

# Water Transportation in Alaska

## Small share of jobs but crucial to economy



**A**laska's location, geography, and lack of basic transportation infrastructure heighten the challenge of moving goods to and around the state. With a limited highway and rail system and the relatively high cost of moving goods by air, Alaska relies heavily on its vast water transportation network to move freight.

With more than 33,900 miles of shoreline and 6,000-plus miles of navigable inland waterways, Alaska depends more on water transport than nearly any other state, using the system to haul bulk cargo such as oil or coal out of the state and bring in freight ranging from refrigerated containers of lettuce to drill rigs.

Transportation as a whole is a bigger industry in Alaska than elsewhere, and water transport is also a larger share of the overarching transporta-

tion industry, at 10.5 percent in Alaska versus 3.0 percent for the U.S. as a whole.

Although it's critical to the economy, water transportation's share of total jobs doesn't necessarily reflect this importance — less than 1 percent of Alaska's average private monthly employment in 2012 was in water transportation, or just 2,077 positions. (See Exhibit 1 on page 14.) It's important to note these numbers don't include the Alaska Railroad and the Alaska Marine Highway System, which are operated by the state.

### Early water transportation

Alaska's water transportation has a long and complex history. Early Alaska settlers frequently used coastal and inland waterways for fishing, hunting, and transportation. Skin-covered watercraft were used by Inupiat, Yupik, Aleut, and Alutiiq populations along the northern, western, and southcentral coast, while birch bark canoes and dugout log canoes were more common among upper Yukon Athabascans and the Tlingit and Haida of Southeast Alaska, respectively.

Europeans first arrived in the late 18th century. Russian explorer Vitus Bering is credited with making the first European contact with Aleuts in 1741, an event that led to the untimely demise of both Bering and the majority of the Aleut population. The Russian-American Company gained a monopoly charter over the Alaska fur trade in 1799, and the company, in conjunction with the Russian navy, feebly maintained a hold on parts of coastal Alaska.

### The steam era

Regular boat service from U.S. ports to Sitka



Above, this 1987 photo shows the S.S. Alaska, the Alaska Steamship Company's third ship named Alaska. Photo courtesy of the Alaska Steamship Company Collection, Elmer E. Rasmuson Library, University of Alaska Fairbanks

began in 1867 after the purchase of Alaska from Russia. Steamers departed Portland and San Francisco several times a year carrying soldiers, tourists, cargo, and mail to Southeast Alaska towns on an irregular basis.

The North Pacific Railroad extended its terminus to Seattle in 1887. With access to inexpensive line-hauled overland freight, Seattle was poised to become a competitive port for the Alaska trade.

## Demand for space on board increases

Mining stories began making their way south for years before the Klondike gold discovery in 1897, but none would parallel the impact the Klondike rush had on Alaska's transportation network.

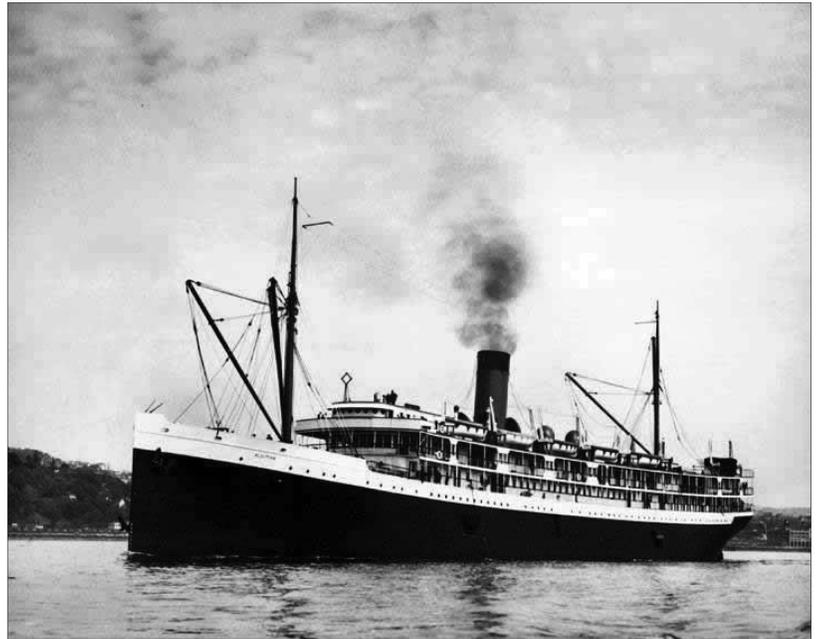
Demand for Alaska-bound vessels suddenly eclipsed the number of ships, and carriers scrambled to get more ships online. During the early rush, vessels carried prospectors to Skagway or Dyea, where miners could make the treacherous overland passes to the Yukon.

