AgWest FARM CREDIT

Industry Perspectives

Fisheries

This Industry Perspective was prepared by AgWest Farm Credit's Fisheries Industry Team. Direct questions and comments to the Business Management Center by email at bmc@agwestfc.com.

Fisheries

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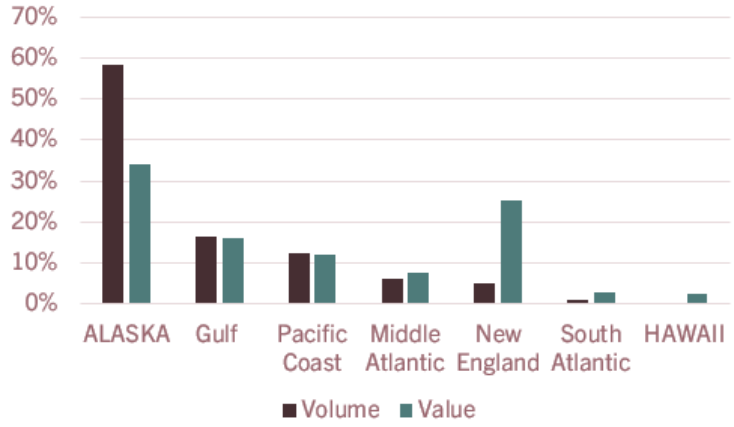
Introduction

The nature and scope of world fishery production has evolved since the 1950s. While initially harvest volume and growth took place in marine capture fisheries (wild-caught fish), this began to shift towards aquaculture in the mid-1990s. By 2020 aquaculture made up 50% of global fish production. This trend will likely continue as a growing population and per-capita consumption of fish come up against the need to protect marine ecosystem diversity and long-term viability. China is the largest global player with 35% of total global production, two-thirds of which is from aquaculture and the remaining from marine capture. In contrast, the United States produces only 3% of the global market and predominately relies on marine catch fisheries[1]. In 2022, U.S. commercial fishermen landed 3.8 million metric tons valued at $5.6 billion. While Alaska is the largest producer by both volume (58%) and value (34%), New England is second in terms of value (25%) given its predominance of lobster and scallop fisheries.

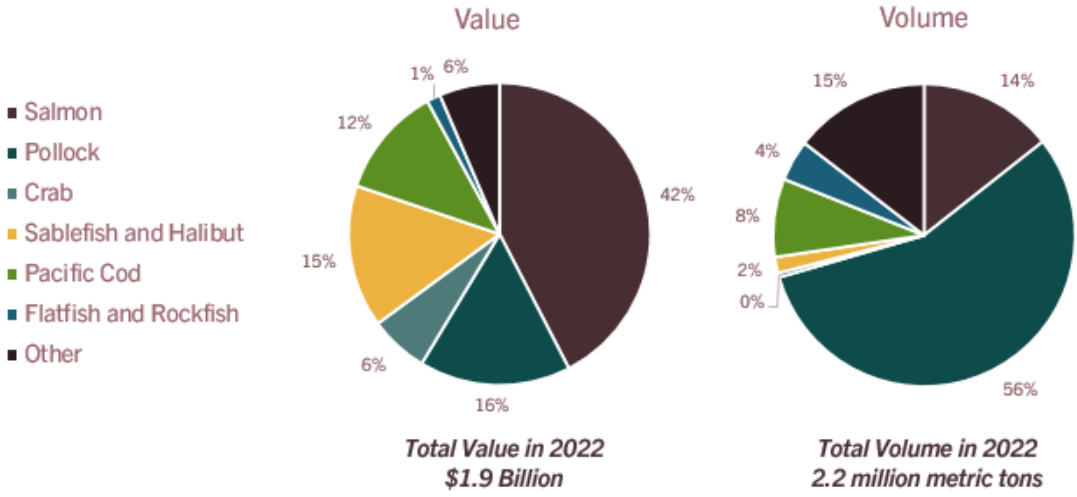
Total Share U.S. Landings by Volume and Value, 2022



Source: NOAA Fisheries, Commercial Landings.

