Oregon's Commercial Marine Fisheries

Oregon's diverse marine resources support commercial fisheries that annually contribute more than $500 million in personal income to Oregon, an important economic driver for the coast and the state. Commercial fishing has long been an integral part of many coastal communities. This document provides general descriptions of Oregon's commercial ocean fisheries, including the Oregon Department of Fish and Wildlife's (ODFW) management to ensure these fisheries are ecologically and economically sustainable. ODFW's Marine Resources Program develops policy and regulates harvest in accordance with state and federal laws, such as the Magnuson-Stevens Fishery Conservation and Management Act (2006). We coordinate closely on management and research with partners including the Pacific Fishery Management Council, the National Marine Fisheries Service, the Pacific States Marine Fisheries Commission, and the commercial fishing industry.

Oregon's Largest Commercial Fisheries

Fishery	Ex-Vessel Value (2018)	Ex-Vessel Value (2010-17 avg.)	Pounds Landed in OR (2010-17 avg.)	Gear	Marine Stewardship Council Certification	Participating Vessels (2018)
D. Crab	$74,396,759	$47,867,097	16,776,976	Pot	2010-2015	319
P. Shrimp	$26,888,308	$12,000,718	21,295,812	Trawl	Since 2008	70
Groundfish Trawl	$21,031,585	$17,485,346	31,070,830	Trawl	Since 2014	59
P. Whiting, Shoreside	$16,397,218	$13,425,229	134,158,524	Trawl	Since 2009	28
Groundfish Fixed Gear	$12,033,573	$11,303,521	5,140,581	Fixed Gear		272
Albacore	$9,722,621	$13,262,967	8,619,195	Troll	Since 2010	276
Salmon	$2,442,403	$2,073,481	396,728	Troll		235
P. Halibut	$1,188,332	$1,089,481	211,465	Longline		49

See Appendix 1 for additional information on ex-vessel value and numbers of participants.

Workers unload catch from a commercial crabber.

Ocean Dungeness Crab

The Oregon Dungeness crab fishery has been Oregon's most valuable single-species fishery for many years. It accounts for up to forty percent of all commercial landings (ex-vessel value) of Oregon commercial fisheries each year. The fishery has been active since the early 1900s; however in the past twenty-five years, both landings and price per pound have increased substantially. The state of Oregon is currently one of the top producers of Dungeness crab worldwide alongside both Washington and California.

The Oregon fishery is a limited-entry fishery (i.e. there are a fixed number of permits and a permit is required to fish in this fishery) with more than 400 permits for both large and small vessels. In 2006, the Oregon Fish and Wildlife Commission adopted a three-tier pot limitation program, which limits each vessel to 200, 300 or 500 pots in order to help reduce the number of pots deployed. Each year, about 75 percent of the permit holders actively participate in the fishery. Dungeness crab are caught with baited traps, also called crab pots. The baited pots rest on the ocean floor, attracting crabs to a one-way door in the pot. Each pot is also equipped with two types of escape hatches. The first is for under-sized (non-legal) crab to escape. The second is an emergency escape hatch kept closed during fishing by weaving in "rotten cotton," which will deteriorate over a few months underwater if the pot is accidentally lost at sea. This emergency escape hatch allows crab and other animals to escape derelict gear.

The management of this fishery is based on the principle of the "three Ss" – size, sex and season. As they are retrieving pots, fishermen sort their catch according to sex (they may only retain males) and size (they may only retain crabs that are 6¼ inches or wider). All under-sized crabs and all females are put overboard (alive) to return to the seafloor to reproduce. The third component of the fishery's three Ss – season – limits the fishery during the summer and fall, the peak time that crabs are molting, giving them time to allow the soft-shelled crabs to fill out undisturbed. The fishery occurs all along the Oregon coast in waters mostly from 5-80 fathoms with some fishing effort out to 100 fathoms.

In recent years, a number of management challenges related to changing ocean conditions have emerged across the entire US West Coast Dungeness crab fishery. These challenges include increased interactions with protected species such as humpback whales, increased frequency and duration of Harmful Algal Blooms that produce biotoxins leading to concerns about human health effects, and changes in the timing of molting of crabs, which affect quality and marketability at the beginning of the season. The MRP has continued to work closely with the crab industry to address these issues through targeted research and monitoring efforts and regulatory changes.

