STATEWIDE FREIGHT ASSESSMENT

Long-Range Transportation Plan & Freight Plan | July 2021

ALASKA STATEWIDE LRTP FREIGHT PLAN

ALASKA STATEWIDE LONG-RANGE TRANSPORTATION PLAN

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IN THIS MEMORANDUM

This technical memorandum provides perspective on what drives market demand for freight transportation in Alaska, how this demand is served today, and trends impacting the future. It builds on the information provided in Technical Memorandum #1: Transportation Assessment. This memorandum is intended to provide a high-level background about freight transportation within the context of the State of Alaska's broader Long Range Transportation Plan (LRTP) to help inform goal setting and performance measures.

INTRODUCTION

Alaska's overall economy and quality of life depend on freight transportation supply chains that span the state, the nation, and the world. Large shares of Alaska's workforce and wages are directly linked to freight-dependent industries. The state has large quantities of petroleum, zinc, coal, copper, gold, rare earth metals, and other valuable commodities that are in high demand around the world. Mining and fishing are key industries that provide employment for many Alaskans. Almost all these products are exported to other states and countries. Alaska produces few of the consumer goods its workforce and population require, so these goods must be imported from other states and countries.

Alaska's size and geography pose unique challenges for its freight transportation system. Much of Alaska's freight is generated by resource extraction in remote areas, requiring long transportation and service corridors through sparsely developed regions, such as the Dalton Highway and the Trans Alaska Pipeline System (TAPS). Most of the population lives in Anchorage, Fairbanks, and Juneau, and these cities attract the bulk of consumer goods that enter the state by way of major seaports and airports. Anchorage and Fairbanks serve as hubs for truck transportation and rail . Hundreds of smaller cities and communities are not connected to the road network and require basic goods such as food and fuel to be brought long distances by air or barge. The federal Essential Air Service (EAS) Program and Bypass Mail Program provide subsidies and services to help resupply these communities with much needed goods. The costs associated with importing and distributing basic consumer goods result in consumer prices that are far above national averages, especially in remote, low-population areas.

To serve its industries, population, military, and government facilities, the Alaska Department of Transportation & Public Facilities (DOT&PF) and its planning partners have invested heavily in its freight transportation infrastructure. There are large seaports that handle containerized inbound cargo at Anchorage and other places, and seaports with specialized facilities to handle bulk commodities at Valdez, Nikiski, Seward, and elsewhere. Two main international airports serve as hubs for goods to reach remote communities. Highways connect the main cities, while smaller roads and seasonal roads allow vehicular access to the state's interior as far as geography and climate permit. Freight rail and pipelines provide services in critical corridors. In the lower 48 states, last-mile freight connections are usually served by trucks; in Alaska, those connections are also made by snow machine and all-terrain vehicle (ATV). Alaska's freight transportation is truly multimodal.

In Alaska, the relationship between commodity prices, resource development, and freight transportation infrastructure is especially close. Much of the freight movement is driven by private sector resource development, especially petroleum and natural gas. The ongoing decline of North Slope oil production has been recognized as a source of uncertainty (for transportation demand) and risk (for State revenues), but with the recent declines in global energy prices, uncertainty and risks are elevated.

Key Demand Drivers Looking Forward

Alaska's population is forecasted to continue growing. The state's total population has been declining since 2016 but is expected to increase over the planning horizon. A growing population translates into greater demand for goods movement and freight transportation.

Geography is destiny. The state is geographically expansive, and rich in natural resources driving primary industries, including petroleum extraction and commercial fishing and processing. While Alaska is a net exporter of goods, it is equally dependent on imported goods from other states and countries. Its strategic position between the continental United States and other Pacific Rim countries ensures its place as a freight hub in the facilitation of global trade.

Transportation resilience. Alaska's economy has often been the product of boom and bust cycles, tied to the price of raw materials and resource extraction activity. The COVID-19 global pandemic that was identified by the World Health Organization (WHO) in January 2020 and would later severely impact the economy has also brought an uncertain future to shippers and governments alike. Vaccines, however, have brought hope of an eventual return to normalcy, and the pandemic has served as a once-in-a-generation disruptor that has fostered innovation in many areas—innovations that ordinarily would have taken years of experimentation. Nowhere has this been more apparent than in the shift to e-commerce and the implications this ongoing trend will have on first- and last-mile freight connections.

While resiliency across all modes is important for efficient freight transport, the roadway network is a critical point of focus—especially in areas where truck volumes are expected to grow. This is due to a lack of redundancy as major events (e.g., landslides, avalanches, earthquakes),

Impacts from climate change and other environmental events (e.g., subsidence, erosion, flooding), or infrastructure damage (e.g., bridge strikes) could disable a connecting roadway for long periods. Downtime and closures on the system could delay the movement of goods and services to communities or to essential intermodal connections that allow them to reach other destinations not directly served by the roadway network.

E-commerce and same-day delivery. Growth in e-commerce has changed shopping habits of all Americans. The COVID-19 pandemic accelerated this shift in consumer buying patterns with most people being isolated and forced to socially distance. According to Adobe Analytics (which tracks activity on thousands of websites), e-commerce sales in the U.S. overall rose 42 percent during 2020 to $813 billion from the previous year. The growth of e-commerce has driven growth in distribution operations and triggered millions of dollars of investments in supply-chain technology and businesses that offer services aimed at meeting online shopping demand.

Critical Trends

Top Alaska export destinations include countries on the Pacific Rim. Top international export destinations, in order, include: China, Korea, Japan, Canada, and Australia. Other major trading partners include the Netherlands, Germany, France, and Taiwan. China remains as Alaska's top international export market, with nearly a quarter of the state's total exports by value, while South Korea and Japan together represent close to a third. Alaska's top export commodities include zinc ores and concentrates, petroleum oils, oils from bituminous minerals, and lead ores and concentrates.

South Korea has replaced Canada as the top origin for freight destined for Alaska. Recent data from the Freight Analysis Framework reveal that South Korea has displaced Canada as Alaska's top origin for imported freight. Alaska is increasingly importing goods from countries in Southeast Asia, including Thailand, Vietnam, and Malaysia. When considering imports from all origins, Alaska's top import commodities include petroleum oils, and oils from bituminous minerals.

For the six-year period ending 2020, overall freight tonnage at the Port of Alaska has increased by nearly 25 percent. The Port of Alaska handles half of Alaska's inbound freight movement, which is then consumed by nearly 90 percent of the state's population**.** Between 70 and 75 percent of the freight stays in the Anchorage/Mat-Su area.

Air Cargo growth at ANC has made it the world's fourth busiest airport for cargo. Massive growth in the air cargo market is positively impacting the Alaska International Airport System, spurring growth at both Ted Stevens Anchorage International Airport (ANC) and Fairbanks

International Airport (FAI).[1]While ANC is largely a fuel stop and crew change site for cargo headed to other airports, there is an opportunity to add services to support efficient movement of air cargo, such as warehousing, sorting hubs, and cold storage facilities.

New technologies and innovations in aviation continue to evolve and be used in cargo operations. Aviation continues to be a dominant transportation mode due to Alaska's vast land mass and minimal surface transportation connections. Alaska is also at the forefront of Unmanned Aerial Systems (UAS). The University of Alaska Fairbanks is a partner with the Federal Aviation Administration (FAA) in developing UAS integration into the National Airspace System. Several private companies are researching new ways to deliver cargo to remote Alaska villages using UAS technology. Additionally, logistic companies are exploring the use of heavy-lift dirigibles to move cargo from South Central Alaska manufacturing plants to the North Slope oil fields.

Motor carrier safety trends have been stable. For the five-year period ending 2017, the state averaged 299 truck crashes and four fatalities annually. Anchorage led all the state's municipalities with an average of 126 truck crashes per year.

The issue of truck parking—while an enormous issue in many other states—does not appear as significant in Alaska. However, the issue is still apparent and is one where the DOT&PF could collaborate with the private sector to address the concerns of motor carriers and municipalities where this problem is more prevalent. The lack of statewide truck parking has led to instances where large trucks have been parking along the sides of highways (such as Seward and Alyeska Highways) in key locations and obscuring sight distances at intersections, which creates safety hazards. Truck parking facilities and rest areas have also been identified as a need for the Dalton Highway, due to its weather, remoteness, and length.

Ongoing environmental changes may make the Northwest Passage more viable as a future shipping lane. As less ice forms over the Arctic and forms later each year, opportunities for shipping over the Northwest Passage open up, significantly cutting shipping time between Asia and Europe. As more traffic moves through the Bering Strait for Baffin Bay, U.S. Coast Guard and U.S. Navy missions will orient toward the Arctic. This also offers an opportunity for the Ports of Alaska, Nome, and Unalaska as the U.S. Departments of Defense and Homeland Security look for ports to support and supply their ships and crews.

After peaking at 2.1 million barrels a day in 1988, oil volumes through the TAPS have steadily declined, reaching a low of 480,000 barrels in 2020. The Alyeska Pipeline Service Company is working to respond to challenges posed by declining throughput to sustain the pipeline as a viable component of Alaska's economy and the nation's energy infrastructure.

[1] DeMarban, Alex. 2021. "Alaska Journal of Commerce." Projects on tap cementing Anchorage as cargo hub. May 19. Accessed June 19, 2021. https://www.alaskajournal.com/2021-05-19/projects-tap-cementing-anchorage-cargo-hub.

Needs and Opportunities

Needs

Commodity flow data highlight the multimodal nature of Alaska's freight transportation picture and the need for DOT&PF to plan for it as a system. **Systemic approaches** toward interoperability and intermodal connections should be addressed through the freight plan update process.

Through the freight planning process, there is a need to understand the unique freight situations and challenges posed by industry and the **military**. For example, moving heavy and oversized loads as efficiently as possible across the network will continue to be a priority. Roads and bridges along key freight corridors will need to be designed to accommodate these movements and the impacts of frequent movement on roadways, which can accelerate rutting and deterioration of the pavement, will need to be considered.

There is a need and opportunity to explore additional sources of **reliable and timely data collection, sourcing, and analysis** to improve decision-making. DOT&PF collects data related to truck size, weight, and volume through its weigh-in-motion stations and other data collection programs; however, funding challenges may make this data less accessible. Private data sources, such as vehicle probe data, may be used to enhance existing data. They depend, however, on cell phone service or internet connectivity to collect commercial vehicle information, including truck travel time reliability and truck delay/demand. Due to the remote and rural nature of some of the transportation network, cell phone and internet-based data sources are less reliable than they could be, bringing the data's completeness and usefulness into question.

Agencies such as MARAD look to state freight plans for information about freight infrastructure needs when they are queried by members of Congress. As such, the freight plan should include a portfolio of both **funded and unfunded needs**.

Opportunities

The updated freight plan could advance the development and use of **maritime performance measures**, including safety measures (e.g., fatalities, injuries, collisions, grounding rates, etc.) using Coast Guard data. This is a best practice to show trends over time.

Through the freight planning process, **freight funding opportunities** and available state and federal assistance (such as the Marine Highway Program, etc.) will be identified so community officials have a greater understanding of available assistance, and how to apply for it.

DOT&PF and the U.S. Army Corps of Engineers have co-sponsored the **Alaska Deep Draft Arctic Ports Study** to evaluate potential deepwater port locations, as the Arctic coast is experiencing increased vessel traffic. The study findings indicated Nome would be the preferred site for a

deepwater port. This port would serve as a major infrastructure asset and the northernmost port for the U.S. Coast Guard, the U.S. Navy, and the National Oceanic and Atmospheric Administration (NOAA).

There is an opportunity to address the role of **maritime technology** and the implementation strategies needed to reduce truck wait times, improve general terminal efficiencies, and mitigate any negative environmental effects of freight movement.

The State has identified several corridors as part of its network of **Critical Urban and Rural Freight Corridors (CUFCs and CRFCs)**. While some were certified by the Federal Highway Administration (FHWA), an opportunity exists for the DOT&PF to have additional mileage certified and sub-allocate funding in support of CUFCs and CRFCs.

DOT&PF should continue to monitor **emerging technologies,** that may enhance data collection efforts, freight movement and transfers between modes.

Commodity Flows and Trade

Alaska's trade patterns rely on all modes of transportation. The data for commodity flows is derived from the Freight Analysis Framework Version 5 (FAF5) produced by the Bureau of Transportation Statistics and FHWA. It integrates data from multiple sources to create a comprehensive picture of freight movement among states and major metropolitan areas by all modes of transportation.

When looking at the trade value of commodities both exported and imported, most value is being transported by air or multiple modes. When considering domestic trade, most tonnage and value is transported by truck. Crude petroleum, metallic ores, and meat/seafood continue to be top commodities that are exported and domestically transported. When looking at domestic inbound commodities, the top commodities include gasoline and fuel, along with foodstuffs.

Table 1: Shipment Tonnages by Type and Mode, 2017

		Within Alaska		Outbound from Alaska to other States		Inbound to Alaska from other states	
Trade Type	**Domestic Mode**	**Tons**	**Percent**	**Tons**	**Percent**	**Tons**	**Percent**
Domestic Only		26,581.3	72.6%	23,488.6	98.8%	2,433.0	84.9%
	Air (include truck-air)	25.3	0.1%	21.5	0.1%	119.7	4.2%
	Multiple modes & mail	1,173.7	3.2%	347.4	1.5%	1,849.5	64.5%
	Pipeline	3,321.1	9.1%	0.0	0.0%	0.0	0.0%
	Rail	2,570.2	7.0%	0.0	0.0%	0.0	0.0%
	Truck	15,857.6	43.3%	0.3	0.0%	0.2	0.0%
	Marine/Riverine	3,633.3	9.9%	23,119.4	97.2%	463.5	16.2%
Export		8,235.8	22.5%	204.5	0.9%	269.5	9.4%
Export	Air (include truck-air)	0.7	0.0%	3.1	0.0%	104.1	3.6%
Export	Multiple modes & mail	677.9	1.9%	13.6	0.1%	81.3	2.8%
Export	Other and unknown	0.4	0.0%	11.3	0.0%	0.2	0.0%
Export	Pipeline	264.5	0.7%	0.0	0.0%	0.0	0.0%
Export	Rail	5,579.1	15.2%	0.0	0.0%	0.0	0.0%
Export	Truck	673.7	1.8%	20.1	0.1%	6.0	0.2%
Export	Marine/Riverine	1,039.5	2.8%	156.3	0.7%	77.9	2.7%
Import		1,787.0	4.9%	82.1	0.3%	163.0	5.7%
	Air (include truck-air)	0.3	0.0%	34.0	0.1%	1.3	0.0%
	Multiple modes & mail	257.3	0.7%	43.4	0.2%	18.3	0.6%
	No domestic mode	147.3	0.4%	0.0	0.0%	0.0	0.0%

	Within Alaska		Outbound from Alaska to other States		Inbound to Alaska from other states	
Other and unknown	0.1	0.0%	0.1	0.0%	0.0	0.0%
Rail	386.4	1.1%	0.0	0.0%	0.0	0.0%
Truck	445.2	1.2%	0.7	0.0%	14.7	0.5%
Marine/Riverine	550.4	1.5%	3.9	0.0%	128.7	4.5%

Source: Freight Analysis Framework, version 5.0—Units in Thousands of Tons

When considering international trade by value, Alaska conducts trade frequently with several Asian countries, including South Korea and China, which rank in the top five in both imports and exports. Top import commodities from international partners by value include petroleum products as well as machinery and associated parts. When evaluating exports by value, top commodities include metallic ores, fish products, and wood products.

Total import value from international trade increased by nearly 39 percent between 2017 and 2020 while export values declined by 7 percent over the same time frame. The trade value of the top 25 commodities imported from international partners has increased by nearly 58 percent while international export values decreased by almost 4 percent. Despite the declines in export values, cargo shipped to other countries has significantly higher value compared to imports. The data in the following tables show the breakdown of value among Alaska's top international trading partners as well as by top commodities. The data show values in millions of U.S. dollars.