Construction of the Yukon-White Pass Railway from Skagway to the Yukon between 1898 and 1900 ensured steamships were loaded with construction materials as well as prospectors. Hopeful miners weren't able to enjoy passage to the interior on the new railroad, however. By the time of its completion, Yukon mining claims had been swept up by large mining firms and the rush was over.

## The Yukon River

The transfer of Alaska from Russia led to increased commercialization of the Yukon River. The now-defunct Russian-American Company sold its holdings to the Alaska Commercial Company, which introduced the first sternwheeler, the Yukon. The Yukon ran from St. Michael's, a trading hub on Norton Sound north of the Yukon terminus, to as far east as the Canadian border. Slowly, more operators and vessels came on the scene carrying fur, supplies, passengers, and mail to settlements along the Yukon River.

The Klondike gold rush changed river trans-



Above, the Alaska Steamship Company vessel is the second S.S. Aleutian purchased by the company, in May of 1930. The first S.S. Aleutian sunk in 1929. Photo by Walter P. Miller, Alaska Steamship Company Collection, Elmer E. Rasmuson Library, University of Alaska Fairbanks

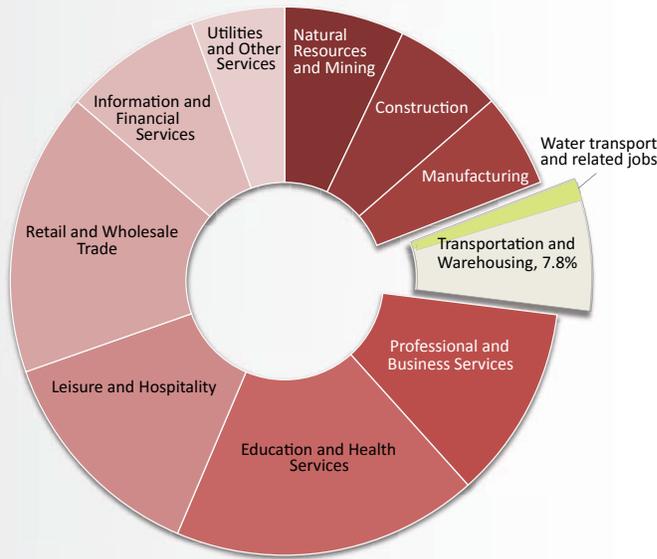
portation on the Yukon the same way it altered steamer travel in the Inside Passage. In 1897, two sternwheelers carried a half-ton of gold from Dawson, a Yukon River boom town, back to St. Michael's, where the gold and happy miners were transferred to seafaring steamers bound for San Francisco and Seattle. Once the news broke, many prospectors still opted for the quicker but more challenging overland route to the Klondike from Skagway or Dyea, but the longer journey by steamer to St. Michael's and up the river to Dawson was also popular, albeit much more expensive. St. Michael's became a boom town in its own right, with an estimated 20,000 people passing through in the summer of 1898.

The completion of the Yukon White Pass Railroad changed the way sternwheelers operated on the Yukon, but it didn't make them obsolete. Now freight could be hauled overland from Skagway rather than shipped up the Inside Passage, across the Gulf of Alaska to Dutch Harbor, up to St. Michael's, and another 1,600 miles up the Yukon River.

