

*Southcentral Alaska Ports
Freight and Fuel Analysis
2016 Update*

Prepared for:
Port of Anchorage

March 2016



Southcentral Alaska Ports Freight and Fuel Analysis 2016 Update

Prepared for:
Port of Anchorage

Prepared by:



Juneau • Anchorage

McDowell Group Anchorage Office
1400 W. Benson Blvd., Suite 510
Anchorage, Alaska 99503

McDowell Group Juneau Office
9360 Glacier Highway, Suite 201
Juneau, Alaska 99801

Website: www.mcdowellgroup.net

March 2016

Table of Contents

- Summary Report..... 1
- Purpose and Scope..... 1
- Movement of Freight 1
- Southcentral Alaska In-Bound Freight 1
- Statewide Alaska In-Bound Freight..... 3
- In-Bound Shipping Options..... 4
- Port of Anchorage’s Role as Alaska Gateway Port for Freight 5
- Movement of Fuel..... 6
- Southcentral Alaska Refined Fuel..... 6

List of Tables

- Table 1. Southcentral Waterborne Van and Container General Cargo, 2015, POA and All Other Ports..... 2
- Table 2. Southcentral Waterborne Freight (Non-Petroleum), 2015, POA and All Other Ports..... 3
- Table 3. Alaska Refined Petroleum Product Consumption, 2012-2013..... 7
- Table 4. Alaska Crude and Petroleum Product Imports, Millions of Gallons, 2010-2013..... 7
- Table 5. Port of Anchorage In-Bound and Out-Bound Refined Petroleum Product Volumes, 2012-2015 (millions of gallons) 8
- Table 6. Port of Anchorage’s Role in Alaska Refined Petroleum Product Distribution, 2012, 2013, and 2015 . 9

List of Figures

- Figure 1. Alaska In-Bound Freight (Non-Petroleum) Profile 4
- Figure 2. Hypothetical Alaska In-Bound Shipping Time and Cost Spectrum 5
- Figure 3. Redistribution of Inbound Freight through Port of Anchorage 6
- Figure 4. Distribution of Refined Petroleum Shipments into Southcentral Alaska Ports 10

Purpose and Scope

This report updates and supplements a 2015 McDowell Group analysis of Southcentral region in-bound marine freight. The original research and analysis focused on determining the percentage of total goods entering Alaska through each of Southcentral Alaska's ports, including Port of Anchorage (POA), Port MacKenzie, Seward, Whittier, Homer, Valdez, and the Alaska Marine Lines and North Star barge facilities located adjacent to POA. The analysis did not consider freight transshipments between Alaska ports. The categories of goods considered included containerized cargo, and cement and other break bulk (i.e., steel, machinery, pipe, etc.). Research to determine in-bound freight tonnages included interviews with marine shippers and port managers, and analysis of secondary data provided by the POA, the U.S. Army Corps of Engineers (USACE), and other sources.

The 2015 report also described the role of the Port of Anchorage in the fuel distribution network serving Southcentral Alaska. The region relies on various combinations of barge, truck, and pipeline systems to meet its refined petroleum supply needs. The Port of Anchorage (POA) plays an important role in this network as fuel products move over its docks or through its valve yard.

This update includes the latest available data on freight and fuel movements into the Southcentral region. It also expands the 2015 analysis to include an assessment of total freight tonnages moving into Alaska from outside the state, including waterborne, truck, and airborne freight. Additionally, POA's role in meeting the state's overall in-bound freight transportation needs is considered.

Movement of Freight

Southcentral Alaska In-Bound Freight

BACKGROUND

While waterborne cargo enters Southcentral Alaska through several ports, the majority of shipments go through POA. Goods arrive at POA on board container or roll-on/roll-off ships operated by Matson (formerly operated by Horizon Lines), Totem Ocean Trailer Express (TOTE). Both operators deliver to Anchorage twice weekly. In addition to these deep-water container vessel shipments, POA receives approximately 7-8 shipments of cement a year, much of which is transported beyond Anchorage to support construction projects throughout Alaska. Other carriers also come to POA on an as needed basis (such as the wind turbines for the Fire Island Wind Project).

