*Growing greens with LED lights in the greenhouse at Chena Hot Springs —Photo © Ken Meter, 2014*

# Building Food Security in Alaska

By Ken Meter and Megan Phillips Goldenberg
Crossroads Resource Center
Minneapolis

July 28, 2014

Commissioned by the Alaska Department of Health and Social Services,
with collaboration from the Alaska Food Policy Council

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# List of People Interviewed

| First | Last | Organization | Location |
|---|---|---|---|
| Brian | Adams | Photographer | Anchorage |
| Leif | Albertson | UAF Extension | Bethel |
| Tim | Andrew | Assoc. of Village Council Presidents | Bethel |
| George | Apataki | Subsistence hunter | St. Lawrence Island |
| River | Bean | Farmer | Palmer |
| Sarah | Bean | Farmer | Palmer |
| Jennifer | Becker | Pioneer Produce of the North Pole | Fairbanks |
| Carolina | Behe | Inuit Circumpolar Council Alaska | Anchorage |
| Suzan | Benz | NASS Alaska | Anchorage |
| Desiree | Bergeron | Alaska Native Tribal Health Consortium | Anchorage |
| Andrea | Bersamin | Center for Alaska Native Health Research | Homer |
| Kenny | Brunette | Ryan Air / Northern Air Cargo | Nome |
| Zachariah | Bryan | Tundra Drums | Bethel |
| Nate | Burrell | Mat Valley Meats | Anchorage |
| Ed | Buyarski | Edible Landscaping | Haines |
| John | Campabello | Middle Way Restaurant | Anchorage |
| Patricia | Campabello | Middle Way Restaurant | Anchorage |
| Ralph | Carney | Alaska Chip Company | Anchorage |
| Laura | Cole | Kitchens of Camp Denali | Denali |
| Danny | Consenstein | Director, Alaska Farm Services Admin. | Palmer |
| Kate | Consenstein | Alaska Seafood Marketing Institute | Anchorage |
| Eric | Cook | Chena Hot Springs greenhouse (grower) | Chena |
| John | Dart | Manley Hot Springs Produce | Manley Hot Springs |
| Alex | Davis | Farmer | Palmer |
| Jacob | Davis | Middle Way Restaurant | Anchorage |
| Ann | Davis | Reindeer herder | Nome |
| Bonnie | Davis | Reindeer herder | Nome |
| Timothy | Doebler | UAA - Culinary Arts, Hospitality, Diet | Anchorage |
| Rachel | Donkersloot | Alaska Marine Conservation Council | Anchorage |
| Chris | Dubois | Artic Roots Farm | Fairbanks |
| Cara | Durr | Alaska Food Coalition | Juneau |
| Toni | Ellingworth | Norton Sound Health Corp. | Nome |
| Johnny | Ellis | State Senator | Juneau |
| Cecil | Ellsworth | Entrepreneur | Wasilla |
| Mike | Emers | Rosie Creek Farms | Fairbanks |
| Julie | Emslie | Fairbanks Econ. Devel. Corp. | Fairbanks |
| Oliver | Evans | Charlie's Produce | Anchorage |
| Eddie | Ezelle | Mat-Su Food Bank | Wasilla |
| Joshua | Faller | Alaska Pacific University | Palmer |
| Gary | Ferguson | AK Native Tribal Health Consortium | Anchorage |
| Greg | Finstad | Dir., Reindeer Research Center UAF | Fairbanks |
| Ed | Fogels | Alaska DNR; Governor's Working Group | Juneau |
| Rose | Fosdick | VP Natural Resources, Kawerak | Nome |

| First | Last | Organization | Location |
|---|---|---|---|
| Wally | Frank | Angoon Community Council | Angoon |
| Kevin | Frank | Angoon Community Council | Angoon |
| Tracy | Gagnon | Sitka Fish to School | Sitka |
| Adam | Galindo | Owner, Taco Loco Products | Anchorage |
| Dan | Gillikin | Kuskokwim Native Assoc. | Aniak |
| Tom | Gray | Reindeer Herders Assoc. | Nome |
| Louis | Green | Gardened at warm springs | Nome |
| Bryant | Hammond | Kawerak | Nome |
| Michael | Hanzuk | Alaska Dept. of Commerce | Anchorage |
| Kevin | Harnter | U.S. Postal Service | Washington DC |
| Pamela | Hatzis | La Bodega | Anchorage |
| Lia | Heifitz | Food systems researcher | Juneau |
| Bree | Hockersmith | The Bridge | Anchorage |
| Jason | Hoke | Director -- Copper Valley Development | Copper Valley |
| Patrick | Hoogerhyde | The Bridge | Anchorage |
| Albert | Howard | Angoon Community Council | Angoon |
| Ken | Hoyt | SEARHC | Wrangell |
| Winona | Huffman | (Tula) | Nome |
| Paul | Huppert | Palmer Produce | Palmer |
| Melissa | Hyer | Bear Tooth Café | Anchorage |
| Natalie | Janika | Bear Tooth Café | Anchorage |
| Bill | Johnson | Johnson's Family Farm | Fairbanks |
| Erik | Johnson | Division of Agriculture | Anchorage |
| Albert | Johnson | Norton Sound Econ. Devel. Council | Nome |
| Sandra | Johnson | Alaska State Library Historical Collection | Juneau |
| Donna | Jones | Eggs to Elders program | Igiuig |
| Seth | Kantner | Fisher, gardening instructor, writer | Kotzebue |
| Bernie | Karl | Chena Hot Springs | Chena |
| Miriam | Karlsson | UAF School Nat Resources | Fairbanks |
| Rob | Kinneen | Snowglobe LLC; Fresh 49 | Anchorage |
| Carolyn | Kinneen | Fresh 49 | Anchorage |
| Marylynne | Kostick | Alaska Dept. of Fish & Game | Anchorage |
| Betsy | Kunibe | Anthropologist | Juneau |
| Will | Kyzer | Anchorage Econ. Devel. Corp. | Anchorage |
| Lorinda | Lhotka | Alaska Dept. Environmental Conservation | Fairbanks |
| Bob | Lochmann | U.S. Postal Service | Anchorage |
| Dan | Martin | Wild Ovens (bakery) | Juneau |
| Bill | Matthews | ANICA | Nome |
| Pete | Mayo | Spinach Creek Farm | Fairbanks |
| Lynn | Mayo | Spinach Creek Farm | Fairbanks |
| Chris | McDowell | McDowell Group | Juneau |
| Mike | McNally | Alaska Commercial Co. | Nome |
| Nancy | Mendenhall | Retired UAF official | Nome |
| Vera | Metcalf | Walrus Commission | Nome |

| First | Last | Organization | Location |
|---|---|---|---|
| Tim | Meyers | Meyers Farm | Bethel |
| Michael | Miller | Food Bank of Alaska | Anchorage |
| Nick | Mink | Sitka Salmon Shares | Sitka |
| Matt | Moser | Office of Sen. Ellis | Juneau |
| George | Nelson | Angoon Community Council | Angoon |
| Christine | Nguyen | Office of Economic Development | Anchorage |
| George | Noongwook | Whaling Commission | St. Lawrence Isl. |
| Joe | Orsi | Farmer | Juneau |
| Maria | Papp | Bender Mountain Farm | Fairbanks |
| Jo | Papp | Bender Mountain Farm | Fairbanks |
| Audrey | Paule | Summit Spice & Tea | Anchorage |
| Heather | Payenna | King Island Native Community | Nome |
| Benjamin | Payenna | King Island Native Community | Nome |
| Micah | Phillips | United States Coast Guard | Alameda, CA |
| Jeannie | Pinkleman | Delta Meats | Fairbanks |
| Heidi | Rader | UAF Extension & Tanana Chiefs Conf. | Fairbanks |
| Paul | Raphael | Subsistence hunter | Emmonak |
| Leo | Rasmussen | Former Mayor | Nome |
| Tyler | Rhodes | Norton Sound Seafood Products | Nome |
| John | Ross | Seamonster Seafoods & Sweet Meats | Juneau |
| David | Rupert | U.S. Postal Service | Denver |
| Lisa | Sadleir-Hart | Dietician | Sitka |
| Rhonda | Sargent | UAF Extension | Bethel |
| Lisa | Sauder | Bean's Cafe / Children's Lunchbox | Anchorage |
| Gay | Sheffield | UAF Coop Extension Nome | Nome |
| Christie | Shell | Calypso Farms & Ecology Center | Fairbanks |
| Sarah | Shimer | Inst. For Circumpolar Health Studies | Anchorage |
| Milan | Shipka | UAF Extension | Fairbanks |
| Tim | Smith | Raises salmon in warm springs | Nome |
| Darren | Snyder | UAF Extension | Juneau |
| Cassandra | Squibb | Copper River Salmon | Anchorage |
| Bill | St. Pierre | HomeGrown Market | Fairbanks |
| Brad | St. Pierre | Fairbanks Coop Market | Fairbanks |
| Sky | Starkey | Attorney | Bethel |
| Jim | Stotts | Inuit Circumpolar Council Alaska | Anchorage |
| Ernie | Swanson | U.S. Postal Service | Seattle |
| Linda | Swarner | Kenai Peninsula Food Bank | Soldotna |
| Megan | Talley | Alaska Pacific University | Palmer |
| Geran | Tarr | State Representative | Juneau |
| Cheryl | Thompson | Garden instructor | Nome |
| Andrew | Thoms | Sitka Conservation Society | Sitka |
| Dave | Thorne | Delicious Dave Thorne | Anchorage |
| Roberta | Townsend | Kodiak Archipelago Rural Leadership | Kodiak |

| First | Last | Organization | Location |
|---|---|---|---|
| Kathi | Tweet | UAF Coop Extension Nome | Nome |
| Kari | Vandelden | UAF Cooperative Extension Service | Nome |
| Ben | VanderWeele | VanderWeele Farms | Palmer |
| Francois | Vecchio | Francois Vecchio Meats | Anchorage |
| Libby | Watanabe | SEARHC | Juneau |
| Carlyle | Watt | Fire Island Bakery | Anchorage |
| Jon | Wehde | NW Arctic School District-Kotzebue | Kotzebue |
| Jeff | Werner | Chena Hot Springs greenhouse | Fairbanks |
| Tom | Williams | Farmer | Palmer |
| Cameron | Willingham | UAF School Natural Resources | Fairbanks |
| Susan | Willsrud | Calypso Farms & Ecology Center | Fairbanks |
| Keith | Wilson | Commercial fisherman | Naknek |
| Travis | Woodbury | Angoon Community Council | Angoon |
| Fritz | Wozniak | Huffman Ranch | Fairbanks |
| Bryce | Wrigley | Farmer; Alaska Farm Bureau | Delta |
| Louisa | Yanes | AK Farmland Trust | Palmer |
| Tom | Zimmer | Calypso Farms & Ecology Center | Fairbanks |
| Allen | Zuboff | Angoon Community Council | Angoon |
| | | Hanson's Grocery | Bethel |
| | | Sullivan's Grocery | Bethel |
| | | Alaska Commercial | Bethel |

The authors would like to extend special thanks to the following for their exceptional assistance in researching and preparing this report:

- Diane Peck
- Franci Havemeister
- Amy Pettit
- Darren Snyder
- Angoon Community Council
- Danny Consenstein
- Kari Vandelden
- Mike Emers
- Susan Willsrud
- Rachel Donkersloot
- Leif Albertson
- Tim Meyers
- Craig Gerlach
- Marylynne Kostick
- Rob and Carolyn Kinneen
- Elanor Bomstein
- Nick Wojciak

## Biographies of Principal Researchers

**Kenneth A. Meter**, MPA, president and principal executive officer of Crossroads Resource Center, holds 43 years' experience in inner-city and rural community capacity building. As one of the most experienced food system analysts in the U.S., he integrates market analysis, business development, systems thinking, and social concerns. He has performed statewide food-system assessments for South Carolina (for the state departments of agriculture and commerce); Pennsylvania (for the Pennsylvania Association for Sustainable Agriculture); Mississippi (for Winrock International and the Mississippi Food Policy Council) Indiana (for the Indiana State Department of Health); for Ohio (University of Toledo Urban Affairs Center); and Minnesota (Blue Cross Blue Shield Center for Prevention). His "Finding Food in Farm Country"™ studies have promoted local food networks in 100 regions in 36 states and the Canadian province of Manitoba. He is currently engaged with a national team convened by Colorado State University to produce a USDA toolkit for measuring economic impacts of community foods initiatives. He also served as a consultant to the Illinois Public Health Institute, measuring the economic impacts of institutional food purchasing, under a contract from the Centers for Disease Control and Prevention. He previously studied agricultural policy in Alaska. As coordinator of public process for the City of Minneapolis Sustainability Initiative, he guided over 85 residents in creating a 50-year vision for the city including sustainability measures. He served as an advisor for the USDA Community Food Projects including managing the proposal review panel, and serves as a contributing editor to the *Journal of Agriculture, Food Systems, and Community Development,* where he has written about local economic multipliers. He has written in-depth literature reviews covering economics of size, and serves as a reviewer for three academic journals internationally. Meter convened and co-chaired the Community Economic Development Committee for the former Community Food Security Coalition. He has worked extensively on community development issues in inner-city settings. Meter taught economics at the University of Minnesota, and at the Harvard Kennedy School. He is an Associate of the Human Systems Dynamics Institute, and serves as a member of the Systems Technical Interest Group of the American Evaluation Association. He has given over 400 presentations across the U.S. and internationally on local foods issues.

**Megan Phillips Goldenberg**, MS, Associate at Crossroads Resource Center and Principal of New Growth Associates, is most interested in the intersections of public policy, food systems, and community development. She endeavors to work in an outreach and community building capacity in order to create and maintain a sense of place through better science and informed decision-making. Megan holds a Master's degree in Agricultural and Natural Resource Economics from Colorado State University. Her coursework emphasized Public Policy and Community Economic Development. Through her graduate research, Megan worked with Be Local Northern Colorado, the Northern Colorado Regional Food System Assessment, Boulder County's Building Farmers Market Track program, and the Building Farmers in the West Beginning Farmer and Rancher Development Program. She then worked for WPM Consulting in Boulder, Colorado as a Food Systems and Policy Associate. At WPM Consulting, she assisted with the development and initial execution of the Colorado Food Systems Advisory Council and provided research support for three county and three regional food system assessments (including metro Denver and rural Colorado) while facilitating community projects focused on increasing healthy eating and active living through sound policy and planning. In her spare time, Megan co-founded and co-directed The Growing Project, a 501(c)(3) nonprofit that promotes the value of a strong, diverse, and just local food system to all residents of Northern Colorado through direct agricultural experiences, education, and advocacy.

# Executive Summary

The most critical concern Alaskans hold for the future of food is the security of its food supply. 95% of the $2 billion of food Alaskans purchase[1] is imported — meaning $1.9 billion leaves the state each year as Alaskans eat. Moreover, this food is shipped through long supply chains. Essential items arrive by airplane, barge, and truck from Mexico, Europe, Asia, and the Lower 48.

To name only one glaring example: Alaska Food Policy Council (AFPC) Town Hall participants expressed deep frustration that even when they want to purchase Alaska seafood, they discover it has been shipped to Seattle for processing, and then shipped back to their local market, so it hardly seems to be a local purchase any more.

**Alaskans spend $1.9 billion each year buying food produced outside of the state.**

Since both production and transportation of this imported food is energy-intensive, Alaskans expressed great concern that as the price of imported fuel rises, the state will face great difficulty in obtaining food for its people.

The main source of local food in the state of Alaska today is subsistence and personal use gathering — which together account for food worth about $900 million per year. Most Alaskans catch some of the fish they eat, or give away or barter for meat hunted in the wilds. Yet for some rural villages, our sources said, subsistence accounts for 80% or more of the annual diet; for urban dwellers, the figure is more like 10%. Many Alaskans, both urban and rural, told us that as long as they can get ample supplies of wild foods, they would prefer not to buy meat and fish at the store: its quality is viewed as inferior. Yet many rural Alaskans have moved away from country foods toward store-purchased.

**The main source of local food in the state of Alaska today is subsistence and personal use gathering.**

While Alaskans have long grown food for themselves, local agriculture has failed to realize the potential many had hoped it would attain. Early initiatives to become self-sufficient for food floundered. Larger efforts to develop agricultural settlements have failed to meet their founders' hopes. State funds to promote farm production have often spiraled into mismanagement. Some of the state's best farmland is now developed into urban areas.

Farmers consistently find that their costs of production are higher in Alaska due to higher living costs, and the need to transport essential inputs long distances from other places. Labor costs are also higher here. With the advent of air travel and more efficient trucking, it became less expensive to haul food from the Lower 48 to Alaska than to grow it here.

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[1] ISER calculates this total to be $2.5 billion. The more conservative figure was used. Travelers in Alaska, of course, also purchase substantial amounts of food that are not included in these totals.

Today, supermarkets in Alaska feature many of the same gourmet foods that can be obtained in any urban area of the U.S. — yet with added delivery costs.

A once-thriving dairy industry has been decimated by imports from Washington State. Most Anchorage restaurants feature meat that was raised in the Lower 48. The state's hopes to mount a barley industry confront the reality that farmers in the Lower 48 can produce the grain at one-quarter of the cost of Delta Junction farms.

**With the advent of air travel and more efficient trucking, it became less expensive to haul food from the Lower 48 to Alaska than to grow it here. This makes the state deeply dependent on oil for its food supply.**

More than $2 billion of seafood is exported to distant markets, increasingly Japan and China. The processors who add value to the harvest are often located in Seattle, so Alaska obtains less benefit from its own seafood than it deserves.

Food is a $5 billion business in Alaska, yet one that supplies food to outside vendors and imports food from outside vendors. Our sources could count only a half dozen manufacturers that focus their efforts on feeding Alaskans.

Meanwhile, the Native population that once so effectively fed itself finds itself caught up in a changing society. As Natives have adopted a processed-food diet, many have had health troubles. External changes (rising fuel costs, changing weather, flooding, bad ice, changing migration patterns) are making it difficult for families to harvest traditional foods. Hunger has become a larger concern. Native youth are less likely to gain skills in subsistence harvesting.

**Small farms have begun to offer foods directly to nearby consumers. The $2.2 million of food that these farmers sell rivals the value of the state's potato crop, the state's third-most important food product. Direct sales rose 32% over the past five years, and now run at 13 times the national average.**

Yet Alaskans have been intrepid in coping with these changes. Small farms have begun to offer foods directly to nearby consumers. The $2.2 million of food that these farmers sell rivals the value of the state's potato crop, the state's third-most important food product from farms, after vegetables and miscellaneous livestock. Direct sales rose 32% from 2007 to 2012, running at 13 times the national average.

Yet these national averages include all farm commodities raised in each of the states; since Alaska farmers produce only $11.8 million of food that is destined for human consumption, direct sales bring in *one of every five dollars* earned by farmers who grow food for humans.

**Direct sales bring in one of every five dollars earned by farmers who grow food for humans.**

Community initiatives to expand gardening programs, convey food growing, processing, and cooking skills, and patient efforts to reintroduce traditional foods have flourished as Alaskans take steps to secure a more certain food supply. USDA states it has given out $4 million in grants to Alaskans who build high tunnels to grow food. Several greenhouses operate using surplus heat from a nearby building, or hot spring. Farmers across the state are launching boldly innovative farms. Fishers are selling high-quality fish direct to customers in Alaska cities. The state has allocated millions of dollars so schools could buy Alaska grown products. Manufacturers are focusing on markets in Alaska.

Many of these initiatives have emerged because someone with considerable means spent their own money to create innovation. Others have relied upon public funds or foundation grants to launch program. Hundreds more operate at a low level, using sparse resources.

Significantly, the most successful of these efforts have been small in scale. All would be stronger if Alaska created lasting infrastructure to support local foods. This is a necessity, since food transportation routes have been an afterthought in state planning: at first these routes were dictated by the mining industry, and now by public investment in highways, railroads, and airports.

**Significantly, the most successful of these local foods efforts have been small in scale. All would be stronger if Alaska created lasting infrastructure to support local foods.**

Small steps could have important impact. If Alaska wanted to ensure that its entire population could eat Alaska-grown produce, the state could set aside 4,700 acres for all the potatoes that would be needed, 200 acres for carrots, 200 more acres for cabbage, and 600 acres for lettuce.

This emergent activity must be supported by the state of Alaska. We recommend the following key steps:

- Foster subsistence harvesting and related skills
- Build personal capacities in agriculture
- Expand agriculture and gardening
- Build infrastructure that supports local food production
- Adopt state policy that supports local food production
- Focus consumer attention on staying loyal to Alaska-grown food
- Expand food processing and manufacturing for in-state markets
- Strengthen internal food distribution networks
- Strengthen statewide transparency and coordination

More details on these steps will be found in the Recommendations section, page 141.

**Figure 1: Land Cover in Alaska**

*Map by Adam Cox, Territory Heritage Resource Consulting, Anchorage, Alaska*

# Finding Food in Alaska

For at least 12,000 years, the bountiful wilderness and oceans that make up and surround Alaska have supported human life. The Native populations who settled here created lasting cultural rituals and expert art to praise this bounty. The necessity of eating was transformed into a cause to bring families and clans together for harvest, hunting, and celebration. Any food harvested was widely shared.

**The necessity of eating was transformed into a cause to bring families and clans together for harvest, hunting, and celebration. Any food harvested was widely shared.**

Five thousand years after Native peoples arrived after migrating across the Bering Land Bridge, agriculture took hold in human society.

At some point, whether through indigenous trading routes or Spanish colonists, potatoes were conveyed from South America for cultivation in Tlingit seaside gardens (Zhange, et al., 2010, p. 14).[2] By the 1700s, Native populations were estimated at least 60,000 to 80,000 (Alaska Humanities Forum, n.d.), with the largest populations scattered along the coast. Eventually, Russian settlers brought gardening techniques with them, planting provisions for themselves in scattered settlements in the Southeast, but still depending on food imported from their mother country (Miller, 1975, p. 17). Forts and trading posts were sited in coastal communities; interior Alaska remained largely untouched by Russian settlers (Alaska Humanities Forum, n.d.).

The naturalist John Muir, wide-eyed at the primal wonders of Southeast Alaska during his 1879 journey up the coast, documented four-foot high grass akin to bunch grass: "I never saw finer or more bountiful pasture," he exclaimed, adding that roaming caribou herds grew "fat" from grazing on "thousands of square miles of this prairie-like region drained by tributaries of the Stickeen, Taku, Yukon, and Mackenzie Rivers." He had only one reservation: "Were it not for the long winters, this would be capital stock country, equaling Texas and the prairies of the old West" (Muir, 1915, pp. 70-71).

**"I never saw finer or more bountiful pasture….Were it not for the long winters, [Alaska] would be capital stock country, equaling Texas and the prairies of the old West."**
**— John Muir, 1915**

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[2] Zhang, *et al* refer to Haida histories that describe potatoes being traded prior to Columbus' explorations (p. 15); and also refer to a Spanish fort that raised potatoes as early as 1791 (p. 14).

Muir further wrote about Kake tribes in Southeast Alaska who nurtured "small bits of cultivation here and there, patches of potatoes and turnips, planted mostly on the cleared sites of deserted villages. In spring the most industrious families sailed to their little farms of perhaps a quarter of an acre or less, and ten or fifteen miles from their villages. After preparing the ground, and planting it, they visited again in the summer to pull the weeds and speculate on the size of the crop they were likely to have to eat with their fat salmon" (Muir, 1915, p. 104).

He sampled heavy boughs laden with berries, and even took time to complain about taverns along the Cassiar gold trail, established to service gold seekers. "The meals are all alike — a potato, a slice of something like bacon, some gray stuff called bread, and a cup of muddy, semi-liquid coffee….The bread was terrible and sinful" (Muir, 1915, p. 73).

Muir's visit, then, encapsulated some of the issues that plague Alaskans today: living in a bountiful land, harvesting wild food when possible, yet importing more meager fare than sufficed for those with commercial dreams. Yet the history of "market economics" in food has not been kind to Alaska, either, as we shall see.

Still, bold visions persisted. An 1897 congressional study found that the state had agricultural potential, and urged the development of agricultural experiment stations. The next year, the Sitka station opened, headed by the Danish emigrant C. C. Georgeson. It would ultimately plant 46 varieties of apples and crab apples (Papp & Phillips, 2007, p. 10). One year later, Kenai opened an experiment station. By the turn of the century, an outpost station was launched at Rampart, one hundred miles below the Arctic Circle. Then experiment stations opened at Copper Center, Kodiak, and finally, Fairbanks and Matanuska (Miller, 1975, p. 17; Gorman, 1998; Lewis & Pearson, 1998).

Georgeson's vision was flush with optimism for the new territory: "He estimated that Alaska could furnish 320-acre homesteads to 200,000 families and support a population of at least three million," (Miller, 1975, p. 20; *See also* Hanscom, 1998). It was a tragically flawed vision that assumed Native families would be forced into extinction so that land would be freely available to Whites. As UAF historian Orlando Miller points out, it also overlooked the high costs of production and transportation. These issues continue to compromise Alaskan food security today. Yet as an expression of farming potential, it differs markedly from current visions in the state.

**"Georgeson…estimated that Alaska could furnish 320-acre homesteads to 200,000 families and support a population of at least three million."**

Middleton Smith, writing in the *National Geographic*, lauded the results of an International Polar Expedition to Point Barrow in 1881-1883. He recalled that seeds were "planted within two hundred yards of the Arctic Ocean, in soil that had been thawed to a depth of three to nine inches." In the "continuous summer sunlight, vegetables germinated, matured, and were harvested in twenty-seven days." Smith concluded that the northern coastal area was

"nature's garden…the most extensive, the least cultivated, and the most productive of any on the American continent" (Miller, 1975, p. 20; Smith, 1901).

Later evaluations of Alaska's agricultural potential identified 1-3 million acres as suitable for cultivation, and another 3-5 million acres for grazing (Little, 1961). This estimate was revised down to less than a million crop acres, approximately 9 million grazing acres, and 50 million tundra acres for reindeer (Johnson & Jorgenson, 1963). However, further years of soil surveying gave a newer estimate of 59 million acres of arable land (Mills, 1994).

The reality of the agriculture that actually developed in Alaska was somewhat less sweeping, yet still grounded in a pragmatic reality. It wasn't until gold was found in the Tanana Valley that mining and agriculture developed on lands suitable to both enterprises (Lewis & Pearson, 1998). A strong cluster of farmers settled into the Tanana Valley — many of them farming on land that is now occupied by the city of Fairbanks. By September, 1909, farmers near Fairbanks shipped forty-six different species of grass, grain, vegetables, fruits, cattle, hogs, poultry, and goats to New York City in an effort to showcase Alaskan Agriculture at the City Investment Building (Papp & Phillips, 2007, pp. 7-8). The exhibit featured five varieties of chickens, and six varieties of potatoes.

Tanana Valley farmers unwittingly echoed John Muir's praise of the natural pastures found in the state: The native Red Top hay, it was said, "grows wild, luxuriantly over thousands of square miles, excellent for horses and cows," (Papp & Phillips, 2007, pp. 7-8). The newly fashioned experiment station had planted 32 potato varieties (Papp & Phillips, 2007, p. 10). The riverboat *Robert Kerr* served as a mobile cold-storage unit that could shuttle food from town to town (Papp & Phillips, 2007, p. 12).

Agricultural statistics published in 1912 for the Interior listed production that would be impressive even in the mechanized era: 46 gardeners and farmers had produced $100,000 worth of crops and livestock that year. This would be worth about $2.4 million in 2014 dollars. Statisticians totaled 20 tons of potatoes, 69 tons of cabbage, 32 tons of carrots, 16 tons of tomatoes, one ton of peas, four tons of beets, one ton of onions, and 8,150 tons of feed grains —oats, barley, and wheat (Papp & Phillips, 2007, p. 15).

Yet the following year was not a good one for agriculture in the Tanana Valley. Although farmers had begun to organize the Tanana Valley Produce Growers Association in an effort to reach out to wider markets and sell larger quantities, a volcanic explosion had clouded the skies, leading to a cold cropping season. Snow fell on August 27. Farmers in the rest of the U.S. were having banner years, but Fairbanks farmers made only meager harvests in 1913. The annual agricultural fair was canceled.

In both 1916 and 1917, food supplies were dangerously low at winter's end in Fairbanks. Farmers and businessmen began to commit themselves to collaborating to achieve self-sufficiency in food production. Importantly, the farmers formed a collaborative with local businessmen, hoping to create a more stable food enterprise in Fairbanks. "Town leaders pledged to support Tanana Valley agriculture," Papp and Phillips note (2007, p. 18). A Farmers' Bank would be formed. An expanded farmers' organization, the Tanana Valley Agricultural Association, hoped the U.S. military would purchase 60,000 tons of potatoes,

and negotiated with one railroad in the Lower 48 to showcase Alaska-grown baked potatoes in their dining cars.

**In 1916 and 1917, Farmers and businessmen in Fairbanks began to commit themselves to collaborating to achieve self-sufficiency in food production….Yet these hopes were never realized.**

By 1921, the *Fairbanks Daily News-Miner* could report that sales of agricultural products had nearly doubled, to $192,000, but that supply still could not meet local demand. The report counted 1,920 acres under cultivation (Papp & Phillips, 2007, p. 238). Yet the Farmers' Bank had closed after two years of operation. While some farms continued to thrive, the hopes for self-sufficiency were never realized.

One of the issues plaguing farmers at the time still applies today. Since much of Alaska's development came from various mining and natural resource booms, transportation systems and markets were not built around agricultural systems, but rather around mining. Agriculture has often suffered because transportation routes intended for other uses had to be retrofitted for foodstuffs, giving few if any efficiencies to state farmers (Lewis & Pearson, 1998).

**Since much of Alaska's development came from various mining and natural resource booms, transportation systems and markets were not built around agricultural systems, but rather around mining.**

For the next decade, rural America fell into a severe economic slump. This was a leading cause of the Great Depression, which broke out in 1929 (Meter, 1990). Now food self-sufficiency for the state's population of 60,000 became a concern of territorial officials — not merely the vision for one agricultural valley. One writer noted that Alaska imported $6 million of food each year (Time, 1935). Of course, this figure applied primarily to the 30,000 nonnative people; presumably the Native population of 30,000 or so was largely self-supporting through subsistence activities. Craig Gerlach points out that at this time, Native folks were also actively engaged in hunting wild game for sale to the miners. Caribou and moose were sold in quantity in open-air markets and stores in downtown Fairbanks. Overharvesting of these animals was part of the stimulus for the introduction of game laws, and the move to set aside National Parks (Gerlach, 2014).

Territorial and federal policy makers set about to populate the Matanuska Valley with a colony of farmers. Their intention was to increase food production by settling a group of colonists, drawn primarily from welfare rolls in Minnesota, Michigan, and Wisconsin, where clear-cut forests had left 86 counties impoverished. The idea was to give a small number of families a fresh start, relieving the demand on services in their home counties.

At the time, there were already 117 occupied farms in the Matanuska Valley (Miller, 1975, p. 32), but most of them were not even being farmed. Employment in nearby copper mines had plummeted from 570 in 1929 to 143. Many former miners eked out a bare bones living by prospecting and hunting.

A thorough history of the colony and its ups and downs is available in Miller's book (1975). Over 200,000 acres were set aside for the development of the colony, of which 80,000 acres were divided into 40-acre parcels and sold through a lottery system. The federal government paid for the construction of barns and houses, paid to move families and their belongings, and sold supplies at cost. The Matanuska Valley quickly proved that it could support vegetable farms and dairies, but despite the assistance, the short growing season, isolation, and lack of markets delayed the development of a vibrant industry.

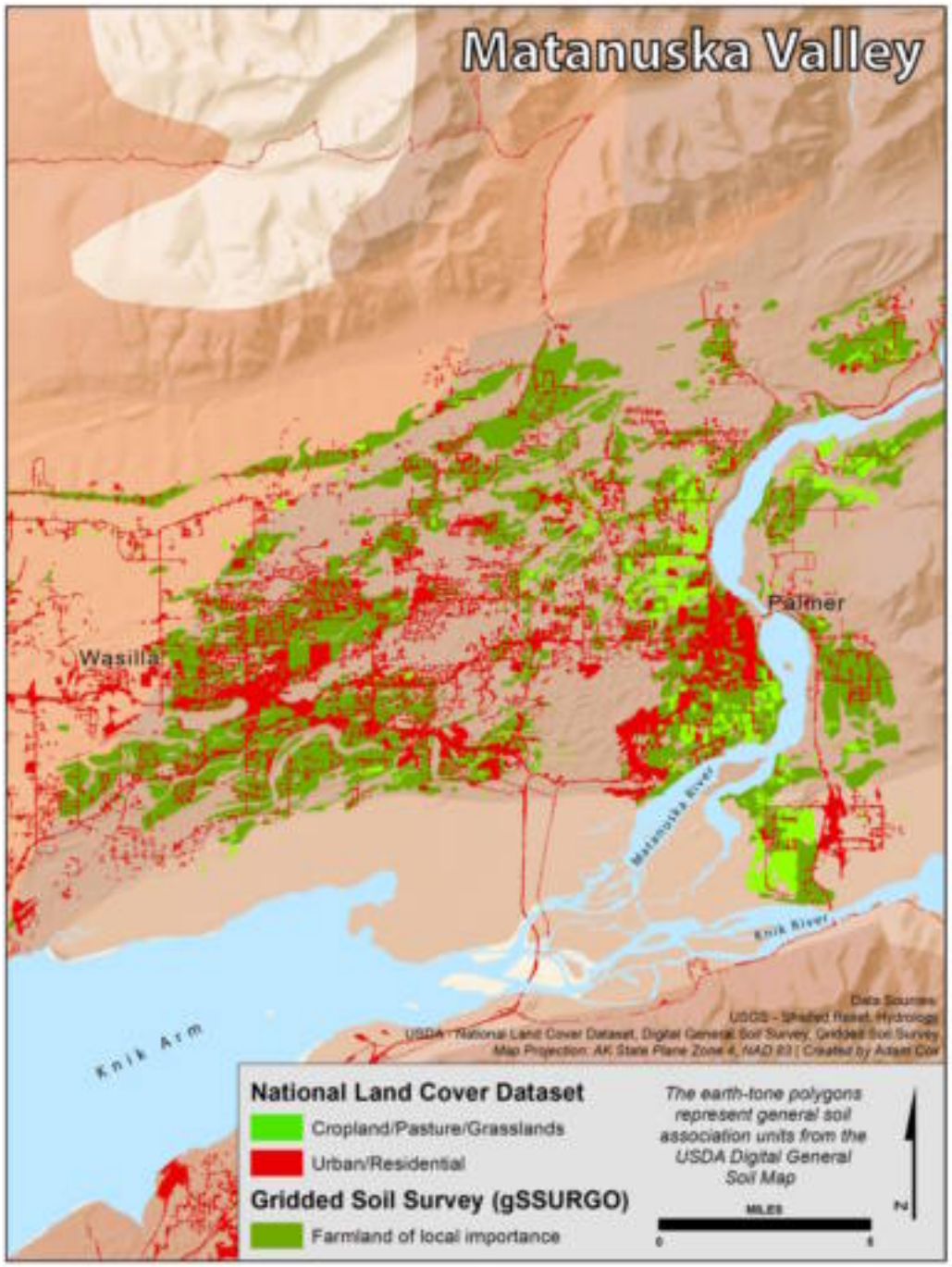
At most 170 families occupied scattered sites on either side of the Matanuska River. Some took over abandoned farm sites, while others had to begin by clearing land anew. A central commons held a school, colony offices, and a store. Colonists were expected to join in collaborative decision-making; a farmers' cooperative was formed to market produce to Anchorage.

All told, the settlement effort cost an estimated $5.4 million in public investment (this is $93 million in 2014 dollars) (Miller, 1975, p. 103), while farmers took on debt that totaled, at one point, about $1.6 million (this is about $27 million in 2014 dollars) (Miller, 1975, p. 127).

**Agriculture developed in a few areas where local markets created by mining, lumbering, or other enterprises made some commercial farming possible.**

Not all of the colonists shared the planners' dream of farming commercially in the Alaskan wilds. For many, it was enough to have a place to live, a garden, and perhaps a job at the mine, driving taxi for their neighbors, or even working for the colony itself (Miller). Some of the more astute colonists seemed to realize that the government needed the overall vision to work more than the individuals did. Many held off on paying back their loans hoping that debts would be reduced — and their hopes came true. Many colonists left altogether — some to head elsewhere in Alaska, others to return to their home states. One of the more ambitious farmers moved closer to markets in Anchorage and built a commercial farm there. (Lundberg, n.d.; Davies, 2007; Hegener, 2012).

Less than five years after the first colonists arrived, half of the families had relocated, although primarily elsewhere in Alaska. Within seven years, Miller adds, the colony had ceased to function as a cooperative enterprise. Many families remained, and some went on to become solidly embedded in the community. Unfortunately, Miller points out that economic stability for the community primarily came about with the expansion of military




*Map by Adam Cox, Territory Heritage Resource Consulting, Anchorage, Alaska. Note that much of the urban development in the region has been built upon former farm sites, or on land with farming potential.*

*Pea field near Palmer. Photo © Ken Meter, 1982.*

bases south of Palmer. Not only did the bases buy food from Valley farmers, they also offered jobs to those who wanted to earn an income stream that was detached from the unpredictability of weather (1975).

Overall though, the colony left an indelible imprint on the Valley. One is a sense of place that few communities have: architectural flourishes even in modern strip malls echo the steeply slanted roofs of Matanuska Colony barns. One scholar noted "the only agriculture of any scale or indication of permanence [in the state] has developed in the Matanuska Valley. This probably developed largely because it came about as part of a total program" (Gazaway, 1960). Reportedly, in the 1940s, the Valley produced half of Alaska's total agricultural output. Several of the families who settled into the Valley for the long haul, whether colonists or not, cultivated potatoes and managed dairies for decades to follow, building large farms that are still under production and supplying Anchorage markets.

**"The only agriculture of any scale or indication of permanence [in the state] has developed in the Matanuska Valley. This probably developed largely because it came about as part of a total program" (Gazaway, 1960).**

Yet even contemporary observers noted that few would be willing to endure the hardships of opening up new land to agriculture, as long as other income opportunities were nearby: "Few potential immigrants to the territory would willingly follow the old pattern of laborious

mastering of the land, subsistence farming, and a generation-long struggle for simple security and comfort. Rather, agriculture would develop in a few areas where local markets created by mining, lumbering, or other enterprises made some commercial farming possible," (U.S. Natural Resources Committee, 1938). In this view, the answer was to maintain close connections between farmers and consumers who had money to spend.

**Alaska's Mixed Success with Dairy**

Dairy industries also formed in the state around the promise of lush pastures and local markets. Although there are reports of dairies among prospectors in Alaska as early as the late 1800s (Alaska Humanities Forum, n.d.), it was the imported dairymen who settled in the Matanuska Valley who gave rise to a bustling dairy industry, led by the state-conceived Matanuska Maid creamery (Matanuska Maid Dairy, 2005). Several dairies also thrived near Delta Junction. In the 1940s, the territorial creamery was transformed into a farmers co-operative (Alaska Humanities Forum, n.d.).

A review of Alaska's agriculture industry in 1967 described milk as "dominating" the industry with a value of $2 million at that time. Milk, hay, and silage accounted for 60% of agricultural output (Francis, 1967). This peak is attributed to a military procurement contract requiring a maximum of 48 hours between pasteurization and delivery, which essentially eliminated the market for imported, processed milk from the Lower 48 (Alaska Humanities Forum, n.d.). Over time, however, the Alaska market was served by imported milk. Innovations in pasteurizing, transportation, and distribution made it more cost-effective for creameries to import fluid milk and process it in-state, and for grocers to import processed milk from the Lower 48 within the given time constraints. This put many Alaskan dairies out of business.

**A review of Alaska's agriculture industry in 1967 described milk as "dominating" the industry with a value of $2 million at that time. Milk, hay, and silage accounted for 60% of agricultural output.**

During the 1970s, an agricultural development plan for Point MacKenzie, west of the Knik arm, was created. The state of Alaska invested more than $120 million ($200 million in 2014 dollars) to create dairy farms on 5,000 acres of land in Point MacKenzie, but abandoned the 15-year long effort in 1992 once farmers became saddled with immense debts. Barley from Delta Junction was intended to feed the dairy cattle (Egan, 1992).

In 1981, 15,000 acres of state lands were sold through a lottery to private owners for the purpose of developing dairy farms. At this time when fluid milk prices were relatively high, many producers believed this was a safe investment. Industry analysts believed that it was possible to supply local markets with milk while consuming growing local supplies for grain. However, by 1983, when farmers nationally began facing a debt crisis, Matanuska Maid defaulted on loans from the Alaskan Agricultural Revolving Loan Fund, a state funded program. Ultimately, the firm filed for bankruptcy. Local milk prices plummeted. In 1986,

the state assumed ownership of the creamery in order to maintain a market for the new dairymen. By 1988 the creamery was back in the black and became a net contributor to the state's economy (Davies, 2007; Matanuska Maid Dairy, 2005).

Yet milk production had peaked in 1986. At that time, the Alaska market supported sixteen local dairies (Davies, 2007) producing 36 million pounds of fluid milk (Caldwell, 2013). Cash receipts peaked a year later, with $13.7 million in sales (adjusted to 2012 dollars) (Economic Research Service, 2012). Shortly after these peaks, however, producers began defaulting on their debt; many farms were foreclosed, and returned back to state ownership (Davies, 2007). Even farms that had not faced foreclosure fell out of production due to difficulties with obtaining land titles. According to one analysis, some of these land tracts should not have been sold in the first place (Lewis & Pearson, 1998). Due to these difficulties, milk supplies started to fall. In the 1990s, Matanuska Maid started importing milk again (Davies, 2007).

**Yet milk production peaked in 1986.**

Although milk production was relatively stable throughout the 1990s and early 2000s, in 2005 Matanuska Maid dipped back into the red. It closed shop by 2007, devastating the local dairy industry at the same point that dairy industries in every other state were also suffering.

The effort was tersely summarized by the *New York Times* after its demise: "Helped by the state development programs, farmers were sold the rights to land they could not legally own and were given a strict time schedule to raise products that nobody wanted to buy (Egan, 1992)."

The *Times* added that "Of 33 lottery winners for the Point MacKenzie operations, only 9 became dairy farmers. Some of the other winners, state officials said, were land speculators hoping to cash in on prime real estate that was within commuting distance of Anchorage.

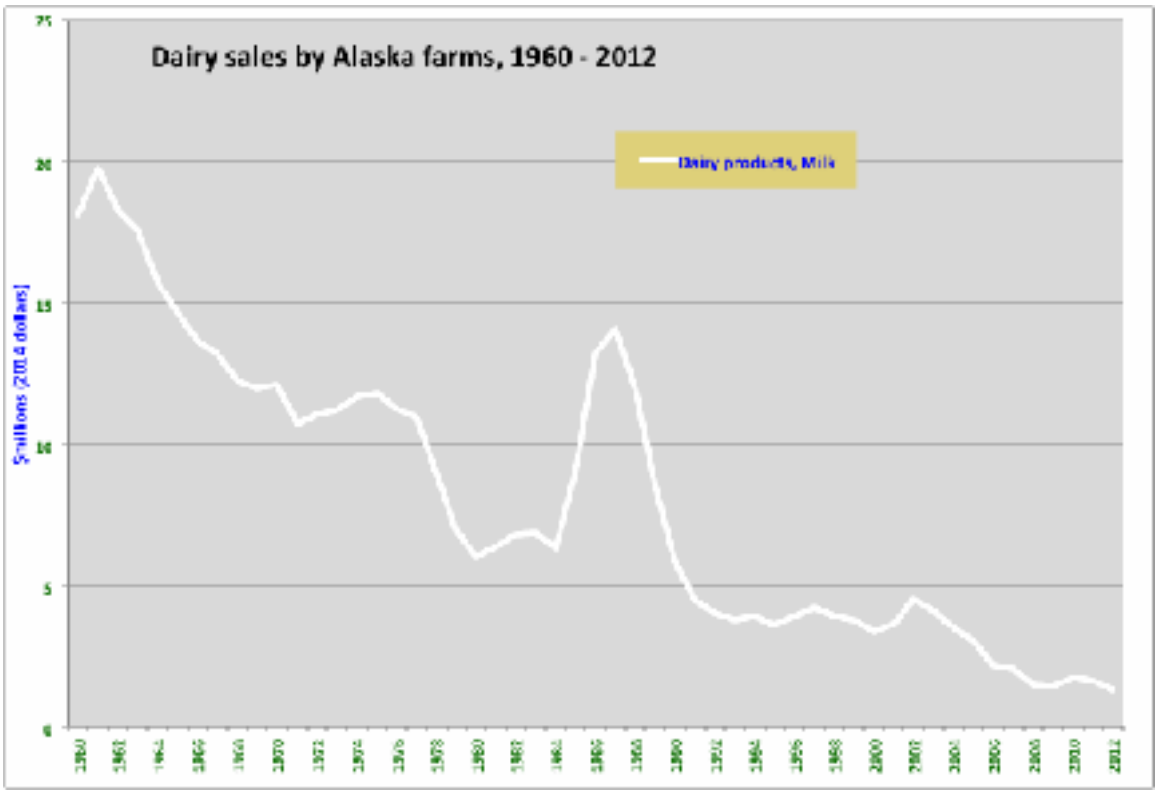
"Some who tried to become dairy farmers never actually bought any cows. But having taken out huge loans from the state to get started, they needed to show something by three years — a deadline all the farmers said was hopelessly unrealistic — or risk default. State inspectors caught some farmers who never had cows borrowing from those who did, moving them from barn to barn."