Table 2: International Imports to Alaska by Value ($M), 2017-20

Rank	Country	2017 Value	2018 Value	2019 Value	2020 Value	2020 % Share
	Total Alaska Imports and % Share of U.S. Total	**1,721**	**1,902**	**2,289**	**2,387**	**0.1**
	Total, Top 25 Countries and % Share of State Total	**1,683**	**1,866**	**2,225**	**2,358**	**98.8**
1	South Korea	458	555	682	836	35.0
2	Canada	456	516	717	459	19.2
3	Thailand	62	119	173	211	8.9
4	Vietnam	3	4	19	137	5.8
5	Malaysia	45	45	98	134	5.6
6	China	369	319	126	116	4.9
7	Japan	66	98	102	107	4.5
8	France	9	11	7	106	4.4
9	Mexico	20	23	59	44	1.8
10	Germany	14	34	19	41	1.7
11+	Other	183	142	224	165	6.8

Source: U.S. Census Bureau; https://www.census.gov/foreign-trade/statistics/state/data/imports/ak.html

Table 3: International Exports from Alaska, by Value ($M), 2017-20

Rank	Country	2017 Value	2018 Value	2019 Value	2020 Value	2020 % Share
	Total Alaska Exports and % Share of U.S. Total	**4,941**	**4,834**	**4,990**	**4,612**	**0.3**
	Total, Top 25 Countries and % Share of State Total	**4,729**	**4,705**	**4,878**	**4,559**	**98.9**
1	China	1,322	1,018	855	1,176	25.5
2	South Korea	675	893	1,083	810	17.6
3	Japan	812	797	679	647	14.0
4	Canada	707	654	582	499	10.8
5	Australia	159	132	354	450	9.8
6	Netherlands	181	263	350	275	6.0
7	Germany	182	209	219	146	3.2
8	France	71	83	77	78	1.7
9	Taiwan	51	26	68	78	1.7
10	Belgium	61	70	124	54	1.2
11+	Other	508	559	486	344	7.5

Source: U.S. Census Bureau; https://www.census.gov/foreign-trade/statistics/state/data/ak.html

Table 4: Top Import Commodities, by Value ($M), 2017-20

Rank	Description	2017 Value	2018 Value	2019 Value	2020 Value	2020 % Share
	Total Alaska Imports and % Share of U.S. Total	**1,721**	**1,902**	**2,289**	**2,387**	**0.1**
	Total, Top 25 Commodities and % Share of State Total	**1,199**	**1,436**	**1,537**	**1,889**	**79.1**
1	Petroleum oils, oils from bituminous minerals	610	905	876	632	26.5
2	Parts and accessories for automatic data processing	16	21	88	390	16.3
3	Machines for the reception, conversion, and transmission or regeneration of voice	71	126	201	229	9.6
4	Airplanes and other aircraft	1	15	0	139	5.8
5	Solid-state non-volatile semiconductor storage devices	128	41	40	92	3.9
6	Light oils and preparations	48	72	72	58	2.4
7	Instruments and apparatus others	1	5	23	54	2.3
8	Copper ores and concentrates	69	49	5	42	1.8
9	Processors and controllers, electronic integrated circuits	21	32	35	32	1.4
10	Photosensitive semiconductor devices, including photovoltaic cells	21	32	14	28	1.2
11	Portable digital automatic data processing machines	42	33	21	22	0.9
12	Casing and tubing for oil, gas drilling, iron, or steel	15	15	39	19	0.8

Rank	Description	2017 Value	2018 Value	2019 Value	2020 Value	2020 % Share
13	Cathode-ray oscilloscopes and cathode-ray oscillographs	0	1	4	16	0.7
14	Electronic integrated circuits	13	19	13	16	0.7
15	Parts and accessories of instruments and apparatus for measuring	1	3	8	15	0.6
16	Seats with wooden frames	2	1	1	14	0.6
17	Digital processing units	54	18	6	14	0.6
18	Parts of gas turbines	6	13	12	13	0.5
19	Memories, electronic integrated circuits	1	3	8	10	0.4
20	Airplanes and other aircraft	9	0	11	10	0.4
21	Copper sulfate	12	7	5	10	0.4
22	Taps, cocks, valves, and similar appliances for pipes	5	6	11	10	0.4
23	Turbopropellers	30	10	14	9	0.4
24	Parts for boring or sinking machinery	24	7	29	9	0.4
25	Parts and attachments, for derricks, cranes	2	2	3	8	0.3

Source: U.S. Census Bureau; https://www.census.gov/foreign-trade/statistics/state/data/imports/ak.html

Table 5: Top Export Commodities by Value ($M), 2017-20

Rank	Description	2017 Value	2018 Value	2019 Value	2020 Value	2020 % Share
	Total Alaska Exports and % Share of U.S. Total	**4,941**	**4,834**	**4,990**	**4,612**	**0.3**
	Total, Top 25 Commodities and % Share of State Total	**4,602**	**4,516**	**4,779**	**4,430**	**96.0**
1	Zinc ores and concentrates	1,231	1,214	1,036	730	15.8
2	Petroleum oils and oils from bituminous minerals	86	114	349	556	12.1
3	Lead ores and concentrates	431	373	412	381	8.3
4	Gold, nonmonetary, unwrought	7	6	270	368	8.0
5	Fish meat, frozen	385	416	439	356	7.7
6	Alaska pollock fillets	265	316	365	302	6.6
7	Fish, frozen	295	322	280	267	5.8
8	Livers, roes and milt, frozen	291	272	239	219	4.7
9	Precious metal ores and concentrates, other than silver	131	144	156	184	4.0
10	Flat fish, excluding fillets, livers, and roes	149	126	141	144	3.1
11	Sockeye salmon	181	235	185	121	2.6
12	Cod	244	203	182	115	2.5
13	Flours, meals, and pellets, of fish or of crustacea	98	97	88	103	2.2
14	Civilian aircraft, engines, and parts	60	32	42	96	2.1

Rank	Description	2017 Value	2018 Value	2019 Value	2020 Value	2020 % Share
15	Pacific salmon	315	159	193	92	2.0
16	Wood, fir, and spruce	0	15	44	69	1.5
17	Copper ores and concentrates	1	43	33	66	1.4
18	Crabs, including in shell, cooked by steaming	55	51	56	61	1.3
19	Alaska pollock, frozen	99	88	68	51	1.1
20	Other coniferous wood	0	6	46	51	1.1
21	Petroleum oils, oils from bituminous minerals	205	200	99	45	1.0
22	Alaska pollock, frozen, except filets	9	15	10	18	0.4
23	Pacific salmon, Atlantic salmon, Danube salmon fillets, frozen	30	31	15	14	0.3
24	Fish fats and oils and their fractions	13	18	19	11	0.2
25	Herrings, frozen	22	19	13	11	0.2

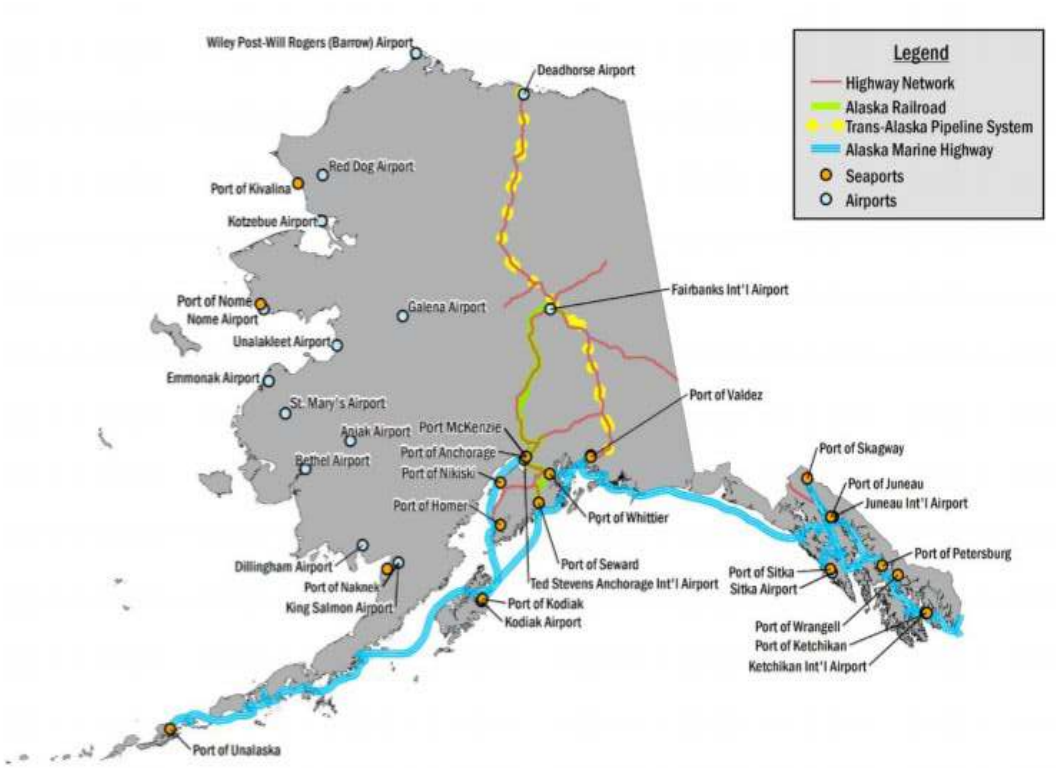
Source: U.S. Census Bureau; https://www.census.gov/foreign-trade/statistics/state/data/ak.html

Freight Infrastructure

Each freight transportation mode has a specific set of freight carriers (trucking companies, airlines, vessel operators, railroads, and pipeline owners) that use a variety of infrastructure assets. Some of these assets are unique to each mode, such as highways, waterways, railroads, and pipelines. Some, known as intermodal facilities, are designed to bring together different modes; these include ports (linking water with trucks, rail, and/or pipelines), airports (linking air with trucks, and sometimes pipelines), and rail terminals (linking rail and trucks). Different networks and facilities have different owners, which may be public or private; and the vehicles and vessels that operate over these networks and through these facilities are both publicly and privately owned.

In 2016, DOT&PF developed a statewide multimodal freight network as part of its Long-Range Transportation Plan (LRTP) freight element that serves a complementary, but separate purpose to the National Highway Freight Network (NHFN) (shown in Figure 1)

Figure 1. National Highway Freight Network



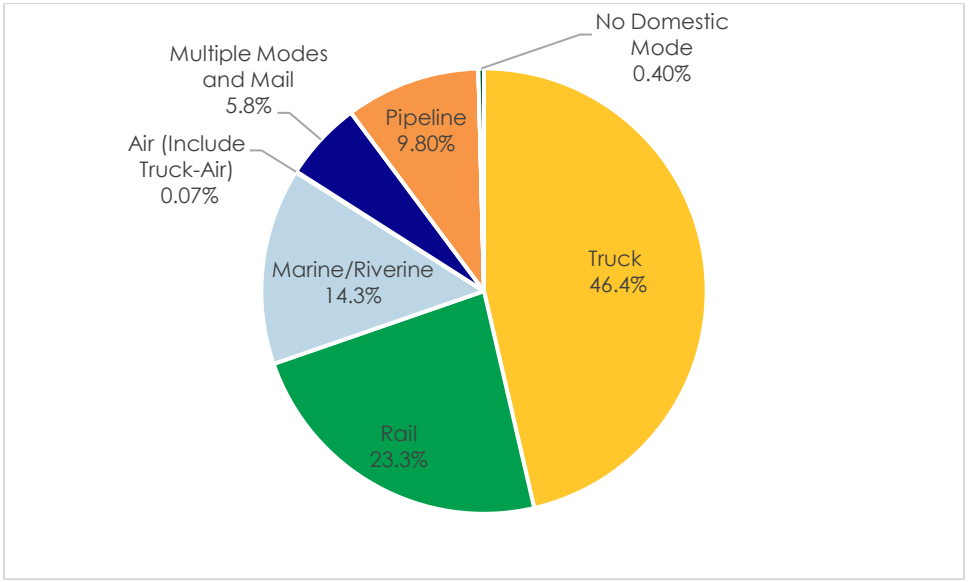
This systemic approach was used to maintain connectivity across all freight modes due to their critical role in the economy and quality of life for residents. The network is regularly monitored for performance and efficiency to verify all regions are adequately served—not only by national and regional markets, but also by last-mile and local connections. It is intended to be revisited and revised as freight needs change over time. The statewide network includes the following components and is described in more detail in the following section:

- Seaports
- Airports
- Highways
- Alaska Marine Highway, navigable Coastal Corridors, navigable Inland Waterways
- Alaska Railroad
- Alaska Pipeline

When considering freight tonnages by mode, trucking accounts for nearly half the weight of domestic freight movement and rail transports nearly a quarter of the total weight (Figure 2), according to 2017 data from FAF5, the latest version available. Freight movement by total value shows trucking carrying the highest percentage at 54 percent followed by marine/riverine at 18 percent (Figure 3). Marine/riverine, or "water," includes shallow draft shipments (barges) along with deep-draft, Great Lakes, and intra-port shipments; however, the data cannot be separated out by shipment type at this time. Additional key findings include:

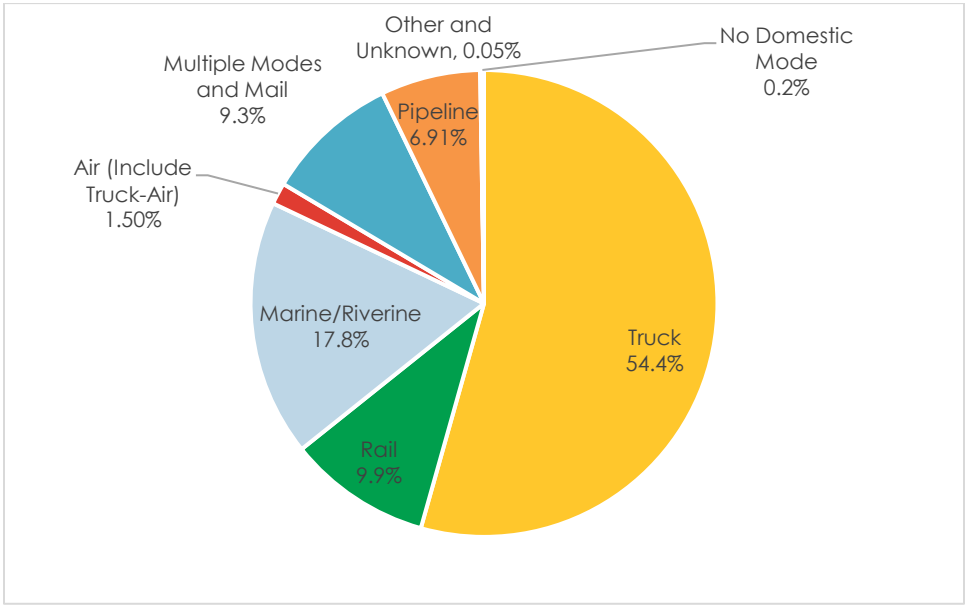
- **Air freight** accounted for only 0.07 percent of tonnage and 1.5 percent by total value.
- **Rail** moved nearly a quarter of the domestic freight by tonnage and 10 percent by value.
- **Multiple modes and mail** comprised of nearly 6 percent total tonnage and 9.3 percent by value. Shipments reported as multiple modes can include anything from containerized cargo to coal moving from mine to railhead by truck and rail to harbor. The mail component recognizes that shippers who use parcel delivery services typically do not know what modes were involved after the shipment is picked up. The mail component also includes U.S. Parcel Service and couriers (capped at 150lbs).
- **Pipelines** moved 9.8 percent total weight and 6.9 percent total value. These numbers account for mostly crude petroleum, gasoline, and other fuel oil products. All pipeline shipments reported here remain entirely within the state of Alaska, with no inbound or outbound moves.

Figure 1: Percentage of Domestic In-State Freight by Mode, by Tonnage (KTons), 2017



Source: FHWA FAF5

Figure 2: Percentage of Domestic In-State Freight by Mode, By Value (M$), 2017



Source: FHWA FAF5

Marine/Riverine

COMMODITY FLOWS BY MARINE/RIVERINE MODES

The following figures summarize key information regarding marine/riverine as a domestic mode of freight movement.

Key Highlights

- The primary commodity by tonnage is gasoline, followed by crude petroleum. When ranked by value, gasoline is still a leading commodity, ranking second behind meat/seafood products.
- Other leading commodities by tonnage include coal and fuel oils. Leading commodities by value include meat/seafood, coal, and mixed freight.
- Domestic outbound movements by water to California rank highest in overall tonnage and value. These shipments include crude petroleum products. These values are followed by freight movements by water that originate and end within Alaska. Top domestic partners sending inbound shipments by water include Washington, Oregon, and Texas, with most inbound tonnage consisting of gasoline, mixed freight, or smaller shipments of other commodities, including agricultural products, paper articles, and chemical products. Figure 4 displays commodity flows by tonnage, while Figure 5 displays it by value.

MARAD

The United States Maritime Administration (MARAD) is an agency of the U.S. Department of Transportation (USDOT). As DOT&PF launched the update of its freight plan, it convened a meeting with MARAD representatives to discuss opportunities for building off the experiences of the previous freight plan.

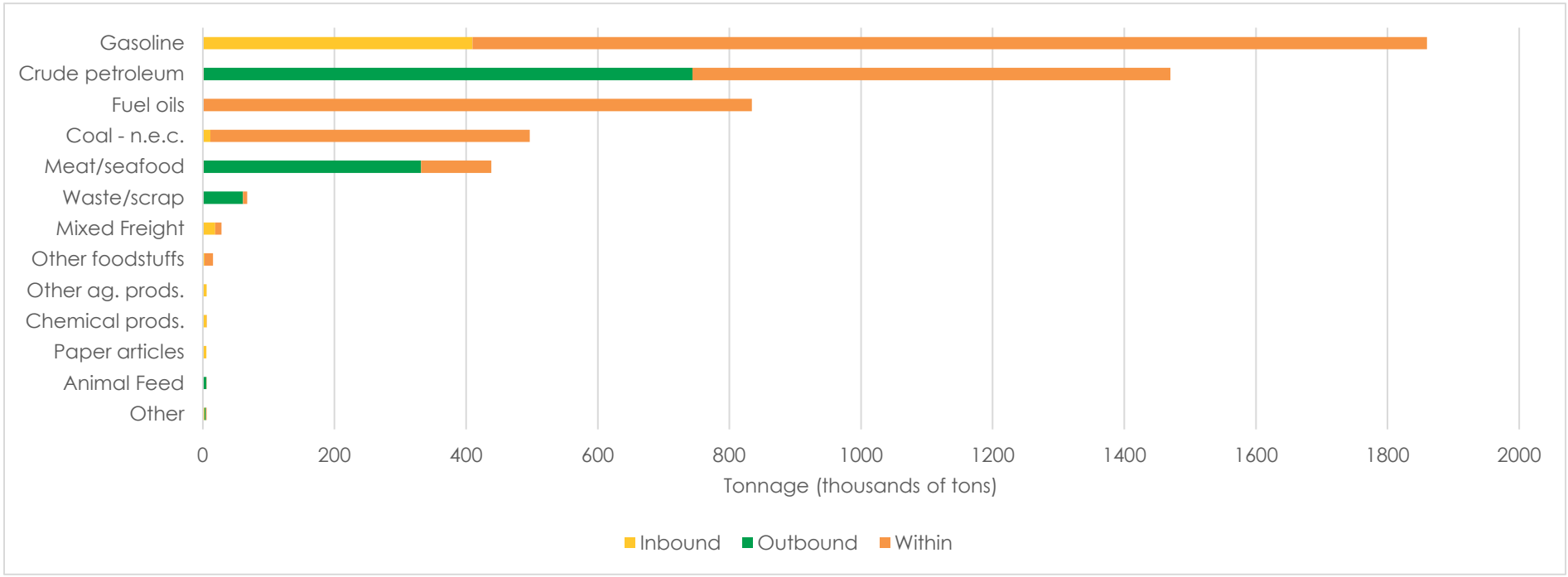
MARAD ranked Alaska's previous freight plan among the top 10 nationally for how it addressed topics of concern, including multimodal connections, intermodal infrastructure, and maritime markets, to name a few. The plan was also lauded for its use of graphs and maps of major domestic maritime shipping partners, as well as measuring the top import and export commodities by tonnage and value as best practices.

Through this engagement with MARAD, the DOT&PF is committed to focusing greater attention to the following areas through the update of its statewide freight plan to potentially leverage more funding:

The importance of marine highways—Alaska has the M-A1, the M-5, and the Alaska Marine Highway System, but greater attention will be given to the America's Marine Highway System.

