

2. ALASKA’S BACKGROUND INFORMATION

The State of Alaska's constitution establishes a policy of maximum self-government for its citizens. Its 16 existing boroughs are not the equivalent of county governments in the emergency management context. Emergency services in Alaska are provided by independent regional service areas throughout the state. Four of the boroughs and municipalities have government-run emergency management systems similar to county-style agencies. The remaining 12 boroughs have area-wide powers focusing on education, land-use planning, and tax assessment/collection. The boroughs cover approximately 38 percent of the land mass and encompass approximately 89 percent of the population. The remaining estimated 11 percent of the population resides in a vast, sparsely inhabited rural area called the Unorganized Borough. The state’s Unorganized Borough is not politically subdivided and is managed by the Alaska Legislature in accordance with the Alaska State Constitution, Article 10, Subparagraph 6.

2.1. ALASKA’S REGIONS

The Alaska Department of Community, Commerce and Development’s Division of Community and Region Affairs (DCRA) provides the Alaska Regions map depicting how Alaska is divided into eight distinct regions based upon variations in climate, terrain, and economics (Figure 2-1).



Figure 2-1 Alaska Regions Map
Source: DCRA

Figure 2-1 depicts Alaska’s strategic location to Russia and the Far East. This location is vital to protecting the nation, while providing a central location for worldwide air transportation and shipping routes.

Alaska is further divided into boroughs and Regional Educational Attendance Areas (REAA); school attendance areas located in Alaska’s Unorganized Borough. The borough and REAA grouping enables the state to more closely identify government responsibilities and define locational disaster impacts when requesting federal disaster declarations (Figure 2-2).

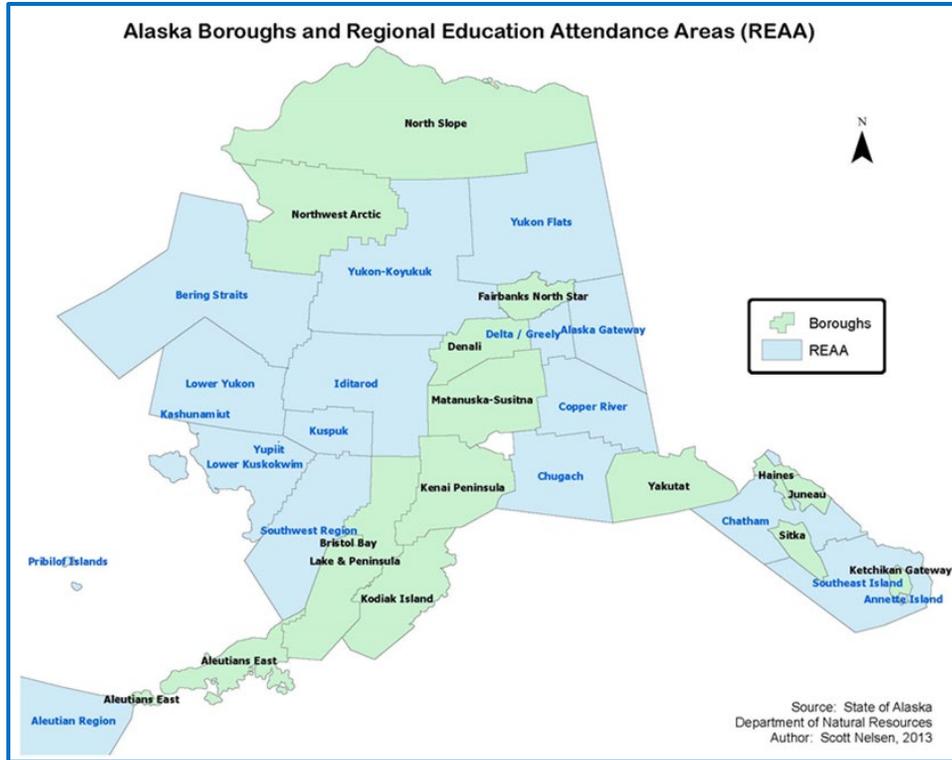


Figure 2-2 Alaska Boroughs and REAA Map

This map excludes, Anchorage, Skagway, Wrangell, and Petersburg. Source: DNR 2013

2.2. GENERAL FACTS

Population: Alaska’s 2017 population estimate is 739,795 with a median age estimated as 33.6 years old. This is roughly two-tenths of one percent (0.2 percent) of the total United States (U.S.) population.

Land Area: With 656,425 square miles, Alaska is the largest state in the U.S. and is approximately one-fifth the size of the lower, contiguous 48 states. There are roughly 1.3 people per square mile in Alaska compared to the national average of 91 people per square mile.



Figure 2-3 Alaska’s Geographic Extent Compared to Contiguous 48 States *Source: AECOM*

Highest Point: At 20,320 feet, Denali is the tallest mountain in North America. Alaska has 39 mountain ranges containing 17 of the 20 highest peaks in the U.S.

Geographic Center: Alaska’s geographic center is N 63.83, 152.00 W and is ~60 miles NW of Mount Denali.



Largest natural freshwater lake: At ~1,012 square miles, Lake Iliamna is the largest freshwater lake in Alaska. Alaska has 94 lakes with surface areas greater than 10 square miles among Alaska's more than 3 million lakes.

Longest river: The Yukon River is 2,298 miles long and 1,875 miles of it flows through Alaska. There are more than 3,000 rivers in the state. The Yukon River ranks as the third longest in the U.S., behind the Mississippi and Missouri rivers.

Largest island: At 3,588 square miles, Kodiak Island in the Gulf of Alaska is the largest in the State. It is larger than Rhode Island and Delaware. There are 1,800 named islands in the state, 1,000 of which are located in Southeast Alaska.

Largest glacier: According to the Bering Glacier Portal the Bering Glacier is the largest (area of 2,008 square miles) and longest (~118 miles) glacier in North America.

Largest city in population: Anchorage, population 294,356.

Largest city in area: The City and Borough of Sitka is the largest city in the state with an area of approximately 4,811.4 square miles (40 percent of this area is water).

Geographic Extent: Alaska is not just large; it is also widespread, with the Southeast panhandle and Aleutian Islands extending its geographic scope (Figure 2-4). From north to south, it measures 1,420 miles, about the distance between Denver, Colorado and Mexico City, Mexico; from east to west Alaska measures nearly 2,400 miles, about the distance from Savannah, Georgia to Santa Barbara, California.

