



**NOAA
FISHERIES**

Guide for Identifying Gear from Marine Mammal Entanglements in the U.S. West Coast and Alaska

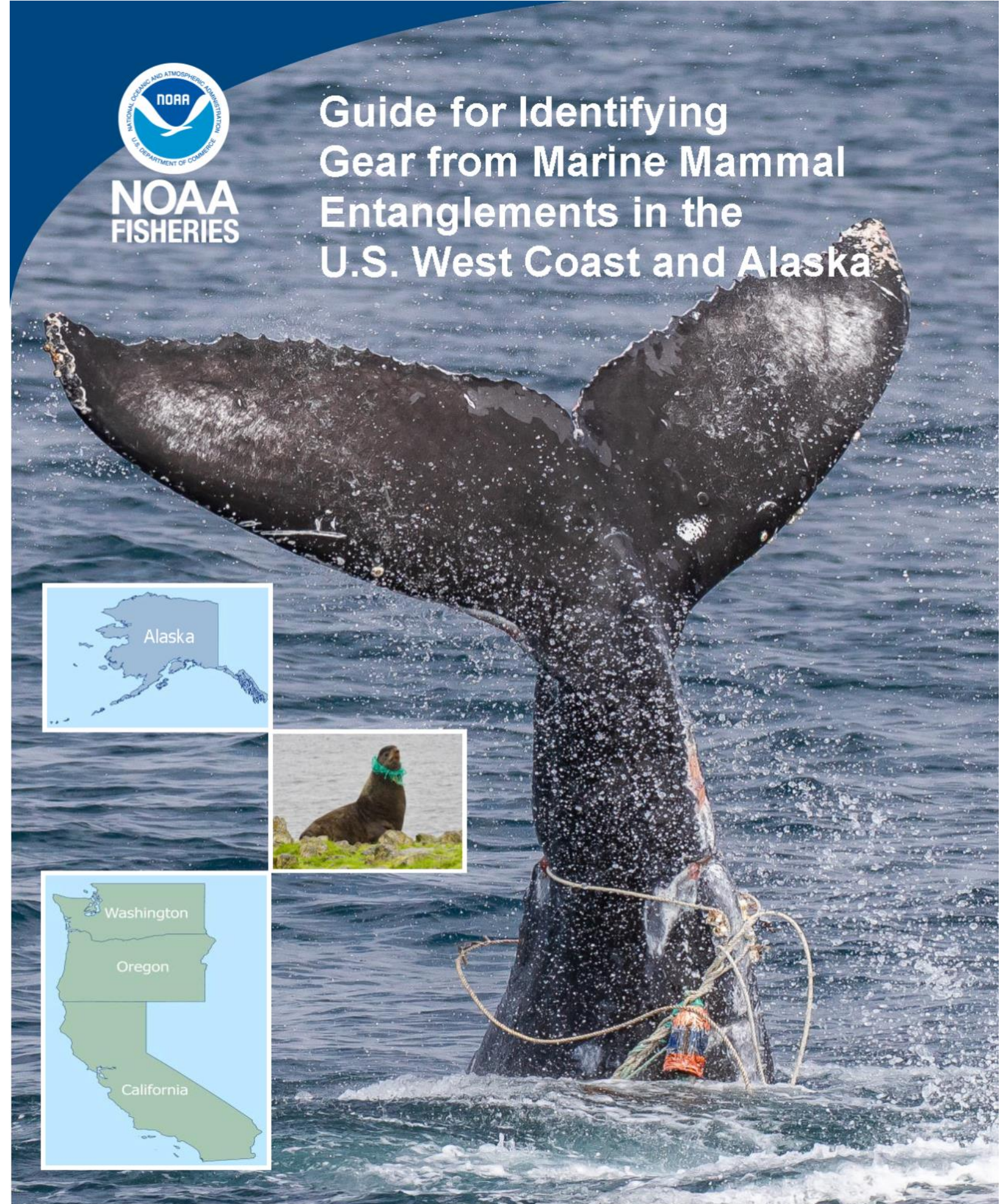


Table of Contents

Introduction & Definitions	4
Target species/gear type/area reference sheets	8
General gear types section	22
Pot/trap	23
Nets	30
Hook and line	37
Miscellaneous gear types	44
Buoys and floats	45
Special gear marking requirements	47
Net measurement and construction	50
Line	52
Fishery reference sheets and summary sheets	56
U.S. West Coast Region	57
Pot/trap	58
Nets	84
Hook and line	108
Alaska Region	121
Pot/trap	122
Nets	134
Hook and line	142
Marine mammal entanglement information	150
Whale information (identification, reporting, photographing)	150
Whale entanglement summaries	156
Pinniped entanglement information	159
Pinniped identification	161
Pinniped entanglement sources and outreach	162
References/Unit conversion	166
Acknowledgements	167
Appendix: scientific names	167
Contact information	back cover

Note to reader:

Readers should be aware that this is only a guide. For the purposes of complying with any requirements the respective management authority should be contacted. Regulations and prominent trends in the preferred or required gear can change quickly in commercial and recreational fisheries. Following publication of this guide, readers should refer to state and federal fishery management websites or publications for the most up-to-date descriptions of fisheries, status of the fisheries (open/closed), gear, and other important updates.

Cover whale photo caption: An entangled humpback whale fluke with multiple wraps around the tail stock and a bullet buoy belonging to the California commercial Dungeness crab fishery, documented off Monterey, California. Credit: Monterey Bay Whale Watch.

Cover seal photo caption: A fur seal with trawl net entangled around its neck. Credit: © AK Dept. Fish & Game, taken pursuant to a NMFS research permit

Introduction

In 2010, National Marine Fisheries Service (NMFS) West Coast Region (WCR) published a Fixed Gear Guide to California, Oregon, and Washington Commercial Fisheries (Gear Guide; Saez et al., 2010). The primary motivation behind creation of the original Fixed Gear Guide was to gather and organize specific information about the gear used in U.S. West Coast (West Coast) commercial fixed gear fisheries to understand and identify gear that may be involved with entanglements of whales and other protected species. At that time, reports of whale entanglements in the WCR were sporadic (~10 confirmed whale entanglements per year), and identification of the specific origin of the entanglements was relatively rare. Development of the Guide for Identifying Gear from Marine Mammal Entanglements (Gear Guide) focused WCR efforts to obtain more specific information about different components of gear involved from entanglement reports through increasing public awareness of which details were most important to document to help distinguish fixed gear fisheries and how gear involved in entanglements was configured. In turn, the Gear Guide also highlighted a multi-year effort to better understand state and federal fixed gear fisheries through engagement with managers and industry about entanglement issues. Immediately upon release, the Gear Guide became a valuable public outreach educational tool for a wide range of stakeholders as a consolidated source of general knowledge on West Coast commercial fixed gear fisheries and marine debris identification. Since publishing the 2010 Fixed Gear Guide, concerns over marine mammal entanglement issues in the WCR have increased. Starting in 2014, the number of confirmed whale entanglement reports on the West Coast increased dramatically (Saez et al., 2021). In response, there have been some significant changes to West Coast fixed gear fisheries that include improvements in gear marking to assist NMFS WCR with identification of the gear involved in entanglements. As a result, a comprehensive update to the Gear Guide is warranted to reflect the current state of West Coast fixed gear fisheries and gear marking to help promote general awareness of these details that are crucial to identifying the origins of entanglement reports.

Entanglements of marine mammals and other protected species are a global problem, and managers in other regions have pursued similar avenues of characterizing fishing gear that may be involved in entanglements. Given the overlap between a number of species during their migrations between the WCR and the Alaska Region (AKR), and the potential for gear to be found in one area that originated from another, AKR expressed interest in having information about Alaska fisheries and interactions with marine mammals included in a more comprehensive WCR/AKR Gear Guide that includes commercial fisheries from both regions. Given the general public interest in information on commercial fisheries and the high value of the previous Gear Guide as a consolidated outreach tool, we collectively decided to broaden the categories of fisheries covered in the Gear

Guide to include some information about gear used in fisheries that are not fixed gear (e.g., trawl nets, troll, etc.). Many of these fisheries are also known to be involved in the incidental bycatch of protected species. When practical and relevant to distinguishing different types of gear involved in entanglements with protected species, this version of the Gear Guide also describes some prominent recreational fishing gears. Additional supplemental information about fisheries, marine mammals, reporting of strandings/entanglements, and other related topics is also provided in context with each region as appropriate.

