SECTION TWO
Technical Analyses

VISION: 2020

Statewide Transportation Policy Plan

State of Alaska
Department of Transportation
and Public Facilities

November 2002

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Statewide Transportation Policy Plan

Prepared by the:
Division of Statewide Planning
with assistance from Regional Planning Offices
Alaska Department of Transportation and
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introduction

INTRODUCTION

This is Section Two of the update to *Vision: 2020*, Alaska's long-range transportation policy plan. This section presents background and resource information on which the policies and objectives were developed. Section Two includes an interesting history of transportation in Alaska, an extensive description of the current transportation system, socio-economic and demographic projections on which to base future system improvements, transportation investment analysis for all modes, and a technical planning analysis that addresses major transportation issues facing us today. These issues are those specified in the federal Transportation Equity Act for the 21st Century (TEA-21).

The department formed a Technical Review Committee composed of staff from thirty federal and state agencies who reviewed and commented on these analyses. Their comments have been incorporated as appropriate into the plan.

This set of Background/Resource papers provide a perspective for the department's development of the policies and objectives presented in Section One. Section Three provides all comments on policy issues received from the public during the plan update process.

HISTORY OF TRANSPORTATION IN ALASKA

MOST TRAVELERS ARRIVING IN ALASKA BY AIR WILL HAVE FLOWN FOR several thousand miles without a sign of human habitation, or at best an occasional glimpse of a tiny community nestled on the banks of a seashore or river. Then, if they are landing at Juneau, Anchorage, or Fairbanks they see a large airport, multi-lane highways, and all the transportation features of a typical American urban area. How did this unusual transportation system come to exist in Alaska? What does it mean to policy decisions today? Understanding the history of Alaska's existing transportation system provides a foundation for writing policies that will guide development of the system in the future. For many Alaskans the history will be "old hat," information they grew up with. But for many other Alaskans, particularly those who are newer and younger, the history may provide insight into the evolution of transportation in Alaska.

This history of transportation in Alaska will begin with a description of the system before contact by Europeans, and will move forward through the various waves of contact—fur-traders, miners, settlers, military, oil boomers—to demonstrate how each group developed transportation systems to meet the needs of their time. In effect, each group added an overlay to what they found. This history emphasizes how the planning efforts of the federal and state governments formed the basis for the development of Alaska's present rail, highway, air, ferry and transit service and how government influenced private efforts in marine transportation and pipeline routing to serve social and economic goals of the people of Alaska and the United States.

PRE-EUROPEAN CONTACT

Natives in each section of the land that became Alaska developed means of transportation to serve their needs. In Southeastern Alaska, the Tlingit, Haida, and Tsimshian Indians built sea-going canoes which were capable of voyages of hundreds of miles, traveling mostly in the sheltered waters of Prince William Sound, the Alexander Archipelago, and the inland passage as far south as Puget Sound. With canoes as seaworthy as those of the Norse longships and similar Polynesian canoes, the people of Southeast Alaska prospered by using the sea for food and trade. Their communities were located in the best anchorages and resource areas in the region. Many of these communities, such as Sitka, retain their importance as transportation hubs today.

In other coastal areas, Native people, lacking the great trees of Southeast but recognizing the benefits of sea travel, made boats of other available materials. In the southwestern and western part of the state the preferred material was sea-mammal skin; in the Interior canoes were made of birch bark. The Aleut peoples, numbering at least 30,000 at the time of European contact, linked their far-flung communities by skin boats, primarily kayaks they called baidarkas, which they used to gather sea mammals and fish. Aleut hunters developed incomparable skills in taking their tiny craft into some of the stormiest waters on earth. Communities in the Aleutians and Southwest Alaska today are largely the ports used for many centuries by the Aleut people.

Along Bering Straits and the Arctic Coast, people traveled widely using dog teams in the winter and skin boats in the ice-free seasons. Here the boats were made of walrus hide.

This chapter was written by Walter B. Parker, Commissioner of the Department of Highways 1974-76, chairman of the Joint Federal-State Land Use Planning Commission for the State of Alaska 1976-79, and Commissioner, U.S. Arctic Research Commission, 1996-present.

The rapid advance of the Thule culture from Alaska to Greenland testifies to the peoples' interest in and ability to travel. At an early period, trade goods were distributed throughout the Arctic, originating both from Russian centers in northeastern Siberia and Hudson's Bay Company posts in Canada. Many present-day shoreline communities on the Bering Strait and along the Arctic Coast were those used as encampments by the Inuit peoples over the centuries.

The Athabaskan peoples of Interior Alaska were river people. Moving by birch bark canoe and log raft in the summer and dog teams and pack dogs in the winter, the Athabaskans moved along rivers and overland trails. More nomadic than other Native Alaskans, the Athabaskans moved their villages frequently to respond to changing wildlife resources and the ever-changing riverbanks. The villages along Alaska's rivers today are mostly traditional sites used on and off over the centuries. Many of the primary trails in Alaska were those developed over the centuries by the Athabaskans. These trails provided the first overland routes for trappers and miners and later became the routes for the first pioneer roads. As with the coastal Aleut and Inuit peoples, Athabaskans developed their transportation to look for food and to serve trade. Most contact was conducted in the summer when various groups would meet primarily at Nuclucayette, near present-day Tanana, for peoples living on the Yukon and its tributaries and at various places between Stony River and Aniak on the Kuskokwim River.

Anchorage Museum of History and Art Archives

Kayak in Chukchi Sea

There were fairly firm divisions between the peoples of the various regions of Alaska, and inter-regional trade was limited until western goods became generally available. Trade between southeastern Alaska and interior Athabaskans was facilitated by bands living near Haines and Skagway, the so-called Carrier Indians. These Indians specialized in packing goods between the two regions along trails later used by gold-seeking miners. Trade between the Inuit and Yupik of western Alaska on the one hand and the Athabaskans on the other occurred along the rivers but was very limited.

THE RUSSIAN PERIOD 1741—1867

The great eastward expansion of the Russian Empire began in 1584 and eventually washed upon the shores of California in 1808 and Hawaii in 1815. The Russians reached Alaska in 1741 on Bering's first voyage and stayed 126 years. The Russians were used to the great distances of Alaska. By the time a Russian official left the capital of St. Petersburg and arrived at Sitka, the last Russian capital in Alaska, he had traveled some 6,000 miles overland by horse, sled and riverboat, and 3,000 miles by sea from Okhotsk to Sitka. The alternative route by sea from St. Petersburg to Sitka was about 22,000 miles via the Cape of Good Hope or 20,000 miles via Cape Horn. Freight via the sea route was over $1,000 a ton in present dollars and three times that through Siberia.

The first Russian outposts in Alaska were operated by the Russian American Company that had been formed by Russian fur traders who began arriving in the Aleutian Islands in 1750. The traders, using small and poorly constructed ships from Okhotsk, gradually worked their way eastward. In early years, one out of three ships was lost at sea. However, the profits in sea otter pelts, traded primarily in China for tea, was high, and expansion continued. The Russians reached the protected harbor of Kodiak in 1763, founding a post there in 1784. They expanded north to the Pribilofs in 1786 and east to Sitka in 1795. The Russians were the first non-Natives to locate the Kuskokwim River in 1818 and the Yukon River in 1834. As Russians occupied the Aleutians and Southwest Alaska, their trade goods were distributed throughout the Arctic by the Native peoples. Protected ports, river routes, and overland trails took on new importance as trade accelerated.

Meanwhile, the Russian explorations and developments in Alaska had not gone unnoticed by the United States and western European nations. The Spanish responded first, accelerating their occupation of northern California and sending their first expeditions north of California in 1774. There was no commercial presence accompanying the explorers and their primary purpose was to lay claim to unoccupied lands for the Spanish crown.

Captain Cook, dispatched by the British in 1776, arrived off Alaska's coasts in 1778. The commercial arm of Britain in the north, the Hudson's Bay Company, reached the Pacific Coast in 1793 and began to compete with the Russian American Company in the fur trade. After Cook's voyage of discovery, a host of independent British and American traders began to transport sea otter pelts directly to Canton as early as 1779. American traders began to arrive in substantial numbers after the initial U.S. voyages of Gray and Kendrick to the northwest coast in 1787. Coastal ports became increasingly important to the competing nations.

The response of Russia to this competition was to provide an imperial charter to the Russian American Company and to expand the Russian Navy presence in the North Pacific. The first warships arrived in 1804, and contributed to Alexander Baranov's battle against the Tlingit at Sitka, which reversed the earlier expulsion of the Russians in 1802.

The spur of U.S. and European competition led to several expeditions to the northern Bering and the Chukchi Seas with Kotzebue reaching the sound bearing his name in 1817. Several efforts were made to expand the Russian fur trade into western Alaska and the Yukon basin, with posts being built at Kolmakov on the Kuskokwim River in 1832, St. Michael in 1833, and Nulato in 1839. Zagoskin in 1843 reached the junction of the Yukon and Nowitna Rivers. Exploration of the interior was accomplished by Creoles, born in Alaska of Russian and Alaska Native parentage, except for Zagoskin who was a Russian naval officer.

The Hudson's Bay Company (HBC) acquired Fort Stikine from the Russian American Company in 1840 after leasing the fur trade rights to the coastline of southeast Alaska. In 1844, John Bell of the Bay traveled to the junction of the Porcupine and Yukon Rivers from interior HBC posts, and in 1847 Alexander Murray founded Fort Yukon.

In 1867, shortly after the purchase of Alaska by the United States, Ivan Lukeen of the Russian American Company stepped from his canoe at the Hudson Bay Company store at Fort Yukon, thus linking the two transportation systems that literally circled the globe. From that time on, a beaver pelt taken in interior Alaska could go to Europe by going either west or east—to St. Petersburg by traveling 9,000 miles west or to London by traveling 7,000 miles east. That the meeting in Fort Yukon took place roughly 125 years after the Russians had first entered Alaska is a testament to the difficulty of travel in the Interior.

The most interesting thing about the rivalry between the two great fur enterprises is the manner in which they handled penetration of the vast North American interior. Both had strong traditions of river travel. The Russians both in Russia and Siberia had used the great rivers as their principal means of transportation. The British and Canadians had worked their way across the continent by canoe and workboats. Both groups were well trained and sophisticated in portaging between river systems.

The Russians tended to use skin boats in most of their efforts. Zagoskin's exploration of the Yukon River ended because he was out of seal oil to grease his boats, and they were leaking too heavily to continue. This and distance from major supply points at Unalaska, Kodiak, and Sitka stymied the Russian effort to move into interior Alaska. Likewise, the Hudson's Bay traders, at the end of their long supply lines from Montreal and London, had little energy left to challenge the Russian hold on the lower Yukon River and contented themselves with the furs of the upper Yukon River and the Tanana basins. The birch bark canoes de maitre and the smaller canoes de nord of the Bay men would have

"Zagoskin's exploration of the Yukon ended because he was out of seal oil to grease his boats, and they were leaking too heavily to continue."

worked as well on the Yukon as they had on all the other rivers of North America, so their stopping where they did represented not a failure of technology but an economic and political decision.

By the 1860s, supply routes by ship between the major Russian American posts were well established, and the ships had been improved dramatically from those of a century before. As an economic engine, the sea otter had been partially replaced by the fur seals of the Pribilofs and other furs, but the bonanza days of the peak of the sea otter trade were a memory. In the final analysis, the economic ties between Russia and Alaska were no longer strong enough to generate the effort to keep them together.

THE EARLY AMERICAN PERIOD 1867—1897

"In 1867 the population of Alaska was about 30,000, 95 percent of whom lived either on the coast or on navigable rivers."

In 1867 the Tsar sold his rights in Alaska to the youthful United States, a country which had little use for Alaska at the time except to block Britain from expanding its empire. With the sale Russia turned its energies elsewhere and one of the major shipping routes in the world literally disappeared, not to resume for 120 years. Left behind, however, was a pattern of established communities along the coast and rivers. At the time of the purchase in 1867, the population of Alaska was about 30,000, probably 95 percent of whom lived either along the coast or on navigable rivers. Of the residents, the vast majority were Alaska Natives, 2,600 were Creoles, and 300 were Russians. The population was small, had few ties with Russia, and was open for activity in Alaska waters by American whaling fleets and an increasing presence of mercantile interests from the Pacific Northwest and California. During the 1840s there were up to 300 whaling ships from New England operating in the Bering Sea, the Chukchi Sea, and in the Gulf of Alaska. Thus, by the time the Stars and Stripes were raised at Sitka on October 18, 1867, there was considerable knowledge about Alaska among American citizens. Moreover, the whaling and mercantile fleet were established and captains and crew had extensive experience in Alaska waters. The shipping link to Russia that was lost was quickly replaced by connections with Seattle and the west-coast states.

The most immediate change in Alaska transportation after the U.S. takeover came from the greater use of steamships and the shortening of supply routes. While a large part of the sealing and whaling fleets were still sailing vessels, there was a rapid change to steamships for commercial and military use. This change can be dramatically illustrated by the fact that it took the Russians 33 years from the time they discovered the Yukon River to arrive at Fort Yukon in 1867. Yet, an American representative was in Fort Yukon eighteen months after the takeover, telling the Hudson's Bay Company they were on U.S. territory and it was time to leave. The representative, Captain Raymond, arrived on the steamboat *Yukon* from St. Michael.

While there was little change in the amount of the fur trade after the Alaska Commercial Company acquired the assets of the Russian American Company, the fishing industry began to develop rapidly after 1878 as the market developed in the U.S. for Alaska salmon. Reliable, faster marine transportation made possible the opening of canneries in southeastern Alaska in 1878; by 1884 the great red salmon runs of Bristol Bay were being canned for export.

The decline of gold mining opportunities in California and the American west generally caused prospectors to look upon the not-yet-golden north as their next area of opportunity. This was accelerated by the discovery of gold in the Cassiar District of northern British Columbia that caused some spillover activity into southeastern Alaska. Increasing activity in the late 1870s led to the discovery of the rich gold-bearing quartz lodes at Juneau in 1880. Joe Juneau and Dick Harris arrived by steam launch from Sitka and Alaska's first big gold camp was soon in place.

American traders had by 1873 replaced the Russians and Canadians on the Yukon River, supplying the posts at Nulato, Fort Yukon and Tanana by the single steamboat operating

from St. Michael. As prospectors became reasonably assured of supplies close at hand, they fanned out over the Yukon Basin, reaching the upper Tanana River in the late 1870s, the Kuskokwim River in 1883, and the Koyukuk River in the same time period. A second steamboat, the *New Racket*, joined the *Yukon* in 1882.

Prospectors had been extremely active in the Canadian section of the Yukon basin during the 1870s and 1880s. All the gold found prior to 1886 was on the Canadian side. However, rich placer gold was found on the Fortymile River in 1886, Birch Creek downstream from Fort Yukon in 1893, and on the Koyukuk River the same year. The value of gold produced in the Alaskan Yukon rose from $30,000 in 1886 to $800,000 ten years later.

Along with the long-used Chilkoot and White Pass trails from the head of Lynn Canal to the Yukon River headwaters, the rivers of Alaska and the Yukon largely served also as winter trails. Mail service from the United States at this time was monthly to Wrangell, Killisnoo, Juneau, and Sitka. The other governmental needs for transportation in Alaska were chiefly military and provided little underpinning for services to the general public or the commercial sector.

During this period, the Alaska school system began to develop beyond that provided by the Russians, which was almost totally based in Sitka. There were sixteen schools in southeastern Alaska by 1888, nine public and seven sectarian. In the rest of the state there were seven public and nine sectarian, for a total of 32 schools statewide.

Missionaries had by 1890 moved into most of the state, with Moravians on the Kuskokwim River, Roman Catholics in Juneau and on the Yukon River, Friends at Kotzebue, Swedish at Unalakleet, Episcopalians on the Yukon River, Methodists at Unalaska, Presbyterians in Southeast Alaska where they founded Sheldon Jackson Institute at Sitka, and the Russian Orthodox churches left by the Russians at Sitka, Kodiak, Unalaska, as well as those serviced by lay readers in Bristol Bay and the Kuskokwim River.

Alaska State Library

Steamship at St. Michael

The combination of schools and churches was very slowly creating a need for public transportation beyond that provided by the Navy, the Revenue Cutter Service, and those commercial companies operating their own ships. The rivers had become major highways for the growing population, in both the summer and winter. Traditional overland trails for trade became more feeder routes to get into the country. The event was almost at hand which would create a totally new Alaska and create transportation demands to serve it.

THE GOLD RUSH 1897—1918

Although the Klondike gold strike of 1896 occurred in Canada, the principal transportation routes to the Klondike went through Alaska. The world did not know of the strike until July 1897 when gold arrived in Seattle and San Francisco. The first steamers down the Yukon River from Dawson had taken the gold to St. Michael where it had been transferred to steamships. At the time of the strike, there were about 500 miners in the Fortymile District in Canada and Alaska and about 1,200 in the rest of the Yukon and Alaska. With the steamship system in place, another 2,000 miners made it to the Klondike that year, with several thousand more stranded en route.

Over the fall and winter of 1898-99 Congress, for the first time, debated how to solve Alaska's "transportation problem." Congress, very stingy with Alaska appropriations since 1867, now laid out $200,000 for reindeer to take food over Chilkoot Pass to supposedly

starving miners. Reindeer, 500 in number, were purchased in Norway, taken by specially chartered ship to New York and put on a special train to Seattle. A second chartered ship took them to Haines, as there was no room for reindeer in Skagway. Reindeer were not, however, a solution to the transportation problem. The reindeer's unique adaptation to life on the tundra did not fit it for use as a pack animal over steep mountain passes, and it certainly could not pull the pulkas (reindeer sleds) over those passes. There was no reindeer moss in southeast Alaska or the southern Yukon for food. Most died of starvation; the 160 remaining were taken by Sheldon Jackson to western Alaska to augment herds there. Eventually word came from the Klondike that there wasn't a food shortage, but not before others proposed solving the Alaska transportation problem with "snow locomotives," an early version of a snow machine, and cargo balloons.

In 1898, the difficult Alaska landscape limited the enterprising rusher to six imperfect routes to the Klondike. The quickest and most popular proceeded from the head of the Inside Passage, typically over the Chilkoot Pass and down the Yukon River; this attracted some 35,000 miners. The next best was to St. Michael and up the Yukon River, which had 6,000 takers. Three thousand people landed at Valdez and tried to make it up the Copper River; 1,000 landed at the head of Cook Inlet and set out cross country to Dawson; and about 1,000 each tried the two all-Canadian routes, either up the Stikine River or from Edmonton via the Mackenzie River to near Norman Wells and then overland. In all, about 200,000 people struck out for the Klondike in 1898 and 1899, and about 50,000 made it. Many of those who did not make it got stranded in parts of Alaska and found other things to do.

"The Nome Gold Rush generated more traffic than the existing shipping companies serving Alaska could handle."

The increase in population greatly increased the need for and economic support for a more developed transportation system. The need was met in large part by a dramatic increase in the number of steamboats on the Yukon River; some 30 were operating by 1899. To connect the steamboat routes, investors proposed railways, first from Skagway to Whitehorse, the head of navigation for steamboats on the Yukon River. The White Pass and Yukon Railway was quickly planned and reached Lake Bennett in July 1900 and Whitehorse the next year.

While the great Klondike rush was on, prospectors found gold on Anvil Creek near Nome. Before steamships could reach the strike, some Klondike miners used the frozen rivers as their route west, traveling by dog team, on foot, and even by bicycle. The route for most followed the Yukon River to Kaltag and then crossed to Unalakleet. In June 1899, when the first ships reached Nome, they found about 400 miners had made the trip west. The Nome rush generated more traffic than the existing shipping companies serving Alaska could handle. New companies were formed in the summer of 1899 and every ship that could be found was mustered for the rush expected in the summer of 1900. Many of these ships had no business being in the North Pacific, being old and originally built for gentler waters. Fortunately, the summer of 1900 was a good weather year in the North Pacific and the Bering Sea.

The other major problem with serving the needs of the new mining district was that there was no natural port at Nome. Ships had to anchor off the open beach with no protection from wind or waves. In case of bad weather, the quickest option was to run for cover behind Sledge Island, some fifteen miles west. In 1900, the city fathers began to plan for a deepwater port, a process still underway almost a century later. On shore, a narrow gauge railway was built from Nome to the camps on the upper Nome River and a standard gauge from the coast along the Solomon River to Council and on to Ophir Creek.

Meanwhile, in the Interior, intensive prospecting was still going on at Birch Creek and on the Fortymile River. Gold in the Interior and on the coast brought improved steamboat service to Alaska. Large, luxurious stern wheelers were soon in place, introducing a level of comfort never seen before in interior Alaska. Better transportation made possible a level of activity that led in the next five years to gold strikes at Fairbanks, the Koyukuk River, and the Kantishna River. All this activity also generated action in the U.S. Congress,

who sent a committee to study ways to improve Alaska's transportation, not only for gold, but for the coal fields and copper deposits that had been found in the Matanuska Valley and the Copper River Valley.

The committee found that there was "not to be found a single wagon road over which vehicles can be drawn summer or winter." The main emphasis of its report was to have the federal government promote Alaska's development by construction of a highway system. This led to the Nelson Act that created the Alaska Road Commission in 1905. It also created the Alaska fund, 70 percent of which was to go to the construction and maintenance of wagon roads, bridges and trails.

The Secretary of War appointed three Commissioners; one was an engineering officer and the other two were Army officers stationed in Alaska. Major Wilds P. Richardson, for whom the present highway is named, was the first president. The Commission soon found that the income from the Alaska fund was not sufficient to build new roads and maintain existing routes; $28,000 had been received the first year. Congressional relief was sought and a million dollars was requested to build an all-Alaska overland route to connect the Gulf Coast to the Yukon River. Congress sent $150,000 in 1907, and by 1910 the Commission was receiving about $250,000 per year from the Alaska fund and from Congress. The trail from Valdez to Fairbanks was being slowly improved; in 1910 a road built from Chitina to Tonsina linked the Copper River Railroad to the Richardson Highway.

Alaska State Library

White Pass and Yukon Railroad

Spurred by the construction of the White Pass and Yukon Railroad, railroad builders began to work on an all-Alaska rail route to the Yukon River. There were two natural routes, one from either Valdez or Cordova up the Copper River and through Mentasta Pass to the Tanana River; the other from Seward or Cook Inlet up the Susitna River and through Windy Pass to the Tanana River. The Copper River route had as its ultimate destination the town of Eagle on the Yukon River, some 525 miles from Cordova. The western route aimed for the Matanuska coalfields and on to Fairbanks. The topography both limited the options and made construction very costly.

Several private companies competed for a grant of right-of-way. Eventually the mining interests of the Guggenheims and J. P. Morgan won out, and the route to the Yukon was given up to build the Copper River and Northwestern Railroad. This railroad, built from 1908 to 1911, was 200 miles in length (from Cordova to the copper mines at Kennecott near McCarthy) and cost $20 million. The decision on the eastern route's length was strictly economic. The copper mines could support the investment of $20 million; the freight revenues of a railroad to Fairbanks could not support the additional amount needed for the longer route. At the same time, the combine acquired the Northwest Commercial Company who owned the Alaska Steamship Company.

Work on the western route began in 1903 by the Alaska Central Railway from the newly founded town of Seward. By 1905 the entire route of 463 miles to Fairbanks had been surveyed and 50 miles of track had been constructed, reaching the western end of Turnagain Arm at a cost of $2,500,000. Then the nascent coal boom in Alaska, which had spurred much of the investment, began to falter as the coal lands laws that had been extended to Alaska in 1900 ran into problems. President Theodore Roosevelt withdrew all coal lands from entry on the public domain in 1906, and that was the end of private investment in railroads in Alaska based on coal hauling. The Alaska Central Railroad went into receivership; it was taken over by the Alaska Northern Railway group who built another 22 miles before giving up in 1911.

The collapse of private investment in rail in Alaska raised the interest of the federal government. Congress authorized a railroad commission in July 1912 to report on the best and most feasible route. In January 1913, the commission recommended two routes: one from Cordova up the Copper River and down the Tanana River to Fairbanks; the other from Seward to the Matanuska Coal Field, the Susitna Valley and thence to the Kuskokwim River. The goal was to unite the two great river systems of Alaska and their transportation system with the coast and open the principal coal and agricultural areas.

In 1914 Congress authorized the Alaska Railroad. The Alaska Engineering Commission was promptly appointed by President Wilson to select a single route. The present route north from Seward was chosen because it served the coal fields and agricultural areas of the Matanuska Valley, and because the Commission feared the government would have to purchase the Copper River and Northwestern Railroad from the Guggenheims to secure the right-of-way as far as Chitina.

The limitation on development of coal was resolved in 1914 when Congress passed the Coal Leasing Law. The law came, in part, from frustration by Alaskans who were forced to buy expensive Canadian coal while Alaska coal was closed to mining. In 1911 in Cordova, the town's leading citizens had marched to the dock and, in a scene reminiscent of the Boston Tea Party, had dumped a load of freshly arrived Canadian coal overboard. The "Cordova Coal Party" had received national attention and encouraged passage of the new entry law intended to support a boom in coal mining in Alaska. While the gold rush declined, the much-hoped-for coal boom did not materialize. The Alaska Railroad was not completed until 1923 due to delays in appropriations associated with World War I. The railroad cost $56 million, but lack of funds would cause some sections to be built with less than the best materials. The initial rolling stock (engines and cars) came from the Panama Railroad.

During the late teens and early 1920's gold miners constructed a road from the Lignite Station on the Alaska Railroad to the gold mining district of Kantishna, eighty-five miles to the west. En route, this trail accessed the historic Stampede antimony mine that was developed in the 1930s. During the 1920s and 1930s the Alaska Road Commission spent money upgrading the route, which moved freight, people and mail into the Kantishna mining district from a point along the Alaska Railroad. This road was the main transportation corridor into the mining district until the McKinley Park Road was built during the period 1922-1938, after which time the Stampede route was used mainly by hunters and recreational users.

> *"The completion of the Alaska Railroad, the Richardson motor road, and the Steese Highway in the period 1920-27 allowed residents and tourists freer movement around Alaska."*

BETWEEN THE WORLD WARS 1918—1941

With the gold rush over and the war effort drawing off many men, Alaska's population declined. Despite economic stagnation and a general depopulation of Alaska's work force, the 1920s were years of great transition for Alaska's transportation system. The completion of the Alaska Railroad in 1923, the upgrading of the Richardson Trail to a motor road, and the completion of the Steese Highway in the period 1920-27 made possible freer movement for Alaska's residents and attracted a few tourists into the country.

In 1920 Congress passed the Merchant Marine Act (called the Jones Act after its senatorial sponsor). This act required that with a few exceptions, cargo transported by water between points in the United States be carried on U.S.-built and registered vessels. It also required that the vessels be owned and primarily crewed (at least 64 percent) by U.S. citizens. Many believe that the general economic effect of the Act has been to increase costs on handling marine freight to and from Alaska.

Population decrease, the demise of the gold rush, and the opening of the railroad to Fairbanks dropped the number of vessels on the Yukon River from a peak of 41 in the early 1900s to two by the 1930s: the *Nenana* serving from Nenana (on the Tanana

River) to Marshall (on the lower Yukon River), and the *Alice* serving upriver to Fort Yukon. Both vessels were operated by the Alaska Railroad.

However, the big event of the 1920s was the arrival of aviation in Alaska. Flying mostly surplus aircraft from World War I, Alaska's early bush pilots became the most famous people in the Territory. Carl Ben Eielson flew the first mail route in 1924 and was swiftly followed by the Wien Brothers (Noel, Fritz, Ralph, and Sig), Joe Crosson, Harold Gillam (thrill 'em, spill 'em, no kill 'em Gillam), Russ Merrill, Bob Reeves, and others. Children in remote villages knew all their names and records just as children today know movie stars and professional athletes.

The pilots were important in part because of the novelty of their craft, but also because they were often the primary link to the rest of the state. For many villages, even those on the shoreline and river edge, the airplane was now the most critical link to extended family and trade. Airplane travel soon became sufficiently regular that companies bid mail contracts against dog team mail drivers. Although dog team mail service lasted until after World War II, airplanes were incrementally becoming the core of the transportation system for many communities. Landing strips for wheel and ski craft were constructed on the outskirts of Anchorage (Merrill Field) and Fairbanks (Weeks Field) while aviators in the Southeast used float planes exclusively.

Anchorage Museum of History and Art Archives

Barrow, Alaska

Spurred by the first commercial flight between Fairbanks and Nome, the Alaska Legislature authorized the use of road monies to build landing fields in 1925. In 1927, the Legislature made an appropriation to subsidize air travel between Seward Peninsula points and the Alaska Railroad. As a result of this and the earlier legislation, 44 small airports were built, mostly in mining areas because the equipment to build them was available there. Where Alaska Road Commission funds were not available, communities improved whatever areas were available. Anchorage's first airport on the Parkstrip was such a community effort in 1923. Otherwise, pilots used river bars or whatever flat place they could find, winter or summer. Technical innovations for winter flying were, of necessity, pioneered by the first generation of bush pilots. Skis were developed by several, and plumber's firepots were adapted to heat engines. There was little or no government oversight until 1935 and pilots could, in general, adapt their aircraft to cold-weather flying as they saw fit.

As airline service became scheduled, the need for air service to all communities increased rapidly. By 1932 the Road Commission had constructed 70 fields, and by 1939, 155. Most of these were about 1,400 feet in length and 30 to 50 feet wide. Radio services were provided by the airlines where they existed though weather data was collected largely through the Alaska Communications System operated by the Army Signal Corps. Federal guidelines for air fields and air transportation began in 1935. There were 31 aircraft operating in Alaska in 1932 and 79 in 1936. By 1940 most mail, passengers, and light freight were moving by air in the winter, not by dog sled. Air passenger traffic increased nearly threefold between 1932 and 1936 while freight, including mail, increased fivefold.

During the late 1920s and 1930s, ice-making equipment became generally available in the commercial fishing areas of Alaska. This enabled fresh fish to be stored for longer periods before being canned. These improvements helped make Alaska salmon more marketable in the U.S. and Europe. As a result, canneries thrived in Southeast Alaska, Bristol Bay, and other areas along the Gulf Coast. Commercial cannery operations formed

the economic base for many communities since they required construction of dock facilities and regular re-supply service by the vessels of Alaska Steam, Northland Transportation, and two smaller firms.

The focus on aviation drew funds from highways; road construction during the 1930s continued only at a slow pace. Road construction accomplished during this period, however, included the Nabesna-Gulkana Road, begun in 1926 and completed ten years later. The McKinley Park Road, begun in 1922 and averaging 5 to 6 miles of construction a year, was finished in 1938. It was built in cooperation with the National Park Service to connect the Kantishna mining district to the Alaska Railroad.

In 1932 the Alaska Road Commission was moved from the Department of War to the Department of the Interior. As part of its program, the Alaska Road Commission had maintained and flagged major trails around the state, most of which were used in the winter by dog teams. With small budgets and a growing demand for both road and air infrastructure, the Alaska Road Commission began to drop trail maintenance. The following figures are instructive:

TABLE 1.1 MAINTAINED ROAD AND TRAIL MILES BY YEAR

Road/Trail Type	1926	1936	1940
Wagon Roads/Tramways	1,533	2,058	2,072
Sled Roads	1,086	1,612	639
Trails	6,671	6,940	2,638
Flagged Trails	712	304	240
Total	10,003	l0,915	5,589

As the United States entered World War II, the Alaska Road Commission reported it had expended over $33 million for the 35-year period of 1906-41. Thus, it had expended less than $1 million per year to construct and maintain over 10,000 miles of trail and roads and almost 200 airports. While the roads were minimal and the airstrips small, it was still a remarkable use of public monies.

EFFECTS OF WORLD WAR II 1941—1945

The effect of World War II on the 73,000 people residing in Alaska in 1941 was overwhelming. At the peak there were 250,000 military in the state and another 50,000 civilians brought in for the war effort. In four years the federal government spent about $600 million (roughly $10 billion in present dollars) on transportation projects, 20 times as much as in the previous 75 years since the purchase in 1867. With this huge investment Alaska almost instantly had a new overlay of overland routes.

The Alaska Highway was built, a surface link first talked about as a railroad during Gold Rush days. There was now a surface link connecting the Pacific Ocean through Alaska to the Lower 48 and the Atlantic. In 1938 President Roosevelt had appointed the Alaska International Highway commission to expedite the project. Several routes were proposed, one going down the Mackenzie Valley and then through the Yukon Territory; another from Hazelton to Watson Lake which became the present Canadian Highway. The U.S. and Canadian military favored the present route as it could serve the airports being constructed to serve the air ferry route from the U.S. to Russia and was thought to be easier to protect in case of a Japanese landing in Alaska. The Alaska Highway cost $135 million, of which $23 million was for bridges. The amount for bridges was almost

as much as had been spent by the Road Commission for all transportation facilities in Alaska since 1906.

Other transportation facilities were developed around Alaska to provide the linkage needed to move soldiers and equipment. The Alaska Road Commission completed the Glenn Highway to the Richardson. The military constructed both the Tok Highway to link the Alaska Highway to Anchorage via the shortest possible route and the Haines Highway to provide access to that port. New ports were constructed at Whittier and Excursion Inlet; almost all existing ports were substantially upgraded with War Department money.

It was in aviation that Alaska made its greatest gains. The Army Air Corps and the Civil Aeronautics Administration spent more than $400 million to construct 54 airports and air bases capable of handling multi-engine aircraft, usually the DC3, as well as 56 radio ranges and 66 communications stations. The new aviation charts of Alaska showed 8,000 miles of instrument airways; instrument approaches were possible at all the new airports. The Civil Aeronautics stations and the military bases were outposts of middle America, circa 1940, in much of the state. Standard Cape Cod houses with indoor plumbing were constructed alongside villages of log cabins and outhouses. Air service brought movies, library service, and fresh produce to the remotest parts of the Territory for the first time.

Alaska Steam, the sole maritime freight and passenger provider for much of the Territory since the Gold Rush, upgraded its fleet. The military began to use barges to move the enormous amounts of freight involved. Contractors on the Yukon River tied hundreds of barrels of petroleum products together and floated these rafts downriver to the air base at Galena and the other new airports along the Yukon. Some of those fuel barrels are still there, buried in Yukon River mud.

Anchorage Museum of History and Art Archives

Early highway construction

The prewar fleet of sixteen vessels belonging to Alaska Steam was expanded dramatically by the addition of 60 vessels assigned by the federal government. Of this fleet of 76, only four were lost during the war. In 1944, Alaska Steam was purchased by Northland Transportation. The company continued to operate some of the vessels assigned to it by the Maritime Commission until 1949. After these ships were returned to their owners, Alaska Steam continued operations with nine ships and Northland with three.

The Alaska Railroad, by providing the military the means to serve its major Alaska bases at Anchorage and Fairbanks, began to shape present-day population patterns. This gave those cities the impetus to eclipse Juneau and Ketchikan as the leading population centers in the postwar period.

In 1999 the Department of Transportation and Public Facilities constructed a single-lane road through the Whittier railroad tunnel; the tunnel opened to vehicle traffic in June 2000. The Alaska Railroad freight operations continue between Anchorage and Whittier, mostly in the late evening hours, while its passenger service has been reduced to summer months from May to September. The Whittier Road was the first toll road in Alaska.

POSTWAR DEVELOPMENT 1946—1958

By 1946 the military population of Alaska had drastically declined to less than 20,000. Except for the Civil Aeronautics Administration employees manning its far flung network of 40 stations, the civilian employees brought in during the war to build the camps and airports also left. Alaska seemed to be returning to the prewar doldrums.

The big gains from the war were the Alaska Highway, the Glenn Highway and a modernized air system. The first truckers pioneered freight shipment over the Alaska Highway from the states and airlines began to operate to serve civil traffic.

As a result of the Pacific Case held by the Civil Aeronautics Board (CAB) before World War II, Northwest Airlines had route authorization from Minneapolis to Anchorage and Seattle to Anchorage, and from Anchorage to Tokyo. Pan American, who had pioneered the latter route with Charles and Ann Lindbergh flying North to the Orient in 1931, had to be content with the Seattle to Fairbanks to Nome route and was given the mid-Pacific route through Honolulu to Tokyo. Alaska Airlines was operating from Juneau to Anchorage to Fairbanks; Pacific Northern also operated from Juneau to Anchorage. The CAB also opened the door to nonscheduled airlines after the war. These airlines soon started flying from the states to Alaska in old military transports with bucket seats. This allowed travelers to go from Anchorage to Seattle for $65 instead of $150, at some sacrifice in comfort.

By 1948, Alaska was back at war—the Cold War. In the fall of 1948 a steady stream of C82 transport planes began flying into Ladd Field in Fairbanks and Elmendorf Air Force Base in Anchorage, bringing the first equipment for the DEW line radar network that would eventually stretch from Attu to Greenland. New airports needed to be built for the radar stations, and the construction business was booming again by 1951. Anchorage and Fairbanks, each of which had declined to 3,000 in population after the war, soon grew to over 10,000 again, and saw steady growth through the 1950s.

"The call for statehood was in part based on transportation issues."

Meanwhile, the Alaska Road Commission had returned to work. The Anchorage-Seward Highway and the Copper River Highway were underway by 1953. The Seward Highway, including the connection to Kenai known as the Sterling Highway, was completed in 1957. The Copper River Highway construction was interrupted by the 1964 earthquake and has never been completed. Both the Taylor and Denali Highways were begun in 1953; the Taylor was finished in 1957 and the Denali a year later.

The Cold War soon led to large federal appropriations to build international airports at Anchorage and Fairbanks to get the civil traffic off the airbases at Ladd and Elmendorf. These were quickly completed in 1950 and 1951. These developments created the possibility of fulfilling the dream of General Billy Mitchell who as early as the 1920s had referred to Alaska as the air crossroads of the world. European airlines began to investigate providing transpolar service as business in the Far East boomed after the end of the Korean War in 1953. SAS led the way, beginning Copenhagen-Anchorage-Tokyo service in 1957, with Air France, BOAC and KLM soon following. Lufthansa, Sabena and others joined the parade later so that by 1970 residents of Alaska had direct service to most of the capitals of Europe.

Meanwhile, in marine transportation in Southeast, declining salmon runs were replaced by increased timber harvesting. The depletion of salmon runs due to cannery weir operations led to the closing of most canneries in the 1950s, but the growth of timber harvesting operations during this period helped to sustain many coastal communities. Logging operations led to the construction of forest development roads, particularly on Prince of Wales Island. An upgraded network of these roads now linked the far-flung communities on this immense island.

The call for statehood was in part based on transportation issues. Many Alaskans regarded maritime commerce as the major impediment to achieving a successful economy beyond that fueled by government expenditures.

Competition began to grow in maritime commerce as the Cold War generated more traffic. The White Pass and Yukon Route pioneered container shipping by providing inter-modal service from Vancouver through Skagway to the Yukon Territory. Barge service to Haines, Valdez and later Seward was begun in 1947, using a modified form of container service. Alaska Steam started regular container service in 1953 to meet the

competition, but rapid freight service by high-speed container ships was more than a decade away.

The great change of this period was that the urban areas of Alaska were becoming more populous, with most of the new population growth in the Anchorage, Fairbanks and adjacent areas: the Railbelt. The 1950s boom brought Alaska's population to 213,000, including 48,000 military.

EARLY STATEHOOD EFFORTS 1959—1968

A major issue supporting statehood efforts was the setting of transportation priorities. As residents of a territory, Alaskans felt they had been unable to influence where and what transportation should be improved. With statehood in 1959, Alaska at last could set its own transportation priorities. Major priorities were soon established and many of them carried out. In Southeast Alaska, the establishment of pulp mills at Ketchikan and Sitka in the 1950s encouraged population growth and the demand for improved marine transportation. Southeast was the beneficiary of the state's first two big transportation initiatives, the Alaska Marine Highway System and the "Get Southeast on Wheels" program which translated into building major airports at Ketchikan, Sitka, Wrangell and Petersburg, so that jet airliners could eventually replace PBY and Grumman Goose service.

The problem for Alaskans was funding. Federal aid to airports took care of the airports, although it had to be stretched out over a decade. Through bonding, the new state found the money to build three mainline ferries, each with a capacity of 108 cars and 500 passengers. These ferries served the route from Prince Rupert to Haines, connecting Ketchikan, Sitka, Wrangell, Petersburg, Juneau and Skagway. A year later, two smaller ferries were put into service in western Alaska, one connecting the ports of Prince William Sound, and the other, especially designed for rough weather, connecting Seward and Homer to Kodiak and occasionally Dutch Harbor. Although the ferries were developed primarily to provide transportation for community residents, given the beautiful Alaska coast tourists soon began to crowd residents for space in the summer. The number of tourists on the ferries grew 63 percent from 1964 to 1967.

Department of Transportation & Public Facilities

M/V Taku

The major highway project of the first decade of statehood was the George Parks Highway. It took almost ten years to build the segment from Willow to Healy. Once completed, the Parks provided a more direct route between Anchorage and Fairbanks, 80 miles shorter than by the Glenn and Richardson Highways. The Parks Highway closely followed the route of the Alaska Railroad and was thus somewhat a reversal of an old policy established in Territorial days that had discouraged redundancy in transportation linkages. Given the considerable need for transportation in Alaska, redundancy was considered a luxury. The construction of the Parks also reflected the fact that Alaska had been getting federal highway funds since 1956. The state could use federal funds from gas taxes to build highways even if other modal service was available.

In 1964 the greatest earthquake ever recorded in North America struck southcentral Alaska. The quake and accompanying tsunamis demolished Valdez and Chenega, and damaged large portions of Kodiak, Seward, and Anchorage. The Alaska Railroad north and south of Anchorage suffered heavy damage as did the Seward Highway. The Copper River Highway, then under construction, was decimated with the loss of many bridges. Damage in varying degrees occurred to most highways and airports in southcentral Alaska as well. Governor Egan flew to Anchorage the morning after the quake and took personal charge of the disaster office.

Ironically, shortly after statehood, the new state, lacking funds and facilities, depended heavily on federal aid for recovery from this emergency. The federal response was quick and massive, and included opening airbases to civilian traffic. At the Anchorage International Airport, major damage included the collapse of the control tower.

With federal support, the infrastructure of the state was reconstructed, with the exception of the Copper Highway. The infrastructure, however, changed in significant ways. A major outcome of the quake was the rise of the Port of Anchorage as the major handler of maritime freight in Alaska. The loss of the railroad and highway to Seward and Whittier forced shippers to begin using Anchorage. The Anchorage port was expanded and modern container technology incorporated. The problems that had limited its use before, namely high tides and broken ice in winter, were found to be solvable and the efficiencies of Anchorage as the major trans-shipment point in Alaska soon became evident.

"A major outcome of the 1964 earthquake was the rise of the Port of Anchorage as the major handler of maritime freight in Alaska."

The response also involved policy matters, such as federal interests in long-term development of Alaska's resources. Shortly after the quake, President Johnson had appointed the Federal Field Committee for Development Planning in Alaska to oversee federal relief efforts. The Committee proposed a host of federal initiatives to reconstruct Alaska and to do so in a way consistent with federal interests. At that time, some 90 percent of Alaska was under federal management, and the state had just begun selecting land entitled to it under the statehood act. A total of 26 million acres had been selected by the state by 1967; 78 million acres were tentatively identified as land the state was entitled to under the statehood act. Proposed federal development in the state—such as the Rampart Dam on the Yukon River—would require new transportation routes. The Federal Field Committee was eventually engaged in transportation issues, and Native claims to federal and state lands were given new importance by the discovery of oil at Prudhoe Bay in 1967. The committee was replaced by the Joint Federal/State Land Use Planning Commission which oversaw the implementation of the Alaska Native Claims Settlement Act (ANCSA) of 1971.

The Tanana Valley Flood of 1967 was not of the same magnitude as the quake, but stretched the state's slender manpower resources that were just finishing putting the earthquake-damaged transportation system back in order. Repair, rather than new construction, was the order of the day for much of the state during these years.

The state's few transportation planners were kept busy planning access to state lands, the 26 million acres selected by 1967 when a land freeze was imposed by Secretary of the Interior Steward Udahl, and the 78 million acres tentatively identified to which the state was entitled under the statehood act.

The end of the 1960s saw other initiatives in Alaska. Governor Hickel appointed the North Commission in 1967 to study the potential for railroad access to western Alaska and the large mining deposits in the Kobuk Valley. State transportation planners began examining ways to provide access to the lands that the state was selecting under its statehood entitlement. The planners were guided by a transportation policy stated shortly after statehood to connect all communities with populations over 2,000 by highway. Implementing this policy required access across federal lands and lands later claimed by Alaska Natives after the passage of ANCSA in 1971. State planners began to build files on RS 2477 rights-of-way, legal state rights-of-way corresponding with historically used routes after the passage of the Mining Law of 1866. Section 8 of that law reads "The right-of-way for the construction of highways over public lands, not reserved for public uses, is hereby granted." This federal grant essentially legalized trespass by allowing the establishment of legal highway easements as the West was settled.

Most RS 2477 routes were early mining and exploration trails. The 10,000 miles of roads and trails maintained by the Alaska Road Commission at its peak became the core routes the State of Alaska investigated for RS 2477 legal status.

On December 14, 1968, Secretary of the Interior Stuart Udahl announced Public Land Order 4582, which segregated all public land in Alaska in preparation for the Alaska Native Claims Settlement Act. This segregation marked the effective end of RS 2477 right-of-way establishment in Alaska, although the statute was officially repealed in 1976 by the Federal Lands Policy and Management Act (FLPMA). FLPMA, however, explicitly preserved valid pre-existing RS 2477 rights. The State of Alaska began to compile historic RS 2477 information in earnest to preserve access rights-of-way that had been lawfully established when RS 2477 was alive. This effort culminated in a multi-million dollar state-funded effort in the early 1990s that administratively adjudicated over 2000 potential RS 2477 rights-of-way claims. Of this number, approximately 660 were found to qualify under the terms of the statute and relevant legal precedent. Meanwhile, the Department of the Interior, fearing the establishment of rights-of-way over many of its key national parks and wildlife refuges, issued proposed regulations to deal with RS 2477 claims—regulations that were unfriendly to state claims and would have required a cumbersome federal adjudication of claimed routes. However, Congress blocked then Secretary of the Interior Bruce Babbitt's effort by putting a moratorium in the Fiscal Year 1997 Interior Appropriations bill that prohibited new rules or regulations pertaining to recognition of validity of RS 2477 right-of-ways without the subsequent approval of Congress. This was reinforced by the Acting Comptroller General of the United States, James F. Hamilton, who ruled that Secretary Babbitt could not administratively regulate or invalidate existing rights-of-ways granted by the Federal government prior to 1976. Under the George W. Bush administration it is conceivable that this moratorium could be lifted and new, more state-friendly federal RS 2477 regulations promulgated.

In the first decade of statehood, federal highway and airport funding were the major components of the state's capital budget. The capital budget was almost the size of the operating budget in those early years, since operating funds were generated from the state's still tiny tax base with resource income from the Cook Inlet oil fields.

THE OIL RUSH 1968—1977

It took some time for the magnitude of the oil field discovery at Prudhoe Bay on the Arctic Coast in 1968 to have an effect on the state. Oil was $3 per barrel, so "How rich will we be?" was the big question. The first indicator of the scale of the effect on the state was the massive airlift of oil-drilling equipment to Prudhoe Bay in August of 1968. There was only one airport at Prudhoe, the private Atlantic Richfield Corporation (ARCO) strip, but others soon blossomed as each company involved sought state permits to build its own strip. Within a year there were 20 private strips between the Colville and the Canning Rivers. The Federal Aviation Administration and the state soon realized that a public strip was also needed and the Deadhorse Airport developed by Mobil in 1968 was secured.

Photo by Gail Davidson

Prudhoe Bay

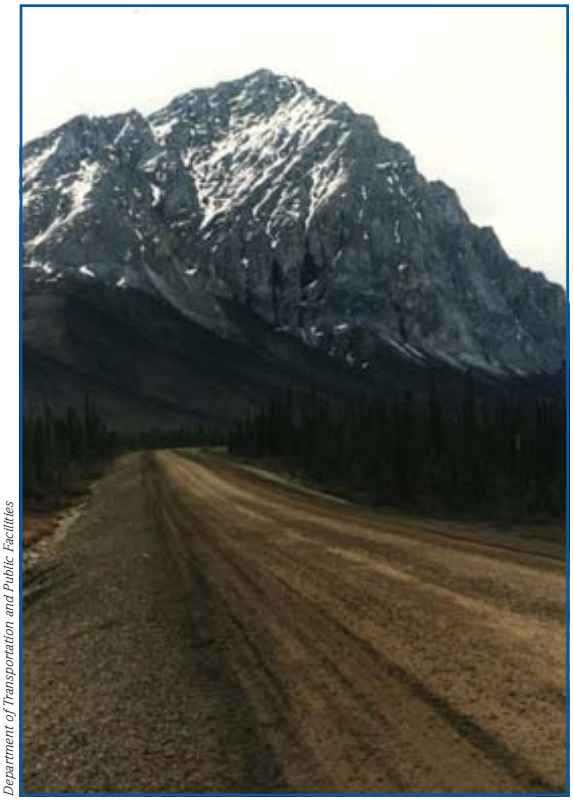
At the peak of the airlift in the summer of 1969 there were over 200 flights a day between Anchorage, Fairbanks and the North Slope. In addition to confirmation wells at Prudhoe, every company on the Slope had seismic crews working. During the winter of 1968, from the vantage point of a northbound aircraft as it cleared the Brooks Range, the lights of all the crews scattered between the Colville and the Canning Rivers looked like a large city suddenly dropped in place.

The next big indicator of the scale of the effect on the state was the famous lease sale of 1969 that generated $900 million, three times the existing state budget. The bid encouraged state development of supportive transportation. Governor Hickel secured $250,000 from the Alaska Legislature in the winter of 1968 to build a winter road from Livengood to the North Slope. The Highway Department had already reprogrammed federal funds

to build as far north as the Yukon River. The winter road was built as far as Sagwon in the spring of 1969, and 7500 tons of material was hauled over it before breakup, about the amount the airlift was carrying in four days. A good deal of road-building equipment was also stockpiled at Sagwon.

Before further work could continue, the newly passed National Environmental Policy Act of 1969 established new rules for development on federal lands. Under intense pressure, the Department of the Interior ruled that the act required that an Environmental Impact Statement be prepared for the proposed pipeline before a right-of-way permit could be issued across federal lands. The leaseholders at Prudhoe Bay, eight companies in all, had already formed a consortium to build the pipeline and were beginning to firm up a route selection. The environmental statement was not the last issue, however. Native claims on federal lands were left unsettled by any previous act, including the Statehood Act. An overland transportation route for the oil was not going to be easy.

One of the partners, Humble, now Exxon, rebuilt the tanker *Manhattan* and dispatched it through the Northwest Passage across the top of Canada to see if oil could be moved out more expeditiously that way. The tanker made it to Prudhoe Bay and back to the East Coast, but the company decided not to pursue this option further. There was a strong faction that wanted the pipeline built across Canada to serve markets in the Midwest and in the Northeast. This option had the major advantage of eliminating large tankers from Alaska waters, gaining the support of conservationists. However, most of the eight partners wanted their oil on the West Coast and also wanted the market flexibility of having their oil in tankers. The state, pressured by developers, wanted the transportation route to stay in Alaska in order to create jobs for Alaskans, despite the fact that some economic studies showed that Alaska would receive more revenue from a route traversing Canada.



Department of Transportation and Public Facilities

Sutkupak Mountain, Dalton Highway

The OPEC cartel was a major factor in galvanizing U.S. domestic support for the Trans-Alaska Pipeline System. The 1973 Arab oil caused gas prices to triple overnight, and desire to get the project underway became widespread.

The Sierra Club and others sued the Department of the Interior in 1970 on the sufficiency of the impact statement. Things ground to a halt until 1973 when Congress passed the Trans-Alaska Pipeline System (TAPS) Act. TAPS cleared the way for an overland pipeline from Prudhoe Bay to Valdez. By this time the oil industry, with a great deal of help from the federal government and others who had built the DEW line, completed engineering on how to build an arctic pipeline.

The state was successful in convincing the oil companies and the federal government that the projected haul road to accompany the pipeline should be eventually converted to a state highway and that it should be built to standards that would make that possible. The state had finished the road to the Yukon in 1970 and was prepared to pay most of the costs for the Yukon Bridge that would also carry the pipeline. Construction was begun and completed in 1974, except for the bridge, which was finished in 1975. The total cost paid by the oil companies was $358 million. State cost including the bridge was $40 million.

The state also involved itself in the tanker leg of the oil delivery system. A task force of three state departments—Highways, Environmental Conservation, and Natural Resources—was formed in 1975 to work out the terms under which tankers would operate from Valdez. The Alaska Legislature passed the Coastal Management Act of 1976 that established environmental protection criteria for tankers. If the tankers did not meet these criteria they had to pay more into the Coastal Management Fund. This was in place for two years after the Valdez terminal opened and some tankers were built with

double bottoms to secure the benefits of the Act. Two months after the Valdez terminal opened, the pipeline owners and shippers sued the state, charging that the Act pre-empted federal authority. They won their case in 1979 and state efforts to improve tanker safety were ruled illegal. The Coast Guard had always been opposed to the Act but did nothing to upgrade federal standards to those called for by the state in 1976.

The pipeline took three tumultuous years to construct and employed 27,000 at its peak. The original cost estimate of $900 million in 1969 had climbed to almost $9 billion by completion.

The North Slope Borough opposed opening the pipeline haul road to the public. The Governor had formed a Growth Council in 1975 to deal with pipeline impact and economic growth generally. This group recommended against opening the road, and in 1982, the road, by then named the Dalton Highway, was opened as far as Dietrich Camp on the south slope of the Brooks Range, about halfway to Prudhoe Bay. In the interim the highway was available for industrial use and for residents of villages along the way.

While much was happening in Alaska, federal highway policy shifted in 1968. The Federal Highway Act of 1968 increased Alaska's funding from the $40 to $60 million range to the $90 to $100 million range. The act also shifted policy toward increased funding of transportation in urban areas, which in Alaska included Anchorage and Fairbanks. The 1968 Act required special planning programs for urban areas to insure that local priorities were respected. The Anchorage Metropolitan Area Transportation Study (AMATS) and the Fairbanks Metropolitan Area Transportation Study (FMATS) were formed and began to work toward planning a better transportation future for these two communities.

An enthusiastic program of limited access highways was presented to both communities; Fairbanks generally accepted the program and Anchorage roundly rejected it. The reason for rejection was primarily the feeling that the proposed freeways would block access from one part of the community to another, and generally decrease property values. The increase in mobility which the system offered was not deemed important enough to justify it to the Anchorage community as a whole. The community response was to begin to reinvigorate its long dormant public transport system. Of the seven freeways proposed in 1970, only two were eventually constructed, the Minnesota Bypass and the new Seward Highway. The existing Glenn Highway was upgraded to limited access status.

In 1971 Congress passed the Alaska Native Claims Settlement Act (ANCSA) which resolved, to a large degree, Native rights to land in Alaska. Natives were given surface title and subsurface title to land they would select, 44 million acres total, to be held by 13 regional corporations and 206 village corporations created by the act. In addition, Natives received $950 million in cash settlements. The Joint Federal/State Land Use Commission, the old Federal Field Committee, monitored the land selection process. The provision of transportation routes to resources and to villages was a central issue in the selection process.

As the 1970s came to a close, federal interests in Alaska were again being raised. The Alaska Native Claims Settlement Act, in addition to resolving Native claims, had initiated a study of federal lands of "national interest" which should not be open to Native or state claims. The Joint Federal/State Land Use Planning Commission was the primary entity to oversee the identification of at least 80 million acres of federal lands in Alaska to be reserved for future national parks, wildlife refuges, and national forests. The Commission formed a 90-person assessment unit from federal and state agencies to begin the planning process. Proposed highway pipeline and railroad maps for the entire state were rapidly developed. The intent of the maps was to insure rights-of-way for future transportation projects. These of necessity crossed considerable amounts of lands reserved

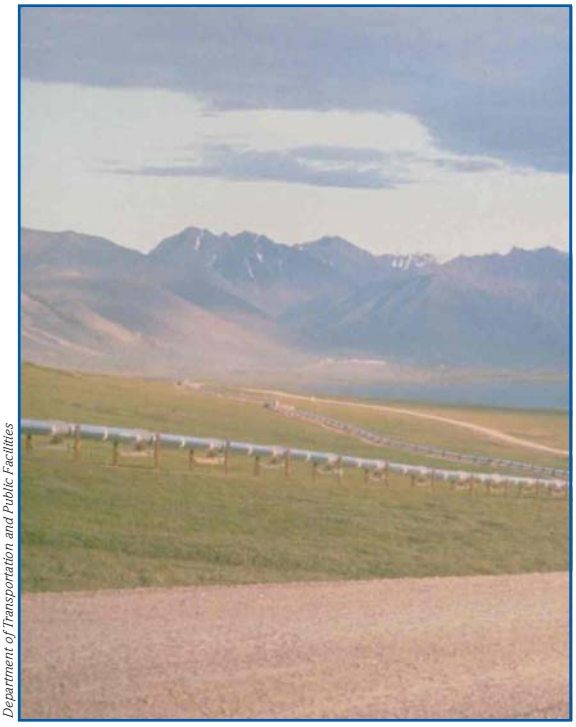
"In 1971 Congress passed the Alaska Native Claims Settlement Act which resolved to a large degree Native rights to land in Alaska."

for Alaska Native selection and for federal units. Essentially, the state did not want to have to pay for future rights-of-way and the potential land-owners and managers wanted to control future access. Some national park proposals blocked natural transportation corridors to western Alaska. A process that insured future rights of transportation agencies without making designations now was the answer the Joint Commission presented to Congress.

The new land ownership pattern threatened the proposed Alaska Highway System shown on the early 1970 maps. Although the entire system could not practically be built by the state—the 11,000 miles of road would cost up to $15 billion in present dollars and require four times the maintenance budget—the threat to future expansion of the system was real.

Responding for the state was the Department of Transportation and Public Facilities, a relatively new organization. As early as 1971, interest had been expressed about creating a department of transportation that would bring all transportation modes together in one department. Jay Hammond made the creation of a consolidated department a key element of his campaign in 1974. When elected, he immediately instituted the process of creating the new department under the rationale of eliminating duplication of offices engaged in comparable kinds of construction maintenance and planning. An acrimonious two-year debate ended with formal creation of the department in 1977.

Planning for expansion of the surface transportation system continued throughout the 1970s. The department's Western Alaska Transportation Study incorporated much of the information learned from the 1970-71 railroad study financed by the Alaska Railroad and the State and from the Joint Federal/State Land Use Planning Commission efforts. This effort, which took place from 1977 to 1978, resulted in no road starts in Western Alaska. The Klondike Highway was constructed in 1978, tying the Port of Skagway to the Alaska Highway network. Efforts were ongoing to get the Copper River Highway underway again. Settlement of a law suit brought by the Sierra Club in 1974 had enabled the use of the remaining emergency funds from the 1964 earthquake to be used to rebuild bridges across the Copper River as far as the Million Dollar Bridge. Rebuilding the Richardson Highway from damage caused by TAPS pipeline construction and upgrading highways in the urban areas took most of the available funds in the period 1977-79.



Department of Transportation and Public Facilities

Trans-Alaska Pipeline

THE POST PIPELINE ERA: 1977 TO THE PRESENT

As the TAPS Pipeline, now called the Alyeska Pipeline, increased its throughput, oil prices began to rise. As the 1980 legislative session approached, the state found itself with undreamed-of wealth. Alaskans knew oil would make them rich but they didn't realize it would be so soon and so much. The new wealth provided the potential to extend transportation in Alaska, but the changes have been relatively modest.

Air service in the state has seen perhaps the biggest change, primarily in operating companies and equipment but also in improvements to airports. Passage of the U.S. Aviation Deregulation Act of 1978 had sent tremors throughout the aviation world and the tremors were largest in Alaska because it depended upon aviation the most. There were provisions in the Act guaranteeing Essential Air Service to small communities. Of Alaska's 265 communities at that time, 257 met the qualifications for Essential Air Service.

In the late 1970's, air service within Alaska was provided by Wien Alaska Airlines in western and northern Alaska, Alaska Airlines in southeastern Alaska, Reeves in the Aleutians, and Peninsula in Bristol Bay. All provided service in parts of southcentral Alaska and the Railbelt area. Wien had the most villages in its area. In each community,

Wien had station agents and its own communication and weather systems. Wien generally provided in rural Alaska what the Federal Aviation Administration and the Weather Bureau were no longer providing. Beginning in the 1960s both of these agencies had begun a long-term program to centralize their operations.

Wien had been serving its villages primarily with Twin Otters, the best bush aircraft of that time. After 1978, it largely pulled out of rural Alaska and began to compete in the States-Alaska service. The air taxis at the regional hubs in Bethel, Kotzebue, Nome and other locations attempted to fill the gap but could not provide the service with their Cessna 206s that the Twin Otters had provided. Service began to fall off badly in the bush.

Coincident with Civil Aeronautics Board hearings on Essential Air Service in Alaska, the Alaska Legislature launched its own investigation of rural service. Governor Hammond neither opposed nor supported the effort. The investigation began in August 1979 and a preliminary report was issued in October of that year. By Christmas 1979, Twin Otters were back in service in much of the area served by Wien.

A report to the legislature in January 1980 recommended improvements at 158 village airports to bring their runways up to a 3,000-foot standard, plus other programs to improve air safety and reliability. Governor Hammond supported the report at this time, and in the next two years about $250 million was appropriated to upgrade rural aviation.

Perhaps the greatest change in aviation transportation in Alaska has been in freight and fueling. The end of the Cold War cost Alaska all of its direct service to Europe and most of that to East Asia. Once there was assurance of air routes across Siberia from Europe to the Far East, the polar route lost its economic advantage. The advent of long range Boeing 747-400 aircraft also cost the State traffic as airlines flying between the Orient and Europe and between the Orient and the East coast no longer needed to refuel in Anchorage or Fairbanks. However, Anchorage and Fairbanks have proven to be ideally located for the rapidly expanding air cargo and air package service from the U.S. to East Asia and to a lesser degree from Europe to East Asia. The economics of air cargo are such that it is better to trade fuel load for cargo load, making for shorter flight legs and midway refueling. The departure of the passenger airlines and the availability of fuel refined in Alaska made Anchorage and Fairbanks International Airports very competitive in securing air cargo airline commitments. The department and the two cities have put in long-term efforts to make Alaska the "Air Cargo Crossroads of the World."

Change in surface transportation has been limited primarily to improvements of existing facilities. Environmental requirements and the new pattern of federal, state, and Native lands in the state has made extension of major overland routes, whether highway or railway, very complicated. The Passage of the Alaska National Interest Lands Conservation Act (ANILCA) in 1980 created 106 million acres of new National Parks and Wildlife Refuges in Alaska. The act included a section establishing a process for the State to secure rights-of-way across federal lands. This was put to its first test in the only major road improvement in twenty years when Cominco Mining Corporation and landowner, the Northwest Alaska Native Association (NANA), proposed a road from their mine at Red Dog to a port site on the Chukchi Sea 52 miles away. The most direct route, minimizing the distance on permafrost and unstable soils, passed through a corner of the Cape Krusenstern National Monument. After some trading between the National Park Service and NANA, some action by Congress and diligent work by the state and federal agencies concerned, the right-of-way for the road was secured. The DeLong Mountain Transportation System (DMTS) supporting the mine was built in the late 1980's and included the road, an airstrip, and a bulk commodity handling port. In cooperation with mine developers, the state government relied on its revenue bonding capabilities to finance the transportation facilities.

"Anchorage and Fairbanks have proven to be ideally located for the rapidly expanding international air cargo and air package service."

Another resource-related project was also proposed in the 1980s. Kennecott Corporation did a major evaluation of its transportation options in western Alaska in 1983-84. Absolute bottom-line costs were established but the costs were too high for either a highway or a railroad link to the existing system. The most feasible option for moving ore from the upper Kobuk was to take it to the Chukchi Sea, similar to what Cominco found.

A third smaller project is a proposed Bureau of Land Management road in the White Mountains National Recreation Area. The 26-mile road was addressed in a master plan for the area in the late 1980s. Ten years later federal funding through the Bureau of Land Management was authorized. The improved gravel road provides access up and down Nome Creek and the White Mountain National Recreation area, a popular recreation area for fishing, hunting, dog mushing, and gold panning.

Marine transportation has also improved. The Alaska Marine Highway System began feeder service to communities in Southeast Alaska through use of smaller ferries in 1974. As a result, demand for public use of the extensive logging road network on Prince of Wales Island grew. Many of the forest development roads were subsequently upgraded for use as public access roads and ownership transferred from the USDA Forest Service to the State of Alaska. Two links were added to the system, with new construction connecting the communities of Hydaburg and Kasaan to the island's road network.

Department of Transportation and Public Facilities

M/V Malaspina in Lynn Canal

Marine Highway service has continued until recent threats of budget cuts and privatization, particularly of profitable routes, have shaken the system. Container barge service continues to become more cost competitive, better scheduled, and more frequent.

The requirements for statewide planning made necessary by the Intermodal Surface Transportation Efficiency Act in 1993 (ISTEA) resulted in more centralized planning by the department in order to distribute projects based upon need. What became quickly apparent with this approach was the great difference in the definition of "need" around the state, and what constituted "beneficial" transportation development. To help highlight the unique transportation character- istics of particular areas of the state and to give each region a voice in its own transportation system development, the department embarked on a series of area transportation plans in 1996. By applying broad policy objectives with specific region goals, these plans have provided greater strategic purpose and definition to transportation development around the state, providing an essential bridge between state transportation policy and individual projects. To ensure implementation of plan-recommended actions, each area plan is published as an element of the statewide transportation plan. The Southeast Alaska Transportation Plan was published in 1999, mapping out an ambitious course for transportation system improvements in Southeast Alaska, particularly within the Alaska Marine Highway System. Plan implementation will include the state's acquisition of several fast vehicle ferries during the first decade of the 21st century. The Prince William Sound Area Plan was approved in July, 2001. The Southwest Alaska, Yukon-Kuskowim Delta, and Northwest Alaska plans are currently underway.

Using policies identified in the department's long range plan, area plans recommend specific strategies and projects for the Statewide Transportation Improvement Program (STIP), the Aviation Improvement Program, and other departmental capital improvement programs.

Transportation facilities represent a significant investment of public funds. This investment needs to be carefully managed to provide the public with the best return possible on its investment. By utilizing the best available technology and management tools, it is

possible to attain the goal of a safe and efficient transportation system.

In 1998 the Alaska State Legislature passed a law requiring the state to record RS 2477 easements where they were documented to exist. Property owners, whose land titles would have been clouded by “phantom” easements of unknown specific location, persuaded the state to only record RS 2477 routes for which a survey had been obtained. The state is now in the position of managing known RS 2477 routes (those that were concluded to qualify following the administrative adjudication), and locating them through survey.

As the major corporations operating integrated services take more and more of facility space available it will become more and more difficult to satisfy the free independent travelers (FIT) needs, which are very different from those on tours. The FIT’s have proven in most tourist economies to be the long-term backbone of local industry because they leave more money with local entrepreneurs and are more likely to return. Integrating tourism planning and transportation planning is necessary to insure all needs are met.

It is getting more difficult for travelers not on tour to secure access to national parks, state parks, hotels and resorts. Now that the Dalton Highway is open to Deadhorse, eight miles from the Arctic Ocean, the planning process already instituted by the state has a great opportunity to work out these problems on this particular road and see how they might apply in the rest of the state.

In June 2000, a new road constructed through a railroad tunnel to Whittier opened, linking it with Anchorage and providing recreational boaters easy access to the port city on Prince William Sound. One of the tunnels that originally provided only rail access to Whittier was reconfigured to allow automobiles, trucks, and buses to use it at periodic intervals. Tolls are charged for use of the facility, beginning in 2001, making it the department’s first toll facility. The tolls collected defray the cost of operating the tunnels and roadway.

Department of Transportation and Public Facilities

Kaxdigoowu Heen/Mendenhall River Trail near Juneau

Bicycling has a long history in Alaska, beginning with the first bicycles that came over the Chilkoot Pass during the 1898 Gold Rush. More recently, the 1990s saw considerable advancement in the construction of modern facilities for bicyclists and pedestrians. The 1990 census showed Alaska to be the "walkingest" state in the nation; that is, a greater proportion of the working population in Alaska walked to work than any other state. This is especially true in rural Alaska where transportation costs are very high. For example, in Kotzebue, over forty percent of the population walks to work on a daily basis. Even in urban Alaskan communities such as Anchorage, Fairbanks and Juneau, the proportion of the population that walks to work is higher than the national average. In the early 1990s, federal legislation required that states spend a certain share of their federal surface transportation dollars on facilities such as bicycle and pedestrian accommodations to improve modal options, physical health and community quality of life. After taking office, Alaska’s Governor announced the TRAAK initiative in early 1995. This initiative has aggressively developed and funded projects to take advantage of the transportation enhancements funding set-aside provided in ISTEA and TEA-21. In addition to the TRAAK (transportation enhancement) funding for stand alone projects like pathways near schools or parks, the department began to incorporate wide shoulders, pathways and sidewalks on routine road transportation projects.

CONCLUSION

Alaska’s transportation system is the product of human ideas and external forces applied to a difficult landscape. Each new wave of people, and each new force, has added an

overlay to the system. Rather than the common "you can drive there from here" system of the Lower 48, Alaskans depend on many modes and inter-modal connections to get around. Often there is only one mode choice for each destination.

It would be safe to say that the greatest improvements in Alaska's transportation system have been driven by great national interests, such as World War II, the Cold War, and the development of North Slope petroleum reserves. These events were of such magnitude that new facilities were developed in spite of possible problems. Today, without crises, improvements in the system are incremental; most funds are spent on sustaining the present investment. A serious question that policy makers and budget developers must answer is whether it is a state goal to encourage population increase in rural areas by providing new transportation facilities, or even by sustaining the present support, such as subsidized rural air service.

"Tourism in Alaska uses many transportation modes."

Most road expansion is on the urban fringe, where pioneer roads no longer meet the needs of the homesteaders who established them. Now school buses pass over the roads on their way to and from schools in more urban areas. Compact development can help to curtail road construction and maintenance costs, and to provide another option in addition to rural living. Urban areas have seen improvements that include freeway-type intersections and bike/pedestrian trails. Many remote areas, although served by modern aircraft, have limited roadways.

That there is only one mode for many areas of the state tends to keep the cost of travel relatively high. While there may be competition in smaller towns and villages within a mode, such as air service, there more than likely isn't another way to get there, such as a road. Only a few communities in Alaska have the variety of modes of travel common to most communities in the nation.

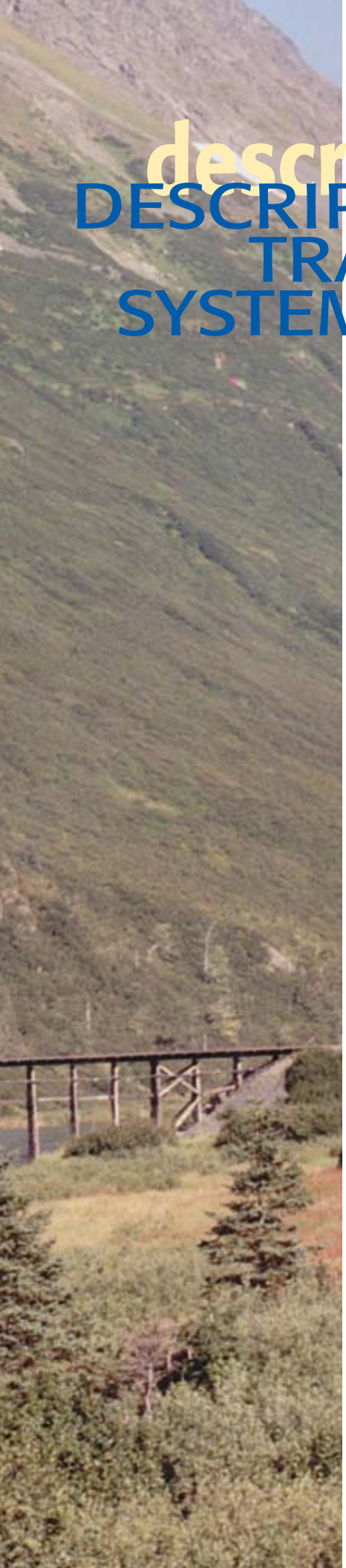
Alaska's transportation system has been driven by motto and event. "Build it and they will come!" is often the underlying hope behind proponents of expanded transportation routes. The qualifier for this theme is that sometimes they will come, and sometimes for only for a short period. The Alaska Railroad, for example, has shaped the population pattern of Alaska more than any other event—creating the Railbelt—but for its first eighteen years, it generated limited revenues and created few exports that had not been in place at its inception.