Pollock is by far the largest catch for Alaskan fisheries, but there's a diverse supply base of salmon, crab, Pacific cod, flatfish/rockfish and sablefish/halibut and other species. Bristol Bay Salmon Fishery saw a record season with 59 million fish in 2022.

Alaska's Fisheries 2022



Source: NOAA Fisheries, Commercial Landings.

[1] Food and Agriculture Organization (FAO), The State of World Fisheries and Aquaculture, 2020.

Management systems

The U.S. commercial fishing industry is highly regulated. To assure sustainability, access is controlled at the state and federal levels. Fisheries are managed at the highest standard for sustainability with a very small carbon footprint all while producing a clean, healthy, sustainable protein. Individual states are responsible for managing fisheries – provided their policies are consistent with federal laws – within three miles of the state's shoreline. Fisheries that fall within federal juristiction are managed by eight regional fishery management councils. The North Pacific Fishery Management Council manages Alaska fisheries and the Pacific Fishery Management Council manages fisheries of Washington, Oregon and California. These regional councils recommend management plans for each regulated fishery, which are then implemented by the National Oceanic and Atmospheric Administration (NOAA) and National Marine Fisheries Service (NMFS). Regional councils also manage operator permitting, fishing areas and periods, regulations addressing harvest equipment and requirements for onboard observers.

Management systems include Total Allowable Catch (TAC), license limitations, individual fishing quotas (IFQ) and more. Most fisheries are managed with TAC, which uses scientific surveys to evaluate fisheries' biomass health and are designed to ensure a stable future resource. Approximately 10% of each stock is given to the community development quota (CDQ) groups. Unlike other catch-share programs, CDQ groups cannot sell or trade their quota allocation, and they must re-invest at least20% of profits to their local indigenous communities. TAC establishes the supply for each fishery, and thus, reductions to it lower supply and can lead to increases in price and demand for other protein sources, depending on global market conditions. To add to the complexity, many species are caught in different fishing areas and TACs are assigned to each fishing area. So, TAC for one area can increase while another one decreases. This can result in price changes that do not reflect TAC changes for every fishing area. IFQs allow individuals holding quota share to participate in fisheries with an IFQ program. IFQs were initially issued to individuals owning or leasing vessels that had fixed-gear commercial landings from 1988 to 1990. Quota shares can be transferred to other eligible fishery participants.

IFQs and catch share programs are regulated under the Magnuson-Stevens Act (MSA), which was signed into law by President Gerald Ford in 1976 in order to ban foreign fishing activities in U.S. territorial waters and restore depleted fish stocks. Amendments to this act have established federally managed catch share programs, CDQ groups and fortified commercial fishing vessel regulations. Under the MSA, quota shares can be transferred, leased, bought and sold to other eligible fishery participants. Regional Fishery Management Councils are required to follow the act's provisions, including meeting economic, political and ecological goals.

Alaska's fixed-escapement program for salmon successfully manages a sustainable yield. Fixed-escapement is another method that assures fisheries' longevity. Under this program, the salmon fishery is opened and closed daily based on escapement targets[2], which affect fishery spawning.

In 1993, NOAA Fisheries instituted a license limitation program for the Pacific Coast commercial groundfish fishery. Federal fishing permits, known as limited-entry permits, control:

- The number of fishing vessels
- The number of vessels using trawl, trap/pot and longline gear types
- Vessel length to cap harvest capacity

[2] Adult spawning salmon escaping capture and spawning in rivers.