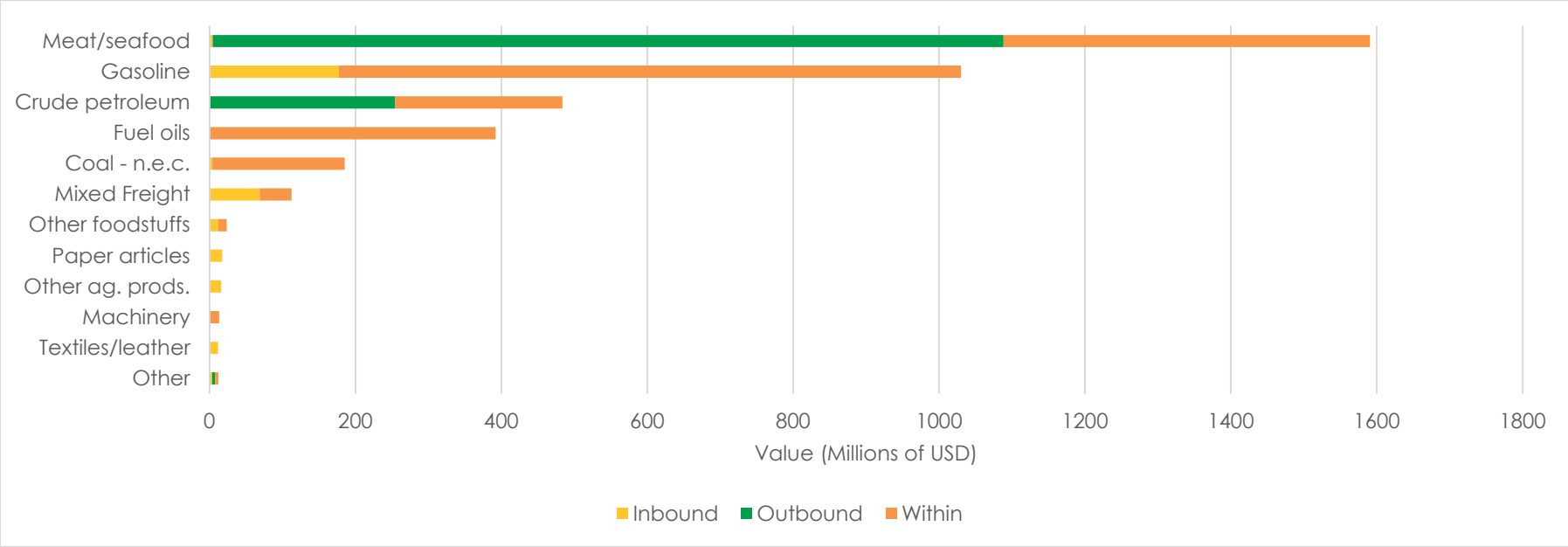
Focus of the Freight Investment Plan (FIP)—The need to document port projects "inside the gate" with project descriptions in order to locate the projects and determine if they would be eligible for National Highway Freight Program (NHFP) set-aside funding for freight intermodal or freight rail projects.

Figure 3: Domestic Marine/Riverine Mode Tonnage (Ktons), 2017



Source: Freight Analysis Framework, version 5.0

Figure 4: Domestic Marine/Riverine Mode Value ($M), 2017



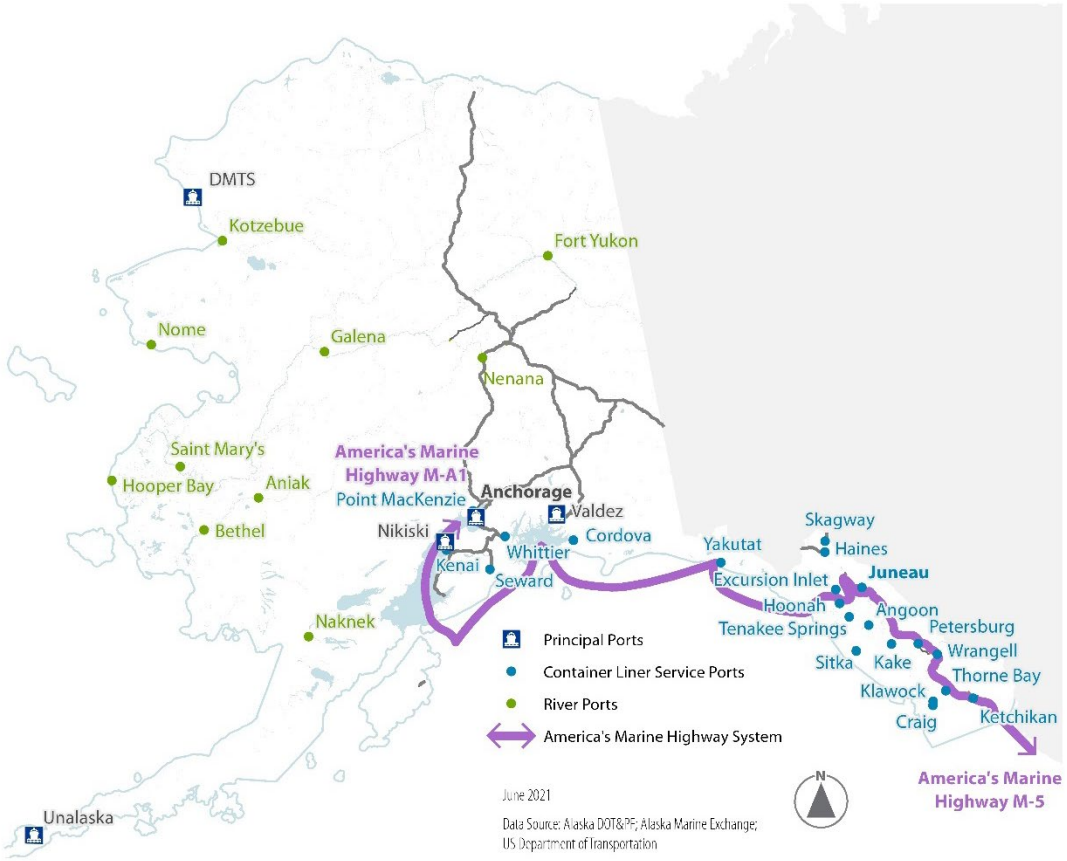
Source: Freight Analysis Framework, version 5.0

Table 6: Domestic Marine/Riverine Mode Origins and Destinations, 2017

Direction	Origin	Destination	Tonnage (Ktons)	Value ($M)
Outbound	Alaska	California	19,241.3	6,071.0
Within	Alaska	Alaska	3,633.3	2,230.5
Outbound	Alaska	Washington	3,204.2	1,615.2
Outbound	Alaska	Hawaii	673.9	212.6
Inbound	Washington	Alaska	455.4	276.9
Inbound	Oregon	Alaska	6.9	37.2
Inbound	Texas	Alaska	1.2	0.4

Source: Freight Analysis Framework, version 5.0

Figure 5: Alaska Port System



ALASKAN PORTS

The previous LRTP reported 476 ports and harbors serving communities, fishing fleets, and other commercial and recreational purposes. Of these, 58 are used for commercial purposes. Of the 58 commercial ports, five are listed by the U.S. Department of Transportation (USDOT) among the top 150 busiest ports in the nation by volume (short tons) of products shipped both inbound and outbound.[i] The transportation assessment and freight assessment analyze movement of goods through Alaska's ports, however, it should be noted the DOT&PF does not own or operate any port facilities. Nearly all Alaska's ports are either privately owned or owned and operated by local municipalities. Alaska's ports are intermodal facilities that interact with DOT&PF transportation facilities and impact the flow of goods and services by various transportation modes. Figure 6 shows the state's commercial container liner service ports, river ports, and principal ports.

The Port of Valdez has a dominant share of cargo tonnage for waterborne freight; however, each of Alaska's marine ports plays a critical role in serving local and regional transportation needs. Major port locations and tonnages are shown in Table 7.

Table 7: Alaska Port Tonnages, 2019

Name	Foreign Imports	Foreign Exports	Canadian Imports	Canadian Exports	Domestic Coastwise	Internal and Local	Total
Valdez	-	919,976	-	-	24,244,486	12,273	**25,176,735**
Anchorage	1,076,533	15,909	28,464	-	1,707,511	-	**2,828,417**
DeLong Mountain Transportation System—DMTS	37,176	1,348,750	34,580	-	1,959	1,348,149	**2,770,614**
Clarence Strait		120,136			488,870	963,202	**1,572,208**
Tongass Narrows	36	120,136	91,260	-	28,804	1,250,534	**1,490,770**
Sumner Strait	-	-	-	-	492,239	930,769	**1,423,008**
Wrangell Narrows	-	-	-	-	17,141	1,201,959	**1,219,100**
Frederick Sound				28,674	31,433	1,005,415	**1,065,522**
Chatham Strait	-	67,784	-	28,674	511,789	426,070	**1,034,317**
Revillagigedo Channel	-	120,172	-	109,959	22,159	778,845	**1,031,135**
Ketchikan Harbor	36	-	109,959	-	7,429	817,909	**935,333**
Stephens Passage	-	-	-	28,674	27,822	823,070	**879,566**
Juneau Harbor	-	-	28,674	-	23,992	611,536	**664,202**
Whittier Harbor	-	-	19,725	-	578,917	53,224	**651,866**
Icy Strait	-	77,450	-	5,889	487,548	51,253	**622,140**
Petersburg Harbor	-	-	-	-	2,903	494,178	**497,081**

Name	Foreign Imports	Foreign Exports	Canadian Imports	Canadian Exports	Domestic Coastwise	Internal and Local	Total
Lynn Canal	-	20,439	-	5,889	16,097	410,342	**452,767**
Homer	155,808	-	-	-	7,370	34,614	**197,792**
Nome	57,184	-	29,506	-	79,922	23,214	**189,826**
Sergius and Whitestone Narrows	-	10,773	-	-	23,616	130,361	**164,750**
Skagway Harbor	-	20,439	-	-	3,983	137,288	**161,710**
Kodiak Harbor	-	10,018	-	-	145,995	-	**156,013**
Seward Harbor	11,037	-	32	-	76,122	-	**87,191**
Valdez Harbor (Small Boat)	-	-	-	-	8,509	618	**9,127**
All Other	473,740	1,058,337	364,181	-	30,998,655	4,395,820	**37,290,733**
Totals	**1,337,810**	**2,851,982**	**342,200**	**207,759**	**29,036,616**	**11,504,823**	**45,281,190**

Source: U.S. Army Corps of Engineers Waterborne Commerce Statistics Center, 2019

*The DMTS supports the Red Dog Mine, which is near the village of Kivalina. The Bureau of Transportation Statistics and the U.S. Army Corps of Engineers refer to the port facility as Kivalina.

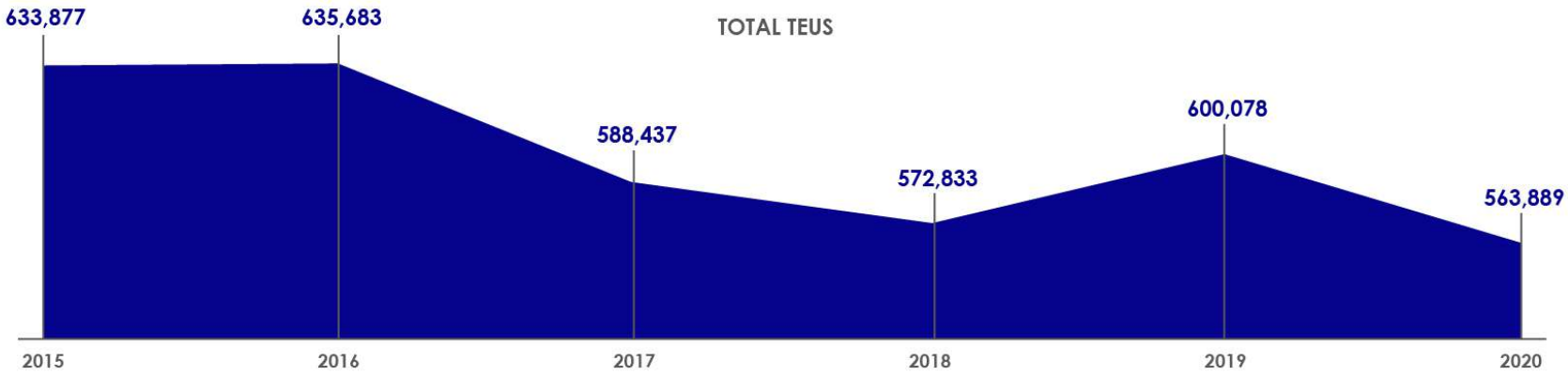
A major challenge facing ports is decreasing shipping volumes and total number of 20-foot-equivalent units (TEUs). Table 8 shows the trends in overall volumes for the state since 2015. Figure 7 shows this trend from 2015 to 2020.

Table 8: Overall Shipping Volumes, 2015-20

Name	2015	2016	2017	2018	2019
Anchorage	3,540,605	3,215,121	3,297,827	3,252,349	2,828,417
Juneau	864,999	771,140	659,168	671,023	664,202
Ketchikan	928,095	824,416	851,802	870,290	935,333
DeLong Mountain Transportation System—DMTS	3,146,813	2,850,810	2,537,253	1,359,589	2,770,614
Nikiski	5,156,956	4,724,918	4,668,736	4,173,279	3,645,972
Unalaska	1,651,306	1,688,215	1,850,870	1,652,281	1,436,905
Valdez	26,747,395	27,652,208	27,971,737	25,807,750	25,176,735
Total Tons	42,306,169	41,726,828	41,178,225	37,115,538	35,858,643

Source: Bureau of Transportation Statistics – Principal Ports (Total Tons) and
U.S. Army Corps of Engineers Waterborne Commerce Statistics Center (2017-2019)

Figure 6: Total TEUs



Source: Northwest Seaport Alliance, 2021 [ii]

One of the causes for the decrease in total tonnage is related to the reduction in oil production on the North Slope and petroleum products shipped from Valdez and Nikiski Ports. When the TAPS was completed in 1977, 610,408 barrels of oil per day were shipped. Peak TAPS throughput reached over 2 million barrels per day in 1988. 2020 saw the lowest level throughput recorded at 480,199 barrels per day. Alyeska Pipeline company reports roughly 20 tankers are berthed and filled from the Valdez Marine Terminal each month, but as the trend shows, the number of tons moved continues to ebb. [iii]

PORT OF VALDEZ

The Port of Valdez plays an important role in the mining and seafood industry. The port remains ice-free year round and the state's highway network connects Valdez to Interior communities and resources. In addition, the Port of Valdez is close to oil and gas activity and Interior mines, communities, and military bases.

As the southern terminus of the TAPS and an oil storage/transfer marine terminal, the Port of Valdez handles 92 percent of the crude petroleum exports. Crude petroleum exports account for 43 percent of all exports and imports by value and 65 percent by tonnage in the state.

In 2019, petroleum and petroleum products accounted for 99 percent of total commodity tonnages handled at the port. Tonnages have slightly decreased over the past five years, dropping from 26.7 million in 2015 to 25.1 million in 2019, shown in Table 9. The TAPS moved an average 480,199 barrels of crude oil per day in 2020. This represented an all-time low for TAPS since it began moving oil in 1977. This crude oil is stored at the Valdez Marine Terminal (VMT). The VMT is owned and operated by the Alyeska Pipeline Service Company and includes 18 crude oil tanks, each with a capacity of 510,000 barrels. Fourteen of these tanks are in service, giving the VMT a storage capacity of over 7 million barrels. Crude oil is transferred to oil tanker ships that moor at the VMT. About 20 oil tankers per month transfer crude oil to refineries in California, Washington, and Alaska.[2] Table 7 shows nearly 24 million tons of oil moved by ship in 2019. Table 8 shows that approximately 3.6 million tons of crude oil made its way by ship to the Port of Nikiski, where it was offloaded and moved by pipeline to the Marathon oil refinery in Nikiski. The balance of the 24 million barrels was transported by ship to California and Washington state, the bulk of that cargo going to California. Table 9 provides more information on trends in commodity flow at the Port of Valdez.

Table 9: Port of Valdez Tonnages, 2015-2019

All Commodities	2015	2016	2017	2018	2019
Petroleum and Petroleum Products	26,715,073	27,644,008	27,964,933	25,799,519	25,165,733
Food and Farm Products	18,599	3,679	2,872	3,657	7,269
Waste Material; Garbage, Landfill, Sewage Sludge, Wastewater	1,775	2,084	1,269	2,779	2,209
All Manufactured Equipment, Machinery and Products	8,410	1,804	1,985	1,740	1,279
Primary Manufactured Goods	2,133	419	635	42	183
Crude Materials, Inedible Except Fuels	424	164	42	12	61
Chemicals and Related Products	778	50	1	1	1
Total	**26,747,192**	**27,652,208**	**27,971,737**	**25,807,750**	**25,176,735**

Source: U.S. Army Corps of Engineers Waterborne Commerce Statistics Center, 2015-2019

[2] www.alyeska-pipe.com/TAPS/ValdezTerminalAndTankers/Tanker

PORT OF ALASKA

The Municipality of Anchorage owns the Port of Alaska.[iv] It is listed by the Bureau of Transportation Statistics as one of the top 25 container shipping ports in the nation, handling 388,000 TEUs in 2019. The Port of Alaska is a true multimodal port connecting to the Alaska Railroad; the Ted Stevens Anchorage International Airport (ANC) and the roadway network. Finally, it is a Department of Defense commercial strategic seaport supporting all four major U.S. Department of Defense installations in the state. The Port of Alaska handles half of all inbound fuel and freight, which is distributed statewide and consumed by 90 percent of the population. It is the state's main cargo terminal and is located at the state's business and population center. According to the Port's website, 60 percent of all residents live within a two-hour drive of the port and 75 percent of the state's population lives along the road system.[3]

Not only does the Port of Alaska serve as the state's major intermodal freight hub, it also administers the Anchorage Foreign Trade Zone (FTZ). The National Association of Foreign-Trade Zones (NAFTZ) defines a FTZ as "secured, designated locations around the United States in or near a U.S. Customs Port of Entry where foreign and domestic merchandise is generally considered to be in international commerce and outside of U.S. Customs territory."[4] The FTZ encompasses the Port of Alaska, ANC, and other privately-owned locations in Anchorage.

In the last six years, overall freight tonnage at the Port of Alaska has increased by nearly a quarter; however, it still accounts for 75 percent of all non-petroleum marine cargo shipped into Alaska, exclusive of Southeast Alaska (which is served primarily by barges directly from Puget Sound). Table 10 provides more information by commodity type.