Ultimately, the project failed, the *Times* concluded, because it was less expensive to ship milk from Seattle than to produce it in-state. At the time a gallon of milk was selling for $3.29 in one Anchorage supermarket, about $1 more than the Seattle price. "The state ended up buying much of the milk it was already paying to produce, and then giving some of it to charity."

**At Point MacKenzie, "Farmers were sold the rights to land they could not legally own and were given a strict time schedule to raise products that nobody wanted to buy (Egan, 1992)."**

While recent development efforts have focused more on commercial and industrial uses of the land, some pastures and forage fields still persist in the region. Nearby farmers caution, however, that the soil is quite shallow in this region, and may not support commercial production over the long haul (*See also* Caster, 2011).

### Chart 1: Dairy Sales by Alaska Farms, 1960-2012




*Source: USDA Economic Research Service*

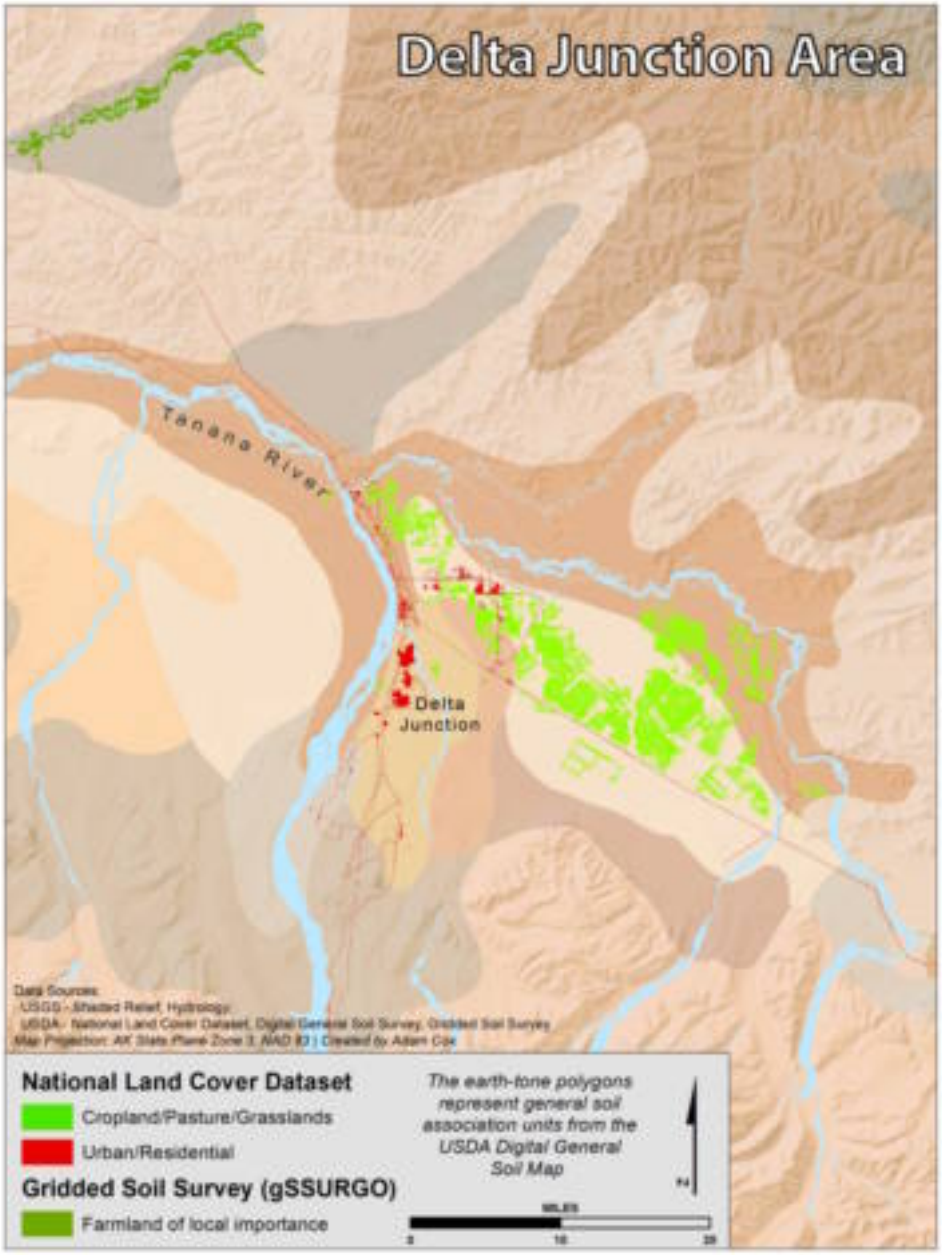
Shortly after Matanuska Maid folded, Matanuska Creamery was born in its image, using state and federal grants and loans. Despite serving as the milk supplier for the Mat-Su Borough School District, this new creamery folded quickly, in December 2012, after defaulting on loans to the state totaling $880,000, and failing to make payments to farmers. Point MacKenzie farmer Wayne Brost, who supplied milk to the plant, recalled, "that plant probably could have handled 10 times the volume that we had. So maybe in the economies of scale, it was overbuilt," (Wisconsin Farmer, 2013). Online dairy forums reveal that several Alaska herdsmen migrated back to the Midwest due to the closing of the prominent creamery (Trytten, 2008).

In 2012, there were only eight dairy farms in the state (Census of Agriculture, 2012), with a total herd of 400 cows (Benz & Mertz, 2013), and only two processors (Wisconsin Farmer, 2013). One dairy, owned by Jean and Bob Havemeister, foreseeing the difficulties the larger Creamery was having, began bottling their own milk at a smaller scale on their farm in the Matanuska Valley. The other dairy is Northern Lights Dairy in Delta Junction. Total milk sales by Alaska farms in 2012 were $1.4 million. More on conditions in the Alaska dairy industry can be found in the Economic Overview, page 47.

*Matanuska Valley farm near Palmer has several generations of farm buildings. Photo © Ken Meter, 2014.*

**Launching Barley Farms from the Forests**

Another wave of agricultural development coalesced around visions of large barley farms in the late 1970s, when state officials responded to a request from the Korean government to purchase or lease as much as 500,000 acres of Alaska land for agricultural use (Anchorage Daily News, 1982). Seeking to work proactively, the Alaska Agricultural Council laid plans to develop barley production, first in the Delta Junction area, and later in Nenana.




*Map by Adam Cox, Territory Heritage Resource Consulting, Anchorage, Alaska*

Barley had shown itself to be a plausible commercial crop in Alaska with $192,000 of sales in 1960 (87,000 bushels worth $1.5 million in 2014 dollars). It has proven a more reliable commercial product in Alaska's cool seasons than other grains, such as wheat, which were formerly grown here.

Yet at the time, Lower 48 farms were selling barley at less than half the Alaskans' cost of production (ADN, 1982), so the prospect that new farm production from Alaska could compete with grains that were already low priced was questionable. Indeed, the hopes for an export industry were based on the notion that one Korean buyer would purchase most of what the state produced. Moreover, the state lacked a grain terminal suitable for transferring barley to ocean-going vessels.

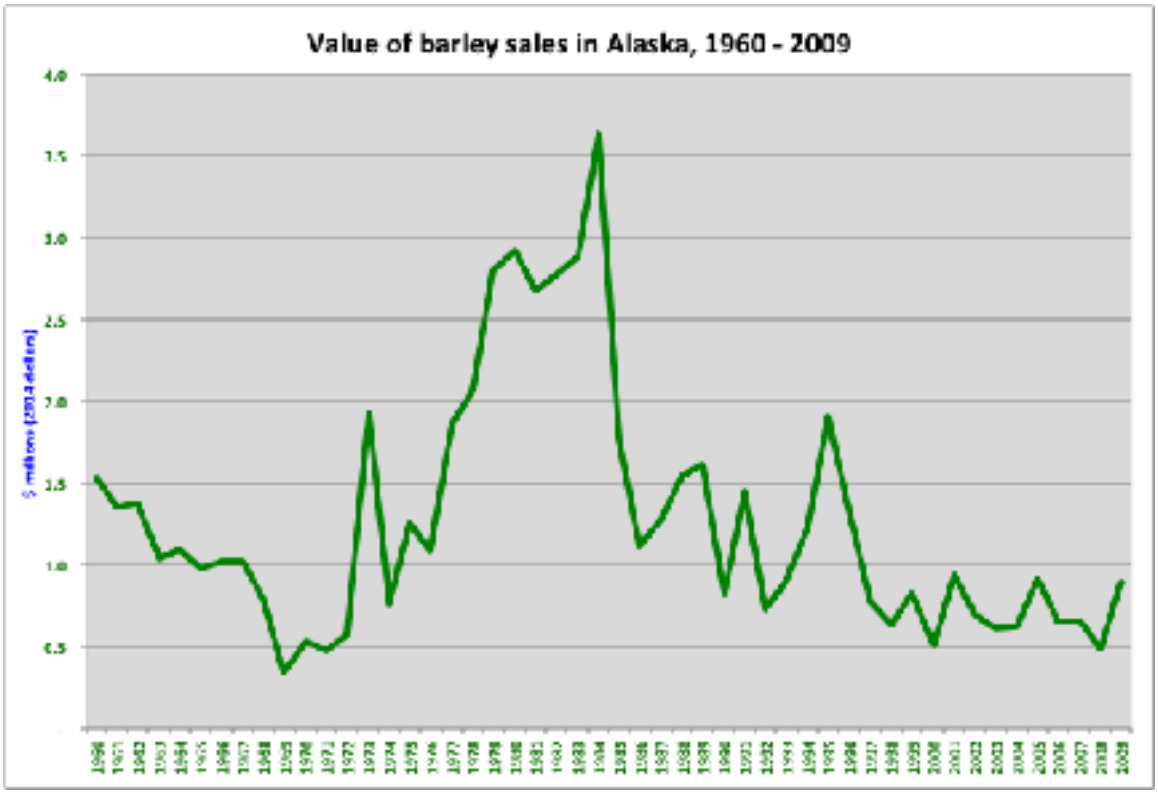
**At the time, Lower 48 farms were selling barley at less than half the Alaskans' cost of production.**

In 1978, the agricultural rights to 60,000 acres in Delta Junction were sold to private owners through a lottery process. Another 24,600 acres were sold in 1981 through auction. Land was cleared and large-scale barley production proceeded through the 1980s. Crop failures, legal issues, and increased in-state demand for grain initially prevented the development of a grain elevator in Seward for export purposes. Then falling global prices and farm failures further delayed the building of export infrastructure. While ultimately a grain terminal was built at Valdez, with nine concrete silos capable of holding 522,000 bushels (City of Valdez, n.d.), production never met expectations (Davies, 2007; Lewis & Pearson, 1998). Yields have hovered around 35 bushels per acre (compared to 65 bushels per acre in the Lower 48 in 2012), but sales peaked at $1.5 million in 1984 ($3.6 million in 2014 dollars), when 500,000 bushels were sold. By the end of the 1990s, only seven of the original thirty-seven landholders in Delta Junction still farmed. The rest had either sold their agricultural rights or had been foreclosed upon by the state (Davies, 2007). By 2012, only $951,000 of barley (212,116 bushels raised on 4,445 acres) were sold by 18 Alaska farmers (2012 Census of Agriculture).

Tragically, as Chart 2 below shows, barley sales for the entire state of Alaska are lower today than they were before the project was launched, once inflation is taken into account, despite the fact that ten times more land is under cultivation today. Essentially, production that used to flourish in the Anchorage area has been displaced to Delta Junction, and its value diminished. The overall impact has been to take land out of production in a zone facing development pressure (near Anchorage), and to move it to a more remote location.

**Essentially, production that used to flourish in the Anchorage area has been displaced to Delta Junction, and its value diminished.**

### Chart 2: Barley Sales from Alaska Farms, 1960-2009




*USDA Economic Research Service*

**In recent years, growers have increased production by raising a more diverse set of crops, not just barley.**

Although most historical accounts report this Delta Junction barley project as a failure, other accounts suggest that it just failed to meet its original goals. Instead the foreclosed farmland was resold to producers with more experience in a diversity of crops, ultimately increasing production but with less discernable impact in one industry (Lewis & Pearson, 1998).

Now farmers in the region are exploring canola production. Yet Gerlach (2014) points out that Chinese investors are also buying land in the Delta Junction area to grow food (primarily potatoes) for Chinese markets.

### Mt. McKinley Meat and Sausage

With the rise of the barley and dairy industries came the need for additional slaughtering facilities. Funds were appropriated for private loans to build two large animal slaughtering facilities. One was built in Fairbanks and eventually redeveloped for fish processing without ever being used for large animal processing. The second facility, Mt. McKinley Meat and Sausage (MMMS), was built in Palmer and opened in 1983. Two years later, it was foreclosed on by the Agriculture Revolving Loan Fund and remained closed until 1987 when the

Department of Corrections opened it up with inmate labor. Since then, the facility has continued to operate as a prisoner rehabilitation and training program, sometimes under the management of the Department of Corrections and at other times under the management of the Division of Agriculture. The facility typically operates at a loss; this deficit has totaled $100,000 per year for each of the past two years. These losses have been covered using subsidies from Agriculture Revolving Loan Fund moneys since 2001. In 2000, 2002, and 2006 attempts were made to transfer the plant to private ownership; however, no qualified proposals were submitted. The Board of Agriculture and Conservation remains committed to maintaining a slaughter facility in South Central Alaska since this provides crucial support to several farm operations and related businesses. The board says it welcomes proposals for transfer to private ownership (Davies, 2007; Nix R., 2009).

**One group of investors had expressed interest in purchasing the processing plant, but caution that this would need to be undertaken as part of a long-term commitment by the state to invest in building up sufficient cattle production that the processing plant could pay for its own operations. An entire system of production, processing, and distribution would need to be created, and this would take many years.**

One group of investors had expressed interest in purchasing the processing plant, revamping the production line, and producing a high-quality Alaska Grown line of gourmet meats primarily for prime restaurants in Anchorage, and for export to the Lower 48 (with lesser cuts directed to Alaska consumers). They caution that this would need to be undertaken as part of a long-term commitment by the state to invest in building up sufficient cattle production that the processing plant could pay for its own operations. An entire system of production, processing, and distribution would need to be created, and this would take many years. The new owners would also require assistance in identifying and reaching viable markets both inside and outside of Alaska. Yet for the time being, these investors appear to have no active interest.

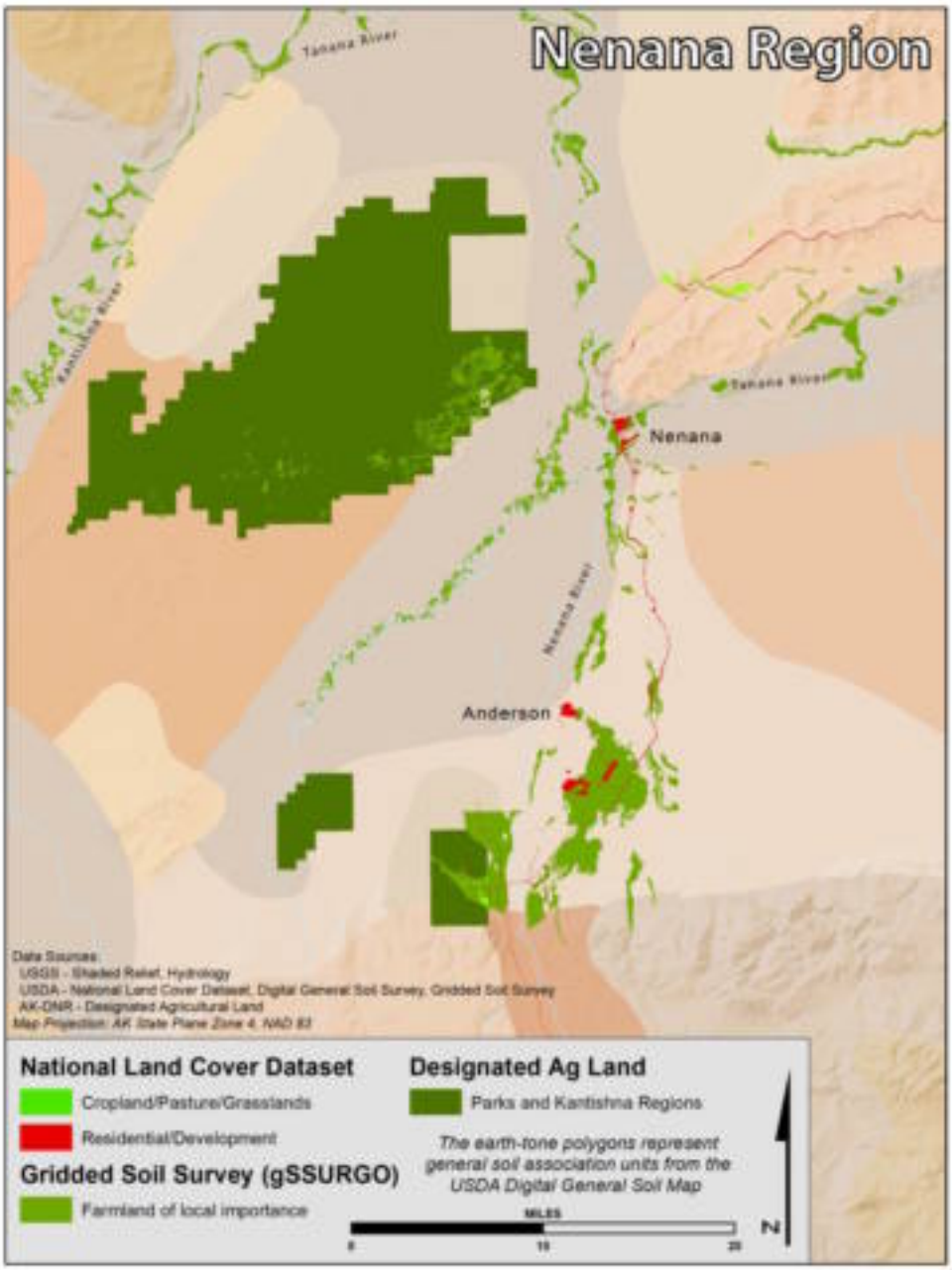
### Nenana-Totchaket Valley

During the 1980s, 175,000 acres of fertile soils were identified by the Soil Conservation District in the Nenana-Totchaket Valley, between Tanana and Kantishna Rivers. A subsequent feasibility study proposed the sale of 75,000 acres for small grain production and frost resistant vegetables, similar to the Delta Junction projects, but funding was delayed until the Delta Junction project could be analyzed. As a result of the delay, the project was never funded (Davies, 2007).

A requisite part of this project was bridge and road development to the remote area. Construction and funding for a road and several bridges west of the City of Nenana is currently underway, 30 years after the initial proposal, with strong support from many stakeholders. Current justifications for this transportation project include the desire to open up prime agricultural lands, to provide access to timber contracts, and to encourage mineral

exploration. The entire plan involves connecting Nenana to Tanana, and eventually to Nome. The Department of Natural Resources may release new agricultural parcels as early as 2015 (Agency of Commerce, Community and Economic Development, 2013).

Development of the property depends upon building a bridge across the river; this is proposed as part of an effort to build a new highway route all the way to Nome; this




*Map by Adam Cox, Territory Heritage Resource Consulting, Anchorage, Alaska*

roadway plan is opposed by many who live in Nome as an unwelcome intrusion of development, mining, and oil interests.

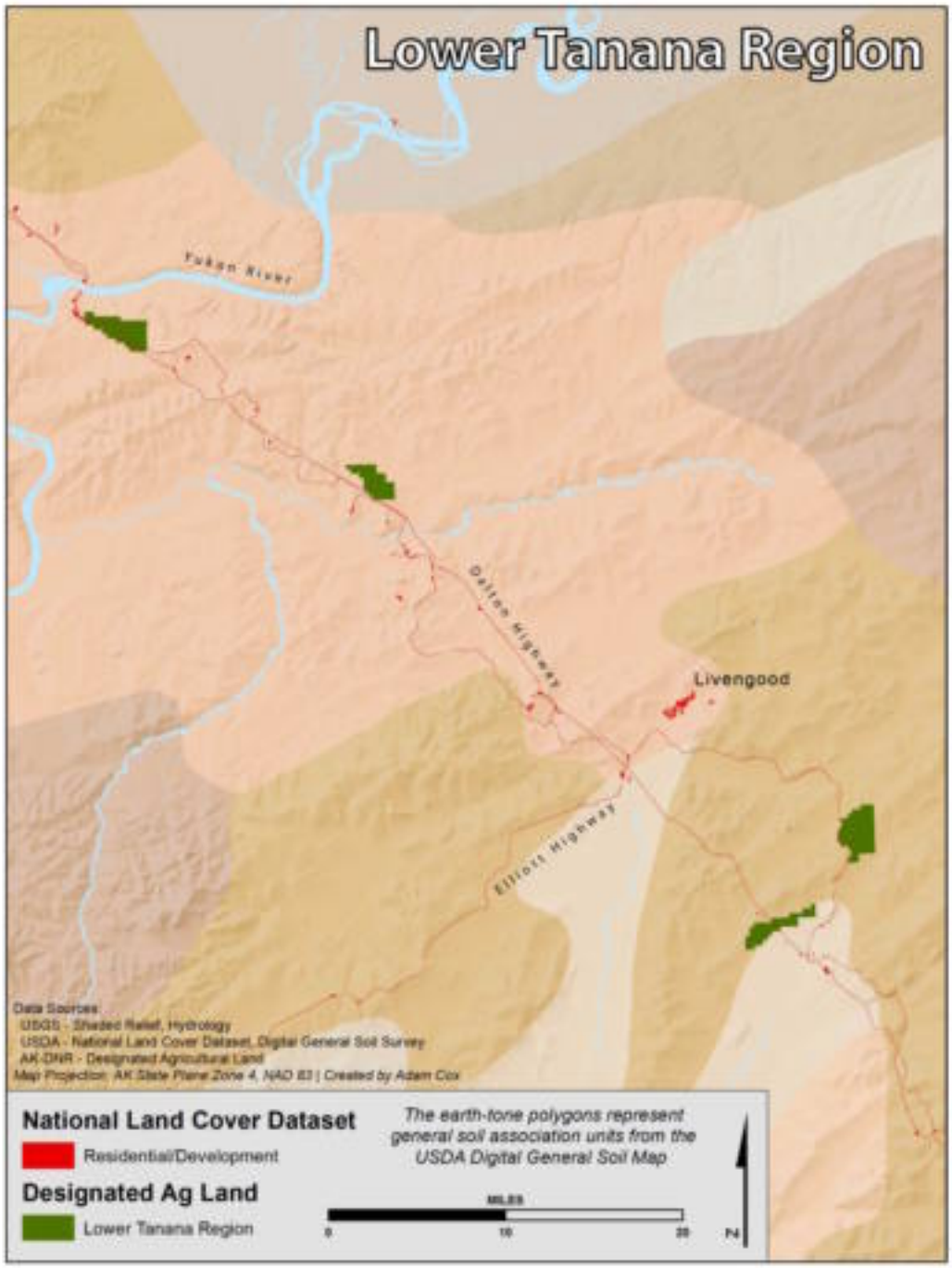
The location of the arable land, close to the Fairbanks airport, suggests that the region could become a center of production of fresh foods for sale to remote villages. The land seems very suitable to raising forage, which could become the center of a livestock industry. Smaller pockets of soil are recommended for vegetable production. Assuming a renewable heat source could be identified, the valley could also become home to hundreds of season-extending greenhouses that could supplement production in the villages themselves.

**The location of the arable land in Nenana, close to the Fairbanks airport, suggests that the region could become a center of production of fresh foods for sale to remote villages.**

Yet many have cautioned that the region must be developed as a stable agricultural community, not simply another settlement of scattered farms that ultimately degrade into suburban development. History shows that the pressure for land to be turned over to other uses in the long haul will be immense.

The region is also proximate to tourist markets in Denali, and the Anchorage rail line, assuming the bridge and highway are built.

The fact that the land is owned by the state may make it possible for land to be offered for lease to farmers at a cost commensurate with what they could earn by farming, rather than at the cost of development.




*Map by Adam Cox, Territory Heritage Resource Consulting, Anchorage, Alaska*

**Lessons Learned**

A common theme in the history of the state's investment in farming and food manufacturing has been that Alaska has invested considerable sums in the hopes that such bold steps would place a new (or refurbished) industry into a strong competitive position. Only by going to scale and focusing on export markets, it was argued, would these fledgling industries be able to bring costs of production down to suitable levels, and command market power.

In fact, it appears that just the opposite has occurred. Large-scale projects and operations, combined with injections of public money, seem to have insulated these new firms from any reliable consumer base. Rather than building consumer loyalty over time, and enduring competitive pressures, these new projects appear to have become dependent upon loans from public sources.

**Large-scale efforts, combined with injections of public money, seem to have insulated these new firms from any reliable consumer base. Rather than building consumer loyalty over time, and enduring competitive pressures, these new projects appear to have become dependent upon loans from public sources.**

Another scenario has involved debt that was taken on, largely by farmers, in response to public initiatives that promised financial return. When the large-scale infrastructure collapsed from its own weight, farmers were trapped with loans they had severe difficulty repaying. Most have made repayments, but many have lost their farm in the process, or were forced to work off the farm in order to repay the loans they had taken on.

**Many assume that the only way to grow a food economy was to export to the Lower 48.**

Some food processors now caution that starting small is a more reliable path, because supply and demand can be balanced at a low and stable level, with discrete steps of expansion built upon that base. Similarly, many of the new generation farmers have reached out directly to consumers, asked the food buyer to share in the risks of farming (through Community Supported Agriculture and similar arrangements), and have been able to tap lucrative markets in neighborhoods where residents have more disposable income. Increasingly, USDA has been offering small grants, for high tunnels, for example, because the carrying costs are so low, and many growers are making considerable impact by using these grants.

**Some food processors now caution that starting small is a more reliable path.**

Also gone missing inside a culture that supports large-scale public intervention has been the culture of farming itself. When the Matanuska Valley was settled in the 1930s, one could travel to the Great Lakes region and find people who held farming skills who were looking for a change in their lives. Today, a new generation of young people has become excited about farming, even within the rugged constraints of the Alaskan climate, yet must learn these skills anew, and do so with little to no supportive infrastructure. Food production skills and infrastructure literally must be built from the ground up, with commensurate training and extension activities built simultaneously.

**Also gone missing inside a culture that supports large-scale public intervention has been the culture of farming itself. When the Matanuska Valley was settled in the 1930s, one could travel to the Great Lakes region and find people who held farming skills who were looking for a change in their lives.**

Another dilemma posed by the history of public investment in the farming and food sectors in Alaska has been that it has been assumed that the only way to grow a food economy was to export to the Lower 48. This was, indeed, the vision of farmers in Fairbanks nearly a century ago. It is the driving principle behind the commercial seafood industry. And this vision is implicit in recent discussions of launching a gourmet meat industry centered around beef and reindeer, marketing the clean air and water that distinguish the Alaska landscape.

The Lower 48 has slowly learned that export-based agriculture made some sense when pioneer populations were small and sparsely scattered among farms that could produce their own food, and when energy and/or shipping costs were relatively low. Yet it does not work as populations become more dense and farmland more scarce. Now that hunger is pervasive in Alaska, with food insecurity figures ranging from 12%-36% depending on region and community, and low-income populations have become a stable feature of life, there is a limit to the ability of an export-based strategy to circle back and feed Alaskans.

Today, it is widely stated that Alaska imports at least 95% of the food it purchases. The source of this statistic is apparently a 1977 speech given by James Drew, former Dean of the agriculture school at UAF (Paragi, et al, 2010) (Gerlach, personal communication 2014), but also has been attributed to the retired director of Alaska Cooperative Extension, Hollis Hall, speaking to a forum at Delta Junction in 1998 (Papp & Phillips, 2007, p. 238).

**Alaska imports 95% of the food it purchases.**

This is a typical rate of food imports for most states in the U.S., but the logistical challenges are more severe in Alaska. Anchorage is a 60-hour drive from the Central Valley of California, where much of the nation's fresh produce is grown, and 68 hours from Nogales, Arizona, the largest produce entry port in the U.S., through which Mexican produce typically flows. If one is looking for fresh vegetables in a village outside of Barrow or Bethel, one

must further wait for a Bypass air shipment to makes its way from Anchorage to the local hub, and then by small plane to one's village. Our sources said this can take as long as seven days, depending on the location of the village, even in good weather. Coastal areas are especially vulnerable to weather disruptions.

*Photo © Ken Meter, 1982.*

Some staple foods arrive by barge from ports such as Seattle, but barges are limited to the warm-weather shipping season. Only high-value products are transported by airplane; Asia and Europe are increasingly the destinations of Alaska seafood. Local food security could be enhanced through construction of suitable storage facilities (root cellars, for example) near airports and ports, so that fresh produce can be safely stored and consumed in all four seasons, and not just during the summer.

At town meetings held in diverse communities by the Alaska Food Policy Council, Alaskans lamented that when they wanted to purchase seafood from commercial sources, they were often purchasing Alaskan products that had been shipped to Seattle, and then back again, because that is how distribution networks function.

**Alaskans lamented that when they wanted to purchase seafood from commercial sources, they were often purchasing Alaskan products that had been shipped to Seattle, and then back again.**

Those consumers who have access, then, are likely to hunt or fish for themselves, or trade with a neighbor, to obtain fresh-caught food for their freezers. Several told us they would never buy seafood at a store; they prefer the flavor of what can be harvested locally.

It is interesting, then, to note what has persisted through all of these public policy and economic cycles: the culture of villages, the dedication of Native people to celebrate nature, share work with each other, and build a solid sense of place by hunting, fishing, and gathering. Even today, 12,000 years after the first settlement, it is the strongest way that Alaskans obtain locally raised food. Nonnative hunting and gathering are also critical sources of food, but not as closely entwined with cultural knowledge.

**What has persisted through all of these public policy and economic cycles is the culture of villages, the dedication of Native people to celebrate nature, share work with each other, and build a solid sense of place by hunting, fishing, and gathering. Even today, 12,000 years after the first settlement, it is the strongest way that Alaskans obtain locally raised food.**

This cultural heritage of subsistence is commemorated today. A council of Inuit elders recently asserted the following natural rights: the right of peoples to be part of the ecosystem, to access food, and to protect the land and water (Behe, 2013). Yet villagers also point out that many youth are growing up with fewer opportunities to learn the essential skills of hunting and gathering food for their own communities (See also Holen, 2013). Mechanization has extended the reach of many hunting parties, but has also added costs. New technologies rely upon inputs that cannot be sourced in Alaska, so the sustainability of this way of life has come into severe question.

Yet as the next section of our report shows, subsistence gathering is still profoundly important to the state of Alaska.

# Subsistence Harvest of Wild Foods

When Native organizations are asked about the security of Alaska's food supply, they tend to respond in terms of subsistence hunting, fishing, and gathering. A wide variety of foods are harvested in the wilds, including salmon (32% of all wild harvests), Pacific halibut, Pacific herring, and whitefish. Harvested marine mammals include seals, sea lions, walruses, and whales. Land mammals such as moose, caribou, deer, bears, Dall Sheep, mountain goats, and beavers are commonly hunted. Birds, shellfish, and plants (including berries and greens) are also harvested when available (Alaska Department of Fish and Game, 2013, p. 2).

The Alaska Department of Fish and Game (ADFG) data show that Alaskans (including sportsmen and those collecting for personal use) harvested 50 million pounds of wild foods in 2012 (ADFG, 2013, p. 2) Most of this, 37 million pounds, was harvested by residents of rural areas, and the rest by urban dwellers. Both Natives and nonnatives are eligible to harvest wild foods for subsistence or personal uses (though only certain Natives may harvest marine mammals), and subsistence uses have priority over other uses (ADFG, 2013, p. 4)

Following is the breakdown of wild foods harvested by local residents, by weight (ADFG, 2013, p. 2):

| | |
|---|---|
| Fish | 53% |
| Land mammals | 23% |
| Marine mammals | 14% |
| Plants | 4% |
| Birds | 3% |
| Shellfish | 3% |

Commercial fishermen harvest 98% of the 3.3 billion pounds of fish that are caught each year; most of this is exported.

Native Alaskans underscored that subsistence hunting, fishing, and berry picking is central to spiritual life. Collaborating to feed themselves and their neighbors brings family members into common purpose. Harvests are typically shared with those who are unable to join in. This activity stands at the core of social connection and tribal heritage.

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Of course, the foods gathered are also important for nutrition. Families in extremely remote places may depend on wild harvests for as much as 80% of their diet (ADFG, 2013); those in more urbanized settings rely far less upon wild foods. However, diets for rural Alaskans with access to stores are rapidly becoming more dependent upon processed foods.

*Copper Center fish camp. Photo: Alaska Department of Health and Human Services.*

Studies have shown that wild foods often fulfill dietary needs quite completely; fish and game are a source of ample protein — on average, 189% of daily requirements for rural villagers (ADFG, 2013). Oils, minerals and micronutrients appear to provide essential components of a healthy diet that a "Western" diet might seek in fruits and vegetables. Several villagers said that eating traditional foods is exceptionally efficient: a small portion can make one feel satisfied all day. Health clinics and nursing homes have begun to reintroduce traditional foods after noticing this promoted better health outcomes.

Tracking wild species also brings subsistence hunters and gatherers into intimate contact with the natural physical environment. Often exposed to extreme weather conditions, traveling long distances tracking wild animals, or noticing shifting migratory patterns, the process of subsistence gathering is an irreplaceable way to learn about, and interact with, nature. Inescapably, this type of knowledge integrates information across more specialized scientific disciplines.

One way to approach the topic of subsistence is to consider the economic value of the harvested foods. Villagers often reject this calculation, pointing out that such financial counts miss the true value: spiritual, cultural, and nutritional regeneration.[3] Yet the ADFG does assess the economic value of the wild foods harvest, and conservatively estimates this at $400 million in 2012 — a substantial share of the estimated $2 billion of food that Alaska residents eat in a year. It may be substantially higher, since this is calculated by assigning a value of $8 per pound harvested (ADFG, 2013, p. 4), and formal tabulations of poundage may understate the actual harvest.[4]

**ADFG conservatively estimates the economic value of the wild foods harvest to be $400 million.**

Given that Alaska's 762 farmers sold $59 million of farm products in 2012 including aquaculture, it is at least clear that subsistence gathering and personal use hunting and fishing (valued at $500 million as explained below) are the most important internal food source Alaskans count on, especially since most of the commercial fish catch is exported.

Moreover, subsistence is most pervasive in regions that are furthest from the road network (ADFG, 1991). While small quantities are shipped out of state, it is fair to assume that most all of what is harvested is consumed close to where it was found. This is a critically important core of Alaska's hopes for a secure internal food supply. Yet Holen (2013) adds that "the subsistence economy is intimately tied to the cash economy, leaving rural communities in Alaska vulnerable, especially with a declining participation in commercial fishing by rural residents."

**Subsistence is most pervasive in regions that are furthest from the road network.**

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[3] As Reedy and Maschner (2014) point out, "A key concern is that capitalist consumption of [traditional] foods will reassign meaning to them, and probably devalue or transform them into something outside the intended cultural matrix."

[4] By another estimate, 650 pounds of wild foods are harvested per year, per person, with whaling communities harvesting around 900 pounds per year, per person in rural villages (Martin, 2012). The Department of Fish and Game Division of Subsistence, however, estimates average harvests of 316 pounds per person in rural communities, and 23 pounds for urban communities. This would result in an annual harvest of 52 million pounds with estimated replacement costs of $182-354 million dollars a year (ADFG, 2012). Although these weight estimates are largely composed of large mammals and fish, wild berries, roots, and greens compose a vital part of the harvest too. One ongoing study in the Copper River basin found that plant materials compose about 5-10% of per capita harvest by weight, but that plant gathering is performed by nearly everyone, whereas hunting and fishing is not (Vine, Kukkonen, & Jones, 2013).

*Processing seal in Kotzebue. Photo: Alaska Department of Health and Human Services.*

Sedentary lifestyles and eating processed foods seem to correlate with declining consumption of subsistence foods. Population increases in Alaska may also apply pressure on wildlife resources — though hunters in the Bering Sea area reported that for current purposes, wildlife populations are adequate to feed those who hunt, and those with whom they share food.

**Uncertainty about the harvest**

Interviews conducted by the Maniilaq Association (Betcher, 2014) and our own interviews show that a variety of pressures are combining to create uncertainty for Native hunters and fishermen. One paramount concern is the cost of fuel. Now driving motorized boats for the marine mammal harvest, and with diesel and gasoline prices rising (prices for automotive fuel were $6.73/gal in Bethel in April, and Betcher's sources report prices as high as $10/gal), the costs of subsistence gathering have squeezed rural subsistence hunters.

**Sedentary lifestyles and eating processed foods seem to correlate with declining consumption of subsistence foods.**

Weather change adds to their concern[5]. With ice breaking up in the Arctic, some of the larger floes that hunters depend upon for creating a solid place to hunt walrus are no longer available unless the captains drive their boats as much as 50 miles further north. This adds greatly to fuel costs, of course.

Rising temperatures have also caused flooding in northern areas. Riverbanks have been severely eroded by racing, swollen streams. Permafrost has thawed, shifting the pilings on which buildings are placed, and flooding root cellars. Migration patterns have shifted for land mammals.

**A variety of pressures are combining to create uncertainty for Native hunters and fishermen: cost of fuel, weather change, flooding, shifting migratory patterns, and radiation.**

Bering Strait seal hunters report that they have shot seals that appeared weakened; many suffered from lost patches of fur or raw lesions on sensitive skin areas. Hunters suspect this is due to fallout associated with the Fukushima nuclear plant disaster; state officials state that no measurable trace of radiation has been found in seal carcasses. Many Native Alaskans expressed concern that this important food source would be compromised.

Salmon populations have declined precipitously in the Kuskokwim River drainage, leading to a formal letter of concern written by a group of Y/K Delta Elders (Bering Sea Elders Group 2011). They believe that salmon bycatch by trawlers, combined with sea routes that have opened to year-round travel in the Arctic Ocean and Bering Sea, have conspired to dramatically reduce King Salmon populations in the river. Catching has been prohibited for two years to allow stocks to replenish themselves, but this has taken a severe toll on subsistence harvesting. While Native families have been able to switch to other varieties of

[5] Craig Gerlach points out that Native residents experience what many call "climate change" to be "weather change."

fish in the short term, the taste and quality of King Salmon flesh are devoutly missed — along with the cultural connection to the salmon fishing.

Near Nome, reindeer populations have been reduced by a combination of factors. On the Seward Peninsula, caribou migration patterns — which are somewhat cyclical but essentially

*Photo by Steven Kazlowski / Alaskastock.com*

unpredictable — have shifted to the west, bringing them into contact with commercial reindeer herds. While reindeer herding was originally a nomadic lifestyle (Miller, 1975, p. 192) when the reindeer population was introduced to Alaska in 1892, modern herders had begun to stay in place, allowing their herds to roam freely on the permafrost pasture. However, when caribou entered, the sociable reindeer often joined the caribou herd — and then wandered away from the ranch as the caribou left. It is estimated that populations have fallen as much as 90%, University of Alaska-Fairbank's (UAF) Greg Finstad says. Now UAF experts have helped to design more permanent corrals where reindeer could be held in the event of another in-migration — but they say there is no use in trying to build these facilities for a few more years, when it is presumed the caribou herds will once again head east away from the reindeer ranges following natural caribou-migration cycles.

Our sources said that moose populations have been holding strong in recent years, and that salmon have been in general plentiful, with the exception of King Salmon as noted above. Occasional shortages of halibut were mentioned. Whale populations are an ever-present concern.

**Managing Subsistence Resources**

Yet subsistence resources are governed by a complex set of relationships involving local, state, federal, and international stakeholders. Global and migratory populations are governed by international councils; both state and federal officials hold responsibility over

the fishing zones, with different but overlapping jurisdictions; local leaders have long-standing interests and knowledge as well.

We were able to witness a very informative conversation between the U.S. Forest Service and one Tribal Community Council. Federal officials came to the meeting with a new offer to liberalize fishing rules in the waterways near the village. Over an extended time, the Council reiterated their position that the tribe once held sovereignty over these waterways, and none of the federal offers broached the topic of ensuring the tribes would remain sovereign. Moreover, the tribes would welcome, it was repeated in soft and patient tones, a stronger role in co-management of wildlife resources in their region. The Council supposedly co-managed wildlife resources with both the state and federal governments. Yet in fact the two governmental entities each held separate powers, at times conflicting or overlapping in ways that were confusing. Typically each made decisions based on their official responsibilities, without strong consultation with the village.

**In soft and patient tones, the Community Council repeated that it would welcome a stronger role in co-management of wildlife resources in their region.**

Given the specialization of government scientists, professional experts in diverse fields such as natural resource management, fisheries, and forestry, it would seem that the integrating knowledge of those who live in villages would be critical to add to the mix. Tapping into traditional lore about historical wildlife migration patterns, intimate with seasonal hunting and harvesting cycles, skillful as hunters, and drawing from a rich cultural and spiritual tradition, it would seem that if anything, the Native voice should be strongest in co-management. After all, wild foods have been successfully harvested by Alaska tribal groups for nearly 12,000 years; science is a relatively new mode of inquiry, segmented by disciplinary boundaries.

The Alaska Federation of Natives is now participating in a trial initiative featuring more equal co-management in the Copper River region.

## The Native Agricultural Tradition

Many Alaskans we spoke with have the impression that there is no tradition of Native agriculture; it is often said that this is an imposed technology that has little to do with the rhythms of life in village settings.

Indeed, there are numerous stories about Native villages that launched a farm or gardening project only to have it wither away over time. The same could be said for nonnative settlements; witness the rapid demise of the collaborative spirit of the Matanuska Colony, or the way excellent farmland was paved over in Fairbanks. Still, the Native reality is quite different than this stereotype conveys.

Just as subsistence harvesting persists because Native families connect it intimately to annual rituals and cultural celebrations, agriculture has persisted in Native settings when there was a solid *cultural* aspect to it — when people developed strong bonds with each other around the practice of cultivating the land and raising food together. When those connections have been broken, the practices may die off relatively rapidly, except in the case of very unusual situations.

**Agriculture has persisted in Native settings when there was a solid *cultural* aspect to it — when people developed strong bonds with each other around the practice of cultivating the land and raising food together.**

*Gathering Sea Greens in the Aleutian Islands. Photo: Gary Ferguson*

Indeed, scientists have uncovered convincing evidence that agriculture predates the arrival of European settlers. Four Native potato varieties have been identified that have genetic material similar to potatoes cultivated in South America — most likely originating in what is now Mexico or Chile. These varieties appear to have been conveyed to Southeast Alaska, perhaps through trade, in the early days of settlement, but not through Europe, genetic markers show (Zhange, et al., 2010).