Similar to the 2010 Gear Guide, information included in this version was collected from a variety of sources, including: federal, state, and tribal fishery managers, current laws and regulations, interviews with fishermen, available published literature, and data or other information gathered and maintained by NMFS Regional Offices. The photos and diagrams are intended to provide general representations of fishing gear used by different commercial fisheries, and variation in specific gear configurations should be expected unless otherwise prescribed by state or federal regulations. Readers should be aware that regulations and prominent trends in the preferred or required gear can change quickly in commercial and recreational fisheries. Following publication of this Gear Guide, readers should refer to state and federal fishery management websites or publications for the most up-to-date descriptions of fisheries, gear, and other important updates.

The Marine Mammal Protection Act (MMPA) requires NMFS to monitor marine mammal bycatch in all U.S. commercial fisheries. Under this mandate, NMFS publishes the List of Fisheries (LOF) that classifies U.S. commercial fisheries according to the level of mortality and serious injury incidental to each fishery. A description of commercial fisheries in the AKR and the WCR along with their classification on the LOF can be found at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries>.

Descriptions of fishing gear and fisheries in the Gear Guide have been influenced by the organization and naming conventions of commercial fisheries used in the LOF, but are not necessarily identical. Where possible, we connect or clarify the labeling of commercial fisheries between the LOF and the Gear Guide.

The Gear Guide also serves as a companion to the West Coast gear guide data portal, where you can access the latest in participant counts, seasonal diagrams, interactive fishery maps, and links for NOAA LOF references. <https://apex.psmfc.org/pacfin/f?p=501:3001>

Definitions

Anchor (for commercial fishing): heavy metal object attached directly to the fishing gear to keep the gear in place on the sea bed, or, if gear is suspended in the water column, over the targeted area.

Benthic: anything associated with or occurring on the bottom of a body of water.

Buoy: a floating device that can have many purposes (e.g., to mark a location or to keep part of the gear from sinking for retrieval). Can be non-compressible or compressible, mostly made of plastic.

Destructive device/Escape panel: a section of material on a pot/trap that degrades over a set period of time, allowing the pot/trap to open and leaving an escape panel, rendering the trap inoperable, should the trap be lost at sea. The destructive material is often cotton twine or magnesium.

Dinglebar: heavy steel or iron bar attached to a troll wire with a single horizontal spread of jigs. The steel is towed such that it touches and bounces along the bottom as the boat trolls to attract fish.

Drift gillnet: any gillnet that drifts freely in the water, unattached to the ocean floor, though one end is often attached to the boat that deployed and is tending the gear. May include a system of weights and buoys to keep the gillnet afloat at the proper depth.

Escape port/ring: an opening, separate from the destructive device, that allows undersized fish or crustaceans to escape a pot/trap.

Endorsement: authorization given to a documented vessel to engage in commercial fishing activities.

Fathom: a measurement of depth. There are six feet in one fathom.

Flasher: a large lure that reflects light as it moves through the water to attract fish.

Float: used primarily for flotation, but can be used as a surface marker. Mostly made of PVC plastic.

Float line: the line attaching a pot/trap, net, or ground line to the surface buoy. May also refer to the line across the top of a net.

Gangion: a thin line used in fishing. This is often used in short sections to spread out and fasten a hook to the main line either permanently or with a manual fastener that can be taken on and off each time the main line is deployed (usually a stainless steel “snap”).

Gillnet: a fishing net that is hung vertically such that fish swim into it, that has mesh openings that correspond to the head size of the target species. When the fish of this size swim into the mesh, their heads push through and they get caught by their gills. Can be set with an anchor or floating (drift).

Ground line: leaded (lead line) or sinking line used in setting strings of pots/traps or bottom set longlines, often weighted at each end and attached to a float line to mark the gear or used along the bottom of a gillnet to weigh it down and stretch out the net.

Harpoon: metal or wooden pole with a steel point used to target fish, can be used by hand or shot from a gun.

Jig: weighted fish hook with a lure.

Jigging: a fishing practice using a jig, a type of weighted fishing lure. The jig is used on a rod and reel and bounced up and down to attract fish.

Limited entry: a fishery where the number of participants is limited by statute or regulations.
(See <https://wildlife.ca.gov/Licensing/Commercial>)

Line: rope used for fishing with variable material and thickness.

Longline: a fishing line with hooks attached at regular intervals, set in the ocean for a period of time and then retrieved. Can be deployed along the ocean bottom or in the water column.

Longline snap: stainless metal clip for attaching a fishing hook or trap to a longline.

Lure: a piece of fishing equipment that usually accompanies a hook and attracts fish to it by the way it looks, smells, or reflects light.

Marker buoy: buoy used for flotation and identification. They are marked with owner identification and are often colored with a specific pattern to aid in identification at sea.

Mesh: refers to the size of an opening in a pot/trap or net that helps target a certain size fish or crustacean.

Monofilament: single strand of extruded polymer with varying strength and color depending on the need of the user.

Multifilament: multiple strands of extruded polymer braided or twisted together.

Open access: access to a fishery that is unrestricted.

Packing band: a plastic strap that comes in many sizes; used to secure boxes.

Pinniped: “fin-footed”; amphibious marine mammals including seals, sea lions, fur seals, and walrus.

Seine: fishing method using a net to surround an area of water to capture fish.

Set gillnet: any gillnet used to take fish that is anchored to the bottom or to land and is not free to drift with the tide or current.

Set line: anchored longline laid on or just above the ocean floor.

String (of traps): a term used to describe multiple traps attached to a single ground line resting on the ocean floor.

Target species: the species or group of species that is primarily sought in a particular fishery.

Trailer buoy: extra buoy(s) attached to existing line to add additional flotation; commonly used for pot/trap gear.

Pot/trap: a portable, enclosed device with one or more entrances that is typically baited and designed to catch crustaceans or fish. Can be set individually with their own float line or in series on a longline with one or more lines attached to a surface float.

Trawl: fishing method that tows a funnel-shaped net through the water. The net has a closed tail end (or codend) where fish are collected.

Trolling: fishing method where lines with bait or lures are towed (surface and subsurface) behind a vessel.

Twine: string made from lightweight fibers such as cotton. Synthetic fibers are also used.