Table 10: Port of Alaska Tonnages, 2015-2020

Commodities Across Facility	2015	2016	2017	2018	2019	2020
Freight NOS	-	4,451	5,876	2,199	1,167	689
Dry Bulk Goods	126,737	122,006	97,223	105,326	109,956	101,853
Petroleum, NOS (vessel fueling)	5,013	893	1,467	129,828	222,536	58,728
Vans/Flats/Containers	1,681,223	1,582,951	1,592,473	1,631,303	1,655,612	1,642,547

[3] https://www.portofalaska.com/

[4] NAFTZ, FTZ Basics and Benefits, accessed 4/11/2021: https://www.naftz.org/ftz-resources/ftz-basics-benefits/

Commodities Across Facility	2015	2016	2017	2018	2019	2020
Petroleum, shoreside	368,294	368,708	471,717	505,980	802,093	902,712
Petroleum, bulk - dockside	1,592,317	1,419,162	1,329,089	1,574,029	1,474,399	1,997,845
Totals	**3,773,584**	**3,498,171**	**3,497,845**	**3,948,665**	**4,265,763**	**4,704,374**

Source: Port of Alaska at Anchorage Tonnage Report, 2011-2020

DELONG MOUNTAIN TRANSPORTATION SYSTEM (DMTS)

The DeLong Mountain Transportation System (DMTS) was constructed as a "public" facility/system to support the transport of large-scale shipments from major mining facilities in northern Alaska. The DMTS consists of a shallow water barge dock on the Chukchi Sea shore, and a 52- mile haul road to transport fuel and other bulk supplies to the Red Dog mine/mill and the transport of concentrates from the mine/mill to the port. Currently, the facility is used only used by Teck Alaska Incorporated to support the Red Dog Mine, one of the world's largest zinc mines, and the Northwest Arctic Borough's largest industry.[5]

INLAND PORTS

While the vast majority of waterborne freight tonnage is associated with deep-water coastal ports, Alaska also has the most inland waterway mileage of any state, with ports on the Yukon, Tanana, and other rivers. These smaller inland ports are vital links for many local communities.

Port of Bethel

The Port of Bethel is situated on the west bank of the Kuskokwim River approximately 80 nautical miles (nm) from its mouth and 58nm above Eek Island. The port is the receiving and transshipment center for petroleum products and barged freight for the Yukon-Kuskokwim Delta and accommodated ocean going vessels during the open season (ice free months). A considerable amount of equipment is transshipped into barges and river steamers for distribution to communities further upstream. The port handles approximately 95,000 tons of cargo annually.

The cargo dock is a nine-acre facility used for offloading, storing and distributing cargo destined for Bethel and transshipping to other communities in western and northern Alaska. Because the Yukon-Kuskokwim Delta is not connected to any other community by road or rail, this facility is critical. Types of freight shipped includes construction equipment, construction material (much of it gravel for roads and

[5] http://www.aidea.org/Portals/0/PDF%20Files/PFS_DMTS.pdf

airport projects), fuel, vehicles, fishing skiffs/boats, fishing supplies, calcium chloride for dust control, and recreational equipment (snow machines and 4-wheelers). The Kuskokwim area commercial salmon industry also relies on the port for most of its infrastructure and processing requirements.

Port of Dillingham

The Port of Dillingham is located in the southwest region near the mouth of the Wood River, where it flows into Nushagak Bay. The port is owned by the City of Dillingham and serves commercial, freight, and recreational uses—operating a dock, a boat harbor, and several boat ramp facilities. The port's harbor is the only protected harbor in the Bristol Bay watershed.

The port serves as a subregional hub for intermodal freight movement and is a major exporter of seafood products. In 2019, it handled nearly 25 million tons of freight with a quarter of this traffic carrying fish. The facility collects regional cargo to send to the Port of Unalaska/Dutch Harbor for national and international export and distributes inbound goods to the small communities in the Southwest. The Port of Dillingham is located approximately two miles from the Dillingham Airport, which provides both passenger and freight cargo services to ANC.

Port of Nenana

The Port of Nenana is a publicly-owned, riverine port on the Tanana and Yukon Rivers. Located near the Alaska Railroad and Parks Highway, the port functions as an intermodal connection. It received supplies and fuel by road or rail and transfers the cargo to barges for delivery to communities along the river in the spring and summer months. Cargo movement by barge is restricted in the winter when the waters freeze, shifting the demand for freight onto other modes.

AMERICA'S MARINE HIGHWAY SYSTEM

The Marine Highway program was established by the federal Energy Independence and Security Act of 2007 to reduce landside congestion through the designation of Marine Highway Routes. There are 25 such marine highway routes serving the United States, including two that serve Alaska: the M-5 and the M-A1.* The purpose of the program is to expand the use of inland, intracoastal, and coastal waterways for the transportation of freight and passengers to mitigate landside congestion, reduce greenhouse gas emissions per ton-mile of freight moved, and other objectives.

**The National Defense Authorization Act of 2016 expanded the definition of short sea shipping to include freight vehicles carried aboard commuter ferry boats and cargo shipped in discrete units—or packages that are handled individually, palletized or unitized specifically for transport.*

ALASKA MARINE HIGHWAY SYSTEM (AMHS)

The Alaska Marine Highway System (AMHS) provides an important freight component for communities in Southeast and Southwest Alaska that are not on the road system. The AMHS supports businesses that ship heavy and bulk goods that are perishable and time constrained, such as produce, seafood, frozen food, and construction supplied and equipment. AMHS also supports the seafood industry by providing an efficient method of moving fresh fish from local communities to the road system in order to speed product to market. Seafood suppliers in Juneau also use the AMHS to ship significant amounts of seafood to Skagway, Prince Rupert, and Bellingham. In the Southwest, fishing fleets rely on the AMHS to ship much of their equipment. AMHS shipping rates are set with sensitivity to private sector shippers, whose operations do not benefit from state funding; however, ferries have proven to move freight faster than barges and at a much lower cost than shipping freight by air.[6]

[6] McDowell Group, The Economic Impacts of the Alaska Marine Highway System, 2016

Air

Many communities can only be reached by air (82 percent of Alaska's communities are located off the road network). This makes aviation services essential. All communities rely on aviation year-round for the delivery of perishable goods and the U.S. Mail, especially the Yukon-Kuskokwim Delta and Northwest and Arctic. DOT&PF owns and operates 237 airports, with most of these facilities falling within the state's Rural Airport System. Among these airports, 49 have paved runways.

COMMODITY FLOWS BY AIR

Figure 8 and Figure 9 summarize key data on aviation as a domestic mode of freight transport. The data show purely domestic movements, which include those within Alaska as well as inbound and outbound. These graphics also include the domestic stretch of international trips, where the international mode could be air, water, or truck.[7]

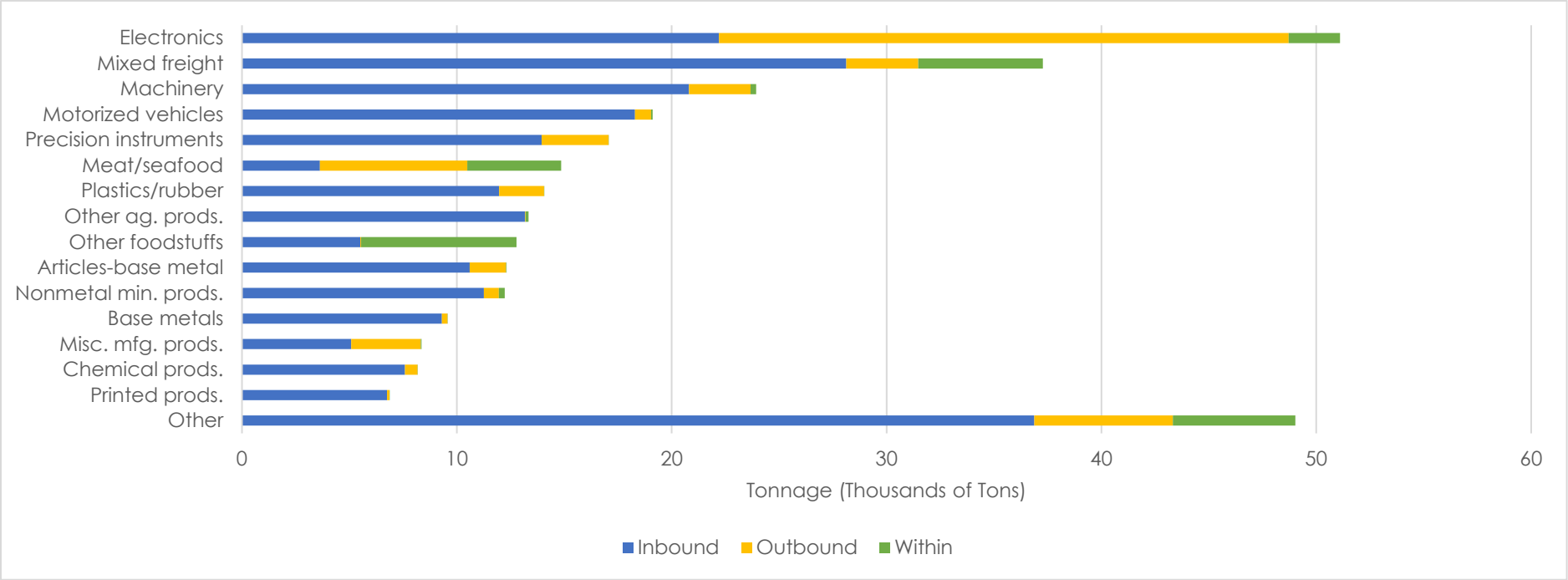
Key Highlights:

- Electronics continues to be the leading commodity in both tonnage and value; however, most of these trips are passing through Anchorage, with a smaller share remaining within the state for use.
- Other leading commodities by tonnage include machinery, motorized vehicles, precision instruments, meat/seafood, rubber and plastics, and other agricultural products and foodstuffs. Movements of these commodities are mostly inbound, either to connect to the next leg of a trip or for use by Alaska's communities and industries.
- Limitations of the landside transportation system, makes air the most viable way of moving essential supplies, including pharmaceuticals and other temperature-sensitive medical goods and solutions, to the state's rural communities.
- The Alaska Bypass Mail system allows for palletized goods, largely foodstuffs, to reach rural communities by air using a hub and spoke network of airports. The Alaska Bypass Program and Essential AirService Program are critical to providing fresh food and basic supplies to communities that could not otherwise afford to ship goods and higher air freight prices. They also support more frequent air passenger service to these communities at lowered fares.
- Leading domestic origin and destination pairings by tonnage show heavy inbound traffic from Washington into Alaska, followed by movements within Alaska (Table 11). Other leading movements by tonnage include inbound and outbound shipments from California

[7] As this report was being drafted (spring 2021), specific directional information (enter, exit, pass-through, etc.) was unavailable from FAF5, but will be available as USDOT rolls out the data throughout the coming year.

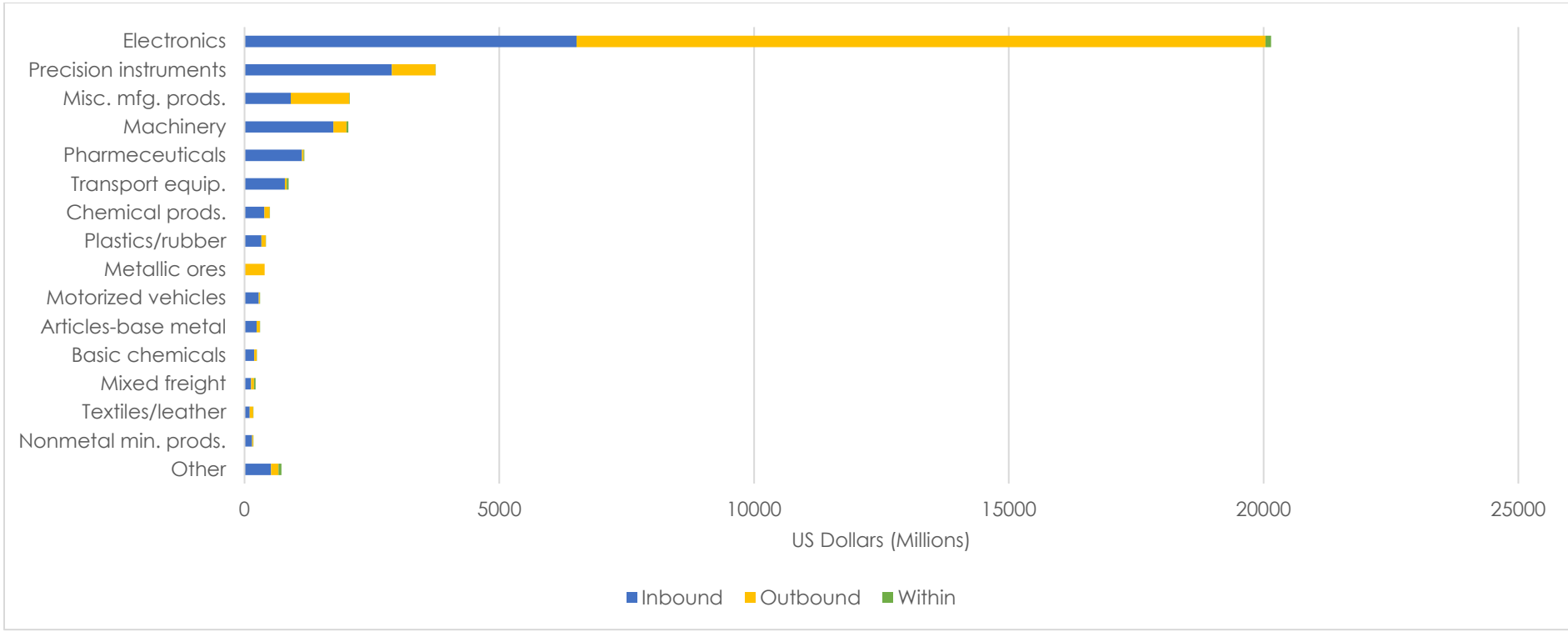
and outbound movements to New York. When considering origin and destination pairings by value, outbound movements from Alaska to California lead with the highest amount (Table 12). California and Texas are leading domestic origins and destinations by value.

Figure 7: Domestic Air Mode Tonnage by Commodity (Ktons), 2017



Source: Freight Analysis Framework, version 5.0

Figure 8: Domestic Air Mode Value by Commodity ($M), 2017



Source: Freight Analysis Framework, version 5.0

Table 11: Domestic Air Mode Origins and Destinations by Tonnage, 2017

Direction	Origin	Destination	Tonnage (Ktons)
Inbound	Washington	Alaska	69.3879
Within	Alaska	Alaska	26.3346
Inbound	California	Alaska	22.7613
Outbound	Alaska	New York	11.6153
Outbound	Alaska	California	11.1498

Table 12: Domestic Air Mode Origins and Destinations by Value, 2017

Direction	Origin	Destination	Value (M$)
Outbound	Alaska	California	7,410.3135
Outbound	Alaska	Texas	2,304.8862
Inbound	California	Alaska	2,053.1494
Inbound	Texas	Alaska	1,711.9885
Outbound	Alaska	Idaho	1,504.404

Source: FHWA FAF5

TED STEVENS ANCHORAGE AIRPORT (ANC)

ANC is Alaska's largest airport, and is owned and operated by DOT&PF. It is an essential gateway for freight and passenger movement both within and out of Alaska. ANC has been ranked in the top ten busiest airports in the world for landed cargo weight for over a decade and has been the second busiest cargo airport in the United States, behind Memphis International Airport, home of FedEx.

ANC's standing as a world-leading air cargo airport is in part due to special cargo transfer rights afforded to the airport by U.S. law through USDOT. In 1994, ANC was granted the following transfer rights:

- Interline to/from non-U.S. carriers
- Interline to/from U.S. carriers
- Transfer on-line between flights
- Change of gauge/"starburst" service
- Change of gauge/"starburst" service
- Commingling of U.S. and non-U.S. traffic on the same flight

In 1999 USDOT expanded transfer rights further by allowing expanded air services at Alaska international airports:

- All foreign air carriers which held or could subsequently receive effective Department authority, were granted the right to serve any point or points in Alaska, and to coterminalize points in Alaska with other U.S. points for which they held Department authority (excluding carriers from the UK).
- Foreign air carriers were invited to apply for exemption authority to serve additional U.S. points on an extrabilateral basis, where those additional points would be served only on flights also serving Alaska.

In January 2004, a new law allowed the expansion of air cargo transfer rights at both ANC and FAI and permitted air cargo to or from a foreign country to be transferred to another airline and continue to be considered as one contiguous international trip. If allowed the carriage of international origin or destination cargo or foreign air carrier aircraft between Alaska and other points in the United States in the

course of continuing international transportation.[8] Air carriers who access the two Anchorage International Airport System (AIAS) airports are offered many benefits because of these cargo transfer rights, including lower operating cost and higher aircraft utilization.

ANC is also strategically located along the air routes from Asia to North America, making it a prime location for technical fuel stops between Asian manufacturing nations and North American consumers. Cargo air carriers have determined the exact amount of fuel needed to reach Anchorage from Asian departure airports in countries like China, Taiwan, Japan, and South Korea. This allows them to load freighter aircraft like the Boeing 747-800 with maximum revenue-generating cargo.

According to the FAA's T-100 series data, ANC handled 3,412,721 tons of cargo in 2019, which is 92 percent of all enplaned and deplaned freight in the state for that year. Nearly 73 percent of international cargo is considered transit cargo—cargo that lands and takes off again without being unloaded and reloaded.[9] This pass-through cargo is associated with international shipments that stop in Alaska only to refuel. According to the DOT&PF's Economic Contribution of the Aviation Industry, ANC maintains busy cargo operations year round, with lows commonly observed around February.

From the T-100 data, the top freight airlines at ANC were:

- United Parcel Service (UPS) (606,572 tons).
- FedEx (336,884 tons).
- Atlas Air (298,949 tons).
- Polar Air Cargo Airways (195,629 tons).
- Alaska Airlines (39,393 tons).

Of these, Alaska Airlines and a set of smaller airlines (Everts Air Cargo, Northern Air Cargo, and Lynden Air Cargo, among others) provide air freight service within Alaska.

[8] Wassel, Trudy. 2018. "New Airline Handbook." Alaska Department of Transportation and Public Facilities Ted Stevens Anchorage International Airport. Alaska International Airport System. July. Accessed June 19, 2021. http://www.dot.state.ak.us/anc/business/airServiceDevelopment/AIAS-New-Airline-Handbook-Revised-July-2018.pdf.