As John Muir (1915) noted,[6] many Native growers in the Southeast planted potatoes near their fishing grounds, typically several miles from traditional villages. The potatoes would be planted there during lulls in the rhythms of harvesting life. Planted near water, often on narrow, south-facing beaches, near the ocean, the crop would require little day-to-day care. When fishing allowed, a family might return to the potato field to weed the plots and check on the plants. At harvest time the potatoes could be cooked as an accompaniment to fresh salmon.

Later, Russian settlers would bring their own seeds and establish gardens in outposts such as Sitka. Often, Native families would emulate their gardening, with, one suspects, considerable trading of information between the villagers and the colonists. The Village of Angoon, as only one example, still hosts the ruins of a former root cellar near a small Orthodox-style church on the hill overlooking the port.

Miners brought gardening experience with them. Often working in remote places, they had little choice but to grow what food they could, and to harvest wildlife. In many settlements: Klondike, Kotzebue, Fairbanks, the Matanuska Valley, and north of Nome (certainly not an exhaustive list) we learned of miners who taught their gardening skills to their neighbors — many of whom were Natives. For those who had a close interest in gardening, those gardening skills persist today.

One gardener who passes on his skills to villagers north of Kotzebue reports that he travels a circuit based on the seasons; he says his arrival is warmly welcomed by small groups of gardeners in each village. Their families had a heritage of learning from the miners, and now embrace this modern-day assistance.

Yet in the Northwest we also heard stories of villagers who have recently set up a high tunnel when grant money was offered, and perhaps managed it closely for a season or two, but then abandoned it because the work involved did not fit into daily life patterns, or conflicted with the demands of harvesting wild foods. If the salmon were running, for example, nothing might be weeded, because the salmon were critical to the culture and diet while the vegetables were more of a specialty item. Over time, many of these high tunnels have fallen idle.

The lesson of this experience seems to be that when growing food becomes incorporated into the culture of daily life: either through collaboration with a neighbor or family member, or rotated into the seasonality of the fishing harvest, or inserted into family tradition, then growing food seemed like a proper Native celebration. When it was simply done to fulfill a grant, or as a momentary project, growing food did not last as long.

Several gardening projects have been undertaken through recent years (See below). The Village of Tyonek has a large community garden with two high tunnels and solar powered irrigation. Tanana Chiefs Conference devotes a plot of land to gardening, and offers gardening classes through a UAF Extension agent placed with the Council. Fort Yukon is

[6] We are also deeply indebted to Betsy Kunibe, both for her work in identifying and protecting these old potato varieties, and in assisting us to learn about this heritage.

launching a greenhouse project that intends to use biomass (for example, wood scraps or pruned branches) as a heat source. Aniak is embarking anew on a community gardening project. Ouzinkie Island villagers reportedly are constructing greenhouses using as many local materials as possible — including lumber from local trees — so that building and maintaining the facilities will be within the means of the village's own resources, rather than relying entirely on imported materials.

*Gathering berries in the Aleutian Islands. Photo: Gary Ferguson.*

## Sport and Personal Use Hunting and Fishing

Alaska state law also specifies several categories of non-subsistence harvesting of animals and fish.

*Personal use* fishing is defined as harvesting fish for one's own consumption. Selected finfish and shellfish species may also be caught for personal use. A Sport Fishing License is required. Reselling or trading one's catch is not allowed, except that people may gather fish or animals "by proxy" for elders, the disabled, or the blind.

ADFG estimates that a total of 2.5 million sport fish were caught in 2012 (ADFG 2014a); and places the economic value of sport and personal use fishing at $500 million per year (ADFG 2014b). This is a value comparable to all subsistence harvesting.

**ADFG places the economic value of sport and personal use fishing at $500 million per year.**

Hunters may harvest a variety of animals for non-subsistence use. Although ADFG publishes detailed data sets showing the number of animals harvested in each of the wildlife management areas, no economic value of the harvest appears to have been assigned.

*Reported harvests in 2013:*

- Bison — (no reports)
- Bear, Black — 0
- Bear, Grizzly — 738
- Caribou — 2,906
- Dall Sheep — 4
- Deer, Sitka Black-Tailed — 13,166
- Ducks — 70,000
- Elk — 17
- Geese — 7,000
- Moose — 1,630
- Mountain Goat — 428
- Musk Ox — 37
- Small Game — (numerous)
- Wolf — 1,200

Both fishing and hunting also have considerable economic importance by attracting tourists to the state.

*Gateway at Fairbanks. Photo © Ken Meter, 2014.*

Alaska state law directs the Board of Game and Board of Fisheries to provide a reasonable opportunity for subsistence uses first, before providing for other uses of any harvestable surplus of a fish or game population [AS 16.05.258 (b)]. This is often referred to as the "subsistence preference" or sometimes the "subsistence priority." It can lead to tensions among food gatherers.

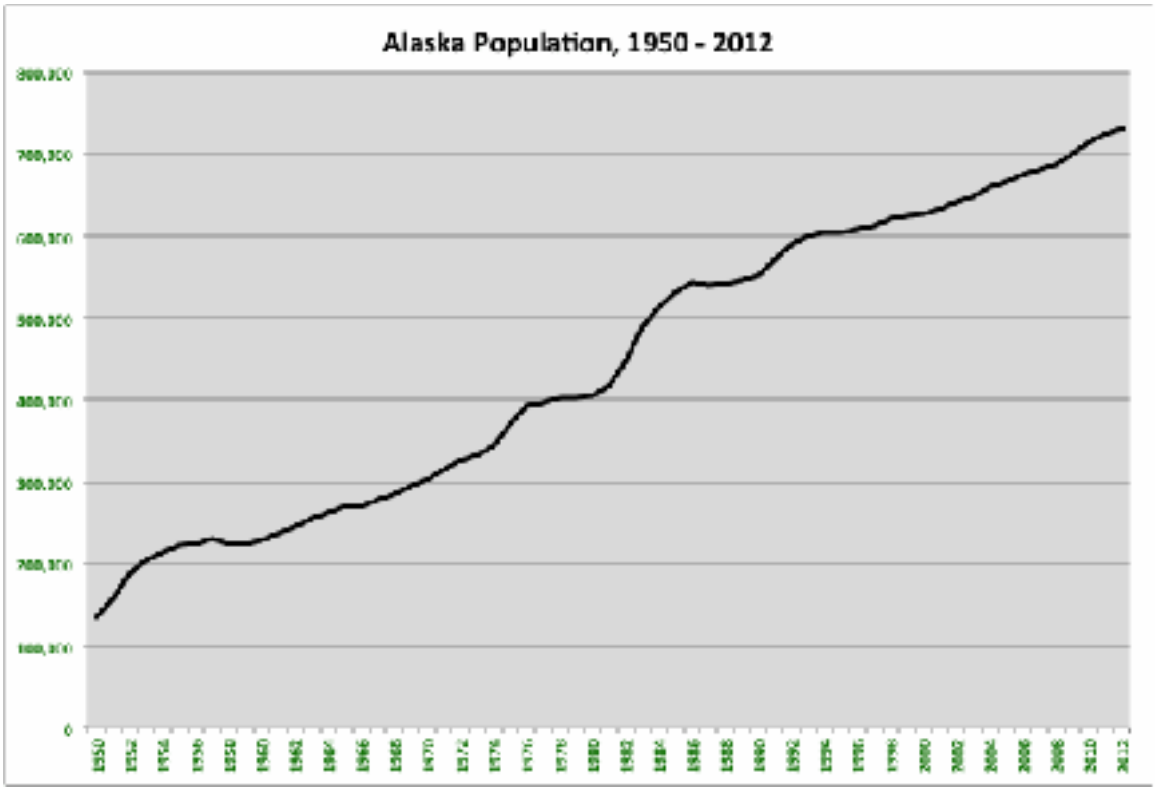
Just as subsistence gathering provides both nutrition and an opportunity for extended families to work together, sport and personal use fishing and harvesting embody lasting rituals around the hunt, including social time. While certainly not as intimately tied to place or millennial heritage as traditional Native harvesting, these more modern forms of gathering food also carry some of the same benefits: food for home use, a chance to bond with the wilderness, and intelligence on changing weather and climate conditions.

As Native hunting becomes more mechanized and draws upon more advanced weaponry, some of the lines of distinction begin to blur. Certainly many nonnative Alaskans consider the results of their hunt to be critical to feeding themselves. Many rural Alaskans, especially, could benefit from greater access to storage facilities where their harvest may be kept safe to eat, just as Native villagers could.

# Economic Overview of Alaskan Agriculture and Commercial Seafood

As Chart 3 shows, Alaska's population has increased six-fold since 1950, fueled in part by the emergence of the oil industry in the 1970s. Our sources indicate that the state has done little planning to ensure that the state has a secure food supply for this rapidly increasing population base.

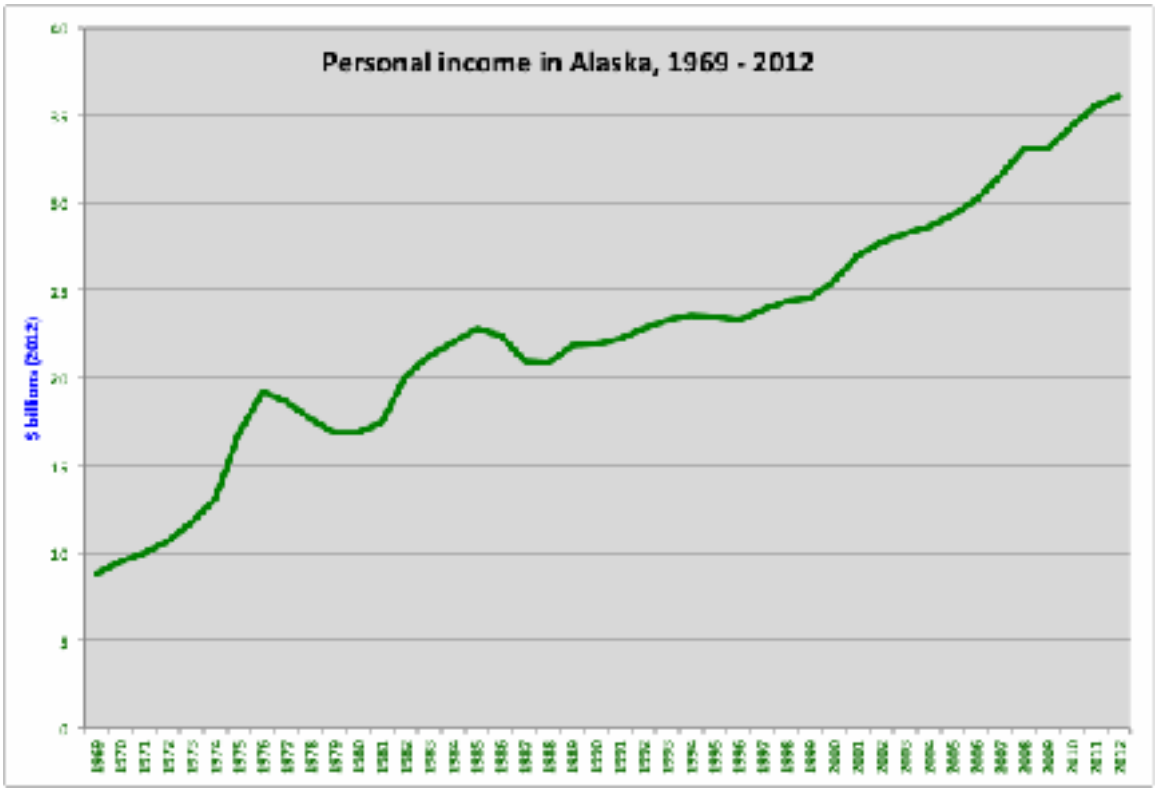
### Chart 3: Alaska Population, 1950-2012




*Source: Bureau of Economic Analysis*

Personal income has more than tripled in the past forty years, after adjusting for inflation (See Chart 4). Residents now earn more than $35 billion each year.

### Chart 4: Personal Income in Alaska, 1969-2012




*Source: Bureau of Economic Analysis*

The sources of this personal income should be explored in close detail. As shown in Chart 5, the number one source of personal income is government jobs, at more than $9 billion. Moreover, this type of income is also the fastest rising source of income in the state today. This included military income, educational institutions, and local, state, or federal employees.

The next largest source of personal income, at $6.5 billion, is interest payments, dividends, and rent – income from capital investments. Presumably this also includes money earned by residents who collect dividends from the Permanent Fund Dividend program. In the past two years, over $500 million per year was distributed to Alaska residents.[7]

Transfer payments (such as retirement income, unemployment benefits, and other forms of income that involve publically run or supervised programs) account for another $5 billion of personal income. If income from government jobs is combined with this transfer payment income, we see that nearly half of all personal income in the state is tied to public programs.

**Nearly half of all personal income in the state is tied to public programs.**

[7] http://pfd.alaska.gov/DivisionInfo/SummaryApplicationsPayments

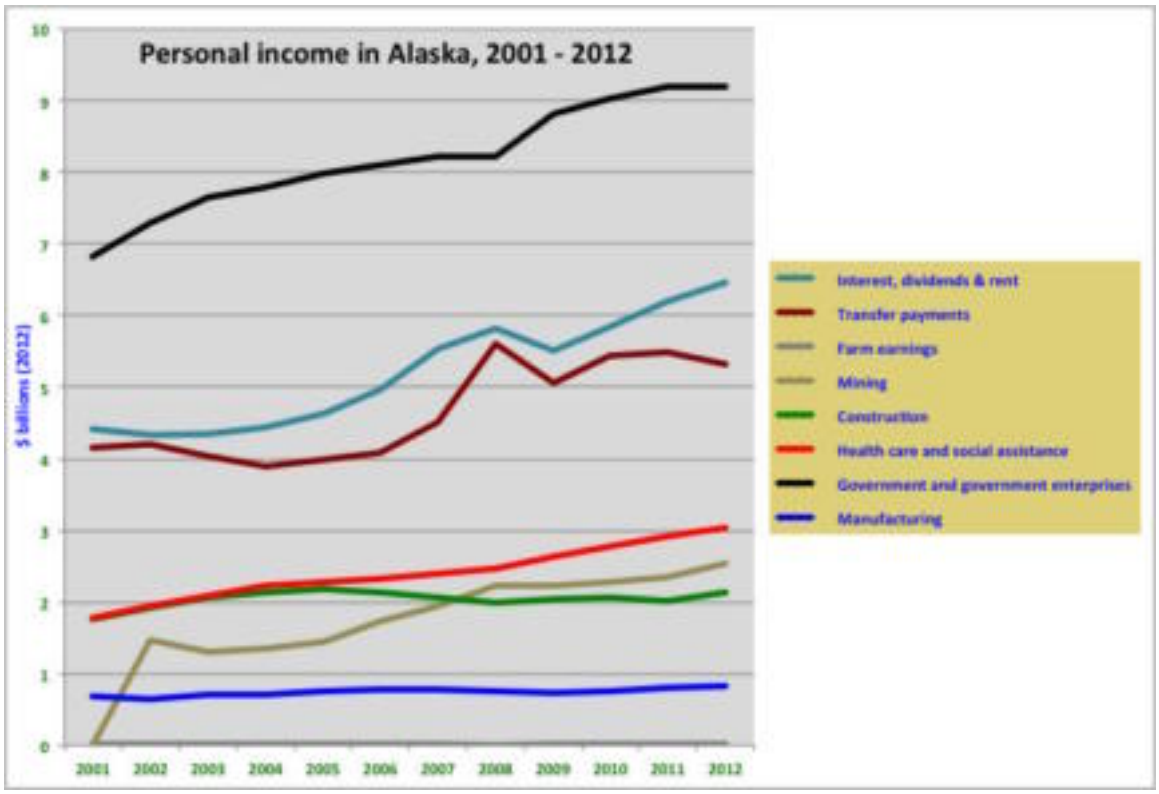
The fourth largest source of personal income is income earned by health care workers. This amounts to $3 billion of income — and is also fueled in part by public health care programs.

Not until we get to the fifth-largest source of personal income, mining, do we reach a source of income that is closely tied to creating new tangible products. Mining workers earn $2.5 billion per year.

The construction industry is close behind, at $2 billion. This form of income has leveled off over the past 10 years, with little growth. Manufacturing income has also held steady over the past decade, and remains below $1 billion per year.

As shown on Chart 5, farm income appears to be essentially negligible compared to these other sources of personal income. Table 1 and Figure 2 outline the top subsectors that compose farm income.

**Chart 5: Personal Income in Alaska by Industry, 2001-2012**




*Source: Bureau of Economic Analysis. Personal income from oil drilling is included in Mining.*

Indeed, the largest source of farm revenue is nursery crops and ornamentals, as Table 1 shows. This includes landscaping plants, peonies, and other crops, but not food (although some of these crops may be young vegetable sets that farmers and gardeners purchase to raise on their own land. Forage crops (hay for feeding livestock) rank second, with $4.4 million in sales (USDA NASS Census of Agriculture 2012).

Vegetables are the most significant cash crop, with $3.3 million in sales, and potatoes come close behind at $2.5 million. Yet as we will learn later, potato sales fell dramatically from 2011 to 2012.

Cattle and calves rank as the state's six-most important farm product, at $1.7 million in sales, with dairy next at $1.3 million. Barley ranks eighth at $1 million in sales. Hog sales are minimal.

### Table 1: Top Products of Alaska Farms, 2012

| | | $ millions |
|---|---|---|
| 1 | Ornamentals | 13.0 |
| 2 | Hay | 4.4 |
| 3 | Vegetables | 3.3 |
| 4 | Misc. Livestock | 2.8 |
| 5 | Potatoes | 2.5 |
| 6 | Cattle & calves | 1.7 |
| 7 | Dairy products | 1.3 |
| 8 | Barley | 1.0 |
| 9 | Hogs | 0.2 |
| 10 | Oats | 0.2 |

*Source: USDA Economic Research Service*

All told, about $14 million of the $30 million that Alaska farmers sell is in intended for human consumption, and much of this must be processed before it enters the retail stream.

Direct sales (from the farm direct to the consumer) totaled $2.2 million in 2012, with 241 farms participating in direct sales. This is a 62% increase of number of farms (149 in 2007) selling direct, and a 32% increase in direct sales over 2007 sales of $1.7 million.

These direct sales amounted to 3.8% of farm product sales, nearly 13 times the national average of 0.3%. This means Alaska's distance from the Lower 48 fosters a sense of independence: If direct food sales made up a single commodity, the value of these sales would just about equal the value of the state's fifth-most important product, potatoes.

**If direct food sales made up a single commodity, the value of these sales would just about equal the value of the state's fifth-most important product, potatoes.**

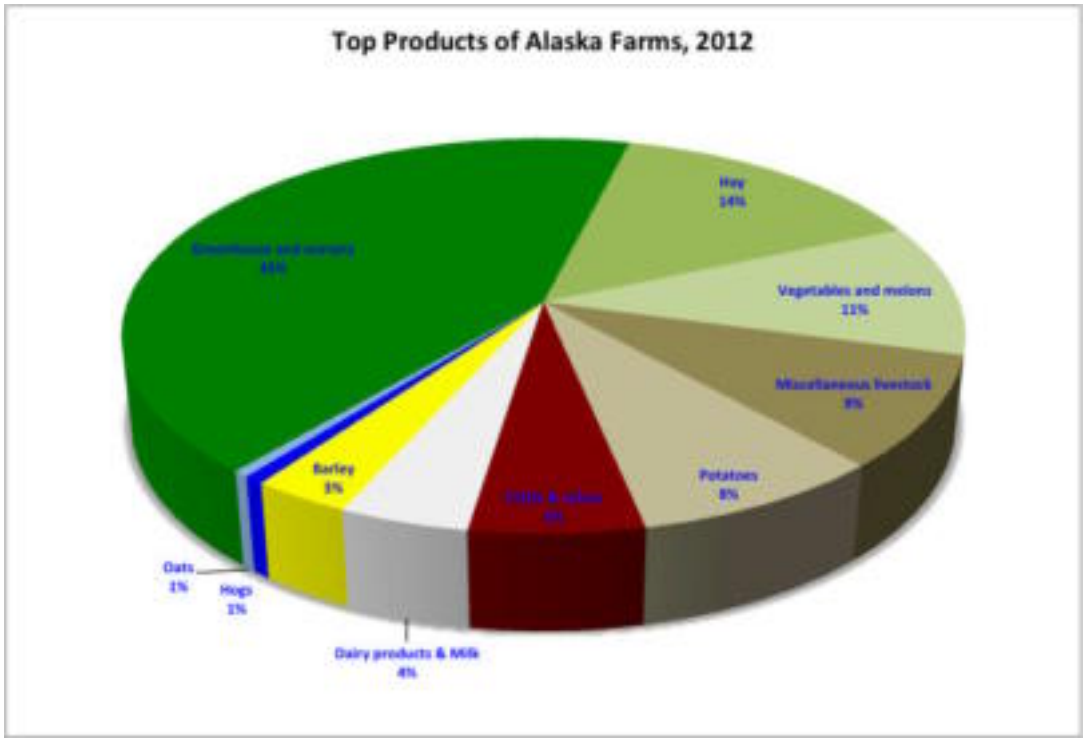
All in all, Alaskans tend to have a more direct relationship to their food than residents of most states in the Lower 48. Surveys show that 65% of Alaskans harvest wild foods at least once each year. Half purchase fresh produce directly from farmers. The number of farmers' markets has tripled since 2005, from 13 markets to 37 in 2013. One of every three Alaskans eats some produce from their own garden (Alaska DHSS, 2013b).

Moreover, food is an important business in Alaska, generating more than $5 billion in sales. To consider only the three largest sectors: The state's 148 food manufacturers sell $2 billion of products combined, in the process hiring more than 9,300 employees with an annual payroll of $289 million. The state hosts about 400 grocery stores[8], which hire 7,519 employees, and pay $184 million in payroll. Approximately 1,468 dining establishments hire 19,000 workers, paying $356 million in payroll (2007 U.S. Economic Census). Total employment is 36,000, with an earned total of $829 million per year.

**Food is an important business in Alaska, generating more than $5 billion in sales. This is one-quarter the value of all primary oil and gas products sold in the state.**

This is hardly insignificant; while these three food sectors account for only one-quarter of the value of all primary oil and gas products sold in the state ($18 billion in 2007) total employment in the oil sector is only 2,900, with a total payroll of $339 million. Employment in these three food sectors provides twelve times the employment of the oil and gas sector, with more than twice the payroll.

### Figure 2: Top Products of Alaska Farms, 2012




*Source: USDA Economic Research Service*

[8] These data may understate the number of rural groceries in remote towns and villages.

**Employment in these three food sectors provides twelve times the employment of the oil and gas sector, with more than twice the payroll.**

Yet nearly all of this food manufacturing is focused on supplying food to other states or countries. More than 3 billion pounds of seafood is harvested at large commercial scale for shipping away. Our sources could count only about a half dozen manufacturers that focus their efforts on the Alaska market.

Next, we will look at specific sectors.

*Romaine lettuce grows indoors year-round at Johnson's Family Farm in Fairbanks.*
*Photo © Ken Meter, 2014.*

**Barley**

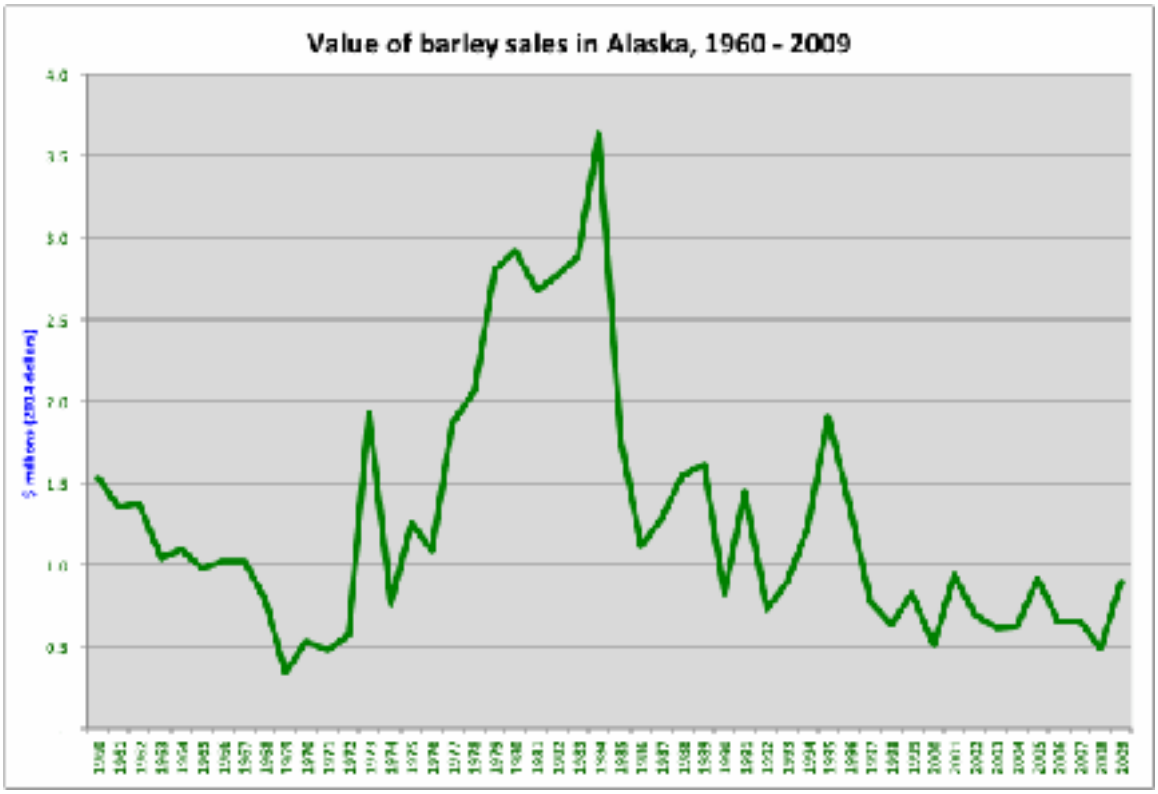
Despite $77 million in direct investment by the state of Alaska in fostering barley production in the Delta region (this would be valued at $188 million in 2014 dollars) barley sales are lower today than they were at statehood. Moreover, total barley sales made by Alaska farms since 1982 are only $30.5 million – about one sixth the value of the investment the state made in this project 30 years ago. See Chart 6.

*Barley. Photo by Patrick Endres / Alaskastock*

When one looks at the regions where barley was produced, it becomes clear that the state's focus on the Delta region was accompanied by reduced production of barley in the Mat-Su region (see Chart 7) (88% of the barley sold in Alaska, as counted by the 1959 Census of Agriculture, was grown in the "Anchorage region"). At the time, Mat-Su Valley farmers sold $1.2 million of barley (in 2014 dollars), more than state farmers have sold in any year since 1996. Thus, it would seem that developing barley production in Delta Junction made it easier to convert Mat-Su farms, including former barley fields, into housing and commercial development, since alternate barley land became available.

Although other grains have been important to Alaska farmers historically, production is relatively small. $200,00 of oats were sold by farmers across the state in 2012. Some wheat is produced each year, as well, yet winter wheats do not reliably survive the winter every year. However some fast-maturing spring wheats have been shown to mature in less than 100 days, the average growing season in the Interior. Spring rye typically doesn't mature fast enough, whereas winter rye is more likely to survive the winter if snow exceeds freezing rain (Wooding, 1998). Specialized grains may serve local markets, however they are unlikely competitors to grains coming out of the Heartland.

### Chart 6: Value of Barley Sales in Alaska, 1960-2009



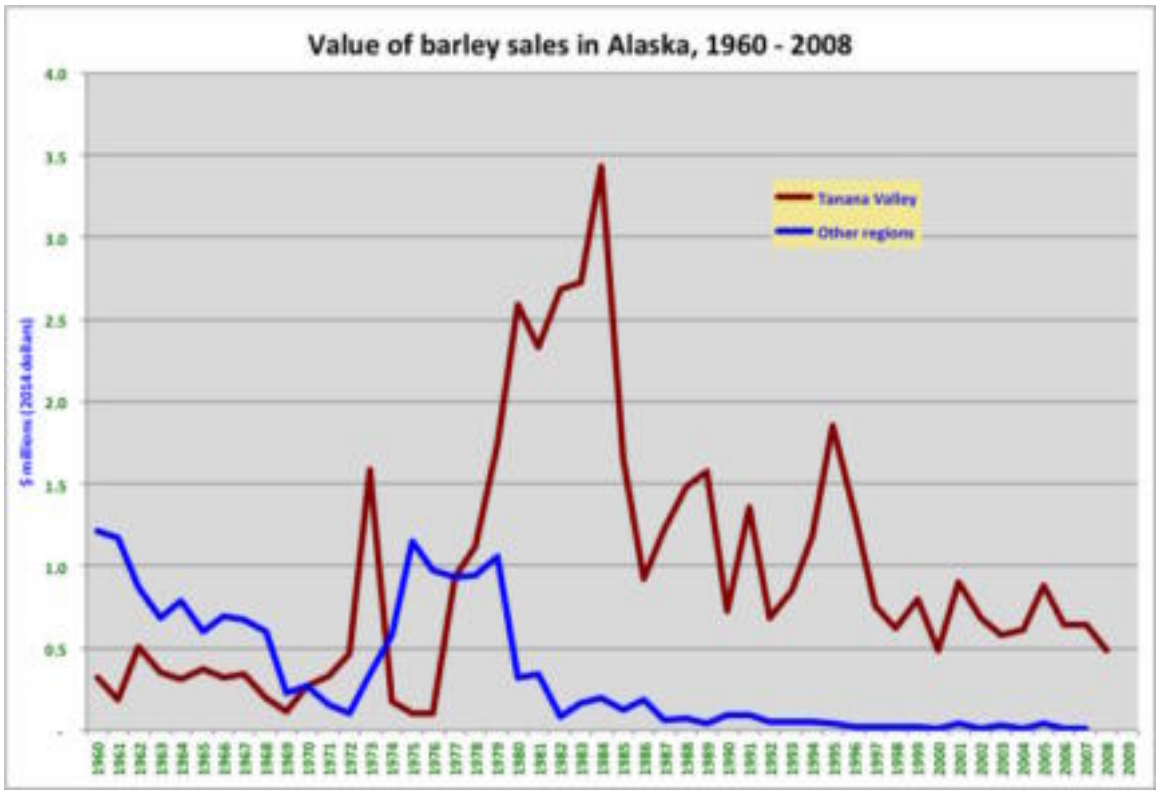

*Source: USDA (NASS)*

**Barley farmers are now exploring additional value-added markets within Alaska. They cite distribution as the main obstacle.**

Under the leadership of Bryce Wrigley, barley farmers are now exploring additional value-added markets within Alaska. This includes milling a hulless variety of barley into flour on a stone grist mill as a substitute for wheat flour, feeding barley to livestock raised for Alaska markets, and malting for brewers.

Yet Wrigley adds that distribution of the product is the major obstacle the growers have uncovered. Their plans have been frustrated by the fact that barley harvests in the Lower 48 may be as high as 150 bushels/acre, nearly four times the Delta Junction yield. This means wholesalers have a wide selection of competing, lower-cost barley to draw from. When the growers spoke to one buyer, they were informed that they could sell their product as long as they could deliver it to Seattle — from where it could be shipped back to Alaska.

### Chart 7: Barley Production in Alaska, 1960-2008



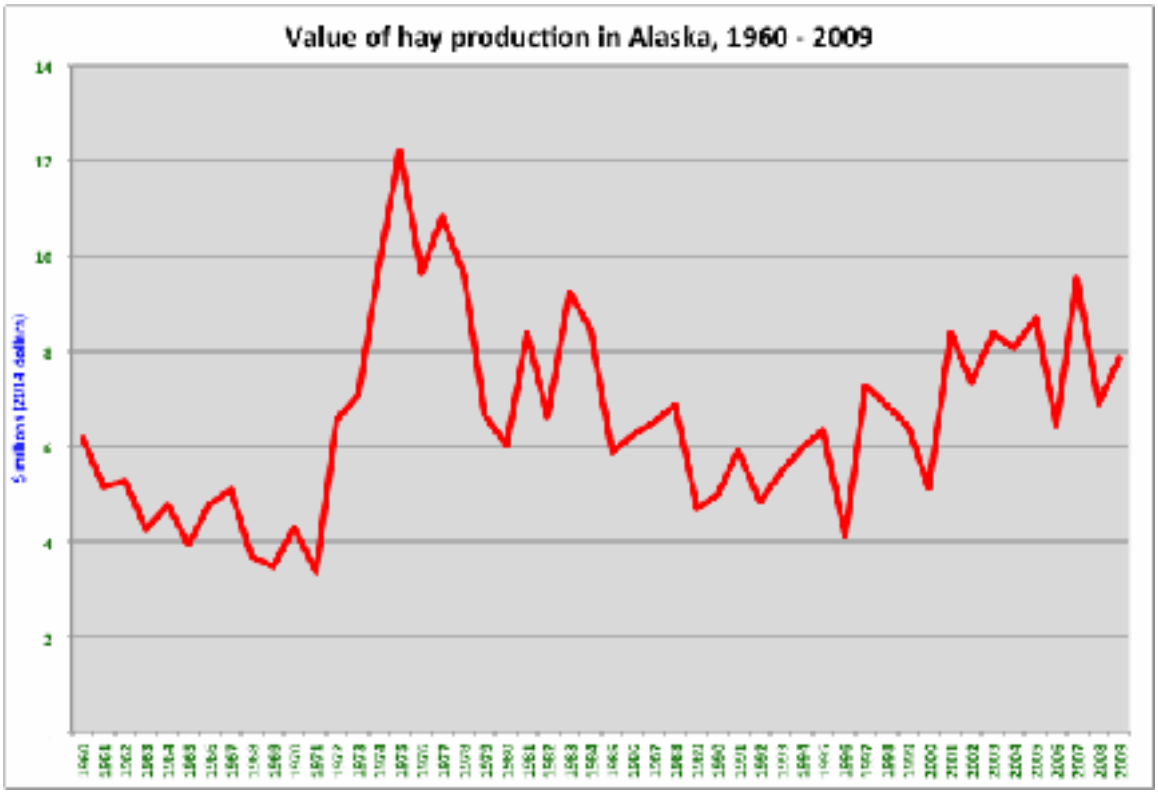

*Source: USDA (NASS). Note that some data for 2008 is missing.*

**Hay**

Some areas of Alaska are suitable for hay and grain cropping, with Delta Junction, Matanuska Valley, and the Kenai Peninsula leading in production. Brome and timothy hay are the most common varieties. Early experiments in Rampart, northwest of Fairbanks, found soil nitrogen to be a limiting factor in crop production (Wooding, 1998). Fairbanks and the Tanana Valley are not considered well suited for hay production due to soil quality and weather patterns. As an example, one producer revealed during an interview that his income from raising hay amounted to only 60% of his fertilizer bill. Respondents to a producer survey in the Fairbanks region reported that they are transitioning away from this enterprise (Caster, 2011).

While Fairbanks producers are envious of Delta Junction's relatively more reliable weather patterns, Delta Junction producers themselves report infertile soil and rising fertilizer costs. A livestock specialist concludes that the quality of grains and grasses available in Alaska is insufficient for dairy production, and potentially even for cattle production (Shipka, 2006). Typically, high quality hay is sold to stables, a high-end market. By some accounts, 70% of Alaskan grown hay goes to horses (Hollander, 2013). This leaves livestock producers with subpar hay, or paying for pricey imports. At times imports cost approximately twice the price of domestic hay, according to one producer.

### Chart 8: Value of Hay Production in Alaska, 1960-2009




*Source: Source: USDA (NASS)*

A survey of producers at a livestock conference named "affordable quantity and quality of feed," as a key limitation to expanding Alaska's meat market (Rowell, Shipka, Greenberg, Gerlach, & Paragi, 2011). Some say that Alaska is in a perpetual state of hay shortage (Hollander, 2013), however, it is unlikely that producers will rush to fill this market opportunity, given natural resource constraints — soil quality, weather, growing season, etc. Much of the land formerly used for forage production has now been converted to use in development.

**A survey of producers at a livestock conference named "affordable quantity and quality of feed" as a key limitation to expanding Alaska's meat market.**

The value of hay production in the state has barely increased since 1960, even though the number of tons of hay produced has risen steadily during that time. Following a peak in 1975, when more than $12 million of hay was produced by state farmers (in 2014 dollars), the value decreased steadily, reaching a low point in 1996, and climbing to higher levels in recent years, as the price of forage has increased (Chart 8).

Here, too, there has been a shift away from the Mat-Su Valley toward the Tanana Valley (including the Delta Junction region). Mat-Su farmers sell about as much hay today as they

did at statehood, while the value of the crop in the Tanana region has more than tripled during the same time period. Yields per acre have diminished for state farmers, from 1.52 to 1.15 tons/acre.

**Vegetables, Fruits, and Specialty Crops**

Vegetable production has a long and contentious history in Alaska. Sometimes referred to as "outpost agriculture," gardening was and is an essential component of Alaska's food security. While it is strongly believed that gardening was introduced by early Russian explorers in the late 1700s and early 1800s, and became a widespread practice in the early 19th century (Gorman, 1998), there is some evidence that supports earlier potato and root production by Native populations (Zhange, et al., 2010). Gardeners in remote locations also report that many of their predecessors learned their skills from miners who decided to settle in Alaska. In the late 1890s, when agricultural experiment stations were established, specialized vegetables and fruits were bred for Alaska's unique growing conditions (Gorman, 1998).

The influx of settlers to the Matanuska Valley in the 1930s established a vegetable industry alongside the dairy industry. During World War II, an increased military presence provided a valuable market for these growers (AlaskaWeb, n.d.) (Alaska Humanities Forum, n.d.). While dairy was the primary industry, potatoes ranked a close second, followed by poultry, and then vegetables, in household income. According to these same records, 9% of the colony's acreage was in potatoes and vegetables while 76% of the land was dedicated to pasture, hay, or silage. Nearly every farmer produced vegetables, but only 5% considered themselves primarily vegetable producers (Irwin, 1953).

The commercial production of vegetables and fruits is still an important slice of the state's agriculture. Many conditions make vegetable and fruit production an unexpectedly strong

*Turnips stored at Meyers Farm in Bethel. Photo © Ken Meter, 2014.*

part of Alaska's agriculture. Short growing seasons, permafrost, extreme weather events, poor soils, wildlife, limited distribution networks, and stiff competition from Outside make vegetable production a hero's mission. However, the solar gains associated with Alaska's extended-day summer growing seasons give vegetables, fruits, and flowers brighter colors and higher sugar content.

**In the late 1890s, when agricultural experiment stations were established, specialized vegetables and fruits were bred for Alaska's unique growing conditions.**

Innovative and enterprising farmers are finding their way, particularly given the growing consumer demand for locally sourced foods. Producers are developing particular niche industries such as potatoes, seed potatoes, most root crops, most greens, and most brassicas (kale, collards, broccoli, etc.). Indeed, cool weather crops with a short growing season and characteristics suitable for long-term storage could lay the foundation for a vibrant and sustainable specialty crop industry. Some farmers are producing year-round near hot springs, and some are producing hydroponic greens under artificial light through the winter. USDA

reports that it has spent $4 million in Alaska in recent years sharing with enterprising growers the cost of season-extending high tunnels (Food Manufacturing, 2014).

As specialty crop farms get larger, they tend to specialize, producing more quantities of a smaller variety of crops. This is certainly the case in Fairbanks, where more seasoned producers report growing more storage crops as the farmers market and CSA marketing channels become saturated with younger and greener farmers and homesteaders. Although these transitions reflect a dynamic and innovating industry, it is not as simple as growing more carrots and less lettuce. Additional infrastructure is required, such as appropriate storage facilities with several climate-controlled rooms, for various classes of vegetables.

**Additional infrastructure is required, such as appropriate storage facilities with several climate-controlled rooms, for various classes of vegetables.**

Certain farms have located near geo-thermal areas giving them the advantage of warmer soil temperatures and sometimes lower energy costs. Chena Hot Springs resort, for example, reports that it produces considerable proportion of the resort's requirements. A new, small vegetable farm has also been established near Manley Hot Springs. Where these farms are more remote and experience additional time travel burdens, they may have a competitive advantage when it comes to producing long season and/or hot crops such as eggplants, tomatoes, and squashes. Some growers, however, report that the local hot springs are too distant from population centers to be practical, or that winter weather including fierce winds or massive snowfalls have posed difficulties.

### *Potatoes*

At times, the value of the Alaska potato industry has been equivalent to the dairy industry, and potatoes and seed potatoes have long been one of Alaska's only export crops (Lewis & Pearson, 1998). Russian fur traders are largely credited with bringing potatoes to the coasts of Alaska. From there, coastal Native populations gave other Natives potatoes (Suttles, 1951). Genotyping, however, suggests that select Native Alaskan varieties were more likely sourced in Mexico or Chile, not Europe, suggesting that Spanish explorers (or even Native traders) brought potatoes to Alaska, not Russian fur traders (Zhange, et al., 2010). Families in several southeastern Alaska villages would plant potatoes on a south-facing beach in a somewhat remote location, and return during the season to weed their plot (Kunibe, 2014). Others planted potatoes in hunting or fishing grounds; these were given as prize gifts, along with salmon, to visitors (Muir, 1915). Regardless, potatoes were considered a lucrative commercial crop during the boom of the trapping and mining industries, and it continues to be a valuable commercial crop in Alaska.

Potatoes are currently the third-most significant Alaska food crop, with a total of $2.5 million sold in 2012, down from $3.6 million in 2011 (Chart 9). Major potato sellers in the Mat-Su region report that they tend to sell out their stocks in early spring each year. Production is slightly higher than it was at statehood, but has fallen in the past few years.

**Potatoes were an even more significant crop at statehood, when this was a $5.6 million industry (in 2014 dollars).**

Yet, as Chart 10 shows, potatoes were an even more significant crop at statehood, when this was a $5.6 million industry (in 2014 dollars). Population has tripled since that time. About 730 acres were in production in 1960, nearly the same as today, and yields are only slightly higher today, so production at statehood was similar to current levels. What has mostly changed is that the price has fallen, so farmers earn less for each acre they till.

Yet these statewide trends mask interesting regional differences. The Mat-Su Valley produces about as many potatoes today as it did in 1960, but the Tanana Valley produces far less, having dropped from over $2 million in sales to about $0.5 million (Chart 11).

Seed potatoes, some say, can be a profitable export crop. The relatively virus- and insect-free growing conditions in Alaska produce a particularly high quality seed potato. This is one of the only seed potatoes allowed for export to Asian markets (Tarnai, 2014). Yet attempts in the last 2-3 decades to boost the seed potato market have yielded mixed results. Research funded by a state manufacturing grant uncovered some viruses not previously observed. The lack of observed symptoms is attributed to Alaska's unique growing conditions — infected potato plants may grow vigorously under extended-light conditions, despite the virus (Tarnai, 2014).

However, original financial projections for an emerging seed potato industry were overstated, promising a potentially unrealistic export market size and price (Forgey, 2010). Strong international relationships with China and Taiwan were not established. Finally, an audit in 2012 by the Division of Legislative Audits decided that the program would never cover its own costs, let alone pay back initial investments. Over the course of nearly thirty years, the state invested $5.5 million dollars into the seed potato program, only to produce revenues of $250,000-750,000, according to the audit report (Forgey, 2012). However, some reports state that large seed orders from China are likely, pending a clean virus evaluation (Tarnai, 2014).

**Over the course of nearly thirty years, the state invested $5.5 million dollars into the seed potato program, only to produce revenues of $250,000-750,000, according to the audit report.**

If Alaska wished to become self-sufficient in raising potatoes, it would need to produce about 85 million pounds of potatoes. State farmers currently produce about 18,000 pounds per acre, so approximately 4,700 acres would be required for the state to produce all of its own potatoes — a six-fold increase over current levels. Since this crop lends itself well to storage and further processing, this also appears to be an attainable goal.