Acronyms

AKR: Alaska Region

ADF&G: Alaska Department of Fish and Game

BC: British Columbia

BRD: Bycatch Reduction Device

CDFW: California Department of Fish and Wildlife

CHTG: California Halibut Trawl Grounds

CPS: Coastal Pelagic Species

DSBG: Deep-set buoy gear

EEZ: Exclusive Economic Zone

FMP: Fishery Management Plan

GOA: Gulf of Alaska

HMS: Highly Migratory Species

IATTC: Inter-American Tropical Tuna Commission

LDSBG: Linked Deep-set Buoy Gear

LOF: List of Fisheries

MMPA: Marine Mammal Protection Act

MSFMP: Market Squid Fishery Management Plan

NMFS: National Marine Fisheries Service

NOAA: National Oceanic and Atmospheric Administration

ODFW: Oregon Department of Fish and Wildlife

PFMC: Pacific Fishery Management Council

PLCA: Pacific Leatherback Closure Area

RAMP: Risk Assessment and Mitigation Program

SCB: Southern California Bight

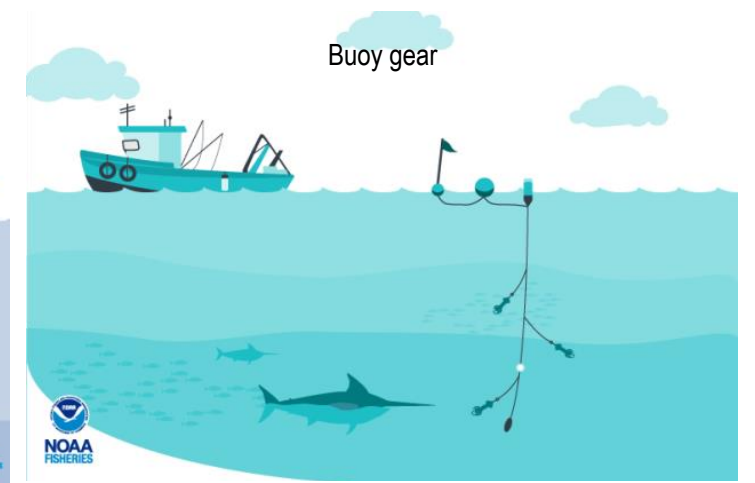
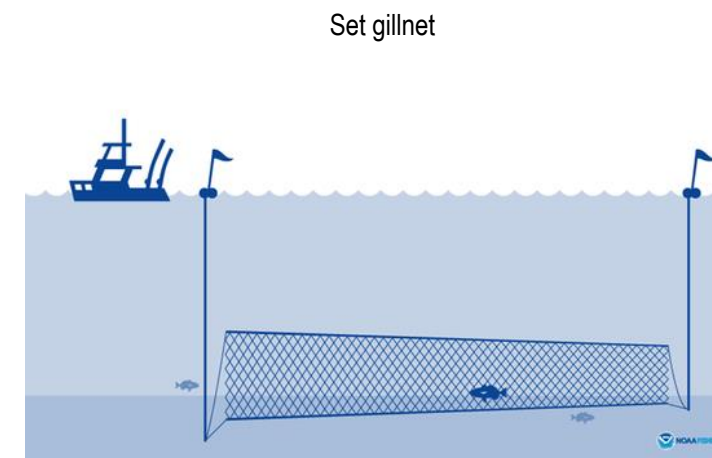
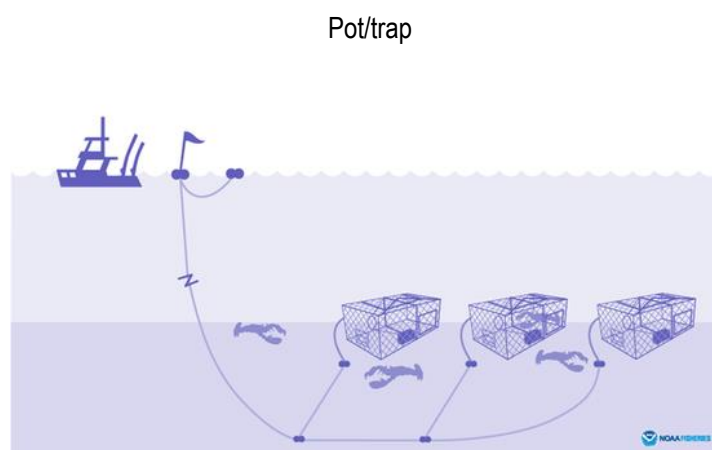
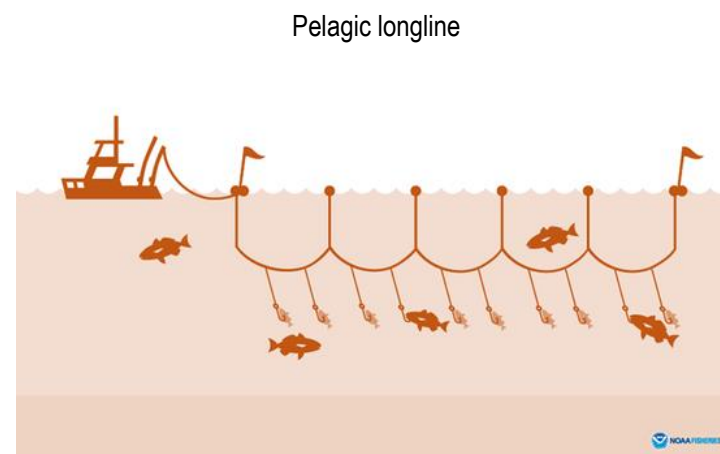
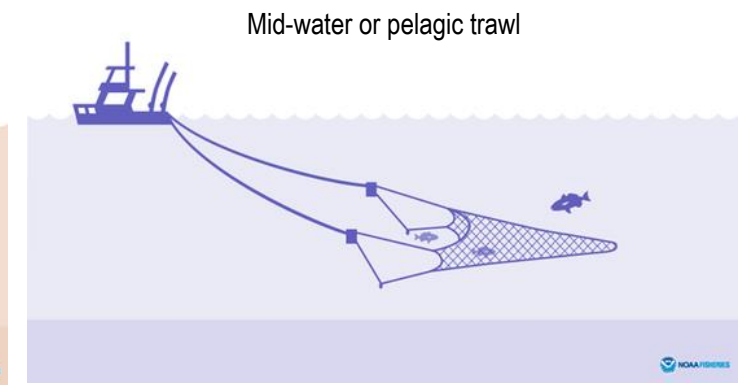
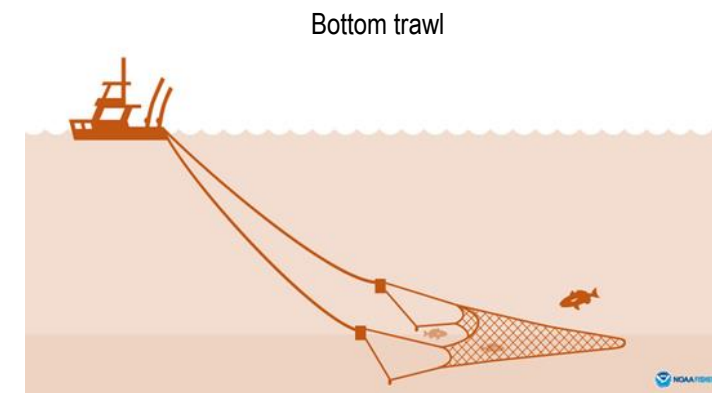
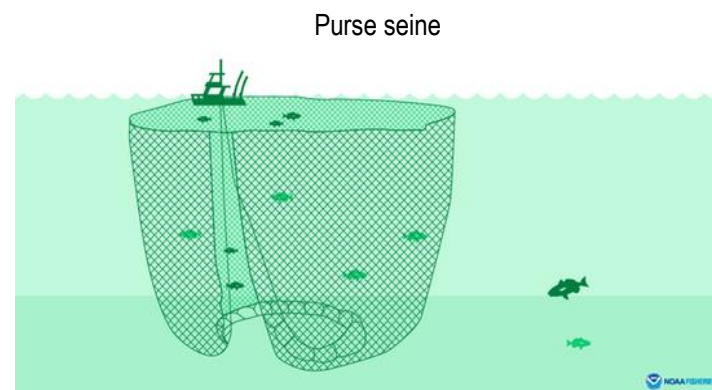
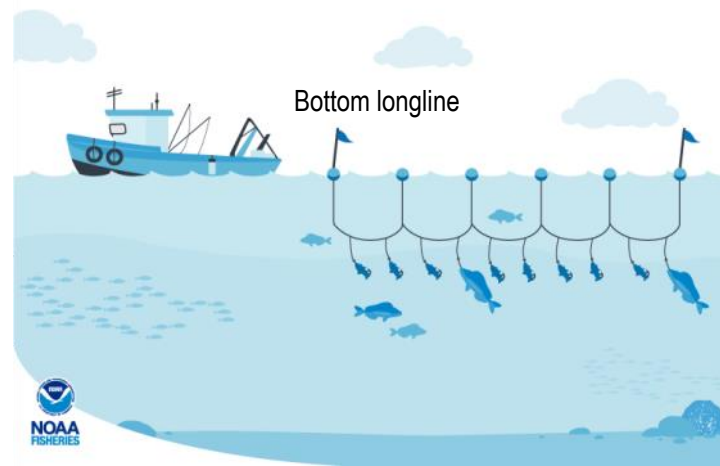
VMS: Vessel Monitoring System

WDFW: Washington Department of Fish and Wildlife

WCR: West Coast Region

Target species/gear type/area reference sheets

Here we present a quick reference sheet that identifies the common/species name for target species fished in the WCR and/or AKR, along with the gear type used, and the area (state) where fishing occurs for the species with this gear type. Where necessary, we associate the multiple common names used for the same species, and vice versa. The sheets are organized by species groups of invertebrates and vertebrates, in alphabetical order.



Diagrams: NOAA Fisheries

Diagrams: NOAA Fisheries

Target species/gear type/area reference sheets

Crabs	Gear types	Region
Dungeness crab <i>Cancer magister</i>	Pot/trap	AK, WA, OR, CA
Blue king crab <i>Paralithodes platypus</i>	Pot/trap	AK
Golden king crab <i>Lithodes aequispinus</i>		
Red king crab <i>Paralithodes camtschaticus</i>		
Brown box crab <i>Lopholithodes foraminatus</i>	Pot/trap	AK, CA
Red rock crab Pacific rock crab <i>Cancer productus</i>		
Tanner crab <i>Chionoecetes bairdi</i> , <i>Chionoecetes opilio</i> , <i>Chionoecetes tanneri</i>		
Yellow rock crab <i>Metacarcinus anthonyi</i>		

Lobster	Gear types	Region
California spiny lobster <i>Panulirus interruptus</i>	Pot/trap	CA

Octopus & squid*	Gear types	Region
Market squid <i>Doryteuthis opalescens</i>	Dip net Lampara net Purse seine	WA, OR, CA
Pacific octopus <i>Octopus dofleini</i>	Bottom longline Pot/trap	AK

Sea cucumber	Gear types	Region
California sea cucumber Giant red sea cucumber <i>Apostichopus californicus</i>	Bottom trawl	CA
Warty sea cucumber <i>Apostichopus parvimensis</i>		