The commercial importance of St. Michael's and the lower Yukon River eventually declined. Although the army maintained a presence in St. Michael's and freight continued to move from

# 1 A Small Share of Alaska Jobs

## Private industry breakdown, 2012



Sources: Alaska Department of Labor and Workforce Development, Research and Analysis Section; and Quarterly Census of Employment and Wages

Norton Sound up the Yukon, much of the river traffic was on the upper Yukon and Tanana rivers, especially after the discovery of gold near Fairbanks and the development of settlements at Tanana, the confluence of the Tanana and Yukon rivers, and at Chena, at the confluence of the Tanana and Chena rivers.

## The Rise of Alaska Steamship Company

The 1900 discovery of a massive copper deposit near present-day McCarthy led to the consolidation of shipping firms operating in Alaska. The development of the Kennecott Mine and the construction of a 102-mile railroad to the mine from Cordova were backed by the Alaska Syndicate, a group of East Coast financiers that included the Guggenheim and Morgan banking interests.

The syndicate began buying up shipping companies to supply railroad and mine construction and eventually carry the copper to market. The existing Alaska Steamship Company was consolidated with other firms, forming a new Alaska Steamship Company.

Copper from the Kennecott Mine helped mitigate one of the classic problems of Alaska shipping: much more is shipped to Alaska than from. Canned fish was sometimes shipped south via common carrier, like Alaska Steamship, but the traffic was highly seasonal. Acquiring south-bound cargo was a constant challenge for Alaska shippers, both for ballast and revenue.

Alaska Steamship Company expanded under the Alaska Syndicate, operating four main routes: Seattle to Skagway, Seward, and Nome, and Seward to Unalaska. Passenger service gained popularity for more than just prospectors, and tourism to Alaska became more and more widespread. Construction of the Alaska Railroad and Richardson Highway increased both freight and passenger transit to Seward, Anchorage, and Valdez. Demand for copper during World War I ensured that shipping from Cordova was profitable.

By the onset of World War II, Alaska Steamship Company had a near monopoly on the Alaska shipping industry. The passage of the Merchant Marine Act in 1920 — also known as the Jones Act — hurt Canadian-owned companies because it mandated that all ships carrying goods or passengers between two U.S. ports be majority American owned, operated, and manufactured.

The Great Depression of the 1930s was hard on Alaska Steamship's competitors, who didn't have the lucrative Kennecott connection. Alaska Steamship bought out the Pacific Steamship Company, the successor of the Pacific Coast Steamship Company, Alaska's Steamship's original and last substantial rival.

## Decoupling of freight and passenger services

World War II further connected Alaska to the Lower 48 with the construction of the Alaska Highway and the expansion of scheduled air service.

Air transportation to Alaska became a federal priority, and existing federal subsidies and contracts for steamers were redirected toward airlines. More airfields sprung up for both civilian and defense purposes. By 1949, Alaska Steamship Company was the only steamship company with service to Alaska and in 1954, the company dis-

continued its passenger service and sold off its passenger liners.

Rail barge service began in Alaska in 1953, which meant rail cars could roll directly onto a barge with embedded tracks. The first service was between the Ward Cove pulp mill near Ketchikan and Prince Rupert, the terminus of the Canadian National Railway, operated by an arm of Crowley that is now the world's largest tug and barge operator.

In 1962, rail barge service began in Whittier, which linked the Alaska Railroad to the rest of the North American rail network. The Alaska Railroad, in conjunction with Crowley tugs, operated the route from Whittier to Seattle, and Canadian National operated the route from Whittier to Prince Rupert. The Alaska Steamship Company quickly entered the railcar market and began operating a train ship between Whittier and Vancouver.

By the time Alaska achieved statehood in 1959, Alaska Steamship was sending two ships each week from Seattle to both Southeast and Southwest Alaska. Smaller vessels carried goods to

ports too small for the container ships.

## Containerization further modernizes the industry

Alaska Steamship Company had begun experimenting with containerization even before exiting the passenger service industry. Early containers were much smaller and more difficult to manage than modern shipping containers, but they did make loading and unloading freight easier and reduced pilfering.

Containerization also helped keep temperatures more consistent, which meant produce was more likely to make it to Alaska before spoiling. Refrigeration and heating techniques improved, and generators were installed on ships to keep temperatures controlled. This service reached Juneau and Ketchikan in 1961, and it was a boon for local grocers.