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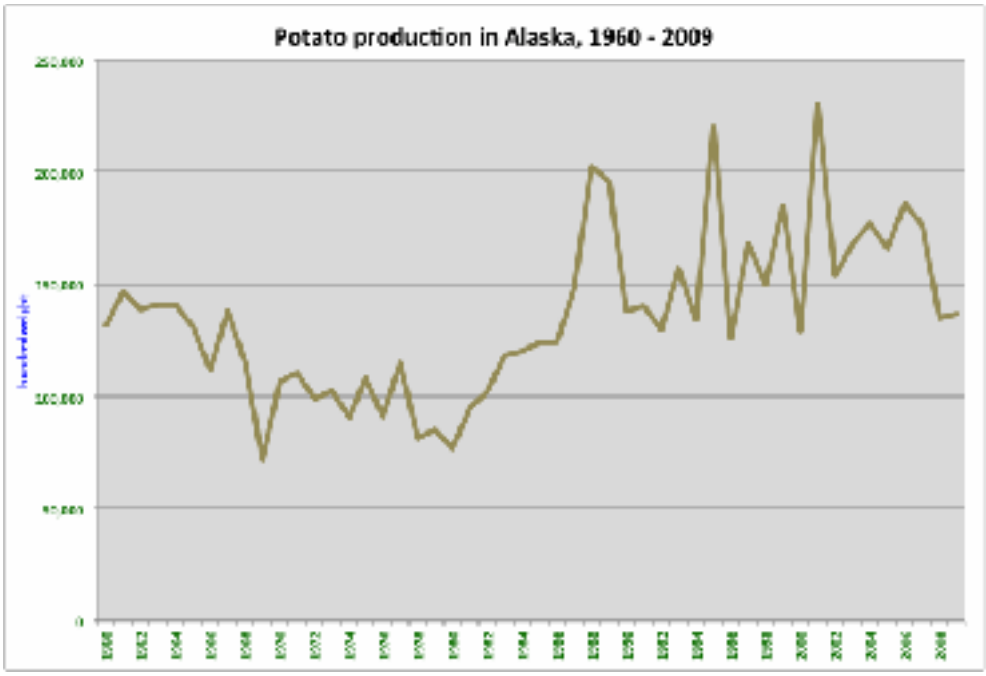
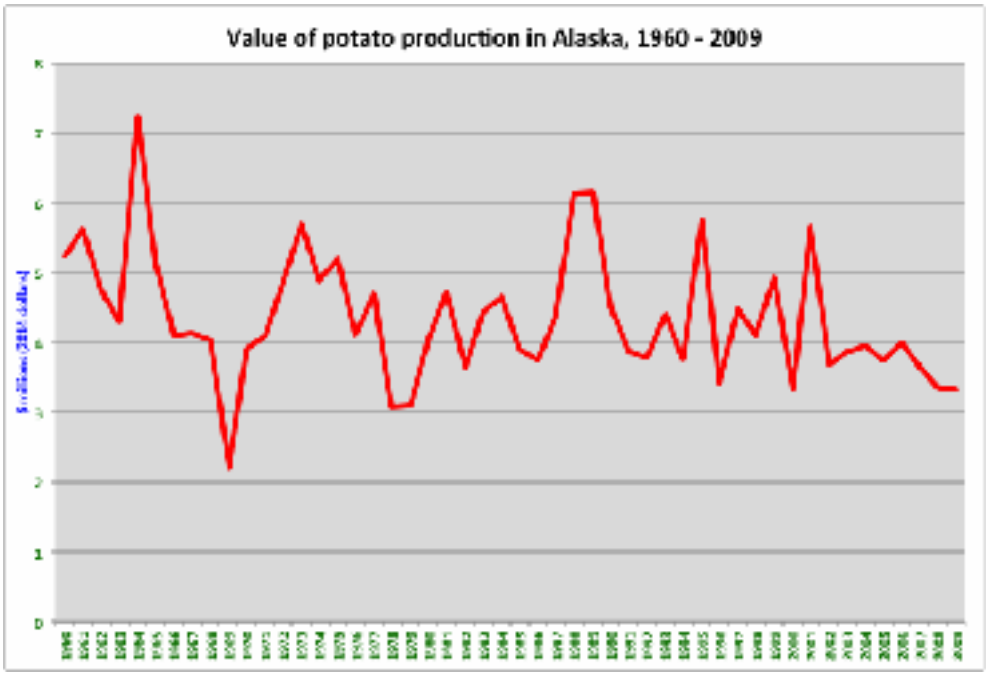
Assuming that state farmers were able to identify sufficient land to produce all the potatoes the state required (for current levels of consumption, which could change if local foods were prioritized). Assuming that Alaska consumers committed themselves to buying these potatoes, then sales of potatoes alone could rival the sales of all other crops and livestock currently produced in the state — with potato sales reaching potentially $21 million per year.

### Chart 9: Potato Production in Alaska, 1960-2009



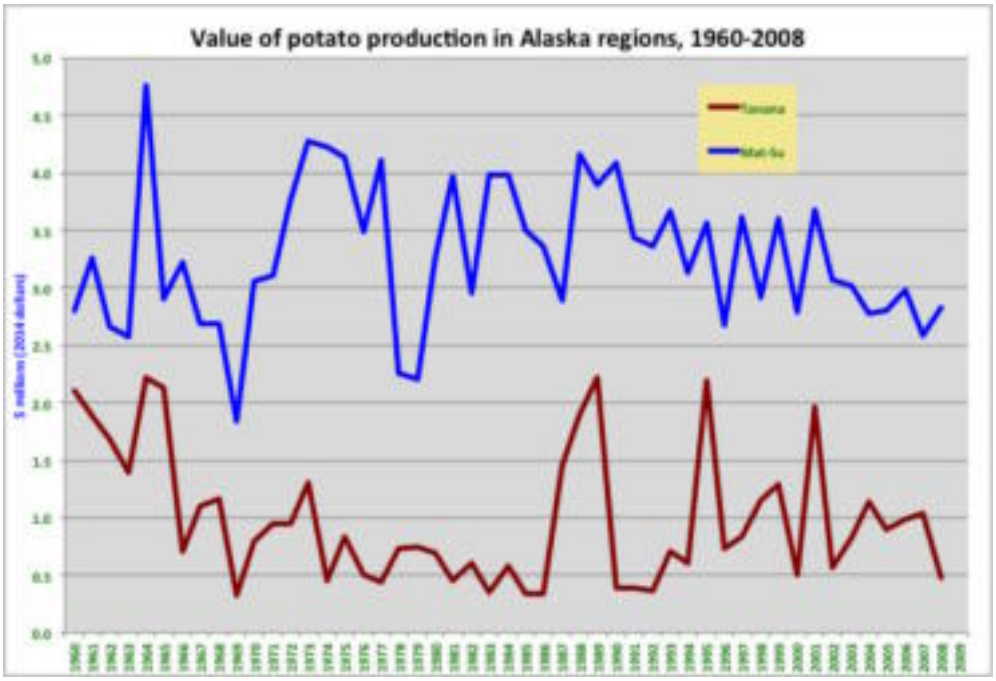

*Source: USDA (NASS). By weight.*

### Chart 10: Value of Potato Production in Alaska, 1960-2009




*Source: USDA (NASS)*

### Chart 11: Value of Potato Production in Alaska Regions, 1960-2008




*Source: USDA (NASS)*

*Potatoes stored at Meyers farm in Bethel. Photo © Ken Meter, 2014.*

*Carrots*

Alaska carrots are renowned for their sweetness, brought on by cool temperatures just before harvest, which induces the carrot root to convert carbohydrates into sugars. Many farmers and chefs consider this a superior product when grown in Alaska. Moreover, it is a crop that grows well in many parts of the state, a staple even above the Arctic Circle, because its placement in the soil helps protect it from cold nights. Carrots are a particularly valuable crop to Alaska. Despite their long growing season, they can be started and finished in cold soils, and even stored directly in the field with enough preparation. Under optimized conditions, they can be stored for four to eight months with only marginal loss.

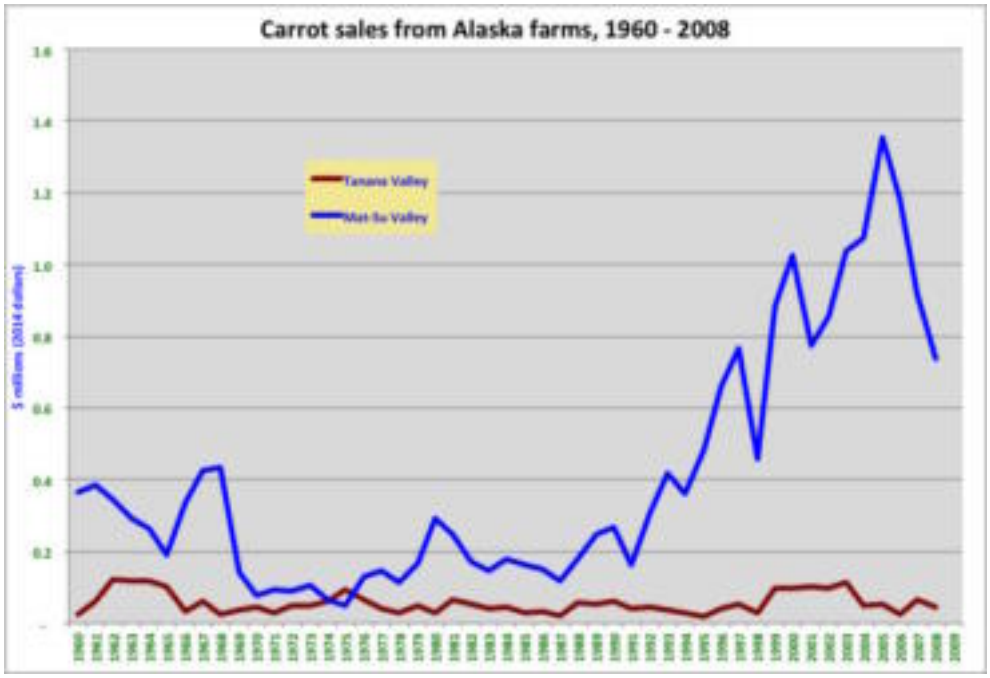
Carrot production has risen considerably in the Mat-Su region, as Chart 12 shows. There has also been a steady, but limited commercial production in the Tanana Valley region.[9] About $800,000 of carrots are currently sold by state farmers each year, making this a significant commercial industry. Yet sales from Mat-Su Valley farmers peaked in 2005, and fell by half over the succeeding three years.

[9] For specific vegetables such as carrots, lettuce, and cabbage, sources indicated that specific details covering the number of acres planted and value are likely to undercount the actual situation since small farms are scattered, and much production, especially in villages is not commercialized, so little data would be collected. It is important to take this into account when interpreting the data included in this section, which will be used more for trends over time, than for absolute numbers.

There are about 40 acres of carrots in production (not counting scattered personal and community gardens). This is about the same as in 1960, but production per acre has risen. Since the average American consumes, by ERS estimates, about 10 pounds of carrots per year, and Alaska farmers currently produce about 37,650 pounds of carrots per acre, the state's commercial farmers produce about one-fifth what would be required to feed the entire population an average diet of carrots. This means that if Alaska reserved 200 acres for carrot production each year, and built effective local distribution networks, the state could be self-sufficient, at current levels of consumption. There is certainly enough available land already to grow this many carrots, making this an attractive goal for Alaska to set.

**If Alaska reserved 200 acres for carrot production each year, and built effective local distribution networks, the state could be self-sufficient.**

### Chart 12: Carrot Sales from Alaska Farms, 1960-2008

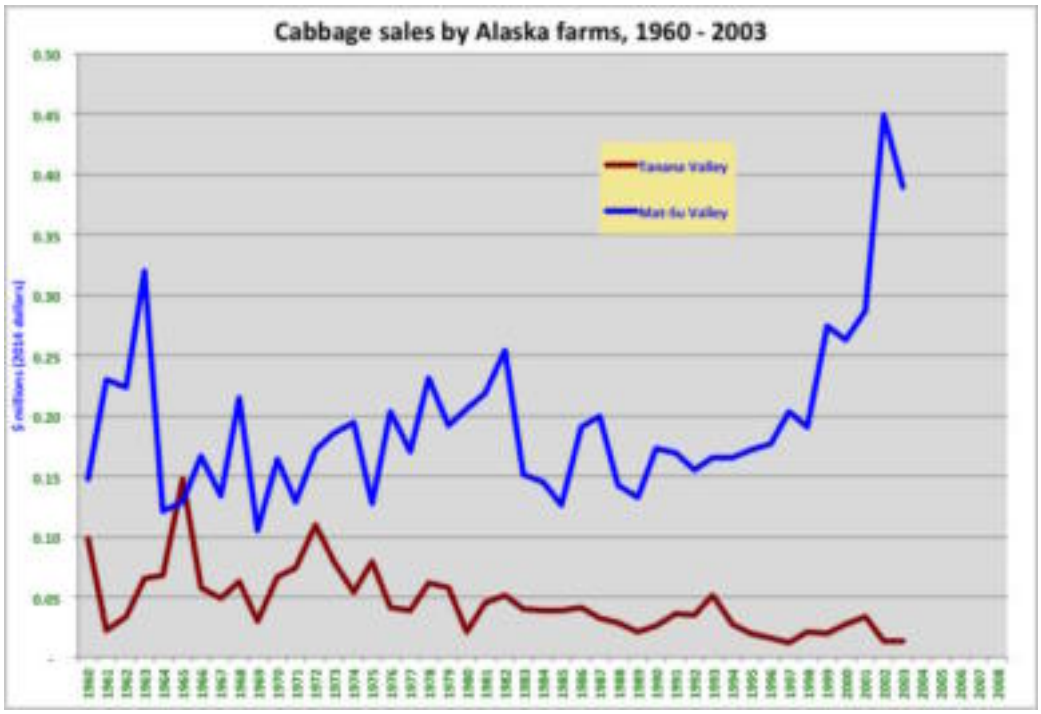



*Source: USDA (NASS)*

*Cabbage*

Another stalwart Alaska crop, cabbage, shows similar trends. Production has increased in the Mat-Su Valley in recent years, as farms have become larger and presumably more mechanized. Yet production in the Tanana Valley has eroded (Chart 13).

### Chart 13: Cabbage Sales by Alaska Farms, 1960-2003




*Source: USDA NASS*

All told, Alaska farmers raised about 35 acres of cabbage in 2008, roughly the same as the acres dedicated to the crop in 1960. Production increased more than five-fold, from 3,600 cwt to 20,500 cwt.[10] Sales have increased considerably, yet when dollars are adjusted for inflation, overall cabbage sales only rose to 1.6 times their 1960 levels.

Alaska would require roughly 200 acres to grow all of the cabbage its population currently requires in a year — about six times the current allocation of land. Assuming these cabbage were all produced in the state and then purchased by Alaska consumers, the total value of this crop would be about $2.4 million per year.

**Alaska would require roughly 200 acres to grow all of the cabbage its population currently requires in a year — about six times the current allocation of land.**

### *Head Lettuce*

After peaking at about 120 acres of commercial production in 1983-1984, acreage devoted to head lettuce in the state has declined to about 40 acres — less than the 50 acres cultivated in 1960. Moreover sales peaked in 1973 at $1.3 million (in 2014 dollars), three times current levels. The decline in sales is attributed to easy access to fresh lettuce from the Lower 48 and Mexico, trucked in to state supermarkets.

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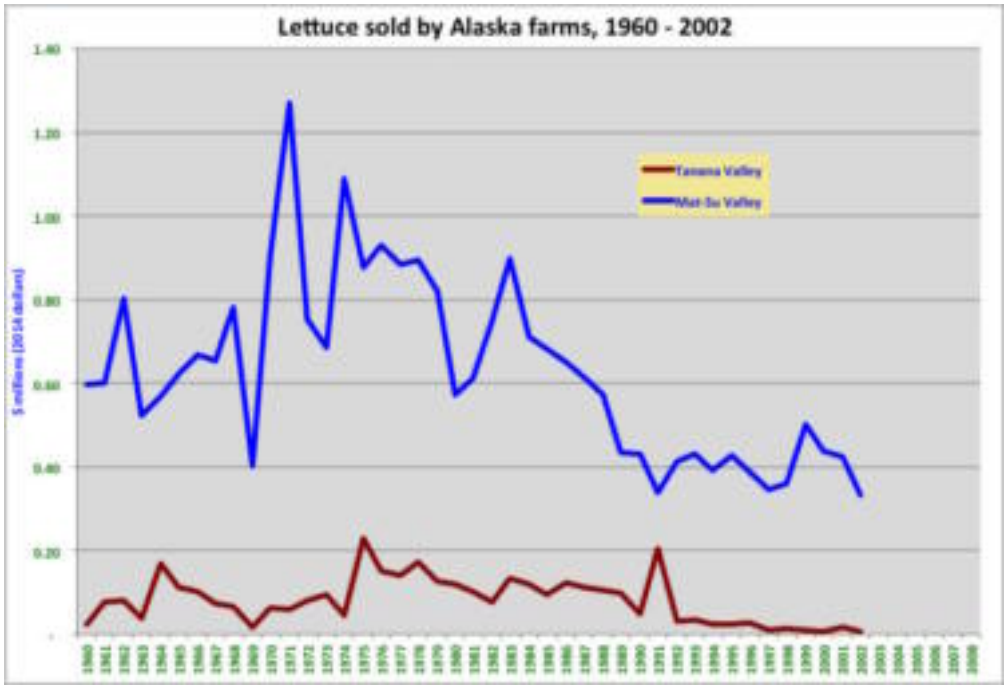
[10] Cwt=hundredweight.

In this case, sales from the Tanana Valley have remained quite flat, while sales from Mat-Su Valley farms have fallen steadily, see Chart 14.

**Chart 14: Lettuce Sold by Alaska Farms, 1960-2002**




*Source: USDA NASS*

Consumers eat about 14 pounds of head lettuce per person each year, so the state would require about 10 million pounds each year to feed its current population. At current production levels (360 cartons per acre with each carton holding about 45 pounds of lettuce), more than 600 acres would be required to feed the state — a 15-fold increase in lettuce production. This would involve sales of about $5 million of lettuce per year. As Alaskans consume more greens for health reasons, this market may well expand.

**More than 600 acres would be required to feed the state — a 15-fold increase in lettuce production.**

### *Hydroponic Microgreens*

Other innovative and determined growers are turning towards hydroponics and grow lights for year-round production of microgreens and other cash crops. Leading this movement is Bill Johnson of Johnson's Family Farm. He sold $100,000 worth of lettuce, greens, and microgreens in 2013, under constrained conditions. He is pursuing a new location where he estimates an upper production value of $200,000 a month. If he can identify these markets, this would make Johnson's Family Farm the 4th-top grossing farm commodity in Alaska.

Even at $100,000 in sales in 2013, he could raise the industry profile for vegetable production. Although these initiatives rely intensively on both energy and

**How much land would be required to provide all of Alaska's demand?**
***[At current rates of consumption. See text.]***

| | acres |
|---|---|
| Potatoes | 4,700 |
| Carrots | 200 |
| Cabbage | 200 |
| Lettuce | 600 |

infrastructure, Bill thinks that hydroponics face nearly limitless market opportunity. Currently, utility costs make up 25% of his expenses, but he feels like this is affordable at the present time. Over the long haul, as fossil fuel costs rise, Bill believes that hydroponics is a clear solution to food insecurity in areas with reliable wind, biomass, solar, or geothermal energy (Johnson, 2014).

### *Cultivated Mushrooms*

Where hydroponic microgreens are making inroads in year round production, cultivated mushrooms can follow. Although the market demand for mushrooms is considerably lower than for microgreens, they require less energy to cultivate. Still, sharp attention to detail and a consistent environment are required for successful cultivation. Although emphasis was put on cultivating mushrooms at the 2012 Annual Sustainable Agriculture Conference in Fairbanks, it has been difficult to identify any commercial production facilities in Alaska. Identified growers declined to be interviewed for this project, insisting that they were still experimenting with the business model.

### *Rhubarb*

A cold-hardy and productive plant, rhubarb is of considerable interest to producers in Alaska. Some hypothesize that rhubarb first came to Alaska with the Russians as a medicinal plant. Although it does have medicinal properties, it is now most commonly marketed as produce. Heavy feeders, and prolific growers, rhubarb plants can produce up to 90 lbs in a season. Further, it is a resilient perennial. Despite these advantages, rhubarb has limited market reach in the state, and growers face global competition from Scandinavian countries. Fresh and frozen wholesale markets are very competitive, leaving direct sales and regionally branded markets (such as "Alaska Grown") the most lucrative for new growers (Bratsch & Mainville, 2009).

Some report using rhubarb in recipes that would otherwise call for tart apples or cranberries. Rhubarb is most often combined with other fruits, such as apples or strawberries. An Alaska

based market study found that wholesale buyers (food distributors, grocers, restaurants) are most interested in fresh stalks, flash frozen chunks, and value added products such as pies, pie fillings, jams/jellies, and infused spirits such as vodka or wine (Solstice Advertising, 2011). Fresh rhubarb is known for dehydrating rapidly, so ready access to processing and freezing infrastructure made be necessary for growers wishing to develop value added products.

### *Fruits and Berries*

For many remote villages, good fresh fruit is considered difficult item to obtain from the store, so people rely upon wild harvests, or pick up fruit when they visit larger cities. In the early 1900s, strawberries, currants, raspberries, gooseberries, wineberries, blackberries, huckleberries, blueberries, service berries, dewberries, buffalo berries, and cranberries were developed and tested by the Sitka agricultural experiment station and distributed to other stations (Gorman, 1998). Strawberries were by far the most successful of the fruit trials (Wooding, 1998), giving rise to many wild Alaskan variety and commercial variety hybrids. Earlier well-growing hybrids had white flesh, making them mostly unsuitable for commercial export markets, but this was overcome in the 1970s with additional research. These full-color berries are still an important commercial crop in Alaska (Holloway, 1998). Wild harvesting of berries for subsistence purposes is an integral part of Alaska's rural food security and Native cultural traditions, as described above.

### *Infrastructure for Produce*

Producers interviewed for this study expressed a general disinterest in expanding their business. They cited increasing efficiency and improving infrastructure as the two most likely pathways to expansion. Few specialty crop producers reported farming without a series of high tunnels and greenhouses. Many feel as though this season extension infrastructure is a downright requirement, and those without the infrastructure list its absence as a barrier to production.

**Producers cited increasing efficiency and improving infrastructure as the two most likely pathways to expansion.**

While some producers have evaluated the financial costs of heating a greenhouse for plant starts, some have found it more economical to import seed trays from places as far away as Florida. As energy prices rise, it will be hard to predict which energy-intensive enterprise will make the most economic sense, let alone environmental sense. This is where greenhouses located in geothermal areas (or running on renewable heating sources, or waste heat from a generation plant or nearby building) may have a real comparative advantage, such as Manley Hot Springs Produce/Dart A&M Farms (Dart, 2014). These more efficient facilities can specialize not just in hot crop cultivation (tomatoes, peppers, eggplants, etc.), but also in vegetable starts for local producers that may have high tunnels, but not greenhouses.

For example, a new farm, Pioneer Produce in Fairbanks, sources plant starts from Dart A&M Farms (Becker, 2014; Tarnai, 2011). Additionally, shared greenhouses for cultivating

plant starts may increase production and provide additional market advantage for producers willing to work cooperatively. New and young farmers in Fairbanks are interested in pursuing this option and the groundwork for cooperation is being laid with the assistance of the Fairbanks Economic Development Corporation (Becker, 2014; Emslie, 2014).

Additional production efficiencies can be gained through increased, specialized storage facilities. One Fairbanks producer reports leaving approximately 2,000 lbs of carrots in the field — after storing 10,000 lbs and selling approximately 30,000 lbs fresh — due to a lack of additional storage facilities. Although this loss only represents 5% of the carrot crop alone, at approximately $2/lb, this amounts to a $4,000 economic loss for one farm in one year because of a lack of adequate infrastructure (Mayo, 2014). It may be financially and logistically impossible for every specialty crop producer to construct their own optimal storage facility, but a shared storage facility can alleviate the burden that such an investment can place on individual producers while also increasing food security and market opportunities in winter seasons.

Many crops that should grow well in Alaska but are not amenable to long term dry storage are still good candidates for flash freezing and are highly versatile. Brassicas particularly dominate this niche, but peas and some hot crops also hold up through the freezing process. At this time, it appears that there is no commercial flash freezing of vegetables taking place in Alaska, although the Point MacKenzie Prison Farm uses this method to process product grown on the correctional farm. This technology is also widely used in the fish industry, and there may be some opportunities for learning from this sector.

The long-term viability of produce storage is dependent on precise and large-scale storage facilities. Yet construction and operation of such facilities will be questionable until sufficient produce is being grown to sustain a multi-million dollar business. In the meantime, Alaska should focus attention on building infrastructure that several farmers in close proximity to each other can use to expand their production and sales incrementally — a food production "node."

**Alaska should focus attention on building infrastructure that several farmers in close proximity to each other can use to expand their production and sales incrementally — a food production "node."**

Such nodes may be one way to create production efficiencies through shared infrastructure suited to a cluster of small farms that are close to each other. Localized infrastructure such as this can also create local marketing efficiencies (Meter & Goldenberg, 2013). Growers expressed interest in shared-storage and greenhouse space in interviews, as mentioned above, but also in an independent survey (Caster, 2011).

Food nodes are described in more detail in
Appendix VI — Potential Food Production Node Components and Costs, page 172.

Currently, a market study is underway to access the feasibility of a local-foods aggregation business and distribution center in Fairbanks. As one young producer characterized the delicate negotiations among farmers and wholesale buyers, "Right now, we're at a stalemate. Both sides need to make compromises or we will have to go on living without each other." (Becker, 2014).

## Livestock and Dairy

*Cows and Cattle*

Cattle were first introduced by the Russians on many of the islands. However, many of these cattle provided little more than additional prey for the local bears. Some of these introduced longhorn cattle became feral and in the 1980s, were rounded up and shot (Brown, n.d.). The United States' acquisition of Alaska encouraged farmers to start additional cattle and dairy herds in the late 1880s, but predation continued to be a major issue. Agricultural experiment stations focused on raising cattle in the Kenai Peninsula until the Matanuska Colony project, which ultimately concentrated the agricultural industries in the Interior (Brown, n.d.).

Alaska's pastures should provide ample opportunity for cattle raisers to grow grass-fed beef as consumers begin to demand this product. Yet due to Alaska's climate and seasons, cattle and other foragers can only graze approximately 100 days of the year, relying on hay and feed stores for 75% of the year (Brown, n.d.). Furthermore, range permits can be hard to come by. In years when weather events (drought, too much rain, late or early freezing) cripple hay production and range pastures, cattle producers either have to import expensive hay from Canada or the Lower 48, or they have to cull their herds before winter, as was the case in 2013 (Hollander, 2013). Widespread culling puts additional stress on the few commercial processing facilities at a time when these facilities are also trying to process game, and also lowers the price farmers can obtain.

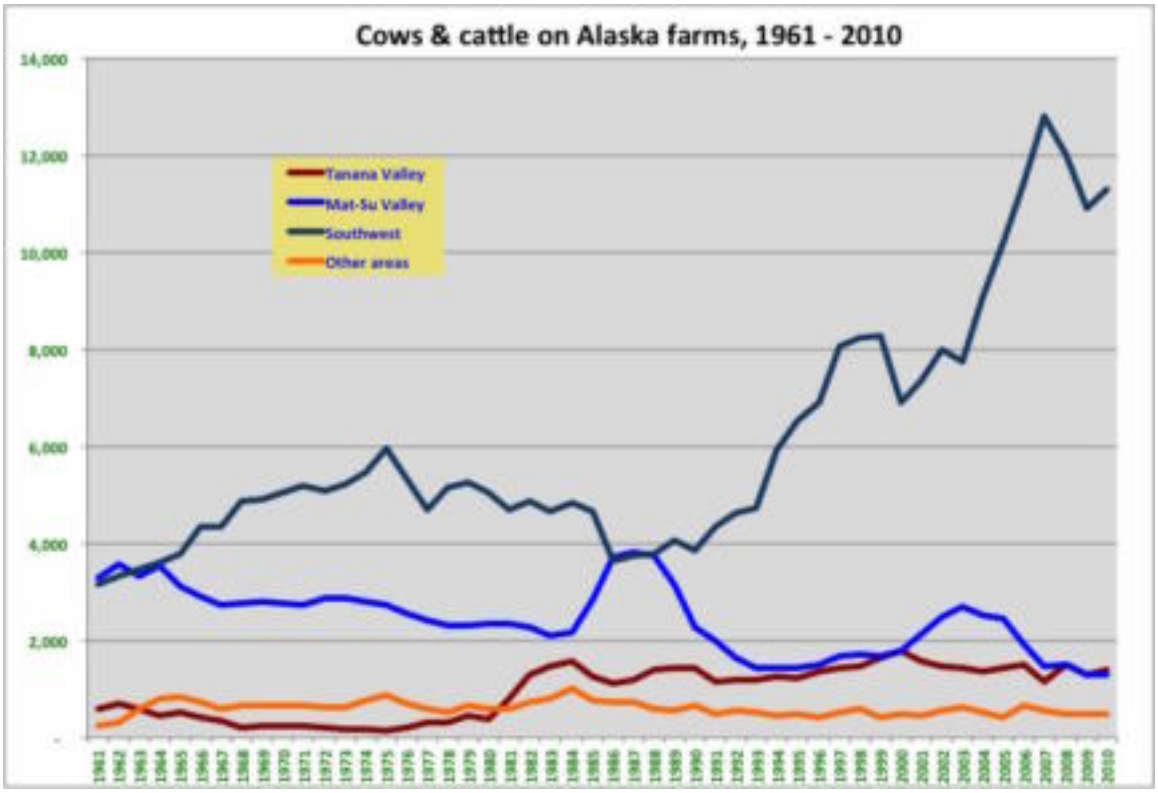
The number of cows and cattle being raised in the state has increased from 8,000 to 14,000 since statehood. Production of cows and cattle has shifted from the classic farm areas of Alaska to the Southwest, as the next chart shows (Chart 15).

Meanwhile, the value ascribed to each animal by state statisticians has fallen by about half, once inflation is taken into account, Chart 16. Since these data cover live animals, rather than the number of animals that are harvested, it is difficult to make solid comparisons that connect these animals with the beef that Alaskans eat.

**The number of cows and cattle being raised in the state has increased from 8,000 to 14,000 since statehood. Meanwhile, the value ascribed to each animal by state statisticians has fallen by about half, once inflation is taken into account.**

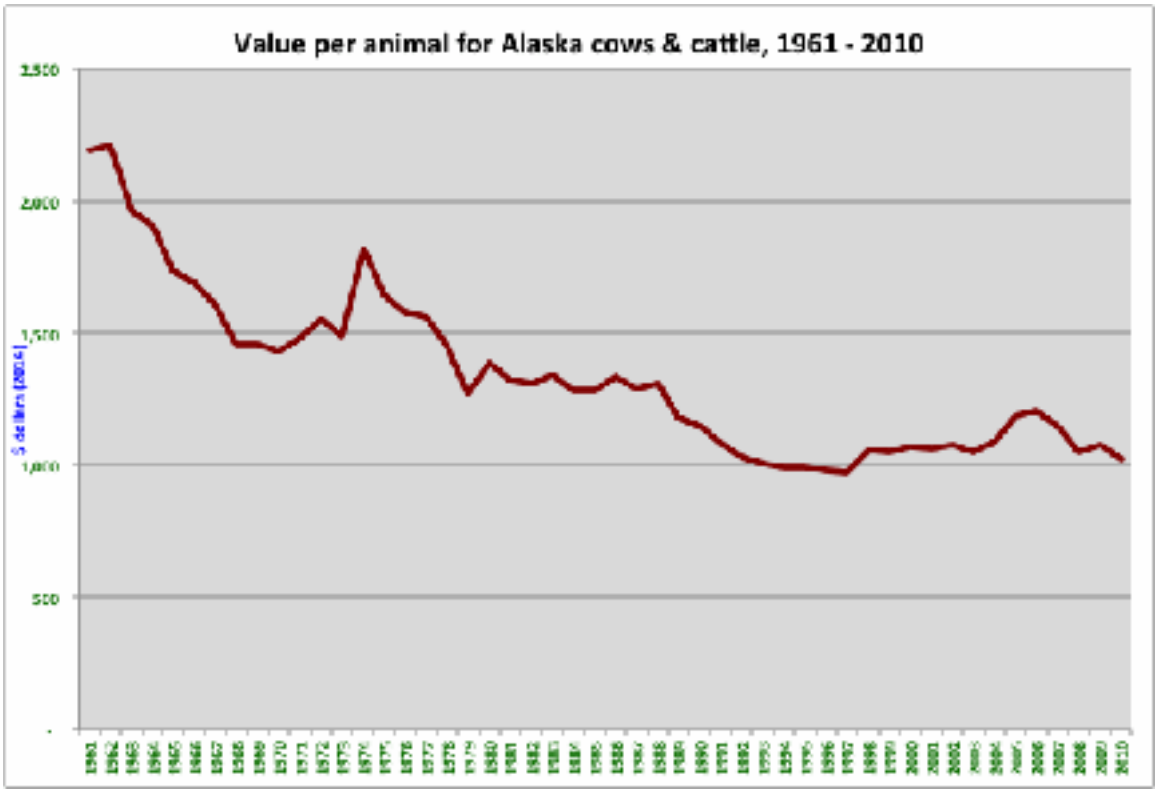
As in the rest of the country, niche meats are a growing market. Independent grocers interviewed for this study report a general inability to secure a steady supply of local meats, and interviewed producers would prefer not to sell their product wholesale. Often times, animals are sold directly to consumers as halves and quarters before they are even dispatched. Beef products, interviewed grocers report, are easier to find than pork products. Several interviewed cattle ranchers are interested in developing herds specifically for farm-to-school programs, however, a herd can take two years to establish in Alaska and the farm-to-school program only won permanent funding in the most recent budget. Guaranteed funding across many years would provide much desired market opportunities for cattle ranchers.

### Chart 15: Cows and Cattle on Alaska Farms, 1961-2010




*Source: USDA NASS*

**Chart 16: Value per Animal for Alaska Cows and Cattle, 1961-2010**




*Source: USDA NASS*

***Dairy*** *(See also Introduction)*
The lack of stable dairy processing facilities in recent years has forced dairymen to get creative or get out of the business. Those who remain have forged strong connections with their consumers through direct channels. This has given rise to two processing and distribution channels. Some producers are selling raw milk through "cowshares" while others — Northern Lights Dairy and Havemeister Creamery, the only two remaining commercial processors — have invested in their own processing equipment (Tarnai, 2013; Caldwell, 2013).

Although the demand for locally grown and produced products is strong — existing dairies report being able to sell everything they can produce — and value-added dairy products (ice cream, cheese, yogurt, etc.) have the added advantage of longer shelf life, its difficult to determine whether or not an industry based on livestock is viable in Alaska. If Matanuska Maid's business model of importing fluid milk proved to be unsustainable in light of rising shipping costs (See Lessons Learned, page 31) surely a livestock industry dependent on importing hay and feed supplements is equally unsustainable.

Indeed, this case was made in a report to the Alaska Dairy Industry Ad Hoc Committee in 2006. Due to the lack of prime feedstuffs grown in Alaska and the costs associated with

importing, Alaska's dairy cows consume subprime feedstuffs (for dairy, and even at times, for beef cattle) resulting in lower milk production per cow than industry standards. This report goes on to highlight the lack of support services (veterinary services, hoof trimming, reliable cull processing, artificial insemination) that also contribute to the success of dairy industries. In 2006, before Matanuska Creamery folded, the conclusion was that the Alaska dairy industry did not have the critical mass of cows or milk to thrive given increasing transportation costs and constrained natural resources (Shipka, 2006). Further, grocers use imported milk as a "loss leader" to attract customers to supermarkets, making the price difference even more steep. Yet as transportation costs continue to rise, local production would be favored at some point as long as its inputs are also locally sourced.

For all intents and purposes, a traditional, large scale, commercial dairy industry is not well suited for Alaska unless it were to seal its border from imported milk. Instead, the current future of local dairy depends on small, localized efforts — dairies that can produce and manage their own feedstuffs efficiently in order to not succumb to increasing shipping costs, and ones that can fully utilize all products associated with dairying including culled cows and bulls, and manure. The success of these specialized dairies is wholly dependent on reliable customer loyalty, and offering a safe, predictable product. The more they can create their own fertility through manuring and rotation, the more resilient the farm would be.

**The current future of local dairy depends on small, localized efforts.**

Although direct and retail demand for local dairy products appears to be high, suppliers declined to be interviewed for the purposes of this study. At the time of this study, one-time industry leader Matanuska Creamery was the subject of federal fraud investigation.

### *Pork*

While Alaska farmers have been raising hogs for more than a century, and high-quality local pork is sometimes available at Anchorage restaurants, commercial-scale production has recently been an elusive goal — once again due to the presence of competing products from the Lower 48.

Many chefs and grocers report that supplies are quite limited. At least two farms raise high-quality pork in the Matanuska Valley (Sun Circle Farm; A.D. Farm.). Yet one grocer explained in despair that he often has to buy a live pig and pay for the slaughter since processed pork is hard to get ahold of, and bacon is even scarcer.

Once again, if pig production relies on grains and other protein-dense feedstuffs not readily grown in Alaska, commercial pork production could be problematic. Yet hogs may also be able to thrive on food scraps or other local feedstuffs.

One of the Delta Junction farm projects launched in the 1980s was a 300-sow hog farm. This enterprise was part of the first round of foreclosures, however. Ultimately, a new owner was able to save the operation and maintain it as a private business at least until 1998

(Lewis & Pearson, 1998). Real estate records reveal the construction of an 80-sow hog facility in 2007. This has been for sale for at least a year and is operating with 100 hogs (J. Riley Realty, 2013).

Pork scarcity could potentially get worse due to widespread Porcine Epidemic Diarrhea virus PEDv in piglets and resulting piglet mortality in the United States and Canada in 2013 and 2014. This epidemic has wreaked havoc in other countries but had previously not been an issue in North America. Alaska's separation from the rest of the Lower 48 may prove to be an advantage, but its path should be monitored closely.

**If pig production relies on grains and other protein-dense feedstuffs not readily grown in Alaska, commercial pork production could be problematic.**

*Sheep, Fiber, and Wool*

Sheep were also imported by the Russians in the 1800s, and ultimately also served as bear bait. Surviving populations were mostly used for wool production since meat did not prove to be very economical. The Aleutian Islands were stocked in the early 1900s with 500 sheep at Dutch Harbor. This gave rise to budding wool industry that never quite overcame transportation costs (Sims, 1962).

There is a small market for lamb, however, some lamb producers report that it is hard to move. The American Sheep Industry Association reports no wool processers, wool or lamb wholesale buyers, wool pools, or auction barns in Alaska (2014). Moreover, musk ox seems to be the preferred fiber produced in Alaska. Still, some small sheep farms have found niche markets selling wool directly to local spinners, weavers, or knitters.

Sheep may be favorable to Alaska's growing conditions since they are known for eating a broad range of forage, including weeds, and can thrive even on subpar feedstocks; however they are also more susceptible to predator attacks due to their size. The overall trend away from animals that require imported feed towards animals that can forage may enhance a sheep industry. However, the Lower 48 lamb industry has suffered for many years in the face of cheap imports from New Zealand.

*Reindeer and Bison*

In the late 1800s, domesticated reindeer were imported from Siberia as an experiment, and for purposes of diversifying the resource base of Native Alaskan populations. After initial successes, and drawing upon government appropriations, more reindeer were imported and distributed in western Alaska. Scandinavian herdsmen were invited to lend technical expertise. In the early 1900s, when Scandinavians owned more reindeer than Native Alaskans, efforts were made to increase ownership by Native populations. In 1937, the Reindeer Act was passed, limiting reindeer herding to Native Alaskans. During this time, the reindeer population peaked at 640,000 head. In recent years, Alaskan reindeer populations

were estimated at 20,000 head. The reduction in population is attributed to herd management shortcomings, to predation, and the ways that reindeer will join wild caribou migrations, as discussed in the Introduction (Bucki, 2004) (Alaska Humanities Forum, n.d.).

Historical reports indicate a commercial market for reindeer initially driven by gold miners. Initial attempts to sell reindeer meat into broader U.S. markets were thwarted by campaigns by cattlemen to classify reindeer as game. In states where these campaigns were successful, reindeer meat could not be sold without a special permit. Still, there were small markets for hides and horns outside of Alaska (Alaska Humanities Forum, n.d.).

Some believe the ticket to a vibrant and sustainable Alaskan livestock industry is reindeer and considerable effort is being put into developing a market for it. Currently considered a luxury meat by some and a game meat by others, many say its flavor is superior to beef. Reindeer thrive on sparse tundra lichens, and graze more effectively in the winter than cattle or sheep, due to their ability to scrape through layers of snow to reach native vegetation. This gives northern lands a comparative advantage.

**Some believe the ticket to a vibrant and sustainable Alaskan livestock industry is reindeer.**

Current policies prevent the herding of native reindeer, an animal that lends itself well to domestication, by nonnatives. Yet some nonnative herdsmen have gained permission to raise domesticated reindeer imported from Canada, sometimes in confined feeding operations. In some regions, however, domesticated reindeer (which generally roam free on open range) have taken up with migrating caribou herds, joining the herds of the larger animals when they move away. Thousands of reindeer have been lost in this manner; herdsmen in the Nome area, for example, are waiting for the caribou migration cycle to wane and then plan to build corrals and monitoring outposts to keep their herds separate from migrating caribou.

Proponents of reindeer herding insist that, without domestication, this species will die out. Others think that, at least initially, reindeer meat will be a luxury meat with limited appeal and market reach, doing little to contribute to Alaska's food security, but creating new market opportunities, none the less. To this end, confined reindeer feeding operations have been developed in Delta Junction, Nenana, Palmer, and Homer (Shain, Finstad, & Prichard, 1998).

However, one cattle producer we interviewed insists that bison is actually the future of meat production in Alaska, that they produce "more bang for the buck." Similar to reindeer, a wood bison population was imported from Canada, but reports claim it will be several years before meat can be harvested from this population. Some Delta Junction ranchers farm plains bison, which are native to the grasslands of the lower United States (Paragi, Gerlach, & Meadow, 2010). Yet bison wander freely and eat as much as half their food supply from hay and barley raised on nearby agricultural land. In addition to eating the crops, bison

damage plants as they walk through the fields. This has led farmers to call for bison ranges to be fenced in (Associated Press 2011).

*Meat Processing and Infrastructure*

Meat processing options are limited; three USDA inspected facilities exist in the state. Two are privately owned and one is state-owned. The two private owned shops in Fairbanks and Delta Junction cater to local ranchers and hunters alike, while the state-owned facility in Palmer only processes livestock.

Additional processing options are available, particularly for game. Some small processors serve as their own anchor customer, essentially raising and processing all their own animals. One explained, "We started this business to support my father's cattle habit. The facility paid for itself in 6 months. One rancher stopped raising pork, so we started doing that. We've brought a lot of stability to this industry," (Pinkleman, 2014). None of the other USDA facilities are running at capacity. "Give me a week and I could dispatch every animal in Alaska," Pinkleman declared (2014). Two private processors welcome additional business, especially in the late winter or early spring when demand from hunters lessens. During the fall, these packers forgo inspection to custom process game. Several said they are interested in expanding their businesses by offering more value-adding processes such as smoking and seasoning, but ultimately this requires more throughput. These smoked products command a premium in the marketplace and niche retail outlets commend these products for drawing in tourists. Processors, grocers, and industry analysts all support the need for more livestock production to meet the growing demand for local products.