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A divided shrimp hopper where LEDs were not used and used, note the difference in bycatch of eulachon smelt (the silvery fish).

Pink Shrimp

The Oregon pink shrimp fishery is important in terms of both the economic value to the fishermen and the large landings (pounds). Pink shrimp is the second most valuable trawl fishery on the US West

Coast and is centered in Oregon. Pink shrimp are short-lived, fast-reproducing species, subject to large population swings associated with year-to-year changes in ocean productivity. Several boom-bust cycles have been noted over several decades of fishery monitoring. The fleet size is currently around 70 vessels.

Oregon's pink shrimp fishery is managed sustainably using a suite of methods. The fishery is limited entry (138 permits), minimum count per pound requirements aide in assuring ideal economic harvesting, and gear requirements minimize bycatch. In addition to rules governing the fishery, sustainability is also assured by biologists working with fishermen in each port to understand fishing locations and ages/sizes of shrimp caught. These data are used to develop stock assessments which are compared to environmental and fishery data to further assure sustainability. These methods, employed with the help of industry assures the fishery's sustainability.

The MRP actively works with the pink shrimp industry to improve the fishery's gear, which at the most basic level is a net (or often a pair of nets) towed behind the vessel. MRP research led to improvements to the design of the net and the addition of devices that allow anything other than pink shrimp to escape from capture. "Bycatch" (non-target species) reduction methods include increasing the mesh size of the net and adding metal grates – also known as bycatch reduction devices (BRDs) – to the throat of the net. The most recent innovation in gear design developed by MRP staff was to install light emitting diode (LED) fishing lights on the mouth of the net, which drastically reduces the bycatch of eulachon smelt, an Endangered Species Act (ESA) listed species, while maintaining shrimp catch rates.

These improvements have been collaboratively modified over the years to reduce bycatch of finfish in the fishery, including halibut and rockfish, in addition to eulachon smelt. The effectiveness of BRDs, LEDs, and other modifications to the design of shrimp trawl nets and close management by ODFW, helped the Oregon pink shrimp fishery become the first shrimp fishery in the world to be Marine Stewardship Council (MSC)-certified as sustainable in 2008 (recertified 2012 and 2018).

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Albacore tuna appear off the Oregon coast from July to October.

Albacore Tuna

Each summer, a finger of warm water makes its way north to the waters off Oregon, bringing with it schools of albacore tuna. The troll (hook and line) fishery lasts from about June until October – ending when the albacore leave Oregon waters. The season has extended into November in some rare years. A Highly Migratory Species permit from the National Marine Fisheries Service is required, but the number of permits is not restricted. It is managed through the Inter-American Tropical Tuna Commission and the Western Central Pacific Fisheries Commission, as well as the Pacific Fishery Management Council. They manage the albacore stock and fisheries within their respective areas of jurisdiction and the US-Canada Albacore Treaty addresses reciprocal fishing effort off the west coast of the U.S.

Albacore is also an MSC-certified sustainable fishery. The young tuna that are caught off of Oregon are just starting their cross-Pacific journey. These younger fish—three to five years old, ranging from 10 to 30 pounds—are higher in desirable omega-3 fish oils than the large, lean, older albacore caught mostly by foreign longline fishermen in the central Pacific. Also, because of their young age, the fish caught off of Oregon have a reduced mercury accumulation in their meat, compared to those caught in many other areas, according to the Oregon Albacore Commission (Oregon Department of Agriculture).

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Nearshore rockfish are some of many species grouped together in the "groundfish" category.

Groundfish

"Groundfish" is a federal management category for a diverse group of fisheries that catch 100+ managed species such as rockfishes, flatfishes, sablefish, lingcod, and others. The groundfish fisheries are the second largest commercial fishery revenue producers in Oregon behind Dungeness crab. The groundfish fisheries are also the highest volume as they can constitute 80% or more of total commercial fishery landings.

The main groundfish fisheries are bottom trawl for flatfish and sablefish, mid-water Pacific whiting trawl, mid-water rockfish trawl, and longline/pot for sablefish and nearshore stocks.

Groundfish fisheries are federally managed by the National Marine Fisheries Service and the Pacific Fishery Management Council. ODFW is actively involved in the management and monitoring of the groundfish fisheries – especially the nearshore fishery which is subject to more state oversight in regards to permitting and regulations.

Groundfish trawlers are the largest fishing boats and can be identified by their large net reels.