* Coastal Pelagic Species (CPS)

Target species/gear type/area reference sheets

Shrimp	Gear types	Region
Coonstripe shrimp** Humpback shrimp King shrimp <i>Pandalus hypsinotus</i>	Bottom trawl	AK, WA, OR, CA
Humpy shrimp <i>Pandalus goniurus/dapifer</i>		
Norther pink shrimp <i>Pandalus eous</i>		
Golden prawn <i>Penaeus californiensis</i>	Pot/trap	AK
Humpy shrimp <i>Pandalus goniurus/dapifer</i>		
Northern pink shrimp <i>Pandalus eous</i>		
Ridgeback prawn <i>Eusicyonia</i>		
Brown box crab <i>Lopholithodes foraminatus</i>	Pot/trap	AK, CA
Red rock crab Pacific rock crab <i>Cancer productus</i>		
Tanner crab <i>Chionoecetes bairdi</i> , <i>Chionoecetes opilio</i> , <i>Chionoecetes tanneri</i>		
Yellow rock crab <i>Metacarcinus anthonyi</i>		

Whelk	Gear types	Region
Kellet's whelk <i>Kelletia kelletii</i>	Pot/trap	CA

** Coonstripe shrimp not targeted with trawl

Target species/gear type/area reference sheets

Barracuda	Gear types	Region
California barracuda <i>Sphyræna argentea</i>	Small mesh drift gillnet	CA
Cod	Gear types	Region
Gray cod Grayfish Pacific cod <i>Gadus macrocephalus</i>	Bottom longline/set longline Bottom trawl Jig Pelagic trawl Pot/trap	AK
Coastal pelagic species (CPS)	Gear types	Region
Northern anchovy <i>Engraulis mordax</i>	Lampara nets Purse seine	WA, OR, CA
California jack mackerel Jack mackerel <i>Trachurus symmetricus</i>	Purse seine	CA
Pacific sardine <i>Sardinops sagax</i>	Purse seine	WA, OR, CA
Small coastal fish	Gear types	Region
Pacific herring <i>Clupea pallasii</i>	Lampara nets Purse seine	AK, WA, OR
	Pelagic trawl	AK
	Small mesh set gillnet	AK, CA
Longfin smelt Pacific smelt <i>Spirinchus thaleichthys</i>	Lampara nets Purse seine	WA, OR

Target species/gear type/area reference sheets

Eulachon	Gear types	Region
Eulachon Candlefish <i>Thaleichthys pacificus</i>	Small mesh drift gillnet	WA, OR
Flatfish and skates	Gear types	Region
Alaska plaice <i>Pleuronectes quadrituberculatus</i>	Bottom trawl	AK
Arrowtooth flounder <i>Atheresthes stomas</i>		
Flathead sole <i>Hippoglossoides elassodon</i>		
Rock sole <i>Lepidopsetta bilineata</i>		
Yellowfin sole <i>Limanda aspera</i>	Bottom longline/set line Bottom trawl Small mesh gillnet Stick gear Pole and line Troll Vertical longline	CA
California halibut <i>Paralichthys californicus</i>		
Blue halibut Greenland turbot <i>Reinhardtius hippoglossoides</i>	Bottom trawl Longline/set line Pot/trap	AK
Pacific halibut <i>Hippoglossus stenolepis</i>	Bottom longline/set line	WA, OR, CA
	Bottom longline/set line Mechanical jig Pot/trap	AK

Target species/gear type/area reference sheets

Flatfish and skates	Gear types	Region
Arrowtooth flounder <i>Atheresthes stomas</i>	Bottom longline/set line Bottom trawl	WA, OR, CA
Big skate <i>Beringraja binoculata</i>	Pot/trap Pole and line	
Dover sole <i>Solea solea</i>	Stick gear Troll	
Longnose skate <i>Raja rhina</i>	Vertical longline	
Pacific sanddab <i>Citharichthys sordidus</i>		
Petrale sole <i>Eopsetta jordani</i>		
Starry flounder <i>Plueronectidae stellatus</i>		
Thornback ray <i>Platyrhinoidis triseriata</i>		

Hagfish	Gear types	Region
Black hagfish <i>Eptatretus deani</i>	Pot/trap	AK, WA, OR, CA
Pacific hagfish <i>Eptatretus stoutii</i>		

Pollock	Gear types	Region
Walleye pollock Alaska pollock <i>Gadus chalcogrammus</i>	Pelagic trawl	AK

Target species/gear type/area reference sheets

Rockfish and other groundfish***	Gear types	Region
Atka mackerel <i>Pleurogrammus monopterygius</i>	Bottom trawl	AK
Black rockfish <i>Sebastes malanops</i>	Bottom longline/set line Bottom trawl Mechanical jigging Troll	AK
Blue rockfish <i>Sebastes mystinus</i>		
Dusky rockfish <i>Sebastes ruberrimus</i>		
Light dusky rockfish <i>Sebastes variabilis</i>		
Northern rockfish <i>Sebastes polyspinus</i>		
Pacific ocean perch <i>Sebastes alutus</i>		
Rougheye rockfish <i>Sebastes ruberrimus</i>		
Shortracker rockfish <i>Sebastes borealis</i>		
Widow rockfish <i>Sebastes entomelas</i>		
Yelloweye rockfish <i>Sebastes ruberrimus</i>		
Yellowtail rockfish <i>Sebastes flavidus</i>		

*** Rockfish and other groundfish, excluding sablefish and Pacific cod (almost 100 species targeted). The following species make up the majority of the catch. Rockfish are not targeted in inland Washington.

Target species/gear type/area reference sheets

Rockfish and other groundfish***	Gear types	Region
Black rockfish <i>Sebastes malanops</i>	Bottom longline/set line	WA, OR, CA
Blackgill rockfish <i>Sebastes melanostomus</i>	Bottom trawl	
	Midwater trawl	
Boccaccio <i>Sebastes paucispinis</i>	Pole and line	
	Pot/trap	
Canary rockfish <i>Sebastes pinniger</i>	Stick gear	
	Troll	
Chilipepper rockfish <i>Sebastes goodei</i>	Troll	
	Vertical longline	
Giant grenadier Giant rattail <i>Albatrossia pectoralis</i>		
Gopher rockfish <i>Sebastes carnatus</i>		
Kelp greenling <i>Hexagrammos decagrammus</i>		
Lingcod <i>Ophiodon elongatus</i>		
Pacific ocean perch <i>Sebastes alutus</i>		
Rougheye rockfish <i>Sebastes ruberrimus</i>		
Shortspine thornyhead <i>Sebastolobus alascanus</i>		
Widow rockfish <i>Sebastes entomelas</i>		
Yellowtail rockfish <i>Sebastes flavidus</i>		

*** Rockfish and other groundfish, excluding sablefish and Pacific cod (almost 100 species targeted). The following species make up the majority of the catch. Rockfish are not targeted in inland Washington.

Target species/gear type/area reference sheets

Rockfish and other groundfish***	Gear types	Region
Brown rockfish <i>Sebastes auriculatus</i>	Bottom longline/set line	WA, OR, CA
Vermilion rockfish <i>Sebastes miniatus</i>	Bottom trawl	
	Midwater trawl	
	Pole and line	
	Pot/trap	
	Stick gear	
	Vertical longline	
Cabezon <i>Scorpaenichthys marmoratus</i>	Bottom longline/set line	CA
	Bottom trawl	
	Midwater trawl	
	Pole and line	
	Pot/trap	
	Stick gear	
	Troll	
	Vertical longline	
Lingcod <i>Ophiodon elongatus</i>	Bottom longline/set line	AK
	Dinglebar	
	Mechanical jigging	
	Troll	
Pacific whiting Hake <i>Merluccius productus</i>	Midwater trawl	WA, OR, CA

Sablefish	Gear types	Region
Black cod Sablefish <i>Anoplopoma fimbria</i>	Bottom longline/set longline	AK, WA, OR, CA
	Bottom trawl	
	Pot/trap	
	Jig	AK
	Troll	

*** Rockfish and other groundfish, excluding sablefish and Pacific cod (almost 100 species targeted). The following species make up the majority of the catch. Rockfish are not targeted in inland Washington.

