

VI. Emerging Sectors

Mariculture

Mariculture at a Glance:

- In 2021, there were 49 producing mariculture operations in Alaska—29 farms with sales and one hatchery/nursery.¹³¹
- Seaweed production in Alaska grew by 232% in 2021, to 536,390 lbs sold.¹³²
- Oyster production declined for the third year in a row in 2021, with 4.6 million oysters sold.¹³³

Mariculture—production of food products from the ocean—is not new in Alaska. Oysters, mussels, and clams have been farmed in Alaskan waters for decades, and the wild harvest has fluctuated over the years. However, developing opportunities with pharmaceuticals, nutraceuticals, bioenergy, and food industries have stimulated a booming interest in the industry, specifically in the cultivation of aquatic plants like kelp.

Aquatic farms are scattered across Southeast, Southcentral, and Southwestern Alaska. The industry is challenged by high energy costs and logistical hurdles, both linked to the remoteness of most mariculture operations. Both factors create challenges for processing products and getting them to market.

Mariculture in the Gulf of Alaska

Permitted mariculture operations in Alaska, January 2022.

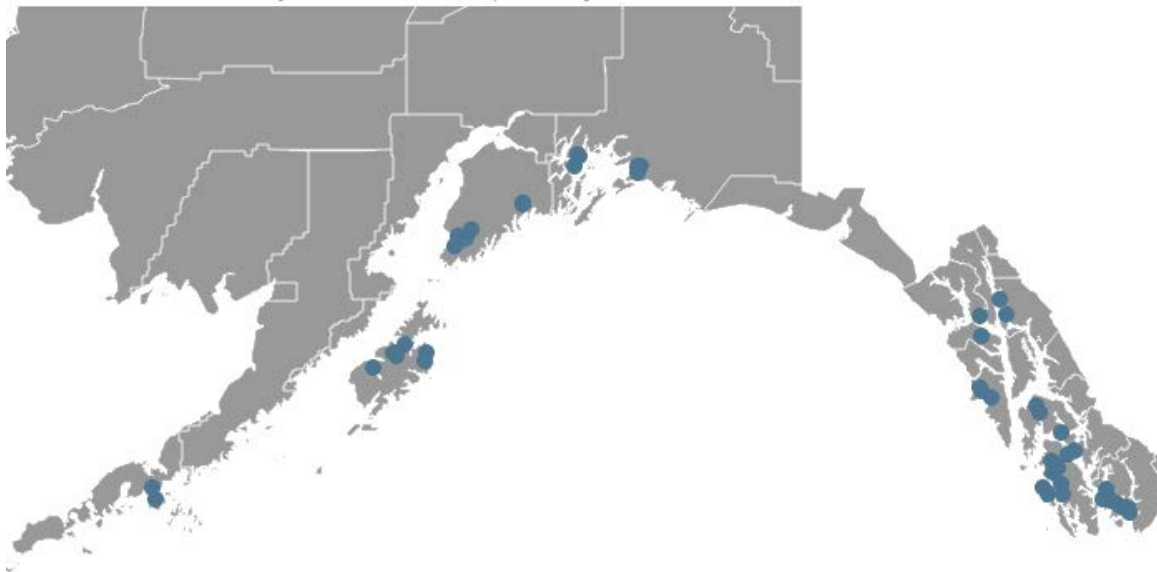


Figure 43: Permitted mariculture operations in Alaska, January 2022.

Source: Alaska Department of Fish and Game.

Mariculture production in Alaska has remained variable over the years with oyster production peaking in 2018 at 11.8 million oysters sold by commercial growers.¹³⁴ Sales decreased in 2019, 2020, and 2021. This was not expected to be a long-term trend; however, the lockdowns and business closures, specifically restaurant closures, associated with the COVID-19 pandemic dramatically disrupted Alaska

oyster production.¹³⁵ The three-year trend is likely driven by reduced sales from hatcheries and nurseries.¹³⁶

Aquatic plant production—seaweed and kelp—has boomed over the last four years, reaching 536,390 lbs sold in 2021 from essentially nothing just five years earlier.¹³⁷ As recently permitted mariculture operations mature, mariculture production could continue to grow rapidly.