[9] Economic Contribution of the Aviation Industry ANC Brochure, 2019. https://www.alaskaasp.com/media/3199/aasp_brochure--anc_final.pdf

The COVID-19 pandemic enhanced ANC's position as a global cargo airport. ANC was the busiest airport in the world for a short period in April 2020.10 Cargo volumes at ANC throughout 2020 caused the airport to become the fourth largest in the world for landed cargo weight, registering a 15 percent increase in total air cargo tonnage over 2019. More than 3.48 million tons of air cargo landed at ANC in 2020, a 16 percent increase over the record-setting volumes in 2019. ANC is also responsible for 1 in 10 jobs in the Anchorage area, totaling approximately 22,000 jobs (15,500 related to the airport and an additional 6,500 off site in the community).[11]

FAIRBANKS INTERNATIONAL AIRPORT (FAI)

FAI, Alaska's second-largest airport, serves as the regional aviation hub for Alaska's interior and as the alternate airport for ANC. The airport serves 50 communities in Interior Alaska and handles cargo from several domestic and international carriers. In the Fairbanks area, FAI is responsible for 1 in 20 jobs for a total of 4,300 jobs in Fairbanks.[12] Approximately 3,000 of these jobs are on-site, related to the airport, while an additional 1,300 are created within the community through consumer spending.[13]

[10] Bloom, Laura Begley. 2020. "forbes.com." You Won't Believe Where The World's Busiest Airport Is Right Now. Forbes Women. May 01. Accessed 06 19, 2021. https://www.forbes.com/sites/laurabegleybloom/2020/05/01/busiest-airport-in-world-anchorage-alaska/?sh=2dcd81ea6731.

[11] Economic Contribution of the Aviation Industry ANC Brochure, 2019. https://www.alaskaasp.com/media/3199/aasp_brochure--anc_final.pdf

[12] Alaska Aviation System Plan, 2019. https://www.alaskaasp.com/media/3196/economic_cont_exec_sum_final.pdf

[13] Economic Contribution of the Aviation Industry in Alaska, 2019; https://www.alaskaasp.com/media/3202/aasp_brochure--fai_final.pdf

JUNEAU INTERNATIONAL AIRPORT

Juneau International Airport (JNU) is owned by the City and Borough of Juneau. While not a part of the AIAS and not a handler of international cargo, it is a critical transportation link as Juneau does not have roadways that connect to other parts of Alaska or the rest of North America. All goods are transported in and out of Juneau by water or air.

According to the FAA's T-100 data, this domestic air cargo hub handled 21,805 tons of freight and mail in 2019. Air cargo facilities are operated by several airlines, including Alaska, Alaska Central Express, and Empire Airlines. As reported in the 2019 JNU Airport Sustainability Master Plan, Alaska Airlines transports freight as "belly cargo" (carried on a combined passenger flight) as well as one all-cargo flight. Empire Airlines brings in feeder flights that operate a FedEx facility and Alaska Central Express conducts frequent all-cargo trips within the state.

RURAL AIRPORTS

Approximately 82 percent of Alaskan communities are not served by roads and have no connection to the contiguous road system. As a result, many Alaskans are dependent on aviation to meet basic transportation needs, and to provide them with goods and services other Americans may take for granted. This creates one of the most robust intrastate aviation freight networks in the country. The Rural Airport System (RAS) provides year-round access to these communities and is made up of 237 commercial service facilities. Tens of thousands of pounds of freight are flown to remote villages from major hubs in Anchorage and Fairbanks through regional airports like Kotzebue, Nome, Aniak, and Bethel. Other services that assist in delivering freight to these communities include the Alaska Bypass Mail System and the federal Essential Air Service program.

RURAL AVIATION SPOTLIGHT: BETHEL AIRPORT

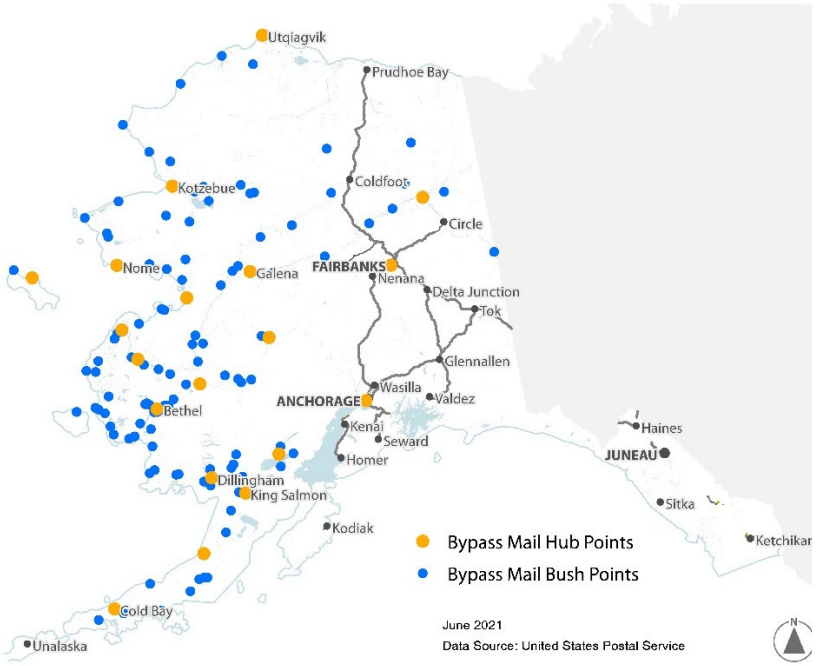
Bethel Airport serves as a domestic air cargo hub and is an example of how the state's air freight system meets the needs of people in nearly 60 villages in the Yukon-Kuskowkwim (Y-K) River Delta. According to 2020 Bureau of Transportation Statistics data, Bethel Airport received 17.462 million pounds of freight by air, then delivered roughly 6.8 million, making it the second-busiest cargo airport in Alaska. Cargo carriers deliver freight to Bethel in large freighter aircraft like the B737 and L100. Freight is then broken down into smaller loads bound for one of the 55 Y-K villages served by smaller cargo carriers. These companies fly from Bethel Airport in smaller aircraft like the Cessna 208, 206, and Casa 212 aircraft. In this way Alaskans in the Y-K Delta receive mail, parcel post, groceries, building supplies, and recreational vehicles. Air cargo is moved throughout Alaska using similar systems and simillar aircraft in order to supply basic necessities to people living in rural Alaska.

Not only does aviation make an impact on delivering the necessary goods and services these communities need, but the industry also accounts for 40 percent of aviation's economic contribution in the state, and 25 percent of jobs are connected to the RAS.[14]

Two important elements of the rural aviation system include:

- **The Alaska Bypass Mail System (ABS).** ABS was introduced in 1972 by the U.S. Postal Service as a mutually beneficial solution for logistical problems related to reliable rural package service. The intra-Alaska system allows palletized goods, largely food, to reach rural communities by air using a hub-and-spoke network of airports. The U.S. Postal Service determines which communities are included in the program. Eligible communities generally have very high transportation costs and limited cash economies. The ABS is critical to providing fresh food and basic supplies to communities that could not otherwise afford to ship goods and higher air freight prices. The ABS also result in more frequent air passenger service to these communities at lowered fares.

Figure 9: Bypass Mail System Sites



Source: United States Postal Service Analysis of Airstop Data[1]

- **The Essential Air Service (EAS) program.** EAS is a federally-directed program to provide air service to underserved communities stemming from the deregulation of the airline industry in 1978. EAS ensures a minimum level of commercial service to rural areas across the country, including 61 communities in Alaska, as of February 2019. Each community that is eligible for EAS must routinely apply for subsidized air service. In Alaska, the average subsidy per community was $357,927 compared to $2,553,332 in the Lower 48 States. [15]

[14] Economic Contribution of the Aviation Industry in Alaska, 2019.

[15] *Alaska Aviation System Final Report*. DOT&PF. 2019.

ADDITIONAL AIR CARGO DATA

Data for deplaned and enplaned air cargo is sourced from the USDOT Bureau of Transportation Statistics T-100 database (Table **13**: Deplaned and Enplaned Freight and Mail, All Alaska Airports, 2020Table 13). The data is reported by U.S. carriers and enplaned freight and/or mail enplaned is included in the origin airport and deplaned freight and/or mail at the destination airport.

Table 13: Deplaned and Enplaned Freight and Mail, All Alaska Airports, 2020Rank	**City Name**	**Deplaned (Tons)**		**Enplaned (Tons)**		**Total**
		Domestic	**International**	**Domestic**	**International**	
1	Anchorage	399,574	1,209,480	1,310,388	299,437	3,218,878
2	Bethel	27,444	-	13,553	-	40,997
3	Kotzebue	12,942	-	8,235	-	21,176
4	Nome	12,966	-	5,676	-	18,641
5	Juneau	10,481	-	7,798	-	18,279
6	Fairbanks	4,620	104	9,659	426	14,809
7	Barrow	11,174	-	2,538	-	13,712
8	Deadhorse	3,515	-	7,691	-	11,206

Table 13: Deplaned and Enplaned Freight and Mail, All Alaska Airports, 2020Rank	City Name	Deplaned (Tons)		Enplaned (Tons)		Total
		Domestic	International	Domestic	International	
9	Ketchikan	6,048	-	4,419	-	10,467
10	Dillingham	5,987	-	4,052	-	10,040
11	King Salmon	3,801	-	4,032	-	7,833
12	Sitka	4,055	-	3,083	-	7,138
13	Unalakleet	3,619	-	2,182	-	5,801
14	Aniak	3,227	-	2,026	-	5,254
15	Kodiak	2,962	-	1,709	-	4,671
16	Emmonak	2,943	-	1,589	-	4,531
17	Alpine	3,031	-	1,440	-	4,471
18	St. Mary's	2,580	-	911	-	3,490

Table 13: Deplaned and Enplaned Freight and Mail, All Alaska Airports, 2020Rank	City Name	Deplaned (Tons)		Enplaned (Tons)		Total
		Domestic	International	Domestic	International	
19	Red Dog	2,722	-	528	-	3,250
20	Yakutat	1,539	-	1,495	-	3,034
21	Cordova	1,365	-	1,408	-	2,772
22	Petersburg	1,078	-	1,348	-	2,426
23	Sandpoint	1,099	-	1,149	-	2,248
24	Wrangell	1,096	-	1,089	-	2,186
25	Galena	1,532	-	464	-	1,996
	All Others	57,164	372	13,907	152	71,596
	Total	**588,563**	**1,209,956**	**1,412,368**	**300,016**	**3,510,902**

Source: Analysis of USDOT T-100 Air Cargo Data

EMERGING TECHNOLOGIES IN AVIATION: UNMANNED AIRCRAFT SYSTEMS

The growth of UAS technology in the United States prompted the FAA to develop the Alliance for System Safety of UAS through Research and Excellence. The University of Alaska Fairbanks was selected to become a member of this group, alongside other academic institutions and industry experts. The Alaska Center for Unmanned Aircraft Systems Integration, or ACUASI, is the largest and most operationally-focused university UAS program in North America. According to an article posted by University of Alaska Fairbanks, ACUASI "conducts research, testing and evaluation of UAS systems and subsystems with the focus on low-altitude operation, operations beyond line of sight and cold weather and extreme climate research and testing."[16]

Because Alaska is an ideal location for UAS testing and evaluation, other private firms have begun researching alternative uses of this technology in the state. Particularly related to aviation freight operations, Sabrewing signed a $43 million deal in 2019 with Alaska's Aleut Community of St. Paul Island to deliver a mix of its Rhaegal and Wyvern cargo aircraft and test the new technologies in partnership with the island. Sabrewing will build and sell (or lease) its cargo aircraft to commercial customers, and partner with the community to offer job training to pilots, mechanics, and people in other important jobs.[17] Additionally, PRL Logistics has partnered with Hybrid Enterprises to introduce the world's first heavy-lift hybrid airship, the LMH-1. These football field-sized airships will provide low-cost and environmentally friendly solutions for moving freight and personnel to the most isolated regions of Alaska and Northern Canada.[18]

MPO FREIGHT PLANS

Freight planning activities are carried out at the regional level by metropolitan planning organizations (MPOs) in Anchorage and Fairbanks.

The **Anchorage MPO** (Anchorage Metropolitan Area Transportation Solutions, or AMATS) adopted its most recent freight plan in 2017. The MPO maintains the plan (known as the Anchorage Freight Mobility Study). The freight plan allows AMATS to:

- Better understand existing and projected regional freight flows, issues, concerns, and needs.
- Identify relevant infrastructure improvements and policy changes to improve freight mobility in the region.
- Create a multimodal transportation network that allows freight to operate and move efficiently across and between each mode.

The **Fairbanks MPO** (Fairbanks Area Surface Transportation Planning, or FAST Planning) collaborated with DOT&PF in adopting its first freight plan in 2019. The freight plan is organized around the same goals as the MPO's long-range transportation plan, yet with freight-specific objectives to guide planning and decision-making. Like Anchorage, Fairbanks North Star Borough is expected to continue to grow, raising the premium for planning for the safe and efficient movement of freight.

[16] Mitchell, Sue. 2015. "UAF News and Information." Unmanned aircraft group part of FAA Center of Excellence. Mo https://news.uaf.edu/unmanned-aircraft-group-part-faa-center-excellence/.

[17] Huber, Mark. 2019. "ainonline.com." Cargo UAS Builder Sabrewing Signs $43M Alaska Deal. March 18. Accessed J news/general-aviation/2019-03-18/cargo-uas-builder-sabrewing-signs-43m-alaska-deal.

[18] Hybrid Enterprises. 2016. "Cision PR Newswire." Hybrid Airships Are Coming To Alaska. Aurgust 30. Accessed June airships-are-coming-to-alaska-300319926.html

These are examples of new technologies people are exploring that open opportunity and respond to the growing need for alternative freight movement in Alaska.

Truck Transportation

In the lower 48 states, trucks carry far more tonnage and value than other modes. In Alaska, they carry less, because trucks do not pass through Alaska on their way to other states and air and water modes are used more extensively. Though trucking fills a smaller statistical role than in other states, it is an irreplaceable part the freight transportation system. Trucks are critical for moving goods from seaports and airports to industrial customers and consumers, and for distributing goods.

The National Highway System (NHS) consists of roadways deemed important to the nation's economy, defense, and mobility and serve as the backbone for freight movement by trucks. There are 2,230 miles of NHS roadway within Alaska, which is 12.6 percent of the total public network.

Table 14: Interstate Designations and Roadway Names

Interstate Designation	Southern/Eastern Terminus	Northern/Eastern Terminus	Roadway Name(s)
A1	Anchorage (A-3)	Canadian Border	• Glenn Highway • Portions of Richardson Highway • Tok Cut-Off • Portions of Alaska Highway
A2	Tok (A-1)	Fairbanks (A-4)	• Portions of Alaska Highway • Portions of Richardson Highway
A3	Soldotna	Anchorage (A-1)	• Seward Highway • Sterling Highway
A4	Palmer (A-1)	Fairbanks (A-2)	• Parks Highway

Source: Alaska DOT&PF and Interstate Guide

The subsystems of the NHS are described below:

- **Interstates**—The Eisenhower Interstate System consists of over 1,000 miles of roadway and is composed of four interstate routes—A-1, A-2, A-3, and A-4. Standards for Alaska's interstates are defined in U.S.C. Title 23 and are different from those in the lower 48 states.
- **Other Principal Arterials**—These highways provide access between an interstate or other arterial and a major port, airport, public transportation facility or other intermodal transportation facility. Sections of the Dalton and Elliot Highways are part of this NHS subsystem.
- **Strategic Highway Network (STRAHNET)**—STRAHNET highways are important to the United States' strategic defense policy and provide defense access, continuity, and emergency capabilities for defense purposes. Alaska has nearly 1,400 miles of roadway on the STRAHNET, including elements of the Richardson Highway, Sterling Highway, Glenn Highway, and the Tok Cutoff Highway, among many others.
- **Major Strategic Highway Network Connectors**—These are highways which provide access between major military installations and highways that are part of STRAHNET. There are no elements of this subsystem in Alaska.
- **Intermodal Connectors**—Intermodal connectors are roadways providing access between major intermodal facilities and the other four subsystems comprising the NHS. There are 29 of these facilities, totaling 112 miles. All the connectors are listed in Table 15.

