WRAC fact sheet

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Characterization of Aquaculture in the Western U.S.

ALASKA

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Photo: Two Glacier Point Oysters, aquacultured in the Kachemak Bay by Alaska Shellfish Farms.

Alaska is a unique state of the U.S. from many perspectives, and its approach to mariculture and aquaculture reflects its geographic and socio-economic differences. Alaska, for example, has the longest coastline, by far, of any state in the U.S. and leads the nation in commercial fishing landings by several orders of magnitude. Salmon is the most valuable commercial fishery in Alaska, accounting for 36% of the ex-vessel value of seafood caught in Alaska and 15% of the volume in 2019, second only to pollock with landings that were 59% by volume (ASMI, 2022).

The salmon fishery in Alaska is supported by a form of aquaculture referred to as ocean ranching in which juvenile fish are released into the ocean to grow without further care until harvested as a common property fishery by commercial, sport, and subsistence fishermen. Alaska has developed a unique structure to provide stock enhancement support to the important salmon fishery by authorizing privately owned, nonprofit corporations to operate hatcheries that support ocean ranching of salmon. There were 30 salmon hatcheries operating in Alaska in 2022.

Commercial mariculture in Alaska refers to farming primarily shellfish and seaweed, but also includes sea cucumber and sea urchin farming. Shellfish farming in Alaska dates back to 1910 when Pacific oysters were first introduced (LaLonde, 1992), but new legislation in the late 1980s created the framework and regulatory language to allow for commercial aquatic farming. Total reported sales more than doubled from the 2005 to the 2018 Census of Aquaculture (USDA-NASS 2006, 2019) (Figure 1). By the end of 2022, there were 64 active farming leases of which 45 had sales in 2022 (Personal communication, Alaska Fish & Game, 2023), including 11 for shellfish, 8 for seaweed, 20 for combined shellfish & seaweed production, and 6 hatcheries (4

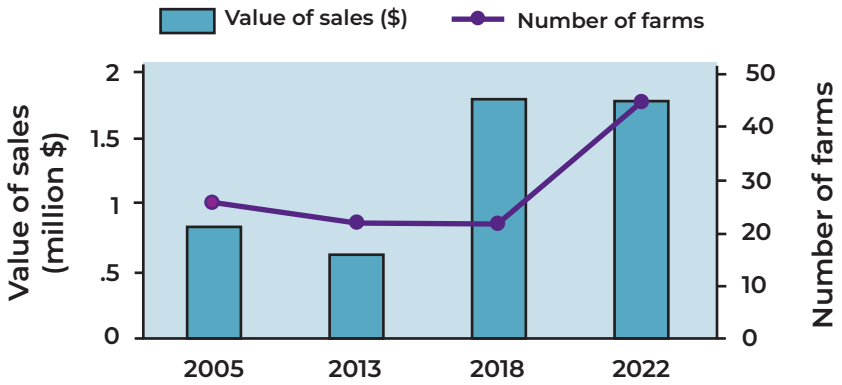

Figure 1. Total mariculture sales and number of farms in Alaska, 2005 to 2022. Source: USDA-NIFA (2006, 2014, 2019; Alaska Fish and Game (2023); Whitney (2023).)

Note: The 1998 Census of Aquaculture incorrectly reported salmon production for enhancement of commercial fishing stocks as commercial farms and those data are not reported here.

for seaweed and 2 for combined seaweed and shellfish) (Table 1). Mariculture permits in Alaska include approvals for a variety of shellfish, including Pacific oysters, Kumamoto oysters, geoducks, blue mussels, cockles, littleneck clams, Pacific razor clams, butter clams, and purple-hinged rock scallops. Permits for seaweed include several types of kelp (bull, ribbon, sugar, giant, dragon, three- and five-ribbed, split), dulse, and nori. The vast majority of sales from mariculture in Alaska, however, are of Pacific oysters. Total sales in 2022 were $1.79 million, of which 84% were from oysters and 16% from kelp, with some minor sales of mussels (Whitney, 2023) (Table 2).

Alaskan mariculture producers create and sustain multiple and diverse supply chains that contribute to local economies and employment, while supplying aquatic products locally and to customers in the lower 48 states. A recent supply chain analysis funded by the Western Regional Aquaculture Center identified 13 distinct supply

Photo: Bobbi Hudson, Pacific Shellfish Inst.

Sorting oysters on a southcentral Alaska oyster farm with extruded plastic high flow cages by Thunderbird Plastics.

Table 1. Active mariculture farms in Alaska, 2022.

Category	Actively farmed but no sales in 2022 (number of farms)	Farms with sales in 2022 (number of farms)
Growout production farms		
Shellfish	23	11
Seaweed	11	8
Combined shellfish & seaweed	24	20
Hatcheries		
Seaweed	4	4
Shellfish	2	2
Total	64	45

Table 2. Sales, and relative proportions of mariculture products sold into food or recreational markets, Alaska, 2022 (Alaska Department of Natural Resources).

Category	Value
Oysters	$1.5 million
Kelp	$278,929
Mussels	$2,990
TOTAL	$1,781,919

Ocean ranching in Alaska contributes to the substantial commercial fishing sector in Alaska. Salmon ranching hatcheries include those owned and managed by the state but also privately owned hatcheries that operate as nonprofit corporations with varying degrees of access to public facilities and publicly funded support for operating expenses. Whether operated by state or non-profit organizations, publicly funded hatcheries support mariculture supply chain businesses (i.e., fuel, farm supply, and repair and maintenance sectors), but it was beyond the scope of this Western Regional Aquaculture Center project to survey entities other than wholly privately owned mariculture farms.

chains for shellfish farms in Alaska (Figure 2). A single supply chain consists of the path that a product takes as it moves from a hatchery or nursery to the end consumer. The various combinations of pathways denoted by dotted lines in Figure 2 show the different supply chains found in Alaska. Major types of participants in Alaska shellfish supply chains include those who provide inputs (i.e., farm supplies and gear, utilities, fuel, financial loans), hatcheries and nurseries, growout farmers, wholesalers and distributors, restaurants and supermarkets, and consumers.