**Meat processing options are limited, and producers are concerned about the quality of cutting performed in some operations.**

Producers are concerned about the quality of cutting performed in some operations. "You know when you get one leg and three shoulders that something isn't right," one producer said. Reliance on direct markets means farmers are more sensitive to the quality and integrity of their processor. Although new processing facilities is not the answer to this concern, specific trainings for the existing processers and their staff may go a long ways to improving the quality of the end product. Finding qualified staff is also a barrier — one processor lamented her inability to hire anyone who has worked with meat, let alone broken down a whole carcass (Pinkleman, 2014).

The state-owned facility in Palmer, Mt. McKinley Meat & Sausage, was built in the 1980s with state-backed loans to private developers. However, within a few years, the facility was repossessed due to defaults to the Agriculture Revolving Loan Fund. The facility is still open, state-owned, and running at a loss. Many attempts have been made to transfer it to private ownership, but these attempts have been unsuccessful. The facility has transferred management from the Division of Agriculture to the Department of Corrections and back again, however inmates continue to supply labor. A 2003 study identified several strategies for increasing efficiencies at the plant, and the implementation of these recommendations

has decreased operational shortfalls. Despite this, the facility continues to lose an average of $110,000 a year (Nix, 2009). The facility is required to purchase and process all safe animals, providing a needed service to the area producers, and work experience to inmates in an industry where skilled labor is in short supply (Davies, 2007; Nix, 2009).

Clearly, though, these processing options hold limited utility for farmers who wish to raise livestock in other parts of the state. In remote places, mobile processing units are often desired. Nome, for example, is creating a mobile unit for reindeer processing. Although mobile units may not be commercially viable as a full-time operation in such remote locations, this style of processing, run on a part-time basis, has proven its utility when other alternatives are distant — for example on the islands in Puget Sound.

### *Future Potential of Livestock*

Raising more animals is certainly one answer to the question of meeting demand in a state that hosts lush pastures. There is no question that healthy cattle can be raised in Alaska. One entrepreneur believes there is room for a commercial industry predicated on marketing cattle raised in remote regions where the air and water are clean.

Yet it is not simply a matter of raising cattle; these also must come in at a competitive price, and processing and distribution must be equally competitive. For many reasons — access to land, feed, labor, and processing — production costs may be inherently lower outside of Alaska.

Fertility of the soil is one issue. Homer cattle producers graze on public lands with little need for added fertility, and one of the promises of the Tanana agricultural project is that state lands may become bountiful pastures for cattle.

Even in the case of pasture-raised cattle, however, some producers rely on imported fertilizer for nourishing their hay fields. Other farmers rely upon imported grains; this will also pose difficulties. Ultimately, a livestock industry that heavily relies on imported feedstuffs or nutrients is no more secure than a population that relies on imported food.

**Ultimately a livestock industry that heavily relies on imported feedstuffs or nutrients is no more secure than a population that relies on imported food.**

Seasoned livestock producers also point out that ranching is land and capital intensive. Young farmers not slated to inherit a farm are unlikely to be able to start a ranching enterprise without considerable assistance. Several producers report difficulty accessing capital, even when having matching equity and a history of farming. As one said, "livestock is not on the winning side of the equation."

Yet others are far more optimistic. Creation of the proper infrastructure once again will be the key. One group of investors has pretty much set out the challenge: to define and create a

commercial livestock industry, as part of a long-term commitment by the state to build an entire system of production, processing, and distribution (see below).

### *Poultry and Eggs*

A handful of homesteaders and hobby farmers raise birds for eggs and sell them to restaurants, small grocers, hotels, and the like. Margins are considered slim at best from the producer's prospective. However one small grocer reports being able to sell all the eggs they can get their hands on, even with a 20-30% mark up, while another grocer reports only being able to get a 5% mark up.

The only small farmer interviewed who had experience raising poultry for meat production has abandoned this operation due to the rising cost of feed and shipping. In his opinion, it only makes sense to raise animals that can wholly rely on what he can grow. Like pigs, poultry have higher protein requirements than other livestock, thus they place additional burdens on producers to raise protein-rich grains or import supplemental feed.

*Chickens roam inside a greenhouse at Meyers Farm in Bethel. Photo © Ken Meter, 2014.*

This producer felt that the on-farm exemptions for poultry processing were sufficient for any market farmer or homesteader willing to do the work. Grocers confirmed that they are unable to source local poultry and instead import it from Canada. There is no specialized poultry processing facility in Alaska, and no real indications of a need for one at this time.

Often, poultry margins are increased by processing on-farm and substituting out commercial feed for pasture and scraps. If an appropriate mix of feed rations can be derived from local grains and minerals, even large-scale poultry may find a viable market in Alaska. Industrial-scale poultry barns don't have a large footprint since hens are raised under artificial light year round. One chicken farmer raises chickens underground to avoid heating costs.

Co-location of commercial poultry production and processing facilities may bring additional economic and food security opportunities to Alaska. However, this idea should be explored carefully. The success of such an industry is wholly dependent on the development of a local intermediate-inputs industry — feeds, bedding, and supplements. Historic models of industrial poultry production have brought very little, if any, wealth to the producers themselves. Financial gains are usually realized further down the supply chain, except in the case where cooperatives are effectively employed.

**The success of co-locating production and processing in the poultry industry is wholly dependent on the development of a local intermediate-inputs industry — feeds, bedding, and supplements.**

A dispersed commercial poultry industry relying on many independent producers may not compete well with a more integrated firm. Processing efficiencies may be lost. A vibrant producer group that works effectively together would be required to keep a poultry processing facility profitable.

**Mariculture**

The cultivation of shellfish in the open ocean is as important financially as the growing of many crops or livestock in Alaska. Chart 17 below shows the value of the main products. Oyster sales have been fairly steady at about one-half million per year since 1994. Clam sales peaked at $200,000 in 2004, and mussels are a relatively small proportion of mariculture sales. This industry was recently funded to develop and implement a strategic plan to build the sector.[11]

[11] http://www.afdf.org/wp-content/uploads/Concept-Paper-Alaska-Mariculture-Initiative-050114.pdf

**Chart 17: Sales of Main Mariculture Products of Alaska, 1990-2012**

*Source: Alaska Department of Fish & Game*

**Commercial seafood landings**

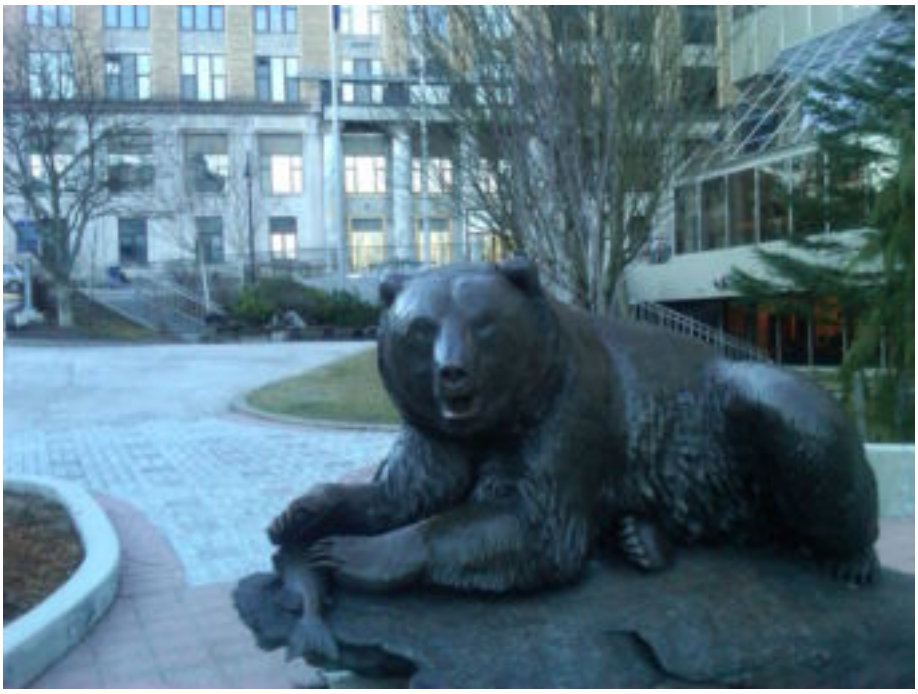
Starting with cod in the 1870s, fishing has always been a major contributor to Alaska's economy. Salmon and halibut quickly followed cod's success. By 1890, commercial fishing was Alaska's major industry. In the 1920s, a tax on canned salmon provided 70% of the general fund revenues for the territory. Still today, fisheries compose 5% of Alaska's economic base (Rasmuson, n.d.), 50% of wild landings in the U.S. are caught in Alaska (Loring, Gerlach, & Harrison, 2013), 95% of salmon caught in the U.S. are wild-caught Alaskan salmon (McDowell Group, Inc., 2013).

Evolutions in fishing equipment increased harvests and led to concerns about overharvesting. The White Act gave Congress the ability to regulate the fishing industry in 1924 (Rasmuson, n.d.). To this day, Alaska's fishing grounds remain some of the most tightly regulated and enforced areas in the world, earning wild-caught Alaska fish many sustainability awards and designations (Loring, Gerlach, & Harrison, 2013; Elliott, 2011). This heavy management and regulation will hopefully allow Alaska's fishing grounds to remain a renewable resource, whereas many wild fisheries around the globe are collapsing, leading to the rise of farmed fish.

Nonetheless, Rachel Donkersloot of the Alaska Marine Conservation Council cautions that

"Although Alaska fisheries are some of the most well managed in the world, we are not without our problems. Recent declines in Chinook salmon returns across Alaska (Yukon, Kuskokwim and Cook Inlet) have led to controversial closures in commercial and subsistence fisheries. There have also been significant cuts to commercial and recreational harvests of halibut given uncertainty about the health of the resource."

*Processing fish in Kodiak. Photo: Alaska Department of Health and Human Services.*



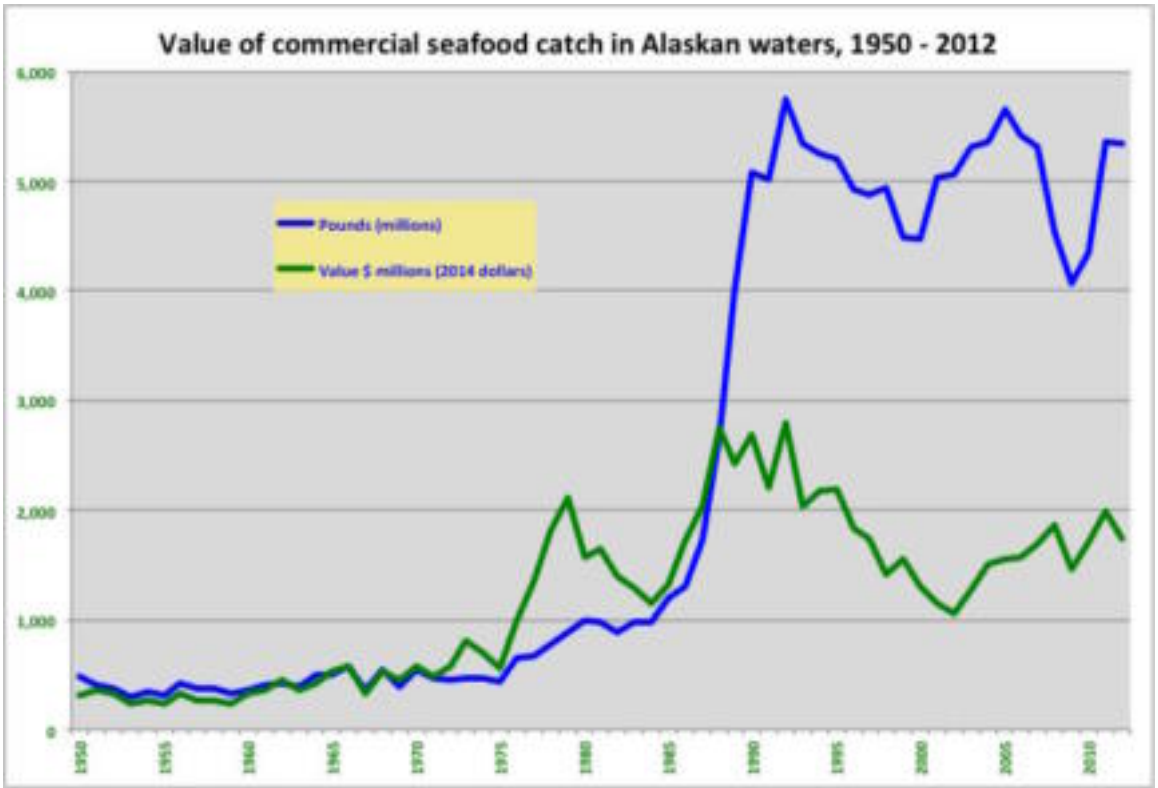
*Sculpture near State Capitol in Juneau. Photo © Ken Meter, 2014.*

) shows that while seafood landings have increased markedly, sales levels have risen far more slowly. This is because prices have settled at very low levels (See Chart 19), below 50 cents per pound, since 1990, after peaking at $2.40 per pound in 1979. (Price per pound varies widely among species, so this data offers only a rough view of relative prices over time — many high value fish have risen greatly in price in recent years.) Both charts are adjusted for inflation by using 2014 dollars.

**Alaska's fishing grounds remain some of the most tightly regulated and enforced areas in the world, earning wild-caught Alaska fish many sustainability awards and designations.**

This would appear to be related to the introduction of very large fishing vessels into the seafood industry. These have exceptional capacity for hauling in large numbers of fish quickly, but the larger supply, especially of lower-grade fish, also appears to place downward pressure on prices.

**Chart 18: Value of Commercial Seafood Catch in Alaskan Waters, 1950-2012**

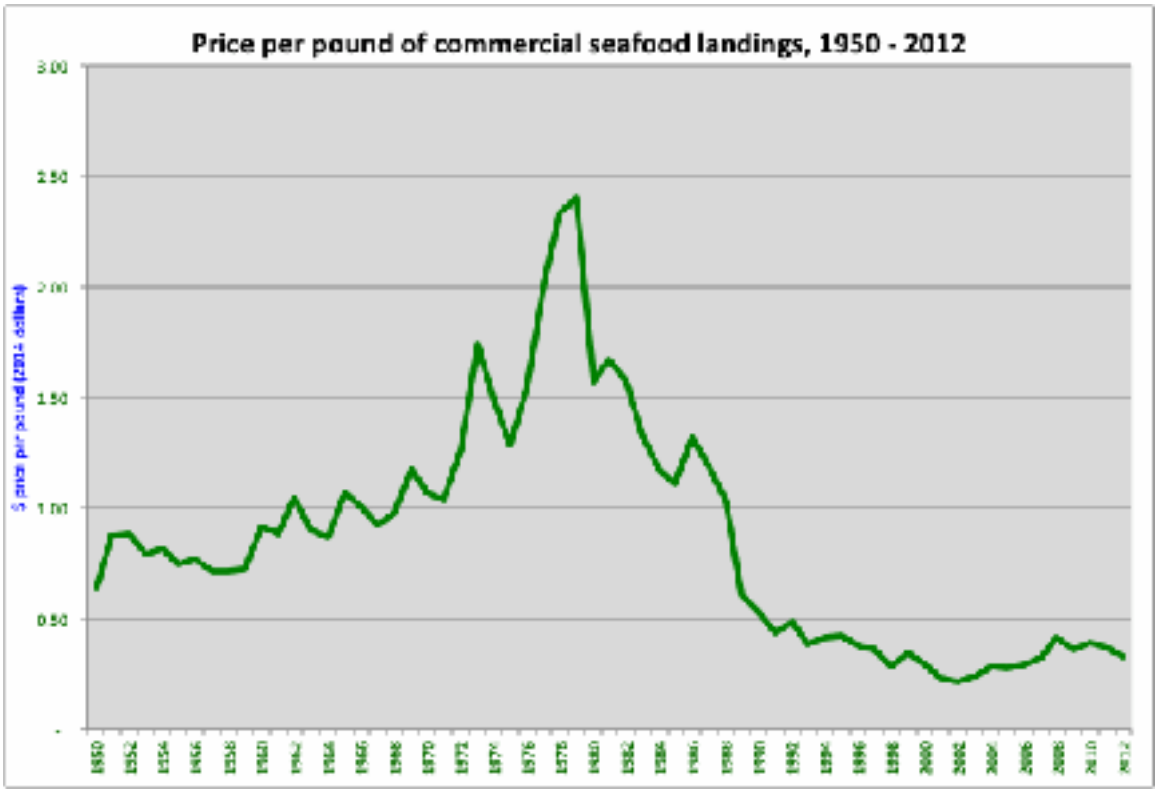



*Source: National Oceanographic and Atmospheric Administration (NOAA)*

NOAA data also suggests that the value of the seafood catch, at about $2 billion per year, is considerably more than the value of agricultural products raised in the state of Alaska.

Unfortunately, the price premium commanded by wild caught salmon and the collapsing of global fisheries has led to rampant fish fraud in other regions of the world — the mislabeling of one product as another. Although this is most commonly thought of as, for example, tilapia being sold as snapper, farmed salmon has often been labeled as wild in global markets. One *Consumers Report* (2006) study found that 56% of fresh, farmed salmon (nationally) was mislabeled as wild. A more recent report contended that upwards of 70% of salmon is mislabeled (Stiles, et al., 2011; Consumer Reports, 2006).

### Chart 19: Price per Pound of Commercial Seafood Landings, 1950-2012




*Source: National Oceanographic and Atmospheric Administration (NOAA)*

Alaska has effectively reduced the risk of such fraud through state oversight and certification programs such as the Marine Stewardship Council's eco-label.[12] During a study of random samples of MSC-labeled fish, all 240 samples were correctly labeled. Annette Island Packing, a native owned seafood processing and packing company, gained certification, reporting that it was essential to have if the firm wished to sell to European export markets. A MSC regional director reports that most Alaskan fisheries are compliant with their standards, and that many are certified (Cooper, 2012).

Other forms of fish fraud — such as scale-tampering, or throwing out extra nets — are considered relatively under control. As one Alaskan resident and fisherman stated, "There's always fraud, I don't want to say that its not a problem, it is, but its insignificant. Most fishermen are honest and the ones that aren't are just creating a lot of extra work and headaches for themselves later," (Wilson, 2014). Federal regulators are starting to pay additional attention to scale-tampering (Joyce, 2013).

The federal authorities have also launched new initiatives to reduce bycatch — the incidental harvest of species that were not targeted by the fisher (North Pacific Fishery Management

[12] The State has recently pulled out of the MSC certification program and is promoting its own ASMI third party certification.

Council 2013). "We do have bycatch problems, particularly in trawl groundfish fisheries that catch important species such as king salmon, halibut and crab in addition to the fish they desire to harvest," Donkerlsoot adds. Although some encroachment takes place near international waters, the U.S. Coast Guard protects Alaskan fisheries (Phillips, 2014).

**In 2011, Alaska exported $3.2 billion of seafood. It is estimated that 60-70% of Alaska seafood is sold to export markets.**

In 2011, Alaska exported $3.2 billion of seafood. It is estimated that 60-70% of Alaska seafood is sold to export markets (McDowell Group, Inc., 2013). Even though the fishing

*Inspecting crab. Photo: Alaska Department of Environmental Conservation.*

industry and its support industries employ more people than any other non-government industry in Alaska (Northern Economics, 2011), many of the fishing companies are outside-owned and employees come in for the fishing season only, leading to concerns that despite the abundance of the Alaska fishing grounds, little benefit is captured by Alaskan residents (Rasmuson, n.d.; McDowell Group, Inc., 2013). It is well documented that modern fisheries management schemes, such as limited entry and catch share programs tend to disproportionately negatively impact rural communities and community-based fishermen (Carothers 2012; Knapp 2011; Fina 2011; Langdon 1980). Moreover, recent data identifies a lack of young people entering into ownership-level fishing careers in Alaska. This is particularly true of Alaska's rural fishing communities. In 2011, the average age of all Alaska permit holders was 47 and there were twice as many permit holders aged between 45 and 60 as there were between 30 and 44 (Cannon and Warren 2012). Nonetheless, commercial fishing ranks second only to oil and gas in private sector resident earnings and 58% of commercial fishermen claim Alaskan residency (McDowell Group, Inc., 2013).

To address some of these concerns the Western Alaska Community Development Quota (CDQ) Program was developed in 1982 to reallocated fishery resources to qualifying rural communities in western Alaska, for example. This program designates 10% of the Bering Strait and Aleutian Island fish quotas to eligible communities and is a significant contributor to economic development in these regions (Northern Economics, 2011).

There is also a Community Quota Entity (CQE) Program in the Gulf of Alaska which functions slightly different from the CDQ program. CQEs are allowed to purchase or hold quota but they weren't given specific allocations as with the CDQs.

Furthermore, a study of local food security and local fisheries in the Kenai Peninsula found that 95% of a representative sample of the population reports some access to local seafood, mostly through sport or subsistence fishing. Only 2-5% of respondents reported purchasing locally caught seafood from a commercial fisher or grocer. This finding suggests either the paucity of retail outlets carrying locally caught fish or the lack of demand for such outlets due to the prevalence for fishing for personal consumption. Town Hall meetings and interviews, however, indicate dissatisfaction with the lack of avenues for purchasing locally caught fish. Additional analysis indicates that access to locally caught seafood increases food security for members of the lowest income brackets, however these people are more likely to obtain their seafood through sharing and bartering, rather than fishing for personal consumption (Loring, Gerlach, & Harrison, 2013).

**A study of local food security and local fisheries in the Kenai Peninsula found that 95% of a representative sample of the population reports some access to local seafood, mostly through sport or subsistence fishing. Only 2-5% of respondents reported purchasing locally caught seafood from a commercial fisher or grocer.**

Further, Holen (2013) points out that in rural communities, those commercial fishermen with access to commercial markets also are the ones who own the proper equipment for subsistence harvesting; access to subsistence harvesting is therefore determined in many ways by the commercial fishery.

Reedy and Maschner (2014) add that the centralized nature of the commercial fishery is less stable than the more horizontally networked traditional practices: quoting Lowe, they state, "the world created by the processors can disappear as quickly as the fish."

This makes community-level work all the more important in restoring local networks that help build local capacity. Recent efforts and the state-funded Nutritional Alaskan Foods for Schools (NAFS) program have made fish-to-school programs possible. In its first year, 137,000 pounds of Alaskan seafood was purchased for schools across the state (Kuhn, 2014). "This program keeps Alaskan resources in Alaska, its great," said one fisherman (Wilson, 2014). Yet interviewees also noted that in certain cases, larger processors were able to supply schools with Alaska seafood — but the product had been shipped out for

processing and then shipped back in for sale — so much of the added value was captured outside of Alaska.

### *Manure and Compost*

As early as 1901, seaweed was reported as a successful fertilizer for potatoes (Gorman, 1998). Growers in Southeast and Northwestern locations make use of a commercially produced fertilizer composted from seaweed, fish scraps, shells, and manure (See Community Initiatives section, page 130.

Building new soil will obviously be important in many Alaska locations, especially places where urban development has taken farmland out of production, or where land is limited by rocky terrain. Building fertility in Alaska offers a way to create new economic development in the state, rather than importing inputs from afar. It would appear to be the key to urban agriculture, indoor agriculture, remote gardens, and other food enterprises. For some cities, composting will also be a cost-saving answer to recycling household organic waste.

## Health Concerns

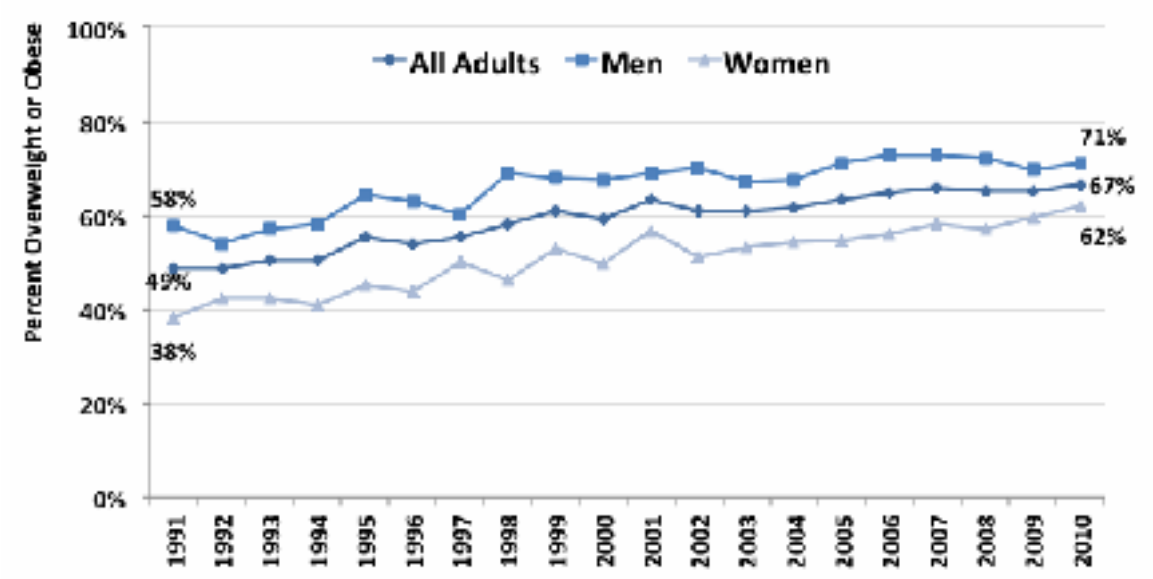
The good news is that the rate of diabetes in Alaska, at 7.8 percent in 2011 (BRFSS) was lower than the national average of 8.3 percent, and ranks among the lowest of the states. The bad news is that 65 percent of the population is overweight or obese, and the total medical costs of treating conditions related to obesity are estimated at $459 million per year (Trogdon et al, 2012) (American Diabetes Association, 2013) — fifteen times the value of all crops and livestock sold by state farmers in a year, and one-quarter of the cost of the food that Alaska consumers eat in a year. This figure does not take into account other financial factors, such as loss of productivity or early life lost.

**Direct medical costs of treating conditions related to obesity in Alaska are estimated at $459 million per year.**

Indeed, in Alaska, four of the top 10 leading causes of death (cancer, heart disease, stroke, and diabetes), are attributable to unhealthy eating, physical inactivity, and being overweight or obese (Alaska DHSS, 2014b). These chronic conditions can lead to reduced quality of life and premature death (U.S. Department of Health and Human Services, 2001).

Over the past 30 years, the prevalence of overweight conditions and obesity has increased sharply for both adults and children, as Chart 20 shows. Currently, about 2 out of 3 adults (67%) are overweight or obese, and about 1 in 4 high-school students (26%) are either overweight or obese (Alaska DHSS, 2014a).

**Chart 20: Trends in Prevalence of Overweight/Obesity (BMI ≥ 25.0), by Sex, Alaska Adults, 1991-2010**

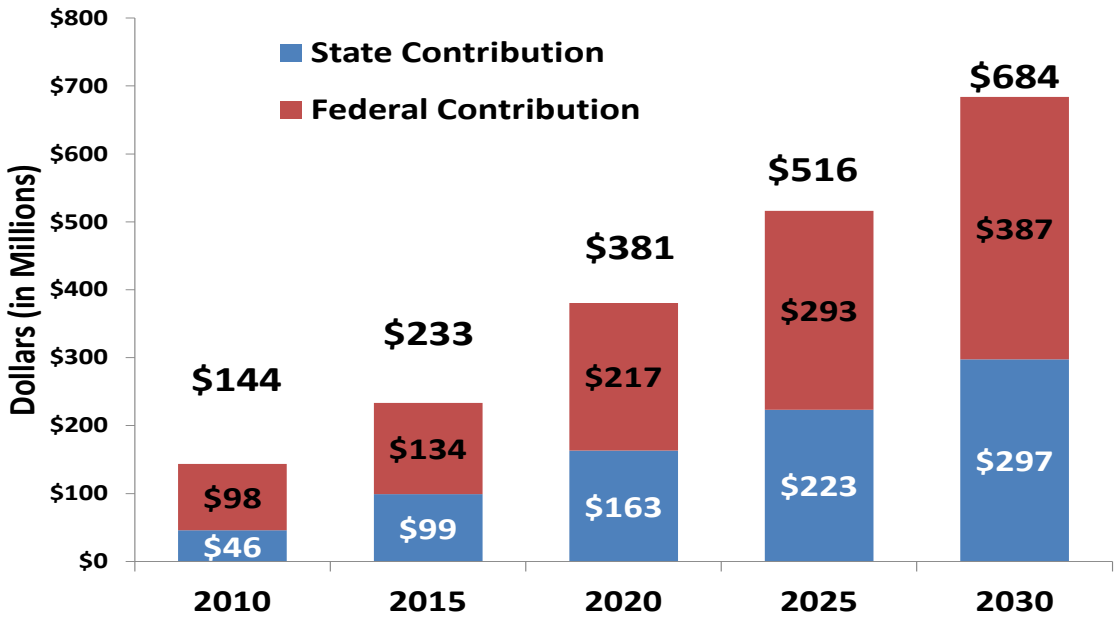



*Source: Centers for Disease Control and Prevention, Behavior Risk Factors Surveillance Survey (BRFSS). Chart by Alaska DHSS OPCP.*

**Four of the top 10 leading causes of death (cancer, heart disease, stroke, and diabetes), are attributable to unhealthy eating, physical inactivity, and being overweight or obese.**

Moreover, the state's financial burden will only increase as Alaska's population ages, healthcare costs increase, and obesity rates remain the same, or continue to rise. The following chart (Chart 21) shows projections for Alaska Medicaid spending (both the Federal and State shares) attributable to obesity, based on increases in Medicaid coverage and healthcare costs in general, as well as an expected rise in obesity prevalence (Alaska DHSS, 2014a).

**Chart 21: Projected Medicaid Spending in Alaska Attributable to Obesity (in millions), Assuming Increases in Obesity Prevalence***




** As projected by Trust for America. Chart by DHSS OPCP.*

Fruit and vegetable consumption is associated with reduced prevalence of chronic diseases, and may help reduce overweight and obesity. Yet approximately 9 in 10 (89%) Alaska adults and high school students (89%) do not consume the recommended daily servings of fruit (two a day) and vegetables (three a day).

Diverse Alaska populations experience different rates of obesity. Disparities are prevalent in key indicators related to obesity across racial groups, and across markers of socioeconomic status like education. Alaska Natives and adults with less education are more likely to be obese and less likely to meet nutrition and physical activity recommendations for good health.

- The Alaska Native age-adjusted rate of death from preventable chronic diseases ran 1.4 to 2.1 times that of their White peers (Alaska DHSS 2014b).
- Obesity prevalence is significantly lower among Whites (27%) than among Alaska Natives (35%).
- Obesity is significantly higher among Alaska adults with some college (30%) and those with a high school degree or GED (32%), compared to college graduates (23%).

Health disparities often occur with modifiable social and economic conditions that policies can impact, such as education, housing, and access to affordable, healthy food. In Alaska, this access can be very limited in rural and low-income areas (Alaska Bureau of Vital Statistics, 2011).

- Residents of the rural regions of the state are significantly more likely to **not meet** the fruit (75%) and vegetable (88%) recommendations than are residents of urbanized regions (65-68% for fruit, 80-85% for vegetables).
- Among adults who believe that they do not get enough fruits or vegetables daily, 3 out of 4 adults under 185% Poverty Guideline (76%) reported that cost was a barrier, compared to half (52%) of those with greater household income.
- Three-year olds living in the Northern (47%) and Southwest (43%) regions, areas of the state, who may have poor access to clean drinking water, are significantly more likely than those living in other regions (14%-17%) to drink any soda on a given day.

Unless otherwise stated, all of the above is from Alaska DHSS, (2014a).

**The Alaska Native age-adjusted rate of death from preventable chronic diseases ran 1.4 to 2.1 times that of their White peers. Some analysts note that weight-related health conditions are closely correlated with moving away from traditional foods to purchased foods.**

Some analysts note that weight-related health conditions are closely correlated with moving away from traditional foods to purchased foods. Diabetes among Native populations "increased 136% from 1995 to 2010," says Dr. Gary Ferguson, Director of Wellness and Prevention for the Alaska Native Tribal Health Consortium. "Healthy Native people live off the land." He adds, "Nature is medicine."

Ferguson cites evidence from the dentist Weston A. Price, who worked with Yup'ik and Cup'ik people in the 1930s. He found that "the first generation of children born after the adoption of store grub had dental arch deformities, they had crooked teeth, and they had changes in facial form." The second generation, Ferguson adds, got sick in middle age. The third generation was sick from birth, and had behavior problems. "The fourth generation is unsustainable."

"Looking at our diets, our diets traditionally were very high in healthy proteins and healthy fats, and very low in carbohydrates," Ferguson says, but by the 1980s, "our overall diets looked very similar to the standard American diet."

Ferguson then lists a number of traditional foods and their benefits. Many wild greens are full of vitamins. "Muktuk, which is the whale skin and blubber, is an excellent source of protein and iron. It is also a source of Omega-3s (beneficial fatty acids). One serving of seal has the same amount of iron as six cheeseburgers." The oils from seal and salmon, "when you consume them regularly, decrease glucose intolerance." He adds that seaweeds and algaes can reduce the accumulation of lipids, and help break down fats.

**"Traditional foods are high in protein, but not in calories."**

His colleague Desiree Bergeron added, "Traditional foods are high in protein, but not in calories." Indeed our interviews with Native residents highlighted the experience of many who eat traditional foods, who say that they feel more satisfied for a longer time when they eat them. Norton Sound Health Service staff in Nome reported that elder residents' health improved when they were given traditional foods. For residents of the Bering Straight who have access, wild and traditional foods may make up 80% of the diet, said Vera Metcalf of Kawerak. Yet "Our foods are not FDA approved" for institutional sale.

Ferguson and Bergeron lead a "Store Outside Your Door" initiative that brings activities to villages that will help Native people learn more about eating in traditional ways, and harvesting wild foods that are available. "Every aspect of it is really about highlighting the community and their knowledge and sharing it with future generations." The effort uses videos and social media to attract the attention of youth, and to preserve technical knowledge for later use.

Subsistence Harvest of Wild Foods on page 35 for more information about wild and traditional foods.

Yet country diets are also veering more toward store-bought food. As in other states, public health workers, farm-to-school advocates, and nutritionists are encouraging Alaskans, Native and nonnative alike, to eat more fruits and vegetables. Studies have shown that increasing fruit and vegetable intake can have positive health benefits including in cancer prevention. Many rural dwellers mention that supplies of these foods are very limited unless one lives close to a major airport or highway. Often, produce shipped through the Bypass Mail system will arrive spoiled, we were told. Even when these arrive fresh, their cost may be out of reach of village residents.

This is yet again an example of food being fit into existing transportation systems rather than transportation being designed around the need to convey food from local farms to local markets. The Bypass Mail system provides cost reductions to consumer goods destined for villages, but costs roughly $100 million per year (Goldsmith, 2007). Despite this subsidy, food is far more expensive in remote areas. "High transportation costs, severe climate, small

local markets, absence of economies of scale, lack of competition, inefficiencies, and other structural problems keep the cost differential stubbornly high. Groceries in the regional centers cost about 50 percent more than in Anchorage, and the price differential is higher in the smaller communities (Goldsmith, 2007).

**Groceries in the regional centers cost about 50 percent more than in Anchorage, and the price differential is higher in the smaller communities.**

Yet issues of access plague Alaskans all over the state, not just in rural areas. Nearly 15% of Alaskans are food insecure (meaning they are not sure where their next meal may come from at some point during the year). Moreover, one in five Alaska children (20%) are food insecure (Feeding America 2014).

A 2010 Feeding America Hunger Study (Mathematica Policy Research, 2012) showed that 77,000 Alaskans sought food assistance through the emergency food system; 46% of those households seeking assistance included at least one working adult and only 36% of those seeking assistance were currently receiving SNAP (Food Stamps).

**One in five Alaska children (20%) are food insecure.**

According to the U.S. Surgeon General (2001), strategies to reduce obesity will need to address policy issues; alter the environment in which we live, play and eat; modify the systems to make the healthy choice the easy choice; and increase the knowledge and change the behaviors of families, children and adults.

**Other statistics about hunger and low-income people in Alaska:**
All information from below is drawn from the USDA Food and Nutrition Service's Programs and Services website, accessed at http://www.fns.usda.gov/programs-and-services

USDA Child Nutrition Programs: Provided 13 million meals to low-income students, children in childcare and adults in nonresidential adult care in Alaska in FY2012:

- National School Lunch Program (NSLP): 53,920 participants; 8,638,686 meals served; $29,565,695 cash payments to state.
- School Breakfast Program: 20,759 participants; 3,398,114 meals served; $8,014,871 cash payments
- Special Milk Program: 16,809 half-pints of milk served.
- Summer Food Service Program: 4661 average daily attendance; 260,425 meals served; $1,172,000 cash payments
- Child and Adult Care Food Program (CACFP): 10,541 average daily attendance, 4,675,100 meals served; $7,800,000 cash payments.

USDA WIC Program: In 2012, 24,969 Alaskans participated in the Women, Infants and Children Program (WIC). The average monthly food costs were $53.74 per participant, for a total of $16,102,872. Alaska WIC also participates in the WIC Farmers' Market Nutrition Program and the Senior Farmers' Market Nutrition Program, providing extra funding to low income Alaskans to shop at farmers' markets.

USDA Food Assistance Programs:

- In 2012, the average monthly participation in the Supplemental Nutrition Assistance Program (SNAP, also known as Food Stamps in Alaska) was 91,298 Alaskans, up from 64,385 Alaskans each month in 2009. The average monthly SNAP benefit was $170.07.
- Food Distribution on Indian Reservations (FDPIR) is an alternative to the SNAP for low-income households living in Alaska villages with fewer than 10,000 people. In 2012, 145 Alaska Natives participated in FDPIR.
- In 2012, 2,166 Alaskans received food from the USDA Commodity Supplemental Food (CSFP). CSFP provides USDA commodity foods to States to distribute them to low-income pregnant and breastfeeding women, infants, children up to age six, and elderly people at least 60 years old.
- In 2012, Alaska received $479,267 for The Emergency Food Assistance Program (TEFAP). Under TEFAP, States receive commodity foods from USDA. States usually provide the TEFAP foods to local food banks, which, in turn, distribute the food to soup kitchens and food pantries that directly serve the public.

Low-income Alaskans receive some $185 million of SNAP benefits from the federal government (BEA, 2012). This, of course, is thirteen times the value of all food products produced by farms in the state.

**Low-income Alaskans receive some $185 million of SNAP benefits from the federal government (BEA, 2012). This, of course, is thirteen times the value of all food products produced by farms in the state.**

# Selected Community Contexts & Initiatives

*Current developments in diverse Alaska regions*

*Note: Available resources did not allow a comprehensive review of all food intiatives in Alaska, nor adequate coverage of all regions. Only highlights are included below. This should not be taken as a complete summary, but it does suggest the breadth of issues that Alaska faces. Some of the material here repeats information provided above; this is intentional.*

## Nome

Native subsistence hunters, and professional experts who address subsistence concerns, report several recent changes that have affected hunting and gathering in important ways. Subsistence hunters rely on a wide variety of birds, fish, marine mammals, and wild animals, and each has special issues.

*Reindeer and Caribou.* Reindeer herds in several regions of the Seward Peninsula have been reduced in size by a combination of factors. Introduced in 1892, reindeer were reserved for the sole use of Native herdsmen by federal law in 1937. At this time, reindeer herding was primarily a nomadic way of life, with herdsmen following reindeer as they migrated. Yet reindeer domesticate readily, and they responded well to changes in the Native lifestyle that allowed herders to live in more permanent homes. As the herdsmen became more settled in a single place, reindeer herds became more stationary. Many herds remained close to the herder's home, even though they were free to roam longer distances in the open.

Caribou (a related species but not domesticated), on the other hand, migrate often, and in ways that are typically unpredictable. Over the past few years several herds moved west into the Peninsula. When they encountered caribou herds, the reindeer often simply attached themselves to the caribou herds. Once the larger animals moved away, often thousands of reindeer would migrate with them, simply because they had acclimated themselves to this new herd. Some herdsmen lost tens of thousands of reindeer. Only a handful of herding families are left in the Nome region. UAF reindeer program coordinator Greg Finstad says that as much as 90% of the industry has been lost, though he believes it can be rebuilt.

**UAF reindeer program coordinator Greg Finstad says that as much as 90% of the industry has been lost, though he believes it can be rebuilt.**

Specialists at UAF are now working on designs for corral fencing that could be built near herdsmen's homes to help limit the tendency of the reindeer to join the caribou herds. If properly managed, these partial enclosures would encircle the reindeer and keep them within a more contained space. Yet the designers say it makes no sense to build these fences until the caribou have migrated away; otherwise the reindeer herd cannot be encouraged to stay in

one place. They estimate that this will happen over the next few years, and several herdsmen say they are poised to build containment areas once the caribou have migrated away. Some neighbors, however, do not like the idea of fencing on the open fields of tundra.

UAF is assembling a multi-faceted approach for creating a more commercial reindeer industry. The strategy includes restocking the herd, stronger educational opportunities for herders, and a mobile slaughter unit that can be used for processing reindeer meat in remote locations. Native herdsmen say they prefer to slaughter the animals in the wild, following traditional practices. This would typically be carried out in cold weather and on a snow or ice cover, meaning the risk of contamination is minimal. Yet when they follow these practices, herdsmen cannot sell their meat though grocery stores since the slaughter and processing have not been USDA-inspected. Some commercial reindeer meat (raised on St. Lawrence Island and federally inspected) is available at local stores, but many Natives say they do not like the flavor of this meat, since it tastes of artificial settings.

Since reindeer meat is coveted for its flavor, some entrepreneurs favor the creation of a high-end reindeer product. Prime cuts of reindeer meat, intended for metro markets in Alaska and Outside, might sell for as much as $25/pound, while lower-cost cuts would be allocated to lower-income neighborhoods and village stores as "stew meat" at $15/pound. In this way, it is said, Alaskans at all income levels would have access to some reindeer meat. Yet this would also create segmentation in the market. This would be extremely different from traditional sharing practices followed by Native herdsmen who currently share food with their neighbors and relatives.

**One herder says, "We want to feed people locally [not export]."**

So, reactions to the plan are mixed. One herder says, "We want to feed people locally." He suggests changing food safety regulations so that traditional practices would be recognized as safe for sale at local groceries. He is also concerned about scale: if he wanted to pay the costs of building a USDA-certified plant, he says, he would have to slaughter 3,000 – 4,000 reindeer per year. At the local scale, he figures he could feed two local villages all the reindeer meat they wanted with 30 animals.

*Whales.* Whale populations in ocean areas north and west of Nome (for example, St. Lawrence Island) have been increasing in recent years, says George Noongwook, a member of the International Whaling Commission. Over the long term, however, this mammal will require protection, he adds.

**The walrus harvest was down 30% last year due to ice conditions.**

*Walrus.* Walrus hunters and natural resource specialists point out that while walrus populations appear to be holding steady, the quality of the ice has changed due to weather changes, making walrus hunting far more expensive, and in some cases far more dangerous.

One source at Kawerak noted that the walrus harvest was down 30% last year because ice conditions prevented hunters from getting out to the locations where animals lived, or made it difficult to find solid ice to stand on for the harvest.

Typically, subsistence hunters have hunted walrus from large sheets of ice, where the hunter can take cover, shoot the animal from a somewhat protected space, and process the meat on solid ice. Yet with recent weather changes, these larger blocks of ice have been shifting further from villages; many hunters report they may have to wait for honeycombed ice to break up, and then travel as many as 50 miles to where the walrus are; and after this travel they may not find solid ice. Many report that they take greater personal risk pursuing the hunt in open water, or without a steady place to work once they harvest the carcass. Yet the most consistent complaint is that, with gas prices rising above $7 gallon (at times as high as $10/gallon), hunters have increasing difficulty covering the costs of the journey.