Other shipments into Anchorage enter through facilities not affiliated with POA. Alaska Marine Lines (AML) offers barge service to its Anchorage terminal once a week during the ice-free season, typically from April or May through September or October. Freight shipments also come through the Anchorage facilities of North Star Terminal & Stevedore Co.

The Port of Whittier, owned by the Alaska Railroad Corporation, is serviced with a rail barge operated by Foss Maritime. Owned by the Canadian National Railway Company (CN), the “Aquatrain” rail barge delivers to Whittier from Prince Rupert two to three times a month, year-round. AML provides rail barge service to the Port of Whittier once a week year-round. AML’s barge has a rail deck and a container deck. Containerized freight delivered by AML to Whittier is redistributed to Cordova, Valdez, and remote locations via barge, and to Anchorage, Fairbanks, and other destinations via rail and truck.

Valdez, Seward and Cordova are served by Samson Tug and Barge Inc. from Seattle once every two weeks. Other barges and companies ship to Southcentral Alaska on an as-needed basis.

VANS AND CONTAINER CARGO

In 2015, TOTE and Matson transported a combined total of 1.53 million tons of freight to POA. That volume accounts for approximately 83 percent of all van/container/platform general cargo moving into Southcentral via marine carrier (estimated at about 1.8 million tons). Other van/container/platform general cargo comes into Southcentral on scheduled AML and Samson barges serving Anchorage (AML), Whittier (AML), and Seward (Samson).

Table 1. Southcentral Waterborne Van and Container General Cargo, 2015, POA and All Other Ports

	Tons	Market Share
Port of Anchorage	1,529,000	84%
All Other Southcentral Ports*	300,000	16%
Southcentral Totals	1,829,000	100%

*Includes Anchorage barge terminals outside POA.

Source: McDowell Group estimates.

RAIL CARGO

Freight arriving in Southcentral (Whittier) on rail cars onboard the AML and CN rail barges is estimated at approximately 200,000 tons annually. This volume does not include AML’s containerized freight, which is placed on a rail car, truck or another barge in Whittier for distribution to other communities in Southcentral and Interior Alaska.

OTHER NON-FUEL FREIGHT

In 2015, other in-bound freight through POA included 129,000 tons of cement, iron/steel, and other miscellaneous break bulk freight. Specific tonnages of other in-bound non-containerized freight to other Southcentral ports are not available, but are estimated at approximately 100,000 tons.

TOTAL SOUTHCENTRAL ALASKA IN-BOUND NON-FUEL FREIGHT

In 2015, the total amount of waterborne non-fuel freight arriving in Southcentral ports is estimated at just over 2.2 million tons. POA accounts for three-quarters (74 percent) of all in-bound non-petroleum freight. While detailed data for each Southcentral port is not presented in this update due to confidentiality restrictions, in general, Whittier is the second-ranked port in terms of in-bound tonnage at approximately 15 percent of the regional total. All other public and private docks individually account for less than 5 percent of inbound tonnage.

Table 2. Southcentral Waterborne Freight (Non-Petroleum), 2015, POA and All Other Ports

	Tons	Market Share
Port of Anchorage	1,658,000	74%
All Other Southcentral Ports	580,000	26%
Southcentral Totals	2,238,000	100%

Source: McDowell Group estimates.

Statewide Alaska In-Bound Freight

Based on the most recent available USACE data, approximately 3 million tons of waterborne freight are shipped into Alaska annually, not including petroleum products. Based on that number, POA accounts for approximately 55 percent of all Alaska in-bound, non-petroleum, waterborne freight.

Freight also comes into Alaska via truck, though at a much smaller quantity. The best available data from the U.S. Bureau of Transportation Statistics indicates that approximately 100,000 tons of containerized freight is trucked into Alaska annually.¹ Including non-containerized freight, the annual total may be in the range of 125,000 to 150,000 tons.