Target species/gear type/area reference sheets

Salmon	Gear types	Region
Chum salmon Dog salmon Keta salmon <i>Oncorhynchus keta</i>	Purse seine Reef net Small mesh drift gillnet	WA
	Purse seine Set gillnet Small mesh drift gillnet Troll	AK
Chinook salmon King salmon Quinnat salmon Tye salmon <i>Oncorhynchus tshawytscha</i>	Small mesh drift gillnet Purse seine Troll	WA, OR
	Beach seine Reef net	WA
	Troll	CA
	Purse seine Set gillnet Small mesh drift gillnet Troll	AK
Coho salmon Silver salmon <i>Oncorhynchus kisutch</i>	Purse seine Small mesh drift gillnet Troll	WA, OR
	Beach seine Reef net	WA
	Purse seine Set gillnet Small mesh drift gillnet Troll	AK
Pink salmon <i>Oncorhynchus gorbuscha</i>	Small mesh drift gillnet	WA, OR
	Purse seine Reef net	WA
	Purse seine Set gillnet Small mesh drift gillnet Troll	AK

Target species/gear type/area reference sheets

Salmon	Gear types	Region
Red salmon Sockeye salmon <i>Oncorhynchus nerka</i>	Purse seine Reef net	WA
	Purse seine Set gillnet Small mesh drift gillnet Troll	AK
Steelhead <i>Oncorhynchus mykiss</i>	Beach seine	WA

Seabass	Gear types	Region
White seabass White weakfish <i>Atractoscion nobilis</i>	Bottom longline/set longline Pole and line Small mesh drift gillnet Small mesh set gillnet Stick gear Troll Vertical longline	CA

Shad	Gear types	Region
American shad <i>Alosa sapidissima</i>	Small mesh drift gillnet	WA

Swordfish	Gear types	Region
Pacific swordfish <i>Xiphias gladius</i>	Deep set buoy gear Harpoon Hook and line	CA

Target species/gear type/area reference sheets

Tunas, sharks and other pelagic fish	Gear types	Region
Big-eye opah Moonfish <i>Lampris megalopsis</i>	Deep-set buoy gear Deep-set pelagic long-line**** Hook and line Large mesh drift gillnet Troll	CA
Small-eye opah Moonfish <i>Lampris guttatus</i>		
Bigeye tuna <i>Thunnus obesus</i>	Deep-set pelagic long-line**** Hook and line Purse seine Troll	CA
Dolphinfish/dorado <i>Cyrophaena hippurus</i>	Deep-set pelagic long-line**** Hook and line Troll	CA
Longfin tuna Pacific albacore <i>Thunnus alalunga</i>	Hook and line Troll	WA, OR, CA
Pacific bluefin tuna <i>Thunnus orientalis</i>	Deep-set buoy gear Deep-set pelagic long-line**** Hook and line Large mesh drift gillnet Purse seine Troll	CA
<i>Pacific yellowfin tuna</i> <i>Thunnus albacares</i>	Deep-set pelagic long-line**** Hook and line Large mesh drift gillnet Purse seine Troll	CA

****Deep-set pelagic longline only occurs outside the EEZ

Target species/gear type/area reference sheets

Tunas, sharks, and other pelagic fish	Gear types	Region
Skipjack tuna <i>Katsuwonus pelamis</i>	Deep-set pelagic long-line**** Hook and line Large mesh drift gillnet Purse seine	CA
Bigeye thresher shark <i>Alopias superciliosus</i>	Deep-set buoy gear Deep-set pelagic long-line****	CA
Common thresher shark <i>Alopias vulpinus</i>	Hook and line Large mesh drift gillnet	
Shortfin mako shark <i>Isurus oxyrinchus</i>	Troll	

Yellowtail	Gear types	Region
Pacific yellowtail <i>Seriola lalandi</i>	Bottom longline/set longline Pole and line Small mesh drift gillnet Stick gear Troll Vertical longline	CA

**** Deep-set pelagic longline only occurs outside the EEZ

General gear types section

A wide range of different gear types are used in fisheries throughout Alaska and the U.S. West Coast. Before exploring details that help distinguish gear used in different fisheries, we generally characterize the different gear types used throughout both regions. These general characterizations provide a foundation to understand the similarities and differences between these different gear types. From there, we describe more specific characteristics of individual fisheries and gear used in each region.



Photo credit: Kim Raum-Suryan

Pot/trap

The terms pot and trap are often used interchangeably with “trap” more often used along the U.S. West Coast and “pot” more often used in Alaska. Pots and traps, designed to catch fish or crustaceans, are in the form of cages or baskets made from various materials (wood, wicker, metal rods, wire netting, etc.) that have one or more openings or entrances. Pots and traps are usually set on the bottom, with or without bait, individually or strung together and connected by ropes/lines to buoys on the surface showing their position (Nedelec and Prado, 1990).

Pots/traps are baited and deployed on the bottom of the ocean at various depths and are left to soak from hours to days depending on the target species, weather, management considerations, and oceanographic conditions.

The mesh size of pot/trap walls can vary, ranging from very small (e.g., 1/2") to larger (e.g., 2" x 3"). An opening in the mesh tapers towards the inside of the trap allowing for crustaceans or fish to enter but not escape. An escapement ring that provides an opening for undersized fish is usually required as well as a destruct device (e.g., a single strand of untreated cotton twine) that will degrade and leave a large opening in the event that the gear is lost which will allow catch to escape.

The vertical line used to mark and retrieve a pot/trap is ideally kept to a minimum length with only the amount necessary to account for the tides, currents, and weather allowable in some fisheries. Some fishermen choose to use leads on floating line or neutral buoyancy line to reduce excess floating at the surface.



Hagfish, Dungeness crab and sablefish trap photos Photo credit: Lauren Saez

Pot/trap

Single pot/trap

A single pot/trap is set on the ocean bottom attached to a vertical line, marked at the surface with one or more surface buoys. The first buoy is referred to as the main buoy and additional buoys are referred to as trailer buoys.

Terms commonly used to describe single trap per vertical line: Singles

Single trap with one or more buoys

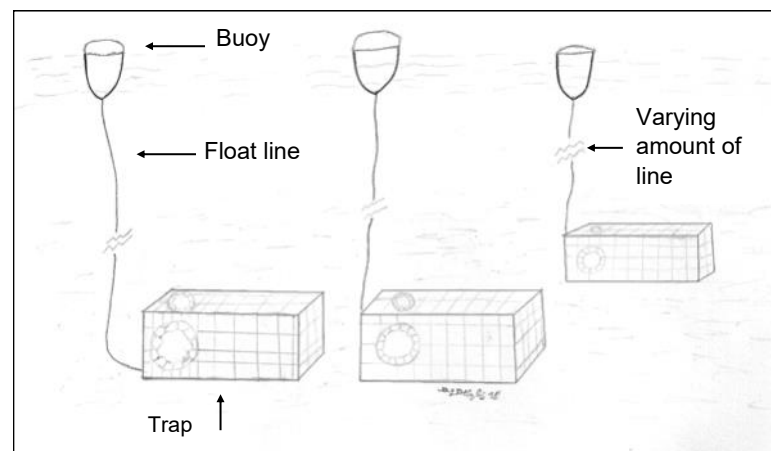


Diagram by Monica DeAngelis

List of common target species and whether single (S) or multiple (M) traps are used. In some cases, both can be used throughout the range of the fishery.

- Dungeness crab (S)
- Tanner crab/snow crab (S)
- Red king crab (S)
- Golden king Crab (S, M)
- Blue king crab (S)
- Brown box crab (S)
- Yellow rock crab (S, M)
- Red/Pacific box crab (S, M)
- Northern pink shrimp (M)
- Ridgeback prawn (M)
- Golden prawn (M)
- Spot prawn (M)
- Sidestripe shrimp (M)
- Humpy shrimp (M)
- Dock shrimp/coonstripe shrimp (M)
- Humpback shrimp/king shrimp (M)
- Lobster (S)
- Kellet's whelk (M)
- Pacific octopus (M)
- Hagfish (black and Pacific) (M)
- Sablefish (S, M)
- Pacific cod/gray cod/grayfish (S, M)
- Rockfish and groundfish (M)
- Greenland turbot (M)