Statewide Mariculture Production

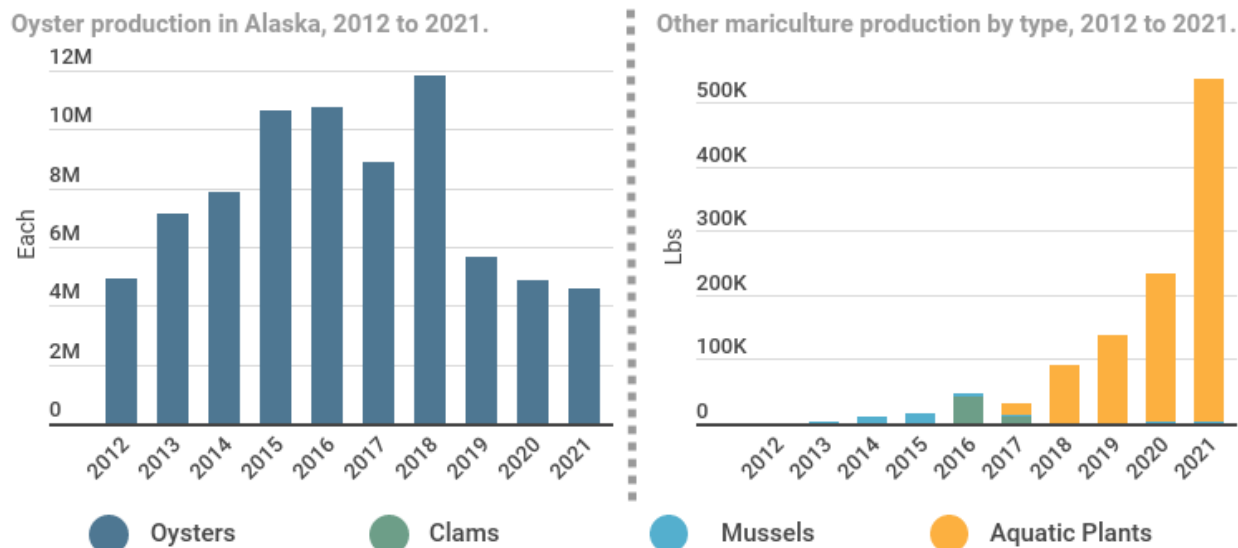


Figure 44: Oyster, mussel, clam, and aquatic plant production, 2012 to 2021.
Source: Alaska Department of Fish and Game.

Seaweed and kelp mariculture represents one area of mariculture that has been targeted for its growth potential. Currently 97% of the world's commercial seaweed is produced in Asia. Worldwide, farmed seaweed production has grown 7% annually over the last 20 years.¹³⁸ Seaweed is used to produce hydrocolloid products, food products, protein replacement, bioplastics, and more; however, Alaska seaweed and kelp is primarily sold to food markets currently.

Alaska's commercial seaweed and kelp producers are still limited by low volumes and high production costs. Achieving larger economies of scale will be necessary to enter the broader global market. Alaska has three currently permitted seaweed farms—two with production; however, 49 seaweed mariculture permits were submitted to the State of Alaska between 2017 and 2021. In addition to a limited number of producers in the state, seaweed and kelp growers also have a limited number of buyers for their products. Blue Evolution and Seagrove Kelp Co. are the two commercial kelp buyers in the state, serving growers in Kodiak and Southeast.¹³⁹

Critical Issues for Alaska Mariculture

- Limited local market for products.
- High production cost.
- Regulatory and permitting barriers.
- Access to global markets.
- Cultivation of seed stock.

Opportunities for Alaska Mariculture

- Marketing of premium “Alaska Grown” products.
- Seaweed and mariculture research and product development.
- “New habitat”: large-scale, carbon sequestering, offshore seaweed farms.
- Expansion of seaweed buyers diversifying the supply chain.
- Growth in seaweed uses and products.
- Marketing Alaska oysters to restaurants and other premium buyers in the Lower 48.