**For each of the past two years, about 50 seals have been found in Alaska, often on or near St. Lawrence Island, with skin lesions, bleeding wounds, and patches of lost hair.**

*Seals.* Once again, Native subsistence hunters report that seal populations are holding relatively steady, yet for each of the past two years, about 50 seals have been found in Alaska, often on or near St. Lawrence Island, with skin lesions, bleeding wounds, and patches of lost hair. Native hunters are deeply concerned that these animals were exposed to radiation as a result of fallout from the 2011 nuclear generator accident at Fukushima, Japan. Some speculate that the mechanism for this transmission was radioactive fallout that landed on ice floes where seals gathered to feed. Yet state food safety officials say that no radiation can be detected in the seal meat, and that no risk is posed to public health. Some observers note that finding such an injured seal places hunters in a compromised position; by subsistence hunting law they can be charged with a federal crime if they dispose of an animal that appears wounded, under provisions that call for stiff penalties if a hunter takes game that is not consumed by his family and social networks. Yet if the hunter keeps the animal, he risks eating meat that may not be healthy to eat.

*Salmon.* Salmon is the primary subsistence food for Natives in the Northwestern region. Fishers living near Nome say that supplies of salmon have been adequate in recent years, but they do note that pressure from commercial fishing in international waters may threaten the salmon population they count on for subsistence.

*Shore birds and other waterfowl.* Native hunters report that enough birds have been available for hunting in recent years. However, Vera Metcalf of Kawerak (and the Walrus Commission) points out that 20,000 seabirds died from avian cholera on St. Lawrence Island in recent years. "The hunters saw it first – they noticed the birds were oil-soaked," she adds.

**20,000 seabirds died from avian cholera on St. Lawrence Island in recent years.**

*Traditional foods in elder care centers.* Staff at the Norton Sound Health Corporation elder care center in Nome have introduced traditional foods into the meal program. They told us that their residents get better nutrition while eating less, since the foods are so rich with nutritional content. They add that residents report they have overcome health conditions by eating traditional foods, and experience greater mental health when they have access to traditional foods. The nursing home has obtained special permission to run this as a pilot program. The new Farm Bill makes it easier for traditional foods to be sourced in institutional settings, and Alaska will become a pilot in implementing this new language.

*Farm-to-school.* Using special state funds allocated for schools to purchase food from Alaska sources, schools have purchased seafood from Norton Sound Seafood.

*Community gardens.* Nome has a cluster of community gardens, and many gardeners have received funds to erect high tunnels or other season extension technology so they can grow more food for more of the year.

*Private farms and gardens.* A German homesteader, Henry Beckus, homesteaded north of Nome in the 1800s when mining was prominent, raising food for miners and local residents, and keeping pastures for livestock. He expanded to 319 acres, said Louis Green, who later farmed some of the land. Green raised potatoes, turnips, and other root crops. Green adds that the groundwater level has risen so much in recent years, due to rising temperatures, that many of the fields cannot be farmed — they remain too wet during the growing season. Green no longer farms at the site.

*Fish and produce production using natural heat from a hot springs.* Louis Green also used heat from a hot springs to produce lettuce in high tunnels. Since the hot springs is 60 miles from Nome, it was not always practical to drive to the farm to cultivate the seedbeds or harvest the produce; he has largely abandoned the effort. Now a retired fish scientist has begun to raise salmon in the warm water. Since aquaculture is not allowed in Alaska, he has obtained special permission (largely due to his professional background working with fish) to grow salmon in this artificial environment.

**One farmer used heat from a hot springs to produce lettuce in high tunnels.**

*Using waste heat to heat a greenhouse.* While we were unable to speak directly with the principals, several sources informed us that the City of Nome is exploring the possibility of cycling waste heat from commercial office buildings downtown and making use of that warmth to heat a greenhouse.

*Foods available to local residents.* Since Nome is located close to an airport, moreover one which is a hub for transferring food shipments to more remote communities in Northwest Alaska, most typical supermarket selections are available at one of three stores in town. This means

*Many foods are flown to remote villages by air. Photo © Ken Meter, 2014.*

that families with means have access to fresh greens from California in mid-winter, and one store offers selected organic foods. Availability may be limited by weather, however. Prices can be extremely high (comparable to or above those of gourmet stores in the Lower 48), and many residents complained about both high prices and limited availability at the Alaska Food Policy Council town meeting in Nome in late January. Many Native residents with access to subsistence hunting resources say they try to eat as much as 80% of their diet from traditional foods; yet not everyone has access to shares of food from a neighboring hunting crew, and in a given year the supply may be uncertain. Dieticians and public health officials state that when Native people shift to a store-bought diet, they typically gain weight and experience ill health. Many feel they cannot afford fresh fruits and vegetables from the town's grocery stores. And, as one resident says, "You can pay $5/pound for half-rotten carrots," if shipping is delayed.

The food-delivery business Full Circle, based in Seattle, delivers fresh produce to Nome and dozens of rural locations during the summer growing season.

**Kotzebue**

*Community gardens.* The City of Kotzebue has dozens of community and individual gardens, due to long-standing interest among a small number of residents in growing food for

themselves. Indeed one of our sources remembered a time, before 1970, when the city had 600 gardens.

**Most of the people who garden today do so because of some connection they made in the past with another resident who gardened – early gardens were founded because miners who settled in the region grew some of their own food, and passed their skills on.**

*Village gardens.* In addition, local writer and fisher Seth Kantner travels to villages in the surrounding region to assist people in establishing and maintaining gardens. Kantner reports that most of the people who garden today do so because of some connection they made in the past with another resident who gardened – early gardens were founded because miners who settled in the region grew some of their own food, and passed their skills on. Dozens of people have taken advantage of federal funds that allow them to build high tunnels for season extension; but these are often underutilized after the first year or two, because tending the garden or high tunnel is likely to be delayed in favor of subsistence hunting and gathering that is more closely connected to the traditional culture. Kantner also cautions that high tunnels are often the targets of vandalism.

**Video documents many of the experiences village residents in the Northwest region are having with weather change.**

Sarah Betcher has produced a video (Betcher, 2014) that documents many of the experiences village residents in the Northwest region are having with weather change. Among the issues raised by sources in Kotzebue are:

- Workplaces do not follow the same seasonal rhythms as hunting and gathering cycles (interview with Lorena Williams).
- Unusual ("sci-fi") winds are causing ice break-ups earlier in the year; this disrupts hunting (Interview with Siikauraq [Martha Whiting]).
- Stronger winds are shifting sand and rocks on the shoreline (Interview with Ross Schaeffer, Sr.)
- Fishers are having more difficulty placing their catch out to dry, or in storing it on the boat, because the weather is less predictable; temperatures may suddenly get too warm or too cold (Interviews with Cyrus Harris, Seth Kantner).
- Food shelves at stores and food banks may be bare if weather prevents planes from landing (Interview with Tracy Gregg).

**Northwest Alaska**

Betcher's video also documented comments from several Northwest Alaska residents:

*Melting, snow, ice conditions, temperature*

- The weather is uncertain every day (Interviews with Seth Kantner, Don Williams, Isaac Levi Killiolluk).
- Permafrost is melting (Interview with Joe Swan).
- With warming weather, rivers rise rapidly, causing flooding of traditional buildings, including root cellars (Interviews with Gerry Guay, Harry Morena).
- Erosion of the riverbanks or shorelines with loss of habitat and loss of ports for supply barges (Interviews with Gerry Guay, Robert Kirk, Joe Swan, Pete Lisbourne).
- Too little snow for winter travel; too much snow for easy winter travel (Interview with Gerry Guay).
- "Rotten" or thin ice does not support weight, delaying or shifting hunting to more remote locations (Interviews with Gerry Guay, Joe Swan).
- Some people cannot go hunting during the normal seasons since game is not present or conditions are too challenging (Interviews with Joe Swan, Isaac Levi Killiolluk).
- Food more likely to spoil on the hunt because weather is too warm (Interview with Robert Kirk).
- Snow has made it more difficult to gather firewood (Interview with Alvin Williams).

**Gas and diesel fuel have cost as much as $10/gallon.**

*Costs of living imposed by modernization and economic instability:*

- Gas and diesel have cost as much as $10/gallon, making daily activities and hunting or fishing prohibitively expensive (Interview with Robert Kirk).
- Sometimes it takes three weeks for food to come in to the village because planes cannot land (Interview with Janet Geary).
- One source said her family was now relying more on gathering their own food because the supplies of food shipped in are increasingly unreliable; often come in spoiled (Interview with Susie Fleming).
- Price of airfreight continues to rise, making the shipping of food expensive (Interview with Alvin Williams).

**"Without the whale we wouldn't be who we are.**
**It is our food, our shelter, our identity."**

*Decline of cultural connections:*

- "Without the whale we wouldn't be who we are. It is our food, our shelter, our identity." (Interview with Henry Koonook).
- Sod houses (built with easily available materials in a traditional manner) are disappearing (Interview with Ken Lisbourne).

- Although not part of the Betcher video, similar concerns emerged during our interview with Caroline Behe. Behe points out that the tradition of gathering and sharing food brought people together to create a sharing system that is deeply in jeopardy as people turn to stores for their food. This also leads to the loss of language, since people have fewer occasions where they draw upon these skills.

*Elders ask for greater share of management:* The Bering Sea Elders Group issued a November 3, 2011 statement (Bering Sea Elders Group, 2011) calling for the "federal government to undertake a rigorous tribal consultation process for all decisions affecting the Bering Sea." Further the elders asked for the creation of a North Bering Sea Reserve.

**As people turn to stores for their food, this leads to the loss of language, since people have fewer occasions where they draw upon these skills.**

**Bethel and the Y/K delta**

*King salmon:* One of the most discussed issues has been the decline of the King salmon populations in the Kuskokwim River basin. As a result, fishing has been restricted for several years. Although the reasons for this imbalance are not known, sources attribute the decline to disruptions caused from bycatch of salmon in U.S. waters, or to commercial fishing in international waters — the habitat of the King salmon. Others say it is related to a decline in productivity in spawning grounds.

*This greenhouse at Tim Meyers' farm shares heat with the living space. Photo © Ken Meter, 2014.*

*Subsistence rally:* About 40 people held a rally in Bethel on April 22, 2013 (Earth Day) asking for a stronger Yup'ik voice in management of subsistence resources relative to the state (Denning-Barnes, 2013).

*Permafrost melting:* The city has installed metal pipes along south-facing riverfront areas, intended to withdraw heat from permafrost, to help reduce the risk of soil erosion from melting.

*Wildlife:* Hunters reported that moose populations have begun to rise after several lean years, and are now in greater balance with wolves, their natural predator. One Yup'ik hunter told us that he has harvested several seals with skin lesions, adding, "I watch that closely."

*4-H programs:* Young Bethel students cultivate a training garden, and learn about food, growing, and cooking as part of the town's 4-H program.

*School programs:* Researcher Andrea Bersamin has been working with schools in the Yukon Delta to assess the impacts of adding salmon to school lunches one day a week. Researchers have compiled some evidence in prior studies showing that even in youth with high cholesterol, lipid profiles are excellent because of eating fish regularly. Bersamin's team is also developing a tool kit for schools to use in introducing fish into school menus, should they desire to.

*Gardens:* Some families maintain potato gardens at fish camp; Community garden spaces are available to residents at the Bethel Community Garden.

*Innovative farmer:* Tim Meyers has fashioned an intensely innovative farm near the Bethel airport. On this farm, he raises chickens year-round for their eggs; raises greens and several vegetables in large high tunnels and greenhouses; plants roots, row crops and cover crops; and manages a store where he sells organic produce that he imports directly from the Lower 48. He designs and builds his own planting equipment so he can plant vegetables at a commercial scale, and also has mechanized his farm chores with small-scale manure spreaders, tractors, and planters (some of which were manufactured by Amish craftsmen in the Lower 48). By diversifying his farm, composting organic matter into fertility, using waste cardboard from the airport and solar energy to heat his greenhouses, and storing crops below ground, he is able to contain operational costs. Meyers fertilizes by blending salmon, bone meal, and seaweed for application on the soil.

**Meyers has built multiple-story buildings in which the heat from one level rises to the next; his laying hens live below ground in one such building that has greenhouse space above where chickens can roam inside, with storage space above. Meyers' greenhouses often help to heat an attached work or living space.**

The scope of what Meyers has built is prodigious, and relies upon a legion of skills he has gained including building construction, piloting airplanes, welding, and machinery design.

*High Tunnel at Tim Meyers' Farm. Photo © Ken Meter, 2014.*

He was able to build up investment capital by building and renovating houses on speculation and investing the proceeds from one building into another; was able to use his piloting skills to establish produce suppliers in the Lower 48, and his technical knowledge of buildings to design metal frames, he feels, will allow him to successfully negotiate permafrost conditions.

Using a solid metal frame that he welded himself, Meyers has placed the foundation of several of his buildings below ground, well below the level of the permafrost. This is in stark contrast to the typical above-ground building style favored by contractors in the Arctic. He says that if the building were to shift due to changing permafrost conditions he can easily jack up the metal frame to straighten its angle. He has built multiple-story buildings in which the heat from one level rises to the next; his laying hens live below ground in one such building that has greenhouse space above where chickens can roam inside, with storage space above. Meyers' greenhouses often help to heat an attached work- or living space.

Meyers has also taken advantage of several federal grants to erect large high tunnels that extend the season for several vegetables. Using large plastic sheets to reduce weed pressure and to help retain heat in the soil, he crafts raised beds with his tractor to heighten drainage. On outdoor plots he plants perennials like rhubarb, and hardy strawberries. He has also skimmed the top layer of peat off a plot of formerly permafrosted land near the airport to thaw out the soil (he has approval from state authorities and only digs where there is enough

sand to retain soil structure); he intends to raise vegetables at a commercial scale here, and to improve soil quality through rotation and planting cover crops.

**"We could feed the whole state from here."**
**— Tim Meyers**

The farm is an exceptional showcase of possible technologies for agriculture in the region. Meyers points to a National Geographic map of the world (Mason & Blow, 2008)[13] that shows hundreds of thousands of acres of arable land in the Yukon Delta; he says this area constitutes one of the largest reserves of undeveloped agricultural land in the world. Meyers thinks his pioneering work will set the stage for large-scale farming using this land base. "We could feed the whole state from here," he adds.

*Aniak:* Kuskokwim Native Association is currently restoring a 20-acre community garden site in Aniak that was once in frequent use by residents. This initiative is also exploring growing potatoes and corn in high tunnels. Families also maintain gardens at fish camp.

**Fairbanks**

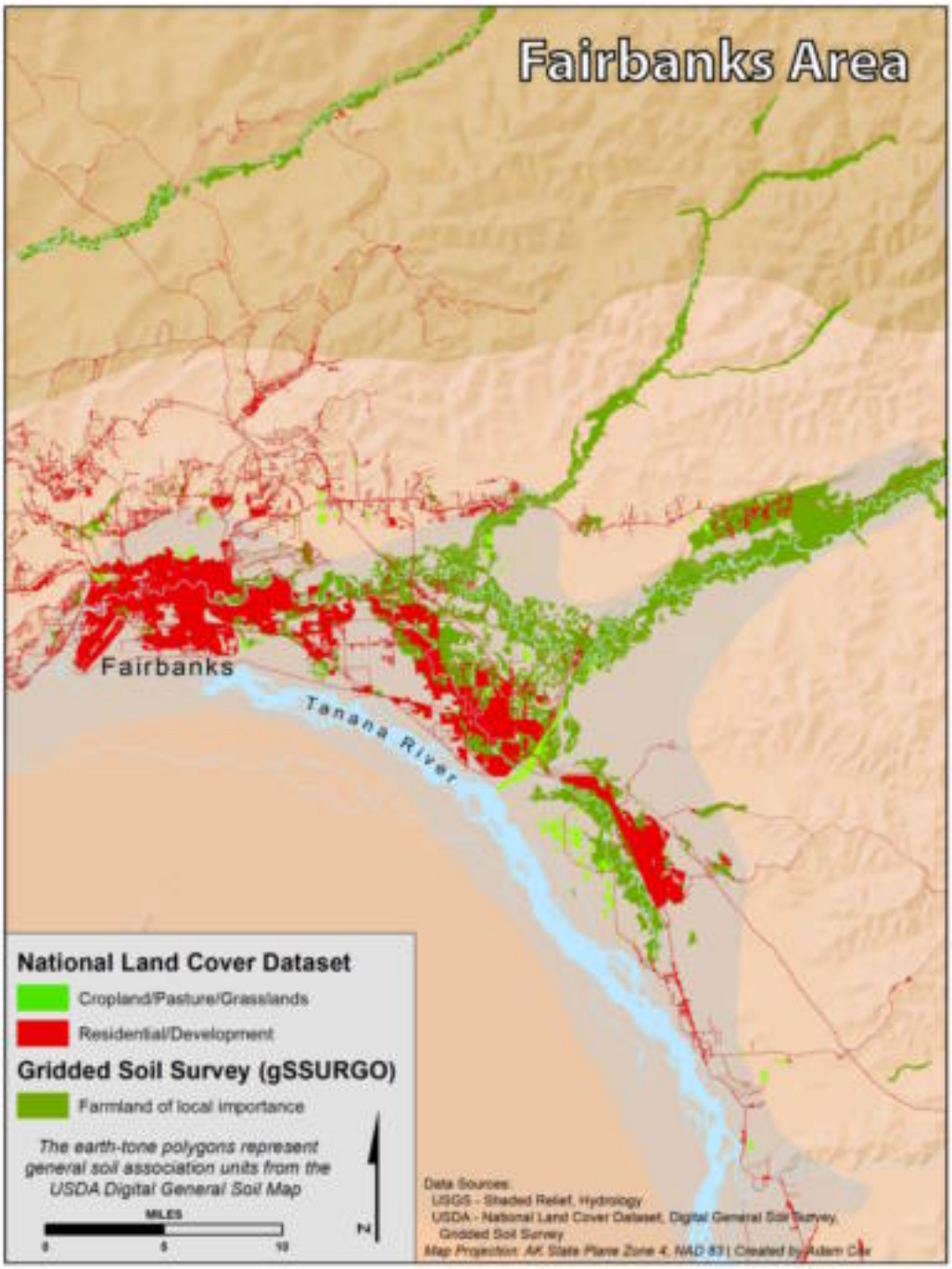
A vibrant cluster of small farms produces food primarily for direct sale to nearby customers; most of these farmers want to continue to sell direct because they can command a higher price. Farmers also report there are limited markets for selling produce to wholesale or institutional markets at a price high enough to warrant strong interest. Several farmers in the Fairbanks region pointed out that it is "easy to raise food" — what is difficult is to market the food at sustainable prices. Only one farm appears to sell enough produce to make a strong share of the family's livelihood simply by raising and selling produce; one other farm has successfully run an educational service that attracts other sources of incomes selling CSA shares has enabled many farm families to share the financial risks of farming with their customers. Many farmers rely upon off-farm jobs, renting out cottages to tourists, or other auxiliary sources of support. Many farmers have extended their growing season using facilities such as high tunnels with assistance from USDA funding programs. Most farmers in the area are reluctant to take on debt since they view this as creating instability in their farm operation; several families have invested hundreds of thousands of dollars of their own money to improve their properties or refine their farm operations.

**Farmers in the Fairbanks region said it is "easy to raise food" — what is difficult is to market the food at sustainable prices.**

Viable farmland in Fairbanks is limited and small with the most suitable land long lost to housing developments. Young farmers report sufficient leasing options, but a general

[13] Data from the USDA Natural Resources Conservation Service.

inability to afford anything worth having for agricultural pursuits. No one interviewed for this study listed access to land as a production constraint although many are concerned about the suitability of land for agriculture. Particularly hay and pasture dependent producers complained about infertile lands. Interestingly, a survey of area farmers found that few




*Map by Adam Cox, Territory Heritage Resource Consulting, Anchorage, Alaska*

producers report access to land as a business constraint but most believe that access to land is a barrier to growing the industry in general (Caster, 2011). Producers interviewed for this study expressed a general disinterest in expanding their business but sited increasing efficiency and improving infrastructure as the most likely pathways to expansion. Caster's survey also a reports a disinterest in expanding, but instead a need for infrastructure — mainly season extension and crop storage.

Seasoned farmers report a significant influx of hobby or homesteading farmers in the direct marketplace, at times resulting in unsustainable price competition. In the face of this changing marketplace, maturing farms are exploring specialization in crops appropriate for wholesale markets.

**Johnson's Family Farm has built a significant market by growing lettuces and other greens indoors using hydroponic techniques.**

Johnson's Family Farm has built a significant market by growing lettuces and other greens indoors using hydroponic techniques. This farm also appears to depend on off-farm income to help balance revenue streams. Yet it has convincingly demonstrated that fresh greens can be produced year-round in an indoor environment using readily available technology. The key question for long-term sustainability of operations such as these will be the source of fuel: making use of waste heat from nearby buildings, or tapping renewable energy sources, will do more to create long-term viability than would reliance upon burning fossil fuels, especially as oil prices rise.

University of Alaska — Fairbanks is building a demonstration greenhouse that will rely upon surplus heat generated in the university building where it will be attached, and also provide heat to the same building. Both natural and artificial sources of light will be used. This appears to be primarily a research facility rather than a place for commercial production. UAF staff hope it will inspire season-extension efforts across the northern part of the state. Yet horticulture professor Miriam Karlsson cautions against thinking this will be the sole model. "Every project is site-specific," she adds, tailored to unique local solar, landscape, climate, and other conditions.

Karlsson and her colleague Cameron Willingham, who hosted an Agriculture in Controlled Environments conference in April, point out that the cost of heating an indoor facility is currently the limiting factor. Heating with diesel fuel is typically too expensive, and fuel costs are certain to rise. Those that have a renewable source of heat are in a better position. Willingham adds that greens have been the primary crop produced in greenhouses; tomatoes have been difficult to raise in confinement commercially in the state. Karlsson says that growing in an enclosed indoor space, without windows, is often a more practical approach than growing in a greenhouse since more heat is retained; yet she says most farmers are opting to grow in greenhouses. Most of the growers who work in controlled environments,

*Greens grow indoors at Johnson's Family Farm in Fairbanks. Photo © Ken Meter, 2014.*

she adds, are new to farming, with very little historical experience to draw upon. They derive technical assistance and support primarily from informal networks, rather than formal sources.

Even in late December it is possible to purchase fresh greens, meats, and potatoes grown by local farmers at the Fairbanks Cooperative Market Grocery and Deli, Alaska's first co-operative grocery. As in many retail stores near roads and airports, fresh foods are also available, sourced from the Lower 48 and Mexico. Some growers report that they wish the co-op could do more to purchase food from local farms, yet buyers at the co-op report buying everything they can locally at the price given by the farmer.

**In a survey of 40 commercial food purchasers, 100% report a willingness to buy more local foods and 63% said they are willing to pay a price premium of 10% or more to do so.**

Local market development studies conducted by Fairbanks Economic Development Corporation have identified significant opportunities for area producers to collaborate in order to fulfill large, wholesale contracts. In a survey of 40 commercial food purchasers,

100% report a willingness to buy more local foods and 63% said they are willing to pay a price premium of 10% or more to do so. Further analysis suggests that broccoli, cauliflower, cabbage, and cucumbers are the most marketable vegetables, and carrots, onions, potatoes, kale, and summer squashes have a limited market due to either costs of production versus non-local prices or quality demands. This body of work suggests significant wholesale market opportunities for specialty crop producers in the Fairbanks area (Nguyen, 2014).

Likely, an experimental food node (See Appendix VI) would do well here. Nearly every producer called for a central warehouse or storage facility and some expressed an interest in sharing high tunnel or greenhouse space.

Fairbanks is also one of the two main airports (along with Anchorage) supplying Bypass Mail food shipments to rural villages.

**Chena Hot Springs**

Using heat released by hot springs on the resort property, and running it through a sort of heat exchanger to convert the heat into warm air for the greenhouse, the Chena Hot Springs Resort has built an enterprise raising food year-round in a remote setting. The system also generates electricity for the operation of the resort.

**Cherry tomatoes, cucumbers, basil, and a wide variety of greens (as well as flowers) have been successfully grown using heat from the hot springs, and served to workers and guests.**

Selling food primarily to its 85 employees and guests of the resort through the on-site restaurant, owner Bernie Karl hopes to provide all of the produce required on site. Construction and development of the greenhouses has depended heavily on extensive investments from the owners as well as federal grant programs.

This site serves as an important learning lab for indoor food production. Cherry tomatoes, cucumbers, basil, and a wide variety of greens (as well as flowers) have been successfully grown here, and served to workers and guests. The staff tests the growing of new varieties regularly, to see which species will grow best in this environment.

This model may not be easy to replicate elsewhere on sites where investment capital is not available, or heat sources more limited. This model also depends on a fairly captive consumer market that may not be found elsewhere. Yet Karl claims that similar heat sources may be found in many rural locations.

*Greens grow under different colored lights at Chena Hot Springs greenhouse. Photo © Ken Meter, 2014.*

**Copper Valley (Ahtna River)**

*Mobile indoor production:* The Copper Valley Development Association (CVDA) is exploring the feasibility of using controlled environment agriculture in the valley as a way of producing more food locally. One of its pilot projects has been to build mobile growing units that are trucked from place to place so greens can be harvested close to the location where they will be eaten. Each unit can hold as many as 1,000 plants at a time. As a participant in farm-to-school programs, CVDA has brought these mobile units to schools so students can learn how to grow food, and participate in the harvest (Copper Valley Development Association, n.d.)

**Mobile growing units are trucked from place to place so greens can be harvested close to the location where they will be eaten. Each unit can hold as many as 1,000 plants at a time.**

CVDA also partners with the Alaska Regional Development Organizations (ARDORS) in Mat-Su Valley and Prince William, to develop a Food Distribution and Local Markets

Network that promotes "Alaska Grown & Harvested" foods. It also hopes to partner with the local school district to learn about students' tastes for locally produced foods, to build storage facilities where root crops can be placed for later use, and to build an instructional greenhouse.

Jason Hoke, who has played a key role in animating this activity, says that his approach is based on small-scale trials that lead to future refinements. "The more marginally we think the better off we are," he adds. Growers in his collaboration have begun to specialize, he says, with one grower focusing on celery, and another on tomatoes.

*Expanding wildlife management powers:* The Alaska Federation of Natives (AFN) is working with Congressional leaders to strengthen the powers that Native leaders have over wildlife management. AFN asks that tribal leaders should have the final say on management policies on their own lands.

*Saint Nicholas Church in Juneau. Photo © Ken Meter, 2014.*

**Southeast Alaska**

Southeast Alaska is a collection of very diverse communities, each with a solid sense of place and a unique tradition. Conditions for farming are very challenging due to limited arable land and persistent rainfall. Some crops are difficult to grow because the soil is moist so much of the year. Widely diverse microclimates favor those who settle into a local place and get to know its character. As in the Mat-Su Valley, much of the arable land has been paved over for city and suburban development. Historically, Admiralty Island supported several strawberry farms, but this industry has waned.

**There is a 100-year tradition of Native agriculture in the region, growing vegetables, potatoes, and lettuce.**

Yet there is a 100-year tradition of Native agriculture in the region, growing vegetables, potatoes, and lettuce; this withered away during World War II, Betsy Kunibe says. Many tribes cultivated narrow strips of land, often south-facing, on beaches at the ocean's edge. Often potatoes were planted in fish camp, where families could check on the crop when they returned to camp during fishing season. Using traditional potato varieties, as explained above, several farmers and gardeners are renewing elements of this tradition.

A number of other growers are launching new farms in the region as well, as was documented by a recent food system report covering the Southeast (Heifitz, 12014). A few examples of the intense interest in food production in the region follow below.

**Juneau**

The main limitation to agriculture in the Juneau region, one grower says, is the lack of land. Several farms once flourished in the Mendenhall Valley, yet these lands have been developed for housing. One community garden site flourishes not far from the glacier, nonetheless, with smaller sites scattered across the metro area.

A grower, Joe Orsi, has a small plot of his own, and supports his farm with an off-farm job. He sells a diverse array of vegetables valued at less than $5,000 per year, but is valued by his customers as a critical source of fresh food. Orsi adds that he may sell half of his crop on a single day — the annual August Food Festival.

**The main limitation to agriculture in the Juneau region, one grower says, is the lack of land.**

Managing the soil is an intricate procedure. A local brewery supplies silage left over after the brewing process; he applies this on his fields, and raises the height of his beds to improve

drainage. Through crop rotation he is able to keep fertility high. He also faces competition with wild animals: bear, porcupine, and deer may eat his crop before it gets to market.

*Farm on the Kenai Peninsula. Photo © Ken Meter, 1982.*

Orsi adds that he would like to see cellar space developed so more root crops could be sold for off-season consumption.

**Haines**

The microclimate for growing food is somewhat more favorable in Haines, both because larger land units are available, and because the fields are drier, being more removed from the ocean. Relatively fertile alluvial soils support growing well, but land is difficult to obtain.

Ed Buyarski is raising seed potatoes and garlic commercially near Haines. He says he has chosen this crop because it is difficult to find good seed potato stock in Alaska, but also because moose and bear are not attracted to eating the crop while it is in the ground.

**"Haines has the potential to be a 'bread-basket' for Alaska."**
**— Lia Heifitz**

Lia Heifitz, who compiled a study of emerging farms in the region, says that Haines has the potential to be a "bread-basket" for Alaska, though she adds this may primarily be interesting to nonnative people.

**Sitka**

After launching in Dillingham and Kodiak, *Farm-to-school and Fish-to-school* efforts have flourished in several Southeast communities, notably Sitka, where fishers have organized independently to connect directly with consumers, and where schools have been willing buyers.

*Community supported fisheries:* Several direct-from-the-boat or community-supported fisheries (CSF) have arisen. The Alaska Sustainable Fisheries Trust launched Alaska's Own, which sells fish to subscribers in Sitka, Juneau, and Anchorage. Fishers enrolled in the program pledge to pursue sustainable practices, and proceeds are directed to the Fisheries Conservation Network program for scientific research and conservation initiatives intended to ensure the continued health and success of Gulf of Alaska fisheries.

The Alaska Marine Conservation Council also operates Catch of the Season Community Seafoods, a mission-related business that has been supplying Anchorage, Homer and Kodiak markets since 2010. The firm began by offering Kodiak tanner crab caught by community-based fishermen to residents and restaurants in each area, as well as Princess Tours. By 2013, over 250 households, seven restaurants, and several lodges had purchased crab through the program. However, in 2014, the Kodiak Tanner crab fishery was closed due to the low abundance of mature males. So Catch of the Season has expanded to offering jig-caught cod and rockfish from Kodiak Jig Seafoods to Alaskans, and are seeking new partners.

An export-based CSF example is Sitka Salmon shares, which aims to convey 50,000 pounds of fish to as many as 1,000 subscribers, mostly in the Lower 48, in 2014. Volunteers in personal vehicles deliver this fish right to the customer's door (Disclaimer: one of the authors is a member). While the firm is "tiny and insignificant in the broader spectrum," says founder Nick Mink, the direct connections to consumers have proven strong. Each delivery includes information on which fisher harvested the fish, and Mink adds, "We're selling the fisherman as well as the fish. It took us a while to recognize that."[14]

**Several direct-from-the-boat or community-supported fisheries (CSF) have arisen. "We're selling the fisherman as well as the fish."**

[14] Alaska Marine Conservation also sells jig-caught fish from Kodiak and Bristol Bay through a CSF in Anchorage. Copper River salmon is also sold directly to supermarkets in the Lower 48.

*Sustainability initiatives:* Sitka also boasts a strong cluster of residents interested in building a more sustainable region. A Native network of community gardeners has formed, and the community holds an annual wild foods potluck, which 250 people attended last year. Through the schools, the community has developed a "stream to plate" curriculum so that every third grader learns about the salmon life cycle while the fish is served at school. Sitka also hosts an annual Community Health Summit and a 4-H program centered on the Alaska Way of Life. The Sitka Local Foods Initiative sold $7,000 of produce in 2013, and used the proceeds to improve the gardens.

Andrew Thoms, director of the Sitka Conservation Society, says "the most successful ventures have been small initiatives that exemplify larger policy." These make progress toward broader change, but are based in discrete and manageable steps.

*Traditional foods:* Public health workers, nutritionists, and others are working through SEARHC to raise awareness of traditional foods, to foster skill development in villages, especially among youth, and to address obesity prevention through traditional foods.

*Waste is shipped away:* Although several towns, such as Gustavus, have begun to compost waste material to produce new fertility for gardeners, Tracy Gagnon reports that Sitka's waste is transported to Washington State, limiting the opportunity for local compost production.

*Angoon from the air. Photo © Ken Meter, 2014.*

**Angoon**

*Tradition of agriculture:* Angoon holds a proud tradition as an historical center of Native artists, but also carries reminders of its agricultural roots. One Japanese-American family cultivated vegetables in a seaside garden long ago, and the remains of a root cellar can be found on high ground near the village. Currently, UAF Extension agent Darren Snyder is working with the Angoon school to develop a community garden where residents can gain access to land for gardening.

**Angoon holds a proud tradition as an historical center of Native artists, but also carries reminders of its agricultural roots.**

*Wildlife co-management:* Members of the Angoon Community Council invited us to attend a meeting at which the U.S. Forest Service offered a plan for expanding access to fish in the waters surrounding Angoon – one of the Southeast communities that has retained the most traditional practices. ACC members expressed their understanding that they should have the authority to manage wildlife resources within their territory. They also expressed concern about the seal population, and whether it had been affected by radiation.

*Groceries:* The grocery store in Angoon has a limited selection of produce, but its quality is aided by the fact the community is a short small plane ride from Juneau, and has some dock space for supply barges.

**Kake**

*Commercial compost:* Drawing upon bountiful supplies of wastes from fish processing and sawdust, the Kake Tribal Corporation has launched a business supplying compost to regional farmers and gardeners (Howk, 2013).

*Rhubarb:* Kake is also a center of commercial rhubarb production.

**Kake is a center of commercial rhubarb production.**

*Using surplus heat to grow food:* The city is also exploring construction of a large-scale greenhouse that would be heated with surplus heat from a power plant.

**Hoonah**

*Oyster farm:* Lia Heifitz also says that Hoonah will have an oyster farm in the coming years. Local leaders hope also to build a commercial kitchen and value-added facility.

**Wrangell**

*Food initiatives:* SEARHC has launched a multi-faceted approach to Health and Traditional Foods by hiring a young staff, Ken Hoyt, to do outreach in the community of Wrangell, training people about the benefits and use of traditional foods. "Food is our best connection," Hoyt says, adding that "Culture *is* medicine."

**"Food is our best connection. Culture *is* medicine."**

SEARHC programs are dedicated to ensuring that a young generation of residents will gain skills in providing food for themselves. Currently his work focuses on canoes and canoe culture, as well as food preservation including smoking and canning fish, picking berries, and foraging other traditional plants. In partnership with local clans and traditional groups, the project also co-sponsors traditional foods feasts.

**Prince William Sound region (Cordova)**

*Direct-to-store and -restaurant sales of seafood:* Copper River / Prince William Sound Salmon is a relatively new firm launched in 1996 by fifth-generation fisherman Scott Blake and three others. Spokesperson Cassandra Squibb says that it has been the firm's marketing campaigns that have led to an "explosion" of interest. "One of our major advantages is the air freight advantage," Squibb says. "With direct flights to the Lower 48, we can be in stores within 24 hours." The firm sells direct to retailers and restaurants. Among the firm's clients are Wal-Mart, Sam's Club, and Sysco. Yet now the firm is "shifting attention to local Alaska consumers," Squibb adds. They are working with several schools to source product.

The firm's sales offices are located in Anchorage, and Copper River also has facilities in Kenai, Togiak, and Dutch Harbor. Squibb says that among the actions the state could take to assist the business would be to provide more grants to schools to purchase Alaska foods for school menus, to assist in developing new products, to help gather intelligence about markets in the Lower 48 and then train staff how to make use of the data, and to build cold storage space in Anchorage.

**Kodiak Archipelago**

Kodiak and its nearby islands have a strong tradition of agriculture dating back to the 1700s, when Russian settlements first took root. Most of the communities cultivated gardens so

they could eat fresh vegetables. Cattle were introduced in 1795. Many local residents, Alutiiq and nonnatives alike, continued to garden after Russian influence waned.

In later years, the lush grasslands of attracted a commercial cattle industry. At one time, fourteen ranches averaging 22,000 acres each thrived south of the town of Kodiak. Kitchen gardens flourished. People raised chickens for their own use or for trading with neighbors. Several farms also raised horses. Kodiak brown bears were often viewed as a nuisance by island ranchers (Coppock, 2008).

Several commercial fish canneries dotted the harbors, but many shut down after being severely damaged in the 1964 earthquake. Others succumbed to centralization of the commercial fishing industry.

Roberta Townsend Vennel, facilitator for the Kodiak Archipelago Rural Leadership forum, says that Native elders tell stories about the ways that raising food was a normal part of life in many remote villages. "That all went out with the food programs," she adds. When provisions began to be delivered to villages, people often let go of their gardens.

**Native elders tell stories about the ways that raising food was a normal part of life in many remote villages. "That all went out with the food programs….When provisions began to be delivered to villages, people often let go of their gardens."**

At one time, she adds, residents would pursue subsistence hunting and commercial fishing when weather allowed, and supplement this with income from working in a cannery. "People would order canned food once a year," she recalls. Kitchen gardens provided fresh vegetables during the short growing season. The mainstay, however, was hunting, fishing, and gathering.

However, during the forty-year decline of commercial fishing that ended about a decade ago Townsend Vennel says, finding a good livelihood was so difficult that the region lost half of its population. Even the subsistence economy was damaged, she adds. Often the people who captained subsistence hunting parties were also commercial fishers — when they sold their permits, often no one in their families had the equipment required to fish for subsistence. Many people could no longer access traditional foods.

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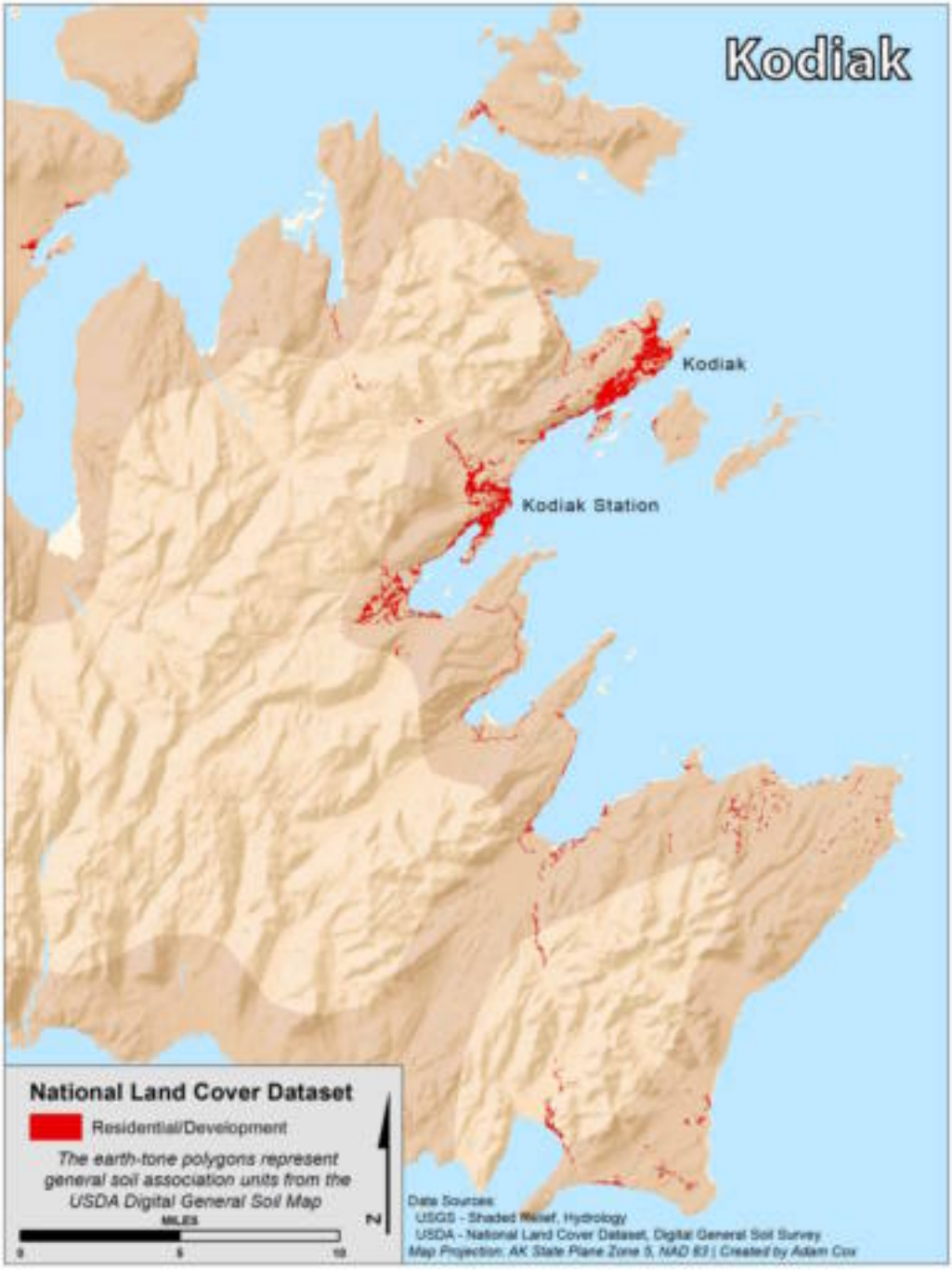
Over time, more and more of the commercial fishing permits have been sold to outsiders, often to people who live in Seattle who hold a different relationship to community life than locals do. In some cases, an individual quota holder would retire or sell his share, and a




*Map by Adam Cox, Territory Heritage Resource Consulting, Anchorage, Alaska*

*Kodiak Fishing Boats. Photo: Alaska Department of Health and Social Services.*

whole cluster of people who once relied upon him for subsistence gathering would no longer have access to food, because no one in their family had the rights to fish. One family that used to gather enough fish for an entire village moved away due to lack of opportunity – and now none of the elders in this community receive subsistence fish because there is no one who holds that mission.

Townsend Vennel adds that state policies, focused on increasing the economic return of the commercial fishing industry, had the unintended consequence of limiting the options for village residents. "The state said they wanted better management of fishing resources," she adds. Yet the outcome has been to create "haves" and "have-nots," she laments.

**"The state said they wanted better management of fishing resources…Yet the outcome has been to create 'haves' and 'have-nots.'**

As a response, several efforts are underway in the Kodiak archipelago to produce more food within the region. These are informed by a distant example in Bristol Bay: the town of Igiugig sponsored an "Eggs to Elders" project. Using federal grants, heated barns were built

for raising chickens (Austerman, 2011). These eggs are given away to the town elders, and sold to other residents at a market price. The barn is heated with a wood-burning boiler so the fuel can be obtained locally. Residents save food scraps to either feed to chickens, or to compost for the community's garden projects. Greenhouses have been built, powered by three wind generators, where organic produce is grown. Potatoes have been planted in an outdoor community garden.

The Shumagin Corporation, in Sand Point in the Western Aleutians, maintains a buffalo herd that they draw upon for hunting. They have considered building some kind of abattoir so the buffalo could be processed commercially. The Pauloff Harbor Tribe watches over a herd of feral cattle, abandoned when the village of Sanak was abandoned.

Sustainable Kodiak reports that 55 high tunnels have been installed on Kodiak Island alone (Sustainable Kodiak Blogspot, 2013). The main source of funding has been the U.S. Natural Resources Conservation Service. Residents of Ouzinkie, a town with a strong heritage of Russian gardening as well as traditional Native culture, are reported by Craig Gerlach to be building greenhouses using as many local materials as practical, to reduce their dependence on resources that must be imported.

Key to ensuring that these food-growing activities last over time, Townsend Venner concludes, "is to try to make growing food a part of the daily routine."

**Mat-Su Valley**

As described in greater detail elsewhere, the Mat-Su Valley has lost some of its pre-eminence as an agricultural region of the state of Alaska despite a substantial New Deal investment to create a colony of farmers near Palmer during the Great Depression. Once a center for diverse produce operations, with thriving cattle, milk, and hog farms, and having gone

*Mat Valley Meats in Wasilla. Photo © Ken Meter, 2014.*

through phases where small farms were consolidated into larger-scale pea and potato production, land in the Valley faces severe competitive pressure from suburban development. A few farms raise cattle and hogs for Anchorage restaurants, and a high quality butcher shop in Wasilla produces gourmet meat cuts, generally using meats raised in the Lower 48.