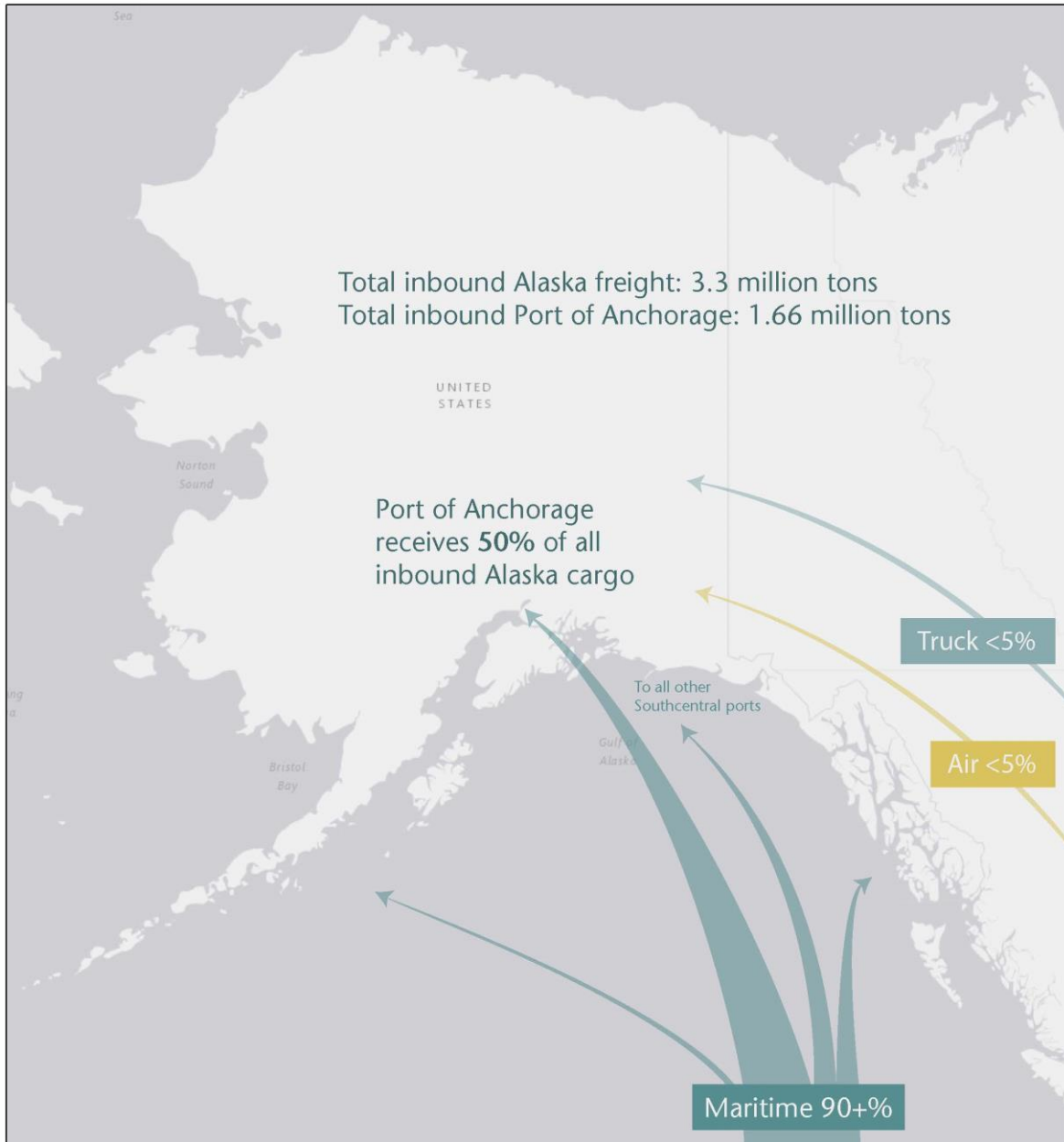
Approximately 2 million tons of cargo transited Ted Stevens Anchorage International Airport (ANC) in 2014, one of the world’s busiest airfreight hubs. Approximately 400,000 tons was enplaned at ANC, and 350,000 tons deplaned, with the vast majority of those volumes related to UPS and FedEx transshipments. Data is not available on the actual tonnage of in-bound air freight for use or consumption in Alaska. However, interviews with shippers indicate this figure is likely similar to the amount trucked into the state, or approximately 100,000 to 125,000 tons annually.

Based on these estimates of truck, airborne, and waterborne freight, a total of 3.3 million tons of freight are shipped to Alaska each year. Half of that total in-bound tonnage moves through POA.

(See figure next page.)