Table 15: NHS Intermodal Connectors in Alaska

Facility Name	Description	Length (Miles)
Airport Facilities		
Anchorage International Airport	From Minnesota Drive via International Airport Road, Airport Arrival Ramp, Airport Departure Ramp	3.30
Fairbanks International Airport	From Parks Highway via Airport Way, Wein Rd, Wein Northbound-Airport Way Eastbound Ramp	2.51
Juneau International Airport	From Glacier/Douglas Highway NHS via Yandukin Road, Shell Simmons Drive	1.41
Kenai Airport	Served indirectly (proximate connection) from Kenai Spur Road	0

Facility Name	Description	Length (Miles)
Ketchikan International Airport	From Ketchikan Ferry Terminal Road via North Tongass, Ketchikan Airport Shuttle Access Road to waterway. From waterway via Gravina Island Airport Road	0.88
Kodiak Airport	From Marine Way via Rezanof Drive, Kodiak Airport Terminal Road	4.95
Petersburg James A. Johnson Airport	From Petersburg Ferry Terminal Road, commencing at Mitkof Highway, along Nordic Drive and Haugen Drive to airport entrance	1.87
Sitka Airport	From Halibut Point Road via Lake Street, Harbor Drive	1.76
Wrangell Airport	From Wrangell Ferry Terminal along Church/2nd Street, Wrangell Avenue, Bennett Street, and Airport Road to Airport Entrance	1.78
Port Terminals		
Ketchikan Port	From Ketchikan Ferry Terminal Road via South Tongass Highway to Bawden Street	2.24
Port Nikiski - Kenai	From Sterling Highway via Kenai Spur Road, Nikiski Beach Road	27.32
Port of Alaska	From 6th Avenue via A Street/C Street couplet, C Street, Ocean Dock Road, and C Street/Ocean Dock Ramps	1.78
Port of Juneau	From Thane Road NHS/Egan Drive (MP 0) via Thane Road to Mount Roberts Drive	1.03
Port of Nenana	From Parks Highway via 6th Street, Nenana Street, Front Street, Dock Road	1.05
Port of Seward	From Seward Highway NHS/STRAHNET	0
Port of Skagway	Served by the Klondike Highway NHS Route	0
Port of Valdez	From Richardson Highway NHS via Dayville Road	5.82

Facility Name	Description	Length (Miles)
Ferry Terminals		
Haines Ferry Terminal	From Haines Highway NHS via Haines/Lutak Road, Ferry Terminal Road	4.46
Homer Ferry Terminal	From Sterling Highway NHS via Homer Ferry Terminal Road	0.03
Juneau Auke Bay Ferry Terminal	From Glacier Highway/Egan Drive NHS/Yandukin Drive via Auke Bay Ferry Terminal Road (via West Berth Road, East Berth Road, and East Stern Berth Road)	6.09
Ketchikan Ferry Terminal	From Tongass Highway via Ketchikan Ferry Terminal Road	0.18
Kodiak Ferry Terminal	From Rezanof Drive via Marine Way, Marine Highway Access	0.40
Petersburg Ferry Terminal	From Mitkof Highway via Petersburg Ferry Terminal Road	0.14
Sitka Ferry Terminal	From Lake Street via Halibut Point Road, Sitka Ferry Access Road	6.73
Skagway Ferry Terminal	Served by the Klondike Highway NHS Route	0
South Mitkof Ferry Terminal	From Petersburg Ferry Terminal Road via Mitkof Highway, South Mitkof Ferry Terminal Road	23.83
Valdez Ferry Terminal	From Richardson Way NHS/Meals Avenue via Egan Drive, Hazelet Avenue, and Ferry Way	0.71
Whittier Ferry Terminal	From Seward Highway NHS via Portage/Glacier Road, Whittier Access Road, Camp Road, Whittier Ferry Terminal Road	11.09
Wrangell Ferry Terminal	From Stikine/Evergreen Avenue via Wrangell Ferry Terminal Spur Road	0.08

Source: FHWA Office of Planning, Environment, and Realty—National Highway System[19]

[19] https://www.fhwa.dot.gov/planning/national_highway_system/intermodal_connectors/alaska.cfm

PRIMARY HIGHWAY FREIGHT NETWORK

In October 2015, the USDOT developed an interim National Multimodal Freight Network (NMFN) as part of its National Freight Strategic Plan. The NMFN is composed of several elements:

- **National Highway Freight Network (NHFN)—** The NHFN consists of the following four subsystems:
  - **Primary Highway Freight System (PHFS)—**Alaska has 1,192 miles of highway on the PHFS, including Interstates A1, A2, and A3, as well as Alaska State Route 1.
  - **Portions of Interstates not on the PHFS—**This network adds connectivity and improved access to freight transportation facilities. Alaska does not have any interstates within this category.
  - **Critical Urban Freight Corridors (CUFCs)—**These priority freight segments typically consist of first- or last-mile connector routes from high-volume freight corridors to freight-intensive land and key urban freight facilities. They must lie within an urbanized area, or urban cluster as defined by the Census Bureau. FHWA established a mileage cap of 122.22 miles of CUFCs for Alaska. DOT&PF (in consultation with Anchorage and Fairbanks MPOs) can designate the CUFCs on both state and local networks. To date, Alaska has designated 14.8 miles of CUFCs.
  - **Critical Rural Freight Corridors (CRFCs)—**Priority freight segments classified as CRFCs lie outside of an urbanized area and satisfy one of seven or more criteria as defined by USDOT. As the DOT&PF considered segments for this designation, it considered public roads that provide immediate links as first- and last-mile freight corridors to key rural freight facilities, including manufacturing centers, agricultural processing centers, farms, and intermodal facilities. FHWA established a mileage cap of 244.45 miles of CRFCs for Alaska. To date, DOT&PF has designated 235 miles of CRFCs statewide.

NATIONAL HIGHWAY FREIGHT PROGRAM

The National Highway Freight Program (NHFP) was established under the Fixing America's Surface Transportation (FAST) Act to promote efficient freight movement. The enactment of the NHFP also created a new type of federal funding for projects and initiatives that support this purpose. To be eligible for NHFP dollars, projects must be documented in a state's freight plan and must also meet certain criteria. While the program predominantly funds highway projects, a state can obligate up to 10 percent of its NHFP allocation toward intermodal or freight rail projects.

The program requires that the NHFP be redesignated every five years by FHWA, including CUFCs and CRFCs). During the redesignation process, state DOTs can submit eligible highway segments on the NHFN as candidates for certification.

While serving as the lead agency in designating CRFCs, DOT&PF partnered with the two regional MPOs to select CUFC mileage. DOT&PF centered its corridor designations around the goal of providing logical freight connections throughout the state. Mileage was selected based on two criteria:

1. Highway segments with near-term critical needs.
2. Identified project opportunities where NHFP funding will likely be applied.

Final certifications were made by FHWA in February 2019 and are shown in Table 16.

Table 16: Alaska's Critical Urban and Rural Freight Corridors

Route Name	Start Point	End Point	Length (miles)
Critical Urban Freight Corridors – Fairbanks Urbanized Area			
Van Horn Road	University Avenue S	South Cushman Street	3.9
South Cushman Street	Richardson Highway	Van Horn Road	0.5
Steese Highway	Johansen Expressway	Hagelbarger Avenue	4.4
Old Richardson Highway	Richardson Highway (MP 351)	Petro Star Refinery	2.9
Peger Road	Johansen Expressway	Tria Road	3.1
Critical Rural Freight Corridors			
Dalton Highway (MP 0-235)	Elliott Highway	Chandalar (MP 235)	235

Source: Alaska DOT&PF

PAVED AND UNPAVED MILEAGE

Nearly 34 percent of DOT&PF's roadway centerline mileage is unpaved, as shown in Table 17.

Table 17: DOT&PF Owned Paved and Unpaved Mileage, 2019

Paved	3,747.845
Unpaved	1,887.916
Total	**5,635.761**

Source: Alaska DOT&PF Certified Public Road Mileage Report (December 31, 2019)

Of note is the Dalton Highway, a 414-mile highway, that still has significant sections of gravel surface Traffic on the highway consists mostly of commercial truck traffic connecting goods and fuel to the oil fields in the North Slope. Despite its essential role as a connector, the Dalton Highway's varied terrain and conditions also pose challenges to freight movement. The highway is very remote with little to no cell phone reception, internet connectivity, or vehicle accommodations.

SIZE AND WEIGHT RESTRICTIONS

Federal law requires states to administer truck size and weight enforcement programs to receive federal funding. Commercial vehicle size and weight compliance and restrictions are monitored by DOT&PF's Measurement Standards and Commercial Vehicle Compliance Division. The Commercial Vehicle Compliance section is responsible for inspections and permitting of all commercial vehicles used to carry freight to ensure overall highway safety and to preserve transportation infrastructure.

Under 23 CFR Part 658, Alaska has a grandfather provision that allows vehicles to operate above 80,000-pound gross vehicle weight (GVW) on parts of federally-funded roadways. Grandfathered routes in Alaska include Glenn Highway from Anchorage to Palmer, Richardson Highway from Fairbanks to Delta Junction, and Parks Highway from the junction with Glenn Highway to Fairbanks. Unlike other states, Alaska does not have a stated gross vehicle weight for operations on federally-funded roadways. Table 18 summarizes State-enacted legal limitations on vehicle size and weight without a valid permit.

Table 18: State-Enacted Vehicle Size and Weight Restrictions

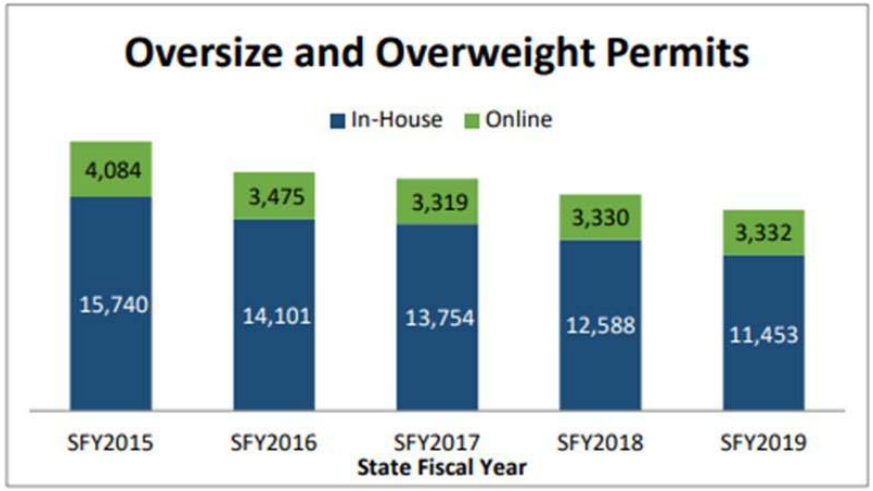
Vehicle Characteristic	Vehicle Type	Regulatory Maximum (without a permit)	Additional Information
Vehicle Width (including load)	All Vehicles	102 inches	
Vehicle Height (including load)	Vehicles Operating Between Fox Weigh Station and Prudhoe Bay on Dalton or Elliot Highways	17 feet	
	All Other Vehicles	15 feet	
Vehicle Length	Power Vehicles	45 feet	
	Semitrailer or Trailer	53 feet	
	Vehicle Combination	75 feet	Applies to the following: Truck with one cargo-carrying vehicle Truck tractor and two-cargo carrying vehicles Combinations may not exceed two cargo-carrying vehicles
	Long Combination Vehicles (LCVs)	95 feet	Outlined in AAC 25.014
	Equipment or Load (Overhang/Extension)	3 feet beyond front bumper 4 feet beyond rear of vehicle	
Vehicle Weight	Single Axle	20,000 pounds	Applies to a single vehicle or combination of vehicles, including load and equipment
	2-Axle Group	38,000 pounds	

Vehicle Characteristic	Vehicle Type	Regulatory Maximum (without a permit)	Additional Information
	3-Axle Group	42,000 pounds	
	4-Axle Group	50,000 pounds	

Source: Alaska Administrative Code, Chapter 25

The state's Commercial Vehicle Customer Service Center (CVCSC) is responsible for processing and issuing permits for all vehicles and loads that exceed legal size and weight dimensions to operate on specific, acceptable routes. In State Fiscal Year (SFY) 2019, the CVCSC issued nearly 15,000 oversize and overweight permits—a decrease of approximately 5,000 permits issued since SFY2015. The number of permits issued over the past five years is shown in Figure 11.

Figure 10: CVCSC-Issued Oversize and Overweight Permits, SFY 2015-19



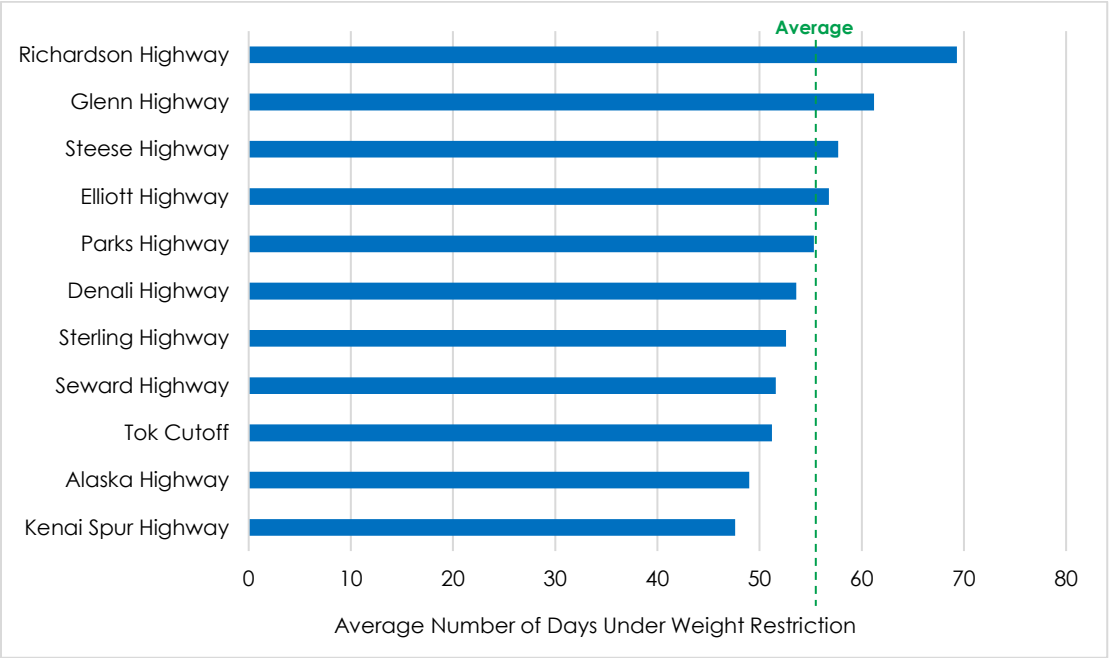
Source: Alaska Department of Transportation and Public Facilities – Division of Measurement Standards and Commercial Vehicle Compliance: 2019 Annual Report.

Weight compliance inspections are conducted at fixed weigh stations and roadside inspection stations away from fixed facilities. Traffic flows and axle weights are also monitored through a series of eight weigh-in-motion (WIM) stations. In recent years, Alaska has maintained a low violation threshold for overweight vehicles, with 98.5 percent compliance.

SEASONAL WEIGHT RESTRICTIONS

Alaska's transportation system is subject to extreme weather conditions (e.g., ice and snow) that cause variations in subsurface temperatures and overall roadway conditions. In fall, the ground beneath highways begins to freeze. In spring, it begins to thaw. Through these processes, pavements become less stable and highways are prone to damage by heavy and overweight vehicles. Per state regulations, DOT&PF may restrict or prohibit vehicle operations on a highway if it is at risk of being seriously damaged. Seasonal weight restrictions are commonly imposed between March and June. Figure 12 shows the average number of days major highways were under weight restrictions during spring over a 10-year period.

Figure 11: Average Number of Days Under Weight Restriction by Highway, March to June 2009-18



Source: Alaska DOT&PF – Transportation Data Programs Division

DOT&PF's Transportation Data Programs division manages a transportation data probe program that serves a critical role in determining which roads will be restricted and the level of restriction that should apply. The program provides a best practice in protecting statewide transportation infrastructure by preventing or reducing the impacts on the pavement as well as the overall cost of maintenance.

Seasonal restrictions can temporarily reduce loads to as low as 50 percent of the legal maximum allowable weight. In addition to freight movement, this has a major impact on construction contractors. Construction equipment begins moving on the highway network in March for the construction season, which typically lasts from April through October. Seasonal weight restrictions often hinder their ability to move major spreads of equipment and further shortens their construction window if equipment is unavailable due to weight restrictions that last until the early summer months.

ROADS TO RESOURCES AND INDUSTRIAL USE HIGHWAYS

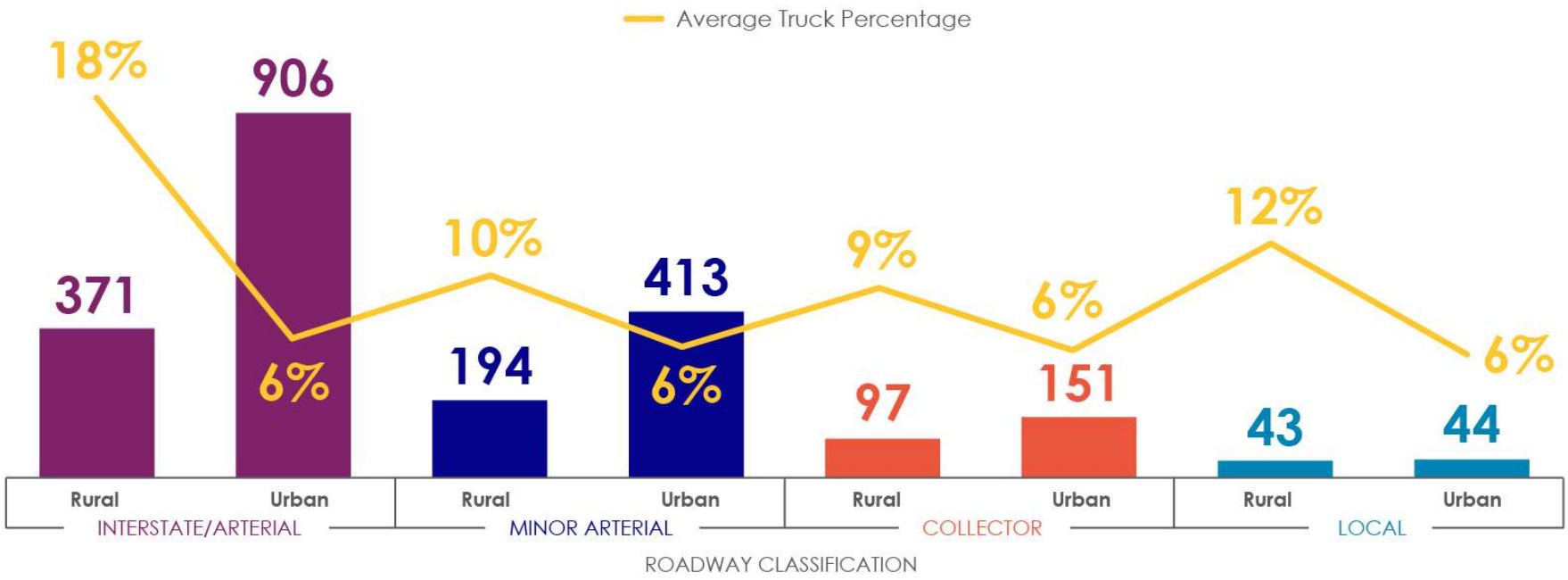
The Roads to Resource Program Initiative was created to facilitate design and construction of projects that support the development of natural resources in the oil and gas, alternative energy, mining, timber, fisheries, and agriculture industries. It considers road access as well as marine-, rail-, and aviation-related transportation improvements. The program includes collaboration with resource developers, the Alaska Industrial Development and Export Authority (AIDEA), Native corporations, contractors, and other interested financial entities to facilitate preparing agreements to develop transportation projects for resource access.

Industrial use highways are defined by Alaska Statute 17 AAC 35.010 as routes with design features allowing them to accommodate long and/or heavy loads. Such routes are designated by DOT&PF upon either written petition from interested parties or a department study of the operational, economic, and environmental feasibility of the designation. The Klondike Highway is the only designated route in the state. It includes a total of 15 miles through Alaska and 423 miles through the Canadian provinces of British Columbia and Yukon. It was designated in 1989 to accommodate heavy use of the highway by oversize and overweight trucks, largely related to mining activities. A growing number of states, including Alaska, are seeking to better align their permitting and fee system to match the true cost of accommodating these vehicles and the volume of shipments that is occurring. In response to the Peak Gold deposit south of Tok, which will send trucks full of ore along the Alaska and Richardson Highways through Fairbanks and along the Steese Highway, DOT&PF is considering making at least part of this route an industrial use highway. This would help defray the cost of wear from approximately 80 ore trucks using these highways each day.