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Marine Services Industry

Marine Services Industry at a Glance:

- Approximately 380 jobs in boat and ship building statewide in 2020.¹⁴⁰
- A fleet of over 9,000 vessels greater than 28ft in length.¹⁴¹

Alaska’s dependence on the marine environment runs deep—from Inupiat whale hunters in *umiaqs* millennia ago, to Bristol Bay sailboat gillnetters in the last century. Today, almost all economic activity in the state has ties to maritime activities. Ocean transportation moves goods and people to the state and around the state and delivers fuel to communities and industry sites around the state. Boats are a tool for mining, seafood, tourism, and more.

All of this means that while the state is dependent on marine vessels, vessel operators are dependent on a robust marine services industry to maintain the current fleet and build new vessels. The marine services industry refers to the activities which facilitate the operation and maintenance of Alaska’s fleet. According to a 2014 study, Alaska has an aging fleet of over 9,000 vessels greater than 28 ft in length with countless more smaller craft used for subsistence harvesting, recreation, transportation, and patrol.¹⁴²

Alaska’s in-state boat and ship building and repair industry is small, directly supporting approximately 380 jobs, and seasonal, with employment fluctuating between a peak of 454 jobs in March 2020 and a valley of 330 jobs in July 2020.¹⁴³ However, the industry is a growing force with the development of key assets, including the Vigor shipyard in Ketchikan, the JAG Alaska, Inc. Shipyard facility in Seward, and a handful of small boat and ship builders scattered across the state.

Boat and Ship Building Employment in Alaska

Annual boat and ship building and repair industry employment, 2011 to 2020.

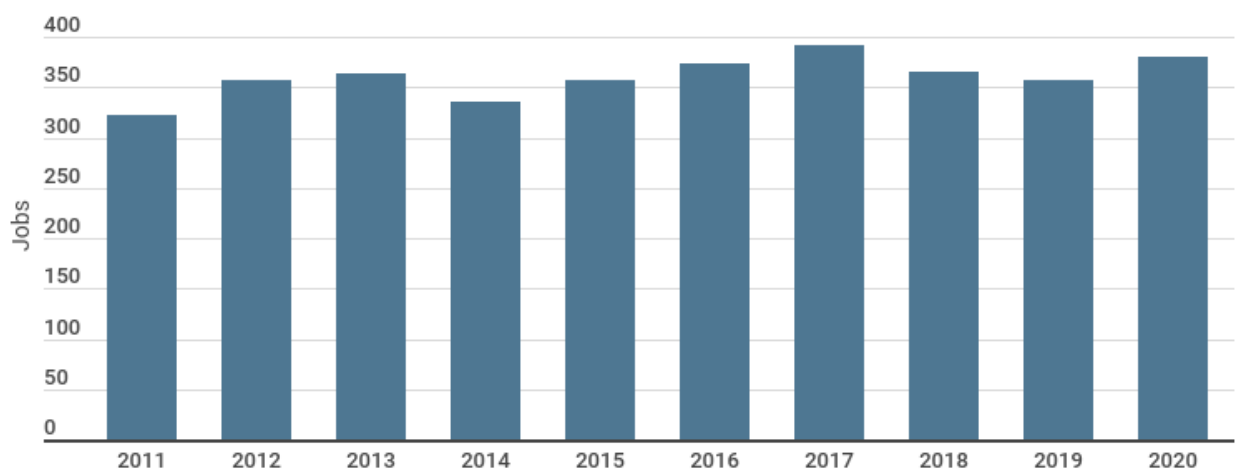


Figure 45: Annual boat and ship building and repair industry employment, 2011 to 2020.
Source: QCEW.

While Alaska’s marine services industry is small, it is important to recognize the value of capturing manufacturing and maintenance work that would otherwise go to out-of-state sources, predominantly Washington. A 2015 report published by McKinley Research, *Ties that Bind*, estimates that 5,300 jobs in the marine services industry in Puget Sound stem from Alaska business.¹⁴⁴

Key constraints for Alaskan companies in this space include workforce challenges, capacity limitations, high energy costs, and access to materials. However, if Alaskan companies can find ways to compete with out-of-state firms by lowering costs or finding other comparative advantages it would reduce leakages out-of-state and improve the economic resilience of industries dependent on maritime activities.¹⁴⁵

Critical Issues for Alaska Marine Services Industry

- High cost of doing business.
- Seasonality of demand for services.
- Workforce shortages.
- Access to working capital and financing for fixed assets.