¹ http://transborder.bts.gov/programs/international/transborder/TBDR_BC/TBDR_BCTSA.html

Figure 1. Alaska In-Bound Freight (Non-Petroleum) Profile



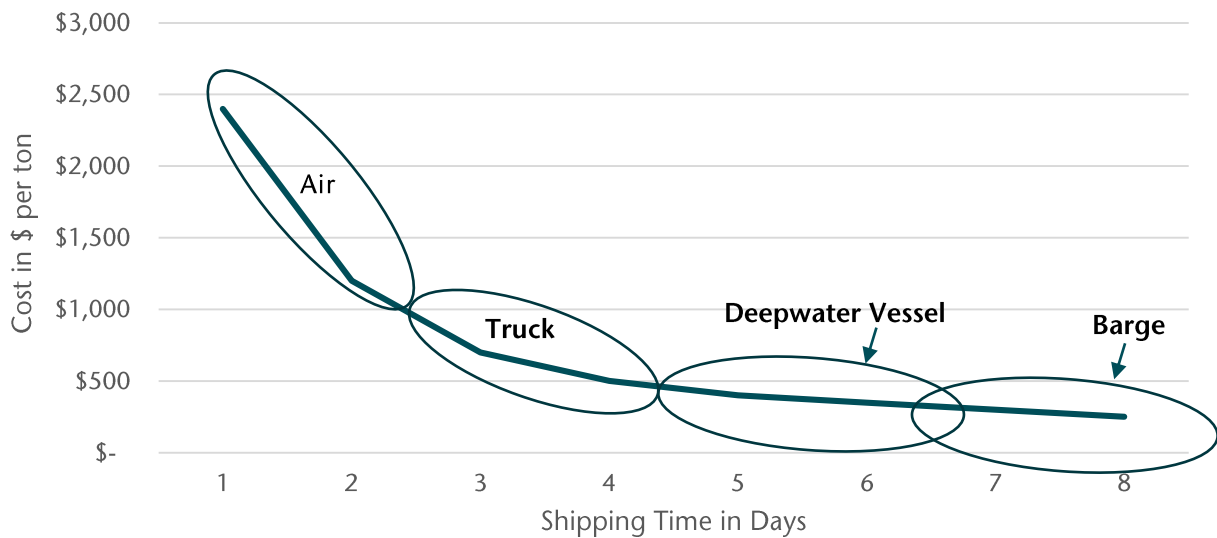
Note: "All other Southcentral ports" includes freight off-loaded in Anchorage outside the Port of Anchorage.

In-Bound Shipping Options

When making decisions about how to best move freight from one location to another, customers consider the trade-off between cost and delivery time, which is a function of many factors, including shipping schedule, cargo weight and volume (dimensions of the cargo), transshipment needs, infrastructure requirements, backhaul opportunities, weather concerns/risks, etc. In addition to cost and delivery times, shipments are limited by the physical capability of different transport options. Maritime shipping has fewer restrictions on the weight, shape, and size of cargo than air and trucking shipments.

Southcentral customers have a full spectrum of shipping opportunities from which to select the optimal mode of transporting goods and materials, including ship, barge, truck, or plane. Air freight provides the fastest service but at a higher cost per pound than the other options. Marine offers generally the slowest option, but at the lowest-cost. Within marine, deep water vessels are faster than barge, but typically more expensive. Trucking is in the cost/time spectrum between marine shipping and airfreight. This is illustrated conceptually in the following diagram.

