TRANSPORTATION AND FREIGHT TECHNICAL MEMORANDUM

ALASKA MOVES 2050

Final Version | August 2022

ALASKA DEPARTMENT
OF TRANSPORTATION
& PUBLIC FACILITIES

LONG-RANGE
TRANSPORTATION PLAN
& FREIGHT PLAN

LRTP
FP

Alaska Moves 2050

Transportation and Freight Technical Memorandum

Prepared for:
ALASKA DEPARTMENT
OF TRANSPORTATION
& PUBLIC FACILITIES

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LONG-RANGE
TRANSPORTATION PLAN
& FREIGHT PLAN

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Photo by Lee Rodegerdts

INTRODUCTION

Each of us relies on a network of transportation options every day, whether we walk, fly, take a ferry or bus, ride a bicycle, or drive. Our transportation network connects us with each other, our families, our jobs, and essential services like medical care. It's how we receive our food, fuel, packages, and the basic goods that contribute to our quality of life. When it breaks down, there are real impacts to our everyday lives—lost time, missed opportunities, and service interruptions.

Maintaining a well-connected, reliable, and safe transportation system takes planning. So how does the Alaska Department of Transportation & Public Facilities (DOT&PF) prepare for a world where changing populations, aging transportation infrastructure, funding challenges, and cutting-edge technologies combine? And how does it plan for a state that is so geographically and socioeconomically diverse, with multimodal connectivity that depends on road, rail, water, and air for the most basic needs? The answer is by working with planning partners, agency stakeholders and the public to understand individual and collective needs, framing potential, and using the best data resources and tools to forecast the most likely outcomes.

Alaska Moves 2050, the Statewide Long Range Transportation Policy Plan and Freight Plan (LRTP and FP), outlines goals, policies, investment strategies, and measurable actions for an adaptable and resilient transportation system—a system that will continue to serve all Alaskans, businesses, and visitors far into the future.

To plan for tomorrow, it's important to understand what's happening today. The first step in developing Alaska Moves 2050 was a planning-level assessment of each transportation mode. This assessment identified key issues and trends that may shape the future transportation system. This appendix presents the initial findings of the assessment and provides perspective on what drives and serves market demand for freight transportation in Alaska. It presents statewide performance trends and indicators based on readily available data for the separate programs and infrastructure assets listed below.

While the report is organized by topic, it's important to remember Alaska's transportation assets and programs are part of an integrated system. This connected system requires DOT&PF to keep in mind all potential transportation users, their communities and environmental contexts, and how they move between modes when making choices about how to invest resources, implement programs, or develop projects.

Overview of the LRTP and FP

The purpose of the LRTP and FP update is to guide planning and programming decisions for DOT&PF-owned and managed multimodal transportation assets for the next 25 years. These assets include highway, aviation, transit, rail, marine, and non-motorized facilities. The LRTP is required by federal regulation (23 CFR 450.216) to provide a clear link between policy, planning, evaluation, and the investments that are made through a cooperative statewide planning process. States are generally required to update their plans every five years to address new trends and any new federal regulations. The LRTP is also required by Alaska State Statute (AS 44.42.050).

Ultimately, the plan will present policy recommendations to achieve a common vision developed with stakeholders, businesses, and other federal and state partners.

The plan updates comply with regulatory requirements of the Fixing America's Surface Transportation (FAST) Act and successive federal transportation authorization for long-range statewide transportation plans and state freight plans. This includes addressing the 10 planning factors (23 CFR 450.206):

- Support the economic vitality of the United States, the states, metropolitan areas, and nonmetropolitan areas, especially by enabling global competitiveness, productivity, and efficiency;
- Increase the safety of the transportation system for motorized and non-motorized users;
- Increase the security of the transportation system for motorized and non-motorized users;

- Increase accessibility and mobility of people and freight;
- Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
- Enhance the integration and connectivity of the transportation system, across and between modes throughout the state, for people and freight;
- Promote efficient system management and operation;
- Emphasize the preservation of the existing transportation system;
- Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation; and
- Enhance travel and tourism.

The LRTP and FP are being updated at a unique period in our recent history. The COVID-19 pandemic has impacted, and continues to impact, how, when and by whom the statewide transportation network is used. Travel is restricted at Alaska/Canada border crossings, the summer 2020 cruise season was canceled, air travel was reduced, and at times, limitations were placed on intercommunity movement. Commuters who normally drive, ride the bus, or even fly for businesses are now working remotely, resulting in fewer trips. The pandemic has also resulted in a significant increase (15 percent) in air cargo moving through the Ted Steven's International Airport (ANC). Freight and airlines are seeing increases in e-commerce deliveries.

Unless otherwise noted, data reported in this memorandum were collected prior to March 2020, the beginning of the COVID-19 pandemic in Alaska. Longer-term transportation system impacts of the pandemic are largely unknown at this time. Because the planning horizon used for state transportation plans is long-range—and funding, revenue, and political leadership vary greatly over the planning period—assumptions and a certain amount of judgment have been applied to assess the effects of current trends, forecasts, and technology over the next 20-30 years.

PLANNING PROCESS

This planning effort updates the 2016 LRTP, Let's Keep Moving 2036, and was developed through a series of technical memoranda, meetings with a Statewide Transportation Advisory Committee (STAC) and Freight Advisory Committee (FAC), stakeholder interviews, and public outreach events which ultimately culminated in final documents that serve as Alaska's LRTP and FP. Key phases in the process included:

- **Data Collection and Analysis Phase**. During this phase, a state-of-the-state, high-level assessment was completed to determine how the current system is performing and understand national and statewide trends that will help inform the 2050 vision. The assessment inventoried the planning context, socioeconomic trends, the current transportation system and how it is performing, and the funding climate. This phase included multiple meetings with the STAC and FAC and stakeholder interviews. It also included a virtual public outreach event and survey to gain insight into public priorities. Findings of this phase were documented in:
    - Transportation Assessment Technical Memorandum #1 (material incorporated into this Memorandum)
    - Freight Assessment Technical Memorandum #2 (material incorporated into this Memorandum)
    - Financial Analysis Technical Memorandum #3
- **Strategic Direction Phase**. Visions, goals, and polices for the transportation system were established in this phase, with the focus on moving people and goods safely and efficiently and aligning with federal, state and local priorities for transportation. Performance targets that represent the goals were set to measure progress over time. These measures track key performance metrics at a statewide level to assess whether the desired outcomes are being achieved. Finally, during this phase, scenario planning was conducted to assess the transportation system's performance under three different plausible futures. Scenario planning helps decision-makers consider how the system will perform under different sets of circumstances (such as high, medium, or low economic growth or different investment strategies), and what the trade-offs might be under each scenario. This phase's findings were reported in:
    - Vision, Goals, and Performance Measures Technical Memorandum #4
    - Scenario Planning Technical Memorandum #5
- **The LRTP and FP Plan Development Phase**. Information from the previous phases were used to develop a final LRTP and FP that outline policies to guide planning and programming decisions for DOT&PF-owned and managed assets. The LRTP is a high-level policy document and does not identify specific projects. The FP includes priority freight projects. The final product of this phase, and of the planning process are the Alaska Moves 2050 LRTP and FP.

Performance-Based Planning

As a steward of public transportation dollars, DOT&PF is looking for more efficient, economical ways to keep Alaskans moving through service and infrastructure. This plan update follows a performance-based planning and programming framework to directly link statewide goals and planning to project programming. Performance-based planning is defined by the Federal Highway Administration as "a data-driven, strategic approach, providing for public and stakeholder involvement and accountability, in order to make investment and policy decisions to attain desired performance outcomes for the multimodal transportation assessment." The benefits of this approach include:

- **Improved decision-making.** Decisions are informed by data and therefore more objective.
- **Higher return on investments.** Investment priorities are linked to systemwide transportation strategic goals and desired outcomes.
- **Better accountability and transparency.** Clear expectations are set about the level of performance likely achievable with a given level of funding. It's easier for people to understand why transportation dollars were spent the way they were.
- **Improved performance.** Performance targets (desired outcomes) are set and progress is monitored and measured over time. It becomes possible to answer the question: "Are we achieving what we hoped?"

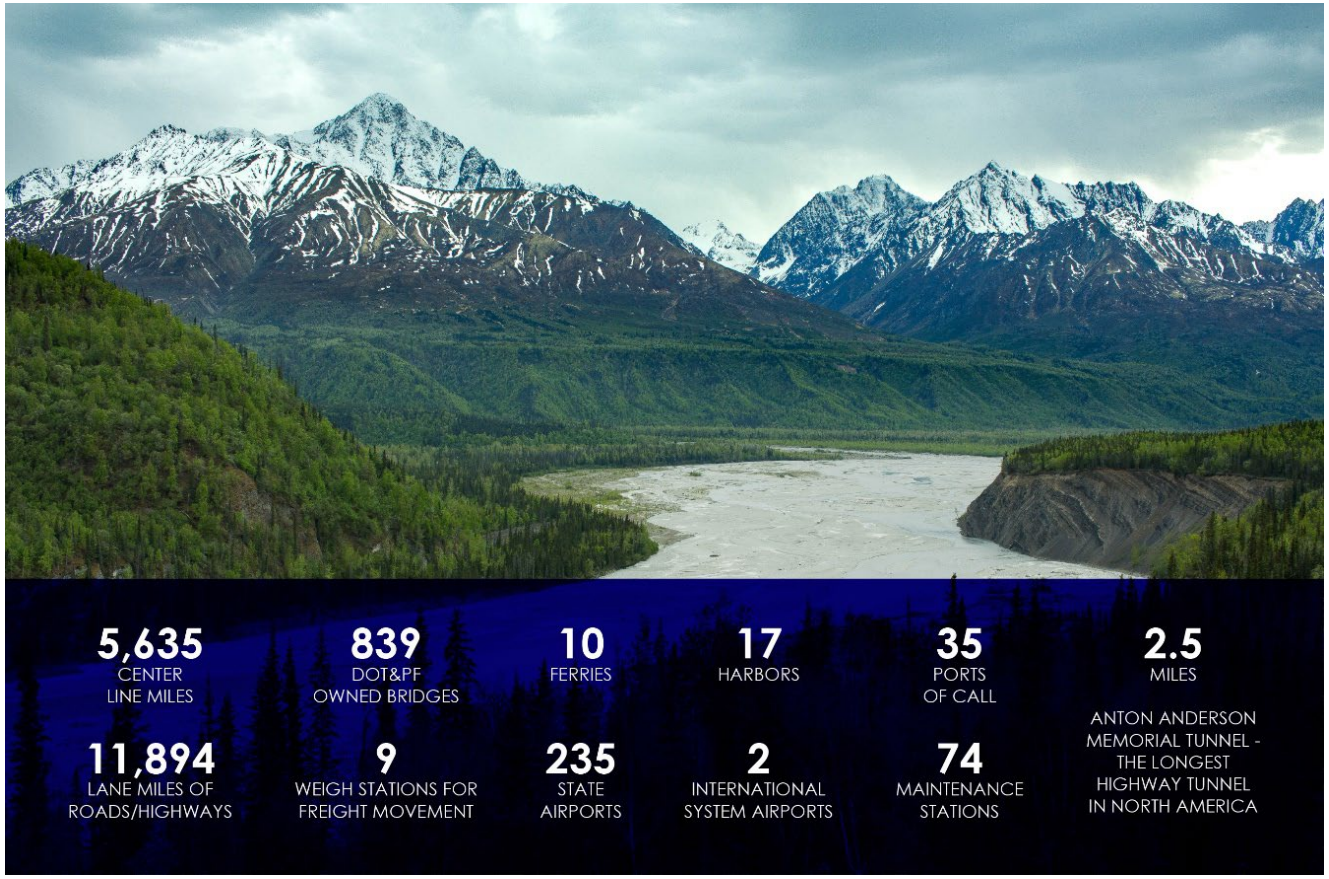
INTERMODAL COORDINATION

Many modes are engaged to move people and goods efficiently for every Alaskan, every day. Within Alaska's 586,412 square miles, 82 percent of communities are not accessible by road. The LRTP/FP focuses heavily on the intermodal nature of the DOT&PF-owned and managed transportation system. Consider the following:

- Alaska's mountain ranges, glaciers, and vast wilderness create natural barriers to transportation. Of the 20 highest peaks in the United States, 17 are in Alaska. There are more than 3,000 rivers in Alaska and over 3 million lakes.
- Alaska is the biggest state in the United States, sure, but it is also larger than the combined area of the 22 smallest U.S. states. Alaska boasts the northernmost (Point Barrow) and the westernmost (Amatignak Island in the Aleutians) points in the United States.
- In the state capital of Juneau, there are no roads that connect to the rest of Alaska or North America.
- The Alaska Marine Highway System (AHMS) stretches over roughly 3,500 miles of coastline, from Bellingham, Washington, to Unalaska in the Aleutian chain, and provides service to 35 communities—many of which are reliant on the ferry for travel and goods provision. For reference, I-90 is an east–west transcontinental freeway and the longest interstate highway in the United States at 3,020.54 miles, stretching from Boston to Seattle.
- The National Highway System is unlike any in the Lower 48. It includes six-lane urban freeway segments with volumes up to 68,000 a day (2019), and 400 miles of the mostly-unpaved Dalton Highway extending to the North Slope with segments seeing as little traffic as 105 vehicles a day (2019).
- Airport services span from the North Slope to the Aleutian Chain. The distances between some airports are comparable to the distance between Minneapolis, Minnesota and Orlando, Florida. Of Alaska's communities, 251 are served exclusively by air.
- All this transportation infrastructure needs ongoing maintenance, and in some cases, reconstruction or replacement to increase efficiencies and safety, mitigate congestion, and improve resiliency and redundancy in the system. This is true for all aspects of the state's transportation infrastructure: highway systems, rail and freight, bicycle/pedestrian, air, maritime, and public bus systems. This requires the joining together of the more urban/suburban communities and rural/remote areas into a single system that incorporates and maximizes all modes to enable economic growth, move goods, and improve personal mobility.

Attachment A contains an overview of the documents reviewed to inform this assessment.

Figure 1. DOT&PF Transportation Assets



The statewide LRTP/FP is one of many critical state, regional, and local plans aimed at improving Alaska's transportation system. It plays a critical role in unifying regional and modal plans into a comprehensive vision for the future statewide transportation system. While DOT&PF is directly responsible for certain assets, metropolitan planning organizations (MPOs), local governments, tribal entities, transit agencies, federal and other state agencies, and private companies also fund, own, operate, and/or maintain connecting assets. Federal-aid-funded transportation projects must also be based on a continuing, comprehensive urban transportation planning process undertaken cooperatively by the state and local governments. Across the state, there are:

- 165 municipalities[i], 144 cities, 19 boroughs, and one federally-incorporated reservation that have varying powers when it comes to the provision of transportation services.

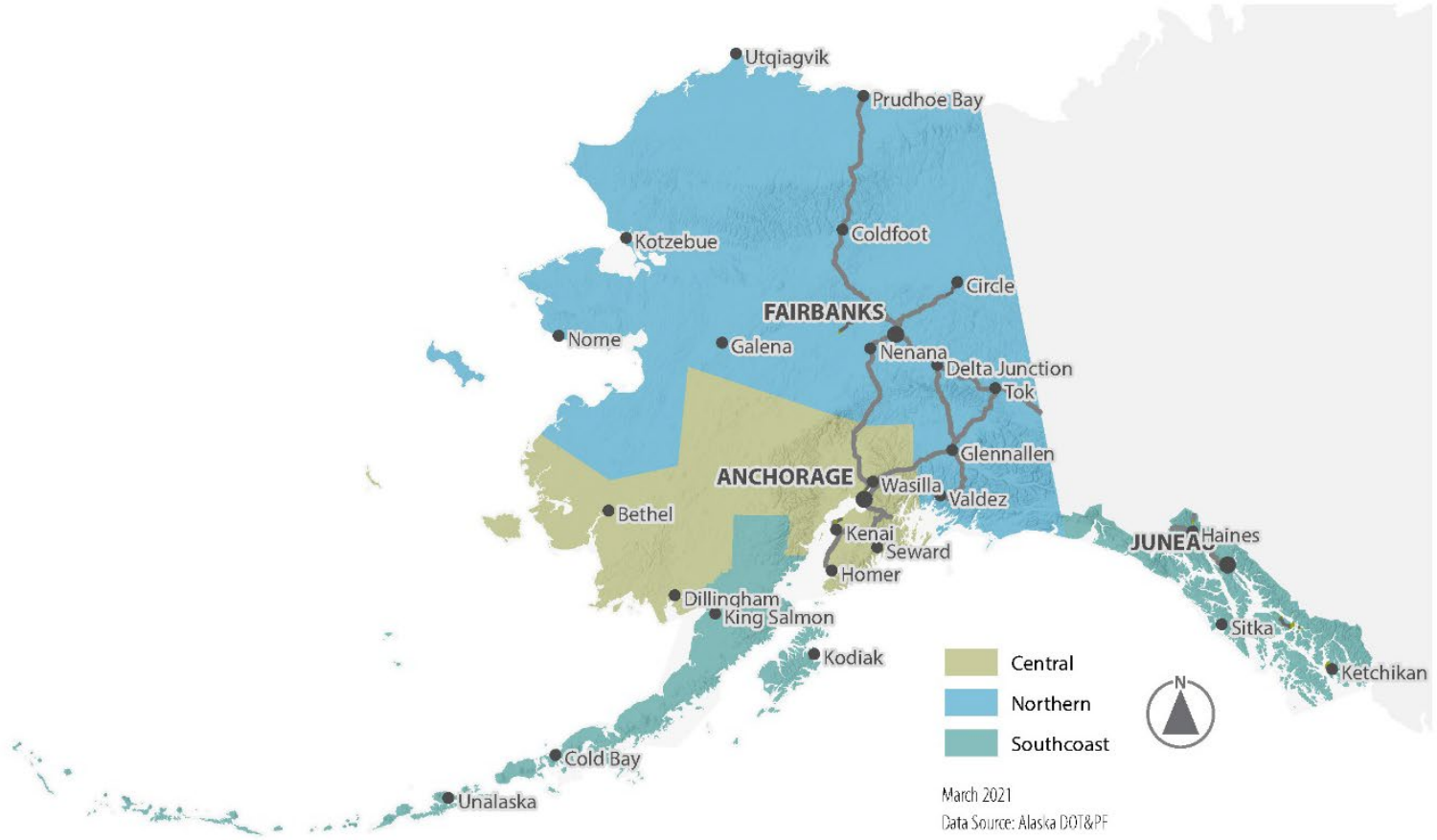
- Regional, local, and tribal governments, and regional tribal nonprofits. Today, almost all 229 federally-recognized tribes[ii] in Alaska have tribal councils as their governing bodies.
- MPOs—regional transportation policymaking and planning bodies with representatives of local, state, and federal governments and transportation authorities—that manage the surface transportation planning process in urban areas, in cooperation DOT&PF.

Specific to roadways, the U.S. Department of Transportation (USDOT) requires urban areas with a population greater than 50,000 to establish an MPO. MPOs are tasked with distributing federal funds for transportation projects in a manner that upholds federal and state transportation goals while also monitoring federally mandated performance measures for safety and efficiency. MPOs develop a variety of work products, including a metropolitan transportation plan (20-year forecast) and transportation improvement plan (short-term funding program) so expenditures for transportation projects and programs are based on a cooperative planning process that fulfills the regional vision and conforms with federal requirements. There are two MPOs in Alaska and a third being formed:

- **Anchorage Metropolitan Area Transportation Solutions (AMATS).** AMATS covers the urbanized Anchorage Bowl and Chugiak-Eagle River areas.
- **Fairbanks Area Surface Transportation (FAST) Planning.** FAST Planning covers the urbanized areas of the Fairbanks North Star Borough, including the cities of North Pole and Fairbanks.
- **Mat-Su MPO (currently being formed).** The Mat-Su MPO is expected to cover the cities of Wasilla and Palmer as well as the Lakes area and Knik-Fairview.

To facilitate serving such a diverse and large constituency, DOT&PF is administratively divided into three regions: Northern Region, Central Region, and Southcoast Region.

Figure 2: DOT&PF Regions



Operation and Maintenance

DOT&PF's maintenance and operations personnel are responsible for the day-to-day operation and maintenance of the state's transportation system. Maintenance and operations are organized geographically by the three DOT&PF Regions.

- **The Central Region** has four districts: Matanuska-Susitna, Anchorage, Kenai Peninsula, and Southwest. It maintains over 4,630 lane miles of roads, and over 570 lane miles of runways at 70 airports. This includes four primary airports located in Aniak, Bethel, Dillingham, and Homer. Of these, Bethel, Dillingham, and Homer airports are certificated by the FAA under the federal government's Part 139 regulations and operated to meet specific standards and guidelines. Local contractors maintain 46 of the region's smaller, community airports. Central Region is also responsible for maintenance and operations of the Whittier Tunnel, the longest highway tunnel in North America at 2.5 miles.
- **The Northern Region** response territory comprises 65 percent of the state's total land area, and is divided into seven districts: Tazlina, Tok, Fairbanks, Denali, Dalton, Valdez, and Western. It maintains over 8,800 lane miles of roads and highways (paved and unpaved) and 1,500 lane miles of airport surfaces. Of the 99 airports for which they are responsible, four are large primary airports certificated by FAA: Utqiagvik, Deadhorse, Kotzebue, and Nome. Local contractors maintain 60 of the region's smaller community airports. The Northern Region is responsible for the highways that parallel the entire length of the Alyeska Pipeline from the North Slope oil fields to the marine terminal on the shores of Prince William Sound in Valdez.
- **The Southcoast Region** has two separate districts that serve the coastal regions of Southeast Alaska, Kodiak Island, a portion of the Alaska Peninsula, and the Aleutian Chain. It maintains 1,528 lane miles, 43 harbors, and 69 airports, including Part 139 airports in Adak, Akun, Cold Bay, Iliamna, Kodiak, King Salmon, Unalaska, Sitka, Wrangell, Petersburg, Gustavs, and Yakutat. The Southcoast Region contracts with local communities and private contractors to maintain state assets where there is no DOT&PF presence.

Operations and maintenance responsibilities include all the activities needed to keep highways, bridges, airports, and harbors in good condition and safe for the traveling public. These include highway and airport snowplowing and snow hauling; avalanche control and mitigation; vegetation management; guardrail repair; sign maintenance; street/traffic light repair; drainage structures maintenance; and fence maintenance. Operations and maintenance personnel also respond to all emergency/weather related situations, such as snow and ice that needs to be removed, fallen trees, mud and landslides, and roadway/airport flooding.

Maintenance and operations are funded through the state budget. As state revenues decline, there is less money available for maintenance. Deferred maintenance needs continue to grow, and continuing to provide the same level of service with less money will become increasingly challenging for all modes. Of particular concern is snow removal. Delays in clearing snow from facilities impacts economic activities and disrupts daily lives. Many maintenance and operations personnel are also aging out, and it is more and more difficult to find qualified replacements. This will be an issue in coming years.

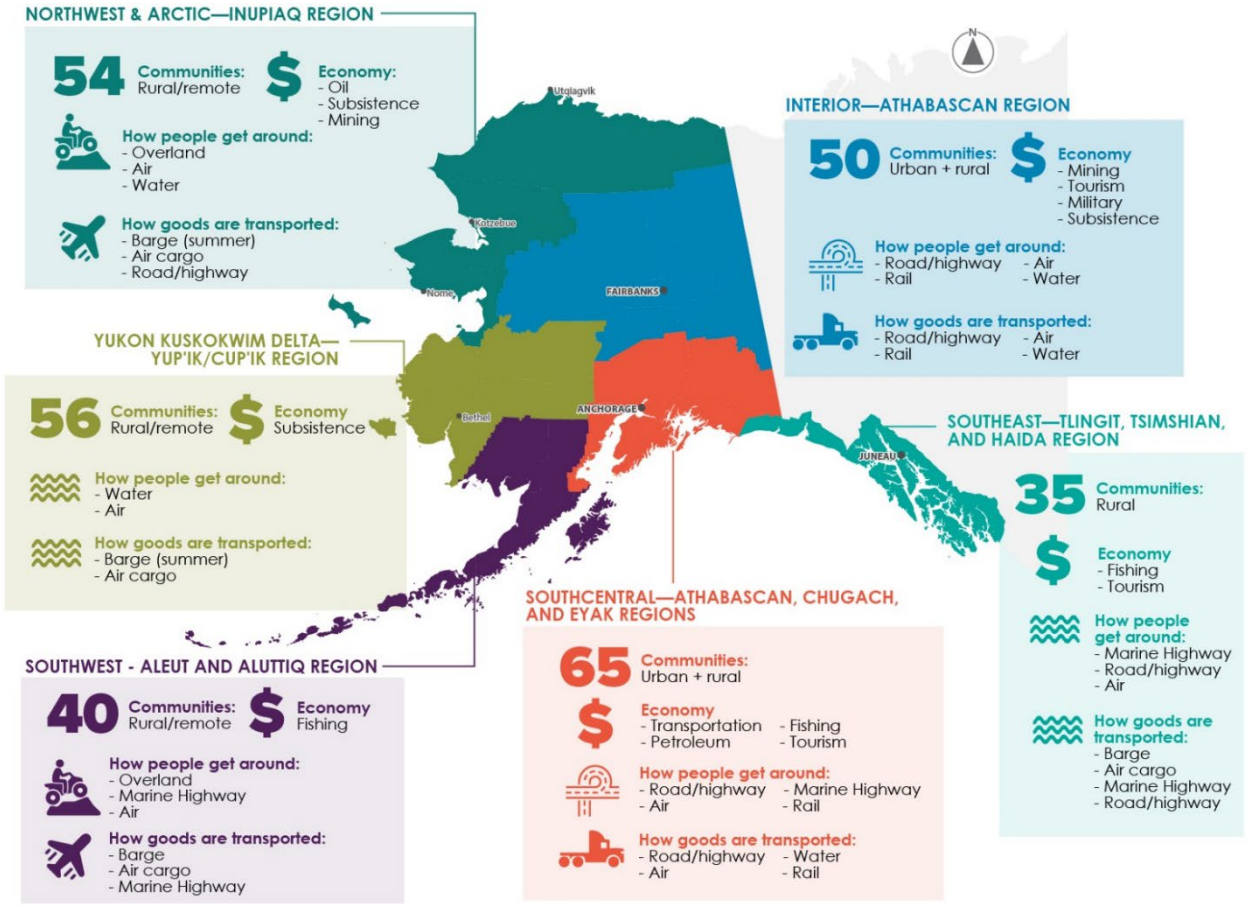
PLANNING CONTEXT

Transportation-related issues and potential solutions vary across the geographic, environmental, cultural, and economic conditions found in Alaska.

Alaska's Cultural and Geographic Regions

The diverse geographical areas DOT&PF serves have inherent challenges and a diverse population, including Alaska Natives, who have inhabited their communities for thousands of years and still depend on the land for their subsistence lifestyle (Figure 3). Many communities within Alaska's 586,412 square miles are not accessible by road. These communities can be reached only by air, sea, river, or overland using ATVs, snow machines, or even sled dogs.

Figure 3. Alaska's Cultural and Geographic Regions



Source: U.S. Census Bureau

Northwest & Arctic—Inupiaq Region

This region is made of 54 communities as well as the North Slope oil fields. Most of the communities are small (25-800 residents) and served by the larger hub communities, including Kotzebue, Nome and Utiqiagvik. Communities are accessible year-round primarily by air. There are no permanent interconnecting community roads; however, ice roads and snow roads serve an important role in connectivity during winter months. Where possible, land travel is also accomplished over trails by snow machine or ATV. Year-round freight is by air cargo and most communities on the west coast are able receive summer barge freight service. The lack of interconnected roads means lighter goods, such as mail and perishable food, typically move by air. Bulkier, heavier materials like dry goods, fuel, and building materials arrive by ocean-going barge. Access for the north slope oil fields is via the 414 mile Dalton Highway, a gravel service road paralleling the Trans Alaska Pipeline System (TAPS) that links Prudhoe Bay to the public highway systems. The Dalton Highway serves mainly as a freight corridor to the oil fields and a summer excursion route for tourists. Subsistence is central to the region's economy.

Yukon Kuskokwim (Y-K) Delta—Yup'ik/Cup'ik Region

The Y-K Delta is one of the largest in the world, stretching across 59,000 square miles. The region includes 56 remote communities. The largest hub community is Bethel, which is home to approximately 6,300 residents. Y-K Delta residents use a system of airports, rivers, ports, barge landings, and trails for transportation to, from, and within the region. Transportation choices vary by season. Given the lack of inter-village roads and the wet, lowland conditions in much of the region, overland travel is not common. In the summer months, river transportation is by skiff or small boat, with barges bringing in fuel and freight. In winter months, river travel is by snow machine, dog sled, or passenger vehicle (via ice roads and winter trails). In colder months, fuel and freight must be flown in, as barges are unable to navigate the frozen rivers.

Southwest—Aleut and Aluttiq Region

The Southwest Region stretches over 1,000 miles into the Pacific Ocean. This largely maritime region is home to some of the most productive fishing grounds in the world—Bristol Bay, the Bering Sea, and the Gulf of Alaska. The fishing industry is the basis for a significant portion of the regional economy. The region includes approximately 40 communities that are not connected to the National Highway System (NHS) or, for the most part, one another. The transportation system comprises airports; paved and gravel roads; ATV trails and winter snow machine trails; board roads/boardwalks; river channels; and the Pacific Ocean. Walking and biking are common modes of transportation. People living here receive their daily goods, fuel, food, vehicles, building supplies, and other domestic goods via barge delivery or air transport.

Southcentral—Athabascan, Chugach, and Eyak Regions

The Southcentral region is home to about 65 communities, most connected via the roadway system, with the exception of Cordova and several smaller communities in Prince William Sound. The area includes more than half the state's population and is made up of Cook Inlet, the Matanuska-Susitna Valley, the Kenai Peninsula, Prince William Sound, and the Copper River Valley. It has the fastest growing area in the state, the Matanuska-Susitna Borough, and is home to Joint Base Elmendorf Richardson (JBER). Anchorage is the largest city and transportation hub for multimodal connections to the rest of the state. People and goods move via a network of highways, airports, ferries, rail, and marine freight. This region includes the Port of Alaska, through which 90 percent of the state's goods pass; Ted Stevens Anchorage International Airport (ANC), one of the world's busiest cargo airports; and the terminus of the TAPS in Valdez. Transportation, tourism, fisheries, and petroleum production are important economic activities in the region.

Interior—Athabascan Region

Though Fairbanks is the economic hub of activity in the Interior, there are about 50 other communities in the region, many of which can be accessed by the highway system. Communities not on the road system rely on barges and air travel. This region is also home to Eielson Air Force Base, Fort Wainwright, and Fort Greely. The interior region has two international border crossings, 36 state-owned public airports, including Fairbanks International Airport (FAI), over 1,100 miles of national highways and about 800 miles of state highways. The Alaska Railroad also provides service between Anchorage and Fairbanks. Rich deposits of silver, gold, copper, lime, nickel, platinum, palladium, gravel, coal, and other minerals are mined in the region. In addition to resource development, tourism is important to the economy.

Southeast—Tlingit, Tsimshian, and Haida Region

This 500-mile long maritime area is home to 35 communities. Residents are distributed throughout the region in isolated communities on the mainland and major islands, separated by the mountains and waters of the inside passage. The Alaska Marine Highway System (AMHS) and air service play the most important role in providing transportation to passengers and vehicles between communities in the southeast. Only three communities in the region—Haines, Skagway, and Hyder—have road connections to the continental highway system. Roads are the primary way to get around within communities, using short highway segments for local travel. Barge operators and air carriers carry the bulk of freight. Federal and state government, fishing, and tourism are the region's top contributors to the economy.

Climate & Environment

Freight and transportation system infrastructure affects both the natural and human environments. In turn, changes in the climate and environment can impact the safety, mobility, and resiliency of transportation systems.

All federally-funded or federally-involved transportation-related activities require an environmental analysis to comply with the National Environmental Policy Act (NEPA) and applicable state and federal standards.

Factors that have a strong correlation to freight and transportation systems operations and maintenance are summarized below.

Climate

As the global climate has changed in recent decades, arctic and subarctic areas have shown a more rapid shift. Temperatures in arctic areas have increased approximately twice as much as the global average over the last 30 years.[iii] The impacts are increasing the cost of construction and repair efforts needed to maintain infrastructure for all modes, but particularly roadways and airfields.

Impacts of the warming trend vary in different parts of the state. In interior areas, permafrost thaw and subsidence is generally the most noticeable issue. The phenomenon known as drunken trees, visible around the Fairbanks area, is the clearest indicator of permafrost subsidence. When permafrost melts, the consistently frozen soil that remains becomes very soft. For roads, runways, and pads, this results in heaves, shifts, slumps, and sinkholes.[iv]

"Drunken Forest." Source: U.S. National Park Service

In the northern and western areas of the state, while permafrost thaw is a concern, coastal erosion is a bigger challenge. Coastal erosion appears to be tied to reduced sea ice cover. Without the ice armoring the shore, storm surges cause the shoreline to recede at an alarming rate: 1.4 meters per year, on average, with some areas experiencing as much as 20 meters per year.[v] Several villages, including Napakiak, Newtok, Shishmaref, and Kivalina, are considering relocation to higher ground, which requires new transportation systems internal to the communities, evacuation routes, airports, and associated infrastructure. The southern portions of the state are most impacted by the increasing storm intensity, with stronger winds or more precipitation. Record rainfalls are leading to flooding and landslides, as experienced in Haines in December 2020.

Climate change is also resulting in the retreat of glacial ice, which causes increased flooding, changing water courses, and in the case of Valdez, the lower river floodplain has been aggregating up to 3 inches of glacial gravel per year that has to be managed to protect land uses and bridges.

Air Quality

Air quality is a localized issue. Poor air quality can be caused or exacerbated by the transportation system and its use. Air quality is regulated nationally under the Clean Air Act (1972), which designates National Ambient Air Quality Standards for a range of pollutants.

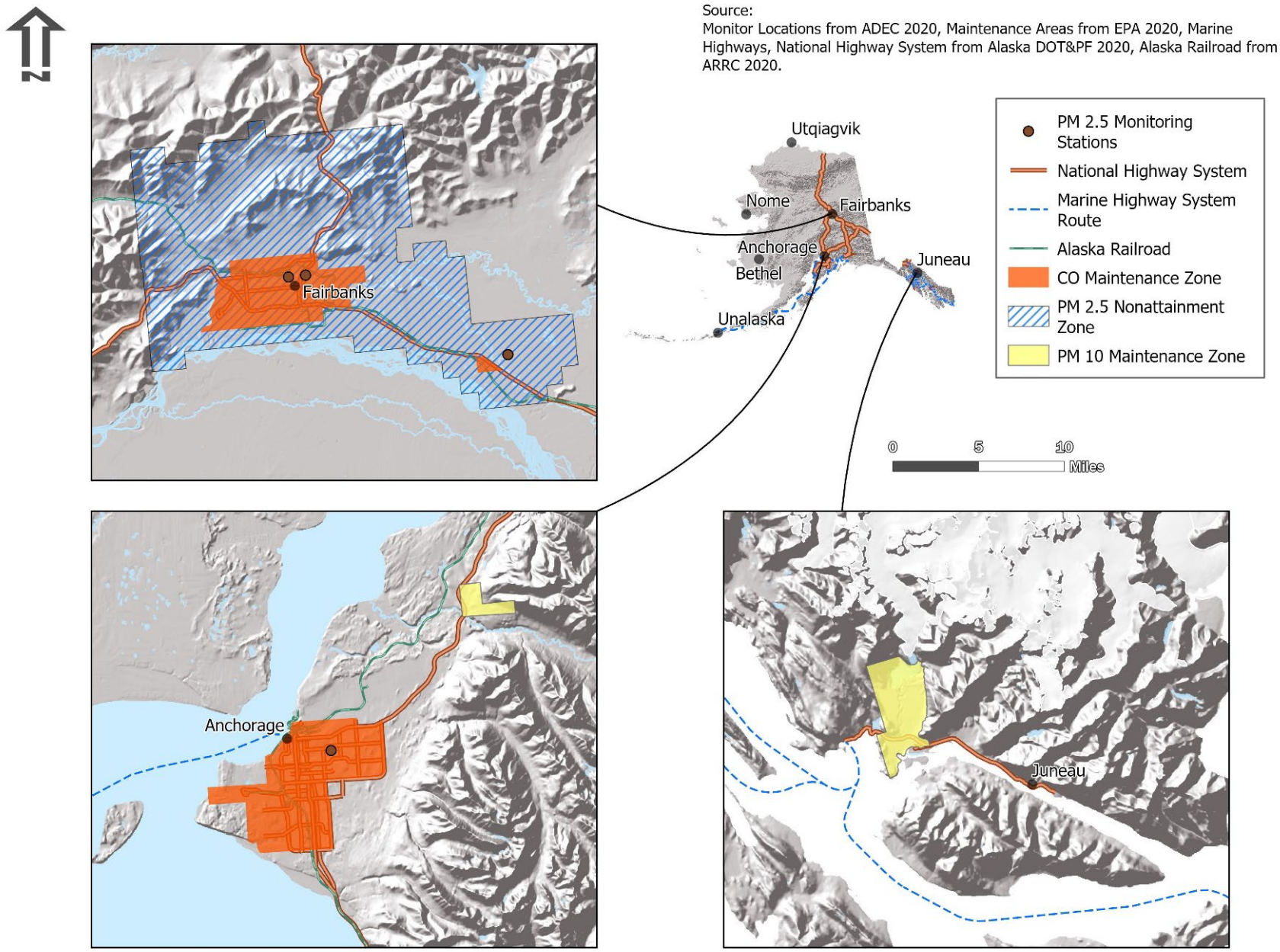
Air quality issues are typically seasonal, with summer and winter pollutant concentrations. In winter, carbon monoxide (CO) levels increase dramatically in Urbanized Areas, particularly in Fairbanks, where the bowl-like topography and frigid air create temperature inversions that reduce air flow and concentrate the city's emissions.[vi] Cold starts and engine idling during warmup contribute to higher CO levels, as does vehicle queueing at signalized intersections.

DOT&PF has identified problem intersections in Anchorage and Fairbanks and implemented solutions to increase traffic flow as a means of decreasing CO concentrations. As a result, Anchorage has not exceeded the regulatory CO threshold since 1996, and Fairbanks has not exceeded the threshold since 1999.

In rural areas, gravel and dirt roads are exposed after spring thaw and breakup. As these surfaces dry, airborne particulate matter of 10 microns or less (PM10) becomes more prevalent as vehicles disturb the dry road surface. Particulate matter of 2.5 microns or less ($PM_{2.5}$), generally caused by wood smoke and biofuel burning, is also a concern. Exposure to fine particles can cause short-term health effects such as eye, nose, throat and lung irritation, coughing, sneezing, runny nose, and shortness of breath. Long-term exposure can affect lung function and worsen medical conditions such as asthma and heart disease.

The Alaska Department of Environmental Conservation monitors for $PM_{2.5}$ in Fairbanks, North Pole, Anchorage, Butte, and the Mendenhall Valley area of Juneau. Only Fairbanks and North Pole currently have designated air quality control boundaries (non-attainment areas) for $PM_{2.5}$ concentrations.

Figure 4. PM10 Problem Areas, CO^2 Areas, and PM2.5 Monitor Locations

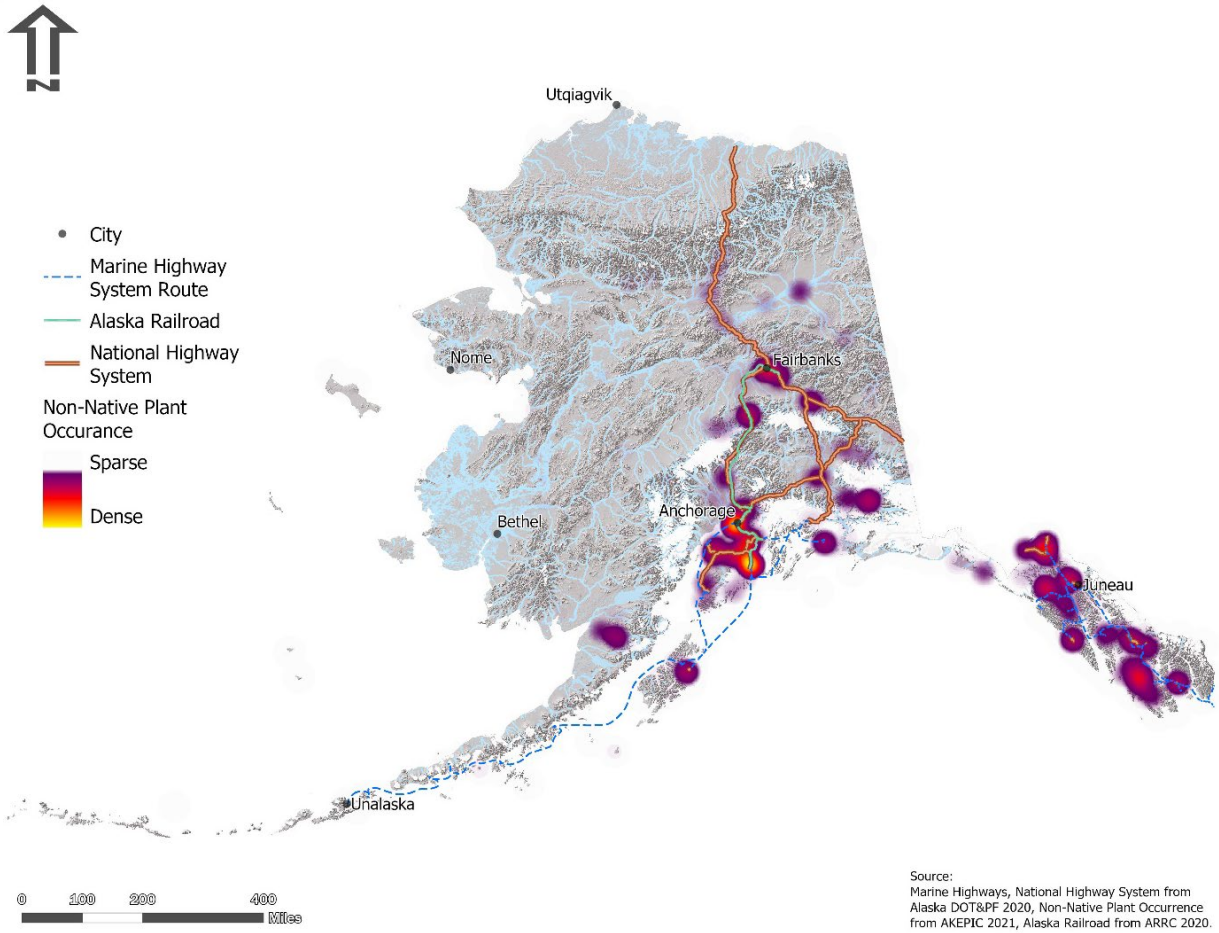


Fish & Invasive Species

As the temperate, subarctic and arctic environments warm, a broader range of non-native species have successfully colonized some of Alaska's ecosystems. There is a correlation between Alaska's surface transportation system and the prevalence and spread of non-native species. Primary spread patterns for invasive plants are along rivers and roads, exemplified by the thick ground cover of bird vetch (*Vicia cracca*) along highway and major arterial embankments, or the presence of European bird cherry (*Prunus padus*) along many Anchorage waterways. DOT&PF tries to minimize introduction and spread of invasive species by requiring a mix of approved native seed to be applied to road embankments to slow the spread of invasive species.

In addition to the surface transportation network, aquatic species may be spreading by hitching rides on boats or floatplanes. Elodea (*Elodea canadensis*) is a non-native plant that was first found in Alaska in 1982. These species can adversely impact important fish resources.

Figure 5. Non-Native Plant Occurrence Along Road, Rail and AMHS Routes



The Alaska Exotic Plants Information Clearinghouse is a database of non-native plants hosted by University of Alaska Anchorage. Most non-native plants are considered invasive.

Freshwater and saltwater fish, including the many species of Pacific salmon, contribute significantly to the economy through commercial and sportfishing as well as supporting subsistence needs. Some Alaskan waterways have seen impacts to historic salmon populations that correlate to development pressures, including urbanization and increased surface impermeability, and construction of dams and reservoirs.

These impacts result from:

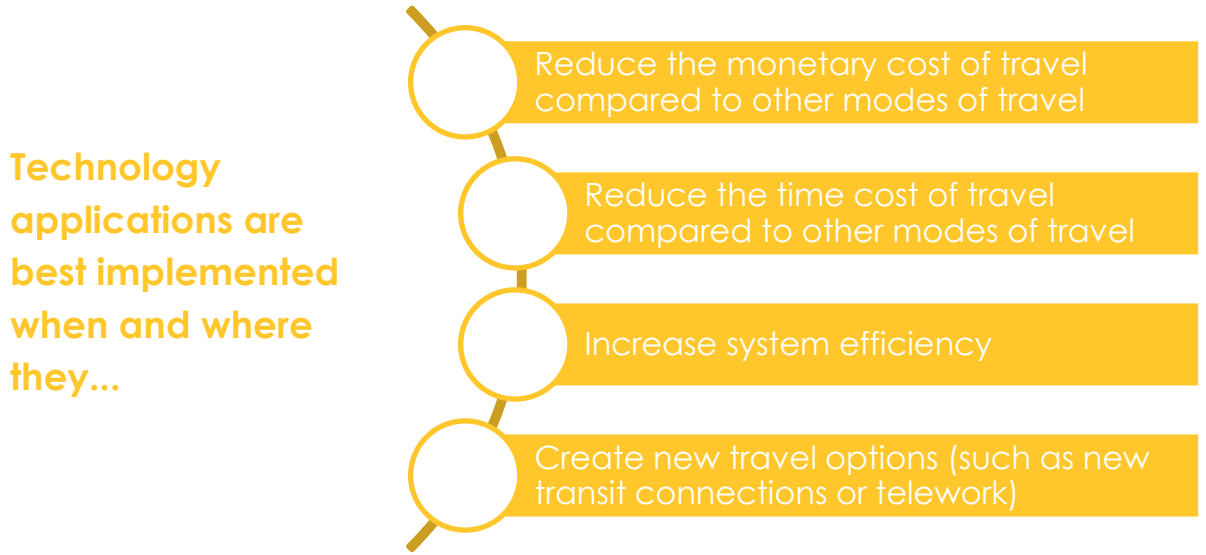
- Constriction of waterways and flood plains through bridges or culverts, as these structures typically do not account for the entire width of a waterway's flood margin. Over the past decades, improvements to design criteria have led to increases in culvert size and improvements in substrate grade and material specifically to address fish passage.
- Increased sediment contributions to waterways at concentrated stormwater outfalls, even with regular maintenance.
- Chemical inputs from roadway vehicles. These have recently been linked to salmon mortality near heavily urbanized areas following significant rainfall.[vii]

Emerging Technology

Emerging transportation technologies encompass a broad range of evolving applications of science, engineering, and social organization that have the potential to transform how people and institutions use land and transportation systems in urban and rural settings.[viii] Examples of emerging technologies include fiber optic networks and 5G communications, connected and automated vehicles, mobility as a service, big data analytics, and electrification. Individually and together, these emerging technologies are changing the ways people, goods, and information move.

Understanding emerging technologies and accounting for them in the long-range planning process enables Alaska to develop reasonable expectations for the types, timelines, and impacts of technologies that are expected to impact the state. The potential impacts are subject to technology development, market direction, and policy guidance. The transportation planning process must adapt as technologies develop and markets evolve. Technology applications are best implemented when and where they are used to achieve statewide goals.

Figure 6. Implementing Technology Applications



Applications of Emerging Technology

The following section highlights existing emerging technology applications being used by DOT&PF and its partners.

- **Intelligent Transportation Systems (ITS).** ITS apply sensing, analysis, control, and communications technologies to transportation infrastructure, vehicles, and users to improve safety, mobility, and efficiency. ITS are used to ease congestion, improve traffic management, minimize environmental impacts, and improve user experience. DOT&PF has implemented several advanced ITS that are essential for efficient management of facilities and equipment, such as: [ix]
    - **Traffic Management Center (TMC) Remote Access**. DOT&PF staff have remote access to traffic signal controllers and traffic camera feeds enabling live tracking, equipment diagnostics, and signal timing adjustments.
    - **Alaska 511 Traveler Information System.** Travelers have access to real-time weather and condition reports along the road system, including livestream camera and video feeds, accessible via phone, website, apps, and social media. DOT&PF also uses portable message boards (PMBs) along remote highways to inform travelers in areas with limited cell phone coverage of upcoming hazards. Messages are updated in real time from maintenance stations through PMB software.
    - **Road Weather Information System (RWIS) Network.** Data stations along major transportation corridors provide real-time data via an online map. Data vary but generally include atmospheric information, precipitation accumulation, camera feeds, and pavement surface and subsurface temperature observations.
    - **Smart Snowblower/Snowplow.** GPS- and radar-based systems are used on snow-removal vehicles to aid in navigation and collision avoidance along the Richardson Highway in Thompson Pass.
    - **Online Tracking/Ticketing Systems**. The AMHS has developed an online vessel tracking system to display real-time vessel arrival and departure information for passenger planning purposes. Where fixed transit service is available, technology is increasingly incorporated into the passenger experience, including mobile ticketing/electronic payment, real-time tracking of buses from a hand-held device or computer, and online trip planning capabilities.