Opportunities for Alaska Marine Services Industry

- Capture a larger share of repair and service business currently going to Puget Sound.
- Developing vessel technology innovations to meet the needs of Alaskans, providing an export opportunity.
- Expansion of maritime tech startups supported by the Alaska Ocean Cluster.
- Growing Alaska's maritime dependent industries (i.e. seafood and marine cargo) to grow business for the state's marine services industry.

Agriculture

Agriculture at a Glance:

- Alaska has approximately 850,000 acres of operated farmland.¹⁴⁶
- Approximately 1,050 farms operated in 2021.¹⁴⁷
- Agriculture revenue has increased over the last two decades, reaching \$39 million¹⁴⁸ in sales in 2017 in real 2021 dollars.¹⁴⁹

Many areas of Alaska have a long history with agriculture, from Palmer which was formally established as an agricultural colony in 1935, to reindeer farming in western Alaska which commenced in the late 1800s and continues today.¹⁵⁰ While the scale of Alaska’s agriculture industry does not lend itself to export—with the exception on the booming peony industry—the products aid Alaskan self-sufficiency and provide valuable import substitution for goods that would otherwise be imported from out-of-state.

A wide variety of agricultural products are produced in Alaska, predominantly for in-state consumption. Nursery, greenhouse, floriculture, and sod production (which includes peony growers) ranks the highest in the state in terms of gross market value of sales, with \$16.9 million in total sales in 2017.

Flower Production Drives Agriculture Revenues

Value of agriculture products sold by product in real 2021 dollars, 2017.