Management Systems by Fishery

Species	Regulation	Access Rights	Season
Pacific whiting	Pacific Fishery Management Council (PFMC)	Shoreside (42% of TAC): Quota system as defined under the West Coast Trawl Catch Share Program Mothership (24% of TAC): quota system cooperative Catcher/Processor ("C/P") (34% of TAC): Pacific Whiting Conservation Cooperative ("PWCC"): quota system cooperative	May – October
Groundfish (Amendment 80)	North Pacific Fishery Management Council (NPFMC)	Amendment 80 quota system	A and B seasons
Pollock	NPFMC and the American Fisheries Act (AFA)	Quota system as defined under the AFA	A and B seasons
Pacific cod	Federally regulated through the PFMC and NPFMC. Near-shore waters are state regulated	Rights vary according to vessel type and region: • Freezer longline conservation cooperative – quota system. • North Pacific region catcher vessels – License Limitation Program[3]. • Pacific region catcher vessels – West Coast Groundfish Quota. • State waters – open access.	A and B seasons
Halibut	International Pacific Halibut Commission (IPHC), NPFMC and PFMC	IFQs in Alaskan waters; West Coast groundfish quotas in Washington, Oregon and California	March – November
Sablefish	NPFMC and PFMC	IFQs in Alaskan waters; West Coast groundfish quotas in Washington, Oregon and California; some open access	March – November
King crab	NPFMC	Quota system	Mid-October – mid-December[4]
Snow crab	NPFMC	Quota system	January – April
Dungeness crab	State regulated	Limited entry permits	December – September
Salmon	State regulated	Limited entry permits	Summer

Source: AgWest Farm Credit and NOAA.

[3] Limited entry permits with area and gear-type endorsements.-Limited barriers to entry

[4] Bristol Bay's red king crab season. Although rare, the season could last until April if the TAC has not been caught. For purposes of fishery sustainability, only male king crabs can be legally caught and sold.

Value chain

The main fishing gear types are:

- Trawl net: a funnel-shaped net that is towed or pulled behind the vessel to capture fish swimming either near the ocean floor or in mid-water depths
- Longline: a series of hooks attached to a single line
- Nets: either gill or seine net
- Pots: a wire-mesh pot
- Jig: fishing lure

Due to the highly perishable nature of seafood, fish is processed or preserved as soon as possible after being harvested. Processing occurs either at sea or at shore-side processors. Processing at sea can occur on board the fishing vessel or the catch is transported to a mothership[5] to be processed. Catch can also be processed at a shore-side facility and can be transported by boats not participating in the fishery, known as tenders, or by the harvesting vessel themselves.

Typically, vessels that handle large volumes of fish, such as freezer longline cod vessels, process and package the fish on board. These boats clean, cut, package and freeze the fish. Certain vessels in the Amendment 80 and pollock (AFA) sectors catch and process fish on board as well. Boats participating in the pollock fishery that don't have onboard processing capabilities deliver the catch to a mothership or to a shore-side processor.

In smaller, higher-value fisheries, such as salmon, fish will be bled and refrigerated on board the vessel and the cutting and packaging is left for the shore-side processor. Crab is delivered to the processor alive.

Shore-side processors can filet, clean, can or prepare the whole fish for shipment. Processors continue to develop new products such as fish meal and fish oil to increase use of the entire fish and capture more value.

Variables affecting fish values

Species	Products	Primary Markets	Primary Gear Types
Pacific cod	Filets, individually frozen single serving, fish & chips, head-off and gutted (H&G)	N. America, Asia, Europe	Longline, pots, trawl, jig
Pollock	Fish sticks, fish & chips, fish sandwiches, surimi products (e.g., imitation crab, roe, filet blocks)	N. America, Asia, Europe	Trawl
Pacific whiting	Fish sticks, fish & chips, fish sandwiches, surimi products, head-off, gutted and tail-off (HGT)	N. America, Asia, Europe	Trawl
Groundfish *(Amendment 80)*	Depends on species	Asia, Europe	Trawl
Halibut	Filets and steaks, high-end retail and restaurants	N. America	Longline
Sablefish	Filets and steaks, overseas market	Japan, N. America	Longline, pots, trawl
King crab	Legs and claws typically steamed and frozen in brine	Japan, N. America	Pots
Snow crab	Legs and claws typically steamed and frozen in brine	N. America and Asia	Pots
Dungeness crab	Early-season live market; later-season crab canned	N. America and China	Pots

[5] A mothership is essentially a floating processor. The processor will typically be near the fishing vessels, saving time and energy spent transporting the fish to a shore-side processor.