Figure 2. Hypothetical Alaska In-Bound Shipping Time and Cost Spectrum



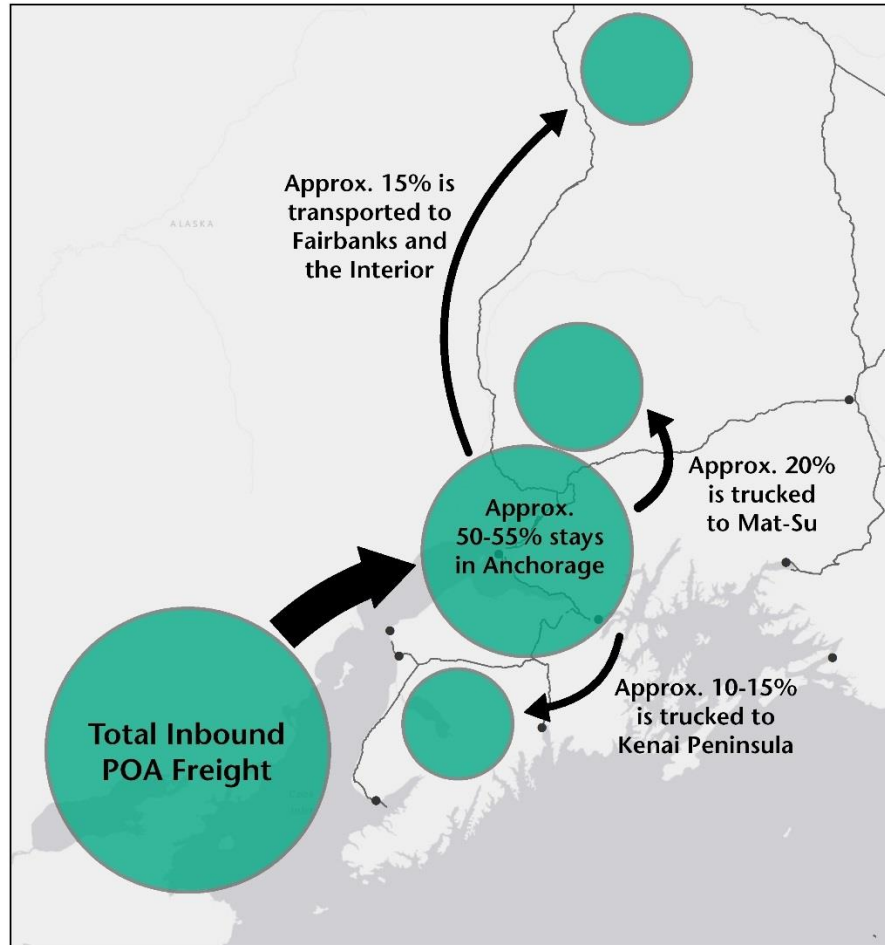
Source: McDowell Group estimates based on tariff rates and interviews with shippers.

With more than 90 percent of Alaska inbound freight moved by waterborne transportation, customers are overwhelmingly choosing the lowest cost option. As the most developed port in Alaska, POA plays a significant role in keeping household and business costs as low as possible.

Port of Anchorage’s Role as Alaska Gateway Port for Freight

Approximately 45-50 percent of the 1.6 million tons of in-bound freight passing through POA is destined for markets and consumers outside Anchorage. Interviews with shippers indicate approximately 15 percent of the in-bound container freight is destined for the Interior (mainly Fairbanks) with lesser amounts (10 to 15 percent) destined for the Kenai Peninsula region. Based on relative population, it is estimated that approximately 20 percent of in-bound container freight at POA travels to Mat-Su. Even smaller quantities of freight entering POA are destined for locations throughout the state including, Kodiak, Dutch Harbor, Western Alaska, and other communities.

Figure 3. Redistribution of Inbound Freight through Port of Anchorage



Movement of Fuel

Southcentral Alaska Refined Fuel

This section begins with a summary of petroleum product consumption in Alaska and total imports of petroleum products from outside Alaska. A description of Southcentral Alaska's fuel supply follows, along with a discussion of POA's role in that fuel supply system.

ALASKA FUEL CONSUMPTION AND IMPORTS

According to Energy Information Administration (EIA) data, approximately 1.8 billion gallons of refined petroleum products were consumed in Alaska in 2013 (the latest available data). Jet fuel accounted for just under half (44 percent) of all petroleum products consumed in the state.

(See table next page.)

Table 3. Alaska Refined Petroleum Product Consumption, 2012-2013

Product	2012		2013	
	Barrels	Gallons	Barrels	Gallons
Distillate Fuel Oil	13,778,000	578,676,000	12,705,000	533,610,000
Jet Fuel	19,966,000	838,572,000	18,931,000	795,102,000
LPG	344,000	14,448,000	333,000	13,986,000
Motor Gasoline	6,661,000	279,762,000	6,505,000	273,210,000
Residual Fuel Oil	432,000	18,144,000	94,000	3,948,000
Aviation Gas and Other Petroleum Products*	4,118,000	172,956,000	4,530,000	190,260,000
Total	45,300,000	1,902,600,000	43,098,000	1,810,116,000

Notes: Includes aviation gas, petroleum coke, naphthas, and a variety of other petroleum products.