Groundfish - Trawl

Oregon is home to the largest groundfish and shrimp trawl fisheries on the West Coast. Astoria and Newport have significant trawl activity in the bottom, whiting, and mid-water rockfish fisheries. This helps to put Astoria and Newport in the top three ports in total commercial fishery value throughout the entire West Coast. Brookings and Coos Bay are also home to valuable bottom trawl groundfish fisheries.

Large processing plants are required to clean, package, and distribute the substantial volumes of groundfish (and shrimp) caught in the trawl fisheries. The Newport and Astoria whiting fisheries typically land 100-200 million lbs. per year, which is machine-processed and sold in domestic and export markets as fillets, surimi ("artificial crab"), and fish meal. Bottom trawl catches of flatfish, sablefish, lingcod, and rockfish are usually hand-filleted, which requires an extensive labor force as 50 million lbs. or more can be taken annually, and single deliveries of 50 thousand lbs. or more may have to be processed at a single time.

The groundfish trawl fisheries are managed under an Individual Fishing Quota ("IFQ") system. Individuals and/or institutions each own a certain percentage ("Quota Share") of the overall trawl sector's allocation for each species, which entitles them to an individual allocation of "Quota Pounds" each year that they can either fish or lease. Accumulation limits prevent any individual from buying up a majority stake in the IFQ fishery. The IFQ system allows vessels more flexibility in where and when they fish, as long as all of their catch, including discards, is covered by their Quota Pounds. A 100% observer/video monitoring requirement ensures that catches are fully accounted for and stay within their individual quotas. Area closures are used to protect sensitive habitats such as rock reef and corals, and can be used to reduce bycatch of non-IFQ species such as salmon.

There is potential for the bottom trawl fishery to grow, since it currently harvests only about 25% of the sustainable quotas for some species. This is primarily due to a lack of market demand for Dover sole and other flatfish, which compete with global seafood products, such as farmed tilapia. The Oregon Trawl Commission, an entity under the Oregon Department of Agriculture, is responsible for trawl commodity product marketing and education.

A good catch of Pacific whiting hits the deck.

The Pacific whiting trawl fishery is unique in that it contains two at-sea components that involve large processing vessels working in the waters off Oregon and Washington. The "mothership" sector consists of processing ships and catcher vessels that deliver their catch to the processing ships at sea. Many of these catcher vessels are based in Oregon ports and also deliver whiting to shoreside processing plants in Oregon. The "catcher-processor" sector consists of large, Seattle-based ships that fish and process their own catch. The at-sea whiting fishery, including Oregon boats, is also heavily engaged in the Alaskan walleye pollock fishery that is one of the largest volume fisheries in the world.

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Sablefish, aka black cod, is the primary species targeted by the fixed gear fishery.

Groundfish – Fixed Gear

Sablefish is the most valuable single groundfish stock, and is very important to both the multi-species bottom trawl fishery and the "fixed gear", or longline/pot fisheries. Sablefish is the primary groundfish species targeted with longline/pot gear, although other species such as lingcod, rockfish, and skates are also caught.

The longline/pot sablefish fishery was subject to one of the first catch share programs on the West Coast, in which individuals were assigned different levels, or "tiers", of tradeable annual sablefish quota based on their history in the fishery. There are also vessels with limited-entry sablefish permits that fish under trip limits outside the primary "tier" season, as well as open-access participants without a sablefish-specific permit, who fish under lower trip limits.

Oregon's fixed gear fleet consists of approximately one-third limited-entry vessels and two thirds open-access vessels. Limited-entry permitted vessels make the majority of the landings (about 90 percent).

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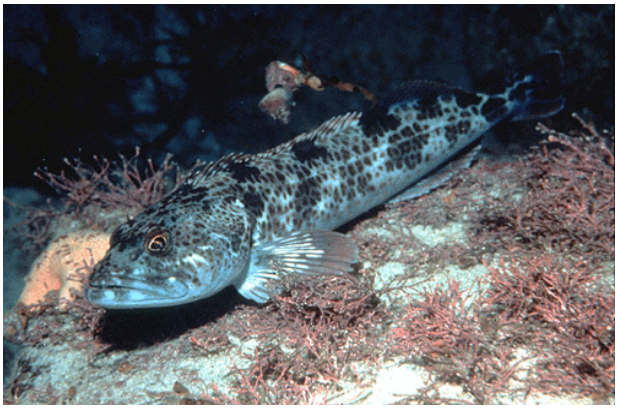

Lingcod is a favorite catch for the nearshore fishery.