Another theme is "roads to resources," which operates on the thesis that miners, oil companies, loggers, agriculturists and other developers are chiefly impeded by lack of transportation infrastructure in expanding their areas of operation. This is true to a degree, but the big question is who pays. It is accepted that with pipelines the developer pays in almost all cases; with modes used by the general public the public benefit for new public expenditures must also be factored in. The lack of certain benefits from expenditures has made virtually all proposals for expansion too risky for even a state with oil revenues to afford.

The Dalton Highway was one of the last major highways constructed, and it was possible because Prudhoe Bay was at the other end. The area between the Yukon River and Prudhoe Bay has changed little in its settlement patterns since the highway was completed in 1975 except for the pipeline pump stations and the service stop at Coldfoot.

The one lesson the Dalton Highway has taught so far is that building a road does not necessarily create either a mining rush or a land acquisition rush. The fact that it took almost two decades after the pipeline was finished to generate enough public pressure to open the road all the way is a lesson that should not be forgotten as other extensions to the road system are planned. There are strong social and economic reasons why over 80 percent of the population of Alaska live in the ten largest communities and their fringe areas. Unless there is unforeseen local economic development in the remote areas, this is unlikely to change.

That villages and towns in Alaska are spread along the coast and rivers is, as we have seen, not an accident. They exist where they are because of prior transportation needs and the systems at the time that served those needs. With each new transportation "overlay," service to some communities improves, but not to others. In times of scarce resources, competition for funds to improve the system increases. Yet, the overlays constitute a "system" and emphasis on one mode at the expense of others, or one region at the expense of others, may harm the overall system, or create impacts to other parts of the social and economic fabric of the state. Perhaps the greatest question for the future concerning transportation in Alaska is the extent to which the present system is going to be balanced by mode and region and, of course, who is going to pay.



description

DESCRIPTION OF ALASKA TRANSPORTATION SYSTEM

A STUDY IN CONTRASTS

To most transportation agencies in the United States these days, network improvements are upgrades to an existing system—adding lanes to highways, increasing transit fleets, constructing a new airport terminal, and so on—to better support efficient movement of goods and people. In Alaska, however, transportation needs are much more basic. Many of Alaska's communities are isolated, either lying hundreds of miles from the nearest highway, located on islands, or confined by mountain ranges and glaciers. These communities do not have reliable links to the kind of transportation systems available in other states.

Virtually every region in Alaska has both human settlement and marketable natural resources. Unfortunately, the needs and opportunities in these regions are in most cases not complemented by an adequately developed infrastructure that provides, among other amenities, the mobility and access most Americans take for granted.

In discussing Alaska's infrastructure, its economic or its social development, it is important to bear in mind that Alaska has three basic types of communities: urban, rural, and remote. Of these three categories, the first two conform to traditional American criteria.

Alaska has one urbanized area (Anchorage, with 261,446 residents in 1999), and five urban areas with populations exceeding 5,000. These are the Fairbanks North Star Borough with a population of 83,814 and Fairbanks proper with 31,423, Juneau with 31,262, Sitka with 8,681, Ketchikan with 8,295, and Kodiak with 6,893 that also enjoy amenities found in urban America.

Alaska's rural communities include cities and unincorporated communities with populations between 100 and 5,000 that are connected by roadways or the Alaska Marine Highway System to the state's highway system. Although the quality of life in these communities is enhanced by their links to the highway system, they face many uncertainties, including low incomes and tax bases, high energy costs, and deteriorating infrastructure. As a further distinction, those urban and rural communities that lie along Alaska's single, main-line railroad track or the highways that parallel it are called "railbelt" communities.

Isolated by Alaska's geography, the state's remote communities face the harshest extremes in the nation. The lack of connection to Alaska's highway system is typically the result of topography, geology, and a vast physical separation from the existing highway system. The high unemployment and poverty and the lack of sanitation systems rival conditions in many developing countries. A few remote communities have grown to support over 1,000 residents. Some of these are considered hubs, because they play a critical role in the supply line between urban Alaska and the smaller outlying villages. For example, Barrow, America's northern-most settlement, with a 1999 population of 4,438, has one primary mode of transportation linking it to other communities—aircraft—although in most years barges are able to land goods in August, and snowmobiles are used for transportation in the winter.

Alaska's transportation system is much younger than the rest of the nation's system and consequently has different needs. We are not making incremental improvements

on an already mature and complete system. Rather, we are still trying to build a rudimentary system; our transportation system is "embryonic." Alaska's pervasive under-development is best understood through the illustration of a number of fundamental differences between its transportation system and that of the continental United States.

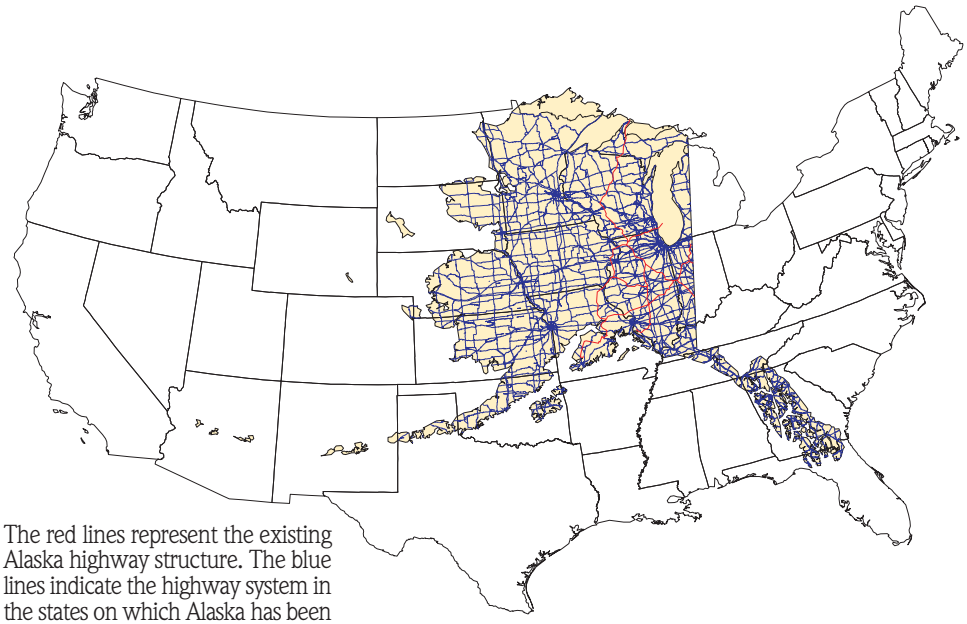
The expectation that freight or passengers can reach virtually any community by road does not apply to Alaska.

Most of Alaska's 350-plus communities, much of its natural resources, and about 30 percent of its population are not connected to the state's road and ferry system. Throughout Alaska, mountains, glaciers, fjords, vast wetlands, physical expansiveness, and land status make road construction and maintenance difficult and expensive. In some cases, the reason is cultural or attitudinal—many residents value their isolation and would rather not be connected to a statewide road system.

Probably the greatest obstacle to expanding Alaska's surface transportation system is the great distance separating communities. The wilderness that lies between cities and villages is typically dozens, even hundreds, of miles. Other significant obstacles are climate and soil conditions. Alaska's size and the limited expanse of its highway system are perhaps best illustrated by the overlay of Alaska on the continental United States. Figure 2.1 represents Alaska and its existing highway network, comparing the Florida-to-California reach of Alaska's landmass and the short reach of its highways. The map overlay shows the Alaska roadway network in red while the blue lines indicate the highway system in the states over which Alaska has been overlaid. In quantitative terms, there is roughly one square mile of land mass per road mile in the continental United States, while in Alaska there are about 42 square miles of land mass per road mile. While Alaska's low population probably does not warrant nor do Alaskans necessarily desire such an expansive road system, the comparison illustrates the unique nature of Alaska's road system.

> *"Alaska is twice the size of Texas, but its population and road mileage compare more closely with Vermont."*

FIGURE 2.1 HIGHWAY SYSTEM DENSITY—ALASKA AND U.S.



The red lines represent the existing Alaska highway structure. The blue lines indicate the highway system in the states on which Alaska has been overlaid.

Where Alaskans have roads, gravel is the norm.

Even within Anchorage, Alaska's metropolitan hub, roadways vary from six-lane expressways to the most humble gravel and dirt roads. For the vast majority of Alaska's

communities, gravel is more often the reality. There are at least 5,061 miles of gravel roads in Alaska, and less than 4,000 miles of paved roads. Another 3,700 miles of road have not yet been catalogued as gravel or paved. Whereas most Americans expect to drive primarily on pavement—91 percent of America's roads are paved—Alaskans are accustomed to gravel roadways.

Air travel and air freight are much more a part of an Alaskan's daily life than they are for residents of other states.

It is estimated that Alaska has about six times as many private pilots per capita than the rest of the United States. Approximately 1 in 50 Alaskans has an airplane pilot's license. Currently 8,752 pilots reside in Alaska, and 3,776 of these have a private pilot certificate. Based on its population, the average Alaskan is sixteen times more likely to own an aircraft than the average American citizen. On a per capita basis, Alaskan residents take many more trips by air than other Americans. On average, Americans take two trips by air each year while Alaskans fly nine times each year. In all of the United States, there are 570 commercial service airports with 2,500 or more annual enplanements (fare-paying passenger boardings). Of these airports 84, or fourteen percent of America's total, are in Alaska. Aside from commercial airports, there are 1,112 designated airports/seaplane bases/aircraft landing areas in the state of Alaska and over 3,000 airstrips, many of which are private and not maintained on a regular basis.

Mark Skok, Anchorage Airport System
Department of Community and Economic Development

Ted Stevens Anchorage International Airport

There are 285 publicly owned airports in Alaska, varying from large international airports in Anchorage and Fairbanks to gravel landing strips in the remote areas. Many of these facilities are vital to communities that depend on state-operated airport facilities for basic travel and freight transport, and for economic vitality. Of the total 285 publicly owned airports, 24 are operated by municipal governments and 261 are state-run. Of the 261 state-owned and operated airports, 41 are for seaplanes, 43 are paved, and 177 are gravel.

The Ted Stevens Anchorage International Airport has been first in the United States for tons of freight landed since the early 1990s. On the other extreme, many villages that have only the most modest roads and few vehicles have a developed landing strip and are dependent on air freight to move goods that would elsewhere move by truck or rail. Examples of these goods include furniture, fuel, and groceries. The U.S. Postal Service's unique bypass mail system (described at the conclusion of this chapter) results in most groceries and household supplies moving into Alaska's smaller communities by air.

Ports and harbors within coastal and riverine communities are an integral part of the transportation network.

The State owns 76 port and harbor facilities in 48 different locations around the state, mostly in Alaska's southeastern and southcentral regions. Ports are involved in the transport of forest products, oil and bulk petroleum, coal, seafood, general cargo and consumer goods. Harbors are an integral part of most coastal communities, influencing a community's culture, economy, and identity. Although there is an immediate need for 3,500 additional boat slips across Alaska, funding is lacking to make all of these improvements. There is an opportunity to attract federal dollars for Alaska's navigation improvement projects by providing match and technical support to communities. How-

ever, current appropriations will support studies and improvements only at Akutan, Anchorage, Chignik, Ketchikan, False Pass, King Cove, Larson Bay, Nome, Ouzinkie, Perryville, Pelican, Port Lions, Seward, Sitka, St. Paul, St. George, Sand Point, Unalakleet and Unalaska. Alaska's existing harbor facilities are becoming substandard and need deferred maintenance funding. More than 40 percent of the department's harbors could be transferred to local ownership with additional appropriations for that purpose. Transferring facilities to local ownership is an important way to minimize costs.

Most goods shipped to and from Alaska move by way of intermodal transportation systems.

The relative lack of roads means that travel and freight movement by air and water are significantly more important in Alaska than in the United States as a whole. It also means that a high portion of trips taken within the state and between Alaska and destinations outside use more than one mode, and that intermodal transportation connections and facilities are used by a greater percentage of the population and commerce moving in the state.

> *"Given its unique characteristics, Alaska's solutions to its transportation needs have been and always will be "intermodal"—involving more than one mode."*

Heavy or bulky commodities that would normally move by truck or especially by rail elsewhere like heavy equipment, gravel, and other building materials are more likely to move by barge than by air in the remote areas in Alaska, wherever seasonal barge service is available.

Most of the food, household items, and consumer goods that are shipped from the continental United States to Alaska begin their journey from the manufacturing plant or distribution facility on trucks destined for ports in either Tacoma or Seattle, Washington. At these ports they are loaded aboard a container ship, barge, or roll-on, roll-off vessel which sail to Alaska ports. If the freight is bound for a community connected to the highway system, the freight often completes its journey in trucks. Freight is also transported north or south from the Anchorage Port via the Alaska Railroad. Freight destined for towns off the road system is flown from either Anchorage or Fairbanks to a hub remote community. Then it is either driven by pickup truck if there is a regional road system or loaded onto smaller aircraft or boats for shipment to outlying villages. Quite often in remote areas, freight makes the final leg of the journey in sleds pulled by snow machines or on four-wheelers.

An example of the intermodal nature of Alaska's freight transportation system is how heating oil is supplied to communities along the Yukon River. First, the crude oil is recovered from oil fields near the Arctic Ocean, and then pumped 450 miles in the Trans-Alaska Pipeline to a refinery near Fairbanks. The refined product is trucked 60 miles to Nenana, the nearest port on the Tanana River, a tributary of the Yukon River, loaded on shallow-draft river barges, and pushed by tug boat 100 to 300 miles up or down the Yukon River to its destination. This final journey can only be made between May and September when the rivers are free of ice.

Given its unique characteristics, Alaska's solutions to its transportation needs have been and always will be "intermodal"—involving more than one mode. By looking to improve its current intermodal transportation network, the department continues to pursue its goal of making its system more efficient and productive.

Alaska's transportation system tends to be characterized by long-distance movements, relatively low volumes, and flow imbalances.

The typical shipment of freight to a remote area in Alaska involves a 1,500 to 2,000 mile movement to Anchorage and an additional 250 to 750 mile trip from there. The fact that the shelf price of goods in Anchorage and Fairbanks is not significantly higher than in the Pacific Northwest is testimony to the efficiency of the container and roll-on, roll-off service into Alaska.

Flow imbalances tend to produce low back-haul volumes that increase the cost of bringing goods into Alaska. The mix of commodities—export of bulk resource materials versus import of manufactured goods and food—is such that a single type of ship or railcar cannot handle both the freight coming in and the freight leaving the state. When they can, however, the benefits are high. This can be seen in the case of one marine shipping company, Alaska Marine Lines, that is a primary supplier of general freight to Alaska from the Seattle area. The company backhauls quantities of fish, but this fills only ten percent of the containers that are brought north. Fish processors that ship fish south benefit by receiving high frequency and quality of service, and lower costs, that would not be possible without the northbound volume.

In addition to the problem of backhauling, since Alaska's communities are small markets and are often only accessible via small vehicles, goods brought into the state have to be separated into smaller shipments at a hub community. These factors have impeded the development of a modern, efficient cargo transport infrastructure in most areas of Alaska. Low volumes mean that in many locations only basic freight-handling facilities are available. These basic facilities, in turn, limit the number of transportation modes available to consumers. Moreover, low volumes perpetuate policies that support a single-mode system, as it is not cost effective to build and operate multiple modes.

These characteristics, compounded by the high cost of construction in many parts of the state, mean that investments in transportation infrastructure must be made judiciously. Significant investment in one mode will often preclude or curtail investment in other modes.

Photo by Mark Wayne, Department of Community and Economic Development

Cruiseship at Juneau

Summer passenger traffic in Alaska has grown rapidly, primarily as a result of cruise-ship-based tourism.

Passenger movement through Alaska's ports has grown significantly over the past decade. The number of passengers has been most influenced by out-of-state visitors arriving by ship and air. They helped create a phenomenal twelve percent rate of growth in the number of visitors in 1993 and 1994. This number slowed to a still rapid rate of six percent from 1994 to 1996 and then to three percent in 1997, to a low of 1.3 percent in 1998, before rising again to three percent in 1999. The total number of visitors to the state, arriving by all modes, more than doubled from over 600,000 in 1990 to over 1.4 million in 1999. Of this number 85 percent, 1.2 million, visited between May and September. Of these summer visitors, 72 percent were on vacation, 10 percent were business travelers, seven percent were combining business and pleasure, and eleven percent were visiting friends.

Summertime congestion, particularly on the few two-lane highways leading into Alaska's recreational areas, has become a regular summer feature. As the visitor industry has made increasing gains as a major sector of Alaska's economy, transportation issues have come to the forefront of public debate on how to accommodate the million-plus people that are welcomed each year into the Great Land.

Public transit in Alaska, like the rest of the transportation system, is in its developmental stage.

At present, two-thirds of Alaska's residents—about 375,000 people—have access to a form of public transportation. Public transportation is of four types in Alaska. Metropolitan area transportation is the classic urban bus system found in cities with populations of

50,000 or more, represented in Alaska by Anchorage. Rural and non-urbanized transit systems are similar but serve communities under 50,000. In Alaska this includes Fairbanks, Juneau, Ketchikan, Barrow, Kodiak, Metlakatla, Kenai-Soldotna, and the Matanuska-Susitna Valley. The third type is specialized transportation services often operated by non-profit human service agencies; they often consist of vehicles used for such programs as meals-on-wheels. These services are found in virtually all Alaska communities except the smallest. Inter-city buses are the fourth kind of public transportation. They provide transportation between cities in Southcentral Alaska and along the Glenn Highway and Alaska Highway across Canada to Skagway.

Fully 60 percent of Alaska's population live in three major cities and 71 percent live in cities with populations exceeding 2,500. Bus transit plays a key role in reducing traffic congestion that can be severe in these cities, improving air quality that is a long-standing problem for Anchorage and Fairbanks, and providing mobility for residents and visitors. Many residents, including the elderly, people with disabilities, and those who are too young to drive, find it very difficult to use or maintain a private auto, especially in the winter. Visitors to cities, whether from outlying villages or other states, find public transportation a valuable service when they come to town. Alaska transit systems are placing a new emphasis on integrating their service with the needs of bicyclists by installing bike racks. The Fairbanks Metropolitan Area Commuter (MAC) system was the first to equip its buses with bike racks in 1997; the Anchorage People Mover system followed later that year, and Capital Transit in Juneau added bike racks in 1998.

Department of Transportation and Public Facilities

Bicycling on an Anchorage pathway

Like the rest of the nation, Alaska is playing catch-up to make up for past years' omission of bikeways and walkways along our public roadways.

As Alaska's population grew over the years, previously quiet country roads became mall-lined, high traffic thoroughfares without provisions for pedestrians or bicyclists. Travel by vehicle became the norm, while walking or commuting by bicycles became known as "alternative" means of transportation. Alaska, along with the country as a whole, became an automobile-dependent culture. As new housing was constructed, sidewalks were often eliminated from their planned location along subdivision roads to cut costs.

Only recently have communities begun to demand safe places to walk and ride bikes. A large number of pedestrians and bicyclists are school children walking between home and school. Over the past decade, state and local governments have made significant investments in pathways, bike lanes, wide shoulders and other provisions that improve conditions for bicyclists and pedestrians. The department has constructed over 70 miles of new pathways and anticipates constructing more. The department's program to upgrade the National Highway System (NHS) routes to current standards has resulted in the addition of wide paved shoulders to over 100 miles of highway in the state. Wide paved shoulders on highways benefit not only motorists, but offer long distance bicyclists a safe place to ride without impeding other traffic. This refocused effort on bicycles and pedestrians should yield a safer and more balanced transportation system.

overview

NETWORK ANALYSIS OVERVIEW

The following sections of this chapter present a description of the Alaska transportation network and its inter-relationships with the population and the economy. It is derived in part from ***Transportation Systems Planning for Alaska*** by John T. Gray and represents an update to the 1994 ***Alaska Intermodal Transportation Plan*** published by the department. This section's focus is principally Alaska's intercity freight and passenger transportation systems, that is, the connections between cities, rather than its intracity movements and facilities.

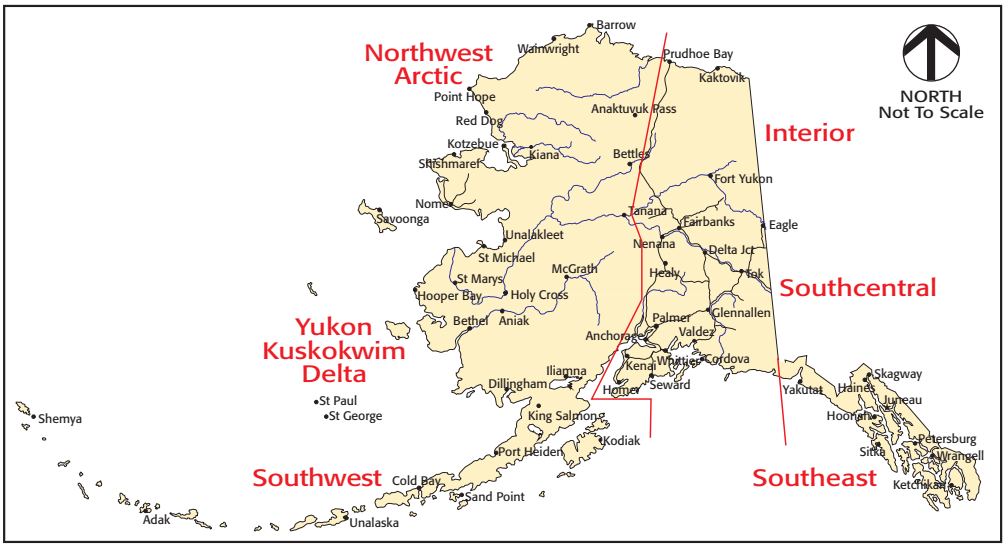
For the purposes of this overview, we divide the state into three major regions: **Southeast, Southcentral-Interior,** and the **Southwestern, Yukon-Kuskokwim Delta, and Northwest Arctic Alaska area.** Figure 2.2 provides a general diagram of the three regions. Each of these has developed a transportation system that in structure is closely identified with its particular geography, population, economy, and resources.

Southeast Alaska's network is primarily oriented toward the forest products, tourism, mining, and fishing industries.

Southcentral-Interior Alaska's network is more typical of a developed economy, as it has a wider variety of influences on the demand for transportation. This region's transportation network needs to accommodate oil and mineral resource development, tourism, wholesale and retail trade, and the service, fishing, and forest products industries.

The Southwestern, Yukon-Kuskokwim Delta, and Northwest Arctic Alaska area's network is oriented toward supporting a subsistence life-style as well as mining and fisheries.

FIGURE 2.2 MAJOR ALASKA TRANSPORTATION REGIONS



For purposes of this document, the southeast Alaska region extends from Yakutat on the Gulf of Alaska to Metlakatla, on Annette Island within the Alexander Archipelago, commonly known as Alaska's "panhandle."

overview SOUTHEAST ALASKA

For fifty years, the principal influence on the southeastern freight transportation system has been the recovery, processing, and exportation of forest products. Commercial fishing also has played an important role in the region. In the past dozen years, the rapid growth of tourism, particularly visitors touring on cruise ships, has added diversity to the regional economy. Several population centers of modest size have developed, and few of these are connected by overland transport. Virtually all freight and passenger movement within the region is by water and air. With the exception of Hyder, Haines and Skagway, none of the larger communities is connected by road to the mainland highway system. In fact, Juneau is the only state capital in the continental United States connected to the rest of the state by marine highway service, rather than by overland transportation. Freight moves primarily by marine transport. Intra-regional passenger trips are taken by air and on the department's Alaska Marine Highway System (AMHS) ferries. Excluding tourist cruise ship travel, passenger trips to points outside the region are made predominantly by air.

WATERBORNE TRANSPORT

Several ports in the region—Ketchikan, Juneau, Petersburg, Sitka, Haines, and Skagway—have annual marine freight traffic volumes typically in excess of 100,000 tons. Wrangell and Metlakatla are secondary ports. Of the major ports only Juneau, Haines and Skagway are not dominated by forest products.

Photo by R. Hood, Department of Community and Economic Development

Cruiseship in Southeast waters

In Southeast Alaska the number of visitors arriving by cruise ship more than tripled between 1985 and 1999, from about 162,000 to 457,000. In recent years the annual growth rate has been accelerating due to the larger vessels brought on-line since 1996. The carrying capacity of cruise ships increased ten percent in 1997 from 27,145 to 29,748. This translates into increased visitors as cruise lines are compelled to fill the ships to cover the large fixed costs associated with new, larger vessels. Spring arrivals have increased as cruise tour companies begin the Alaska season earlier, in May and even April, to offset low demand in the Caribbean. Alaska's summer season is now described as the 150 days extending from May through September. Some communities in the region, Ketchikan and Juneau in particular, are receiving virtually all ships that sail the Inside Passage. Other ports, such as Skagway and Haines, capture a lesser, but growing percentage of ships. Sitka, being located outside of the Inside Passage, has experienced a decline in number of visits in recent years, following a 1996 peak in cruise visitor numbers.

Southeast Alaska has two distinct cruise patterns, which combined represent 97 percent of the cruise passengers visiting Alaska. One is a seven-day round trip from Vancouver that visits the ports of Ketchikan, Juneau, Sitka, Skagway, Glacier Bay, and other stops in Southeast. Some ships disembark and embark up to 30 percent of their passengers in Skagway. Those individuals are either completing a land tour or starting a land tour. The second pattern is a seven-day, one-way trip from Vancouver, through Southeast Alaska, across the Gulf of Alaska to Seward and back to Vancouver. All passengers disembark in Seward and the ship embarks with all new passengers on its return. Just three percent of the cruise passengers are on alternative routes, mostly on small ships.

The number of stops a vessel makes in Alaska and the specific ports it calls on reflect the scheduling of port facilities and departure dates from Vancouver, British Columbia, Canada as well as the tides in certain narrows. Vessels leave from Vancouver, rather than U.S.

ports, because most ships are built overseas and the Passenger Vessel Act allows only U.S.-built ships to carry passengers or freight between two U.S. ports. One smaller, 200-plus-passenger, American-made vessel began service from Seattle to Southeast in 1999.

PORTS

Ketchikan—1999 City/Borough population 13,961. Ketchikan is among the largest of the region's ports. Until the closure in 1997 of the Ketchikan Pulp Company, located at Ward's Cove north of Ketchikan, the port annually handled approximately 1.8 million tons of materials, primarily timber products but also petroleum, fish, and general freight.

The pulp plant closure eliminated the import of 550,000 tons of logs and the export of an equal amount of pulp and timber products. Gateway Forest Products purchased the sawmill portion of the Ketchikan Pulp Company in November 1999. In November and December of 1999 it reported movement of wood products totaling 22.8 million board feet. Of this total, 13.6 million board feet was in the form of logs, 4.2 million board feet was lumber, and 4.9 million board feet (equivalent) was chips. Several efforts have been made to restart operations at the closed pulp mill. Alaska Forest Products began operations in Wards Cove in August 2000, potentially increasing timber volumes in this port area.

Much timber, however, in the Ketchikan region does not visit a port. Rather it is loaded on barges near harvest areas. The Sealaska Timber Corporation (STC), a major Southeast timber operator, is presently loading from several temporary docks near harvest areas. STC, however, is evaluating the feasibility of building a central sorting and shipping facility to create more efficiency, as well as other possibilities, such as a veneer or ethanol plant. STC harvested 115 million board feet in 1999, down from 150 million a few years ago. Logs and lumber generally move directly to the Far East by break-bulk shipment.

The port receives about 232,000 tons of petroleum products and redistributes about 192,200 tons; the remainder is consumed locally. Most fuel distributed in Southeast Alaska is redistributed out of Ketchikan. The bulk petroleum comes primarily from U.S. refineries on the West Coast and typically arrives in 40,000 barrel-capacity petroleum barges. Ketchikan has three petroleum distributors: Petro Alaska, Petro Marine Services, and Anderes Oil.

Most general freight, consisting primarily of consumer goods, arrives at the port in containers brought north on barges from Seattle. Some freight moves on AMHS ferries. Major barge lines include Alaska Marine Lines, Northland, and Boyer Alaska Barge Lines. Most general freight moving to Alaska is containerized, most often in 20 foot length units that hold a maximum of 25 tons (ten tons is an approximate average). The number of containers moving through Ketchikan numbers about 22,500 for 1999. Of these, a total of 12,200 were northbound, 9,000 were southbound, and 1,200 were circulating among ports in the region. Processed fish is moved by containers on barges to Seattle for either domestic consumption or onward for shipment to foreign markets. In 1999, 10,451 tons of seafood were shipped from Ketchikan. The port includes a shipyard that is used for repairs to Alaska Marine Highway System vessels and offshore fish processors.

Over the past decade, Ketchikan has seen summer cruise-ship traffic increase dramatically from the occasional summer ship. In 1996, 26 ships made 366 stops with 425,104 passengers. These numbers increased to 32 ships making 452 stops with 565,005 passengers in 1999. In 2000 the first of 38 vessels arrived on April 11 and the last departed in September, expanding the "summer" season to nearly six months. See Figures 2.3 through 2.6, which portray barge service, Far East shipping, Inter-Alaska and West Coast shipping, and cruise line routes, respectively.

"Most general freight moving to Alaska is containerized."

FIGURE 2.3 ALASKA MARINE SYSTEM BARGE SERVICE

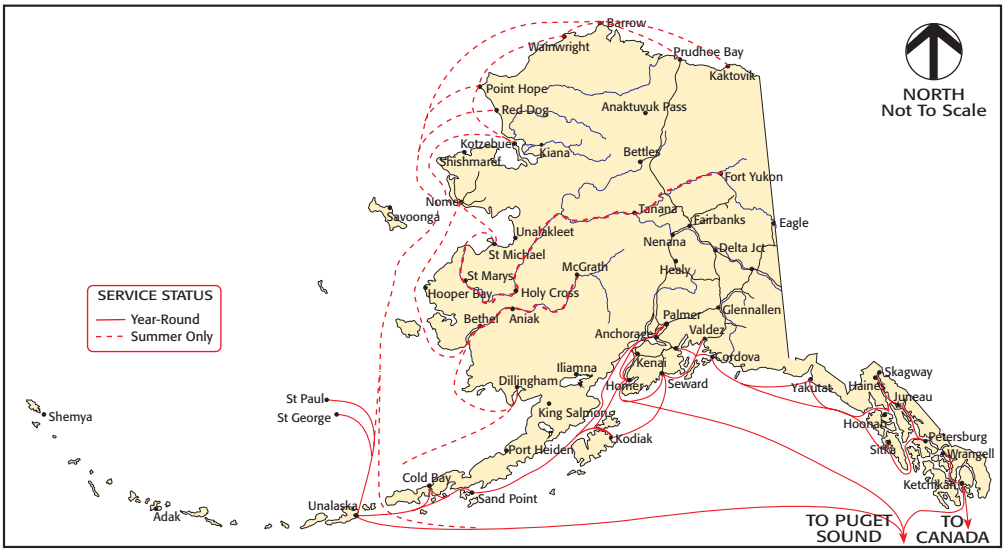


FIGURE 2.4 ALASKA MARINE SYSTEM FAR EAST SHIPPING (excluding barges)

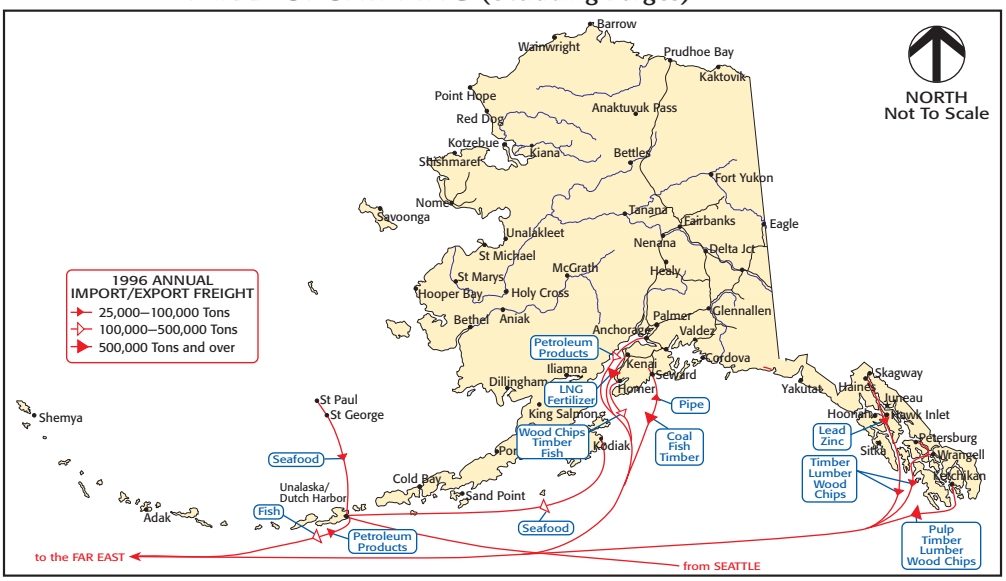


FIGURE 2.5 ALASKA MARINE SYSTEM INTER-ALASKA & WEST COAST SHIPPING (excluding barges)

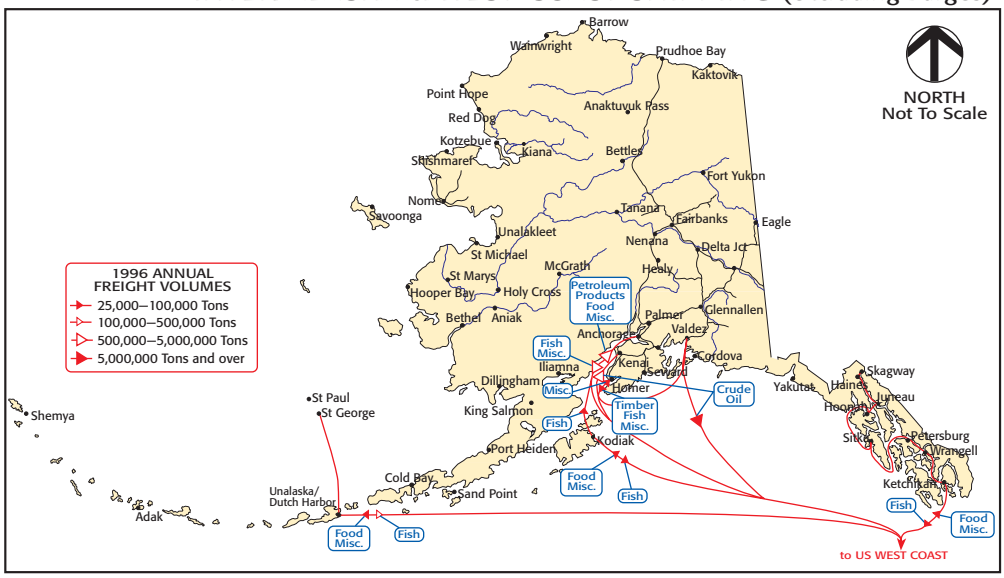
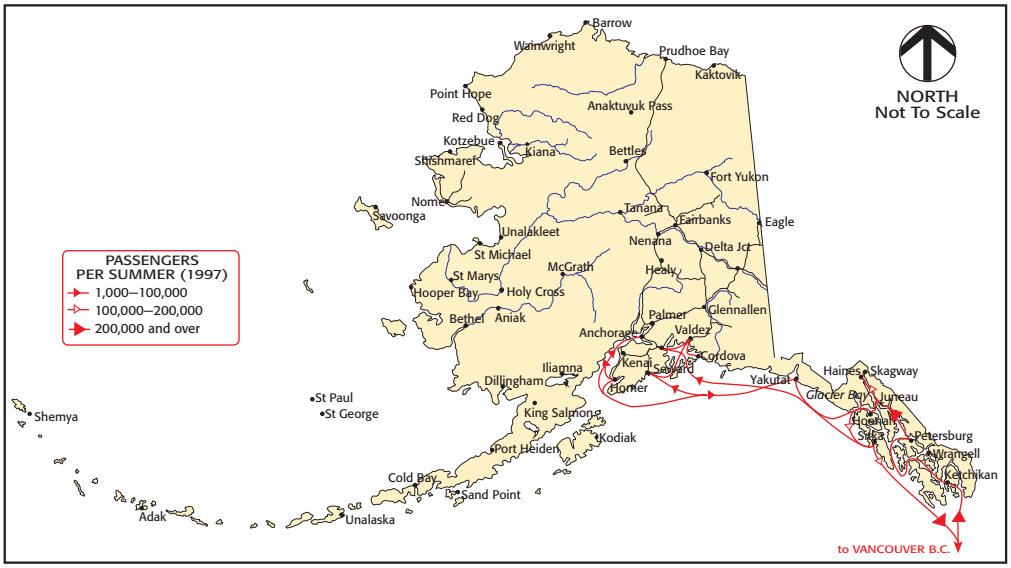


FIGURE 2.6 CRUISE LINE ROUTES IN ALASKA



Sitka—1999 City/Borough population 8,681. Until 1993, Sitka's freight movements were essentially a scaled-down (one-third) version of Ketchikan's. With the closure of the Alaska Pulp Corporation mill in Sitka in 1993, imports and exports associated with the pulp industry ceased. About 8,727 tons of fish and shellfish were handled through the port of Sitka in 1999. There are two petroleum distributors in Sitka—Petro Marine Services and Sitka Fuels. The local demand for petroleum products is about 24,800 tons per year.

Cruise ship traffic through Sitka, unlike the other large ports in the region, declined in the 1990s. In 1996 the passenger count was 252,256, but declined in 1977 to 183,582 and in 1998 declined again to 161,351. The number rebounded somewhat in 1999 to 168,024. The decline occurred in part because Sitka is outside the Inside Passage, somewhat more difficult to access, and was displaced on cruise ship itineraries by more accessible destinations such as Glacier Bay National Park.

Juneau—1999 City/Borough population 30,189. Because Juneau's economy is based on government and tourism, the port's main purpose is to accept petroleum and general freight, primarily consumer goods, and to accommodate cruise ships and local-based excursions during the summer season. Petroleum arrives via tankers and barges from Alaska sources, Nikiski and Valdez, and from West Coast suppliers. Petroleum suppliers receive a small portion of their petroleum product from West Coast suppliers due to winter weather conditions in the Gulf of Alaska that prohibit the safe passage of barges and tankers. Petro Marine Services, Delta Western, and Taku Oil Sales serve Juneau; local demand is about 102,300 tons annually.

Photo by Rex Melton, Department of Community and Economic Development

Cruiseship docked at Juneau

Most other non-petroleum commodities are brought north by container barges from distributors on the West Coast. Time-sensitive goods such as groceries move by air or on the AMHS because of their faster rate of travel.

Juneau was founded because of its mineral reserves, and mining remains important in the region. The Alaska Juneau Mine, immediately south of Juneau, operated as a world-class mine through the early part of the century until it closed during World War II. Attempts to re-permit and open it in the 1990s failed. However, in 1997 Kennecott re-opened the Greens Creek mine on Admiralty Island, eighteen miles west of Juneau. In 1999 the mine shipped 160,000 tons of metal concentrates—silver, zinc, lead, and gold—up from 120,000 tons in 1996. In 1999 it received 18,000 tons of petroleum products and 17,000 tons of general freight, primarily materials and supplies. The Greens Creek Mine in 1999 was the largest silver producing mine in North America and the largest private employer in Juneau with 265 employees. Another mining company, Coeur Alaska, is currently working on opening the Kensington mine, located between Juneau and Haines. Coeur is continuing to study the optimization of the Kensington Mine and to apply for permit modifications that relate to the changing plan of operations previously approved. A skeleton crew is at work on site. The Kensington Mine has had recent reserve estimates indicating at least 11.5 million tons grading 0.143 ounce/ton of gold yielding approximately 1.6 million ounces. The Jualin Mine nearby has reserve estimates at 1.07 million tons of 0.349 ounce/ton of gold Together these properties approximate 2 million ounces of gold.

In 1999, Juneau hosted 39 ships making 565 stops with 595,959 passengers during its five-month season. This was nearly 28 percent above the 464,484 passengers that visited Juneau in 1997. The growth in the number of ships, port calls, and passengers has been fast and steady. However, in 1999, Juneau residents, by a 70 percent vote, passed a $5 "head tax" on each cruise passenger visiting Juneau to pay for public services used

by visitors, including sewer, water, and safety. This fee has not reduced the number of cruise ship visits in Juneau.

Skagway—1999 population 825. Skagway is influenced by factors that make this destination unique in Alaska. As the primary port for the Yukon Territory, the demand for its service has little relationship to Alaska conditions. Ore from the mine at Faro, Yukon dominated the freight handled at Skagway until the mine closed in 1997 due to low metal prices. As much as 600,000 tons was trucked from the mine to Skagway's port each year when it was operating. With mineral prices remaining low there is little or no expectation that it will reopen soon. Since the Klondike Highway has other industrial users, the department expects to continue to provide the same level of road maintenance between Skagway and Whitehorse as it did while the mine was operating.

Skagway's local consumption needs are satisfied by container-barges, freight brought by the AMHS, and by petroleum barges. With ore no longer being shipped from Skagway, petroleum products are now the largest commodity handled, with 114,700 tons handled in 1999. Of this sum, 12,400 tons is sold to the Alaska Marine Highway System and about 100,000 tons is "exported" by the sole distributor, Petro Marine Services, to Whitehorse for redistribution throughout the Yukon Territory. A petroleum pipeline from Skagway to Whitehorse ceased operation in October, 1994, and petroleum products are now trucked between the communities. Local consumption of petroleum products totals about 3,100 tons each year.

Historically, Skagway has seen some of Alaska's most varied and interesting freight movement. Before completion of the Klondike Highway in 1978, the White Pass & Yukon Route Railway (WP&YRR) handled freight to and from the Yukon Territory. In addition to handling ore from Faro (that had been trucked from the mine to Whitehorse and loaded on the railroad there), consumer goods, building materials, and other northbound goods were brought to Skagway by White Pass container ships. The containers were loaded on the WP&YRR at the port of Skagway for shipment to Whitehorse in an early, small-scale example of intermodal container movement. Alaska Marine Lines now provides twice-weekly container-barge service. Containers are taken from Skagway to Whitehorse and other Yukon points via the Klondike Highway.

Growth in cruise ship arrivals has been strong. In 1999 Skagway hosted 514,940 cruise ship visitors, 92 percent more than its 268,443 visitors in 1996. Skagway offers destination activities in the form of the Klondike Gold Rush National Historic Park and the White Pass & Yukon Route Railway.

Department of Transportation and Public Facilities

Unloading freight in Haines

Petersburg—1999 population 3,415. Petersburg is the largest seafood processing center of the region, producing 47,730 tons of this commodity in 1999. Seafood moves by container-barge and the Alaska Marine Highway System to Seattle. Local demand for petroleum products is about 15,500 tons. Petro Marine Services is the sole distributor, having purchased Alaska Fuel Sales in 1999. The port also ships a limited amount of lumber.

Other Ports. Wrangell, Metlakatla, Hoonah, Haines and Klawock are timber ports. The only significant quantities of any commodities moving through these ports are inbound rafted logs and outbound logs and forest products. Export of these products is almost entirely to the Far East via break-bulk shipping. All of the communities noted above receive petroleum and supplies mostly by barge from Ketchikan. For consumer and construction-type commodities, Wrangell and Haines are served both by container barges and the AMHS, while Metlakatla is served by the AMHS. Haines, through its two distributors, Petro Marine Services and Totem Oil, locally imports about 16,000 tons of petroleum products annually. Totem Oil then exports about 10,000 tons to the Yukon Territory by truck.

With a population of only 1,775 (1999), Haines hosted 95,988 passengers in 1996 and 159,734 in 1999. The Haines cruise ship industry rapidly grew in the 1990's until in 2000 the borough initiated a four percent tour tax on excursions in the Haines Borough. This borough tax was just one of the economic factors that influenced the cruise line Royal Caribbean to cease its stops in Haines. Wrangell also has had some cruise ship activity, but the numbers are relatively small and vary widely from a high of 24,426 in 1996 to a low of 8,347 in 1997. The passenger count for 1999 was 11,987.

On Prince of Wales Island, logs are no longer shipped from multiple small ports but are trucked over the road system to a central loading dock near Klawock then barged to Ketchikan. The amount of lumber moving from the island is declining: the Klawock Island Dock Company shipped 52 million board feet of timber in 1996 but just ten million board feet in 1999.

There are numerous smaller ports in the region that are primarily engaged in the shipment of logs or fish. Most are served by feeder barges from the larger centers, although occasionally a mainline container barge will call at one of them for a major shipment. Collectively, they have an annual throughput of about 1.0 to 1.5 million tons, with log movements constituting 90 percent of this amount.

Petroleum products are distributed widely to small port communities including Craig (18,600 tons), Angoon (3,000 tons), Hoonah (6,000 tons), Pelican (2,000 tons), Elfin Cove (1,000 tons), Gustavus (1,500 tons), Kake (3,000 tons), Kasaan (775 tons), Metlakatla (3,000 tons), and Wrangell (12,000 tons).

In 1999 SeaCal, a subsidiary of Sealaska, began test production of high-grade calcium carbonate, suitable for high-quality paper coatings and paint, at its Calder Mine on Prince of Wales Island. As of 2000, no product had been shipped as the company is in the process of developing its markets.

Department of Community and Economic Development

M/V Aurora near Ketchikan

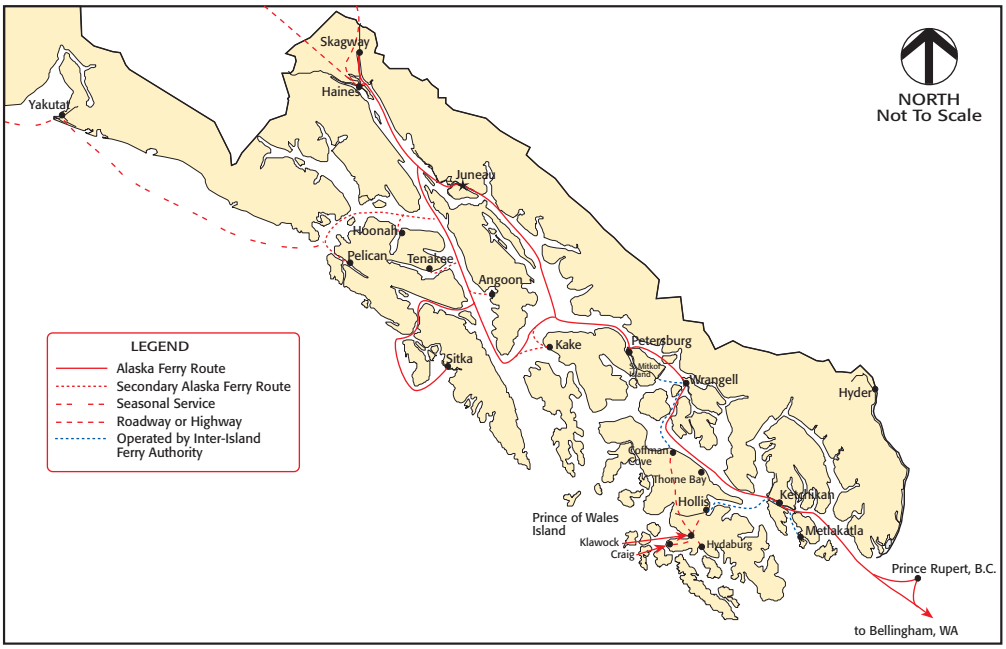
SOUTHEAST ALASKA MARINE HIGHWAY SYSTEM

Tying together the entire region is the Alaska Marine Highway System (AMHS). Owned by the state and operated as part of the department's Southeast Region, the mainline vessels of the fleet serve all of the eight major ports mentioned above. The smaller feeder vessels of the outport fleet serve Metlakatla and seven smaller Southeast communities. The mainline routes also extend south to Prince Rupert, British Columbia, and Bellingham, Washington. During the summer, the vessel M/V Kennicott makes once a month trips from Juneau to Valdez and Seward with a whistle-stop in Yakutat.

The AMHS fleet consists of eight ships ranging in length from 193 to 418 feet. These vessels range from the M/V Aurora, the smallest vessel serving Southeast, that can transport 250 passengers and 34 vehicles, to the largest vessel in the fleet, the M/V Columbia, which can carry 625 passengers and 134 vehicles. A new ocean-class vessel, the M/V Kennicott, beginning service in mid-1998, has the capacity to carry almost 750 passengers for Southeast Alaska service, or 500 passengers for Gulf of Alaska service, as well as 120 cars/vans.

Traffic on the system is primarily passenger and private vehicle, although commercial van freight is also moved from Bellingham and Prince Rupert to various Southeast Alaska locations. Mainline service includes weekly departures from Bellingham. Prince Rupert service operates twice per week during the winter and makes six calls a week during the summer season. Metlakatla, Kake, Angoon, Tenakee Springs, Pelican, Hoonah, and Hyder are connected to the mainline by AMHS feeder vessels. As a result of ramp upgrades, Hoonah, Hollis, and Kake are also served by the M/V Taku as well as the smaller feeder vessels serving the outport communities. Using the smaller AMHS ferries, most

FIGURE 2.7 ALASKA MARINE HIGHWAY SOUTHEAST FERRY ROUTES



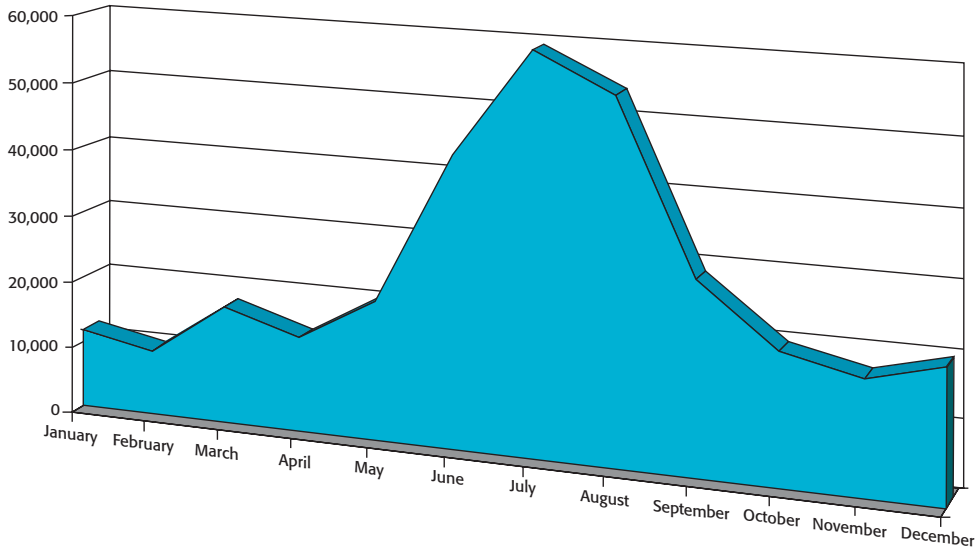
feeder service is provided once or twice per week, depending on the season. See Figure 2.7 for the Alaska Marine Highway Southeast ferry routes.

Four Prince of Wales Island communities (Thorne Bay, Coffman Cove, Craig, and Klawock), along with the cities of Petersburg and Wrangell, formed a new Inter-Island Ferry Authority (IFA) in February, 1997. This public port authority was established under the Municipal Port Authority Act. The IFA is using federal transit funds to design, construct and operate a new passenger and vehicle ferry between Hollis and Ketchikan. Negotiated use agreements with the AMHS will allow the IFA to use terminals already in place on Prince of Wales Island and Ketchikan. Service is currently expected to be in place in late 2001. Once IFA service begins, the AMHS will discontinue its Hollis-Ketchikan service. The second phase of IFA development calls for a second vessel to service Coffman Cove, Petersburg, and Wrangell.

Over the decade from 1988 to 1998 the number of passengers on the marine highway routes in Southeast Alaska declined from about 400,000 to about 350,000. However, the number increased again in 1999 to 376,229. This increase is attributed to increased marketing in Alaska and the Yukon Territory. The decline in the '90s was attributed in part to increased availability of low-cost cruise options, reduced marketing of AMHS, and limited vessel capacity. The summer (May through September) count of 252,592, or about 50,000 per month, is about three times the off-season (October through April) count of about 15,000 per month. In 1999 the total number of vehicles carried by the AMHS in southeast was 106,188, of which 68,674 were in the five summer months. The lower winter traffic numbers can be attributed in part to reduced weeks of service when most of the vessels undergo lengthy refurbishment. Figure 2.8 shows the number and distribution of passengers over the year in 1999.

With an average fleet age of 24 years, including the almost new M/V Kennicott, AMHS management is actively planning long-term fleet replacement and refurbishment options. Recently, the state has proposed to add four new high-speed ferries to the system. One vessel is expected to begin service in the winter of 2003/2004; the next ferry will be delivered the following year, and the final two ferries will come on line in subsequent years if a $70 million bond proposal is approved by voters and the Alaska Legislature in 2002. The ferries will travel twice as fast and twice as often as existing vessels, cutting the travel time from Juneau to Sitka from nine to five hours, for example.

FIGURE 2.8 ALASKA MARINE HIGHWAY SYSTEM SOUTHEAST PASSENGER COUNT, 1999. Includes the ports of: Angoon, Bellingham/Seattle, Haines, Hoonah, Hyder, Juneau, Kake, Ketchikan, Metlakatla, Pelican, Petersburg, Prince Rupert, Sitka, Skagway, Tenakee, and Wrangell.



AIR TRANSPORT

Air service is the primary means for transporting people to Alaska and within Alaska. Juneau, with its significant population and concentration of government offices, is the hub of air transportation in Southeast Alaska. In the region, airports capable of handling jet aircraft up to the size of a Boeing 727 or 737 are also located in Ketchikan, Petersburg, Sitka, Wrangell, and Yakutat. Each of these communities is served by daily jet service, with flights stopping at a combination of points between Anchorage and Seattle.

The Juneau Airport in 1999 had 153,010 flight operations (air carrier, air taxi, and general aviation landings and departures). Of these 95,191 were in the tourist season months of May through September. Figure 2.9 and Table 2.1 show the number of enplanements (fare-paying passenger boardings) at Southeast Alaska airports that boarded 5,000 or more passengers in 1999. Juneau, as is typical of large airports, has both air carrier and air taxi service.

FIGURE 2.9 ENPLANEMENTS IN SOUTHEAST ALASKA, 1999

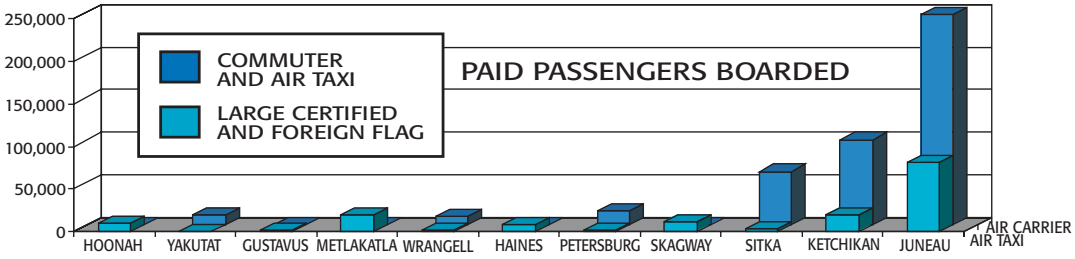


TABLE 2.1 ENPLANEMENTS IN SOUTHEAST ALASKA, 1999

	Hoonah	Yakutat	Gustavus	Metlakatla	Wrangell	Haines	Petersburg	Skagway	Sitka	Ketchikan	Juneau
Air Taxi	10,174	91	1,653	19,888	1,372	8,624	2,469	11,201	2,999	19,229	81,779
Air Carrier	0	11,874	0	0	9,747	0	16,058	0	62,663	99,907	245,618

In Juneau and Ketchikan there is also substantial air traffic from harbor "runways" and helipads outside the primary airport. There were 65,100 flight operations in 1999 from the harbor adjacent to downtown Juneau, including 20,000 air taxi, 45,000 general aviation, and 100 military operations. Ketchikan recorded 88,000 operations, several times the 16,208 operations of its primary airport. Of all Ketchikan flights, 85 percent are air taxi-based. In addition to extensive floatplane use in Southeast Alaska, helicopter use is growing. Almost all helicopter passengers are on flight-seeing tours organized by private tour companies.

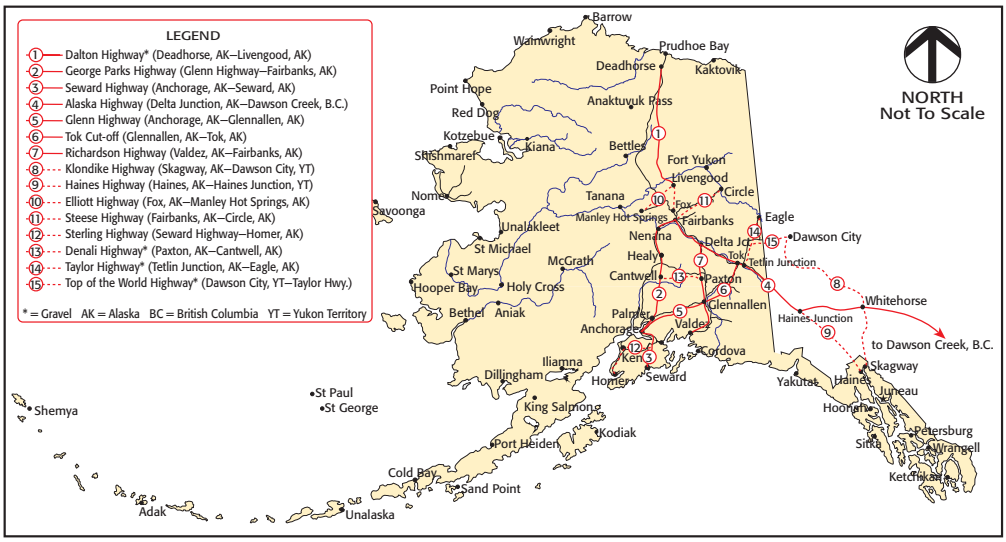
Although most seafood that is caught and canned or frozen is shipped by barge to the Orient or to the continental 48 states, fresh fish is shipped by air. The demand for fresh fish has been growing both in the United States and Asia and increasingly the catch in Southeast Alaska is processed, packed in ice, placed in refrigerated containers, and sent as air freight. If bound for the U.S. the shipment goes to Seattle; if bound for Asia it travels to Anchorage for transfer to westbound air-freight carriers.

LAND TRANSPORT

All highways in the state are shown in Figure 2.10. Highways in the Southeast region are limited in scope, with most representing only local service or logging road networks. Two exceptions are the Haines Highway that runs from Haines 154 miles north to a junction with the Alaska Highway in the Yukon Territory (of which 42 miles are in Alaska), and the Klondike Highway that runs between Skagway and Whitehorse (of which 15 miles are within Alaska). The Klondike Highway parallels the White Pass and Yukon Railway. Access to the Canadian road system is also available from Hyder via a spur of the Cassiar Highway in British Columbia. All land connections to Southeast Alaska require passage through Canada. The largest highway in the region, in terms of volume of traffic, is Egan Drive/Glacier Highway, which extends from downtown Juneau 42 miles north. This highway carried an average annual daily traffic (AADT) count in 1999 of 24,286 at the Lemon Road intersection north of Juneau and 3,996 AADT at the Auke Bay Ferry Terminal.

> *"All land connections to Southeast Alaska require passage through Canada."*

FIGURE 2.10 HIGHWAYS IN ALASKA



The plan for high-speed ferries, noted above, may provide some answers to the longstanding question of whether a road would be built to access the state's capital city of Juneau. By opting for expanded marine service, the state will not pursue a road for the foreseeable future.

HIGHWAYS

Haines Highway. The Haines Highway is a two-lane asphalt road that serves as the primary connection to the Alaska Highway for those arriving from points south on the AMHS. A limited volume of freight is moved via this route. Traffic in the past has peaked when the Klondike Highway has been closed during the winter. In 1999 the AADT on the Haines Highway at the Canadian/U.S. border was 198 vehicles per day but rose to 655 at the Airport Road near Haines. It should be noted, however, that the AADT at the border in the highest month, July, is about eight times the February volume. Vehicle classification data indicate that at the border in 1999, 93 percent of the vehicles consisted of personal vehicles—cars, pickups and motorcycles, 6.1 percent were trucks, and less than one percent were buses.

Klondike Highway. The Alaska portion of the Klondike Highway connects Skagway to Whitehorse and the Alaska Highway. Built in 1978, it is a two-lane, asphalt-surfaced road, which in recent years has been open year-round. The route also connects those arriving from the south on the AMHS ferries to the Alaska Highway near Whitehorse. The Klondike Highway served as the primary route to tidewater for trucks hauling lead-zinc concentrates mined at Faro in the Yukon Territory until 1997 when the mine closed. Average annual daily traffic at the Canadian/U.S. border averaged 531 vehicles per day in 1999. As with the Haines Highway, traffic in the summer is much heavier than in the winter and much heavier near town where there is local traffic.

Department of Community and Economic Development

Klondike Highway

The Klondike Highway was constructed in 1978. In 1986 the state paved the portion of the road within Alaska, approximately fifteen miles, with two inches of asphalt. In an early example of public/private investment, Alaska West Express (a Lynden Inc. subsidiary company) which then hauled ore from the Faro Mine to the port of Skagway paid for an additional inch of paving and for other improvements to support overweight vehicles. For the investment, Alaska West Express can haul ore without a fee for the life of the improvements.

The Haines and Klondike Highways may be influenced in the future more by activities in Canada than in the United States. Recent changes in the Yukon Territory may dramatically increase transportation in the region. In November 1998 the territory received control of oil and gas resources and began to sell oil and gas leases in the geologic region east of Prudhoe Bay and the Arctic National Wildlife Refuge. In addition, about eight to nine percent of the territory's land, now federally controlled, is being turned over to the First Nations as part of Canadian First Nations land claim settlements. The remainder will come under the control of the territory in 2000. In preparation for future development, the Yukon Territory in January 2000 purchased options to buy dock facilities in Haines and waterfront acreage in Skagway.

Prince of Wales Island Roads. On Prince of Wales Island, a two-lane paved road connects Hollis with Craig and Klawock. Gravel roads link those communities with Hydaburg and Thorne Bay. The roads connect all of the island communities and through AMHS service at Hollis to Ketchikan and other communities. Many of the routes on the island were originally constructed to reach timber harvest areas and now comprise a fairly extensive network.

RAILROADS

White Pass and Yukon Route. The White Pass & Yukon Route Railway (WP&YRR) was one of several massive privately funded construction projects to access mineral wealth in Alaska and the Yukon. Completed on July 29, 1900, the 110-mile railroad provided the first link between tidewater at Skagway and the Yukon River and gold fields beyond.

The line was built as a narrow gauge, 3' 0" width rail line (compared to 4' 8" for standard tracks), and features a steep climb from sea level at Skagway to the 2,885 foot summit of White Pass fifteen miles away. After World War II, mining and other development in the Yukon Territory kept the railroad in business.

In the late 1960s the railroad began to haul ore from the Cyprus-Anvil lead-zinc mine at Faro in Yukon Territory. For about twenty years, ore concentrates were trucked from the lead-zinc mine to Whitehorse and transferred to the railroad for shipment to Skagway where it was loaded on ore-carrying ships. The mine closed in 1982 leading to the closure of the railroad as well. When mine operations were restarted in 1986, the Klondike Highway had been completed and the mine used trucks to haul the ore to tidewater. Two years later, however, the railroad resumed operations on the southern section, taking tourists the 40 miles from Skagway to Frasier, British Columbia, and beyond via motorcoach to Whitehorse, Yukon Territory before returning to Skagway. As the number of cruise ships visiting Skagway has increased, so has the railroad's ridership, from 108,000 passengers in 1992 to 258,000 in 1998. To support this growth, in 1999 the company re-acquired five of its original 53' long locomotives that it had sold as surplus in 1992 to a firm in Columbia, South America. With a total of eight engines in its inventory, WP&YRR will be able to pull additional passenger cars and have backup engines in case of mechanical problems.

PUBLIC TRANSPORTATION

The City and Borough of Juneau has fourteen thirty-five foot buses and operates ten buses during peak hours; it has an annual ridership of 850,000. Juneau is also served by a paratransit service, the Southeast Senior Services operated by the Catholic Community Services. This agency provides transportation to persons over the age of 60 and those of all ages with disabilities through fifteen senior centers in several southeast communities. The annual ridership is 64,000.

Department of Transportation and Public Facilities

Juneau Care-A-Van

Ketchikan has a fleet of three thirty-foot buses that provide 186,000 rides per year. During peak hours they operate two buses. Metlakatla initiated a two-bus system in March 2000. One bus operates at a time following a scheduled route through the community of slightly over 1,000 population. Ridership on the new system has grown to over 300 passengers a day, a 100,000 per year rate. Sitka is currently pursuing development of some form of public transit.

Private, inter-city van service presently links the Marine Highway Terminals in Skagway and Haines with Whitehorse, Fairbanks, and Anchorage. The vans stop at each community and between these destinations to pick up passengers.

BICYCLE/PEDESTRIAN FACILITIES

In Southeast, where communities are not linked by a road system and cruise ship travelers are common, bicycles provide touring options for visitors as well as residents. Bike tour companies take tourists by vans to nearby starting points to begin short ten to fifteen mile bike rides on area roads. Touring communities by foot is also popular. Juneau, Sitka, and Ketchikan have developed plans to better handle the flood of pedestrians disembarking the cruise ships. Other southeast communities frequented by cruise ships are assessing their pedestrian facilities.

Southeast residents are attempting to make their communities more walkable through methods such as traffic calming of neighborhood streets and developing safe routes to school. Local pedestrian improvements that simultaneously attempt to preserve smooth

traffic flow in downtown areas are becoming more common. In 1997 Juneau adopted a non-motorized transportation plan for bicycling and walking in the community; other communities in the region have expressed interest in doing the same.

overview SOUTHCENTRAL-INTERIOR ALASKA

For the purposes of this document, this region follows the road system from the southern tip of the Kenai Peninsula north to Prudhoe Bay and east to the Alaska-Canada border, not including Yakutat.

Southcentral-Interior Alaska contains the majority of the state's population and economic activity. Accordingly, it has the most diverse transportation system and is the only area of the state where overland modes play a significant role for movement within the region. This is the area that most closely approximates the manner in which the rest of the nation's transportation network evolved. The economy is more diverse here than in the other two regions. Additionally, this area has sufficient population to support an extensive service sector, which gives commodity flow a much different texture than it has elsewhere. The region has five major seaports, three minor seaports, a river port, a rail and highway network, and extensive air service that ties together all principal population centers.

PORTS

Valdez—1999 population 4,164. In terms of tonnage handled, the state's largest port is Valdez. Really three ports: the city-owned Port of Valdez, the Alyeska Pipeline Service Company marine terminal, and a Valdez Petroleum Terminal operated by Petrostar, the Valdez port facilities serve as the southern terminal of the Trans-Alaska Pipeline. The port, which is deep water and ice-free, includes a 600-foot city dock and a 700-foot container terminal. The port has a foreign trade zone as well as facilities for the storage and handling of grain, which could help Alaska develop an agricultural export capability. Valdez is capable of handling all U.S. registered tankers and supertankers up to 265,000 deadweight tons. Annual throughput has decreased from a high of 107 million tons in 1988 to about 80 million tons in 1999. Over 99 percent of the annual throughput is crude petroleum en route to West Coast refineries or to Panama for trans-shipment to the East Coast of the U.S. With a change in Federal law in 1996 that allows export of Alaska crude oil without an export license, five percent of Alaska crude oil has been shipped from Valdez to the Far East. Five percent of the total oil that comes to Valdez remains in the state.

Department of Transportation and Public Facilities

Valdez port facility

Before 1990, Valdez handled about 400,000 tons per year of inbound refined petroleum products, much bound for the Interior. In the late 1980s this Interior demand was served by the Williams refinery and the annual volume passing through the Valdez port declined to about 70,000 tons. The inflow declined further in 1993 with the start-up of the Petro Star refinery in Valdez, a 38,000 barrel-per-day refinery that produces jet fuel, marine diesel and heating fuel. It is the largest supplier of petroleum products to Prince William Sound communities and competes for market share in Kodiak, the Alaska Peninsula, and Bering Sea communities. Petro Star shipped about 375,000 tons of petroleum products out of the Port of Valdez in 1999. Valdez also serves as a trans-shipment point for material such as pipe and other general cargo destined for the North Slope oil operations and interior Alaska with nearly 24,000 tons shipped in 1999.

Valdez occasionally handles forest products, with 111,000 tons shipped in 1995, but none in 1999. Valdez has a small cruise ship industry with 62 port calls bringing 81,133

visitors in 1999. The number of port calls is expected to decline by 50 percent in 2000 due to changes in federal permit availability for Glacier Bay National Park.

Kenai—1999 population 7,005. Kenai, the second largest freight-handling port in the state, has a diversity of outbound, petroleum-based products. The principal crude export terminal is not actually in Kenai but rather is across Cook Inlet at the mouth of Drift River. The petrochemical facilities are seven miles north of Kenai at Nikiski. The main shippers are Phillips Petroleum and UNOCAL. Phillips operates a natural gas plant and ships liquefied natural gas to Japan, 1.9 million tons in 1999. UNOCAL, which in 1998 formed Alaska Nitrogen Products LLC, manufactures fertilizers such as ammonia and urea. The fertilizer plant has the capacity to produce 1.3 million tons of ammonia and 1.1 million tons of urea each year. In 1999 Alaska Nitrogen Products LLC shipped almost 700,000 tons of ammonia and 915,000 tons of urea. A larger, earlier component of this marine movement ceased in late 1977 with the completion of a pipeline between Anchorage and Kenai. In addition to petroleum products, Kenai facilities handle about 75,000 tons of general cargo.

Anchorage—1999 population 259,391. Alaska's largest general cargo port is Anchorage. Cargo volume is annually at the 3 million-ton level. Of this, about 40 percent is composed of petroleum products and the remaining 60 percent is general cargo and cement. General cargo has continued to increase, both absolutely and proportionately, over the past decade. About 90 percent of the general cargo is inbound and about 90 percent of this is brought to the port on CSX Corporation (formerly SeaLand) container or Totem Ocean Trailer Express (TOTE) roll-on, roll-off ships operated from Tacoma. The remainder is generally bulk construction material brought from Seattle by barge. Of the general cargo, consumer merchandise represents about 35 percent and food products represent about 25 percent. The remainder is composed of a variety of construction and consumer items. Of the products moving into the port, about 50 percent is destined for Anchorage, 25 percent for Fairbanks, and 21 percent for Kenai, with the remainder having final destinations throughout the state.

Port of Anchorage

Ship and tugboat docking at Port of Anchorage

The Port of Anchorage has several multi-use, deep-water terminals. These terminals include two container roll-on, roll-off berths, one berth usable for general cargo, dry bulk, log and two petroleum terminals in addition to privately owned shallow-water barge facilities. The port is open year-round with twice-weekly container service from Tacoma in the winter and service three times per week in the summer. While not free of ice in the winter, the harbor is navigable year-round due to the action of the tides, which keeps the ice broken throughout the winter.

The port is a primary hub in an intermodal system that links rail, road and air cargo from Dutch Harbor to Prudhoe Bay. The port facilitates ship-side to rail capabilities and efficient movement of containers from ship to highway vehicles. The port is a key link between consumers and suppliers and serves over 80 percent of the state's total population. Ninety percent of consumer goods sold within the Municipality of Anchorage and in the Railbelt communities are received across its docks. From the docks the goods are trucked, hauled by train, flown, or barged to their destination.

Since the first year of municipal operations of the Port in 1961, general cargo tonnage has increased at an average rate of 1.5 percent per year. The port consistently ranks as one of the top 25 container ports in North America. The port also has an active foreign trade zone. With fewer than ten stops each summer, the port does not have a developed cruise ship trade.