Column totals may not sum to total due to rounding. A barrel is equal to 42 gallons.

Source: Energy Information Administration (compiled by McDowell Group).

In 2013, nearly 357 million gallons of refined petroleum products were shipped into Alaska. No crude was imported, unlike in 2012 when about 83 million gallons of crude oil was brought in (according to USACE Waterborne Commerce data). Refined products shipped into Alaska in 2013 accounted for about 20 percent of the total volume of petroleum products consumed in the state that year. With the tapering output and eventual closure of the Flint Hills refinery in North Pole, Alaska lost internal capacity for refining petroleum products. Since the refinery's closure (in May 2014), it is presumed imported petroleum products have increased, although comprehensive import data to confirm this is not yet available. One indicator, though, is the quantity of imported jet fuel at POA, which has risen substantially since 2013 (see Table 5).

Table 4. Alaska Crude and Petroleum Product Imports, Millions of Gallons, 2010-2013

Product and Origin	2010	2011	2012	2013
<i>Crude Oil</i>				
Foreign (excl. Canada)	128.4	66.5	82.8	-
Canada	-	8.9	-	-
<i>Total Crude Oil</i>	128.4	75.4	82.8	-
<i>Petroleum Products</i>				
Canada	84.7	61.6	85.8	72.7
Foreign (excl. Canada)	242.0	212.4	268.0	144.2
Washington	112.1	123.7	165.3	139.8
Oregon	21.2	27.8	-	-
California	41.1	45.5	33.6	-
<i>Total Petroleum Products</i>	501.1	471.1	552.7	356.7
Grand Total	629.5	546.5	635.5	356.7

Source: Based on U.S. Army Corps of Engineers Waterborne Commerce data (compiled by McDowell Group).

SOUTHCENTRAL ALASKA FUEL SUPPLY

Tesoro Alaska's 72,000 barrel-per-day refinery in Nikiski supplies much of Southcentral Alaska's fuel. Using crude oil from North Slope, Cook Inlet, and (as needed) imported sources, the refinery produces gasoline, jet fuel, diesel fuel, heating oil, propane, and asphalt oil. These products are transported throughout the region by pipeline, truck, and barge. A 69-mile, 48,000 barrel per day common-carrier pipeline extends from Nikiski under Turnagain Arm to Anchorage, where it splits and goes to both POA and ANC. Product moving to Tesoro's terminal at POA is stored prior to transport to the airport via a second pipeline. Occasionally, when demand exceeds pipeline capacity, barges are also used to transport jet fuel to POA from the refinery.

Another smaller portion of Interior and Southcentral Alaska's refined petroleum supply comes from Petro Star Inc.'s refineries in Valdez and North Pole. With crude oil from the North Slope, the 60,000 barrel-per-day refinery in Valdez produces ultra-low sulfur diesel (#2 and Arctic Grade #1), military and commercial grade jet fuel, heating oil, and marine diesel. Petro Star does not produce gasoline. The 22,000 barrel-per-day Petro Star refinery in North Pole produces heating fuel, kerosene, diesel, and jet fuel for Interior and Northern Alaska markets.

Southcentral Alaska also receives deliveries of fuel from out-of-state sources, which primarily enter the region through POA. All aviation gas entering Southcentral Alaska and the Railbelt comes through POA, delivered by Crowley Marine from Chevron's Richmond, California refinery. Out-of-state jet fuel is also delivered by tanker to Southcentral Alaska – all of it passing through POA.

Port of Anchorage

In 2015, POA handled a total of about 594 million gallons of petroleum products. This includes 112 million gallons of valve yard transfers, approximately 465 million gallons of petroleum products that moved in-bound over the dock, and another 18 million gallons directed out-bound over the dock.

Table 5. Port of Anchorage In-Bound and Out-Bound Refined Petroleum Product Volumes, 2012-2015 (millions of gallons)

	Shoreside (In-Bound)	In-Bound Dockside	In-Bound Total	Out-Bound Dockside	Grand Total (In-Bound and Outbound)
2012	317.2	237.5	554.7	14.1	568.8
2013	288.7	155.3	444.0	22.2	466.2
2014	277.6	157.8	435.4	18.1	453.5
2015	111.6	464.5	576.1	18.1	594.2

Note: In-bound and out-bound dockside are approximations.
Source: Port of Anchorage.