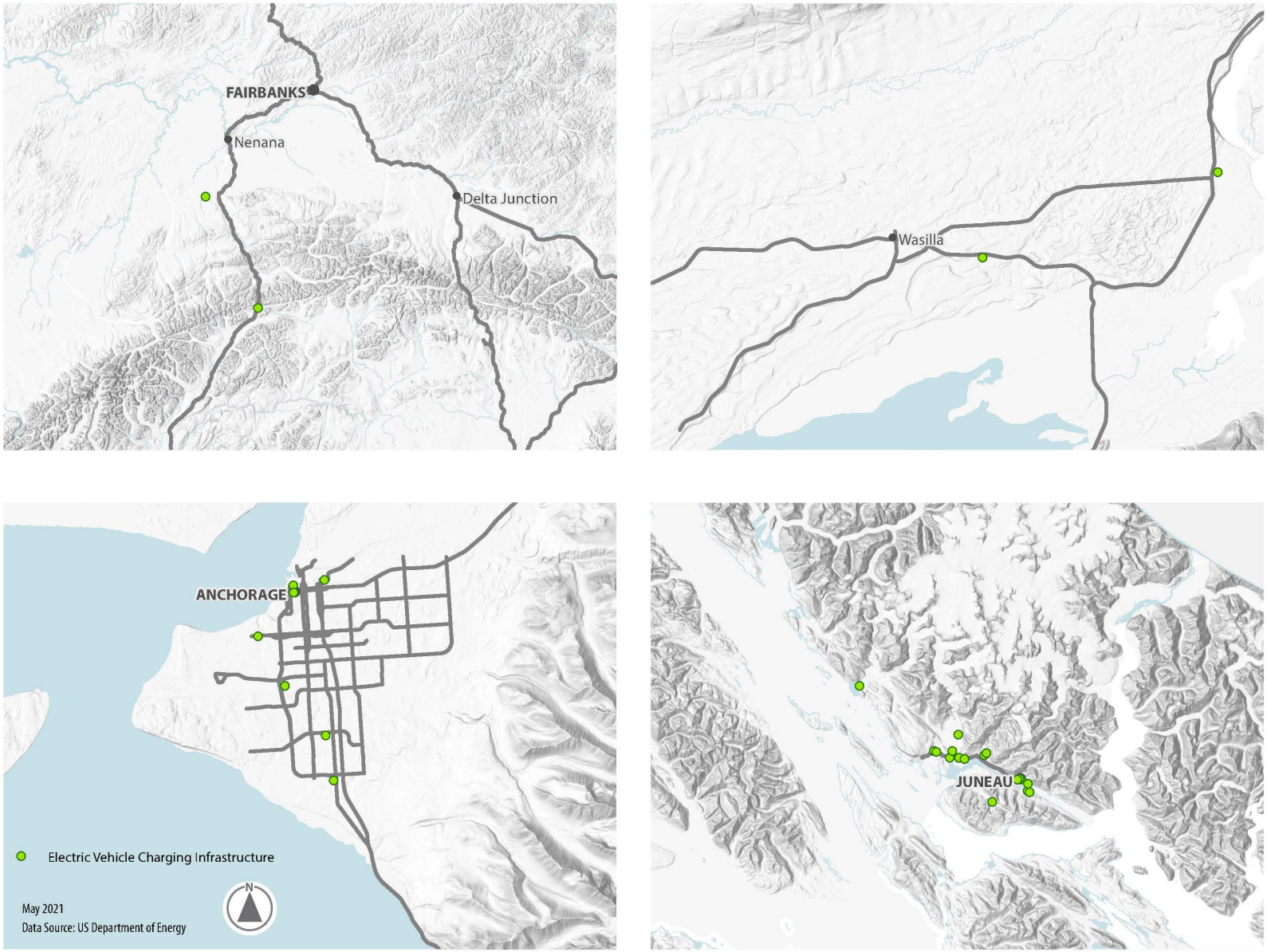
- **Fiber Optic Networks/5G Cellular Networks.** Fiber optic and 5G cellular technologies form the high-speed communications backbone required to support the large quantities of data produced and analyzed for connected and automated vehicles, traffic management systems, and other emerging technologies. Fiber optic networks are expanding, including the first solely land-located connection between Alaska and the contiguous United States, completed in May 2020.

Figure 7. Telecommunications Infrastructure

- **Automated Vehicles (AVs).** AVs encompass a wide variety of technologies and applications across all modes. In recent years, there has been significant industry focus on the development and pilot testing of cars, buses, and trucks capable of performing some or all driving functions, with the goals of increasing system safety and efficiency. While connected and automated vehicles (CAVs) have gained much attention for their recent advancements, it will likely still be decades before widespread adoption and market penetration will significantly alter travel demand patterns, though advanced driver assistance technologies are becoming more widespread. DOT&PF recently completed a CAV readiness research report, which concluded that "Alaska is at an early stage of CAV readiness" based on the U.S. Department of Transportation (USDOT) Transportation Systems Management and Operations (TSMO)/CAV Capability Maturity Model framework[x]. DOT&PF is currently developing a framework plan for CAV readiness including the identification of potential pilot projects.

- **Electrification.** In recent years, battery technology has evolved to reserve more power, charge more quickly, and maintain a longer use cycle, resulting in lower-cost electric vehicles (EV) and increased larger vehicle electrification applications (buses, trucks, ferries, etc.). Demand for charging infrastructure is likely to increase in coming years.
    - EV charging infrastructure (EVCI) is available at several private businesses in Anchorage, Palmer, Wasilla, and Fairbanks. Juneau has both private and public EVCI locations. The Alaska Energy Authority has dedicated funds from the State Energy Program (SEP) towards establishing an Alaska Electric Vehicle Working Group and installing charging stations at state-owned facilities.[xi] Additionally, federal Congestion Mitigation and Air Quality (CMAQ)-funded plug-in infrastructure can double as low-power vehicle charging.
    - Private EV charging stations that are open for public use are located sporadically along the Parks Highway as far north as Denali State Park.
    - Juneau's first electric transit bus entered service in March 2021, and the city plans to replace its entire fleet of 18 buses with battery-powered vehicles.
    - The Municipality of Anchorage tested cold-weather battery performance and charging operations using an electric/battery-powered bus in 2018.
    - Tok Transportation has replaced one diesel school bus with an electric/battery-powered model funded by an Alaskan Energy Authority grant.
- **Crowd-Sourced Data and Big Data Analytics**. As the telecommunications industry advances, it enables the collection of crowd-sourced data, in areas such as origin-destination, traffic conditions, and infrastructure conditions. Aggregated and anonymized, over time this data can be used to better inform modelling, planning, operations, and design.
- **Unmanned Aerial Systems (UAS)**. A variety of UAS, hybrid airships, and vertical takeoff and landing (VTOL) unmanned cargo aircraft are currently being developed. These technologies are being tested in Alaskan communities because they have the potential to operate at remote and inaccessible locations. Private companies and DOT&PF are increasingly using drones or UAS technologies to conduct infrastructure inspections and collect data.[xii] These modes of air transportation require only a fraction of the infrastructure development needed to support conventional aviation modes.[xiii]

Figure 8. Electric Charging Station Infrastructure



Key Challenges and Opportunities Related to Emerging Technologies

CHALLENGES

- Reliability and costs associated with key infrastructure needs, specifically electricity and internet, varies significantly between urban, rural, and remote areas, and will be a barrier to widespread implementation.
- Inconsistent cellular data coverage limits continuous communication and data collection and analysis.
- Extreme weather conditions challenge the capabilities of many current emerging technologies, such as automated driving system sensors and EV battery range.
- Limited state and local funding is available for pilot projects to apply new technologies.

OPPORTUNITIES

- Alaska Moves 2050 is the first Alaska LRTP/FP to fully incorporate performance-based planning, which better equips DOT&PF to monitor and plan for the impacts of emerging technologies.
- DOT&PF can begin collecting, synthesizing, and maintaining emerging technology data sources (i.e., GIS-based maps of fiber optic network, EV charging infrastructure, alternative fuel stations, etc.).
- It will be possible to build on advancements and lessons learned by peer states based on current pilot projects and infrastructure investments.[xiv]
- DOT&PF can develop goals and policies that are flexible enough to remain valid as new technologies emerge and their impacts are realized.
- The adoption of some technologies may require incentivization, such as publicly-funded electric vehicle charging infrastructure. DOT&PF can monitor to assess whether potential incentives are achieving desired behaviors and adjust the fees or incentives as needed. Agency staff must be empowered to adapt fees or adjust rules in a timely manner, especially at the beginning of project implementation.
- Emerging technologies are generating huge data sets that many public agencies do not yet have the resources to manage. Coordinating across agencies and collaborating with the private sector will help agencies remove data analysis and storage barriers, which will facilitate technology implementation and empower agencies through data-driven decision-making.

Population & Economy

Where people live and how and where they work affects transportation infrastructure design and locations. Employment patterns and industry activity drive the demand for transportation through the movement of people, material inputs, and products.

Population

Alaska is the largest state in the country, encompassing 586,412 square miles of land and 33,904 miles of coastline,[xv] yet it has the fourth smallest state population.[xvi] In 2020, Alaska was estimated to have 728,900 residents.[xvii] Over the last two decades, the population grew steadily until 2013, when it plateaued. It has been in a slow decline since 2016. Despite the recent decline, the population grew nearly 17 percent from 2000 to 2018, and the Alaska Department of Labor and Workforce Development's medium forecast shows that it is expected to continue growing from 2020 to 2050.

As with past population growth, different regions are expected to see stronger growth than others. The population centers, primarily the Municipality of Anchorage, Matanuska-Susitna Borough, and Fairbanks North Star Borough, have seen the most growth over the last 20 years and are expected to gain the most population over the next 30. These are areas with more established and connected transportation infrastructure, and that already have high population bases. Areas that are less connected and less populated are expected to remain small and, in many areas, shrink in size. Table 1 summarizes the historical and projected changes in population from 2000 through 2050.

Table 1. Historical and Projected Changes in Population, 2000 to 2050

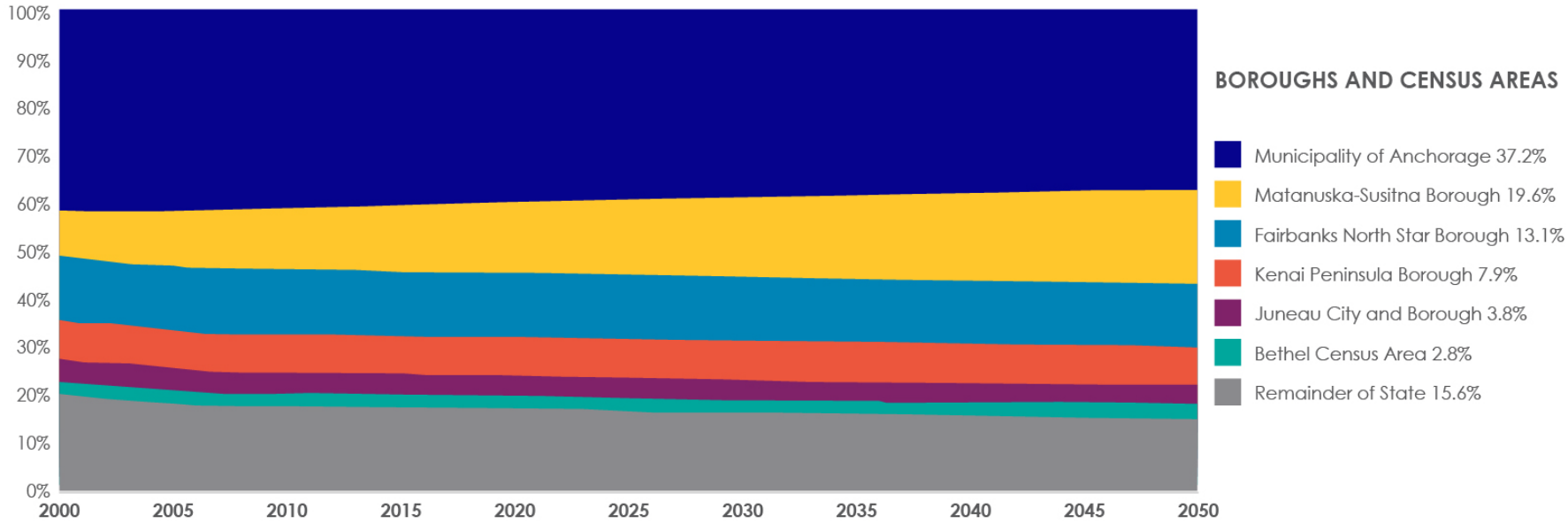
New Borough	Population 2000	Population 2020	Population 2050	Change in Population, 2000 to 2020	Percent Change in Population, 2000 to 2020	Projected Change in Population, 2020 to 2050	Projected Percent Change in Population, 2020 to 2050
Matanuska-Susitna Borough	59,322	107,829	162,171	48,507	81.8%	54,342	50.4%
Municipality of Anchorage	260,283	290,406	307,276	30,123	11.6%	16,870	5.8%
Fairbanks North Star Borough	82,840	97,080	108,210	14,240	17.2%	11,130	11.5%
Kenai Peninsula Borough	49,691	58,671	65,586	8,980	18.1%	6,915	11.8%
Bethel Census Area	16,047	18,162	23,098	2,115	13.2%	4,936	27.2%
Kusilvak Census Area	7,028	8,184	11,536	1,156	16.4%	3,352	41.0%
North Slope Borough	7,385	9,905	12,075	2,520	34.1%	2,170	21.9%
Nome Census Area	9,196	9,812	11,231	616	6.7%	1,419	14.5%

New Borough	Population 2000	Population 2020	Population 2050	Change in Population, 2000 to 2020	Percent Change in Population, 2000 to 2020	Projected Change in Population, 2020 to 2050	Projected Percent Change in Population, 2020 to 2050
Northwest Arctic Borough	7,208	7,642	8,458	434	6.0%	816	10.7%
Dillingham Census Area	4,922	4,893	5,219	-29	-0.6%	326	6.7%
Skagway Municipality	862	1,094	1,408	232	26.9%	314	28.7%
Lake and Peninsula Borough	1,823	1,654	1,866	-169	-9.3%	212	12.8%
Denali Borough	1,893	1,819	1,927	-74	-3.9%	108	5.9%
Southeast Fairbanks Census Area	6,174	6,823	6,923	649	10.5%	100	1.5%
Yakutat City and Borough	808	544	436	-264	-32.7%	-108	-19.9%
Bristol Bay Borough	1,258	829	695	-429	-34.1%	-134	-16.2%
Aleutians East Borough	2,697	2,935	2,757	238	8.8%	-178	-6.1%
Wrangell City and Borough	2,448	2,402	2,213	-46	-1.9%	-189	-7.9%
Aleutians West Census Area	5,465	5,386	5,183	-79	-1.4%	-203	-3.8%
Haines Borough	2,392	2,471	2,220	79	3.3%	-251	-10.2%
Hoonah-Angoon Census Area	2,574	2,122	1,786	-452	-17.6%	-336	-15.8%
Juneau City and Borough	30,711	32,000	31,572	1,289	4.2%	-428	-1.3%
Petersburg Borough	4,260	3,229	2,774	-1,031	-24.2%	-455	-14.1%
Prince of Wales-Hyder Census Area	6,125	6,140	5,574	15	0.2%	-566	-9.2%
Yukon-Koyukuk Census Area	6,510	5,100	4,345	-1,410	-21.7%	-755	-14.8%
Ketchikan Gateway Borough	14,067	13,709	12,917	-358	-2.5%	-792	-5.8%
Valdez-Cordova Census Area	10,195	9,408	8,381	-787	-7.7%	-1,027	-10.9%
Sitka City and Borough	8,835	8,407	7,305	-428	-4.8%	-1,102	-13.1%
Kodiak Island Borough	13,913	12,910	11,332	-1,003	-7.2%	-1,578	-12.2%

Source: Alaska Department of Labor and Workforce Development (2020), Northern Economics, Inc.

Figure 9 shows the share that each of the larger boroughs and census areas are expected to have of the state's overall population in 2050. Though its share is expected to decline, the Municipality of Anchorage will remain the largest area, with 37.2 percent of the state's population. The Matanuska-Susitna Borough is expected to more than double its share from 2000 (9.5 percent), reaching 19.6 percent of the population in 2050. Fairbanks North Star Borough and Kenai Peninsula Borough are expected to remain steady, while the City and Borough of Juneau, Bethel Census Areas, and all other boroughs and census areas are projected to lose population share.

Figure 9. Boroughs and Census Areas as a Share of the State's Population, 2000 to 2050

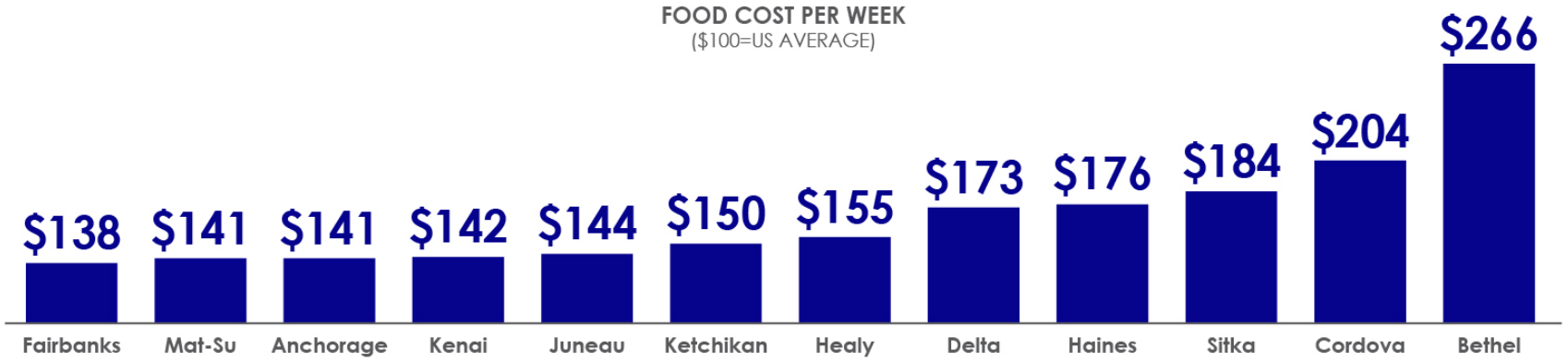


Source: Alaska Department of Labor and Workforce Development (2020), Northern Economics, Inc.

Cost of Living

Alaska is known for its high cost of living, particularly in communities that are off the road system. Figure 10 draws on a December 2018 survey that tracked weekly food costs in selected communities. It shows food costs for a family of four, indexed to the U.S. average (equal to 100). Of the communities surveyed, Fairbanks had the lowest food cost (138, or 38 percent higher than the U.S. average), Southcentral communities had a food cost of 141, and communities located farther away from the Railbelt had increasing relative costs. Bethel had the highest food cost, with an index value of 266.

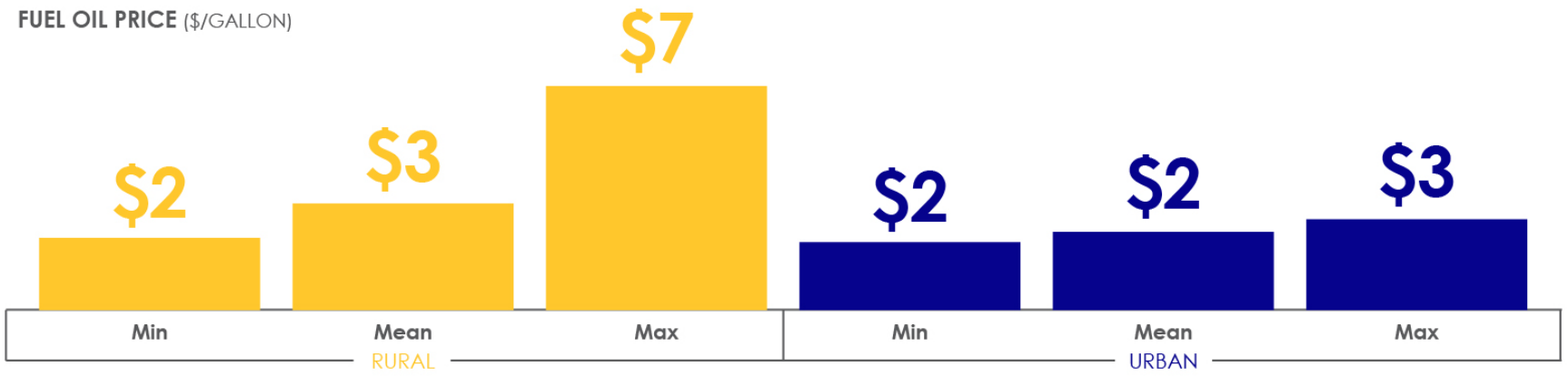
Figure 10. Food Cost for a Family of Four Relative to U.S. Average, by Alaska Community, December 2018



Source: University of Alaska School of Natural Resources & Extension (2019 [xviii]) and Northern Economics, Inc. analysis

Energy costs for home heating and electricity generation are likewise high in Alaska, and again, especially so for communities off the road system and without access to natural gas. Figure 11 shows the price for a gallon of fuel oil for electricity generation, based on Alaska Energy Authority (2020) modeling of rural and urban communities that use fuel oil. For communities defined as urban, prices averaged $2.48 per gallon, but in rural communities, fuel oil cost an average of $3.40 per gallon and peaked at $7.18 per gallon in some communities.

Figure 11. Price per Gallon of Fuel Oil for Electricity Generation, 2020

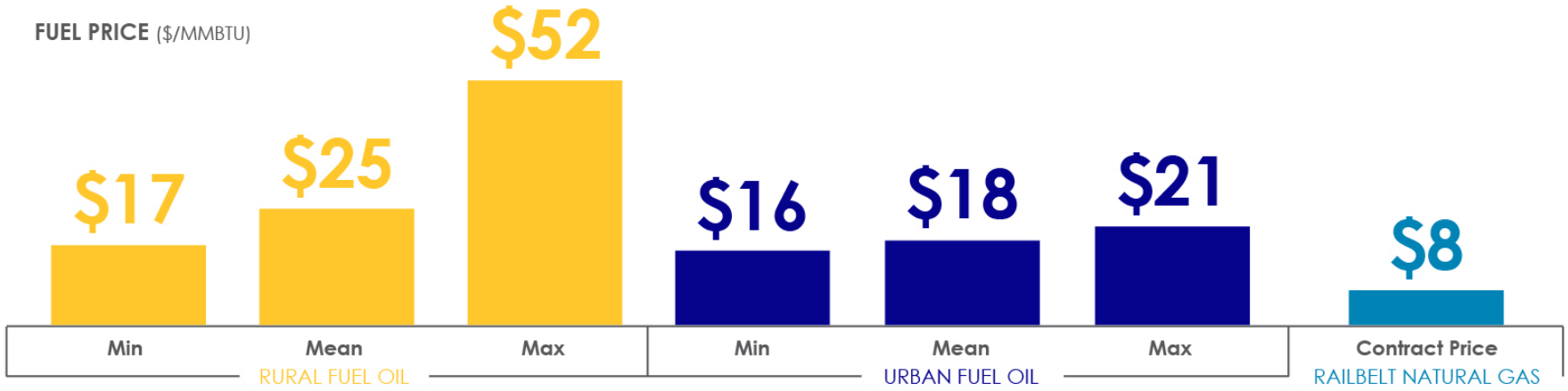


Source: Alaska Energy Authority (2020) [xix] *and Northern Economics, Inc. analysis*

Note: Urban communities include Fairbanks, Juneau, Ketchikan, Kodiak, Petersburg, Sitka, and Wrangell. These are communities that use fuel oil for electricity generation because they do not have access to piped natural gas. Rural communities include the remainder of the state, except for Railbelt communities that do not use fuel oil for electricity generation.

Compared with the fuel oil used in most of the state (by land area), natural gas is significantly less expensive per unit of energy. This is largely driven by the transportation cost associated with shipping small quantities of fuel oil in tanks to communities on the coasts and rivers, often limited to the months of the year that are ice-free. Natural gas is priced based on a contract specifying a delivery location, with the cost to users based on that base gas price plus pipeline transportation and administrative costs. In 2020, the contract price for natural gas was $7.50 per MMBtu. After adjusting from a volume basis to an energy content basis, rural fuel oil averages 3.3 times the cost of natural gas, while urban fuel oil is 2.4 times as expensive (Figure 12).

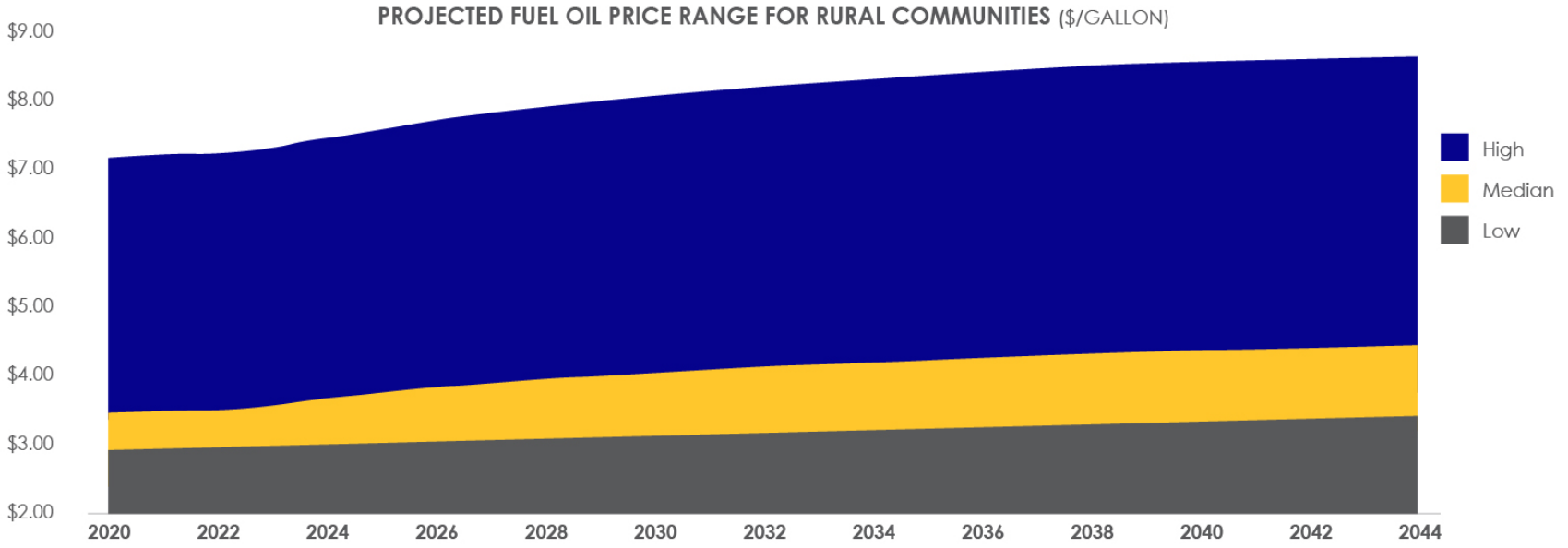
Figure 12. Fuel Price Comparison for Electricity Generation, Based on Cost per Energy Content



Source: Alaska Energy Authority (2020) [xx]*, U.S. Energy Information Administration (2020)* [xxi]*, and Northern Economics, Inc. analysis*

Fuel oil prices for electricity generation are expected to continue to grow. Alaska Energy Authority's (2020) modeling of fuel oil prices in rural communities is shown as ranges in Figure 13. The lower band indicates the lower end of the range of projected prices, which are projected to reach $3.14 per gallon in 2045. The upper band shows some communities reaching as high as $8.69 per gallon by that year. The mean price of fuel oil for electricity generation is expected to be $4.38 per gallon in 2045.

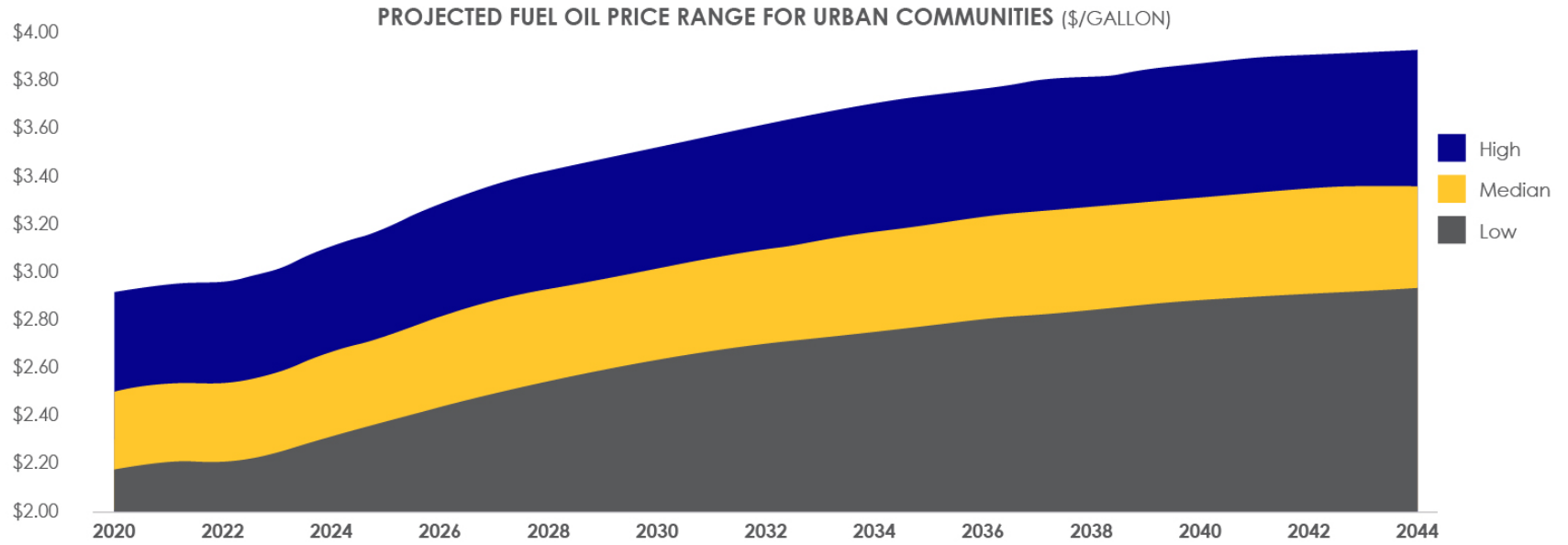
Figure 13. Projected Fuel Oil Price for Electricity Generation in Rural Communities, 2020–2045



Source: Alaska Energy Authority (2020) [xxii] *and Northern Economics, Inc. analysis*

Figure 14 shows projected fuel oil prices for urban communities. By 2045, fuel oil prices in these communities are expected to reach $2.92 per gallon on the low end and $3.92 per gallon on the high end, with a mean price of fuel oil for electricity generation of $3.34 per gallon.

Figure 14. Projected Fuel Oil Price for Electricity Generation in Urban Communities, 2020–2045

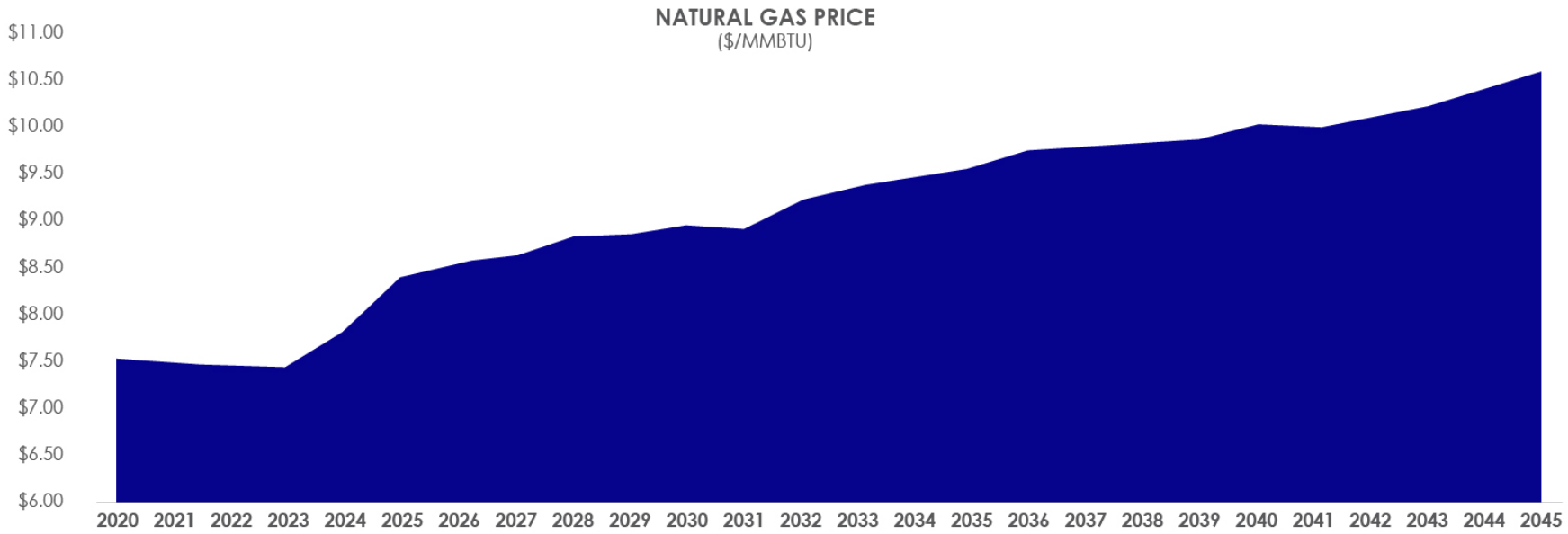


Source: Alaska Energy Authority (2020) [xxiii] *and Northern Economics, Inc. analysis.*

Note: Urban communities include Fairbanks, Juneau, Ketchikan, Kodiak, Petersburg, Sitka, and Wrangell. These are communities that use fuel oil for electricity generation because they do not have access to piped natural gas. Rural communities include the remainder of the state, except for Railbelt communities that do not use fuel oil for electricity generation.

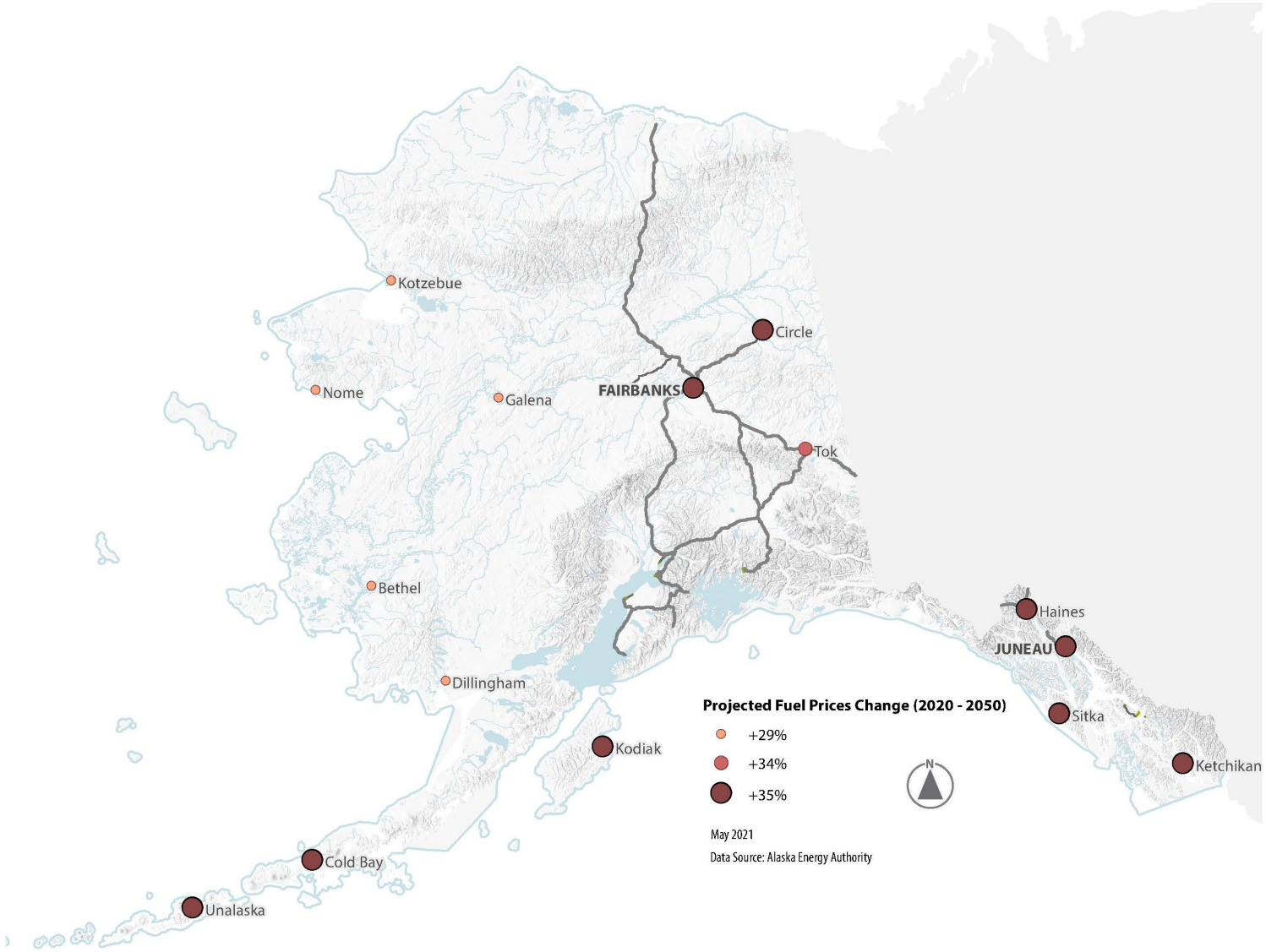
Figure 15 shows projected fuel oil price increases in selected communities around the state. Natural gas prices are expected to increase to $10.54 per MMBtu in 2045, a 40.5 percent increase from 2020 (Figure 16). On a per-MMBtu basis, this increase is equivalent to the projected increase in fuel oil prices. Despite the projected increases in fuel prices, many communities around the state have seen a rise in support for renewable energy projects such as wind generation that help counteract the rising cost of energy. The Alaska Energy Authority has offered a matching grant program to help communities fund these projects (Alaska Energy Authority 2020).[xxiv]

Figure 15. Natural Gas Price Projections for 2020–2045



Source: Alaska Energy Authority (2020) and Northern Economics, Inc. analysis

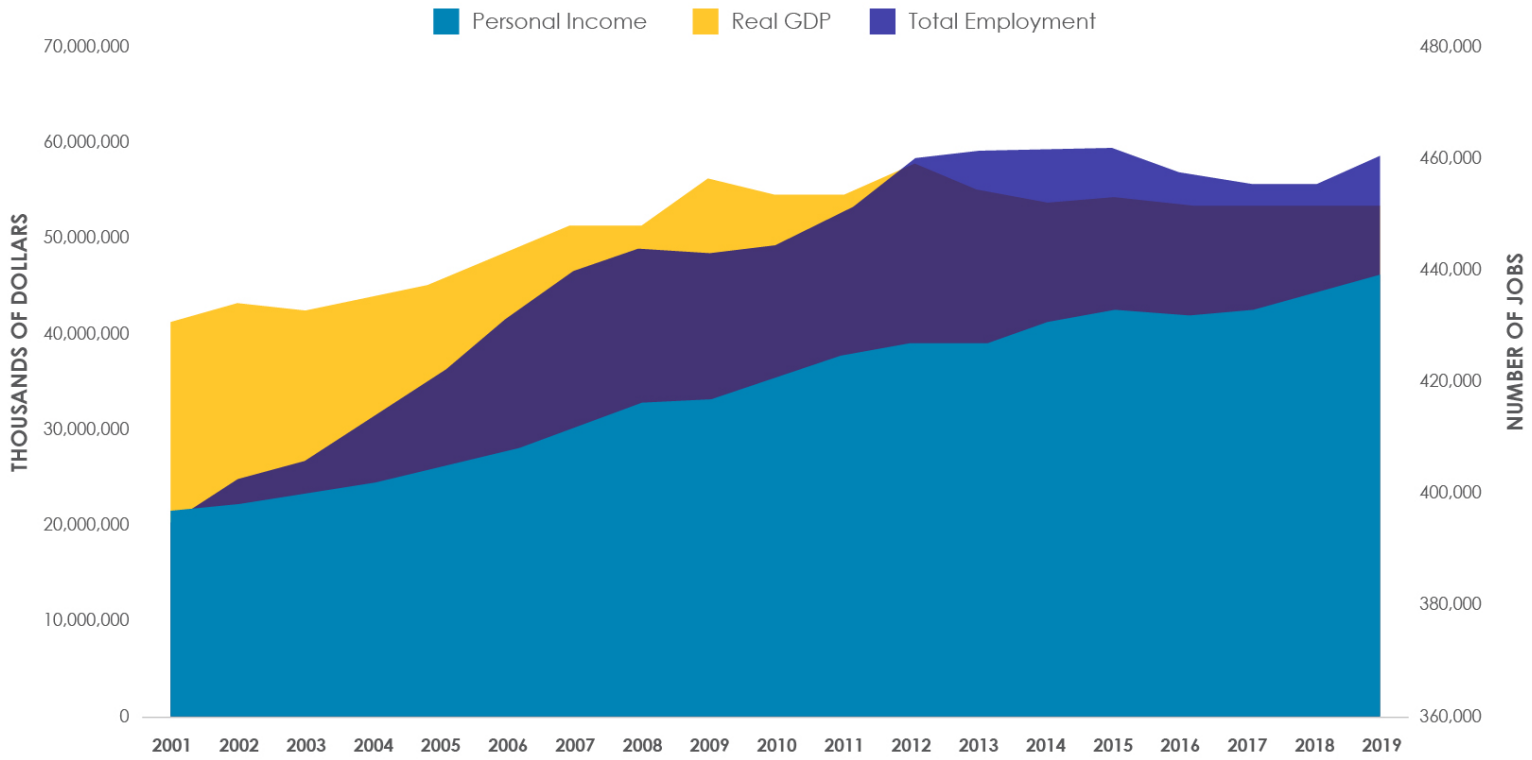
Figure 16. Projected Fuel Prices Change (2020-2050)



Economic Activity

Economic activity, growth in gross domestic product (GDP) and employment, drives demand for transportation infrastructure, and appropriate transportation infrastructure enables economic development. Figure 17 presents federal data, estimated by the U.S. Bureau of Economic Analysis, which include estimates of both employee and sole-proprietor/non-employee jobs and income. From 2001 through 2019, personal income rose from $21.2 billion to $45.9 billion, an increase of 116 percent during a period in which real GDP and total employment rose by only 30 percent and 17 percent, respectively. The figure highlights the plateauing of real GDP and employment since 2014, when the state entered its latest recession. It does not show the drop in economic activity in 2020 as a result of the COVID-19 pandemic, though preliminary data suggest employment has since started to recover.

Figure 17. Personal Income, Real Gross Domestic Product, and Total Employment for Alaska, 2001–2019



Source: Bureau of Economic Analysis (2020) [xxv]

Alaska's economy and labor force are highly seasonal, with large swings in employment, particularly in commercial fishing, construction, and tourism[xxvi]. These swings influence transportation demand. For example, increased air travel in coastal communities to support crew changes for commercial fishing and processing; more freight movement on highways, rail, and through marine facilities to support construction activities; and increased demand across all modes to support summer tourism volumes (Figure 18).

Figure 18. Seasonal Tourism Volumes by Arrival Mode

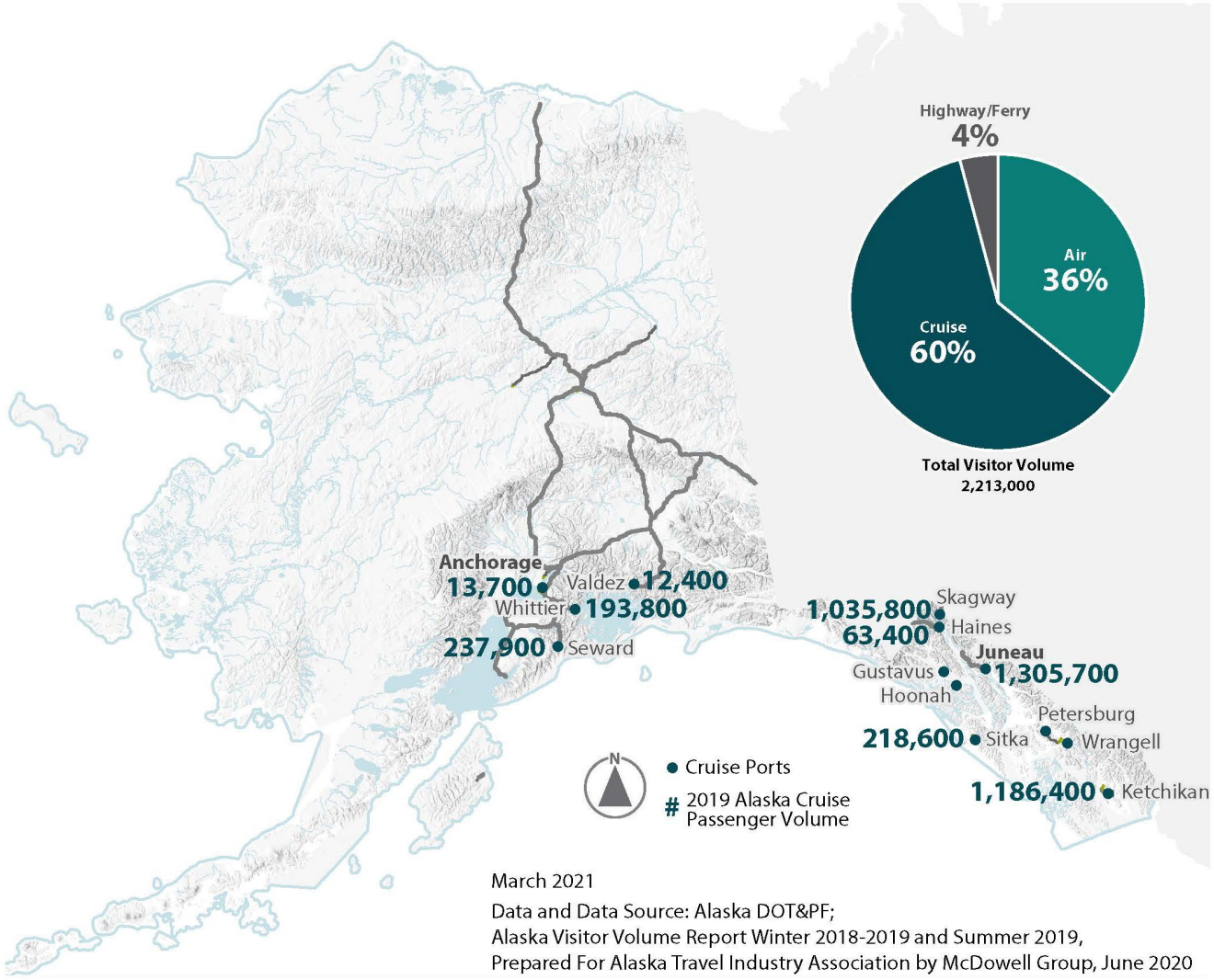
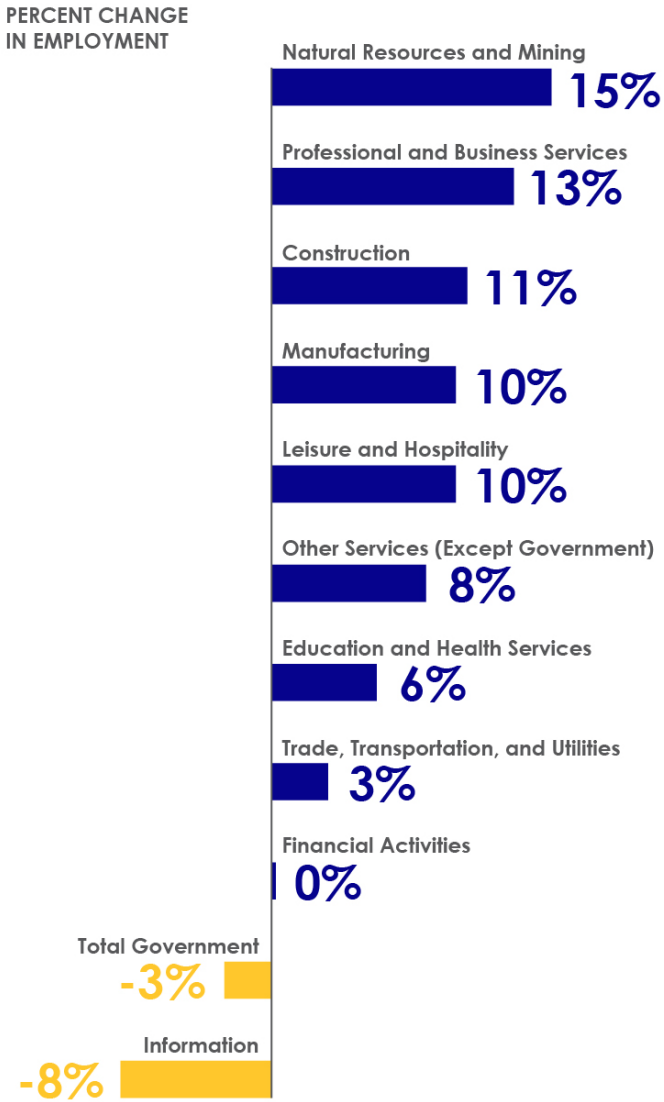


Figure 19. Industry Employment Projections, 2018-2028



Source: Alaska Department of Labor and Workforce Development (2020)

EMPLOYMENT PROJECTIONS

Employment projections by industry for 2018 to 2028 are shown in Figure 19. Employment is expected to grow in the goods-producing industries of natural resources and mining (15.2 percent growth), construction (10.7 percent), and manufacturing (9.9 percent) during this period, indicating potential demand for transportation infrastructure and services. Trade, transportation, and utilities employment is likewise projected to grow by 3.1 percent, which should help serve these needs. Projected growth in other industries, such as leisure and hospitality, points to increased demand in tourism, notwithstanding the impacts COVID-19 had on tourism in 2020 and is expected to have in 2021.