Near the port, at the Anderson Dock property, Veco Corporation has prepared sealift modules since 1996. The modules, weighing from 400 to 3,500 tons and up to 135'

tall, are barged to the North Slope oil fields in the August ice-free period. Modules were delivered in 1999 and 2000. A total of eight to ten modules are contracted for development. (See Planning Factor Analysis 1 for additional information on the port.)

Seward—1999 population 3,744. The Port of Seward, terminus of the Alaska Railroad and the Seward Highway, has experienced significant fluctuations in freight volumes over the years. Most of the port's facilities were destroyed in the 1964 earthquake and its history after rebuilding in 1966 was primarily as a general cargo port, handling about 50,000 to 150,000 tons per year. Major movements through the port occurred from 1974 to 1977 and were related to pipeline construction and offshore oil exploration. From 1979 until 1984 the port's primary activity was the export of about 40,000 tons of logs and wood chips annually.

The port handles over 600,000 tons of cargo per year. In 1983 the port started exporting coal, brought from Healy to Seward by rail, to the Far East. Of the 600,000 tons of cargo handled by the port each year, 90 percent is coal delivered by the Alaska Railroad (see the later discussion on the Alaska Railroad). The remaining ten percent consists of exported wood products, inbound pipe, outbound fish, and other general commodities. The pipe is shipped by truck or rail to the North Slope. General cargo is delivered to Seward by TOTE, CSX Corporation, United Parcel Service, Federal Express, City Express, and trucking companies via Anchorage. Port facilities include a commercial dock owned by the Alaska Railroad Corporation, a dry-bulk (coal) terminal, and several docks at the Marine Industrial Center across Resurrection Bay from Seward. The center offers ship repair and refitting services and also includes a fish processing facility.

"The Whittier Tunnel is the only combined highway/railroad tunnel in the world and the longest highway tunnel in North America."

Similar to several other Alaska ports, cruise ship dockings in Seward have been growing rapidly. The number of visitors arriving in Seward by cruise ship grew from 230,042 in 1996 to 280,220 in 1999. The visitation to the Kenai Fjords National Park, nearly all by boat from Seward, grew from 70,850 in 1990 to 290,763 in 1999. Nearly all cruises stopping at Seward operate one-way. Passengers depart their vessel in Seward, are taken by train or bus to Anchorage, and then flown back to their point of origin. They are then replaced by a new contingent of passengers who have flown north to Anchorage and bused to Seward by rail.

The Alaska SeaLife Center, a research center where visitors can watch scientists at work, opened in May 1998.

Whittier—1999 population 280. The Port of Whittier with its 1,100-foot wharf is a preferred port for the Alaska Railroad Corporation (ARRC). The port is the point at which barges coming from or destined for Seattle and Prince Rupert, British Columbia are loaded and unloaded, with the rail cars entrained and moved to Anchorage and Fairbanks. The port is preferred because of its deep water and ease of access—almost no gradient—from Anchorage. Annual throughput of the port is generally 200,000 to 300,000 tons, with no single commodity being particularly dominant. Barges serving Whittier are operated by the ARRC's weekly rail/barge service from Seattle, and the Canadian National Railroad's biweekly "Aquatrain" service from Prince Rupert. The railcars received at Whittier are usually loaded at origin points outside the immediate Seattle area and carry consumer goods not sold wholesale in that area. The railcars also carry other items such as chemicals, vehicles, machinery, lumber, and metal products generally moved by rail in the continental United States and Canada. Destinations in Alaska for these goods include Anchorage (60 percent), Interior Alaska (25 percent), and other areas (fifteen percent).

In 1999 the department constructed a single-lane road through the railroad tunnel; the tunnel opened to vehicle traffic in June 2000. The Whittier Tunnel is the only combined highway/railroad tunnel in the world and the longest highway tunnel in North America. ARRC's freight operations will continue between Anchorage and Whittier but will occur mostly in the late evening hours. The railroad's passenger service will be reduced to

summer months from May to September. The passenger train will leave every morning from Anchorage, returning from Whittier each evening. The passenger shuttle service between Portage and Whittier will be reduced to one daily round trip. The shuttle will not include vehicle or baggage service.

Tunnel access will be managed by the department through a contract with a private construction firm. The Legislature established the tunnel as a toll way, with fees varying from $15 for automobiles to $250 for oversize vehicles, beginning April 1, 2001. Drivers can log onto the department's website to obtain the latest vehicle and train schedules and hours of operation. Passengers interested in ticket and travel information of the railroad can call a toll-free number. Passenger shuttle service tickets are available for purchase on board the train.

The Alaska Marine Highway System connects Whittier with Valdez and Cordova during the summer season.

Homer—1999 population 4,154. The Port of Homer is primarily a seafood-receiving center with substantial movement of wood products. Homer was the leading port for commercial halibut landings in Alaska in 1998 and 1999 with 52,500 tons and 57,590 tons landed respectively. The port also receives quantities of salmon, Pacific cod, and other species. Most of the fish received in Homer is trucked to Seward or Anchorage, and some is flown from Anchorage to Seattle, for value-added processing. Although one of Homer's three seafood-processing plants was destroyed by fire in 1998 and not rebuilt, the transportation system permitted distribution of the catch to other processors.

Department of Transportation and Public Facilities

Homer boat harbor

The Homer small boat harbor has a 383-foot public fish dock with several fish-buying companies. The Port has two additional docks. The main (ferry) dock provides berthing for the U.S. Coast Guard buoy tender and AMHS ferries. It also receives petroleum barges that in 1999 delivered about 27,000 tons of petroleum products to Homer. The main dock's functions are due to be replaced by a 750 foot, deep-water (40-foot depth) dock, to be named pioneer dock, in 2002. The old dock will remain "inside" the new dock providing additional space. The Port also has a 324-foot length deep water dock that is used for export of wood products. In 1999 over 34 million board feet of logs and nearly 90 million units of wood chips were exported from the dock.

Homer anticipates growth in cruise ship dockings with completion of the pioneer dock. There were ten cruise ship dockings in 1998, none in 1999, and one in 2000. With completion of the pioneer dock, however, Homer will be better able to accommodate large cruise ships and will actively market Homer as a destination.

Cordova—1999 population 2,435. Cordova is a fishing port whose exports are seafood products and whose principal imports are petroleum products. Over 34,300 tons of seafood were exported in 1999. Marine freight service to Cordova includes Sampson Tug and Barge that provides twice-monthly service to Anchorage, TOTE that provides landing craft service from Anchorage and Whittier, and the Alaska Marine Highway System. Barge service between Seward and Cordova was tried in 1994 but was discontinued. Parcels that are not priority mail are sent to Cordova via barge.

North Slope Dock Facilities. The major remaining ocean ports in this region are the three privately owned facilities for sea-lift barges on the North Slope. In addition to a facility at Prudhoe Bay, a second is located to the west at Oliktok/Kuparuk and a third to the east at Badami. The ports are usually only open four to six weeks per year and may not open at all some years due to ice conditions. The volume of throughput fluctuates considerably, depending on the level of oil field construction activity currently under way. Annual

volumes have ranged from a high of 187,000 tons during 1970 and 153,000 tons in 1975, down to 2,372 tons in 1994. Lower rates of usage are due to increasing emphasis being placed on the Dalton Highway as a year-round supply facility for the Prudhoe Bay area. In recent years, high-volume water transport has been limited to sea-lift operations to move in gas-handling and other large oil field service modules. Large sea-lift operations to Prudhoe Bay occurred during the summer in 1994 and another in 1999, when modules were shipped from Nikiski near Kenai and the Anchorage Port area to Prudhoe Bay. Other modules, such as for the Northstar development, are fabricated in Southcentral Alaska and trucked to the North Slope over the Dalton Highway.

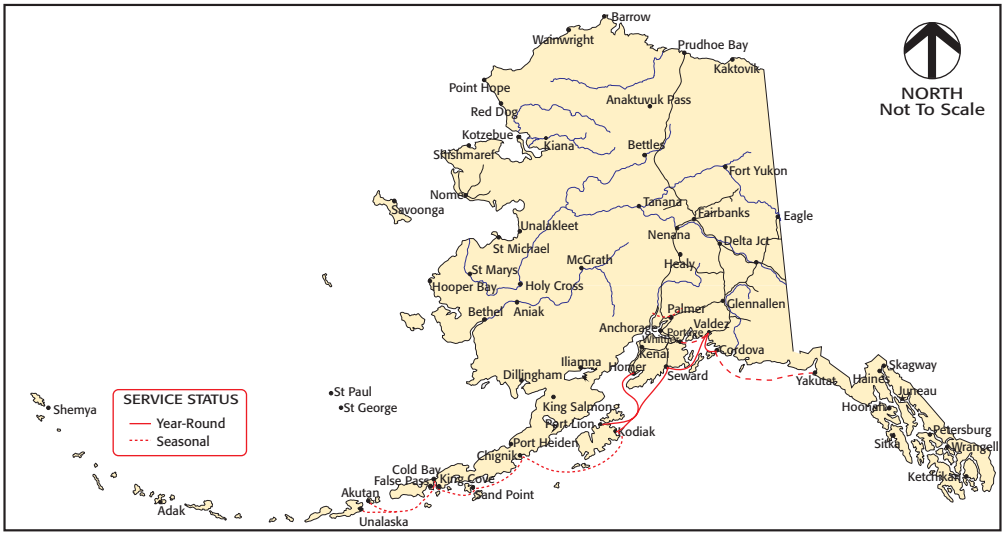
> *"Nenana is the only major river port in Interior Alaska."*

Nenana—1999 population 435. Nenana is the only major river port in Interior Alaska. The port is located at the confluence of the Tanana and Nenana Rivers, 192 miles above the point at which the Tanana joins the Yukon River. It is a seasonal port operating from late May through early October of each year. Throughput is usually between 30 and 40 thousand tons, 99 percent of which is outbound to villages along the rivers. Of this, about 60 percent is petroleum products with general commodities and construction goods making up the remainder. The port, originally owned by the Alaska Railroad, is now owned and managed by the City of Nenana. The principal movement consists of petroleum products trucked from the North Pole refinery to Nenana and loaded on barges of 50,000 to 200,000 gallon capacity. From Nenana, Yutana Barge Lines serves all of the Yukon River villages below Circle and several coastal villages. Yukon communities served from Nenana include Fort Yukon, St. Mary's, Emmonak, Kotlik, Sheldon Point, Alakanuk, Marshall, Tanana, Galena, and Pilot Station. Coastal communities served include Hooper Bay, Chevak, Stebbins, St. Michael, and Unalakleet.

SOUTHCENTRAL ALASKA MARINE HIGHWAY SYSTEM

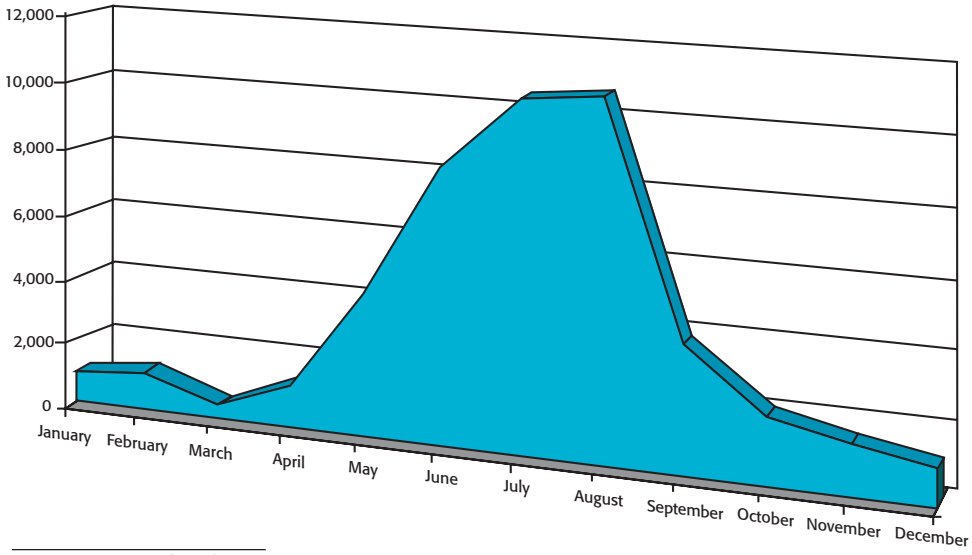
The AMHS connects Homer, Seldovia, Port Lions, Seward, Cordova, Valdez, Chenega, Tatitlek, and Whittier to each other and to Kodiak. Service for these routes is year-round, except for the Whittier-Valdez route that operates only during the summer. Figure 2.11 shows the AMHS routes in the Southcentral and Southwestern ports of the state. The two vessels operating in Southcentral waters are the M/V Tustumena and the M/V Bartlett. Traffic consists primarily of passengers and their vehicles, with the exception of the Cordova, Seward, and Valdez ports, which occasionally receive freight movements. Service frequency is once or twice a week on most routes with three weekly ferries available between Homer and Seldovia and five sailings per week between Valdez

FIGURE 2.11 ALASKA MARINE SYSTEM SOUTHCENTRAL AND SOUTHWEST FERRY ROUTES



and Whittier. Passenger traffic differences between summer and winter are shown in Figure 2.12. The new ocean-going ferry, the M/V Kennicott, makes monthly trips across the Gulf of Alaska, connecting Juneau, Yakutat, and Seward.

FIGURE 2.12 ALASKA MARINE HIGHWAY SYSTEM SOUTHWEST PASSENGER COUNT, 1999. Includes the ports of: Akutan, Chenega Bay, Cold Bay, Cordova, False Pass, Homer, King Cove, Kodiak, Port Lions, Sand Point, Seldovia, Seward, Tatitlek, Unalaska, Valdez, Whittier and Yakutat



AIR TRANSPORT

Air service in the region is comprehensive. Although long-distance passenger traffic moves by air, other transportation alternatives exist in this region, making air travel a less dominant mode than in other regions. Airfields with scheduled jet service include Anchorage, Fairbanks, Deadhorse (Prudhoe Bay), and Cordova. Airports at Anchorage and Fairbanks are international-class facilities around which most service in the region revolves. Figure 2.13 and Table 2.2 present air passenger enplanements for communities in the Southcentral-Interior region in 1999.

> *"Anchorage is the hub not only of the region and the state but also of the Northern Pacific Rim."*

FIGURE 2.13 ENPLANEMENTS IN INTERIOR AND SOUTHCENTRAL ALASKA, 1999

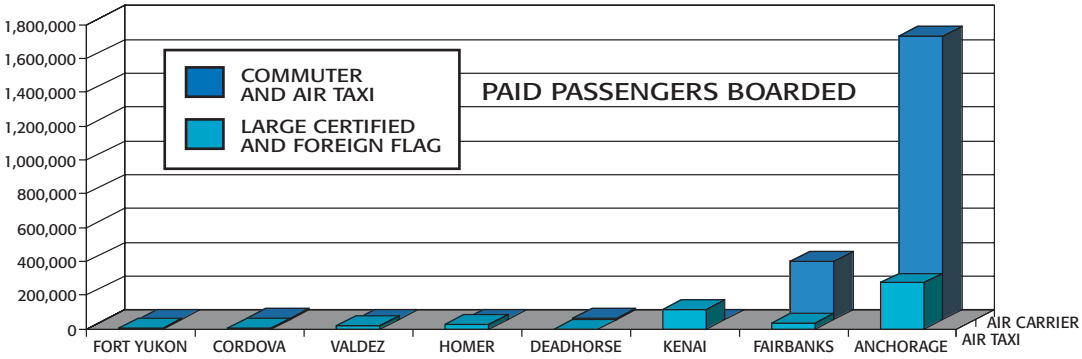
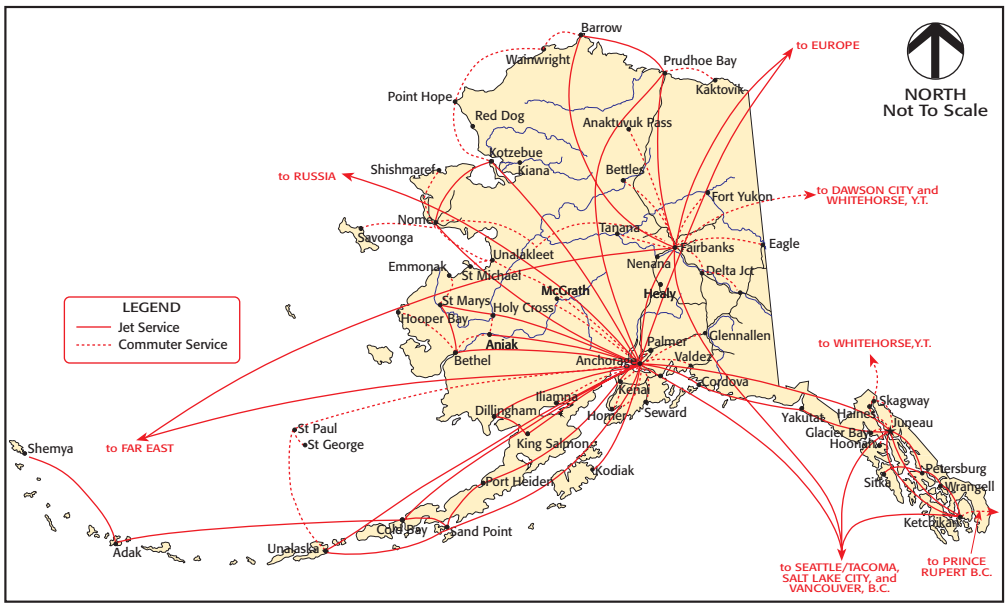


TABLE 2.2 ENPLANEMENTS IN INTERIOR AND SOUTHCENTRAL ALASKA, 1999

	Fort Yukon	Cordova	Valdez	Homer	Deadhorse	Kenai	Fairbanks	Anchorage
Air Taxi	6,765	9,081	23,688	29,128	1,320	117,400	37,901	274,033
Air Carrier	0	10,904	0	0	10,691	0	346,599	1,675,996

Anchorage is the hub not only of the region and the state but also of the Northern Pacific Rim; Figure 2.14 displays the Alaska Air System and the importance of Anchorage to the system. Anchorage has direct passenger and freight flights to Western Europe and Asia, with past service to the Russian Far East. It also is the hub for frequent service to other U.S. points and Alaska locations. Frequency varies from one or two flights a day to U.S. mid-western locations and most overseas points, to ten to fifteen flights a day to Seattle, to four to six flights a day to other West Coast points. Intrastate jet service is provided from Anchorage to numerous points such as Fairbanks and Juneau, which are the most heavily traveled routes. Through these hubs, jet service is also provided to smaller communities throughout the state. Other scheduled service for commercial aircraft is available to Aleutian Island points, and scheduled and charter freight service is available throughout the state. Commuter flights are available from Anchorage to many points, including Kenai, Homer, and Valdez, which are the most heavily traveled commuter routes. The total number of flight operations at the Ted Stevens Anchorage International Airport (AIA)—landings and departures—in 1999 was 289,472. Of these 107,560 were commercial air carriers. More than 4.9 million passengers arrived, departed, or transited through the domestic terminal in 1999, more than twice as many as passed through in 1989.

FIGURE 2.14 ALASKA AIR SYSTEM



AIA has been the national leader in air freight since 1992. A total of 33,932 cargo operations occurred at AIA in 1999, representing nearly 40 Boeing 747 class freighters daily, each carrying from 114 to 124 tons of freight. A total of 1,827,540 tons passed through AIA in 1999; 528,252 tons were loaded or unloaded that year. Freight tonnage has grown 27 percent from 1996. Numerous air freight companies—Federal Express, United Parcel Service, Polar Airlines, United Airlines and Northwest Airlines—have established or expanded hubs at AIA. The value of air freight exported from the United States through Alaska continued its steady growth, increasing 17 percent in 1998 to over $5 billion. This growth occurred despite a general decline in exports due to the economic slump in Asia. New and expanded air parcel hub facilities have placed Anchorage in a pivotal position with regard to international air cargo operations and the airport is preparing a Cargo Master Plan to guide this growth. The Mapco-Lynx air cargo project, which began construction in 1999, will open AIA to third-party customers. The facility will encourage the trend of international carriers to transfer freight between planes and between carriers at the airport. The facility will also provide storage services. Anchorage is actively soliciting additional development that will take advantage of its location, such as logistical distribution warehousing for high value air cargo.

To support AIA in meeting its needs and potential the state has initiated the Gateway Alaska program. This program involves renovating and expanding the existing domestic terminal and improving ground access. Terminal projects include improvements to roads and parking, replacement of Concourse C, renovation and expansion of existing terminal space for ticketing and baggage handling, and improvements to airside facilities. Construction of improvements began in 1999 and will continue through 2004.

Fairbanks International Airport (FIA) has both international and domestic traffic, although not at Anchorage's levels. The airport had 133,267 total flight operations in 1999; of these 16,781 were scheduled air carriers and the remainder were primarily general aviation (90,367) and air taxi (23,339). Fairbanks is attractive to international freight movement due to its closeness to direct Europe-Orient routes and the availability of locally refined jet fuel. In addition, it has numerous one-stop flights to Seattle as well as service to most principal destinations in the northern section of the state. It also serves as a staging area for the transport of high-value goods to the North Slope after they have been brought as far north as Fairbanks by truck or rail. Total freight operations at the FIA more than doubled from 2,885 in 1993 to 6,446 in 1999.

Alaska holds several national distinctions in general aviation. In 1994 the Federal Aviation Administration recorded 273,589 general aviation aircraft nationwide. Of these, 18,224 were based in Alaska. Anchorage was home base for 3,587 craft, Fairbanks was home to 431, and Juneau 317. This makes Alaska home to 6.6 percent of the nation's general aviation airplanes yet it has less than .2 percent of the U.S. population. Another distinction is that Lake Hood, adjoining the Ted Stevens Anchorage International Airport, is the busiest float-plane base in the world. Merrill Field in Anchorage, exclusively a general aviation field restricted to aircraft weighing 12,500 lbs. or less, had 201,000 flight operations in 1999, making it the 102nd busiest airport in the nation. More than 950 general aviation aircraft are based there.

Although the larger cities have high levels of general aviation and air taxi flights, smaller communities throughout the region have substantial levels in the state as well. Homer, for example, had over 35,000 operations in 1999 and Valdez had 12,000. Talkeetna, the base camp for climbers attempting Mt. McKinley and a center for "flight seeing," had 37,000 operations in 1999, most in the summer months.

"Alaska holds several national distinctions in general aviation."

LAND TRANSPORT

Most points in the region are linked to Alaska's highway system. The network is composed predominantly of two-lane, asphalt-surfaced roads. Exceptions to this include some four-lane and freeway facilities in the Anchorage and Fairbanks areas and several major gravel highways. Road coverage of this region is not dense; the region's 175,000 square-mile area has only seven major and five minor highways, and a few access roads. This region also contains Alaska's principal railroad and most of its pipeline mileage.

HIGHWAYS

Richardson Highway. The state's oldest highway, the Richardson, extends 364 miles from Valdez to Fairbanks. The two-lane asphalt highway crosses Thompson Pass in the Chugach Mountains in its first 50 miles north and east of Valdez, then traverses the Alaska Range before crossing high plateaus and following the Tanana River flats to Fairbanks. The highway has four lanes between Eielson Air Force Base and Fairbanks. Heavily used during construction of the Trans-Alaska Pipeline, the south half of which parallels the road, the highway has been regularly rehabilitated or reconstructed. The main commodities carried over the road are petroleum products distributed to interior Alaska towns and pipeline pump stations. General freight is shipped from Anchorage to Valdez via the Glenn and Richardson Highways and from Fairbanks to Eielson Air Force Base and Delta Junction.

The average annual daily traffic (AADT) ranges widely depending on specific location. In 1999 the AADT near Valdez was 5,346 but at Lowe River south of Thompson Pass it was 469. At Delta Junction, the AADT increased to 3,315 and then dramatically increased to 21,967 at the intersection with Badger Loop between North Pole and Fairbanks due to the high commuter traffic between those communities. As is the case with most highways in Alaska, monthly average daily traffic in the summer is roughly three times the winter figures except in those situations, such as between North Pole and Fairbanks, where there is heavy commuter traffic that occurs all year.

Alaska Highway. Alaska's only all-weather, all-season overland connection to Canada and the lower 48 states is the Alaska Highway. Built during World War II, the two-lane, asphalt and bituminous-surface-treated highway intersects with the Richardson Highway at Delta Junction. From there it extends southeast for 197 miles to the Canadian border. From the border, it runs 1,200 miles through Canada's Yukon Territory and British Columbia to connect with the Canadian transcontinental system at Dawson Creek, British Columbia. The highway is also an important link to the Southeast Alaska Marine Highway System through Haines Junction and the 160-mile long Haines Highway.

Photo by Ernst Schneider, Department of Community and Economic Development

Alaska Highway near Haines Junction

Freight traffic on the road experienced a brief boom during the 1975-1977 pipeline construction years; about 40,000 tons of general cargo was brought into the state by this route in 1977. During the 1980s and early 1990s freight movement decreased to much lower levels, reflecting little more than local supplies, mail, and household goods. In recent years, however, there has been some growth in freight movement—both groceries and oil field supplies—on the highway. Nearly all of the Alaska portion of the highway has been reconstructed between 1985 and 2000.

Passenger—principally tourist—traffic continued to increase at a steady rate until 1979, when it slackened due to gasoline supply problems in the United States. In recent years the AADT at the Canadian border has been steady with 426 in 1995 and 431 in 1999. The number of vehicles entering Alaska at the Al-Can customs station was 58,948 in 1999. The highest month, July with 12,889 vehicles, was over nine times higher than the lowest month, February with 1,343 vehicles. The total number of visitors coming through the Al-Can station in 1999 was 128,412 of whom 10,520 came by tour bus. A total of 466 buses entered the state during the five summer months.

Glenn Highway. Connecting Anchorage to the Richardson Highway is the Glenn Highway, which extends 189 miles from Glennallen southwesterly to the Matanuska-Susitna Valley and Anchorage. Traffic on the route includes petroleum products from Anchorage destined for points along the Glenn, Richardson, and Alaska Highways and general goods destined for Valdez and Southeast Alaska and points along the highway. From Glennallen to the junction with the Parks Highway southwest of Palmer, the highway is an asphalt-surfaced roadway with two-climbing-lane (three-lane) portions. Sections of this part of the highway have been upgraded with reduced curvature and widened shoulders during the past decade, although substantial sections are built to older standards. Between the Parks Highway junction and Anchorage, the highway is configured as a limited access freeway with four to six lanes. The AADT for various sections in 1999 ranged from 2,447 at Glennallen to 900 at Lake Louise Road. From the Mat-Su valley to Anchorage the number of vehicles quickly rises to 22,010 near Eklutna and then to 54,950 in Anchorage at the intersection with Bragaw Street.

Tok Cut-off. Connecting the Glenn and Richardson Highways to the Alaska Highway is the 125 mile-long Tok Cut-off. This highway provides the principal access route between the lower forty-eight and Southcentral Alaska. Most of the road has been widened and

reconstructed to meet current engineering standards, but because it traverses large areas of marginal permafrost, it requires continual maintenance and rehabilitation. There are no major towns or cities along the route, but it does serve as a gateway to the Wrangell-St. Elias National Park. Motorists coming from Canada on the Alaska Highway and bound for Anchorage or other Southcentral Alaska points use this two-lane, asphalt highway. AADT for 1999 was 430 vehicles.

Parks Highway. The newest and most heavily used highway for freight movement is the Parks Highway. The Parks provides direct road access from its junction with the Glenn Highway 35 miles north of Anchorage to Fairbanks, 310 miles north. Intermediate points of importance include several small towns—Wasilla, Willow, Talkeetna, Cantwell and Anderson—as well as Denali National Park and Preserve, the Healy and the Healy Creek coal mining area and the river port of Nenana. Commodities moved are in all classes and include about 75,000 tons for local delivery and about 150,000 tons of items bound for Fairbanks and points north. Several sections of the road include climbing lanes (three-lanes), and near Wasilla the highway is four lanes. This highway has also become a principal artery for passenger travel within the state. Excluding local traffic at either end of the road, AADT was about 1,930 in 1999 with significantly higher levels during the summer months. Commuter traffic near Palmer and Wasilla brought the AADT to as high as 27,960 and as the highway enters Fairbanks the AADT is over 13,000 vehicles, depending on the specific segment.

Department of Transportation and Public Facilities

Seward Highway

Seward Highway. South of Anchorage, two highways—the Seward and the Sterling—serve the larger communities on the Kenai Peninsula. The Seward Highway begins in its namesake city and runs 125 miles north and west to Anchorage. The two-lane, asphalt highway is used to carry visitor and recreational traffic. It is also used to carry consumer goods from Anchorage to Seward, as well as move pipe materials and seafood from Seward northward to Anchorage where the latter is shipped southward and westward. In 1999 AADT volumes totaled about 2,680 vehicles between Seward and the Seward-Sterling Highway junction, 3,450 vehicles between the junction and Portage, 5,290 between Portage and Girdwood, and 12,900 between Girdwood and Anchorage. Within Anchorage, six lane segments of the Seward Highway carried over 60,500 vehicles a day in 1999—the highest counts of the state occurring on the Seward Highway at the intersection with Dowling Road.

Sterling Highway. From its junction at mile 36 of the Seward Highway, the Sterling Highway extends 135 miles west and south to the cities of Soldotna and Homer, with a major spur north from Soldotna to Kenai and the petro-chemical and fish processing area at Nikiski Dock. Total commodity traffic on the Sterling Highway is estimated at about 225,000 tons annually, with the majority being inbound consumer goods and outbound processed seafood from Homer and Kenai. The development of the Alaska Seafood Center in Anchorage may change this flow of seafood. The center is designed to annually produce 100 million pounds of value-added, prepared seafood. The owner, Alaska Seafood International, began operation in December 1999 and expects to increase production through the year 2000 with employment for 400. The center anticipates that eventually most fish for the plant will be shipped by barge and truck, drawing heavily on the fisheries in the Southcentral region. The plant is working with fishers to receive product all year, even during the traditional winter off-season.

In addition to consumer goods and seafood, there are significant movements of petroleum products throughout the area and logs along the Homer-Kenai segment. Traffic on the highway averages 3,600 AADT (1999) with significantly larger numbers locally in Homer and Soldotna. This highway is primarily an asphalt, two-lane facility with summer traffic volumes two to three times those of winter levels.

Other Highways. The highway to Deadhorse and the Prudhoe Bay area is the last major artery in this region. It is comprised of two roads: the southernmost 73 miles of the Elliott Highway that extends north from Fairbanks and the 416-mile Dalton Highway constructed by Alyeska Pipeline Service Company during the building of the Trans-Alaska Pipeline. The first 28 miles of the Elliott Highway is asphalt surfaced and the majority of remainder of the Elliott as well as the majority of the Dalton is surfaced with gravel, with several new, short chip-sealed sections. This highway is primarily used by North Slope oil producers, companies supplying goods for the oil producers' consumption and the tourism industry. AADT on the Dalton highway was 410 at the Yukon River in 1999; the Elliott Highway AADT was 565 at the Chatanika River and 226 further north at the Tolovana River.

The Steese Highway originates in Fairbanks and runs to Circle and the Yukon River, accessing historic and contemporary placer mining claims and the communities of Central, Circle, and Circle Hot Springs. The mostly-gravel highway has an AADT is nearly 20,000 in Fairbanks then declines to 10,897 at the outskirts of town, to 150 at the Chatanika River crossing, to 25 at Birch Creek—140 miles from Fairbanks.

The Taylor Highway heads north from Tok to Eagle. At the Jack Wade Junction the "Top of the World Highway" cuts east to the Poker Creek Customs Station and Dawson City, Yukon Territory. The Taylor and Top of the World Highways provide an alternate, summer-only route to the Yukon Territory. AADT on the Taylor Highway is 160 at South Fork and 143 at the Jack Wade Junction. The Poker Creek station reports a total of 11,899 vehicles entering Alaska from Canada in 1999 in the months it is open, from May through September. The highway passes through the Fortymile Mining District, the oldest mining district in the state, partly paved. The traffic into Alaska included 275 buses carrying 6,976 tourists over this highly scenic route.

Another highly scenic route is the Denali Highway, a mostly gravel connection between the Parks Highway and Richardson Highway about midway between Anchorage and Fairbanks. The route, that crosses from Paxson to Cantwell, has an AADT of about 100.

The paved Edgerton Highway runs eastward from the Richardson Highway to the community of Chitina, where the pavement ends. The road then continues as the McCarthy Road, a primitive facility along the former Copper River and Northwestern Railway railbed to McCarthy. AADT on the highway to Chitina is about 170. The McCarthy Road section has an AADT of about 75.

Lastly, the partly paved Copper River Highway runs from Cordova eastward and northward about 49 miles to the "Million Dollar Bridge" and the Child's Glacier. The department has considered developing portions of the Copper River & Northwestern Railway roadbed along the Copper River which would most likely connect Cordova with the Richardson Highway, although alternate routes have been considered. Near Cordova the AADT is 3,775, declining to 100 at Sheridan Glacier Road. The current proposal for this route along the old Copper River and Northwestern Railway bed is a pedestrian-only trail from the Uranatina River to the Allen River, with short road segments and trailhead parking on either end. Improvements to the Million Dollar Bridge crossing the Copper River, as well as improvements to the road sections leading respectively to the Allen and Uranatina Rivers and trailheads, are also currently planned.

RAILROADS

THE ALASKA RAILROAD. The Alaska Railroad Corporation (ARRC) is owned by the State of Alaska and governed by a Governor-appointed board under the Alaska Department of Community & Economic Development. Previously owned and operated by the federal government, the Alaska Railroad was acquired by the state in 1985, after the former private company failed. Best described as a regional carrier, the Alaska Railroad stretches 525 miles north from the ports of Seward and Whittier through Anchorage,

Healy and Nenana to Fairbanks, and Eielson Air Force Base. To some extent the railroad has created its own region, the "Railbelt." The railroad carries a variety of freight, restricted only by two tunnels between Anchorage and Fairbanks that limit loads to a maximum of twenty feet above top of rail and fourteen feet in width.

Freight Service. Annual freight volume for ARRC was 7.3 million tons in 1999 with 77 percent composed of three commodities: gravel, coal and petroleum. In 1999 the railroad moved 3.7 million tons of gravel from Palmer to Anchorage in summer-operated unit trains. This tonnage is half of the annual freight volume, though it represents a much smaller fraction of total revenue.

The railroad is the primary carrier of coal from the Usibelli Mine near Healy. The railroad ships the majority of the 1.5 million-ton annual mine production, over 600,000 tons, to six Alaska electrical generation power plants and the same amount to Seward for export to South Korea. An additional 300,000 tons is delivered by truck to the Healy Clean Coal Project, a 50-megawatt electric station, located near the mine mouth. The "clean coal technology" power plant has been operating as a U.S. Department of Energy demonstration project since 1998.

Photo by Ernst Schneider, Department of Community and Economic Development

Alaska Railroad

The railroad also moves about 2.0 million tons of petroleum products from Williams Energy North Pole refinery to Anchorage for consumption and trans-shipment each year. Of the total petroleum shipped by Williams, 71 percent is jet fuel for the Ted Stevens Anchorage International Airport.

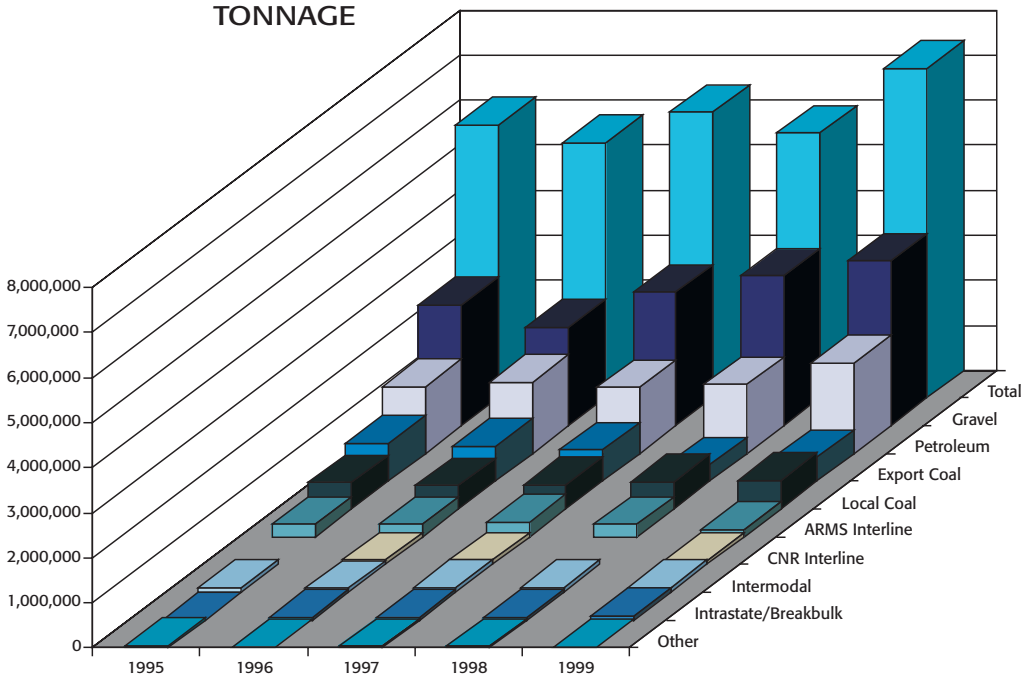
The railroad also provides container service. Anchorage to Fairbanks container and trailer traffic totals about 115,000 tons per year. The remaining tonnage is accounted for primarily by interchange movements received via the rail car barges at Whittier and by other commodities transported from Anchorage to Fairbanks. Figure 2.15 shows the Alaska Rail and Rail-Barge System; Figure 2.16 displays ARRC freight tonnages for various major groups of cargo from 1995 through 1999.

Freight trains operate fourteen to sixteen times weekly between Anchorage and Fairbanks, and two to four times weekly from Anchorage to meet barges in Whittier. Coal trains move three times weekly from Healy to Seward and two to four times weekly from Healy to Fairbanks. Gravel trains run 20 to 26 times per week from Palmer to Anchorage during the summer.

FIGURE 2.15 ALASKA RAIL AND RAIL-BARGE SYSTEM

"Best described as a regional carrier, the Alaska Railroad stretches 525 miles north from the ports of Seward and Whitter through Anchorage, Healy, and Nenana to Fairbanks and Eielson Air Force Base."

FIGURE 2.16 ALASKA RAILROAD CORPORATION ANNUAL FREIGHT TONNAGE



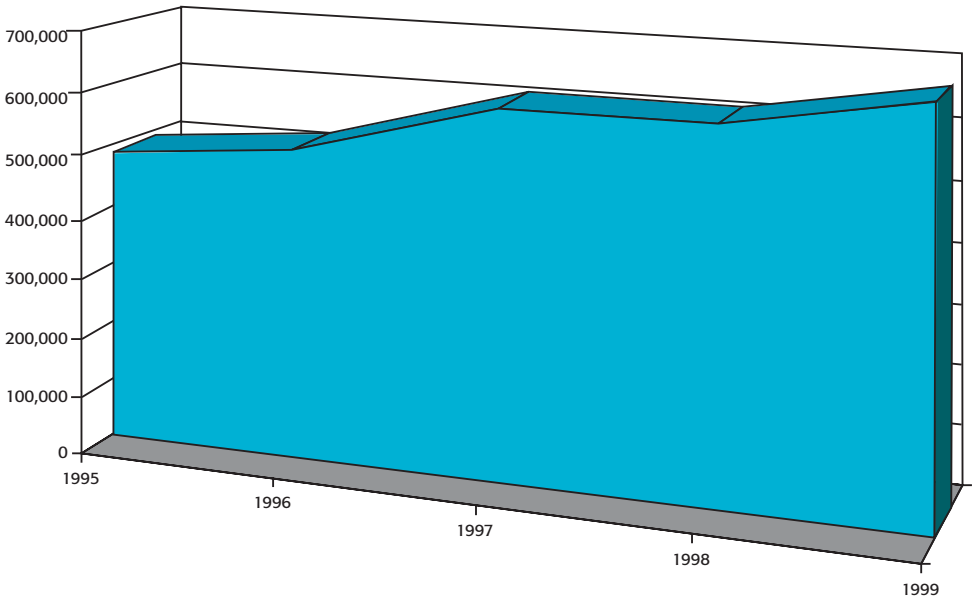
CNR = Canadian National Railroad ARM = Alaska Railbelt Marine

With the opening of the Whittier road and joint-use tunnel to vehicular as well as train traffic in 2000, Whittier remains an integral part of the Alaska Railroad's freight operations. ARRC views Whittier, from an economic and geographic standpoint, as the railroad's best freight interchange point for barge service connecting Alaska with the Lower 48 states and Canada. As noted earlier, the port is preferred because of its deep water and year-round ice-free conditions, its distance of only 50 miles from Anchorage, and the fact that the tracks from Anchorage to Whittier have little gradient. The rail line to Seward has steep grades, limiting freight capabilities. The new Whittier access tunnel opened in June 2000. The state operates the Whittier tunnel in a similar manner as a drawbridge with the railroad, trucks, buses, recreational vehicles, and cars and vehicles receiving different priority slots.

Passenger Service. The Alaska Railroad serves a growing number of visitors and residents each year. Summer service from mid-May to mid-September includes daily express trains between Anchorage and Fairbanks with stops in Talkeetna and Denali National Park and Preserve. The railroad offers daily service between Anchorage and Seward. A popular summer service is the four-day-a-week Talkeetna-Hurricane local "flag stop" train. Winter service for passengers includes a week-end "flag stop" train between Anchorage and Fairbanks and return, and a once-monthly round-trip "flag stop" service between Anchorage and Hurricane. Passenger travel on the Alaska Railroad is an increasingly popular part of the Alaska visitor experience with ridership increasing by 36 percent from 1995 to 1999 (see Figure 2.17). The passenger service is increasingly linked with and supportive of businesses that serve tourists, such as river rafting, wildlife, bicycle and hiking tours, and bed and breakfasts. With the increasing number of cruise ships visiting ports in the Southcentral region, demand for passenger train travel is expected to increase.

In 1998 the Alaska Railroad initiated the most extensive capital improvements, many intermodal in nature, since its original construction completed in 1923. These improvements include safer and more efficient port facilities at Whittier and Seward, a new full-service depot at Denali National Park and Preserve, new depot and public-transit centers in Anchorage and Fairbanks, and a central rail station at the Ted Stevens Anchorage International Airport. As part of these investments the railroad has also begun

FIGURE 2.17 ALASKA RAILROAD CORPORATION PASSENGER RIDERSHIP



straightening track alignments between Anchorage and Wasilla, which will reduce the present twelve-hour travel time from Anchorage to Fairbanks by one hour.

The railroad has also conducted a feasibility study of developing commuter service between Anchorage and the communities of Wasilla, Palmer, and Girdwood. The service would be focused on the significant proportion of the Anchorage workforce that now commutes to work, most from the Matanuska-Susitna Valley.

PIPELINES

Trans-Alaska Pipeline System. One of the most expensive private construction projects ever built, the 789-mile Trans-Alaska Pipeline System (TAPS) was constructed to move crude oil from the oil fields on Alaska's northern coast across the state to the ice-free port of Valdez for shipment by tanker to refineries. Completed in 1977, the line is owned and operated by Alyeska Pipeline Service Company, which itself is owned by a consortium of oil companies that produce oil on the North Slope and ship through the TAPS.

The pipeline serves several independently operated oil fields located at or near Prudhoe Bay. Construction and servicing of the pipeline required building 420 miles of new highway (now the Dalton Highway) from the extremity of the then-existing road north of Fairbanks to the oil fields. From Fairbanks, the pipeline generally follows the Richardson Highway to Delta Junction and on to Valdez, located on Prince William Sound. Although the 48-inch diameter line transported over 2 million barrels per day in the late 1980s, recent flow rates have approximated 1.1 million barrels per day due to the gradual reduction in oil field production. The estimated 1999 volume was 1.08 million barrels. Seven oil projects on the North Slope are under development; these new projects are expected to keep oil production above the one million-barrel threshold through 2006, although volumes are expected to decline over the long term.

Since development of the Trans-Alaska Pipeline there has been an ongoing attempt to commercialize large scale development of the natural gas resource on the North Slope. In 1999 two proposals to develop a North Slope liquefied natural gas (LNG) project were put forward. The first proposed a pipeline with a terminus in Cook Inlet area. The second, backed by TAPS pipeline corridor communities of the North Slope Borough, the Fairbanks North Star Borough, and the City of Valdez, would form a municipal port

authority to plan, finance, and operate a gas pipeline terminating in Valdez. The port authority was formed, but since then interest has shifted from a totally in-state route to one following the Alaska Highway through both Alaska and Canada. The winter of 2000-2001 brought intensified interest in developing North Slope gas reserves. Governor Knowles established a Governor's Alaska Highway Natural Gas Policy Council to determine how the state could best promote the Alaska North Slope natural gas pipeline and provide maximum benefits to Alaskans. The estimated gas reserves on the North Slope are projected to supply one quarter of America's natural gas needs for the next twenty years. The Alaska Legislature passed a law titled "No Gas Pipeline over Beaufort Sea," which amended the Right-of-Way Leasing Act on state land to specifically disallow a northern Beaufort Sea route for any gas pipeline. The concern with such a route was that it would not provide as many jobs or as much gas energy to Alaskans. However, a rough construction estimate for the Alaska Highway option is $10 billion, versus approximately $8 billion for a northern Beaufort Sea route. The industry, with financial contribution from the state, has let contracts for conceptual engineering and a feasibility evaluation of those gas line routes traversing Alaska.

Department of Community and Economic Development

The Trans-Alaska Pipeline

Beluga Natural Gas Pipeline System. Enstar Natural Gas Company built this natural gas pipeline from the Beluga gas fields, located on the west side of Cook Inlet, to Anchorage in 1984. The line is routed around the Knik Arm of Cook Inlet, which allows it to supply Palmer, Wasilla, and other communities in the Matanuska-Susitna Borough on its way to Anchorage. The line is 20 inches in diameter, 102 miles long, and can deliver 200 million cubic feet of natural gas per day. The Beluga gas fields also power a gas-fired turbine electric generation plant located near the fields, which supplies Anchorage with much of its electricity.

Haines-Fairbanks Pipeline. In 1955 the U.S. Army Corps of Engineers completed a petroleum multi-product pipeline from the Port of Haines to military installations in and near Fairbanks, including Eielson Air Force Base, Fort Wainwright, and Fort Greely. The line runs 626 miles, generally paralleling the Haines Highway to Haines Junction, Yukon Territory, and the Alaska Highway and Richardson Highway to Fairbanks. Product flow, typically 12,000 to 20,000 barrels per day, could be boosted to a maximum of 27,500 barrels per day by operating all nine of the pipeline's supplementary pump stations. The 8-inch-diameter line was constructed as a supply line for diesel fuel, jet fuel, aviation gasoline, and automotive gasoline. Most of the line was surface-laid, and pressure changes in the line as a result of ambient temperature increases or decreases were troublesome. The Defense Fuel Office of the U.S. Air Force ceased operation of the line in 1980, and pipe itself has been dismantled and most of the pipe salvaged. The military's fuel needs in Interior Alaska are currently supplied by Williams refinery in North Pole that draws crude oil from the Trans-Alaska Pipeline.

Kenai Natural Gas Pipeline System. This was the first natural gas pipeline built to connect the oil and gas fields on the Kenai Peninsula to Anchorage. The Kenai Pipeline System was constructed by Enstar Natural Gas Company in 1960. The original pipeline was a 12-inch-diameter, 85-mile long facility. A second 12- to 16-inch-diameter pipeline was laid alongside the original in 1978. Two supplementary pumping stations were also added to the line to increase its capacity to its present level of 190 million cubic feet of natural gas per day.

Nikiski-Anchorage Pipeline. Built by the Tesoro Alaska Petroleum Company in 1976, the Nikiski-Anchorage pipeline is designed to move diesel fuel and lighter products from

Tesoro's Nikiski refinery to Anchorage. The 70-mile-long line is buried, ten inches in diameter, and has a normal operating level of 32,000 to 36,000 barrels of petroleum products per day. With its terminus at the Port of Anchorage, the pipeline can support export of petroleum products or local distribution. Currently, most of the product shipped through the line is Jet-A fuel destined for the Ted Stevens Anchorage International Airport.

Whittier-Anchorage Pipeline. Constructed by the U.S. Army Corps of Engineers in 1967, the Whittier-Anchorage pipeline was built to provide a means to supply petroleum products to the military facilities in the Anchorage area on a year-round basis. Although no longer the case, at the time of its construction, the Port of Anchorage was occasionally inaccessible during the winter due to ice and channel conditions in Cook Inlet. In addition, the petroleum-oil-lubricant (POL) dock in Whittier, built with the pipeline, can accommodate T-5 class super tankers. The line is 62 miles long, eight inches in diameter, and is buried for its entire length. In 1995, Enstar obtained a lease for the pipeline and now provides natural gas service to communities between Anchorage and Whittier. The normal operating level is 20 million cubic feet of natural gas per day.

PUBLIC TRANSPORTATION

Anchorage has the largest public transportation system in Alaska, providing People Mover bus service, Share-A-Ride car pool and van pool service, and AnchorRIDES para-transit service. The People Mover bus service operates seven days a week with fifty 40-foot accessible buses for the fixed route service. The system includes 1,200 bus stops, 56 passenger shelters, four transit centers, and five Park and Ride lots. The system's annual ridership, once nearly four million in the 1980s, dropped to 3,316,060 in 1999 as the result of reductions of service. The Share-A-Ride van pool program consists of fifteen active van pools operating between Anchorage and the areas of Girdwood and the Matanuska-Susitna Valley. Many personal cars are used for area car pooling as well. Approximately 8,800,000 annual vehicle miles traveled are eliminated due to this program. Para-transit curb-to-curb service utilizing 35 vans provided 170,000 annual passenger trips in 1999.

Department of Transportation and Public Facilities

MASCOT buses in Matanuska-Susitna Borough

The Mat-Su Community Transit System (MASCOT) began service in August 1999 as a result of a coordinated transportation planning process that involved human service agencies, the department, other state agencies, businesses, and the Community Transportation Association of America. The system includes five buses that each can carry twenty passengers or eighteen passengers with two wheel chairs, and one nine-passenger van, purchased with grant funding from the Federal Transit Administration and the Alaska Mental Health Trust Authority. Monthly ridership for the fixed route bus service was 4,000 in March of 2001.

Commuters between the Matanuska-Susitna Borough and Anchorage were offered a new way to get to work in late 1999. The Anchorage People Mover system teamed up with the new Mat-Su Community Transit System to provide commuter service between Wasilla and Palmer in the Valley and Anchorage. Called the Southcentral Connection, the system charges a single fee that permits riders from Mat-Su to transfer to Anchorage buses at the Eagle River Transit Center. The linked service provides three round trips per day, Monday through Friday, and carried over 554 passengers in June, 2001.

The Fairbanks North Star Borough Metropolitan Area Commuter System (MACS) system has eight 30-foot buses. The system operates seven buses during peak hours, four during off-peak, and moved 252,367 passengers in 1999. The Borough also operates five para-transit vans that in 1999 provided 23,215 rides for the elderly and disabled.

In 1998, the Kodiak Area Transportation System (KATS) began operation with two vehicles as the first transit system in the community. Service was suspended in October 1999 pending reorganization under the management of the Senior Citizens of Kodiak. Service on a more limited basis resumed in 2000.

A coordinated transportation planning process in the Central Kenai Peninsula resulted in the start of Alaska's first transportation brokerage (CARTS) in September 2000 that serves the greater Kenai-Soldotna area. Monthly ridership had reached over 2,800 by the end of the first year of operation.

BICYCLE/PEDESTRIAN FACILITIES

The Southcentral region has some of the best and some of the worst conditions in the state for bicycling or walking. Anchorage has won national recognition for its extensive urban trail system, which provides safe, easy access to much of the city for bicyclists, pedestrians, and skiers. On the other hand, the city and some nearby communities also are criticized for building multi-lane, high volume, high-speed roads without shoulders, bike lanes or sidewalks. Often if sidewalks exist, they are immediately adjacent to the curb, offering little separation from the traffic and filled with snow cleared from the highway for much of the winter. The percentage of working population that bikes to work in Anchorage and Fairbanks and Palmer are above the national average. Elsewhere in the region, numbers are lower.

Like other regions, there is growing demand for pedestrian and bicycle accommodations in this area of Alaska. Like Southeast, bicycle touring in Southcentral Alaska is growing in popularity among visitors. The initiative to upgrade the National Highway System routes in the state to current design standards, including minimum six-foot wide paved shoulders, is making dramatic improvements in conditions for bicyclists. Residents in communities along the highways have begun to request pathways along the roads in their communities, particularly between schools and nearby residential developments and business districts.

overview SOUTHWESTERN, YUKON-KUSKOKWIM DELTA AND NORTHWEST ARCTIC ALASKA

For the purposes of this document, these three areas are combined into one large region because the transportation system in these areas is similar in structure and is closely identified with the population, economy, and resources of the region. The collective area extends from Kodiak Island, south to the Aleutian Islands, west to Point Hope, Nome, and Kotzebue, and north to Barrow.

The Southwestern, Yukon-Kuskokwim Delta, and Northwest Arctic region has the biggest area and the smallest population. The fact that the larger region is entirely off the road system unites these three distinct areas. Nearly all communities and settlements are accessible only by air, although some have summertime barge/ferry service as well. Consequently airports or air strips are common in virtually all communities. The minimal transportation structure in the larger region has been shaped principally by the catching, processing, and shipment of seafood. Only Nome has a significant public road system, with three 70-80 mile-long gravel highways radiating from its center. This road system dates back to the turn of the century when Nome was a center of gold mining activity. The only other long-distance road in the region enables the transport of the lead and zinc resources of the Red Dog Mine to the Alaska coast north of Kivalina, and from there by barge or air to market.

WATERBORNE TRANSPORT

Four ports in this area, Kodiak, Unalaska/Dutch Harbor, Bristol Bay, and Kotzebue, have annual traffic volumes normally exceeding 100,000 tons each. Other areas with significant activity include Dillingham, Bethel, Nome, and Barrow. Each of these has a service area of considerable size. Additionally, there are many small ports, most with seasonal activity, usually related either to fishing or the import of goods for local residents.

A major influence on traffic patterns in much of this region is the seasonal nature of marine access. North of the Alaska Peninsula, most ports are closed by ice during much of the year. The ice-free period ranges from four to six months in Lower Bristol Bay to one to two months near Barrow. In addition, those ports above the Alaska Peninsula do not have fixed loading and unloading facilities available, due both to very shallow water, which often extends a considerable distance offshore, and to winter ice action. This lack of fixed facilities requires that cargo for these points be lightered ashore in small lots for beach transfer. This is true even at larger locations such as Nome, Kotzebue, and Barrow. Some ports, like the Port of Bristol Bay at Naknek, provide intermediate depths that serve most small vessels. The net effect is that marine transport is much less cost effective for many points in this region compared to more densely settled and accessible areas.

PORTS

Unalaska/Port of Dutch Harbor—1999 population 4,178. The Port of Dutch Harbor, located on Amaknak Island within the City of Unalaska, is the largest of the region's ports. The port enjoys a strategic position as the center of one of the richest fishing areas in the world, and is strategically located for transshipment of cargo from North America to Asia. In 1998 the port had a total freight volume, incoming and outgoing, of nearly 800,000 tons. Of this, fish was the primary product at 383,250 tons, petroleum products followed at 293,500 tons, and general freight made up the remainder, 122,930 tons. Of the seafood handled at the port, 298,550 tons was processed in Unalaska; the remaining 84,700 tons included relayed freight or at-sea production offloaded and shipped from the port. Unalaska has ranked as the number one U.S. community for seafood volume since 1988 and has been number one in seafood value since 1992. The port is the principal petroleum distribution center in the region; petroleum products are generally received from West Coast and Alaska refineries directly by small tankers and tank barges.

Department of Community and Economic Development

Aerial view of Dutch Harbor/Unalaska

With the expansion of the city's dock facilities in 1991, Unalaska/Dutch Harbor's role as a trans-shipment center grew substantially. Both American President Lines and CSX have established U.S. Far East routes via Unalaska/Dutch Harbor. Seafood products from Southcentral Alaska and Kodiak are transferred to Asia-bound ships at the city dock. The community's location, only a few miles from the trans-Pacific shipping lanes (on the great circle route), facilitates the growth of this service. In addition, the port serves as a trans-shipment point for smaller Aleutian and Pribilof Island communities such as Akutan, Atka, Nikolski, St. Paul and St. George. Container service is provided to the port by ships operating from Anchorage and Kodiak, and by coastal barges in the Bering Sea, the Aleutians, and along the Alaska Peninsula. Direct container ship service is also provided to Japan on a weekly basis for seafood export by American President Lines and to Tacoma by CSX Lines. Unalaska has a small but growing tourist industry and a new Convention and Visitors Bureau. In 1997, eight cruise ships brought over 6,000 visitors to Unalaska.

Kodiak—1999 city population 6,893. Kodiak is the second largest port in the region. Similar to Dutch Harbor, it is a major seafood port, fifth in the nation in volume in 1998 with 178,800 tons landed. Although the volume of seafood changes from year to year, Kodiak has been in the top three in value of landings for the past ten years. The port also handles over 100,000 tons of general freight each year. In 1999, 108,998 tons of general freight were received. The port also receives or ships about 65,000 tons of petroleum each year to surrounding communities. The port serves as a trans-shipment point for goods bound for Southwestern Alaska. Service is provided for inbound cargo and outbound seafood by container ships from Anchorage. Seafood exports to Japan move directly to that destination by container ships or are transferred at Unalaska/Dutch Harbor. Inbound raw seafood and outbound goods distributed to other points are serviced by small container ships and a number of tug-and-barge operators. The overall volume of freight is expected to increase with development of the Kodiak Launch Complex, a space vehicle launching site, that will require regular shipment of large equipment, support materials, launch vehicles, and fuels. In addition, in 1998 the Free Trade Zone Board approved the state's application to establish a free trade zone in Kodiak in conjunction with the launch complex.

Bristol Bay Borough—1999 population 1,258. Since 1983, the Port of Bristol Bay at Naknek has been the shipping center for the region. Frozen salmon and herring go by reefer barges to Dutch Harbor for shipment to the Far East. Canned salmon is back-hauled to Seattle for shipment to England. Some species now have sufficient value that they are flown to Anchorage for processing and trans-shipment. The port handles over one million pounds of salmon each year. Petroleum is received by barge, primarily from distributors in Unalaska/Dutch Harbor with a lesser amount coming directly from West Coast or Alaska refineries. The petroleum is pumped to the local electrical co-op and is hauled by truck to the King Salmon Airport (formerly the King Salmon Air Force Base). The port is open from April through November and maintains a "barge draft" depth of sixteen to eighteen feet. Dillingham provides similar port services but on a smaller scale.

Department of Community and Economic Development

Bethel

Bethel—1999 population 5,471. Bethel offers a barge-draft port on the Lower Kuskokwin River. It is a distribution center for the region and a trans-shipment point for traffic moving up the river. In 1999 the port handled about 20,000 tons in general freight plus 36,000 tons of petroleum products and 60,000 tons of gravel/aggregate. Most of the general freight comes from Seattle while the petroleum comes through Unalaska/Dutch Harbor. About one-third is trans-shipped to communities up river. Gravel/aggregate is moved down the Kuskokwim River to Bethel from up-river sources; the amount of gravel/aggregate may decrease or increase by 50 percent depending on the demands of construction projects.

Kotzebue—1999 population 2,932. Handling about half the volume of the larger port of Bethel, Kotzebue is the trans-shipment point for goods moving up the Kobuk River. Like Bethel, its principal commodities are inbound petroleum products moved by barge from Southcentral refineries and fish flown out to Anchorage. Unlike Bethel, Kotzebue has very little gravel/aggregate shipment. In 1999 approximately 26,800 tons of petroleum products were inbound to Kotzebue and 8,375 were outbound to surrounding villages. Waterborne freight service to the port is generally on the order of three or four barges yearly. The shipping season lasts about 100 days, from early July to early October. Due to sediments deposited by the Noatak River, the harbor is shallow. Deep-draft vessels anchor out fifteen miles and cargo is lightered to shore. Given the difficult harbor conditions most freight arrives in Kotzebue by air. Alaska Airlines, the primary cargo

carrier to Kotzebue, delivered 3,000 tons of mail and general freight to Kotzebue in 1999; Lynden Air Cargo delivered 1,750 tons, and Alaska Central Express 900 tons.

Nome—1999 population 3,615. Nome is the "hub" port for the Seward Peninsula. In 1999 it handled about 15,000 tons of general freight. The port also received 30,300 tons of petroleum products, of which about 5,000 tons was redistributed to surrounding villages. In 1999 the port also barged 38,360 tons of gravel to other communities in the region, down from a particularly high volume of 85,000 tons in 1998. The port has berthing facilities for vessels up to eighteen feet of draft and is undergoing major improvements. The Corps of Engineers has nearly completed designs for a new harbor channel entrance and breakwater. The new facilities will provide much greater protection for dock facilities. The City is also providing support for two seasonal floating docks and a boat launch, in part to support the growing fisheries available due to the Community Development Quota (CDQ) program. The special fisheries quota for Nome, established by 1996 legislation, has increased the potential for local fish processing and jobs.

"Nome is the "hub" port for the Seward Peninsula."

St. Michael—1999 population 381. Another smaller Norton Sound port similar to Kotzebue is St. Michael, northeast of the Yukon River delta. About 7,500 tons, chiefly petroleum products, are trans-shipped yearly at this location for movement to points on the Lower Yukon River. St. Mary's, located approximately 100 miles upstream from the mouth of the Yukon, serves as a cargo trans-shipment point for the Lower Yukon. The community features one of the few improved barge dock facilities on the Yukon and also enjoys the largest airport on the lower Yukon.

Barrow—1999 population 4,438. The nation's northernmost port is Barrow. It is a small port with almost no outbound cargo. Inbound items are entirely for the use of local enterprises, residents, and the government. Barge service from Seattle is normally provided only once yearly in August due to ice conditions in the Arctic Ocean. Weather and ice permitting, barge service is provided as far east as Kaktovik. In 1999 Bowhead Transportation's summer barge delivered to Barrow about 1,500 tons from Seattle and an additional 200 tons from Anchorage. The barge also delivered freight to various coastal communities: 500 tons to Prudhoe, 230 tons to Wainwright, 140 tons to Pt. Lay, and ten tons to Pt. Hope. Materials transported range from groceries to modular housing, with building and construction materials being the highest volume. Deliveries are provided by shallow draft tug with a 1,000-ton capacity, 180' lighterage barge that can place freight directly on the beach without benefit of developed dock facilities.

Almost all freight to Barrow comes from the west. In 1993 and 1994, however, Barrow received petroleum products by barge from Hay River, Northwest Territories. The shipment moved from the Great Slave Lake down the Mackenzie River to the Beaufort Sea and west to Barrow. The barge lines bid each year and the successful bid determines who hauls it for that year. With the exception of the 1993/1994 years, all fuel to western Alaska ports comes from refineries in Southcentral Alaska.

Delong Mountains Transportation System. A prime example of transportation improvements designed and built as an intermodal system is the Delong Mountains Transportation System, built in 1988-89 to bring ore from the open-pit Red Dog lead-zinc mine to tidewater. Located 90 miles northwest of Kotzebue in the Brooks Range, it is a self-contained system consisting of the following facilities:

- A shallow water dock used to land general cargo.
- A barge-draft dock for berthing lightering barges to move ore loads off the beach to bulk carriers offshore and for off-loading fuel into the Red Dog facility.
- A 52-mile-long, 22-foot-wide, all-weather gravel road capable of accommodating 72-ton ore trucks, to link the port facilities and the mining area.
- A 6,000-foot gravel airstrip, located 40 miles inland of the port, capable of accommodating Lockheed Hercules, Douglas DC-6, or Boeing 727/737 aircraft.

Construction of the Delong Mountains Transportation System was financed by $103 million in revenue bonds issued by the Alaska Industrial Development and Export Authority (AIDEA) and an additional $77 million in state appropriations. The System supports the Red Dog mining operations by transporting ore concentrate, commodities and fuel oil. Annual throughput increased from 809,000 tons in 1995 to 1.1 million tons in 1998. The ore concentrate is shipped between mid-July and late October when the Chukchi Sea is ice-free. Concentrates are lightered to ocean-going vessels moored about four miles offshore. About half of the concentrate is barged to British Columbia and about half is shipped to Japan, Korea, and Europe. The mine employs about 350 workers who reside in dorms on the site. Mining staff rotations and transient workers constitute the major passenger movements and occur primarily through air service. Fresh supplies are flown in weekly from Anchorage. General freight is delivered by barge to the port site during the summer and trucked to the mine.

The ore bodies now identified in the Red Dog mineral zone make it the largest discovery in the world, exceeding the Broken Hill Mine in Australia which has a 100-year mining history. A 1993 study of the Delong Mountains Transportation System concluded that the system is "well maintained, in good condition, and generally capable of receiving and handling an increased volume of bulk fuel and commodities...and an increased volume of lead-zinc concentrate given modifications to the ship loader and...storage building."

Department of Community and Economic Development

Delong Mountains Road supporting the Red Dog mining operations

A planned $160 million expansion of the port includes a proposal to build a 2,700-foot extension to the present dock and to dredge 10,000 feet of shallow offshore sediments, allowing direct loading of ore concentrates into Panamax-class ocean vessels. Presently, ore is shuttled in smaller barges from the dock out to a ship anchored in deeper water offshore. Benefits of such an expansion include allowing large quantities of concentrates to be shipped, as well as extending the present three-month season on both ends because vessels wouldn't have to contend with shore-fast ice near shore. The development of a deep-water port also offers the potential for developing the vast bituminous coal reserves to the north, which could be connected to the port with a rail spur. Finally, the port could serve as a regional hub for delivery of other bulk materials. For example, fuel could be stored at the port and then flown to villages, at great savings as many of these communities now receive fuel by air from Fairbanks. The presence of natural gas in local shale formations adds to the potential for the port to serve as a regional hub, possibly providing area villages with natural gas and displacing diesel fuel that now must be shipped in at considerable expense. The feasibility study by the U.S. Corps of Engineers was completed in late 2000, to be followed by permitting and construction, with the first shipment of ore in 2007-2008.

Other Ports. Like Southeast Alaska, this area has a number of small ports scattered along the coast. In this region, however, the ports are generally smaller and farther apart. Their commodity volume distribution tends to be much like that of the larger centers. The total for all the smaller ports is about 100,000 tons. About 65 percent of this number consists of petroleum products and twenty percent consists of seafood.

HOVERCRAFT

The Alaska Hovercraft JV was proposed in 1991 and again in 1994 to transport mail from Bethel to seven villages along the Kuskokwim and Johnson Rivers. As early as 1973 a firm had proposed using "air cushion vehicles" in the Bethel region and in the early 1980s the State of Alaska, with a federal grant, conducted a demonstration of the use of hovercraft in Bethel. The U.S. Postal Service responded to the 1994 Alaska Hovercraft JV proposal by preparing an Environmental Assessment and holding public meetings throughout the region. The Postal Service authorized Alaska Hovercraft JV to

operate as a demonstration project from July 1997 to July 2000. The Postal Service has been sufficiently satisfied with the service that it is planning to continue the service through July 2006. The hovercraft replaces transport of non-priority and bypass mail by fixed-wing airplanes. However, first class and priority mail continues to be flown to the villages served by the hovercraft.

The use of hovercraft to deliver mail is by no means free of concerns. Many villagers have complained about the reduced mail delivery schedule, the noise generated, and impacts to subsistence hunting and fishing. If hovercraft service is sustained in the future, landing ramps and loading docks will likely be constructed to better accommodate the loading and unloading of mail and freight.

From July 1997 through February 2000 the hovercraft delivered over 5,140 tons of bypass mail to the villages. In addition, it carried some general freight, occasional passengers, and it has served as a "medivac" unit during inclement weather. A Hovercraft Committee, consisting of regulatory agencies and local communities, meets periodically to assist with fine tuning the hovercraft operations and monitoring the overall program. For more information on mail delivery in the region, see the "air transport" section below.

Department of Transportation and Public Facilities

Unloading Hovercraft freight in Kuskowim region.

THE SOUTHWEST ALASKA MARINE HIGHWAY SYSTEM

The Alaska Marine Highway System connects Kodiak with the Southcentral ports of Homer and Seward with service four times per week (See Figure 2.11). It is primarily used by passengers with vehicles. The system provides seasonal service from Kodiak to the Southwest ports of Chignik, Sand Point, King Cove, Cold Bay, False Pass, Akutan and Unalaska/ Dutch Harbor. This service is provided six times each year during the late spring, summer, and early fall. In 1999 the Southwest Alaska Marine Highway routes carried 38,794 passengers, 372 freight vans, and over 12,000 personal vehicles. The Southwest traffic figures indicate a volume difference in passenger ridership of about 700 percent between summer and winter. The new M/V Kennicott provides a periodic link between Southcentral and Southeast routes, thus connecting such distant coastal communities as Metlakatla and Unalaska.

AIR TRANSPORT

Because of the long distances, air travel is much more prevalent in the Southwestern/ Yukon-Kuskokwim Delta/ Northwest Arctic Alaska region than in other parts of the state. Major locations having the capability to handle jet aircraft include: Kodiak, Cold Bay, Unalaska, Adak, Amchitka, Shemya, King Salmon, Dillingham, Bethel, Aniak, McGrath, St. Mary's, Unalakleet, Nome, Kotzebue, Barrow, and Galena. McGrath and St. Mary's airports have been decertified, which means they can handle jets but there is a limit on passenger service. Cold Bay is the center for Alaska Peninsula and Aleutian Islands service, whereas Bethel, Nome, Kotzebue, Barrow, and Galena are hubs for widespread local commuter service. Air connection to the remainder of the state is mostly through Anchorage. For Barrow, air connection is through Fairbanks or Anchorage. Figure 2.18 displays the passengers enplaned during 1999 for the larger Southwestern, Yukon-Kuskokwim Delta, and Northwest Arctic Alaska area airports. Air operations in the region, however, are dominated by air taxi and general aviation craft. Kodiak, for example, had 1,690 operations by air carriers in 1999 but 21,000 operations involving air taxi and general aviation. Kodiak, as a major U.S. Coast Guard base, had nearly 16,000 military operations in 1999.

FIGURE 2.18 ENPLANEMENTS IN SOUTHWEST, YUKON-KUSKOKWIM, AND NORTHWEST ARCTIC ALASKA, 1999

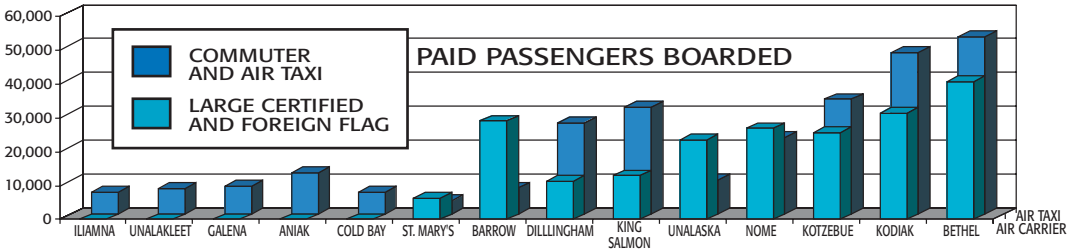


TABLE 2.3 ENPLANEMENTS IN SOUTHWEST, YUKON-KUSKOKWIM, AND NORTHWEST ARCTIC ALASKA, 1999

	Iliamna	Unalakleet	Galena	Aniak	Cold Bay	St. Mary's	Barrow
Air Taxi	6,360	7,331	8,246	12,102	3,912	6,305	7,567
Air Carrier	0	0	0	0	6,180	0	29,053

	Dillingham	King Salmon	Unalaska	Nome	Kotzebue	Kodiak	Bethel
Air Taxi	26,932	31,414	9,991	22,590	33,785	47,686	52,282
Air Carrier	11,308	12,902	23,426	26,925	25,566	31,415	40,867

The network of air routes, especially at the regional hub-to-village level, is determined to a large extent by the parcel post delivery policies of the U.S. Postal Service. Under the current system, virtually all mail, even parcel post, moves by air. The U.S. Postal Service is mandated to provide "uniform and universal service" to all locations in the country. This means that mail that would normally travel by surface carrier in the lower 48 must be carried by air to those communities off the road system in Alaska. In 1998 the U.S. Postal Service paid Alaska air carriers $114 million to ship mail around the state. Of this $49 million went to carriers serving rural villages. Because the U.S. mail provides the lowest rates to move all kinds of goods to roadless communities, nearly all rural residents and businesses use this service for most of their freight needs. The cost savings are substantial: for example, a 70-lb. package mailed from Anchorage to Dillingham by commercial air would cost $49.00, by priority mail $33.60, and by parcel post $5.60.