The Contribution of Mariculture to the Economy of Alaska

The total economic contribution of mariculture in Alaska in 2022 was $3.73 million (Table 3). Of this, $1.79 million was from direct contributions from mariculture farms, $1.14 million of indirect contributions of supply chain partners, and $0.80 million in induced output from the additional household spending from employment created. Of the total 162 jobs supported by mariculture in Alaska, 152 were on mariculture farms, 6 from supply chain partners, and 4 from induced effects. Additional economic contributions include $276,922 in federal tax revenue, $43,376 in state tax revenue, and $28,816 in local/county taxes (Table 4).

Alaskan Shellfish Farming Supply Chains

Nearly all shellfish production in Alaska is of Pacific oysters. Shellfish farms purchase seed from either a hatchery (in Washington or Hawaii) or from an Alaskan nursery that purchases seed elsewhere and grows it to a larger size for re-sale. A cooperative has developed in Alaska to support shellfish producer members by purchasing seed from hatcheries to grow to the size required for planting into growout facilities.

Oyster growers in Alaska use various types of gear to raise their crops. Many use suspended tray systems, others use intertidal or floating flip bags, and at least one uses lantern nets. Once the oysters are market size, they are tumbled a final time, allowed to heal for 30 days, and then, ideally, put on a hardening beach for 30 days to strengthen the adductor muscles

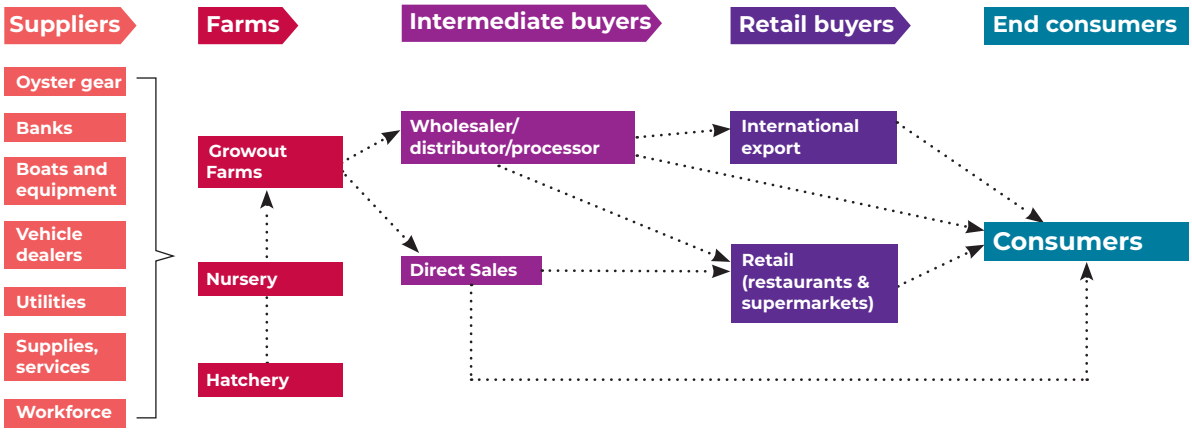

Figure 2. Supply chain map of Pacific oysters grown in Alaska.

Table 3. Economic contribution of the mariculture sector to the economy of Alaska, 2022.

Type of impact	Employment	Total Output
Direct economic impact	152	$1.79 million
Indirect economic impact	6	$1.14 million
Induced economicXmpact	4	$0.80 million
Total economic impact	162	$3.73 million

Table 4. Tax revenue generated from the mariculture sector in Alaska, 2022.

Tax category	Tax revenue ($)
Federal	$276,922
State	$43,376
Local/county	$28,816
Total	$349,114

to extend their shelf life. Oysters must be tested for paralytic shellfish toxin (PST) before sale. Test results often are not received for several days during which time the oysters must be refrigerated to preserve quality. Thus, shelf life of Alaskan oysters is important and has led to development of the hardening process to extend oyster shelf life. Most growers in Alaska ship shellfish by air or by boat. The COVID-19 pandemic resulted in changes to airline flight schedules that created shipping challenges for shellfish growers. While many growers sell locally, Alaskan oysters are also sold to wholesalers/distributors for sale to larger urban areas in Alaska, other states, and internationally. Approximately 27% of Alaskan shellfish are sold to a wholesaler/distributor that sometimes is also a packer or processor, and 34% are sold directly to restaurants or consumers, many of whom are in other states. The remaining 39% of sales are to other farms that often serve as wholesalers/distributors for re-sale. Some direct sales to consumers are from customers who stop by to purchase oysters, but most direct sales to consumers are online sales.

Alaska presents many opportunities for expansion of commercial mariculture, particularly of various types of shellfish and seaweed and is home to the largest kelp farm in the United States. Shellfish growers have developed effective supply chains despite the remote locations of many farms and the accompanying distance to markets. Continued growth of shellfish and seaweed sales in Alaska has potential for increased economic contributions to the state.

Photo: Bobbi Hudson, Pacific Shellfish Institute

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* *Census of Aquaculture 2005, 2013, and 2018 available at: https://www.nass.usda.gov/Surveys/Guide_to_NASS_Surveys/Census_of_Aquaculture/index.php*

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