During this same period, employment in farming, fishing, and forestry occupations is expected to grow by more than 28 percent. Table 2 shows employment projections by occupational group. Each industry in Figure 19 can span a variety of occupations in Table 2. For example, transportation and material moving occupations are expected to grow by 5.5 percent, above the 3.1 percent growth expected in all occupations associated with trade, transportation, and public utilities.

Table 2. Projected Change in Occupational Employment, 2018–2028

Occupation Group	Percent Change	Mean Wage ($/hour)
Farming, Fishing, and Forestry Occupations	28.7	20.45
Healthcare Support Occupations	10.9	19.84
Food Preparation and Serving-Related Occupations	10.4	14.17
Construction and Extraction Occupations	9.9	31.94
Architecture and Engineering Occupations	9.0	48.92
Personal Care and Service Occupations	8.1	15.88
Healthcare Practitioners and Technical Occupations	7.6	48.91
Production Occupations	7.4	22.98
Community and Social Services Occupations	7.3	26.49
Computer and Mathematical Occupations	6.2	38.40
Management Occupations	5.5	51.48
Transportation and Material-Moving Occupations	5.3	27.73
Installation, Maintenance, and Repair Occupations	4.9	29.45
Building and Grounds Cleaning and Maintenance Occupations	4.8	16.92
Office and Administrative Support Occupations	3.7	22.22
Life, Physical, and Social Science Occupations	3.6	37.72
Sales and Related Occupations	2.8	18.37
Protective Service Occupations	2.2	30.16
Business and Financial Operations Occupations	1.9	36.46
Education, Training, and Library Occupations	-0.7	29.44
Arts, Design, Entertainment, Sports, and Media Occupations	-0.7	26.08
Legal Occupations	-7.5	45.05

Source: Alaska Department of Labor and Workforce Development (2020) [xxvii]

Future Statewide Economic Development Projects

Several planned large-scale economic development projects (described below) have the potential to influence population, economic growth, employment, and transportation needs, if they secure funding and are developed. It will be important to consider the Impacts these projects may have on the transportation system, which may include increased vehicular and freight traffic (roadway, marine and rail); pavement and bridge condition degradation; travel time impacts; diminished capacity and service; and connectivity between modes.

- **Ambler Mining District and Access**. The Ambler Mining District in Northwest Alaska has an estimated $26 billion resource value over the life of the mines, which will generate additional revenue for the State of Alaska and local governments, according to the Alaska Industrial Development & Export Authority (AIDEA).[xxviii] The mining district is not currently accessible by road, rail, or barge. AIDEA has proposed a 211-mile road from the Dalton Highway to the District. The current proposal assumes a public-private partnership for construction and maintenance of the roadway, which would not be owned or maintained by DOT&PF; however, getting the product to market will require travel on the DOT&PF Dalton Highway and connecting network.
- **Alaska to Alberta Rail (A2A).**[xxix] This proposed project would construct a railway from Alaska to Alberta, Canada with the intent of transporting resource commodities to global markets via the ports of Southcentral Alaska. The project includes extending the rail lines from Alberta to Tok, Alaska, with a spur line to connect existing rail lines in Delta Junction, Alaska, and adding a new line south to Valdez.
- **Alaska Liquefied Natural Gas (LNG) Project**. The Alaska Gasline Development Corporation proposes an 800-mile-long natural gas pipeline from the North Slope gas fields to a liquefaction plant in Nikiski and on to international markets via the marine terminal.
- **Fort Knox Gold Mine**. The Peak Gold deposit, south of Tok, Alaska, is scheduled to open in 2024. It is short-lived (4.5 years) open pit mine, so the intent is to truck the ore north, approximately 250 miles, to the Fort Knox mill for processing. The trip would involve hauling the crushed ore up the Alaska and Richardson highways, through Fairbanks, and up the Steese Highway to the mine site near Chatanika.
- **Northwest Passage and Arctic Ports**. Arctic ice is retreating to the extent that the Northwest Passage could become an economically viable shipping route. DOT&PF and the U.S. Army Corps of Engineers co-sponsored the Alaska Deep Draft Arctic Ports Study to evaluate potential deepwater port locations in response to increased vessel traffic; however, the study was suspended in October 2015.
- **West Susitna Access**. AIDEA and the Matanuska-Susitna Borough are studying the feasibility of a road that would provide access to development opportunities west of the Susitna River, including mining, agriculture, forest/timber, oil and gas, and recreation.[xxx]
- **Port MacKenzie Rail Extension.** The Matanuska-Susitna Borough is pursuing construction of a 35-mile rail line in the Susitna River Valley that will connect the port to existing main line tracks at a point between Houston and Big Lake. The rail extension would create a bimodal transportation link between northern Interior Alaska and a deepwater port in Southcentral Alaska.

Freight 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 3: Shipment Tonnages by Type and Mode, 2017

		Within Alaska		Outbound from Alaska to other States		Inbound to Alaska from other states	
Trade Type	**Mode**	**Tons**	**Percent**	**Tons**	**Percent**	**Tons**	**Percent**
Only Domestic	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%
	Total	***26,581.2***	***72.6%***	***23,488.6***	***98.8%***	***2,432.9***	***84.9%***
Export	Air (include truck-air)	0.7	0.0%	3.1	0.0%	104.1	3.6%
	Multiple modes & mail	677.9	1.9%	13.6	0.1%	81.3	2.9%
	Pipeline	264.5	0.7%	0.0	0.0%	0.0	0.0%
	Rail	5,579.1	15.2%	0.0	0.0%	0.0	0.0%
	Truck	673.7	1.8%	20.1	0.1%	6.0	0.2%
	Marine/Riverine	1,039.5	2.9%	156.3	0.7%	77.9	2.7%
	Other and unknown	0.4	0.0%	11.3	0.0%	0.2	0.0%
	Total	***8,235.8***	***22.5%***	***204.4***	***0.9%***	***269.5***	***9.4%***

		Within Alaska		Outbound from Alaska to other States		Inbound to Alaska from other states	
Import	Air (include truck-air)	0.3	0.0%	34.0	0.1%	1.3	0.1%
	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%
	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%
	Other and unknown	0.1	0.0%	0.1	0.0%	0.0	0.0%
	Total	***1,787.0***	***4.9%***	***82.1***	***0.3%***	***163.0***	***5.7%***

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 4: 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 5: 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 6: 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 7: 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

Rank	Description	2017 Value	2018 Value	2019 Value	2020 Value	2020 % Share
14	Civilian aircraft, engines, and parts	60	32	42	96	2.1
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

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.

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.

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.

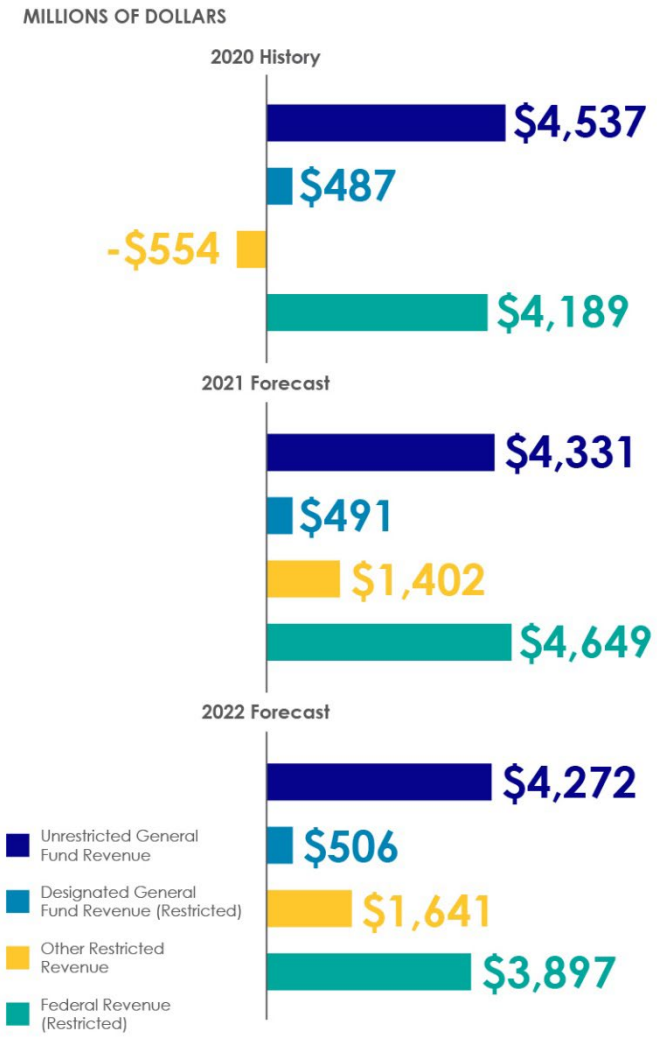
DOT&PF and the U.S. Army Corps of Engineers have co-sponsored the **Alaska Deep Draft Arctic Ports Study** to evaluate potential deepwater port locations, as the Arctic coast is experiencing increased vessel traffic. The study findings indicated Nome would be the preferred site for a deepwater port.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

Figure 20. Total State Revenue, FY 2020 Actual and FY 2021–2030 Forecast



Source: Alaska Department of Revenue (2020)

Fiscal Outlook

Alaska's fiscal health has long been tied to oil production. As population and government spending have increased over time, petroleum production has declined. With a shifting fiscal environment and no dedicated fund for transportation infrastructure, DOT&PF will continue to face increased challenges in funding capital improvements, operations, and maintenance.

STATE OVERVIEW

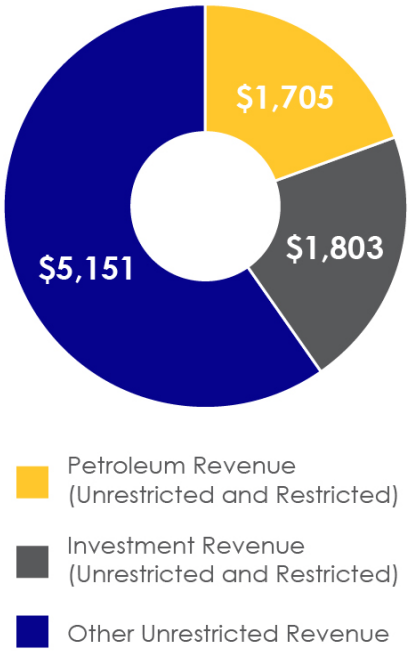
The State of Alaska's total revenue was $8.66 billion in fiscal year (FY) 2020 (Figure 20). Fifty-two percent of that revenue ($4.54 billion) was in unrestricted general funds, while the remainder was in restricted funds, limited to specific uses. While other restricted revenue was negative $554 million in 2020, that was driven by investment losses; $537 million in petroleum revenues were received by the Permanent Fund. Over the next two fiscal years, state revenue is expected to increase to more than $10 billion.

As discussed below, petroleum has accounted for 80 percent of the state's revenue in the past and is projected to account for two-thirds of its future revenue. Therefore, petroleum plays an outsized role in the state's fiscal situation, even though petroleum revenues are routed through different accounts, including the Permanent Fund.

Petroleum revenue and motor fuel taxes are of particular interest in a transportation context. Petroleum revenues do not flow directly to DOT&PF, but they do contribute to the state's General Fund as well as to the corpus of the Permanent Fund, which then provides General Fund money through a regular annual draw. Though the state's constitution largely prohibits dedication of funds, motor fuel taxes are dedicated to infrastructure under state and federal law.

Petroleum, including both unrestricted and restricted funds, directly accounted for almost 20 percent of Alaska's FY 2020 revenue (Figure 21). The annual draw from the Permanent Fund, a $2.99 billion portion of the other unrestricted revenue in FY 2020, accounted for an additional 35 percent.

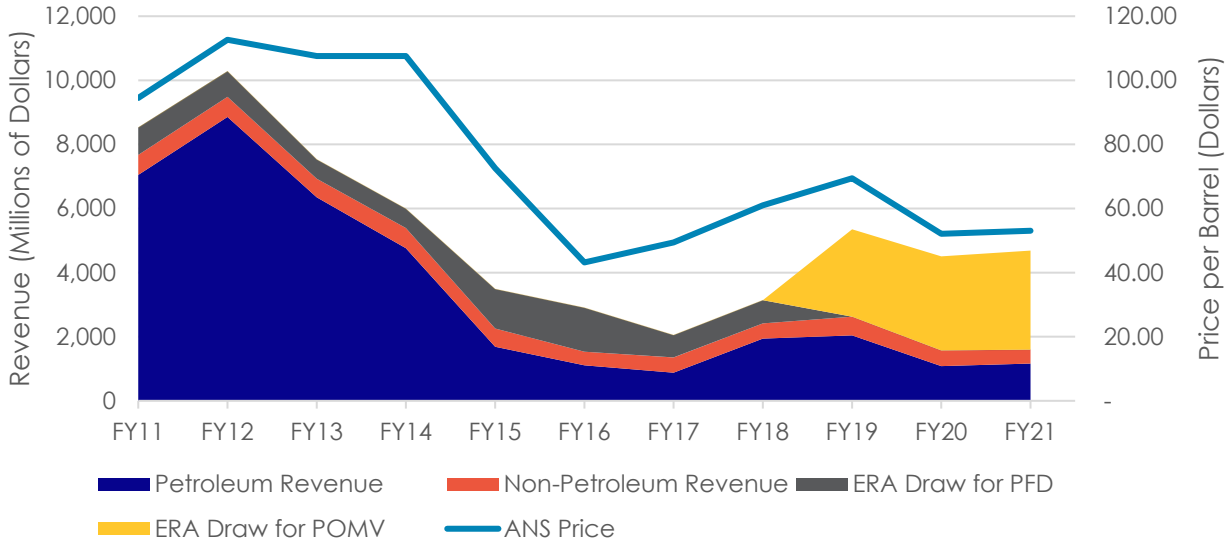
Figure 21. Total State Revenue (Petroleum, Investment, and Other), FY 2020



Source: Alaska Department of Revenue (2020) and Northern Economics, Inc. analysis

Despite petroleum being a major source of revenue for Alaska, its role has been slowly declining over time as production has fallen from its peak in the late 1980s. Figure 22 shows the state's declining petroleum revenue from FY 2011 to FY 2021. Starting in FY 2019, the state began a Percent of Market Value draw from the Permanent Fund to fund state government. Production is expected to remain steady over the next decade, though as Prudhoe Bay and the other major fields decline that forecast will become increasingly dependent on new fields and production.

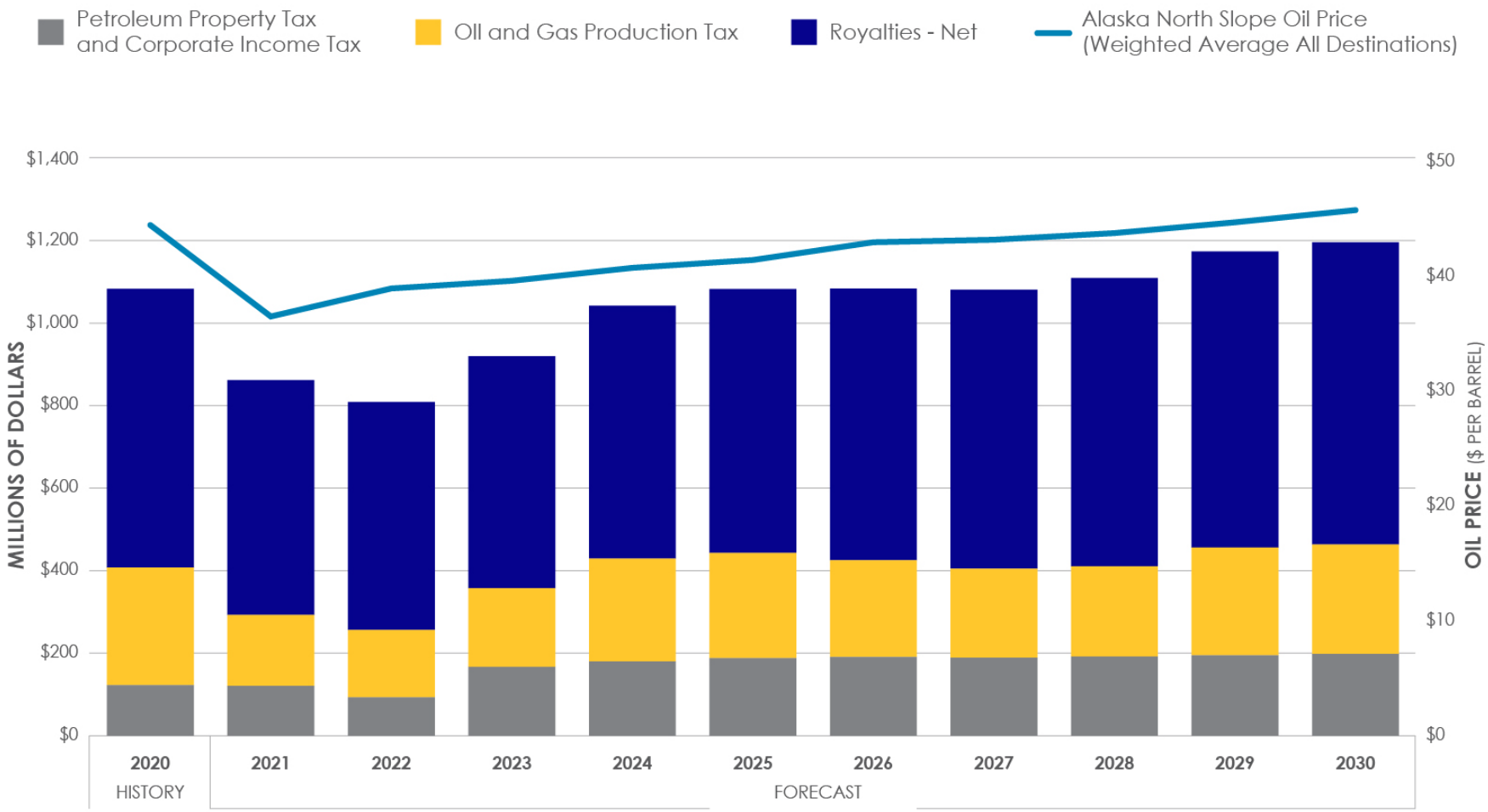
Figure 22. Alaska North Slope Production, by Production Area, FY 1977 to FY 2030



Source: Legislative Finance Division (2021) [xxxi]

The state's petroleum revenue forecast anticipates a decline in 2021–2023, followed by steady and slightly upward trending revenues through 2030 (Figure 23). The forecast is based on projected production volumes as well as a forecast of wellhead oil price.

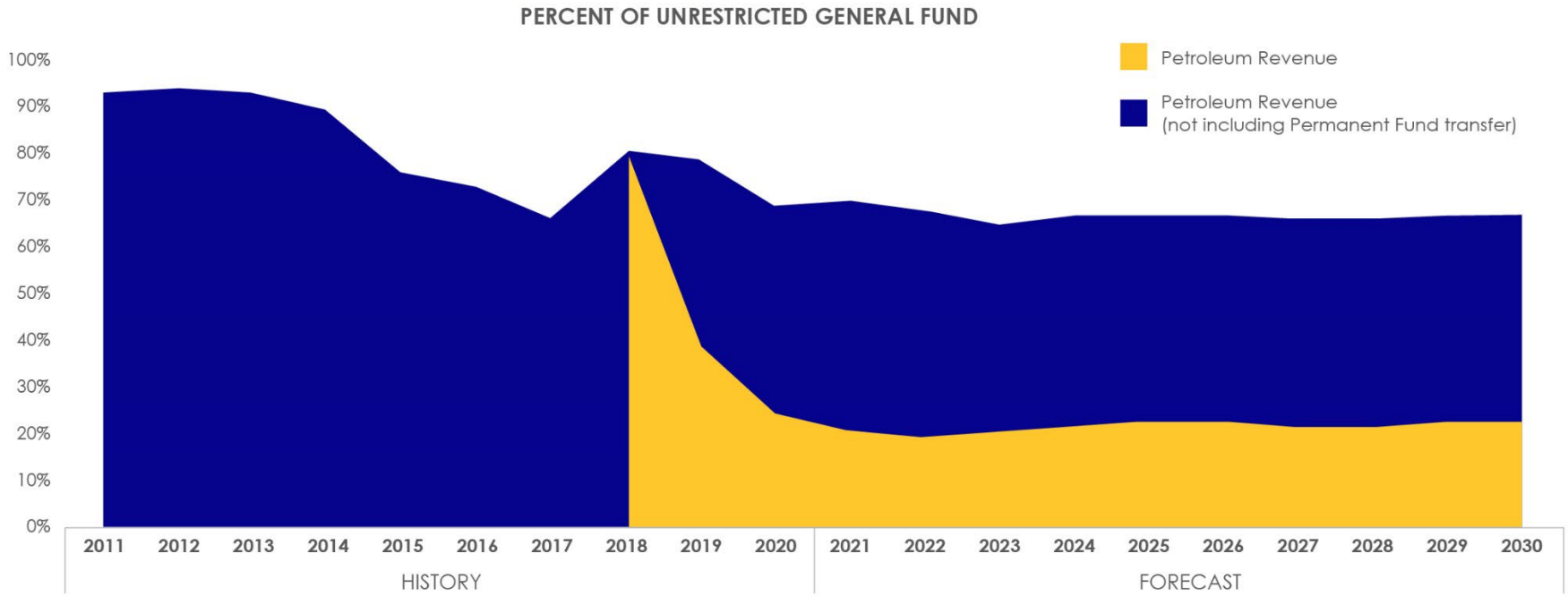
Figure 23. Unrestricted Petroleum Revenue and Oil Price, FY 2020 Actual and FY 2021–2030 Forecast



Source: Alaska Department of Revenue (2020)

Over the next decade, direct petroleum revenue is expected to account for 65–70 percent of Alaska's unrestricted General Fund, down from the more than the 80 percent that was seen in 2011–2014 (Figure 24). With the initial Percent of Market Value draw from the Permanent Fund enacted and beginning in 2018, that share has now dropped to approximately 20 percent. While this is a significant diversification of the state's revenue, the Permanent Fund was created by and continues to be funded by petroleum revenues, so it is important to note that the Permanent Fund may be affected by declines in future oil production in addition to the performance of the fund's investments.

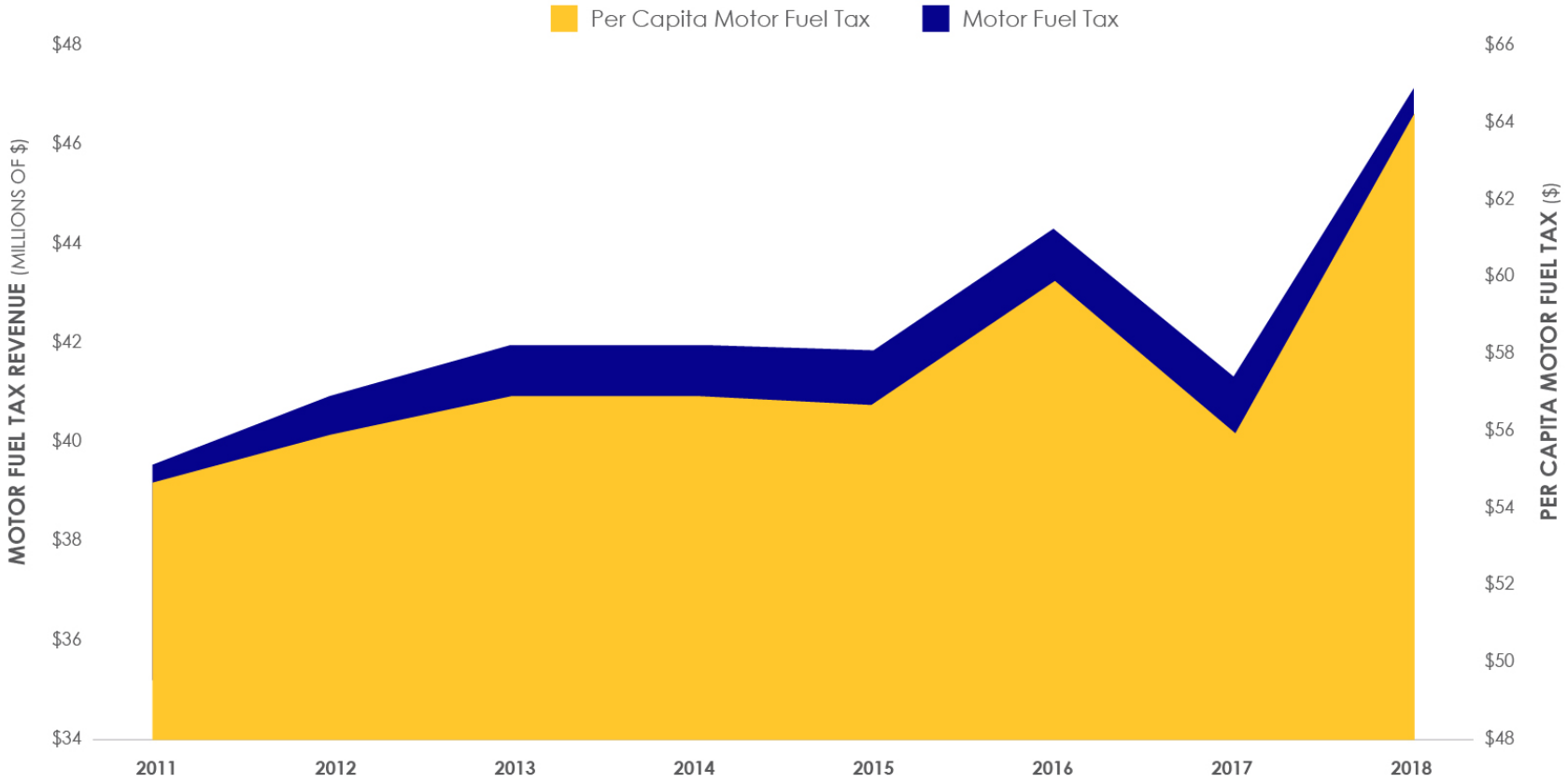
Figure 24. Unrestricted General Fund Revenue from Petroleum as Percentage of Total, FY 2011–2020 Actual and FY 2021–2030 Forecast



Source: Alaska Department of Revenue (2020) [xxxii]

Alaska levies a motor fuel tax on fuels for highway use, marine fuel, aviation gasoline, jet fuel, and gasohol.[xxxiii] While relevant to transportation, it currently accounts for less than one percent of Unrestricted General Fund revenues. From FY 2011 to 2017, the tax generated revenue of approximately $40 to $45 million annually, but it increased to $47 million in 2018, the most recent year for which data are available (Figure 25). On a per capita basis, the tax revenue has tracked closely with changes in the population, though with an upward trend. It was $64.23 per resident in 2018.

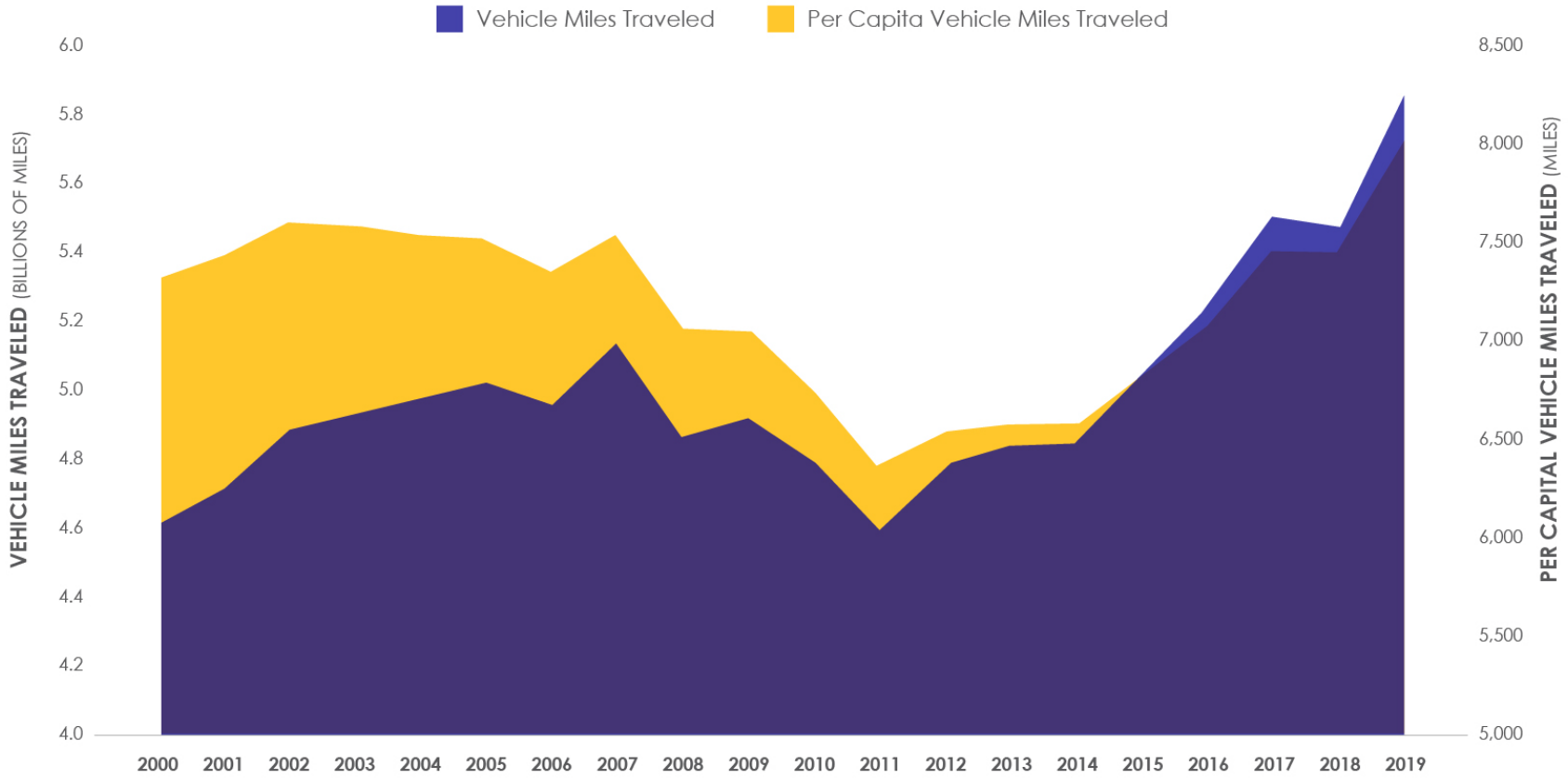
Figure 25. Motor Fuel Tax Revenue and Per Capita Amounts, FY 2011–2018



Source: Alaska Department of Revenue (2020)[xxxiv], Alaska Department of Labor and Workforce Development (2020)[xxxv], and Northern Economics, Inc. analysis

Annual vehicle miles traveled (VMT) within Alaska have been growing over the same period, rising from 4.6 billion miles traveled in 2011 to 5.9 billion miles in 2019 (Figure 26). This came after a rise and then fall from 2000 to 2011. On a per capita basis, VMT have followed a similar pattern, though prior to 2011, per capita VMT remained high despite an overall lower total VMT. In 2019, Alaska roads saw an average of 8,045 VMT per resident.

Figure 26. Total and Per Capita Vehicle Miles Traveled (VMT) in Alaska, 2001–2019



Source: Federal Highway Administration (2020) [xxxvi], Alaska Department of Labor and Workforce Development (2020) [xxxvii], and Northern Economics, Inc. analysis

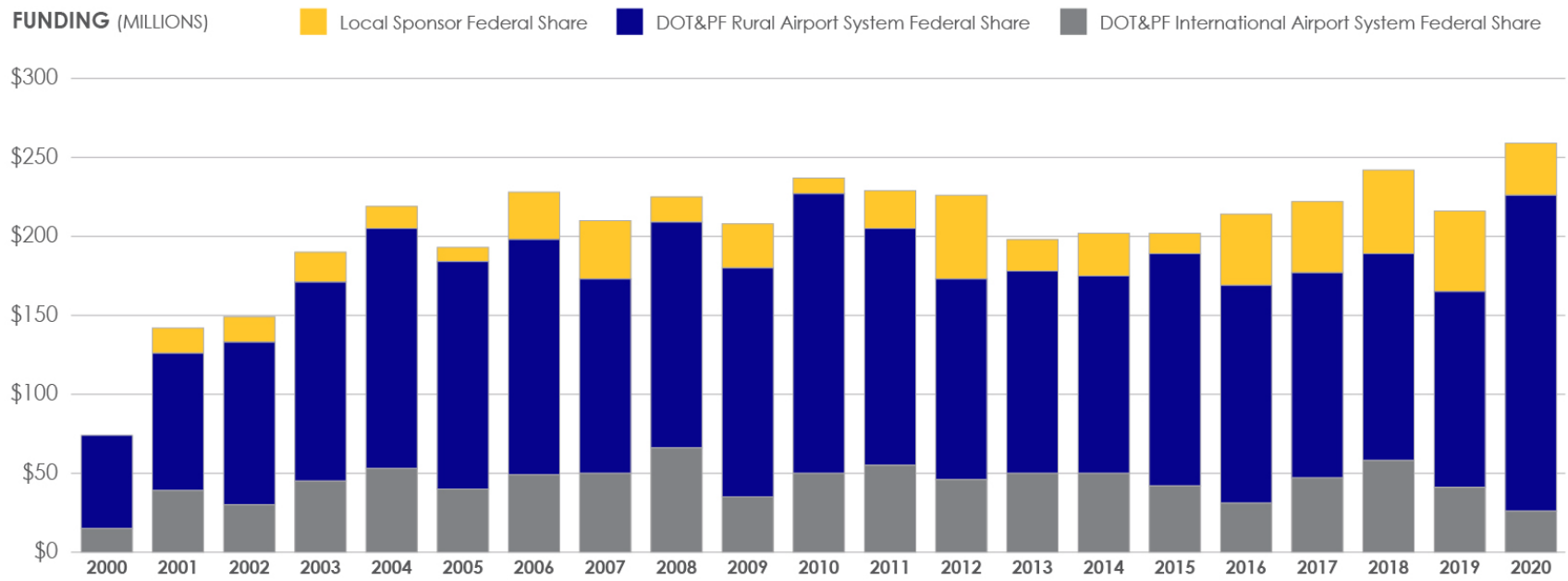
Motor fuel taxes are designated funds under federal and state law. Tax revenue from aviation fuel, both aviation gasoline and jet fuel, are required to be spent in direct support of the airport facilities where the revenue was generated. Alaska Statute designates other motor fuel taxes for specific infrastructure maintenance accounts. An additional fuel surcharge is also collected and set aside for appropriation, even though it is not a designated fund.[xxxviii]

As of January 2017, Alaska had the lowest combined state and local tax rate on highway fuels.[xxxix] There have been multiple attempts to increase the tax rate in recent years. [xl] [xli] [xlii]

DOT&PF OVERVIEW

DOT&PF receives revenue from state and federal funds as well as user fees. Over the last 10 years (federal fiscal years 2011–2020), federal Airport Improvement Program funding has averaged $221 million, of which 84 percent has gone to DOT&PF and the remainder to local sponsors (Figure 27). The International Airport System has received an average of $45 million annually, while the rural airport system has averaged $140 million annually.

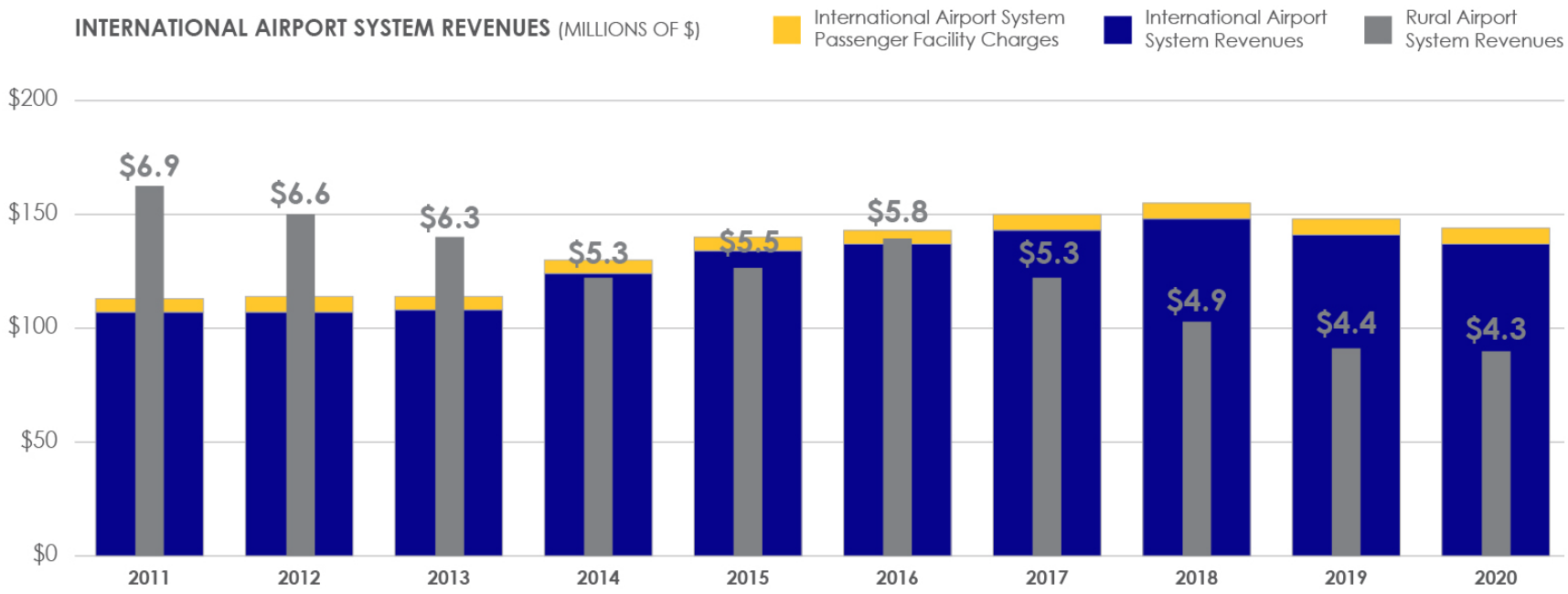
Figure 27. Federal Funding of the Airport Improvement Program, Federal Fiscal Years 2000–2020



Source: Alaska Department of Transportation and Public Facilities (2020) [xliii]

International Airport System revenues, including passenger facility charges, have averaged $135 million annually (Figure 28). The rural airport system generates much lower revenues, averaging $5.5 million annually but with a clear downward trend over the last decade.

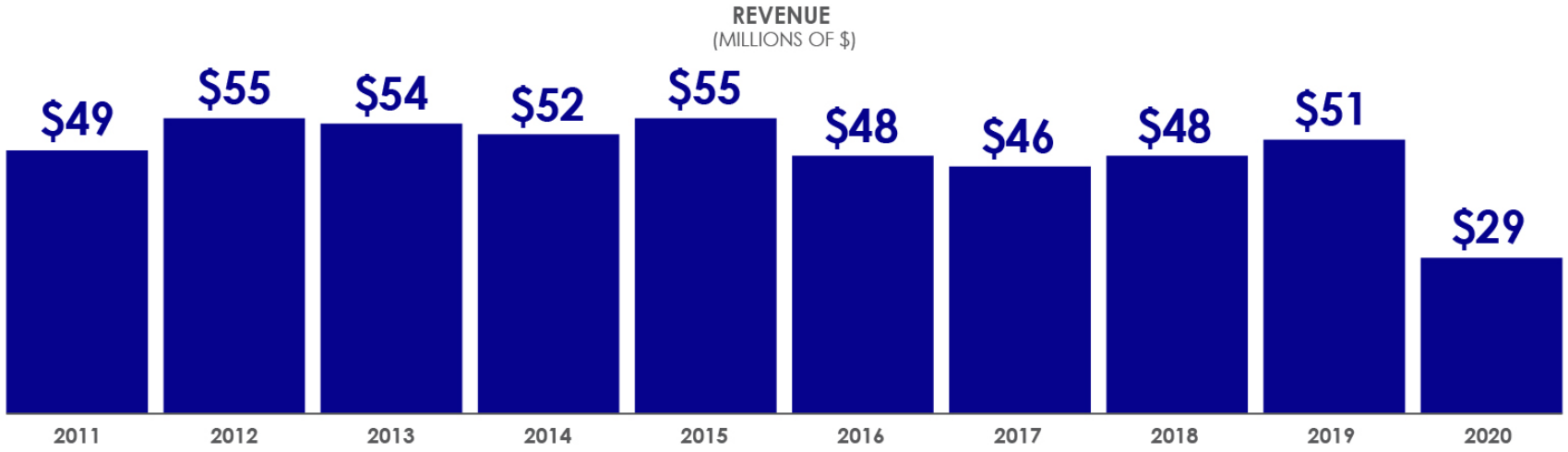
Figure 28. International and Rural Airport Systems' Revenues, Fiscal Year 2011–2020



Source: Alaska Department of Transportation and Public Facilities (2020) [xliv]

Another component of DOT&PF, the AMHS, has averaged $49 million in revenue annually from ticket sales, stateroom sales, and other user fees (Figure 29). The AMHS has historically operated with a farebox recovery rate (the percentage of expenses covered by user fees) of about one-third, so the state has historically provided additional funds to cover its operating losses.

Figure 29. Alaska Marine Highway System (AMHS) Revenues, Fiscal Years 2011–2020



Source: Alaska Marine Highway System. Annual Financial Reports. 2011-2020. [xlv]

Alaska's fiscal structure does not greatly benefit from population and economic growth, with the majority of revenue derived from the oil and gas industry either directly or indirectly (through the Permanent Fund). Alaska's North Slope faces a decline in oil production and revenues. Geology drives a natural decline as fields age. However, in the national political environment, there is also pressure to move away from fossil fuel production, which could lead to delays or even cancellations of development projects.

Minimal non-oil and gas revenues and a lack of broad-based taxes result in a system that does not generate significant revenues from population growth or economic development to fund construction and maintenance of transportation infrastructure that is used to support that growth. This disconnect between fund sources and uses is a challenge.

Alaska's constitution largely prohibits dedication of funds, which makes it challenging to ensure that funds generated with the intent of supporting transportation infrastructure are in fact appropriated to that use. With increasing demands for government spending and absent broad-based taxes or other measures to grow state revenues, there will be increasing competition for funding across multiple state priorities. Future funding opportunities could include the following:

- Various industries have demonstrated a willingness to work with the state to fund transportation infrastructure they use. Examples of these public-private partnerships include initial design and permitting of a restricted-access road to the Ambler Mining District in northwest Alaska; and the cruise ship industry's payment of a passenger tax that affected communities used for infrastructure that supports cruise visitors.
- Public-private partnerships may become an increasingly important tool for funding major transportation infrastructure projects, especially in remote and less-populated areas in which developable resources exist. Public-private partnerships may also allow for the outsourcing of operations and maintenance of facilities, such as the state's rural airports.
- User fees, including tolls, are common in other parts of the United States and may be feasible in some situations. For example, the proposed Knik Arm Crossing would have used tolls to support revenue bonds used for its construction.
- The AMHS has been studied extensively over the last decade, including an economic analysis of reshaping options,[xlvi] a state-supported working group formed to evaluate options, and a regional working group formed to provide recommendations.
- Though not specific to transportation, implementing broad-based taxes would help solve the disconnect between fund sources and uses and would relieve pressure on the major sources of funding (as noted before, the Permanent Fund draws on oil and gas-related taxes) that support the majority of the state's expenditures.

STATE-DESIGNATED MULTIMODAL FREIGHT NETWORK

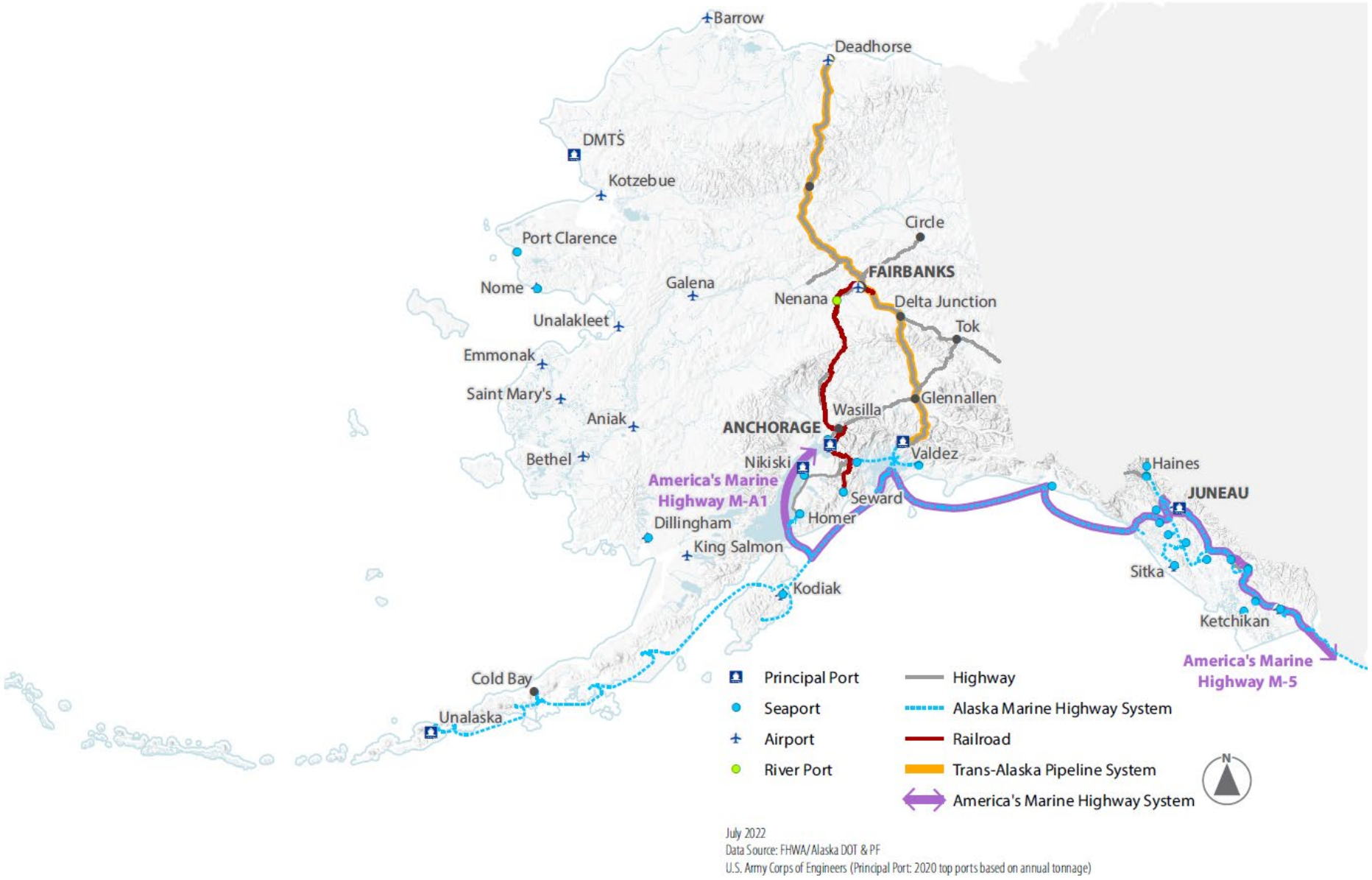
Each freight transportation mode has a specific set of freight carriers (trucking companies, airlines, vessel operators, railroads, and pipeline owners) that use a variety of infrastructure assets. Some of these assets are unique to each mode, such as highways, waterways, railroads, and pipelines. Some, 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). Like the freight network at the federal level, the statewide network provides benefit to Alaska's transportation system by offering a foundation to focus limited funding resources on the portions of the system that have the greatest impact to freight movement. DOT&PF, the State Freight Advisory Committee, and other freight stakeholders reexamined the Statewide Multimodal Freight Network and identified new additions and revisions to its components as part of the 2050 plan update, shown in Figure 30.

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:

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

Figure 30. State-Designated Multimodal Freight Network



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 31a), 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 31b). 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 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.

More detailed information is found under each modal description.