The mail and goods moving as mail are shared equally by all the air carriers offering regularly scheduled service within a similar time frame. Anchorage-originating bypass mail hubs are: Aniak, Bethel, Cold Bay, Dillingham, Emmonak, Galena, Iliamna, King Salmon, Kotzebue, McGrath, Nome, Port Heiden, Saint Mary's and Unalakleet. Fairbanks-originating bypass mail hubs are Barrow, Galena and Fort Yukon. In 1999 over 81 million pounds of by-pass mail was delivered from Anchorage and nearly fifteen million pounds from Fairbanks.

Bypass mail is used principally to ship wholesale goods to retail stores. The goods consist mostly of food products and consumer goods addressed to a limited number of consignees whose orders exceed 1,000 pounds. Shippers in Anchorage package, weigh, affix postage, palletize and shrink-wrap the goods ordered by village stores. They deliver these pallets directly to air carriers in Anchorage or Fairbanks, thereby bypassing the post office. The palletized and shrink-wrapped goods are weighed at the airports, affixed with postage, and flown to the communities serving as hubs. This is called main-line service. Out of Anchorage to Kotzebue, for example, main-line service is provided by Alaska Airlines Air Cargo Express, which flies both freight and passengers, and Northern Air Cargo and Lynden Air, which fly freight only. At the hub, by-pass mail destined

for remote villages is broken down into smaller packages and transferred to smaller planes for delivery there. At Kotzebue, for example, the regular and bypass mail is transferred to smaller commuter carriers that serve the outlying communities linked to the Kotzebue hub.

HIGHWAYS

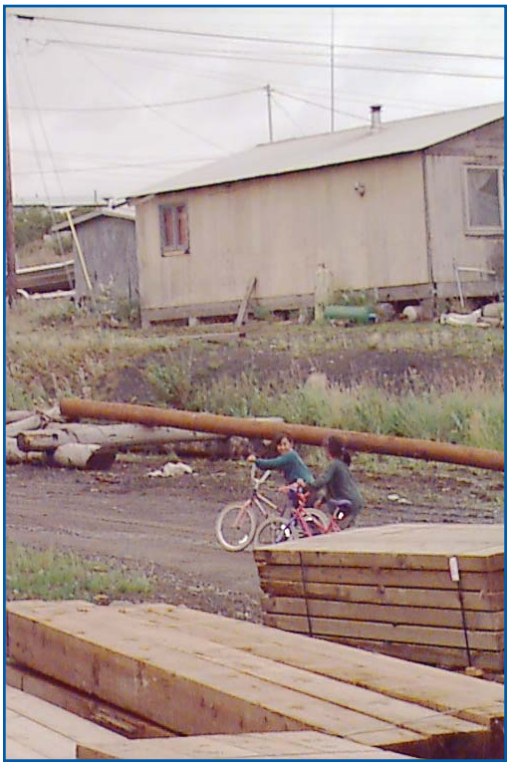
Seward Peninsula Roads. From Nome, located on the southern coast of the Seward Peninsula, three gravel roads extend to the northeast, north, and northwest. The Nome-Council Highway (Council Road) is about 75 miles long and connects Nome to the settlements of Solomon and Council to the east; the AADT at mid-point is about 100. The Nome-Taylor Highway extends about 70 miles north of Nome. Only about the first thirteen miles are maintained by the state. The third route, the Nome-Teller Highway, runs 71 miles to the north and west to Teller, located on Port Clarence. There is also a 7.8-mile spur leading to the village of Wooly Lagoon. Traffic volume on the Nome-Teller Highway is about 2,000 near Nome but decreases to 50 AADT at the Sinuk River twelve miles from Teller.

PUBLIC TRANSPORTATION

The North Slope Borough operates a transit system in the City of Barrow and seven other villages in the borough. In Barrow the system includes seven buses with three thirty-foot buses operating at any given time. In the villages it includes one or two small buses. Barrow's system, the Inuich Commuter Express, or ICE, has annual ridership totaling 325,000. Paratransit service is available in Barrow and the villages as well.

BICYCLE/PEDESTRIAN FACILITIES

The Southwestern, Yukon-Kuskokwim Delta and Northwest Arctic region has some of the highest walk-to-work percentages in the nation. A 1990 census showed that more than 60 percent of the working population in areas of the North Slope and Seward Peninsula, over 58 percent in the lower Yukon and lower Kuskokwim census areas, and over 42 percent in Kotzebue walked to work. This high rate is in part due to the compact size of the villages and the compact street networks of the larger regional hubs. Village layouts typically allow one to easily walk from home to work within a few minutes. However, the very high cost of gasoline, lack of trained automobile mechanics, and high automobile shipping costs also play a role.



Department of Transportation and Public Facilities

Children riding bicycles in Mountain Village

The high cost of vehicle ownership has led to the use of all-terrain-vehicles (ATVs), bicycles, or foot travel. Less expensive to buy and operate than cars and trucks, ATVs burn less fuel and do not require a license. For many communities, walking and bicycling will remain important means of transportation for years to come.

conclusion

CONCLUSION

The Alaska economy, and the Alaska experience, is defined in large measure by the state's transportation system. The system is unique in the United States. This uniqueness is found in components that are "world class"—each year 100 million tons of crude oil are shipped from the Port of Valdez, nearly 400,000 tons of fish are shipped from Unalaska, 600,000 passengers arrive by cruise ship in Southeast, and air freighters

land 33,000 times at Ted Stevens Anchorage International Airport. The uniqueness is created by transportation modes not found in other states: a state ferry system that is a federal highway, sea lift barges that provide once-a-year service to Arctic Ocean ports, and hovercraft that transit the rivers of the Yukon-Kuskokwim Delta to deliver mail to villages. And the uniqueness is found in those components that express Alaska's unique history: the White Pass and Yukon Railroad from Skagway, the Yutana Barge Lines service to Yukon River villages, and the thousands of small airplanes that provide Alaskans with access to rural communities, homesteads, and recreation areas.

Alaskans have created this unique system to serve their needs. It is a highly intermodal system, integrating many ways to move people and freight, and it is a highly expansive system, reaching across thousands of miles to serve remote communities and access remote resources. It is also a young system, a "work in progress," and it is because of this youth that thoughtful planning and investment now is critical.

projections

SOCIAL AND ECONOMIC PROJECTIONS

population economy

ALASKA'S POPULATION AND ECONOMY: 1959—2020

Alaska's population and economy shape our current and future transportation needs. This chapter describes many dimensions of population growth and economic change in Alaska, looking both to the past and the future. The chapter concludes with three growth projections—high, medium, and low—and a discussion of the implications for transportation. The sections in this chapter include:

- an overview of population and economic changes
- trends and projections in employment
- personal income and price levels
- demographic changes
- regional population and economic trends
- projections for the future
- implications for the transportation system

overview

OVERVIEW OF POPULATION AND ECONOMIC CHANGES

Between statehood in 1959 and the end of the century Alaska's population came close to tripling, the number of jobs quintripled, and real—adjusted for inflation—personal income increased almost sevenfold. That impressive growth in 40 years was not steady but rather came in cycles of very rapid growth followed by periods of consolidation. Table 3.1 shows the growth in population, the increasing median (average) age of the population, and the increase in real personal income. The table also lists "wage and salary employment"—those individuals who are employed by others—and total employment, including self-employment. Historically, the self-employed in Alaska included a large percentage of miners, but now this category also includes a large number of small business owners, proprietors, and fishers.

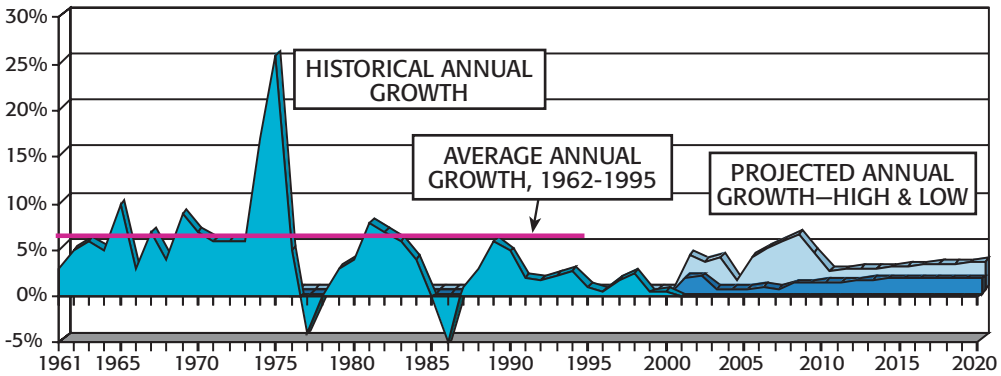
TABLE 3.1 SOME INDICATORS OF CHANGE—An Alaska Snapshot

	1960	1970	1980	1990	1999*
Population (thousands)	230,400	308,500	410,800	553,171	622,000
Median Age	23.3	22.9	26.0	29.3	32.4
Real Personal Income (in millions)	$2,470	$4,901	$8,696	$13,417	$17,124
Wage & Salary Employment	56,900	92,500	170,00	236,200	289,200
Total Employment	94,320	133,420	211,350	285,570	340,000

**all 1999 figures are estimates*

This chapter is based on a report prepared by the Institute of Social and Economic Research, University of Alaska Anchorage, for the department in 1997. Data have been updated to 1999 from original sources such as the Alaska Department of Labor and Workforce Development.

FIGURE 3.1 ANNUAL WAGE AND SALARY EMPLOYMENT GROWTH: HISTORICAL AND PROJECTED



Alaska's economy is volatile because it depends so much on natural resource industries in general and the petroleum industry in particular. Resource industries are subject to quick changes as world market conditions change. Most of the ups and downs in the Alaska economy for the past 30 years can be traced in one way or another to oil development and oil prices, especially to the oil revenues the state government collects from that development.

> *"Alaska's population in 2020 will likely be 870,000, about 40 percent larger than it is today."*

From now until the year 2020, much slower growth in population, jobs, and income is expected primarily due to the decline in oil production. The state government's role in the economy will decline because it will have less oil money to spend. Resource industries will continue to be the mainstay of the economy, with petroleum, mining, and tourism having the most potential for growth. Figure 3.1 shows historical growth in jobs and the potential range of future growth.

Based on past growth and present trends, Alaska's population will most likely grow at a rate of about two percent per year and in 2020 would be 870,000, about 40 percent larger than it is today. It could, however, be anywhere from 20 to 80 percent larger. If population trends of the past 20 years continue, the Department of Labor and Workforce Development places the expected population in 2018 at 776,488. There will most likely be an increase of about 30 percent in the number of jobs in 2020, but the increase could be as little as 10 percent or as much as 80 percent. Future growth, like past growth, will not be smooth but cyclical—although the cycles will likely be more moderate.

A BRIEF ECONOMIC HISTORY

When Alaska became the 49th state in 1959, it had a small economy dominated by military activities (payroll, purchases, and construction). There were 32,680 uniformed military personnel in Alaska in 1960, comprising 14.2 percent of the population. Commercial fishing, logging, and mining were the dominant components of a relatively small private economy. But high costs and a risky investment climate limited development. Formation of the new state government, development of the Cook Inlet oil field, and rebuilding after the 1964 earthquake fueled a cycle of economic growth in the mid- to late-1960s. More local businesses began opening, supplying goods and services that hadn't been available until then; this growth in support industries was the start of a trend that has continued until the present.

By the end of the 1960s, oil companies had discovered the Prudhoe Bay oil field, the largest in North America. Construction of the Trans-Alaska Pipeline System (TAPS) to carry oil south from Prudhoe Bay to the port of Valdez on Prince William Sound sparked an economic boom from 1974 to 1977. Tens of thousands of people were drawn to the state by the hope of high-paying jobs. The rapid growth in local service jobs also continued during the 1970s; state and local government employment rose sharply.

Oil production from Prudhoe Bay started in 1977 but it was in the early 1980s that a combination of circumstances brought the state government billions of dollars in oil revenues. First, because the state owns the Prudhoe Bay oil field, it collects royalties as well as taxes from North Slope production. Second, oil production steadily increased from the late 1970s through the early 1980s. And, the Iran-Iraq war allowed the Organization of Petroleum Exporting Countries (OPEC) to triple oil prices between 1979 and 1981, thus increasing the value of Alaska's oil.

Oil revenues were at their peak in the first half of the 1980s. The state government used the revenues in ways that reached throughout the economy, including construction of new public facilities, increased aid to local governments, subsidies for home mortgages and other loans, and annual cash payments of dividends—the Permanent Fund Dividend—to virtually all Alaskans. This spending created the largest economic boom to date in Alaska. It not only boosted direct state and local government employment, but also created thousands of new jobs in private industry.

But by 1985, Alaska had begun to move into recession as the massive state spending couldn't be sustained. And when world oil prices crashed in 1986, Alaska faced a severe recession. In 1988—after losing ten percent of jobs statewide—Alaska's economy began to recover, and the recovery was boosted by substantial spending for clean-up in the aftermath of the 1989 *Exxon Valdez* oil spill.

Through the 1990s economic growth was slower than in previous decades. North Slope oil production peaked in 1988; since then, declining production and generally lower oil prices have reduced state income. Overall, population, jobs, and income have continued to grow, but mainly trade and service industry jobs have been added to the economy since 1990.

Department of Community and Economic Development

Prince William Sound

THE SECTORS OF THE ECONOMY

The structure of Alaska's economy has changed over time, with changes in the relative size of various sectors. This document groups Alaska's industries into four sectors: basic, infrastructure, support, and state/local government.

Basic industries bring money into Alaska either by selling goods and services outside the state or selling to non-residents visiting the state. Basic industries are oil and gas, mining, seafood harvesting and processing, forest products, agriculture, tourism, and international cargo handling. Federal government spending is also included in this sector because it brings money into the state from taxpayers nationwide.

Infrastructure industries make money mainly by selling goods or services to other industries, although some of their sales are to consumers. These industries include construction, transportation, communications, public utilities and communications, and business services.

Support industries include trade, finance, services (excluding business services) and miscellaneous manufacturing for the Alaska market. These industries sell services and goods to Alaska consumers and to a lesser extent to other industries.

State and Local Government are often included in the support sector, because they provide services to residents. In Alaska they are considered separately because they are such a large part of the economy and because they depend so much on petroleum revenues.

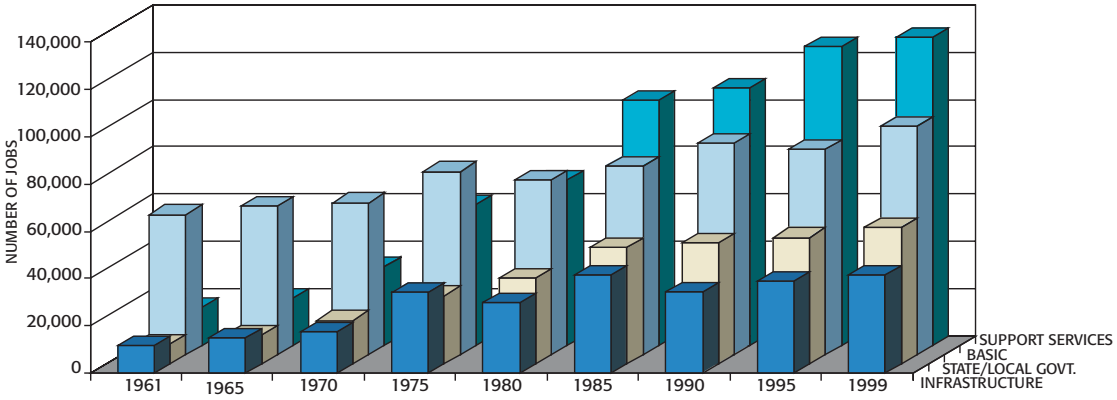
Each of these sectors has changed in different ways over the years. In 1961, 63 percent of the 94,000 jobs were in basic industries—the federal government (about two-thirds

military personnel and one-third civilian workers), natural resource industries, and tourism. Jobs in infrastructure industries made up another twelve percent of the total, and many of those jobs directly supported federal military activities. Support industries contributed sixteen percent and state and local government nine percent.

By 1999, just 28 percent of Alaska's 340,000 jobs were in basic industries. Infrastructure jobs still made up twelve percent of the total, but the share of support industry jobs had leaped to 43 percent and state and local government jobs had increased to seventeen percent.

The different growth rates among the industry sectors changed the composition of employment over time, as shown in Figure 3.2. The support sector grew the fastest, benefiting from growth in population, household income, basic sector activity, and government spending. The enormous influx of petroleum revenues and a growing population boosted the number of state and local government jobs. The infrastructure sector grew at the same rate as the overall economy. Despite strong growth in tourism, basic industry jobs didn't grow nearly as fast, and since 1990 the number has dropped slightly—due mostly to military cutbacks but also to reduced oil and gas employment as North Slope production declines.

FIGURE 3.2 ALASKA EMPLOYMENT BY SECTOR, 1961-1999



TRENDS AND PROJECTIONS IN EMPLOYMENT

BASIC INDUSTRY SECTOR

The basic industries that bring money into Alaska include oil and gas, mining, seafood harvesting and processing, forest products, agriculture, tourism, and international cargo handling. Past and future trends for each is discussed below.

OIL AND GAS

Past Trends: The number of direct jobs in the petroleum industry increased rapidly from the early 1970s to 1990, peaking at just over 10,000. Since then the number of jobs has fallen to nearly 8,000 as shown in Figure 3.3. Petroleum industry jobs, concentrated on the North Slope and in Anchorage, comprised 4.4 percent of total statewide employment in 1990 but, despite brief increases related to exploration, dropped to 3.3 percent in 1999. The industry, however, creates many indirect jobs not included in these figures—jobs in exploration and development and in construction, transportation, wholesaling, and business services—because of large procurement budgets and capital spending. These jobs are all among Alaska's highest paid.

A measure of the oil industry's economic importance is its contribution to gross state product (GSP). GSP is the value of everything that businesses and government in Alaska produce in a year. It is for Alaska what the gross domestic product (GDP) is for the United States. Because the oil industry is capital intensive, it contributes a larger share of GSP than of jobs. In 1965 oil and gas contributed three percent of the $1.2 billion GSP. In 1999 oil and gas directly contributed about 40 percent of the $24.49 billion GSP, as shown in Figure 3.4. It is also indirectly responsible for some GSP in the sectors of state/local government, support, and infrastructure.

FIGURE 3.3 ALASKA BASIC SECTOR EMPLOYMENT, 1961-1999

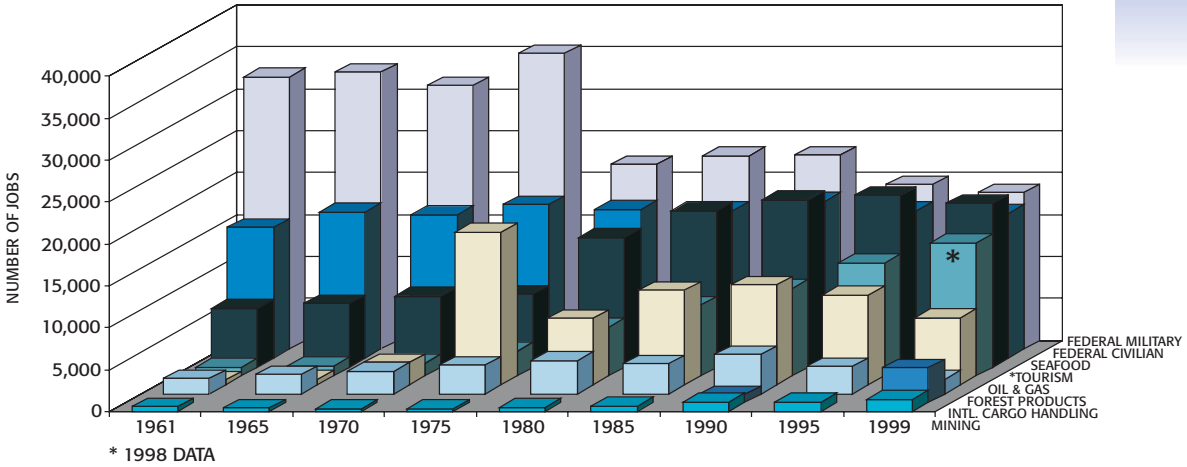
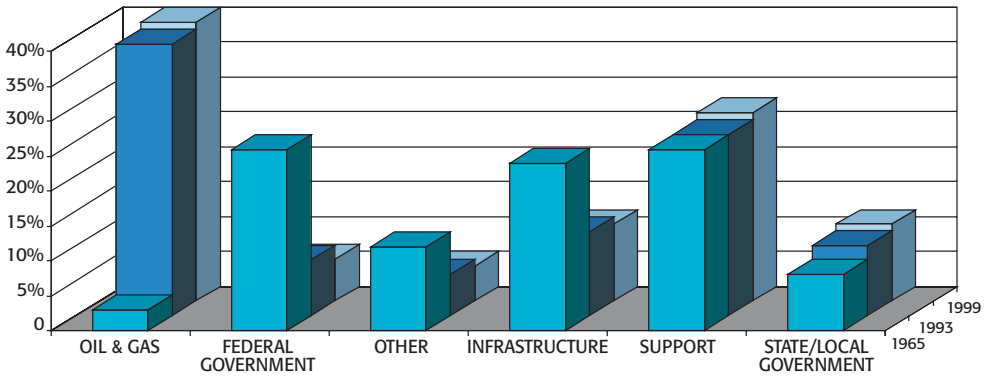


FIGURE 3.4 CHANGE IN ALASKA'S GSP SHARES, 1965-1999



Future Trends: North Slope production peaked in 1988 and has declined at about four percent annually since then to a level of 1.06 million barrels a day in early 2000. In part the low price for oil during the late 1990s diminished the incentive for investments in drilling and production. The Alaska Department of Revenue in mid-2001 projected oil prices will average about $24 per barrel for 2002 and 2003, potentially creating new investments and jobs. The Department of Revenue expects production to continue a declining trend to a level below a million barrels per day by 2006. The overall trend will be interrupted by short-term production increases in new oil field development. On December 2, 1999 the State of Alaska, BP Amoco and ARCO, Inc. entered a charter for development of the Alaska North Slope. A consent decree by the Federal Trade Commission to allow the merger followed. At the request of the State, ARCO's Alaska assets were sold to Phillips Petroleum Company, forming Phillips Alaska Inc.

A major factor for expanded employment in the petroleum industry is the potential opening of the coastal plain of the Arctic National Wildlife Refuge (ANWR) to oil drilling. This was the subject of much debate during 2001, due to the new policies and priorities of the Bush administration. The Securing America's Future Energy Act of 2001

was approved by the House of Representatives in August 2001. If passed by the Senate, this act would open ANWR to oil drilling in an attempt to increase domestic oil sources for America.

The September 11, 2001 terrorist attacks resulted in the losss of over 4,000 American lives and sent the U.S. stock market reeling. Oil prices rose sharply and then fell significantly lower in the weeks following the attack, sparking fears of a nationwide, and perhaps global, economic recession.

The terrorist attacks came at a critical point in the debate to open ANWR, and are widely expected to shift the emphasis of Americans from wildlife and conservation to the need to develop domestic energy sources. In the aftermath of the attacks, the SAFE Act is considered by many as likely to pass.

Another potentially major factor in employment in the petroleum industry in the future is natural gas. If transportation costs from the North Slope to Asia can be reduced, enough to make North Slope gas competitive with gas from other sources, Alaska could see construction of a gas pipeline and sales to the growing Pacific Rim market. There have been several attempts to commercialize large-scale development of the natural gas resource on the North Slope. In 1999 two new proposals to develop a North Slope liquefied natural gas (LNG) project were put forward, one with a proposed terminus in the Cook Inlet and the other following the TAPS corridor to a terminus in Valdez. This proposal is exploring using conversion of natural gas to a liquid product using gas-to-liquids (GTL) technology that permits the diesel-like liquids to be pumped in the existing TAPS pipeline. Proposals to build a gas pipeline to the Lower 48 states are also being re-evaluated, but the very high cost of alternatives is a major obstacle to the economic feasibility of any of these proposals.

Whether or not the recent sale of ARCO assets to Phillips Petroleum Company has the effect of increasing investment, or the natural gas on the North Slope is developed, the petroleum industry is expected to continue to be a driver of the economy due to the many undeveloped oil and gas fields in the state and continued high world demand for energy. New technology will tend to extend the economic life of oil fields beyond current estimates.

Department of Transportation and Public Facilities

Seward harbor

SEAFOOD

Past Trends: Alaska's seafood industry, including both fishing and processing, has gone through a long period of expansion, driven by growing salmon harvests and development of the bottom fish industry. Fishing is important in coastal towns throughout Alaska, with concentrations in Dutch Harbor, Kodiak, Homer, Sitka, Petersburg, and Ketchikan. The 1995 annual average seafood employment was nearly 20,000 of which 9,500 were employed in processing and the remainder on vessels. In 1999 the number working in processing in the industry declined to 19,500 with about 9,000 in processing. This industry is very seasonal; summer employment is several times higher and winter employment much lower than the average. Many fishers and processing workers are non-residents; most fishers are self-employed.

The fishery also varies by region, species, and weather. Beginning in 1997, silver and chum salmon failed to show in the Kuskokwim River creating an economic disaster that led to state assistance. Ironically, the dearth of salmon in the Kuskokwim and other Western Alaska rivers came in a year when other regions were harvesting a near-record catch. The fiscal impacts on small communities with no other sources of income can be severe. Effects, however, are not just to individual fishers but to processors and employees. Severe ice in the Bering Sea early in 2000 delayed the opilio crab harvest. This disrupted employment, which was also compounded by the tight labor market nationwide. Processors are finding it increasingly difficult to hire sufficient workers to operate the plants.

Future Trends: The offshore fisheries that created many new jobs in the seafood industry over the past couple of decades are now fully developed. The implementation of individual fishing quotas (IFQs) in 1995 and community development quotas (CDQ) in 1996 for certain species (halibut and sable fish) signaled the saturation of employment in offshore fishing. The National Marine Fisheries Service is monitoring the impact of the IFQ and CDQ programs on employment but the programs are too new to fully understand their effects. In general, the programs appear to have increased the number of self-employed fishers (those who own all or part of a quota) and reduced the number of employees, both as hands on vessels and cannery workers. The quotas have spread out the harvest through the season, reducing the "derby" frenzy that required high numbers of employees for a short time both on vessel and in the cannery. The CDQs appear to have shifted some cannery employment to villages.

The fisheries industry in Alaska continues to be dynamic. In December 1999 the Alaska Seafood Center began operation in Anchorage. The Center, designed to annually produce 100 million pounds of value-added, prepared seafood, expects to employ 400 when in full operation. The plant is working with fishers to receive product all year, even during the traditional winter off-season, thus potentially altering fisheries employment further. Competition from farmed seafood and from unexploited stocks elsewhere around the world, however, could continue to reduce the value of Alaska stocks.

FOREST PRODUCTS

Past Trends: Employment in the forest products industry, which includes loggers as well as sawmill and pulp workers, peaked in 1990 at about 4,000 jobs. Employment has declined rapidly since then, to about 3,250 jobs in 1995 and 1,500 in 1999, as shown in Figure 3.3. The industry has been historically centered on timber from the Tongass National Forest in Southeast Alaska. Since the 1950s, the U.S.D.A. Forest Service has issued long-term contracts for logging in the Tongass. Companies holding those contracts supplied two pulp mills, in Sitka and Ketchikan, and several sawmills.

A combination of aging facilities, changing markets, and changing federal policy led to re-evaluation of the long-term timber contracts. The Sitka pulp mill closed in 1994 and the Ketchikan pulp mill in 1997. The closing of the pulp mills has led to the closing of at least two large sawmills and threatens others.

Native corporations have also logged their lands in Southeast and Southcentral Alaska, and profitably exported raw logs. But that production peaked in the late 1980s. Future logging on Native lands will be limited because the remaining commercial timber is limited. There are also smaller processing and exporting facilities in the Southcentral/Interior region, mainly producing raw lumber and chips. The Port of Homer has served as a significant exporter of chips to Japan and Korea in the recent past. However, competition from foreign suppliers has reduced the amount of wood chips leaving Homer by 50 percent.

Department of Community and Economic Development

Tongass National Forest in Southeast Alaska.

On November 13, 2000 the USDA Forest Service banned commercial harvest of timber in roadless areas of national forests, drawing criticism from professional foresters, the state of Alaska, and other western states. A final policy was signed January 5, 2001. Under the roadless decision, road construction, reconstruction, and timber harvest except for stewardship purposes were permanently prohibited in over 90 percent of the Tongass National Forest and in almost 99 percent of the Chugach National Forest. Alleging the policy violated good public process as well as the "no more" clause of the Alaska National Interest Lands Conservation Act, the State of Alaska filed a lawsuit against the federal government in late January 2001. With the passage of ANILCA, Congress had stated that this designation of 106 million acres as national forests, parks, preserves, and wildlife refuges, "represent[ed] a proper balance between the reservation of national conservation system units and those public lands necessary and appropriate for more intensive

use and disposition." The state lawsuit aimed to permanently prevent the federal government from implementing the policy, citing numerous federal laws the State alleged it violates. If left in tact, the Roadless prohibition is expected to result in mill closures and reduced logging activity that will trigger direct job losses of 364 to 383 employees in the private sector and direct income losses estimated at $16.7 to $17.6 million in Southeast communities. Including indirect job losses and reduced forest service staffing requirements, the total losses from application of the prohibition on the Tongass is expected to be 864 to 895 jobs along with a loss of $37.3 to $38.7 million dollars in income.

The change in presidential administration may influence the implementation of this policy. When President Bush took office in January 2001, he instituted a 60-day delay on its implementation during which time he reviewed the policy and other resource policies instituted during the Clinton administration. In July 2001 the Bush administration held a 60-day comment period on ten questions regarding the protection of roadless areas.

The outcome of the lawsuits of Alaska and several other western states will help define the Roadless Policy framework and will have a significant economic effect on the State of Alaska, particularly in Southeast Alaska and along the southcentral coast.

Future Trends: Exporting unprocessed round logs remains the most profitable option for this industry in the foreseeable future, even with a highly competitive market. However, the size of the industry is constrained by the limited availability of commercial timber. Investments are still being made to sustain a timber industry, such as by Gateway Forest Products in Ketchikan. And, there are a growing number of small firms that do additional, value-added processing in Alaska—for example, producing extremely precise lumber for Japanese home builders or high quality wood panels for musical instrument makers. The economic impact of these firms is limited. The recent opening of a veneer plant in Southeast Alaska by the Sealaska Timber Corporation holds some promise for the future, although its long-term outlook is guarded due to timber supply and capital debt.

Department of Community and Economic Development

Hirst Gold Mine
Klag Bay, Chichagof Island

MINING

Past Trends: Historically, much Alaska mining has been done by self-employed miners (mostly gold placer miners). Self-employed miners are not included in employment figures developed by the federal Bureau of Labor Statistics and the Alaska Department of Labor and Workforce Development. Independent miners, however, are now much less common than in the past, due to environmental regulations and the economy of scale—large operations can work low grade ore less expensively. Figure 3.3 includes only jobs in large corporate mining firms. In the 1960s and 1970s there were at least an equal number of self-employed miners but by the 1990s there were few independents because most mining was corporate. Capital spending for mines also generates additional jobs not reflected here.

In territorial days several large mining operations existed in Alaska. But World War II ended large-scale gold mining, and for a number of years the only major mining operation was the coal mine at Healy in the Interior. In the past two decades, however, corporate mining has returned to Alaska. The Red Dog zinc mine near Kotzebue and the Greens Creek silver mine near Juneau opened in the late 1980s. The Red Dog mine is now the largest zinc mine in the world. It has identified additional reserves and is boosting its production, potentially adding new jobs. The Greens Creek silver mine near Juneau and the Fort Knox gold mine north of Fairbanks are now both in production, each with over 300 employees. Consolidation of gold properties near the Fort Knox mine could create up to 100 new jobs. But many mineralized sites are remote with no direct access to infrastructure. This makes them expensive to develop and vulnerable to world price fluctuations. The number of jobs in mining is relatively low—1,600 in 1998—but growing.

Future Trends: The combination of a large base of reserves, increasing demand, and technological advances will mean increased mining in Alaska in the coming years. Low prices will restrict mining to only the richest deposits. The two most promising projects are the Pogo project near Delta Junction and the Kensington project north of Juneau. The mining industry could add 1,000 jobs to the state's economy over the next several years. Still, the general lack of infrastructure at most sites, high construction and operating costs, and the high cost of transporting minerals to markets means that only the largest deposits can be successfully developed. Mines in Alaska must also be able to withstand the dramatic price fluctuations common in world metal and energy markets.

TOURISM

Past Trends: For years, tourism has been one of the fastest growing basic industries in Alaska, increasing at rates up to twelve percent annually during the decade. The number of tourists first topped 600,000 in 1990, one million in 1996, and 1.4 million in 1999. Communities on the cruise ship routes, on the road system, or with major airports get the most visitors. But increasing numbers are visiting more remote places like Barrow, Nome, Cordova, Unalaska, and the Pribilof Islands.

Department of Community and Economic Development

Tourists enjoy Southeast Alaska

Jobs in the "visitor industry" are spread among the transportation, trade, and service industries, and are difficult to quantify. Employment in tourism must be deduced from other factors, such as the difference in level of employment between tourist and non-tourist months. Also, the tourist industry provides many opportunities for self-employment, such as in the manufacture of crafts or in guide services.

Studies by the McDowell Group provide estimates of tourism-related employment for 1991 and 1998. They estimate that 13,522 jobs were created by tourism in 1991: 3,518 in transportation, 4,993 in retail, and 5,011 in the service sector. These employees were "on land" and did not include an additional 10,000 or more crew members on cruise ships visiting Alaska in the summer months.

As noted above, in the 1990s the number of visitors to Alaska more than doubled. When the McDowell Group repeated their study in 1998 they found 15,928 jobs that were created by tourism: 4,277 in transportation, 5,896 in retail, and 5,753 in services. A portion of this change relates to a hotel construction boom in Alaska over the past few years; the single biggest facility is the Marriott in Anchorage that opened in 1999. Employment in tourism is shown in Figure 3.3.

Future Trends: Tourism is likely to continue growing, although the pace will slow somewhat. Cruise ship traffic is expected to continue growing at five percent or more annually for the next several years. Potential changes at the Port of Anchorage could bring substantial visitors to Anchorage from tour ships. Increased tourism in the U.S. and abroad is driving the growth, which could potentially double the annual number of visitors to Alaska by 2010 from the 1999 level.

FEDERAL GOVERNMENT

Past Trends: Federal government employment is made up of employees of federal agencies, such as the Federal Aviation Administration and the U.S.D.A. Forest Service, and military personnel. The number of federal employees has been basically declining since 1975 as shown in Figure 3.3. Much of this decline has been in military personnel that numbered 32,680 in 1960 but only 18,884 in 1999. The decline has been continuous with the exception of the late 1980s when a new light infantry brigade came to Fort Wainwright. Since then, bases have closed at Adak, King Salmon, and Galena. The

number of personnel at Fort Richardson and Fort Wainwright has declined and Fort Greely has been reduced to a maintenance staff of about 50.

The Bush administration has pursued retaining Fort Greely as an interballistic missile site, from which ground-based missile interceptors would be launched at target missiles fired from an aircraft, as well as those fired from foreign ground launch facilities. Under this scenario, Fort Greely would work in cooperation with the existing Kodiak Launch complex, a commercial spaceport that has been used several times to launch missiles and satellites. The Bush administration has indicated it hopes to see missile defense facilities at Fort Greely on line by 2004.

However, controversy over the proposal exists. Providing antiballistic missile interceptors designed to intercept aircraft-fired missiles violates the Anti-ballistic Missile Treaty signed with the Soviet Union in 1972. More fundamentally, the ABM Treaty prohibits a missile defense system designed to protect an entire nation. The administration hopes to persuade the Russian government to either amend the ABM Treaty or to replace it with a new framework that would allow the U.S., its allies and Russia to pursue a cooperative missile defense system.

U.S. Department of Defense

Blackhawk helicopters at Fort Greely

The effect of the September 11, 2001 terrorist attacks on President Bush's plans for an anti-ballistic missile defense system are largely unknown. The incidents may bolster support for missile defense, or, given the terrorist's success with simple box cutters and knives, produce an opposite effect. In late September 2001 the Senate agreed to compromise on the Defense Reauthorization bill to allow the President to determine the allocation of $1.3 billion of the total funding for missile defense and anti-terrorism measures. The remainder of the funding is still up for debate, and the future of Fort Greely unclear. Regardless of the outcome of this bill, the fight for missile defense is expected to continue into future years. Although the Senate Armed Services Committee majority retreated from its hard line position on missile defense in the aftermath of the terrorist attacks, it may be years before even a rudimentary national missile defense can be deployed, and possibly longer before this technology is proven effective.

Future Trends: Federal employment will remain a stabilizing force in Alaska's economy. Civilian federal employment is likely to remain fairly constant in the future. Some agencies, like the Postal Service, will grow as the population grows. Other agencies may add a few jobs to meet increased demands on public lands—over 60 percent of Alaska land area is federally managed—but an overall national trend to curb or reduce the size of the federal government will likely force agencies to balance new jobs with job reductions in other areas. Evolving forest management practices within the U.S.D.A. Forest Service may eventually cause reductions in the size of their Alaska-based staff. The Department of Labor and Workforce Development anticipates that Alaska will lose 600 federal jobs in 2000.

The recent reductions in Alaska's military manpower are expected to slow, although Congress could call for another round of base closures in the next few years. Civilian employment related to military activities is also likely to be reduced as military commands eliminate non-essential activities to recoup funds needed for essential training and readiness. Annual appropriations for capital projects (such as a National Oceanic and Atmospheric Administration research center in Southeast Alaska and a new hospital at Elmendorf Air Force Base) will continue to help build infrastructure and provide jobs in construction and other industries. Although the Department of Labor and Workforce Development projected that Alaska would lose 600 federal jobs in 2000 and 2001, the new focus on interballistic missile defense at Fort Greely and the increased focus on the military since the September 11, 2001 terrorist attacks may counter this projection.

INTERNATIONAL CARGO HANDLING

International cargo handling is a new and rapidly expanding basic industry in Alaska. Alaska's location and the continued expansion of trans-Pacific trade will combine to keep this industry growing in the coming years. Almost unheard of before 1990, in 1998 there were 4,195 jobs in international cargo handling in Anchorage. Of these, 2,485 were at the Ted Stevens Anchorage International Airport (AIA) and 1,710 were off the airport property. Recent developments by air freight companies such as Federal Express and United Parcel Service have made AIA a major international air cargo hub. The rapid growth of jobs in this sector through the 1990s has occurred despite economic woes in Asia. The industry showed continued strength through the 1990s; continued expansion of trans-Pacific trade will keep this industry growing in the coming years. Major new investments by the private sector, such as a $25 million facility at AIA to trans-load air cargo, suggest this sector will continue to grow rapidly. Figure 3.3 shows the number of jobs in this new industry.

AGRICULTURE

Past Trends: Commercial agriculture began in the Tanana Valley around 1912 and then expanded substantially in the 1930s with the development of the Matanuska Colony near Palmer and in the 1940s with population growth related to World War II. Through the 1960s the primary production was dairy, hay and vegetables. In the late 1970s the State sold 158,000 acres of land for agriculture, primarily grain production, near Delta Junction and Point MacKenzie. Many of the new farms reverted back to the state but have since been resold. Currently there is a stable base of 560 farms/ranches with 910,000 acres in production in Alaska. Products include livestock (beef, dairy, swine, sheep, reindeer, bison, elk, yak) and crops (grain, hay, vegetables, horticultural plants, seed). Cash receipts totaled roughly $47 million in 1999. Major markets for Alaska agricultural products are retail and wholesale outlets across the state, sales to the military, farmers markets and other direct sales, and some export. Estimates of farm labor are highly variable, but the Division of Agriculture estimates up to 1,500 Alaskans receive a portion of their income from agriculture.

Department of Community and Economic Development

Farm in the Matanuska Valley

Future Trends: As state land sold for agriculture has returned to private hands, production has increased. Modest production increases are expected in two areas. First, there will be increased production of traditional livestock and crops such as dairy, beef, hay, grain and vegetables. Production will be primarily for a growing Alaska market with some limited export opportunities. Recently, for example, an export market has developed for Alaskan potatoes and carrots. Second, there will be an expansion of niche and specialty crops, particularly in the horticultural, organic, and exotic livestock areas. Production, however, will remain centered in the Tanana Valley and in the Matanuska-Susitna Valley near Palmer. Employment in agriculture will increase proportionally to increased production.

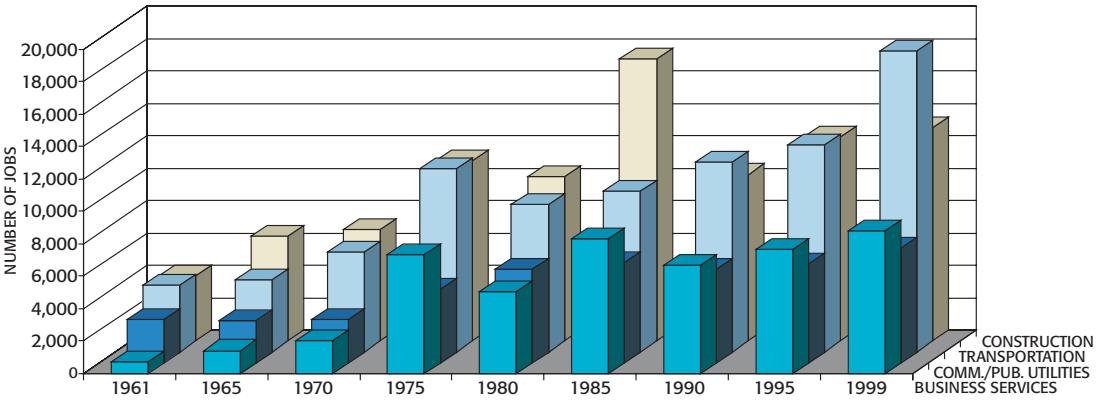
INFRASTRUCTURE INDUSTRY SECTOR

Infrastructure industries provide the framework or services that permit the other parts of the economy to function. They make money primarily by selling goods or services to other industries, although some of their sales are to consumers. These industries are construction, transportation, communications and public utilities, and business services.

CONSTRUCTION

Past Trends: Construction in Alaska depends on the amount of new private investment in basic industries (particularly petroleum, mining and tourism); on government spending; and on the general health of the economy. Since these factors change from year to year, the construction industry fluctuates more than others. As shown in Figure 3.5, construction in 1975 exceeded 11,000 during the construction of the pipeline, declined, and then grew to over 17,000 in the mid-1980s with the construction boom fueled by government spending. In 1999 there were about 13,200 construction jobs. These jobs are among Alaska's highest paying, partly because many sites are remote; workers typically commute from urban areas to remote sites. The construction industry has been more important in Alaska than in other regional U.S. economies in the past few decades because much effort went into developing the state's basic infrastructure, and because employment and population grew rapidly.

FIGURE 3.5 ALASKA INFRASTRUCTURE SECTOR EMPLOYMENT 1961-1999



Future Trends: The projected slower growth of population and employment means that future construction activity will be somewhat smaller in relation to the overall economy. A major factor in the equation is whether a gasline will be constructed to bring North Slope gas power to the lower 48 states. The project has been widely discussed during 2001, with most of Alaska favoring a route that would follow the Alaska Highway and create more jobs for Alaskans than the other option—a northern route following the Beaufort Sea. Some analysts predict $66 billion in total revenue from the Alaska Highway route, and $68 billion in total revenue from a northern route, with fewer in-state jobs and arguably greater environmental risks. Although the oil industry produced an analysis in late September suggesting that construction of a gasline to the lower 48 is financially infeasible given the financial return to the companies would be less than 15 percent, political will and demand for domestic energy sources favor its eventual construction. The issue is largely regarded to be a factor of when the line will be constructed, not if.

Additionally, concern over the scope of Alaska's deferred maintenance problem (the lack of maintenance of public facilities such as roads, bridges, airports, harbors, and buildings), if addressed by the legislature, could result in construction activity associated with the repair of state-owned facilities. These two projects illustrate how construction will continue to be Alaska's most volatile industry as it grows and retracts to adapt to economic trends, corporate investments and legislative actions. The Department of Labor and Workforce Development documented an additional 600 construction jobs in 2000 in Alaska, mostly related to public projects such as the expansion of the Ted Stevens Anchorage International Airport.

TRANSPORTATION

Past Trends: The number of transportation jobs in Alaska depends partly on the overall size of the economy but also specifically on levels of resource development and production, tourism, and construction. In 1995 there were about 17,000 transportation jobs in the state, including those attributable to petroleum—including the Trans-Alaska Pipeline System—and tourism. In 1999 there were 18,600 transportation jobs, a fifteen percent increase. Alaska's transportation employment varies in several areas from that of the rest of the nation. Where about 27 percent of transportation employment is in the air sector in the nation, the percentage is over 47 percent in Alaska. Similarly, water transportation is about four percent nationwide, but ten percent in Alaska. Trucking, however, is much lower in Alaska, fifteen percent versus 40 percent nationwide.

Future Trends: Historically, growth in the transportation industry has closely followed overall growth in the economy. Jobs in transportation are expected to grow modestly with the economy. Major capital improvements to the transportation infrastructure, such as at the Ted Stevens Anchorage International Airport, the Port of Anchorage, and the Alaska Railroad facilities will position the industry for future growth. Tourism will play its part in increased employment if the higher costs of fuel do not discourage travelers. Water transportation may not grow due to the consolidation of major grocers and the efficiencies of the marine barge system. Trucking has shown a steady increase in one area: the number of trucks crossing the border into Alaska from Canada nearly doubled from 3,054 in 1994 to 6,003 in 1998. The percentage of trucks in transportation will grow as the highway infrastructure continues to improve, which is certain with the increased funding available under TEA-21.

Department of Transportation and Public Facilities

Maintenance contractors

PUBLIC UTILITIES AND COMMUNICATION

Growth in public utilities and communication jobs has traditionally been slow because a few workers can provide services to many people. Employment grew fastest in the 1970s because utilities expanded to new areas and more utilities were provided by local rather than out-of-state workers. An increase in 1989 was related to clean-up of the Exxon Valdez oil spill. Since then employment has grown slowly from about 5,700 in 1990 to 6,000 in 1995. It then "jumped" to 7,100 in 1999 when the Anchorage Telephone Utility was privatized and more than 700 communication jobs moved from the "local government" category to the private sector. Although privatization of other utilities is possible, this level of growth cannot be sustained, and with consolidation of telecommunication companies in Alaska, the potential for continued rapid growth is limited. This industry is expected to expand slowly with continued economic development.

BUSINESS SERVICES

Past Trends: Business services (advertising, personnel supply, building maintenance, computer services, and others) make up a small but growing part of Alaska's service industries, with about 8,800 jobs in 1999 (Figure 3.5). These services are analyzed as part of the infrastructure rather than the support sector because they mainly serve other businesses. The number of jobs grew because the economy grew, but also because some services were new to Alaska. In recent years, firms have been outsourcing more work. Business service jobs are concentrated in urban areas with lower costs of doing business and economies of scale.

Future Trends: Business services will likely be among the fastest growing segments of the economy in the coming years. Local service providers could grow by gaining more of the market share that now goes to firms in the Lower 48, by taking advantage of the

growing market as firms outsource more work, and by providing new services as technology improves.

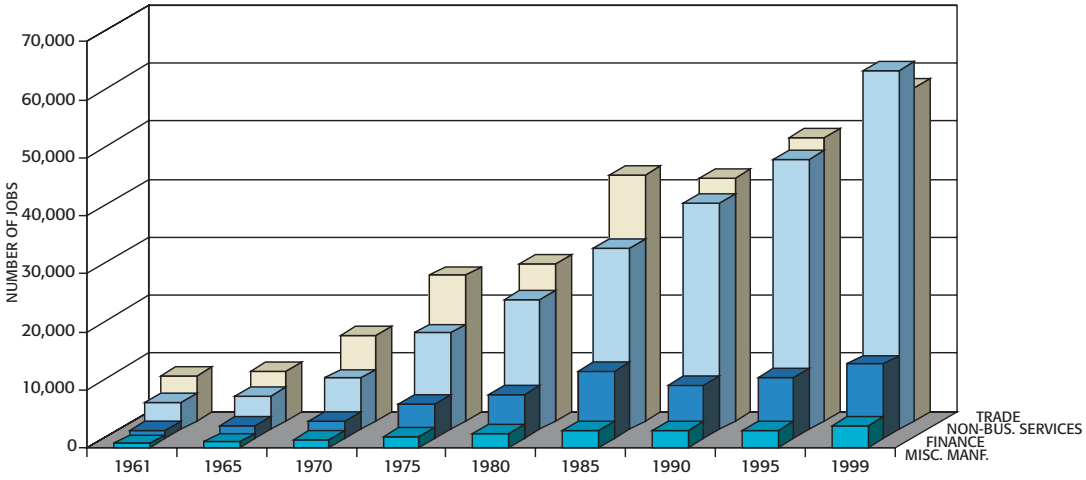
SUPPORT INDUSTRIES SECTOR

Support industries include trade, finance, non-business services, and miscellaneous manufacturing for the Alaska market. These industries sell services and goods to Alaska consumers and to a lesser extent to other industries.

NON-BUSINESS SERVICES

Past Trends: Industries that serve consumers have been among Alaska's fastest growing. Jobs in non-business services (including those created by tourism) have grown more rapidly than other elements of the support sector, increasing from about 4,600 jobs in 1961 to 61,800 in 1999 (see Figure 3.6). Non-business service jobs include everything from health care to hotels. These jobs are relatively immune to economic fluctuations. They grew as population and income grew and became more stable. Service jobs tend to be lower paying; many are seasonal or part-time.

FIGURE 3.6 ALASKA SUPPORT SECTOR EMPLOYMENT, 1961-1999



Health care service has been the single fastest-growing industry during the 1990s. Jobs in health care have grown at a rate of three to four percent or more per year, increasing from 1,000 in 1960 to 15,400 in 1999. The health sector has grown in part to meet the need of Alaska's aging population. The sector has also grown as some federal health positions, such as with the Indian Health Service, have been privatized. In particular, medical services the government pays for on behalf of older and poorer households has grown very rapidly in the 1990s. Some growth mirrored the nationwide growth of services.

Future Trends: Non-business services—particularly health services and services for tourists—will continue to grow. Both nationwide and in Alaska, Americans are expected to spend a greater share of their incomes for services. Some services will grow less than in the past, because of slower growth in disposable income and because some Alaska markets—at least in the urban areas—have been saturated.

TRADE

Trade, including stores and restaurants, has grown rapidly and, for the most part, steadily since the 1960s except for the late 1970s and late 1980s. As Figure 3.6 shows, there

were fewer than 10,000 jobs in this sector in 1960, increasing to 57,300 in 1999, including jobs generated by tourism. Many "proprietors"—small non-corporate shop owners—fall into this category and are not included in the wage employment statistics captured by federal and state labor agencies. This industry benefited from the same factors that benefited non-business service industries. Trade businesses are concentrated in urban centers where costs are low and markets are larger—although there has been some expansion of trade into smaller communities. The expansion to Alaska of the general merchandise "Big Box" stores such as Wal-Mart have increased jobs as has an abundance of new eating and drinking establishments. Businesses in this trade sector will continue to benefit from the expanding tourist industry that provides a strong summer season. Like other support industries, trade employment should continue to be among the fastest-growing in the future.

FINANCE

The finance industry—banks, real estate businesses, and insurance carriers—after growing rapidly from 1,500 in 1961 to 11,600 in 1985—declined through the late 1980s and early 1990s but has grown slowly to 12,800 at the end of the decade. Notable growth has been found in rural areas where rural housing authorities are active. Alaska's Native corporations, as they continue to diversify, both require and invest in a broad range of financial services. In banking, technology is creating competitive pressure and providing alternative forms of service. Consolidation in the industry, such as the takeover of the National Bank of Alaska by Wells Fargo, will probably lead to consolidation of jobs. Finance employment in Alaska is expected to enjoy a stable, slow growth pattern.

World Eskimo Indian Olympics, Department of Community and Economic Development

Blanket toss at the World Eskimo Indian Olympics, Fairbanks

MISCELLANEOUS MANUFACTURING

Manufacturing for local markets creates about 3,000 Alaska jobs in such industries as printing and publishing, bakeries, concrete products, and boat building and repair. Manufacturing in Alaska is constrained by small local markets, high costs of business, and distance from large markets. Future manufacturing will continue to be hampered by the same factors, but some small businesses will succeed by finding niches in the market.

PROPRIETORS

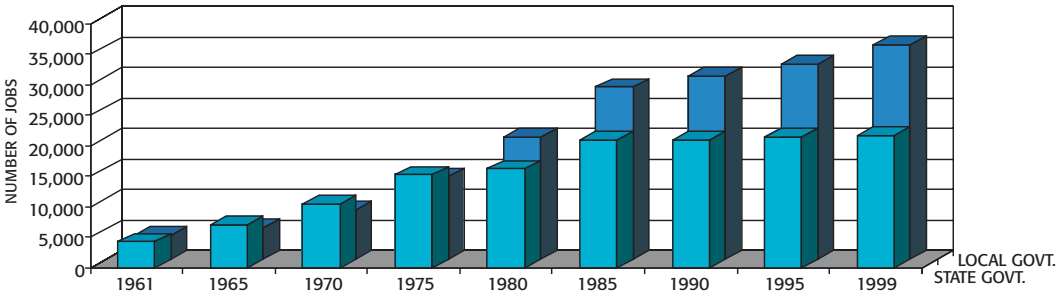
Included in the support sector are most Alaskans who are self-employed (except commercial fishermen, who are included in the seafood industry figures). A majority of self-employed people is in trade and services businesses.

STATE/LOCAL GOVERNMENT SECTOR

Past Trends: Both state and local government employment grew rapidly from statehood through the mid-1980s as shown in Figure 3.7. Since then fiscal restraint has held growth in state jobs to a much slower pace, about in line with population growth. As a percent of overall employment, state and local government has declined from nine percent in 1985 to eight percent in 1999. Yet, in real numbers, state and local government employment continues to grow modestly, from a total of about 53,500 in 1995 to 56,700 in 1999. Privatization of some local government services, such as utilities as discussed above, has moderated the overall growth of local government.

Future Trends: Less oil revenue in the future will keep the number of state and local government employment from increasing and likely will mean fewer jobs in this decade.

FIGURE 3.7 ALASKA STATE AND LOCAL GOVERNMENT EMPLOYMENT, 1961-1999



The state has already cut or eliminated several local aid programs; local governments with small tax bases have been hard-pressed to expand or even maintain services. Local government employment is expected to remain static statewide with the exception of the Matanuska-Susitna Valley where growth is rapid. State aid for education still pays most local school costs, and that is the one type of aid most likely to continue flowing.

Areas of state program growth are expected to be in the fields of health, social services, and corrections. For example, the Alaska Department of Corrections and the Municipality of Anchorage have collaborated to build a new 400-bed correctional facility in Anchorage. The facility, currently under construction, is scheduled to open in January 2002 and create approximately 85 jobs. If ANWR is opened to oil development, among the projected 735,000 domestic jobs will be additional government sector jobs as well.

PERSONAL INCOME AND PRICE LEVELS

Department of Transportation and Public Facilities

Neighborhood in Juneau.

HISTORICAL CHANGES

From 1961 to 1999 the state's population grew from 230,400 to an estimated 622,000. In that period the total personal income of Alaskans rose from $628 million to more than $17 billion. During the same period, income composition also changed. In 1961, income from wages made up 90 percent of Alaskans' income but by 1999 wages made up just 67.8 percent. This shift occurred because income from other sources —dividends/interests/rents, government transfers, and the Permanent Fund Dividend (PFD) — grew faster than wage income. Dividends, interest and rent made up 17.9 percent of total income and transfer payments—payments to individuals for which no current service is performed, such as federal Social Security, state unemployment, or local government aid—made up 14.3 percent. In many communities in Alaska income from wages makes up less than 50 percent of total income. The PFD is an increasingly larger part of Alaskans' per capita income, rising from 3.6 percent statewide in 1994 to 5.3 percent in 1998. The PFD represents over ten percent of the local income in some low-income communities. The PFD and other forms of transfer payments that are independent of wages have helped stabilize the economy and moderate the state's boom-bust cycles.

The real average annual civilian wage in Alaska, adjusted for inflation, grew rapidly in the 1960s, as did wages nationwide. Average wages continued to grow in the 1970s,

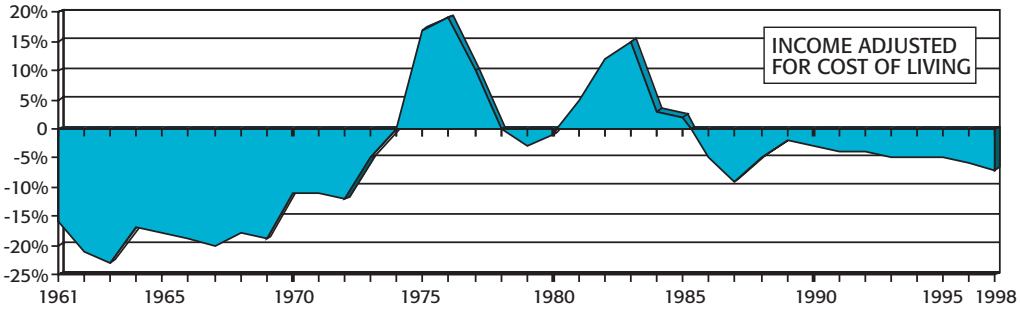
though at a slower rate, but fell in the second half of the 1980s. In the 1970s and early 1980s, many new Alaska jobs were in high-wage professional and technical occupations. Employers also had to raise wages to attract workers during the pipeline construction boom in the mid-1970s and the boom created by state spending in the early 1980s.

Starting in the mid-1980s, Alaska employment shifted more toward lower-paying service jobs and slow growth in high-paying jobs held wages down. These changes were partly due to the state recession that followed the 1986 oil price crash, partly due to structural change in the Alaska economy and partly due to changes in the national economy.

Alaska's median household income ranked second highest in the nation in 1990; in 1998 it ranked highest at $50,692, thirty percent above the national average. But Alaska households aren't as well off as these figures suggest. The figures aren't adjusted for Alaska's higher cost of living; the gap between Alaska and U.S. living costs has narrowed but not disappeared over time. Alaska has few households headed by retired people, who generally have lower incomes. Also, Alaska's larger average household size and high labor force participation rate also increase median income.

Per capita personal income in Alaska also has been historically higher than the U.S. average. However, adjusting for the difference in living costs means that Alaska's per capita income has been below the U.S. average except during the boom created by construction of the oil pipelines in the late 1970s and the boom associated with state spending in the early 1980s (Figure 3.8).

FIGURE 3.8 ALASKA REAL PER CAPITA INCOME COMPARED TO U.S. AVERAGE, 1961-1998



ANTICIPATED CHANGES

The real (adjusted for inflation) average annual civilian wage in Alaska is likely to decline modestly. This is expected as employment continues to shift toward lower wage industries, as slow growth in jobs holds wages down, and as the cost of living difference between Alaska and the rest of the U.S. continues to narrow.

Income from sources other than wages is expected to keep growing, but at a slower pace. Dividend, interest, and rent income will increase as Alaska's population ages. There will be less growth in government transfers, due primarily to lower state oil revenue. Federal government entitlement programs are also being reduced, as indicated by reforms in public assistance, Medicaid and Medicare. As the growth in non-wage income slows, so will growth in household income.

Several events could change this prediction. If the state personal income tax is re-imposed, real per capita disposable income will fall slightly. Per capita personal income will continue to vary sharply across Alaska communities, tending to be higher and from a broader range of sources in urban areas.

DEMOGRAPHIC CHANGES

PRICE LEVELS

Living costs in Anchorage were about three percent above the national average in 1998, while they had been 46 percent higher in 1961. The cost of living gap between Alaska and the rest of the U.S. has narrowed as markets in Alaska got bigger, creating competition in consumer and labor markets and economies of scale. This trend is expected to continue, although at a slower rate—that is, Anchorage living costs will move closer to but remain above the national average.

Other Alaska communities, however, have higher costs of living. For example, Juneau is 15.4 percent above the "standard city" in the USA; costs in other Alaska communities are known to be 50 percent above those in Anchorage. In rural areas, higher costs will persist because so many Alaska communities are small and remote. Inflation in Alaska is expected to closely track the national average.

> *"About ten percent of the Alaska population turns over through migration every year—among the highest rates in the U.S."*

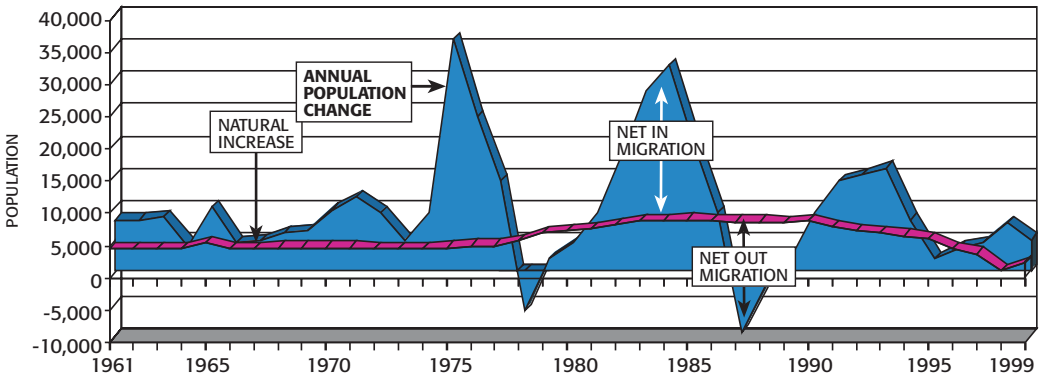
POPULATION

Past Trends: Alaska's population in 1999 was more than 2.6 times larger than in 1961, increasing from 230,400 to 622,000. This represents a considerably faster growth rate than in the U.S. as a whole. Both natural increase (births minus deaths) and net migration (the number of people arriving minus the number leaving) contributed.

About ten percent of the Alaska population turns over through migration every year—among the highest rates in the U.S. This high turnover is due to military personnel coming and going, the state's young population (which is more likely to move with economic opportunities), and the state's periods of rapid growth. Overall, more people moved to Alaska than left over the past few decades, but migration in and out has been volatile.

Figure 3.9 shows how natural increase and migration contributed to population change in recent decades. Clearly apparent are the arrivals and departures associated with trans-Alaska pipeline construction (many arrivals during construction in the early to mid 1970s, many departures in the late 70s) and with changes in state spending (many arrivals during the boom of the early 1980s, many departures in the later recession). Most recently, Alaska experienced net negative migration from 1993 to 1997 of nearly 18,000, due mainly to military reductions and job losses in the petroleum, timber and fishing industries. Net migration will be strongly influenced in the future by the results of military base closure commissions and the somewhat unpredictable fishing industry resource returns and market prices.

FIGURE 3.9 COMPONENTS OF ALASKA POPULATION CHANGE, 1961-1999



Annual Population Change = Natural Increase plus or minus Net Migration

Future Trends: Alaska's population is becoming more stable, as can be seen by comparing information from the 1960, 1970, 1980, and 1990 U.S. censuses. The census asks the question, Where did you live five years ago? In 1960, only half of Alaska residents reported living in the state five years earlier. By 1990 the share had grown to more than 75 percent.

AGE, RACE, AND SEX

Past Trends: As Alaska's population grew since 1950, the share of Caucasians increased somewhat (from 72 to 76 percent), the share of Natives declined (from 26 to 16 percent), and the share of other races grew sharply (from less than two percent to nearly nine percent). The Native share of the population declined not because their numbers declined—in fact, the Native population tripled—but because so many people of other races arrived.

Harsh winters and high living costs have traditionally caused many older people to leave Alaska. In 1990 only four percent of the Alaska population was 65 years of age or more, compared with thirteen percent nationwide. In 1998 this percentage had grown to 5.5 percent, compared with 12.7 percent nationally. Alaska continues to rank 50th among the states for the percentage of the population that is 50 years and older. On the other hand, people moving to Alaska tend to be younger, who either came for economic opportunities or were transferred here by the military. Residents under eighteen years old make up 31 percent of Alaska's population, compared to 26 percent nationally.

Photo by John Hyde, Department of Community and Economic Development

Athabaskan woman preparing fish for drying in Interior Alaska.

The Native population is both younger and older than the general state population. More than 43 percent of Natives are under eighteen, compared with 31 percent among all residents. Also, a slightly larger share of Natives is over 65. The Native population does not tend to move in or out of the state in large numbers.

Future Trends: People over 65, who in earlier years were likely to leave the state, are now the fastest growing segment of Alaska's population. Also, Alaska had many more men than women 40 years ago, mostly due to the large number of military personnel but also due to the types of jobs associated with the oil, timber, and fishing industries. But the gap has narrowed and continues to decline as the number of military personnel here decline and as more women enter the military. These changes are shifting Alaska's population composition more toward the U.S. average.

HOUSEHOLDS

Past Trends: The composition of Alaska households changed rapidly in the past thirty years, as it did in the rest of the U.S. The percentage of "traditional" families—married couples with children—declined and the share of single-parent families increased. Many more people are living alone or in households with people who are not relatives.

Married couples made up more than three-quarters of all Alaska households in 1970 and most of those were raising children. About eight percent of families were headed by single men or women—mostly women. By 1994, married couples made up just over half of households in Alaska and only 33 percent were couples raising children. The share of single women raising children had more than doubled. Non-family households made up more than 30 percent of all households.

Like households nationwide, Alaska's average household became smaller in recent decades—although the downward trend has slowed in recent years and the average may not decline much from the current 2.79 persons. Among non-Native Alaskans, the changing composition of households accounts for most of the decline in the average household size. Among Native households, a declining birth rate has reduced household size. In addition,

a larger supply of housing in rural areas in recent years has increased the number of Native households and reduced household size. Despite the decline, Alaska's average household remains slightly larger than the average U.S. household. A higher percentage of Alaskans are in their child-rearing years so more households include children. Also, fewer Alaska households are headed by older people; such households tend to be smaller.

Future Trends: As Alaska's population continues to age, the composition of population and households will likely continue to become more like that of the U.S. as a whole, moving toward fewer households with children and more non-family households.

SETTLEMENT PATTERNS

Past Trends: The biggest shift in Alaska settlement patterns in the past 30 years has been the increasing concentration of the population in Southcentral Alaska, caused not only by growth in Anchorage itself, but also by the very rapid growth in the Matanuska-Susitna Borough and in the Kenai Peninsula Borough.

Department of Community and Economic Development

Halibut Cove neighborhood

Alaska's overall population grew at an annual average rate of 2.9 percent between 1980 and 1999 and Anchorage's population grew about 2.6 percent annually. But growth in the Mat-Su Borough north of Anchorage averaged 7.2 percent annually, the fastest in the state. Growth was also high in the Kenai Peninsula Borough south of Anchorage, averaging 4.2 percent annually. As a result, the share of Alaska's population living in Anchorage, the Mat-Su, and the Kenai Peninsula increased from under 50 percent in 1970 to over 61 percent in 1999.

During the same period, population in most rural areas grew less than the statewide average, as did population in a few of the smaller urban areas. The Department of Labor and Workforce Development has found that in most rural areas, more people left than moved in. Many Native people moved from the outlying villages to the urban areas of Anchorage, Fairbanks, and the Kenai Peninsula. However, because more people were born in rural areas than moved out, the population continued to grow although more slowly than urban areas. The slower growth rates in Southeast Alaska's urban communities in part reflect the decline of the logging industry and slow growth in the seafood industry.

Military base closures and military restructuring in the last ten years greatly changed the population composition of the western Aleutians, Bristol Bay Borough, Kodiak Island Borough and some communities in Interior Alaska. In 1999 the largest concentrations of active-duty military personnel were in the urban areas of Anchorage, Fairbanks, and Kodiak.

Future Trends: Little change in settlement patterns are expected in the foreseeable future; a slight trend toward more concentration in the Southcentral area will continue.

COMMUTING PATTERNS

Many workers in Alaska don't live where they work. A significant number live outside the state; the Department of Labor and Workforce Development estimated that non-residents held about 19.5 percent of Alaska jobs in 1999. This is a substantial drop from the peak year of 1992 when 24 percent of all workers were non-residents. Although non-residents make up one of out five employees they earn only 11.3 percent of the total wage and salary earnings. Many of these non-residents work seasonal jobs in the seafood, tourism, and construction industries. A small number, particularly in the petroleum industry, holds year-round jobs and commute to and from Alaska regularly. Non-residents held about 26 percent of oil industry jobs in 1998. The highest concentration of non-resident workers is found in seafood processing in the Southwest part of the state.

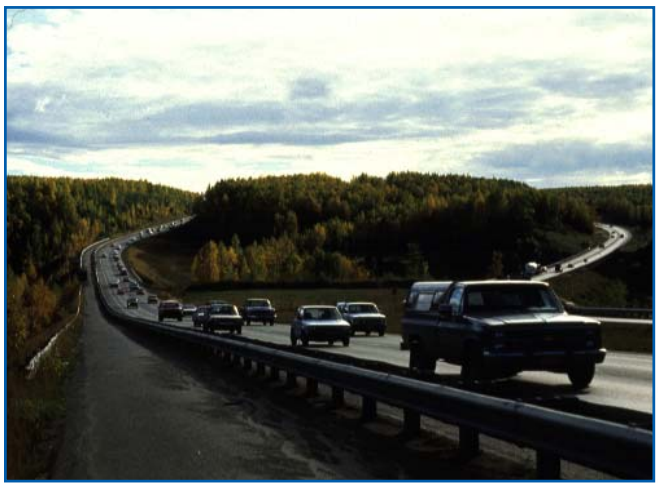
Among workers who do live in Alaska, there is also a variety of commuting patterns. Seasonal jobs in fishing and tourism draw some Alaskans from urban areas like Anchorage to more outlying places. Some residents of Southcentral Alaska commute (typically every two or three weeks) to North Slope oil-related jobs or to the Red Dog Mine north of Kotzebue. Many residents of the Mat-Su Borough commute to Anchorage to work. Finally, a substantial number of jobs in urban areas require occasional travel to rural areas—for instance public or private jobs involving service delivery.

RECREATION PATTERNS

The most pronounced pattern of recreation travel among Alaskans is that residents of urban centers travel to the smaller coastal communities for fishing and other types of recreation. This pattern is expected to persist and to intensify as Alaska's population grows.

TRADE AND SERVICE PATTERNS

Many Alaskans from outlying areas travel to larger urban places to shop, get medical attention, or attend conferences, among other reasons. Anchorage is the main trade and service center for the state while Fairbanks is the regional center for Interior residents and Juneau is the regional center for Southeast. The larger rural communities—like Bethel, Nome, Kotzebue, and Barrow—serve as regional hubs. Alaskans from communities off the road system frequently fly into these regional centers or hubs, often using air taxi services. Residents of the Mat-Su and Kenai Peninsula boroughs routinely drive into Anchorage.



Department of Transportation and Public Facilities

Commuting between Anchorage and the Mat-Su Valley on the Glenn Highway

trends REGIONAL POPULATION AND ECONOMIC TRENDS

Population and economic trends vary across the regions.

SOUTHCENTRAL/INTERIOR

This region stretches from the Gulf of Alaska to the Arctic Ocean and includes Anchorage and Fairbanks, the state's two largest cities and the major trade and service centers. It includes oil development in Cook Inlet, commercial fishing centers in Cook Inlet and Prince William Sound, and major tourist destinations such as Denali National Park and Preserve and the Kenai Peninsula.

Trends in this region correspond with statewide trends discussed in earlier sections, because the majority of Alaskans live in this region.

SOUTHEAST

The oldest industries in Southeast Alaska are commercial fishing and logging. Since statehood, government and tourism have also developed as major parts of the economy. The fishing industry in this region has grown since the 1960s, but not as quickly as fishing statewide. The timber industry, which grew rapidly after statehood, has been declining since the late 1980s with the closure of regional pulp mills and saw mills that depend on timber from the Tongass National Forest and the decline in timber harvests from Native corporation lands.