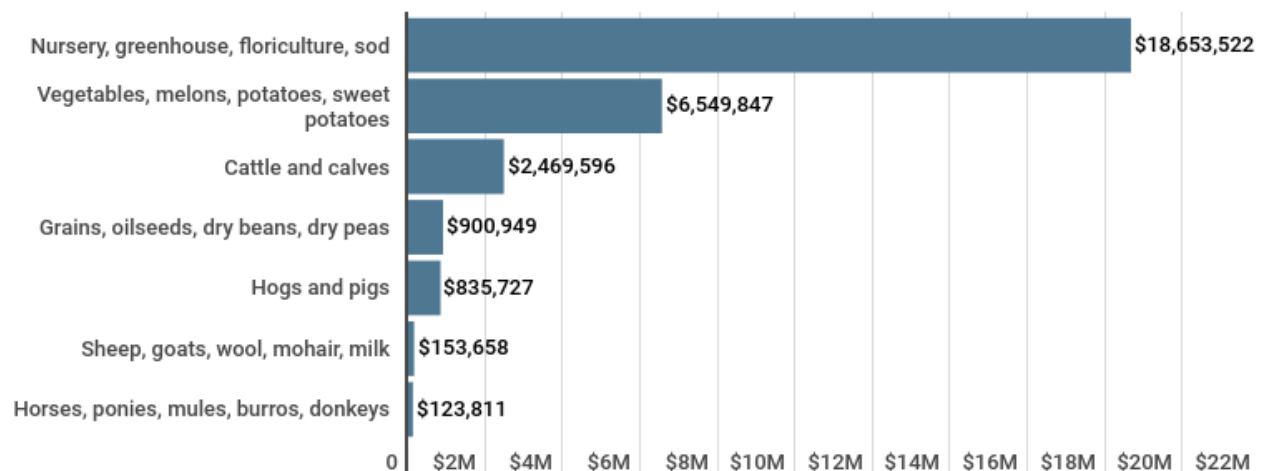


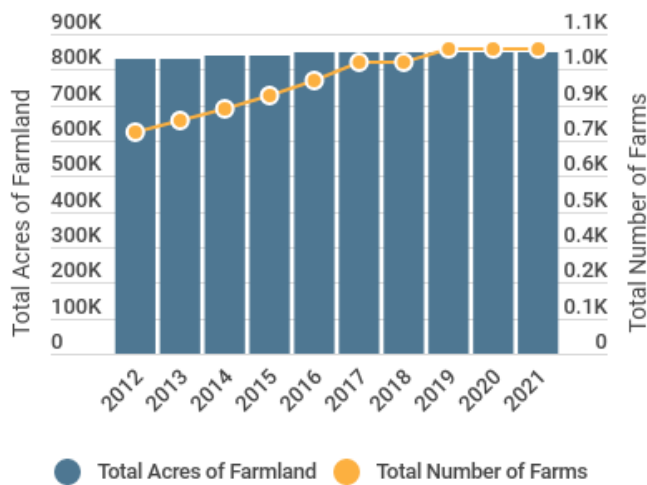
Figure 46: Value of agriculture products sold by product in real 2021 dollars, 2017.

Source: USDA.

Over the last two decades the total acreage of farmland in Alaska has grown. However, the average farm size has decreased. This is perhaps a function of a transition in the type of agricultural activity in the state. While farming activities which require large swatches of acreage, like hay or barley production, still play a role in the state’s agriculture industry, the rise of micro-farms for small-scale vegetable production and peony farming has started to shift the industry. Despite this transition total farm sales have grown substantially.

Growth in Quantity of Farms outstrips Growth in Farmland

Total acres farmed compared to total number of farms in Alaska, 2012 to 2021.



Estimated total agriculture sales in real 2021 dollars, 2002 to 2017.

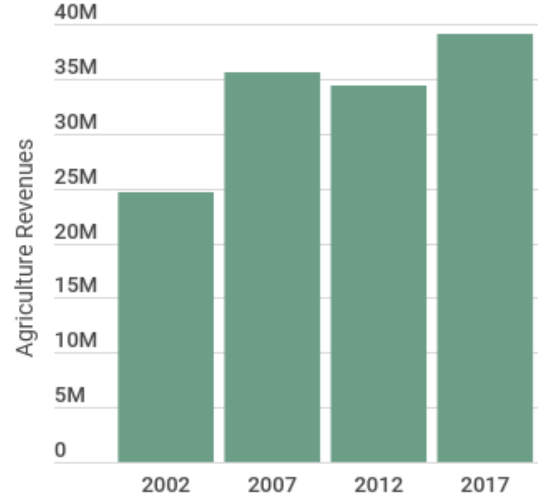


Figure 47: Total acres farmed compared to total number of farms in Alaska, 2012 to 2021; Estimated total agriculture sales in real 2021 dollars, 2002 to 2017.

Source: USDA.

Critical Issues for Alaska Agriculture

- Land availability.
- Succession planning—finding the next generation to step into established operations.
- High cost and logistical hurdles of meeting FDA/USDA requirements.
- High cost of operations in isolated areas.

Opportunities for Alaska Agriculture

- Growing local supply chains (i.e. Alaskan brewers using Alaskan barley and other Alaska grown products).
- Substituting in-state produce for imported produce to keep money local and increase resiliency.
- Maturation of high growth agriculture “cash crops” like peony production.
- Controlled environment agriculture of CEA (e.g. hydroponics and containerized growing systems) enabling year-round production.

Aerospace and Aviation

Aerospace and Aviation at a Glance:

- A total of 6,451 jobs were supported by aerospace and aviation-related industries in 2020.¹⁵¹
- Aircraft engine and parts manufacturing exported \$96 million in products in 2020, ranking 14th in the state’s total exports.¹⁵²
- FAA’s Alaska Region has 2.4 million square miles of airspace.¹⁵³
- Alaska hosts an FAA-designated test range for unmanned aircraft, and the University of Alaska Fairbanks is a global leader in the field.
- The Pacific Spaceport Complex – Alaska hosted its first private sector launch in 2018. In 2021, the launch site hosted 2 launches, both commercial.¹⁵⁴

Aviation is not a new sector in Alaska’s economy. Alaska’s history has been dotted with the names of many firsts since the invention of aircraft: Noel Wien (Alaska’s first commercial aviator), Ben Eielson (first to fly mail), and Joe Crosson (first to land on Denali’s glaciers). Coinciding with that list of firsts is a history rich with aviation innovation and technology development, from airplane skis and floats to specialty bush plane tires designed to land on sandbars.