Alaska Steamship was no longer the only company pursuing containerization. Tug-and-barge operations required far less labor than a typical self-propelled ship, and because of containerization they could get in and out of port quickly.

Crowley was the first company to offer common carrier container barge service to Alaska in 1958, after already making a splash in Alaska by supplying the Air Force's Distant Early Warning Line radar installations along the northern and western Alaska coasts.

Alaska's marine freight transportation industry was truly modernizing. Sea-Land Service, a major American shipping firm, entered the Alaska market with year-round fully containerized deep draft service from Seattle to Anchorage and Kodiak.

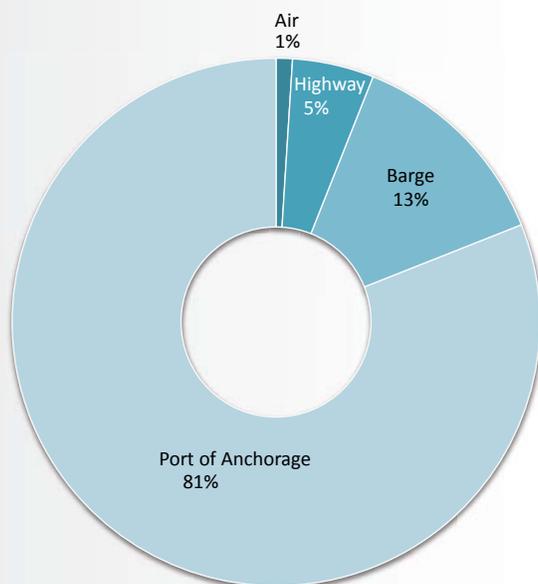
Alaska Steamship also introduced container ship service between Seward and Seattle. Alaska Steamship's older fleet couldn't compete with the new operators, however, and after three-quarters of a century of service in Alaska, it went out of business in 1971.

## Good Friday earthquake

The 1964 earthquake devastated coastal South-

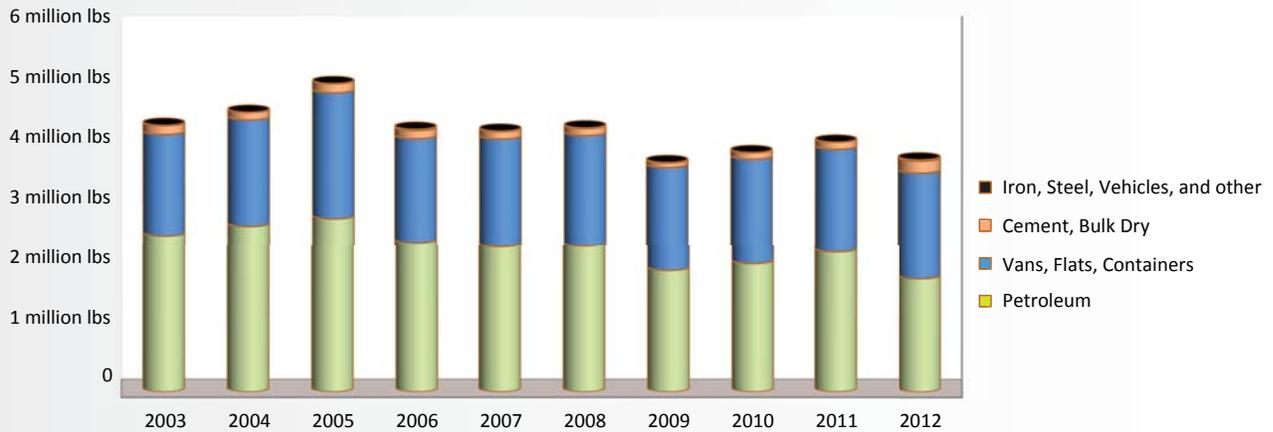
## 2 Freight Entering Railbelt

Source by tonnage, 2009



Sources: University of Alaska Anchorage, College of Business and Public Policy; and Port of Anchorage

### 3 Port of Anchorage Dock Tonnage by Commodity 2003 to 2012



Source: Port of Anchorage

central Alaska. Waves and fire destroyed the docks in Seward, Whittier, Valdez, and Kodiak and decimated entire smaller Southcentral communities such as Chenega and Portage. Anchorage suffered the most damage as the largest city in the area, but largely from subsidence rather than waves.