Fuel flowing to, and through, POA is part of a complex distribution network serving Southcentral Alaska, Interior Alaska, and Alaska's military bases. In addition to product moving into POA via pipeline from the Tesoro refinery, tankers and barges regularly deliver high and low sulfur diesel, unleaded gasoline, and jet fuels to POA from refineries in Nikiski and Valdez. Recently, deliveries of jet fuel from Asian refineries to POA have been required to meet Alaska's needs. All of the JP-8 fuel used by Joint Base Elmendorf-Richardson (JBER) comes through POA, and is then transferred by a small diameter pipeline running from fuel storage tanks to JBER.

Companies with refined product storage capacity at POA include Tesoro, Flint Hills, Crowley, and Aircraft Services International Group (ASIG). Additionally, Delta Western is constructing storage capacity at POA. From these storage facilities, fuel is distributed by truck throughout Southcentral Alaska’s road system, by barge to other destinations in Alaska, and by pipeline to the airport. Products are also shipped via truck or rail car to Interior Alaska and North Slope.

POA plays a significant role in Alaska’s refined petroleum product transportation infrastructure. Including products moving through the POA valve yard and over the dock, in 2015, POA handled approximately 576 million gallons of refined petroleum products, approximately one-third of all product consumed in Alaska that year. This total represents nearly 90 percent of petroleum products handled by all Southcentral ports (*See below for details on other Southcentral ports*).

Table 6. Port of Anchorage’s Role in Alaska Refined Petroleum Product Distribution, 2012, 2013, and 2015

	2012	2013	2015
Total Alaska Consumption (Millions of gallons)	1,902.6	1,810.1	1,800.0**
Port of Anchorage Volume (Millions of gallons)*	554.6	444.0	576.0
Percent of Total	29%	25%	32%**

*Includes inbound volumes to avoid double-counting.

**Estimated.

Source: Energy Information Administration (2012-2013) and Port of Anchorage (2012, 2013, 2015) (compiled by McDowell Group).