**Once a center for diverse produce operations, with thriving cattle, milk, and hog farms, and having gone through phases where small farms were consolidated into larger-scale pea and potato production, land in the Valley faces severe competitive pressure from suburban development.**

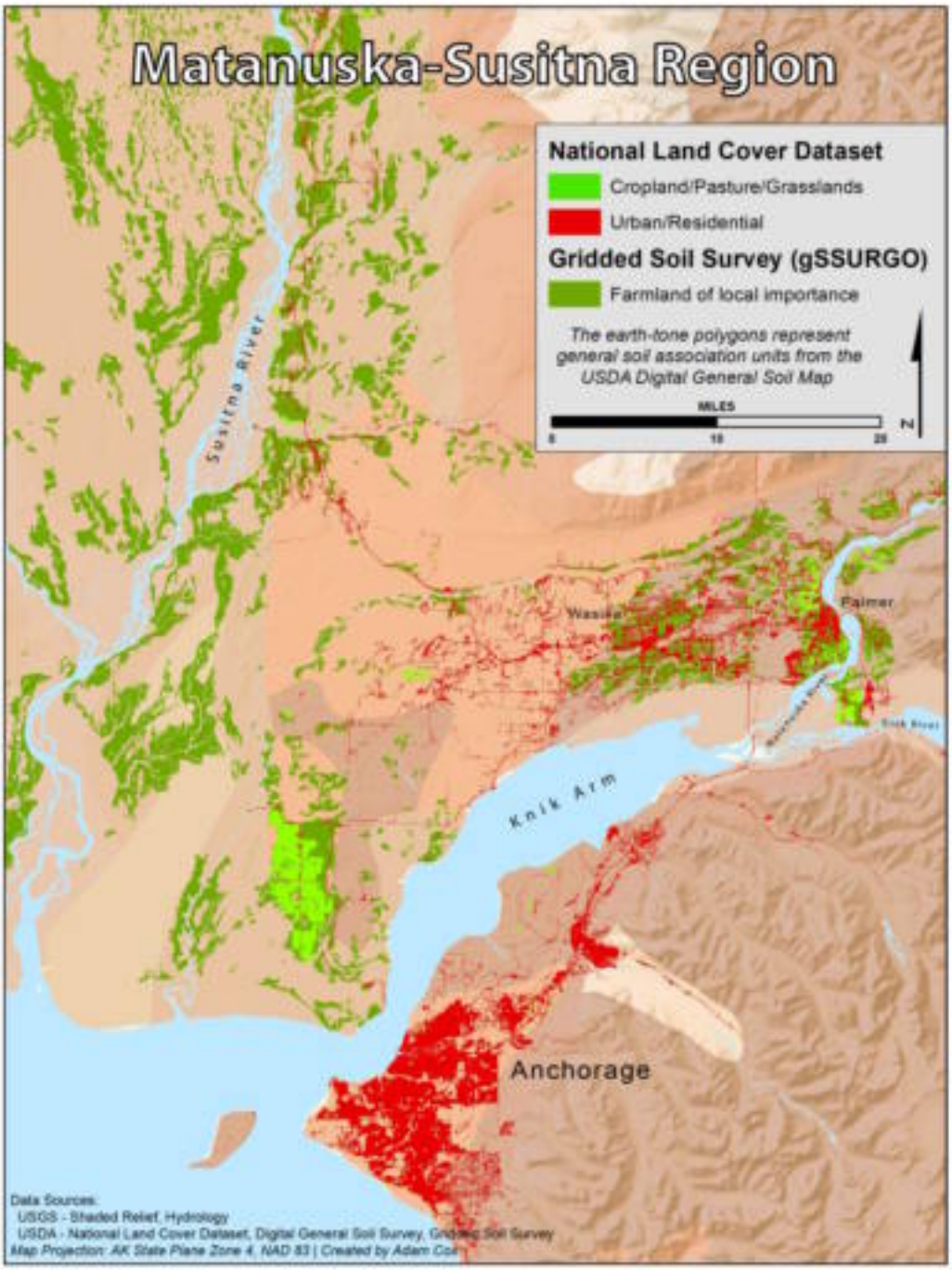
*Produce:* Two large produce farms endure; centered on potatoes, carrots, and onions, which effectively reach markets across most of the state. One of these farmers, Ben VanderWeele, sells to both the Carr-Safeway and Fred Meyer chains. "We have all the market we care to have," he says, adding that household customers are loyal to his brand. One of the largest

impediments to increasing production is that so little labor is available in Alaska, he adds. Yet he feels there is room for young farmers to enter, "if they start small."[15]

The second larger farmer, Paul Huppert of Palmer Produce, offers a more diverse set of products, including potatoes, cabbage, head lettuce, romaine, and broccoli, but also represents other farmers in the Palmer area by selling their products to supermarket chains, including Wal-Mart. These neighbors supply him with vegetables, rhubarb, zucchini, and other products. Having been in the market 60 years, he does not see much room for expanding his market beyond what it already is.

*Palmer Produce plants vegetable starts in this greenhouse. Photos © Ken Meter, 2014.*

[15] A production survey targeted towards commercial growers (and specifically not gardeners) reported results consistent with a heavy hobby/homesteading population (Caster, 2011).




*Map by Adam Cox, Territory Heritage Resource Consulting, Anchorage, Alaska*

**"There is room for young farmers to enter, if they start small."**

*Dairy:* The former Matanuska Maid Dairy plant has been closed, amidst allegations of improprieties, and one small on-farm dairy processor persists.

*Meat slaughter and packing:* Mt. McKinley Meats and Sausage is operated by the state, using prisoner labor, at a loss reported to be about $100,000 in each 2012 and 2013, against $1.8 million in revenues (Alaska Division of Agriculture, 2013). Very few sources would speak openly about the situation. Still, the Division of Agriculture notes that they have posted a wealth of information about the project on their web site. Efforts to privatize the meat processing plant have not been brought to fruition.

As noted above, one group of investors had expressed interest in purchasing the processing plant, revamping the production line, and producing a high-quality Alaska Grown line of gourmet meats primarily for prime restaurants in Anchorage, and for export to the Lower 48 (with lesser cuts directed to Alaska consumers). They caution that this would need to be undertaken as part of a long-term commitment by the state to invest in building up sufficient cattle production that the processing plant could pay for its own operations. An entire system of production, processing, and distribution would need to be created, and this would take many years. The prospective new owners would also require assistance in identifying and reaching viable markets both inside and outside of Alaska. Yet they have dropped their pursuit of the proposal for now.

It is not clear that if such a plan were pursued, that Alaska Grown beef could be produced at a price low enough to compete with product shipped in from the Lower 48, where production costs are lower. The investors say that production costs are inherently lower outside of Alaska; rising fuel costs might eventually alter this calculation, but also would increase growing costs in the state.

One expert with a 50-year history of involvement in the meat industry, Francois Vecchio, adds that "the current system is all wrong. It is a real disaster." While traditional techniques in Europe (like many Native approaches) focus on dehydrating meat to preserve it, current USDA regulations focus on eliminating the presence of pathogens, and an effort to make meat appear "sterile." This approach favors larger processors who can handle the costs of adding treatment, he adds, and "has led to a monopoly of 3-4 major retailers."

**While traditional techniques in Europe (like many Native approaches) focus on dehydrating meat to preserve it, current USDA regulations focus on eliminating the presence of pathogens, and an effort to make meat appear "sterile," Vecchio says. This approach favors larger processors who can handle the costs of adding treatment, he adds, and "has led to a monopoly of 3-4 major retailers."**

*Rempel Family Farms at Anchorage Farmers' Market. Photo: Webb's Consulting and Management Services.*

Vecchio adds that, while he feels the slaughter plant should be privatized, "It will not be enough to simply have a slaughterhouse. We will need to relaunch animal husbandry in the Mat-Su Valley." This will indeed be a challenge given all of the former farmland that has been paved over.

*Reindeer:* Tom Williams, who farms near Palmer, has been given permission to import reindeer from other countries (primarily Canada) to build up a commercial herd, even as a nonnative. He reports that he sells about 300 reindeer a year to 33 states. He has identified several niche markets: selling live animals; selling trained reindeer (which may appear in a

commercial or a movie); meat sales; creating a tourist draw for visitors to come to his farm; and as a recreational attraction. To feed his herd, he accepts shipments of spent brewers' grains. He says he "has all the grain I need."

Williams adds that the state's ability to export reindeer once was prodigious. At one time, he says, Alaska shipped 60,000 reindeer carcasses each year to New York. Slaughtered animals were stored in the permafrost during the winter for spring shipment.

*Soil quality:* Several farmers with experience in the Mat-Su Valley say that soil quality has deteriorated due to farming practices that tend to remove nutrients from the soil. Farmers also say the soil profile was thin to begin with (Caster, 2011).

*Training farm:* Alaska Pacific University is launching a training farm on the site of one of the original Matanuska colony farms, the Kellogg farm. APU's Spring Creek Farm is collaborating with the Tanana Chiefs Council and UAF to open the Alaska Growers' School at the farm, with funds from the USDA. Support has also been given by the Kellogg/De Wolf Trust.

*Irrigation equipment on a farm in Palmer, Alaska. Photo © Ken Meter, 2014.*

**Anchorage**

Alaska supports only a handful of food manufacturers; examples being Franz' Bakery, Trapper Creek smoked fish, Copper River Seafoods, Alaska Sprouts, and McKinley Meats and Sausage (Palmer), as well as the two mentioned immediately below.

*Alaska potato chips:* Ralph Carney of the Alaska Chip Company sees considerable potential for expanding his home-grown business, one that combines Alaska grown potatoes, value-added processing, and a gourmet product. Priced at the high end, the Alaska Chip Company prominently features the Alaska Grown logo, and has found outlets in many urban areas of the state.

**In launching this business, Carney says, he was aware that, "typically, large projects fail." He set out to take small steps and to expand as conditions allowed. Yet he also laments, "if I did this again I would go a lot smaller."**

America is frozen french fries," and hints at wanting to tap such a market, he also laments, "if I did this again I would go a lot smaller."

Yet business is growing well, and Carney stays tremendously busy without a dedicated marketing budget. "We are nowhere near capacity."

*Alaska tacos:* Another local food manufacturer is Taco Loco, the only taco producer in the state. Vice President Adam Galindo took over management of the firm from his parents, who launched the business in 1969. Although the corn he relies upon as a raw material is imported from the Lower 48, and the expensive machinery that facilitates large-scale cooking and packaging is all imported, Galindo sells his products statewide, with most of the Latino restaurants in Alaska relying upon his taco shells and tortilla chips.

Galindo has worked with schools across the state that purchase his products including salmon tamales and tacos used in school lunches. He purchases Alaska-grown lettuce from Charlie's Produce to insert into the tacos, and he has worked with Bryce Wrigley from Delta Junction to explore whether Alaska-grown barley could be profitably added to his recipes.

**Taco Loco, the only taco producer in the state, sells products statewide, with most of the Latino restaurants in Alaska relying upon his taco shells and tortilla chips. Galindo has worked with schools across the state that purchase his products including salmon tamales and tacos used in school lunches. He purchases Alaska-grown lettuce from Charlie's Produce to insert into the tacos, and he has worked with Bryce Wrigley from Delta Junction to explore whether Alaska-grown barley could be profitably added to his recipes.**

*Adam Galindo of Taco Loco. Photo © Ken Meter, 2014.*

*Restaurants featuring locally grown food:* Anchorage supports a cluster of restaurants that feature local food when available. We spoke with many; the names of the chefs are listed in the front of this report. Chefs say that supplies of many produce items, in season, are enough to attract customer interest, but that Alaska-grown meats are often difficult to come by, and that food safety regulations create unnecessary barriers and unsustainable costs. Demand for locally sourced food continues to exceed the supply.

*Wholesaling:* As one of the world's major cargo airports, and the roadway, barge, and rail hub through which most food items are shipped to more remote sections of the state, Anchorage plays an important role as a food wholesaling and distribution center. Firms such as Charlie's Produce, diTomasos Produce, and Food Services of America, import many foods from Washington State, California and Mexico, with the journey often taking 4-5 days. Two Mat-Su Valley farms (VanderWeele Farms and Palmer Produce) supply potatoes, carrots, and onions statewide through these wholesalers.

Dave Thorne has launched a business called "Alaska Root Sellers" that conveys specialty foods to about 40 restaurants in the Anchorage area. Delivering twice weekly, he carries foods from seven farms near Palmer. Thorne says the firm fills a niche that is left open by

the larger players: "The major purveyors basically only want to talk about three products: carrots, potatoes, and cabbage." These would be the only crops that reliably are grown in Alaska at sufficient volume to meet wholesale demand. Thorne says he survives in this

*Making salmon tacos at Taco Loco. Photo: Anabel Galindo.*

climate by staying small. "I keep very low overhead. You can do more at my scale because I don't have to pay for a fleet of trucks. I can deliver with my own truck." He adds that he does this work because, "I love to do it." Thorne is also working with a test kitchen to prepare products from his partner farms for schools to use.

**"Alaska Root Sellers" fills a niche that is left open by the larger players: "The major purveyors basically only want to talk about three products: carrots, potatoes, and cabbage."**

However, Thorne is concerned about rising land prices that have soared from $3,000 per acre to $20,000 per acre in recent years. He is concerned this will price new farmers out of business.

*Commercial seafood exports:* While covered elsewhere in this report, the export of commercial seafood is big business in the state. "Less than one percent of seafood caught here is

shipped fresh," says Will Kyzer of the Anchorage Economic Development Corporation. An effort to form an Alaska Seafood Processing Center failed because labor costs were too high, he adds. "Many of the big shippers do processing in China."

Kyzer is primarily looking for export opportunities, and sees strong potential in shipping foods to the Lower 48 because many barges arriving in Alaska currently go back empty. "Value-added and premium products are the most successful," he adds.

He also notes that some Community Development Quota (CDQ) holders are exploring fresh seafood sales in rural communities.

*Food bank logistics:* The Food Bank of Alaska hopes to play a stronger role in providing food logistics that will convey fresh foods to lower income residents of the Anchorage area. They are beginning to conduct a feasibility study to establish a food hub that would aggregate, store, and possibly process fresh produce for distribution to larger markets in the Anchorage area, such as schools, hospitals, and retail markets.

*Permanent agricultural land:* The Alaska Land Trust is working to open opportunities to preserve farmland, especially in the greater Anchorage region. The biggest threat to farmland is development," says Louisa Yanes, director of the Alaska Farmland Trust.

## Community-scale innovations

**Composting**

*Anchor Point:* An established business in Anchor Point produces "fishy peat," a combination of fishmeal, peat moss, and rhizobia.

*Kake:* Kake Tribal Corporation has launched a business supplying compost to regional farmers and gardeners (Howk, 2013).

**Community Gardening**

*See Nome, Kotzebue, Juneau, and Bethel, above*

*Aniak:* Kuskokwim Native Association is currently restoring a 20-acre community garden site in Aniak that was once in frequent use by residents. This initiative is also exploring growing potatoes and corn in high tunnels. Families also maintain gardens at fish camp.

*Nenana Valley and surrounding region:* Tanana Chiefs Conference is distributing seeds to 500 gardeners in some 37 villages in the Interior near Fairbanks.

*Fort Yukon:* Community gardening efforts have been in place for a long time, though not consistently.

*Angoon:* UAF Cooperative extension is working in collaboration with the Angoon school to develop a community garden where residents can gain access to land for gardening.

**Season Extension**

*See also Nome, Kotzebue, and Bethel, above.*

*Fort Yukon:* An off-grid greenhouse, to be heated with bio-mass, is under construction.

*Kake:* Kake is exploring construction of a large-scale greenhouse that would be heated with surplus heat from a power plant.

*Yakutat:* A greenhouse is in production in Yakutat, UAF researchers say.

*Thorne Bay:* Farm-to-school funds allow schools to buy food from local farmers and have allowed school food officials to commit to purchasing greens from a new greenhouse in Thorne Bay that uses wood as fuel for a boiler to heat the space.

**Using federal grants, the town of Igiugig paid for heated barns to be built for raising chickens. The source of heat is a wood-burning stove so fuel is local. In this "Eggs to Elders" project, eggs laid by the hens are given away to elders, and sold to other residents at the market price.**

*Igiugig:* Using federal grants, the town paid for heated barns to be built for raising chickens (Austerman, 2011). The source of heat is a wood-burning stove so fuel is local. In this "Eggs to Elders" project, eggs laid by the hens are given away to elders, and sold to other residents at the market price.

*Ouzinkie:* Residents of Ouzinkie, a town with a strong heritage of Russian gardening as well as traditional Native culture, are reported by Craig Gerlach to be building greenhouses using as many local materials as practical, to reduce their dependence on resources that must be imported.

*Pribilof Islands:* UAF researchers report that lettuce and other greens are being grown in a greenhouse on the remote St. Paul Island, drawing primarily upon wind energy.

**Farming on a larger scale**

*See also Bethel and Haines, above.*

*Talkeetna:* Considerable arable land, close to rail transport, is available in the Talkeetna area, and several farmers are reported to be building up vegetable production intending to reach commercial scale.

*Kake:* The community has long been a center of commercial rhubarb production.

**Farm-to-School**

*See also communities above.*

After launching in Dillingham and Kodiak, *Farm-to-school and Fish-to-school* efforts have flourished in several Southeast communities, notably Sitka, where fishers have organized independently to connect directly with consumers, and where schools have been willing buyers.

Dillingham City School District was one of the pioneers of farm-to-school in the state. The work began by creating a garden at the school where students could learn to grow food; school snacks were served from the garden.

The discussion of purchasing fish from nearby sources was made all the more urgent by years of poor fishing in the 1990s. Faced with tight budgets, the school had been buying farm-raised processed fish products because the product was readily available through commercial channels. Since it arrived prepackaged, food safety concerns were minimal. Yet over time, school officials worked with the nearby Peter Pan company to purchase their new line of high quality, frozen salmon. Fish were donated by local fishermen, and Peter Pan donated the processing. This also reduced shipping costs (Luckhurst, 2010).

**Dillingham saved money by sourcing local fish, and offered a healthier meal to its students.**

*School Chef in Nenana. Photo: Alaska Department of Health and Social Services*

In just a short time, the school's freezer contained all of the salmon needed for the community's three schools for an entire year. The school district calculates that 23 of the 600 local commercial permit holders donated fish to the school, including one gift of 1,600 pounds from a single fisherman. Yet, one-third of the donors were based outside the state. The donated, processed salmon carried a value of $28,000 on the open market, and the school district saved half that much — $14,000 — by collaborating with local fishers and Peter Pan.

The district adds that the fresher, locally caught salmon also was a healthier product, with 543 fewer grams of sodium per portion, no added sugar, 16 fewer calories from fat, 2 additional grams of protein, and 7.5 grams of beneficial Omega 3 fatty acids. Overall, each portion had 75 fewer calories.

Then the district began to work with another family business, Dancing Salmon, to have the salmon processed into patties. In addition to baking salmon has also been prepared by the school in casseroles, chowders, as tacos, tortilla wraps, and roll-ups. Students were engaged in the process through educational units, and by developing new recipes for the lunch program.

Overall, the school reports that the program was a "boost to the morale of community members," helped boost the local economy, and garnered significant press coverage. Over

time, Peter Pan agreed to sell salmon at a reduced margin, ensuring that fishers and the processors could get paid something for their work.

The statewide Alaska Farm-to-School Program was formally developed in 2011, and is hosted by the Division of Agriculture in collaboration with the Department of Health and Human Services, Department of Education and Early Childhood Development, Department of Administration, Cooperative Extension, and several universities. This program supports increased sales of local foods to school districts, school garden development, technical assistances for school staff and producers, and educational activities for youth regarding food and agriculture. Mini-grant programs provide financial support for small, school-based projects that provide additional educational opportunities to students. This grant program and grant support through the USDA plus technical assistance has allowed some schools to invest heavily in their garden programs, including the Alaska Gateway School District in Tok, which is investing in a school greenhouse, among other things.

**"School purchases have been a nice shot in the arm"**
**that enabled one agricultural business to turn the corner.**

A pilot program, the Nutritional Alaskan Foods in Schools, administered by the Department of Commerce, Community, and Economic Development and the Division of Community and Regional Affairs, distributed $3 million to school districts for the purchase of Alaska Grown foods to be used in school food service programs during the 2013 fiscal year. As one producer put it, "school purchases have been a nice shot in the arm," that enabled him to turn the corner on a new agricultural business venture. Another producer wasn't able to plan for the new demand for his product and ended up leaving thousands of dollars of produce in the field instead of harvesting due to his perception that there was no buyer for it all. Overall, every participating producer interviewed felt that this farm to school food procurement funding is a real game changer for Alaska Grown producers. The program now appears to have fairly permanent funding, which will allow producers to more easily plan for and accommodate the new demand. Alaskans do note, however, that there are often too few Alaska-grown products to meet school demand.

**Every participating producer interviewed felt that this farm to school**
**food procurement funding is a real**
**game-changer for Alaska Grown producers.**

The following examples offer merely a glimpse of farm-to-school activity in the state. These are drawn both from our interviews and also from Alaska Farm-to-School Mini-Grant Reports for 2011, 2012, and 2013.

*Nome.* Using special state funds allocated for schools to purchase food from Alaska sources, schools have purchased seafood from Norton Sound Seafood.

*Bethel:* High school students were given nutritional instruction covering the benefits of fruit and vegetables, and then were served a vegetable stew featuring root crops that can easily be grown in Alaska. Surveys showed the students liked the stew; eating root crops is considered part of a diabetes-prevention effort. Researcher Andrea Bersamin has been working with schools in the Yukon Delta to assess the impacts of adding salmon to school lunches one day a week. Researchers have compiled some evidence in prior studies showing that even in youth with high cholesterol, lipid profiles are excellent because of eating fish regularly. Bersamin's team is also developing a tool kit for schools to use in introducing fish into school menus, should they desire to.

*Tok:* has built a greenhouse in the school to produce fresh greens, and is launching a plan to ensure that 20% of the food eaten in school lunch programs is regionally sourced. Since inclement weather had dampened student participation in outdoor gardening programs, the greenhouse is viewed as a way of ensuring that students can engage year-round.

*Palmer:* Louise's Farm School has won first place in the annual farm-to-school competition for two years in a row. Engaging the community broadly, the school raised vegetables, stored them, and prepared them for sauces, soups, and veggies in school lunches. Next school officials set out to create more storage space so that more product could be carried through to the winter and spring months.

The school's efforts emerge out of a broad vision. Megan Rock, Louise's Farm School principal said "With the loss of valuable farm land in Alaska to development and retail stores we would like to teach our students that without our local farms we may not readily have access to fresh food in their future. By promoting healthy food choices we will encourage a preference for food grown and harvested in Alaska."

**"With the loss of valuable farm land in Alaska to development and retail stores we would like to teach our students that without our local farms we may not readily have access to fresh food in their future. By promoting healthy food choices we will encourage a preference for food grown and harvested in Alaska."**

*Talkeetna:* To engage the wider community, the elementary school hosted "A Healthy Taste of Alaska" dinner featuring a local potato bar. This was expanded into a potluck. The Flying Squirrel Bakery Café prepared soups from local ingredients (Salmon Chowder, Pumpkin Moose Chile and Broccoli Cheddar) for everyone.

*Sitka:* Through the schools, the community has developed a "stream to plate" curriculum so that every third grader learns about the salmon life cycle while the fish is served at school. Schools have been willing buyers of fish through fish-to-school initiatives where fishers have organized independently to reach local markets. Even in its early years, 30% of students participated in a local fish lunch

*Thorne Bay*. Farm-to-school funds helped the Thorne Bay School to construct a "math garden" where a diverse array of skills are applied to growing food: math, shop, horticulture, and science. In addition to mapping the Thorne Bay "foodshed," students raised potatoes, radishes, kale, lettuce, carrots, and broccoli. A later grant allowed schools to buy food from local farmers and also encouraged school food officials to commit to purchasing greens from a new greenhouse in Thorne Bay that uses wood as fuel for a boiler to heat the space.

*Kodiak Fish-to-School Program. Photo: Kodiak Schools*

## What is Emerging to Create New Approaches to Food?

Subsistence gathering has proved resilient as a way of life for 12,000 years — and appears to capture more economic value than agriculture does in the state. Like farming, this work is seasonal and unpredictable. It stands at the very heart of culture, creating ways that extended families can nourish themselves, work together in productive ways, define their place in creation, celebrate natural cycles, and maintain mental health.

Yet this way of life increasingly depends upon new technology powered by fossil fuels, upon equipment that is no longer fashioned in local communities, and upon families that are more scattered. As a result, some elders are not getting access to traditional foods, and many youth are growing up without essential skills. As fuel prices rise, gathering foods has become increasingly expensive.

Given the leakage of $1.9 billion from the Alaska economy each year as Alaskans farm and eat, combined with weather change that is related to an economy dependent upon fossil fuels, diminishing oil reserves in the North Slope, and declining state revenues as oil production falls, Alaskans all over the state are deeply concerned.

Many Alaskans have launched critical initiatives to ensure that food supplies will be secure, and that Alaskan ways of life will persist.

- **Native communities are resiliently adapting** to substantial changes to their lifestyle brought about by industrial society: flooding, unstable ice, changing wildlife migrations, increased costs of hunting, weakened family ties and cultural bonds, and diminished subsistence skills. Solid initiatives are in place to ensure that the cultural heritage surrounding traditional foods persists.

- **Commercial fish harvests have been sustained through careful public management practices,** but in some cases these policies have had the unintended consequences of creating haves and have-nots.

- **Several fishers are selling direct to customers** in an effort to connect more closely with consumers and to sell at an adequate price.

- **Farm-to-School and Fish-to-School initiatives are for the first time funded in an ongoing manner through legislative appropriations.** These initiatives have the important impact of creating new market channels for locally produced foods, greater local voice in determining food choices, richer educational opportunities, and new community efficacy in creating a stronger future.

- **Farmers report that it is relatively easy to grow food, but difficult to market it at a price that sustains the farm.** Dozens of small farms have reached out to consumers asking them to share the risks of farming through community supported agriculture (CSA) arrangements in which members invest money up front in exchange for food deliveries at harvest.

- **Farmers also report that direct sales are thriving.** A strong desire among farmers and consumers to connect more closely with each other is driving lasting change in the food industry. 241 Alaska farms sell $2.2 million of food directly to consumers. This is a 62% increase of number of farms selling direct, and a 32% increase in direct sales, over 2007 sales of $1.7 million. Alaska sells food direct at 13 times the national average.

- **USDA reports it has spent $4 million dollars in Alaska sharing the costs of high tunnels, greenhouses, and other season extension facilities** with small and large growers. Community gardening efforts are also increasing in rural villages.

- **Several composting initiatives are building new soil and new fertility in state**, building the promise that Alaska can reduce its dependence on imported inputs.

- **Several growers have launched innovative farm enterprises.** Many show promise of extending the production season by using hot springs or waste heat. However, these innovations are seldom financed by farm production itself; they rely heavily on investment by individuals of means, or grants.

- **The State of Alaska contemplates releasing new publicly owned lands to farmers in 2015.** Yet the washing, storage, cooling, and freezing infrastructure required to support new farm production and sales is often lacking.

- **Chefs, especially in Anchorage and Juneau, are creatively sourcing Alaska-grown foods for their menus**, but report that supplies are limited and regulatory obstacles are immense.

- **A handful of food manufacturers are creating new products using Alaska-grown foods.**

- As the culture of food harvesting, preparation, and farming has declined in Alaska, **the need for education has increased**, so that Alaska youth will learn hunting, gathering, farming, and food preparation skills, Alaskans will value Alaska-grown foods more highly, and consumers will understand the seasonality of the foods they eat.

Alaska also wrestles with deep obstacles to supplying its own food:

- Costs of land, labor, and living are higher than in the Lower 48.
- Imported food is widely available at lower costs than Alaskans can produce it.
- Many farmers depend on imported inputs, making their operations highly vulnerable.
- The legacy of state intervention in agriculture has often been problematic.
- Skills, infrastructure, and cultural connections regarding agriculture are very fragile, and subsistence skills have begun to diminish. As one public health nurse put it when we spoke with her in Anchorage, "Subsistence gathering is threatened the same way that family farming has been."

*Vendors at Sitka Farmers' Market. Photo: Sitka Local Foods Network.*

Amidst an economic context that is not highly favorable to agriculture, and with limited infrastructure to promote local food trade, the most successful efforts have been small initiatives.

Indeed, several food businessmen who started larger-scale firms now say they wish they had remained small to simplify their operations. Without supportive infrastructure and policy, larger firms are more vulnerable.

**The most successful efforts have been small initiatives, yet they require supportive infrastructure.**

Small-scale initiatives are tailored to unique local characteristics, are able to respond flexibly to changing conditions and rapidly changing consumer needs. Moreover, capital requirements are limited. Many people work part-time on several endeavors, none of which would pay a full livelihood by itself, and this has produced great dynamism. Smaller-scale activity is more likely to be blended in with family and cultural life.

When the state has invested in smaller-scale activity, greater return has been realized. However, this is difficult to quantify precisely. It is far easier to tally up the hundreds of millions of dollars of questionable state investment, and the massive leakage of resources, because the state's economy depends so heavily on resources and products sourced outside. By clustering together and collaborating, smaller firms are able to gain stronger market presence, greater consumer loyalty, and longer life.

The most significant role the state can play is to:

1. Embrace emergent food activity.
2. Surround this with supportive infrastructure (at the farm and local levels, primarily).
3. Continue to invest in farm-to-school activities that shape new options for Alaskans.
4. Educate Alaska residents about the need to protect wildlife resources and promote Alaska-grown food.

The food system of the future will be based on activity that is fueled with local resources, friendly to family and community capacity building, and resilient over time. Unless a culture of food production is renewed in Alaska, residents of the state will have severe difficulty surviving as fossil fuel becomes both scarce and expensive.

This leads us to the following recommendations.

*Smokehouse in Hydaberg. Photo: Alaska Department of Health and Human Services.*

# Recommended Actions with Measures of Success

By Ken Meter and Megan Phillips Goldenberg
June 30, 2014

*Part of a report, "Building Food Security in Alaska"*
*for the Department of Health and Social Services and the Alaska Food Policy Council*

## A. Foster Subsistence Harvesting and Related Skills:

1. Subsistence foods are a key piece of Alaska's food system. They provide important benefits to Alaskans related to nutrition, health, culture, and economic growth.
2. Alaskans must diligently protect the ecosystems on which we all depend, and wildlife of all kinds, especially those fish, animals, and birds that are central to subsistence gathering. Although it is unlikely that enough wildlife live in or near the state to feed the entire population should economic conditions become dire, this is far and away the most significant food source in Alaska that currently feeds Alaska residents.
3. Organizations representing Alaska Native communities should play a strong role in co-management of wildlife resources. The current subsistence management structure with State and Federal managers faces many challenges. The experiment in co-management currently underway in Copper River, through the Alaska Federation of Natives, should yield essential insight into the potential for tribal community councils to play a more central role in managing wildlife. It seems likely that those who live in a specific place, drawing upon a long heritage and deep cultural insights, have more integrated knowledge than specialists who focus only on one aspect of the natural system. Interdisciplinary teams involving scholars, public officials, and residents may also play a useful role.
4. Programs such as "Store Outside Your Door" and Alaska Native Cultural Camps that help cultivate skills in gathering, storing, and preparing wild foods should be encouraged.
5. Identify barriers and proposed solutions to continued access to subsistence resources, such as the cost of fuel, State and Federal regulatory challenges, etc.

*Measures of success:*

- Number of wildlife co-management processes that expand the roles of Native leaders.
- Satisfaction of tribal and village officials with co-management processes.
- Number of participants in programs, events, and workshops that teach subsistence skills.

## B. Build Personal Capacities in Agriculture:

1. By 2034, every graduating high school senior shall hold basic skills in gardening, foraging, composting, safe handling, food preparation, and storage.

2. A culture of food production should be nurtured that brings Alaskans together to learn about growing, gathering, preserving, preparing, and savoring good food, to celebrate seasonal foods and natural cycles, and to form social bonds across generations that celebrate place. It is this basic awareness of, and connection to, food production, combined with a strong sense of community connection, that will do the most to promote economic growth and self-reliance, prevent obesity, reduce food-related health impacts, and achieve food security.
3. The State should allocate funds to ensure that food banks and other organizations that serve low-income Alaskans can encourage their constituents to build economic opportunity for themselves by producing and processing foods for their Alaska neighbors.
4. The State, through community and technological colleges, land grant universities, land trusts, and other nonprofit organizations, should support and sponsor ongoing initiatives to train new farmers in commercial production of food for Alaska markets.

*Measures of success:*

- Percent of high school graduates who hold documented skills in gardening, foraging, composting, safe handling, food preparation, and storage.
- Number, locations, and participant counts for local food-oriented celebrations.
- Number of new farmers who graduate from food production training programs with business plan and start-up capital in hand.
- Number of new farmer programs created or communities served by such programs.

### C. Expand Agricultural Production and Gardening:

1. Devoted efforts must be made to improve soil quality by converting organic materials into soil fertility — including recycling of food scraps in urban areas, re-use of spent hay or straw, harvesting of seaweed, shellfish bones, egg shells, and other suitable materials, so the State can reduce its dependency on imported farm inputs. By 2025, all organic wastes should be put to productive use.
2. Support existing federal programs that help gardeners and farmer invest in high tunnels, greenhouses, and other season-extension technologies (including year-round indoor production facilities). State funding should be made available to partner with these programs so that residents in all Alaskan communities can produce more food, create jobs, and provide more healthy, local food choices.

*Measures of success:*

- Percent of organic waste in Alaska cities that is recycled into compost or similar source of fertility.
- Percent of rural villages that have season-extension capacity suitable to produce food for local residents.

### D. Build Infrastructure that Supports Local Food Production:

1. Food caches should be created across the state, providing safe and secure spaces to store healthy food during winter months and for emergency preparedness year-

round. These should emphasize traditional storage techniques that use little fossil fuel energy, and storage of Alaska-grown root crops should be a priority.

2. Food production "nodes:" Local level washing, packing, storage, and distribution facilities, should be funded through a competitive grant program open to any community-based food production initiative.

*Measures of success:*

- Number of food caches developed, diversity and quantity of food stored.
- Funds allocated by the State of Alaska to invest in local-foods infrastructure at the community level.

### E. Adopt State Policy that Supports Local Food Production:

1. The Nutritional Alaskan Foods in Schools program should receive continued and sustainable funding.
2. Farm-to-school programs should receive adequate and sustainable funding.
3. Grants and loans should be made available to Alaskans who wish to install agricultural production facilities that run on renewable energy produced in Alaska, including waste or surplus heat from nearby buildings, hot springs, etc.
4. Food production lands should be set aside in and near Anchorage, Fairbanks, Haines, Kodiak, Juneau, Sitka, and other cities to ensure that fertile acres are spared from development, and continue to be available for helping feed urban populations.
5. Farm land that the State of Alaska is opening up in the Nenana-Totchaket should be developed with a high priority for raising food for delivery to remote villages across the state. In order to reduce development pressure on the land, to retain the rural landscape, foster community life, and to ensure that land is affordable to farmers, the state should hold land prices to levels that are commensurate with a farmer's ability to produce food, either through easements or leases.

*Measures of success:*

- Dollars appropriated by the Alaska Legislature to ensure Alaska grown foods are served in institutional food service programs; percent of total demand represented by these purchases.
- Other incentives for state procurement of local food, such as the bidder's preference for Alaska Grown, are supported and implemented by the State of Alaska.
- Acres of land near urban areas set aside for permanent agricultural use.
- Percent of total demand for food in rural villages that is produced in Nenana farm development and purchased by consumers in remote locations.

### F. Focus Consumer Attention on Staying Loyal to Alaska Grown Food:

- The State should engage in intensive and long-term marketing campaigns to leverage its prior investment in the Alaska Grown program.

- Marketing campaigns that combine food and health, such as the "Eat Five, Buy Five" campaigns launched in other states (eat five fruits and vegetables per day; buy five dollars of food from an Alaska farm each week) will help prevent obesity.
- These campaigns should also remind Alaska consumers which products are in season during harvest months.

*Measures of Success:*

- Number of new campaigns established to promote food, health, and locally grown foods.
- Dollars of private and public money raised to carry out these campaigns.
- Impacts of these campaigns.

### G. Expand food processing and manufacturing for in-state markets:

1. By working in collaboration with farmers, chefs, and other food system stakeholders, Department of Environmental Conservation (DEC) should expand the review of state food safety regulations with a mission of enabling as much local food production and processing as can safely be created. This would extend work previously accomplished through the Cottage Foods program. Revised regulations should be simplified, scaled appropriately for small and mid-size growers so they do not serve as impediments to earning a living as a farmer raising safe foods, and should be kept low-cost.
2. The State should allocate money for community kitchens in or near low-income areas where residents may learn basic food preparation, processing, and cooking skills; create a small business opportunity by producing food items for local use; or successfully aggregate food items for sale to larger markets.
3. The State should support through loans and technical assistance individual entrepreneurs who invest in and manage community-based food initiatives, with a priority on projects that provide Alaska-grown food to Alaska residents.

*Measures of success:*

- In an annual survey of food-business startups, the percentage of respondents who believe that food-safety requirements are cost-effective, appropriate to the scale of their business, and transparent.
- Number of commercial kitchens open to resident use in urban Alaska; percentage of operating expenses that are covered through operational revenue.
- Value of foods that are processed in existing and new food businesses that are sold to Alaska household consumers.
- Percent of State food production/infrastructure loans that are repaid.

### H. Strengthen internal food distribution networks:

1. The State should invest economic development funds in *creating local efficiencies* in food distribution. This would include creation of strong local food transportation routes.
2. The State should allocate funds for food banks that choose to make use of their food-handling expertise and logistical capacities to source locally grown food to low-income residents. Through such initiatives, food banks may play a significant role in creating more robust food systems across Alaska.

*Measures of success:*

- Value of farm products that are delivered to in-state public institutions from Alaska farms (for each farm) by each market channel (direct, through wholesaler, or other intermediaries, processors, etc.).

### I. Strengthen statewide transparency and coordination:

1. The Alaska Food Policy Council should compile a resource library containing key studies covering the potential for local foods, and related themes; and compile comprehensive data sets that allow APFC to monitor prevailing conditions and evaluate success of local foods efforts. Ongoing evaluation of local foods investments should be coordinated on a statewide basis; without drawing funds away from local foods implementation.
2. In collaboration with other agencies, educators, and organizations statewide, AFPC should convene meetings of local foods leaders statewide at least once per year.
3. AFPC should raise funds to offer small research or "emerging opportunity" grants to entrepreneurs, farmers, small processors, scholars, and others who wish to test a new idea. In exchange for funding, recipients would make their findings public. This would not be academic resarch, but rather practical applications.

*Measures of success:*

- Number of Alaska food leaders who convene in annual meetings.
- Diversity of these participants (Native/nonnative, rural/urban, academic/community, etc.)
- Value of research/emerging opportunity grants that are given to Alaska community foods initiatives.
- Unexpected outcomes and new insights gained from these convenings and research opportunities.

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# How "Food Security" is Defined in this Report

**Food security** is commonly used by Alaskans to signify the security of the food supply from potential disruption due to weather incidents, flooding, war, breakdown of supply lines, etc.

Often the definition of "food security" in the Lower 48 is more focused on ensuring that low-income residents have a secure food supply. Increasingly this term has come to mean that low-income communities produce food for themselves.

In this report "food security" is used in the Alaska sense, captured best by University of Alaska researchers below.

"In the context that we use it here, food security describes more than merely whether sufficient food is being produced, or a one-size- fits-all food-nutrition relationship, and incorporates all of the various ways in which a food system supports health in its various biophysical, social, and ecological dimensions (Loring & Gerlach, 2009). These include matters such as the importance of certain foods, food choice, local perceptions of hunger, uncertainty and worry about food safety or shortages, and any other psychosocial, sociocultural, or environmental stresses that result from the process of putting food on the table (S. Maxwell, 2001).

In rural, predominately Alaska Native communities, for example, wild fish and game are important for food security, not just because they are readily available, but also because they are important to the preservation and transmission of traditions and cultural practices, for the maintenance of social networks and interpersonal relationships, and for supporting individuals' sense of self-worth and identity (Fienup-Riordan, 2000; Loring & Gerlach, 2009; Loring, Gerlach, & Harrison, 2013)

# APPENDIX I — Census of Agriculture highlights

**Highlights of the 2007 and 2012 Census of Agriculture for the state of Alaska[16].**
*Agricultural Census data for 2012 were released May 2, 2014*

*The Census of Agriculture defines a "farm" as "an operation that produces, or would normally produce and sell, $1,000 or more of agricultural products per year."*

*Land:*

- 762 farms.
- Alaska had 11% more farms in 2012 than in 2007. Some of this may be due to census takers making better contact with small farms, and NRCS funds for high tunnels appear to have also expanded the number of farms.
- 49 (6%) of these are 1,000 acres or more in size.
- 428 (56%) farms are less than 50 acres.
- Average farm size is 1,094 acres.
- The state has 834,000 acres of land in farms.
- The state holds 31,000 acres of harvested cropland.
- 2,451 of these acres are irrigated.
- Average value of land and buildings per farm was $681,000.

*Sales:*
*With the exception of foods sold directly to consumers (see below), farmers typically sell commodities to wholesalers, brokers or manufacturers that require further processing or handling to become consumer items. The word "commodities" is used in this report to mean the crops and livestock sold by farmers through these wholesale channels. The term "products" encompasses commodity sales, direct sales, and any other sales.*

- The state's farmers sold $59 million of crops and livestock in 2012.
- Farm product sales increased by 3% from 2007 to 2012.
- $25 million of crops were sold.
- $34 million of livestock and products were sold.
- 440 (58%) of the state's farms sold less than $10,000 of products in 2012.
- Total sales from these small farms were $1.25 million, 2.1% of the state's farm product sales.
- 87 (11%) of the state's farms sold more than $100,000 of products.
- Total sales from these larger farms were $54 million, 91% of the state's farm product sales.
- 51% of the state's farms (392 of 762) reported net losses in 2012.
- 195 (26%) of Alaska's farmers collected a combined total of $2.4 million of federal subsidies in 2012.

[16] Compiled with the assistance of Nick Wojciak.

**Top farm products of Alaska (2012).**

*Note that some product sales figures were suppressed by the USDA in an effort to protect confidentiality, so although certain products may have significant sales, they are not included in this chart.*

| | | $ millions |
|---|---|---|
| 1 | Ornamentals | 13.0 |
| 2 | Hay | 4.4 |
| 3 | Vegetables | 3.3 |
| 4 | Misc. Livestock | 2.8 |
| 5 | Potatoes | 2.5 |
| 6 | Cattle & calves | 1.7 |
| 7 | Dairy products | 1.3 |
| 8 | Barley | 1.0 |
| 9 | Hogs | 0.2 |
| 10 | Oats | 0.2 |

*Production Expenses:*

- Hired farm labor was the single largest expense for Alaska farmers in 2012, totaling $19 million (33% of production expenses).
- Alaska farmers charged $7.7 million (14%) to depreciation.
- Feed purchases totaled $6.4 million (11%).
- Gasoline, fuels, and oil purchases were $5.1 million (9%).
- Alaska farmers spent $4.4 million (8%) on repairs, supplies, and maintenance.
- Utility expenses were $4.1 million (7%).
- Fertilizer, lime, and soil conditioners cost farmers $3.2 million (6%).

*Cattle & Dairy:*

- 134 farms hold an inventory of 11,000 cattle.
- 1,000 cattle were sold by farmers in 2012 for total sales of $1.1 million.
- 98 farms raise beef cows.
- 28 farms raise milk cows.
- 226 farms produced 29,000 tons of forage crops (hay, etc.) on 24,000 acres.