Figure 31a: Percentage of Domestic In-State Freight by Mode, by Tonnage (KTons), 2017

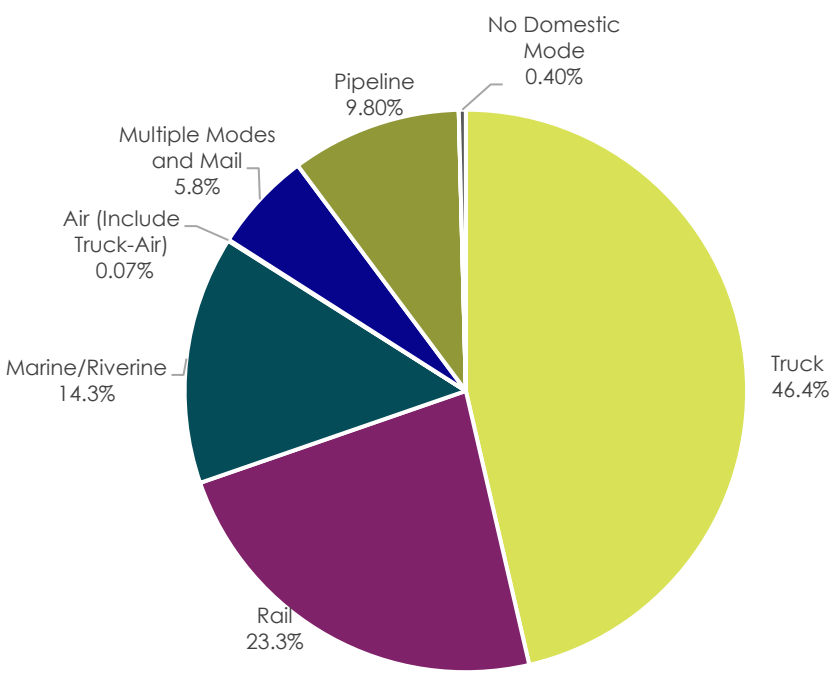
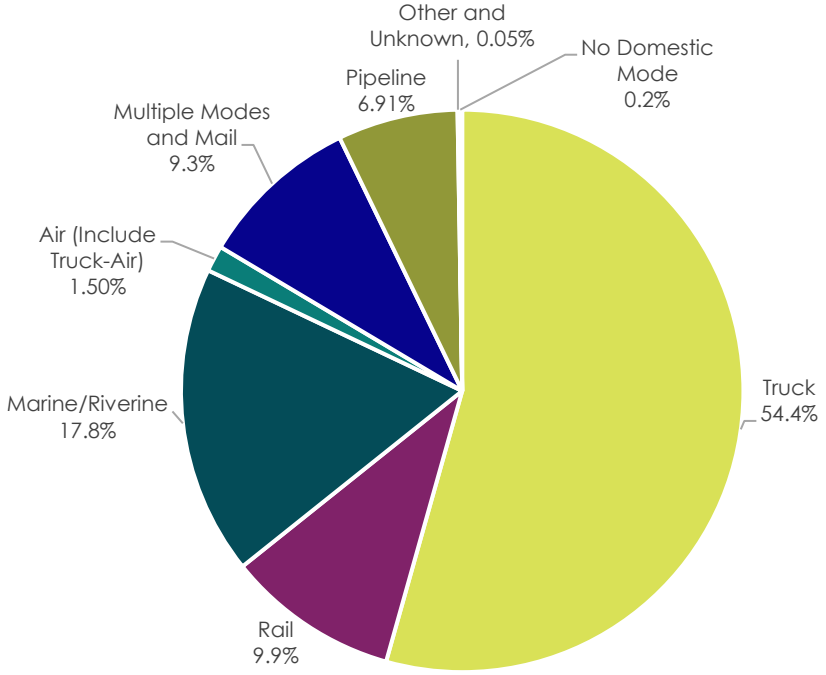


Figure 31b: Percentage of Domestic In-State Freight by Mode, by Value (M$), 2017



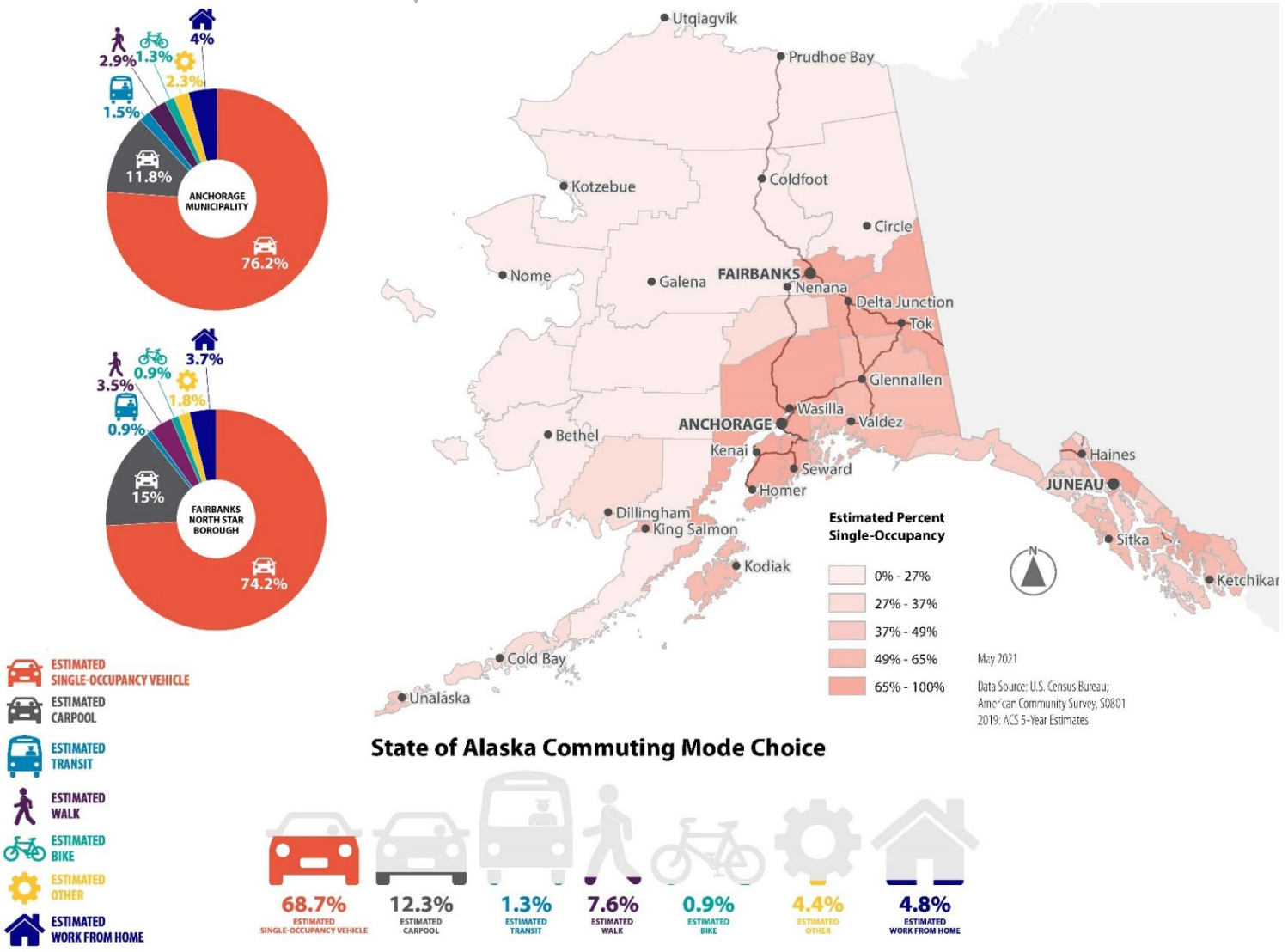
Source: Freight Analysis Framework, version 5.0

TRANSPORTATION AND FREIGHT ASSESSMENT

Transportation and freight infrastructure are the basic lifeline for commerce and everyday life across Alaska. Making the right investments at the right time is critical to sustaining the systems' strong performance. The desire to develop and modernize Alaska's transportation systems is balanced by the importance of maintaining the current network, making it resilient to disasters of all types, and maintaining accessibility to remote and rural communities. Integrating and connecting modes begins with an understanding of each mode and its role in moving people and goods statewide. Identifying trends helps inform policy development actions taken to guide investments in and management of the transportation system.

The commute mode shares shown in Figure 32 are based on the percentage of workers age 16 years and up who commute by bicycle; by private vehicle, including car, truck, van, taxicab, and motorcycle; by public transportation, including bus, rail, and ferry; and by foot.

Figure 32. Commute Mode Choices



Roads and Highways

National Highway System (NHS) roads fall into different classifications that determine their federal funding eligibility and reporting requirements. These classifications include the NHS; the Alaska Highway System; the Strategic Highway Network (STRAHNET) designated by the Department of Defense for military mobilization; or in the Community Transportation Program (Figure 33). Federal funds are targeted on the NHS, which includes the Interstate Highway System as well as other roads important to the nation's economy, defense, and mobility. Bridges are classified as either on or off the NHS. Other important roads and bridges that link communities are on the Alaska Highway System, while most of the community and local roads fall under the Community Transportation Program. These roads and bridges form the core network for the state. They accommodate freight movement and are used by people to get to and from work within their communities.

Table 8. Interstate Designations and Roadway Names

Interstate Designation	Southern/Eastern Terminus	Northern/Eastern Terminus	Roadway Name(s)
	Anchorage (A-3)	Canadian Border	• Glenn Highway • Portions of Richardson Highway • Tok Cut-Off • Portions of Alaska Highway
	Tok (A-1)	Fairbanks (A-4)	• Portions of Alaska Highway • Portions of Richardson Highway
	Soldotna	Anchorage (A-1)	• Seward Highway • Sterling Highway
	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.
- **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 9.

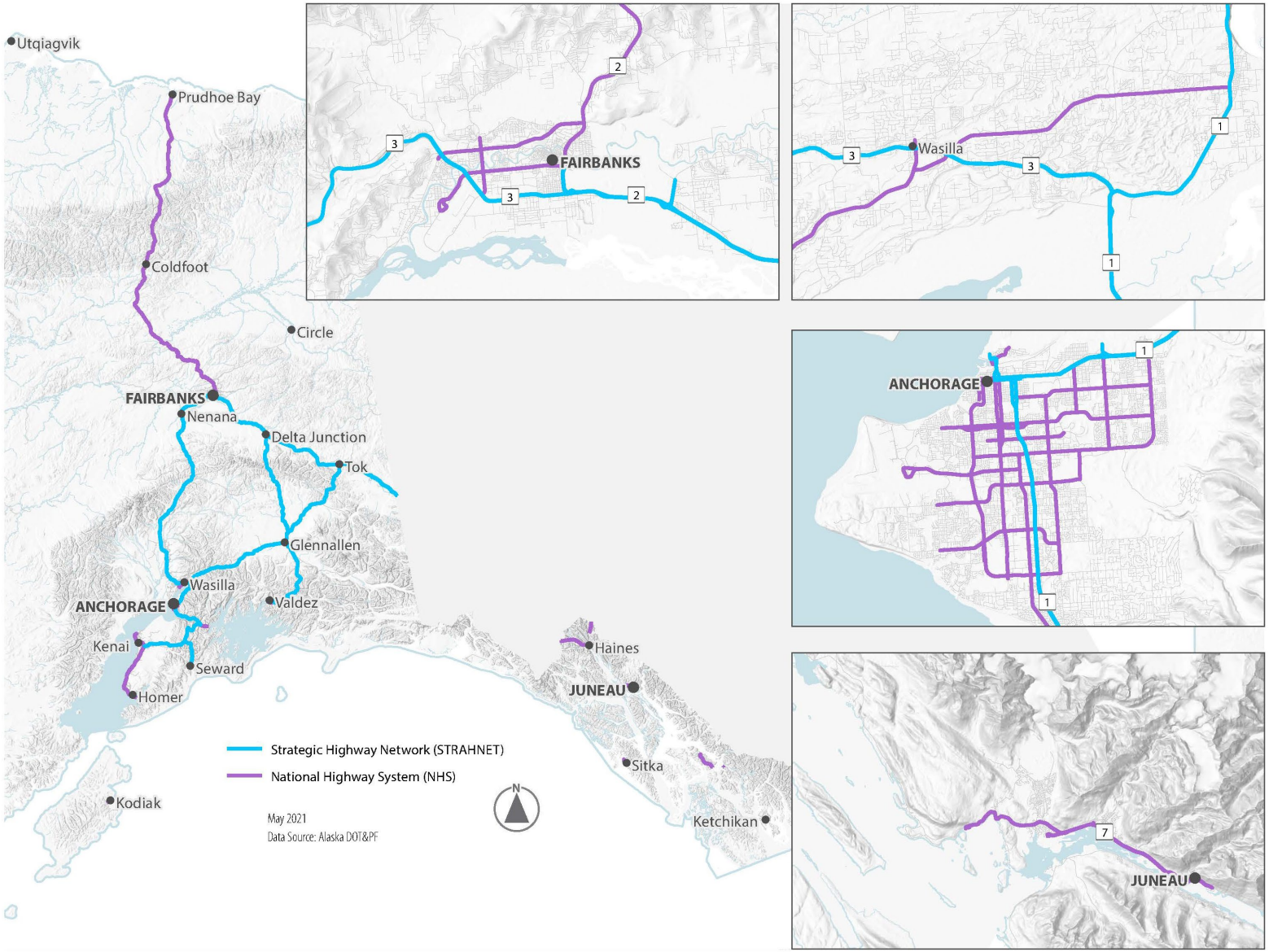
Table 9. NHS Intermodal Connectors in Alaska

Facility Name	Geographic Limits	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, Wien 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
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	Geographic Limits	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

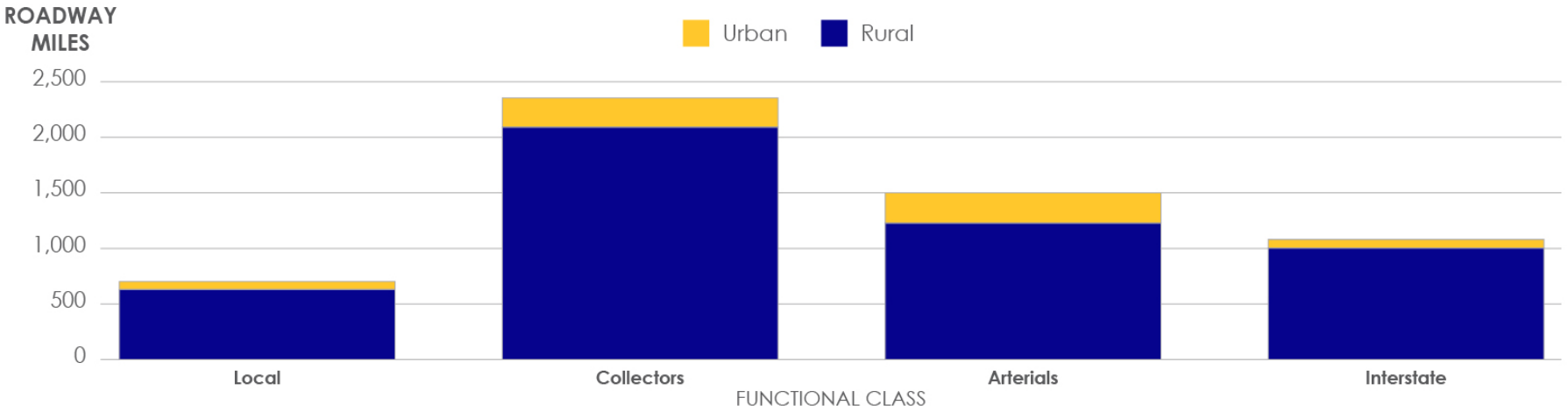
Source: FHWA Office of Planning, Environment, and Realty—NHS[xlvii]

Figure 33. Alaska Highways



DOT&PF owns more of the roadway centerline miles than any other agency, with 5,635 of the total 17,735 miles in the state (32 percent). Most state-owned roads are rural, with only 12 percent classified as urban. Figure 34 shows roadway centerline miles for state-owned roads by functional class. Between the 2013 data used in *Let's Keep Moving 2036* and 2019, state-owned mileage increased 44 miles (0.8 percent).

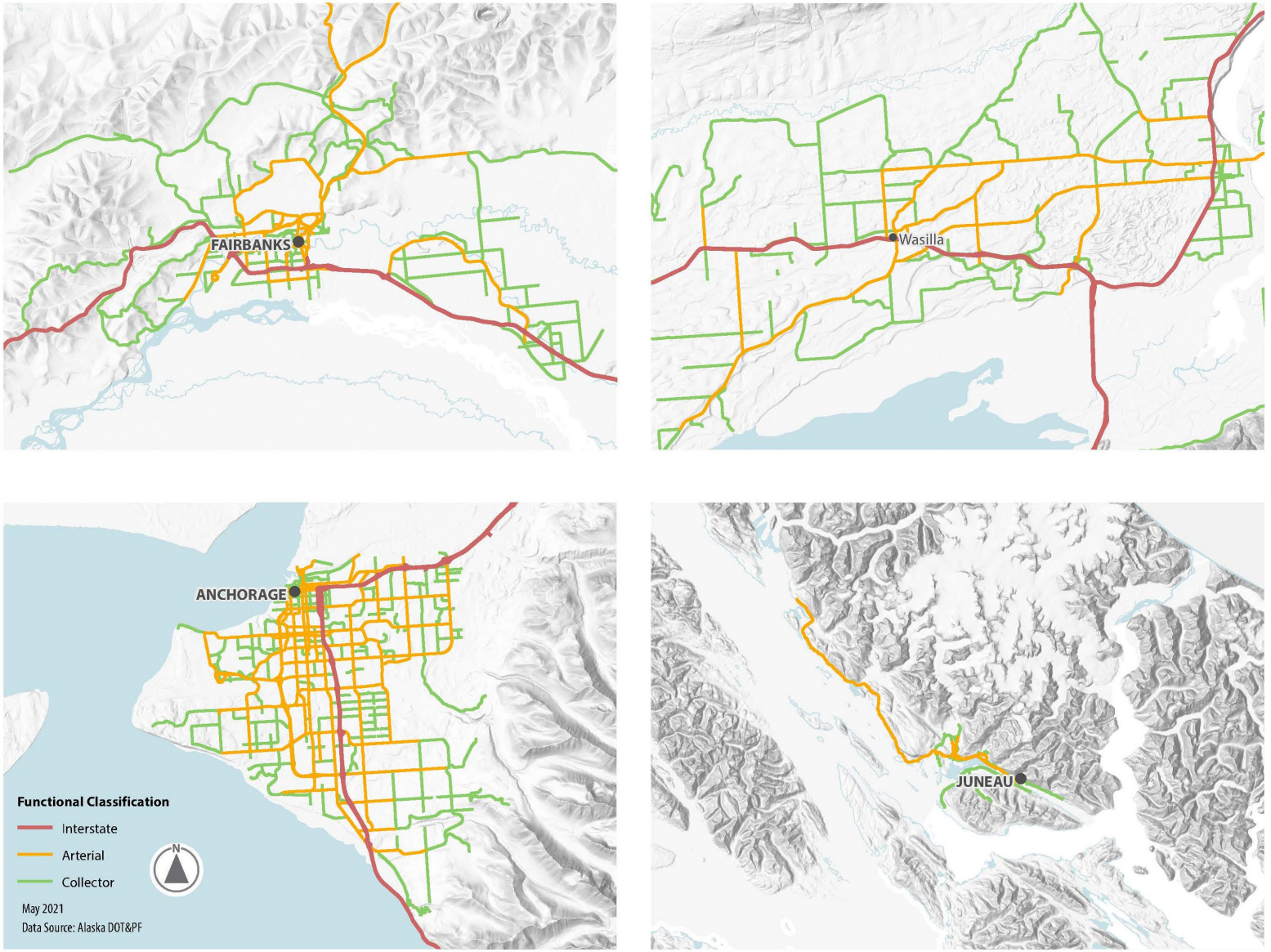
Figure 34. 2019 State-Owned Roadway Centerline Miles by Functional Class



Data Source/Date Accessed: FHWA, February 2021

Figure 35. Roadway Functional Class

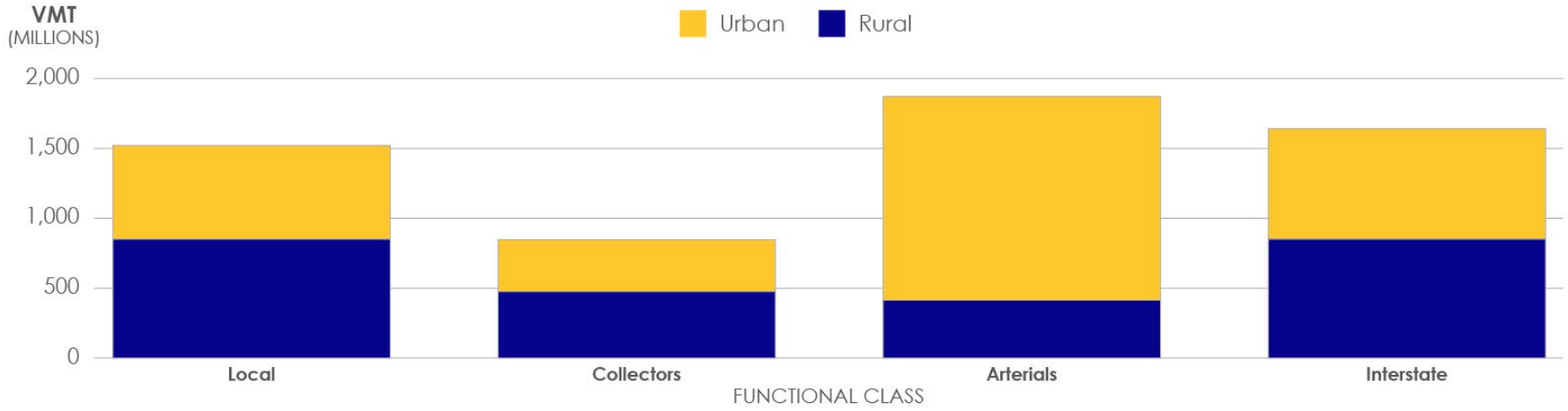
Figure 36. Roadway Functional Class (Detail)



Vehicle Miles Traveled (VMT)

Despite arterials comprising less than 10 percent of statewide roadway mileage, they represent the largest portion of total VMT at 32 percent. The second most-traveled functional class in Alaska is Interstate routes (28 percent) which comprise 7 percent of the total roadways. Major roads in urban population centers carry the highest traffic volume. Figure 37 presents 2019 VMT by roadway functional class on all DOT&PF roadways. Between 2006 and 2019, statewide lane miles increased by 20 percent while total VMT increased by 18 percent and VMT per capita increased by 8 percent. Overall, the amount of driving per lane-mile length has decreased.

Figure 37. Annual VMT by Functional Class

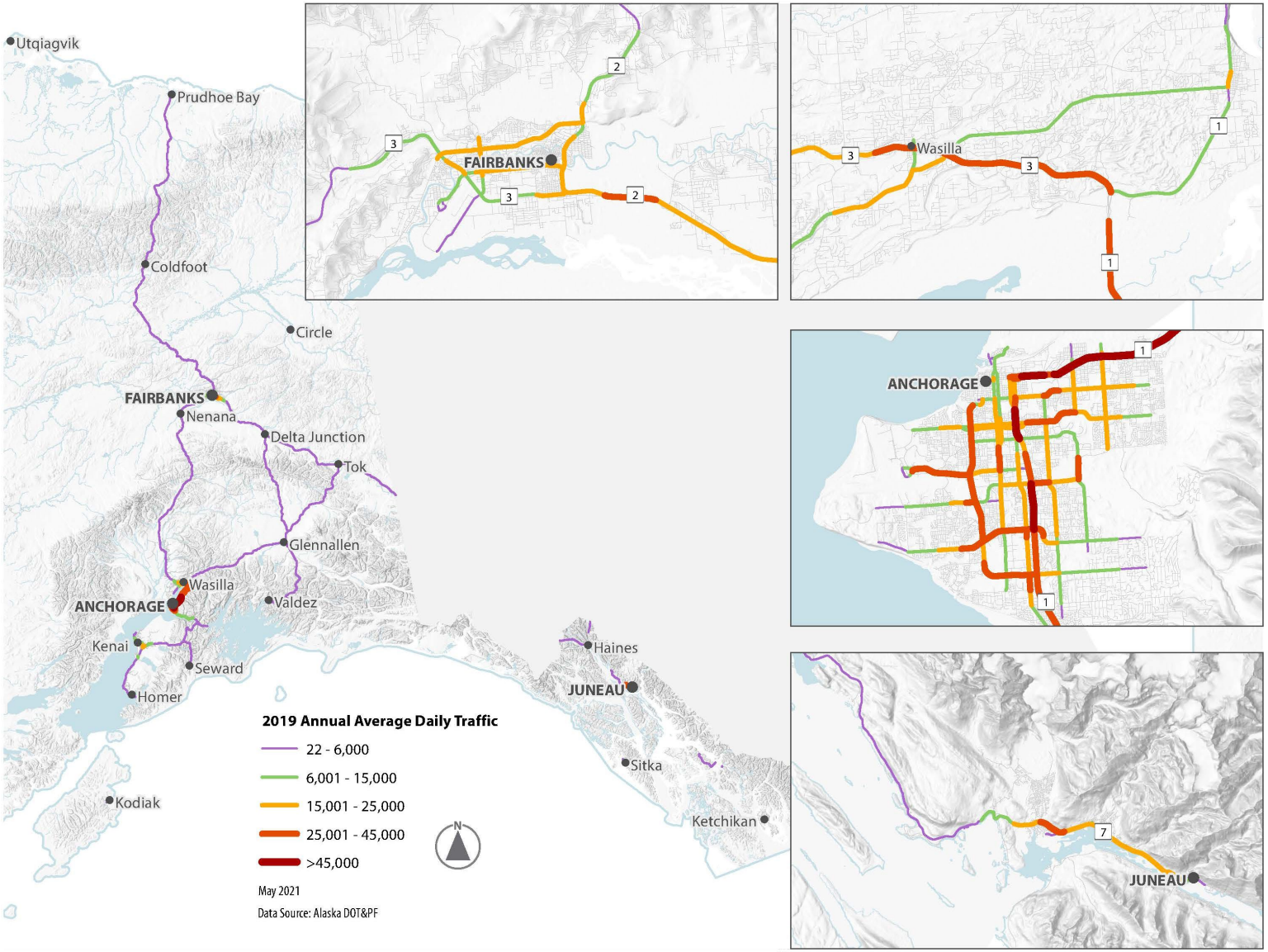


Data Source/Date Accessed: FHWA, February 2021

Annual Average Daily Traffic (AADT)

Related to VMT, annual average daily traffic (AADT) on key roadways is shown in Figure 38. Urban-area roadways carry the highest traffic volumes. AADT, along with vehicle classification and weight, is a key measure for pavement wear and serves as a basis for traffic capacity assessment. Notably, in reporting annual averages, these data do not reflect traffic volume seasonality which substantially impacts driver experience between peak and off-peak times.

Figure 38. 2019 Annual Average Daily Traffic



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 15 miles of urban 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 rural CRFCs statewide.

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.

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.

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 10.

Table 10: 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

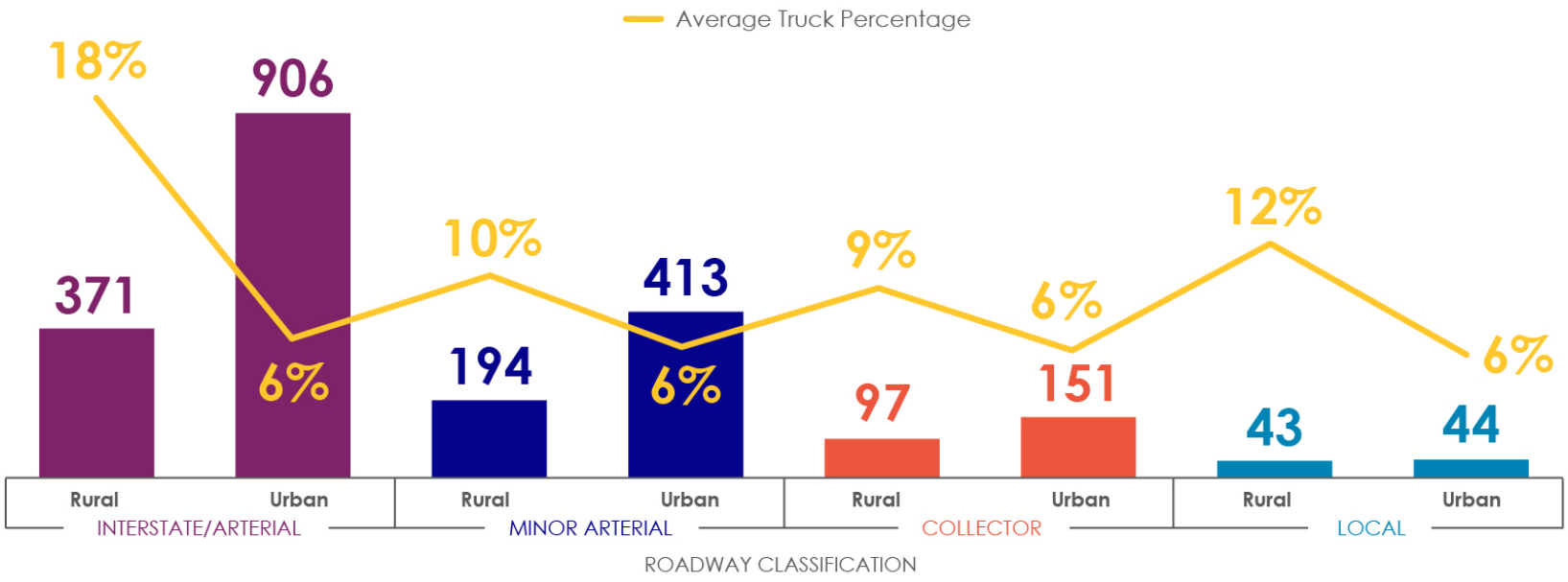
Industrial Use Highways

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 39 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 40 shows these patterns across statewide highways.

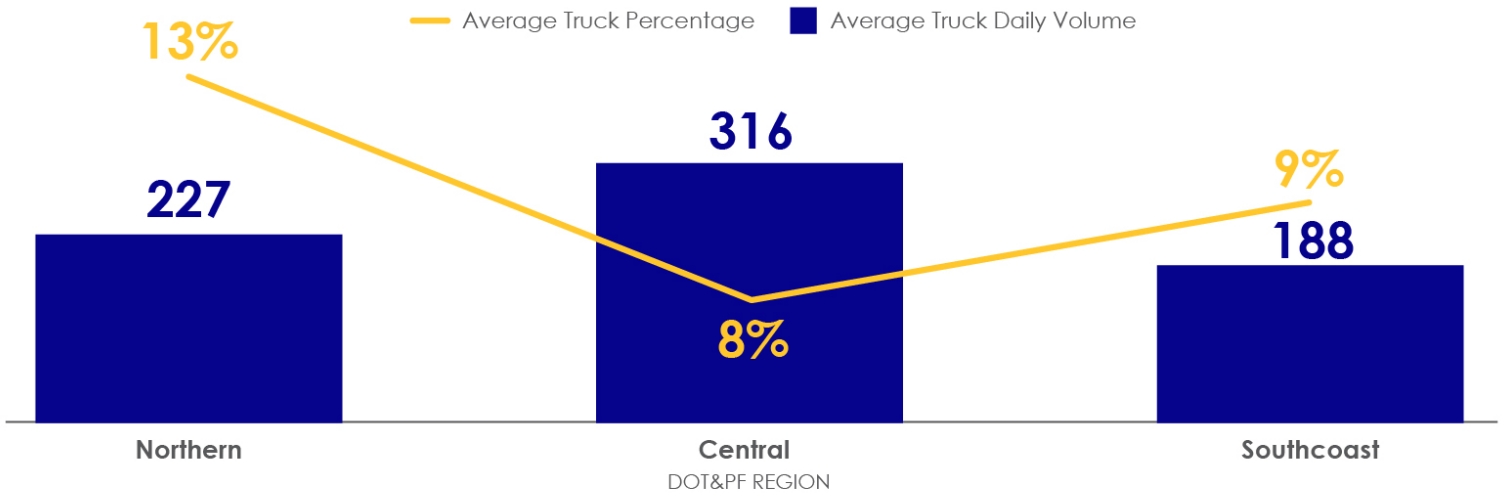
Figure 39. Average Truck Volume and Percentage by Roadway Classification (2010-2019)



Source: Alaska DOT&PF

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 40. Average Truck Volume and Percentage by DOT&PF Region (2010-2019)



Source: Alaska DOT&PF

Figure 41 displays statewide truck volumes on the 308 roadway segments counted in 2019. As demonstrated in Figure 41, urban areas have higher truck volumes, but rural highways carry more trucks as a percentage of vehicles with many over 20 percent trucks. Dalton Highway traffic is composed of over 60 percent trucks, though totals fewer than 100 trucks per day, as shown in Table 11. Figure 42 summarizes average reported truck volumes by region on selected roadways with truck volumes increasing since 2012 in Central and Northern Regions and declining in the Southcoast Region. The data shown in Figure 41 and Figure 42 are the most recent and widespread available but do not necessarily capture a complete and representative picture of truck volume patterns and trends.

Figure 41. Truck Volumes, Selected Locations

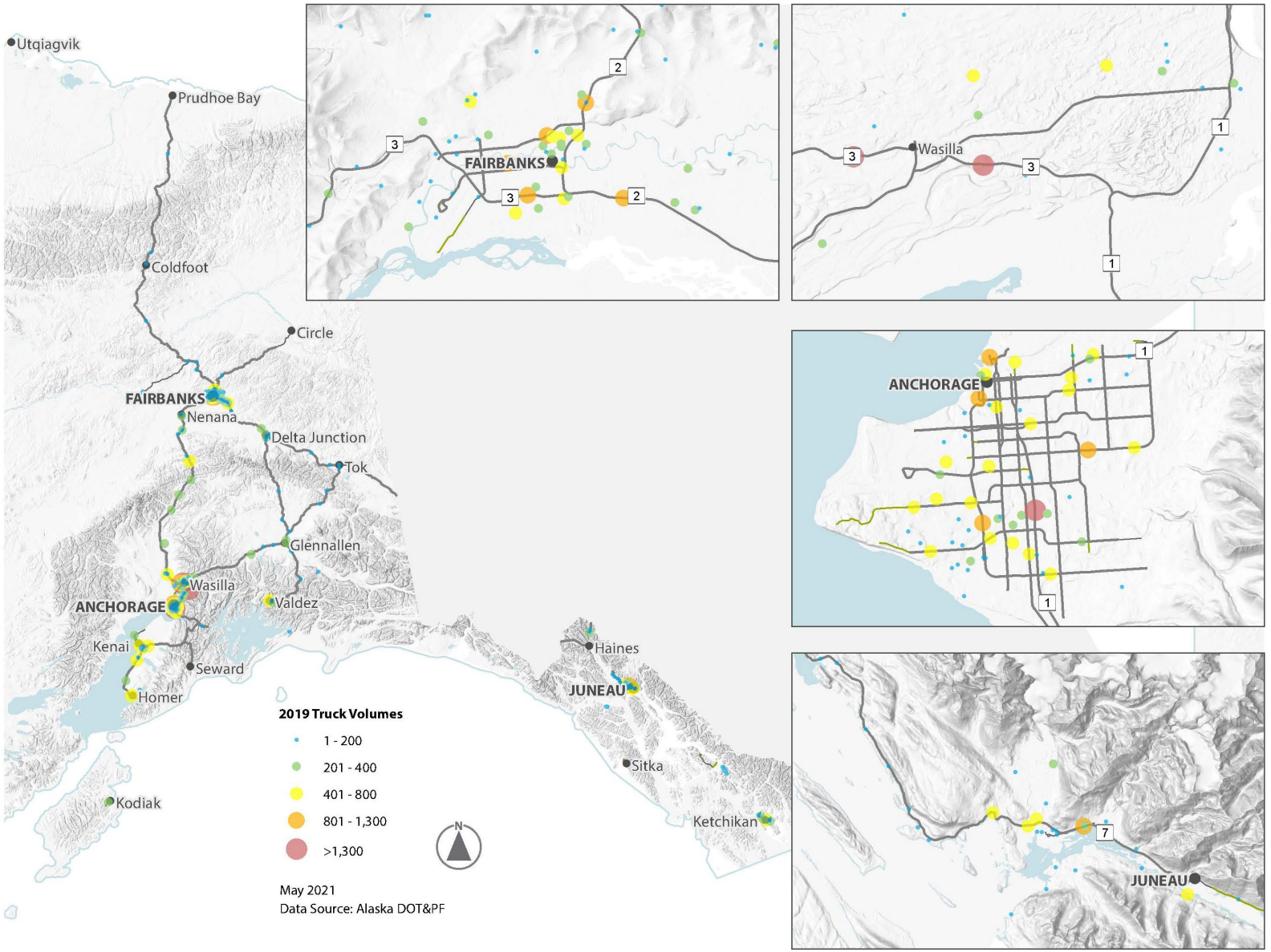
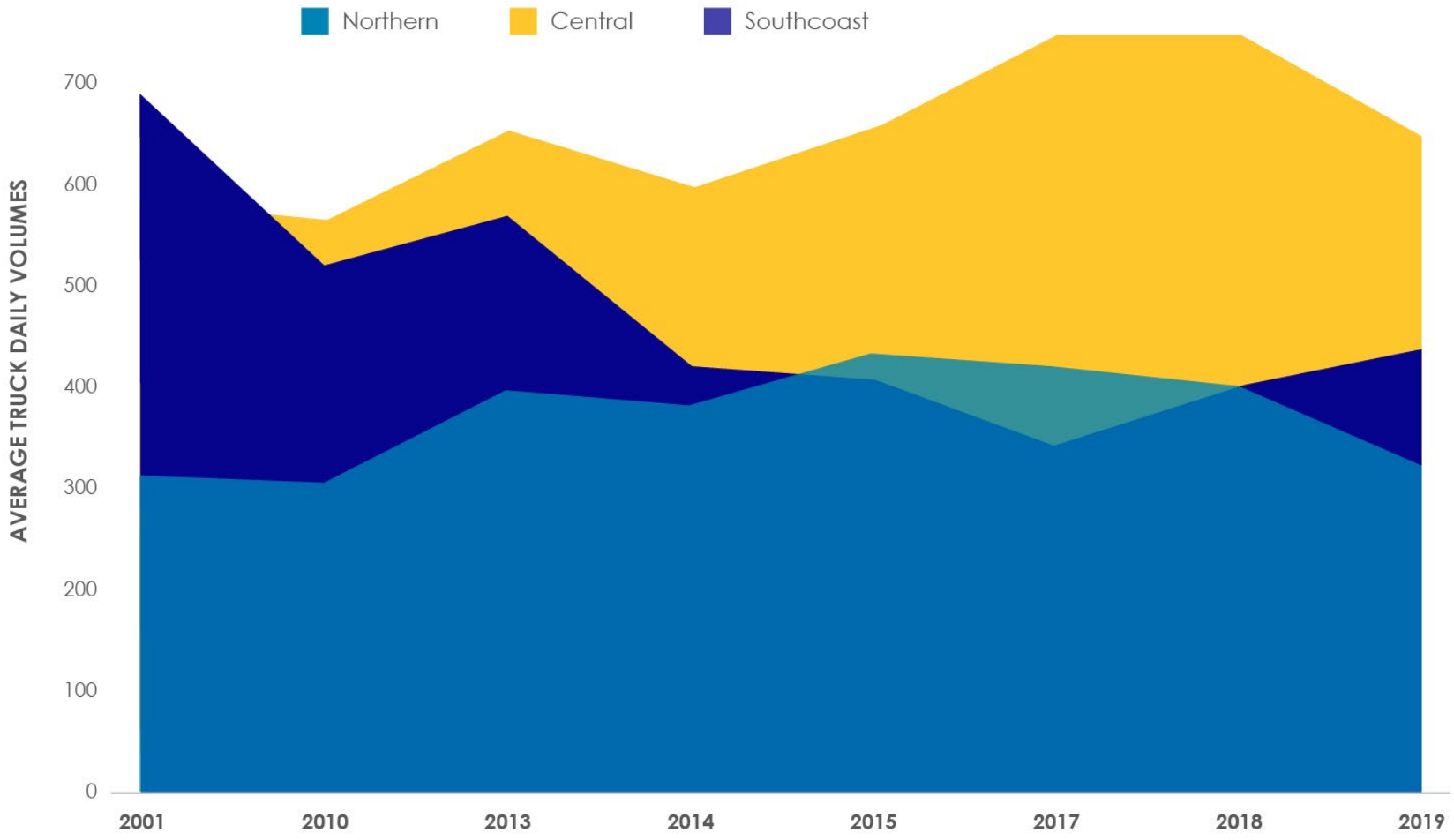


Figure 42. Average Truck Volumes by DOT&PF Region, Selected Roadways, 2012-2019



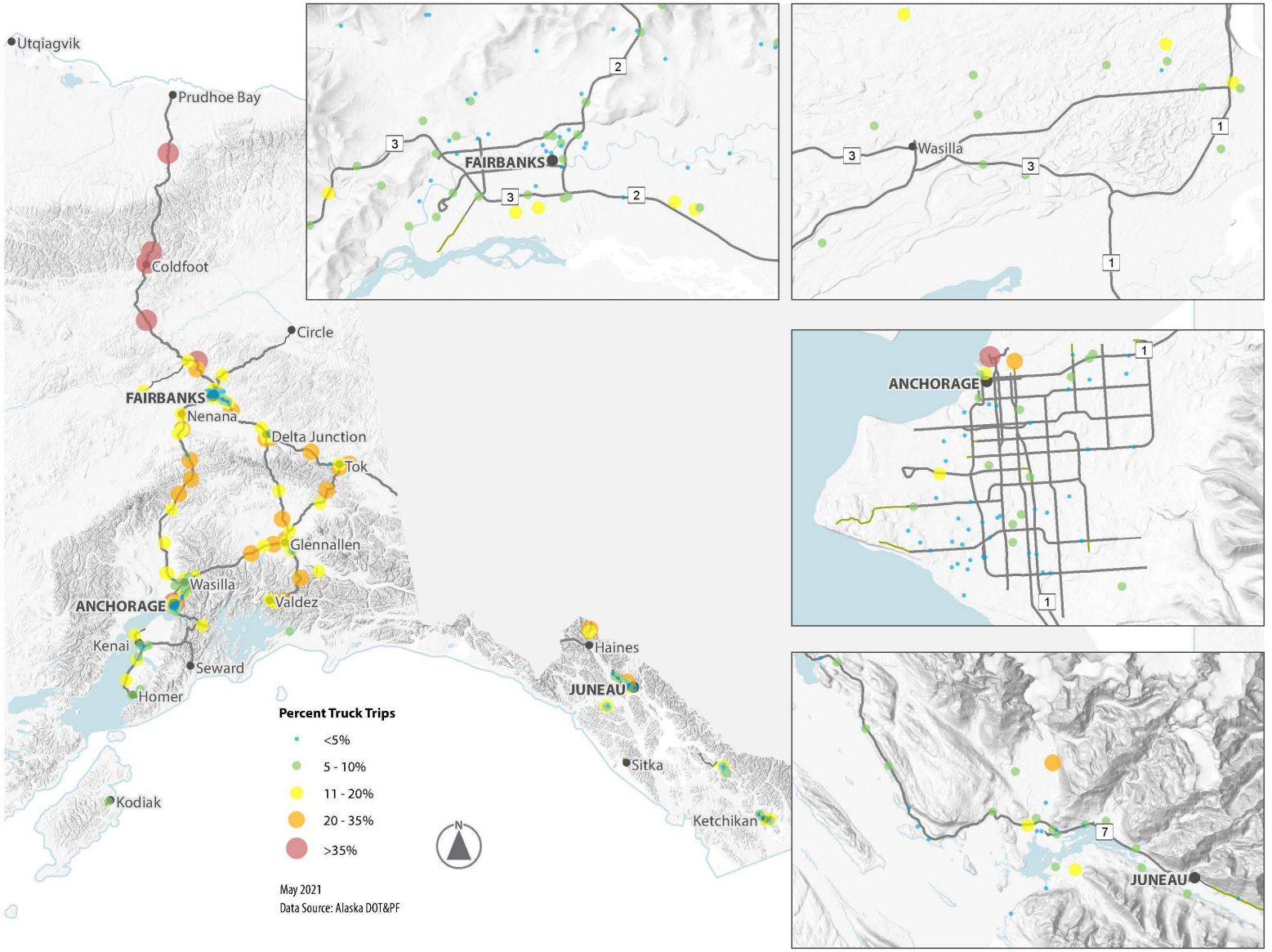
Source: Alaska DOT&PF – Transportation Data Programs

Table 11. 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
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

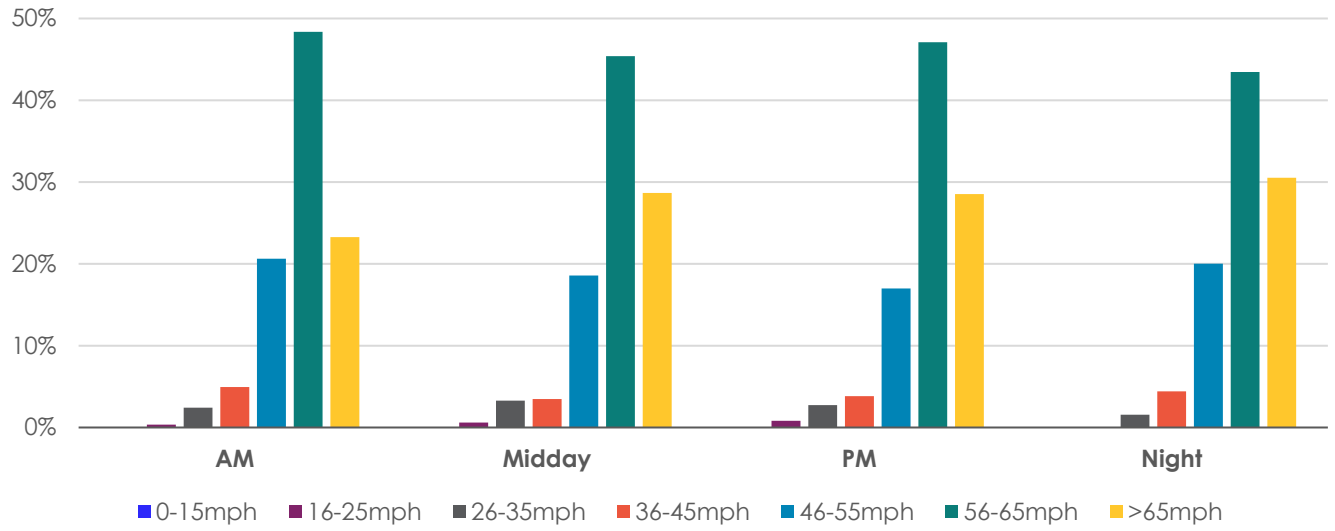
Figure 43. Percent Truck Trips



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 44).

Figure 44: Distribution of Interstate Truck VMT by Median Speed Range, 2020



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

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 12 summarizes State-enacted legal limitations on vehicle size and weight without a valid permit.

Table 12: State-Enacted Vehicle Size and Weight Restrictions

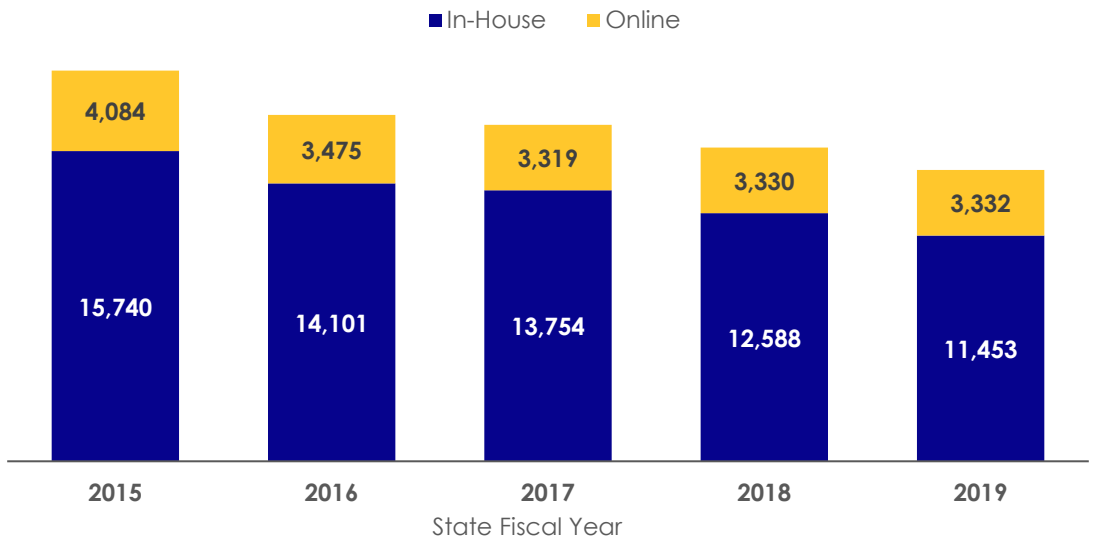
Vehicle Characteristic	Vehicle Type	Regulatory Maximum (without a permit)	Additional Information
Vehicle Width (including load)	All Vehicles	102 inches	
Vehicle Height (including load)	Vehicles Operating Between Fox Weigh Station and Prudhoe Bay on Daltonot Highways	17 feet	
	All Other Vehicles	15 feet	
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	
	3-Axle Group	42,000 pounds	

Vehicle Characteristic	Vehicle Type	Regulatory Maximum (without a permit)	Additional Information
	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 45.

Figure 45: CVCSC-Issued Oversize and Overweight Permits, SFY 2015-19



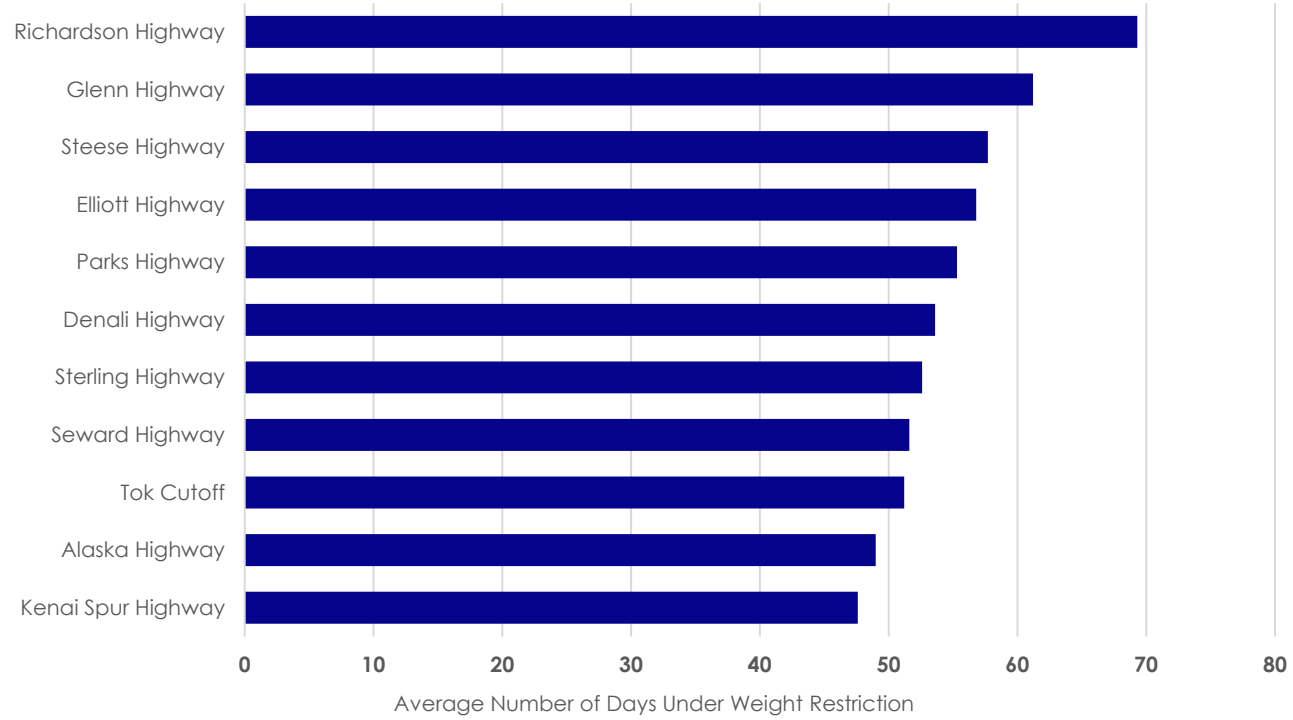
Source: Alaska Department of Transportation and Public Facilities – Division of Measurement Standards and Commercial Vehicle Compliance: 2019 Annual Report.