State government, which had been a source of rapid growth in Juneau from the 1960s through much of the 1980s, has been relatively static in recent years. Tourism is currently the fastest growing industry in Southeast, with increasing numbers of cruise ship passengers and independent travelers and steady growth in eco-tourism companies.

SOUTHWESTERN, YUKON-KUSKOKWIM, AND NORTHWEST ARCTIC

The Southwestern, Yukon-Kuskokwin, and Northwest Arctic region includes some of the poorest areas of the state as well as North Slope oil development and rich fishing grounds. Communities in Kodiak, Bristol Bay, and the Aleutians depend heavily on fishing, which boomed during the 1980s with development of the Bering Sea bottom fishing industry and record salmon runs. However, the dearth of salmon in the Kuskokwim and other Southwestern rivers in the late 1990's created an economic disaster that led to state and federal assistance.

In the northwesterly parts of the region, economic opportunities are limited. The local economies depend largely on state and local government jobs, Native corporation jobs, and on government transfers payments including Permanent Fund dividends. The federal government also creates some jobs, especially through contracts for health care. The Red Dog Mine employs over 300 people directly and supports other jobs indirectly.

On the arctic slope, oil development employs many people at high wages, but virtually all the workers commute from other areas. The North Slope Borough, however, is able to employ many local residents using property taxes on oil development.

> *"One in three jobs in Alaska can be traced in one way or another to state government spending."*

PROJECTIONS FOR THE FUTURE

State fiscal policy and trends in the national economy and politics will strongly influence Alaska's economy in the coming years. They are discussed briefly below before estimates of future growth in Alaska's population and employment are presented.

STATE FISCAL POLICY

The future health of Alaska's state government is critical to the economy, because about one in three jobs in Alaska can be traced in one way or another to state government spending. Most of the state government's money—85 percent of the general fund budget—comes from petroleum revenues. But those revenues have dropped with declining production from the huge Prudhoe Bay field.

The state has dealt with declining revenues over the past decade by holding growth in spending to a minimum and filling in budget shortfalls with cash reserves. Also, a few unexpected events—like the 1991 Gulf War and the severe winter of 1995-1996—have at times boosted oil prices and increased state revenues. Oil prices have been high at times recently as a result of OPEC production cuts, but the trend is for prices to decline toward the average over time.

Oil production will likely continue to decline, since no known fields can replace the Prudhoe Bay field. The potential opening of ANWR to oil drilling may be an exception; the region has long been recognized to have high potential for significant discoveries of oil and gas. However, the extent of this potential is still largely speculative. Although early explorers of the region at the turn of the century found oil seeps and oil-stained sands, from the time of the establishment of the refuge in 1960, exploration in the region has been restricted to surface geological investigations. Regardless of whether ANWR is opened to oil drilling, other new fields may come on line and actually increase annual production

levels for a time. Still, these will likely only temporarily interrupt the overall declining trend in oil production. Falling production will continue to reduce state oil revenues (some analysts disagree, maintaining that changes in oil production, prices, or tax and ownership regimes can maintain or even increase petroleum revenues.)

Although the trend for oil revenues is down, it is difficult to predict with any precision how much or how fast they will drop, or how the state government will deal with the decline. The state has a number of potential tools: continued budget restraint, increased efficiency measures, new taxes, use of the Constitutional Budget Reserve, and use of Permanent Fund earnings (not the principal.) There is no assurance that state government will use these tools in ways that minimize economic effects. However, the special contributions the Alaska Legislature made to the Permanent Fund in the 1980s provides evidence that Alaskans can balance future needs against present demands.

NATIONAL ECONOMY AND POLITICS

Trends in the national economy also influence the Alaska economy. First, a big share of Alaska's exports are sold in the Lower 48, so the strength of the state's export industries—particularly tourism—depends on the health of the U.S. economy. Second, if real wages grow nationally, real wages in Alaska will follow, boosting purchasing power of Alaskans. Third, unemploy- ment in the rest of the nation affects Alaska: when unemployment is high elsewhere, more people look to Alaska for jobs and vice-versa. Presently low unemployment across the nation is causing major employers in Alaska, particularly seafood processors, to operate their facilities at less than full capacity.

Department of Community and Economic Development

Fairbanks cityscape

The level of federal spending also affects Alaska, since Alaska receives more in federal expenditures per capita than any other state. In general, no major departures from current federal policies affecting Alaska are assumed, such as the legal structure of the Alaska Native corporations and the by-pass mail system of the U.S. Postal Service, which provides subsidized freight service to rural Alaska. The federal cost of living adjustment (COLA), paid to a large share of federal employees in Alaska, is assumed to gradually decline from its current level of 25 percent to fifteen percent, and Alaska's inflation will closely track national inflation. A modest increase in real national per capita income and a national unemployment rate of between six and seven percent is assumed.

ECONOMIC AND DEMOGRAPHIC PROJECTIONS

Estimating future growth requires making assumptions about oil prices and production, development in other industries, state fiscal policy, trends in the national economy, and much more. Because it's impossible to predict exactly what will happen, a range of projections is offered—low, medium, and high—rather than a single projection. The medium case projections are based on assumptions about future levels of natural resource production and other variables that seem most likely today. The high case projections are based on more optimistic assumptions about development and the low case on less optimistic assumptions.

In the future as in the past, Alaska's economy will go through economic cycles as prices for Alaska's resources respond to world market conditions. The timing of such economic cycles, of course, is unknown. Consequently, the economic and demographic projections presented here have an appearance of smoothness and continuity—which is unlikely to be the actual pattern in the future. Figures 3.10, 3.11, and 3.12 graphically present

FIGURE 3.10 LIKELY RANGE OF ALASKA'S POPULATION GROWTH THROUGH 2025

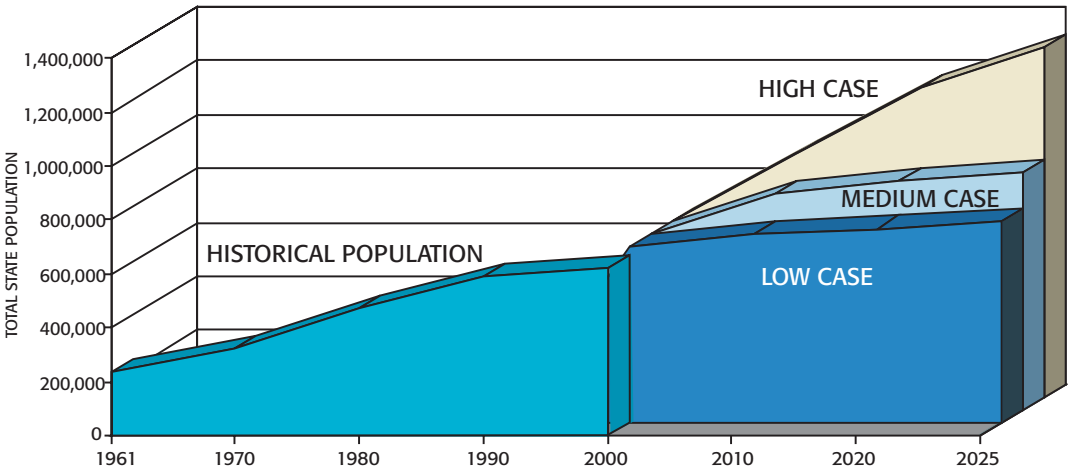


FIGURE 3.11 LIKELY RANGE OF ALASKA'S GROWTH IN REAL PERSONAL INCOME THROUGH 2025

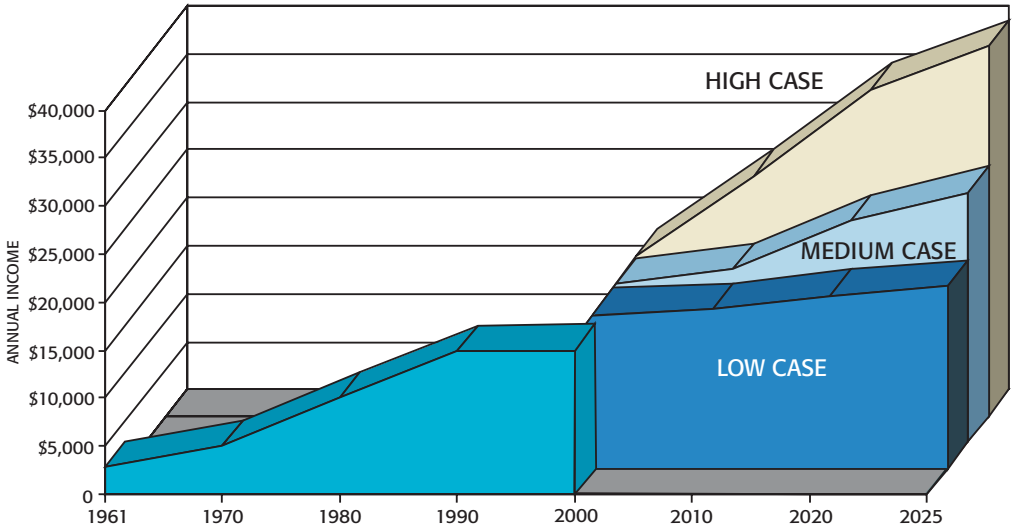
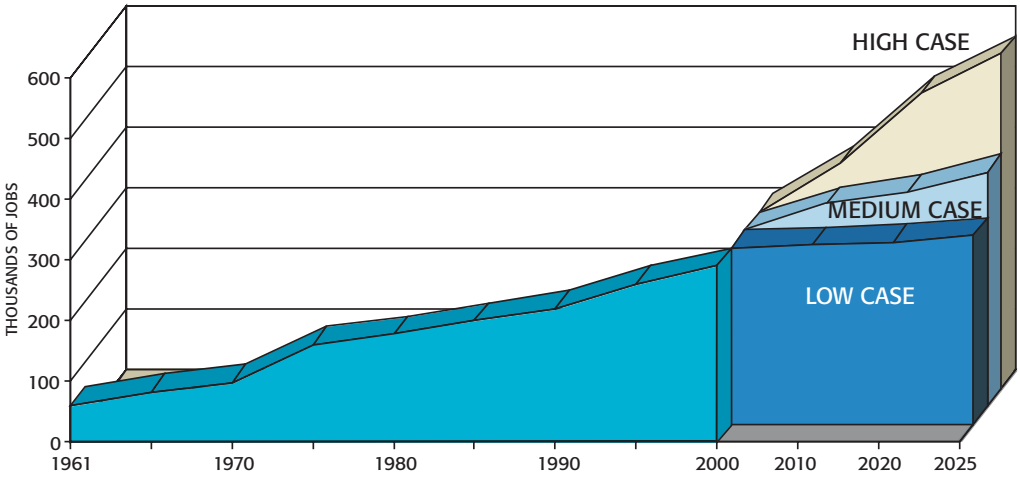


FIGURE 3.12 LIKELY RANGE OF ALASKA'S GROWTH IN WAGE AND SALARY EMPLOYMENT THROUGH 2025



our medium, high, and low projections for growth in population, real income, and employment (wages and salary).

MEDIUM CASE PROJECTIONS

Total employment, including both wage jobs and self-employment, is projected to grow just over one percent annually between 2000 and 2025—more slowly in the next few years and somewhat faster in the subsequent years. This is slower growth than in recent decades, and results from maturation of the economy, maturation of the petroleum industry, and the fiscal constraints on state and local governments. Growth will continue despite the expected decline in oil production.

Employment growth will be concentrated in the support sector—trade, services, and finance. Business services, although small, will grow very rapidly. Transportation, public utilities, and communication will grow at about the same rate as population and income, while construction will remain relatively flat. Basic sector jobs will grow more slowly, with the most growth in petroleum, mining, tourism, and airfreight transportation. Petroleum jobs will increase despite declining production because exploiting smaller fields is more labor intensive. Employment in the seafood sector will likely stay more or less constant over time. Federal, state and local government employment will decline at first and then grow slowly.

Department of Community and Economic Development

Downtown Anchorage

Real (adjusted for inflation) personal income will grow about 1.6 percent annually between now and 2025. Income will grow faster than employment mainly because of growth in non-wage income. The proportion of older households will be increasing, and older households get a larger share of their income from non-wage sources like pensions. Income from dividend interest/rent is expected to increase faster than wage income.

Population will likely grow around 1.5 percent annually over the next 25 years. Migration and natural increase will insure that population growth at least keeps pace with employment growth, but population is expected to grow faster than employment. That's because the population over 65 will grow rapidly and the working-age population will be on average older; as people age a declining percentage choose to work. The number of households will likely grow a bit faster than population due to a continuing slow trend toward smaller average household size.

The Southcentral/Interior region will grow faster than the other two regions; growth will be slowest in the Southwest, Yukon-Kuskokwim, and Northwest Arctic region. Between now and 2025, population is projected to grow 1.5 percent annually in Southcentral/Interior, 1.4 percent in Southeast, and one percent in the Southwest, Yukon-Kuskokwim, and Northwest Arctic region. In all regions, population will grow faster than employment.

The Southcentral/Interior region will capture four out of five new residents, new jobs, and additional dollars of income in the coming years. A substantial share of the state's growth industries is in this region; it also has the transportation infrastructure to ship goods and services to remote areas.

In Southeast Alaska, little growth is projected for fishing, logging, and state government, which have been the historical mainstays of the regional economy. However, tourism is a growing part of the regional economy; in particular, almost all cruise ship passengers to Alaska spend at least some time in Southeast. Increased mining will also fuel economic growth in the Southeast region, which will capture two out of three new mining jobs statewide.

The Southwest, Yukon-Kuskokwim and Northwest Arctic region is the least economically developed region in the state and will remain so for the foreseeable future.

Employment in commercial fishing and processing in the southern areas is expected to stay at current levels. Petroleum development and mining activity will provide continuing employment in the northern area. Most new jobs in the coming years will be in the support or government sectors, but growth will be slow due to budget constraints that state and local governments face.

Growth in employment and in real personal income will be about the same in urban and in rural areas—an annual average of around 1.2 percent for employment and 1.6 percent for personal income. This may seem surprising at first glance, but while support and infrastructure jobs are concentrated in urban areas, oil industry and mining jobs tend to be in rural areas. Tourists visit both urban and rural areas.

Rural areas statewide will see slightly faster population growth than urban areas, 1.6 percent annually compared with 1.4 percent, but much of the difference can be traced to growth in the Mat-Su Borough. Although it borders on Anchorage it is currently classified by the U.S. Census as rural. Differences in rural and urban growth within the three regions are mostly due to how entire census areas are classified rather than to actual urban/rural differences.

Department of Community and Economic Development

Cruise ship in Glacier Bay

HIGH CASE PROJECTIONS

Employment growth in the high case is projected to be about twice the rate as in the medium case—that is, about 2.5 percent annually until 2025. This case assumes full development of the North Slope gas fields and construction of a gas pipeline. The high case projections, compared to the middle case, projects faster growth in mining and tourism, assumes that state petroleum revenues will be higher, and that non-wage income grows faster.

Population and households, as in the medium case, is projected to grow somewhat faster than employment, largely because of the aging of the population and the continuing slow trend toward smaller households.

Urban areas would see somewhat faster employment growth than rural areas under this case (2.6 percent annually, compared with 2.5), but population growth would be a bit faster in rural areas.

Growth in population and employment under this case would still be fastest in the Southcentral/Interior region, followed by the Southeast region and the Southwest, Yukon-Kuskokwim, and Northwest Arctic region in order.

LOW CASE PROJECTIONS

Employment growth under the low case would be about half the rate as in the medium case—about 0.5 percent annually over the next 25 years. Job growth would be concentrated in the support and infrastructure sectors, with virtually flat levels of employment in basic industries and state and local government.

As in both the medium and high cases, population and household growth would be faster than employment growth in the low case—again, because of the aging of the population and a slow trend toward smaller households. With slower economic growth, population growth would be more concentrated in rural areas.

Growth would still be fastest in the Southcentral/Interior region, followed by growth in the Southeast. Employment in the Southwest, Yukon-Kuskokwim, and Northwest Arctic region would be virtually flat—although population would still grow.

IMPLICATIONS FOR THE TRANSPORTATION SYSTEM

Alaska's economy and population will shape future transportation needs. As noted, the economy and population is expected to grow over the next 25 years, but slowly as compared with the past 25 years. Under the most likely scenario—the medium case—the economy will grow at about half the rate in the recent past. Oil development will continue to be a driver for the economy; tourism and mining will also grow. Population will continue to grow, contributing to economic growth.

The growth of population and the economy will differ across the state. Economic growth will include diffuse development in remote areas and more concentrated development in urban areas, including infill development. Tourism, mining, infrastructure, and trade and services will create new jobs in rural regional hubs. Anchorage and Fairbanks will continue to see growth as trade and service centers, and as headquarters for support and infrastructure industries that depend on economies of scale. Warranting special mention in Anchorage is the Ted Stevens Anchorage International Airport, which has become a recognized major hub for moving goods by air freighter between North America and Asia. Warranting special mention in Southeast and Southcentral regions are the marine barge lines and cruise ships that efficiently bring goods and tourists to Alaska.

Department of Transportation and Public Facilities

Bicycling in Anchorage

The overall patterns of settlement and economic activity won't change much, although the Southcentral/Interior region—which already has the majority of the state's population and jobs—will increase its share somewhat. This region also has the most developed transportation infrastructure, with road, rail, air, and water transportation links already in place. These existing transportation facilities will have to absorb most of the growing demand and growth in the transportation system will mostly be in improvements to existing links and facilities. A few remote mining operations may demand new transportation links or routes. The concentration of job growth in the service industries, including tourism, will tend to increase transportation demand for the movement of both people and goods.

In the Southcentral region, growth in jobs in Anchorage will lead to continued population growth in the neighboring Mat-Su Borough, where many residents commute to jobs in Anchorage. That population growth will increase traffic on the Parks and Glenn highways. Increased demand between the Mat-Su Valley and Anchorage will likely exceed the current highway capacity some time before 2020. Bus and rail commuter service may help ease the present heavy traffic load.

The growth in the Mat-Su Borough is indicative of the potential for more dispersed settlement patterns around urban areas in the future. One of the continuing attractions of Alaska is that it offers rural residential and recreational environments that are readily accessible to urban areas. Continued growth in demand for transportation links that expand the opportunity to live in rural areas and commute to urban jobs is expected.

In Southeast Alaska, population and employment are expected to grow most in the larger communities of Juneau, Ketchikan, and Sitka. Air transportation demand between those communities and the larger urban centers of Anchorage and Seattle may increase. In addition, as the infrastructure and support sectors of the larger Southeast communities grow, transportation demand between them on the one hand and the smaller regional communities on the other will grow.

Transportation demand in the Southwest, Yukon-Kuskokwim, and Northwest Arctic region will remain diffuse and relatively sparse, likely with rather modest increases in demand on existing facilities.

In summary, Alaska's population and economy have grown dramatically in the forty plus years since statehood. The present transportation system has developed in large part as a response to the cycles of growth. As the economy and population have grown and changed they have required different transportation support. For example, past capital investments in ports and harbors have made possible the highly productive marine freight and tourist trade. Looking to the future, similar investments may be projected. For example, the "graying" of the Alaska population may result in greater demand for public transportation. Major investments in transportation infrastructure, such as at the Ted Stevens Anchorage International Airport, the Anchorage Port, and the Alaska Railroad, incorporates connections to other modes. The modest rate of growth projected for the state's future suggests that there is the time and opportunity to incrementally build the transportation system that will best serve the people and economy of Alaska.

investment analysis

TRANSPORTATION INVESTMENT ANALYSIS

An effective, safe, and environmentally sound transportation system requires adequate and reliable funding. In Alaska, the vast distances, rugged terrain, and sparse population mandate using multiple linked modes, including marine, air, and land transportation systems. This transportation investment analysis provides an overview of existing transportation funding, an assessment of Alaska's funding system, an overview of transportation investment possibilities, and the department's proposed investment program.

overview

TRANSPORTATION FUNDING OVERVIEW

Alaska's transportation programs are funded by federal and state appropriations. Federal funds have provided almost all of the support for transportation improvements of highways, transit, ferries, railroad, ports and harbors, and airports. These federal funds are designated for capital improvements and preventive maintenance; the funding cannot be used for routine maintenance and operations. Alaska is one of only two states that has no state-funded capital transportation improvement program; the state funds routine maintenance and operations.

At the federal level, dedicated trust funds and user-related fees support transportation improvements for highways and airports. Federal motor fuel taxes are deposited into the Highway Trust Fund. The Highway Trust Fund is the source of federal funding for surface transportation capital improvements, including highways, transit, ferries, and bicycle/pedestrian facilities. This fund is composed of the Highway Account, which funds highways, and the Mass Transit Account. The Federal Aviation Trust Fund is the source of funding for capital improvements for airports. Federal taxes on airline tickets, cargo, and fuel are deposited into this fund. There is no comparable federal trust fund for ports and harbors or railroads.

Historically, the Highway Trust Fund has had a surplus, as by law expenditures cannot exceed revenues. In 1991, Congress passed the Intermodal Surface Transportation Efficiency Act (ISTEA), which increased the authorized distribution of funds to states for surface transportation capital improvements for the period 1991-97. Although ISTEA increased the amount of revenue distributed to the states, income from federal motor fuel taxes continued to create a surplus, and by 1995 the fund had grown to $19 billion.

In 1998, Congress passed the Transportation Equity Act for the 21st Century (TEA-21), the successor to ISTEA. TEA-21 authorized funding for highways, transit, ferries, and bicycle/pedestrian facilities for six years, 1998-2003. The new legislation formally tied the level of funding available for distribution to actual federal gas tax receipts. In a major change to Federal budget rules, TEA-21 guaranteed a minimum level of Federal funds for surface transportation. In essence, the guaranteed amount is a floor; it defines the least amount of funding authorizations that may be spent. Under ISTEA, about 85 percent of highway authorization was eventually appropriated. Under TEA-21, this guarantee is about 92 percent for highway projects and 85 percent for mass transit projects.

Federal funds come to the state through various mode-specific programs, including highways, transit, aviation, rail, and ports and harbors. The flexibility to move funding between

modes and within modal programs is extremely limited. TEA-21 like ISTEA provides a degree of flexibility in that it allows spending of highway funds on transit and vice versa. TEA-21, again like ISTEA, provides that a certain proportion of highway funds must be spent on transportation enhancements such as bicycle and pedestrian facilities. Limited federal highway funds are spent on rail improvements if it decreases traffic on highways. But it still remains largely impossible for federal funding for one mode, say highways, to be spent on harbor, rail, or airport projects.

Thus, federal funding, by coming to the states only by specific mode, severely limits the range of solutions to transportation needs in Alaska. This occurs because many of our transportation needs are intermodal in character, and many are unique to Alaska. The state's geography makes it impractical to develop roads and rail over large areas. Without these forms of transportation—the dominant forms of movement of people and goods throughout the lower 48—Alaska relies more on marine and aviation systems. There are many communities in Alaska accessible only by air, and some accessible only by water. Because Alaskans require more modes of transportation than other states, there is a greater need for planning that gives balanced consideration to all modes, not just to the mode that provides the greatest level of federal funding, which for many years has been highways. Since Alaska does not have a state-funded capital transportation improvement program, it has not been possible to purely evaluate a transportation need and the appropriate modal solution without considering which modal funding we're likely to actually receive from the federal government. The Alaska transportation system requires a more comprehensive approach to infrastructure improvements if it is to be efficient, safe, and environmentally sound.

"Alaska receives nearly four dollars in federal highway funds for every dollar of federal gas tax collected in the state."

Table 4.1 and Figure 4.1 show federal capital funding to Alaska for 1995-2000. The vast majority of federal transportation funds to Alaska over the past nine years has come from ISTEA and TEA-21 appropriations for surface transportation (highways, transit, ferries, and bicycle-pedestrian facilities). Capital marine highway expenditures include the purchase of ferries and capital expenses related to ferry terminals.

TABLE 4.1 FEDERAL TRANSPORTATION CAPITAL FUNDING FOR ALASKA, 1995-2000

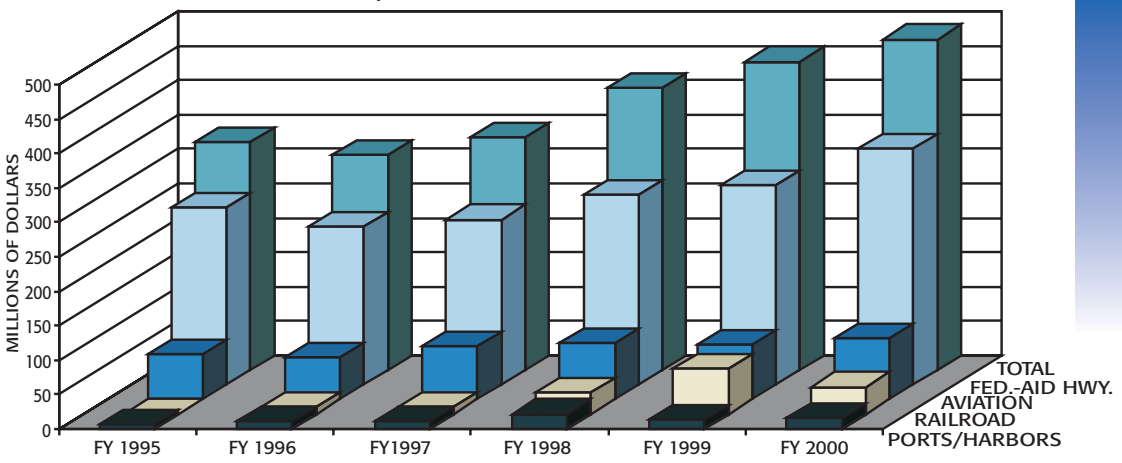
	$ Millions					
Program	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000
Federal-Aid Highways*	$ 258.0	$ 230.2	$ 240.2	$ 275.9	$ 291.1	$ 343.2
Aviation	$ 65.9	$ 61.7	$ 76.5	$ 81.2	$ 79.0	$ 88.6
Railroad	$ 0.1	$ 10.0	$ 10.0	$ 32.1	$ 65.8	$ 39.5
Ports/Harbors	$ 7.3	$ 10.1	$ 11.7	$ 21.4	$ 12.7	$ 14.9
Total	$ 331.3	$ 312.0	$ 338.4	$ 410.6	$ 448.6	$ 481.1

** Highways, transit, ferries, and bicycle/pedestrian facilities*

Funding for aviation comes through the Aviation Improvement Program administered by the Federal Aviation Administration. Funding for navigation improvements at ports and harbors comes from the U.S. Army Corps of Engineers. Grants for rail system improvements come from the Federal Railroad Administration. TEA-21 and the Department of Defense provide rail funding as well.

The following sections of this overview look more closely at federal and state capital and maintenance/operation funding for surface transportation, aviation, ports and harbors, and railroad. The overview concludes with a discussion of local sources of funding.

FIGURE 4.1 FEDERAL TRANSPORTATION CAPITAL FUNDING FOR ALASKA, 1995-2000



FEDERAL SURFACE TRANSPORTATION CAPITAL FUNDING

The primary funding source for surface transportation projects in Alaska is federal-aid highway funding, which flows through two U.S. Department of Transportation agencies: the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). Table 4.1 and Figure 4.1 show that between two-thirds and three-fourths of surface transportation appropriations every year are for highways.

With the passage of TEA-21 in 1998, the amount of funding available to Alaska increased substantially. The full authorization for surface transportation from Congress is $218 billion nationally; the amount guaranteed is estimated to be $198 billion over the six-year life of TEA-21. The act allocates these funds among the states on a percentage basis. Under ISTEA, Alaska received 1.1660 percent of the total national funding while under TEA-21, Alaska receives 1.1915 percent. With this increased percentage, Alaska's share of surface transportation funding increased to nearly $300 million in 1999 and over $343 million in 2000. These totals include about $70 million for discretionary programs and Congressionally designated projects under TEA-21. This higher level of funding is expected to continue over the life of TEA-21, through 2003. Alaska receives nearly $4 in federal highway funding for every dollar of federal gasoline tax collected in the state. This is the highest rate of return among the states.

"With the passage of TEA-21 in 1998, the amount of funding available to Alaska increased substantially."

State funds are required to match these federal funds. Federal funds cover 80 to 93.4 percent of project cost depending on the specific category of work. For most highway projects, the federal ratio is essentially 91 percent. The state must supply the match (for highways, nine percent) in order to receive federal funds.

While Congress distributes funding to the states with guidelines on its use, the state has some flexibility in how it allocates spending. For 2001, the department's three-year spending plan for surface transportation, the Statewide Transportation Improvement Program (STIP), distributes funds into various program categories including the National Highway System, the Alaska Highway System, the Community Transportation Program, and Trails and Recreation Access for Alaska (referred to as the TRAAK program). These programs reflect an attempt by the department to balance the need to upgrade major state highways with community streets and local transportation needs (including pedestrian, bicycle, and tourist facilities).

The National Highway System is a Congressionally-designated system that includes major inter-city, statewide and Alaska Marine Highway System routes. Funding for this program in 2001, the fourth year of TEA-21, was $195 million.

The Alaska Highway System includes transportation facilities, excluding those on the National Highway System, that provide greater utility to Alaska as a whole than to individual municipalities and tribal governments. In 2001, the program's first year, funding totaled $24 million.

The Community Transportation Program includes projects that meet local transportation needs, including economic development projects that contribute directly to the growth of the economy. Transit projects are included in this category. This program was funded at $147 million for 2001.

Trails and Recreational Access for Alaska (TRAAK) includes transportation enhancements and trail projects which improve public access for travel and recreation. TRAAK was funded at $28 million for 2001.

In addition to the basic distribution of revenues described above, Alaska benefits from the TEA-21 legislation in several ways. First, the act provides an additional $10 million each year in highway funding for construction of ferry boats and ferry terminal facilities. Second, it provides another $70 million in transit funds for years 1999-2003 to Alaska and Hawaii for ferry boats and facilities.

Division of Parks and Outdoor Recreation, Department of Natural Resources

Chilkat Bald Eagle Preserve, Haines

Alaska also benefits from TEA-21 appropriations managed by other federal agencies. The Federal Lands Highway Program provides federal transportation capital funding for roads within certain federally managed public lands. These funds are not allocated to states but require competition on a national basis based on multiple criteria. While there are generally no state match requirements, there are many restrictions on the use of these funds. Funded programs include Park Roads and Parkways, the Indian Reservation Road Program, Public Lands Highway (discretionary and Forest Highways), and a category created by TEA-21 called Refuge Roads, which are federally-owned public roads providing access to or within the National Wildlife Refuge System. Federal Lands Highway funds can be used for transit facilities within public lands, national parks, and Indian reservations and can also be used as the state/local match for most types of Federal-aid highway funded projects.

Over the last several years, Alaska has competed and received funding fairly consistently from the Forest Highway Program and Indian Reservation Road Program. The department, along with FHWA and the U.S. Department of Agriculture Forest Service, selects Forest Highway projects, but has had little influence over projects funded under the Indian Reservation Road program. The Bureau of Indian Affairs' public process and selection criteria by design serves the federal government's trust obligations toward American Indians and Alaska Natives, and not the public at-large. Spending in Alaska under the Park Roads and Parkways Program has been minimal during this period. The National Park Service maintains an enormous amount of National Park and Wilderness land in Alaska, most of it inaccessible by road. Since the late 1960s it has been the agency's policy to limit or reduce the number of motor vehicles entering parklands.

In early 2000, Governor Tony Knowles proposed a new program to address infrastructure needs. The Accelerated Transportation Initiative would provide a $350 million bonding package to speed up needed transportation projects across the state. Improvements already scheduled for future construction would be built years ahead of schedule by selling bonds secured by promised federal funds. The program takes advantage of a mechanism that the federal government recently created to allow states to acquire full bond funding for projects ahead of the usual schedule of annual federal allocations. Through this strategy, Alaska can effectively borrow against anticipated federal revenues.

The bonding package accelerates the pace at which transportation projects are built but does not mean more money for projects or require any additional state match. The cost of bonding to build the projects now would be offset by eliminating the added cost of inflation that would accumulate if the projects were built years later. In Alaska, such a bonding mechanism requires approval of the legislature and the public. The Governor's proposal was not approved by the state legislature in 2000 or 2001; the department expects to continue to pursue it in the future.

STATE SURFACE TRANSPORTATION CAPITAL FUNDING

Alaska does not have a state-funded capital improvement program for surface transportation. In recent years the only meaningful state capital contributions have been legislative appropriations to match federal funds. As noted, this match for highway projects is nine or ten percent of project cost.

All other states except Rhode Island have a state-funded capital improvement program. When Alaska's investment in capital construction is compared to that of other states, the difference can be dramatic. For example, in 1995, while Alaska funded 9.7 percent of highway capital improvements with state money, Texas funded 44 percent, Kansas 68.6 percent, and New York 70.7 percent. At first glance, it appears that Alaska benefits the most by having the highest federal/state funding ratio. However, the advantage to the other states is that by spending state money they can meet their transportation needs more effectively and provide the intermodal connections best suited to solve a transportation challenge without restrictions associated with federal modal funding.

As will be discussed later, a state-funded capital improvement program for transportation in Alaska would reduce vulnerability to changes in federal funding authorization laws and funding formulas, and would provide the flexibility needed in Alaska to develop an effective, intermodal transportation system.

SURFACE TRANSPORTATION MAINTENANCE AND OPERATIONS FUNDING

Under federal highway policy, states are responsible for the primary maintenance and operation (M&O) of roads, highways, and ferries. Federal highway funds can be used to build, improve, or increase the capacity of roads and bridges, acquire land and other rights-of-way, conduct planning and design, and reconstruct, resurface, rehabilitate, and restore existing roadways. Under TEA-21 for the first time, Federal capital highway funds can be spent for preventive maintenance, including chip sealing, pavement markings, crack sealing, and summer bridge repair work. Federal funds cannot be spent for operations or routine maintenance.

Department of Transportation and Public Facilities

Winter road maintenance

In 1999 the Alaska legislature appropriated about $56 million for highway M&O. During that year, $25.5 million was collected in highway motor fuel gasoline tax at a rate of eight cents per gallon. The appropriated funds fell far short of the level of funding required to maintain the highways to protect the capital investment.

The challenge of paying for M&O extends beyond roadways to transit systems as well. Federal capital funds for transit can be used for purchase of vehicles and construction of such improvements as shelters, pullouts and stations. Many communities with transit systems struggle to provide sufficient operating funds to ensure adequate levels of service. For bus systems, revenue from fares typically covers only 30 to 45 percent of operating costs. These communities must budget a substantial portion of public transit operations and maintenance funding from local tax revenues or other means. There is, however,

some federal funding allocated to states for subsidizing transit system operating expenses in rural areas. The State Transit Program office apportions this funding to community transit systems by formula (Anchorage, a federally-designated metropolitan planning organization, receives a direct grant from the Federal Transit Administration). Although the apportioned funds can cover up to 50 percent of any one system's operating losses, the amount available when spread among the various transit systems in the state, including some new community coordinated systems, is much less than the need. As with highways, inadequate M&O funding means that capital transit investments are not adequately maintained and local transit systems do not have sufficient operational funding.

FEDERAL AVIATION CAPITAL FUNDING

Alaska's extensive aviation system plays a crucial role in the movement of people and goods throughout the state. In many parts of rural Alaska, aviation serves as the principal link between communities. Given the dependence on air travel, funding for capital improvements of airports is critical.

Nearly all of Alaska's airport capital improvements rely on funding from the Federal Aviation Trust Fund. This fund, supported by federal taxes on airline tickets, cargo, and fuel, supplies monies for capital improvements through the Airport Improvement Program (AIP). Unlike surface transportation spending, which is usually authorized every six years, federal aviation funding is authorized on a yearly basis.

Department of Transportation and Public Facilities

Eagle Airport

The Federal Aviation Administration administers the program, which has both entitlement and discretionary funding categories. The types of capital improvements that are funded include general airport improvements, specialized buildings such as passenger terminals and heated equipment sheds, and equipment to operate and maintain airports. Both entitlement and discretionary aviation funds require a state or local match of 6.25 percent.

From 1995 to 2000, AIP entitlement funds for Alaska's airports varied from approximately $62 million to $88.6 million annually, as shown in Table 4.1 and Figure 4.1. Alaska ranks third nationally, after Texas and California, in the amount of federal aviation funding received. Alaska's high level of aviation funding reflects the critical importance of air transport to its residents, 30 percent of whom live in communities not connected by road to the state's highway network. Moreover, Alaska has more airports than most states and more airports that do not meet national safety standards. In addition, airport construction in remote areas of the state is extremely expensive.

While the AIP funding is significant, it falls far short of the need. The state owns and maintains 261 airports including seaplane bases. In addition, there are 21 public airports owned and maintained by local units of government that compete independently for a share of the state's AIP funding. All public-use airports are eligible to compete for the available funding. The current AIP authorization expires on September 30, 2003. This legislation authorizes funding at significantly higher levels than previous authorization levels.

STATE AVIATION CAPITAL FUNDING

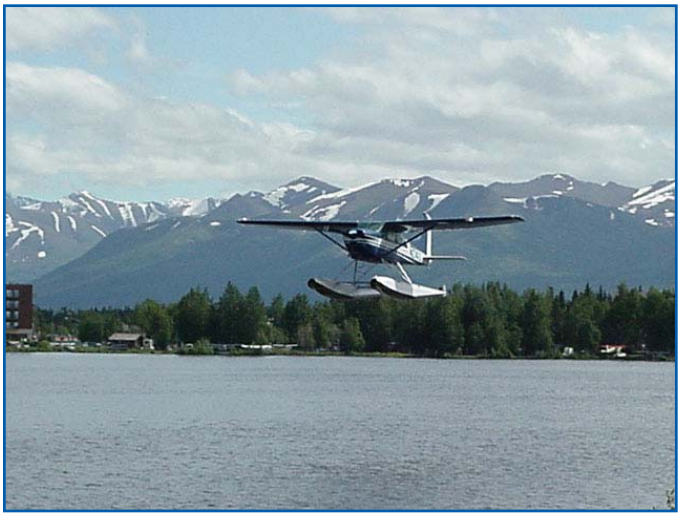
Alaska state airports are divided into two categories: 1) the International Airport System, consisting of the Ted Stevens Anchorage International Airport (AIA) and the Fairbanks International Airport (FIA), and 2) the Rural Airport System, consisting of all other state-owned airports.

The International Airport System is self-supporting through fees for aircraft landings, fuel flowage, terminal area and lease lot space, concessions, and aircraft tie-downs. These fees are deposited directly into the International Airport Revenue Fund (IARF) that in turn provides funds for capital improvements and M&O costs at AIA and FIA.

There is no state-funded program for capital improvements to rural airports. As with surface transportation, the lack of a state capital improvements program for rural airports creates problems in developing the effective intermodal transportation system that Alaska needs. The large number of sub-standard airports in the state make transport of people and commodities difficult and expensive. In the absence of a state funding program, opportunities to address many of Alaska's unique needs are lost.

AVIATION M&O FUNDING

AIP money can be used for capital projects, while the sponsor (the department in almost every case) is responsible for M&O costs. In Alaska, paying for airport maintenance and operations is more of a concern than funding capital projects.



Department of Transportation and Public Facilities

Float plane in Anchorage

M&O for the rural airport system is funded by legislative appropriation from the general fund. Fees from land rental, concessions, and fuel flowage are collected at these airports and deposited into the general fund. A state aviation fuel tax of 4.7 cents per gallon for jet fuel at all airports (including the international airports) is also deposited into the general fund to support state appropriations for airports. Landing fees at rural airports are currently prohibited.

The legislature traditionally appropriates more money for Rural Airport System M&O than the total revenue from the various fees. For example, in 1996, revenues generated by the fees were $2.3 million. In addition, $8.2 million in aviation fuel taxes collected statewide brought total deposits to the general fund to $10.5 million. The legislative appropriation for Rural Airport M&O that year was approximately $19.2 million.

Yet the need for rural airport M&O outstrips the funds appropriated. Revenue shortfalls attributable to aviation have ranged from a low of $3.6 million in 1987 to a high of $11.2 million in 1991. The shortfall in 1996 was $8.7 million. The yearly deficit recently increased due to a law passed by the legislature in 1997 that exempts incoming and outgoing international flights at AIA and FIA from paying fuel taxes as of July 1, 1997. Department of Revenue figures show that revenue from aviation fuel taxes declined 35 percent from $8.1 million in 1997 to $5.3 million in 1998, and $5.6 million in 1999. However, revenue from aviation fuel taxes was back up to $8.3 million in 2000.

FEDERAL PORTS AND HARBORS CAPITAL FUNDING

With over 30,000 miles of shoreline, relatively few roads, and 90 percent of the state's population living within ten miles of the coast or along a major river, Alaska's marine facilities are integral to the local, statewide, and international transportation of goods and people.

While overland trucking and rail are important for delivery within the state, marine and air transport dominant interstate freight movement. In this regard, Alaska differs markedly from other states where trucking and rail dominate interstate freight.

The National Highway System was created by ISTEA. This system is composed of those highways throughout the nation that are most important for interstate commerce. Congress designated Alaska's mainline marine highway routes and facilities as part of this national system in recognition of the importance of marine transportation to interstate commerce. However, barges, container ships, and oil tankers carry much greater volumes of marine freight to and from Alaska than do ferries. While improvements in oil tanker safety and navigation have been realized in recent years through the use of funds from the Exxon Valdez settlement, the majority of Alaska's public ports and harbors have steadily deteriorated due to lack of funding for upkeep and improvement.

As Alaska's population has grown, so have the demand for marine shipping and the need for regular maintenance and periodic expansion of port and harbor facilities. Poorly maintained port facilities limit delivery capacities and increase the risk to the carrier, resulting in higher shipping fees and delivery via alternate, more expensive, modes. The result is increased cost of goods for Alaskans.

> *"Ninety percent of Alaska's population live within ten miles of the coast or along a major river."*

Ports and harbors have no federal capital assistance program comparable to the highway and airport funding programs. Federal funds for ports and harbors come through the U.S. Army Corps of Engineers. The Corps distributes funding on a nationally competitive, project-by-project basis. The Corps, moreover, only develops projects; funding depends on Congressional approval on a line-item basis. Thus, the state cannot plan on receiving any portion of the Corps' support in any given year, nor can the state "flex" any Corps funding; all funding is appropriated on a project-specific basis. Rather than being driven by any state prioritization or program, the federal port and harbor funding process is driven by the Corps' assessment of a project's merit, and by Congress' willingness to fund the Corps' recommendations.

Corps program requirements limit federal responsibility to navigation improvements consisting of breakwaters and entrance channels. A very structured analysis in a feasibility study eventually determines federal interest and non-federal interest and the benefit and cost. Funding for a navigation project requires non-federal matching funds, the amount depending on the characteristics of the project. Feasibility studies require 50 percent non-federal local match.

For construction, the Corps requires 20 percent match for shallow draft improvement projects and 35 percent match for deep draft improvements. The amount for project elements that add benefits to the project but have no federal interest is 100 percent local funding. These improvements—including dredging basins, docks, floats, grids, and upland facilities—increase the net effective rate, which can be as low as 20 percent, but in most cases it will be near 40-60 percent, again depending on specific project characteristics. This obligation is beyond the financial means of many first and second class communities without assistance.

The Corps selects projects based on National Economic Development criteria where the expected benefits must exceed costs. Few small Alaska towns and villages can demonstrate such a positive return on investment due to low population and high cost of construction. Nonetheless, the state and local communities in Alaska have been awarded an average of $12 million annually in federal funding for all Corps of Engineers programs over the past eight years. However, this amount is insufficient to adequately address needed economic development projects and a growing list of ports and harbors whose maintenance needs have been deferred. The department estimates that the cost of funding priority projects at Alaska's ports and harbors is $247 million.

STATE PORTS AND HARBORS CAPITAL FUNDING

State support for ports and harbors varies by type of facility. The state has historically provided grants to local governments for the development of ports, whose users are mostly commercial transportation carriers and very large vessels. Local governments

then receive income from the ports through wharfage and service fees. Local governments use these fees to cover M&O costs and any indebtedness. Direct state grants for new port construction, which come through legislative appropriation from the state general fund, have become increasingly uncommon and appear very unlikely in the future. Recently constructed ports have been financed through local taxes and bonds and in some cases with private financing guaranteed by the Alaska Industrial Development and Export Authority. Nevertheless, there remains a gap in funding for projects promoted for community development where beneficiaries are best represented by local governments.

Harbors are public facilities for the use of commercial fishing and charter operators, tug and utility services, and recreational boaters. The funding source for harbors is the state general fund. The state has most often constructed and retained ownership of the basins, floats, grids, and docks. Federal assistance through the Corps of Engineers has been used when available for dredging channels, constructing breakwaters, and erosion control. The state has assisted in constructing harbors in Alaska; 76 of these facilities are currently owned by the state. Of these, 53 are operated under agreement with the governing municipality. While the state retains ownership, local governments assess moorage and service fees to pay M&O. Capital replacement remains a state responsibility. The user-paid marine fuel tax, deposited in the general fund, is the logical funding source for harbors.

Department of Community and Economic Development

Cordova boat harbor

Financing of harbors has changed over the decades. The generous legislative appropriations in the 1970s and early 1980s have declined as oil revenues have declined. As noted, federal assistance is very limited and only larger communities have the tax base to raise capital, and then only to develop the least costly inner-harbor facilities. Capital appropriations for ports and harbors are discretionary requests, subject to legislative appropriation. There has not been a successful financing model for many years. In recent years, the model that maximizes federal invest- ment in Alaska's marine transportation infrastructure through the Corps of Engineers, Civil Works Program for navigation improvements has enjoyed some successes. Through local project sponsorship, state assistance, and federal investment, some new projects are coming on line, and there are a number of others that may eventually become reality. Providing state matching funds to help local project sponsors meet their financial obligation in project sponsorship has accelerated the completion of projects in many communities. For example, Kodiak, Kake, Sitka, King Cove, Ouzinkie, Larson Bay, Saint Paul Island Harbor, Saint George Island Harbor, Chignik, and Anchorage have projects in line for construction with state assistance in hand as a part of the funding plan. The key characteristics that make the program work are the willingness of communities to own and operate the facilities, their willingness to commit to sponsor projects with the federal government, and their willingness to commit to financially cost-sharing with the state for feasibility and construction at 50 percent of the non-federal-project development cost.

While the model has been successful in recent times, it remains discretionary. It is not codified or in statute; it remains a policy-driven program with some political support, but has no broad-based appeal and no federal mandate to provide quality harbor facilities. While the model addresses some projects that need new breakwaters and entrance channels for capacity expansion, the nearly $150 million of projects not being addressed is because there is no federal interest. A similar model offering state assistance for locally sponsored projects and significant local match for projects with no federal interest is the next step.

State municipal assistance has declined in recent years, and local governments find it difficult to raise fees, taxes, and bonds when their economies are slow. Unless a substantial external funding source emerges to support marine infrastructure development in Alaska, local governments need to define the appropriate level of state assistance required. Securing continued state assistance is the greatest single challenge for municipalities at this time. The state will only respond to the level of expectation required by local governments.

STATE PORTS AND HARBORS M&O FUNDING

Maintenance of the infrastructure is far "behind the curve"; as with highways and airports the level of funding has not been sufficient to protect the investment. Not long after statehood, a marine fuel tax was imposed. This tax of five cents per gallon has not been raised since 1977. In recent years, taxes on marine fuels have brought in around $6.7 million each year. While these funds could pay for construction and major repair of ports and harbors, they are not dedicated to marine use but are deposited into the general fund. If marine fuel tax receipts were allocated to ports and harbor maintenance every year, they would probably amount to enough to stem the tide of depreciation. Legislative funding of M&O has been erratic over the last five years.

> *"The marine fuel tax of five cents per gallon has not been raised since 1977."*

FEDERAL RAIL FUNDING

There is no annual program for federal funding of rail capital improvements. However, the Federal Railroad Administration (FRA) disburses special grant funds for rail projects on a case-by-case basis. The Alaska Railroad Corporation was the beneficiary of $10 million FRA grants in each of the years 1996 through 2000 for rail-tie replacement and track rehabilitation. TEA-21 authorized $31.5 million for 1998-2003 in grants for capital rehabilitation and improvements to passenger services of the Alaska Railroad. As a publicly-owned railroad with inter-community passenger service, the Alaska Railroad was granted an additional $29.1 million in TEA-21 for the same period in transit formula grant funding. Of this funding, 80 percent is to come from the federal Mass Transit Account and 20 percent from the state's general fund. These funds are dedicated specifically to improvements such as additional passenger capacity, passenger terminal improvements and improvements in intermodal connectivity. No federal funding is available for rail maintenance and operations.

STATE RAIL FUNDING

Since the State of Alaska purchased the Alaska Railroad from the federal government in 1983, no state funds have been provided for capital improvements. The state has, however, invested federal highway funding to move track at the Anchorage Port in order to separate truck and rail traffic.

The Alaska Railroad Corporation has managed the railroad as a for-profit business. Revenues have been sufficient to meet operational costs and provide some capital funding for replacement and upgrade costs, but not enough to stimulate significant expansion of service or extension of the rail system.

LOCAL SOURCES OF FUNDING FOR TRANSPORTATION

Local sources of funds for transportation improvements include property tax revenues, local appropriations, municipal bonds, grants-in-aid to local governments and other sources.

The Federal Highway Administration (FHWA) maintains statistics on local government funding for highways. In 1997, local governments in Alaska invested $211.5 million of

local revenues in highways, streets and roads—not including federal and state disbursements for projects in the Statewide Transportation Improvement Program (STIP). This included $1.3 million in local highway user tax revenues, $59.1 million in appropriations from general funds, $118.8 million in property taxes, and $20.1 million in bond proceeds. An additional $12.2 million came from miscellaneous receipts. Over half of the revenues used by local governments for highways came from property tax revenues (51.7 percent), followed by appropriations from general funds (25.7 percent) and bond proceeds (8.8 percent). Non-STIP payments from state and federal governments totaled $18.1 million, with the bulk (88 percent) coming from the state.

For the communities operating transit and para-transit systems in Alaska in 1996, approximately $11 million in operation costs was contributed from local taxes. That represents 67.5 percent of all annual operating expenditures. In Anchorage, local taxes accounted for $8.2 million in operation costs, amounting to 72.6 percent of that transit system's annual operating expenditures. Some local governments subsidize non-profit agency services with tax dollars, but portions devoted to transportation use are not specified.

Some transportation funding to local communities comes from other federal sources not yet mentioned. For example, the U.S. Department of Agriculture Forest Service distributes a portion of timber receipts to boroughs that contain national forests. Community impact funds are another source of money for transportation projects. These funds typically are federal monies made available to local communities in times of sudden economic downturn or emergency situations. Recently, the federal Economic Development Administration distributed "Tongass Relief" funds to communities in Southeast Alaska. These funds are to help communities respond to the decline in allowed timber harvest in the Tongass National Forest. Local governments have complete discretion in the use of these funds and may use them for transportation or non-transportation purposes. No data are available.

Many communities have financed the building and maintenance of their own trail systems over the years, usually for recreation purposes. The funding can be part of a community's parks and recreation budget, but may come from recreational clubs, user fees, business contributions, volunteer labor or other sources. The department has not attempted to collect data on this funding.

Figures for local tax receipts and fees devoted to non-state-owned airports are not collected or tabulated by either the FAA or the department. These funds could possibly include fuel sales, fees, personal property tax on aircraft, tie down fees, rent from tenants, Passenger Facility Charges, and sales tax from tenant concessions. No local tax revenue is contributed toward the operation or maintenance of any of the state-owned airports.

Photo by Elke Brosin, Department of Community and Economic Development

Spaulding Meadows Trail, Juneau

investing AN ASSESSMENT OF ALASKA'S SYSTEM INVESTMENT IN TRANSPORTATION

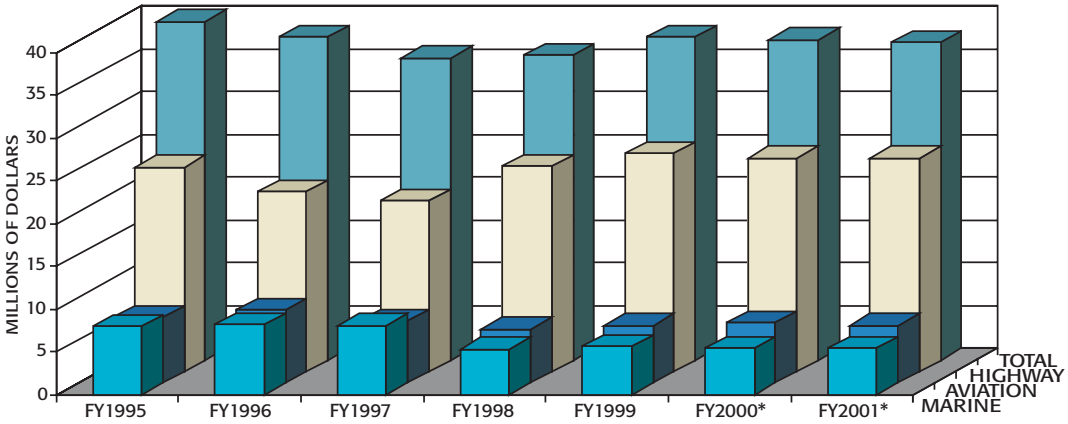
In this section greater detail about the present investment system for transportation in Alaska is presented. First, three major issues that affect investments are examined: fuel tax revenues, deferred maintenance and inflation, and preventive maintenance. Then principles of a good revenue system are presented and the Alaska system is evaluated against these principles.

TABLE 4.2 SOURCES OF STATE FUEL TAX REVENUES IN ALASKA, 1995-2001

	$ Millions						
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000*	FY 2001*
Highway	$ 23.9	$ 21.0	$ 19.9	$ 24.0	$ 25.5	$ 25.0	$ 25.0
Aviation	$ 8.0	$ 8.2	$ 8.1	$ 5.3	$ 5.6	$ 5.4	$ 5.4
Marine	$ 7.7	$ 8.5	$ 7.3	$ 6.3	$ 6.7	$ 7.0	$ 6.7
Total	$ 39.6	$ 37.7	$ 35.3	$ 35.6	$ 37.8	$ 37.4	$ 37.1

** Preliminary estimates*

FIGURE 4.2 SOURCES OF STATE FUEL TAX REVENUES IN ALASKA, 1995-2001



** Preliminary estimates*

FUEL TAX REVENUE

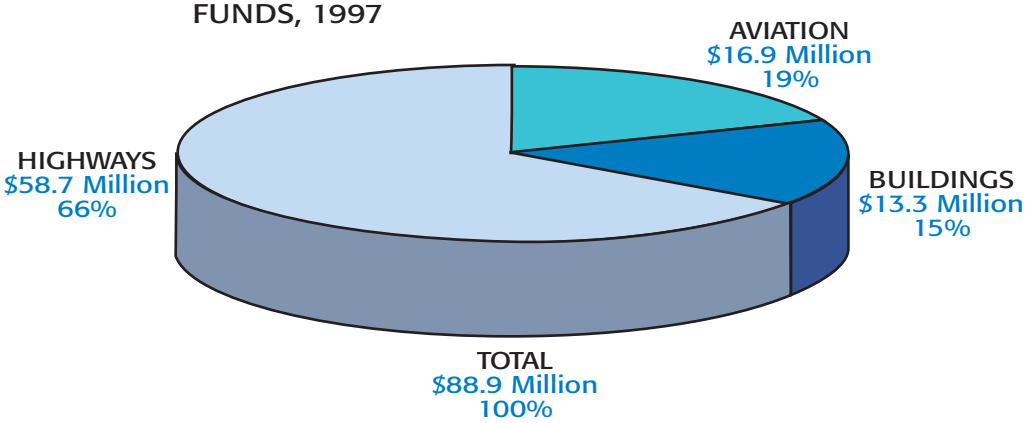
Motor fuel taxes are an important source of revenue for the state. Alaska currently levies a tax of 8 cents a gallon on highway gasoline and diesel fuel, 4.7 cents on aviation gasoline, 3.2 cents on jet fuel, and 5 cents on marine gasoline. A historical comparison of revenue from these taxes is shown in Table 4.2 and Figure 4.2. The combined fuel tax revenue amounts to $35 to $39 million annually.

Alaska does not tax all fuels, however. Liquefied petroleum gas and compressed natural gas are exempt from state motor fuel taxes. Gasohol fuel, used widely in Anchorage and Fairbanks to help reduce emissions, was exempt until July 1997. In place of the exemption, the legislature approved a two cents per gallon tax on gasohol fuels during mandatory use periods (winter months) and the regular eight cents per gallon tax at all other times. After the exemption ended in July 1997, the amount of taxes collected on gasohol increased dramatically, by over 20 percent, from $19.9 million in 1997 to $23.9 million in 1998.

Since the reduction in aviation fuel taxes on international carriers noted in the previous section and increased highway fuel revenues due to the lifting of the exemption on gasohol, over two-thirds of the fuel tax revenues have come from highways. In 1999, the highway fuel tax accounted for about 68 percent of total motor fuel revenues while taxes on marine fuel represented eighteen percent, and fourteen percent came from aviation.

These revenues become part of the general fund, unlike federal gas taxes that become part of a dedicated federal Highway Trust Fund. The Alaska Constitution prohibits dedi-

FIGURE 4.3 DISTRIBUTION OF STATE MAINTENANCE & OPERATIONS FUNDS, 1997



No state funds were appropriated for harbors M&O in 1997.

cated funds, except as required for participation in federal programs. Hence, there is no guarantee that these fuel tax revenues or other fees will be appropriated to pay for transportation facilities and services.

In 1997, 66 percent of the funds appropriated for M&O went to highways, nineteen percent went to aviation and fifteen percent went to buildings, as shown in Figure 4.3. There was no appropriation for maintenance of ports and harbors in 1997.

DEFERRED MAINTENANCE AND INFLATION

The department calculates that the revenues from highway and aviation fuel taxes are not enough to maintain the investment in highways and aviation infrastructure. Even if all highway fuel taxes were dedicated to highway maintenance and all airport fuel taxes were dedicated to airport maintenance, they would not be sufficient. In contrast, however, current marine fuel tax revenues of $7 to 8 million annually, if used exclusively for maintenance of ports and harbors, would be sufficient to meet most routine maintenance requirements.

Lacking sufficient funding—for highways, aviation, and ports and harbors—the department postpones, or defers, maintenance on facilities. The backlog of deferred maintenance grows each year and the cost of undoing the damage caused by lack of maintenance increases geometrically. That is, costs grow by greater amounts each year.

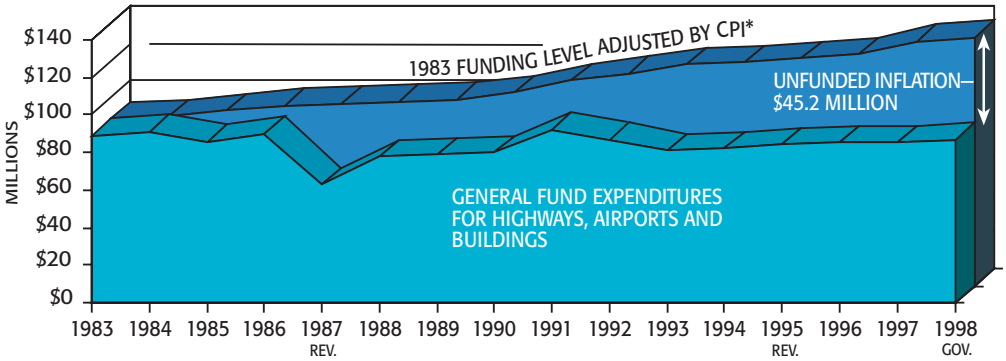
The department uses a standard engineering model to track the condition of the transportation infrastructure. With this model, the department can apply maintenance funds most effectively. When it cannot fund needed maintenance, such as repair to a bridge or a runway, it calculates the deferred cost using calculations of the original life-cycle design, level of past and future use, and environmental factors such as underlying geology and weather. Although the calculations are complicated, the concept is straightforward—deferred maintenance is not unlike repairs on a house where painting, roofing, and gutters need periodic attention to prevent larger, more expensive structural problems from developing. Eventually, lack of maintenance can render a house beyond repair.

When maintenance is deferred, in addition to the cost of maintenance problems becoming structural problems, the cost of resolving the problem also increases due to inflation. To assess the latter, the department establishes a base year for maintenance costs and then adjusts this figure for inflation using the Consumer Price Index. The department then compares the inflation-adjusted figure to actual M&O funding. Figure 4.4 shows this comparison for highways, airports, and buildings, using 1983 M&O funding levels as a baseline.

"The backlog of deferred maintenance of transportation facilities grows each year."

FIGURE 4.4 DOT&PF MAINTENANCE & OPERATIONS GENERAL FUND EXPENDITURES

1983 Funding level adjusted annually by consumer price index vs. authorized budget expenditures



* CONSUMER PRICE INDEX

Inflation raises fixed costs such as labor, utilities, and equipment. At the same time, inflation decreases the value of the fuel tax revenues collected. Alaska has had an eight-cents-per-gallon highway fuel tax since 1961, but in the past 40 years the value of the tax has declined by over 80 percent due to inflation. Thus, inflation decreases the value of revenues collected while it increases the cost of repairs. The result, as shown in Figure 4.4, is that if maintenance expenditures had merely kept up with inflation, the state would have spent $45.2 million more than it did. This gap is expected to continue to increase at about the same rate for the foreseeable future.

Not only do roads, aviation, and buildings suffer from deferred maintenance; so does the marine infrastructure. The Commissioner's Advisory Committee on Transportation Fiscal Policy reported in 1995 that there was a backlog of approximately $26 million in deferred maintenance on harbors. For the eight years ending in 1995, over $66 million had been collected in marine fuel tax and only $37 million had been appropriated to maintain harbor facilities.

PREVENTIVE MAINTENANCE

In addition to the compounding effects of inflation on costs and revenues, the department must also address increasing maintenance responsibilities. As the Alaska population has grown, the transportation infrastructure has expanded, and there has been increased use of the transportation system and higher expectations by those users. The department is now responsible for more lanes of road due to widening of our roadways and higher maintenance costs at our airports partly due to security and safety requirements set by the FAA.

The department has responded to the challenge with several strategies. For example, improvements such as paving a gravel road or reconstructing a poorly-built road can reduce maintenance requirements. In other cases, improved technologies, such as new equipment, can lower the cost of maintenance itself.

Overall, however, the most cost-effective strategy for long-term reduction of transportation costs is preventive maintenance. Preventive maintenance seeks to extend service life to its optimum level through a balanced program of regular annual maintenance and periodic restoration of critical elements. It is more cost effective to engage in preventive maintenance than to allow transportation systems to deteriorate to the point where major reconstruction becomes necessary. Although the economic benefits of preventive maintenance are indisputable, there are not sufficient funds to keep up with the maintenance obligation. There are two main obstacles to investing in regular preventive maintenance.

The first obstacle is the constraint on the use of federal funds. As noted earlier, maintenance has been predominately funded by the state, while rehabilitation and major repair have been mostly funded from federal sources. The state must match about ten percent of federal highway project costs and about six percent of federal aviation project costs. This generously low level of required state match encourages states, including Alaska, to allocate their limited state transportation dollars toward matching federal capital projects since each state dollar will leverage, on average for highways, nine federal dollars.

The federal matching program for capital construction, however, can have an unexpected, negative outcome on transportation systems. The program may actually encourage states to allow facilities to deteriorate to the point where reconstruction becomes necessary. This reconstruction, ironically, can be paid for with federal funds, but at a cost much higher than that of timely maintenance. The Transportation Research Board reports that deferred capital improvements cost up to 160 percent more than the cost of regular maintenance. There is an incentive for the state to defer maintenance until facilities qualify for federal funding. As a result, the federal capital improvement program may discourage preventive maintenance.

In an attempt to alleviate this unintended feature of its funding program, the Federal Highway Administration monitors the level of maintenance a state performs on its federally funded projects. The FHWA notified the department in January, 1997, that the agency was concerned with the declining level of maintenance of the state's roadways.

Department of Transportation and Public Facilities

Hauling gravel

In the same year, a national transportation watchdog group praised Alaska for pursuing system preservation before new capacity. The Surface Transportation Policy Project, a national nonprofit coalition of over 200 groups and individuals working to ensure that transportation policy and investments help the environment and emphasize the needs of people, cited Alaska as one of the top sixteen states for directing road spending to maintaining existing roads. Based on an analysis of 1994 and 1995 ISTEA funding, STPP noted that Alaska spent 77 percent of its federal funding for surface transportation on system preservation. When only measuring ISTEA flexible funds—those not earmarked for specific projects on the interstate—Alaska again gets high marks, ranking thirteenth among all states on system preservation.

Whether Alaska should be praised for its high level of system preservation, or whether it should lose federal funding for not maintaining its system to standards, is a broader issue than can be addressed here. What is clear is that the continued reconstruction of facilities using federal funds is highly ineffective. The federal funds are not being used to actually improve the overall transportation system, but are increasingly used to resolve problems caused by deferring maintenance. Federal funds could be used on a greater number of new projects that would have a greater overall benefit to Alaska. Alaska has the potential to expand its transportation system, but only if it can stop spending its capital resources on reconstruction, correcting problems caused by deferring maintenance.

The second obstacle to preventive maintenance is its subtlety or lack of visibility. Good maintenance is practically invisible. When maintenance is done well the transportation system stays the same: smooth roadways, working harbors, graded runways. There is a human tendency to think such sameness happens without effort. Of course, citizens complain as roads and airports deteriorate without maintenance, but then are pleased when reconstruction finally occurs. But citizens do not realize that the price they pay for not maintaining existing facilities is they are not able to have all the improvements they could otherwise enjoy.

The lack of visibility of good maintenance extends to the political world as well. Transportation infrastructure deteriorates over many years, much longer than most elected officials are in office. Maintenance is not a politically exciting topic; elected officials are rewarded more for building something new. Putting off needed maintenance for a few years is generally not dire, but the cumulative effect of deferring maintenance continues to negatively impact the quality of the system.

PRINCIPLES OF GOOD REVENUE SYSTEMS

In light of these obstacles, what can be done to ensure Alaska enjoys a quality transportation system? What is needed is a revenue or investment system that meets the principles of equity, efficiency, adequacy, reliability, and diversity.

The principle of equity relates both to how revenues are collected and how they are distributed. Transportation taxes and fees, such as highway fuel taxes and auto licensing fees, tend to be regressive. That is, if everyone rich and poor pays the same, it tends to result in a disproportionately high tax burden on low-income taxpayers. Alternatively, progressive taxes increase proportionally depending on the ability to pay. The difficulty in designing an equitable transportation tax system is balancing a progressively imposed system with the need to provide strong linkage between costs and use of the system. Development of a program to increase revenues for transportation is clearly politically charged with multiple constituencies.

Department of Community and Economic Development

Front Street, Kotzebue

The issue of equity in distribution of transportation benefits is also difficult and similarly politically charged. The department allocates available resources on the basis of a statewide evaluation of need, using a criteria-based, participatory process. Contribution by local communities is one of the criteria.

An efficient revenue system is easily understood, administered clearly, with components that work together. It permits users to link their use of the transportation system with fees or taxes paid to improvements and maintenance of the system. This interconnection is most clear with toll roads and bridges: a user pays for each use and can see the road or bridge maintained. Motor fuel taxes are considered part of an efficient revenue system as there is a moderately direct relationship between fuel consumed and miles driven.

A revenue system must generate adequate and reliable income over time. The principle of adequacy is straightforward: the system must generate enough revenue to consistently fund its programs as they grow, through increases in population and use, and as inflation changes values. A reliable revenue system provides adequate funds to administer programs through economic downturns and unexpected events.

The final characteristic of a good revenue system is its diversity of revenue sources. A diversified revenue system derives funds from a variety of sources. Diversity has links to other criteria, including equity and reliability. A diverse system is arguably more likely to draw revenue from its many benefactors and is less likely to be impacted by downturns in a particular revenue stream.

EVALUATION OF ALASKA'S TRANSPORTATION REVENUE SYSTEM

The principles of good revenue systems give us a starting point from which to evaluate Alaska's transportation revenue system. The Alaska revenue system fails to fulfill some of the major principles. Arguably, the existing revenue system is inadequate and unreliable, lacks diversity, and is without sufficient linkage to system use.

Alaska's system fails to meet the most important characteristic of good revenue systems: adequacy. Transportation funding in Alaska comes basically from two sources: federal and state appropriations. Federal funding does not support necessary maintenance and operations costs. State legislative appropriations from the general fund are not adequate to maintain the quality of our transportation system, even though the amounts are larger than the revenue generated by motor fuel taxes. The problem is that the motor fuel tax is unreasonably low. Only the revenue generated from marine fuel taxes would be adequate to maintain the ports and harbors infrastructure were it appropriated by the state legislature for that purpose, though it has not been. In addition, one of the underlying problems with the tax system in Alaska is that it does not generate revenue from tourists. The low motor fuel tax rate, for example, does not capture the value of system use by visitors.

The transportation revenue system in Alaska fails to meet the principle of efficiency, to sufficiently link costs with use. While it is common to buy ferry tickets and airline tickets, the use of Alaska's roads is not closely linked with the costs of building and maintaining them. The average gasoline mileage of cars and light trucks improved threefold from 1970 to 1991; as a result, tax revenue fell equally dramatically on a real-dollar basis. The federal government and many state governments consequently increased fuel tax rates in an attempt to restore revenue to original levels; Alaska did not. Thus, Alaskans pay only about one third of the per-mile state highway tax paid in 1961, and considerably less than that in 1961 dollars (taking the consumer price index into account). However, Alaskans pay a price in terms of road closures, higher vehicle maintenance costs, shorter vehicle service life, greater incidence of accident/injury, higher auto insurance rates, and limited access that more than offset the savings in price at the gas pump.

Department of Community and Economic Development, c/o ARCO

Central Processing Facility #1, Prudhoe Bay

Alaska's transportation revenue system is neither reliable nor diverse. About 81 percent of the general fund's unrestricted revenue is tied to petroleum production. The revenue generated from petroleum production, although it has provided billions of dollars for state programs, varies depending on the price of oil and the level of oil production. The unreliable nature of oil production and price forces the state into the awkward position of forecasting oil prices and production to estimate revenue on a year-to-year basis. In 1997, 48 out of 50 states posted budget surpluses due to a strong economy and income-based revenue structures. In spite of massive budget cuts, Alaska again posted a budget deficit. Forecasts indicate that oil production in Alaska will continue to decline.

This lack of diversity of funding sources has severe implications for state programs during economic downturns or oil price fluctuations. Although the state has a large savings account that can be used to support programs during years with low oil revenues, use of this account depletes the state's budget reserves and reduces the state's ability to generate revenue from interest.

Reductions in state government expenditures amplify the negative effects of economic downturns on Alaska's economy by further reducing the money in circulation. Additionally, reductions in certain state programs have a direct effect on the economy. For example, the reduced number of highway visitors to Alaska in 1996 and 1997 was at least partly the result of reduced state funding for tourism marketing beginning in 1992, while the state's funding of direct marketing in 1997 led to an impressive seventeen percent increase in highway arrivals in 1998.

TRANSPORTATION INVESTMENT AND FUNDING POSSIBILITIES

The department has identified many transportation needs that should be addressed. As noted, not only are existing funds inadequate, current funding mechanisms do not always lead to the most efficient and effective use of limited resources. Since transportation budgets are by nature fiscally constrained to varying degrees, it is important for the department to consider all measures that may alleviate some of the financial pressure on the system. This section examines alternative methods of project selection and allocation of transportation funds.

PROJECT SELECTION AND ALLOCATION OF TRANSPORTATION FUNDS

Cost-Benefit Analysis in Project Selection. Cost-Benefit Analysis (C/B) is commonplace in the evaluation of investments in both the public and private sectors. Typical C/B tabulations attempt to quantify all the costs directly associated with the project, including scoping, planning, design, and construction. C/B can be a valuable tool that may lead to better choices in project section; however, C/B is criticized for failing to include factors not ordinarily assigned economic value. For example, C/B is effective in assigning the economic benefit of a project that opens up new territory to resource development, such as building a new road to a mine. But C/B does not address well such "intangibles" as changes in lifestyle of nearby residents or impacts on wildlife habitat. Economists have developed tools to evaluate these "non-market" values, but the values of concern are illusive and tend to vary among user groups, such as between area residents and those from other areas who wish to use the road for recreational or hunting access. C/B has its greatest utility in comparing alternative solutions to the same or similar transportation problems. It is only marginally useful, perhaps even counterproductive, in comparing dissimilar projects in different communities or areas, because it will tend to give an edge to projects that serve larger populations and areas with more developed infrastructure. For example, use of C/B in project selection can skew projects in favor of urban community projects since rural community needs are not easily quantified in comparison with the needs in larger communities.