Seward's port was not rebuilt. The Port of Anchorage, which had just been built three years prior, was relatively unscathed by the earthquake. Rail barge service continued out of Whittier once the tracks were repaired, but the earthquake hastened the inevitable concentration of shipping at Anchorage's new port. (See Exhibit 2.)

### Oil and shipments by water

When oil was discovered in Cook Inlet in 1957, tugboats became essential to the oil industry, especially with the development of offshore oil platforms. Cook Inlet has some of the most extreme tides and currents in the world and isn't ice-free year-round, so specialized techniques were developed to haul barges for construction and supply of oil industry facilities.

This expertise in working in difficult conditions became even more useful with the discovery of oil at Prudhoe Bay in 1968. Crowley continues to be a major supplier of tug-and-barge services

to oil operations on the North Slope, and it has delivered more than a million tons of cargo since 1968.

The construction of the pipeline between Prudhoe Bay and Valdez in 1974 was another major project for the shipping industry. Most of the steel pipe for the pipeline came to Alaska on the rail barge to Whittier, where some was reloaded onto barges bound for Valdez. The Valdez waterfront even featured rail siding, though it had no connecting railroad, so pipe-laden rail cars could unload.

Other pipe was transported north on the Alaska Railroad, then trucked farther north on the Haul Road. An estimated 120 shiploads were required to carry 550,000 tons of pipe for the construction of the pipeline.

Once the pipeline was finished, Valdez became a major port. Two or three supertankers would arrive and depart Valdez daily, bound for West Coast refineries. Daily average throughput peaked in 1988 at just over 2 million barrels a day. By the end of 1988, more than 6.6 billion barrels had been shipped out of Valdez.

The aftermath of the 1989 grounding of the Exxon Valdez tanker and subsequent spill of up to 11 million gallons of oil in Prince William Sound had a lasting effect on water transportation and

its support services. The Ship Escort/Response Vessel System, or SERVS, was established after the spill, and two tugboats were required to escort tankers out of Prince William Sound. They also helped with both navigation and immediate spill response.

SERVS currently operates with two enhanced tractor tugs, three prevention response tugs, and five other vessels that include docking tugs and a utility boat. The SERVS vessel of opportunity program began in 1990 to employ local boat captains in spill response. Alyeska Pipeline Services contracts with more than 400 area vessels — mostly fishing boats — and crew for response readiness. SERVS provides training and drills to ensure captains are prepared for an incident.

## Water transport today

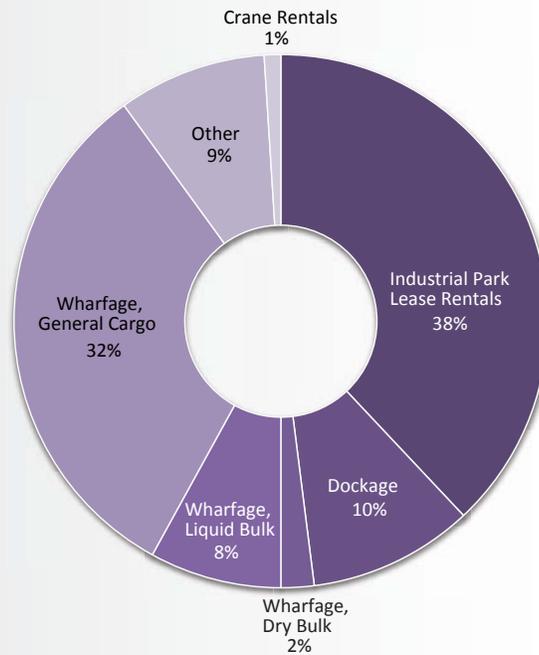
Oil isn't the only bulk cargo that leaves Alaska's ports. Alaska's other mines rely on water transportation to get their materials to market. Red Dog Mine in the Northwest Arctic Borough and the Greens Creek and Kensington mines near Juneau have their own docks for loading material onto barges and ships. Interior mines use Alaska's intermodal transportation network to get their minerals to shipping vessels bound for ports all over the world.