Chinook salmon	Fresh mainly in the summer and early fall (varies by area and fishery) and frozen for year-round consumption	N. America	Troll and gillnet
Sockeye salmon	Sold fresh, frozen, canned and smoked; prized for roe	N. America and Japan	Gillnet and seine
Coho salmon	Available frozen year-round and served fresh primarily in summer through late fall	N. America	Troll
Pink salmon	Eggs valuable for use in salmon caviar. Meat is mostly canned	N. America and China	Seine
Chum salmon	Sold fresh, frozen or smoke-cured. At market, one of the lower-priced Pacific salmon. Roe typically more valuable than the fish itself	N. America and China	Seine and gillnet

Drivers

Resource availability

Maintaining the availability, or health, of each fishery's biomass in the long run influences global supplies of wild-caught fish. Resource availability is calculated and controlled through various programs. NOAA is the federal agency responsible for managing fisheries in U.S. federal waters. NOAA scientists work with regulatory fishery management councils to monitor fish populations and ensure sustainability. They report long-term average harvest levels that balance fishing with fisheries stock rebuilding. The percentages of stocks subject to overfishing are falling. We have seen a decrease in crab stocks this season, and scientists are beginning to think that a high mortality event is causing this.

When biomass health is compromised and the TAC is reduced, a fishing operation's net income can be negatively impacted if the market price is not enough to offset the decline in production volume. However, fisheries management is imperative for long-term access to the resource and health of the biomass.

Bycatch

NOAA rules regarding bycatch[6] also impact fishing practices and available supply. Examples include species-selective fishing gear, education and outreach, standardized reporting and fisheries closure.

There are strategies for limiting bycatch such as capital investment in equipment revisions. However, these strategies can increase fuel costs and slow operations. Although bycatch restrictions increase the fishery's harvest costs, they help the sustainability of other fisheries.

Weather events and a changing climate

Weather events and shifting climate patterns have significant impacts on fisheries. Warmer water temperatures can impact sea ice, plankton bloom and the abundance/distribution of food sources (i.e. invertibrates for many fish). It may also disrupt migration patterns and lead to greater overlap in both time and space between predators and prey. Many predict receding sea ice and warmer water surface temperatures will shift spawning locations for several species including pacific cod, snow crab, and pollock. For fishermen, a shift in fishing practices may be needed to harvest future stocks of these species. Additionally, inclement weather can raise fishermen's costs and risks.

Global markets

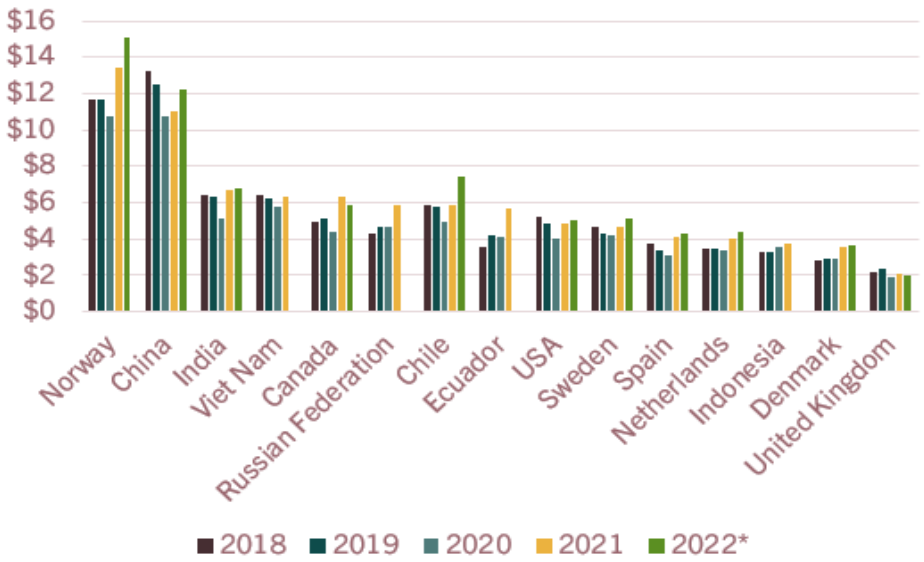
International trade in seafood is complex. Countries can be both major exporters and importers depending on their consumer preferences, processing and supply chain capabilities, type and quantity of fish available and how supply/demand from other countries interact with one another.

- In 2021, global seafood exports were approximately $127.5 billion, of which the United States contributed 3.8% (Norway led with 10.5%, followed by China at 8.7%).

[6] Fish caught while fishing for a different species.