Department of Transportation and Public Facilities

Parks Highway road reconstruction

Life-Cycle Costing in Project Selection. In addition to C/B, the department is considering the use of life-cycle costing as a means of evaluating projects for selection for its capital programs. Life-cycle costing attempts to evaluate the total cost of a project over its life span, leading to more efficient use of scarce resources. Life-cycle costing not only considers construction costs, but also costs of maintenance, operation, and modifications over time. This form of evaluation is especially important given the problem of deferred maintenance costs and use of federal funds for reconstruction. The use of life-cycle costing may help guide decision-making concerning the level of investment in a project and the subsequent maintenance obligations.

Full Cost Accounting attempts to include the costs of consequences resulting from building or not building the project as well as necessary associated services. These may include congestion and resulting emissions and lost productivity, particulate matter and vehicle damage resulting from driving on unpaved surfaces, long-term loss of land and

environmental/historical impacts, public safety and emergency response costs, economic impact of not building, and many others. Objective measurement of these costs is extremely difficult and probably not feasible, but improved public input offers a means to identify these costs early on and prompts planners to consider them in conceptualizing alternative solutions to a need.

POSSIBLE FUNDING SOLUTIONS

These three methods are time- and information-intensive and have thus far only been used by the department in review of specific projects such as Juneau Access and in area plans. For the department to realistically consider using these techniques for STIP development, additional staff and funding would be needed.

The following are possible solutions to the funding difficulties that the department is considering. A brief discussion of each follows:

Department of Transportation and Public Facilities

Floatplane dock at Juneau International Airport

INNOVATIVE FINANCING STRATEGIES PROMOTED BY THE FEDERAL GOVERNMENT

- Federal Matching Flexibility
- Public-Private Partnerships
- State Infrastructure Bank
- TIFIA
- "GARVEE"
- Letter of Intent

INNOVATIVE FINANCING STRATEGIES AT STATE LEVEL

- Governor's Proposed Accelerated Transportation Initiative
- Dedicated Fund
- State Motor Fuel Taxes
- Registration Fees
- Transfer of Facilities to Local Government
- Privatization
- Toll Roads
- Transportation Endowment Fund

AVIATION

- Passenger Facility Charges

INNOVATIVE FINANCING STRATEGIES PROMOTED BY FEDERAL GOVERNMENT

In recent years, the federal government has begun to support innovative financing of transportation projects. Innovative finance is expected to play an increasingly important role in future transportation infrastructure financing in Alaska and elsewhere in the country. Over the past few years, the federal government has spent $5 billion for projects demonstrating new loan programs, new types of partnership, toll road concepts, and cash flow concepts that alter the timing and match of funding to get projects on line

sooner. Innovative finance techniques provide state and local governments with alternatives to traditional, pay-as-you-go, grant-based programs. Both ISTEA and TEA-21 advanced the cause of innovative finance by including in these laws specific enabling legislation. These elements make it easier for states to leverage federal dollars to secure additional private sector funding, as well as providing several forms of public sector credit enhancements.

Innovative financing techniques include both "leveraging tools"—designed to make more funds available to states and other transportation providers—and "cash-flow tools" — designed to get projects into construction more quickly. Leveraging tools include flexible match, federal share on toll projects, bonds and debt instruments, loans, and toll investment credits. Cash flow tools include advance construction and partial conversion of advance construction.

"TEA-21 allows "tapered match."

Some financing techniques would allow the state to borrow more easily to finance projects, free up state funds to be used for other needs, or otherwise leverage additional dollars for transportation projects. A leveraging tool, ISTEA Section 1012 loans, allows states to loan money to a project sponsor to leverage investment in any eligible Title 23 program. The loan may be repaid to the state with project-generated revenue. This gives the state more flexibility to commingle federal aid funds with state and private funds. A cash flow tool, advance construction, allows the state to independently raise up-front capital for a project and preserve eligibility for future federal aid funding for that project. This allows the state to manage federal aid funds more effectively by choosing when to seek reimbursement.

FEDERAL MATCHING FLEXIBILITY

Several provisions in TEA-21 provide greater flexibility to states and local governments in satisfying the non-federal matching requirements of a project. TEA-21 now allows "tapered match" where the federal share ratio can be adjusted up and down during the life of a project. The final project cost ratio of federal to state must be as agreed. TEA-21 also allows the fair-market value of land obtained by the state or local government to help meet the match requirement and allows funds from other federal agencies to be used as match for recreational trails and transportation enhancement projects. Federal Lands Highway Program funding can now be used to pay the non-federal share of federal-aid highway funded projects.

PUBLIC—PRIVATE PARTNERSHIPS

Public-private partnerships in transportation are not new. Local, state and federal agencies have long contracted with private sector engineers, road builders, and management consultants for specified services. What is changing is the extent to which the private sector is being prevailed upon to provide the initial investment, and to reap some portion of the rewards (assuming that they exist) of providing public transportation facilities and services.

The use of public/private partnerships in surface transportation, permitted for the first time by ISTEA and extended by TEA-21, has intriguing possibilities. Many states believe a significant source of new funds will come from the private sector and financial community. They recognize that, in certain circumstances, public-private partnerships can identify, finance, construct, own, operate and maintain transportation projects. To date, twelve states have enacted public-private partnership legislation. Nationwide, there are currently a number of public-private partnership projects. These include operation and maintenance of toll facilities; development, construction and operation of new highway facilities; park-and-ride capacity enhancements; corridor improvements; access improvements; and technological solutions to improve transportation infrastructure efficiency. The success of project implementation has been mixed. Key issues include establishment of a sound formal state process, tort liability, need for comprehensive public outreach, need for good traffic and revenue forecasts, and ability to rely on dedicated revenue streams. Experi-

ence to date indicates that public-private partnerships fit very limited circumstances and that projects should be chosen very carefully.

A recent example of a public-private partnership is the completion of a road link from the village of Kasaan to the highway network on Prince of Wales Island in Southeast Alaska. The department contracted to eliminate the five-and-half mile roadway gap that isolated Kasaan, with substantial financial participation from Sealaska Corporation. Besides its importance to Kasaan, Sealaska was interested in completing this route because it improved access to timber and mineral resources. The communities of Thorne Bay and Kasaan also contributed funding, with Thorne Bay accepting maintenance responsibility of the completed route. Participation in funding by these entities helped advance the project by several years.

The Alaska Industrial Development and Export Authority (AIDEA) offers public/private partnerships in economic development projects, including transportation infrastructure. AIDEA is a public corporation and state government entity. The Alaska Legislature established AIDEA in 1967 to "promote, develop and advance the general prosperity and economic welfare of the people of Alaska." In 1980 the Legislature established and funded an Enterprise Development Account within AIDEA. AIDEA uses this account to participate in commercial loans through various bond, loan, and guarantee programs. AIDEA projects include the Delong Mountain Transportation System (DMTS), which includes a 52-mile road and shallow water dock, an offshore conveyor concentrate loading facility, storage, and other facilities. The road and port were constructed to support operation of the Red Dog mine north of Kotzebue, one of the world's largest zinc producers.

Department of Community and Economic Development

Red Dog Mine Port Ore Loading Facility

To qualify for the AIDEA Development Finance Program, projects must be "compatible with the local economy and endorsed by local government." Projects must also generate revenue from user fees and leases sufficient to repay the cost of the project.

A recent public-private partnership in Canada provides another good example of potential partnership opportunities in Alaska. Under a public-private partnership, a group of private-sector investors in collaboration with the Government of Canada, designed, built and financed the Confederation Bridge, a toll bridge linking Prince Edward Island and the Canadian mainland. The bridge replaces government-subsidized ferry service. The funding strategy chosen by Canada places no public funds at risk and results in a "net cost savings" for the government.

The construction cost of the bridge was fully financed in Canadian capital markets by the developer through issuance of real rate bonds. The only public funding for the project is the annual payment by the government equal to the annual government subsidy required to maintain the ferry system ($42 million in 1992 dollars) over 35 years. This Parliamentary appropriation represented the security for the issuance of the bonds. At the end of the 35-year period, the bridge will be transferred to the government. A net cost savings will be realized for 65 years after the developer's operating period by eliminating costs associated with operating, maintaining and replacing the ferries and docking facilities.

STATE INFRASTRUCTURE BANK

In order to give states more flexibility in financing transportation infrastructure improvements, the National Highway System Designation Act of 1995 established a pilot program for state infrastructure banks (SIB).

A SIB is an infrastructure investment fund established to facilitate and encourage investment in eligible revenue-generating transportation infrastructure projects sponsored by

public and/or private entities. Through a SIB, a state can use its initial capital, provided by its federal-aid highway apportionment, federal transit allocations, and non-federal monies, to make loans, enhance credit, serve as capital reserves for bond or debt financing, subsidize interest rates, ensure letters of credit, finance purchase and lease agreements for transit projects, or provide other forms of financial assistance for construction of projects qualified under the federal-aid highway program and transit capital program. As the funds are repaid or compensation is provided, the SIB can make new financial assistance available to other projects, continually recycling the initial monies, thus leveraging the initial funds available. Some estimates are that SIBs could leverage federal funds by four-to-one.

In 1997, Alaska was selected to participate in the SIB program. The State SIB is managed by the department under the name of the Alaska Transportation Infrastructure Bank (ATIB). The ATIB currently has legislative authority to provide loans to state and local governments. Additional legislative authority is needed for the ATIB to expand the types of financial assistance provided as allowed in the 1995 NHS Act. The first pilot loan from the ATIB was made to the Whittier Access project in December, 1998, utilizing $3.7 million from a special allocation from FHWA and state match.

Department of Transportation and Public Facilities

Selecting material for road construction

However, SIBs generally, and the ATIB in particular, were dealt a considerable blow when ISTEA was re-authorized. Under TEA-21, the federal SIB program was reduced from 39 to four states: Missouri, California, Rhode Island, and Florida. SIBs in states not on this list (including Alaska) did not cease to exist, but currently do not have the authority to capitalize their SIBs with federal apportionments beyond FFY 1996-97. In contrast, the four states on the list were able to use up to ten percent of their federal apportionments in specified programs on a continuing basis, beyond the FFY 1996-97 and onward indefinitely.

The state will use the ATIB to assist the financing of revenue-generating transportation projects through loans. ATIB funds would be replenished as loans are repaid, allowing the ATIB to make new loans. It is anticipated that these mechanisms will work particularly well for projects with potential dedicated revenue sources or user fees that will support debt financing.

TIFIA

Another form of innovative finance authorized under TEA-21 is the Transportation Infrastructure Finance and Innovation Act (TIFIA) which is designed to provide federal assistance directly to public/private sponsors of major surface transportation projects to assist them in gaining access to capital markets. Forms of assistance include secured direct federal loans with flexible repayment terms, loan guarantees backed by the full faith and credit of the federal government, and standby lines of credit, representing secondary sources of funding in the form of contingent federal loans that may be drawn upon to supplement project revenues in the first ten years of project operations. The program is intended to fill market gaps and to leverage private co-investment by providing supplemental and subordinate capital. Nationally, the program provides $530 million to pay the subsidy cost of supporting loans, loan guarantees and lines of credit worth up to $10.6 billion. The program is designed to finance major transportation investments of critical national importance and must be supported in whole or in part by user charges or other non-federal dedicated revenue streams. The Secretary of the U.S. Department of Transportation evaluates and selects eligible projects based on a variety of factors, including national significance, credit-worthiness, and private participation. Examples of eligible projects include the Woodrow Wilson Memorial Bridge near Washington, DC, New York City's Pennsylvania Station, and a proposed high-speed rail line connecting Tampa, Orlando, and Miami, Florida.

"GARVEE"

The NHS Designation Act of 1995 made payments for debt service an eligible cost of federal-aid highway projects. Federal Highway Administration has developed the "GARVEE" or Grant Anticipation Revenue Vehicle to take advantage of this provision. A state may incur debt through bonds, notes, mortgages, leases, or other financing means to fund a federal-aid highway eligible project. Future federal funds are used to back the indebtedness, but the project can be done much earlier. TEA-21 has increased the security of future federal funding, and this avenue has become attractive to the State of Alaska.

LETTER OF INTENT

The letter of intent is a mechanism used to accelerate aviation projects. The process is much like the "GARVEE" where an airport project may be financed or otherwise funded. Future federal aviation funds can be used to reimburse the initial funds used.

INNOVATIVE FINANCING STRATEGIES AT THE STATE LEVEL

GOVERNOR'S PROPOSED ACCELERATED TRANSPORTATION INITIATIVE

Governor Tony Knowles proposed a new program to address infrastructure needs and take advantage of the federal-aid highway "GARVEE" innovative financing technique. The Accelerated Transportation Initiative would provide a bonding package to speed up needed transportation projects across the state. Improvements already scheduled for future construction would be built years ahead of schedule by selling bonds secured by future federal funds. The bonding package accelerates the pace at which transportation projects are built but does not mean more money for projects nor any additional state match. Eliminating the added cost of inflation that would accumulate if the projects were built years later offsets the cost of bonding to build the projects now. In Alaska, such a bonding mechanism requires approval of the legislature and the public. The Governor's proposal was not approved by the state legislature in 2000 or 2001, but the department expects to pursue it in later legislative sessions.

Department of Transportation and Public Facilities

Trucking on the Dalton Highway

DEDICATED FUND

Required matching funds for federal transportation grants are typically appropriated from the state's General Fund. The Alaska constitution prohibits the dedication of funds, except when required by the federal government for state participation in federal programs. Currently the only Alaska dedicated fund for transportation is the International Airport Revenue Fund (IARF). Operations, maintenance, and capital improvement costs at the Ted Stevens Anchorage International Airport and Fairbanks International Airport are appropriated from the IARF. The special unrestricted accounts in the General Fund, such as the special highway fuel tax account, into which state transportation taxes and fees are deposited, serve as convenient accounting tools for documenting the amount collected from a particular source, but the funds themselves are not dedicated. Even the Marine Highway System Fund, to which all revenue generated from operation of the AMHS is deposited, is not dedicated. Funding for specific programs is appropriated as needed by the state legislature.

Many groups and individuals have expressed an interest in the creation of a dedicated transportation fund. Such a fund would receive direct deposits of transportation taxes and user fees, such as motor fuel taxes and vehicle registration fees, and would be used

only for transportation purposes, such as to fund maintenance and operations of transportation facilities. Proponents point to the success of the Permanent Fund as a positive example of dedicated funding. There are two principal reasons for the use of dedicated funds.

First, fund dedication provides better linking of program costs to benefits. An example is the dedication of tax proceeds from the sale of highway motor fuels for surface transportation projects. When motor fuel tax revenues are dedicated, citizens are better able to see the link between the their fuel taxes and transportation project construction and maintenance.

A second important reason for dedicating funds is to gain public support for new or higher taxes or to continue current tax systems. Over the years dedication has been an effective strategy to gain political support; promising that the funds will go toward some particular purpose also makes good fiscal sense when beneficiary charges can be directly linked to program benefits.

There are, of course, counterpoints to the argument. One disadvantage of the dedicated fund is that it interferes with the ability of elected officials to make choices among competing programs. In addition, dedicated funding has at times reduced the level of political accountability for programs' expenditures. Expenditures of the programs can lose their focus relative to programs that undergo periodic re-evaluation as part of the active budgetary process. A third problem is that dedicated funding can seemingly absolve policy-makers of the responsibility for appropriating additional revenues to support the program in a time of falling revenues and increasing need.

"Alaska's state gasoline tax of eight cents a gallon is the lowest in the nation."

STATE MOTOR FUEL TAXES

The state collects taxes on highway, aviation, and marine motor fuels, as previously mentioned. The highway and aviation revenues generated are not sufficient to adequately maintain the respective systems. Marine taxes, about $8 million per year, however, are sufficient to maintain the state's harbors but are typically not used for that purpose by the legislature. Aviation taxes, at about $8 million per year, account for about 50 percent of the amount appropriated for M&O at airports. Highway fuel taxes, at about $20 million per year, represent about one-third of the amount appropriated by the state for highway M&O each year. This does not include local funding for M&O. The following discussion focuses on highways, but the principles relate to the other systems as well.

In 1999, state highway fuel tax revenues totaled $25 million. State appropriations from the general fund for highway M&O were $58.7 million. The gap of $33.7 million between the fuel tax revenues and the funding spent on M&O is large because Alaska's motor fuel tax, at eight cents per gallon, is the lowest in the nation. Figure 4.5 compares 1999 fuel taxes in several states. Connecticut had the highest state tax rate, 34 cents per gallon. The average rate for the fifty states was 18.3 cents while the average state rate of large western states was 23.4. Alaska's 8-cent fuel tax rate has remained constant since 1961. In contrast, Oregon's rate was 6 cents a gallon in 1961 but was four times as high, 24 cents, in 1999.

As noted earlier, inflation has further diminished the value of Alaska's fuel tax. A pound of coffee in Anchorage sold for 69 cents in 1961 but was over 6.6 times more expensive, $4.55, in 1999. If our tax rate had kept pace with the changing consumer price index, which increased 4.2 times since 1961, the 1999 motor fuel tax would be 33.6 cents per gallon (see Figure 4.6) and over $107 million would have been raised. If we had taxed at the average rate for all 50 states (18.3 cents), over $58 million would have been raised through 1999. Every penny increase adds $2.9 million to state coffers.

Governor Knowles proposed a nine cent per gallon increase in the highway gas tax to the 1999 legislature. He noted that if this proposed gas tax increase to seventeen cents a gallon were adopted, forty-five states would still have higher rates. The proposal repre-

FIGURE 4.5 1999 STATE GASOLINE TAX RATES, SELECTED STATES

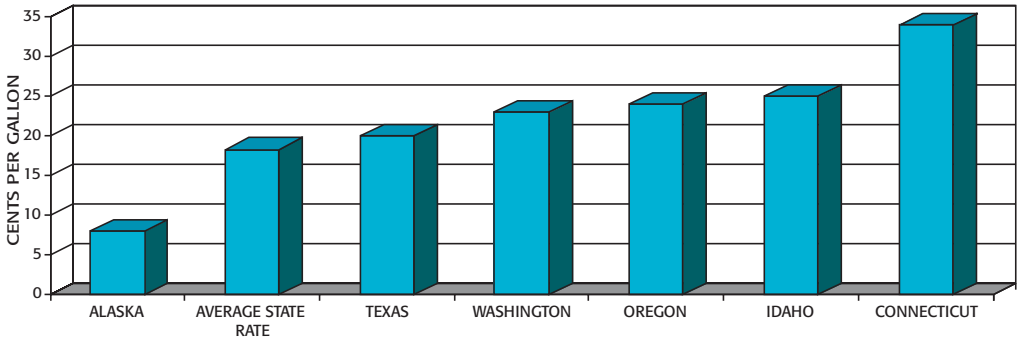
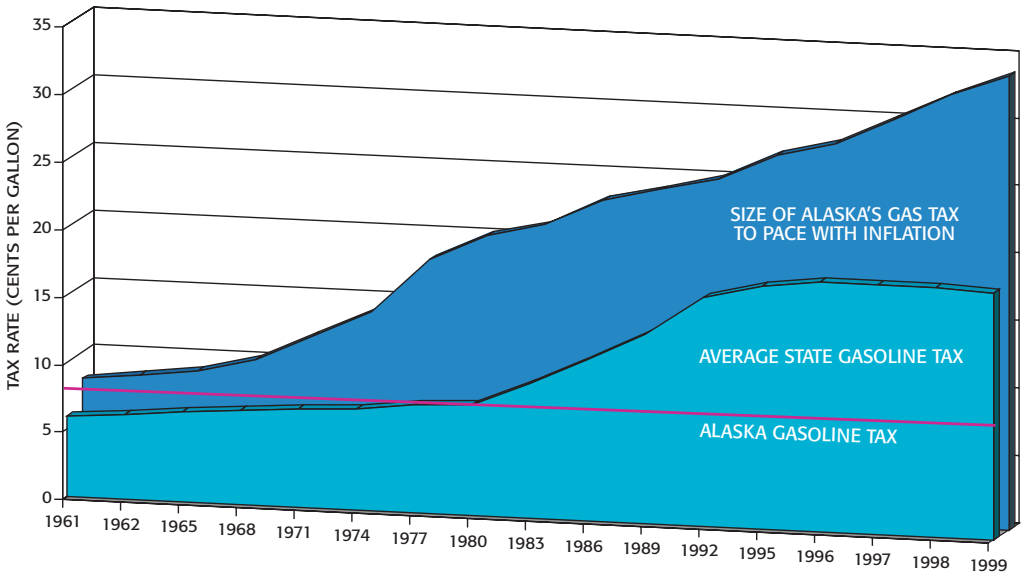


FIGURE 4.6 ALASKA'S GAS TAX, 1961-1999



sented a user-pay approach to leveraging federal highway dollars. The revenues from the increase combined with the existing tax of eight cents a gallon would have raised the $50 million needed in state match to secure the $400 million in federal highway construction dollars each year. The recommended use of these revenues was, first, for planning, design, and construction of highway projects, ferries, and ferry terminals, and second, for secondary road paving and deferred maintenance. The governor's proposal would not have affected taxes on aviation or marine fuel nor the seasonal tax reduction allowed for gasohol users. However, the Legislature did not pass the governor's bill and the gas tax remains 8 cents/gallon.

Another argument for increasing motor fuel taxes is the principle of user costs based on miles driven. The federal government has raised taxes in response to improvements in the aggregate fuel efficiency of motor vehicles. Most states have followed suit. This increase is designed to keep user fees per mile driven from declining as more fuel-efficient cars are developed. Based on this principle alone (not counting inflation), Alaska's motor fuel tax rate should be over three times higher, or about 25 cents per gallon. This rate would raise over $60 million a year, approximately the annual amount currently appropriated by the state for highway M&O.

Proponents of an increase in state motor fuel taxes say that there is no reason why highway users (both tourists and residents) should not pay a share for the continued maintenance and improvement of Alaska's highway system commensurate with that use. Transfer of the cost of M&O to those who use the system makes sense in terms of equity. This is particularly true of tourists who are subsidized when they visit Alaska and

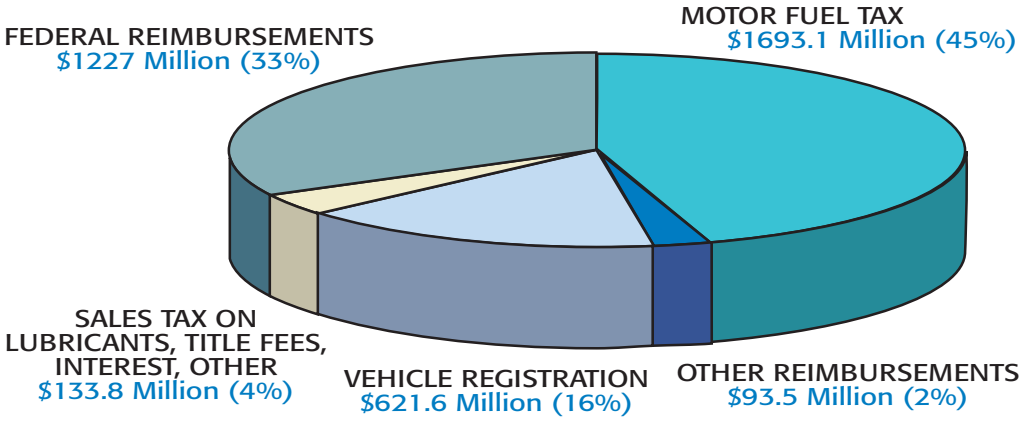
use the road system. Given the size and profile of tourism activity in Alaska, the fuel tax represents an opportunity for Alaska to "export" a significant portion of the costs of financing transportation system needs. Alaskans, when they travel to other states, help subsidize those state systems.

An increase in motor fuel taxes may have other positive benefits aside from revenue generation. A cost increase encourages use of more fuel-efficient vehicles and stimulates use of mass transit, alternative fuels, carpooling, and alternative modes. The increase in fuel cost would tend to affect persons with low incomes more dramatically and therefore should be coordinated with measures to increase infrastructure and capacity of mass transit and alternative modes. Although fuel price increases tend to have a dampening effect on consumption, motor fuel consumption has been shown to hold up well to price increases.

In sum, an increase in fuel tax could help Alaska address its transportation needs. The form of transportation funding in Texas may be instructive here. In 1996, Texas' state motor fuel tax of 20 cents per gallon funded 45 percent of Texas Department of Transportation's (TxDOT) annual budget; vehicle registration fees accounted for another 16 percent (Figure 4.7). State funding thus represented 67 percent of the department's budget while federal aid accounted for only 33 percent.

The revenues generated in Texas are held in a dedicated transportation trust fund. The state fund gives TxDOT considerable flexibility in allocating funds to meet the objectives of its statewide transportation plan. The agency can fund innovative transportation

FIGURE 4.7 DISTRIBUTION OF TOTAL TEXAS DEPARTMENT OF TRANSPORTATION RECEIPTS
Fiscal Year Ending August 31, 1996



Texas 1996 state motor fuel tax rate = 20 cents a gallon

projects (including rail and harbor improvements) where federal contributions are small or nonexistent. Moreover, the state can maximize the longevity of its capital investments, thus minimizing the need to spend federal capital dollars on reconstruction.

In the late 1990s, the department funded projects to mark inter-village trails throughout western and arctic Alaska. Trails in these parts of the state are basic transportation routes and also serve recreation. Over $5 million was allocated to mark several hundred miles of trails between 1995 and 2000. The Southwest Area Plan has identified the need for some 1,000 miles of marked trails in that region alone. The trail-marking projects are expected to improve safety, reduce fatalities, and reduce the need for expensive search and rescue operations each winter.

Little or no maintenance of the markers has been required so far, but as trail routes shift due to changing river courses, landslides, erosion, and as the markers themselves are

lost or deteriorate over time, maintenance will be needed. A source of funding for that maintenance needs to be identified and budgeted. One source may be a portion of the state fuel tax attributable to off-road vehicle use. Another source could be an expansion of the registration requirements to include all-terrain vehicles.

Federal fuel tax receipts attributable in part to off-road recreational vehicle use (snowmobiles, ATV's, and other vehicles used exclusively off-road) are returned to the states (using a complicated formula) for the Recreational Trails Program, administered by the Department of Natural Resources. Alaska is eligible for about $700,000 per year for the remainder of TEA-21 until 2003. These funds have been used mostly for projects off the road system for motorized, non-motorized and diversified recreational trail use and for education. There is no comparable program that would use state gas tax receipts to maintain basic winter transportation routes.

In 1999 a state law was enacted requiring point-of-sale snowmobile registration. Fees collected annually are appropriated to the Department of Natural Resources Division of Parks and Outdoor Recreation (State Parks) for snowmobile projects. In 1999, $120,000 was appropriated and nearly $200,000 in 2000. With the enactment of the state snowmobile registration law, the state is on its way to better track actual numbers of machines. As of 2000, there were about 40,000 snowmobiles registered in Alaska. No registration fees were currently collected for all-terrain vehicles (ATVs).

REGISTRATION FEES

Currently, state registration fees are based on the class of vehicle (passenger, commercial, motorcycle, etc.). The state receives about $30 million per year in registration and license fees. Although the revenue generated by the license and registration fee system is substantial, unlike many other states Alaska currently does not apportion these revenues to highway construction and maintenance.

Looking to Texas as an example again, vehicle registration fees fund sixteen percent of TxDOT's total annual budget. In Alaska, these revenues are deposited in the general fund, with a portion refunded to municipalities and some reserved to cover collection costs and appropriations for the Alaska Mandatory Automobile Insurance Act.

Department of Community and Economic Development

The city of Kodiak

Critics of across-the-board increases in registration fees point out the regressive nature of these measures, that lower-income individuals are more adversely affected than others. An alternative would be a progressive registration fee system. In some states, registration fees are based on the monetary value of the vehicle. More expensive vehicles pay higher registration fees. Critics of progressively increasing registration fees point out that taxing older vehicles at a lower rate may encourage the continued use of less fuel-efficient, less environmentally friendly older automobiles. Alternative, it is possible to tax vehicles based on their emissions or fuel efficiency.

TRANSFER OF FACILITIES TO LOCAL GOVERNMENT

The department currently maintains roads and airports owned by the state. Many of the facilities maintained by the department actually serve primarily the needs of local communities in which they are located. Unlike most other states, a large percentage of Alaska's local roads and airports are state-owned rather than locally owned. The department maintains 40 percent of the roads in the state, while the average state DOT maintains 20 percent. All but 22 of the 284 public airports in the state are state-owned and main-

tained. The heavy local facility burden diverts the department's limited maintenance resources away from the state's principal highways and inter-community routes.

While many communities favor the general principle of owning and maintaining their own transportation facilities, most local governments insist that the facilities be repaired and refurbished by the department before any transfer occurs. Communities are concerned about bearing full financial responsibility without receiving any continuing state assistance, constituting an "unfunded mandate." Thus the policy of transferring facilities to local government ownership is hindered by the condition of the facilities and the long-term cost of ownership without a dependable funding source. One suggestion has been for the state to share a portion of revenue from an increased motor fuel tax with communities that agree to accept ownership and maintenance responsibility for roads to offset some or all of the maintenance costs of the facilities transferred.

Local ownership of transportation roadways (and assumption of associated maintenance) would enable the department to concentrate its maintenance efforts on the inter-community highways that are the primary channels for resource development, commercial freight, travel, and recreation in the state, and are the primary responsibility of a state transportation agency. Benefits to local citizens include increased accountability and better linkage between any user fees and the upkeep and operation of transportation facilities. Local governments are more familiar with the needs and characteristics of communities and therefore should provide greater benefits to users.

Photo by Rex Melton, Department of Community and Economic Development

Dehavilland beaver near Homer

To encourage transfer of ownership, the Community Transportation Program and TRAAK program have project evaluation criteria that reward projects where the local government, other agency, or user accepts ownership or maintenance responsibility. While this approach encourages self-sufficiency on the part of local governments, it may unfairly discriminate against communities without the resources or economic base to take on maintenance themselves, by keeping them from acquiring the very infrastructure they need to become economically viable. The department is challenged to work with the legislature, local governments, and the Alaska Municipal League to develop a long-range strategy and a menu of options for systematically transferring ownership of appropriate transportation facilities to local authorities.

One technique has been to use federal special project grants for testing new pavement rehabilitation techniques as incentive for local governments to assume ownership of streets once pavement rehabilitation has been performed. The incentive for communities to take ownership and maintenance is particularly strong because the points gained in project evaluation will normally elevate otherwise low-priority projects to inclusion in the three-year spending plan, the STIP. In some localities, the department lays down pavement on roads slated for transfer to local governments without incorporating shoulders, pathways, or sidewalks for the use of bicyclists and pedestrians.

PRIVATIZATION

One of the more important trends affecting transportation development is a popular political movement to push public services out of government and onto the private sector. The advantage of privatization is that it attracts private capital rather than relying solely on tax revenue from public sources. Privatization could be applied to all modes of transport, including railroads and the construction of intermodal transportation and parking facilities. Toll highways are another option.

The most viable source of privatization is probably in issuance of general obligation or revenue bonds to support transportation improvements. Virginia has issued private bonds to support construction of a major transportation corridor along its southern, undeveloped border with North Carolina. More liberal rules for the use of federal funds to retire bonded debt also offer potential. In addition, the concept of using taxable bonds has been discussed nationally.

Privatizing for maintenance and operation can give the public the efficiency of competition in some areas, but it can be extremely costly to the state in areas where insufficient levels of competition or expertise in a particular service are present. Contracting of regular maintenance (versus using state employees) in most of Alaska's remote areas may actually add to the cost of maintenance, due to distance, start-up and shut-down costs, loss of continuity, poor economies of scale, and costs of legal action.

TOLL ROADS

In many states, toll roads are commonplace on major highways and interstate routes. However, with a road-mile-to-citizen ratio that is 50 percent higher than the national average, Alaska's low traffic volumes may make transferring project costs directly to the users impractical, except to supplement conventional funding for specific facilities.

There is little need and few potential candidate routes for a "state turnpike" where projected traffic volumes could generate enough revenue to cover the cost of toll operations. Residents cannot be expected to support tolls on existing roads where they currently can drive free of charge, unless the toll is applied to the costs of major improvements in access or level of service (maintenance costs included). In such cases, an analysis of the potential for tolls to generate revenue for capital improvements and/or maintenance would be very useful in project evaluation and project development.

One toll road, however, has recently been constructed in Alaska. Opened in mid-2000, the new Whittier access road is Alaska's first toll road. The Whittier project provides new road access to Whittier and Prince William Sound via two tunnels and is expected to be used primarily by visitor/recreation traffic. There was little resistance to proposed tolls for the new road (begun in 2001), due probably to three factors: the economic benefit the road is expected to bring to the community of Whittier, new road access to Prince William Sound for residents of the greater Anchorage area, and the fact that there was already a fare to use the existing railroad.

In Southeast Alaska where residents and visitors are already accustomed to paying a fee for inter-community travel by air or ferry, tolls on new road links between communities may be tolerated. The degree of tolerance would relate, of course, to the level of improved access and other benefits, such as lower transportation costs to the consumer. Such links would likely be accompanied by discontinuing existing ferry links over the same route, eliminating redundancy and freeing up vessels for increased level of service on other routes.

> *"The new Whittier access road is Alaska's first toll road."*

TRANSPORTATION ENDOWMENT FUND

Proposals have been made for the creation of an endowment fund whose revenues would be used for transportation maintenance and operations. Possible sources of "seed money" are a legislative grant, dedication of a portion of the Permanent Fund, or a statewide bond issue. The fund could then serve as a repository for transportation-related revenues, including motor fuel taxes, driver's license and vehicle registration fees, interest on the fund account, and toll receipts (including marine highway user fees).

An endowment fund is a form of dedicated fund and the pros and cons of dedicated funds discussed earlier apply. An endowment fund would require an additional layer of bureaucracy (board of directors, investment management team, accounting team) to

ensure management of the fund in the public interest. Most successful endowment funds have a strictly defined purpose and generally are supported by contributions from very like-minded interests (i.e., a scholarship fund or a foundation for the preservation of a historical building). The political complexities inherent in the use of endowment funds for the public at large indicates that this approach is both risky and difficult to manage effectively. The department does not recommend this option.

AVIATION

Air transportation services in Alaska, as elsewhere in the nation, are generally provided by private sector firms that operate out of publicly owned airports and use federally funded flight services and navigational aids.

The federal funding framework encourages the status quo. Federal airport grants for capital projects are available to public sponsors of airports only. Private contributions to public airports are allowable, but receipt of federal airport grants is contingent upon agreeing to numerous assurances including promoting competition among service providers and allowing public and commercial use of airport facilities.

Department of Transportation and Public Facilities

Juneau International Airport

PASSENGER FACILITY CHARGES

Although Alaska might increase its aviation fuel tax in order to generate more revenue for the airport system, there is a possible alternative: Passenger Facility Charges or PFCs. Legislation enacted in 1991 allowed PFC collection by airports having at least 2,500 annual passenger enplanements. Forty-seven other states have instituted PFCs to provide supplemental funding to Federal Aviation Administration-approved capital improvements. In Alaska, aircraft with a seating capability of less than 60 passengers are exempted from PFC collection.

Currently, enplaning passengers can be charged up to $4.50 per segment on a maximum of two segments per one-way trip and four segments per round-trip (the first two enplanements on a one-way trip and the first and last two enplanements on a round trip ticket). Once approved by the Federal Aviation Administration, the PFC is part of the ticket purchase price collected by the airline. PFCs are collected by the airline and then reimbursed to the enplaning airport(s) to use for capital improvements.

Any public agency controlling a commercial service airport may apply to the Federal Aviation Administration for authority to impose PFC collections and to use the PFC revenue for airport planning and development. A commercial service airport is defined as one enplaning 2,500 or more passengers annually and having scheduled service. There are currently 91 commercial service airports in Alaska. At the present time, only two municipally controlled airports, Juneau and Ketchikan, have applied for and received authority from FAA to institute PFC collections. Two state airports, Ted Stevens Anchorage International Airport and Fairbanks International Airport, began collecting the fees on October 1, 2000. These four airports currently charge a PFC of $3 per flight segment, rather than the $4.50 allowable. Should the collection authorization be expended beyond the current expiration date of January 1, 2004, collection of the $3 PFC could bring FIA $5.4 million over the next six years, while AIA would receive $15 million. The money will be used to fund improvements, including a new maintenance building and the purchase of heavy equipment like snowplows and graders in Fairbanks.

Prior to the imposition of PFCs in Alaska, many Alaskan passengers flying to other U.S. destinations already paid maximum PFCs on those segments, but the state received no share of the revenue. With the imposition of a PFC in Alaska, some of this money would

stay in the state. Further, some visitors would pay PFCs at Alaska airports depending on their itinerary; this would increase revenue to Alaska's airports.

recommendations
CONCLUSION AND DEPARTMENT RECOMMENDATIONS

The revenue stream supporting Alaska's investment in transportation is clearly lacking in its ability either to maintain current investments or to allow adequate diversification to build the types of transportation infrastructure which meets the demands of Alaska's people, economy, geography and climate. Unless changes are made, Alaskans will likely continue to cope with a transportation system that doesn't keep up with their needs. Because transportation infrastructure is vital to any state's economy, failure to invest will have a negative effect on Alaska's economy, business climate, tourism and employment. The costs of under-investing in the long run far outweigh the short run tax "savings."

The department believes the following measures are the right fiscal steps to take for ensuring the long-term health of Alaska's transportation system:

Revenues:

- Increase state motor fuel tax to seventeen cents per gallon.
- Dedicate state fuel tax revenues and vehicle registration fees to transportation use.
- Diversify state revenue generation to include a population-based component that tends to generate higher revenues as the state's population grows, helping to maintain per capita levels of service.

Investments:

- Establish a state-funded transportation capital improvement program.
- Prioritize capital improvements that reduce maintenance requirements.
- Continue efforts to transfer responsibility for local roads and airports to local governments.
- Encourage more corporate/private investment in transportation infrastructure through public-private partnerships.
- Support legislative and public approval of the Governor's proposed Alaska Transportation Initiative.

Eliminate deferred maintenance:

- Establish current maintenance baseline funding requirements and adjust annually for population growth, added infrastructure, inflation, added standards, material improvements, and technology.

Adequate revenue is the cornerstone of fiscal policy at every level of government. Fiscal resources ultimately are the chief limiting factor in public sector budgeting. The Department of Transportation and Public Facilities has the statutory responsibility for the development and preservation of Alaska's transportation system. This transportation system is of vital importance to the well-being of Alaskans. A safe, reliable and efficient transportation system benefits communities, economic development, and the citizens of the state. Only with equitable, efficient, adequate, reliable, and diversified funding can the department protect and plan for Alaska's transportation infrastructure both now and for the future.

planning factor

PLANNING FACTOR ANALYSIS

factor one

TEA-21 PLANNING FACTOR 1

Support the economic vitality of the United States, the state, and the metropolitan areas, especially by enabling global competitiveness, productivity, and efficiency.

Alaska is at the aviation crossroads of the northern hemisphere. Its residents depend on the plentiful fishing, mineral, and timber resources for their incomes, and Alaska's petroleum resources are vital to the nation as a whole. Alaska is also a destination. Each year over a million people visit the state, and that number is growing. Among the most noticeable investments the State is currently making is in international air transportation facilities for passengers and freight. The State has also been investing strategically in the surface transportation system to bring Alaska's roads, ferries, trails, and transit assets up to the most modern of standards. Alaska has positioned itself to take full advantage of the limited state and federal funding with which to do this.

AVIATION

One of Alaska's most important attributes is its strategic global location. During World War II, Alaska became an important point for staging lend-lease deliveries from the U.S. to the Soviet Union, aiding the war effort against Nazi Germany. During the Cold War, when air travel along corridors through Soviet airspace was severely restricted, Anchorage International Airport served as a vital link for international passenger travel between Europe, America, and the Far East. Today, with the opening of new trade opportunities in Asia, Alaska's location continues to make it a natural international air crossroads between east and west. Because Alaska is largely dependent upon delivery of commodities from elsewhere, this is perhaps the most important long-term consideration influencing the state's transportation system development.

Two of Alaska's airports (in Anchorage and Fairbanks) are classified as international system airports. They serve as significant gateways for both international passenger travel and international air freight. In fiscal year 1999, the Ted Stevens Anchorage International Airport (AIA) reported the transport of 6,261,678,000 pounds of cargo, while the Fairbanks International Airport (FIA) reported roughly 286,000,000 pounds transported. Additionally, AIA transported 4,944,672 passengers and FIA transported 850,610 the same year.

The ten-year Gateway Alaska Plan announced by Governor Knowles in November 1997 calls for improvements and expansion of AIA and associated facilities to support airport operations and access into the airport area. The entire Gateway Alaska program will cost approximately $350 million over 10 years. Terminal (landside) and runway (airside) improvements totaling $191 million (1997 dollars) make up the Terminal Redevelopment Project. Highway improvements include changes to the primary access routes to the airport to meet current and projected traffic demands. An interchange at International Airport Road and Minnesota Drive was recently constructed in large part to improve vehicle flow to and from the airport.

Elmendorf Air Force Base in Anchorage serves as a waypoint for international relations (Air Force One frequently stops enroute to the East) and for strategic airlift in support of U.S. military operations overseas.

Many communities depend on state-operated airport facilities for basic travel and freight transport, and for economic vitality. There are 285 public owned airports in Alaska. Of these, 24 are operated by municipal governments and 261 are state-run. Of the 261 state-owned and operated airports, 41 are for seaplanes, 43 are paved, and 177 are gravel. The department is currently attempting to improve all non-primary airports to a minimum runway length of 3300 feet, where practical, to allow operations under non-precision instrument flight (IFR) rules. The department is also in the process of installing additional runway lights at non-primary Community Class airports.

The department's aviation project evaluation criteria for capital fund programming include criteria to favor projects that improve safety, provide access to basic necessities, provide significant economic benefits, and improve access for communities with few transportation alternatives. Separate funding allocations are provided for Primary Airports (airports with more than 10,000 or fewer annual enplanements) and Non-Primary airports (airports with 10,000 or fewer annual enplanements). Alaska, with a population that travels by air much more frequently than the rest of the nation, has lobbied FAA to add an additional funding criterion for distribution of national discretionary funding by considering the number of enplaned passengers per capita.

Photo by Ernst Schneider, Department of Community and Economic Development

Denali Highway

SURFACE TRANSPORTATION

In 1993 the department selected Alaska's National Highway System routes, with FHWA approval. In 1995 Congress designated the National Highway System under the NHS Designation Act. These routes serve international border crossings, provide access to ports and airports as well as other intermodal transportation facilities, connect with major freight distribution routes, national parks, recreation and scenic areas, monuments and historic sites, and military installations. Alaska's NHS supports the economic integrity of the state and the nation. It also facilitates global competitiveness and productivity. The main routes of the Alaska Marine Highway System are also part of the NHS. The ferry system provides an important transportation link for residents of Alaska, the continental United States, British Columbia and Yukon Territory.

The Governor's 1995 Surface Transportation Initiative made the NHS the single largest capital improvement program in the State Transportation Improvement Program (STIP). Initially there were three programs: NHS, Community Transportation Program (CTP), and Trails and Recreation Access for Alaska (TRAAK). Currently about 40 percent of the annual capital improvement program for surface transportation in Alaska (or about $171 million in Fiscal Year 1999) is allocated for facilities and improvements on the NHS. In 1999 the department added a fourth program, the Alaska Highway System. This program separates state highways serving inter-community needs from lesser state roads and municipal projects largely serving intra-community needs. The AHS provides a certain level of funding that can be dedicated to projects on facilities that serve the economic welfare of the state as a whole.

Like the NHS and the CTP, AHS projects include accommodations for bicycles and pedestrians where possible. Many NHS projects are likely to be associated with a TRAAK project to further enhance an area as a destination for visitors and residents alike. The AHS includes many of the road links to the ferry system that are not on the NHS, such as the Craig-Klawock-Hollis Road to Hollis on Prince of Wales Island.

The limited reach of the state's highway network heightens the influence of any particular highway, particularly new roads that expand the state's highway network. Much of

the state's natural resource wealth lies beyond Alaska's surface and marine transportation system. In many cases the projected costs associated with extending road or rail access to the resources outweigh the projected benefits. Construction and maintenance costs can be prohibitively high due to vast distances, extreme climate, and difficult terrain. While there have been roads built for resource development, most highways were meant to link Alaska's main communities, ports, and military facilities to each other and to nearby Canada and the Continental United States. Economic growth has more often been a product of, or been hastened by, a road's existence.

THE PORT OF ANCHORAGE AND RAIL TRANSPORT

The Port of Anchorage represents the major gateway for Alaska's waterborne commerce and plays a vital role in the state's economy. The Port of Anchorage serves over 80 percent of the state's population and in 1999, contributed an estimated $725 million to Alaska's economy. The Port's influence is felt throughout the state, the Pacific Northwest and the nation. It is the dominant terminal in Alaska for inbound containerized freight. Over 90 percent of all consumer goods delivered in the Municipality of Anchorage and railbelt communities, in addition to a large portion of the goods bound for outlying rural communities, are received across the Port's docks and maritime terminals. From there, the goods are trucked, hauled by train, flown or barged to their final destination. In 1998 the Port handled close to three million tons of cargo. Since 1961, the first year of Port operations, the annual general cargo tonnage has increased at an average rate of 1.5 percent per year. The draft Port of Anchorage Master Plan projects a 2.5 percent growth rate for general cargo (compounded annually). The Port of Anchorage consistently ranks in the top 25 container ports in North America, including San Juan, Puerto Rico and Honolulu, Hawaii, for the volume of cargo and number of containers moved across its docks.

Port of Anchorage

Ship at Port of Anchorage

To meet the challenge of growing demand, port managers have prepared a market-driven Port of Anchorage Master Plan through the year 2020. The plan has been reviewed by the Port Commission, and will be presented to the Municipal Assembly and the Anchorage Municipality Planning Department for incorporation into the Anchorage Municipality Comprehensive Plan. This plan will provide a pragmatic, environmentally sound program to stimulate and accommodate economic development, employment opportunities, and an efficient transportation element serving Alaska. Market opportunities include growth in domestic and international container traffic, automobile and bulk cargo transport, and cruise ship traffic. Some of the improvements recommended in the Master Plan include enhancement and reconfiguration of port facilities, redevelopment of a petroleum dock into a multi-purpose dock, an increase of available depth of water at the Port, and phased expansion of the bulk and container facilities to the north.

Because the Port is an intermodal terminal, freight and fuel move from barge to rail or from truck to barge. The simultaneous movement of humans from train to trail and/or from bus to rail adds to congestion. Many residents and visitors drive into the Port's relatively small and busy area to access cold storage, the rail depot, fuel facilities, and fishing spots. The department recently reconstructed Ocean Dock Road, which is located in the Port area. These improvements will reduce the conflicts between trains and trucks at the existing numerous "at-grade" crossings by eliminating four of the most dangerous crossings. Additionally, the Anchorage Metropolitan Area Transportation Study (AMATS) is preparing a Ship Creek Multimodal Plan to address the various transportation modes that converge at the port facilities. AMATS has programmed a Ship Creek trail project, the first phase of which will construct the trail from the Chugach Electric Association Dam to Post Road. More work will likely be needed to improve the intermodal links to the popu-

lar trails that traverse the port area and accommodate the anticipated increase in freight, vehicle, rail, and pedestrian movement through the port.

The department is the designated railroad planning authority for Alaska, but railroad capital improvement planning is a function of the Alaska Railroad Corporation (ARRC). The Commissioner of the Department of Transportation and Public Facilities influences rail capital improvement planning and investment decisions through membership on the ARRC Board of Directors. The department also influences railroad investment decisions by its investments in competing highway facilities and in its regulatory actions in regard to competing highway carriers. The department has analyzed railroad extensions to western Alaska and to Delta Junction as part of its regional planning process, and has also reserved the right of way for a railroad extension to Canada. A weakness of intermodal transportation planning in this area is the lack of integration between federal programs for highways and railways. Consequently, the department does not presently evaluate potential rail projects as alternatives to proposed roads or airport facilities.

"There is a growing interest in further developing rail links in Alaska."

There is growing interest in further developing rail links in Alaska. This is of particular interest to rural Alaskans looking for increased, lower-cost access without the social and environmental consequences of a road connection, and from a growing number of citizens concerned with long-term costs of building more roads. Better rail access to the Port of Anchorage and Ted Stevens Anchorage International Airport would improve flow of freight between the two facilities and out of Anchorage, reducing some of the need for trucks on the Glenn Highway.

Congress earmarked funding in TEA-21 for rail improvement and expansion projects in Alaska. These projects include adding a rail passenger and transfer terminal at the Ted Stevens Anchorage International Airport, provisions for commuter rail from Anchorage north to the Matanuska-Susitna Borough and south to Girdwood, as well as a downtown rail terminal facility in Fairbanks. In view of these funding opportunities, the Alaska Railroad Corporation and the department have initiated an update of the Alaska Rail Plan. A new long-range plan for rail transportation in Alaska is expected for review by summer 2002.

TOURISM

The phenomenal growth in cruise ship traffic to Alaska stems from many factors. Alaska's wealth of scenic resources, including the pristine and expansive Tongass and Chugach National Forests, the glaciers and mountains of the Inside Passage, and the rich cultural history along Alaska's coasts attract cruising visitors into Alaskan waters. The proximity of the major international ports of Seattle and Vancouver combine with a well-developed Alaskan air transportation network, creating ideal logistics to fuel a vibrant cruise ship industry. The department makes an effort to consider the needs and impacts on tourism when making transportation decisions.

Despite the common influences of modern global culture, many Alaskan Native villages still retain elements of the lifestyle they have led throughout much of the last millennium. In an effort to avoid the exploitation of their cultural values and impacts to their subsistence resources, some communities do not embrace tourist visits. Others are interested in making cultural tourism an economic mainstay. The department's area transportation plans are sensitive to the delicate balance between basic transportation needs on the one hand and the impacts and opportunities for increasing access to Alaska's villages on the other. At the regional level, the department's transportation planners seek improvements to the surface transportation and aviation systems to benefit residents and visitors where this is a priority for a community.

Alaska's access to wilderness areas is a draw for adventurers from all over the world. Hiking, mountain-climbing, mountain biking, and bicycle touring are among the most popular pursuits. Nabesna Road and the McCarthy Road provide access to Wrangell-St.

Elias National Park and Preserve. Petersville Road approaches Denali National Park and Preserve from the south by way of Denali State Park. Historically these roads have been a low departmental priority for maintenance and reconstruction. However, the traffic along these roads and on to the adjacent lands is increasing, calling for coordinated recreational land use and development planning by this department and the departments of Natural Resources, Community and Economic Development, and Environmental Conservation, as well as the National Park Service.

Most visitors to Alaska arrive and depart during the summer months between May and September. To compensate for Alaska's extremes in seasons, many businesses have become successful or are looking for opportunities to build a winter tourism base. This is especially true for those communities that can boast of such winter assets as spectacular northern lights displays and major dog sledding events like the Iditarod, Yukon Quest, or Kuskokwim 300. Opportunities for downhill and cross-country skiing and ice skating abound. The manufacture and use of snow machines is considered a growth industry. Outdoor winter recreation, motorized or non-motorized, is an important aspect of Alaska living and is thought by many to be an untapped tourism resource.

Department of Transportation and Public Facilities

Interpretive kiosk in Sitka (Whale Park)

Tourism plays a growing role in Alaska's economy. During the year from Fall, 1998 through Summer, 1999, nearly one and a quarter million visitors came north to Alaska. One of the goals of the state administration is to strengthen Alaska's role as a world class visitor destination. Two recent efforts to foster this vision are the "Destination Alaska" program, and the Trails and Recreational Access for Alaska (TRAAK) program, both initiated by Governor Knowles in 1995. Destination Alaska promotes Alaska as a destination through publications and an internet web site. In concert with the Division of Parks and Outdoor Recreation, Department of Natural Resources, the department is keeping TRAAK a high priority through an active Scenic Byways program, the National Recreational Trails program, and the TRAAK funding program in the STIP. The TRAAK Citizens Advisory Board is also working with other state and federal agencies, local governments, and trail enthusiasts to ensure that recreational access and tourism are considered in all aspects of improving the transportation infrastructure in Alaska. The Department of Community and Economic Development works with individual communities to foster healthy tourism development. The state also maintains a tourism marketing program through a private tourism trade association.

NATURAL RESOURCE DEVELOPMENT AND TRANSPORT

While resource development is often cited as the basis for suggested extensions of the highway network, in many cases the costs of a road construction outweigh the benefits. However, a few of Alaska's roads have been built specifically with resource extraction as a primary consideration. The Dalton Highway served the construction of the Trans-Alaska Pipeline. The Klondike Highway has provided the marine access for mining in Yukon Territory and British Columbia. The road network on Prince of Wales Island has evolved with the extraction of timber from that portion of the Tongass National Forest.

The DeLong Mountains Transportation System was built in 1988-89 to bring ore from the open-pit Red Dog lead-zinc mine to tidewater, providing an intermodal transportation infrastructure for mining operations. Located 90 miles northwest of Kotzebue in the Brooks Range, facilities include a shallow water dock, a barge-draft dock, a 52-mile long all-weather gravel road, and a 6,000-foot gravel airstrip capable of accommodating a Lockheed Hercules, Douglas DC-6, or Boeing 727/737 aircraft. The system supports Red Dog mining operations by transporting ore concentrate, commodities and fuel oil. Construction of this system was financed by revenue bonds issued by the Alaska Industrial Development and Export Authority (AIDEA) and by state legislative appropriations.

A proposed $160 million port expansion is in the planning stage. This project will include a 2,700-foot extension to the dock facilities and dredging of 10,000 feet of shallow offshore sediments. The improvements will allow direct loading of ore concentrates into Panamax-class ocean vessels, facilitating the shipment of large quantities of ore concentrates. Additionally, improvements will allow the extension of the current three-month shipping season by eliminating interaction with shore-fast ice. The U.S. Corps of Engineers feasibility study was completed in late 2000, followed by permitting and construction. The first shipment of ore using the new facilities is projected to occur in 2007-2008.

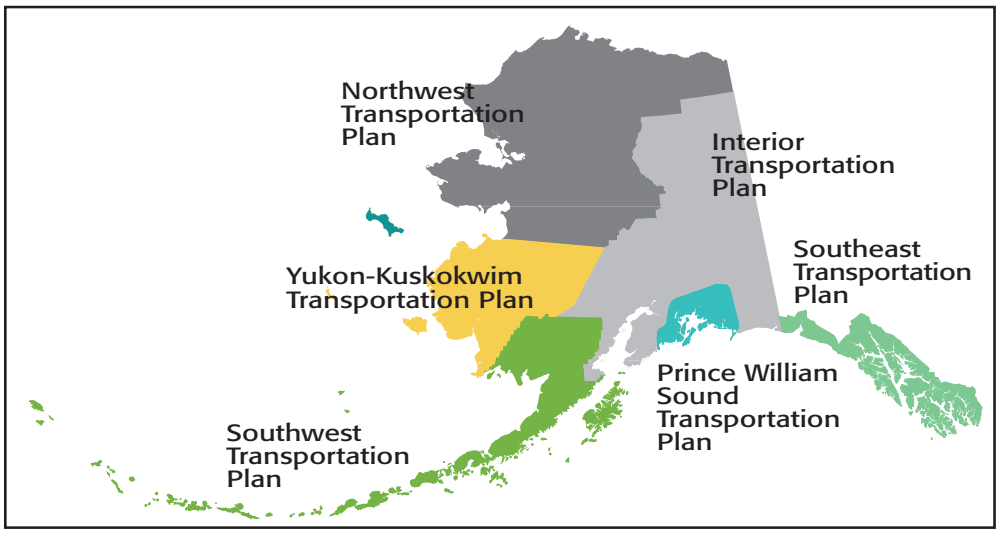
Adding value to timber and seafood resources before shipping them from the state is another way to improve the economic vitality of Alaska communities. However, the high cost of shipping the materials needed for "value-added" processing is a constraint. For example, the costs to purchase and ship the packaging, breading, and other materials for seafood processing can often render the processing infeasible from an economic standpoint. Opportunities to reduce the cost of delivering value-added materials to communities may exist—for example, through potential partnerships with private entities and the Alaska Marine Highway System (AMHS). Alaska marketers may also find opportunities to showcase Alaska products by partnering with AMHS to offer seafood on board during the tourist season, or by using Alaska wood products in transportation projects.

AREA TRANSPORTATION PLANS

Area Transportation Plans are being developed for specific regions of the state to assess the most complex transportation challenges. These plans are twenty-year, multi-modal documents that address the transportation of people, vehicles, and freight between communities within each region, and between the region and the outside world. An area plan may recommend improvements such as new ferry routes, airports, new or improved road links, or better connections between communities. Area plans will help determine where best to invest resources with the goal of efficiently and effectively meeting the future transportation needs of a specific region.

Using the goals and policies in the long-range plan, area plans will recommend specific strategies and projects for the Statewide Transportation Improvement Program (STIP), the Aviation Improvement Program, and other departmental capital improvement programs. The Southeast Area Plan was adopted in March, 1999, and the department's

FIGURE 5.1 AREA TRANSPORTATION PLANS

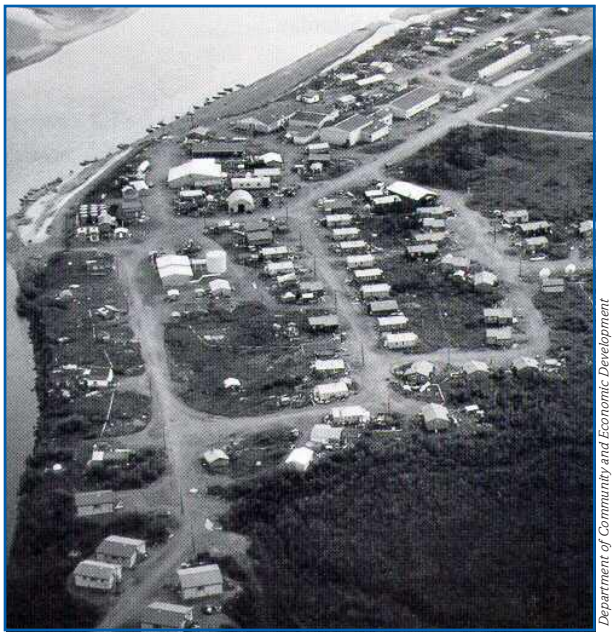


Southeast Regional Office is currently developing strategies to implement the recommendations in the plan. The Prince William Sound Area Plan was similarly adopted in July, 2001. The following three Area Plans are currently in progress: Southwest Alaska, the Yukon-Kuskokwim Delta, and Northwest Alaska Area Plan.

Southeast Transportation Plan: The department completed the Southeast Alaska Transportation Plan in the spring of 1999. Over the next several years, the department's planning team will work to implement the new plan for regional transportation in and around Southeast Alaska. Using the plan as the blue print, department designers are beginning the detailed tasks that will result in improvements to roads, ferries and terminals. The final products will come as close as possible to the original concept, but must still meet public safety requirements and reasonable cost constraints. The plan proposes to add a system of dayboats or "fast ferries" to supplement the existing system. The department recently selected a contractor to design and construct the first fast ferry.

Prince William Sound Transportation Plan: This plan was adopted in July, 2001. The plan study area includes the coast and islands from Resurrection Bay on the west to Cape Saint Elias on Kayak Island, east of Cordova, and extends inland to the Edgerton Highway. This area contains the communities of Seward, Chenega Bay, Whittier, Valdez, Tatitlek, Cordova, and Chitina. The plan focuses on the intermodal transportation links between communities in the region and to the rest of the state. The plan's development was impacted by several major projects that were implemented during its development. These include improvements to the Seward Highway and a road connection to Whittier. These developments increased the importance of Whittier as a transportation link between Prince William Sound communities and Anchorage, shifting demand on the various routes between Prince William Sound communities. The result has been a plan that focuses on ferry system improvements to fulfill the region's transportation system needs.

Yukon/Kuskokwim Transportation Plan: A draft plan was completed during the summer of 2001. The study area covers a huge expanse of land serving a small, mainly subsistence-based population, stretching from the Yukon River to the north, south to Kuskokwim Bay and bordered on the west by the Bering Sea. Almost 60 communities are included within the study area. The plan's objective was to define transportation priorities and projects of significance for the area as a whole to serve as a blueprint for implementing regional transportation developments. To accomplish this, the project team interviewed residents and businesses, distributed surveys through community groups and schools, and provided forecasts of travel demand. Recommended projects, service modifications and financing strategies were prioritized and phased through the year 2020.



Department of Community and Economic Development

Aerial view of Noatak

Southwest Transportation Plan: This plan is nearing completion. The plan study area extends to the end of the Aleutian Chain and the Pribilofs and includes the Aleutians East Borough, Kodiak Island Borough, Bristol Bay Borough, Lake and Peninsula Borough, Aleutians West Census Area and Dillingham Census Area. The western boundary includes Togiak and lies below Kuskokwim Bay. Over 50 local communities are included within the study area. A primary objective is to develop a regional plan for ground, water and air transportation in Southwest Alaska. While examining the region as a whole, the plan will focus on the intermodal transportation links between communities in the region and the rest of the state.

Northwest Transportation Plan: This plan began in September 2000 and is in progress. The major purpose of this plan is to prepare a twenty-year strategy that guides transportation infrastructure development in Northwest-Arctic Alaska, building on the past planning efforts for the region. It will guide the department's operational and capital

development plans. The plan will reflect the broad range of concerns, views and considerations of the people that live and travel in this large region, comprised of the North Slope Borough, Northwest Arctic Borough, the Seward Peninsula, and portions of the Yukon and Koyukuk River systems—an area of approximately 217,865 square miles. The plan will carefully consider plans for marine, aviation, rail and highway systems, and other economic, political and technological forces that serve this and other adjoining areas of Alaska.

Interior Transportation Plan. The department plans to begin another area plan in interior Alaska after the Southwest and Yukon-Kuskokwim Area plans are completed. This plan will include most of the area not currently included in an existing area plan.

Transportation facilities represent a significant investment of public funds. This investment needs to be carefully managed to provide the public with the best return possible on its investment. By utilizing the best available technology and management tools, it is possible to attain the goal of an efficient transportation system. This section described some of the methods that have been instituted statewide to optimize system efficiency. When the system is operating at less than peak efficiency, minor investments can often help achieve a more optimal operating level, leading to greater economic vitality statewide.

RECOMMENDATIONS

The department should:

- Support upgrades and improvements to key international passenger and cargo facilities, particularly those that encourage trade and improve intermodal connectivity.
- Continue partnering with communities, private entities and other state and federal agencies to support transportation improvements with demonstrable economic benefits, such as tourism and natural resource development, and emphasizing the economic benefits of "value-added" processing.
- Recognize the unique and varied cultural and historical values in Alaska, and that economic needs and desired types of economic activities vary across the state.
- Strengthen Alaska's role as a world class visitor destination through the TRAAK Program, Destination Alaska Program, and other initiatives that improve visitor facilities.

factor two

TEA-21 PLANNING FACTOR 2

Increase the safety and security of the transportation system for motorized and non-motorized users.

Providing, operating and maintaining a safe transportation system is at the heart of the department's mission. Alaska's highways, transit systems, pathways, airport facilities, ports, harbors, and ferries are designed to maximize operational safety. This planning factor analysis examines the ways the department monitors the safety and security of the statewide transportation system. It examines the ways in which the department addresses safety problems, as well as some of the opportunities that exist to improve system safety and security.

HIGHWAY SAFETY PROGRAMS

Project Evaluation Criteria. Road construction or rehabilitation projects, as well as capital improvements in the Alaska Marine Highway System (AMHS) and transit are budgeted or "programmed" in the Statewide Transportation Improvement Program (STIP). In the project evaluation criteria, priority for funding is given to projects that improve the safety of the transportation system or address a demonstrated safety problem.

Highway and Road Safety. The department has the primary responsibility for ensuring safety in the improvement, operation, and maintenance of the state-owned road system. The Alaska Highway Safety Office (AHSO), recently made part of the department, provides safety education, performs research on highway safety, and assists agencies and communities to implement safety and safety education. The Department of Public Safety enforces traffic laws.

Highway Safety Improvement Program. Every state is required by federal law to administer a Highway Safety Improvement Program (HSIP) on a continuing basis. Federal funding for the HSIP comes primarily from the TEA-21 Safety program through the Federal Highway Administration (FHWA). Since the inception of the HSIP in 1991, the national highway fatal accident rate has decreased from 3.5 fatalities per 100 million vehicle-miles traveled, to 1.4 today. In Alaska, the department's regional traffic engineers, in concert with the statewide HSIP coordinator, develop the safety-improvement funding program. HSIP is the list of highest-priority safety projects. The SA allocation for Alaska was $4,947,163 in federal fiscal year 1999, and $6,774,678 in 2000.

Department of Transportation and Public Facilities

New section of the Seward Highway

Using motor vehicle accident reports and fatality data from the department of Administration's Division of Motor Vehicles, accidents are tallied, defined, and stored in the department's Highway Analysis System (HAS) database. The department's accident reporting staff ensures the data are complete, and publishes annual Alaska Traffic Accidents reports that consolidate and interpret the accident data. This staff also produces data reports for several clients, including the department's regional offices. Regional traffic engineers use accident data to prepare regional HSIP project nominations.

HSIP projects are designed to address highway safety problems, including critical road related bicycle and pedestrian safety problems in areas where accidents between automobiles and bicycles or pedestrians have occurred. Safety improvement projects are also identified for locations with potential accident danger and correctable safety problems where accidents have not yet occurred. The step-by-step process for identifying and prioritizing highway safety projects concludes with a detailed cost-to-benefit analysis of each project. Consequently, the highway locations with the highest accident rates and corresponding potential benefits from improvements are top priorities for HSIP funding. HSIP-qualifying projects are ranked according to this score, and are funded in the STIP in one of three ways:

- As part of a statewide allocation for HSIP projects. HSIP projects can be allocated for National Highway System (NHS), Alaska Highway System (AHS) projects, Community Transportation Program (CTP) and Trails and Recreational Access for Alaska (TRAAK) programs.
- As part of the Anchorage Metropolitan Area Transportation Study (AMATS) HSIP Program for Anchorage. The overall AMATS HSIP allocation, rather than individual HSIP projects, appears in the STIP.
- HSIP projects not funded in AMATS or dedicated statewide HSIP umbrella allocation projects are shown as individual projects in the STIP. HSIP-qualifying projects are

given an automatic five-point bonus in the project evaluation criteria, thereby increasing their overall score.

Figure 5.2 is a schematic depiction of the funding process for the HSIP in the STIP.

FIGURE 5.2 HIGHWAY SAFETY IMPROVEMENT PROGRAM PROJECT FUNDING

FHWA-APPROVED HSIP PROJECTS

This includes all past project submittals approved by the FHWA as well as new projects submitted for approval annually. Proposed new projects are submitted to the Regional Traffic Engineers for analysis and possible inclusion in the annual statewide submittal to the FHWA.

FUNDED HSIP PROJECTS

"DEDICATED" HSIP PROJECT FUNDING

Individual projects are funded by two umbrella STIP projects: the Statewide NHS HSIP and the Statewide Non-NHS HSIP including the AHS. Individual projects in these umbrella categories are not listed separately in the STIP. Projects are ranked and prioritized for funding using the department's HSIP process which is based on projected elimination of accidents, injuries, and fatalities per project dollar spent.

AMATS HSIP PROJECT FUNDING

Individual projects are funded by the Community Transportation Program (CTP) AMATS allocation project and possibly by the TRAAK AMATS Allocation project. Individual projects do not appear in the STIP. Projects are ranked using the department's HSIP process but are prioritized for funding by AMATS.

OTHER HSIP PROJECT FUNDING

HSIP projects not funded by AMATS or dedicated HSIP funds are shown as individual projects in the STIP. They are ranked and prioritized for funding under the standard NHS, AHS or CTP processes.

TEA-21. The passage of TEA-21 provided a source of revenue to improve highway safety data programs. Accordingly, the State of Alaska has established a Traffic Records Coordinating Committee, which includes representatives from the department, the Division of Motor Vehicles, the Department of Public Safety's Alaska State Troopers, the Alaska Court System, and the Anchorage Police Department, as well as other agencies. Under the lead of the AHSO, the committee submitted a Traffic Records Strategic Plan to the National Highway Traffic Safety Administration (NHTSA) in 1998. This strategic plan provides a framework by which traffic data, accident data, emergency medical care data, and other data needs can be improved, particularly through the use of the latest data collection and analysis technologies. The department's primary data tool, a relational database for highway statistical information, is the HAS. The department uses this tool to correlate accident information to specific categories. HAS consists of four subsystems: the ROADLOG Highway and Condition Inventory, Accident Information, Traffic Data, and Project History.

TEA-21 also sets out several funding sanctions and funding incentives aimed at improving highway safety. One sanction applies to states that do not have a repeat intoxicated driver law, which Alaska does not have. The second TEA-21 sanction penalizes states whose open container law does not meet federal criteria. Although Alaska has an open container law, the National Highway Traffic Safety Administration does not think Alaska's law is in compliance with federal law, because it exempts motorcycles. Failing to establish these requirements in state law means that one percent of the state's highway apportionment (for each requirement not met) will be transferred to the state's Highway Safety Program. This is expected to total over five million dollars. Because Alaska does not meet either of these requirements, federal highway funds for fiscal year 2002 were transferred to the Alaska Highway Safety Office. This pattern will continue until the requirements are met. The penalty is expected to double in FY 2003.

There are a variety of highway safety grants available through the AHSO, including grants to encourage seat belt and child car-seat use, grants for impaired driver programs, and grants to improve and modify driving behavior. The use of seat belts is required by law, and is encouraged through signing, advertising, and enforcement. Adult drivers may be cited for not wearing seat belts if they have been stopped for another reason. Drivers of cars carrying unrestrained children of up to the age of sixteen may be stopped and cited for that reason alone. Law enforcement agencies around the state participate in nationwide enforcement and education programs to increase child car seat and seat belt use.

Other Highway Safety Developments. Many traffic signs in Alaska are larger than those used in other states. The Older Driver Highway Design Handbook has been distributed to departmental employees so that practical opportunities to improve highway facilities for older drivers can be found.

Many of Alaska's rural roads have rumble strips. A large project to install milled-in rumble strips in Central Alaska was completed in 2000 including portions of the Glenn Highway, Parks Highway, Seward Highway, Sterling Highway, Minnesota Boulevard, Ocean Dock Road, and the Kenai Spur Road. All these roads had rumble strips installed during the 2000 construction season. A similar project installing rumble strips in interior Alaska will be completed in 2002. Rumble strips improve automobile safety by causing a vibration when cars drive too close to the shoulder. Rumble strips can, however, pose problems for bicycles, motorcycles and wheelchairs using the highway shoulder.

The Alaska section of the Institute of Transportation Engineers has produced a technical committee report on methods accommodating bicycles and pedestrians. This report, which has been distributed to state transportation decision-makers, contains many useful ideas for improving bicycle and pedestrian safety.

Alaska's law establishing double fines in work zones became effective in April 1999. Work zone safety is being addressed through the use of police officers dedicated to construction projects and speed monitoring trailers as well as the normal attention to design and field review of traffic control plans.

Transit Safety. The department is responsible for ensuring the safety of all rural public transit systems that receive funding from the Federal Transit Administration. The goal of the department's Safety and Security Program is to achieve the highest practical level of safety and security for transit. In order to protect passengers, employees, revenues, and property, all transit systems are encouraged to develop and implement a proactive system safety program. The department supports these efforts by providing guidelines, best practices, and training. It also performs system safety analyses and reviews, and sponsors an annual Alaska Transit Conference and state bus "Roadeo."

Department of Transportation and Public Facilities

Ketchikan Gateway Borough Transportation Services—the Bus.