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 46 shows the average number of days major highways were under weight restrictions during spring over a 10-year period.

Figure 46: 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.

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.[xlviii] 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 need along the Dalton and Richardson Highways 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.

Travel Time and Freight Bottleneck Performance Measures

TRAVEL TIME RELIABILITY AND EMISSIONS PERFORMANCE MEASURES

Travel time reliability is a measure of how consistent or dependable travel times are. Travel time reliability can be measured either from day to day or across different times of day, or both. If trip times are inconsistent, travel time is considered unreliable, because it is difficult to estimate consistently and accurately.

States must establish and report reasonable targets based on Federal Highway Administration (FHWA)-supplied travel time data from the National Performance Management Data Set (NPMRDS); analysis of representative segments; and contributing factors and projections of future efforts for the level of travel time reliability (LOTTR) for interstates and non-interstate NHS, as required by US 23 CFR 490.507. States must document actions they will take to achieve the target if the actual performance level is not equal to or better than the established target (Significant Progress Determination US 23 CFR 490.109).

DOT&PF established conservative targets because there are large gaps in travel time data for rural areas. These gaps are due to low volumes and other contributing factors such as limited access control, lack of roadway connectivity, and alternative routes. Based on the mid-performance progress report, DOT&PF is meeting its established targets for travel time reliability.

DOT&PF is also required to set a target and report on the Total Emissions Reduction measure (23 CFR part 490) to assess on-road mobile source emissions. Tracked emissions include $PM_{2.5}$, PM_{10}, NO_X, VOC, and CO. Emissions reductions targets were met in 2020 for NO_X and CO. No data or targets are yet available for VOC.

Table 13. Federal Performance Measures for Travel Time Reliability, Congestion, and Emissions

Performance Measure	Baseline	2-Year Condition	2-Year Target	4-Year Target
Percent of Reliable Person-Miles Traveled on the Interstate	95.5%	94.7%	92.0%	92.0%
Percent of Reliable Person-Miles Traveled on non-interstate NHS	-	80.8%	-	70.0%
Total Emissions Reduction for CMAQ Criteria Pollutants				
Total Emission Reductions: $PM_{2.5}$	400.6	0.042	0.050	0.050
Total Emission Reductions: NO_X	4,663.0	0.304	0.050	0.050
Total Emission Reductions: VOC	-	-	-	-
Total Emission Reductions: PM_{10}	1,943.0	0.087	2.0	-
Total Emission Reductions: CO	5,023.0	310.9	20.0	40.0

Source: Alaska's 2020 Mid Performance Period Progress Report[xlix]

TRUCK TRAVEL TIME RELIABILITY PERFORMANCE MEASURES

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. Shippers and freight carriers require predictable travel times to remain competitive. The Truck Travel Time performance measure related to freight movement on the interstate uses truck speed and travel time reliability data to calculate the Truck Travel Time Reliability Index. Truck travel time reliability is calculated and averaged for the entire interstate highway system in the state. Again, like the travel time reliability performance measure, data challenges impact the ability to accurately calculate this index, and conservative targets were set from the *2020 Mid Performance Period Progress Report*[l]. Table 14, 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 14. 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

Source: Alaska's 2020 Mid Performance Period Progress Report

This measure is also used to identify and quantify freight truck bottlenecks on interstate highways. Freight bottleneck locations routinely experience recurring congestion and backups because traffic volumes exceed highway capacity. The *2018 Alaska Truck Bottlenecks Report* identified 18 segments associated with 11 bottleneck locations, primarily in Anchorage and Fairbanks, based on truck delay and travel time reliability estimates from NPMRDS. A 2020 addendum to this analysis using 2019 NPMRDS data concluded that improvement projects raised performance at two locations. Conditions declined at one location.

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 15.

Table 15: 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

Rank	Location	Roadway Name	Direction
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
11	Geist Road/Johansen Expressway/University Avenue[li]	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

Source: Alaska DOT&PF

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.

Pavement and Bridge Conditions

PAVEMENT

DOT&PF owns and maintains a combination of paved (61 percent) and unpaved (39 percent) roadways. The Northern Region has the most unpaved centerline miles, including the 414-mile-long Dalton Highway, part of the NHS, which still has significant sections gravel surfaces with intermittent pavement (Table 16). 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.

Table 16. DOT&PF Highway & Roadway Pavement Status (2019)

Region	Paved Centerline Miles	Unpaved Centerline Miles	Total Centerline Miles
Northern Region	1,884.955	1,480.883	3,365.838
Central Region	1,302.349	251.840	1,554.189
Southcoast Region	560.541	155.193	715.734
Statewide	**3,747.845**	**1,887.916**	**5,635.761**

Source: State of Alaska Certified Public Road Mileage[lii]

Figure 47a. Overall Pavement Conditions

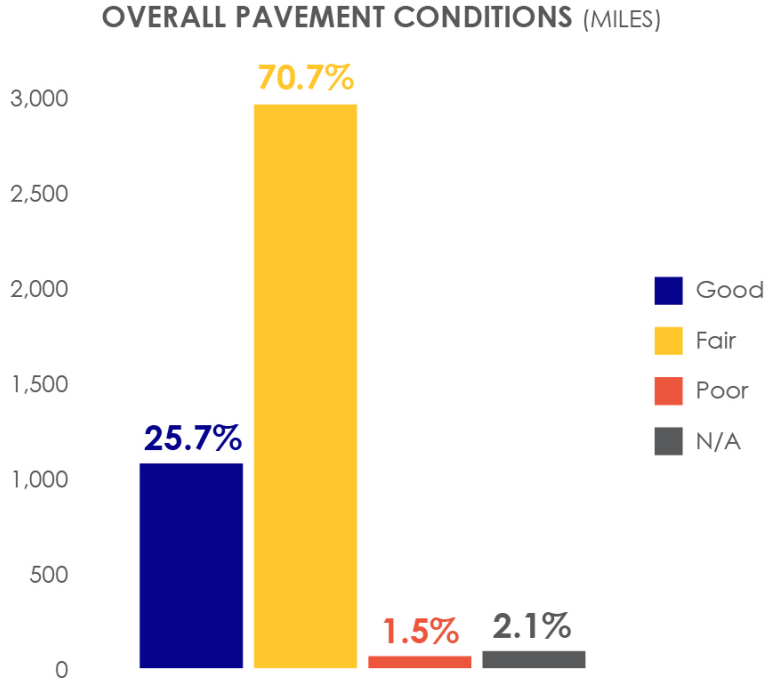
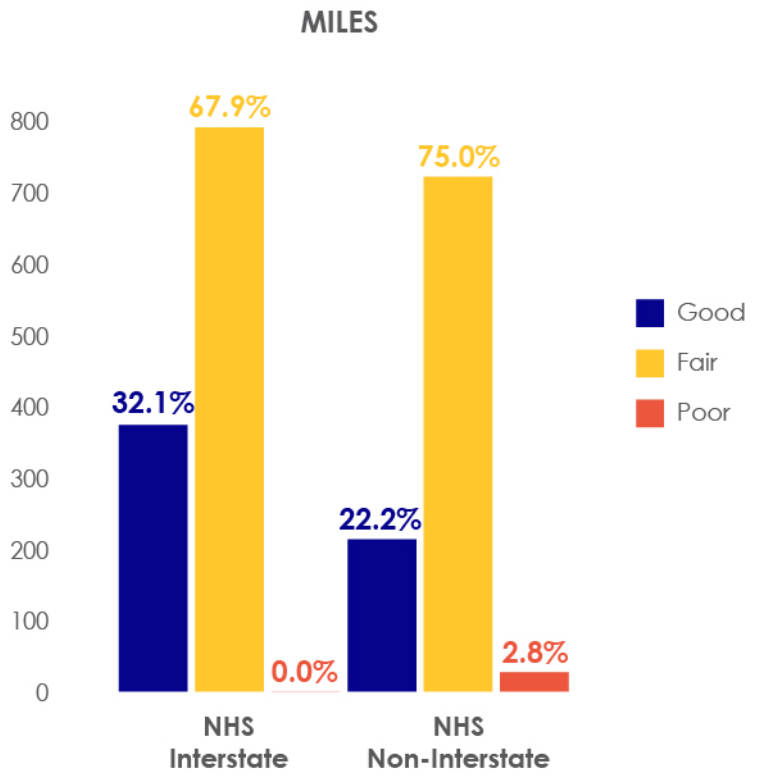


Figure 47b. 2020 Pavement Conditions for the NHS



Data Source/Date Accessed: FHWA, February 2021

Figure 47a and Figure 47b summarize the available 2020 pavement conditions data for DOT&PF-owned paved roadways. Pavement condition is mapped in Figure 48, which shows poor-condition pavement is generally found on relatively short segments of facilities with fair condition ratings.

Of particular concern for roadway pavement condition is the use of studded tires, which results in a pavement defect known as rutting. Higher volume roads have higher average wear rates due to studded tire use than lower volume roadways. Based on planning-level economic analysis completed in 2019, pavement resurfacing costs resulting from studded tire use ($13.7 million/year) is more than 42 times the states fees from studded tire and stud-installation sales ($318,000).

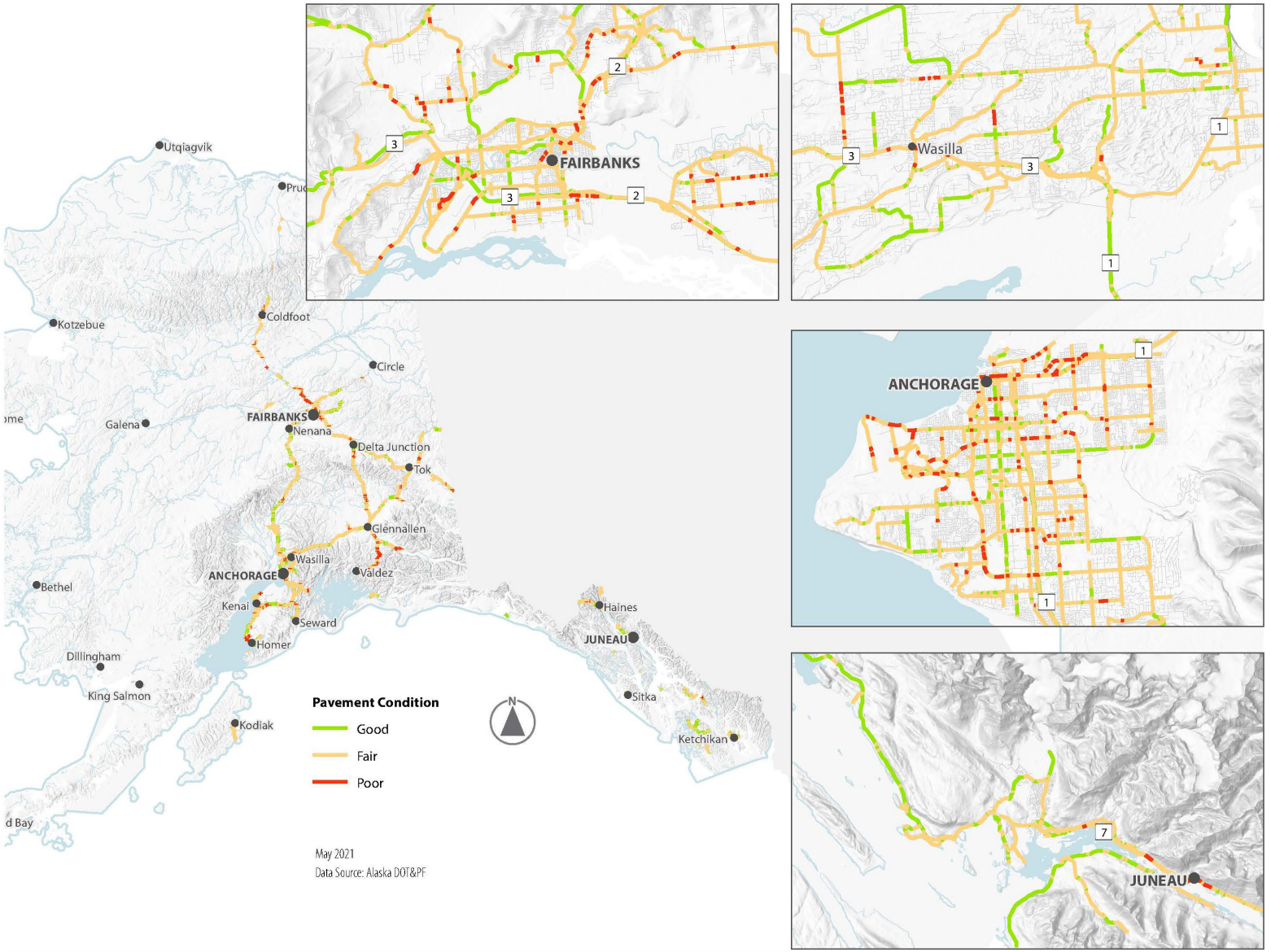
Table 17 documents improvements in NHS pavement conditions between 2015 and 2020. The proportion of the NHS in good condition has increased and the portion in poor condition has decreased for both interstate and NHS non-interstate routes. No part of the interstate system was reported with poor condition in 2020.

Table 17. NHS Pavement Condition Comparison, 2015-2020

Pavement Condition	NHS Interstate		NHS Non-Interstate	
	2015	2020	2015	2020
Good Condition	23.6%	32.1%	16.3%	22.2%
Fair Condition	71.3%	67.9%	68.1%	75.0%
Poor Condition	5.1%	0.0%	15.6%	2.8%

Data Source/Date Accessed: FHWA, February 2021

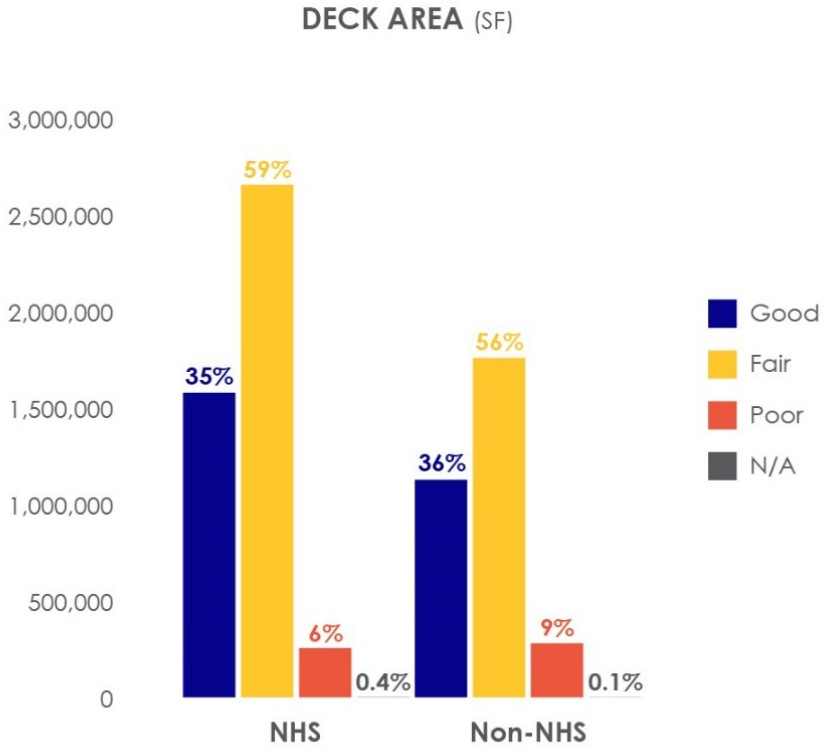
Figure 48. 2020 Pavement Conditions for NHS Routes



BRIDGES

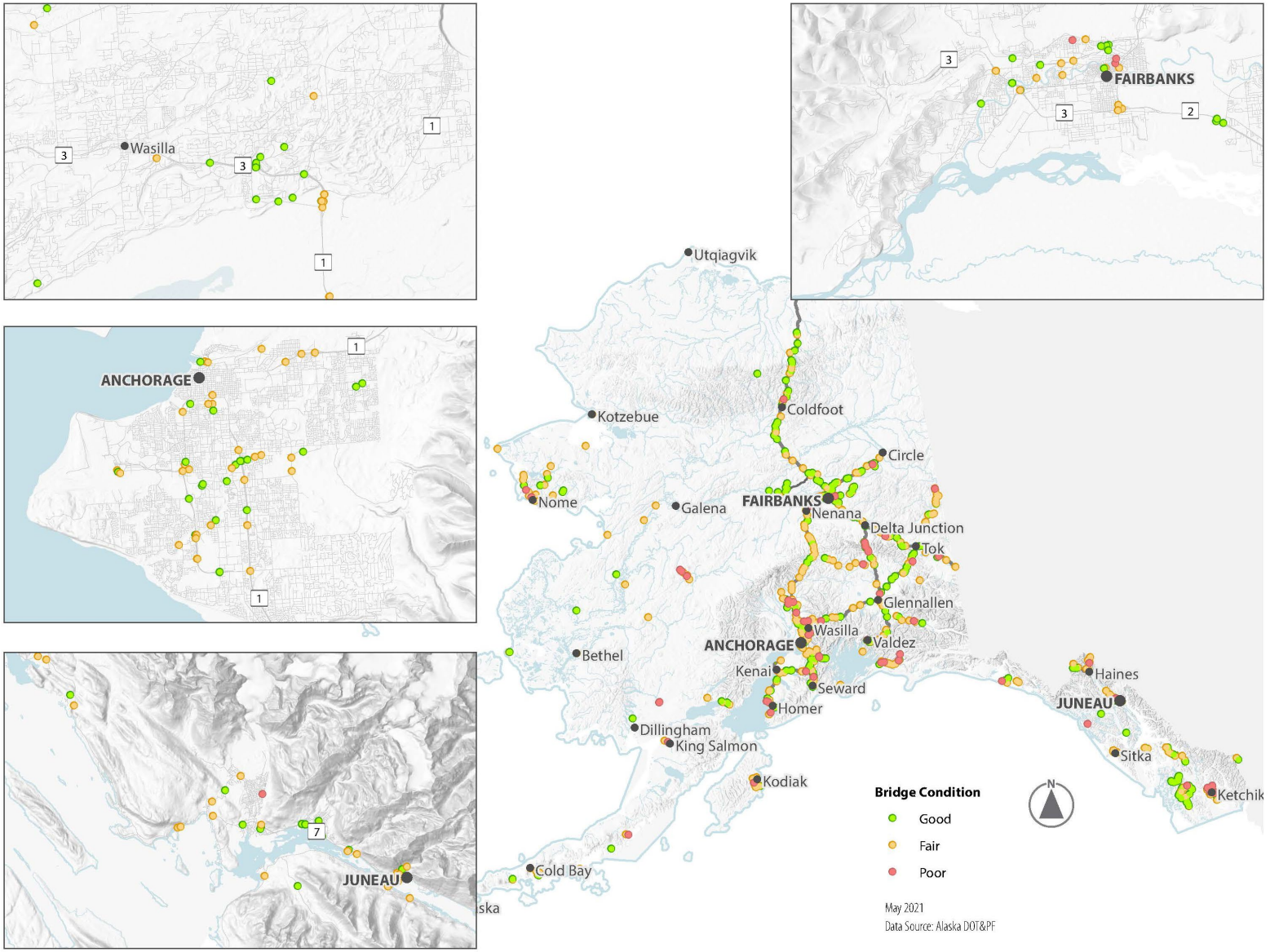
DOT&PF provided bridge condition data for 1,306 bridges, including large culverts, and 565 bridges on NHS routes. Based on 2020 bridge data, summarized in Figure 49, a majority of deck area on both NHS and non-NHS bridges is in fair condition. Out of approximately 4.5 million square feet of NHS deck area, 35 percent is in good condition. Figure 50 displays statewide bridge conditions, including bridges owned by other public agencies, but inspected by DOT&PF.

Figure 49. 2020 NHS and Non-NHS Bridge Condition by Deck Area



Data Source/Date Accessed: FHWA, February 2021

Figure 50. Bridge Condition



MANAGING PAVEMENT CONDITION

DOT&PF is improving its pavement management practices by transitioning to the more cost-effective life cycle planning method from the "worst-first" method. A life cycle planning method emphasizes rehabilitating assets that are still in good or fair condition before they can deteriorate into "the worst," requiring more costly replacement.

To manage pavement and bridge infrastructure, DOT&PF is using AgileAssets, an updated AASHTOWARE bridge management software, and the Transportation Asset Management Information System (TAMIS). Project cost data is being used to assist in life cycle planning and in the selection of maintenance, preservation, and rehabilitation projects. This allows the DOT&PF to analyze long-term strategies and funding needs. DOT&PF complies with the 24-month inspection frequency mandated by 23 CFR 650 Subpart C—National Bridge Inspection Standards.

DOT&PF is working towards the following objectives for pavement and bridge management:

- Treating pavement in good and fair condition before it deteriorates, to save money over the pavement's life cycle
- Providing data and information to more effectively select designs for future surface treatment, rehabilitation, and reconstruction
- Designing and constructing bridges to last with minimal maintenance
- Sealing decks and expansion joints to protect bridges from road-salt-laden runoff
- Performing maintenance, such as cleaning gutters and deck drains, removing debris from bottom chords and bearing seats, and removing drift from piers
- Investing in preservative treatments for bridges in good and fair condition to slow deterioration—preservative treatments might include deck seals and repainting structural steel elements
- Providing information to allow effective selection and design of future maintenance and preservation (i.e., deck treatments), rehabilitation, and reconstruction projects
- Accurately estimating future conditions versus funding scenarios to evaluate pavement bridge funding strategies
- Displaying analysis results in a format understandable to non-technical audiences

The TAMP sets objectives for pavement management strategies that make best use of limited funds by prioritizing optimal target areas. Proper data analysis of current conditions is important to identify these target areas. The 2019 TAMP projected $88 million would be needed annually from 2019-2028 for pavement management and $47 million for bridge management to maintain a state of good repair at the lowest cost. This budget includes preservation, rehabilitation, and reconstruction costs.

As new projects are constructed and more infrastructure is added to the current transportation system, a lack of maintenance and operation resources could put the assets at risk. Challenges for future pavement and bridge maintenance listed in the TAMP include the following:

- Lack of quality data for needs forecasting
- Seismic events
- Inadequate funding
- Flooding
- Coastal erosion
- Permafrost thawing
- Aufeis (river ice overflow) impacts
- Maintaining lifelines to rural communities
- Construction quality control

Highway Infrastructure Condition Performance Measures

Table 18 summarizes the performance measures for highway infrastructure conditions. All performance measures are exceeding targets with the exception of the percentage of NHS bridges classified as in good condition, with a two-year condition of 33.5 percent, which falls short of the 40 percent target. The infrastructure condition performance measure is relatively new and some benchmarks and targets are not fully developed.

Table 18. Infrastructure Condition Performance Measures Summary

Performance Measure	Baseline	2-Year Condition/ Performance*	2-Year Target	4-Year Target (2021)
Lane Miles in Good Condition – Interstate Pavement		32.4%		20.0%
Lane Miles in Poor Condition - Interstate Pavement		0.7%)		10.0%
Lane Miles in Good Condition - Non-Interstate NHS	35.6% (2017)	44.1%		
Lane Miles in Good Condition - Non-Interstate NHS (Full Distress +IRI)		23%	15.0%	15.0%
Lane Miles in Poor Condition - Non-Interstate NHS	29.9% (2017)	21%		
Lane Miles in Poor Condition - Non-Interstate NHS (Full Distress +IRI)		7.0%	15.0%	15.0%
Deck Area in Good Condition - NHS Bridges	39.4% (2017)	33.5%	40.0%	40.0%
Deck Area in Poor Condition - NHS Bridges	6.4% (2017)	5.8%	10.0%	10.0%

Source: Alaska's 2020 Mid Performance Period Progress Report[liii]

Highway Safety

The most recent federal transportation legislation, the Fixing America's Surface Transportation (FAST) Act (2015), continued a trend of increasing emphasis on transportation safety. Notably, it continued the Highway Safety Improvement Program (HSIP) as a core federal-aid program. The HSIP requires that all states have a current Strategic Highway Safety Plan (SHSP) that guides investments of HSIP funds through a data-driven project selection process, as well as a Rail-Highway Crossing Program. The Alaska SHSP was updated in 2017 and covers the years 2018-2022.

DOT&PF's approach to safety is primarily guided by the Alaska Strategic Highway Safety Plan.

The SHSP defines three broad emphasis areas for improving highway safety in Alaska:

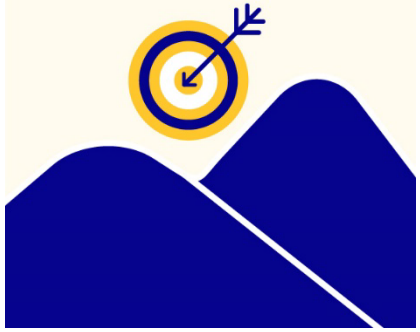
- **Driver Behavior:** Involves the actions and behavior of drivers and passengers with respect to impaired driving and occupant protection (e.g., seat belt and car seat use). This emphasis area also focuses on two age groups who are at higher risk of being involved in a fatal or serious injury crash: young drivers (20 and under) and older drivers (65 and up)
- **Roadways:** Includes lane departure, intersection, and animal-vehicle collision types
- **Special Users:** Focuses on crashes involving pedestrians, bicyclists, motorcyclists, and off-road vehicles

THE COST OF CRASHES IN ALASKA

TOTAL COST
$1,244,491,200
DAILY COST
$3,409,565

Alaska's VISION is toward ZERO deaths and serious injuries so all public roadway users arrive safely at their destination.

The **SHSP MISSION** is to improve the safety of all roadway users through a collaborative approach that focuses resources on the most effective solutions using evidence-based engineering, enforcement, education, and emergency response initiatives.

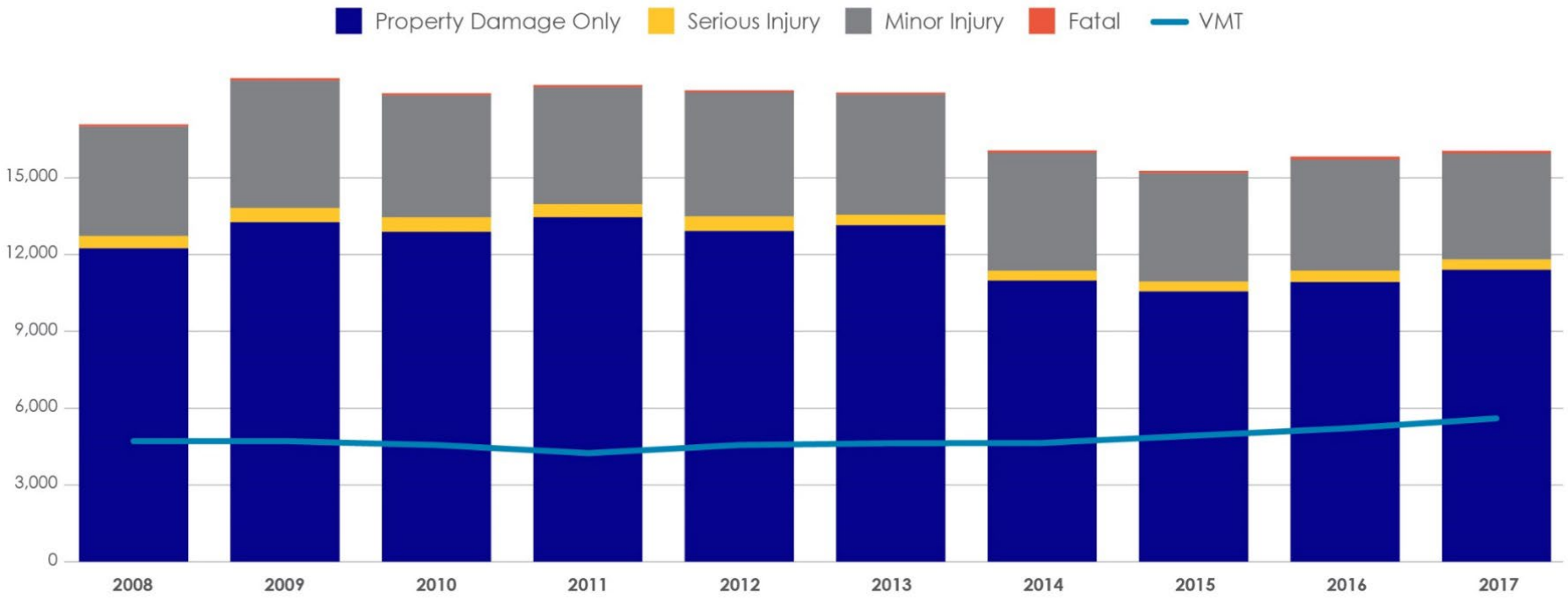


Source: SHSP

FATAL AND SERIOUS INJURY CRASHES

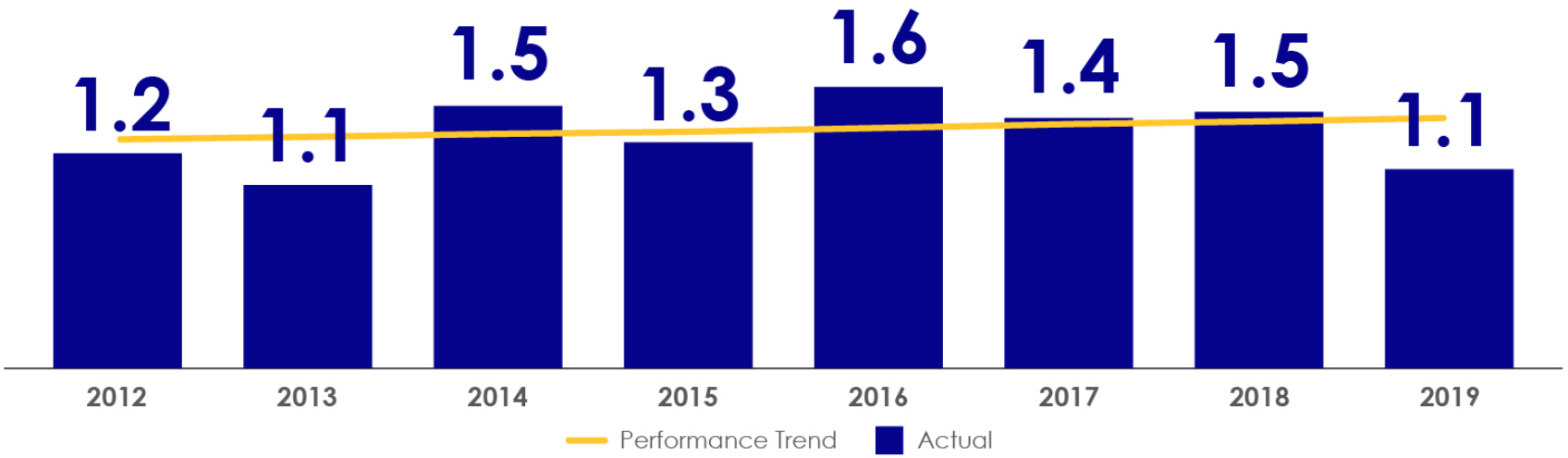
Figure 51 shows that while there is fluctuation from year to year, fatalities have generally been on the rise while serious-injury crashes are trending downward. The trendline for the fatality rates per 100 million VMT in Figure 52 reflects this trend. Figure 53 represents the statewide serious injury rate per 100 million VMT.

Figure 51. Statewide Crashes by Severity, 2008-2017



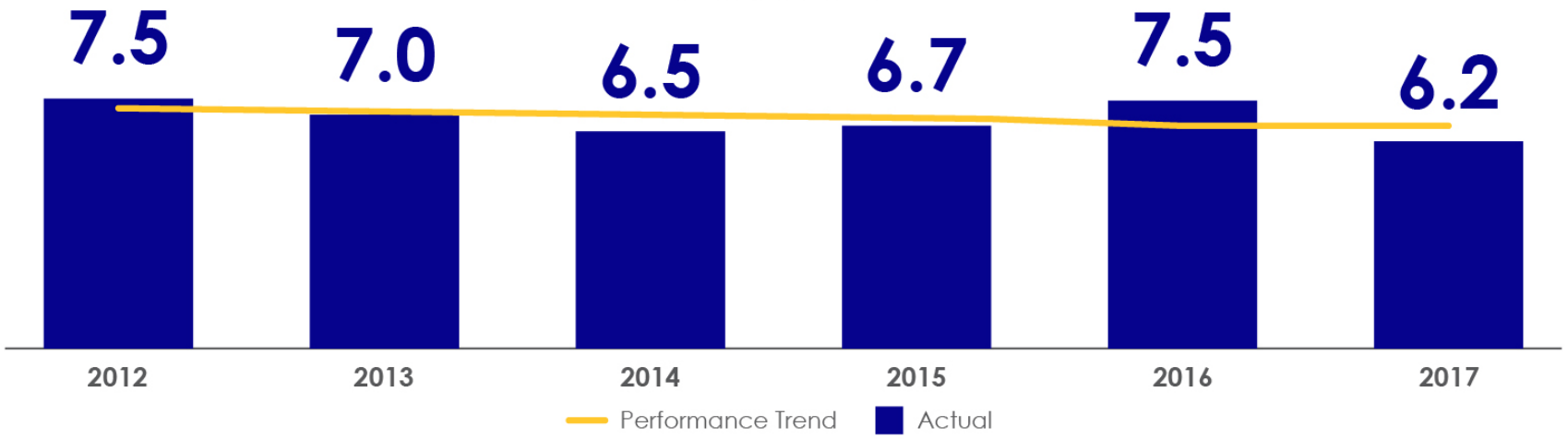
Source: SHSP, HSP, 2019

Figure 52. Statewide Fatality Rate per 100 Million Vehicle Miles Travelled (MVMT)



Data Source/Date Accessed: FHWA (2012-2018)/February 2019; HSIP Annual Report, 2020 (2019)

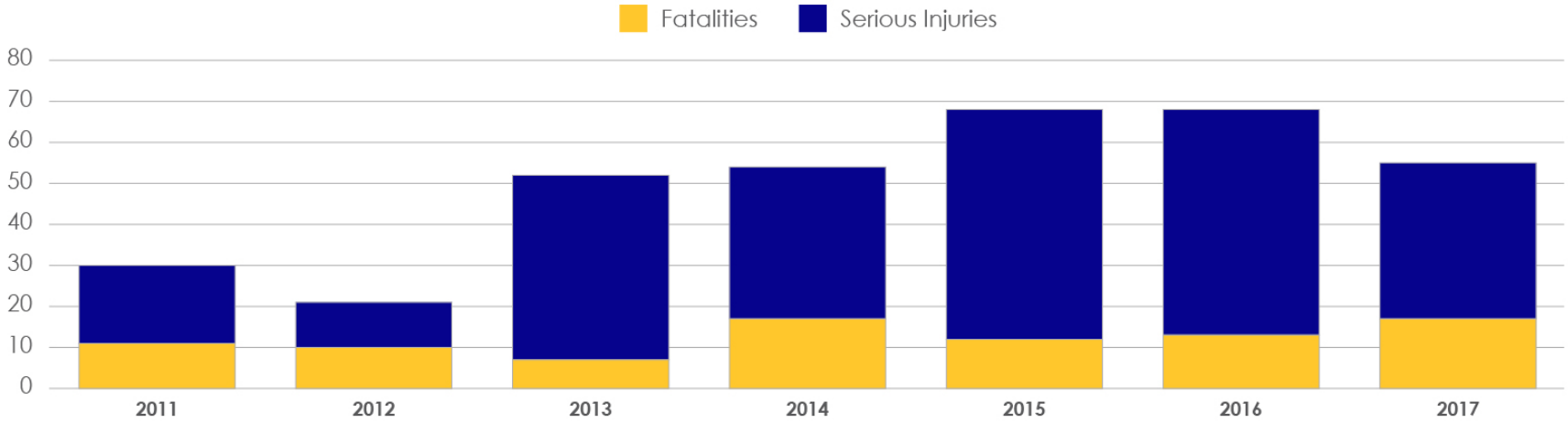
Figure 53. Statewide Serious Injury Rate per 100 MVMT



Data Source/Date Accessed: FHWA (2012-2016)/February 2019; HSIP Annual Report, 2020 (2017)

Non-motorized fatalities and serious injuries, shown in Figure 54, have also been trending upward, consistent with national trends.

Figure 54. Statewide Non-Motorized Fatalities and Serious Injuries

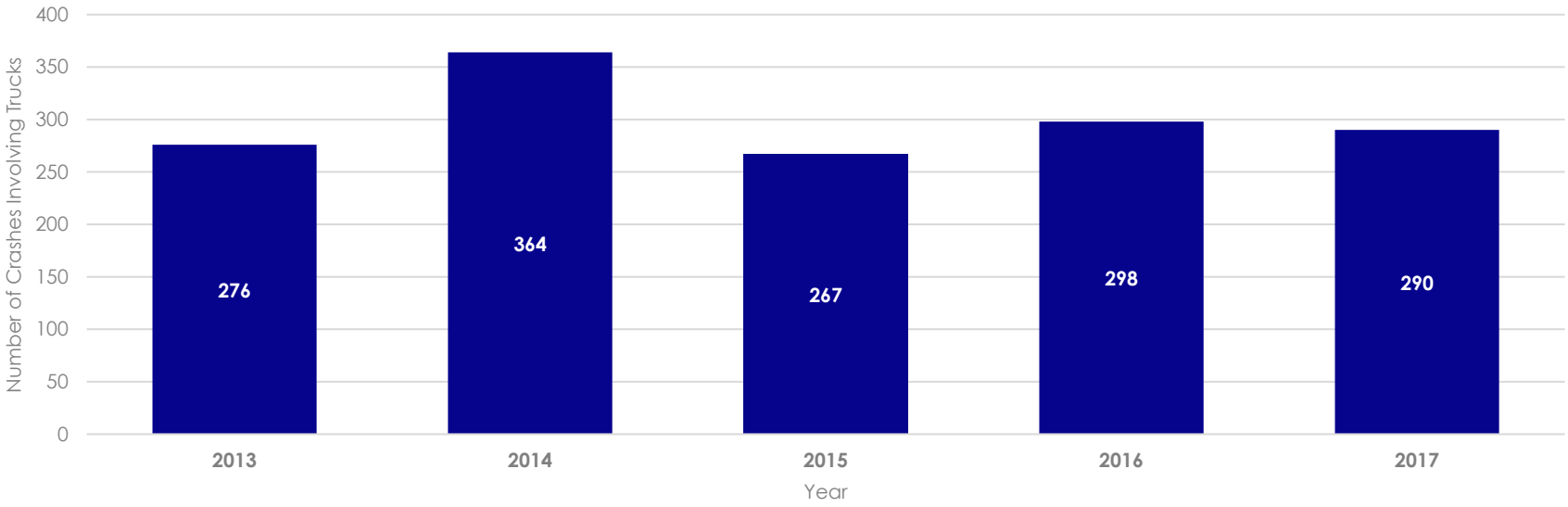


Data Source: HSIPR, 2020

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 55.

Figure 55: Crashes Involving Trucks, 2013-17



Source: Alaska DOT&PF

Table 19 shows the number of crashes in each municipality/borough annually along with their respective annual average, sorted from greatest to least.

Table 19: Annual Truck Crashes by Borough/Municipality, 2013-17

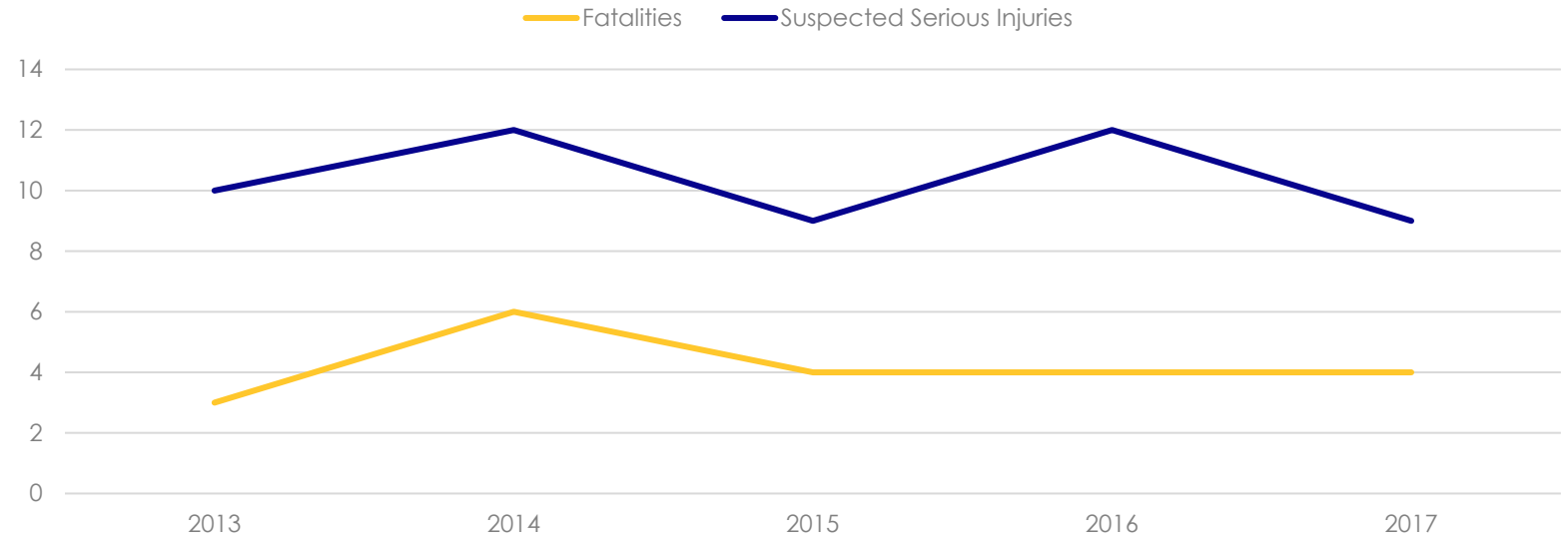
Borough/Municipality	5-year Total
Municipality of Anchorage	628
Matanuska-Susitna Borough	251
Fairbanks North Star Borough	244

Borough/Municipality	5-year Total
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 56.

Figure 56: Fatal and Suspected Serious Injury Crashes Involving Trucks, Statewide, 2013-17



Source: Alaska DOT&PF

SAFETY PERFORMANCE MEASURES

FHWA also requires that states establish and monitor performance targets for five-year averages for five safety performance measures:

1. Number of fatalities.
2. Rate of fatalities per 100 million VMT.
3. Number of serious injuries.
4. Rate of serious injuries per 100 million VMT.
5. Number of non-motorized fatalities and non-motorized serious injuries (non-motorized refers to active transportation modes, such as walking, biking, riding a scooter, or skating, etc.).

Table 20 presents Alaska's safety performance measures and targets and reports on progress to date. The data show that Alaska did not meet the 2018 target for the number of fatal crashes, but it met the target for the fatality rate. DOT&PF has revised its targets upward to account for the increase in crashes.

Table 20. Progress on Performance Targets (five-year moving average)

Performance Measure		2015	2016	2017	2018	2019	2020
Number of Fatalities	5-year Average		66.4	70.4	76.2		
	Target (5-year average)				75	75	80
Fatality Rate (per 100 million VMT)	5-year Average	1.334	1.374	1.456	1.384		
	Target (5-year average)				1.5	1.5	1.5
Number of Serious Injuries	5-year Average		348.8	346.3			
	Target (5-year average)				375	350	400
Rate of Serious Injuries (per 100 million VMT)	5-year Average		7.028	6.913			
	Target (5-year average)				7.5	7	7.5
Number of Non-Motorized Fatalities and Serious Injuries	5-year Average		52.6	60.5			
	Target (5-year average)				55	55	70

Source: FHWA. Data Accessed: February 2018. HSIP 2020 Annual Report. Note: 2018 5-year average performance data is only available for fatal crashes and for fatality rate. Remaining measures will be reported when additional data is available.

Funding

Alaska highways are primarily funded through federal dollars with a biannual Surface Transportation Block Grant program funding most of the capital projects throughout the state.

Alaska typically receives $500 to $600 million annually in formula-determined federal funds that can be spent on road construction or marine highway (ferry) projects identified in the Statewide Transportation Improvement Program (STIP). All these funds are subject to a state match—typically around 10 percent for highway funds and 20 percent for ferry funds.

Maintenance and operations funding has decreased about 20 to 30 percent in the last five years and is not keeping up with the need. That has led to an increase in deferred maintenance – that is, the postponement of building and equipment maintenance/upgrades from an entity's normal operating budget cycle due to a lack of funds.

In general, highways do not generate revenue dedicated to the operation and maintenance of roadway facilities with the exception of:

- Whittier Tunnel charges vehicle tolls for passage through the tunnel to cover expenses including the costs of operating and maintaining the facility, cost of insurance, loan repayments with interest, and repair and replacement of equipment (17 AAC 38).
- The Klondike Highway from Skagway to the Canadian Border is designated as an industrial use highway per (17 AAC 35 Toll Highways) and uses a permit fee to offset the costs to the state to keep the roadway surface and other structures, including bridges, in a condition to accommodate long or heavy loads, and administrative costs related to issuing industrial use highway permits.

Roadway System Key Trends, Challenges, and Opportunities

TRENDS:

- Between 2006 and 2019, statewide lane miles increased by 20 percent while total VMT increased by 18 percent and VMT per capita increased by 8 percent.
- Urban-area roadways carry the highest AADT. Reporting statewide annual averages, however, does not reflect traffic volume seasonality, which substantially impacts driver experience between peak and off-peak times. Urban areas have higher truck volumes, but rural highways carry more trucks as a percentage of vehicles, with many carrying over 20 percent trucks.
- DOT&PF is improving their pavement management practices by transitioning to the more cost-effective life-cycle planning method from the "worst-first" method.
- DOT&PF has prioritized safety with its federal funds.[liv] HSIP funds are promptly and consistently obligated, averaging a 94 percent obligation rate since 2014 and with only one year below 90 percent. From 2016 to 2020, Alaska transferred approximately $46 million dollars from other federal programs into the HSIP, boosting its HSIP funds by about 30 percent.

CHALLENGES:

- Limited funding, retiring personnel, studded tire use, and climate change impacts are some of the major challenges DOT&PF faces while maintaining the existing roadway and bridge network.
- Lack of roadway network redundancy means that major events (e.g., landslides, avalanches, and earthquakes) or infrastructure damage (e.g., bridge strikes) could disable a connecting roadway and cut communities and freight off for long periods of time.

- Travel time reliability is impacted by external factors, such as avalanche mitigation activities along the Seward, Dalton, Richardson (Thompson Pass), and Klondike highways, and Thane Road; extreme weather events; lack of reductant facilities/alternative routes; construction work zone management; maintenance; and the physical capacity of roadways.
- Bridge height and overhead clearance limitations, bridge load restrictions, and roadway seasonal weight restrictions impact the movements of people and goods.
- Pedestrian fatalities have been increasing since 2013. Fatalities involving a driver under the influence of alcohol have been increasing. Relying solely on federal HSIP funds for safety work constrains what can be accomplished. The lack of additional state funds, or flexibility in federal funds prevents the implementation of certain strategies.
- DOT&PF GIS data do not always correspond with established DOT&PF boundaries, nor do they always align with federally-reported data. This poses challenges for efficiently and accurately mapping and reporting transportation roadway data.

OPPORTUNITIES:

- The majority of DOT&PF centerline miles (54 percent) are local or collector roads. There may be opportunities to discuss jurisdictional transfers to local agencies.
- Coordination and alignment between DOT&PF and rural and tribal leaders could be improved with the development and implementation of Tribal Safety Plans.
- The data-driven safety approach could be expanded by emphasizing treatment cost-effectiveness assessments and *Highway Safety Manual* screening and evaluation methods at the project level.
- Treating and rehabilitating pavements and bridges in good and fair conditions before they deteriorate will save money over a project's life cycle
- Continuing to allocate resources for improved data collection, management, and analysis will foster timely and accurate prioritization of investments, management of assets, and required reporting.

By Gillfoto - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=39808013

Transit

Public transportation plays a vital role in the state transportation network, especially for transportation-disadvantaged populations. Many public transportation trips connect to other modes. This could mean a walk or bike ride to a local public transportation stop or a connection to a regional option, such as rail, ports, ferries, or buses.

Figure 57 shows which communities provide public transportation services and what types of services are available. Intercommunity public transportation is limited to the Alaska Railroad, Tetlin Village Council, Soaring Eagle Transit, Interior Alaska Bus Line, Seward Bus Line, and the AMHS Ferry Route. Most transit services are local, typically staying within the community boundary. Most local services are demand-response, which tend to be operated in smaller, less-dense communities. Larger and denser communities, such as Fairbanks and Anchorage, operate more types of service, including fixed-route.