Rural Myth: Contrary to widely held perceptions, in 2017 Alaska's three largest cities with over 30,000 people comprise about 49 percent of the state's population.



Figure 2-4 Alaska vs. Continuous “Lower” 48-States Source: AECOM

Land Ownership: Including federal and state land ownership, nearly 90 percent of the land in Alaska is publicly owned.

Education: The 2013 Department of Education and Early Development (DEED) lists 53 school district locations that provide public educational services in the state. There are 18 borough, 19 Regional Educational Attendance Areas (REAs), and 16 city districts established by the Alaska Legislature in cooperation with regional corporations established under the Alaska Native Claims Settlement Act (ANCSA). (<https://education.alaska.gov/esea/titlei-c/docs/doe2013map.pdf>)

Cities and Boroughs generally participate singly or jointly in developing local or multi-jurisdictional plans. REAs and unorganized communities within the Unorganized Borough are included within the State Hazard Mitigation Plan. The State is the governmental jurisdiction for unincorporated communities in the Unorganized Borough; as such the SHMP is their governing plan. As substantiated by FEMA’s 2008 Unorganized Borough Waiver, REAs and unorganized

jurisdictions within the Unorganized Borough need only identify hazard threats, their infrastructure vulnerabilities, and location specific mitigation actions.

Figure 2-5 displays Alaska’s Land Management and Ownership map.

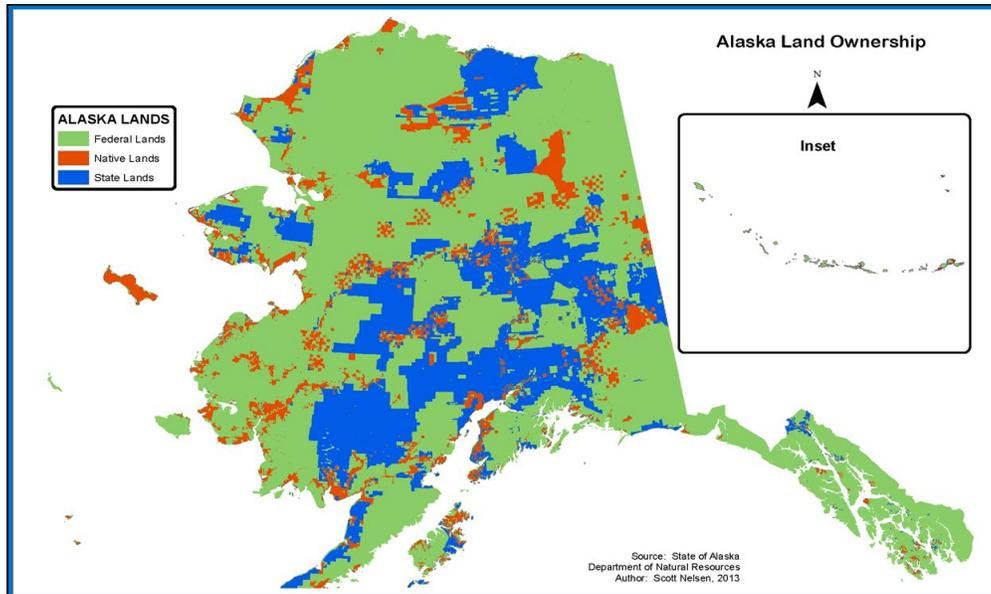


Figure 2-5 Legacy 2013 HMP AK Land Management and Ownership Map
Source: DNR 2012

Table 2-1 Figure 2-5 Map Key Defined

Federal Lands	237.8 million acres
	Five different agencies manage federal lands in Alaska: the Bureau of Land Management (82.5 million acres), U. S. Fish and Wildlife Service (78.8 million acres), the National Park Service (52.4 million acres), U. S. Forest Service (22.3 million acres), and the Department of Defense (1.7 million acres).
Alaska Native Lands	44 million acres
	On December 18, 1971, P. L. 92-203, the Alaska Native Claims Settlement Act (ANCSA) was signed into law. The purpose of ANCSA was to legislate the terms by which Alaska Natives could acquire title to their lands. This claim had been unresolved for more than 100 years since the United States purchased Alaska from Russia in 1867. Native lands are private lands. ANCSA mandated the creation of regional and village Native corporations to manage 44 million acres and payment of 1 billion dollars. 13 regional corporations were created for the distribution of ANSCA land and money; 12 of those shared in selection of 16 million acres. The 13 th corporation, based in Seattle, received a cash settlement only. 224 village corporations of 25 or more residents shared 26 million acres. The remaining acres, which include historical sites and existing Native-owned lands, went into a land pool to provide land to small villages of less than 25 people.
State of Alaska Lands	105 million acres
	Under the terms of the Alaska Statehood Act of 1959, the federal government granted the new state 28% ownership of its total area. Approximately 103,350,000 acres were to be elected under three types of grants: 1) Community – 400,000 acres 2) National Forest Community – 400,000 acres 3) General – 102, 550,000 acres Additional territorial grants for schools, university and mental health trust lands totaling 1.2 million acres were confirmed with statehood.

Table 2-2 lists US Census, Fact Finder population and total land area.