- In 2022, the Anchorage, AK port district made up 39% of U.S. exports by value, followed by Seattle, WA at 25% and Portland, ME at 8%.
- Top export markets out of the Pacific Northwest and Alaska include Canada, China and Japan.
- China is a major secondary processing hub for global seafood trade. Since the Covid-19 pandemic, secondary processors in Southeast Asia (particularly in Thailand and the Philippines) have seen increased production.

Top Seafood Exporters, by Value, 2018-2022



Source: United Nations Trade Database (UNComtrade). *Data not available for all countries.

Modernization

Modernizing a vessel can improve fuel efficiency, processing capacity and attract and retain high-quality crew members. The average age of ships in the North Pacific fleet is 40 years and while fishermen continually make enhancements, major upgrades and new ship purchases are capital intensive and often hard to justify. There has been a recent trend to build large fishing vessels in Louisiana or in other states with lower labor costs; however, small vessels are still being built in Alaska and along the West Coast. Advances in data collection and survey technology are underway in order to collect better information.

Appendix A

Best practices

Financial management

- Sound and demonstrated industry expertise and excellent peer performance
- Audited quality financial statements
- Quality of internal accounting appropriate for the size of the business, requiring little to no adjustment
- An ownership/management transition plan exists (and is funded); the next generation is adequately prepared; a clear exit strategy is in place
- Thorough knowledge of cost structure, profitability and market dynamics
- Earnings regularly retained in the business, evidenced by recurring liquidity improvement and/or reinvestment in income-earning capital assets; owner distributions are not excessive or detrimental to the company's financial position
- Growth is part of the long-term business strategy; forward-looking mindset reflected in quality projections
- Operation has no reliance on processor advances

Production management

- Top-quartile peer performance for production
- Diversified among multiple fisheries
- Established quota-lease relationships help maximize profitability
- Superior vessel or fleet and performance compared to peers
- Clearly defined fishing plan and vessel maintenance plan in place
- Most efficient and modern technology incorporated in fishing operationligned with high-quality, reputable processor(s)

Processing management: shoreside

- Processing facilities strategically located near fishing grounds/fleet, with strong ability to also source raw materials from outside locations
- Value-added processing facilities with ongoing state-of-the-art upgrades to lines
- Capacity-ready facilities (with minimal delivery limits)
- Processing facilities adaptable to more than one fishery
- Full use of processing facility assets
- Strong and active fleet management group that maintains loyalty among producers
- Active and participatory role in fishery management, following best sustainability and stewardship practices
- Robust food safety/quality control programs strictly adhered to and certified by their customer base or third party
- Consistent ability to staff up with seasonal labor

Processing management: catcher-processor

- Consistent production combined with efficient use of onboard processing equipment, which maximizes recovery and includes value-added, at-sea processing
- Owns or has access to sufficient quota to maximize production and processing capabilities of the vessel
- Catcher-processor platform incorporates the newest technology and maintained to high standards
- Processing platform adaptable to more than one fishery
- Strong ability to attract and retain efficient, reliable crew members

Marketing management

- Well-recognized brand with strong reputation at the consumer and distribution level
- Diversified market channels for commodity and consumer-ready products (10+ key accounts); for catcher-processors, may be aligned with a large, well-known processor/marketer
- Many product line offerings with diversification in species and level of value-add
- Strategically located distribution facilities with ease of access to multiple markets

Appendix B

Glossary

Biomass: 1) The total weight of a group (or stock) of living organisms (e.g. fish, plankton) or of some defined fraction of it (e.g., spawners) in an area, at a particular time. 2) Measure of the quantity, usually by weight in pounds or metric tons, of stock at a given time.

Bycatch: Fish and other marine creatures accidentally caught during fishing for a specific, targeted species.

Chinook salmon: Also known as king salmon. In North America, Chinook salmon range from Monterey Bay in California to the Chukchi Sea area of Alaska. Along the Pacific coast of Asia, they are found from the Anadyr River of Siberia southward to Hokkaido, Japan. Chinook are the largest of the Pacific salmon, weighing up to 130 pounds and measuring nearly five feet long; however, their typical weight and length are about 30 pounds and three feet. Chinook are "anadromous," which indicates that they hatch in freshwater streams and rivers, and then, after approximately one year, they reach the smolt stage and migrate to the ocean. They remain there until they reach 3 or 4 years old, at which time they return to spawn in the freshwater where they hatched.