Figure 57. Public Transportation Services in Alaska

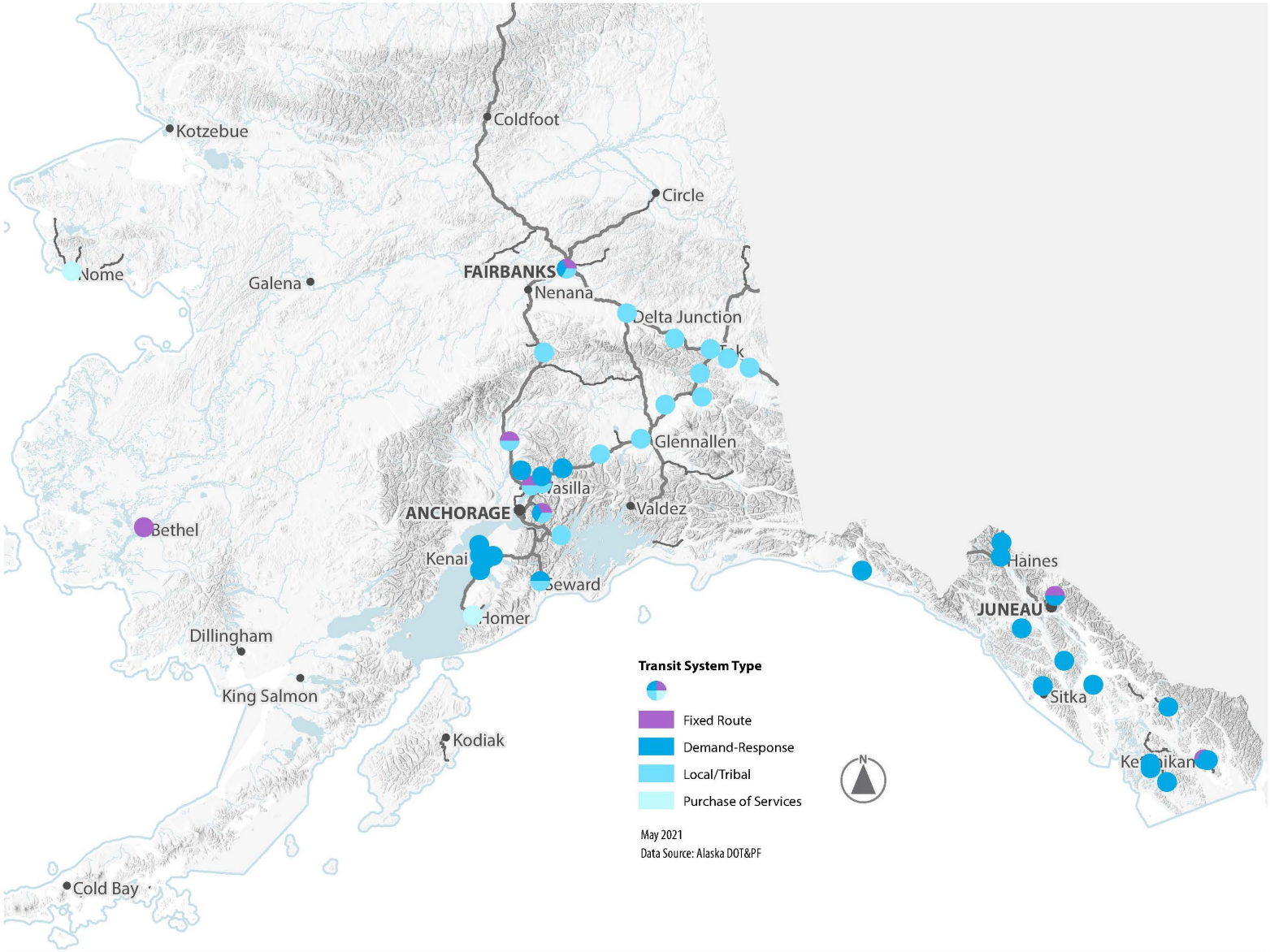


Table 21 shows public transportation services in Alaska, the corresponding community or communities served, and several characteristics of these services.[lv] This table reflects information from the most recent year of available National Transit Database (NTD) data, 2018, and does not include providers who do not receive federal funding.

Table 21. Public Transportation Services

Provider Name	Communities Served	Annual Revenue Hours	Annual Rides	Average Rides Per Hour	Number of Vehicles in Fleet	Average Age of Fleet (Years)
Anchorage	Anchorage	269,403	3,566,747	13	162	17
City and Borough of Juneau (CB Juneau)	Juneau	59,327	1,068,131	18	35	5
Railroad	Fairbanks - Seward	47,576	478,140	10	15	17
Ketchikan Gateway Borough (GB)	Ketchikan	26,711	404,717	15	14	5
Valley Transit	Mat-Su Valley - Anchorage	18,024	62,037	3	17	15
Central Area	Sterling, Kasilof, Nikiski, Kenai, Soldotna	12,547	35,389	3	31	2
Sitka Tribes	Sitka	9,984	51,504	5	23	9
Sunshine	Willow, Wasilla	9,221	16,188	2	15	5
Glacier Valley	Girdwood	7,410	88,987	12	4	4
Fairbanks	Fairbanks	7,093	199,666	28	37	24
Gulkana Village Council	Gulkana	5,122	8,055	2	4	9
Catholic Community Service (CCS) Sitka	Sitka	4,674	8,772	2	4	8
Senior Kodiak	Kodiak	3,642	21,083	6	2	6
Bethel	Bethel	3,634	25,058	7	4	10
Kenaitze Indian Tribe	Kenai	3,323	4,671	1	6	8

Provider Name	Communities Served	Annual Revenue Hours	Annual Rides	Average Rides Per Hour	Number of Vehicles in Fleet	Average Age of Fleet (Years)
Chickaloon Native Village	Chickaloon	3,041	2,926	1	12	3
Interisland Ferry	Hollis - Ketchikan	2,541	42,237	17	2	16
Gwichyaa Zhee Tribal Transit Service	Fort Yukon	1,883	8,883	5	2	1
Ketchikan Indian Community	Ketchikan	1,602	8,468	5	5	5
Ninilchik Village	Ninilchik	1,470	400	0	12	2
Native Village of Noatak	Noatak	1,073	2,000	2	7	1
Hydaburg Cooperative Association	Hydaburg	682	1,153	2	11	2
Nome Eskimo Community	Nome	570	3,938	7	4	1
Seldovia Village Tribe	Seldovia	323	11,188	35	10	1
Manley Village Council	Manley Hot Springs	140	59	0	11	2
Native Village of Unalakleet	Unalakleet	134	241	2	6	2
Interior Alaska Bus Line	Anchorage, Palmer, Sheep Mountain, Eureka, Glennallen, Chistochina, Slana, Mentasta, Tok, Northway, Dot Lake, Delta Junction, and Fairbanks	n/a	1,903	n/a	n/a	n/a
City and Borough of Juneau (CB Juneau)	Juneau	59,327	1,068,131	18	35	5

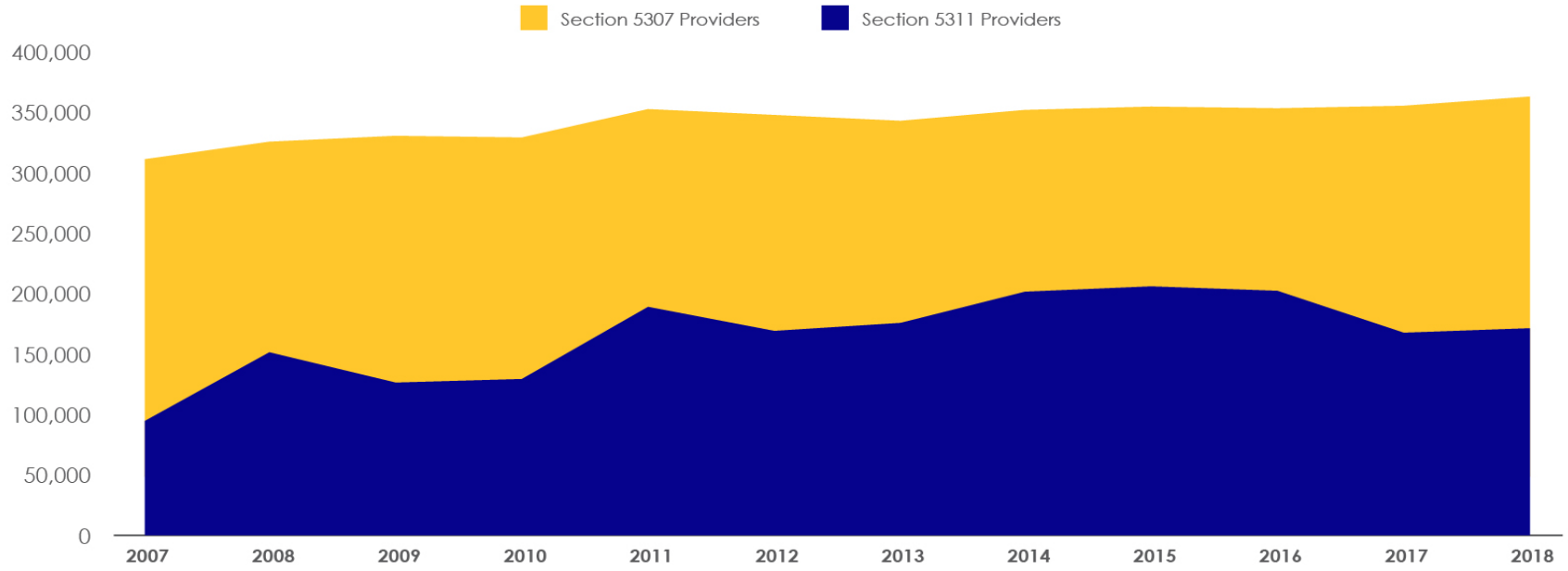
Data Source/Date Accessed: NTD/May 2021

Revenue and Ridership Trends

Revenue and ridership trends for the most recent years of available NTD data (2007–2018) are presented below. These data are presented for all Section 5307 and Section 5311 providers. Section 5307 funds are for urbanized areas (population 50,000 or greater) and support Anchorage, Fairbanks, vRide, and the Alaska Railroad. Section 5311 funds are for rural areas (under 50,000 people), such as Juneau and the Mat-Su Valley, as well as public transportation provided by tribes, or Tribal Transit.

Figure 58 presents the vehicle revenue hours trend for Section 5307 and Section 5311 agencies. Overall, revenue hours have increased despite a slight decrease in 2017 and 2018 for Section 5311 providers. Between 2011 and 2018, the annual vehicle revenue hours averaged near 500,000. In general, urban providers are more stable in the service they provide due to larger, typically more consistent funding pools to match federal grants.

Figure 58. Vehicle Revenue Hours Trend, Section 5307 and 5311 Providers (2007-2018)

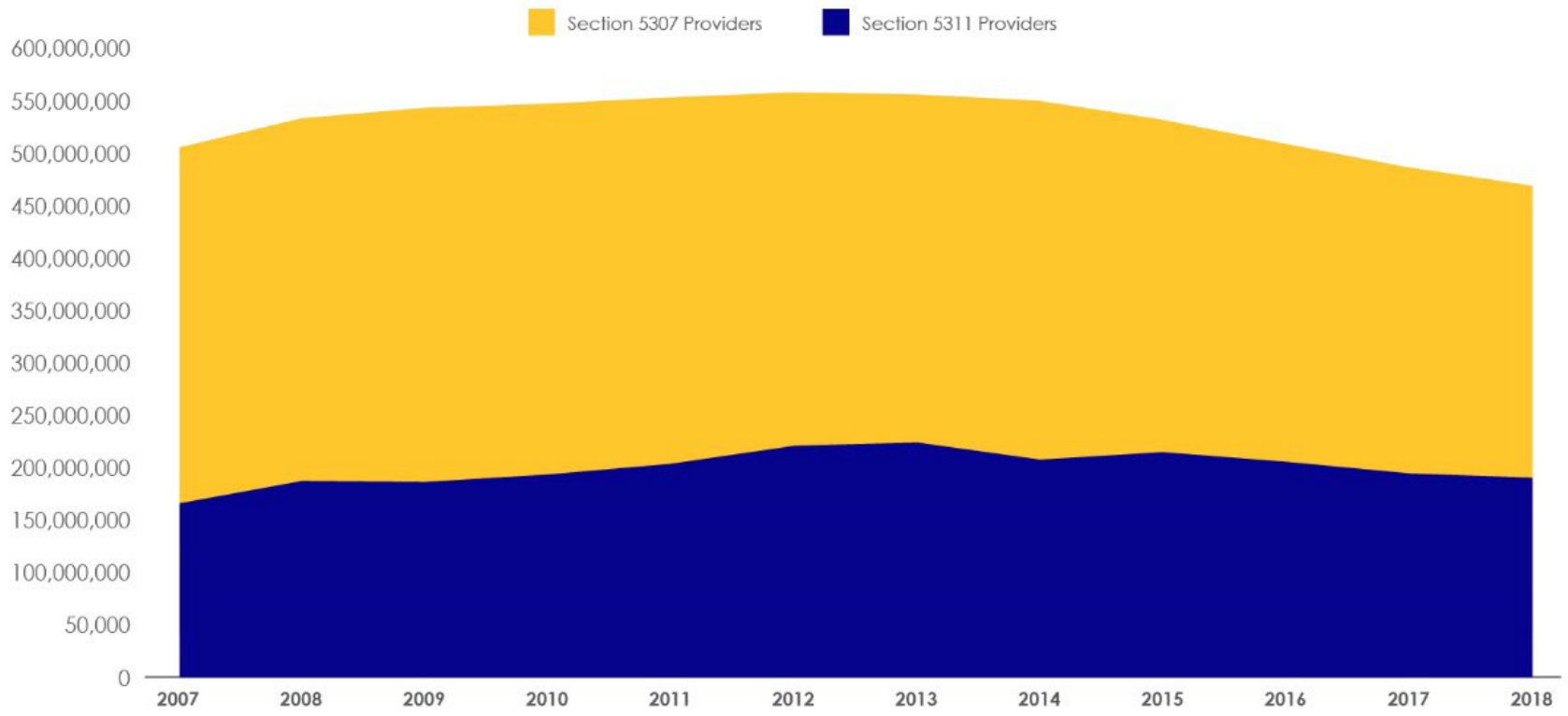


Data Source/Date Accessed: NTD/May 2021

Rural area and tribal transit providers face more change on an annual basis and have experienced an overall decrease in revenue since 2015. The inconsistent trend shows that rural providers are a lot more volatile due to smaller, sometimes unstable funding sources. This makes it more difficult to match federal funding.

- For all providers who receive federal funding, ridership was increasing up until 2012 and then started to decrease in 2013. This correlates with the decreasing population in the state and nationwide trends often linked to the decrease in the cost of gasoline[lvi].
- Urbanized area (Section 5307) providers experienced an increase in ridership up until 2012 and a decline starting in 2013. Anchorage is the largest contributor to the overall decline, which is directly related to a significant decline in the city's population since 2013. Railroad ridership did not decline in these years due to a strong tourist economy.
- Rural area and tribal transit (Section 5311) providers experienced a decline in service in recent years, but not as significant as urban communities did. Many rural public transportation agencies provide demand-response services for grocery and medical trips, and often restrict their use to the elderly and people with disabilities who rely on these services.
- Urban providers and public transportation systems in denser places tend to have higher associations to commute travel and less-dependent public transportation riders, who may choose to use private automobiles or relocate for work. Despite the overall economic decline in Alaska, those reliant on demand-response services for essential travel still need to make trips.

Figure 59. Ridership Trends by Provider (2007-2018)



Data Source/Date Accessed: NTD/May 2021

Funding

The DOT&PF does not manage transit programs or handle funding. Transit services in Alaska are handled by local agencies, with service provided within the community boundary. Most local services are demand-response, which tend to be operated in smaller, less-dense communities. Larger and denser communities, such as Fairbanks and Anchorage, operate more types of service, including fixed-route.

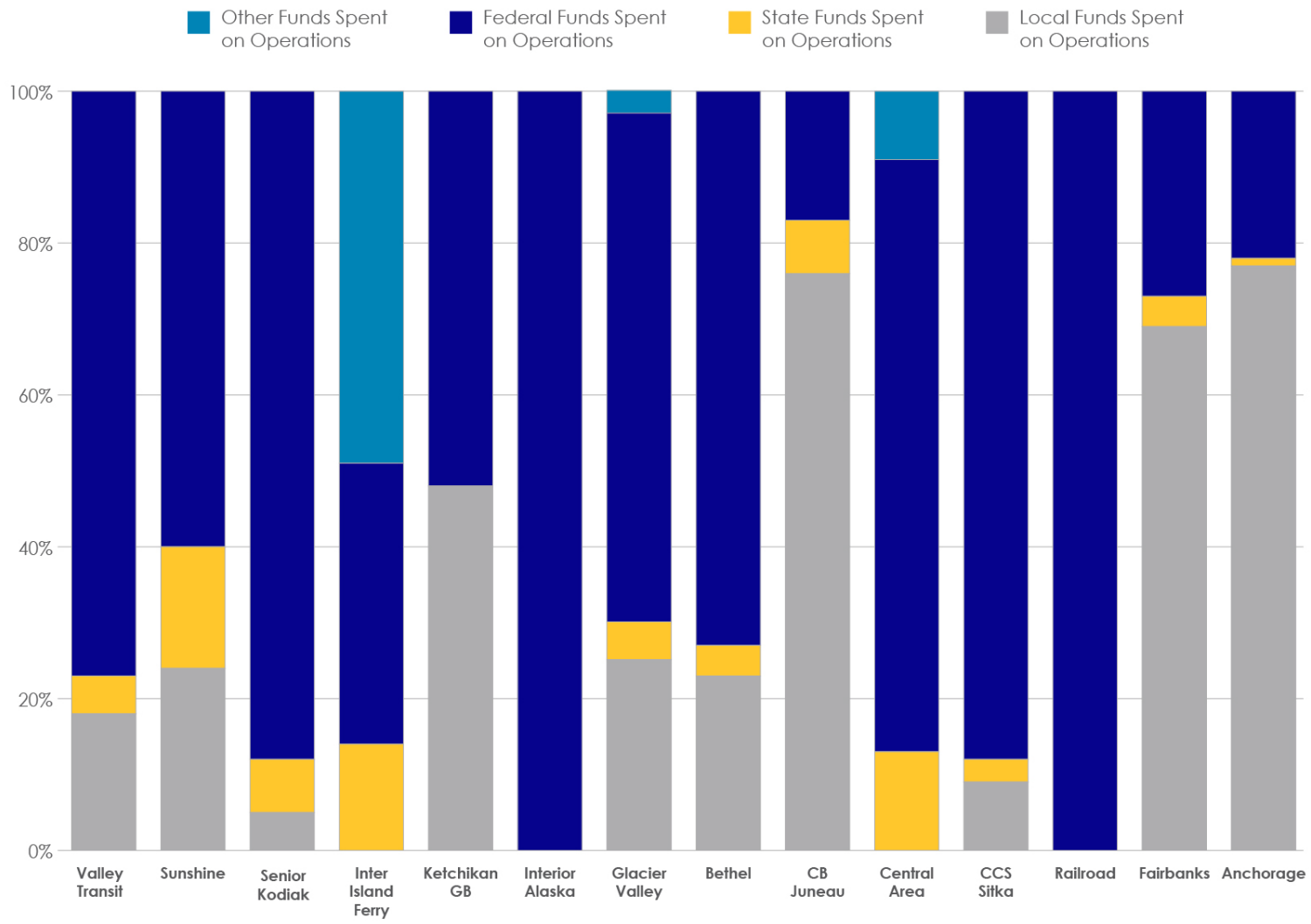
Funding sources for public transportation providers include federal, state, and local sources. Figure 60 shows funding by source and provider, as reported to the NTD. Notably, most providers' funding primarily consists of federal funds, with smaller providers having little in state or local funding to use as a local match. The fact that many federal grant programs require a local match puts public transportation providers in Alaska at a disadvantage, as they can't leverage match-required funding sources. Additionally, minimal state or local funding can result in

volatility if a provider is dependent on few funding sources. Tribal Transit relies heavily on federal funding as well, and is sensitive to changes at the federal level. Larger providers, such as Anchorage, Fairbanks, and Juneau tend to have majority local funding to pay for their services.

Current public transportation conditions and performance data were taken from the most recent public transportation plans in Anchorage,[lvii] Fairbanks North Star Borough (FNSB),[lviii] and Juneau.[lix] Alaska's public transportation providers generally operate consistently with other providers nationwide. Key performance findings include:

- **Ridership:** Demand-response services, which are often found in Alaska's rural communities, typically generate two to four rides per hour nationwide. Systemwide rides per hour for Urbanized Areas with populations between 50,000 and 200,000 average eight rides per hour, and areas with populations of 200,000 to 1 million average 15 rides per hour.[lx] Available NTD data indicated Alaska public transportation agencies generally meet or exceed these averages. The fixed-route public transportation system in Anchorage has stayed above the forecasted rate of decline in weekday average ridership and has observed an increase of 17.2 percent on Sundays. Based on the most recent Juneau operations analysis, fixed-route ridership supports an average of 29.3 trips per capita—relatively high compared to peers and likely related to tourism. [lviii]
- **Amount of Service Provided:** While urbanized area providers have generally increased their service hours annually, rural area providers have decreased them in recent years. In 2017, Anchorage redesigned its fixed-route and paratransit system to include expanded service hours to midnight on weekdays for fixed routes; more frequent arrival times for fixed routes; and an expanded core service area and extended operation hours for paratransit. The FNSB fixed route and paratransit services have noted inadequate service and availability beyond a ¾-mile radius of service areas.
- **Fleet Age**: The nationwide expected useful life for public transportation vehicles is typically 12 years.[lxi] Several public transportation agencies' average age of fleet exceeds 12 years. Their public transportation fleets may have a higher expected useful life (EUL) than the national typical fleet, but generally this indicates that agencies are in need of faster fleet replacement.

Figure 60. 2018 Funding Source by Type and Provider



Data Source/Date Accessed: NTD/May 2021

Transit Key Trends, Challenges, and Opportunities

A review of the most recent public transportation plans in Anchorage, Fairbanks, and Juneau, and the background and trends data were used to determine strengths and weaknesses with existing public transportation services in Alaska. The reviewed public transportation plans primarily focus on fixed-route and paratransit services.

TRENDS:

- Public transportation plays a vital role in the state transportation network, especially for transportation-disadvantaged populations.
- Ridership is trending downward statewide.

CHALLENGES:

- Funding for maintenance, capital, and operations projects is a challenge. Few public transportation systems are currently operated with a dedicated funding source. Public transportation providers in urban areas have identified the need to evaluate the fare structure of their systems to determine if fares are equitable and sufficient to support capital, maintenance, and operational needs. Providers that rely on state sources experience difficulties as the overall economy fluctuates and state revenue declines.
- Low population densities in both urban and rural service areas make efficient spatial connectivity difficult.
- It is a challenge recruiting professional staff with public transportation experience, and in rural areas, it can be difficult to retain and recruit experienced administrative and maintenance staff.

OPPORTUNITIES:

- Improving connectivity to other modes, including active transportation, rail and ferries and ports, will make transit an attractive option for more people.
- Nearly every public transportation rider accesses a bus stop by walking or biking. Providing safe, comfortable, and convenient access is crucial to the success of a public transportation system and user experience.
- Continuously monitoring performance can help DOT&PF adapt to the changing needs and demands for public transportation. COVID-19 impacts to commute patterns, demographic trends, and remote work are yet to be seen.
- Seeking opportunities for new or expanded local and state stable funding sources to match and leverage federal funding can help stabilize public transportation services.

Photo by Lee Rodegerdts

Active Transportation

Since the first Alaska Bicycle and Pedestrian Plan was completed in 1994, the state has made progress in providing facilities to accommodate pedestrians and bicyclists both within the right of way and adjacent to roadway facilities, primarily in urban areas.

Strong active transportation networks confer a host of benefits on the communities they support. The physical activity encouraged by improvements in active transportation, including walking and bicycling, has been linked to improvements in overall health and quality of life. Continued investment in safe infrastructure contributes to a reduction in motor vehicle-related bicycle and pedestrian injuries and fatalities, making roadways safer for all users. Active transportation facilities and networks also attract tourists, connect people to everyday destinations, and can create economic development opportunities in both urban and rural areas. For many people, especially in rural Alaska, active modes are the primary means of getting around.

The Alaska Statewide Active Transportation Plan (ASATP)

The Alaska Statewide Active Transportation Plan (ASATP) outlines Alaska's bicycle and pedestrian transportation system in terms of existing conditions, needs, shortcomings, and goals. DOT&PF has identified goal areas, objectives, and performance measures to deliver the ASATP's vision, guide transportation decisions, and ensure the effectiveness of transportation investments over the 20-year life of the ASATP. The goal areas listed below identify and describe key matters for focus and improvement over the life of the ASATP.

- Safety
- Health
- Maintenance/System Preservation
- Connectivity
- Economic Development

AMATS and FAST Planning are currently developing updated active transportation plans and the City and Borough of Juneau developed an active transportation plan in 2009 with similar goals of increasing active transportation facilities and safety.

Safe Routes to Schools

Alaska had a Safe Routes to School program, aimed at increasing the number of students who choose to walk or bike to school by making it an accessible and safe option. The program provided resources for improving walking and biking facilities, in addition to driver education for school zones. Although dedicated funding to the Safe Routes to School Program was terminated in 2012, some funds are still available for Safe Routes to School improvement projects through the Alaska Transportation Alternatives Program.

Rural Communities

For rural communities, off the road system, active travel has generally not been a focus of regional plans. But the lack of roadway infrastructure and the number of visitors to hub communities for services or seasonal employment who do not have access to vehicles make active options a critical need. As noted in the Southwest Alaska Transportation Plan Update, non-resident pedestrians, such as tourists and seasonal workers, can significantly increase pedestrian activity in small communities and may not understand how the local system functions.

Performance Measures

The ASATP has set a goal to double the walking and bicycling portions of the mode share in each region. The factors influencing whether people choose to walk or bicycle will vary based on existing active transportation networks, winter and summer maintenance, and their

geographic context. Performance measures are used by DOT&PF to track progress toward achievement of goals and objectives in the ASATP as shown in Table 22.

Table 22. ASATP Performance Measures

Goal Area		Performance Measure	
	Goal Area One **SAFETY**	**PM 1.1**	Reduction in the number of fatal or serious injury collisions involving bicyclists and pedestrians in the last five years, as both a rolling average and percentage of total collisions.
	Goal Area Two **HEALTH**	**PM 2.1**	Percent change in average minutes of physical activity per day per capita over a five-year period, as measured by the Alaska Department of Health and Social Services.
		PM 2.2	Percentage of health regions meeting Healthy Alaska Benchmarks by 2020.
	Goal Area Three **MAINTENANCE/SYSTEM PRESERVATION**	**PM 3.1**	Miles of roadway adopted through Adopt-a-Road and Adopt-a-Highway initiatives.
	Goal Area Four **CONNECTIVITY**	**PM 4.1**	Miles of state-owned active transportation facilities, including trails, sidewalks, designated bicycle facilities, and road shoulders.
	Goal Area Five **ECONOMIC DEVELOPMENT**	**PM 5.1**	Number of communities with current active transportation plans and Safe Routes to Schools programs or plans.
		PM 5.2	Percent of commute trips completed by walking or bicycling, as determined by American Community Survey data.

Alaska Statewide Active Transportation Plan Goals and Performance Measures

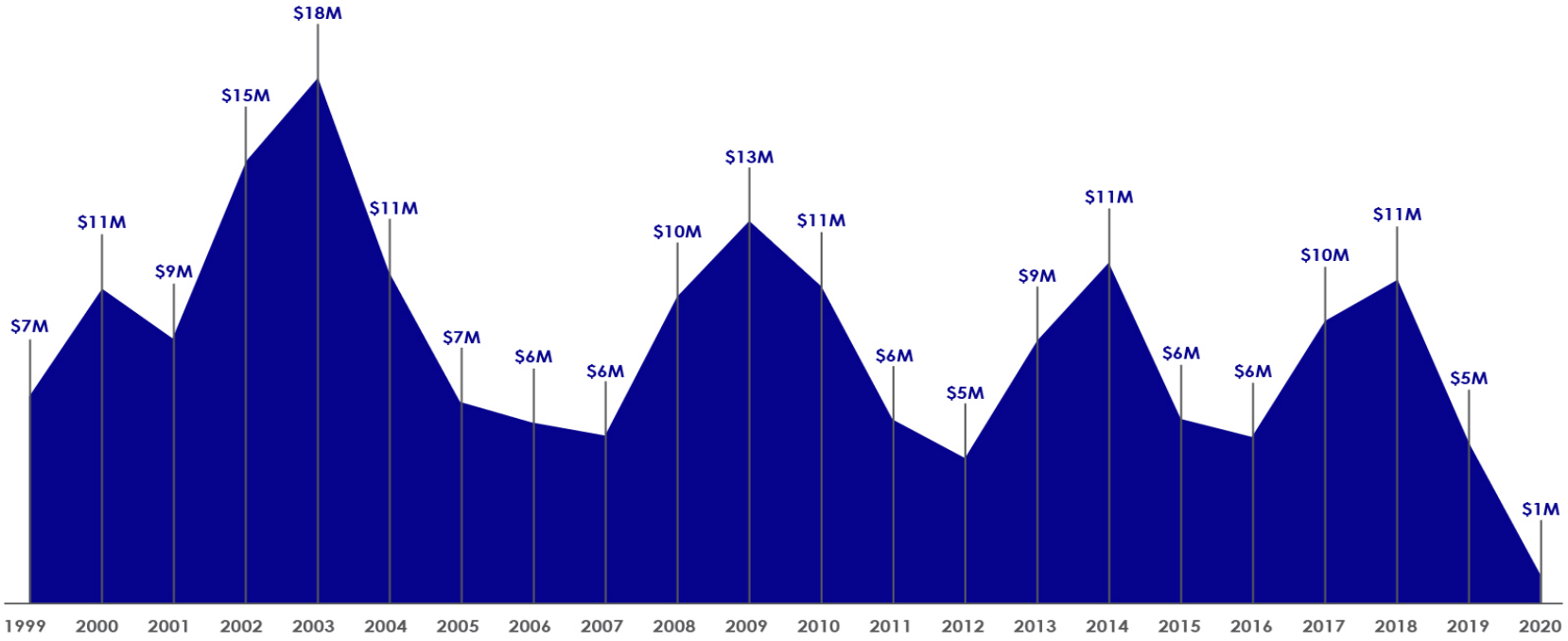
Funding

There is no dedicated capital project development or maintenance funding for bicycle and pedestrian facilities, though DOT&PF have some maintenance/snow removal agreements with other local agencies in the more urban areas of the state. For existing and planned facilities, improvements are typically rolled into highway projects.

Alaska receives higher federal funding per capita than other states. As a result, it ranks #1 in the country for highest spending per capita ($11.58) on walk/bike projects; however, this does not account for the vast size of the state. Figure 61 shows the amount of federal-aid highway program spending on pedestrian and bicycle facilities in Alaska. These dedicated funds represent only part of the funding picture.

Metropolitan planning organizations (MPOs) and local agencies commit additional funding to active transportation, and active transportation infrastructure is also constructed as a part road projects. However, these federal funds are a key source of non-automobile funding and have been declining.

Figure 61. Federal-Aid Highway Program Spending on Pedestrian and Bicycle Facilities in Alaska, 1999-2020



Source: Federal-Aid Highway Program Funding for Pedestrian and Bicycle Facilities and Programs - Funding - Bicycle and Pedestrian Program - Environment - FHWA)

There are significant economic benefits to increasing walking and biking mode shares. A new report from the Rails-to-Trails Conservancy[lxii] projects that shifting short trips from driving to walking and biking via connected active transportation infrastructure could help generate a return on investment of $73 billion to $138 billion per year in the United States if connected to public transit systems. In Alaska, the total potential economic benefits associated with the ASATP's goal of doubling walking are estimated to be approximately $37 million per year, while doubling bicycling would generate an estimated $17 million in economic benefits annually, according to the ASATP.

These estimates are considered conservative, because they primarily account for direct benefits that can be quantified in monetary terms. The estimates do not fully account for localized aggregate health, transportation savings, reduced congestion, and environmental impacts

of complete walking and bicycling networks. This implies that statewide walking and bicycling economic benefits, when fully accounted for, may well exceed the totals listed.

Active Transportation Key Trends, Challenges, Threats and Opportunities

The elements identified below are primarily drawn from the ASATP and the project team's experience with planning and design.

TRENDS:

- There is increased interest in active transportation and recreation in the more urban areas of Alaska. The COVID-19 pandemic has contributed to this. Anchorage, which is the only city that has permanent counters, recorded an over 100 percent increase on active transportation trips between 2017 and 2020.
- DOT&PF, AMATS, and FAST Planning have recently updated their active transportation plans, capturing recent national design guidance, public input, and policy and project recommendations.
- Residents of rural communities will continue to rely on active transportation to access services, employment, and other modes such as air and ferry travel.
- Pedestrian and bicycle injury and fatal crashes are rising.
- Special users, including pedestrians and bicyclists, are an emphasis area of the SHSP.

CHALLENGES:

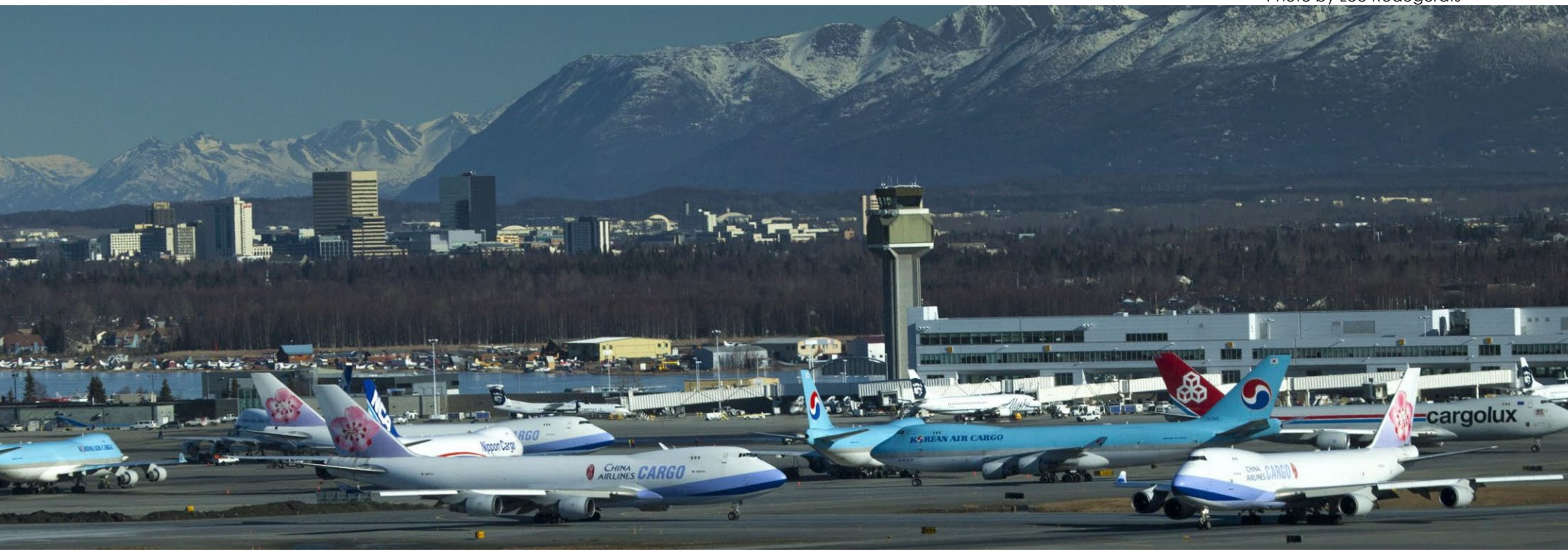
- There is no statewide data set of pedestrian and bicycle facilities or volumes. This hinders an agency's ability to make informed decisions regarding facility needs and priorities. Pedestrian and bicycle crashes are also likely underreported, especially in rural areas.
- Weather creates difficult conditions for walking and bicycling, especially in the winter months. The availability and effectiveness of winter maintenance varies across the state. With decreasing state funding, maintaining these facilities will become more difficult.
- The distance between communities can make walking and bicycling impractical for intercommunity and/or regional connections.
- Federal funding disbursements are subject to change. The state currently relies heavily on federal funds. Any changes to federal funding amounts or programs could affect DOT&PF's ability to meet its goals.

- Chapter 12 of the Alaska Highway Preconstruction Manual (HPCM) covering Non-Motorized Transportation has not been updated since 2005 and would benefit from incorporating more recent guidance and standards from FHWA, American Association of State Highway and Transportation Officials (AASHTO), and other entities. The HPCM references outdated versions of documents:
    - The 1999 version of the AASHTO *Guide for the Development of Bicycle Facilities*, which is no longer the current version of the guide.
    - The 1992 FHWA "Selecting Roadway Design Treatments to Accommodate Bicyclists," which was superseded by the 2019 FHWA "Bikeway Selection Guide" and numerous other guidance documents.
    - HPCM Section 1220 governing pedestrian facilities is unused, but currently under development.

OPPORTUNITIES:

- The ASATP specifies several laws, policies, and procedures that could enhance the safety of all road users, such as a complete streets policy, a safe passing distance law, and a vulnerable user law. Statewide groups are actively petitioning for implementation of ASATP law recommendations.
- The ASATP sparked the first steps towards a statewide active transportation coalition that meets monthly. The coalition currently has four working groups advocating for safer active transportation facilities and networks.
- DOT&PF is in the process of creating an internal working group focusing on challenges related to statewide active transportation, such as winter maintenance and gaps in facilities.
- There is an opportunity to focus on connecting different modes of transportation with pedestrian and bicycle facilities to accommodate residents and visitors. For example, in rural hub communities, active transportation infrastructure connects people who do not have vehicles to services and/or seasonal employment.

Photo by Lee Rodegerdts



Aviation

Alaska's aviation system is unlike any other in the United States. By far the largest in North America, it consists of 765 registered private and public use airports, heliports, and sea plane bases as of 2021.[lxiii]

Alaska's airports support the movement of people and commerce in ways that roads support similar services in most other states. Approximately 82 percent of Alaskan communities are inaccessible by the road system and depend on air access to provide basic needs such as medical care and supplies, food, and nearly all mail delivery.

A 2019 economic impact study prepared by DOT&PF estimated that Alaska's airports contribute $3.8 billion and supply more than 35,000 jobs (7.8 percent of total state employment) to the state's economy annually.[lxiv] In addition, 40 percent of aviation's economic contribution and 25 percent of jobs are connected to the Rural Airport System (RAS).

DOT&PF owns and operates 237 out of 394 public use airports, as reported by DOT&PF staff on 2/25/21. Over 370 private landing facilities have been registered with the Federal Aviation Administration (FAA). Thousands of other private landing facilities and lakes are not registered with FAA.

Alaska has 25 Part 139 certified airports. Federal regulations (14 CFR Part 139) require FAA to issue airport operating certificates to airports that:

- Serve scheduled and unscheduled air carrier aircraft with more than 30 seats.
- Serve scheduled air carrier operations in aircraft with more than nine seats but fewer than 31 seats.
- As required by the FAA Administrator.

Table 23 provides a list of these airports. However, uniquely in Alaska, statutory authority of Part 139 doesn't apply to airports serving aircraft with fewer than 30 seats. Alaska has many other airports serving various forms of commercial service. Part 139 certificated airports have more stringent FAA standards due to size and scope of aeronautical activity. There are 311 certified air carriers providing commercial and on-demand services across the state.[lxv]

Table 23. Part 139 Certificated Airports

City	Airport Name	Airport Code
Adak Island	Adak	ADK
Bethel	Bethel	BET
Cold Bay	Cold Bay	CDB
Deadhorse	Deadhorse	SCC
Dillingham	Dillingham	DLG
Fairbanks	Fairbanks International	FAI
Gustavus	Gustavus	GST
Homer	Homer	HOM
Juneau	Juneau International	JNU
Kenai	Kenai Municipal	ENA

City	Airport Name	Airport Code
Ketchikan	Ketchikan International	KTN
King Salmon	King Salmon	AKN
Kodiak	Kodiak	ADQ
Cordova	Merle K (Mudhole) Smitch	CDV
Nome	Nome	OME
Peterburg	Petersburg James A Johnson	PSG
Kotzebue	Ralph Wein Memorial	OTZ
Red Dog	Red Dog (Private)	DGG
Sand Point	Sand Point	SDP
Sitka	Sitka Rock Gutierrez	SIT
Anchorage	Ted Stevens Anchorage International	ANC
Unalaska	Unalaska	DUT
Valdez	Valdez Pioneer Field	VDZ
Utqiagvik	Wiley Post-Will Rogers Memorial	BRW
Wrangell	Wrangell	WRG
Yakutat	Yakutat	YAK

Source: FAA Airport Database Information Portal (ADIP), May 2021.

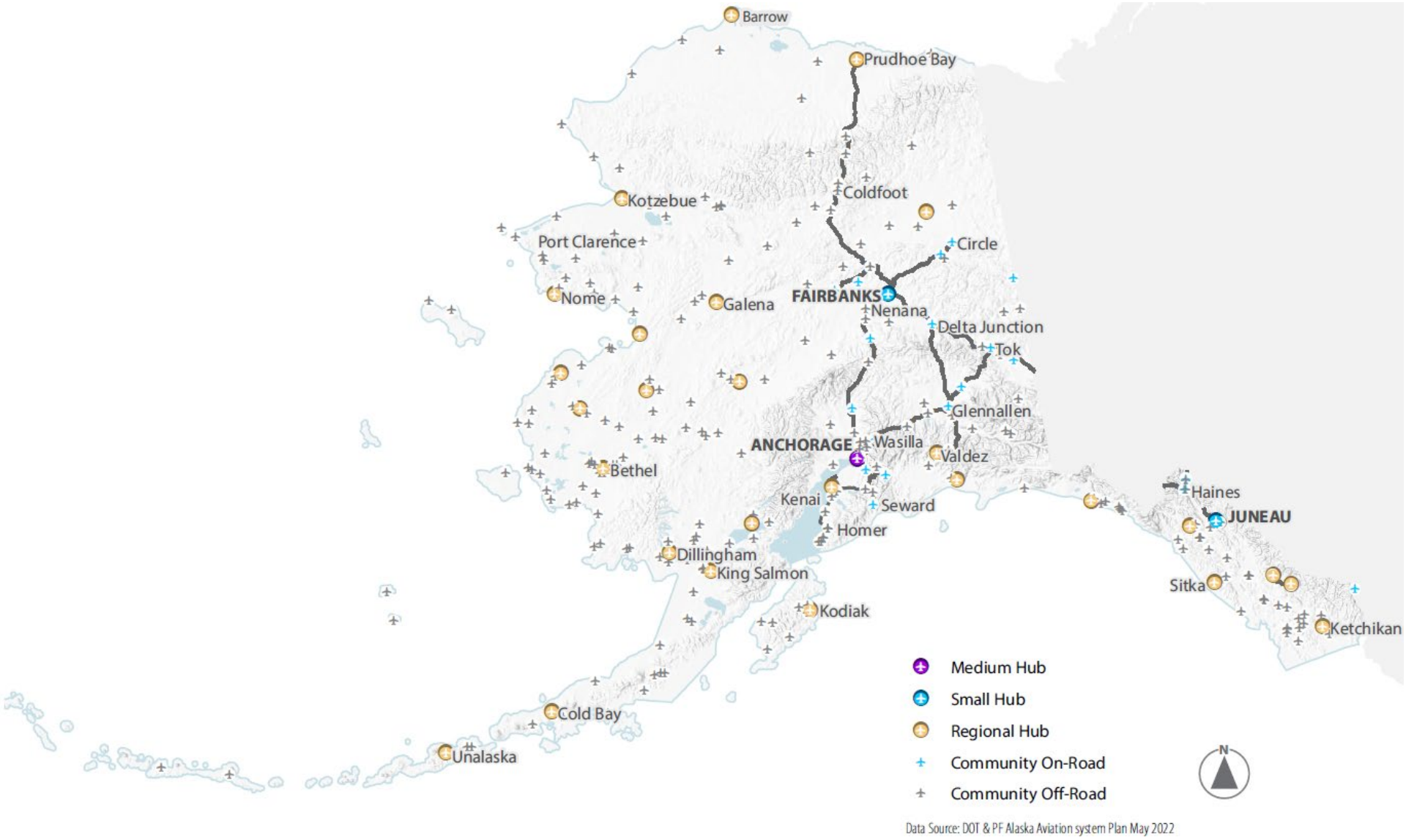
The airports are very diverse in terms of size and use. Within the Alaska Aviation System Plan (AASP), airports are grouped into classifications based on their roles and functions within the system. These classifications help DOT&PF benchmark statewide initiatives and prioritize airport funding and investments. Airports fall into one of four state system plan roles as described in Table 24. Figure 62 depicts the location of public and private airports in the system.

Table 24. Alaska Airport System Classifications

Classification	Number of Airports	Definition
Small or Medium Hub	3 Total	Airports that serve at least 0.05 percent of the annual passenger boardings in the U.S.
Regional Hub	28 Total	Public use airports, heliports, or seaplane bases that serve as an economic or transportation hub for more than one community, indicated by having at least three of the following characteristics: at least 10,000 annual passenger boardings; an air carrier hub, a postal hub or more than 2 million pounds of cargo handled annually; scheduled passenger service in aircraft with at least 30 seats; a health facility serving two or more communities; a primary or secondary fire tanker base; a U.S. Coast Guard air station, air support facility, or forward operating station.
Community	164 Total • 19 On Road • 145 Off Road	Community airports generally fulfill the role of a small community's primary airport when no medium, small, or regional hub airport serves this function. These airports usually serve basic community needs regarding hospital airlift, local aviation-related business, and emergency needs. Community airports are further subdivided into off-road or on-road categories, depending on whether or not they have year-round road access to the NHS.
Local	536 Total • 12 NPIAS High Activity • 52 NPIAS Low Activity • 37 Non-NPIAS	Airports, heliports, or seaplane bases that accommodate mostly general aviation activity. There are three sub-classes of local airports: **NPIAS High Activity**—airports included in the NPIAS and has at least 20 based aircraft **NPIAS Low Activity**—airports included in the NPIAS and has fewer than 20 based aircraft **Non-NPIAS**—airports not assigned to another classification

Source: 2022 Alaska Aviation System Plan Classifications & Performance Measures, DOT&PF. May 2022

Figure 62. Alaska Airport System



The Alaska International Airport System (AIAS) is made up of FAI and ANC. AIAS has a relatively broad customer base consisting of airlines (international and domestic), air cargo transfer operators, and commercial passenger airlines. Alaska's third international airport is Juneau International Airport (JNU). JNU is owned and operated by the City and Borough of Juneau and is not part of the state-owned airport system.

Table 25 identifies the top 15 airports ranked by passenger enplanements in 2019 and a comparison to 2018 statistics. Complete enplanement statistics for 2020 are not fully available as of May 2021 for these airports. The AIAS estimates a greater than 60 percent reduction in enplanements at ANC and FAI in 2020 when compared to 2019.[lxvi] Given the impact of the pandemic on passengers, FAA has asked sponsors to continue to use 2019 data. In 2019, ANC ranked second in the nation for on-time departures, with 89 percent of flights departing on time and 84 percent arriving on time.

Table 25. Top 15 Airports by Passenger Enplanements

Rank	Airport ID	City	Airport Name	2018 Enplanements	2019 Enplanements	% Change
1	ANC	Anchorage	Ted Stevens Anchorage International	2,642,607	2,713,843	2.70%
2	FAI	Fairbanks	Fairbanks International	549,289	562,420	2.39%
3	JNU	Juneau	Juneau International	440,277	459,191	4.30%
4	BET	Bethel	Bethel	160,110	160,874	0.48%
5	KTN	Ketchikan	Ketchikan International	135,389	137,090	1.26%
6	ENA	Kenai	Kenai Municipal	93,889	95,239	1.44%
7	SIT	Sitka	Sitka Rocky Gutierrez	87,119	90,839	4.27%
8	ADQ	Kodiak	Kodiak	81,562	85,655	5.02%
9	SCC	Deadhorse	Deadhorse	43,655	71,822	64.52%
10	OTZ	Kotzebue	Ralph Wien Memorial	69,070	67,876	-1.73%
11	OME	Nome	Nome	64,122	65,087	1.50%
12	HOM	Homer	Homer	46,867	46,367	-1.07%

Rank	Airport ID	City	Airport Name	2018 Enplanements	2019 Enplanements	% Change
13	BRW	Barrow	Wiley Post-Will Rogers Memorial	46,450	46,289	-0.35%
14	AKN	King Salmon	King Salmon	44,131	44,244	0.26%
15	DLG	Dillingham	Dillingham	34,496	35,486	2.87%

Source: FAA ACAIS. https://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/. Accessed February 2021.

Ted Stevens Anchorage International 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 USDOT authority, were granted the right to serve any point or points in Alaska, and to co-terminalize points in Alaska with other U.S. points for which they held USDOT 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. It allowed the carriage of international origin or destination cargo on foreign air carrier aircraft between Alaska and other points in the United States in the course of continuing international transportation.[lxvii] Air carriers who access the two 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.[lxviii] 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.