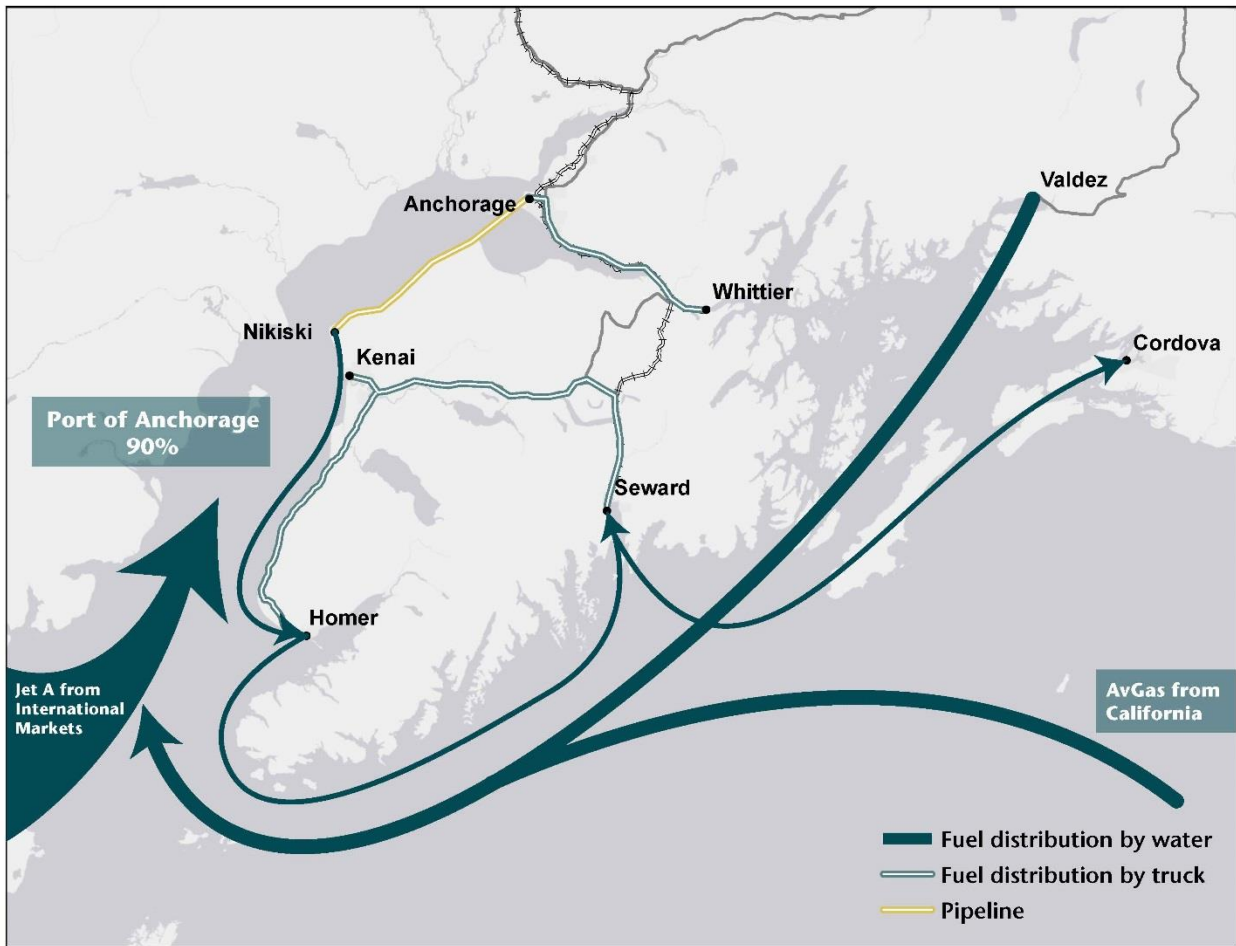
Other Southcentral Ports

Fuel infrastructure for Southcentral Alaska’s smaller coastal communities on the road system are owned by either Petro Marine or Shoreside (both part of the Petro 49, Inc. family of companies). When fuel is barged into the communities listed below, it is done so almost exclusively through Petro Marine barge service. Brief community overviews are provided below.

- Seward: Fuel is supplied mainly by Tesoro via truck and barge. Barge service is provided by Petro Marine. Product from Petro Star’s Valdez refinery is also barged, on a limited basis, to Seward. Shoreside Petroleum has a fuel distribution terminal in Seward. USACE data suggests an annual average of 1.7 million gallons were barged into Seward over the 2011 to 2013 period (the most recent available data).
- Homer: Fuel is supplied primarily by Tesoro via truck and barge. Barge service and fuel distribution is operated by Petro Marine. According to USACE data, approximately 50 million gallons of petroleum products came into Homer over the dock annually (based on 2011-2013 data).
- Valdez: Fuel is supplied primarily by the local Petro Star refinery. Petro Star Marine operates as North Pacific Fuel in Valdez. However, USACE data indicates about 7.3 million gallons of petroleum products come into Valdez by barge annually. Small amounts of fuel are trucked into Valdez to supplement the local refinery.

- Whittier: Fuel supply is trucked in through the tunnel from Anchorage. Shoreside Petroleum has a fuel distribution terminal in Whittier. In addition, the USACE reports approximately 2.3 million gallons of petroleum products move into Whittier via water annually.
- Cordova: Approximately 10.7 million gallons of petroleum products are barged to Cordova annually, according to USACE data. Barge shipments come from the Nikiski refinery or, in the case of aviation gas, from POA.

Figure 4. Distribution of Refined Petroleum Shipments into Southcentral Alaska Ports



Port of Anchorage’s Role as Alaska Gateway Port for Fuel

With about one-third of all refined petroleum products consumed in Alaska moving through its valve yard and over its docks, POA is a critical component of Alaska’s fuel distribution network. All aviation gas consumed within Southcentral and the Railbelt first enters the state through POA docks. Furthermore, JBER and ANC depend exclusively on jet fuel that passes through POA, either over the docks or through the valve yard. POA’s intermodal connections, storage capacity, and ability to efficiently handle large amounts of refined products is unparalleled in the state. While specific data is not available, POA handles a substantial majority of all refined products imported to Alaska, including aviation gas, commercial jet fuel, and military jet fuel.