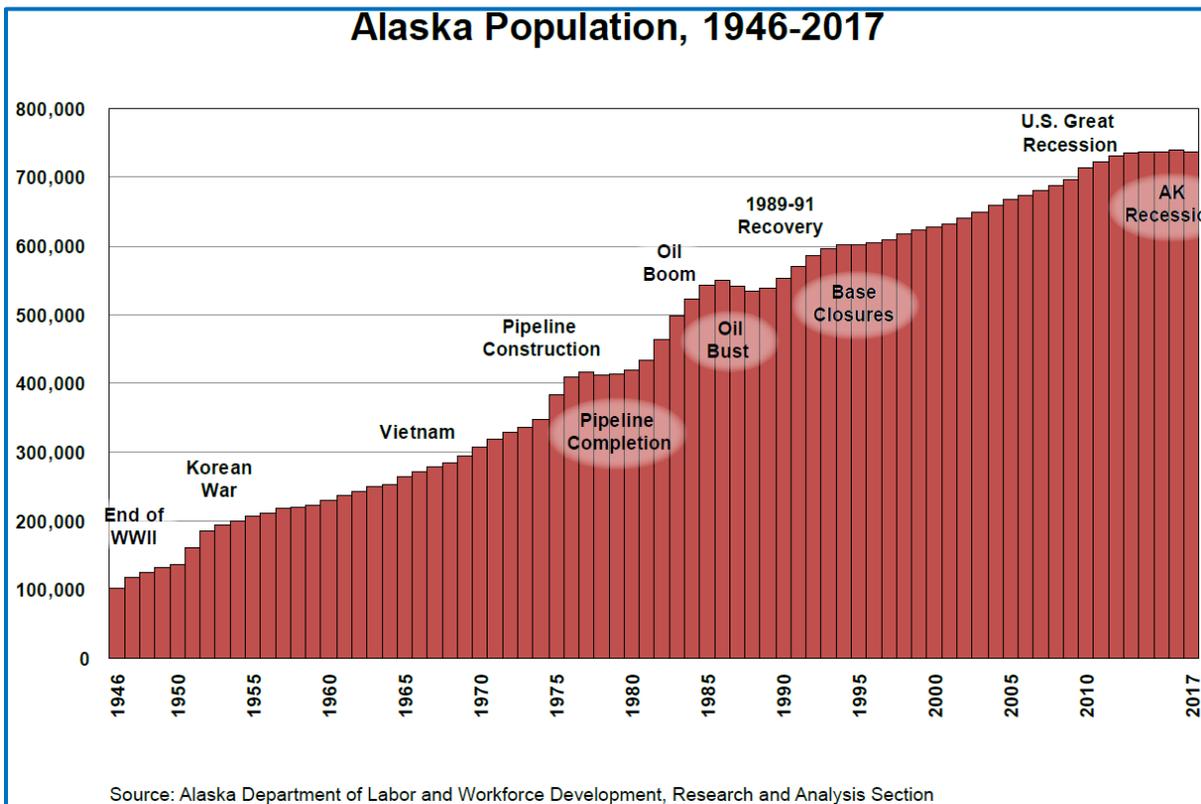
Table 2-2 2017 AK Population Statistics US Census Fact Finder

Area	Population	Area (mi2)
Alaska	737,795	663,268
Anchorage/Mat-Su Economic Region		
Anchorage, Municipality of	297,483	1,961
Matanuska-Susitna Borough	106,532	25,258
Gulf Coast Economic Region		
Kenai Peninsula Borough	58,617	24,752
Kodiak Island Borough	13,488	12,022
Valdez-Cordova Census Area	9,278	40,340
Interior Economic Region		
Denali Borough	2,074	12,777
Fairbanks North Star Borough	99,703	7,444
Southeast Fairbanks Census Area	6,888	25,059
Yukon-Koyukuk Census Area	5,365	147,805
Northern Economic Region		
Nome Census Area	9,921	28,278
North Slope Borough	9,430	94,796
Northwest Arctic Borough	7,684	40,749
Southeast Economic Region		
Haines Borough	2,526	2,726
Hoonah-Angoon Census Area	2,145	10,914
Juneau, City and Borough of	32,094	3,254
Ketchikan Gateway Borough	13,856	6,654
Petersburg Borough	3,281	3,829
Prince of Wales - Hyder Census Area	6,643	7,683
Sitka, City and Borough of	8,689	2,870
Skagway, Municipality of	1,157	464
Wrangell, City and Borough of	2,521	3,462
Yakutat, City and Borough of	605	9,463
Southwest Economic Region		
Aleutians East Borough	3,370	15,010
Aleutians West Census Area	5,763	14,116
Bethel Census Area	18,076	45,504
Bristol Bay Borough	867	888
Dillingham Census Area	4,932	20,915
Kusilvak Census Area	8,202	19,673

Source: 2017 Census Estimates



Figure 2-6 displays the Alaska Department of Labor’s (DOL) statistical economic events that directly influenced Alaska’s population growth from 1946 through 2017.



Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

Figure 2-6 DOL’s Economic Event Relationship to Population Growth

Source: DOL 2017

2.3. LAND TRANSPORTATION

Alaska DOT/PF has stated the following information has not substantially changed since 2013. Except where noted, additional statistics are from:

State of Alaska Department of Transportation and Public Facilities (DOT/PF) Fast Facts

DOT/PF Public Mileage

US Department of Transportation (USDOT), Federal Highway Administration (FHWA) highway statistics

FHWA certified centerline road miles

Road Mileage: Alaska has 13,546 paved road miles, 1,601 unpaved road miles and 3,500 Marine Highway water miles statewide. The U.S. has a total of 4,058,347 miles of paved and unpaved roads. Alaska is home to about 0.04 percent of all roads in the U.S.

Pavement: Approximately 48.5 percent of Alaska's roads are unpaved whereas only 33 percent of roads are unpaved in the rest of the U.S.

Road Density: Alaska has one mile of road for every 38 square miles of land area. The U.S. average is less than one to one.

Road Miles per Capita: Alaska has roughly 22 road miles per 1,000 people. The U.S. average is 13 road miles per 1,000 people.



Vehicles and Drivers: Alaska has 1.2 vehicles per person while the U. S. average is 0.8. Alaska has 524,158 licensed drivers.

Vehicle Miles Traveled (VMT): Alaskans often travel by air and ferry, consequently the VMT represents only 0.16 percent of the U.S. total.

Connectivity: Nearly 30 percent of Alaska's population is not connected by road or ferry to the continental road network.

Note: Mileage does not include ramps, wyes, or proposed roads

2.4. RAIL TRANSPORTATION

The Federal Railroad Administration provides the following information for the Alaska Railroad (ARR).

The U.S. built, owned and operated the Alaska Railroad from 1914 until 1985. The railroad was established by Congress on March 12, 1914 to facilitate economic development and access to mineral deposits in the territory of Alaska. Construction began shortly thereafter and was completed in 1923 when President Harding drove the final spike near Nenana. The railroad was under the Department of the Interior's jurisdiction until the Department of Transportation was created; at which time the railroad became part of the Federal Railroad Administration (FRA).