The COVID-19 pandemic led to the airport's position as the fourth largest in the world for landed cargo weight in 2021 (3.6 million tons). ANC experienced a 15 percent increase in total air cargo tonnage between 2019 and 2020.[lxix] Nearly 73 percent of international cargo is pass-through cargo associated with the international shipments that stop in Alaska only to refuel change crews and sometimes transfer cargo. In Anchorage, 1 in 10 jobs is tied to ANC for a total of approximately 26,000 jobs.[lxx]

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 more than 80 communities in Interior and Northern 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.[lxxi] 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.[lxxii]

Juneau International Airport (JNU)

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 Airport System

Outside of the AIAS, the remaining airports are considered part of the rural airport system. The rural airport system consists of 235 commercial and general aviation airports owned by the DOT&PF.[lxxiii] Local or tribal governments operate some DOT&PF-owned airports (e.g., Ketchikan) or own and operate passenger terminals on DOT&PF-owned airports (e.g., Cold Bay, Homer, Sand Point, and Unalaska). Non-DOT&PF airports within the rural airport system include public, military, and private aviation facilities, specifically:

- 388 public facilities, including 290 airports, 86 seaplane bases, and 12 heliports owned by municipalities and the federal government
- 21 military facilities, including 20 airports and one heliport owned by the U.S. Department of Defense
- 313 (known) private facilities, including 241 airports, 43 seaplane bases, and 29 heliports

The exact number of private facilities is difficult to determine due to the relative absence of land use controls and oversight, and the fact that many are not registered with the FAA in the Airport Master Record System.[lxxiv]

AIRPORT DESIGN STANDARDS

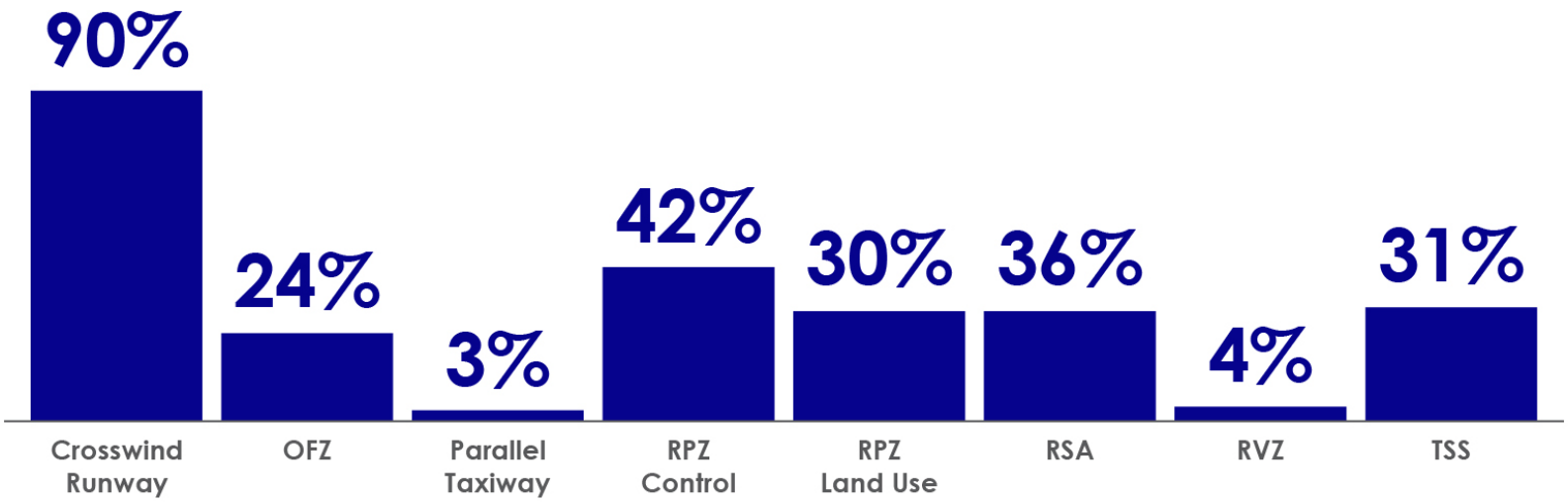
Pavement Conditions Index (PCI). The Alaska State Legislature has established minimum PCI condition ratings of 70 PCI for runways and 60 PCI for taxiways and aprons. DOT&PF performs PCI surveys every three years on approximately one third of 55 selected airports within the system. Of the 237 airports owned and operated by the AK DOT&PF, 49 are paved and are subject to PCI ratings.

Airport Design Standards. As part of the continuous system planning process, DOT&PF has established a Design Standards Index to measure performance of various key FAA airport design standards at all AASP airports. As stated in the *2014 Alaska System Plan*, these measures are:

- **Crosswind Coverage:** If wind coverage for a single runway is under 95 percent, the FAA recommends that the airport have a crosswind runway. This standard is shown as "not applicable" for airports with 95 percent or better wind coverage, but do not have a crosswind runway. Those with neither 95 percent wind coverage nor a crosswind runway do not meet this standard. Wind data is not available for 55 airports in the AASP and is shown as "data unavailable."
- **Obstacle Free Zone (OFZ):** The OFZ is airspace centered on the runway centerline and extending 200 feet beyond each runway end. OFZ standards apply to the main runways of all airports included in the Design Standards Index.
- **Parallel Taxiway:** The standard is for airports with at least 20,000 annual operations to have a parallel taxiway, either full or partial. This standard is shown as NA at airports with fewer than 20,000 annual operations.
- **Runway Protection Zone (RPZ):** The RPZ is a trapezoidal area extending from the runway ends, designed to enhance the protection of people and property on the ground. All airports were evaluated for both control of their RPZs and for compatible land uses. RPZ standards apply only to main runways.
- **Runway Safety Area (RSA):** The RSA is part of an airport's geometry and is a rectangular area centered on and surrounding the runway. RSA standards apply to the main runways at all airports.
- **Runway Visibility Zone (RVZ):** The RVZ is an area between intersecting runways where an unobstructed sight line between points five feet above each runway is required. This standard only applies to airports with intersecting runways.
- **Threshold Siting Surface (TSS):** The TSS is an imaginary airspace surface sloping up from the runway threshold. A compliant TSS is free of objects. TSS standards apply to the main runways of all airports included in the Design Standards Index.

Figure 63 shows the noncompliance ratings at airports as measured in the Alaska Aviation Database. Note, these benchmarks apply only to airports measured in the AASP.

Figure 63. Non-Compliance with Airport Design Standards Index



Source: DOT P&F Alaska Aviation Database, accessed February 2021.

Commodity Flows by Air

Alaska's geographic position makes it an ideal international gateway for air cargo and commerce. Approximately 90 percent of the industrialized northern hemisphere is within a 9.5-hour flight of Anchorage. Significant amounts of cargo traffic are routed through ANC and FAI. ANC, the larger of the two, is the fifth largest airport in the world for cargo throughput and the second largest in the United States for landed weight.[lxxv] It is also a critical technical refueling stop for international cargo flights. Table 26 shows cargo landed weight for both airports.

Table 26. All-Cargo Airports Landed Weight

Rank	Airport Name	City	2018 Landed Weight (lbs.)	2019 Landed Weight (lbs.)	2020 Landed Weight (lbs.)
2	Ted Stevens Anchorage International	Anchorage	18,413,943,946	18,306,699,196	22,882,827,499
121	Fairbanks International	Fairbanks	108,927,136	101,471,972	131,341,307

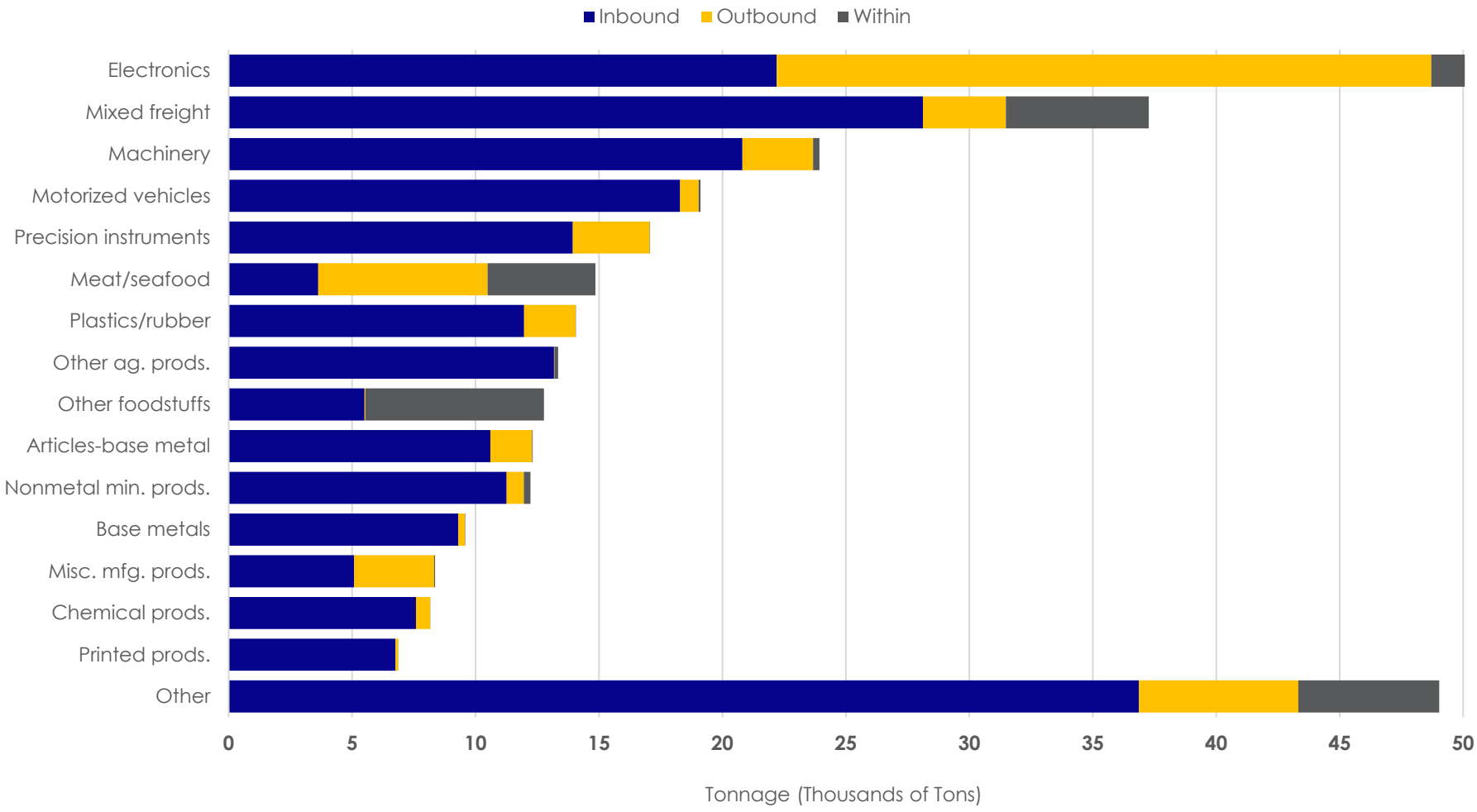
Source: FAA ACAIS. https://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/. Accessed May 2022.

FAI also serves as is a diversionary airport for ANC. It has ample terminal area and airfield facilities to accommodate passengers and cargo aircraft during diversionary events and is capable of handling 50 to100 percent of the ANC technical stop cargo traffic without creating airfield delay concerns. Figure 64 and Figure 65 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.[lxxvi]

Key Highlights:

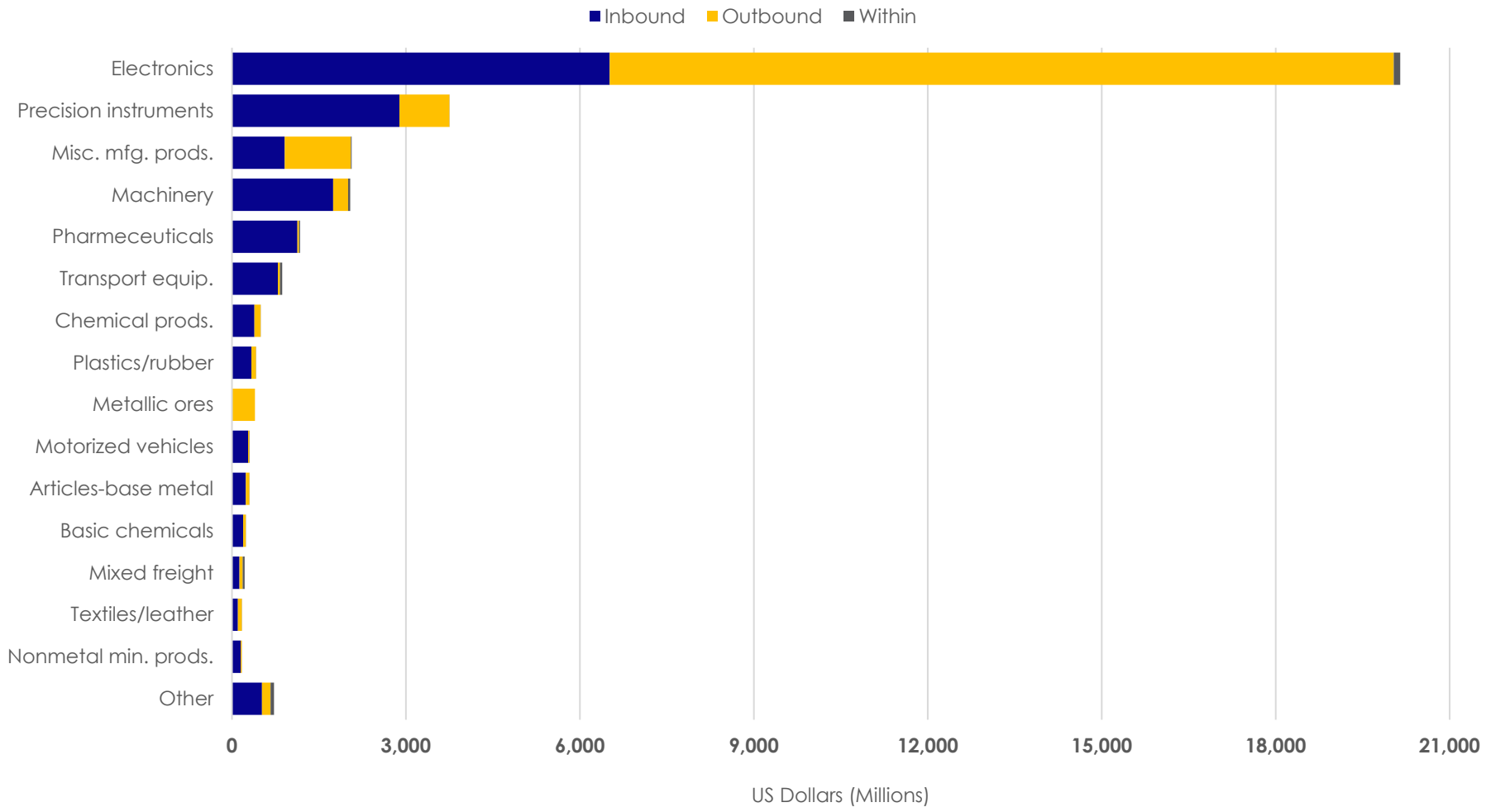
- Electronics continues to be the leading commodity in both tonnage and value; however, most of these trips are passing through Anchorage, with a smaller share remaining within the state for use.
- Other leading commodities by tonnage include machinery, motorized vehicles, precision instruments, meat/seafood, 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 27). Other leading movements by tonnage include inbound and outbound shipments from California 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 28). California and Texas are leading domestic origins and destinations by value.

Figure 64. Domestic Air Mode Tonnage by Commodity (Ktons), 2017



Source: Freight Analysis Framework, version 5.0

Figure 65: Domestic Air Mode Value by Commodity ($M), 2017



Source: Freight Analysis Framework, version 5.0

Table 27: 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

Source: Freight Analysis Framework, version 5.0

Table 28: 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: Freight Analysis Framework, version 5.0

CARGO AND THE RURAL AIRPORT SYSTEM (RAS)

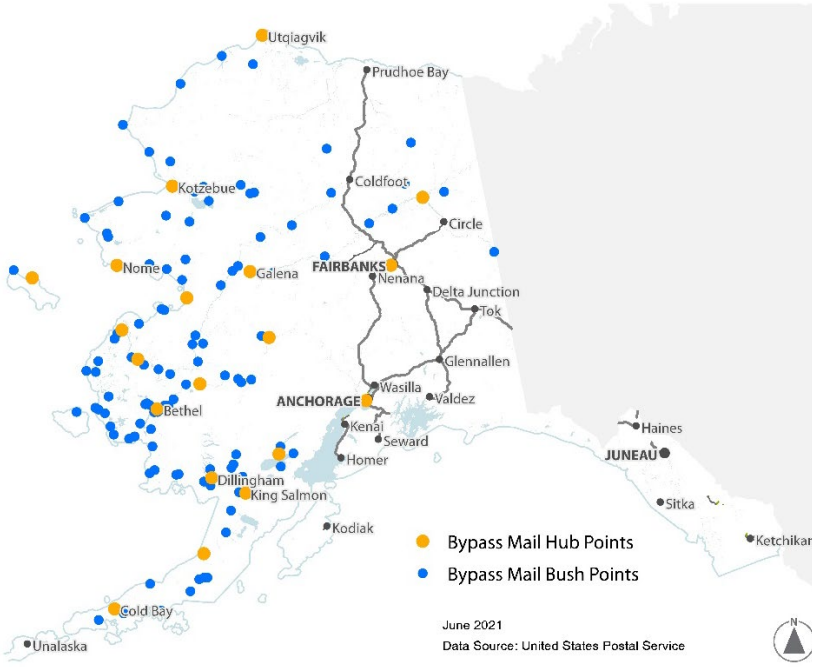
The Rural Airport System (RAS) provides year-round access to goods and services that other Americans may take for granted and is made up of 237 commercial service facilities. Tens of thousands of pounds of freight are flown to remote villages from major hubs in Anchorage and Fairbanks through regional 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.

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.[lxxvii]

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 66: 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. [lxxviii]

ADDITIONAL AIR CARGO DATA

Data for deplaned and enplaned air cargo is sourced from the USDOT Bureau of Transportation Statistics T-100 database (Table 29). 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 29: Deplaned and Enplaned Freight and Mail, All Alaska Airports, 2020

Rank	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
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

Rank	City Name	Deplaned (Tons)		Enplaned (Tons)		Total
		Domestic	International	Domestic	International	
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
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

Funding

The FAA's Airport Improvement Program (AIP) provides grants to public agencies for the planning and development of public-use airports. Funds for the AIP come from the Airport and Airway Trust fund, which is supported by airline ticket taxes, fuel taxes, and other similar revenue

sources. In general, AIP funds are used for projects that enhance airport safety, capacity, security, and environmental mitigation. Airport planning, surveying, design, construction, and right-of-way acquisition are eligible for AIP funds.

RURAL AIRPORT SYSTEM

Funding sources for rural airports include AIP funds, Alaska's General Fund, local airport sponsor funds, airport lease rates and fees, and other sources. FAA AIP funds invested annually into AIP projects varied between approximately $215 million in 2016 and $243 million in 2020.[lxxix] During that period, DOT&PF spent an additional $37 million annually on maintenance and operations for rural airports. In response to the COVID-19 pandemic, the DOT&PF accepted an additional $124 million in Coronavirus Aid, Relief, and Economic Security (CARES) Act funding to mitigate impacts of the pandemic on airport operations.[lxxx] The 2019 aviation economic impact study estimated that AIP spending alone contributes a total of $586 million in annual impact (on- and off-site impacts) and nearly 2,600 jobs.[lxxxi]

More than 25 local public (non-DOT&PF) entities and agencies also sponsor airports. These organizations own and operate their own public-use airports. Although these airports compete with DOT&PF-owned airports for FAA AIP funding, they often partner with and receive funding from DOT&PF.

Communities also depend on two key programs that do not directly fund infrastructure projects but contribute to aviation activity at many airports, making freight and travel to and from remote communities efficient and affordable.

- **Alaska Bypass Program (ABS)**: The ABS, introduced in 1972 by the U.S. Postal Service, allows palletized goods, largely foodstuffs, to reach rural communities by air using a hub-and-spoke network of airports. The ABS is critical to providing fresh food and basic supplies to communities that could not otherwise afford to ship goods at higher air freight prices. The ABS also results in more frequent air passenger service at lowered fares. The U.S. Postal Service determines which communities are included in this program.
- **Essential Air Service (EAS) Program**: The EAS program 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 approximately 60 communities. 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. [lxxxii]

Aviation Key Trends, Challenges, and Opportunities

TRENDS:

- No part of America's economy has escaped the impact of the COVID-19 pandemic. In April 2020, rural air service within Alaska was impacted severely with a 90 percent service reduction resulting from the bankruptcy of the state's largest regional air carrier. Although most rural communities also imposed travel restrictions during this period, the Governor's Aviation Advisory Board focused efforts on addressing the immediate needs of communities impacted by this loss of service.[lxxxiii] The regional air carrier is

operational again, however, this scenario could happen again, cutting off essential services to remote communities that do not have redundant transportation options.

- In comparison, the state's AIAS cargo operations have fared better during the pandemic due to demand from Pacific regions and the shift of "belly cargo." Although many passenger flights were cancelled or diminished, high-value cargo that traditionally flies in the belly of a passenger airplane was converted to freight shipments. As a result, ANC was at times the busiest airport in the U.S. during the months of May and April 2020 due to the increase in air freighters stopping for fuel.[lxxxiv]

CHALLENGES:

- As robust as the AIAS is, many of the weaknesses within the aviation system are related to the unique character of the region.
    - Outside of major cities, such as Anchorage and Fairbanks, lack of local supplies and infrastructure makes airport development challenging. Rural airports require shipping equipment and materials for construction, maintenance, or repair of remote sites. These locations often lack alternate means of year-round access such as roads or barge services. The remoteness, logistical challenges, and high costs associated with operating and maintaining such airports makes them less resilient.
    - The vast majority of RAS airports do not have the resources to provide active airport management, including airfield inspections and oversight of maintenance and capital improvements. These communities rely heavily on state and federal funding programs to provide a minimum level of service. In many rural villages, populations are declining, contributing to the challenges of providing air service.

OPPORTUNITIES:

- Moving forward there will continue to be opportunities to leverage Alaska's ideal geolocation (specifically Anchorage and Fairbanks) within the worldwide aviation system. Forecasts of world growth provided in the FAA *Aerospace Forecast Fiscal Years 2020-2040* indicate Asia regions led by India and China are expected to have the most significant worldwide GDP growth.
- Alaska has a shortage of certified weather stations, which are under the purview of FAA. Weather stations enable development of instrument approach procedures that provide access to the airport during poor weather conditions. According to the *2017 Alaska Weather Equipment Needs Summary* prepared by DOT&PF, there are only 135 FAA-certified weather stations. Combined with limited poor-weather instrument approaches at airports, this lack of proper equipment hampers safe and efficient movement of goods and people. The 2017 report encourages advocacy for FAA funding and support to establish an improved network of weather reporting stations and an appropriate budget to maintain these systems. According to the *Alaskan Aviation Database* (accessed May 14, 2021), $4.9 million is programmed for AWOS installations at various airports in 2021. DOT&PF has eight locations currently in design with construction planned for summer of 2021.[lxxxv]

- DOT&PF has also encouraged the following: [lxxxvi]
  - Use of DOT&PF's Capital Improvement Maintenance Program (CIMP) inspection and ranking process for system needs: airport components are rated using the CIMP review on an A to F rating system. Ratings of D or F are considered a deficiency that needs to be added to a future AIP project. To date, over 200 airports have been inspected under this program.
  - Justify runway length at low-activity airports: FAA design guidelines dictate a minimum of 500 operations by the critical aircraft prior to justification of a runway extension. However, these guidelines limit choice of potential operators seeking to serve that market, including freight operators.
  - Within the FAA AIP funding program, create goal-oriented metrics tied to percentage of funding prioritized to runway surfaces, safety, navigational aids, planning, etc.
  - Identify critical freight systems airports along with available funding streams for freight-specific improvements.

Photo source: Gillfoto - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=22848606

Marine/Riverine

Marine transportation infrastructure, ports and the AMHS provide transportation for essential services, recreation, tourism, and economic development.

Alaska Ports

The DOT&PF does not own or operate ports. Most ports are either privately owned or are owned and operated by local municipalities.

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 (Figure 67). Of the 58 commercial ports, five are listed by the USDOT in the top 150 busiest ports in the nation by volume (short tons) of products shipped both inbound and outbound:[lxxxvii] the Port of Alaska, the Port of Valdez, the Port of Nikiski, the Port of Unalaska, and the Delong Mountain Transportation System (DMTS).

DMTS is the port for Red Dog Mine. It is owned by AIDEA and operated by Teck Alaska, Inc. Kivalina is the nearest Alaska community to the mine site, but is not served by the DMTS port.

While DOT&PF does not own or operate ports, they do sponsor by statute the Harbor Facility Grant Program, designed "to provide financial assistance to municipal or regional housing authority owned harbor facilities." The program is intended to recapitalize the local community port and harbor infrastructure, "furthering the sustainability of Alaska's public harbor system."[lxxxviii]

As shown in Table 30, in 2019 Alaska ranked number 28 in the country for volume of goods shipped, at 37,488,000 shorts tons of cargo. Valdez is the largest shipping port, with a measured volume of 25,176,735 short tons. Most of this tonnage was petroleum products shipped to the ports of Tacoma and San Francisco for movement to refineries. The Port of Nikiski with 3,645,972 short tons is next, followed by the Port of Alaska with 2,828,417 short tons, DMTS at 2,770,614 short tons, and Port of Unalaska at 1,436,905 tons. Four out of five of these ports ship goods out of Alaska. The Port of Alaska is the only port with as majority of its cargo coming inbound.[lxxxix]

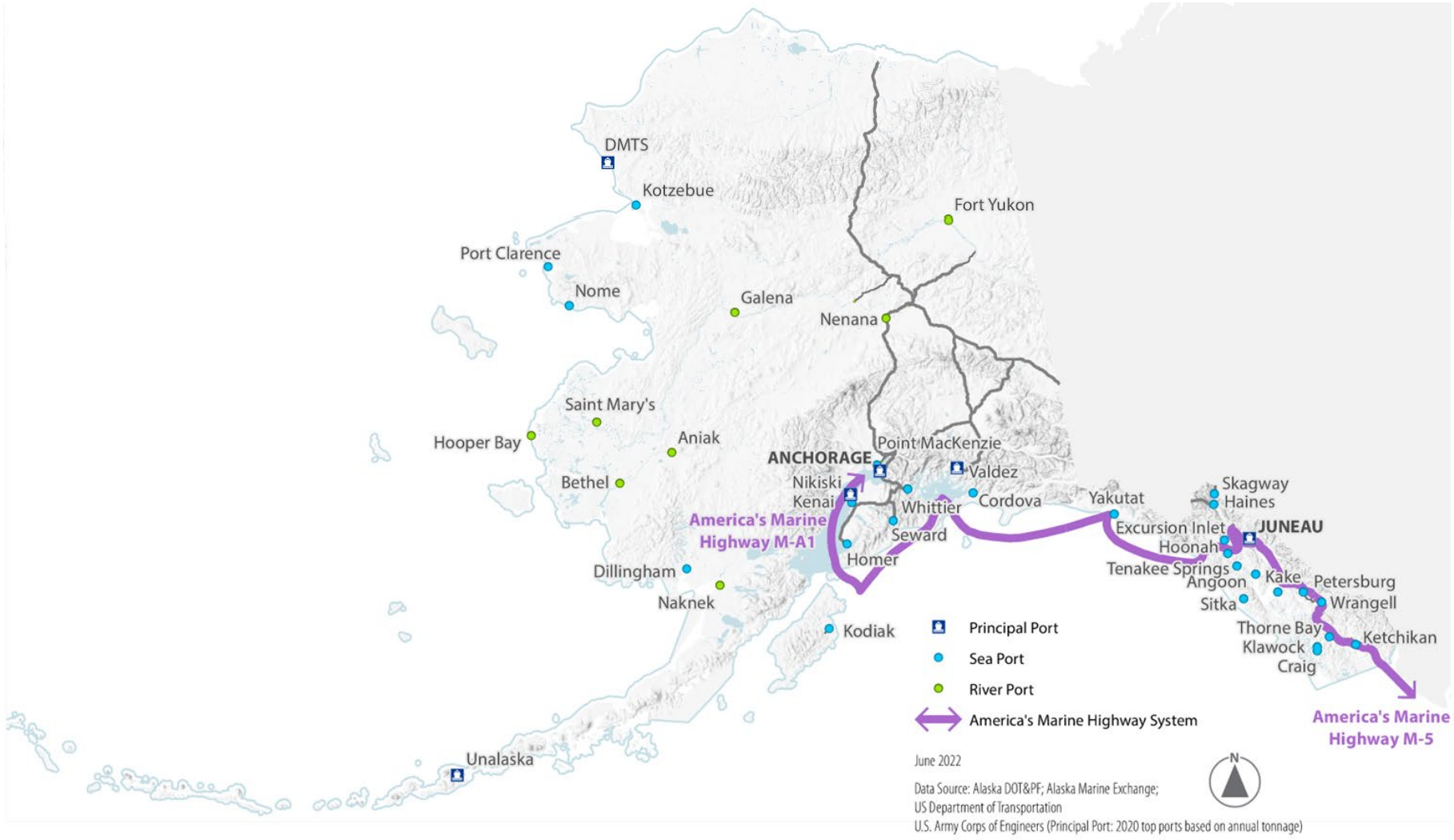
Table 30: Overall Shipping Volumes, 2015-20

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)

This section introduces the top five ports and the total volume of shipping in/out of Alaska by the USDOT Bureau of Transportation Statistics (BTS). More detailed information on ports and associated freight are included in the Freight Plan.

Figure 67. Alaska Port System - Container Line Service 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 31.

Table 31: Alaska Port Tonnages, 2019

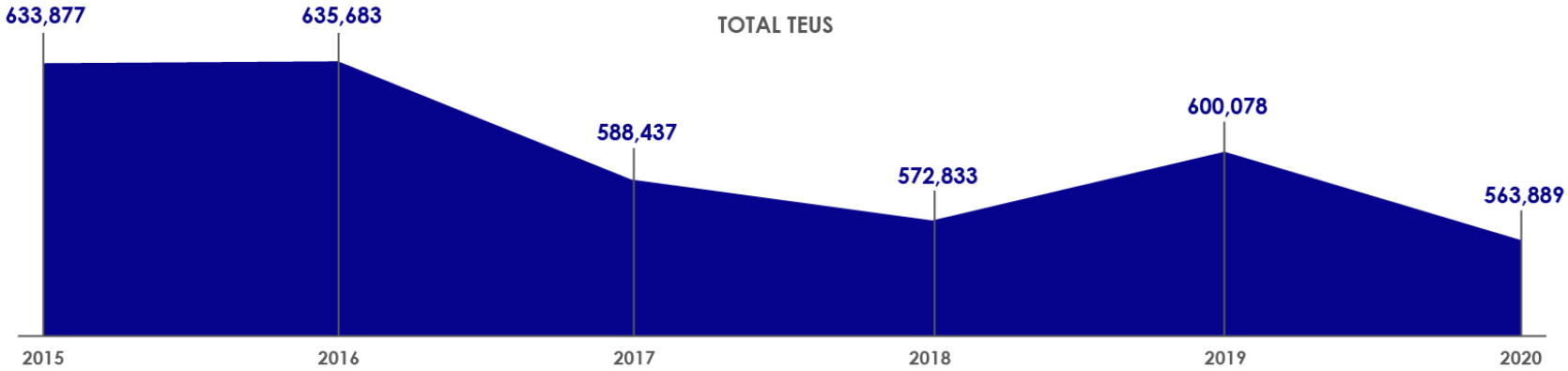
Name	Foreign Imports	Foreign Exports	Canadian Imports	Canadian Exports	Domestic Coastwise	Internal and Local	Total
Valdez	-	919,976	-	-	24,244,486	12,273	**25,176,735**
Anchorage	1,076,533	15,909	28,464	-	1,707,511	-	**2,828,417**
DeLong Mountain Transportation System—DMTS	37,176	1,348,750	34,580	-	1,959	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.*

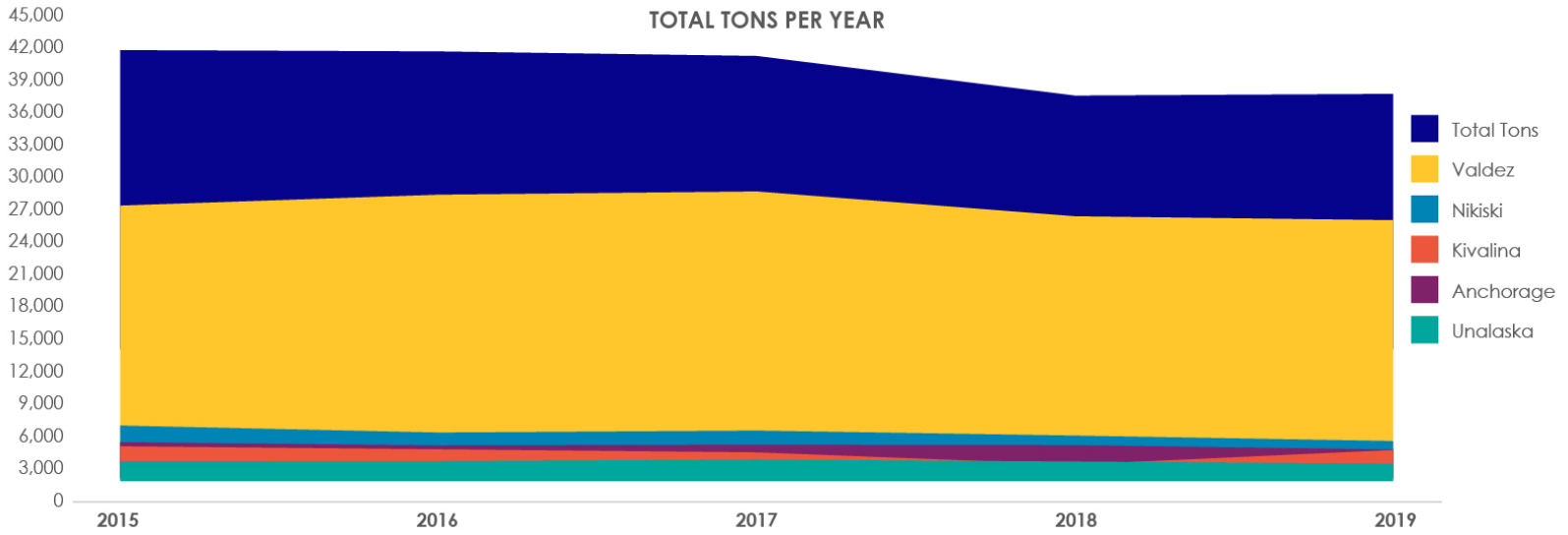
A major challenge facing ports is decreasing shipping volumes and total number of 20-foot-equivalent units (TEUs). Figure 68 shows the trends in overall volumes for the state since 2015. Figure 69 shows this trend from 2015 to 2020.

Figure 68. Total TEUs



Source: Northwest Seaport Alliance, 2021 [xc]

Figure 69. Overall Shipping Volumes (2015 to 2020)



Source: Bureau of Transportation Statistics – Principal Ports

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. The lowest level throughput was in 2020, recorded at 480,199 barrels per day. Alyeska Pipeline company reports that 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.[xci] A declining population may also be contributing to the downward trend at the Port of Alaska.

PORT OF ALASKA

The Municipality of Anchorage owns the Port of Alaska (POA).[xcii] The POA is listed by the BTS 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 Alaska Highway System, via the Glenn and Seward highways; and ANC. It is also linked to the North Slope oil fields via Fairbanks and the Steese and Dalton Highways. The Port of Alaska is a Department of Defense commercial strategic seaport that protects U.S. power across Alaska, the Pacific Rim, and the Arctic, supporting all four major U.S. Department of Defense installations in the state. It handles half of all inbound fuel and freight, which is distributed statewide and consumed by 90 percent of the population, including:

- More than 80 percent of all vans and containers shipped into the Southcentral ports: some 1.66 million tons in 2019 (plus another 174,000 tons outbound)
- 1.47 million tons of refined petroleum products in 2019, plus another 802,000 tons of refined petroleum products that flowed through port facilities via pipeline. The vast majority flows via pipeline to support cargo aircraft servicing at ANC.
- 110,000 tons of bulk dry freight in 2019, including some 80 percent of all cement used statewide.[xciii]

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."[xciv] 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 32 provides more information by commodity type.

Table 32: 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
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

The port is undergoing a modernization program to upgrade critical infrastructure, known as the Port of Alaska Modernization Program (PAMP). The purpose of PAMP is not to expand the port—it is a reconstruction program to improve safety, reliability and cost-effective operations; improve resiliency to seismic and severe weather events; update facilities to meet current codes and standards and accommodate modern shipping operations; and optimize facilities to accommodate changing market needs.[xcv]

PORT OF VALDEZ

The Port of Valdez is made up of the TAPS Marine Terminal, the Valdez Container Terminal, the AMHS terminal, Sea Otter Park, and a small boat harbor. It is a multimodal port connecting AMHS ferry passengers to the Alaska Highway System via the Richardson Highway. Passengers can also connect through the Valdez Pioneer Airport with connections to Anchorage, Fairbanks, Cordova, and many other Alaskan communities. 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. The Valdez Container Terminal, owned and operated by the City of Valdez, handled 69,498 tons of cargo in 2017.[xcvi]

The Valdez Marine Terminal is owned and operated by the Alyeska Pipeline Service Company. As the southern terminus of the TAPS this is an oil strorage/transfer marine terminal and is used to transfer crude oil from the TAPS to large outbound oil tankers. The Port of Valdez handles

92 percent of the crude petroleum exports and in 2020 there were 480,199 barrels of crude loaded onto tankers each day, down slightly from 490,366 barrels in 2019.

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.[xcvii] Table 30 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 33 provides more information on trends in commodity flow at the Port of Valdez.

Table 33: 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

PORT OF NIKISKI

The Port at Nikiski imports and exports petroleum products and supports Cook Inlet oil and gas production. 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.[xcviii]

PORT OF UNALASKA

The Port of Unalaska, owned by the Unalaska Corporation and operated by community of Unalaska, is the largest fishing port by volume in the U.S., handling 173 million pounds of sea food, valued at $182 million (ranked third in U.S.). The port has held this position for the last 22 years.[xcix]

DELONG MOUNTAIN TRANSPORTATION SYSTEM (DMTS)

The 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.[c]

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 distribution center for the Kuskokwim district and is used by ocean going vessels during the open season (summer months). A considerable amount of equipment is transshipped onto barges and river steamers for distribution to communities further upstream. It handles approximately 95,000 tons of cargo annually.

The port is also the receiving and transshipment center for petroleum products and barged freight for the Yukon-Kuskokwim Delta. The Kuskokwim area commercial salmon industry also relies on the Port for most of its infrastructure and processing requirements. Because the Yukon-Kuskokwim Delta is not connected to any other community by road or rail, the Bethel general cargo dock and staging area are critical to the shipment of freight. Types of freight shipped to and through the Port of Bethel includes construction equipment, construction material, (much of it gravel for roads and airport projects), fuel, vehicles, fishing skiffs/boats, fishing supplies, calcium chloride for dust control, recreational equipment (snow machines and ATVs).

Port of Dillingham

The Port of Dillingham is 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.[ci] 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.[cii] The Port of Dillingham is 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.

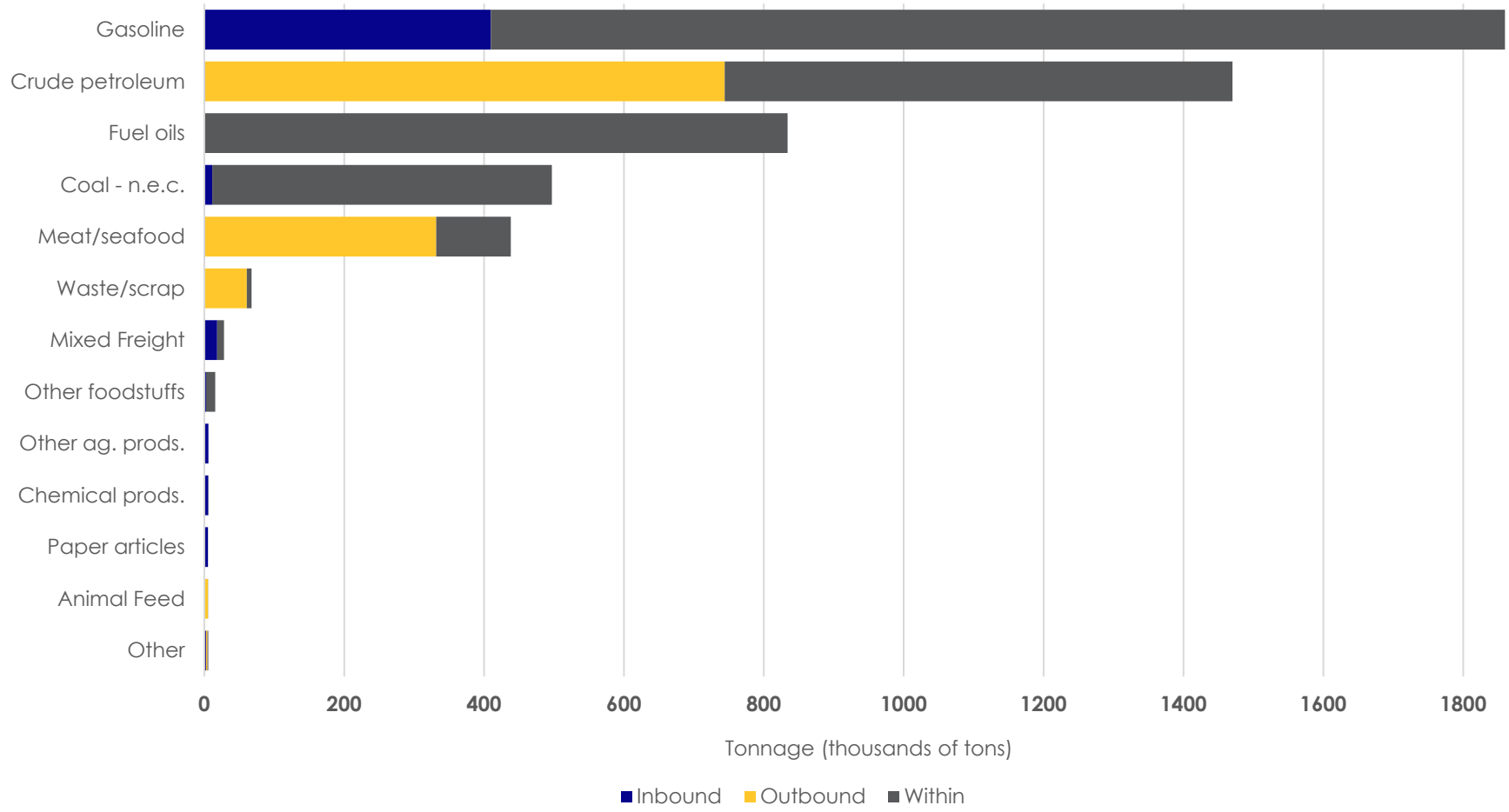
Commodity Flows by Marine/Riverine Modes

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

Key Highlights

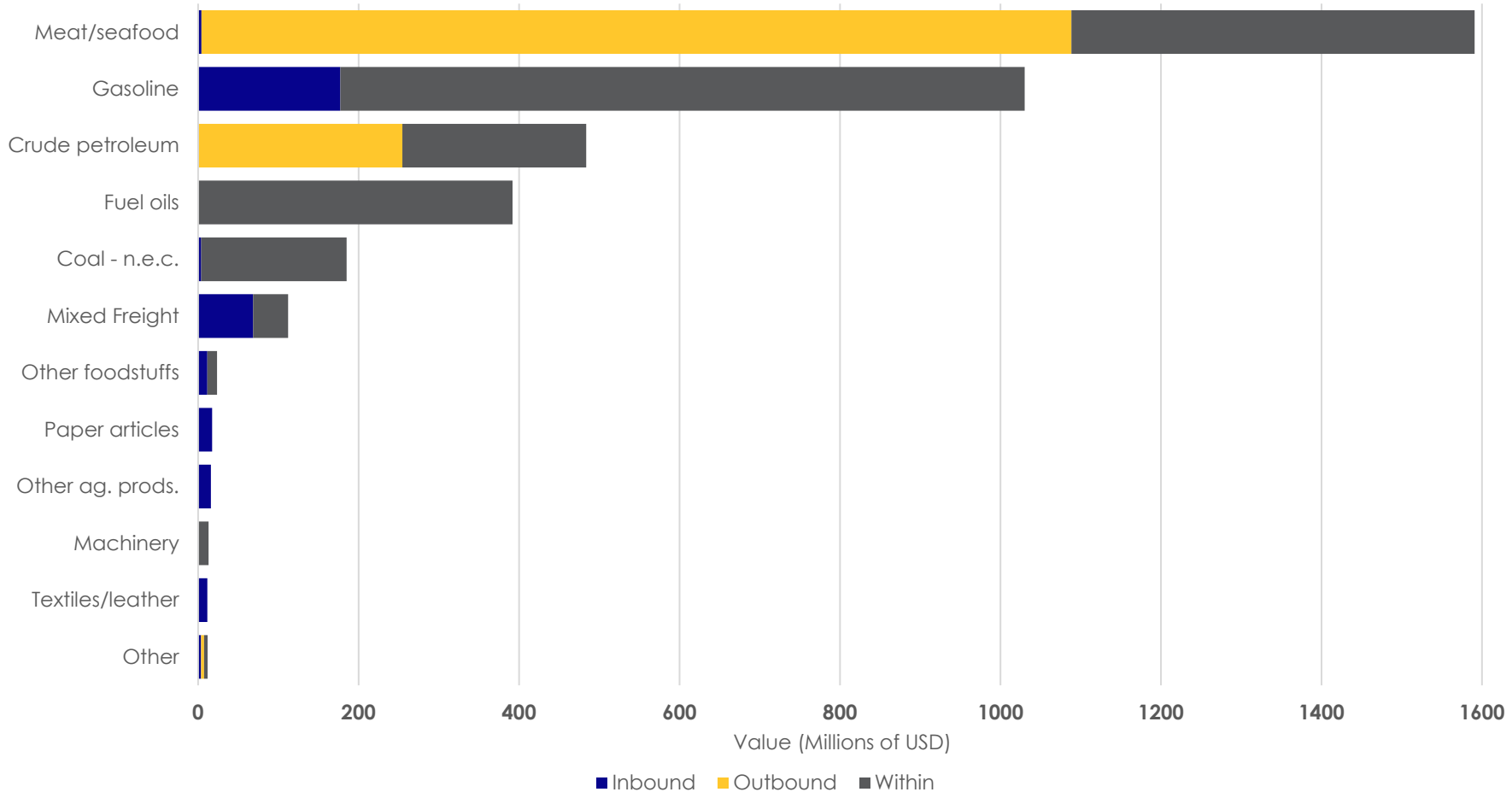
- The primary commodity by tonnage is gasoline, followed by crude petroleum. When ranked by value, gasoline is still a leading commodity, ranking second behind meat/seafood products.
- Other leading commodities by tonnage include coal and fuel oils. Leading commodities by value include meat/seafood, 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 70 displays commodity flows by tonnage, while Figure 71 displays it by value.

Figure 70: Domestic Marine/Riverine Mode Tonnage (Ktons), 2017



Source: Freight Analysis Framework, version 5.0

Figure 71: Domestic Marine/Riverine Mode Value ($M), 2017



Source: Freight Analysis Framework, version 5.0

Table 34: 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

Funding

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

The Alaska Marine Highway Fund is a subfund of the Unrestricted General Fund and receives revenue from operations of the AMHS, including passenger and vehicle ticket sales, stateroom sales, and other user fees. This revenue is customarily appropriated for AMHS operating and capital expenditures. From FY 2011 through FY 2020, the AMHS averaged $48 million in revenue annually.

In years past, ferry system revenue more closely approached costs, but in recent years no ferry route is net revenue positive. The AMHS currently operates with a farebox recovery rate (the percentage of expenses covered by user fees) of about one-third. It has in recent years faced revenue shortfalls from its operations upwards of $100 million. Consequently, the General Fund has had to provide additional funds to cover the AMHS' operating expenses. Recently, this subsidy has been reduced due to state fiscal constraints, necessitating a reduction in ferry service. In 2019, the general fund transfer was $92.5 million, though AMHS received only $45.8 million from the general fund in 2020.

A decline in ridership over time has been attributed to improved aviation access and reliability in areas served by AMHS. In addition to its operational needs, AMHS has an aging ferry fleet, with many vessels in need of replacement or major maintenance.

Port Key Trends, Challenges, and Opportunities

TRENDS:

- Top Alaska export destinations include countries on the Pacific Rim. Top international export destinations—in rank 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, while South Korea (replacing Canada) and Japan together represent close to a third.
- For the six-year period ending 2020, overall freight tonnage at the Port of Alaska has increased by nearly 25 percent. The Port handles half of Alaska's inbound freight movement, which is then consumed by nearly 90 percent of the state's population.

CHALLENGES:

- 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.
- Port infrastructure is aging and funding for improvements is limited.

OPPORTUNITIES:

- Strengthening connections between ports and roadways, rail and air service will result in the more efficient movement of goods.
- 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. Department of Defense and Department of Homeland Security look for ports to support and supply their ships and crews. There were 27 transits in 2019, up from 2018, but down from 2017, which saw 31 transits.

Alaska Marine Highway System (AMHS)

The AMHS provides marine transportation services to connect coastal communities. It is currently the only marine route recognized as a National Scenic Byway and All-American Road. The AMHS system stretches over roughly 3,500 miles of coastline, from Bellingham, Washington, to Unalaska in the Aleutian Island chain, and provides service to 35 communities. The AMHS is a line agency of DOT&PF and receives funding from the state for system operations and maintenance.

In addition to the AMHS, there are also non-state-operated ferry services, including the Inter-Island Ferry Authority in Southeast Alaska, Ketchikan International Airport ferry service, and Seldovia Bay M/V Kachemak Voyager.

Together, the state and independent ferry services form an important component of Alaska's transportation system, serving communities in Southeast Alaska, Prince William Sound, Kodiak Island, and the eastern Aleutian Islands.