TRUCK VOLUMES

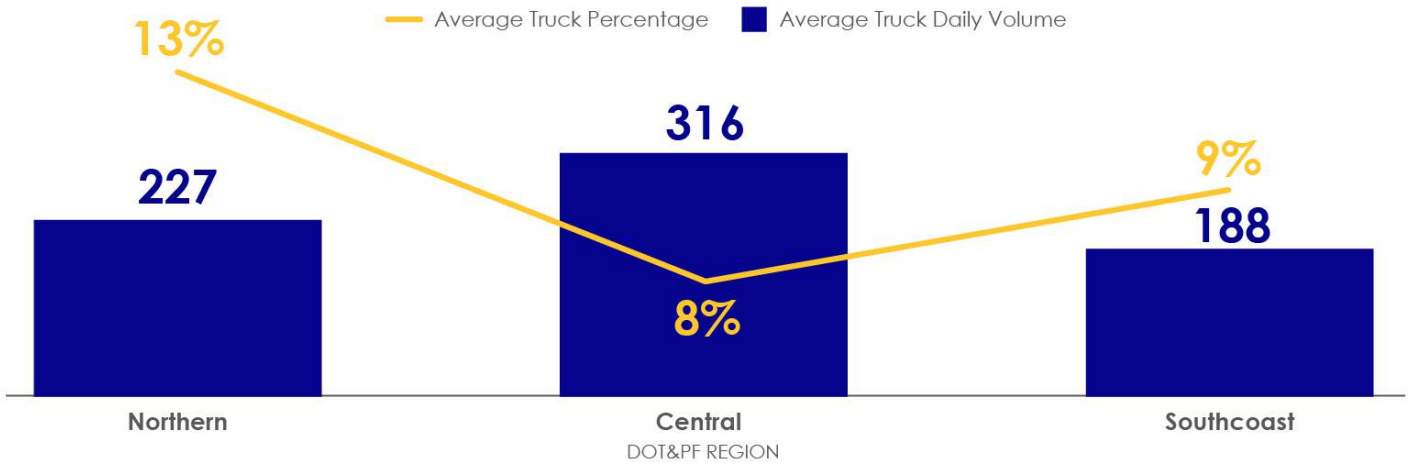
Truck volume and percentage data was sourced from 808 statewide count locations on higher-order roadways between 2010 and 2019. Figure 12 demonstrates that for each road classification, urban roadways carry more single-unit and combination trucks than rural roads, up to an average of over 900 daily trucks on urban Interstate and principal arterial roadways. However, trucks make up a higher proportion of traffic on rural roads, with an average of up to 18 percent on rural Interstate and principal arterial roadways. Figure 13 shows these patterns across statewide highways.

Figure 12: Average Truck Volume and Percentage by Roadway Classification (2010-2019)



When combined by DOT&PF region, average Central Region roadways in the dataset carry the highest truck volume but represent the lowest truck percentage of the traffic stream at 8 percent.

Figure 13: Average Truck Volume and Percentage by DOT&PF Region (2010-2019)



Truck volumes vary widely across the state's highway network. Figure 15 provides larger-scale mapping of where truck volumes are heaviest, including Anchorage, Fairbanks, Juneau, and Wasilla. Figure 15 summarizes average reported truck volumes by region on selected roadways, with truck volumes increasing since 2012 in Central and Northern Regions and declining in Southcoast Region. Table 19 details average daily truck counts on selected roadways in 2019. The data shown in Figures 14 and 15 are the most recent and widespread available, but do not necessarily capture a complete and representative picture of truck volume patterns and trends.

Figure 14: Truck Volumes, Selected Locations

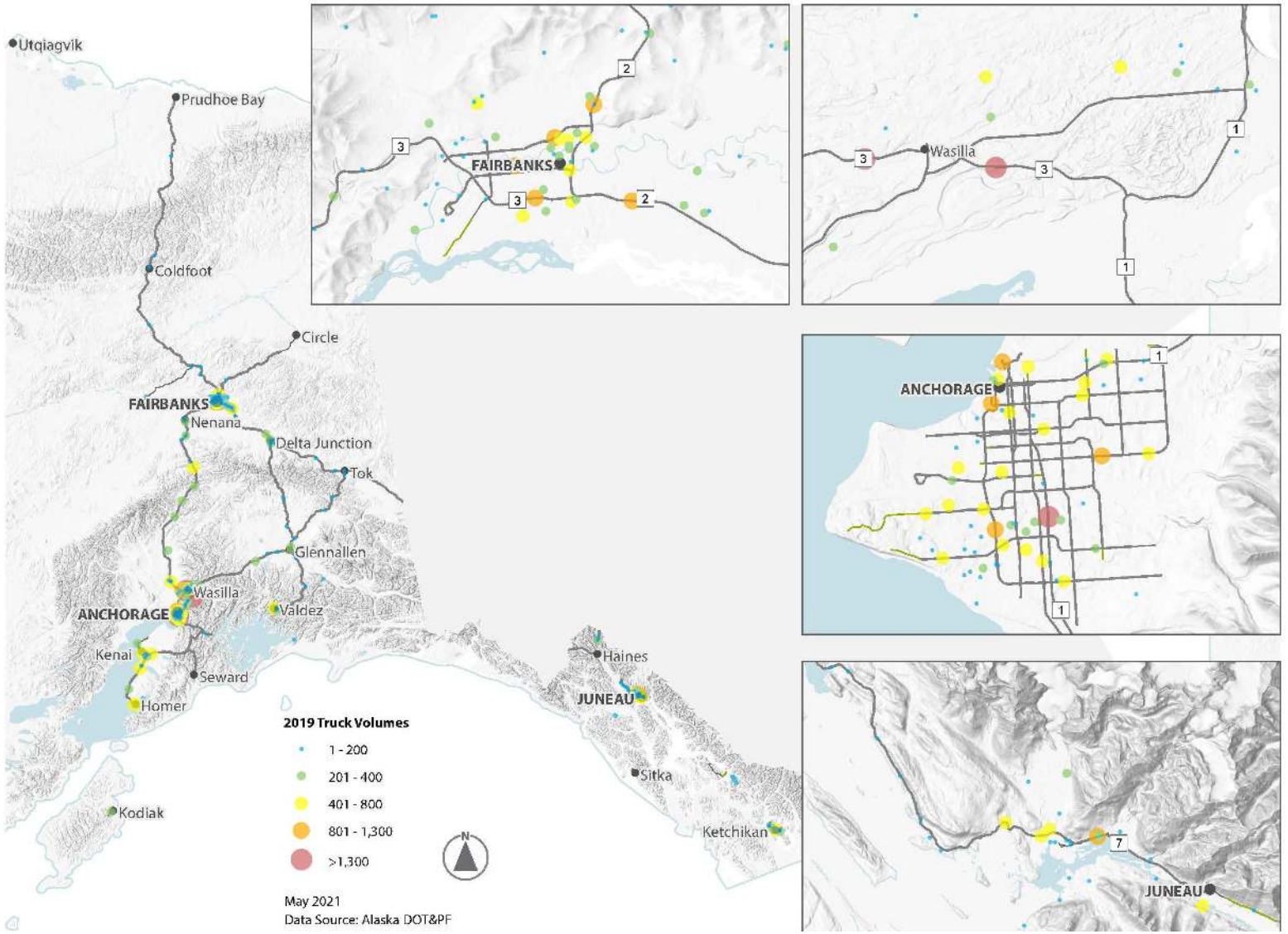
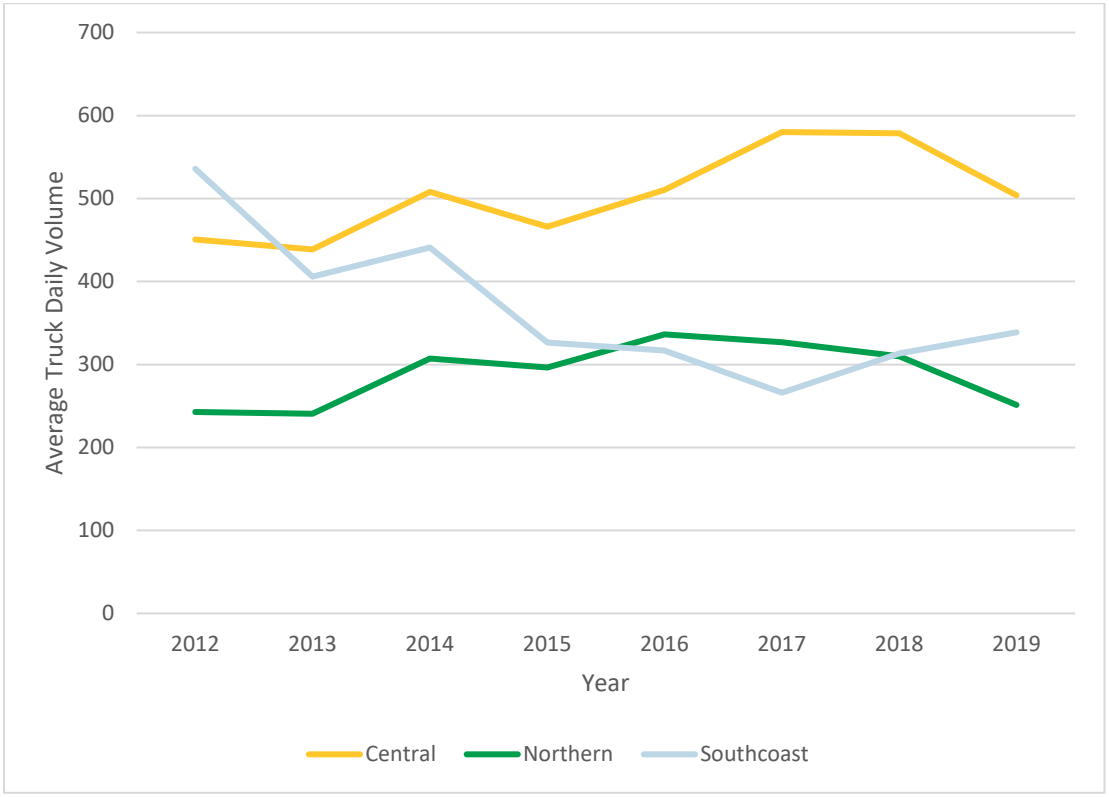


Figure 15: Average Truck Volumes by DOT&PF Region, Selected Roadways, 2012-2019



Source: Alaska DOT&PF – Transportation Data Programs

Table 19: Average Daily Truck Volumes, Selected Roadway Segments, 2019

Roadway	Segment Descriptor	Daily Truck Volume
Egan Drive / Glacier Highway	Near the Juneau Airport	995
Douglas Highway	Near Juneau Douglas Bridge	550
South Tongass Highway	In Ketchikan	650
Klondike Highway	In Skagway	130
Dalton Highway	Milepost 189	115
Parks Highway	Near the Denali Highway	360
Parks Highway	In Fairbanks	940
Steese Highway	Near Fox	195
Richardson Highway	Near Tok Cut-off	220
Glenn Highway	Near Eureka	225
Elliot Highway	Near Tatalina	125
Parks Highway	In Willow	700
Parks Highway	In Wasilla	2060
Seward Highway	South of Potter's Marsh	720
Seward Highway	Near Dimond Blvd	1830

Roadway	Segment Descriptor	Daily Truck Volume
Sterling Highway	In Sterling	690
Sterling Highway	In Homer	545
C Street	Through Midtown Anchorage	640
Glenn Highway	Near Eklutna	1905

Source: Alaska DOT&PF – Transportation Data Programs

TRUCK TRAVEL TIME RELIABILITY

Truck travel time reliability affects Alaska's economy by increasing transportation costs and creating variance freight delivery schedules when there is unreliability in the system. There are several sources of unreliability, including congestion, collisions, weather, and roadway conditions. Table 20, from the 2020 Mid Performance Period Progress Report, [v] documents the 2020 truck travel time targets met. FHWA requires continuous reporting of Truck Travel Time Reliability as a crucial performance measure.

Truck travel time reliability values of 1.50 or less generally indicate a system that is well-performing and reliable while values between 1.25 and 1.75 indicate fair and marginal travel conditions. Values above 1.75 indicate major unreliability of the roadway network. DOT&PF has identified a statewide target of less than 2.0 for 2020.

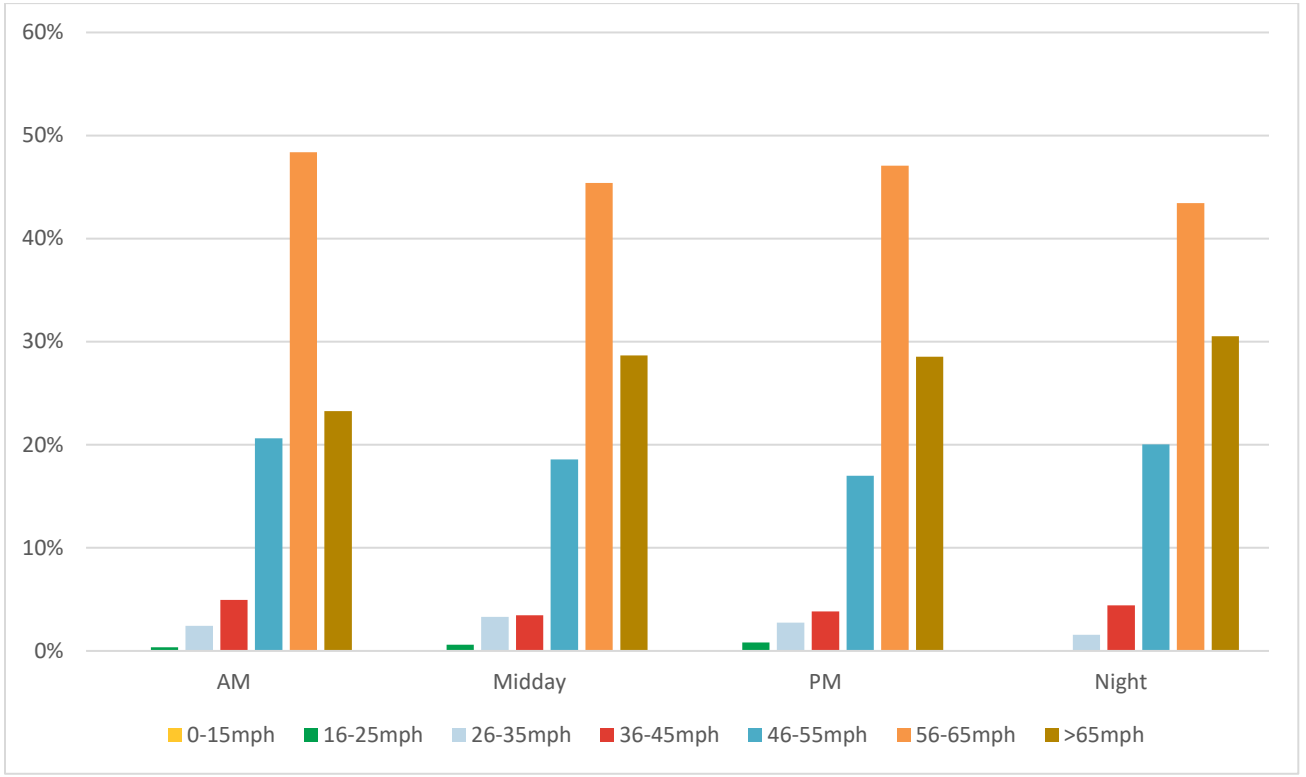
Table 20: 2020 Truck Travel Time Performance Measure Summary

Performance Measure	Baseline	2-Year Condition/ Performance	2-Year Target	4-Year Target
Truck Travel Time Reliability (TTTR) Index	1.84	1.79	2.00	2.00

TRUCK TRAVEL TIME AND OPERATING SPEEDS

DOT&PF has specific policies and procedures for setting speed limits along the roadway network. Currently, the highest posted speed limit in Alaska is 65 miles per hour. In order to gain an understanding of truck movements along the interstates, median operating speeds were calculated by National Performance Management Research Data Set (NPMRDS) segment and compared with commercial vehicle miles traveled (VMT) by time of day. The results of this analysis show that approximately 30 percent of commercial truck VMT clock in at speeds above the highest posted speed limit in Alaska throughout most of the day, with the exception of the a.m. peak period (Figure 17: Distribution of Interstate Truck VMT by Median Speed Range, 2020).

Figure 16: Distribution of Interstate Truck VMT by Median Speed Range, 2020



Source: Regional Integrated Transportation Information System (RITIS) and Calculations

FREIGHT BOTTLENECKS

MAP-21, passed in 2012, and its successor legislation, the FAST Act of 2015, both expressed the importance of identifying and addressing freight bottlenecks on the multimodal freight system. In 2018, DOT&PF developed a Truck Bottlenecks Report. The report defines a freight bottleneck as part of the transportation system that exhibits disproportionately high costs to the freight industry in terms of delay and unreliability. The list of 18 identified bottlenecks was prioritized by severity based on these two indicators. Most of the identified locations were segments within the urban areas of Anchorage and Fairbanks. These bottlenecks are listed in Table 21..