Local governments that operate transit systems in Alaska are Anchorage, Fairbanks, Juneau, Ketchikan, Metlakatla, and the North Slope Borough. Kodiak's public transportation system was recently re-established with the senior center as the lead agency. In the Matanuska-Susitna Borough, a private nonprofit agency operates the transit system called MASCOT. It began operation in August 1999. A new transportation brokerage offering public transportation for the first time in the Central Kenai Peninsula (CARTS) opened in September 2000. Sitka's new public transit system is schedule to open in late 2001.

Transit safety projects that are programmed in the STIP include the expansion and modernization of bus or van fleets, as well as construction and purchase of maintenance facilities and equipment, transit stations, and passenger shelters.

Installing portable hydraulic bus lifts, video surveillance cameras for buses, geodesic tracking equipment, and fire suppression systems are also examples of transit safety improvements. In Barrow, video monitors display the location and updated schedule of their transit buses/vans on cable television. This safety measure reduces the amount of time spent waiting for the bus in extreme cold weather.

During transit emergencies, personnel from the transit system and other agencies come together to manage the incident, performing such tasks as rescuing or evacuating passengers, extinguishing fires, controlling crowds, repairing track and wayside structures, and restoring service. In addition to responding to emergencies affecting their own system, transit agencies must be prepared to assist in larger emergencies, such as evacuations.

The operation and maintenance of transit systems poses safety challenges as well. Running a safe transit system includes training drivers, mechanics, dispatchers, and supervisors. The department ensures that transit officials are trained to perform drug and alcohol testing of their drivers and operators. The maintenance of transit stops can be a challenge for the communities in which they are located, particularly in areas that receive heavy snowfall.

Department of Transportation and Public Facilities

Ted Stevens Anchorage International Airport

AVIATION SAFETY

As with the surface transportation program, aviation facility improvements are primarily funded through a federal program. The Aviation Improvement Program (AIP) is administered by the Federal Aviation Administration (FAA). The AIP is developed on a statewide basis by the department's Statewide Aviation office. AIP projects are scored by the regional offices in which they are located, and presented to the Aviation Project Evaluation Board, consisting of six senior members of the department, for re-scoring. The majority of aviation projects are strongly oriented toward safety; safety is the primary criterion articulated in the aviation project evaluation criteria the department uses to determine its AIP priorities. The obvious safety difference between highways and airports is that vehicles can slow down or stop when road conditions or weather deteriorate, but once an airplane initiates a flight it cannot slow down beyond a certain speed, and its options for stopping are very limited.

In addition to aviation facility improvements, safety is enhanced by improvements in weather information collection and dissemination, communications, and measures to minimize pilot error. Congress recently provided $11 million for the Capstone project, under which the FAA will upgrade the operating infrastructure for aviation by installing weather products, communications facilities, and Global Positioning System (GPS) systems. A recent study of 112 air carrier accidents occurring during a three-year period in Alaska indicated significant potential safety improvements through the use of this technology. The Capstone project seeks to accelerate the implementation and use of modern technology, beginning in federal fiscal year 2000 for Bethel and eleven other sites in the Yukon-Kuskokwim Delta.

The FAA has a national directive to expand runway safety areas to meet recent changes in their standards. Safety areas extend beyond the aircraft operational surfaces (runway, taxiway, and aprons), and have strong, smooth surfaces with grades designed to minimize aircraft damage and injury in the event that the aircraft comes into contact with these areas during takeoff or landing. The expansion of safety areas can be very expensive and diverts funding otherwise available for improving operational surfaces and facilities. This in fact competes for funding with the department's efforts to bring all community

class airports up to the current standard length of 3,000 feet —an improvement essential to safety and to improving community freight and passenger service.

In April, 2000, the President signed the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century. This law increases both AIP funding and the flexibility to use the available funding in Alaska.

PORT AND HARBOR SAFETY

The department is responsible for more than 70 port and harbor facilities. Maintenance of these facilities continues to be transferred to the local governments in which they are located. Over 50 ports and harbors fit this category; the rest are located outside organized city and borough boundaries and will continue to be state-maintained. Maritime laws regulate the basic safety of these facilities. In addition to emphasizing the safe operation and maintenance of maritime facilities, the department improves the safety of marine travel around the state through capital improvements. Unlike surface transportation and aviation projects, there is no federal funding program for ports and harbors on which to base a regular spending plan. The department maintains a list of improvement needs for ports and harbors, and uses these priorities to leverage and allocate available federal or state funds.

When harbors exist, safety is improved for commercial fishing and maritime activity. Harbors provide safe havens from inclement weather as well as access to other transportation modes and to health services. Providing these facilities is a particular challenge in southwestern, western and northwestern Alaska, where there are high levels of maritime activity and long distances between ports with medical evacuation capability. Poorly maintained facilities can be hazardous. Repairs and renovations that eliminate poor walking surfaces and tripping hazards, repair fire systems, or otherwise bring facilities up to safe standards are given priority in the ranking of port and harbor improvement projects during project evaluation.

Alaska Marine Highway System. A significant portion of the operating and capital budget for the Alaska Marine Highway System (AMHS) is dedicated to improving shipboard safety. The department has instituted a major project to upgrade the passenger safety on all AMHS vessels. This safety improvement project is mandated by a number of international and federal regulations. The Safety of Life at Sea (SOLAS) treaty sets standards for safety equipment such as lifeboats, rescue boats, personal floatation devices, plus a myriad of other safety mechanisms. SOLAS mandates their use aboard AMHS vessels that operate internationally. Currently, the M/Vs Kennicott, Matanuska, LeConte, and Taku are all SOLAS certified because of their routine transit into Prince Rupert, BC. These international safety requirements are being incorporated into U.S. statutes within Title 46 CFR under Lifesaving Appliances. Similar safety upgrades under this program are being planned in the continuing effort to maintain the utmost safety standards for the AMHS Roll-on/Roll-off (Ro/Ro) passenger fleet. This will be an ongoing project for the foreseeable future as international and national safety standards evolve.

There is also a personnel training project underway to meet the evolving international Standards for Training and Certification for Watchkeepers (STCW) regulations aimed at preventing accidents aboard ships through basic safety and higher level training standards. The goal is to prevent accidents through training that demonstrates and measures the sailor's ability to meet safety objectives.

All AMHS capital improvement projects include work that promotes the safe and efficient operation of AMHS vessels and terminals.

The U.S. Coast Guard also imposes safety regulations on all AMHS vessels. The AMHS must comply with all federal regulations, in addition to International Maritime Organization (IMO) shipping regulations. Whenever an AMHS vessel goes into the shipyard for repairs, it is held in abeyance while both operational safety concerns such as life-boat launch-

ing time, and in-place equipment are assessed by the Coast Guard. This must occur at least once each year.

SAFETY FOR NON-MOTORIZED USERS

Non-motorized forms of transportation such as bicycling and walking are increasingly recognized as viable transportation choices both nationwide and in Alaska. The incorporation of these modes in roadway design improves overall traffic flow. Bicycle and pedestrian planning can also help to minimize both the number and duration of conflict situations. An efficient transportation network includes bike lanes, wide curb lanes, bicycle-sensitive traffic signal detection loops, sidewalks, separated pathways (where appropriate), convenient cross-walks and over- or underpasses, and plentiful bicycle parking.

Many of Alaska's roads were initially built to provide links for motorized traffic and did not include provisions for bicycles and pedestrians. Accommodation of these modes along existing roads is a long-term objective that is most cost-effectively implemented through phasing-in during normal roadway reconstruction.

Department of Transportation and Public Facilities

Fairbanks bike path

The department has instituted a bicycle/pedestrian policy that mandates the incorporation of bicycle and pedestrian improvements into all reconstruction projects, unless specifically infeasible. The most important reason for implementing such a policy is to improve safety for all users of the transportation system. Increased opportunities for funding bicycle and pedestrian safety improvements came with the passage of TEA-21, which specified that pedestrian facility improvements are eligible for the HSIP program.

Road maintenance can impact bicycle and/or pedestrian travel. The common practice of placing gravel on roadways for additional winter traction can result in accumulations of gravel on the shoulders and medians. The high cost of snow removal and widespread lack of maintenance funding typically results in inadequate road sweeping in the spring, summer, and fall. This tends to discourage many potential bicyclists from commuting. The most determined riders use the roadway instead of using the shoulder, slowing traffic and increasing the accident potential.

Winter bike trail and sidewalk maintenance options include grooming a layer of snow for walking, skiing, and winter bike riding. However, in general, snowplowing trails better serves pedestrians and people with wheelchairs. One safety problem that results from plowing is the resulting snow berm deposited onto the adjacent pathway or sidewalk. This can create significant safety problems for winter maintenance, and limits options for pedestrians. To prevent this situation, the department attempts to provide adequate separation distance between a pathway and the roadway.

ALASKA RAILROAD CORPORATION SAFETY

The Alaska Railroad Corporation (ARRC) experienced three railroad car derailments and four fuel spills during the winter of 1999 and spring/summer of 2000, spilling between 50 and 120,500 galloons of fuel per incident. Additionally, in February 2000 a railroad employee changing a fuel filter wired open a valve to enhance fuel drainage and left the scene, resulting in a 2500 gallon fuel spill onto the ARRC rail yard in Anchorage. Due to these safety and spill issues, the Governor appointed a cabinet-level commission to investigate ARRC safety and operations practices. Correspondingly, the ARRC instituted its own safety audit to determine operating maintenance and other conditions that

can cause derailments, detailing track conditions, flaws and maintenance problems. Following the completion of the study in the spring of 2001, the ARRC began implementing the study's recommendations. It instituted a maintenance quality assurance program and a rail-grinding program to smooth out track imperfections. It also initiated an operational testing program to improve employee alertness and readiness in the event of derailments. Additionally, the ARRC audited the condition of its tank car fleets and launched a "truck rebuild" program after discovering a systemic problem with "wedge rise," an issue affecting the shock-type system of the rail trucks on which tank cars rest. Although not a federal requirement, the ARRC is establishing a best management program for its truck system.

One of the most significant derailment prevention measures the ARRC will be undertaking will be straightening the railroad tracks between Anchorage and Wasilla, where heavy traffic and tight "S" curves pose the greatest statistical probability of derailments. This $78 million project will straighten approximately 70 curves, significantly decreasing travel times between the two communities. The project is expected to be completed in 2003.

RURAL TRANSPORTATION

A departmental effort is underway to improve safety in western Alaska where very few villages are connected by road. Most villages are located on or near the coast or large rivers, but many of them are hundreds of miles apart by water. In winter, however, when the ground is frozen and snow covers the tundra, residents can travel shorter distances by snowmachine, off-road vehicles, dogsled, or on skis. Under the Trails and Recreational Access for Alaska (TRAAK) program, the department is using federal Transportation Enhancements funding to mark these winter trails. Cities, non-profit corporations, and the department have joined together to install permanent markers along winter trails in Southwest Alaska, the Bering Straits region, Yukon-Kuskokwim region, and the Northwest Arctic Borough.

RECOMMENDATIONS

The department should:

- Foster an ongoing network for communication among all state, federal, and local agencies that have responsibilities for roadway systems and the users of those systems. This type of cooperation lends an interdisciplinary approach to address safety problems. Participation in the Traffic Records Strategic Plan is one way the department is keeping these lines of communication open.
- Partner with the Department of Public Safety to regularly review and update Alaska's drivers and bicycle and pedestrian regulations, and recommend any needed updates to the Alaska Statutes in the interest of public safety. Ensure that user regulations and enforcement, maintenance practices, and transportation designs are complementary.
- Where possible, strive to institute innovative ways to improve maintenance of harbor facilities, and/or repairs and renovations to bring harbor facilities up to safe standards.
- Institute bicycle and pedestrian planning to ensure that these facilities are fully integrated into roadway design, so that transportation options are improved. Accommodate bicycle and pedestrian facilities along existing roadways during normal roadway reconstruction.

factor three

TEA-21 PLANNING FACTOR 3

> *"The original roads to and within Alaska were trails."*

Increase the accessibility and mobility options available to people and for freight.

In Alaska, options for mobility are often a function of one's location. Residents have a broad range of needs and desires for different levels of mobility. Although Alaska's urban and rural residents often enjoy amenities and standards of living comparable to their counterparts in the rest of the country, residents of the state's most remote communities have more limited access to other areas and resources. For some, relative isolation is a lifestyle choice, and it does not detract from quality of life. For others, geographic or climatic isolation may cause economic, psychological or physical hardships. Mobility is a challenge, and the geographic constraints on mobility can contribute to unemployment, poverty, and lack of sanitation and safety infrastructure.

In many communities residents adhere to some facets of a traditional lifestyle, but have adopted many other modern practices such as buying food at the store or ordering it by mail. This requires a link to the transportation system. In some communities, households must haul human waste by bucket to a community dumping area and emergency health care may be hours away by air, if available at all. The department strives to improve the level of service and mobility that the existing transportation system provides, beginning with the basics. Can children get to and from school? Can residents get to the store, or do they have a way to acquire the food they need? Do the mobility options meet the access needs of each community?

This analysis discusses some of the ways the department works with local governments to improve the local transportation system, often by attempting to increase mode choices. In areas where no local government holds transportation responsibilities the department is the closest transportation provider to the users, cataloging the needs for many of these communities. Local needs are defined by the specific improvements that citizens, organizations and public agencies request. On the regional scale, the department is conducting long-range planning in five Area Transportation Plans to analyze the trends in the movement of people and goods within, into, and out of a particular region and to plan how to meet their unique transportation challenges.

MOBILITY AND ALASKA'S ROAD SYSTEM

Alaska's road system serves three distinct modes of travel that people rely on for access and mobility: motor vehicles (cars and trucks), non-motorized means (walking, wheelchairs, and bicycles), and transit (buses and vans). The Alaska Marine Highway System (AMHS) is the highway system for inter-community surface transportation for much of southeast, the gulf coast, and southwest Alaska.

The original roads to and within Alaska were trails. Rivers, mountain passes, and well-worn paths were the only overland surface transportation routes. Roads have replaced many of these trails. Access and mobility improved dramatically in the twentieth century in Alaska, as it has elsewhere.

The linked road system in Alaska is limited to central and southern interior Alaska. In western and northern Alaska, roads, where they exist, are typically local or regional in nature. In Southeast Alaska the road system is also localized, with connections to the rest of the state, Canada, and the lower 48 states by way of the AMHS. Although Alaska is more than twice as large as Texas, the next largest state, its population and land road mileage compare more closely with Vermont.

Most of the public roads that provide local or community access are owned and maintained by the city, borough, state, or federal government. Local streets feed traffic into collector roads; these routes feed into higher volume arterials. The department classifies routes according to their function in order to provide optimum vehicular access to home, work, or school, while maximizing the mobility, or ability for people to move around the system in the least amount of time.

The AMHS is comprised of main routes and feeder routes, each of which has its functional route classification analogous to roadways. TEA-21 earmarked discretionary funding for many categories of funding, including ferryboat transit operations. It also earmarked $10,400,000 for ferries and ferry terminal facilities in Alaska and Hawaii.

The Inter-Island Ferry Authority (IFA) is an Alaska port authority established in 1997 under the Municipal Port Authority Act. Six southeast Alaska communities (Coffman Cove, Craig, Klawock, Petersburg, Thorne Bay and Wrangell) are participating municipalities. The first of IFA's new ferries will provide service on a route between Clark Bay on Prince of Wales Island and Ketchikan. The M/V Aurora currently serves this route. The IFA plans to provide year-around twice-daily summer service and once daily winter service on this route using a sixteen-hour, two-shift operating day. The second of the proposed new ferries will initiate a new northern route service linking Coffman Cove on Prince of Wales Island, South Mitkof Island (where Petersburg is located), and Wrangell using a one-shift operating day. The IFA initially plans to offer seasonal (May through September) service on this route; however, IFA anticipates that this route could experience significant growth of traffic and service over time.

The IFA contracted with a naval architecture firm in Washington to prepare contract designs and specifications for the construction of two new Subchapter "K" passenger-vehicle ferries. The first ferry was delivered in December 2001, and the second is anticipated in the summer/fall of 2002.

Department of Community and Economic Development

M/V Aurora near Misty Fjords

NON-MOTORIZED TRANSPORTATION

Most trips begin and end on foot, transitioning from a sidewalk, road, or trail to one's destination, or walking to and from the car or the bus. For many the trip includes a bicycle ride, and for some, a ride in a wheelchair. These are the fundamental modes of transportation, and non-motorized transportation is a basic element of the transportation network. Early on, state transportation agencies did not integrate non-motorized transportation facilities fully into the transportation mix. But in recent years, a combination of increased traffic congestion, a growing problem of physical inactivity, an aging population, and public demand for bicycle and pedestrian facilities has caused more attention to be given to the provision of non-motorized facilities. In 1995, the Governor made it a policy to include accommodations for bicycles and pedestrians in all of the department's street, road, highway, and marine highway improvement projects if at all feasible. The department has begun to provide more places for people to move around without cars. It has made some improvements in safety for pedestrians by building crosswalks and overpasses. Even so, Alaska has a long way to go to correct the problem. Additionally, frequent heavy snow conditions pose a unique problem for the Alaska pedestrian.

The TRAAK (Trails and Recreational Access for Alaska) program is a good tool for identifying transportation projects that benefit visitors and residents by increasing the options for recreational access and general transportation access for bicycles and pedestrians. This program should be strengthened so that a wider range of mobility options becomes commonplace.

TRANSIT

Bus transit, which includes scheduled fixed-route and demand-responsive van service, provides the foundation of the Alaska public transit system. Transit serves as an alternative mode of transportation in congested urban areas with high traffic densities and air quality problems. Transit systems provide basic mobility for citizens in rural communities. Smaller specialized transportation services operated by for-profit and non-profit organizations such as village corporations, senior centers, churches and service organizations, are offered in communities throughout the state. These human service agencies provide transportation for senior citizens, persons with disabilities, youth, and the economically disadvantaged.

Public transit systems exist in Anchorage, Barrow, Fairbanks, Juneau, Kenai-Soldotna, Ketchikan, Kodiak, the Matanuska-Susitna Borough, and Metlakatla. Anchorage's People Mover and AnchorRIDES, which serve the largest ridership in the state, had 3,000,000 passenger trips in 1999. Fairbanks North Star Borough provided 275,000 passenger trips, the City and Borough of Juneau had 895,000, and Ketchikan's system had a ridership of 186,000. The North Slope Borough transit service operating in Barrow and seven outlying villages tallied 343,000 passenger trips. After an extensive coordinating planning effort in each community, new transit systems began service in Kodiak in 1998, Mat-Su in 1999, and Kenai-Soldotna in 2000. Sitka's new community transit system is scheduled to open in late 2002.

Department of Transportation and Public Facilities

Barrow Transit Station

Public transportation is funded from a variety of sources including user fees and federal, state, and local governments. Costs can be divided into two major categories: capital and operating. Capital funds are needed to purchase vehicles, facilities, and equipment. Operating costs include overhead, staff wages, fuel, and insurance. Federal and state sources primarily fund capital purchases. Operating funds for the most part must come from local sources. This has resulted in a major burden on communities that would like to develop a public transit system.

The department administers federal grant funding from the Federal Transit Administration (FTA) in support of community transit systems. In recent years, the department has supplemented FTA funds with transferred federal highway funds as well. In addition, the department administers the Alaska Mental Health Trust Transportation Grant program (see below). Although the department does not operate a transit system, it provides support through technical assistance, training, and grant administration. The department also works with state agencies that manage transportation components. The department administers federal transit grant programs and assists communities in applying for federal grants that fund:

- Local coordinated public transportation plans
- Transit education programs
- Transit technical assistance
- Acquisition of vehicles and equipment
- Operating costs

More federal transit funding has been available under TEA 21 than previously. Federal funding contributes 80 percent of the cost of capital improvements. The 20 percent match comes from state appropriations or the local community. The department allocates by formula the Federal transit funding available for subsidizing operating expenses of public transit systems in non-urbanized areas of the state. Although this can fund up to a maximum of 50 percent of a system's annual operating loss, the amount available when spread among the various transit systems in the state is not sufficient. As a result,

most operating costs must come from local sources. Many communities support the establishment of a state-funded transit program in Alaska, as many other states have.

The department also administers the Alaska Mental Health Trust Authority (Trust) Transportation Grant Program, which first awarded grants in 1997. Established to increase the mobility of the Trust's beneficiaries, the Trust grant program has assisted in the development of coordinated transportation systems in the beneficiaries' communities.

The goal of coordination efforts is to deliver public transportation services more efficiently and cost-effectively. Coordination consists of a variety of networking techniques among human service agencies (such as Head Start, Senior Services, etc.) as well as clients and governmental bodies to pool finances, capital goods, and other resources. Through coordination, communities can:

- increase the cost-effectiveness of providing transportation
- maximize vehicle use
- eliminate duplication of efforts
- expand services.

Working together, the agencies agree to share information and may elect to cooperate in the purchase of maintenance, insurance, and fuel. Coordination may result in the consolidated dispatch of all agencies' vehicles or in the establishment of a new community transit system operated by the local government or by a non-profit organization.

Trust funds as well as FTA funds support planning and implementation of these new systems, including capital acquisitions and start-up operating costs. Priority for Trust and FTA grant funding is given to communities that demonstrate significant levels of networking among human service agencies, private transit providers, and governmental bodies. A limited portion of Trust and FTA funding is available for vehicles and equipment in communities in which coordinated transportation systems are not feasible.

While the Trust funds primarily target beneficiaries, vehicles and equipment purchased under the Trust program may be used to provide transportation to non-beneficiaries if beneficiary use is not affected. The Trust program is highly successful, as indicated by a 24 percent increase in Trust beneficiary ridership in January 2001 over baseline figures.

In the Statewide Transportation Improvement Program (STIP), transit projects are scored in a transit category, which emphasizes local contribution of funds to capital construction costs, local contribution of funds for operation and maintenance, system continuity, increased mobility for elderly, persons with disabilities or the economically disadvantaged, and the coordinating/sharing of resources. Missing from the criteria is a means of comparatively scoring eligible transit projects by efficiency, such as projected operating cost per rider-mile.

In October 2001, the department, in partnership with other state agencies, established the Alaska Mobility Coalition. Partner agencies include the Governor's Council on Disabilities and Special Education, the State Independent Living Council, the Mental Health Trust Authority, and others. The coalition's mission is to raise the awareness of the need for community transportation and to ensure accessible, affordable transportation for Alaskans, including people with disabilities, senior citizens, and persons with low income. The coalition will advocate for needed changes to existing policies and practices and for increased federal, state, and local funding for community public transportation.

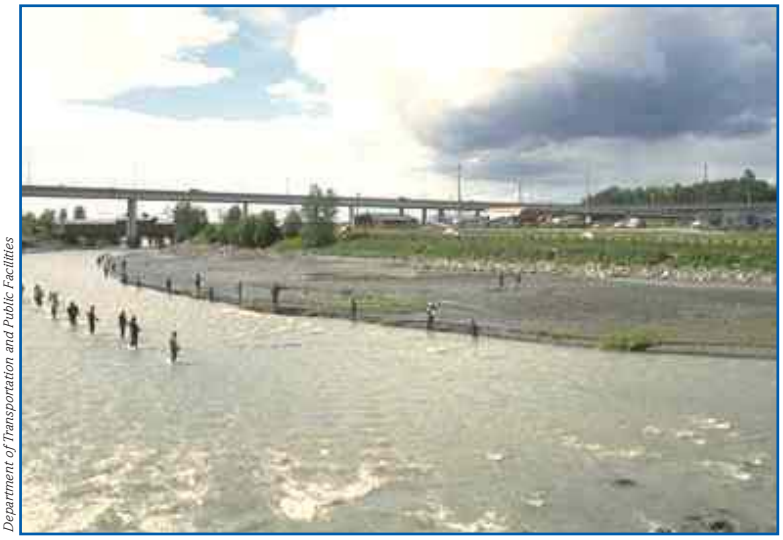
The demand for transit services is expected to grow moderately over the next twenty years. Coordinated planning will likely occur in other Alaska communities, resulting in new community transit systems in areas with no history of public transportation. Welfare reform has generated a new demand for public transportation as recipients are now required to seek work. Many of the people receiving public assistance do not own vehicles. Conformance to federal air quality standards for the Anchorage and Fairbanks areas will also increase the need for public transportation.

"Transit services between communities in Alaska are very limited."

Rail Transit. The Alaska Railroad has begun to lay the framework for commuter rail service serving Anchorage from the Matanuska-Susitna Borough and Girdwood. One project is a new intermodal facility next to the current ARRC passenger terminal in the Ship Creek area of downtown Anchorage. The expanded commuter rail service to the Mat-Su Valley and Girdwood and link to the Ted Stevens Anchorage International airport will require a focused effort between the Alaska Railroad, Anchorage's People Mover bus system, and the downtown pedestrian network. Improvements will focus on:

- An intermodal Ship Creek depot to ensure the smooth movement of passengers to and from train connections;
- Expansion of the bus and mini-bus fleet to provide additional trips to the downtown areas and the primary bus terminal;
- Development of four transit bus stop facilities to serve the Central Business District and Ship Creek; and
- Improvements for a year-round pedestrian connection between Ship Creek and downtown.

As mentioned in the planning Factor Analysis 3, a second major project consists of line changes to the mainline track between Anchorage and Wasilla. This project will reduce running time by 30 minutes between Wasilla and Anchorage, substantially reduce operating costs, and allow ARRC to achieve greater schedule consistency and be in a position to offer commuter service in the future. The project will reduce the number of roadbed curves, provide signals and grade separated crossings, and separate freight and passenger trains onto dual main-line track. The project has two phases. Most of the work is expected to be completed by the fall of 2003.



Department of Transportation and Public Facilities

Ship Creek, downtown Anchorage

Inter-Community Transit. Transit services between communities in Alaska are very limited. Alaska's low population density and limited road network has worked against private sector solutions such as bus lines. The Alaska Railroad (a state-owned, for-profit corporation) provides passenger service from Anchorage north to Fairbanks and south to Seward, but its passenger service is designed to meet summer tourist demand while providing a minimum level of service to railbelt residents for inter-community transit. Passenger service provided by the Alaska Marine Highway System helps meet the need for inter-community surface transit in Southeast Alaska and coastal Southcentral Alaska. Alaska Direct Bus Line provides inter-city bus service between the AMHS port communities of Haines and Skagway to Whitehorse, Fairbanks and Anchorage. It reported a ridership of 1875 in 1999. In Northwest and Western Alaska, inter-community public transit does not exist, and residents must travel between most communities by air or boat, or by dogsled or snowmachine in the winter.

MOVING FREIGHT

The TEA-21 Planning Factor 6 analysis describes some of the ways the State of Alaska facilitates efficient freight movement into, out of, and around the state. While the mode and economic choices are determined by cost and provided in large part by private operators, the public sector has a role in providing highway, ferry, aviation, rail, and other transportation infrastructure. Improvements to these facilities benefit both the movement of people and freight. A key component for freight is the attention the department, local, and federal governments are paying to the transfer points, or intermodal terminals between transportation modes. Examples of intermodal terminals include the Ted Stevens

Anchorage International Airport, Fairbanks International Airport, the Port of Anchorage, and the Port of Valdez.

The department includes intermodal transportation in all levels of planning. The Federal Highway Administration has included intermodal terminals as a top priority for the National Highway System. The department's project evaluation criteria for funding projects in the STIP under the Alaska Highway System and the Community Transportation Program favor projects that improve intermodal connections. This is especially important in Alaska, which is more "multi-modal" than any other state. By the time a carton of milk arrives in a remote village such as Nulato, it has been barged, hauled by truck or rail, flown by air or barged once again, and finally delivered by four-wheeler, truck or snowmachine to the local store.

Alaska's freight and passenger infrastructure is seeing some expansion right now in rail and marine transport, as well as in the air freight capacity of existing airports. Significant Nome port improvements are underway, as are improvements to the Red Dog Mine deep water minerals transfer facility. The Knik Arm dredging project initiated during the summer of 2000 by the State of Alaska and the U.S. Army Corps of Engineers increased the Port of Anchorage's capacity.

RAIL PLANNING AND RAIL PROJECTS

In the State Rail Plan Update currently underway, the Alaska Railroad Corporation (ARRC) is examining ways to preserve and enhance freight and passenger rail transportation in Alaska, including ways to better connect with other modes of transportation. This effort will update the 1985 Rail Plan.

Photo by Ernst Schneider, Department of Community and Economic Development

Denali Railway Station, Denali National Park and Preserve

From a range of funding sources, including TEA-21 and internal ARRC sources, the ARRC has a number of expansion projects in the planning or development stages, most notably

- Ted Stevens Anchorage International Airport
- Expansion and Rail Passenger Station
- Anchorage to Wasilla Line Changes and new Wasilla Depot
- Anchorage Intermodal Facility
- Anchorage and Fairbanks Yard and Terminal Plan
- Fairbanks Intermodal Facility
- Denali Depot Expansion
- Girdwood Rail Transportation Plan
- Whittier Dock Studies
- Whittier Pedestrian Overpass
- Seward Dock Intermodal Project

Recently a Senate committee approved legislation to create a U.S.-Canada Commission to study a railroad connection between Canada and Alaska. The federal transportation act provides $2 million to study the railroad connection. Half of the 20-member committee will be appointed by the U.S. president and half by the Canadian government. It must report on the feasibility of the proposal by the end of 2003. The most likely route would run between Eielson Airforce Base in Fairbanks and Fort St. James or Fort Nelson in British Columbia. Total cost of such a railroad is projected to be between $1.15 and $2.3 billion.

TOURISM

The United States is the most visited country in the world. Alaska is a feature attraction to Americans as well as tourists from other countries. One significant challenge facing the state is to offer as many modal options to the travelling public as possible. Consequently, the trends and needs of tourism factor into the way the department manages its transportation system. To keep pace with increasing visitation, both recreational access and access to Alaska's scenic and historic resources must be improved. Tourism generates substantial revenue for the Alaska Marine Highway System. Because visitation fuels funding for highways and Alaska is a magnet for tourists, tourism indirectly contributes to the improvement of Alaska's highways. For these and other reasons, the department strives to improve mobility options for visitors.

> *"The vast majority of visitors come from the United States, predominately the western states."*

Denali National Park and Preserve is one of the main attractions for people visiting Alaska. In the 1980s the National Park Service began restricting private vehicles from driving the Denali Park Road, instituting shuttle bus service instead. Today, visitors to the park must pay a $5.00 entrance fee and a $12.00-31.00 shuttle bus fee. It is sometimes necessary for visitors to wait a day or more before they are able to purchase a pass to go into the park. Due to the desire to allow more people to see the park, an official North Access road/rail feasibility study was conducted by the National Park Service in 1996-97 under the direction of public law 103-134. The study was completed in conjunction with representatives of the department, the Department of Natural Resources, the Department of Fish and Game, and the Citizens Advisory Commission on Federal Areas. Road costs for the 80-mile long North Access route were estimated to be between $87 million to $100 million. Railroad construction would cost between $136 million to $213 million, and was concluded to be largely infeasible. It remains to be seen if such access will ever be built, although interest in the concept is still alive.

The number of visitors entering Alaska from May through September of 1999 was almost 1.2 million, and accounted for 75 percent of total passenger arrivals to the state in that year. This represents a three percent increase over 1998. There was a six percent increase in the number of cruise ship passengers. Marine highway travel decreased by about four percent, and travel by motor coach by almost ten percent. Highway travel by personal vehicle showed a slight decrease, while arrivals by domestic and international airlines increased slightly.

An Alaska Visitor Statistics Program (AVSP) report indicates that during the period October 1996 to September 1997, visitation was for vacation/pleasure (72 percent), business (ten percent), visiting friends and relatives (eleven percent), and combining business and pleasure (seven percent). About eighty percent of the total visitors come during the peak summer travel months of May through September. Visitors are fairly equally split between males and females.

TABLE 5.1 VISITORS TO ALASKA BY ENTRY MODE SUMMER 1998 AND SUMMER 1999

Entry Mode	Summer 1998	Summer 1999	Percent Change 1998 to 1999
Domestic Air	551,600	555,600	+2.5%
International Air	20,000	21,700	+8.3%
Highway—Personal Vehicle	107,600	106,300	-1.2%
Highway—Motor Coach	4,100	3,700	-9.6%
Alaska Marine Highway	21,600	20,800	-4.0%
Cruise Ship	431,200	457,100	+6.0%
Other	27,600	23,800	-13.7%
Total Visitors	1,163,700	1,199,000	+3.0%

Source: McDowell Group, *Alaska Visitor Arrivals, Summer 1999*

The vast majority of visitors (about 83 percent) come from the United States, predominantly the western states. Canada accounts for approximately ten percent of the visitors with the remaining seven percent coming from international or overseas locations.

Annual growth in visitation between 1989 and 1994 averaged ten percent. In 1993 and 1994, the number of visitors increased twelve percent each year. However, between 1994 and 1996, growth slowed to less than six percent per year. Since 1997, annual growth has averaged less than three percent. The 1998 summer season marked Alaska's lowest growth rate in a decade at 1.3 percent; however, 1999 rebounded to 3 percent.

Both tourists and residents have a need for adequate transportation to access the varied scenic and recreational opportunities that Alaska has to offer. The more options the transportation system provides in road, trail, air, rail and water transport, the better travelers can be dispersed. The major air carriers, cruise lines and railroads have predictably responded to tourism demand by increasing capacity. Because the road network is not appreciably expanding, it becomes more critical to add roadside facilities such as scenic pullouts, parking for recreational access, restrooms, and campgrounds in order to meet the need.

RECOMMENDATIONS

The department should:

- Continue to look for ways, including establishing a state-funded capital program, to benefit all Alaskan communities with the increased TEA-21 funding levels. Federal surface transportation funding can be spent on highways, ferries, roads, waysides, trails and pathways, and transit. Because of this, communities linked to the connected road and ferry system are more likely to benefit from this funding.
- Continue using the area transportation plan process to examine area-wide access needs and develop intermodal system solutions to improve overall access.
- Enhance system intermobility by providing appropriate trailhead and parking areas to dovetail with community trail projects. This will help extend the Governor's policy to provide appropriate accommodations for bicycling and walking.
- Continue to expand participation in partnership programs (such as TRAAK, the Federal Lands Highways Program, and cooperative efforts such as the Alaska Land Managers Forum). The department's goal should be to provide opportunities for cooperative land use decisions among government agencies, and to affect improvements in mobility around the state.
- Encourage responsible community and public agency long-term land management and development planning.
- Pursue new public road access only with community support and in compliance with the long-term land management and development goals of affected communities.
- Assist and encourage local governments to develop effective long-range land use practices that facilitate successful operation of transit systems. The social benefits of effective transit systems for enhancing personal mobility and reducing the social costs of automobile dependency make these systems desirable in most communities. The most critical element in successful transit system operation is ridership, and land-use decisions figure prominently in ridership levels.
- Continue to encourage coordination and sharing of transit assets within communities in order to reduce costs, improve efficiency, and reduce excessive inventory. Give priority to public transportation systems resulting from coordinated planning efforts during project evaluation.

RECOMMENDATIONS cont.

- Institute a means of comparatively scoring eligible transit projects by efficiency, such as projected operating cost per rider-mile.
- Preserve public access to and use of waterways for transportation access to biological and scenic resources, for subsistence, commercial harvest, and recreational uses.
- Provide top-quality and fully accessible public facilities.
- Participate as an active member of the Alaska Mobility Coalition with other partner agencies whose goal is to secure increased and stable capital and operating funds for community public transportation systems and services.
- Improve the traveler information network. Start by completing the visitor information kiosk project (in conjunction with the Department of Community and Economic Development).
- Institute a program to collect bicycle and pedestrian use data.

factor four

TEA-21 PLANNING FACTOR 4

Protect and enhance the environment, promote energy conservation, and improve the quality of life.

Department of Community and Economic Development

Bull walrus, Western Alaska

Many planning factors converge in this analysis. The Department's environmental review process for transportation project development helps achieve the goal of "protecting and enhancing the environment." State, federal, and local regulations, programs, and policies help the department ensure that capital improvement programs conform to air and water quality standards. Conforming to state and federal laws and guidelines regarding energy use in our transportation systems, along with using alternative fuels, reduces the need or the demand for automobile travel and helps achieve the goal of "promoting energy efficiency and conservation." Inviting the state's natural resource agencies to participate in the earliest stages of pre-project planning will help avoid impacts to habitat and water quality, as well as impacts to legislatively designated areas. To achieve the goal of "improving the quality of life," the department has adopted policies and goals that integrate community involvement in transportation projects. Several recommendations sum up this analysis by providing reasonable steps that might be taken to protect and enhance the environment and Alaska's overall quality of life.

PROTECTING AND ENHANCING THE ENVIRONMENT

Transportation decisions always impact society and the environment in ways that go beyond the transportation system itself. Impacts to property values, commerce, societal behavior, energy consumption, the landscape, habitat, air quality, water quality, and resource and land development can occur following decisions to change (or not to change) a transportation system. Some impacts can be foreseen; others may not be. By observing effects of transportation decisions in other communities with similar characteristics, it is possible to predict the potential outcomes of similar decisions. Appreciation of these likely effects can, in turn, help focus transportation planning on desired societal and

environmental outcomes, rather than strictly highway or airport design, which may not address the comprehensive issues. Considering cumulative impacts from construction activities can contribute to the improvement of a community's quality of life.

Secondary and cumulative impacts of transportation projects may not be obvious. For example, a new road opens up land to development, which in turn affects more habitat and produces other undesired environmental consequences not directly attributable to the road. In extreme cases, habitat fragmentation may result. At its most extreme, habitat fragmentation can affect survival.

Construction activities often produce significant effects in rural areas. The widening or realignment of roads requires that land be converted to transportation purposes, with a resulting loss of habitat. The clearing of vegetation and subsequent erosion may result in short-term perturbations to water quality. Initial construction of roads and airports requires large quantities of borrow, aggregate and petroleum products. The gravel or other material generally comes from a nearby location, and extracting it can result in the erosion and loss of vegetation and habitat.

The National Environmental Policy Act (NEPA) establishes a mandatory federal process for identifying the environmental impacts of transportation improvement projects and addressing the impacts on the human, natural and manmade environments. Environmental documentation comes in the form of an environmental assessment or the more comprehensive environmental impact statement (EIS). These processes are often initiated after a capital improvement project is identified and programmed for funding. Sometimes a project the department believes will require an EIS is programmed into the STIP as an EIS project. In proposals of significant scope, where the "no-build" alternative is a possible option, the environmental documentation may be programmed as an independent project, apart from the proposed action. Such is the case for the Juneau Access EIS, which investigated the purpose and need for additional road or increased marine access to Juneau.

Photo by George Matz, Department of Community and Economic Development

Snowgeese in flight

The EIS process begins with public scoping to identify the issues that should be addressed in project development. NEPA requires the proposing agency to seriously consider a range of alternative solutions to any proposed action. NEPA is a legal requirement and therefore dictates the minimum steps that must be taken. While meeting NEPA requirements, the department has sometimes been criticized for inadequately considering the secondary and cumulative impacts of a proposed project. NEPA does not prevent the department from incorporating additional measures in its environmental processes to improve their effectiveness, learn from citizens, develop informed consent, and build public confidence in the agency. The department works with FHWA, FTA, and FAA as appropriate in developing NEPA documentation. These agencies must affirm the way an EIS specifically addresses a project's secondary and cumulative impacts. The EIS process is particularly important for projects that have significant impacts on land use.

TEA-21 ENVIRONMENTAL STREAMLINING PROVISIONS

Section 1309, Environmental Streamlining, was included in TEA-21 for the purpose of coordinating federal agency involvement in major highway and transit projects under the National Environmental Policy Act (NEPA) process. Environmental streamlining defines a new way of doing business that links the timely delivery of transportation projects with the protection and enhancement of the environment. First enacted into legislation for highway and transit projects with TEA-21, environmental streamlining is also being discussed in aviation reauthorization. Environmental streamlining provisions attempt to address concerns relating to delays in implementing projects, unnecessary duplication of

effort, and added costs often associated with the conventional process for reviewing and approving surface transportation projects. Section 1309 calls on FHWA to develop the following:

- a coordinated environmental review process by which the U.S. Department of Transportation would work with other federal agencies to ensure that major highway and transit projects are advanced according to cooperatively determined time frames.
- standards for concurrent rather than sequential environmental reviews to save time, so long as this does not result in adverse impacts to the environment.
- a dispute resolution process between the department and other federal agencies.

The U.S. DOT and federal environmental review and permitting agencies entered into a National Memorandum of Understanding (MOU) in July 1999. This formalized the agencies' commitments to expedite federal highway and transit projects while fulfilling their responsibilities to protect the environment. Additionally, three regional MOUs have been signed and some type of streamlining activity has been initiated in about 30 states.

"In Anchorage and Fairbanks the air quality is at its worst in the winter."

The department has begun a major environmental streamlining initiative with state and federal resource agencies. The goal is to reduce the amount of time necessary to develop projects while assuring environmental protection. In 1992 the department entered into an agreement with the U.S. Army Corps of Engineers, Alaska District and the Federal Highway Administration, Alaska Division to merge elements of the transportation NEPA process and the process for obtaining individual 404 (Clean Water Act) permits for federal-aid transportation projects within the State of Alaska. In 1995 this agreement was expanded to include additional state and federal resource and regulatory agencies in the merged process. The department also has also entered into programmatic agreement with the State Historic Preservation Office to merge National Historic Preservation Act permitting requirements with NEPA. This was similarly initiated to streamline Federal Aid Highway projects.

In order to enhance the success of the environmental streamlining effort, the department should also consider allocating funding to allow state and federal resource agencies to fully participate in the Environmental Streamlining process.

AIR AND WATER QUALITY

Air Quality. TEA-21 provides a special category of federal funds to address Congestion Mitigation and Air Quality (CMAQ) concerns, which can be used for projects or special programs aimed at reducing harmful emissions in air quality in non-attainment areas. Alaska's non-attainment areas are Anchorage and Fairbanks for carbon monoxide, and Anchorage's Eagle River and Juneau's Mendenhall Valley for particulate matter. While most carbon monoxide concentrations are directly attributable to mobile-source (truck and auto) emissions, particulate matter is usually a result of soot from wood burning or other stationary sources, dust kicked up from dry dirt roads, or a combination of both.

The Air Quality Improvement office in the State Department of Environmental Conservation is responsible for identifying and monitoring mobile sources of air contaminants, radiation sources, and general air quality monitoring. The 1970 federal Clean Air Act established air quality programs to regulate air emissions from stationary, mobile and other sources that pose a risk to human health and the environment. Alaska established its program in the early 1970's. A State Implementation Plan (SIP) is required by the federal Clean Air Act Amendments of 1990 to address air quality problems in each of these areas.

Transportation conformity regulations require that all highway and transit plans, programs (including the STIP), and projects that are federally funded or approved must be demonstrated to conform to the SIP. In addition, state and locally funded projects that

are regionally significant must conform. This means that projects must not contribute to new air quality violations or delay timely attainment of the National Ambient Air Quality Standards (NAAQS). Anchorage and Fairbanks were previously considered moderate non-attainment areas, and the SIP called for attainment by 1996. Attainment is met when NAAQS are not violated for two consecutive years. Anchorage and Fairbanks were not able to meet the 1996 deadline and are now considered "serious" non-attainment areas. They are now in the process of amending their SIPs to meet the requirements for such areas.

In most large metropolitan areas, higher than normal concentrations of carbon monoxide can be correlated with heavy automobile congestion, as is the case in Anchorage. In Anchorage and Fairbanks the air quality is at its worst in winter, primarily because cold-starting a vehicle results in the very high hydrocarbon emissions. Engines are often left idling in winter, and temperature inversions trap emissions near the surface, resulting in high concentration of pollutants.

The Anchorage Metropolitan Area Transportation Study (AMATS), Anchorage's metropolitan planning organization, is responsible for implementing a Congestion Management Plan under federal regulations. The regulations apply to carbon monoxide (CO) non-attainment areas with a population over 250,000 (called a Transportation Management Area, or TMA). The regulations essentially provide that no federal funds will be programmed in a CO or ozone non-attainment TMA for any highway project that will result in a significant increase in single occupant vehicle capacity, unless the project is based on an approved congestion management plan. The Anchorage Congestion Management Plan outlines the strategies that the Municipality uses to reduce traffic congestion. FHWA and FTA monitor progress toward this end.

Juneau and Fairbanks have both experienced steady growth in traffic volume during recent years. Average daily traffic (ADT) along sections of Juneau's Egan Drive increased approximately 20 per cent between 1992 and 1996, from 19,777 to 24,200 ADT. Fairbanks' Steese Expressway experienced similar a similar increase in ADT between 1993 (15,000) to 1995 (18,000). Fairbanks, Anchorage, and drivers that commute to Anchorage must meet vehicle inspection and maintenance requirements (I/M testing) for vehicle registration.

Photo by Ernst Schneider, Department of Community and Economic Development

Fishing at Summit Lake, Denali Highway

Water Quality. Alaskans need safe water for drinking and personal use. Water standards also provide for healthy habitat for fish, aquatic birds, and other animals. Fish habitat is a critical water quality concern. Fish provide subsistence, commercial livelihood, and recreation. Stream-crossing structures on the state road system can block upstream fish migrations, denying access to miles of productive fish habitat.

Transportation projects can affect water quality both directly and indirectly. During construction, care must be taken to avoid exposing soils vulnerable to erosion. The department develops erosion and sediment control plans (ESCP) for every construction project in accordance with the American Association of State Highway and Transportation Officials (AASHTO) guidelines. These policies and procedures meet requirements of the federal coastal zone program. ESCP development involves identification of erosion and sedimentation sensitive areas affected by the project, measures to avoid these areas or minimize encroachments, and temporary control measures for erosion and sediment control based upon best management practices for the local conditions and needs. Normally, early revegetation of the disturbed ground cover is a key component of erosion control.

State watershed development and water quality protection regulations are administered by the Department of Environmental Conservation, and serve to minimize the harmful effects of discharges through a "point source" permitting system, water quality standards, and a coordinated state/local government approach to controlling water pollution. These efforts compliment federal regulations and measures that are administered through the Environmental Protection Agency.

The department cooperates with local governments to minimize watershed pollution from storm water runoff through storm water pollution prevention plans. Storm water runoff in developed and urban areas degrades water quality and alters the normal flow regime in fish streams, reducing the amount and quality of fish habitat. Conventional storm water treatment systems are ineffective. Innovative systems that incorporate large retention ponds and artificial wetlands restore water quality and buffer large fluctuations in flow.

Maintenance and operations must take into account a number of impacts, and take measures to minimize them. Snow and ice control on roadways involves spreading large quantities of aggregate (sand and pea gravel), which is often treated with small quantities of salt to prevent clumping from freezing. This aggregate material is gradually worn down to smaller particles and much of it enters storm drains and roadside ditches. In coastal communities, dumping of cleared snow into harbors adds sediment and, if present, toxins to the marine ecosystem. Tidal action can also spread these toxins to estuarine areas, wetlands, and other biologically important zones. Roads with large traffic volumes generate oil, grease and fuel drips as well as metal and exhaust particles left by passing vehicles. Some of this material is transported into adjacent waterways by storm runoff.

Snow and ice control at airports, including the deicing of aircraft, can add urea and glycol to the stream of pollutants entering waterways. The refueling of aircraft is another potential threat for pollution, as is the presence of unprotected fuel storage tanks. Harbors pose yet another source of water pollutants, including paints used to treat hulls for marine growth, oil, grease and petroleum fuels, and cleaning compounds. Toxic materials spilled during Alaska Railroad car derailments can also cause pollution and environmental hazards.

Photo by Ernst Scheider, Department of Community and Economic Development

Turnagain Arm coast

The project evaluation criteria used in the department's capital improvement programs for Rural and Urban Streets and Roads, Remote Roads and Trails, and for Harbors award a higher priority to projects that have undergone a NEPA-required environmental documentation process, or that are determined to have no significant negative environmental impacts. Environmental reviews that are factored into this criterion include the evaluation of impacts on water quality.

Coastal Zone Management. Alaska's coastal zone encompasses over 33,900 miles of coastline and includes approximately 80 percent of the state's total population. Alaska's Coastal Management Program is coordinated at the state level by the Division of Governmental Coordination in the Office of the Governor. The coastal zone is divided into locally administered coastal resource districts. Each district develops locally specific program standards in the form of a local coastal resource district management plan, which is incorporated into the state program and used for construction and other project reviews. The Coastal Policy Council, which provides program oversight statewide, brings together representatives from several state agencies (including the department) and local governments. The Coastal Management Program requires a consistency review for any project proposal that would affect natu-

ral resources in Alaska's coastal zone. The review itself serves to streamline identification of all necessary permit and notification requirements.

In the process of determining that a transportation project is consistent with coastal zone policies, specific conditions are often stipulated within a specific permit or authorization. Most of the provisions applicable to transportation projects and maintenance operations are incorporated into the department's design and maintenance standards. Projects proposed for construction in the coastal zone closely follow the consistency review process in addition to other required regulations.

The department often uses corridor planning to address water quality and coastal zone concerns on a local, regional, or statewide basis and to avoid or minimize impacts on these resources in the future.

Departmental Policies on the Environment. In 1997, as part of the *Vision: 2020* Update process, the department solicited policy recommendations from a Commissioner-appointed Policy Advisory Committee. Several members expressed strongly held values in caring for Alaska's environment. The department's mission statement specifically requires environmentally sound development, operation, and maintenance of Alaska's transportation system. The goals and objectives section of the department's multi-modal area transportation plans addresses socio-economic and environmental considerations. These in turn are factored into the development of regional transportation projects.

> *"United States energy use in transportation continues to increase."*

PROMOTING ENERGY EFFICIENCY AND CONSERVATION

One of the stated goals in TEA-21 is to develop a national intermodal transportation system that will move people and goods in an energy-efficient manner, reducing energy consumption and air pollution. Underlying this goal is the national interest in reducing dependence on oil imports and developing renewable energy sources, coupled with growing concern over the external costs of current modes of transportation projected into the future. These costs include increased environmental pollution, traffic congestion, greenhouse effects, loss of alternate land use, and depletion of non-renewable energy reserves. Of long-term concern are patterns of low-density land-use development, known as sprawl, which relies upon and encourages higher levels of transportation energy. Also of concern is the dwindling supply of world oil reserves. From 1985 to 1995, new oil discoveries worldwide averaged less than nine billion barrels per year, while consumption averaged more than 26 barrels per year. Current estimates indicate that world oil production will begin declining in 2011, and economically recoverable reserves will be depleted by 2036, assuming no increase in oil consumption from current levels.

National Direction and Trends. In the National Energy Policy Plan of 1995, the U.S. Department of Energy outlines a Sustainable Energy Strategy. The plan identifies increasing transportation efficiency and fuel flexibility as cornerstones of U.S. transportation sector energy policy, critical to improving U.S. energy security and environmental quality, while reducing economic risks imposed by the transportation sector's heavy dependence on oil. It introduces alternatives and discusses policies

- to improve transportation efficiency,
- to promote near-term efficiency improvements,
- to develop markets for alternative fuels,
- to reduce the demand for travel, and
- to develop technologies for a new generation of vehicles.

United States energy use in transportation continues to increase, primarily due to increased vehicle-miles traveled (VMT) each year. The most obvious manifestations of this trend are increased urban congestion and more severe air pollution, even in the face of tremendous improvements in utility company practices brought about by the Clean Air Act and its amendments. Consumer demand for more energy-efficient vehicles waned

during the period of the mid-1980's to the late 1990's, in large part due to lower relative gasoline prices. However, the rise in gasoline prices during the years 2001-2002 created more interest. Even though prices have since moderated, car manufacturers are once again experimenting with extremely fuel efficient gasoline, compressed natural gas, ethanol, and electric-powered vehicles to appeal to long-distance commuters.

Alaska implements federal policy and state statutes aimed at conserving energy use in public buildings. However, the state of Alaska has not established a clear policy to define the direction it is headed regarding energy use in transportation.

Many oil industry analysts now believe the industry may be teetering at the brink of a major shortage. Over the past twenty years, oil production in many top-producing oil fields has been declining, both in OPEC and non-OPEC countries. Once an oil field has reached peak production, steep declines are common. New technology has only enabled many giant oil fields on their last legs to continue to produce, although at far higher costs than when the fields were in top-producing years. Technology has also helped to discover many smaller, new fields that tend to peak fast and decline even faster. Although high gasoline prices in 2000 and 2001 shocked consumers, what seems to be a high price may actually be low, when one compares world oil supply with demand. Some analysts have reported that current warning signals show a situation more precarious than what immediately preceded the 1973 energy crisis.

Source unknown

Volvo refueling with CNG

Alternative Fuels. The Energy Policy Act of 1992 (EPACT) requires federal, state, fuel provider, and electric utility vehicle fleet purchases within metropolitan statistical areas (population 250,000 or greater by 1980 census) to consist of minimum mandatory percentages of alternative-fueled vehicles. Because Anchorage had less than a 250,000 population in the 1980 census, it has not been bound to this requirement. However, Anchorage has voluntarily participated in an alternative fuel program. Municipalities can voluntarily participate in the Clean Cities Program, a federal program administered by the U.S. Department of Energy, which encourages and assists communities to develop viable alternative fuel markets through partnerships.

In the year 2000, President Clinton signed Executive order 13149, Greening the Government though Federal Fleet and Transportation Efficiency. This order was designed to increase the use of alternative fuel by federal agencies as well as to increase the use of fuel-efficient vehicles in the federal fleet. During the model year 2000, Alternate Fuel Vehicles (AFVs) are to constitute 75 percent of covered federal fleet vehicle purchases. The new order directs federal agency fleets to use alternative fuel to meet a majority of their fleet's fuel needs, while simultaneously requiring the reduction of petroleum consumption by at least 20 percent by the end of 2005. Agencies can meet this goal by using a variety of petroleum saving strategies. Agencies are also directed to use environmentally friendly products, including re-refined motor oil, bio-based engine lubricants and retread tires.

A federal income tax deduction is in place for the purchase of alternative fueled vehicle or conversions of conventional gasoline powered automobiles. In Anchorage, the price and availability of natural gas makes compressed natural gas (CNG) a competitive fuel alternative. Additionally, Alaska Statute (AS) 44.42.020 requires the department in its management of state vehicles to annually evaluate the cost, efficiency, and commercial availability of natural gas for automotive purposes and to convert or purchase vehicles that utilize natural gas, whenever practicable.

With these things in mind, in 1996 federal, state and municipal vehicle fleet managers in Anchorage purchased compressed natural gas (CNG) vehicle conversion kits using

federal highway funds available for Congestion Mitigation and Air Quality (CMAQ). The department's State Equipment Fleet office partnered with the Municipality of Anchorage to secure federal funds for the project. Between the state and municipal fleets, CNG conversion kits were installed in 78 vehicles. These kits allow drivers to operate in gasoline or natural gas mode. Because many drivers of these dual-option vehicles (gas and CNG) often opted to fill with more convenient gasoline anyway, AMATS recently adopted the policy to limit purchases to original manufactured, dedicated CNG-fueled vehicles for distribution within Municipal and State fleets, rather than converting existing vehicles. The municipality purchased fifteen CNG-fueled only vehicles in 2001, one of which went to the department's state equipment fleet. The municipality has decided to continue its CNG program using vehicles originally manufactured for CNG. These vehicles perform better than converted or bi-fuel vehicles, and have lower emissions. The cost of CNG is low (about half that of conventional fuel on a per mile basis), and CNG vehicles are now close in price to conventional vehicles. For a time Trillium USA operated a CNG fast-fill fueling station in Anchorage, but it closed down due to lack of a market. There are a few slow fill "Fuel Maker" stations within Anchorage, which operate gas compressors and take 4-6 hours to fill up a tank. Typically, fleet vehicles are fueled as they are parked overnight. The Municipality also operates two cascade fill stations that can fill several vehicles within a few minutes. A growing number of automobile companies are producing CNG vehicles, including Honda, Ford, Mazda, Dodge, Volvo, and Toyota. For all these reasons, the market for CNG vehicles in Anchorage is expected to improve.

Federal agencies, notably U.S. Department of Energy and the Environmental Protection Agency, offer programs and incentives for local communities, utility companies, and private businesses to improve their energy efficiency in transportation, including the Clean Cities Program (promoting development of alternative fuel markets) and Climate Challenge (promoting electric utility company reductions in greenhouse gas emissions).

Reducing Demand for Motor Vehicle Travel. The national transportation energy challenge (and that of Alaska) is to find ways to preserve convenience and mobility in transportation while reducing the "hidden" costs. Reversing the increasing consumption of gasoline in transportation is not simply a case of designing more energy-efficient systems; it also requires a leveling off or reduction in vehicle miles traveled. This means providing alternative modes of travel to the automobile, as well as a favorable climate for more environmentally-friendly energy markets to develop and flourish.

For the last several decades, land-use development in urban communities has been characterized by suburban sprawl, causing greater dependence upon the personal automobile. Because transit is not as cost effective in low-density suburban areas as it is in higher density metropolitan areas, it is not as widely available. This land development pattern is unlikely to change without local community intervention or a state growth-management directive to restrict outward expansion and encourage greater concentration of population near the heart of the community. Local governments can assist in this process through review and revision of their zoning and tax laws.

The department actively supports and encourages community efforts to develop public transportation systems and coordinated transit programs as a means of reducing motor vehicle travel. The department is committed to incorporating adequate bicycle and pedestrian accommodations in roadway construction or reconstruction projects, as will be discussed in more detail later in this analysis. Over time this will improve mobility within Alaska's urban communities and will make biking and walking to many destinations possible, thereby reducing demand for automobile travel. Accommodating various modes of travel during roadway design improves overall traffic flow and reduces accidents. An efficient transportation network includes on-street provisions for bicyclists and pedestrians, which may include bike lanes, wide curb lanes, bicycle-sensitive traffic signal detection loops, sidewalks, separated pathways (where appropriate), convenient cross-walks and over- or underpasses, and plentiful bicycle parking.

"The department is committed to incorporating adequate bicycle and pedestrian accommodations in roadway construction."

AMATS carpool and vanpool incentives further this end, although there is more work to accomplish. State and local government agencies could make minor facility improvements to encourage their workforces to commute on foot or by bicycle, such as installing showers, lockers, and bicycle racks. Transit can be encouraged by allowing shifts that fit the transit system schedule, or possibly by acquiring group rate bus tokens. Agencies could also offer tax incentives for private businesses that take similar measures.

Zoning laws affect single occupant vehicle (SOV) use, such as those that require new businesses to provide free parking to employees and customers. Employer paid parking is one of the most significant incentives for SOV commuting. From a real estate perspective, parking lots are expensive. In some cases it may be worthwhile for business owners to sell off some parking lot areas and offer employees additional pay or free bus passes (or both) in lieu of free parking. Of course, local zoning laws would have to allow for this, and the local transit system would need to provide adequate capacity to accommodate the increased demand. The Planning Factor 6 analysis also discusses ways to manage the transportation system more efficiently, in part to reduce traffic congestion.

> *"Adding highway lanes actually induces more car travel."*

Not Adding Capacity. One of the ironies in traffic management is that when highway capacity is increased, so is average vehicle miles traveled. This is due to "induced travel": where people take trips because of the roadway improvements, whereas they wouldn't have used the route to the same extent before. While there may be a reduction in congestion where the capacity is added, the increased traffic may raise the level of congestion system-wide. It is partly because of this situation that ISTEA and the Clean Air Act Amendments prohibited non-attainment areas from increasing the capacity of a roadway without first demonstrating that the increase is consistent with an approved Congestion Management Plan.

Incentives and Disincentives. The Alaska Constitution Article IX Section 7 prohibits dedicated use of state taxes for special purposes except as necessary to participate in federal programs. Alaska's low state motor fuel tax rate is a discouragement to developing alternative energy markets. The state motor fuel tax for Alaska is eight cents per gallon. The national average is 18.3 cents per gallon. Taxing options, of course, carry a political risk, and need to be well-considered and accompanied by an extensive public information campaign. The following are examples of incentive options that could help redirect Alaskans' energy use in transportation along more efficient lines:

A substantial increase in the motor fuel tax would likely help encourage Alaskans to be more conservative in their fuel consumption and to seek out alternatives to single-occupancy privately owned vehicles to meet their transportation needs. However, the tax increase would have a carryover effect, increasing consumer prices for many goods and services that depend upon motor vehicles for distribution and delivery. Off-road households would not be appreciably affected because their motor fuel consumption is relatively low. Fuel used off-road (such as for snowmobiles, all-terrain vehicles and ice road travel) is either taxed at a lower rate, or a six cents per gallon tax refund can be obtained from the Department of Revenue upon written affidavit (AS 43.40.30 and AS 43.40.050). In order to effect a decrease in SOV use, this increase would most likely need to be accompanied by improvement in transit service capacity and convenience, keeping in mind that people in lower income brackets would be most affected.

The State Legislature repealed the motor fuel tax exemption for oxygenated fuels (ten percent or more alcohol by volume) in July 1997, replacing it with a two cents per gallon tax during mandatory use periods (November through February) in Anchorage. The original exemption was of questionable benefit. This was largely because of the risk factors (increased flammability and toxicity), the higher cost and limited energy benefit associated with oxygenated fuel use, the availability of better alternative fuel choices (such as CNG or LNG), and the fact that use of the exempted fuels produced no revenue to meet already seriously underfunded maintenance needs. Although use of gasohol produces fewer harmful emissions than gasoline, particularly in colder temperatures, a

discount during a mandatory use period has no incentive value. For a more effective incentive, the lower tax rate should be applied in the winter months for air quality non-attainment areas, but only in those areas not governed by mandatory use requirements.

Natural gas used as motor fuel is currently not taxed. Continued exemption in the near term would help encourage purchases of vehicles fueled by natural gas and facilitate development of a natural gas fueling infrastructure. State and municipal participation in a CNG vehicle program in Anchorage will contribute to development of alternative fuel markets in Alaska. Implementing highway vehicle weight fees for certain routes could help discourage use of heavy delivery trucks for freight, while encouraging more energy-efficient modes if they are available. For example, although rail freight between Anchorage and Fairbanks provides a more energy-efficient freight delivery method than does trucking along the Glenn/Parks Highway, a combination of other factors such as speed of delivery, schedule, rail freight charges, and additional transfer costs make trucking a more economical alternative for many shippers. Weight fees may help tip the balance in favor of rail for some of them, although they could also exact a toll on the cost of living. In 1997 the weighing and permitting function moved to the department from the (then) Department of Commerce and Economic Development. The move creates more synergy between fee determination, which was historically a department function, and collection.

Technological Improvement and Innovation in Alaska. For much of the year, interior, northern and western Alaska lakes and rivers are frozen, preventing transport by river boat and barge, while at the same time turning the rivers into "ice roads" that are used for transportation by snowmobile, sled, and even some autos and light trucks, and allow people to adapt transportation modes to the changing season.

Department of Transportation and Public Facilities

Landing at Hooper Bay

Tapping into technologies from Scandinavia, Russia, Canada, and other arctic areas, Alaska transportation planning and economic development has already benefited from improvements in highway bridge design and pavement design. Rechargeable salt-battery technology, under development by the National Aeronautics and Space Agency (NASA), is aimed at producing high short-term heat discharge and has potential for addressing the cold-start problem in a less wasteful and more environmentally-friendly manner.

Advanced airport navigation aids and approach systems using Global Positioning System (GPS) technology improve energy efficiency in winter air travel by reducing delays and by diverting landings and rescheduling flights due to inclement weather. Alaska Airlines has equipped its entire Boeing 737 fleet with this technology. The majority of smaller air carriers in rural Alaska have benefited from outfitting their aircraft with off-the-shelf GPS receivers.

In 1996 the Alaska Marine Highway System (AMHS) tested models of the M/V Taku fitted with bulbous bow and sponsons for reducing drag and adding stability. The modifications, which result in significant fuel savings, could be applied to two of the fleet's large ferries. A similar design was used for the newest ferry, the M/V Kennicott, which began service in 1998.

The department's Technology Transfer (T2) Center maintains ongoing partnerships with the University of Alaska Fairbanks, Federal Highway Administration, Bureau of Indian Affairs, various professional engineering associations, and T2 centers from other states. The goal of T2 is to promote transportation research and sharing of information. Continued partnerships in arctic transportation research offer possibilities for technological discoveries that could provide incremental improvements in cold climate energy-efficiency.

IMPROVING THE QUALITY OF LIFE

The department has several initiatives that have contributed positively to Alaska's quality of life. ISTEA and TEA-21 have delivered unprecedented means to enhance the environmental, scenic, and historic characteristics of the transportation system and improve the quality of life. By assisting and participating in community planning efforts relating to transportation, the department is better able to link transportation and land use solutions.

Environmental Justice. Under Executive Order 12896, signed February 11, 1994, each federal agency is directed to institute an environmental justice strategy. The strategy should identify and avoid disproportionately high and adverse human health and environmental effects, including the interrelated social and economic effects of their programs, policies, and activities on minority and low-income populations in the United States. In terms of transportation, the strategy should identify and avoid adverse transportation impacts on these populations. This is a flexible policy that may change periodically in response to new insights. Under Title VI of the 1964 Civil Rights Act, each federal agency is required to ensure that no person is excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, national origin, age, sex, disability, or religion.

Department of Transportation and Public Facilities

Reindeer at the Kougarok River on the Seward Peninsula.

TRAAK. Another mechanism to improve quality of life is through the Governor's Trails and Recreational Access for Alaska (TRAAK) program initiated in 1995. The department, in association with several other state agencies, is aggressively involving local governments and citizens in developing ways to improve outdoor recreation and tourism opportunities in Alaska. In keeping with this goal, the department has instituted a policy to better integrate bicycle and pedestrian improvements into roadway planning and design. The State is fully employing TEA-21's Transportation Enhancements program. The National Recreational Trails grant program and the National Scenic Byways grant program are two of the other TEA-21 federal programs underway in Alaska. In brief, the goals of the TRAAK program are:

- to build trails that safely link neighborhoods, parks, and commercial areas together,
- to improve access to recreation for Alaskans,
- to build and maintain Alaska's role as a world-class visitor destination, and
- to serve as a model for interagency coordination and public involvement.

Bicycle and Pedestrian Program. Bicyclists and pedestrians need access to and from neighborhoods, work centers, retail and commercial shops, schools, parks, and recreation areas. Particularly in cases where children and other inexperienced riders can be expected, separated multi-use pathways may provide more direct and convenient access than do existing roads. Alaska's limited and underdeveloped road system creates many opportunities for opening new bicycle/pedestrian transportation links without necessarily building a road to handle motorized traffic. Weather and climate may however create some limitations.

State policy for accommodating bicyclists and pedestrians in the state's transportation system is outlined in a June, 1995 memo from Governor Knowles, which makes several points:

1. Every road in Alaska, with few exceptions, is a potential pedestrian walkway and bicycle way.
2. Accommodations for both bicyclists and pedestrians shall be included in the design for all projects where reasonably possible.

3. Accommodations for both bicyclists and pedestrians shall be constructed where economically feasible.
4. By fully considering bicycles and pedestrians in roadway designs, we serve not only them, but motorists as well.

In 1995 the department also released the Alaska Bicycle and Pedestrian Plan, to promote the increased use and safety of bicycling and walking as year-round transportation choices by giving them full consideration in the planning, design, construction, and maintenance of transportation facilities. The plan outlines state and federal regulations, describes Alaska's facilities and conditions for bicycling and walking, and sets out goals and objectives aimed at meeting the needs of non-motorized transportation in the state. The plan was adopted as an integral part of the 1995 edition of *Vision: 2020,* Alaska's interim long-range Statewide Transportation Plan.

A winter transportation study for alternative transportation along Alaska's roadways completed in the winter of 2001-2002. Many Alaskans use the highway right-of-way to transport themselves by snowmachine, four-wheeler or on foot to work, school, recreational, or commerce locations. This study considered the various modes of travel that use the highway right-of-way and suggested options for encouraging or discouraging alternative transportation modes along Alaska's roadways. To accomplish this, the study researched applicable statutes and regulations that affect the ability of various users—snowmachiners in particular—to make use of the highway right-of-way, and produced a brochure to inform snowmobilers about safety laws, regulations, and trail etiquette issues.

Department of Transportation and Public Facilities

Bicyclists on Juneau's Glacier Highway

Transportation Enhancements. A project is eligible for federal transportation enhancement (TE) funding if it is directly related to transportation and has one or more of the following purposes:

- Provision of pedestrian and bicycle facilities
- Acquisition of scenic easements and sites
- Scenic or historic highway programs
- Provision of tourism and welcome centers
- Landscaping and scenic beautification
- Historic preservation
- Rehabilitation and operation of historic transportation facilities and buildings; and establishment of transportation museums
- Preservation of abandoned railway corridors
- Control and removal of outdoor advertising
- Archaeological planning and research
- Mitigation of highway runoff
- Provision of wildlife undercrossings for highways

In Alaska, TE projects to date have included rural and urban trails that connect neighborhoods to schools, rest areas along the highways, and ADA-accessible boardwalks. In rural villages, projects include boardwalks, boat launches, and winter trail markers.

National Recreational Trails Program. The Recreational Trails program is administered by the Department of Natural Resources. Until it was incorporated into ISTEA and later TEA-21, this was known as the Symms Grant program. Grants are awarded competitively on an annual basis for four different project categories:

- Motorized trail projects
- Non-motorized trail projects
- Diversified (motorized and non-motorized) trail projects
- Environmental Protection or Safety Education projects or programs

Snowmobile Trail Grant Program. The Department of Natural Resources also administers the Snowmobile Trails Grant program. In May, 2000, the Alaska Legislature approved funding for grants to develop and maintain snowmobile trails and trailheads, and for safety and education programs. Grants are available for easement acquisition, equipment rental or purchase, and construction or maintenance of trails and trail-related facilities. Matching funds are required for trail development grants. No match is required for safety and education grants.

Scenic Byways Program. The State Scenic Byways Program was established by departmental policy (DPOL 01.03.020) in 1993. The program gives the department authority to designate as scenic those segments of Alaska's highway system that have outstanding scenic, historic, recreational, cultural, natural, or archaeological qualities. It gives the department authority to develop standards for signs and informational displays along the designated Scenic Byway routes.

Department of Transportation and Public Facilities

Seward Highway

The National Scenic Byways program brings with it the opportunity for additional planning and project funding from National Scenic Byways Program grants. As one of the twelve eligible categories, projects within scenic designated areas can also receive TE funds. A Scenic Corridor Partnership Plan is complete for the Seward Highway, which holds the highest national designation of All-American Road. The plan partners are now working collaboratively to implement the recommendations in the plan, such as common design themes and joint promotion programs. In 1998 and 1999 the department received National Scenic Byway grants for scenic corridor plans for the Dalton and Richardson Highways, and in 2001 it received similar grants for the Glenn, Taylor and Alaska Marine Highway System. Meetings have been underway, although community concerns along some of the routes have slowed or curbed the planning process.

TRAAK Corridor Assessments. In December, 1998, the department published the TRAAK Corridor Assessments; Part I: the National Highway System. This document is an inventory of existing rest areas, waysides, trailheads, and attractions along Alaska's major highways. The inventory includes sites or attractions that are already developed along the highway. It also includes some of the potential sites where there are attractions but no formal/legal access to the specific attraction. The purposes of the inventory are to identify where those facilities or prospective facilities are, identify who owns and manages them, and provide a general assessment of their condition or their need for improvement. Most of the potential projects listed in the assessments could be candidates for federal transportation funding under TEA-21. There are other potential funding sources as well, such as federal sports fishing access funds.

Community and Citizen Involvement. The TRAAK Citizens Advisory Board and Alaska Land Managers Forum provide the department additional opportunity to become more involved with Alaska communities. The TRAAK Board has fifteen members appointed by the Governor, and also includes representatives and staff from the department and the Department of Natural Resources. Board meetings provide good opportunities to involve the public with various state and federal agencies responsible for outdoor recreation in Alaska. The TRAAK Board functions as a mechanism to review diverse public concerns, recommendations, and comments relating to recreation and transportation, and to convey them to the appropriate state agencies or the administration.

The Alaska Land Managers Forum. The department is a participating member of the Alaska Land Managers Forum (ALMF). Formally consisting of state and federal land management agencies and Native land owners, the ALMF has enjoyed active participation by the Alaska Visitors Association and community organizations. Since its inception

in 1996, the focus of the ALMF has been on economic development through tourism. The ALMF has provided the department with another way to address important land use and transportation issues. ALMF meetings and workshops have provided an additional way for people, particularly rural residents, to get involved in land management issues. The focus of ALMF discussions has tended to be on improving safety for pedestrians, bicycles, snowmachines, wheelchairs, and cars, and improving the overall quality of life. It has also focused on planning for a transportation infrastructure that will handle the growing tourism industry. Under the new federal administration, it is not clear if the ALMF will continue to operate.