Groundfish – Nearshore

The commercial nearshore groundfish fishery targets a number of different species found in Oregon's coastal waters. Two types of permits are issued in this state-managed, limited-entry-permit fishery: black and blue rockfish permits with a nearshore endorsement, and black and blue rockfish permits without the endorsement. There are ~112 permitted vessels in total, 67 of which have the nearshore endorsement. The nearshore endorsement allows permitted vessels to land 21 nearshore species, including a number of nearshore rockfish, greenling, cabezon, buffalo sculpin, and Irish lords, in addition to black, blue

and deacon rockfish. Fishery participants use a variety of hook and line gear types to target these species, including jigging with rod and reel, bottom longline, and cable gear.

Permitted vessels may fish from any Oregon port, but the majority of fish are landed on the south coast at Port Orford, which is where most permit holders are based. There are two primary markets for this fishery: one for live fish and one for fresh (dead) fish. Some species fetch as much as $6 or $7 per pound if landed live – far more value to fishers than the same species is if it is landed dead. Nearshore fish sold to the fresh fish market rarely exceed $2.00 per pound. The total ex-vessel value of this fishery is approximately $1 million per year.

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Fishers prepare to suck sardines from a seine net into the hold.

Coastal Pelagic Species

Commercial fisheries for a variety of coastal pelagic species such as Pacific sardine, northern anchovy, Pacific mackerel, jack mackerel, market squid and Pacific herring have occurred in Oregon over the years. These species share a number of common life history traits, such as schooling behavior, consuming prey that are generally near the base of the food web, and having relatively short lives, though the details vary considerably by species.

Fisheries for all of these species off Oregon, with the exception of Pacific herring, are managed in partnership with the federal government through the Pacific Fishery Management Council under its Coastal Pelagic Species Fishery Management Plan. Oregon has instituted a state limited-entry system for the Pacific sardine fishery, but fisheries for all of the other species are open access off Oregon.

Populations of coastal pelagic species are known to change in abundance over time and those changes are thought to be related to environmental conditions, but there is much that is still unknown about what drives changes in both abundance and distribution of these species. Commercial fisheries for these species also change in their relative importance over time, reflecting both species abundance and socio-economic factors. The two most important fisheries in terms of both the number of pounds landed and value have been Pacific sardine and market squid.

The Pacific sardine population is currently at low abundance and there has not been a directed commercial fishery for sardine anywhere on the US West Coast since 2015. Market squid occur in Oregon sporadically. Fisheries for market squid have occurred when the squid are available since the 1980s, with some of the largest catches occurring in the last few years.

Fishermen generally use seine nets to fish for these species, and then pump the fish from their nets into their holds. Most fishing occurs during the day, but some fishing for market squid occurs at night. Spotter planes were used to locate schools of Pacific sardine when the fishery was active.

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Commercial salmon fishers unload a chinook salmon at the docks.

Ocean Salmon

Oregon's commercial ocean salmon fishery is a hook-and-line troll fishery. The fishery almost exclusively targets Chinook (king) salmon, with only minor coho (silver) salmon seasons primarily on the very north coast for hatchery coho. This is a limited-entry fishery (i.e. permit required), with 870 permits in 2017, however, only about half of those permit holders actively participate in the fishery each year. At the request of the commercial salmon industry in 2012, the Oregon State Legislature removed the lottery system for latent (unused) permits. This has resulted in a continued decline in the number of permits, and the only avenue for new entrants to the fishery is to purchase an active permit from another vessel.

Salmon caught off the Oregon coast are of mixed stock primarily originating from the Central Valley in California, northern California streams, southern Oregon, and the Columbia Basin. The majority of Oregon and Columbia Basin Chinook salmon leave their native streams and turn north contributing primarily to fisheries off British Columbia and Alaska. These local stocks of Oregon Coastal Chinook are only available to Oregon's ocean fisheries for a brief time as they stage at the mouths of coastal estuaries before heading upriver to spawn.

Fishery harvest has plummeted in recent years to one-tenth its average harvest during previous decades due to sharp declines in regional stocks, and subsequent harvest restriction through management measures. The 2019 season has seen a continued low harvest of Chinook salmon by the Oregon troll fishery, and will likely end up with less than 35,000 fish landed.