Cargo entering the Port of Anchorage accounts for 90 percent of merchandise in Alaska communities west of Cordova, according to a joint study by the University of Alaska Anchorage and the port. Nearly all of these goods originate from the Port of Tacoma, which has replaced Seattle as Alaska's shipping hub. An estimated 30 percent of Tacoma's total cargo is bound for Alaska. (See Exhibit 2.)

Two main firms, Horizon Lines and Totem Ocean Trailer Express, or TOTE, supply two ships per week at the port. Horizon Lines uses container cranes to lift containers from the ships, while TOTE ships are designed to carry wheeled cargo.

The Port of Anchorage is a major fuel hub as well. Up to two-thirds of jet fuel bound for Ted Stevens Anchorage International Airport passes through the port as well as two-thirds of the fuel used by military and federal agencies in Alaska.

## 4 Port of Anchorage Revenues By source, 2012



Source: Port of Anchorage

All of the aviation gas used by smaller planes comes to Alaska through the Port of Anchorage, and up to 90 percent of gasoline used in motor vehicles and small boats passes through the port before delivery to the rest of the state.

In 2012, 3.8 million tons of cargo came in through the Port of Anchorage, including container cargo, mail, fuel, construction materials, drill pipe, cement, and military equipment. (See Exhibit 3.)

Around 700,000 tons of cargo entered at other railbelt ports, including private Anchorage docks, Whittier, and Seward. This includes cargo that arrives in Whittier from Seattle and Prince Rupert from two rail barge operations.

Anchorage-bound freight is typically trucked to its final destination. The Alaska Railroad transports around 60 percent of cargo bound for other railbelt communities, and the remaining 40 percent is trucked. Goods for rural Alaska are primarily trucked to warehouses and distribution centers and then flown in by air freight and bypass mail carriers. Some cargo originating at the Port of Anchorage is also air-freighted to Southeast.

Bypass mail serves much of rural Alaska's freight needs, allowing rural retailers to fly cargo directly from designated wholesalers in Anchorage and Fairbanks at the cost of Parcel Post mail while bypassing the USPS sorting facilities. Although bypass mail is competition to barge service, it substantially increases the demand for aviation gas in rural Alaska, creating a different opportunity for coastal and inland tug operators.

Some cargo bound for Western Alaska is loaded onto barges and towed north. The majority of cargo barged to Western Alaska, however, comes directly out of Seattle.

Horizon Lines provides direct container ship service to Kodiak and Dutch Harbor along with Anchorage. Horizon Lines ships bound for farther western ports typically unload cargo in Anchorage, then load Asia-bound frozen fish from Southcentral Alaska and Kodiak and carry it to Dutch Harbor, where it travels on ships that cross the North Pacific.

Frozen fish from Kodiak and Dutch Harbor are also backhauled to Tacoma for domestic consumption. Backhaul remains a challenge for Alaska shippers because so much goes into Alaska with relatively little outbound freight. On av-

erage, two of every 10 containers are loaded with cargo for the return trip to Tacoma, usually with recycling, frozen fish, rental fleet inventories, and household goods and cars for people moving out of Alaska.

While container ships arriving at the Port of Anchorage handle the bulk of Alaska-bound cargo, Alaska's network of tug-and-barge operations are essential to communities off the railbelt and in shallow or inland water. An estimated 90 percent of freight bound for Southeast Alaska travels by tug and barge. Barges' benefits are shallow draft and large flat surfaces that can haul just about anything. Inclement weather, particularly in the winter, can hold up barges for weeks, which means an occasional bare grocery store shelf isn't uncommon off the railbelt.

Off-road Alaska communities depend heavily on fuel barges as well. All fuel shipped to Southeast Alaska, with the exception of aviation gas, is towed up from the Lower 48 and stored in bulk fuel storage facilities. During the ice-free summer, barges tow fuel to Western and Northern Alaska from the Lower 48 and Anchorage, then river tug and barge outfits haul it up the Yukon River.