In 2020, aviation and aerospace-related industries supported 6,451 direct jobs in Alaska. This area of the economy was impacted by the COVID-19 pandemic and associated travel reductions. Prior to the pandemic the industry experienced slow but steady growth despite the statewide recession between 2015 and 2019. Though small, the aerospace parts manufacturing sector specifically has shown strong growth, nearly tripling the number of jobs over the last decade. This includes companies like Airframes Alaska and Airglas, who build aircraft components in Alaska and export them globally.¹⁵⁵

Aviation and Aerospace Related Industries Job Growth

Employment in aviation and aerospace related industries, 2011 to 2020.

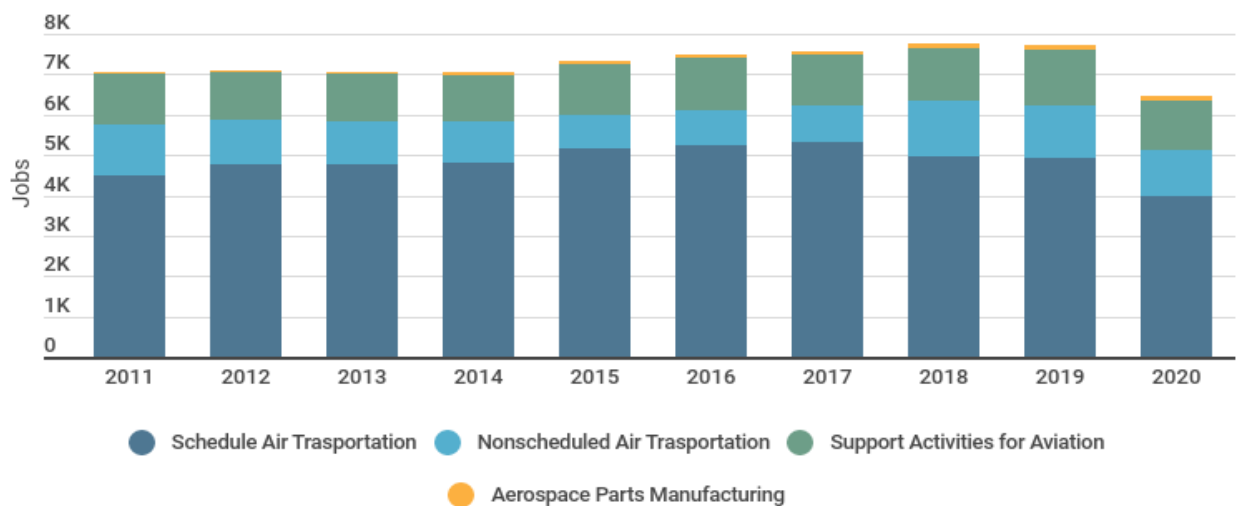


Figure 48: Employment in aviation and aerospace related industries, 2011 to 2020. Source: QCEW.

According to a report published by the State of Alaska Department of Transportation and Public Facilities, the aviation industry in Alaska supported more than 35,000 jobs in Alaska in 2017.¹⁵⁶ This

considers the additional indirect and induced impacts of the aviation industry. The industry holds an outsized impact in Alaska's economy, representing 8% of the total employment in the state.

Today Alaska is also leading in other areas of aerospace. The Pacific Spaceport Complex, a launch site on Kodiak Island, facilitates launches by commercial and government partners. Another valuable asset, the Alaska Center for UAS Integration at UAF, operates one of six FAA unmanned aircraft test sites. Both sites are examples of innovation and technology development emerging out of Alaska's miles of airspace.

Critical Issues for Alaska Aerospace and Aviation Industry

- Supply chain isolation.
- High cost of operations.
- Complex regulatory processes.
- A need for greater awareness of Alaska as a testing ground.
- Access to high skilled workforce (technology skill sets, coding, etc.)

Opportunities for Alaska Aerospace and Aviation Industry

- Participation in recurring business from the low earth orbit (LEO) satellite industry.
- Marketing aerospace facilities to commercial operators
- Strategic northern location to access northern latitudes.
- Scale of available airspace to test new technologies.
- Integrated workforce and training opportunities in communities (Kodiak) and the University of Alaska system.