The recent collapse of the southern salmon stocks has been a result of a variety of factors including spawning habitat loss, water quantity and quality issues, prey abundance, and fishing pressure; however, the primary limiting factor is usually poor ocean productivity during smolt migration. When Oregon's salmon stocks are healthy and productive, the ODFW management strategy allows for "bubble fisheries" around several of Oregon's river mouths to provide harvest opportunity where stocks are strong. The bubble fisheries divert effort from areas where stocks are more constrained. However, Oregon's coastal fall Chinook have been on the decline for the last several years, and no "bubble fisheries" were authorized in 2019.

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Sea urchins from recent survey work.

Sea Urchins

Ranked as the third largest shellfish fishery in Oregon (in both landing and dollars, following Dungeness crab and pink shrimp), the red sea urchin fishery is pursued by a small number of commercial divers, who harvest red sea urchins by hand from rock reefs in the nearshore waters of Oregon. These divers make single-day trips aboard small vessels and deliver urchins live. From the dock, these urchins go to processing plants in Washington or California where the fishery product "uni" (urchin gonad) is packed into trays and sold domestically or shipped to Japan for auction to the sushi industry. The value of the

urchins is dictated by attributes of the product (gonad weight and quality) as well as market demand and the dollar/yen exchange rate.

The fishery occurs primarily on two south-coast reefs (Orford and Rogue), where kelp beds and urchins are most abundant, but also on central-coast reefs. Though habitats are limited, the fishery has been impressively productive since its beginnings in 1986. Harvest of urchins peaked in 1990 when divers landed 9.3 million pounds. The harvest is down markedly in recent years but persists as a valuable fishery for a small number of divers.

Despite major changes in the fishery and its stock since the 1990s, little fishery management had occurred. Recently, ODFW reviewed fishery dependent data and reinvigorated fishery independent sea urchin surveys, developing a good picture of management needs. Data review and public process from this review guided recent management actions including: 1) reduction of the number of limited entry permits, 2) disallowed the use of mixed gases in diving and 3) inclusion of sea cucumbers in the permit.

Recently, a large recruitment of purple sea urchins occurred along the US West Coast. In Oregon, we've seen high densities of purple sea urchins at depths where they were previously rare. Purple sea urchins have never been a major fishery target, however they may depress kelp bed development directly, although low kelp conditions are typically driven by environmental conditions (i.e. warm water events) similar to what we've seen in recent years.

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Most hagfish are exported to Korea.

Hagfish

There is increasing interest in fishing for hagfish – also known as slime eels, due to the copious amount of protective slime they exude when perturbed. Hagfish are often exported to Korea (live or dead), where they are a delicacy. The fishery began in the early 1990s as an eel skin fishery but it has been more successful in recent years for the human consumption market. Because of the higher value fetched for live hagfish, fishers are increasingly experimenting to try to land a higher proportion of their catch live.

Currently the fishery is open-access (i.e. no permit required), with approximately 9 boats participating. Each boat is limited to 200 traps, and each trap is required to have an emergency escape mechanism, in the event the gear is lost at sea. The fishery is re-evaluated in any year during which landings exceed the state harvest guideline of 1.6 million pounds, to prevent over-harvest.

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A biologist measures a commercially-caught halibut.

Pacific Halibut

Oregon's commercial Pacific halibut fishery is short but intense. In most years, the directed fishery is only open for two or three 10-hour periods. In 2018, 49 vessels participated in the directed fishery. They landed 211,465 pounds of Pacific halibut with a value of $1,188,332 - about 0.7 percent of Oregon's commercial fisheries' total ex-vessel value).

Oregon is near the southern end of the Pacific halibut's range, which extends into northern California. Pacific halibut can migrate long distances and tend to be larger in Alaska (the population center of their range). The big halibut common in Alaska and the Aleutian Islands – some as big as 650 pounds – do not occur in Oregon. A really large fish in Oregon is around 150 pounds. Oregon commercial fishermen must release any Pacific halibut smaller than 32 inches (about 14 pounds).

The International Pacific Halibut Commission (IPHC) assesses the Pacific halibut stock annually and sets catch limits for areas in Alaska, British Columbia, and the U.S. West Coast. The National Marine Fisheries Service and the Pacific and North Pacific (Alaska) Fishery Management Councils regulate commercial Pacific halibut fisheries in U.S. waters.