Table 21: Alaska Freight Bottlenecks, 2018

Rank	Location	Roadway Name	Direction
1	Access off the Glenn Highway from Muldoon Road	Glenn Highway	SB
2	Parks Highway through Wasilla (Segment 1)	W Parks Highway	SB
3	Parks Highway through Wasilla (Segment 1)	W Parks Highway	NB
4	Access off the Glenn Highway from Muldoon Road	Glenn Highway	NB
5	Tudor Road/Lake Otis Parkway intersection	E Tudor Road	WB
6	3rd Street/Steese Highway intersection	Steese Highway	WB
7	Geist Road/Johansen Expressway/University Avenue	Johansen Expressway	WB
8	Parks Highway through Wasilla (Segment 2)	W Parks Highway	NB
9	Parks Highway through Wasilla (Segment 2)	W Parks Highway	SB
10	Geist Road/Johansen Expressway/University Avenue	University Avenue	NB

Rank	Location	Roadway Name	Direction
11	Geist Road/Johansen Expressway/University Avenue[20]	University Avenue	SB
12	Johansen Expressway/Steese Highway	Steese Highway	EB
13	Johansen Expressway/Steese Highway	Johansen Expressway	EB
14	Geist Road/Johansen Expressway/University Avenue	University Avenue	SB
15	Tudor Road/Lake Otis Parkway intersection	E Tudor Road	SB
16	Tudor Road/Minnesota Drive intersection	W Tudor Road	WB
17	Tudor Road/Minnesota Drive intersection	W Tudor Road	EB
18	Tudor Road/Minnesota Drive intersection	W Tudor Road	SB

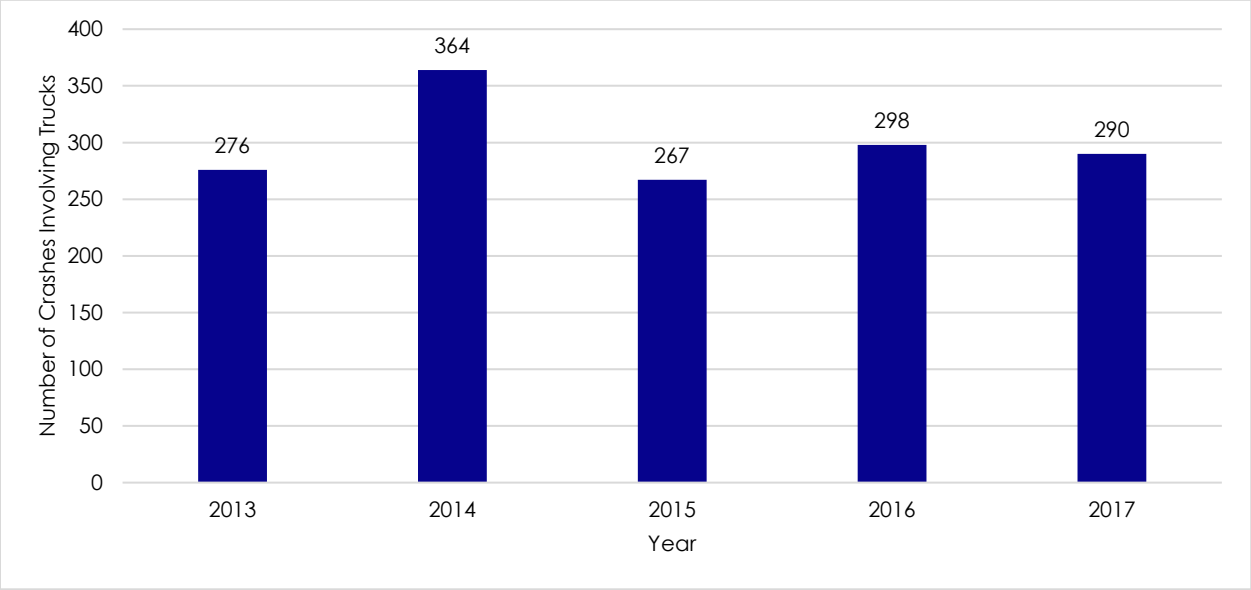
A 2020 addendum to the original analysis was prepared by DOT&PF using the 2019 NPMRDS. Data concluded that road improvement projects raised performance at two locations. Improvement projects on the Glenn Highway access from Muldoon Road in Anchorage and Geist Road/Johansen Expressway/University Avenue in Fairbanks resulted in better performance. Deteriorating performance was identified at the Johansen Expressway/Steese Highway intersection in Fairbanks.

[20] The Geist Road/Johansen Expressway/University Avenue intersection (#10, #11, #14) was closed for construction in 2018 when source material was drafted, and the intersection reopened to traffic in 2019. DOT&PF analysis of NPMRDS data has shown that the improvements have resulted in improved roadway performance.

COMMERCIAL VEHICLE SAFETY

From 2013 to 2017, DOT&PF reported a total of 1,495 crashes involving commercial trucks, or an average of 300 crashes annually. The number of crashes per year is illustrated in Figure 18.

Figure 17: Crashes Involving Trucks, 2013-17



Source: Alaska DOT&PF

Table 22 shows the number of crashes in each municipality/borough annually along with their respective annual average, sorted from greatest to least.

Table 22: Annual Truck Crashes By Borough/Municipality, 2013-17[21]

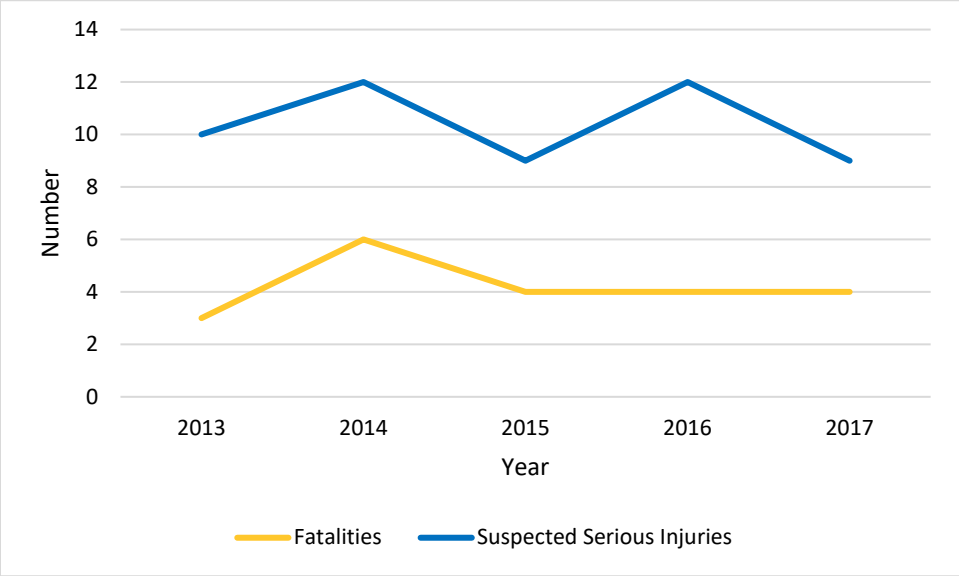
Borough/Municipality	5-year Total
Municipality of Anchorage	628
Matanuska-Susitna Borough	251
Fairbanks North Star Borough	244
Kenai Peninsula Borough	168
Unorganized Borough	263
Denali Borough	35
Juneau City and Borough	19
North Slope Borough	14
Ketchikan Gateway Borough	10
Kodiak Island Borough	9
Sitka City and Borough	7
Skagway Municipality	3
Petersburg Borough	1

Source: Alaska DOT&PF

Fatal truck crashes have remained low and stable in recent years, as illustrated in Figure 19.

[21] Five-year crash totals generated from CARE database, provided by DOT&PF in June 2021

Figure 18: Fatal and Suspected Serious Injury Crashes Involving Trucks, Statewide, 2013-17



TRUCK PARKING

MAP-21 requires the USDOT to conduct a survey (FHWA's Jason's Law Survey) at a state level to analyze and compare public and private parking capacities against total commercial motor vehicle traffic on interstates. Key stakeholders including state departments of transportation; commercial motor vehicle safety enforcement agencies; truck drivers and operations managers; truck stop owners and operators; and port authorities were the survey's target audience. DOT&PF currently does not own or maintain any public parking facilities for commercial motor vehicle traffic, however, there are 18 privately-owned truck stops with a total of 179 parking spaces.[22] While the issue of truck parking is not as significant in Alaska as in other states, it is still a concern, and the state still exhibits a need for truck stop services and rest areas along interstate routes. The lack of truck parking has led large trucks to park along the sides of major highways (e.g., Seward and Alyeska Highways) at locations that obstruct views at intersections, ultimately creating safety hazards. Rest areas have been identified as a

[22] Jason's Law Truck Parking Survey and Comparative Analysis, US Department of Transportation: https://ops.fhwa.dot.gov/freight/infrastructure/truck_parking/jasons_law/truckparkingsurvey/ch3.htm

need along the Dalton Highway due to its weather conditions, remoteness, and length. These concerns present the opportunity for DOT&PF to collaborate with the private sector to work toward solutions to truck parking, such as a possible midway truck trailer switch between Anchorage and Fairbanks that would allow shorter travel times and compliance with hours of service regulations.

Rail

The Alaska Railroad Corporation (ARRC) provides freight services throughout Southcentral and Interior Alaska. The ARRC is a State-owned corporation that is operated like a private business and is not under the purview of DOT&PF. ARRC transports both freight and passengers between Anchorage, Whittier, Seward, Denali, Fairbanks, and Eielson Air Force Base. The railroad's lines are located entirely within the state, and do not provide any land-based connections to other North American railroads. The railroad offers extensive intermodal connections with other freight transportation modes, including motor carrier and waterborne traffic. Its mainline is over 650 miles in length.

Table 23: Railcar Types and Purpose

Railcar Type	Purpose	Fleet
Tank Car	Moves liquid bulk cargo including jet fuel, gasoline, asphalt, vegetable oils, aircraft deicer, and various other chemicals.	2 cars plus 180 tankers leased by customers for in-state use only
Flat Car	Moves trailers and containers, pipe, lumber, and heavy equipment	354 cars
Air Dump	Side-dumping railcars used primarily to transport ballast and other rock materials for track maintenance.	31 cars
Open Top Hopper	Moves bulk solids, primarily coal and gravel, and unloads from the bottom.	396 cars
Covered Hopper	Moves dry bulk including grain, fertilizer and cement.	41 cars
Box Car	Moves a variety of commodities including lumber, paper and drilling mud.	14 cars
Gondola	Moves metal products (pipe, sheet pile, rebar) north and scrap south.	10 cars

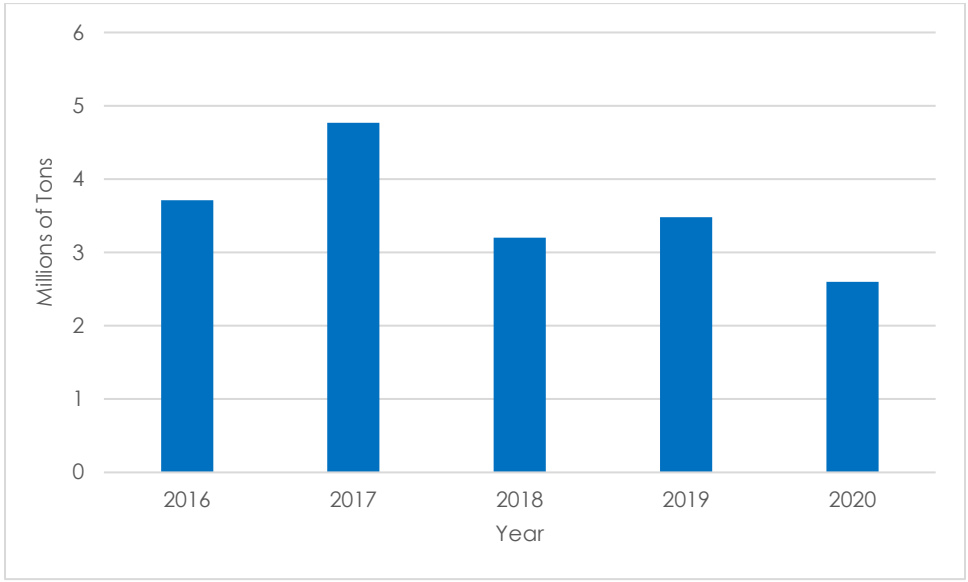
There are currently no scheduled freight services operating to and from Seward. Freight trains are constructed on an as-needed basis, dependent on customer requirements and demand. Prior to 2015, there were regular coal trains moving between the Usibelli coal mine in Healy and the Seward Marine Terminal.

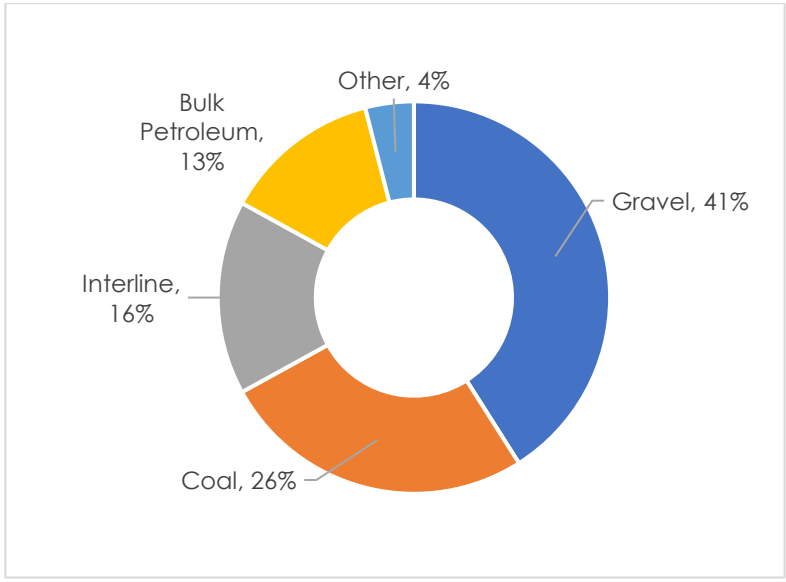
Across its system, the railroad offers important connections:

- It connects population centers, military installations, resource facilities, and the Ports of Alaska, Seward, and Whittier.
- At Whittier, it connects to the Alaska Rail-Marine Service, which moves railcars on barges on a route terminating in Seattle, with stops along the way. Rail cars are loaded onto rail-equipped barges, which leave Seattle every week, year round. At Whittier, the Alaska Railroad unloads the rail cars and routes them to destinations along the rail belt from Whittier and Seward, and north to Anchorage and Fairbanks. At Whittier, the railroad also connects with the Canadian National Railway's AquaTrain service to Prince Rupert, B.C. Rail cars are loaded from a dock at Prince Rupert onto a railcar barge which is then moved by tugboat to Whittier. From there, the rail cars are interchanged to the Alaska Railroad for delivery throughout the state. The service operates year round.
- The railroad also links to key interior freight highways between Fairbanks and Seward/Whittier, as well as inland waterway traffic on the Yukon and Tanana rivers.

Railroads specialize in carrying low-value, high-bulk commodities that are not time sensitive over longer distances. According to ARRC, the most significant commodities moved include coal and gravel.

Figure 19: ARRC: Total Freight Tonnage (2016-2020) and Commodity Mix (2020)





Source: ARRC 2020 Annual Report

RAILROAD CROSSINGS

According to the Federal Railroad Administration's highway rail crossing inventory database, Alaska has 237 total at-grade highway-rail crossings. Of this total, 162 are public crossings. Grade-separated facilities have been a high priority for DOT&PF, the ARRC, and MPOs for many years to improve safety the efficient movement of goods and people. In 2016, DOT&PF updated its State Rail Plan, which has several objectives to advance the grade separation of as many railroad crossings as possible, especially in areas with higher volumes or frequent delays. These objectives support safety and the community-related goals of the plan. The following crossings experience the most delay due to railroad activity and are a priority:[23]

- C Street (Anchorage) – NHS
- 104th Avenue (Anchorage)
- 100th Avenue (Anchorage)
- Outer Springer Loop (Palmer)
- Grandview Road (Palmer)
- Whittier Avenue (Whittier)
- University Avenue (Fairbanks) – NHS
- Knik Goose Bay Road (Wasilla) – NHS

In the five-year period from 2016-2020, Alaska reported a total of four at-grade railroad crossing crashes.

[23] Alaska State Rail Plan, 2016.

Pipeline

Pipelines are governed by and regulated under USDOT's Pipeline & Hazardous Materials Safety Administration. Alaska's most significant pipeline infrastructure is the TAPS. Construction of this 800-mile, 48-inch-diameter pipeline began in 1974 and was completed in 1977. The TAPS transports crude oil from the North Slope across 800 miles of varied terrain to Valdez. There are 12 pump stations along its length to heat the product for better flow and velocity control. Due largely to permafrost, more than half the line was constructed above ground.

TAPS operates 24 hours a day, 365 days a year. In its first year of operation, 610,408 barrels of oil per day were shipped through TAPS. Peak TAPS throughput reached 2.1 million barrels per day in 1988. Oil volumes moved through TAPS have experienced a steady decline since 1988. The lowest level throughput was recorded at 480,199 barrels per day in 2020. Reduced oil output poses a substantial economic issue for the state, as Alaska's economy is still heavily reliant on oil revenues and royalties.

Alaska also has multiple utilities delivering natural gas to customers in the Anchorage Mat-Su region and the Kenai Peninsula. ENSTAR Natural Gas Company is the largest of these utilities, with 139,000 residential, commercial, and industrial customers, encompassing over 57 percent of the state's population. The Interior Gas Utility (IGU) is the newest natural gas company, working to deliver natural gas to customers in the Fairbanks North Star Borough. The company is currently constructing a 5.25 million-gallon liquified natural gas tank. Completion of tank construction is estimated in fall of 2021 and will allow IGU to grow its customer base and maintain greater continuity of service.

ALASKA GASLINE DEVELOPMENT CORPORATION

For over 40 years, Alaskans have been exploring opportunities to deliver natural gas from the North Slope oil fields to Alaskan and international markets. The Alaska Gasline Development Corporation (AGDC. was formed by the state legislature in 2010 and charged with "developing a liquefied natural gas (LNG) project on the State's behalf and assisting the Department of Revenue and the Department of Natural Resources in maximizing the value of the state's gas."[24] The project consists of a gas treatment plant in the existing oil field on the North Slope and an 800-mile, 42-inch pipeline that runs the length of the state to Nikiski. Here natural gas will be transformed to liquid natural gas before being loaded onto ships bound for customers, likely in Asia. A portion of this gas will be taken to provide alternative power for communities in the state.[25] DOT&PF has spent several years reviewing access points and staging areas for the proposed project. Construction of such a massive project will impact all modes of Alaska's transportation system, which will be needed to get personal and materials to construction sites. Significant planning and ongoing upgrades to transportation infrastructure will be necessary.

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[24] Alaska Gasline Development Corporation. 2021 . "agdc.com." AGDC History. 06 22. Accessed 06 22, 2021. https://agdc.us/about-us/agdc-history/.

[25] Alaska Gasline Development Corporation. 2021 . "agdc.com." AGDC History. 06 22. Accessed 06 22, 2021. https://agdc.us/about-us/agdc-history/.

i Bureau of Transportation Statistics. Principal Ports. 2020. https://www.bts.gov/principal-ports

ii Northwest Seaport Alliance. Northwest Seaport Alliance - Cargo Statistics. February 2021. https://www.nwseaportalliance.com/about-us/cargo-statistics

iii Alyeska Pipeline Service Company. Pipeline Operations - Throughput. February 2021. https://www.alyeska-pipe.com/TAPS/PipelineOperations/Throughput

iv Kelly, D. (2012, January 24). Cost of Fixing Anchorage port doubles to $2 billion, setting stage for the higher gas and grocery prices. Anchorage Daily News. January 2012. https://www.adn.com/alaska-news/anchorage/2019/01/25/cost-doubles-to-2-billion-to-fix-anchorage-port-setting-stage-for-higher-gas-and-grocery-prices/

v Federal Highway Administration. State Performance Dashboard – Alaska: Mid-Year Performance Period Progress Report. August 2020. https://www.fhwa.dot.gov/tpm/reporting/state/state.cfm?state=Alaska