On January 5, 1985, pursuant to authority delegated by the Alaska Railroad Transfer Act of 1982, (45 U.S.C. 1201 et seq.) (ARTA), the State of Alaska purchased the federal government's interest in the Alaska Railroad from FRA and created the Alaska Railroad Corporation (ARRC), a public corporation of the state of Alaska, to own and operate the Alaska Railroad.

The ARRC has approximately 656 miles of track, four rail yards (Seward, Anchorage, Whittier, and Fairbanks), and three port facilities (Seward, Whittier, and Seattle, Washington). ARR is North America's northernmost railroad.

ARRC provides freight and passenger services from the ice-free southcentral Alaska ports of Whittier and Seward, and between Anchorage and Fairbanks, including key locations such as Denali National Park and military installations. Vessel and freight rail barge connections are provided from Seattle, Washington, and Prince Rupert, British Columbia.

The ARRC benefits from the State's HMGP, which provides essential funding for critical infrastructure repairs. ARRC also participates in the State's strong PDM program, striving to strengthen their statewide infrastructure damage prevention program.

2.5. AIR TRANSPORTATION

The following information is from:

Statewide Library Electronic Doorway (SLED)

DOT/PF Ted Stevens Anchorage International Airport Statistics

FAA 2012 Passenger Boarding and All-Cargo Data

Pilots: It is estimated Alaska has about six times as many pilots per capita and 16 times as many aircraft per capita as the rest of the U.S.

Commuter Air Travel: General aviation hours flown in Alaska annually are about 995,000, which is 3 percent of the U.S. total general aviation hours flown. Alaska averages 105 hours flown per pilot, while the U.S. as a whole averages 43 hours per pilot. Alaska's population



comprises only 0.2 percent of the U.S. population. yet Alaskans utilize 13 percent of all commuter airline and air taxi trips in the U.S, this means that Alaskans use commuter airlines 65 times more often than the average U.S. citizen.

Seaplane Bases: Alaska not only has the largest seaplane base in the world, Lake Hood, it also has 102 seaplane bases, far more than any other state. This is 25 percent of the U.S. total. Minnesota ranks second with 66.

Air Freight: Alaska's Ted Stevens International Airport (ANC), located in Anchorage, is the number two airport in the U.S. for total air freight by weight for 2012 (second to Memphis International Airport in Tennessee). ANC ranks fourth in the world for tonnage of cargo serviced.

Airports: Alaska has about 300 airports.

2.6. WATERBORNE TRANSPORTATION

Information from:

Alaska Marine Highway System

National Oceanic and Atmospheric Association (NOAA) Fisheries Service

State of Alaska Department of Commerce website

Ferries: Alaska's ferry system is unique among the 50 states, operating eight, 24 hours per day long-haul vessels that include restaurants, lodging, and lounges. The total route structure covers more than 3,500 miles and includes ocean passages of the stormy Gulf of Alaska.

Ports: The Alaska Marine Highway serves 33 ports of call.

Coastline: Alaska has 6,640 miles of coastline and, including islands, has 33,904 miles of shoreline. Alaska has more than 50 percent of the entire coastline in the U.S.

Fishing: Commercial fishermen harvested over 2 million metric tons of fish and shellfish in 2012, according to the National Marine Fisheries Service Alaska Region Bering Sea Aleutian Islands Catch Report, making Alaska the country's top state for seafood.

2.7. SPACE TRANSPORTATION

The Kodiak Launch Complex is the nation's only high latitude full service spaceport, developed by the Alaska Aerospace Corporation. On March 2, 2012, Lockheed Martin Corporation announced it had chosen Alaska's Kodiak Launch Complex (KLC) as its dedicated West Coast launch facility for Athena rocket launches. The company's decision will enable the Alaska Aerospace Corporation to move ahead with plans to expand its space launch capabilities. Lockheed Martin has been working with the State of Alaska and Alaska Aerospace Corporation on expansion plans for the new medium-lift launch pad to support potential Athena III launches.

2.8. UNIQUE WINTER TRANSPORTATION

Trails: Winter dog sled and snowmachine trails are a historically important transportation system utilizing long winter conditions to provide a solid surface where wet ground and water surfaces exist in summer. Various agencies and groups mark many of these trails for public use. These trails form an important element of the rural transportation system in areas lacking roads and highways.



Ice Roads: A few areas of Alaska utilize ice roads to traverse rivers and soft ground. The ice roads are an acceptable alternative to the damage caused by permanent roads in sensitive landscapes. These roads are also commonly used in other high-latitude countries such as Canada and Russia.

2.9. COST OF LIVING

The following information is from: “The Cost of Living in Alaska” by Neal Fried, from Alaska Economic Trends (AET), July 2017, developed by the State of Alaska Department of Labor and Workforce Development, Office of Economic Development, Research and Analysis.

“The survey reports that the costs of living in Anchorage, Juneau, Fairbanks, and Kodiak remain well above the national average. (See Exhibit 8.) Alaska’s index values haven’t changed much in the past 30 years. Before then, the index included only Anchorage. In the 1960s, Anchorage’s index was typically in the 160s and as high as 174.7, meaning Anchorage costs were 74.7 percent higher than the average U.S. city.

Alaska’s cities aren’t the highest in the country, though, and a growing number are more expensive to live in than the four in Alaska.” Source: COL 2017

Council for Community and Economic Research (C2ER) provides the Cost of Living Index (COLI) that compares living costs for approximately 300 urban areas in the U.S. The COLI focuses on households with incomes in the top 20 percent for the area. It is often used by companies to equalize employee salaries in different cities. Of the seven detailed categories studied, the four Alaska cities all had higher than average costs with the exception of Anchorage utility costs.