The Copper River/Wrangells Tourism Work Group, originally a subcommittee of the ALMF, developed a series of reports that outline community tools for managing the growing tourist traffic and visitor industry in and around Wrangell St. Elias National Park and Preserve (WSENP). The focus of the Chitina Valley Roundtables project is the department's proposed improvement of McCarthy Road. McCarthy Road provides access to the town of McCarthy and the historic Kennicott Mine area within the WSENP. The Work Group is comprised of residents of communities potentially impacted by area growth and involved agencies. This group is working to develop an understanding of how road improvements may impact the area, and how to match road improvements with desired community outcomes.

In conjunction with the Copper River/Wrangells Tourism Work Group and the ALMF, the department has hired consultants to help identify potential growth management strategies that the communities of Chitina, McCarthy, and residents of the McCarthy road corridor can implement to better control the growth of their communities.

RECOMMENDATIONS

The department should:

I. Protect the Environment

- Examine the effectiveness of department's NEPA process. Consider broadening the scope of cumulative and secondary impact reviews.
- Participate in the promulgation by FHWA and other relevant USDOT agencies of new environmental streamlining regulations.
- Continue to incorporate historical and cultural review elements into project development in order to preserve and visibly enhance Alaska's unique heritage along transportation corridors.
- In partnership with the Department of Environmental Conservation, advocate, assist and encourage communities to develop long-term growth management strategies through workshops, cooperative planning, and incentives. This will encourage community governments to consider ways, including zoning, to avoid concentrating residential and commercial development along the major highways.
- Employ long-term growth management strategies to the planning of highways, airports and harbor facilities.
- Explore and promote the use of clean-fueled vehicles (for example, those fueled by natural gas).
- Emphasize funding to allow the appropriate state and federal agencies to participate in National Highway System-related natural habitat and wetland mitigation efforts.
- Consider allocating funding to allow state and federal resource agencies to fully participate in the Environmental Streamlining process.

RECOMMENDATIONS cont.

II. Promote Energy Efficiency and Conservation

- Continue implementing bicycle/pedestrian accommodation in roadway designs, creating more energy-efficient modal alternatives and reducing demand for motor vehicle travel.
- Emphasize energy efficiency in the selection of preferred modal choices for area transportation plans.
- Participate in the Alternative Fuel Transportation Program (10 CFR 490), establishing patterns for alternative fuel purchases that would contribute to development of alternative fuel markets in Alaska and smooth the transition to eventual mandatory compliance when required. Such participation could also facilitate Alaska's eligibility for special grants and assistance offered through USDOE by providing a single point of contact in the department for coordinating these grants statewide.
- Consider increasing motor fuel taxes and advocating for a state-funded capital program. This could help to discourage unnecessary motor vehicle use and encourage the purchase of more efficient and/or alternative fuel vehicles and the use of public transportation.
- Work diligently to develop informed consent on transportation issues of regional or statewide significance, and work to bring about changes in legislation where needed to address system inefficiencies, appropriate ownership of facilities, and imbalances in system revenues and expenditures.
- Evaluate transportation improvements fairly and objectively based upon a needs-assessment, and as justified by social, economic or environmental circumstances.
- Develop a state transportation energy policy to help focus public awareness on the high costs of transportation energy consumption. Determine cohesive strategies to address national and state energy concerns. Form partnerships with community organizations, local governments, utility companies, fuel providers, and other state government agencies to form cooperative energy policies.
- Support the establishment of a state energy programs coordinator position to manage the policy, secure available funds, and coordinate public education and outreach.
- Institute minor facility improvements to encourage workers to commute on foot or by bicycle, and encourage other state and local government agencies to do the same. Such improvements might include installing showers, lockers, and bicycle racks. Encourage transit by allowing flexible work shifts that fit the transit system schedule, or possibly acquire group rate bus tokens.
- Provide tax incentives to use oxygenated fuel/gasohol in areas where its use is not mandated by lowering the gas tax.
- Implement highway vehicle weight fees for certain routes to help discourage the use of heavy delivery trucks, while encouraging more energy-efficient transportation modes, if available.

III. Enhance the Quality of Life

- Consider how communities want their transportation facilities to look and function, as related to their land use goals.
- Ensure that Alaskans benefit equally from all federal assistance programs or activities in which the department is involved, and that no person is ex-

RECOMMENDATIONS cont.

cluded from participation in federally-funded programs or activities on the basis of race, sex, color, or national origin.

- Continue to foster community and agency partnerships though efforts such as the TRAAK Board and the Alaska Land Managers Forum, and more informal interagency cooperation.
- Through the implementation of the 1995 Bicycle and Pedestrian Plan, develop a procedure for measuring the number of users of the non-motorized transportation system, and measuring and monitoring its safety.
- Periodically review the progress and implementation of the Bicycle and Pedestrian Plan, particularly with respect to system maintenance and operation.
- Support programs such as TRAAK, the Recreational Trails program, and Alaska Scenic Byways to provide more recreational infrastructure and promote outdoor recreation and tourism.
- Incorporate historical and cultural review elements into project development in order to preserve and visibly enhance Alaska's unique heritage along transportation corridors.

factor five

TEA-21 PLANNING FACTOR 5

Enhance the integration and connectivity of the transportation system, across and between modes throughout the state, for people and freight

The development of Alaska's existing major surface transportation routes and facilities derived from the need to provide links between centers of strategic and economic importance. Some of these routes were created during Alaska's territorial days to address national defense needs and are still important to the national and state interest. Today, attention is focused on linking these established, often independent transportation systems, and integrating them into a logical, cost effective network. TEA-21 Planning Factor 6 looks at ways to efficiently manage a transportation system comprised of both integrated and independent modes of travel. This analysis will consider the ways the links in the transportation system can be improved in order to maintain a healthy and diverse nature.

The high cost of constructing and maintaining transportation facilities in Alaska has been a disincentive to new construction, generally resulting in fewer transportation alternatives. Many locations are only accessible by a single mode. Users not connected to the road system must pay a high premium (in the form of airfare or a ferry ticket) to go to or from their location. Historically, selection of a specific location's initial transportation facility was made by a willing investor (a business entrepreneur, the Army or Navy, the federal administration, the territorial government, the state legislature, or the state administration) to serve a specific need. This investment was restricted by the availability of funds. Today, public funds almost exclusively pay for such improvements.

Alaska contains a high proportion of federally owned land, which, with the exception of military land, is generally accessible to the public for recreational use. The various blocks of federal land are managed by agencies including the National Park Service, U.S.D.A. Forest Service, U.S. Fish and Wildlife Service, U.S. Department of Defense, Bureau of Land Management, and Bureau of Indian Affairs. Much of this scenic land

remains accessible only by air and is thus restricted to those residents who have the monetary resources to access it, or who can take the time to walk or boat to remote areas. Because of the state's limited road infrastructure, transportation connections and low-cost mode alternatives are important to the access needs and desires of the general public.

ALASKA INTERMODAL TRANSPORTATION PLAN

The Alaska Intermodal Transportation Plan (AITP) was published in 1994 under a grant awarded by the FHWA to Alaska and five other states. The AITP provided the first fairly detailed description of Alaska's transportation system. In addition to describing the road, marine, rail, and air transportation networks, the plan analyzed the relationship between the individual modes of transportation. As a result of the AITP planning process, the department incorporated a project evaluation criteria process for STIP development, awarding points to projects that improved intermodal connectivity. The intermodal plan also illustrated the differing character and transportation needs of various regions of the state. This prompted the department to initiate the multimodal Area Transportation Plans.

> *"Area plans help determine where best to invest public resources to meet future transportation needs."*

AREA TRANSPORTATION PLANS

Through the area transportation plans initiative, the department examines selected areas of the state as distinct transportation system units. This allows the development of each system in a manner that provides the greatest long-run benefit to a specific area. Area plans are 20-year, multi-modal area analyses that address the transportation of people, vehicles and freight between communities within each region, and between the region and the outside world. The department develops area transportation plans in specific regions to address the most complex transportation investment questions. Area plans may recommend projects such as ferry links, airport improvements, new road links, or connections between modes. Each plan incorporates economic modeling to evaluate potential projects and prioritize them to best meet state and regional goals. Area plans help determine where best to invest public resources to efficiently and effectively meet the future transportation needs of the regions under study.

Through the area plan process, the need for greater integration of roadway systems and marine transportation was discovered. Marine facilities, rather than roads, are often the limiting factor in the economic growth potential of a region. More information on area plans can be found in Planning Factor 1 analysis.

AVIATION

Airports and Air Transport. It isn't surprising that in many communities, airports were the first significant transportation alternative to steamship or riverboat service. They also provide critical transportation links to communities not located on the coast or on navigable rivers. Upgrades to these airport facilities often came long after the initial installation of a dirt or Marston mat airstrip without lights or aids to navigation. Upkeep costs for airports tended to be relatively inexpensive when compared with other modes.

Through a combination of Federal Aviation Administration grants and state bonds, airports have been gradually improved over the years, but the improvements and regulatory requirements have added significantly to the costs of operation. Most community airports in Alaska do not handle sufficient volumes of passengers or freight to be economically self-supporting, and are substantially subsidized. Air and surface freight delivery across Alaska has evolved to complement other available modes of transport. By studying examples of delivery patterns, the department is provided with clues as to inefficiencies that could be addressed through better system planning.

Alaska has two international airports, located in Anchorage and Fairbanks. The Ted Stevens Anchorage International Airport is a hub, not only of the region and state, but also of the North Pacific Rim. Although numbers of passengers enplaning and deplaning in Anchorage has risen by over 30 percent since 1987, the advent of the 747-400 aircraft, which has the ability to fly from the Orient to Europe without refueling, has severely reduced passenger flights stopping to refuel in Anchorage. The Fairbanks International Airport does not support the same levels of use as Anchorage, although it has attracted a significant number of freight transport jets due to its proximity to Europe-Orient routes and the availability of locally refined jet fuel. Additionally, in 2001 Condor Airlines began offering Frankfurt-Whitehorse-Fairbanks flights for European travelers to Canada and Alaska.

Regional air hubs at Juneau, Bethel, Nome, Kotzebue, and Barrow provide another layer of aviation transportation infrastructure. When traveling to smaller villages, local commuter air services are often employed from these regional hubs. Passengers and freight often transfer from larger to smaller aircraft en route to the villages. This trend is reversed when traveling from a village to a larger city or outside the state.

Alaska is the home for 27 percent of the nation's general aviation airplanes, 40 percent of which reside in Anchorage. The majority of Anchorage's local tiedowns are at Merrill Field and the Ted Stevens Anchorage International Airport, which includes the float plane base at Lake Hood, the busiest in the nation.

Department of Transportation and Public Facilities

Fairbanks International Airport

Air Cargo. The movement of cargo has always been a key factor in the Alaskan economy. Before the relatively recent arrival of airplanes, marine propulsion and snowmobiles, Native Alaskans carried trade goods by boat, horse, dogsled, and on foot. Prospectors and other pioneers relied on steamships and barge lines for fuel, equipment, and staples. Since the early 1920's, mail and medicine have been delivered to rural settlements by air. The Alaska Highway was built during World War II to allow war material to be brought to Alaska by truck from Canada and the continental United States. Since 1979, the Trans-Alaska Pipeline has carried billions of barrels of crude oil from Prudhoe Bay to the ice-free port of Valdez.

Today, Alaska is the greatest net exporter of all the fifty states. More cargo passes through the Ted Stevens Anchorage International Airport than through any other domestic airport. Alaska's exports remain primarily raw materials such as crude oil, timber, seafood, and minerals, while most finished products and consumables must be imported. Development of oil and gas refining capability in recent years has added natural gas and petroleum products to Alaska's exports. For communities or areas with significant resources to export, separate freight arrangements are typically made that are designed to carry the resource directly to its processing destination from the remote extraction site. These are distinct from the arrangements made to bring basic commodities to community residents, usually due to significant freight-carrying requirement differences of the resource and the imported goods. The typical shipment of freight from the lower 48 to a rural remote community involves a 1,500 to 2,000 mile movement to Anchorage and an additional 250 to 750 mile trip to the village. To further reduce the efficiency of the system, most freight is shipped to villages and the volume of "back haul" is very low. The freight journey typically involves use of more modes than in most lower 48 states.

Bypass Mail. The U.S. Postal Service heavily subsidizes the delivery of freight and mail services to rural villages, providing the key to quality of life in rural Alaska. It contracts with freight and passenger aviation companies to deliver these essential sup-

plies. At a cost of approximately 70 million dollars per year, this federal subsidy is equal to approximately 7 percent of an average rural village annual income. For more information about Bypass Mail, see the System Description.

PORTS AND HARBORS

Marine and Riverine Transportation. In Alaska, the marine mode is extremely important in meeting the need for passenger travel and freight distribution between communities and other important destinations. The Alaska Marine Highway System (AMHS) was created during the early years of statehood to provide access to Alaska's many coastal communities. Major southeastern AMHS routes service Juneau, Ketchikan, Petersburg, Sitka, Skagway, Haines, and Wrangell, as well as seven additional feeder routes to Angoon, Hollis, Hoonah, Kake, Metlakatla, Pelican, and Tenakee Springs. Southwestern AMHS ports include Chenega Bay, Cordova, Homer, Kodiak, Port Lions, Seldovia, Seward, Tatitlek, Valdez, and Whittier. The Aleutian Islands/Alaska Peninsula routes service Akutan, Chignik, Cold Bay, False Pass, King Cove, Sand Point, and Unalaska/Dutch Harbor from June through September. During the same interval, the M/V Kennicott makes once-a-month trips from Juneau to Valdez and Seward, with "whistle stops" in Yakutat. This route connects the Inside Passage/Southeast and Southcentral routes. It also provides road access at Valdez, and to a highway and the Alaska Railroad at Seward.

The U.S. Army Corps of Engineers assists in ports and harbors development and is the primary source of federal funds for harbor improvements. Private entities can also play a major role in developing port facilities. The department owns 76 port or harbor facilities in 48 different locations, and has transferred eighteen facilities to local governments. The Port of Anchorage is a significant U.S. port, and infrastructure improvements targeted at intermodal connections and traffic flow are planned. Valdez, always a critical domestic port, has become a significant international port for export of crude oil since the oil export ban was lifted in 1996.

The Jones Act states that no merchandise transported by water between U.S. ports is to be carried "in any other vessel than a vessel built and documented under the laws of the United States and owned by persons who are citizens of the United States." The Jones Act also prevents foreign cruise ships from transporting passengers between U.S. ports and restricts access to U.S. rivers and canals. The Jones Act places severe restrictions on U.S. businesses and agriculture by requiring that merchandise transported entirely or in part by water between U.S. points—either directly or via foreign points—must travel in U.S.-built, U.S.-manned, and U.S.-citizen owned vessels. No other U.S. industries or their customers are bound by such restrictions. Removal of restrictions in the Jones Act and the related Passenger Vessel Act, which essentially prohibits a non-U.S. flagged, built and crewed ship from embarking passengers in one U.S. port and disembarking them in another U.S. port, could greatly alter international shipping patterns in the North Pacific.

Particularly in the Western portion of the state, summer riverine barge traffic is critical to transport bulk fuel and industrial commodities to communities situated along the major rivers. The barge activity in the summer months is significant because it provides communities with enough reserve supplies to last through the long winter season. Bethel, Southwestern Alaska's regional hub, receives all the aviation fuel for the surrounding area's year-round needs via summer barge deliveries from Dutch Harbor. Finding public funds to build adequate dock facilities is, however, difficult.

Each of the major rivers acts as the main access corridor for travel via boat between communities lining the river, but each is also an isolated modal system. The exception to this is the port of Nenana, which connects the Yukon-Tanana rivers with the Parks Highway and the Alaska Railroad. In the winter months, many frozen rivers are used as "ice roads" between communities when conditions permit; they form a natural corridor for snowmobiles, sleds and even some automobiles.

Port of Anchorage. As mentioned in more detail in the Planning Factor 1 Analysis, freight and passenger demand on the Port of Anchorage continues to grow, prompting Port managers to prepare a market-driven Port of Anchorage Master Plan through the year 2020. This plan will eventually be incorporated into the Anchorage Municipality Comprehensive Plan, and will provide a pragmatic, environmentally sound program to stimulate and accommodate economic development and employment opportunities, while providing an efficient transportation facility to serve Alaska. Market opportunities include growth in domestic and international container traffic, automobile and bulk cargo transport, and cruise ship traffic. Some of the improvements recommended in the master plan include enhancement and reconfiguration of port facilities, redevelopment of a petroleum dock into a multi-purpose dock, an increase of available water depth at the Port, and phased expansion of the bulk and container facilities to the north.

The Anchorage Metropolitan Area Transportation Study (AMATS) is preparing a Ship Creek Multimodal Plan to address the various transportation modes that converge at the port facilities. AMATS has programmed a Ship Creek trail project, the first phase of which will construct the trail from the Chugach Electric Association Dam to Post Road. More work will likely be needed to improve the intermodal links to the popular trails that traverse the port area and accommodate the anticipated increase in freight, vehicle, rail, and pedestrian movement through the port. For more information about intermodal connectivity and planned improvements at the Port of Anchorage, see the Planning Factor 1 Analysis.

Port of Anchorage

Anchorage Port Facilities

Port of Seward. The Port of Seward, terminus of the Alaska Railroad and the Seward Highway, has experienced significant fluctuations in freight volumes over the years. Most of the port's facilities were destroyed in the 1964 earthquake and its history after rebuilding in 1966 was primarily as a general cargo port, handling about 50,000 to 150,000 tons per year. Major movements through the port occurred from 1974 to 1977 and were related to pipeline construction and offshore oil exploration. From 1979 until 1984 the port's primary activity was the export of about 40,000 tons of logs and wood chips annually.

The port handles over 600,000 tons of cargo per year. In 1983 the port started exporting coal, brought from Healy to Seward by rail, to the Far East. Of the 600,000 tons of cargo handled by the port each year, the majority is coal delivered by the Alaska Railroad. The remainder consists of exported wood products, inbound pipe, outbound fish, and other general commodities.

IMPROVING FREIGHT AND PASSENGER MOBILITY

ISTEA and TEA-21 emphasized improvement of intermodal connections, those places where people or goods transfer from one mode of transport to another. Ports, train stations, and airports are prime examples of these intermodal terminals. Making the transfer between modes of transportation more efficient is just as important as improving those modes independently. In the 1995 National Highway System (NHS) Designation Act, Congress designated the most important intermodal terminals as NHS Intermodal Connectors. For example, the Nenana Port Access Road is a designated NHS intermodal connector linking the Parks Highway and the Nenana Barge Dock on the Tanana River.

Rail Links. Alaska's two operating railroads, the corporately-owned White Pass and Yukon Route Railway (WP-YRR) and the state-owned Alaska Railroad Corporation (ARRC), have played integral roles in Alaska's transportation history and will continue to do so in the future. Alaska's two railroads are unique in that neither is connected directly with

other railroads, therefore each must rely on connections with other transportation modes in order to operate successfully. This has resulted in a number of innovations. For example, in the years following World War II the White Pass & Yukon Route Railway helped pioneer containerized shipping in order to reduce handling expenses associated with carrying freight that must transfer across several modes between origin and destination. Although the WP-YRR no longer carries freight, its operations still rely on smooth intermodal connections. Many of its passenger excursion trains load and unload from the cruise ship docks lining Skagway's waterfront. A traveler need only walk a few steps from the gangway to a waiting parlor car for the trip over the historic White Pass.

Rail Passenger. Construction of a rail passenger terminal at the Ted Stevens Anchorage International Airport has begun. The initial work consists of a tunnel connecting the planned rail terminal adjacent to the existing parking garage to the air terminal, and is being done in conjunction with a department project to improve overland access to the airport. Later, the Alaska Railroad will extend an existing spur some 900 feet and construct the 17,000 square-foot rail terminal. Completion is expected by the summer of 2002. The facility will allow passengers to connect via planned rail service to cruise ships docking in Seward and Whittier, and to other locations along the railbelt.

Department of Transportation and Public Facilities

Alaska Railroad engine on the Kenai Peninsula

The Alaska Railroad and the Municipality of Anchorage are working together to design and construct a new intermodal facility next to the existing passenger terminal in Anchorage at Ship Creek. The railroad anticipates one million visitors and tourists will use ARRC facilities annually, and the new facility will be able to serve various types of passengers transferring from a variety of transportation modes (pedestrians, bicyclists, public transit users, and individual vehicles). Service improvements will include commuter rail to the Matanuska-Susitna Valley and Girdwood, as well as a link to the Ted Stevens Anchorage International Airport. The success of the Ship Creek intermodal facility will require links between the Alaska Railroad structure, Anchorage's People Mover bus system, and downtown pedestrian network. The facility is expected to be completed in the spring of 2002.

In anticipation of the development of commuter rail service resulting from the straightening of the track between the Matanuska-Susitna Valley and Anchorage, ARRC is planning new railroad depots in Wasilla and Palmer that can serve as "park and ride" locations. Other stations are also under consideration.

A new intermodal terminal in Fairbanks will address congestion problems at the current rail passenger terminal, and ease transfer between modes. The current terminal location results in passenger trains blocking a key roadway while loading and unloading passengers. The project will expand and relocate the passenger depot to a much larger site that will accommodate the full length of the train in addition to local vehicles, commuter buses, and tour buses. The new depot will serve as a central transfer point in the Metropolitan Area Commuter Service (MACS), the transit system for the Fairbanks North Star Borough. The facility is expected to be completed in the spring of 2002. Additionally, ARRC has instituted planning efforts to improve the transfer points in the Fairbanks rail yard and freight services in general.

Cruise ship activity in Seward has increased significantly in recent years. A multi-phase project will result in a new freight dock while the existing passenger dock will be expanded to simultaneously accommodate the state ferry and two cruise ships. Passengers will be able to walk off the gangway of their ship or ferry and board the train that will deliver them to the airport terminal.

A joint project of ARRC and the National Park Service (NPS) will replace the current Denali depot with one that better fits increased rail traffic, additional park transport requirements, and passenger service facilities. The new facility will minimize train delay time for passenger loading and unloading and enhance the waiting experience. Safety and control of foot traffic are important criteria for the design of the site. Site work will accommodate pick-up and drop-off areas for buses and cars, pedestrian access to the adjacent natural history museum, and adequate parking for buses and cars. NPS is redesigning the road to provide space for the full scope of this project. The actual construction schedule is to be coordinated with the road realignment work and the NPS construction schedule. Completion is expected in 2002.

Rail Freight. A significant portion of the freight bound for destinations along the railbelt, interior and southcentral Alaska comes via barge from the Pacific Northwest to Whittier. Alaska Hydro-Train, a division of Crowley-Maritime Corporation, and the Canadian National Aqua-Train Barge provide freight service to Alaska through Whittier, bringing in both railroad rolling stock and highway truck trailers. The Railroad and the department are examining ways to improve intermodal connections at this key port.

In 1999 the department constructed a single-lane road through the Whittier railroad tunnel; the tunnel opened to vehicle traffic in June 2000. ARRC's freight operations are continuing between Anchorage and Whittier but occur mostly in the late evening hours. The railroad's passenger service has been reduced to summer months from May to September. The passenger train leaves daily from Anchorage at 10:00 am and departs Whittier at 6:45 pm.

Department of Transportation and Public Facilities

Hauling freight on the Alaska Railroad

The Alaska Railroad is also studying how to improve its Anchorage yard, which constitutes a major transfer point between transportation modes. Although the yard is constrained by surrounding development and congestion, the study will develop a ten-year proposed program of projects to improve yard design, operational plans, and land use plans to better serve freight customers. For example, the department's Ocean Dock Road project should help to rehabilitate the prime access road to the Port of Anchorage with its realignment of rail spurs to improve traffic flows and reduce freight delays.

Coal mined in Healy is shipped by rail to Seward where it is stockpiled and loaded aboard freighters for export to Korea. This has the potential for expansion to other Asian markets. Development of other coal resources, in particular deposits in the Matanuska Valley, could increase volumes through the Seward port.

The Matanuska-Susitna Borough has been developing of a Cook Inlet port near Point McKenzie with a short rail spur connecting to the Alaska Railroad mainline near Wasilla. The first phase of the project, a dock at Point McKenzie, was constructed in 2000. During the 2001 summer, a construction company used the new dock to ship prefab houses to remote Alaska villages. Work is planned to improve the structural ability of the facility to withstand earthquakes. Once the intermodal connections are constructed, the facility will have the potential to divert coal currently bound for Seward and freight now landed at Anchorage. Future port projects include running natural gas to the port, paving the last fifteen miles of Point McKenzie Road, lessening the slope to the dock, constructing a ferry landing, terminal building and a deep-draft dock.

At Nenana, rail and highway freight is transferred to barges for distribution to communities along the Tanana and Yukon Rivers. Recently a Senate committee approved legislation to create a U.S.—Canada Commission to study a railroad connection between Canada and Alaska. The proposed railroad would run from Eielson Airforce Base near Fairbanks, Alaska (at the end of the Alaska Railroad track) to either Fort St. James or Fort Nelson, Canada. The federal transportation bill provides $2 million to study the railroad connection. Total construction costs are projected to be between $1.15 and $2.3 billion.

Bicycle and Pedestrian Facilities. As mentioned in the Planning Factor 4 analysis, the department's policy to include facilities for bicyclists and pedestrians in road improvement projects (see the TEA-21 Planning Factor 4 analysis) was put in place largely to enhance the connectivity between motorized and non-motorized transportation modes. Many of Alaska's roads were initially built to provide links for motorized traffic and did not provide facilities for non-motorized travelers. Neighborhood multi-use trails connect bicyclists and pedestrians to neighborhoods, work centers, retail and commercial shops, schools, parks and recreation areas. Bike lanes allow travelers to share the road. The Alaska Bicycle and Pedestrian Plan was adopted in 1995, and provides a statewide framework for improving the integration and connectivity of non-motorized transportation. The TRAAK Program provides a means of addressing some of the access considerations of this planning factor. Among its goals are to link parks, neighborhoods, and commercial areas through trails, multi-use paths and transportation enhancements, and to improve access to recreation. Such facilities help to connect community infrastructure and to encourage modal diversity.

"It is essential to coordinate transportation planning and land use issues."

Transportation and Land Use. It is essential that transportation planning and closely related land use issues be coordinated. Transportation planners, land use planners, and communities must work together to pair appropriate transportation facilities with desired land uses. Without this coordination, land use trends derive from transportation developments and communities lose their ability to direct development to appropriate places designed to preserve community identity. Strong community identities promote stronger economies.

OTHER PLANNING CONSIDERATIONS

Transportation needs and use will vary over time, based on changes in land use and designation, shifts in economic focus and population growth, defense requirements and other considerations. A systematic review of available data and federal requirements would help in decisions to add or remove routes from the NHS and Alaska Highway System. Currently such reviews are initiated by the department for particular studies (such as the socio-economic analysis conducted for *Vision: 2020* Update), but are not done at regular intervals. Instituting such a review process may prove valuable. Currently, the Department engages a Technical Review Committee (TRC) for Statewide Plan updates. This team is comprised of representatives from transportation-related federal and state agencies. The TRC reviews draft plan updates and provides relevant information and concerns to the department.

RECOMMENDATIONS

The department should:

- Coordinate transportation and land use to the maximum extent by involving local communities in transportation decisions.
- Institute systematic reviews of departmental socio-economic and other data, as well as new federal requirements, in order to make sound decisions on routes to be added to/removed from the National Highway System and Alaska Highway System.
- Continue to emphasize intermodal connectivity in planning, project evaluation criteria and during project design.
- Evaluate intermodal transition areas such as airports, marine terminals, train stations, boat harbors, trailhead parking areas, etc., to determine whether they are inadequate in terms of multi-modal connections and user capacity (particularly during the summer season when they receive heavier use). Make improvements as necessary.

RECOMMENDATIONS cont.

- Emphasize intermodal planning in all phases of transportation project design, project selection, and facility upgrades.
- Demonstrate the value of TRAAK for providing low-cost but effective solutions to real transportation problems.
- Be receptive to employing new approaches and new technologies to address transportation needs in remote Alaska.
- Continue to objectively program transportation improvements based upon needs-assessment, and as justified by social, economic or environmental factors.

factor six

TEA-21 PLANNING FACTOR 6

Promote efficient system management and operation

With its tremendous geographic diversity and size, Alaska requires a broad range of transportation modes. People may travel on foot, by boat, car, bicycle, snowmachine, airplane, all-terrain vehicle or dog team. En route to an Alaska village home, a head of lettuce is hand-carried, trucked, transported by rail, barge, airplane, delivery truck, and/or four-wheeler. There are obvious difficulties in promoting efficient management of such a complex transportation and delivery system. Realizing that efficient design facilitates effective management, the department attempts to optimize the operational conditions for each mode and to simplify transfers between modes.

Transportation planning helps determine the most effective ways to invest in the transportation infrastructure. The department is specifically charged with intermodal long-range planning for highways, bicycle and pedestrian facilities, rail, aviation, transit, harbors, and ferries, and is responsible for programming federal funding for these different transportation categories. This requires considerable study and planning.

The department is also responsible for the design and construction of the majority of the state's public transportation facilities, including public roads, transportation-related trails, ferries, harbors, and airports.

The department promotes efficient system management and operation in the following ways:

- Establishing sound management policies.
- Planning for effective transportation investment at the regional and statewide levels.
- Implementing strategies to reduce traffic congestion and make more efficient use of the existing transportation system.
- Monitoring system efficiency through data collection and system analysis.

PLANNING FOR EFFICIENCY

Statewide Transportation Plan. The Statewide Transportation Plan, *Vision: 2020,* is the long-range policy document for the development and operation of the transportation system. It takes into account the multi-modal nature of the system by including policy for all modes. During the *Vision: 2020* update process, the Policy Advisory Com-

mittee recommended the department adopt a policy to promote transportation system efficiency and effectiveness.

Area Transportation Plans. Area transportation plans are being developed for specific regions of the state to address transportation challenges. Area plans are twenty-year, multi-modal plans that address the transportation of people, vehicles, and freight between communities within each region, and between the region and the outside world. Area plans recommend system improvements such as new ferry routes, airports, new or improved road links and better connections between communities. They help determine where best to invest resources, focusing on efficiently and effectively meeting the future transportation needs of a specific region.

Using the goals and policies in the long-range plan, area plans recommend specific strategies and projects for the Statewide Transportation Improvement Program (STIP), the Aviation Improvement Program, and other departmental capital improvement programs. The Southeast Area Plan was adopted in March, 1999, and the department's Southeast Regional Office is currently developing strategies to implement the recommendations in the plan. The Prince William Sound Area Plan was completed in late 2000. The following three Area Plans are currently in progress: Southwest Alaska, the Yukon-Kuskokwim Delta, and Northwest Arctic area. The Interior Area plan, which will be initiated once the Northwest Arctic and Yukon-Kuskokwim area plans are completed, will cover that portion of the state not currently included in an existing area plan.

More information on area plans can be found in the Planning Factor 1 analysis.

Department of Transportation and Public Facilities

Severe erosion

TRAFFIC CONGESTION

Alaska's urban areas experience highway traffic congestion during peak driving hours. In more rural areas there is often considerable seasonal congestion during the summer tourism season. Large numbers of motor homes, tour buses and other recreational vehicles tend to congregate at or near centers of tourist activity, causing vehicle slowdowns and congestion, especially near pullouts and intersections. The Matanuska-Susitna Borough is the state's fastest growing area, and the Glenn Highway, as the single road between Anchorage and the Mat-Su Valley is perhaps the state's most congested highway during rush hours. Transit and other systems can also become congested. In the summer, tourists swell the transit ridership in Juneau, and regular riders occasionally are unable to ride because the buses are filled to capacity. Congestion is a symptom of system inefficiency.

Compounding this problem is the fact that many of Alaska's urban areas suffer from poor traffic circulation. Typical land development since the 1970's has followed the "strip" pattern, where businesses and residential developments have a single access to the main highway or arterial, resulting in poor traffic circulation and contributing to congestion. This growth pattern differs somewhat from the lower 48 states, where paved superhighways appeared after town development patterns were already firmly established. New multi-lane highways were then built as bypass or through routes, and two or more connector routes could be added to balance traffic flow. Many of Alaska's highways have become the foundation for commercial and residential development, leading to interruptions in traffic flow from vehicles attempting to enter and leave the roadway. Congestion along the Parks Highway at Wasilla and at Denali National Park and Preserve, and along the Sterling Highway at Soldotna, are examples of this phenomenon.

Transportation System Management. Transportation System Management (TSM) refers to methods to combat highway traffic congestion in urban areas. TSM strategies

are intended to improve operating efficiency of the existing transportation system by reducing vehicle use, improving traffic flow, and encouraging the use of transit. TSM strategies include "supply" management elements such as traffic engineering and signal improvements, and "demand" management elements like priority treatment for carpools and parking management. TSM can successfully reduce automobile emissions and energy consumption, and can foster the long term use of alternate transportation modes. TSM strategies should be evaluated as alternatives whenever major infrastructure improvements are proposed.

The Municipality of Anchorage operates a transit system and implements several traditional TSM strategies, such as ride-sharing. The Anchorage Congestion Management Plan provides AMATS and the department with several TSM strategies that are effective for Anchorage.

Although there is no formal statewide congestion management plan to identify problems that could be mitigated through TSM, there are a number of departmental programs and projects aimed at optimizing the efficiency of the present system for people and freight, including the following:

- The department has been working with the Department of Community and Economic Development to devise a program for placement of traveler information kiosks. This can be an efficient way to distribute information such as road condition reports and trip planning assistance.
- The department is participating in a national effort called Intelligent Transportation Systems for Commercial Vehicle Operations (ITS/CVO), aimed at improving freight and passenger mobility statewide. An ITS/CVO Executive Committee, sponsored by the department, was formed in early 1998, and completed its business plan in March, 1999. The committee continues to oversee the ITS/CVO program.
- The State Bicycle and Pedestrian Program seeks to improve the existing transportation system to better accommodate bicycle and pedestrian traffic.
- The Winter Trails on Alaska State Highways project examined whether and how highway corridors can safely and appropriately accommodate winter off-road vehicle traffic.
- The Parks Highway Corridor Study has been initiated to plan to maintain and enhance the Parks Highway's ability to function as an interstate route. The study will address congestion, turning movements and access policy issues along the Parks Highway Corridor from Anchorage to Fairbanks.

Department of Transportation and Public Facilities

People Mover bus in downtown Anchorage

Managing For Congestion. Passing lanes and pullouts are constructed, where feasible, as part of major reconstruction projects. Passing lanes enhance safety and traffic flow, and help to relieve congestion within a given facility. Pullouts and rest areas can be funded as part of road reconstruction projects, or as stand-alone projects under the Trails and Recreational Access for Alaska (TRAAK) program. Data produced from Traffic Monitoring System for Highways and the Safety Management System help to identify intersections where signal timing or improved design is needed to alleviate congestion problems. Adding new lanes to existing roads in order to increase capacity may be considered, but this practice has historically resulted in greater use of the roadway, adding to long term congestion.

The Anchorage Metropolitan Area Transportation Study (AMATS), the Metropolitan Planning Organization responsible for transportation planning in Anchorage, has developed a Congestion Management Plan for Anchorage. This plan identifies the most

congested roadways and presents strategies to eliminate congestion. In Anchorage, TSM strategies have been routinely considered and where feasible, incorporated into roadway improvements. A traffic signal monitoring study is in place and has been used to adjust traffic signal timing to improve traffic flow and reduce congestion. Bus turnouts are constructed to reduce traffic queuing on roadways behind off- or on-loading buses. Car pool and van pool programs reduce the number of single-occupant vehicles on the roads during peak commuting hours. Throughout Alaska, right turns are allowed on red lights after stopping. Right-turn lanes and left-turn pockets are added during road reconstruction to accommodate turning movements with minimal impacts to traffic flow.

Statewide Management and Monitoring Systems. In 1991, ISTEA formalized a number of management and monitoring systems as tools to identify capital improvement projects. In Alaska, the department uses two of these management systems as an efficient way to monitor the condition of bridges and pavement. These two management systems are used in the project evaluation criteria to give points in the STIP to road projects where bridge or pavement conditions are marginal or poor. A third management system for public transportation regularly inventories the state's public transit assets. The department also maintains a statewide inventory of harbors and Alaska Marine Highway System (AMHS) facilities in order to determine priorities for capital investment.

Department of Transportation and Public Facilities

Bridge over Kougarok River, Western Alaska

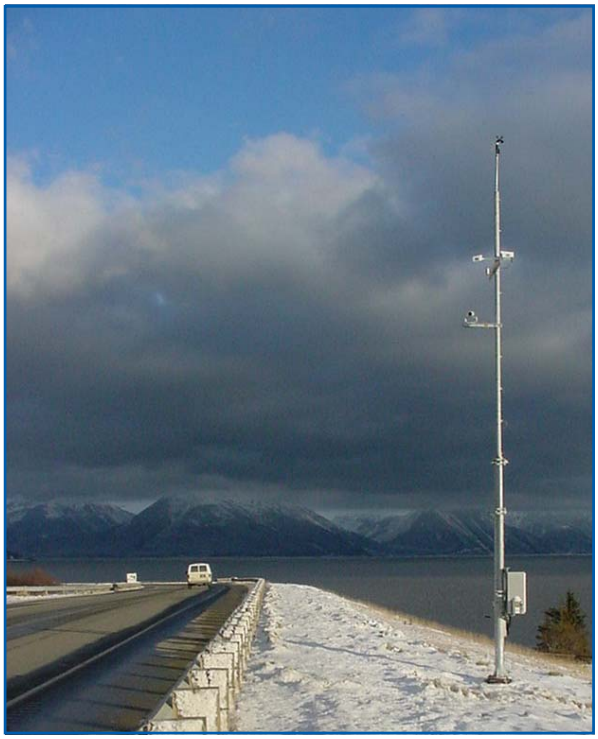
Under the Bridge Management System (BMS), the department periodically monitors the condition of each bridge in the state. This includes bridges on the National Highway System, the state-maintained road system including the Alaska Highway System, and a few that are not on the state maintained road system. A statewide database monitors and records key measures. Bridges are rated on their overall condition; these ratings are used to prioritize preventive maintenance, reconstruction, and replacement.

The Pavement Management System (PMS) uses a computer model to optimize pavement service life for a particular section of road. The department uses the pavement condition reports that come from PMS to prioritize highway repair, resurfacing, and improvement projects. The reporting system provides "on-line" graphical presentations of conditions on state-maintained paved routes in Alaska. It is intended to be useful and easy to understand with minimal explanation. Pavement conditions are shown in terms of ride quality and rutting measurements made with the State's profile van and special laser measuring equipment. Along with pavement conditions, summary figures showing pavement age, road width, and traffic level are included.

Intelligent Transportation Systems. The department is developing an Intelligent Transportation System (ITS) Statewide Deployment Strategy (SDS) in order to use technology to improve the safety and efficiency of transportation. By making the most of sophisticated sensors and computers, advanced communication networks, and innovative management strategies, ITS enables people and goods to be moved more quickly, safely and efficiently and with less harm to the environment. An example of ITS-based management techniques is the coordination of traffic signals in urban areas, which can save ten to twenty percent in travel time. ITS real-time traveler information can help facilitate travel by informing travelers about trip times between communities, including those on the ferry system. ITS helps reduce commercial vehicle inspection time by allowing trucks to be weighed in motion and automating safety inspections. ITS innovations to manage highway incidents include highway call boxes and GPS-dependent Mayday systems. The latter functions similarly to an emergency locator beacon in an aircraft, deploying to alert emergency service responders in the event of a serious accident.

Under the SDS the department is attempting to develop an integrated, statewide ITS effort. The contractor and the SDS Project Team, comprised of decision-makers and technical experts representing a variety of disciplines and modes of transportation services, has been working on a draft statewide ITS architecture, which will define how various ITS elements will function and interact. The statewide architecture must conform to the broader national ITS architecture, which is used as a framework for the design, development and implementation of ITS technologies. However, due to the uniqueness of Alaska's climate and various modes of travel, the architecture will be adapted and expanded to meet regional needs.

Similarly, the Municipality of Anchorage, the SDS Project Team and the contractor are working on a regional metropolitan ITS architecture for Anchorage that will coincide with the SDS. Anchorage is the largest city in the state and contains a significant portion of the services and retail economic infrastructure for smaller cities and the rural areas of the state. Additionally, Anchorage contains a major port and is an international air gateway for both cargo and passengers. Consequently, creating a compatible architecture throughout the layers of government will ensure that ITS projects around the state share common characteristics. The final SDS, expected to be completed soon, will consist of individual ITS projects that are needed to realize the ten-year long range vision set forth for the state of Alaska. Projects will be ranked by their ability to improve safety, cost/benefit and other characteristics.



Department of Transportation and Public Facilities

RWIS at Bird Point near Anchorage

During the development of the SDS and the Anchorage ITS architecture, the department is making plans to deploy several Roadway Weather Information System's (RWIS) throughout the state. Eight sites have already been deployed in the Anchorage bowl area. Plans exist to deploy up to 25 additional sites statewide. RWIS are weather sensors that are designed to convey current road and weather information to the department, government and private agencies and the general public. Sensors are being deployed in locations where data are scarce. In turn, these sensors improve the efficiency of maintenance crews in making operational decisions such as de-icing and snow removal. Additionally, travel can be safer and more efficient by informing the general public about road and weather conditions in remote areas.

The success of RWIS deployment is determined by forming partnerships with key stakeholders. For instance, this program is being developed in conjunction with partners who possess existing weather data sources, such as the National Weather Service, Air Force Weather, and the University of Alaska Fairbanks Geophysical Institute. In addition, RWIS is an integral part of the SDS and the Anchorage ITS architecture to ensure coordination and compatibility among other ITS projects and key ITS stakeholders. Forming partnerships and ensuring compatibility with other ITS projects improves the promulgation of data across administrative boundaries and various organizations thus helping increasing safety and efficiency of travel and reducing costs for everyone involved.

Transit. The department and the Municipality of Anchorage Transit Department jointly developed the Alaska Public Transportation Management System (APTMS). The APTMS provides a statewide inventory and condition survey of transit and paratransit assets and helps in the identification of transit projects and programs. The data helps the department gauge real need for expanded service, replacement vehicles, additional funding, etc. Although it is not presently used directly in the project evaluation criteria, it could be used in the future to automatically assign points to projects based on vehicle age/mileage, annual maintenance costs, compliance with safety standards, and other measures of relative need.

Ports and Harbors. The importance of marine resources and transportation to Alaska dictates a need to protect and maintain the investment in ports and harbors infrastructure, as well as to build needed improvements based on statewide priorities. The Harbors Management System (HMS) recognizes the state's significant investment in harbor facilities and provides guidelines for maintaining those facilities. Since funding for this system is not provided in federal legislation, it requires an annual appropriation by the state legislature, independent of state match funds normally approved for federally-funded transportation programs and projects. The HMS baseline was established with a 1992 physical inventory, which now includes 96 Alaska harbors. The information is available in computer-accessible databases, which are updated through questionnaires and on-site inspections. Ideally, the system calls for biennial updates of system information for each of the public harbors in Alaska, but staffing and funding level projections indicate updates will likely occur at the rate of once every four or five years. The system has proven extremely useful in comparing facility conditions and providing needed information to resolve questions of capital expenditure priority.

For the department's ferries, the department periodically assesses fleet condition and sets maintenance and repaxir priorities using the AMHS Vessel Condition Survey. As the fleet ages and operating costs continue to rise, there is an increasing need to include other system measures that could help identify problems and prioritize improvements, such as fuel efficiency, parts and repair, passenger satisfaction, heat and noise monitoring, passenger demand and throughput. An option available to the department is to include all of these recurring concerns in a "Marine Highways Management System" which could be used to monitor condition and performance indicators, evaluate long-term costs of different alternatives, and recommend optimal solutions. The main driver of AMHS improvements currently is passenger vessel regulation enforced by the U.S. Coast Guard, which mandates many changes in vessel design in order to remain in compliance.

Department of Transportation and Public Facilities

Nome-Council road

MAKING INTERMODAL CONNECTIONS

As mentioned in the Planning Factor 5 analysis, ISTEA and TEA-21 emphasized improvement of intermodal connections—those places where people or goods transfer from one mode of transport to another. Ports, train stations, and airports serve as examples of these intermodal terminals. These two laws emphasized promoting efficient transfers between modes of transportation is as important as improving those modes independently. In the 1995 National Highway System (NHS) Designation Act, Congress designated routes connecting intermodal terminals to the NHS as NHS Intermodal Connectors eligible for federal NHS funding. This has allowed the improvement of several key intermodal connections in Alaska.

In 1998, at the request of FHWA, the department completed a condition survey of selected intermodal terminals. Ten Alaska intermodal terminals, including the ports of Anchorage, Juneau, and Skagway, were analyzed as to the adequacy and efficiency of their connections to the NHS. Traffic congestion, road surface condition, and other traffic constraints were assessed in the survey. Bridges and at-grade rail crossings along the connectors were counted. The survey inventoried the state, local, and federal investments in the intermodal connectors. It assessed the overall funds invested during the previous three years as well as the funding programmed over the next three years. The results of this nationwide survey have not yet been released.

HIGHWAY DATA MANAGEMENT SYSTEMS

The department established a database for highway statistical information known as the Highway Analysis System (HAS) in 1986. HAS consists of four subsystems: the ROADLOG Highway and Condition Inventory, Accident Information, Traffic Data, and Project History. HAS is periodically updated to comply with the American Statewide Highway Transportation Officials (AASHTO) standards and federal requirements for Traffic Management System for Highways (TMS/H). TMS/H includes volume counts, truck weights, speed counts, classification counts, and summarized data such as Annual Average Daily Traffic (AADT), which are incorporated in the Traffic Data subsystem of HAS. Information in HAS can be displayed in a number of standardized formats, and associated with road video and mapping data. Alaska's HAS assists in corridor planning studies, environmental impact studies, input to PMS and BMS, and identifying changes in traffic patterns. The AADT is one variable in a formula that helps measure cost-effectiveness of proposed projects in the Rural and Urban Streets project evaluation criteria.

Outside of Anchorage, traffic levels are not systematically identified and monitored. When congestion becomes a problem in an area, important use information can be collected with relative ease by using TMS/H data, measuring travel times and wait times at intersections, and related methods. In association with local transportation authorities, the department could consider instituting performance measures and data collection programs for certain areas around the state with potential for congestion problems. These programs might specifically target locations within the Matanuska-Susitna, Kenai Peninsula, and Fairbanks North Star Boroughs. Such information would establish a baseline and assist state and local planners in developing appropriate strategies to mitigate congestion before it becomes a serious problem.

There are some types of data that, although desirable, the department does not currently gather. For example, bicycle and pedestrian traffic levels constitute an important piece of transportation information due to the increasing investment in these modes of travel. The best bicycle/pedestrian counting method continues to be visual; automated counters have not proven to be as effective as those used for automobile counts. Reliable data on bicycle/pedestrian use levels would provide important information.

"Showers and lockers at workplaces encourage bicycle commuting."

REDUCING MOTOR VEHICLE TRAVEL

As described in the Planning Factor 4 analysis, the department actively supports and encourages community efforts to develop public transit systems and coordinated transportation programs as a means of reducing motor vehicle travel. The department's bicycle/pedestrian policies and AMATS carpool/vanpool incentives help to further this end. It is likely that more can be done. Federal, state, local, and private employers could make minor facility improvements that would help encourage their workforce to commute by means other than by automobile. Examples include installing showers and lockers in the workplace, bicycle racks for commuting cyclists, work shifts that "fit" the transit system schedule, and group rate bus tokens. State and local government could offer tax incentives for businesses that adopt similar measures. Oftentimes local zoning laws actually encourage personal vehicle use. For example, Juneau has an ordinance that requires new businesses to provide parking to employees and customers. Rather than paying for the expensive real estate required for parking, businesses could offer employees additional pay or free bus passes (or both) in lieu of free parking. The Planning Factor 4 analysis also discusses ways to reduce motor vehicle travel.

LIFECYCLE COST ANALYSES

Efficiency and cost-effectiveness should be considered when evaluating a future project. Typical lifecycle cost tabulations take into account all costs directly associated with the

project. These include planning, design, construction, maintenance and modification costs. It is more difficult to tabulate intangible costs associated with lifecycle maintenance; for example, added public safety costs, air pollution, long-term loss of land, environmental/historical impacts, and the economic impacts of not building. An objective measurement of these costs is extremely difficult. However, improved public involvement offers a means to identify some of these costs early in the process and prompts planners to consider these costs when developing alternative solutions to meet a need.

EFFECTIVE PARTNERSHIPS

Operating the state's transportation system is the responsibility of the department's regional offices, the Alaska Marine Highway System, the Alaska Railroad, and the Anchorage and Fairbanks International Airport managers, in addition to the managers of the 261 state-owned and operated airports. The department aims to develop partnerships to encourage management efficiency. In some cases, local, regional, and private companies are best able to manage a transportation facility or program. Some airports, such as the Juneau International Airport, are municipally owned. The Inter-Island Ferry Authority (IFA) has recently been established to operate a system of ferries serving Prince of Wales Island and southeastern Alaska, and began operating between Hollis and Ketchikan in December, 2001.

Department of Transportation and Public Facilities

Teller

PROJECT EVALUATION

The scoring criteria for AMHS projects awards points to projects that make significant improvements to service levels or capacity, as well as to projects for terminals or services that are experiencing high traffic volumes. Statewide criteria for rural and urban streets and roads do not specifically address congestion concerns, but once AMATS apportionment is determined through the STIP process, AMATS criteria favor projects that make improvements to service levels. Statewide transit criteria award points to projects identified in the State Implementation Plan (SIP) for air quality conformity. The Planning Factor 4 analysis describes this in greater detail.

PLANNING

The department has sponsored bicycle/pedestrian design workshops in Anchorage, Fairbanks and Juneau, which have strengthened staff appreciation for the role of effective multi-mode roadway design in preventing congestion caused by different modal user groups trying to compete for the same road space. The department collects information at ports, marine terminals and airports to identify peak summer loads. The AMHS adjusts its schedules to provide increased service during the busy summer months.

The department engages in a continuous airport system planning process that includes keeping airport master plans current. The ongoing nature of this planning process ensures identification of passenger terminal crowding, frequent delays in takeoffs, insufficient parking, and other indicators of airport congestion relief needs.

RECOMMENDATIONS

The department should:

- Complete the area transportation plans to provide a long-range plan and implementation strategy for transportation improvements, to identify potentially dramatic efficiency improvements, and to determine an investment strategy in the STIP for these areas.
- Develop a program to inform and encourage communities to implement alternate transportation modes and TSM strategies and to better utilize opportunities and resources available to maintain their transportation systems.
- Collect statistical data and monitor both automobile and non-automobile transportation modes to establish a reliable baseline showing the relative importance of road, rail, river, trail, marine, and air transportation and the interrelationships of these systems.
- Develop practices and regulations in coordination with community governments that
  1. strive to develop community street networks that enhance circulation
  2. accommodate use of the transportation system by bicycles, pedestrians, and transit users
  3. offer disincentives for residential and commercial development on the major highways
  4. consider long-term growth management in the planning of airports and harbor facilities
  5. encourage communities, such as Juneau, to improve transit so as to better handle peak travel periods, specifically during summer tourist months.
- Partner with the Department of Environmental Conservation to advocate, assist and encourage communities to develop congestion mitigation practices through workshops, cooperative planning, and incentives.
- Designate a staff position responsible for developing and coordinating statewide congestion mitigation policy and programs. Consider modifying the rural and urban streets and roads project evaluation criteria to award points to or otherwise prioritize projects listed on the STIP (similar to the transit criteria).
- Continue conducting periodic updates of area plans to identify needs and study long-term costs and effects associated with proposed solutions and alternatives.
- Continue implementing and improving the utility of Pavement Management System, Bridge Management System, and Public Transportation Management System. Improve the traveler information network, and, in conjunction with the Department of Community and Economic Development, complete the visitor information kiosk project.
- Work with the freight and passenger industry to incorporate their infrastructure needs into policy and project development, as appropriate.
- Continue to aggressively develop the department's ITS program to improve safety and mobility and reduce congestion.
- Consider instituting a Marine Highways Management System to address AMHS maintenance and repair issues and prioritize improvements.
- Implement lifecycle cost analyses on future projects to account for both tangible project costs (planning, design, etc.) and intangible costs (air pollution, environmental impacts, etc.)
- Strive to improve communication through innovative methods, including user queries, focus groups, surveys and various other methods of outreach.
- Encourage more corporate/private investment in transportation infrastructure through public-private partnerships.

factor seven
TEA-21 PLANNING FACTOR 7

Emphasize the Preservation of the Existing Transportation System

Planning factor 6 addresses some of the tools the department uses to efficiently manage and maintain the existing transportation system, and make optimum use of existing facilities. Planning factor 7 identifies ways the department emphasizes the preservation of the existing system. The department is currently emphasizing state maintenance and improvement of roads, ferries, airports, and trails that are most important at the regional, state, and national levels and supports local maintenance and operation of facilities that primarily serve individual communities.

ALASKA'S NATIONAL HIGHWAY SYSTEM

In 1995 Governor Knowles announced a commitment to bring the primary highway and ferry routes of the National Highway System (NHS) up to modern standards. In the 1995 Draft National Highway System Plan, the department systematically identified necessary capital improvements to Alaska's NHS routes. These improvements were identified through review of highway and pavement conditions, the expected service life of the routes, and an analysis of known deficiencies, and were programmed over a twelve-year period beginning in 1996. The NHS plan hasn't been revisited, the STIP is continuously updated, and the NHS component now involves things like waysides, bike trails, pavement rehabilitation, etc. Accordingly the plan's timeframe for addressing necessary capital improvements resulting from system deficiencies has expanded somewhat, due to limited funding. At the same time, funding for the NHS program represents the largest single category of capital funding for surface transportation in the STIP.

Department of Transportation and Public Facilities

Steese Highway

There are 158,720 miles of road in the entire National Highway System in the United States, which averages about 0.6 miles of NHS per 1,000 people. Alaska's total of more than 2,100 miles represents 3.4 NHS route miles per 1,000 people, underscoring the importance of the NHS in Alaska.

ALASKA HIGHWAY SYSTEM

The department recently established a Alaska Highway System (AHS). This system is comprised of state highways that are not on the NHS but that serve the economic and general welfare needs of the state as a whole. AHS routes serve to connect communities rather than serve trips within communities. The purpose of including the Alaska Highway System in the STIP process is to separate the major state roads, highways, and state ferry terminals from the local and community transportation priorities in the Community Transportation Program (CTP). Projects funded in the CTP have the advantage of a local sponsor or local partnerships and community support. State facilities, such as the Taylor Highway, which threads the long distances between communities, often do not benefit from this direct community support. The new Alaska Highway System funding category will directly benefit these important state roads. The following distinguishing characteristics were used to determine AHS routes:

- Greater utility to Alaska as a whole than to a particular city, borough, or tribal government;

- A route, or a portion of a route with a functional classification of major collector, minor arterial, or principal arterial;
- A facility that provides connectivity between any of the following: NHS routes, other AHS routes, international border crossings, passenger and freight terminals (airports, rail stations, ferry terminals, ports), tourism facilities, resource development activities, state or national parks, and other major destinations;
- A facility that connects a city, town, or village to a regional center that offers commercial services, health care, education and other necessities;
- A route that serves as a bypass route to another highway of national or state significance;
- A route within an organized borough or city that is generally ten miles or greater in length.

Routes that are owned or maintained by a local government or other entity should not be included in the AHS unless the state elects to assume ownership.

Allocating funding to this new program allows the department to systematically schedule capital improvements for these highways. With a higher level of funding in TEA-21, the department is able to allocate money to this category without reducing funding for the Community Transportation Program below the 1999 level. The department solicited comments on the proposed AHS as part of the review process for the 2001-2003 STIP.

"Maintaining or preserving the existing transportation system requires adequate and stable funding."

DEPARTMENT INITIATIVES

Gravel to Pavement Program. Often it is less costly and more efficient to maintain a paved road than a gravel road. The hardened surface can reduce the wear from traffic, erosion on the surface, and the level of ongoing maintenance and grading needed. In 1999, the department embarked on a program to reduce annual maintenance requirements by converting a number of state-maintained gravel roads to paved roads. The department anticipates converting roads to pavement will reduce its maintenance effort, eliminate dust, and improve the overall quality of these roads. This program will allow future maintenance dollars to concentrate where heavy use causes wear and tear, principally on the state's major highways.

Studded Tires. Studded tires create wear and tear on paved road surfaces, and shorten expected road life. Department efforts at public education have had some effect in promoting use of lightweight studs, but have not convinced the public at large to give up using studded tires. Although research shows only marginal safety increases from stud use, drivers generally view the use of studded tires as a measure of safety in the winter. Although they collectively may like the roads to last longer, this is simply not worth their personal risk.

MAINTENANCE

Priorities. The department's regional maintenance supervisors determine road and airport maintenance priorities at the regional level.

Highways. Highways are classified into three maintenance categories; Class I routes represent the highest priority.

Class I	National Highway System routes.
Class II	Non-NHS collector and arterial routes. Many of these routes are on the Alaska Highway System.
Class III	While many minor collectors and local roads are maintained by cities and boroughs, the department also maintains many of these routes in a Class III maintenance category.

The department has sought to improve the delivery of maintenance services for more than fifteen years. The department's highway and airport lane mile responsibilities have increased almost 33 percent during that period. At the same time, the department's operating budget has received reductions of almost 45 percent, when adjusted for inflation. In considering the use of more formal management procedures that have proven effective in other agencies that provide similar services, the department elected to begin preparing a comprehensive maintenance management system to improve the delivery of its maintenance services. In April of 2000, the department hired a consultant to conduct a Comprehensive Maintenance Management System Feasibility Study (CMMS).

The feasibility report recommended that the department implement the CMMS in stages over a period of three years, and included six major recommendations that function as core program components:

Department of Transportation and Public Facilities

Road work on Chena Hot Springs Road near Fairbanks

- Standardize the use of the department's coding structure to address the way maintenance-related data is reported, with a goal of consistent standards for coding data among the regions.
- Establish a maintenance quality assurance program similar to the Maintenance Accountability Program (MAPS) used in Washington State. This program links the observed road conditions to the actions that must be performed to meet customer-based service levels and achieve desired outcomes. Ultimately, the MAPS process would improve service and make Alaska roads safer for the traveling public.
- Develop standardized station profiles to establish a formal process for capturing, maintaining, and presenting the station profile information currently used by the department.
- Standardize and automate the needs assessment process with formal criteria. Also provide a mechanism for recording, displaying, and maintaining the data. The assessment will identify deficiencies by type, severity, and location.
- Establish a maintenance feature inventory to collect and maintain information about the responsibilities of each maintenance station. This will help quantify the potential work that must be done.
- Establish a traditional maintenance management system (MMS) to address planning, organizing, directing, and controlling maintenance operations.

Airports. The Alaska Aviation System Plan discusses two types of maintenance performed at state airports. Operational maintenance occurs throughout the year. Cyclical maintenance is performed when facilities or equipment must be repaired or reconstructed. Operational maintenance must occur continuously or an airport will be closed or decertified. Regional maintenance supervisors must balance crew size and the number and pieces of snow removal and other maintenance equipment with FAA regulations. When the same crew covers both roads and certificated airports, the airport has higher priority.

Whether cyclical or operational, airport maintenance requirements for airports are on the rise, stemming from the general trend to larger aircraft. Larger planes require longer runways and better surface maintenance. New instrument approaches based on Global Positioning System technology also demand better surface conditions. These shifts tend to produce significant impacts to local and unclassified airports. With limited resources available, the highest maintenance priorities of the department are the International, Regional, Transport, and Community Class airports, in that order. The International Airport System, consisting of Anchorage and Fairbanks International Airports, is self-supporting. Fees for aircraft landings, fuel flowage, terminal area and lease lot space, concessions and aircraft tie-downs are deposited directly into the International Airport Revenue Fund.

Marine Highways. Alaska Marine Highway System maintenance priorities focus on maintaining the existing fleet of vessels and terminals in safe and reliable operating condition. Major vessel construction projects address replacement of major components such as engines that have exceeded their expected service life, and refurbishment of machinery and accommodation spaces. In recent years, heavy expenditures have gone toward upgrading passenger safety equipment to meet new U.S. Coast Guard regulations. On the shore side, the major terminals have undergone extensive renovations, which include construction of several new terminal buildings. These buildings were designed to handle today's traffic demands, meet current building codes, as well as to be aesthetically pleasing.

The recently approved Southeast Alaska Transportation Plan (SATP) will have a significant impact on AMHS funding. The SATP calls for construction of several new vessels to operate on new ferry routes throughout Southeast Alaska. Some of these new vessels will be fast ferries, utilizing new technology. AMHS funding priorities in future years will shift toward integrating these new vessels into the fleet while continuing to maintain the existing fleet in safe operating condition. This operational shift attempts to meet passenger demand while saving overall costs.

State Funding for Maintenance and Operations. The Transportation Investment Analysis in this plan compares the cost of operating and maintaining each of the state's modal transportation systems with the amount of funding available. It discusses the need for a dedicated fund for transportation. Maintaining or preserving the existing transportation system requires adequate and stable funding. Due to federal limitations on funding eligibility, maintenance has been predominantly funded from the state's General Fund, while new construction, rehabilitation and major repair have been funded from federal sources.

It is important to consider future maintenance and operation costs when evaluating capital projects, whether for highways, trails, runways, or harbor facilities. Although the project evaluation criteria used to develop capital programs rewards projects with lower maintenance and operations costs, a complete accounting of the maintenance and operations costs is not used in evaluating capital projects. A full benefit-to-cost analysis for every capital project is not feasible given the time, resources, and effort involved.

FUNDING STATEGIES FOR MAINTENANCE

Transfer of Ownership for Maintenance Responsibility. When a transportation facility can be more effectively operated or maintained by a local community, the department believes that the local community should own and operate the facility. The department currently owns and maintains many facilities that exist primarily to serve the needs of the communities in which they are located. While communities generally favor having more control over these facilities, there is little incentive for them to assume the responsibilities of ownership, given the associated costs. However, local ownership and maintenance of transportation facilities enables the department to concentrate its maintenance efforts on regional transportation links that serve inter-community travel, resource development, commercial freight, recreation, and tourism. To encourage local ownership and maintenance, the project evaluation criteria for the Community Transportation Program and Trails and Recreational Access for Alaska Program award more points to projects when a local government accepts ownership and maintenance responsibility once the facility is improved. Harbor project evaluation criteria provide the same emphasis, as do the aviation project evaluation criteria used for developing the Aviation Improvement Plan. While this approach encourages self-sufficiency on the part of local governments, it can work to the disadvantage of communities without the resources or economic base to assume maintenance responsibility.

The department has been working with the Legislature, local governments, the Alaska

Municipal League, and others to develop a long-range strategy for systematically transferring ownership of appropriate transportation facilities to local authorities.

Industrial Use Highway. The Klondike Highway was built with a strengthened structure designed to accommodate multiple movements of heavy ore trucks carrying lead-zinc ore from mines in Yukon to the shipping terminal in Skagway. The State negotiated a cooperative agreement with the private trucking company to have the private sector pay for the costs of the improved structural standards for this designated "industrial use highway," including strengthened pavement, truck climbing lanes, and escape ramps. The designation also gives the department authority to charge permit fees for other large commercial vehicles using the highway. A similar strategy could be used to fund structural improvements to roadways repeatedly used by commercial trucks for moving product to staging areas, such as occurs with logging and mining operations.

Commercial Use Fees for Highways. Another funding technique is the imposition of fees on commercial vehicles based on weight and mileage traveled on certain highways. This would provide needed funds for higher standards of highway design and construction. Currently, the only fees that are collected are the fines assessed for overweight vehicles (when they are caught in violation of weight limits by an alert trooper or weigh station crew). To enhance coordination between vehicle weight restrictions and weight enforcement as well as carrier and freight relationships for other transportation modes, the Division of Measurement Standards was moved from the (then) Department of Commerce and Economic Development (DCED) to the Department of Transportation and Public Facilities in July, 1997. Additional steps to improve the utility of weight standards, measurement and fees to protect the state's highway investments are under consideration.

Photo by Bill Evans. Department of Natural Resources

Semi-truck on the Seward Highway

Weigh in Motion. Weigh in motion (WIM) systems are used to weigh vehicles moving at normal highway speeds. WIM equipment has been deployed at fifteen locations since 1990 to collect weight data for pavement design purposes and to meet federal reporting requirements. The technology is improving and the department plans to design and install up to thirteen new WIM systems, which have better in-road sensors and provide data of higher accuracy and reliability. In some locations near weigh stations, the WIM equipment will be used as a mainline sorting system to enable legally loaded trucks to bypass the static scales. None of the planned WIM systems are currently operational.

Passenger Facility Charges at Airports. Alaska's state-owned airport facilities use a number of revenue generators such as land leases, building space rental, and tie-down fees to help pay for maintenance, but these have proved inadequate. The majority of airport maintenance is funded through state general fund appropriations. Landing fees at rural airports were prohibited by 1994 state legislation effective through 1999. Federal legislation in 1990 allowed the enactment of passenger facility charges (PFCs) at airports having at least 2,500 annual passenger deplanements to pay for capital investments. Of the 71 airports in the state that qualify, only the Anchorage and Fairbanks international airports and Juneau and Ketchikan regional airports have instituted PFCs.

PFCs can increase the cost of a round-trip airline ticket up to $18.00. Enplaning passengers are charged up to $4.50 per segment on a maximum of two segments per one-way trip and four segments per round-trip (the first two enplanements on a one-way trip and the first and last two enplanements on a round trip ticket). Once approved by the FAA, the PFC is part of the ticket purchase price collected by the airline. Many Alaskan passengers flying to other U.S. destinations already pay maximum PFCs on those segments, but the state receives no share of the revenue. When a PFC is imposed, some of this money from out-of-state flights stays in Alaska without increasing the ticket price. PFCs

can increase in-state fares by up to $4.50 per segment, but this money goes to improving the airport facilities used by those passengers. Opposition to PFCs has come primarily from air carriers, particularly in-state air carriers, who are concerned about the negative effect of a fare increase on their market and potential loss of revenue. The Anchorage and Fairbanks international airports recently elected to implement $3.00 PFCs. This is expected to bring the Fairbanks International Airport $5.4 million over the next six years, and the Ted Stevens Anchorage International Airport close to $15 million.

Toll Roads and User Fees. Because of the state's low traffic volumes, transferring project costs directly to beneficiaries in the form of toll roads or user fees is impractical, except to supplement conventional funding for specific activities. There is little need and few potential candidate routes for "state turnpikes" where projected traffic volumes could even generate enough revenue to cover the costs of toll operations. It seems unlikely that residents would support tolls on existing roads where they currently can drive free of charge, unless the toll is applied to the cost of major improvements in access, level of service, or maintenance. In such cases, an analysis of the potential for tolls to generate revenue for capital improvements and/or maintenance would be useful in project evaluation and project development.

In June 2000, the department opened a new section of road into Whittier, Alaska. One of the tunnels that originally provided only rail access to Whittier was reconfigured so that automobiles, trucks, and buses can also use it at periodic intervals. This project included facilities needed to collect a toll for the use of the Whittier access road, which constitutes the department's first toll facility. The tolls collected defray the cost of operating the tunnels and roadway. If the amount of toll collected exceeds the costs of operation, the revenue can be used for other purposes that are eligible for federal aid highway funding. Tolls were not collected during 2000, the first year of operation of joint rail/road access.

Department of Transportation and Public Facilities

Entrance to Portage Lake tunnel leading to Anton Anderson Memorial Tunnel (part of Whittier Access project).

STATE/LOCAL GOVERNMENT TASK FORCE RECOMMENDATIONS

The November 1996 report of the State/Local Government Task Force (chaired by Lieutenant Governor Ulmer) recommended a slate of "user pay" taxes that relate to state/municipal services. These revenue sources may be shared based on the relative responsibility for the provision of related services. Potential taxes cited in the report include:

- a marine fuel sales tax to repair and maintain state and municipal harbors
- a motor fuel sales tax to repair and maintain state/municipal roads
- airport landing fees to operate and maintain airports

The report clearly indicated the importance of creating "specific user-related revenue streams" to the future of the state's transportation facilities. To encourage local governments to take responsibility for currently state-owned transportation facilities in their communities, the report recommended allocation of these designated funds to localities in relation to the degree of local ownership or maintenance of facilities.

CONCLUSIONS

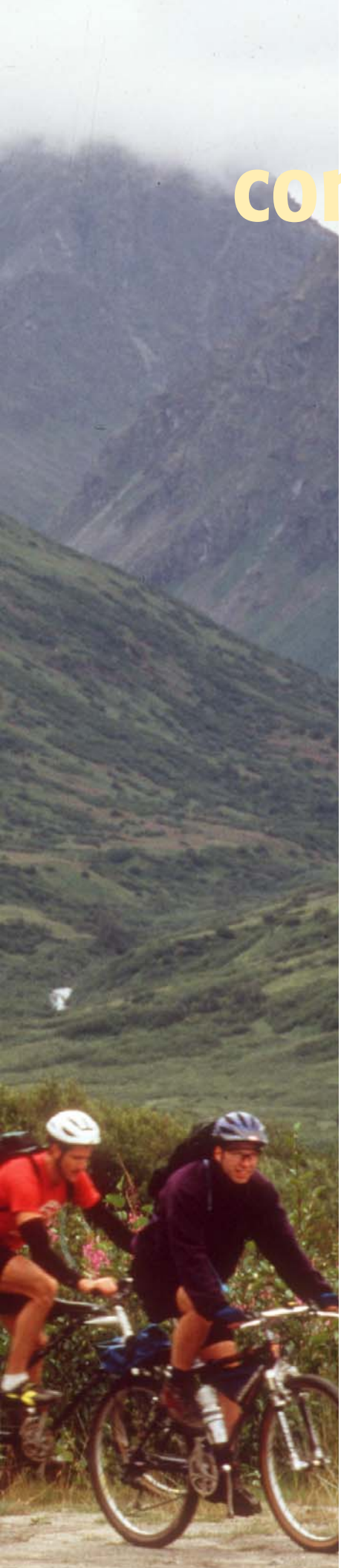
The department emphasizes the need to maintain and improve regionally-significant roads, ferries, airports, and trails. It also supports local maintenance and operation of facilities that primarily serve individual communities.

Traditional modes of transportation in Alaska can provide attractions to visitors. Often the journey to one's destination is as memorable as the experience at that destination. In addition to providing viable transportation options for residents, preserving Alaska's unique transportation system is important to sustain its visitor industry, and the economic health of the state as a whole.

RECOMMENDATIONS

The department should:

- Develop strategies to improve utilization of weigh stations.
- Consider implementing freight use charges on selected highways after evaluating adverse potential economic impacts.
- Incorporate innovative partnership/public involvement techniques in pursuing solutions to excessive road wear.
- Identify and propose additional highway sections for upgrade through industrial-use highway regulation.
- Develop a plan of action for
  1. preventing the department from assuming additional maintenance responsibility for public-use transportation facilities nominated by local governments, user groups or other agencies, and
  2. a systematic transfer of state-owned and maintained, locally used transportation facilities to local government ownership and maintenance.
- Pursue legislation to increase state motor fuel tax, while devising a way to ensure that revenue from fuel taxes, vehicle registration fees and taxes, and drivers license fees are used solely for maintaining and enhancing the transportation system.
- Use all or a portion of the current marine fuel tax revenue to fund major harbor repair and replacement.
- Consider instituting commercial use fees to offset the costs of higher highway design and construction standards necessitated by commercial traffic.
- Prioritize capital improvements that reduce maintenance requirements.
- Develop guidelines for collecting tolls (roads, bridges, and tunnels), and for how the toll revenues are to be used.
- Before committing major capital money to a project, factor in projected maintenance costs.
- Implement an integrated statewide Maintenance and Operations (M&O) management or monitoring system such as MAPS.
- Work to reduce M&O costs by improving service and efficiency through current technology application and by reducing energy costs for state-owned buildings and facilities.
- Remain committed to maintaining and protecting the NHS investment, while being responsive to conditions that dictate the need for additional NHS system links.
- Establish current maintenance baseline funding requirements and adjust annually for population growth, added infrastructure, inflation, new standards, material improvements, and technology.



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