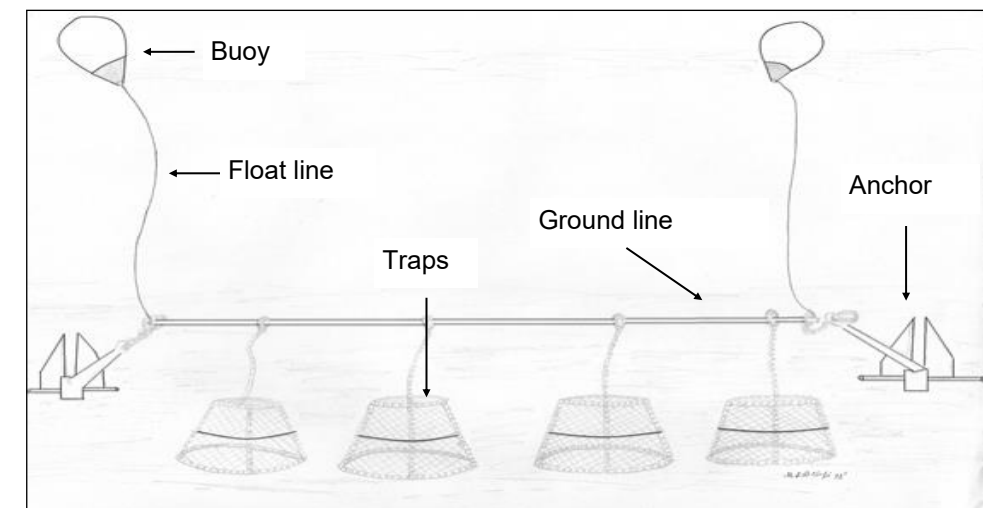
Pot/trap

Multiple pots/traps per line

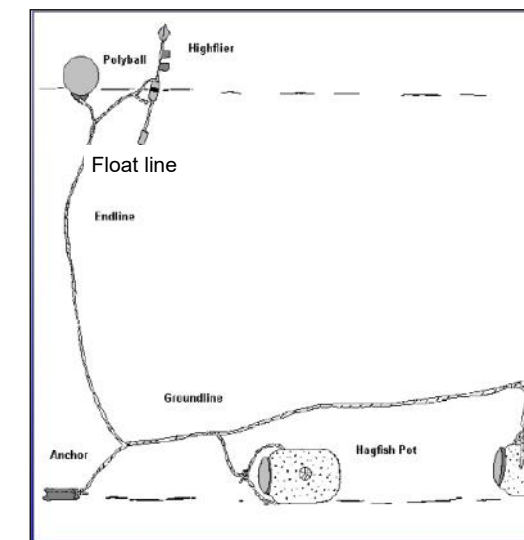
Multiple pots/traps are set on the ocean bottom connected to a common groundline attached to at least one vertical line, marked at the surface with buoys and possibly a pole, flag and/or radar reflector.

Terms commonly used to describe multiple traps per vertical line: Strings of traps, trawled traps, pot longline.

Traps attached to a common ground line (string or trawl)



Sablefish trap configuration
Diagram by Monica DeAngelis



Hagfish trap configuration
Diagram by Massachusetts Division of Fisheries

Pot/trap

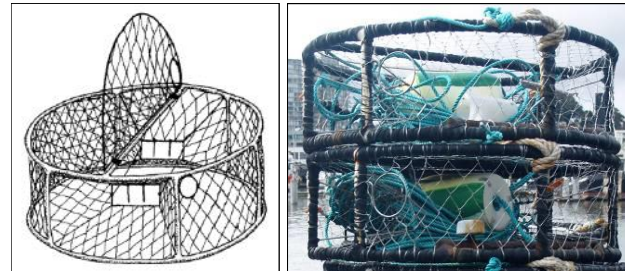
Pot/trap shapes

Round pots/traps

Round crab pot

Single pot/trap targets Dungeness crab

Diagram: CDFW, Photo: Lauren Saez



Round fish pot

Multiple pots/traps per line targets sablefish/black cod

CodCoil collapsible "slinky pots"

Photo: www.longlinepots.com



Conical pots/traps

Conical crab pot

Single pot/trap per line targeting Pacific cod

Photo: ADF&G



Conical shrimp pot

Multiple pots/traps per line targeting spot prawn and coonstripe shrimp

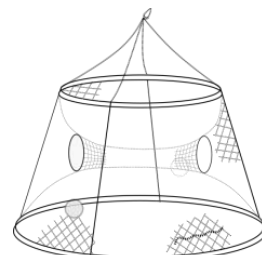
Photo: CDFW



Conical/pyramid fish pot

Multiple pots/traps per line targeting sablefish/black cod

Photo: Lauren Saez, diagram: Jane Sullivan, ADF&G



Pot/trap

Barrel/bucket traps

Barrel fish traps

Multiple trap/pots per line target hagfish
55 gallon barrel

Photo: CDFW



Bucket fish traps

Multiple trap/pots per line target hagfish
5 gallon bucket

Entrance funnel used in both barrel and buckets

Photo: CDFW and Susan Scott, Honolulu Star



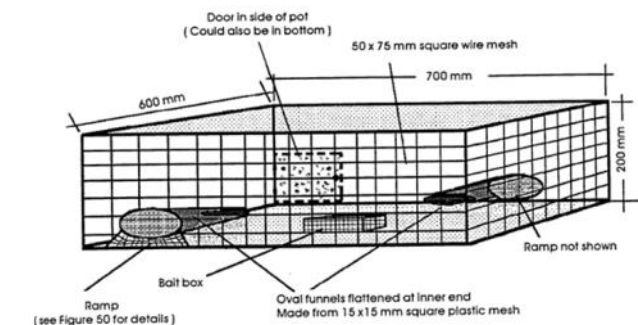
Rectangular pots/traps

Large rectangular crab pots

Single pots/traps per line targeting king, tanner and snow crab

Made from galvanized steel and covered with polypropylene mesh

Diagram and photo: ADF&G



Pot/trap

Rectangular pots/traps

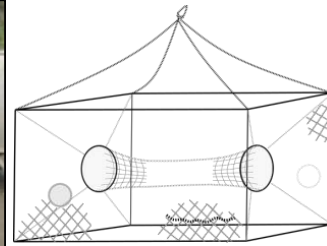
Large rectangular fish pot

Single pots/traps per line targeting sablefish

Made from galvanized steel and covered with polypropylene mesh

Multiple traps stacked in picture

Photo: ADF&G, Diagram: Jane Sullivan, ADF&G

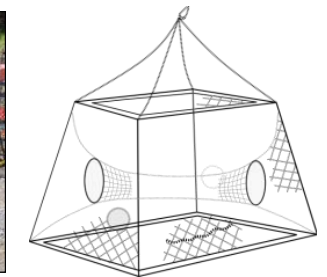


Trapezoidal fish pot

Multiple pots/traps per line targeting sablefish/black cod

Made from galvanized steel and covered with polypropylene mesh

Photo: ADF&G, Diagram: Jane Sullivan, ADF&G



Rectangular pots/traps

Single or multiple pots/traps per line targeting lobster, spot prawn, rock crab and finfish

Photo: Lauren Saez



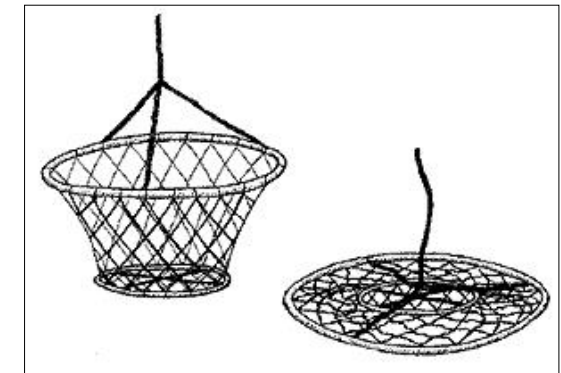
Pot/trap

Hoop/ring nets

Large rectangular fish pot

Single or multiple nets per line targeting Dungeness crab or tanner crab

Diagram: CDFW, Photos: Ryan Bartling, CDFW



Nets

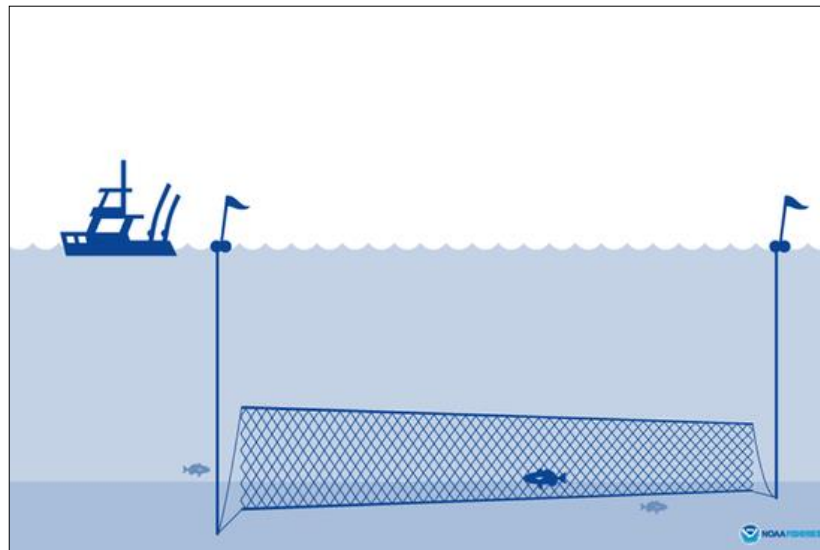
Gillnet

Gillnet is a type of gear with mesh openings that are large enough for fish to get their heads stuck or gilled, entangled, or enmeshed in the netting. Gillnets can be used to fish on the surface, in midwater, or on the bottom according to their design and buoyancy (Nedelec and Prado, 1990). Gillnets are typically made of monofilament or multifilament nylon.