*Other Livestock & Animal Products:*

- 37 farms hold an inventory of 1,009 hogs and pigs.
- 42 farms sold 2,042 hogs and pigs in 2012.
- 50 farms hold an inventory of 773 sheep and lambs.
- 141 farms hold an inventory of 8,265 laying hens.
- 23 farms raise 2,044 broiler chickens.
- 51 farms engage in aquaculture.
- 29 farms raise horses and ponies.

*Grains, Oil Seeds, & Edible Beans:*

- 23 farms produced grains, oil seeds, and edible beans. *Note that data for sales of grains, oil seeds, and edible beans were suppressed by the USDA in an effort to protect confidentiality.*
- 18 farms produced $951,000 worth of barley.
- 8 farms produced 57,000 bushels of oats on 903 acres.

*Vegetables & Melons (some farmers state that Ag Census data does not fully represent vegetable production):*

- 164 farms worked 1,059 acres to produce vegetables. *Note that data for sales of vegetables were suppressed by the USDA in an effort to protect confidentiality.*
- This represents a 75% increase in the number of farms (from 95) over 2007 levels.
- 115 farms raised potatoes.

*Fruits (some farmers state that Ag Census data does not fully represent fruit production):*

- 17 farms in the state hold 21 acres of orchards.
- 12 farms sold fruits and tree nuts. *Note that data for sales of fruits and tree nuts were suppressed by the USDA in an effort to protect confidentiality.*
- 49 farms sold berries. *Note that data for sales of berries were suppressed by the USDA in an effort to protect confidentiality.*

*Nursery & Greenhouse Plants:*

- 198 farms sold $13 million worth of ornamentals in 2012.
- This represents an increase of 43% in the number of farms (from 138) and a decrease of 16% in the number of sales since 2007.
- 3 farms sold Christmas trees.

*Direct & Organic Sales:*

- 241 farms sell $2.227 million of food products directly to consumers. This is a 62% increase of number of farms (149 in 2007) selling direct, and a 32% increase in direct sales over 2007 sales of $1.682 million.
- This amounts to 3.8% of farm product sales, nearly 13 times the national average of 0.3%.
- 20 farms in the state sold organic products. *Note that data for sales of organic products in Alaska were suppressed by the USDA in an effort to protect confidentiality.*
- 42 farms market through community supported agriculture (CSA).
- 75 farms produce and sell value-added products.
- 118 farms marketed products directly to retail outlets.
- 48 farms had on-farm packing facilities.

**State of Alaska highlights (Agriculture Census 2012):**

- 762 farms, 11% more than in 2007.
- Alaska has 834,000 acres of land in farms.
- Farmers sold $59 million of products in 2012.
- $25 million (42%) of these sales were crops.
- $34 million (58%) of these sales was livestock.
- The most prevalent farm size is 1 to 9 acres, with 247 farms (32%) in this category.
- The next most prevalent is 10 to 49 acres, with 181 (24%) farms.
- 49 farms (6%) are 1,000 acres or more.
- 428 farms (56%) are less than 50 acres.
- 440 farms (58%) sold less than $10,000 in farm products.
- 87 farms (11%) sold more than $100,000 in farm products.
- 241 farms sell $2.2 million of food products directly to consumers. This is a 62% increase of number of farms (149 in 2007) selling direct, and a 32% increase in direct sales over 2007 sales of $1.7 million.
- Direct sales were 3.8% of farm product sales, nearly 13 times the national average of 0.3%.
- If direct food sales made up a single commodity, the value of these sales would just about equal the value of the state's third-most important product, potatoes.
- 20 farms in Alaska sold organic food products.
- 42 farms market through community supported agriculture (CSA).
- 75 farms produce and sell value-added products.
- 118 farms marketed products directly to retail outlets.
- 48 farms had on-farm packing facilities.
- 81 farms practice rotational or management intensive grazing.
- 4 farms practiced alley cropping or silvopasture.
- 14 farms harvested biomass for use in renewable energy.

# APPENDIX II — 1909 Exhibit from Tanana

**Exhibits Sent to New York City by Tanana Valley farmers — September 27, 1909**

**Source:** Papp, Josephine; & Phillips, Josie A. (2007) *Like A Tree to the Soil: A History of Farming in Alaska's Tanana Valley, 1903-1940.* University of Alaska Fairbanks, School of Natural Resources and Agricultural Sciences, 7-8.

Samples of the following crop varieties were shipped to the City Investment Building to showcase Alaska agriculture:

*Forage:*
Grass, Timothy
Hay
Hay, Red Top (Native hay)**

*Grain:*
Barley, bald
Barley, bearded
Oats
Oats, Black
Oats, White
Rye, Winter
Wheat, Spring
Wheat, Winter (Blue Stem)
Wheat, Winter (Club)

*Vegetables:*
Beets, Table
Cabbage
Carrots
Celery
Parsnips
Potatoes, Alaska (New Creation)
Potatoes, Burbank
Potatoes, Early Eureka
Potatoes, Early Ohio
Potatoes, Early Rose
Potatoes, Gold Coin
Radish, Chinese White
Rutabagas
Turnips, White

*Fruits:*
Raspberries, Wild
Cranberries, Native

** It was said of the Red Top native hay that it "grows wild, luxuriantly over thousands of square miles, excellent for horses and cows."

*Poultry:*
Chickens, Plymouth Rock
Chickens, Wyandotte
Chickens, Brown Leghorn
Chickens, White Leghorn
Chickens, Rhode Island Red
Ducks, White Peking
Pigeons, Homing

*Cattle:*
Brahman
Galloway
Guernsey
Holstein
Jersey
Shorthorn

*Hogs:*
Berkshire
Chester White
Poland China

*Goats:*
Saanens
Toggenburgs

# APPENDIX III — Regional Varieties

**Region-specific variety development**
Varieties of northern-region grains, vegetables, and fruit have been developed for subarctic or arctic areas. The Alaska experiment station works to produce new varieties that will succeed in Alaska's weather conditions, often starting from plant or animal strains used in Scandinavia and Siberia. Below are release dates and varieties developed.

2009. Sunshine hulless barley[1]
2008. Midnight Sun-flower (unofficial release)[2]
2006. Wooding barley
2001. Finnaska, a short-stemmed, high-protein barley
1987. Kenai polargrass
1986. Nortran tufted hairgrass
1983. Alasclear potato
1981. Datal barley; Otal barley; Thual barley; Norcoast Bering hairgrass; Highlat russet potato; Squentna strawberry; Ingal wheat; Nogal wheat; Vidal wheat
1980. Sourdough bluejoint reedgrass
1979. Denali potato
1977. Alaska red potato
1976. Tundra glaucus bluegrass; Alyeska polargrass; Kiska raspberry; Toklat strawberry
1974. Yukon Chief corn
1972. Denali alfalfa; Lidal barley; Weal barley; Ceal oats; Toral oats
1970. Alaska 6467 & 6469 cabbages; Alaska Frostless potato; Early Tanana tomato
1969. Susitna and Matared strawberries
1968. Pioneer strawberry
1965. Nugget Kentucky bluegrass, Polar bromegrass
1964. Arctared red fescue
1963. Alaska russet potato
1961. Stately potato
1959. Alaska 114 potato
1953. Gasser wheat, Alaskaland red clover, Knik potato
1920. Trapmar barley
1905. Sitka hybrid strawberry

Source: "100 Years of Alaska Agriculture." *Agroborealis* 30(1), Spring 1998. Fairbanks: University of Alaska.

# APPENDIX IV — 42 Potato Varieties

**42 Varieties of potatoes grown in the Tanana Valley prior to World War II.**

**Source:** Papp, Josephine; & Phillips, Josie A. (2007) *Like A Tree to the Soil: A History of Farming in Alaska's Tanana Valley, 1903-1940.* University of Alaska Fairbanks, School of Natural Resources and Agricultural Sciences, 234.

*The authors state this is only a partial list:*

1. Alaska Beauty
2. American Wonder
3. Arctic Seedling
4. Beauty of Hebron
5. Bliss Triumphs
6. Blue Bell
7. Burbank
8. Darling's Favorite
9. Early Eureka
10. Early Market
11. Early Ohio
12. Early Rose
13. Early Victors
14. Eureka
15. Extra Early Pioneer
16. Freeman
17. Gold Coin
18. Gold Cola
19. Great Farmers
20. Green Mountain
21. Irish Cobbler
22. Katahdin
23. Kennebec
24. Kinik
25. Michigan early
26. Netted Gem
27. New Creation
28. Norton Beauty
29. Noverton Beauty
30. Ohio Junior
31. Ontario
32. Pink Eye Spoots
33. Red Bliss
34. Salina Burbanks
35. Superior Vorenheim
36. Teton
37. Warba
38. White bliss
39. White gold
40. White Rose
41. White Swiss
42. 114-3

# APPENDIX V — Food Clusters in the Lower 48

**Economic Theory of Clusters**

Clustering of businesses is a long-supported economic development approach in which businesses in similar fields locate close to one another to cooperate, share resources and information, even though at times they may also compete with each other. Drawing upon common infrastructure, they often create special efficiencies due to their ability to reduce overhead costs.

A shopping mall is one example of such a business cluster; Detroit built its automotive might in the 1920s by locating amidst a cluster of small towns that manufactured components (wagons, wheels, glass, etc.) that would be useful in assembling an automobile. As one expert said, "Clusters are increasingly seen as key to the creation and exploitation of regional innovation and competitiveness" (Braiser et al., 2007, 1). Connection across firms and industries supports competition, productivity, innovation, and new business formation (Porter, 2000, 5).

Cluster participants generally share common needs, opportunities, constraints, and obstacles to productivity. The cluster itself can provide a constructive environment for dialogue among related companies, their suppliers, government, and other institutions. Clusters are geographically based and often connected irrevocably to a particular location (Porter, 2000, 5).

Clusters have many positive social and economic impacts on the community in which they are located. They tend to improve wages, economic growth and worker training opportunities. They also often attract workers to the region, and help retain them even when the workers seek alternative employment because there are many similar firms nearby (Braiser et al., 2007, 3-4).

Clusters also tend to foster entrepreneurial activity. The presence of a cluster allows better access to information, infrastructure, an established customer base and existing relationships for new businesses. It also lowers perceived risk for entrepreneurs because there are multiple nearby opportunities within the industry (Porter, 2000, 25). To the extent linkages are made among local businesses, increasing the flow of local commerce economic multipliers are also likely to increase.

There are other positive impacts beyond these economic benefits. There is a well-documented positive correlation between social capital and the extent of locally owned business in an area. This applies specifically to agricultural businesses as well. Communities that rely predominately on small family-run farms enjoyed appreciably higher levels of social and economic welfare than those that rely mostly on industrial farms. Communities characterized by smaller farms often have lower rates of crime and income inequality, higher rates of democratic participation and better access to social services (Lobão & Stofferahn, 2008; Goldschmidt, 1978).

Further, there is documentation showing stronger social networks in communities with other types of clusters (Flora and Flora, 1993). There are also several anecdotal examples of environmental and cultural benefits resulting from farm clusters in the academic literature (Salamon *et al.*, 1998; Hilchey, 2006).

Both the academic literature and anecdotal testimony suggest that farm clusters work best when there exists a standing and identified market for their products. A major aspect of creating a successful cluster is securing solid ties to a market, be it a retail outlet, restaurant, farmers market or an institution. As Donald explains, the sustainable food movement is by and large a consumer-driven process (2008); clusters appear to be a way of both building consumer loyalty and maintaining it over time.

Though there are many examples of business clusters in the academic literature and in the real world, this is not as well documented as a strategy specifically for agriculture. However, a highly competitive, localized, specialized, and capital and infrastructure-intensive industry such as sustainable agriculture could benefit greatly from its application.

Though the academic literature has just begun to chronicle the existence of small farm clusters, there are many successful examples functioning in the market today.

## Findings of The Small Farms Industry Clusters Project

Braiser, *et al.* conducted a set of interviews with farm clusters across the Northeast as part of an academic undertaking known as the Small Farms Industry Clusters Project. These academics discovered many economic and community benefits from these agricultural clusters. Notably, representatives from each cluster mentioned higher income and multiplier effects from being part of the cluster. Many clusters also spawned other supportive businesses, such as equipment dealers and processing plants.

The project also characterized the elements that make agricultural clusters successful: a functional agricultural cluster has a clear vision or mission, often related to community development and/or sustainability. There must also be an organizational framework, and a leadership structure that upholds that framework. Collaboration and communication between members is crucial, and there should be a regular, systematized outlet for this communication. Trust must exist between stakeholders in order to compete and collaborate at the same time.

Braiser and her colleagues also identified some key characteristics of the members of a farm cluster. They tend to be geographically close, with shared interests, be they financial, environmental or social. Cluster members benefit from what they call a "shared sense of fate;" that is, the recognition of their dependence on one another and the ability they have to help and be helped. Though clusters are variable in their location, size and specific mission, these overall identifiers help define and clarify the makeup of a successful cluster.

## Examples of Farm Clusters

*Pioneer Valley Heritage Grain Project*

Several solid examples of food-business clusters function in the market today. One such cluster is the Pioneer Valley Heritage Grain Project in western Massachusetts. It is a project of the New England Small Farms Institute (NESFI), a nonprofit organization that works to improve the sustainable regional food system. The Institute recognized a growing market for locally grown "heritage grains," such as spelt, rye, and barley. This change in demand came partially in response to global price increases, but also emerged out of consumer desires for locally grown food. Many farmers in the Pioneer Valley in Massachusetts had already started shifting their production towards these grains. NESFI opted to help manage this shift, and to aid farmers in this process. NESFI established an intentional cluster that shares processing equipment and storage facilities. It also created training opportunities and opened market access for the farmers. This initiative was funded by a grant from the Massachusetts Agricultural Innovation Center, a subsidiary of the Massachusetts Department of Agricultural Resources, as well as an in-kind contribution from NESFI. The total startup budget was $133,522 (Pioneer Valley Grain Project Proposal, 2009).

*Tuscarora Organic Growers*

Another successful, and renowned, farm cluster is the Tuscarora Organic Growers Cooperative (TOG). TOG was founded in 1988 when several small organic farmers began co-marketing their produce. In 2013, the Coop planned for 28 member farmers and 17 nonmember farmers to sell over 100,000 cases of produce, primarily to the Washington, DC, metro area. TOG sells to retailers, restaurants and individual buyers. They currently have a full time staff of four who run sales and marketing, as well as 18 part time employees who manage shipping and delivery (Tuscarora Organic Growers, 2008).

"We work for the farmers," said TOG's account manager Jeff Taylor. TOG offers farmers three main services: marketing of produce; production coordination; and quality assurance for buyers. They aim to get the highest value for their producers and a consistently high quality standard for the retailer and restaurants that buy their products. The presence of a longstanding reputation and brand is a critical part of the coop's success. TOG also runs what Taylor calls a "pass through facility," which includes a refrigerator and dry storage.

Unlike other clusters, TOG has no outside funding. The farmers who started the coop made small investments over time to build the facility and staff employees. Today, farmers who sell their produce through TOG get 75% of the sale price of their product. The remaining 25% goes back to TOG's operations budget. It is a for-profit enterprise.

Taylor noted the importance of having non-farmers managing the day-to-day operations. He attributed this to the highly independent nature of many farmers, and the resentment that built up early on before the coop hired employees. The success of TOG, he said, comes from its adherence to cooperative principles, and its autonomous, market-based structure. Tuscarora Organic Growers is a solid example of a successful cluster that combines a social mission and smart business sense to support local farmers (Jeff Taylor, August 9, 2013).

*The Meat Suite*

There are many types of farm clusters. Some share equipment, some work together on marketing, many aggregate their products to reach larger markets. One creative example is called Meat Suite, a program of Cornell Cooperative Extension in Ithaca, New York. The project was recently launched through a USDA Farmers' Market Promotion Program grant

of $80,000 plus private donations from foundations and private citizens. Through Meat Suite, consumers rent commercial freezer space when buying bulk meat quantities. This relieves pressure on both small producers and consumers who lack storage space. It is an innovative way to break down the logistical barriers between small farmers and individual consumers. This is a relatively new project so more time must pass before we can judge its overall success, but it is a strong example of the creativity of farm clusters (Cornell Cooperative Extension, 2012).

## The Role of Incubators

Clusters can arise in many different contexts. However, the presence of a farm incubator (that is, a farm site where a group of emerging farmers can practice their growing and marketing skills) can be hugely useful. Incubators help not only to train emerging farmers needed for a successful cluster, they also tend to establish a collaborative, clearly defined vision among them. Thus, an incubator provides the formalized network that can be critical in engineering a sustainable cluster. There are a substantial number of successful incubators across the U.S., and their numbers are growing. As interest and demand for sustainable food grows, more incubators appear to be providing new farmers with many of the resources they need to meet this demand (Niewolny & Lillard, 2010).

*The Agriculture and Land-Based Training Association*
One impressive example of a successful incubator is the Agriculture and Land-Based Training Association (ALBA) in Monterey County, California. ALBA was founded in 2001. It works with limited-resource and aspiring farmers, mostly Latinos, by providing them with information and technical assistance that is often unavailable through traditional extension agencies. ALBA owns two training farms and employs seven people full time.

One farm hosts the Small Farm Education Program. Here, beginning farmers learn about organic farming, business planning, and marketing, and also cultivate a handful of crops on small plots. During the farmer's tenure, ALBA aims to help them establish small farm businesses and then transition to other locations. ALBA also owns a secondary farm where more established local Latino farmers lease land in order to learn new strategies that can be adapted elsewhere. In 2010 alone, ALBA graduated 44 farmers, who started 25 independent farm businesses. ALBA also runs a retail store, which sells the farmers' produce to the general public.

ALBA is funded through many sources, including federal grants, foundation grants, and donations from private citizens. In FY2010, it received $980,000 in grants from more than 12 private foundations and 5 federal agencies. According to their website, "ALBA's current goal is to increase its ability to leverage its assets and build on its experience and partnerships to continue delivering quality programs and become self-sustaining, assuring a continuing legacy of rural economic development."

*The Farm Business Development Center*
Another exciting example of a successful farm incubator is the Farm Business Development Center at Prairie Crossing Farm (FBDC) in Grayslake, Illinois, which is about 40 miles from downtown Chicago. This is a unique example because the Center and the Farm are part of a

larger conservation Community, Prairie Crossing. The community includes a housing development, a for-profit organic farm, and a charter school in addition to the incubator and teaching farm. The Liberty Prairie Foundation supports the development financially. One-half of a percent of the value of the sale of each home in the development goes to support the FBDC. The foundation's executive director also noted that this incubator did not have the same financial constraints that many others face, because it already owned the land upon conception and therefore did not require the same amount of startup capital as others might (Brad Leibov, July 31, 2013).

The FBDC runs on forty acres. Beginning farmers participate in courses and training for up to five years, in addition to leasing small parcels of land from the FBDC. One unique and crucial aspect of this incubator is the presence of an organic, family farm, which also leases land from Prairie Crossing. According to Leibov, the farmers on this land serve as mentors and teachers to the beginning farmers as part of their lease agreement.

*The Intervale Center*

One of the oldest examples of an incubator is the Intervale Center located outside of Burlington, Vermont. The Center was founded in 1988 as a nonprofit aimed at rehabilitating suburban farmland. The farm incubator component began in 1990. Today, the Center runs a food hub (which aggregates and sells food from multiple small farms), business development programs for existing farmers, and a farm incubator.

The Farms Program leases land, equipment, greenhouses, irrigation and storage facilities to small farms on 135 acres of land. Each year, between one and three new farm businesses join the program, receiving subsidized rental rates, business planning support and mentorship from established growers. The Intervale Center dedicates about one-third of its available farmland to incubator farmers and the remaining two-thirds to mentor farms. The Center charges new farmers a subsidized leasing rate for three years. For the remaining two years, incubator farms must pay full rates. After five years, incubator farms are required to relocate their farm.

After several years of owning equipment in common, Intervale decided to vest responsibility for purchasing and maintaining farm equipment into the hands of one of the center's farmers with especially solid skills in maintenance. For Intervale it was recognition that the center itself did not have the required skills, but this was also a realization among the farmers that owning equipment in common did not always lead to the best results.

In addition to the incubator program, the Intervale Center runs a farm business planning program, Success on Farms. This program supplies and assistance to help farmers support expand their markets, increase revenues and achieve other quality of life goals to ensure they stay in farming.

Additionally, the Intervale Center runs a food hub that primarily handles CSA share distributions for its member farmers. The CSA model offers farmers a relatively stable market, fair prices, and advanced working capital. Intervale also provides technical assistance and support, enabling farmers to grow and process more food, diversify production, and develop innovative specialty products (The Intervale Center, 2013).

The Center is aided by its location in Vermont, one of the national centers of local and sustainable food activity. With many small food businesses and supportive nonprofits, and a legislature that is sensitive to agricultural concerns, a wealth of mutually reinforcing activity has emerged (Schmidt, *et al.*, 2011, 158).

*Big River Farms (a project of the Minnesota Food Association)*
Another farm incubator program in Minnesota runs a multi-cultural training program, combined with supportive infrastructure and a distribution network. MFA's Executive Director Glen Hill (Hill, July 12, 2013) explains that the incubator project "bridges cultures, and that is the future." Yet Hill also realizes that this approach requires "more inventive training" because of cultural influences.

Hill added that in the beginning, MFA simply ran a training program, but building physical infrastructure "makes everything else go easier." Each component requires different approaches, he said. "Training needs to be hands on, while for the incubation, we provide the space, but the farmer is on their own."

Big River Farms currently has two walk-in coolers, each about 16 x 16 feet (built from kits), and added a second washing line so farmers would have easier access to equipment when they were ready to harvest – a necessity especially since many farmers hold off-farm jobs, and have a limited time window for harvesting.

Big River purchased both large and small tractors for different farming tasks, invested heavily in fencing to keep deer and other animals at bay, and dug a new well for irrigation. The farm also has both a greenhouse and high tunnels, so farmers could maximize retained value by growing their own seedlings.

Based on his experience Hill estimated that a good starting size for an incubator farm would be five farmers, which offers a critical mass for farmers to learn from each other. Each farmer should have access to 3-5 acres, or "just to the point where the farm would have to start hiring labor." Farmers are expected to transition to buying their own land, but finding available land can be challenging.

Big River currently sells about $90,000 of produce from 6-7 acres of land. This is sold through CSA shares, as well as aggregating produce sales to commercial accounts. A recent evaluation of the farm showed that individual farmers had increased their gross from $3,000/acre to $12,000/acre through participation in the program, but Hill added that actual results depend on market fluctuations, weather, and other intangibles.

*National Incubator Farm Training Initiative (NIFTI)*
This national clearinghouse and training initiative was launched in Massachusetts in collaboration with Tufts University. Its New Entry Sustainable Farming Project held a workshop at Clemson's Sandhill campus this summer, in hopes of fostering a farm incubator at that site. NIFTI's coordinator is Eva Agudelo Winther.

**General Characteristics of Incubators**

Though incubators are varied and diverse, there are several general characteristics that seem to apply to most incubators. First of all, the most crucial aspect is the availability of ample land. All of the successful incubators included in this report own a significant amount of land, which allows for several incubator farms as well as mentor farms. It also seems that the presence or proximity of successful farm businesses is highly helpful to an incubator. Effective mentors also play a crucial role in farm startups (Niewolny & Lillard, 2010).

Many incubators also grew out of a larger organization, or had significant support from one. Cooperative extensions, foundations, housing developments like Prairie Crossing, conservation organizations, and local governments have all supported or started incubators. Given the substantial startup costs involved in an incubator, it seems that support from a larger entity with a higher tolerance for risk is incredibly helpful. Incubators do exist separate from such entities, but they seem to have encountered more difficulty.

In general, incubators require effective collaboration, and require support from a wide range of stakeholders. Another important aspect of food incubators is their adherence to a larger mission or value system. Similarly to food clusters, incubators tend to pursue societal goals that go beyond economics. Many incubators, such as ALBA, aim to bring marginalized populations into farming occupations. These groups attempt to combat the barriers that exist for immigrants, racial minorities, and women attempting to start farm businesses. Others focus on sustainability or community development, but there is generally a larger driving mission.

An exciting development in the incubator of arenas is the growing availability of information for new farmers. Traditionally, extension services were the main source for information on farming technology. However, today as more people seek to enter farming, new sources have become available to them. Many existing incubators run online information centers, while other resources are purely online. Some useful examples of farming clearinghouses are the New England Small Farm Project, the New Entry Sustainable Farming Project and start2farm.gov, which is an initiative out of Beginning Farmer and Rancher Development Program of the United States Department of Agriculture.

The New Hampshire Coalition for Sustaining Agriculture and UNH Cooperative Extension has created a tracker to rate a location on its friendliness to farm startup businesses based on criteria such as zoning regulations, Right to Farm laws and the inclusion of farming in economic development activity.[17]

As interest and market demand for sustainable food grows, small and beginning farmers will need continuing and increasing support to start their businesses. A farm incubator provides this support and is a strong model for investment in local and sustainable farming.

## Conclusions

Farm clusters and farm incubators are two solid strategies for bolstering the local food economies of South Carolina. Several such initiatives are already functioning in the U.S.

[17] Available at http://cecf1.unh.edu/sustainable/farmfrnd.cfm

today, and the communities in which they are located are experiencing many economic and social benefits. Though the history and makeup of these organizations can vary widely, there are many important lessons to be gleaned from them. Effective collaboration, mutual trust, and open communication is key to their successes.

Yet farm incubators, new farm businesses and farm clusters all require major infrastructural inputs: The availability of a mill for grain farmers, a processing center for vegetable farmers, or a responsive and effective distribution network can be the difference between a successful farm and a failed one. If left to the "market" alone, creation of these facilities will be left primarily to those with existing wealth, access to credit, off-farm income, or some other form of stored capital. State action would open up these opportunities to more communities, potentially allowing for greater collaboration and more lasting economic impacts.

In the case of South Carolina, clustering should be an effective strategy for creating local efficiencies; that is, efficiencies that favor local trade. This will be an critical complement to prior policies that favored import or export trade, but failed to build lasting capacity, connection, and wealth in rural communities.

South Carolina also holds all of the key ingredients required to make farm incubators a lasting element of infrastructure for continually training new generations of farmers over time. If an incubator were not viewed simply as a project to be funded over the short-term, but as an essential educational facility that can foster the creation and adoption of new farming techniques, a lasting culture of collaboration and social connection, and effective new local economic channels, effective clusters of farm and food businesses could be formed across the state.

*Elanor Bomstein contributed significant research to this section.*

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# Appendix VI — Potential Food Production Node Components and Costs

The following pages show one potential design for a food production node. This is only one of numerous possibilities, and is meant only to illustrate the concept visually to help spark more detailed site plans for specific sites in Alaska.

This represents a basic module for an on-farm packing facility on a shared-use farm; this concept might be adapted for use at various other sites.

Assumptions of this prototype are:

1. 30 acres of open farmland is available.
2. This acreage is home to an incubator farm (or shared-use farm) with five plots of five acres each.
3. Five farmers each work five acres of land to grow produce.
4. The five farmers share common use of a packing shed, located adjacent to each farm, and have access to greenhouses for raising seedlings, or for season extension.
5. A brand new pole barn with a concrete floor is built to house the facility.
6. Water service is available for field plots, hoop houses, and the packing shed.
7. The facility has washing stations, hydrocoolers, and staging areas for preparing fresh items.
8. Three temperature-controlled storage facilities are built, for storing diverse products (e.g., root crops at slight chill, more perishable items at cooler temperatures, with two levels of humidity).
9. The packing shed also has storage and loading dock areas.
10. A light processing kitchen is available for farmers who wish to produce value-added products on site.
11. A shared office space allows each farmer some access to desk space with computers, etc.
12. All equipment is new.
13. A restroom is constructed.
14. More detailed design work would be required to fashion this to any particular site.

The land use suggested here is for illustration only, and may not meet local codes in some counties.

Note also that costs are based on generic estimates; actual costs are likely to be higher in Alaska. This is especially true of taxes and interest charges, which do not reflect Alaska policies.

Farmers who have the ability to build their own building, or who can re-use an old barn, or who can repurpose existing equipment, may be able to reduce the costs listed here. On the

other hand, actual prices could be higher depending on the site chosen, and market conditions at the time of construction.

Estimated total cost is about $350,000. Yet a similar design has been prepared for a farm in Minnesota that adapts an existing building, and relies upon the farmer to do most of the construction, which runs about $175,000.

Designers added that a nonprofit developer that performed its own construction management would also be able to reduce costs significantly (See P&O allocation).

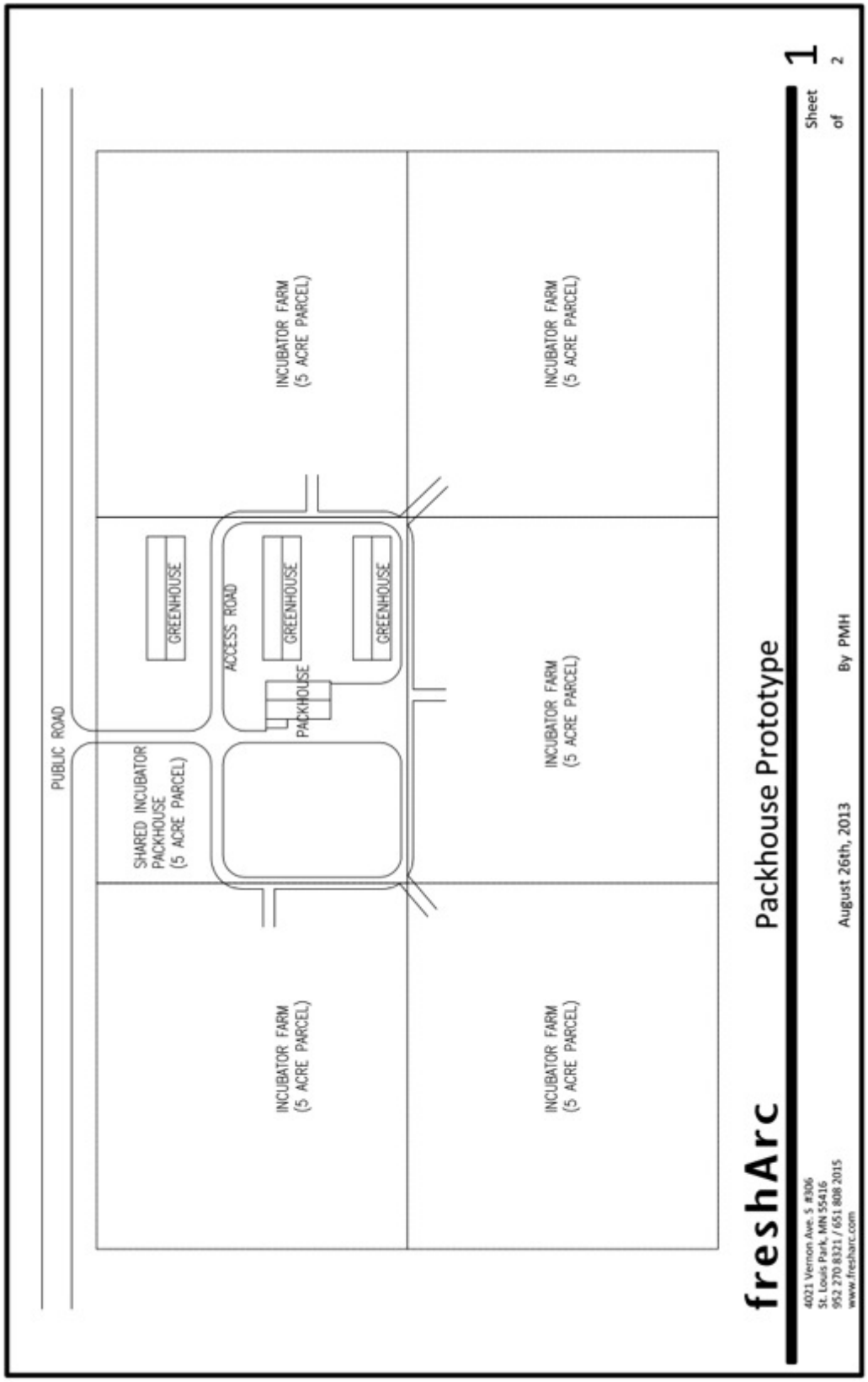
Diagrams and cost estimates were developed by freshArc, a design and consulting firm in St. Louis Park, Minnesota. The firm graciously donated staff time to create these examples for this study, at the request of, and with design input from, Ken Meter of Crossroads Resource Center, who created the "food production node" concept.

Three pages follow:

1. Schematic diagram for an incubator farm or shared-use land parcel of 30 acres.

2. Prototype design for a shared-use packing shed for this farm.

3. Estimated costs for building this packing shed on open land. Adaptation of an existing building might involve lower or greater cost.


PUBLIC ROAD
SHARED INCUBATOR PACKHOUSE (5 ACRE PARCEL)
GREENHOUSE
ACCESS ROAD
GREENHOUSE
GREENHOUSE
PACKHOUSE
INCUBATOR FARM (5 ACRE PARCEL)
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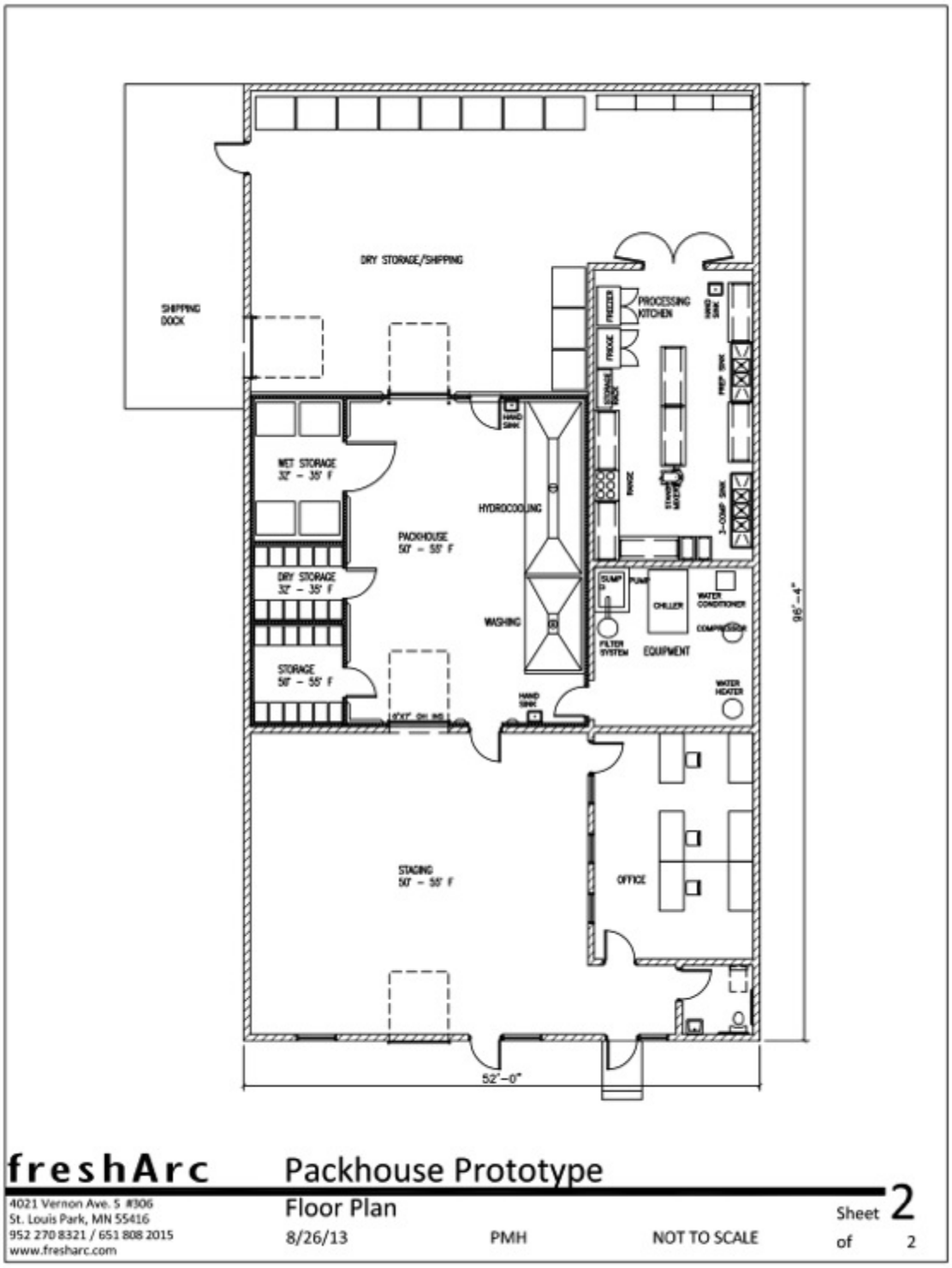
August 26th, 2013
By PMH
Sheet 1 of 2


DRY STORAGE/SHIPPING
SHIPPING DOCK
PROCESSING KITCHEN
FREEZER
FRIDGE
HAND SINK
PREP SINK
RANGE
OVEN
3-COMP SINK
WET STORAGE 32° – 35° F
PACKHOUSE 50° – 55° F
HYDROCOOLING
DRY STORAGE 32° – 35° F
STORAGE 50° – 55° F
WASHING
SUMP
PUMP
CHILLER
WATER CONDITIONER
COMPRESSOR
FILTER SYSTEM
EQUIPMENT
WATER HEATER
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8/26/13
PMH
NOT TO SCALE
Sheet 2 of 2

| Const. Cost Estimate | 8/26/13 | | freshArc St. Louis Park, MN |
|---|---|---|---|
| **Food Node: Hoop Houses, Packhouse and Kitchen** | | | |
| Projected Construction Cost | Base | P&O | T&I | Total |
| | $289,025.00 | $43,353.75 | $19,342.73 | $352,321.48 |

**General Conditions**

| No. | Section | Item | Unit | Quantity | Cost / unit | Cost | Labor hours | Rate | Total | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | Design | | | | $0 | 100 | $75 | $7,500 | |
| 2 | | Engineering | | | | $0 | 24 | $100 | $2,400 | |
| 3 | | Project mgr / sup | | | | $0 | 200 | $50 | $10,000 | |
| | | Subtotal | | | | | | | $19,900 | - |

**Site**

| No. | Section | Item | Unit | Quantity | Cost / unit | Cost | Labor hours | Rate | Total | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 4 | | Survey / layout | | | | $0 | 48 | $50 | $2,400 | |
| | | Water Service | Unit | 6 | $2,400 | $14,400 | | | $14,400 | |
| 5 | | Grading | E&L | | | $0 | 48 | $400 | $19,200 | |
| | | Subtotal | | | | | | | $36,000 | - |

**Packhouse Shell**

| No. | Section | Item | Unit | Quantity | Cost / unit | Cost | Labor hours | Rate | Total | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | | Metal Building | Mtl Bldg | 1 | $35,000 | $35,000 | 160 | $30 | $39,800 | |
| 7 | | Concrete | CY | 120 | $110 | $13,200 | 80 | $30 | $15,600 | |
| 8 | | Overhead Doors | Unit | 2 | $1,200 | $2,400 | 8 | $30 | $2,640 | |
| 9 | | Swing Doors | Unit | 3 | $350 | $1,050 | 9 | $30 | $1,320 | |
| | | Subtotal | | | | | | | $59,360 | - |

**Greenhouses/Hoop Houses**

| No. | Section | Item | Unit | Quantity | Cost / unit | Cost | Labor hours | Rate | Total | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | 30'x120' Hoop House | Unit | 3 | $6,500 | $19,500 | | | $19,500 | |
| 11 | | Water Service | Lump | 3 | $1,000 | $3,000 | | | $3,000 | |
| | | Subtotal | | | | | | | $19,500 | - |

**Packhouse Equipment/Finishes/Utilities**

| No. | Section | Item | Unit | Quantity | Cost / unit | Cost | Labor hours | Rate | Total | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 12 | | Cooler Boxes | Unit | 3 | $12,000 | $36,000 | 48 | $30 | $37,440 | |
| 13 | | Finishes | Lump | 1 | $6,000 | $6,000 | 120 | $30 | $9,600 | |
| 14 | | Electrical | Lump | 1 | $7,000 | $7,000 | 120 | $55 | $13,600 | |
| 15 | | Mechanical & Plumbi | Lump | 1 | $38,000 | $38,000 | 120 | $50 | $44,000 | incl. rest room |
| 16 | | Overhead Doors | Unit | 2 | $1,200 | $2,400 | 8 | $25 | $2,600 | |
| 17 | | Swing Doors | Unit | 6 | $350 | $2,100 | 9 | $25 | $2,325 | |
| | | Subtotal | | | | | | | $109,565 | - |

**Kitchen**

| No. | Section | Item | Unit | Quantity | Cost / unit | Cost | Labor hours | Rate | Total | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 18 | | 20 quart mixer | Unit | 1 | $1,200.00 | $1,200 | | | $1,200 | |
| 19 | | Refrigerator/Freezer | Unit | 2 | $900 | $1,800 | | | $1,800 | |
| 20 | | 2 & 3 comp sinks | Unit | 2 | $600 | $1,200 | | | $1,200 | |
| 21 | | Hand sinks | Unit | 1 | $100 | $100 | | | $100 | |
| 22 | | Range and Hood | Unit | 1 | $9,500 | $9,500 | | | $9,500 | |
| 23 | | Flooring | | 1 | $4,500 | $4,500 | 100 | $45 | $9,000 | |
| 24 | | Wall/Ceiling Finishes | | 1 | $6,800 | $6,800 | 80 | $30 | $9,200 | |
| 25 | | Mechanical/Plumbing | | 1 | $2,400 | $2,400 | 80 | $50 | $6,400 | |
| 26 | | Electrical | | 1 | $3,000 | $3,000 | 60 | $55 | $6,300 | |
| | | Subtotal | | | | | | | $44,700 | - |

# APPENDIX VII — Fossil fuel use in Alaska

**Fossil Fuel Use in Alaska 2012 (trillion BTUs)**
http://www.eia.gov/state/seds/data.cfm?incfile=/state/seds/sep_fuel/html/fuel_use_pa.html&sid=US&sid=AK

| | Residential | Commercial | Industrial | Transportation | Electric Power | Total |
|---|---|---|---|---|---|---|
| Petroleum | 8 | 10 | 47.8 | 185 | 5 | 257 |
| Natural Gas | 22 | 20 | 261 | 4 | 40 | 347 |
| Coal | 0 | 9 | 0 | 0 | 6 | 17 |
| Total | 30 | 39 | 309 | 189 | 51 | 620 |

Alaska's energy demand per person is almost three times higher than the U.S. average. Spends $6.9 billion on fossil fuel energy each year.

Alaska ranked second in the United States in 2013 in the share of its electricity that is generated from petroleum liquids.

188 million bbls produced in AK 2013.

Prudhoe Bay field is the largest oil field in the country, although production has fallen to less than 300,000 barrels per day from its peak of 1.6 million barrels per day in 1988.

Motor gasoline demand is primarily met by oil refineries in Kenai and near Fairbanks. Alaska is ranked high in state jet fuel consumption. It is a major fueling stop for military aircraft and for commercial passenger and cargo flights between the United States and Asian countries. Alaska also consumes a large amount of distillate fuel for electricity generation.

Alaska is the country's second leading natural gas producer (in terms of gross withdrawals), but most of the state's production is not brought to market, because natural gas volumes far exceed local demand and there is insufficient pipeline capacity to transport the natural gas to distant markets. Large volumes of Alaskan natural gas are extracted during oil production, but most of that natural gas is reinjected into existing oil fields to provide pressure to maintain oil production rates. Most of Alaska's natural gas is consumed at the production site as lease fuel for equipment or plant fuel.

Coal mines have operated in Alaska since 1855. Substantial deposits of bituminous, subbituminous, and lignite coal are found in the north, south, and central portions of the state, but most of Alaska's coal resources have remained unmined. Alaska has only one operating surface coal mine, the Usibelli mine, which produces about 2 million tons of coal per year. Most of the state's coal exports go to countries in Asia and South America.