Chum salmon: Also known as keta salmon or dog salmon. The most widely distributed of all Pacific salmon, chum live in waters as far north as the McKenzie River on the Arctic coast of Canada and throughout the west coast of North America. On the Asian side of the Pacific, chum salmon are found from Korea and Japan to northern Russia. They can grow over three and a half feet long and tip the scales at 30-35 pounds; however, the average chum weighs 8-15 pounds.

Coho salmon: Also known as silver salmon. Found throughout the north Pacific Ocean and in the surrounding coastal streams and rivers from Alaska to central California and from Russia to Japan. In North America, they are most abundant in coastal areas from southeast Alaska to central Oregon. Wild coho are harvested commercially on both sides of the Pacific, but Alaskan fisheries supply most of the global market. Coho are also farmed in floating pens offshore in Chile, Japan and Canada. Coho salmon are smaller than chinook and larger than sockeye; market-sized coho average 4-12 pounds. Hatchery-raised fish often are smaller at 2-3 pounds each.

Community Development Quota (CDQ): The Western Alaska Community Development Quota (CDQ) Program allocates a percentage of all Bering Sea and Aleutian Islands quotas for groundfish, prohibited species, halibut and crab to eligible communities.

Drift gillnet: Gillnet boats have large spools with a net wrapped around them called net reels. The two different types of gillnet vessels are distinguished by placement of the net reel. With sternpickers, the net is situated on the ship's aft or stern (rear); with bowpickers, the net reel is on the bow (front). Some vessels have the design versatility to set the net off either the bow or stern. Typically, gillnets are set in a straight line, like a curtain. These nets feature a cork line that floats atop the water and a lead line that pulls the bottom of the net downward in the water. Nets are subject to specific mesh diameter requirements for each fishery so as to catch the targeted fish while simultaneously limiting bycatch volume. The harvesting mechanism is simple; fish swim into the net and are caught by their gills. Most gillnet vessels range in size from 27 to 32 feet.

Gillnet setnet: One end of a gillnet is anchored on the beach or in shallow water. Attached on the net's opposite end is a large buoy. A small skiff – usually 18 to 25 feet long – is used to pull the unattached end out to deeper water where it remains suspended by the buoy.

Groundfish: Fish that live on, in or near the bottom of the body of water they inhabit. Some typical saltwater groundfish species are cod, flounder, halibut and sole.

Dungeness crab: Also known as red or red stripe. Dungeness crabs inhabit bays and estuaries. This crab species is found as far north as the Aleutian Islands and as far south as Mexico's Magdalena Bay. It has a broad, oval body covered by a hard shell, four pairs of walking legs and a pair of claws. The legs of Dungeness crab are much smaller than king crab's, and its body is more oval than the snow crab's. Only male Dungeness crab can be kept during harvest, provided they meet or exceed the fisheries' allowed size, which is usually specified at six and a half inches wide.

Ex-vessel price: The price received by a captain at the point of landing.

Federally managed fisheries: Any fishery located in the U.S. Exclusive Economic Zone (EEZ) from three miles offshore to 200 miles offshore.

Halibut: Halibut and pacific cod are the fourth most valuable fishery in Alaska, making up 14% of all fisheries' ex-vessel value in 2020. Pacific halibut is one of the largest flatfish; it weighs up to 500 pounds and can grow to more than eight feet in length. Pacific halibut live in coastal waters from Santa Barbara, California to Nome, Alaska, and the western side of the Pacific, from the Gulf of Anadyr in Russia to Hokkaido, Japan. However, they are most common in the central Gulf of Alaska. Adult halibut migrate seasonally from shallow summer feeding grounds to deeper winter spawning grounds.

Individual Fishing Quota: Permits to harvest specific quantities of fish or shellfish.

Jig fishing: A hook-and-line method that uses an electric jig machine that pulls a lured line up and down in the water. Each jigging machine can handle as many as five lines at a time and each line can have as many as 30 hooks attached.