Table 2-3 2017 Cost of Living Index, Select US Cities

Category’s Weight in Total Index	100.00	13.61%	27.59%	10.06%	9.59%	4.00%	35.15%
	Percent (%)	Groceries	Housing	Utility	Transport	Medical	Misc.
State of Alaska	Total						
Anchorage, AK	127.6	130.6	143.9	104.6	113.2	143.7	122.4
Fairbanks, AK	134.3	127.1	123.9	222.7	120.8	150.9	121.7
Juneau, AK	132.1	140.7	145.4	121.7	122.1	153.9	121.5
Kodiak, AK	131.8	149.4	142.6	125.7	128.7	140.7	118.2
US West Region							
Portland, OR	127.3	116	175.9	80.1	100.9	109.3	116.2
Honolulu, Hi	187.7	165.7	299.3	193.3	133.3	119.3	129.6
San Francisco, CA	188.5	121.9	351.8	114.4	130.3	123.7	130.7
Los Angeles, CA	146.3	112.3	238.9	111.5	124.9	110	106.7
Las Vegas, NV	100.4	101.7	108.8	86.4	105.9	102.7	95.6
Reno, NV	102.8	95.3	105	85.2	110	108	106.5
Seattle, WA	145.1	128.5	181.7	120.7	128.4	125.7	136.5
Spokane, WA	95.7	94.3	91.1	76.7	108.5	115.3	99.5
Tacoma, WA	106.2	111.1	94	111.9	95.2	118.3	113.8
Boise, ID	92	91	86.6	84.8	106.3	102.7	93.6
Bozeman, MT	98	101.6	107.8	79.4	92.9	99.2	95.5
Laramie, WY	99.9	103.5	107.4	95.3	90.8	104.3	95.8
US Southwest / Mountain Region							
Salt Lake, UT	95.8	105.4	92.1	76.2	101.4	95.9	99.1
Phoenix, AZ	94.7	97.5	97.8	98.1	90.7	98.9	90.9



Table 2-3 2017 Cost of Living Index, Select US Cities

Category's Weight in Total Index	100.00 Percent (%)	13.61%	27.59%	10.06%	9.59%	4.00%	35.15%
	Total	Groceries	Housing	Utility	Transport	Medical	Misc.
Denver, CO	111.8	99.7	133	95.1	108.4	104.7	106.3
Colorado Springs, CO	95.3	99.3	102	76.4	94	101.3	93.6
Dallas, TX	101.2	90.6	102.4	102.3	101.2	103.4	103.7
Houston, TX	97	84.8	104.8	99.3	92.9	90.6	96.7
McAllen, TX	76.1	83.2	63.6	90.6	84.6	75	76.8
US Midwest Region							
Cleveland, OH	101.4	110.8	89.7	98.7	103.3	102	107.1
Chicago, IL	123	109.3	152.5	89.1	129.3	102.6	115.5
Minneapolis, MN	104.8	109.4	106.2	92.2	108.6	104.6	104.5
US Southeast Region							
Fort Lauderdale, FL	119	108.5	157.4	99.9	110.4	98.7	103
Miami, FL	114.3	108.1	138.4	99.9	119.3	99.7	102.3
Birmingham, AL	90.2	96.1	82.5	102.4	91.7	85.3	90.7
Atlanta, GA	97.7	104.7	91.1	89.2	101.4	107.8	100.4
US Atlantic / New England Region							
New York, NY	230.8	129	479.9	119.2	130.6	114.6	147.1
Boston, MA	148.6	107.1	204.4	146.6	111.5	134.1	133.1
Philadelphia, PA	116.2	115.3	129	121.9	112.2	105.4	107.3
U.S. Average	100	100	100	100	100	100	100

Note: Index numbers represent a comparison to the average for all cities for which C2ER volunteers collected data.

Source: C2ER

Another way to assess the cost of living is to look at community cost differences relative to Anchorage (Table 2-4). This information contains weekly costs for four dietary staples.

Table 2-4 2017 Cost of Living Relative to Anchorage

Community	Eggs (1dz)	Milk (1 gal)	Bread	Gas (1gal)
Anchorage	\$2.00	\$3.69	\$2.50	\$2.55
Juneau	\$1.99	\$3.89	\$2.39	\$2.98
Fairbanks	\$1.99	\$3.89	\$3.59	\$2.91
Kenai	\$1.97	\$3.88	\$1.68	\$2.84
Kodiak	\$2.19	\$4.19	\$2.79	\$3.14
Valdez	\$2.29	\$4.09	\$2.39	\$3.32
Glennallen	\$5.50	\$5.95	\$3.95	\$3.27
Nome	\$2.79	\$6.49	\$2.59	\$4.67
Bethel	\$4.39	\$8.29	\$2.69	\$4.99
Barrow	\$3.79	\$10.29	\$4.99	\$6.50
Average	\$2.89	\$5.47	\$2.96	\$3.72

Source: COLI 2017

Table 2-5 provides AET Article 3, “The Cost of Living” in Alaska, by Neal Fried, dated July 2017 provided rural Alaska fuel per gallon costs and transportation delivery modes data.

These data demonstrate how rural-remote Alaska communities living costs differ widely from the lower contiguous U.S. Shipping costs raise Alaska’s utility prices, goods, and services. Fuel



prices are no exception, even though Alaska is an oil-producing state. Communities without road access pay a much higher price for fuel than other Alaskan communities.

Table 2-5 Rural Alaska Fuel Per Gallon

Community ¹	Heating Fuel #1, Residential	Gasoline	Bulk Fuel Delivery Method(s)
Angoon	\$3.50	\$3.49	Barge
Arctic Village	\$12.00	\$10.00	Air
Atka	\$6.85	\$6.65	Barge / Air
Utqiagvik (was Barrow)	Natural Gas	\$5.90	Barge
Bethel	\$4.78	\$5.02	Barge
Chignik	\$3.31	\$4.00	Barge
Circle	\$2.46	\$2.96	Truck
Deering	\$4.38	\$4.64	Barge
Dillingham	\$2.56	\$3.93	Barge
Eagle	\$3.50	\$3.95	Refinery / Truck
Fairbanks	\$2.50	\$2.89	Truck
Galena	\$5.95	\$6.40	Barge
Gambell	\$4.65	\$5.00	Barge / Truck
Golovin	\$4.00	\$4.00	Barge
Holy Cross	\$5.55	\$6.00	Barge
Homer	\$2.58	\$2.92	Air
Hooper Bay	\$5.20	\$5.35	Barge
Huslia	\$5.70	\$5.50	Barge
Juneau	\$2.88	\$2.21	Barge
King Cove	\$3.07	\$3.81	Barge
Kokhanok	\$6.10	\$6.02	Barge
Kotzebue	\$5.34	\$5.45	Truck
Nenana	\$2.94	\$3.09	Air
Noorvik	\$5.64	\$6.06	Barge
Nuiqsut	Natural Gas	\$5.00	Barge
Nulato	\$4.35	\$5.00	Barge
Pelican	\$3.21	\$3.43	Barge
Pilot Station	\$7.32	\$6.81	Barge
Port Lions	\$3.45	\$3.75	Refinery /Barge
Ruby	\$3.45	\$4.60	Barge
Sand Point	\$4.32	\$3.80	Barge
Unalaska	\$3.90	\$3.64	Barge
Wales	\$7.21	\$8.24	Barge
Wrangell	\$3.00	\$3.47	Barge
Notes:			
I. This is a partial list of the 100 communities surveyed.			
II. The North Slope Borough subsidizes heating fuel.			
III. Utqiagvik (formerly Barrow) uses natural gas as a heat source.			