Set gillnet — have different meanings per region

WCR: A set gillnet is set on the ocean bottom with anchor(s) and vertical lines attached to marker buoys on both ends of the net. Floats and floating line on top of the net and leadlines with sinkers on the bottom of the net are common. Mesh size and material vary depending on target species.

Alaska: Set gillnets are fixed to land, allowing for surface fishing.



Set gillnet diagram: NOAA

Target species

- California halibut
- White seabass
- Herring
- Salmon

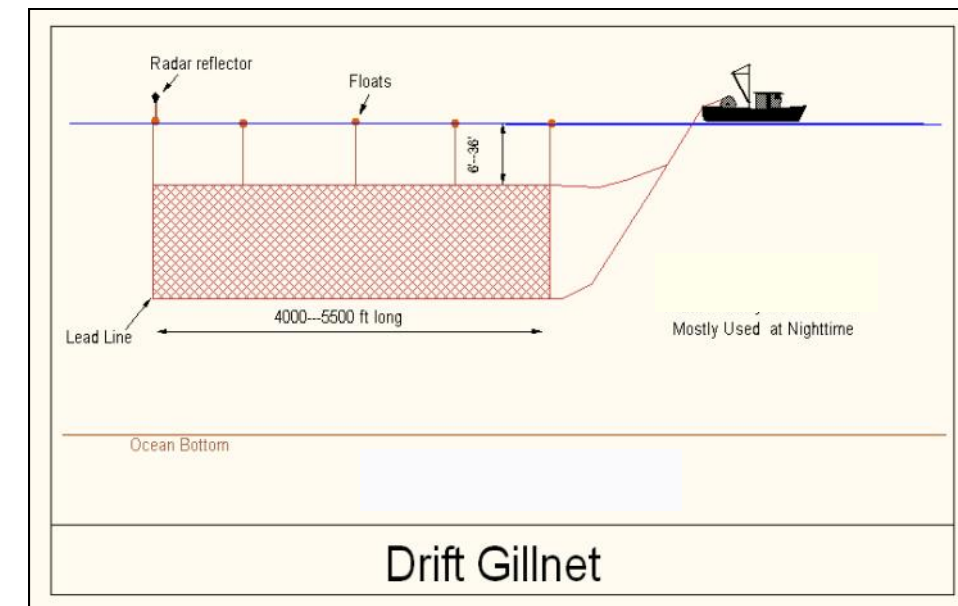


Example set gillnet vessel. Photo credit: Jody Van Niekerk

Nets

Drift gillnet

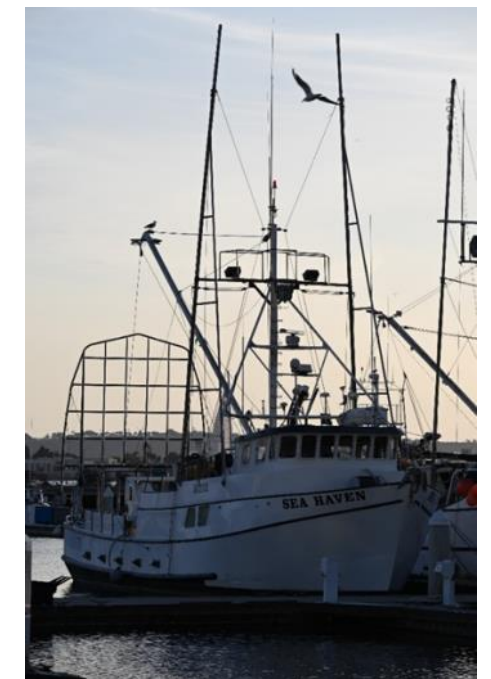
Drift gillnets can be set attached to or near a boat and allowed to drift for a set period of time. Nets can be set below the surface with extenders. Floats and floating line on top of the net, and leadlines on the bottom of the net are common. Mesh size and material vary depending on target species. The nets are marked at surface with buoys/floats and radar reflector.



Drift gillnet diagram: Manny Aschemeyer, 2006

Target species

- California halibut
- White seabass
- Yellowtail, barracuda, and white seabass
- Thresher shark/swordfish
- Eulachon
- Shad
- Salmon

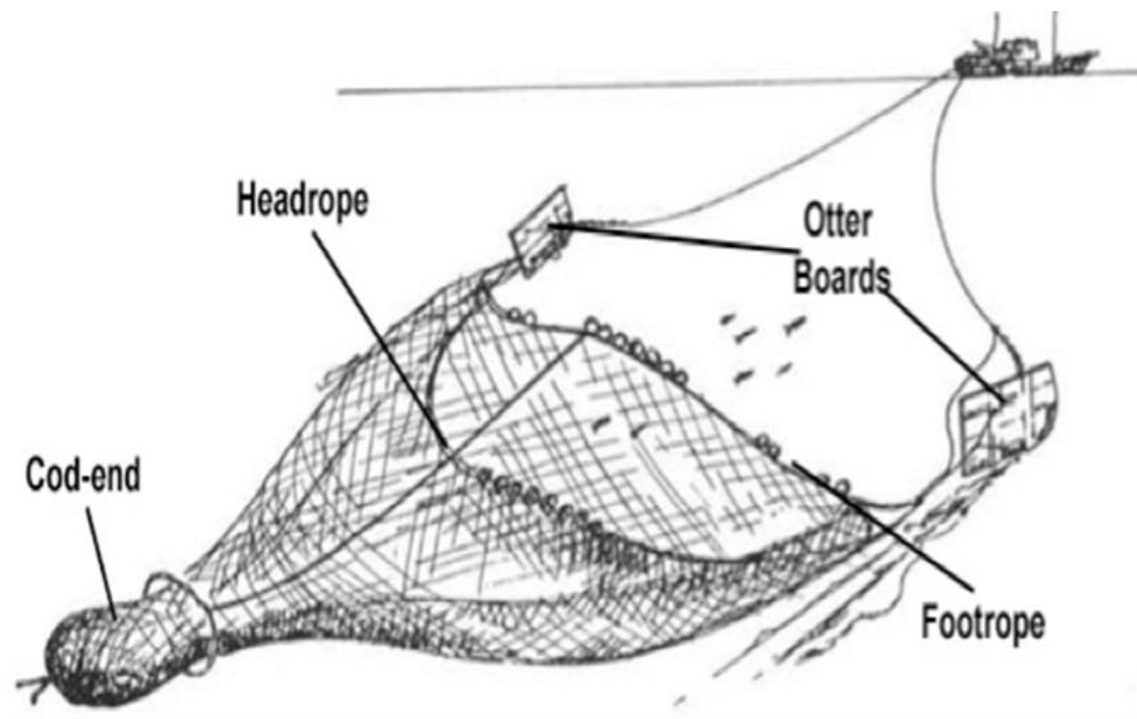


Example drift gillnet vessel. Photo credit: Jody Van Niekerk

Nets

Trawl

Trawl nets are cone- or funnel-shaped nets that are towed through the water by one or more vessels (FAO 2014). The net has a closed tail end (codend) where the fish are collected. Most trawl nets have doors on either side of the net's opening to help hold it open, and some that are fished near the bottom have a heavy chain strung along the bottom of the opening to hold it close to the seafloor. The net is retrieved using large winches and a power drum upon which the net is rolled as it is brought aboard (CA Sea Grant).



Trawl diagram: NOAA

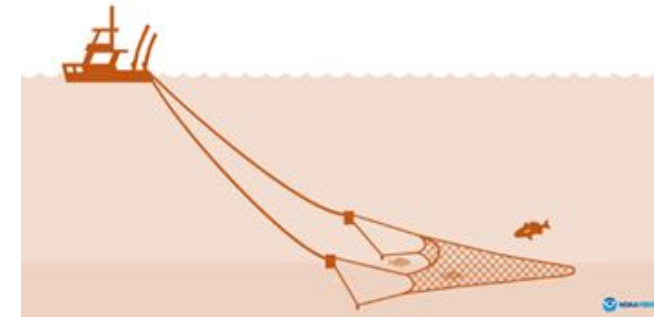


Photos by Kari Fenske

Nets

Bottom trawling

Bottom trawling is a fishing practice that herds and captures the target species, such as groundfish, by towing a net along the ocean floor. Floats are attached to the headrope, the top of trawl opening, while weights and special gear are attached to the footrope, bottom of trawl opening, to keep the net open as it moves through the water across the ocean floor. Bobbins are used to elevate the net off the ground as well.