King crab: Also known as Bristol Bay red king crab. The largest of the commercially harvested crabs, red king crabs are found in the Bering Sea, Aleutian Islands and along the Gulf of Alaska's coast, south of British Columbia, Canada. Populations also range from Hokkaido, Japan to Cape Olyutorsk, Russia. In terms of appearance, king crabs are brownish to bluish-red in color and are covered with sharp spines. Only male crabs can be kept during harvest. Similar species include golden (brown) king crab and blue king crab.

Landings: The point at which fish are brought to shore.

Longline: Longline gear consists of a long series of hooks attached by a leader to a single line. The most common longlines are used for harvesting cod, halibut and sablefish, and are the most efficient type of gear for selective bottom fishing. The gear is set using anchors and buoys and retrieved using an automated line-hauler with a person standing at the rail ready to retrieve targeted species and to release prohibited or undesired bycatch.

Overfishing: Harvest rates higher than maximum sustainable yields.

Oysters, mussels and clams: Shellfish grown throughout the Pacific Northwest. Shellfish growers are treated similarly to traditional farming operations, rather than as a commercial fishing enterprise.

Pacific cod: Also known as cod, grey cod, true cod or P. cod. In 2014-15, Pacific cod was the fifth-largest fishery by ex-vessel value and cod was the seventh most valued U.S. domestic species in 2015[7]. Pacific cod are located in the coastal north Pacific Ocean, from the Bering Sea to Southern California and westward to the Sea of Japan. They live on the shelf edge and upper slope in waters ranging from 300 to over 800 feet deep during the winter and move to waters shallower than 300 feet deep during the summer.

Pacific whiting: Also known as hake and whiting. A species similar to pollock. Whiting is caught in federal waters off the coasts of Washington and Oregon.

Pollock: Also known as walleye pollock and Pacific pollock. The United States' largest fishery by volume, and the second largest fishery worldwide. With annual landings valued at nearly $500 million, the pollock fishery makes up 26% of Alaska's ex-vessel value. Although pollock is distributed throughout the North Pacific, the largest concentrations are found in the eastern Bering Sea.

Pink salmon: Also known as humpback salmon or humpies. Found on both sides of the North Pacific from Alaska to Puget Sound in Washington and from Russia to North Korea. Though their range extends further south, pink salmon do not reproduce in significant numbers below Puget Sound. Typically weighing between three and a half and five pounds and growing to an average length of 20 to 25 inches, pink salmon are the smallest and most abundant of the Pacific salmon species found in North America. Today, they account for almost half the salmon harvested in Alaska's fisheries where their populations are well managed and stable. In Washington, pink salmon are harvested in smaller numbers during odd-numbered years in concert with the species' lifecycle.

Pot gear: Pots are constructed by stretching wire-mesh netting around a cylindrical or rectangular frame that is left open on at least one side. Bait is strung within the pot to attract the fish inside the trap. This design allows the targeted species to enter and not escape and also limits bycatch.

[7] All values sourced from NMFS, ADF&G (compiled by McDowell Group) and NOAA's *Fisheries of the United States*, 2015.

Regional councils: The Magnuson-Stevens Fishery Conservation and Management Act (MSA) created eight regional fishery management councils responsible for the fisheries that require conservation and management in their region. The councils are composed of both voting and non-voting members representing the commercial and recreational fishing sectors in addition to environmental, academic and government interests. Under the MSA, councils are required to:

- Develop and amend Fishery Management Plans.
- Convene committees and advisory panels and conduct public meetings.
- Develop research priorities in conjunction with a Scientific and Statistical Committee.
- Select fishery management options.
- Set annual catch limits based on best available science.
- Develop and implement rebuilding plans.

Sablefish: Also known as black cod and butterfish. Found across the Northeastern Pacific Ocean from the Gulf of Alaska to northern Mexico, and west to the Aleutian Islands and beyond into the Bering Sea. Adult sablefish live on mud bottoms in waters more than 650 feet deep.