The AMHS also 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.[ciii]

According to an analysis of the AMHS system published by the McDowell Group in 2016, *The Economic Impact of the Alaska Marine Highway System*, the key benefits of the service include:

- Reduced cost of living by giving residents of smaller communities access to lower-priced goods and services available in larger, nearby communities
- Employment, total spending, and return on investment:
    - AMHS employment and spending resulted in 1,700 Alaska jobs ($103.7 million in wages) in 2014, including 1,017 direct jobs ($65 million in wages) and 683 indirect jobs ($38.7 million in wages).
    - AMHS economic activity resulted in total spending of $273 million in 2014, including $184.7 million in direct spending and $88.3 million in indirect spending.
    - The state's General Fund investment of $117 million resulted in a total return on investment of $273 million: more than 2 to 1.
    - AMHS plays an important role in the tourism sector. The AMHS carries over 100,000 non-resident passengers annually. [civ]

Much has changed since 2016. A study commissioned by Governor Mike Dunleavy and published in October 2020 found, "For a variety of reasons, and despite best efforts by system employees and the mariners who operate the vessels, today the system operates an aging ferry fleet that is costly to maintain and operate, poorly matched to ferry route needs, with limited flexibility to adjust to changing circumstances. Equipment breakdowns, costly labor agreements, cumbersome procurement processes, and a recent surprise strike all highlight underlying systemic issues that pose sustainability risks to the system." [cv]

Figure 72. Ferry Systems

FERRY SYSTEMS

The AMHS is described by DOT&PF as a two-part system: Southwest and Southeast.

The Southeast System

The Southeast System from Bellingham, Washington, in the south to Yakutat in the eastern Gulf of Alaska. Vessels serving the Southeast System include:

- M/V Columbia
- M/V Hubbard
- M/V LeConte
- M/V Lituya
- M/V Tazlina
- M/V Malaspina*
- M/V Matanuska

**As of January 2021, this vessel is in long-term layup status.*

The Southeast Alaska communities served include:

- Angoon
- Bellingham, WA
- Gustavus
- Haines
- Hoonah
- Juneau
- Kake
- Ketchikan
- Metlakatla
- Pelican
- Petersburg
- Prince Rupert, B.C*
- Sitka
- Skagway
- Tenakee Springs
- Wrangell
- Yakutat

**Due to Canadian COVID-19 restrictions, the AMHS has ceased to serve Prince Rupert, B.C. since April 2020. There is no indication this service will return.*

The Southwest System

The Southwest System runs from Cordova in the eastern Prince William Sound to Unalaska in the Aleutian Chain. Vessels serving the Southwest System include:

- M/V Aurora
- M/V Kennicott
- M/V Tustumena

+ M/V Kennicott serves both Southeast and Southwest with cross-gulf service

Southwest Alaska communities served by this system include:

- Akutan
- Chenega Bay
- Chignik
- Cold Bay
- Cordova
- False Pass
- Homer
- King Cove
- Kodiak
- Old Harbor
- Ouzinkie
- Port Lions
- Sand Point
- Seldovia
- Tatitlek
- Unalaska/Dutch Harbor
- Valdez
- Whittier

An Aging Fleet

The AMHS fleet is aging—three of the 11 AMHS vessels were built almost 60 years ago. Table 35 summarizes the ships that comprise the current fleet by name, year built, and age.

- The M/V Taku, one of the oldest vessels, was sold as excess in 2016, as its annual maintenance and operating costs exceeded economic viability.
- The Tazlina (2019) and the Hubbard (2019) were designed to operate with smaller crews and to be slightly more fuel-efficient. They were also built with the expectation that the Juneau Access Road and new ferry terminal would be constructed to Katzehin Bay. The ferries were slated to operate between Katzehin Bay, Haines, and Skagway. The ships were built with bow and stern doors to provide roll-on/roll-off loading and unloading capabilities which would also require new ferry docks in Haines and Skagway. None of these new facilities has been built and plans for their construction are on hold. As a result, both new ferries are being retrofitted

so they are compatible with existing dock structures. Additionally, the routes they were intended to sail as shuttle ferries require transit times that proved too long for regulatory compliance with crew rest requirements.

- In 2014, following a major service interruption the previous year, the importance of building an ocean-capable replacement vessel for the M/V Tustumena became a focus. Design for the M/V Tustumena replacement vessel is ongoing. The Tustumena is one of two ocean-class vessels and is the only vessel capable of serving all ports between Homer and Unalaska/Dutch Harbor. Initial design was completed in 2017, however the state is struggling with the estimated construction price of over $220 million. FHWA funds could be made available to defray construction costs, but with an annual federal highway program of just under $600 million, it is difficult to justify $50 to $60 million over four federal fiscal years when there are competing surface transportation needs throughout the state.
- The M/V Malaspina, one of the system's oldest ships, has been placed in long-term lay-up status. The cost to maintain and operate this ship makes its economic viability questionable.
- Two other vessels, the M/V Chenega, and the M/V Fairweather, were sold for a combined $5.17 million in March 2021.[cvi] The two sold vessels are fast ferries purchased in 2006. While these ships were popular with passengers, they were massive fuel consumers, costing almost a third more to operate in fuel costs alone. Special licensing for crews imposed unnecessary scheduling issues for AMHS leadership, and ongoing hull and engine difficulties made these ships misfits within an already struggling system.

Table 35. Summary of AMHS Ferry Fleet

	M/V Aurora	M/V Columbia	M/V Hubbard	M/V Kennicott	M/V LeConte	M/V Lituya	M/V Malispina	M/V Matanuska	M/V Tazlina	M/V Tustumena
Year Built	1977	1974	2019	1998	1974	2004	1963	1963	2019	1964
Age	44 years	47 years	2 years	23 years	47 years	17 years	58 years	58 years	2 years	57 years

Note: the M/V Malispina is currently in long term layup in Ward Cove

AMHS provides year-round and seasonally-scheduled ferry service. Since 2015, AMHS ferry schedules have varied from year to year, based on available funding levels and operating budgets. DOT&PF prepares an operating plan that is designed to meet the essential needs of the communities the AMHS serves, but they are statutorily required to operate within available funding while maintaining regulatory and safety standards for the vessels. Three types of vessels and three types of service are offered:

- Mainline Service is provided by the largest AMHS vessels. These vessels have larger carrying capacity for passengers and vehicles. They service routes that historically see the greatest traffic demand during the summer season from May to September. During this high season, mainline ferries operate 24/7 and have crew cabins. Typical mainline service runs from Bellingham, Washington, to Haines and Skagway in the North Lynn Canal, stopping at many Southeast communities. Other mainline routes include cross Gulf of Alaska route from Juneau to Homer via Whittier, and finally Homer to Unalaska.
- Day Boat Service also known as LeConte Class service provides service to smaller communities in Southeast and Southwest Alaska. These ships also maintain crew quarters to provide extended day service, but normally berth in port overnight.
- Shuttle Service provides service to specific designated routes. Three ships are currently designed to provide shuttle service: M/V Lituya between Ketchikan and Annette Bay, serving the community of Metlakatla; the M/V Hubbard and M/V Tazlina also known as Alaska Class ferries, provide service in the Lynn Canal between Juneau, Haines and Skagway.

The AMHS maintains its vessels during the fall, winter, and spring months due to lower demand. Annual maintenance takes at least six weeks per vessel. Vessels not needed to meet off-season schedules but not undergoing maintenance are placed in lay-up status. One ship, the M/V Malaspina, is listed in long-term lay-up status.

Other Ferry Operators

- The Inter-Island Ferry Authority (IFA) provides transportation to Prince of Wales Island communities in Southeast Alaska. The IFA fleet consists of two roll-on/roll-off passenger car ferries, the M/V Prince of Wales and the M/V Stikine. The IFA operates one route between Ketchikan and Hollis on Prince of Wales Island. IFA also fills in on the AMHS Annette Bay to Ketchikan service when the regular ferry is undergoing maintenance.[cvii]
- The Ketchikan Gateway Borough's Transportation Services Department owns and operates the Airport Ferry System service between Gravina Island, home of the Ketchikan International Airport, to Revillagigedo Island, where the city of Ketchikan is located. The Ketchikan Gateway Borough owns two vessels, one that was built in 2013 (M/V Ken Eichner) and the other in 2001 (M/V Oral Freeman). Since 2017, DOT&PF has worked with the community on projects that will provide nearly $95 million in improvements to this system.[cviii]
- The Seldovia Village Tribe operates the Seldovia Bay M/V Kachemak Voyager between Seldovia and Homer during the summer months. The vessel carries light freight and up to 150 passengers. The vessel was purchased and the service initiated by the Tribe as an economic development project for the benefit of the community of Seldovia.[cix]

Ferry ridership is reported by AHMS in its annual traffic volume reports. Ridership is broken down between Southeast and Southwest systems and passenger ridership and vehicle volumes are listed. Ferry volumes have been declining for roughly a decade, and, since 2015, have taken a significant turn downward. One major driver of traffic is the frequency of scheduled service AMHS is able to provide based on their authorized operating budget. However, even when service was increased in 2019, ridership continued on a negative trend. According to the AMHS operating plan for 2020-2021, ship weeks of service are planned at 205 weeks of service. Six of the 12 vessels AMHS owns are scheduled to provide service during the peak summer season.[cx] An additional challenge results from schedule reliability challenges, brought on by weather, mechanical failures, and in at least one case, failure of the State Legislature to fund the published schedule in 2016. Table 36 shows historical AMHS traffic trends as compared to scheduled ship weeks of service since 2012.

Table 36. Historical Traffic Volume vs. Ship Weeks Scheduled

Year	Passengers	Vehicles	Ship Weeks Scheduled
2012	337,774	115,448	
2014	319,004	108,478	391
2015	288,133	100,547	365
2016	258,042	98,969	342
2017	244,748	96,526	326
2018	No data	No data	318
2019	190,118	77,203	329

Source: 2014 - 2017 AMHS Annual Traffic Volume Reports, http://dot.alaska.gov/amhs/reports.shtml

AMHS Key Trends, Challenges, and Opportunities

TRENDS:

- The AMHS provides critical marine transportation services to connect coastal communities.
- The current fleet is old and subject to challenging marine operating conditions. Despite the best efforts of ship crews and AMHS staff, the ferry system is not as reliable as it should or could be.
- Since 2016, AMHS traffic volumes are trending steadily downward, with 2019 passenger numbers 44 percent below 2012 volumes, and vehicle volume 33 percent below 2012 numbers. In recent years, farebox recovery dropped from about 50 percent of operating cost to about 30 percent.

CHALLENGES:

- AMHS is challenged today with operating and maintaining the system and providing reasonable levels of service at a cost the state can afford.[cxi] This includes vessel refurbishment and recertification to keep vessels safe and compliant with federal regulatory standards and attractive to customers.
- The timing of AMHS budget approvals is tied to the state government's fiscal year. Agency budget decisions are often not final until late spring. As a consequence, the AMHS, not knowing its budget, is unable to confidently plan and schedule summer ferry sailings more than a few months in advance.

OPPORTUNITIES:

Based on the challenges facing the system, the AMHS Reshaping Workgroup has outlined several needs and recommendations:

- A predictable governance model with marine operations and marine business expertise would be beneficial.
- The AMHS needs to secure a stable source of funding.
- It may be possible to partner with community groups and local and tribal authorities to identify opportunities for public-private partnerships to take over local ferry operations.
- The Northern Economic Report recommends taking advantage of existing and potential land-based (road/trail) infrastructure to reduce ferry route transit times and operating costs. Additional recommendations include:
    - Inserting the ferry terminal at Cascade Point into the AMHS ferry system to improve operational and capital planning. It would serve as base for dedicated ferry runs in Lynn Canal. It would also reduce Juneau-Haines and Juneau-Skagway one-way sailing by about 30 miles and 2.1 hours. This would enable use of a 12-hour dayboat to service the route, reducing ferry operating cost and enhancing route revenue, if the route includes service between Skagway and Haines.

- Inclusion of Tenakee Springs to Hoonah overland access in AMHS ferry system planning. Service to Tenakee Springs today requires use of a 24-hour vessel, and traffic is passenger, not vehicles. Eliminating AMHS ferry service saves 2.1 route hours. This would enable a 14-hour dayboat with reduced cost to serve the remainder of the route.
- Terminating cross-gulf service at Whittier rather than Kodiak. Passengers continuing to Kodiak would travel by road from Whittier to Homer and the reverse from Kodiak to Whittier. The run between Whittier and Kodiak, which includes a stop at Homer, is redundant, as direct ferry service from Homer to Kodiak remains. This change could eliminate ferry service to Chenega Bay and reduce it to Seldovia and Port Lions.

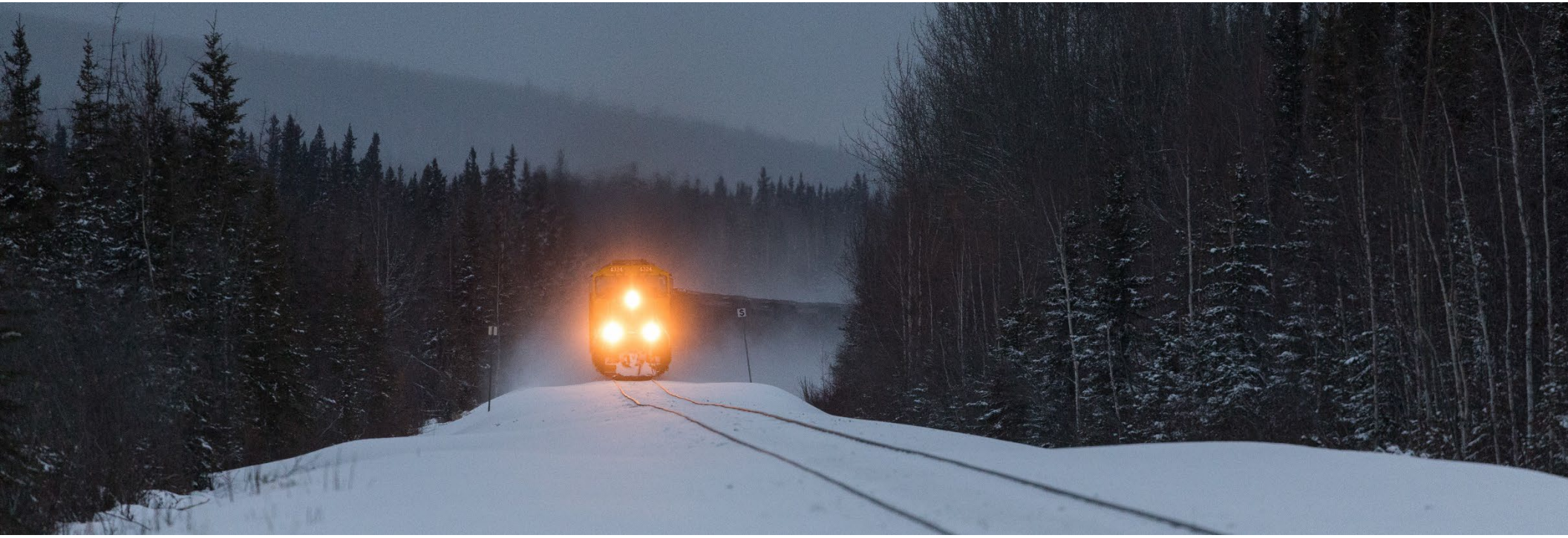


Photo Source: Markus Trienke - Alaska Railroad, CC BY-SA 2.0, https://commons.wikimedia.org/w/index.php?curid=75591038

Rail

The Alaska Railroad Corporation (ARRC) provides freight and passenger rail 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 must generate enough revenue from train and real estate services to cover workforce, operations, and infrastructure maintenance expenses.[cxii] It has real estate holdings totaling approximately 36,000 acres. Of these, 14,000 acres are devoted to the track bed and right of way, 4,500 acres are used for rail operations/yards, and the remaining acreage is available for lease. Alaska's rail system plays an essential role in transporting passengers and freight to and from Alaska, with freight revenue generating more than half its operating revenues. ARRC has 656 total miles of tracks and rail yards in Seward, Whittier, Anchorage, and Fairbanks that serve as centralized distribution hubs for connectivity to other transportation modes. This includes 178 bridges and large culverts greater than 10 feet in diameter. Table 37 outlines Alaska's railcar types and purposes.

Table 37: 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

Figure 73. Passenger Rail Network

Source: ARRC Annual Report 2019

The White Pass & Yukon Route is a privately owned tourist railroad that operates on 67.5 miles of track from the seaport at Skagway inland to Carcross, in Canada. Nearly half a million tourists ride the scenic White Pass route each year between May and September. The train runs on narrow-gauge track that climbs almost 3,000 feet on a nearly 4 percent grade. The route passes through tunnels and over steel bridges and timber trestles, offering panoramic views of glaciers, gorges, and waterfalls.

Passenger Rail

The ARRC operates six different passenger trains, serving resident, visitor, and contract markets. The frequency of each train varies depending on the season. [cxiii]

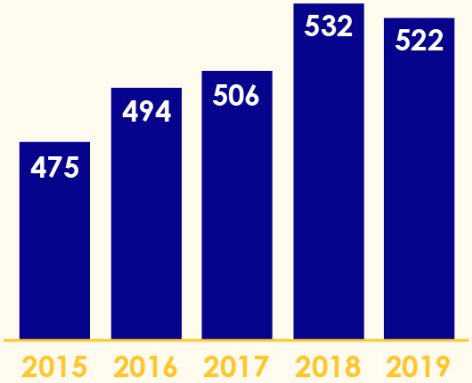
ARRC operates the following scheduled passenger train services:

- **The Coastal Classic** operates daily roundtrip service between Anchorage, Girdwood, and Seward between mid-May and mid-September.
- **The Denali Star** operates daily between mid-May and mid-September from Anchorage to Fairbanks (12-hour trip). A sister train in Fairbanks makes the same trip in reverse. Stops may include Wasilla, Talkeetna, and Denali National Park.
- **The Glacier Discovery** operates daily between late May and mid-September from Anchorage, with stops at Girdwood, Whittier, Portage, the Spencer Glacier Whistle Stop, and Grandview. On the return journey, Anchorage and Girdwood-bound passengers may disembark at Portage for a motorcoach transfer.
- **The Hurricane Turn** serves as a lifeline for Alaskans living off the road system north of Talkeetna. Typical stops are: Chase (MI 236.2), Curry (MI 248.5), Sherman (MI 257.7), Gold Creek (MI 263.2), Twin Bridges (MI 270), and Chulitna (MI 273.8). In the summer, it operates Thursday through Monday, departing Talkeetna and providing flag stop service to Hurricane Gulch. The Winter train operates on the first Thursday of the month, October through May, departing from Anchorage to Hurricane Gulch.
- The Aurora Winter Train operates from mid-September to mid-May between Anchorage and Fairbanks, with flag stop service between Takeetna and Hurricane. The train operates either northbound or southbound, depending on the day.

The ARRC plays a significant role in supporting summer tourism and the cruise industry. Cruise ships that arrive or depart from Seward or Whittier need to convey passengers to Anchorage or Fairbanks for transportation in or out of the state and for connections to other activities. The only available options for large numbers of cruise ship passengers to make this 120-mile journey are trains or motor coaches.

In addition to scheduled services, a range of contracted train services operate to provide passenger transportation connections. Almost all cruise ships choose to offer this train service. The

Figure 74. Passenger Ridership



ARRC's passenger train business transports more than half a million passengers each year. During 2019, ridership totaled 522,101. This represents a slight (<2%) decrease from the 2018 passenger total, due in large part to service disrupted during flooding and wildfire events.

Seward cruise train only offers trips to Anchorage. Passengers can then choose to transfer to other cruise trains or scheduled services to travel north to Denali or Fairbanks.

Discussions with Alaska Railroad staff indicate that the cruise train is an extremely popular service and is almost always fully booked. The exception was in 2020, when passenger service was down by 90 percent. It is expected to remain this way until the pandemic is under control and cruise service to Alaska can resume.

Freight Rail System

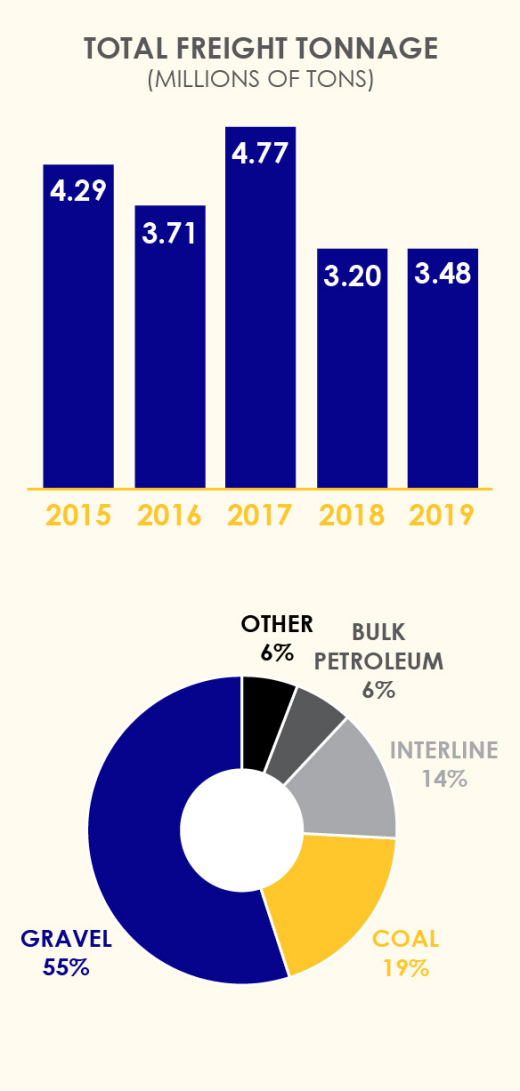
The ARRC's freight service fleet includes 863 railcars that are owned or leased by ARRC, along with 180 railcars leased by customers. Historically, freight has generated about two-thirds (65 percent) of operating revenues (excluding capital grants), however, with the downturn in the coal market worldwide and the oil industry, it is now about 56 percent of the revenue. Gravel accounted for more than half of the nearly 3.5 million tons of freight moved in 2019.

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.

Figure 75. Total Freight Tonnage (millions of tons)

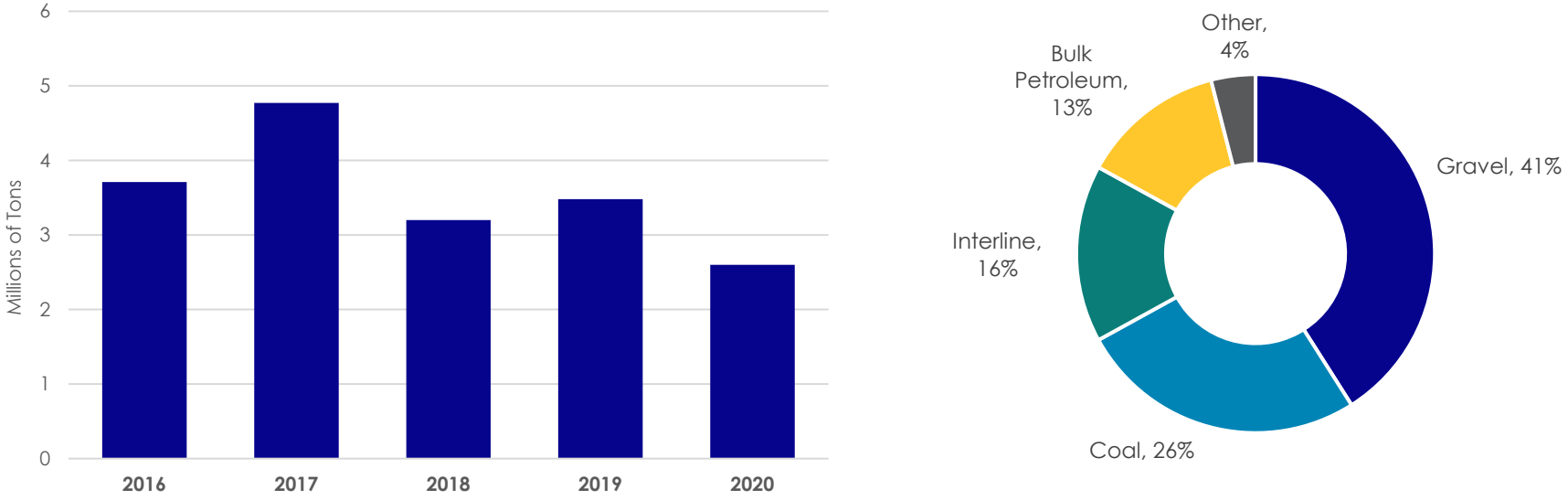


Source: ARRC Annual Report 2019

- 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 76: 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:[cxiv]

- 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.

Funding

The railroad is unique in that is not part of DOT&PF and is not under the state budget act; it is effectively a private company that is owned by the State. All revenue earned goes back into the railroad's budget.

ARRC Key Trends, Challenges, and Opportunities

TRENDS:

- The rail system plays an essential role in tourism and transporting goods, with freight revenue generating more than half its operating revenues.
- Rail yards in Seward, Whittier, Anchorage, and Fairbanks serve as centralized distribution hubs that rely on a strong roadway and marine network.

CHALLENGES:

- The downturn in freight and tourism revenues has put pressure on the ARRC's ability to earn sufficient revenues to both operate service and adequately maintain the railroad.
- The rail system can be impacted by various unpredictable hazards. The 7.1-magnitude earthquake in 2018 caused significant damage to the track, right of way, and facilities. Weather events and wildfires disrupted freight and passenger rail services and are expected to continue causing disruptions in the future. Finally, COVID-19 has had a devastating impact on the cruise industry and in turn on passenger rail service.

OPPORTUNITIES:

- Needs are always greater then funding available for projects, but ARRC continues to make progress on operations and maintenance, engaging with planning partners to:
    - Implement a positive train control (PTC) system that prevents human errors that may cause catastrophic results. This task has been delayed, allowing ARRC time to complete it beyond the federally-mandated milestone of December 31, 2020.
    - Rehabilitate main lines, sidings and yards from Seward to Fairbanks, including embankment stabilization, culvert crossings, etc.
    - Implement and continuously update the Bridge Program, which identifies structures to be upgraded, overhauled, or replaced. The current five-year plan calls for 13 bridge projects to be completed in the future.
    - Monitor the long-term agreement to support the A2A Railway Development Corporation's proposal to build a 1,500-mile rail connection between Alaska and Canada.
    - Engage in discussions with planning partners to expand rail service (commuter rail) between Anchorage and the Mat-Su Valley as well as south to Indian and Girdwood. This includes track realignments, an intermodal hub in Wasilla and reactivating the Bill Sheffield Alaska Railroad Depot at ANC.
    - Continue to pursue an intermodal transportation center in the Ship Creek area in Anchorage to facilitate connections between rail, air, marine, transit, passenger, and freight vehicles, and active transportation.

Pipelines

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 477,800 barrels per day in 2021. 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."[cxv] 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.[cxvi] 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.

Funding

Over 800 miles of pipeline that are privately owned and operated that are key for the movement of crude oil through and out of Alaska, which in turn is critical for the overall state economy and availability of funding for all transportation modes.

REFERENCES

[i] Alaska's Local Government, Alaska Municipal League
[ii] University of Alaska Fairbanks, Federal Indian Law for Alaska Tribes https://www.uaf.edu/tribal/112/index.php
[iii] National Snow & Ice Data Center. Climate Change in the Arctic. May 2020. https://nsidc.org/cryosphere/arctic-meteorology/climate_change.html

[iv] Melvin, April M., et al. Climate change damages to Alaska public infrastructure and the economics of proactive adaptation. National Academy of Sciences. January 2017.

[v] U.S. Geological Survey. Climate Impacts to Arctic Coasts. 2021. https://www.usgs.gov/centers/pcmsc/science/climate-impacts-arctic-coasts?qt-science_center_objects=0#qt-science_center_objects.

[vi] Alaska Department of Environmental Conservation. Fairbanks Particulate Matter $PM_{2.5}$. 2021. https://dec.alaska.gov/air/anpms/communities/fbks-particulate-matter/.

[vii] Tian, Zhenyu, et al. A ubiquitous tire rubber-derived chemical induces acute mortality in Coho salmon. *Science Magazine*. January 2021. https://science.sciencemag.org/content/371/6525/185.

[viii] National Cooperative Highway Research Program. Research Report 924: Foreseeing the Impact of Transformational Technologies on Land Use and Transportation. 2019.

[ix] Alaska Department of Transportation & Public Facilities. Alaska Iways Program. 2021. http://www.dot.state.ak.us/iways/projects.shtml

[x] Alaska Department of Transportation and Public Facilities. Self-Evaluation and Readiness of Alaska DOT&PF on Deployment of Connected and Automated Vehicles (CAV) on Alaskan Roads. January 2021.

[xi] PlugShare. Best EV Charging Cities in Alaska. March 2021. https://www.plugshare.com/directory/us/alaska

[xii] Alaska Department of Transportation and Public Facilities. Technology for Alaskan Transportation. March 2016. http://www.dot.state.ak.us/stwddes/research/assets/pdf/16no90.pdf

[xiii] American Society of Civil Engineers. 2020 Infrastructure Report Card. February 2021.

[xiv] NADO Research Foundation. Transportation Technology and Operations Case Studies. October 2020. http://ruraltransportation.org/new-nado-rf-case-studies-published-on-transportation-technology-and-operations/

[xv] State of Alaska. Geography of Alaska. 2021. http://alaska.gov/kids/learn/aboutgeography.htm

[xvi] U.S. Census Bureau. Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2019. December 2019. https://www2.census.gov/programs-surveys/popest/tables/2010-2019/state/totals/nst-est2019-01.xlsx

[xvii] Alaska Department of Labor and Workforce Development. 2020 Population Estimates by Borough, Census Area, and Economic Region. January 7, 2021. https://live.laborstats.alaska.gov/pop/index.cfm

[xviii] University of Alaska School of Natural Resources & Extension. Alaska Food Cost Survey, December 2018. https://www.uaf.edu/ces/files/fcs/2018q4.pdf

[xix] Alaska Energy Authority Economic Evaluation Model (workbook), "Diesel Fuel Prices" tab. January 2021. http://www.akenergyauthority.org/Portals/0/Programs/RenewableEnergyFundGrants/Documents/EvaluationModel%20REF%20R13%20v2.xlsx?ver=2020-08-28-081007-673

[xx] Alaska Energy Authority Economic Evaluation Model (workbook), "Diesel Fuel Prices" tab. January 2021 http://www.akenergyauthority.org/Portals/0/Programs/RenewableEnergyFundGrants/Documents/EvaluationModel%20REF%20R13%20v2.xlsx?ver=2020-08-28-081007-673

[xxi] U.S. Energy Information Administration, Units and Calculators Explained. June 2020. https://www.eia.gov/energyexplained/units-and-calculators/british-thermal-units.php

[xxii] Alaska Energy Authority Economic Evaluation Model (workbook), "Diesel Fuel Prices" tab. January 2021. http://www.akenergyauthority.org/Portals/0/Programs/RenewableEnergyFundGrants/Documents/EvaluationModel%20REF%20R13%20v2.xlsx?ver=2020-08-28-081007-673

[xxiii] Alaska Energy Authority Economic Evaluation Model (workbook), "Diesel Fuel Prices" tab. January 2021. http://www.akenergyauthority.org/Portals/0/Programs/RenewableEnergyFundGrants/Documents/EvaluationModel%20REF%20R13%20v2.xlsx?ver=2020-08-28-081007-673

[xxiv] Alaska Energy Authority. Renewable Energy Fund Fact Sheet. February 2020. http://www.akenergyauthority.org/Portals/0/Fact%20Sheets/2020.02.11%20Renewable%20Energy%20Fund%20Fact%20Sheet.pdf?ver=2021-02-11-160112-237

[xxv] Bureau of Economic Analysis Regional Economic Accounts (Downloads). https://apps.bea.gov/regional/downloadzip.cfm

[xxvi] Alaska Department of Labor and Workforce Development. Alaska Seasonally Adjusted Labor Force Data, 1976 to 2020. January 22, 2021. https://live.laborstats.alaska.gov/labforce/labdataall.cfm?s=2&a=1

[xxvii] Alaska Department of Labor and Workforce Development. Alaska Occupational Forecast 2018 to 2028. September 30, 2020. https://live.laborstats.alaska.gov/occfcst/index.cfm

[xxviii] Alaska Industrial Development and Export Authority. Ambler Access. 2016. http://www.ambleraccess.com/index.html

[xxix] Alaska—Alberta Railway Development Corporation. Our Railway. 2021. https://a2arail.com/

[xxx] Alaska Industrial Development and Export Authority. West Susitna Access. 2020. http://www.aidea.org/Programs/ProjectDevelopment/WestSusitnaAccess.aspx

[xxxi] Legislative Finance Division. Revenue and Budget History, FY 1975 to March 2021. March 2021. https://www.legfin.akleg.gov/Graphs/Revenue-BudgetHistoryFY75-Mar2021.xlsx

[xxxii] Alaska Department of Revenue. Revenue Sources Book Fall 2020. December 2020. http://tax.alaska.gov/programs/documentviewer/viewer.aspx?1634r

[xxxiii] Alaska Department of Revenue. Revenue Sources Book Fall 2020. December 2020. http://tax.alaska.gov/programs/documentviewer/viewer.aspx?1634r

[xxxiv] Alaska Department of Revenue. Revenue Sources Book Fall 2020. December 2020. http://tax.alaska.gov/programs/documentviewer/viewer.aspx?1634r

[xxxv] Alaska Department of Labor and Workforce Development. Alaska Population Projections 2019 to 2045. April 2020. https://live.laborstats.alaska.gov/pop/projections/pub/popproj.pdf

[xxxvi] Federal Highway Administration. Highway Statistics 2019. Table VM-202, 5.2.1 Vehicle-miles of travel, by functional system, 1980-2019. November 2020. https://www.fhwa.dot.gov/policyinformation/statistics/2019/xls/vm202.xls

[xxxvii] Alaska Department of Labor and Workforce Development. Alaska Population Projections 2019 to 2045. April 2020. https://live.laborstats.alaska.gov/pop/projections/pub/popproj.pdf

[xxxviii] Alaska Department of Revenue. Revenue Sources Book Fall 2020. December 2020. http://tax.alaska.gov/programs/documentviewer/viewer.aspx?1634r

[xxxix] Institute on Taxation and Economic Policy. Alaska's Motor Fuel Tax: A National and Historical Outlier. January 2017. https://itep.sfo2.digitaloceanspaces.com/akfueltax0117.pdf

[xl] Brooks, James. Walker proposes tripling gasoline tax to take a bite out of Alaska budget deficit. *Anchorage Daily News* (republished from The Juneau Empire). December 2016. https://www.adn.com/alaska-news/2016/12/19/walker-proposes-tripling-gasoline-tax-to-take-a-bite-out-of-alaska-budget-deficit/

[xli] George, Tom. Alaska aviation motor fuel tax increase under discussion. *Aircraft Owners and Pilots Association blog*. March 2017. https://blog.aopa.org/aopa/2017/03/07/ak-fuel-tax-change/

[xlii] McGroarty, Erin. Alaska Senate OKs increase in motor fuel tax. *Fairbanks Daily News-Miner*. March 2020. http://www.newsminer.com/news/local_news/alaska-senate-oks-increase-in-motor-fuel-tax/article_8dbe77a8-5cf5-11ea-9b48-83f0622aeead.html

[xliii] Alaska Department of Transportation and Public Facilities. AIP funding history, federal fiscal year 1995 through 2020 (worksheet provided by DOT&PF). Received by e-mail January 28, 2021.

[xliv] Alaska Department of Transportation and Public Facilities. Unrestricted General Fund Revenues and Expenses (worksheet provided by DOT&PF). Received by e-mail January 28, 2021.

[xlv] Alaska Marine Highway System. Annual Financial Reports. 2011-2020. http://dot.alaska.gov/amhs/reports.shtml.

[xlvi] Northern Economics, Inc. Draft: Reshaping the Alaska Marine Highway System. Prepared for Alaska Department of Transportation and Public Facilities. January 2020.

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

[xlviii] 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

[xlix] Alaska Department of Transportation and Public Facilities. Transportation Performance Management—State Biennial Performance Report for Performance Period 2018-2021:Alaska Mid Performance Period (MPP) Progress Report 2020.

[l] 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

[li] 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.

[lii] Alaska Department of Transportation & Public Facilities. State of Alaska Certified Public Road Mileage in Centerline Miles. December 2019. http://www.dot.state.ak.us/stwdplng/transdata/pub/2019_CPRM_Final.pdf

[liii] Alaska Department of Transportation and Public Facilities. Transportation Performance Management - State Biennial Performance Report for Performance Period 2018-2021:Alaska Mid Performance Period (MPP) Progress Report 2020.

[liv] Federal Highway Administration. Obligation Rates for the Highway Safety Improvement Program. November 2020. https://safety.fhwa.dot.gov/hsip/gen_info/slorhsip/

[lv] Federal Transit Administration. The National Transit Database (NTD). November 2020. https://www.transit.dot.gov/ntd

[lvi] CRS Report. Public Transit Ridership Continues to Decline. October 2019. https://www.everycrsreport.com/reports/IN11181.html#:~:text=Between%202008%20and%202018%2C%20nationwide,trips%20taken%20than%20in%202008

[lvii] Municipality of Anchorage. Transit on the Move – 2020 Transit Plan. December 2020. https://www.muni.org/Departments/transit/PeopleMover/Pages/transitonthemove.aspx

[lviii] Fairbanks North Star Borough. Metropolitan Area Commuter System (MACS). 2021. https://www.fnsb.gov/349/Metropolitan-Area-Commuter-System-MACS

[lix] Juneau Capital Transit. Transit Development Documents. 2021. https://juneaucapitaltransit.org/document-library/

[lx] Federal Transit Administration. 2019 Service. https://www.transit.dot.gov/ntd/data-product/2019-service

[lxi] Federal Transit Administration. Useful Life of Transit Buses and Vans. April 2007. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/Useful_Life_of_Buses_Final_Report_4-26-07_rv1.pdf

[lxii] Rails to Trails. Active Transportation Transforms America. http://railstotrails.org/resource-library/resources/active-transportation-transforms-america/

[lxiii] Alaska Department of Transportation & Public Facilities. Alaska Aviation System Plan Fact Sheet. January 2021.

[lxiv] Alaska Department of Transportation & Public Facilities. The Economic Contribution of the Aviation Industry to Alaska's Economy. June 2019.

[lxv] Alaska Department of Transportation & Public Facilities. Alaska Airports and Aviation Annual Report. August 2020. http://www.dot.alaska.gov/documents/aviation/2020-Annual-Report.pdf

[lxvi] Alaska Department of Transportation & Public Facilities. Alaska Airports and Aviation Annual Report. August 2020. http://www.dot.alaska.gov/documents/aviation/2020-Annual-Report.pdf

[lxvii] 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.

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

[lxix] 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.

[lxx] Anchorage Economic Development Corporation. Accessed May 16, 2022. https://aedcweb.com/tsaia/economic-impacts/.

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

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

[lxxiii] Alaska Department of Transportation & Public Facilities. The Economic Contribution of the Aviation Industry to Alaska's Economy. June 2019.

[lxxiv] Alaska Department of Transportation & Public Facilities. Alaska Statewide Long-Range Transportation Plan. September 2016.

[lxxv] American Society of Civil Engineers. 2020 Infrastructure Report Card. February 2021. https://infrastructurereportcard.org/tag/2020/

[lxxvi] 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.

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

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

[lxxix] American Society of Civil Engineers. 2020 Infrastructure Report Card. February 2021. https://infrastructurereportcard.org/tag/2020/

[lxxx] Alaska Department of Transportation & Public Facilities. Alaska Airports and Aviation Annual Report. August 2020. http://www.dot.alaska.gov/documents/aviation/2020-Annual-Report.pdf

[lxxxi] Alaska Department of Transportation & Public Facilities. The Economic Contribution of the Aviation Industry to Alaska's Economy. June 2019.

[lxxxii] Alaska Department of Transportation & Public Facilities. Alaska Aviation System Final Report. 2019.

[lxxxiii] Alaska Department of Transportation & Public Facilities. Alaska Airports and Aviation Annual Report. August 2020. http://www.dot.alaska.gov/documents/aviation/2020-Annual-Report.pdf

[lxxxiv] Alaska Department of Transportation & Public Facilities 2021 Legislative Fact Sheet. January 2021.

[lxxxv] Alaska Department of Transportation & Public Facilities staff correspondence. February 4, 2021.

[lxxxvi] Alaska Department of Transportation & Public Facilities staff correspondence. February 4, 2021.

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

[lxxxviii] AK DOT&PF website: Transportation & Public Facilities, State of Alaska: DOT&PF > Program Development > Harbor Facility Grant Program.

[lxxxix] Alaska Department of Transportation & Public Facilities 2021 Legislative Fact Sheet. January 2021.

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

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

[xcii] 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/

[xciii] City of Anchorage. About the Port of Alaska. February 2021. https://www.portofalaska.com/about-us/

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

[xcv] Risvold, R. Plan of Finance Port All Phases, First Draft. May 2020. https://www.muni.org/Departments/Assembly/Documents/Plan%20of%20Finance%20Port%20All%20Phases%20May%2014%202020.first%20draft%20for%20discussion.pdf

[xcvi] City of Valdez. City of Valdez - Port. February 2021. http://www.valdezak.gov/151/Port

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

[xcviii] Bureau of Transportation Statistics – Principal Ports (Total Tons)

[xcix] Liddel, M., & Yencho, M. Fisheries of the United States 2018. NOAA Fisheries Publication, National Marine Fisheries Service Office of Science and Technology, Fisheries Statistics Division.

[c] Reuters Staff. FACTBOX-Teck Resource's Red Dog Mine. Reuters Basic Materials. February 2010. https://www.reuters.com/article/zinc-factbox/factbox-teck-resources-red-dog-mine-idUSN2640430120100226

[ci] U.S. Army Corps of Engineers Waterborne Commerce Statistics Center, 2019. http://cwbi-ndc-nav.s3-website-us-east-1.amazonaws.com/files/wcsc/webpub/#/report-landing/year/2019/region/4/location/4846

[cii] https://www.poa.usace.army.mil/Portals/34/docs/AKports/Planning%20for%20Alaska's%20Ports%20&%20Harbors%20Jan%2011.pdf

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

[civ] McDowell Group. (2016, January). The Economic Impacts of the Alaska Marine Highway System. Retrieved 02 12, 2021, from Alaska Marine Highway Reports and Official Documents: https://issuu.com/alaskamarinehighwaysystem/docs/econ_15?e=32410890/67331148

[cv] Barrett, T. E. Alaska Marine Highway Reshaping Work Group – Report to the Governor. 2020.

[cvi] Alaska Department of Transportation & Public Facilities press release, March 11, 2021. http://dot.alaska.gov/comm/documents/news-uploads/031521/JE-sold.pdf

[cvii] Inter-Island Ferry Authority. Alaska's Inter-Island Ferry Authority. 2021. https://interislandferry.com/

[cviii] Ketchikan Gateway Borough. Ketchikan Gateway Borough Airport Ferry. 2021. https://www.borough.ketchikan.ak.us/147/Airport-Ferry

[cix] Seldovia Village Tribe. About the Seldovia Bay Ferry About. 2021. https://seldoviabayferry.com/

[cx] Alaska Marine Highway System. AMHS 2020-2021 Operating Plan. 2021. http://dot.alaska.gov/amhs/reports.shtml

[cxi] Barrett, T. E. Alaska Marine Highway Reshaping Work Group – Report to the Governor. 2020.

[cxii] Alaska Department of Transportation & Public Facilities. Alaska State Rail Plan, November 2016.

[cxiii] Alaska Department of Transportation & Public Facilities. Alaska State Rail Plan, November 2016.

[cxiv] Alaska State Rail Plan, 2016.

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

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

ATTACHMENT A: EXISTING PLANS SUMMARY

Existing Plans Summary

Highway Safety

Plans reviewed for highway safety include:

- Alaska Strategic Highway Safety Plan (2018 - 2022)
- State of Alaska Highway Safety Annual Report (2018)
- Alaska Highway Safety Plan (2019)
- Alaska Iways Architecture Update: Implementation Plan (2017)

Alignment	Strategies	Gaps
•"Creating a safer, more efficient transportation system" •"Toward zero deaths and serious injuries so all public roadway users arrive safely at their destination"	•Utilize Data and Analysis to Improve Traffic Safety •Annual Safety Data Reporting •Widen Shoulders in High Crash Areas	•Upward trend in fatalities in Alaska between 2009 – 2019

Aviation

Plans reviewed for aviation include:

- Alaska Aviation System Plan (2019)

Alignment	Strategies	Gaps
•Sub-area plans completed during 2019 planning process to provide updated project needs for the aviation system	•Expand Website Data Tracking Capabilities	•Full Pavement Management Study Needed

Freight (Marine, Truck, and Rail)

Plans reviewed for marine, truck, and rail freight include:

- Alaska Statewide Long-Range Transportation Plan – Let's Keep Moving 2036: Freight Element (2016)
- Alaska Statewide Long-Range Transportation Plan – Let's Keep Moving 2036: Freight Element Implementation Guidance (2016)
- Alaska Weigh in Motion Plan Update (2018)
- Port of Alaska in Anchorage Fact Sheet (2020)
- Port of Alaska in Anchorage Logistical and Economic Advantages of Alaska's Primary In-Bound Port Fact Sheet (2020)
- Railport Seward – Seward Marine Terminal Master Plan (2017)
- Industrial User Highway Scanning Report (2014)
- USACE/DOT&PF Alaska Arctic Ports Planning Charette Report (2011)
- Valdez Comprehensive Waterfront Master Plan (2019)
- Port of Valdez: Competitive Market Analysis & Long Range Plan (2015)

Alignment	Strategies	Gaps
•"Reliable, affordable, timely, safe, and secure" •Creating new facilities to support economic development •Freight is often transshipped by rail, truck, air, and barge throughout Alaska	•Performance Based Resource Allocation to Increase Revenue and Accountability •Public and Private Freight Issues Working Group •Increase Vehicle Data Accuracy by Using Alaska-specific data at Weigh in Motion stations	•Systematic statewide metric for acceptable truck performance •State mandate for number of vehicles weighed at Weigh in Motion stations •Scalable Oversized/Overweight Vehicle Permit and Payment System •Funding sources for new port facility creation (Arctic)

Ferry

Plans reviewed for ferries include:

- Alaska Marine Highway Reshaping Work Group Governor's Report (2020)

Alignment	Policies	Gaps
•Provide essential service in a cost-efficient manner •Recommends performance-based planning to improve system reliability, increase revenues, and reduce costs	•Fare Increases •Maintain Existing Governance Structure with Governor-Appointed AMHS Operations Board	•Steady, forward funding •Clear and simple union contracts

Active Transportation (Walking and Biking)

Plans reviewed for active transportation include:

- Alaska Statewide Active Transportation Plan (2019)
- AMATS Non-Motorized Transportation Plan (2019)
- Fairbanks Non-Motorized Transportation Plan (2012)
- Anchorage Pedestrian Plan (2007)

Alignment	Strategies	Policies	Gaps
•"People in Alaska will enjoy equitable, accessible, and safer walking and bicycling opportunities as an integral part of daily life" •Safety & Livability	•Active Transportation Inventory Program	•Complete Streets •Safe Passing Distance (Law) •Vulnerable Road User (Law)	•Bikeshare program (Fairbanks) excluded from plans

Transit (Bus and Rail)

Plans reviewed for highway safety include:

- Alaska State Rail Plan (2016)
- Transit on the Move – Anchorage Transit Plan (2020)
- City and Borough of Juneau Transit Development Plan (2014)
- Fairbanks North Star Borough Short & Long Range Transit Plan (2013)

Alignment	Strategies	Gaps
•Maintenance, safety, modernization performance measures •"Provide safe and efficient freight and passenger [rail] services coordinated with other transportation modes, regionally and internationally"	•Increase transit facilities to expand services	•Steady, forward funding

Regional Plans

Regional plans reviewed include:

- Yukon-Kuskokwim Delta Transportation Plan (2018)
- Southwest Alaska Transportation Plan Update (2016)
- Southeast Alaska Transportation Plan (2014)
- Interior Alaska Transportation Plan (2010)
- Northwest Alaska Transportation Plan (2004)
- Prince William Sound Area Transportation Plan (2001)

Alignment	Strategies	Gaps
•Recognize the importance of AK's multi- and inter-modal transportation system •Recognize cost constraints as well as large unmet need for system preservation and modernization	•Alignment with Performance-Based Measurement System •Prioritize Investments that Spur Resource Development, Fishing, and Tourism	•Modernization •Overall Acknowledgement of Climate Change Impacts •Older Plans Exclude Performance Measurement

Metropolitan Planning Organization Plans

MPO plans reviewed include:

- FMATS 2045 Metropolitan Transportation Plan (2018)
- AMATS Anchorage Bowl 2025 Long-Range Transportation Plan (2005)

Alignment	Strategies	Gaps
•A vision of safe, well-maintained roadways for vehicles, to keep freight moving, and broadening walking, bicycling, and transit options •Develop a balanced multi-modal transportation system that serves as a catalyst to ehance quality of life in Anchorage	•Improve Multi-Modal Options •Prioritize Investments that Spur Economic Vitality	•Overall Acknowledgement of Climate Change Impacts •Older Plan Exclude Performance Measurement

Other Relevant Plans

Other relevant, statewide plans reviewed include:

- Alaska Department of Transportation and Public Facilities Non-Metropolitan Local Official (2020)
- Alternative Fuels – Public Fleets Phase 1 Technical Memorandum (2014)
- Alaska Federal Lands Long Range Transportation Plan (2011)
- Report on State of Alaska Vehicle Fleet CNG Pilot Program Recommendations (2011)
- Alaska DOT&PF Strategic Plan (2008)