Alaska has very geographically separated communities. This does not make fuel acquisition either easy or inexpensive. Therefore, Alaska has very elaborate fuel transportation, delivery, and pricing challenges. Alaska refineries receive and ship to and from the following locations:

Table 2-6 Rural Alaska Fuel Per Gallon

Community ¹	Fuel Type	Received ³	Shipped ³
Anchorage	Gasoline ²	165,901,639	134,426,230
	Distillate ⁴	2,816,901	45,633,803
Valdez	Gasoline ²	327,869	82,950,820
	Distillate ⁴	--	14,366,197
Ketchikan	Gasoline ²	18,032,787	12,459,016
	Distillate ⁴	8,450,704	15,492,958
Nikiski	Gasoline ²	--	213,442,623
	Distillate ⁴	--	289,295,775
Dutch Harbor	Gasoline ²	21,967,213	5,245,902
	Distillate ⁴	44,788,732	9,014,085
Juneau	Gasoline ²	18,360,656	655,738
	Distillate ⁴	11,549,296	845,070
Notes: (1) Corps of Engineer data is reported in short tons. Gallon conversions assume gasoline weight of 6.1 pounds per gallon and distillate weight of 7.1 pounds per gallon. (2) Assumes all fuel is shipped out of Nikiski and none is imported. (3) ISER calculations to summarize in and outbound shipments. (4) Distillates are primarily diesel #1 and #2. Sources: U.S. Army Corps of Engineers, Waterborne Commerce Statistics, Pacific Coast, Alaska and Hawaii; ISER calculations. Bethel is also a major western Alaska fuel depot, but it is not shown here because shipments in and out are not segregated in Corps of Engineer data.			

The Institute of Social and Economic Research (ISER), University of Alaska Anchorage prepared the “Components of Delivered Fuel Prices in Alaska” Final Report, June 2008 prepared for the Alaska Energy Authority. The report analyzed Alaska’s fuel deliver requirements as they affected fuel pricing. The report states:

IV. Fuel Product Transportation

Fuel products in Alaska are transported in various ways, both from refineries to fuel terminals and from terminals to communities. Fuel is usually stored in communities before distribution to residents and businesses. This chapter describes fuel transportation (truck, barge, airplane), as well as storage and distribution methods, including how characteristics of each method influence fuel prices.

Refinery and Terminals to Communities

Truck

Of the most common methods of transporting fuel in Alaska, trucking is the least expensive and complex. All Alaska communities on the road system have fuel delivered by truck. Gasoline is generally delivered directly to gas stations. Heating fuel is delivered from the refinery to regional fuel hubs for distribution or by distributors directly to homes from refineries...

Railroad Transportation

Transporting fuel by rail to Alaska communities along the rail belt is affordable, efficient, and green (minimizing impacts to the environment by reducing emissions from vehicles on the road system). The railroad transports approximately 130 million gallons of fuel per year.



Barge

Barging fuel to Alaska communities is an expensive, complex, and risky endeavor. Fuel transporters face a different set of delivery challenges and costs for each community. There are few fuel transport companies with the experience and capital needed to successfully deliver fuel to remote areas in Alaska. In addition to overcoming the physical challenges of barging fuel to Alaska communities, fuel transporters must correctly price their fuel transportation charges to fully recover the cost of delivery...

Barge Transportation Regions

For this analysis we divided Alaska into five regions: ice-free southern coast, Kuskokwim River, Yukon River, Northwest and Kobuk River, and Arctic. All these regions have some common factors that influence the cost of fuel delivery...

Ice-Free Southern Coast

This region extends from Southeast Alaska, along the Gulf of Alaska and out the Aleutian Island chain. The defining characteristic of this region is that it is ice-free year round and the communities are coastal. These characteristics allow year-round delivery of fuel. Crowley, Delta Western, and Petro Marine Services deliver fuel in this region...

Kuskokwim River

The Kuskokwim River Region includes all the communities on the Kuskokwim River and its tributaries, as well as coastal communities near the mouth of the river. Bethel serves as the regional hub, and almost all fuel delivered to the region is at least temporarily stored in Bethel. Fuel from Bethel storage tanks must be loaded into smaller barges to navigate the Kuskokwim River upstream of Bethel. Approximately four million gallons of fuel are shipped out of Bethel each year...

Yukon River

Nenana serves as the fuel hub for the Yukon River. Fuel arrives at the Nenana hub from refineries in North Pole, or is carried from Anchorage on the Alaska Railroad or by truck. From Nenana, fuel is barged both upstream as far as Fort Yukon and downstream to the mouth of the Yukon River. Crowley is the dominant fuel transporter in the region. Recently, Ruby Marine started competing on a small scale with Crowley...

Northwest and Kobuk River

This region is defined as the area served by fuel hubs in Kotzebue and Nome and consists of Norton Sound, Kotzebue Sound and the Kobuk River. Nome's port can accommodate large barges and does not require lighterage, while Kotzebue's port is shallow and does require fuel lightering...

Arctic

Fuel delivery in the Arctic region is subsidized by the North Slope Borough and is not investigated in this report...

Air delivery

Flying fuel is the most expensive method for transporting fuel to rural Alaska villages. Communities will generally only fly in fuel if they do not have access to navigable water or in emergencies when the river is frozen and the barges are unable to deliver. This can happen if a community did not have the cash or credit available to purchase a full winter season of fuel before freeze-up, or when a community sells all its fuel before spring break-up when the barges are able to return...