On the West Coast, Treaty Tribes receive 35% of the total quota, and 65% is allocated to commercial and recreational fisheries in Oregon, Washington, and California. Approximately 85 percent of the non-tribal commercial share goes to the directed fishery, and 15 percent is allocated to incidental Pacific halibut catch in the salmon troll fishery. To legally retain Pacific halibut, salmon trollers must hold a Pacific halibut license, and there are strict limits on how many halibut they can retain per trip, and overall.

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Heart cockles are an important part of Oregon's bay clam fishery.

Bay Clams

The Oregon bay clam fishery produced more than 816,000 pounds of clams with a value of $875,000 in 2018. There are 15 limited-entry permits in the dive bay clam fishery and the intertidal fishery is open-access. Approximately 50 individuals participate in these two fisheries each year. New rules including an increase in some quotas, restrictions on harvest in Netarts Bay, and the protection of native littleneck clams were adopted beginning with the 2016 season.

Cockles and gaper clams dominate the commercial landings. More than 284,000 pounds of cockles and 414,000 pounds of gapers were harvested in 2018, with the vast majority coming from Tillamook Bay. Butter clams made up the remainder of the landings. Significant numbers of bay clams are also commercially harvested from other bays such as Coos, Yaquina, and Netarts bays. Generally, the human consumption market is still being developed and accounts for a small minority of the commercial harvest. Bay clams are predominately used as bait for the Dungeness crab fishery, and for animal feed in public aquariums. Bait clams are dyed red prior to landing.

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A worker cleans a commercial catch of razor clams.

Razor Clams

In 1935, ODFW began monitoring the commercial harvest of razor clams, and in 1947 started to record the number of licensed diggers and their catch. Nearly all of the commercial harvest is from the 18-mile stretch of beach between the Columbia River's south jetty and Tillamook Head. The commercial razor clam fishery is an open-access fishery, with the number of participants roughly corresponding with the razor clam population abundance. Prior to the late 1950s, the commercial harvest was the primary component of razor clam total harvest, with a peak of 335,000 pounds in 1950. Since then, the landings have steadily declined so now the recent five-year average is 63,000 pounds per year.

The commercial fishery accounts for approximately 15 percent of the total harvest (sport and commercial combined), of which 75 percent is sold for human consumption. In the last 15 years the commercial landings in this fishery have been variable – landings range from 16,000 pounds -174,000 pounds harvested per year.

In 2018, the total commercial harvest of razor clams was 26,345 pounds, all from Clatsop Beach. The average price to the fishermen was $3.16 per pound.

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Commercial fishing for Dungeness crab occurs in bays as well as the ocean.

Bay Dungeness Crab

The commercial Bay Dungeness Crab fishery is limited to Oregon's bays and estuaries (excluding the Columbia River) and provides commercially harvested Dungeness crab during a period when the ocean fishery is closed. The relatively short bay season, from Labor Day through December 31, constitutes only 0.2% of Oregon's commercially caught Dungeness crab. This open access fishery does not require a permit. Only male crab that meet the same size minimum as the ocean Dungeness fishery of 6¼" may be retained. State management of the bay crab fishery began in 1886, and size limits were set in 1933. Landings are well documented starting in 1971, and over 70,000 lbs were recorded in 1978. In 1981, bays were open all year and pots were allowed. Regulatory changes in 1984 prohibited pots in favor of rings, disallowed weekend crabbing, and set a vessel limit of 15 crab rings. In 1988, the season was set to open after Labor Day through December. The bay crab fishery is closed on all legal holidays, as well as in December if the adjacent ocean area is closed to commercial ocean Dungeness crabbing. These measures partially mitigate conflict with recreational crabbers. There is no commercial harvest allowed in the Chetco River.

Over the past decade (2008-2018), commercial bay crabbers have landed an annual average of 31,000 pounds, with a maximum of 90,639 in 2017. While the number of participants varies annually, approximately 30 different vessels typically harvest more than 500 pounds each from various ports.

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For more information about Oregon's commercial fisheries, species, regulations, and more, please see our regulations book and our website:
http://www.dfw.state.or.us/MRP/

Appendix 1. History of real annual ex-vessel value (millions of $) by species in Oregon marine commercial fisheries, 1981-2018. (Numbers of boats and buyers from 2010-2018.)