Seine gear: Seine boats are 40 to 58 feet in length[8]. The seine is a large net with a cork line that floats and a line weighted with lead at its bottom. When the net is cast, the lead line sinks to the bottom, allowing the unfurled net to hang in the water like a curtain. One end of the seine is pulled by a skiff that encircles the targeted species. After the set is made, a rope threaded through the weighted bottom of the net – known as the "purse line" – is pulled closed. When the fish are trapped inside the net, it is hoisted by winch onto the deck of the purse seine vessel.

Snow crab: Also known as opilio crab and opies. Snow crab are widely distributed in many oceans. In Asia, they're found in the Sea of Japan and the Sea of Okhotsk. In the Atlantic, they're found from Southwest Greenland to Maine. In Alaska, they live in the Bering, Beaufort and Chukchi seas, but are harvested only in the Bering Sea. Their preferred habitat is soft sandy or muddy bottoms, typically in water shallower than 650 feet.

Sockeye salmon: Also known as red salmon. Sockeye salmon are found on both the eastern and western extremes of the North Pacific. In North America, sockeye salmon range from Point Hope in northwestern Alaska to the Klamath River in Oregon. In Asia, they're found from Siberia's Anadyr River area southward to Hokkaido, Japan. In the United States, almost 100% of the sockeye salmon comes from domestic fisheries that operate primarily in Alaska. Measuring 1½ to 2½ feet in length and weighing 4 to 15 pounds, sockeye are among the smaller species of Pacific salmon.

Stocks overfished: Low stocks compromising maximum sustainable yields.

Stock rebuilding: Also known as the maximum sustainable yield.

Total Allowable Catch (TAC): An annual catch ceiling. All catch taken in directed fisheries or caught incidentally in other fisheries, whether retained or discarded, is counted in the TAC. Management plans prescribe that TAC may equal, but never exceed, the Acceptable Biological Catch (ABC), and always must be less than the Overfishing Limit (OFL). Fisheries are managed in-season to achieve the TAC without exceeding the ABC or OFL. The sum of TACs for all groundfish stocks also must remain within the optimum yield range as defined in the Fisheries Management Program.

All the TAC numbers can't add up to more than two million. The ABC and OFL are determined for the respective fishery using statistical information gathered from stock survey results. The TAC is set by the respective management council based on these recommendations.

Trawlers: A trawl net is a funnel-shaped bag that is towed behind the vessel to scoop up fish swimming either near the ocean floor or in mid-water depths. The narrow end of the trawl net is called the "cod end." When the net is full or the tow complete, the cod end is brought aboard by winch so that the fish can be unloaded. Attached toward the open end of the net are large steel plates called "trawl doors." These are used to weigh down the net and maintain the desired depth.

Troll fishing*:* Troll vessels typically feature tall poles from which gear is rigged. A series of baited hooks hang from these poles. When a fish is hooked the line is pulled in either by hand or by a motorized revolving drum, or spool, called a "gurdy."

[8] To participate in a fishery in Alaska state waters, a boat cannot exceed 58 feet.

Tenders: Usually contracted by a processor, a tender vessel is used to receive fish from smaller catcher vessels underway at sea and then transport those fish to the contracting processor.

Appendix C

Additional information

Overfishing and overfished list

Species	Overfished	Overfishing
North Pacific		
Blue king crab – Pribilof Islands and St. Matthew Island	X	
Pacific		
Chinook salmon – Klamath River fall	X	
Coho salmon[1] – Queets and Juan de Fuca	X	
Pacific sardine – Northern Subpopulation	X	
Pacific and Western Pacific		
Pacific bluefin tuna – Pacific[1]	X	X
Swordfish – Eastern Pacific[1,2]		X
Yellowfin tuna – Eastern Pacific[1.2]		X

[1]Stock is fished by U.S. and international fleets.
[2]The geographic boundary of this stock extends from Mexico south and west to the Palmyra Atoll.
Source: NOAA, Status of Stocks 2020.

Alaska Department of Fish and Game: http://www.adfg.alaska.gov/index.cfm?adfg=home.main

Alaska Fisheries Information Network: https://akfin.psmfc.org/

International Pacific Halibut Commission: http://www.iphc.int/

NOAA Fisheries: https://alaskafisheries.noaa.gov/fisheries/commercial

Washington Department of Fish & Wildlife: http://wdfw.wa.gov/