Table 10 shows the delivery cost component of 2003 and 2006 State of Alaska fuel contracts—that is, contracts for fuel for state-owned facilities. We combined the two fuel contract years and



averaged costs for communities that received contracts in both years. For most communities with contracts in both years the delivery charge was similar. Source: ISER 2008

ISER prepared the True Cost of Electricity in Rural Alaska and True Cost of Bulk Fuel in Rural Alaska, October 26, 2016 in collaboration with Mark Foster & Associates. The document defines actual fuel costs throughout the state.

True Cost of Electricity in Rural Alaska

Introduction

In this analysis, we compile data from several sources to estimate the true cost of electricity in rural Alaska. The true cost includes expenses listed on the utilities' books plus costs paid by other entities in the form of explicit and implicit subsidies.

Our focus is on the nonfuel costs of power. Fuel costs are quite volatile and are tracked carefully by AEA on a monthly basis. The concept of "Fuel cost" typically includes the price paid at the point of delivery into a bulk storage tank. We do include here as contributed resources the estimated subsidies to the fuel delivery system for electricity due to provision of bulk fuel storage by, for example, the Denali Commission...

True Cost of Bulk Fuel in Rural Alaska

Methodology

To estimate the true cost of bulk fuel, we began with per gallon fuel prices obtained from the Department of Community and Regional Affairs (DCRA) Heating Fuel Survey (January 2016.) To those reported prices we added an estimate of the per gallon subsidy that results from bulk tank farm projects.

Bulk Fuel Program Cost Compilation and Cost Allocations

The data on bulk tank farm projects were extracted from the Denali Commission Project Database on December 15, 2015. This data included the total project cost as well as contributed capital from state and federal sources for bulk fuel tank farm project developments and construction across Alaska. We totaled the bulk fuel tank farm project costs that were contributed from other than ratepayers, also known as "contributed capital" for individual communities. We allocated regional or statewide project development costs to communities based on storage capacity.

We reviewed a sample of a dozen bulk tank farm project business plans to estimate the tank farm capacity associated with electric fuel and the capacity associated with heating fuel. Roughly one-third of the bulk fuel tank capacity was attributed to electric utility diesel fuel and roughly two-thirds of the bulk tank farm capacity was attributed to local heating fuel.

To annualize the resulting capital project cost allocations to electric (1/3) and heating markets (2/3), we assumed a 30-year life and a discount rate of 4.5% (a conservative lower-bound estimate of the long-run real return on the Permanent Fund, based upon historical returns through FY15 and preliminary projections for FY16.)

The underlying calculations for these can be found in the "BulkFuel to Electric" and "BulkFuel to Heating" tabs in the "Denali Commission Project Database 15 December 2015a" Excel workbook.

Results

The Department of Community and Regional Affairs (DCRA) Heating Fuel Survey (January 2016) included 98 villages with reported prices. Forty-three (43) of those communities received Denali Commission Subsidized Bulk Fuel Storage Projects. The total cost of heating fuel for the DCRA survey, with the addition of the DC bulk fuel storage subsidies, ranges from \$2.32 per



gallon in Fairbanks to \$13.99 per gallon in Arctic Village. The appendix at the end of this section presents the data by community...

Finally, we have computed regional average data for those 43 communities with bulk fuel tank storage projects, which is presented in Table 1. The average total cost of heating fuel ranged from \$4.64/gallon in Southeast, including \$0.72/gallon of fuel tank farm subsidy to \$7.04/gallon in Interior including \$1.26/gallon of fuel tank farm subsidy.

Table 1: Total Cost of Heating Fuel for Communities in DCRA Survey with Denali Commission Bulk Fuel Storage Subsidies

Row Labels	Average of Survey \$/gallon	Average of \$/gallon storage subsidy	Average of \$/gallon total
Gulf Coast	\$ 4.57	\$ 1.26	\$ 5.82
Interior	\$ 6.18	\$ 0.86	\$ 7.04
Northwest	\$ 5.10	\$ 0.99	\$ 6.09
Southeast	\$ 3.92	\$ 0.72	\$ 4.64
Southwest	\$ 5.13	\$ 0.79	\$ 5.92
Western	\$ 5.90	\$ 0.82	\$ 6.72
Grand Total	\$ 5.30	\$ 0.92	\$ 6.22

Appendix to True Cost of Bulk Fuel in Rural Alaska

Table 10: Fuel oil cost per gallon by community

Community		Survey \$/gallon	\$/gallon storage subsidy	\$/gallon total
Arctic Village	Interior	\$12.00	\$1.99	\$13.99
Hughes	Interior	\$9.00	\$0.22	\$9.22
Alatna	Interior	\$7.00	\$2.03	\$9.03
Pilot Station	Western	\$7.32	\$1.51	\$8.83
Nunapitchuk	Western	\$6.49	\$1.74	\$8.23
Atka	Southwest	\$6.85	\$1.33	\$8.18
Brevig Mission	Northwest	\$5.80	\$2.12	\$7.92
Kokhanok	Southwest	\$7.00	\$0.84	\$7.84
Chenega Bay	Gulf Coast	\$6.05	\$1.74	\$7.79
Toksook Bay	Western	\$6.00	\$1.60	\$7.60
McGrath	Interior	\$7.45	\$0.00	\$7.45
New Stuyahok	Southwest	\$6.52	\$0.91	\$7.43
Saint George	Southwest	\$7.36	\$0.00	\$7.36
Wales	Northwest	\$7.21	\$0.00	\$7.21
Nelson Lagoon	Southwest	\$6.18	\$0.90	\$7.08
Stebbins	Northwest	\$5.69	\$1.06	\$6.75
Atmautluak	Western	\$6.73	\$0.00	\$6.73
Koyuk	Northwest	\$4.80	\$1.88	\$6.68
Larsen Bay	Gulf Coast	\$5.26	\$1.31	\$6.57
Noorvik	Northwest	\$6.56	\$0.00	\$6.56
Scammon Bay	Western	\$6.33	\$0.19	\$6.52
Huslia	Interior	\$6.50	\$0.00	\$6.50
Hooper Bay	Western	\$6.45	\$0.00	\$6.45
Saint Michael	Northwest	\$5.88	\$0.48	\$6.36
Upper Kalskag	Western	\$6.25	\$0.00	\$6.25
Akiak	Western	\$6.24	\$0.00	\$6.24
Galena	Interior	\$6.21	\$0.00	\$6.21
Kiana	Northwest	\$5.67	\$0.42	\$6.08
Savoonga	Northwest	\$5.25	\$0.82	\$6.07
Anvik	Interior	\$6.00	\$0.00	\$6.00
Gambell	Northwest	\$5.25	\$0.60	\$5.85



Table 10: Fuel oil cost per gallon by community

Community		Survey \$/gallon	\$/gallon storage subsidy	\$/gallon total
Kotlik	Western	\$5.30	\$0.50	\$5.80
Tanana	Interior	\$5.25	\$0.47	\$5.72
Old Harbor	Gulf Coast	\$4.07	\$1.63	\$5.70
Sleetmute	Western	\$5.70	\$0.00	\$5.70
Deering	Northwest	\$4.89	\$0.78	\$5.68
Bethel	Western	\$5.67	\$0.00	\$5.67
Shishmaref	Northwest	\$4.08	\$1.51	\$5.59
Holy Cross	Interior	\$5.55	\$0.00	\$5.55
Golovin	Northwest	\$5.00	\$0.52	\$5.52
Grayling	Interior	\$5.50	\$0.00	\$5.50
Kaltag	Interior	\$4.50	\$1.00	\$5.50
Teller	Northwest	\$5.46	\$0.00	\$5.46
White Mountain	Northwest	\$4.35	\$1.10	\$5.45
Marshall	Western	\$5.41	\$0.00	\$5.41
Nondalton	Southwest	\$5.24	\$0.00	\$5.24
Pelican	Southeast	\$3.43	\$1.76	\$5.20
Unalakleet	Northwest	\$4.57	\$0.62	\$5.18
Emmonak	Western	\$5.15	\$0.00	\$5.15
Tuntutuliak	Western	\$4.88	\$0.23	\$5.11
Quinhagak	Western	\$5.00	\$0.00	\$5.00
Mountain Village	Western	\$4.98	\$0.01	\$4.99
Ruby	Interior	\$3.70	\$1.19	\$4.89
Point Baker	Southeast	\$4.65	\$0.17	\$4.82
Russian Mission	Western	\$4.80	\$0.00	\$4.80
Seldovia	Gulf Coast	\$4.00	\$0.79	\$4.79
Kwigillingok	Western	\$4.65	\$0.00	\$4.65
Togiak	Southwest	\$4.62	\$0.00	\$4.62
Sand Point	Southwest	\$4.48	\$0.00	\$4.48
Nulato	Interior	\$4.45	\$0.02	\$4.47
Port Lions	Gulf Coast	\$3.45	\$0.81	\$4.26
Eagle	Interior	\$4.25	\$0.00	\$4.25
Goodnews Bay	Western	\$4.12	\$0.00	\$4.12
Kake	Southeast	\$3.68	\$0.22	\$3.90
Wrangell	Southeast	\$3.85	\$0.00	\$3.85
King Cove	Southwest	\$3.37	\$0.34	\$3.71
Chignik	Southwest	\$3.25	\$0.45	\$3.70
Gustavus	Southeast	\$3.58	\$0.00	\$3.58
Dillingham	Southwest	\$3.57	\$0.00	\$3.57
Minto	Interior	\$3.55	\$0.01	\$3.56
Angoon	Southeast	\$3.55	\$0.00	\$3.55
Unalaska	Southwest	\$3.54	\$0.00	\$3.54
Akutan	Southwest	\$2.75	\$0.76	\$3.51
Kotzebue	Northwest	\$3.16	\$0.00	\$3.16
Juneau	Southeast	\$3.15	\$0.00	\$3.15
Thorne Bay	Southeast	\$3.07	\$0.00	\$3.07
Petersburg	Southeast	\$2.97	\$0.00	\$2.97
Craig	Southeast	\$2.94	\$0.00	\$2.94
Ouzinkie	Gulf Coast	\$2.94	\$0.00	\$2.94
Hoonah	Southeast	\$2.85	\$0.00	\$2.85
Cordova	Gulf Coast	\$2.79	\$0.00	\$2.79



Table 10: Fuel oil cost per gallon by community

Community		Survey \$/gallon	\$/gallon storage subsidy	\$/gallon total
<i>Kodiak</i>	<i>Gulf Coast</i>	\$2.72	\$0.00	\$2.72
<i>Valdez</i>	<i>Gulf Coast</i>	\$2.70	\$0.00	\$2.70
<i>Nenana</i>	<i>Interior</i>	\$2.69	\$0.00	\$2.69
<i>Healy</i>	<i>Interior</i>	\$2.65	\$0.00	\$2.65
<i>Anderson</i>	<i>Interior</i>	\$2.59	\$0.00	\$2.59
<i>Kaktovik</i>	<i>Northern</i>	\$2.50	\$0.00	\$2.50
<i>Chitina</i>	<i>Gulf Coast</i>	\$2.45	\$0.00	\$2.45
<i>Circle</i>	<i>Interior</i>	\$2.45	\$0.00	\$2.45
<i>Glennallen</i>	<i>Gulf Coast</i>	\$2.45	\$0.00	\$2.45
<i>Homer</i>	<i>Gulf Coast</i>	\$2.35	\$0.00	\$2.35
<i>Delta Junction</i>	<i>Interior</i>	\$2.35	\$0.00	\$2.35
<i>Fairbanks</i>	<i>Interior</i>	\$2.32	\$0.00	\$2.32
<i>Nuiqsut</i>	<i>Northern</i>	\$2.05	\$0.00	\$2.05
<i>Point Hope</i>	<i>Northern</i>	\$1.74	\$0.00	\$1.74
<i>Anaktuvuk Pass</i>	<i>Northern</i>	\$1.55	\$0.00	\$1.55
<i>Wainwright</i>	<i>Northern</i>	\$1.50	\$0.00	\$1.50
<i>Atkasuk</i>	<i>Northern</i>	\$1.40	\$0.00	\$1.40

Source: ISER 2016, https://pubs.iseralaska.org/media/b0e39f4e-90d5-4afb-a329-77be171913de/2016_10_26-TrueCostElectricityFuelRuralAK.pdf



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