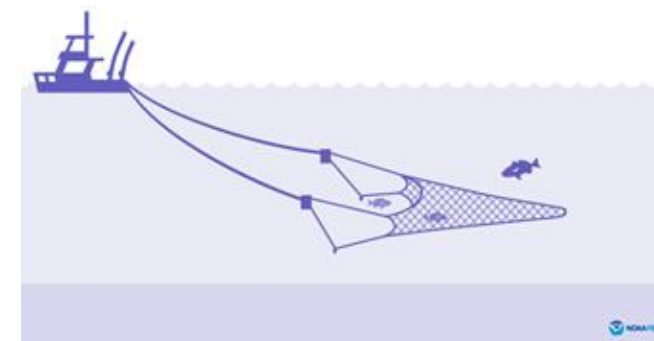


Target species

- Flatfish and skates
- Rockfish and other groundfish
- Sablefish
- Pacific cod
- Shrimp
- Sea cucumber
- Squid

Midwater/Pelagic trawling

Midwater or pelagic trawling involves towing a large net through the water column. Trawls are designed to capture and trap the target species inside the codend as the net is hauled through the water.



Target species

- Herring
- Pollock
- Squid
- Rockfish and other groundfish



Kari Fenske

Kari Fenske

Kari Fenske

Nets

Seine

A seine net is usually set from a boat, but can also be operated from the shore (beach seine). The manner of capture is to surround an area of water with a very long net, with or without a bag at the center to collect catch. The net is usually operated by two ropes fixed to its end, used both for hauling it in and for herding the fish (Nedelec and Prado, 1990).

Purse seine

A purse seine net is characterized by the use of a purse line at the bottom of the net. When setting a purse seine, the net will close like a purse and thus retain all the fish caught. The net is first stacked on the stern of the boat and then deployed into the water while the boat travels in a large circle around the fish. The far end of the net is attached to a power skiff, which holds the net while the seiner completes the circle. The top of the net stays on the surface of the water because of its float line – sometimes comprised of thousands of floats – and the bottom of the net falls vertically because of its weighted lead line. As a result, the net hangs like a curtain around the school of fish. The vessel crew then purses its bottom with a purse line. The lines and the net are pulled up with a hydraulic power block (winch). Once most of the net has been retrieved, with the remainder of it lying in a bag alongside the vessel, the fish are dipped from the bag into the vessel's hold.

Target species

- Octopus and squid
- Tuna
- Sardine
- Anchovy
- Mackerel
- Herring
- Salmon



Diagram: NOAA



Example purse seine vessel
Photo: Jody Van Niekerk

Nets

Lampara

The lampara net is a surrounding net, shaped like a dust pan or a spoon, with two lateral wings and a central bunt (similar to a codend) with small meshes used to retain the shoal of fish when the two wings are hauled up at the same time (FAO, 2014).

Target species

- Squid
- Anchovy
- Smelt
- Herring

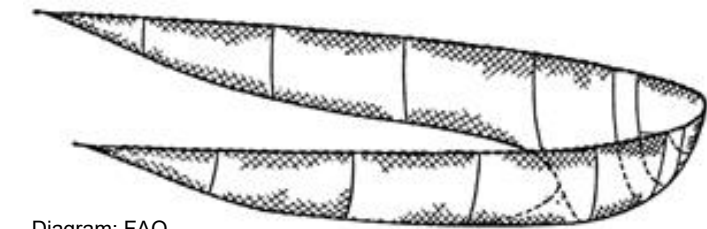


Diagram: FAO

Beach seine

A beach seine is a net operated from land, usually in shallow water near the shore, sometimes with the assistance of small vessels. The bottom and surface of the ocean act as natural barriers to prevent fish from escaping as the net is enclosed (Nedelec and Prado, 1990).



Photo: Seafood Watch

Target species

- Herring
- Salmon

Dip nets/hoop nets

Dip nets consist of a net or mesh basket, made from either wire, nylon mesh or cloth mesh, held open by a hoop. This hoop may or may not be connected to a handle, which can differ in length. Generally speaking, hand nets with the hoop attached to a long handle are called dip nets, and hand nets with no handle are called scoop nets.

Target species

- Squid

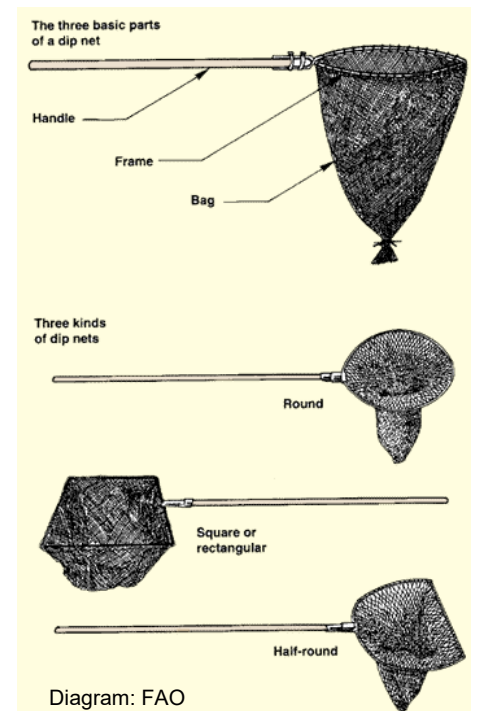


Diagram: FAO

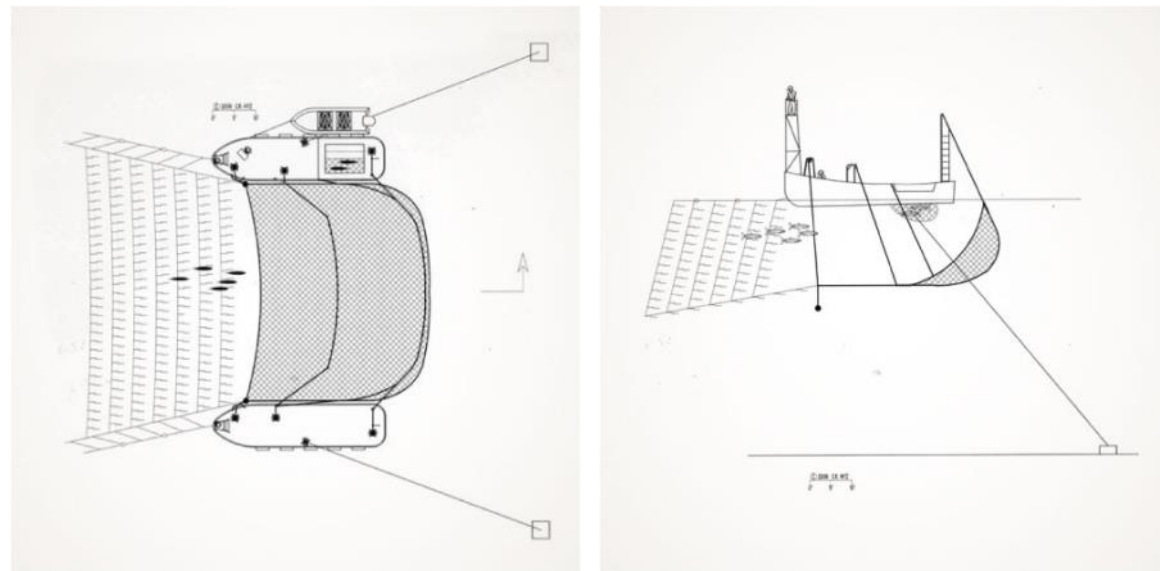
Nets

Reef nets

Reef nets are suspended between two anchored boats upstream from an area that fish (e.g. salmon) use to pass through. The bottom ropes are much lower than the bunt to create an incline that gradually raises up to catch the fish when passing over the net. The lead lines of the reef net are floating at all times in order to keep the net suspended at its required target depth. Reef nets are typically set so that the dominant daytime tide, “flood” tide, pushes the fish to follow the lead lines over webbing and into the bunt of the net. Streamers are woven into the side and bottom ropes (webbing) in order to potentially trick fish by giving the illusion of an eelgrass bed. The net is pulled to the surface by a system of battery powered winches and all salmon trapped in the bunt are maneuvered into a live well on the outside vessel. The vessels and gear are anchored in one place for the duration of the fishing seasons and set year after year in the same locations.

Target species

- Salmon



Reef net diagram: www.lummiislandwild.com

Hook and line

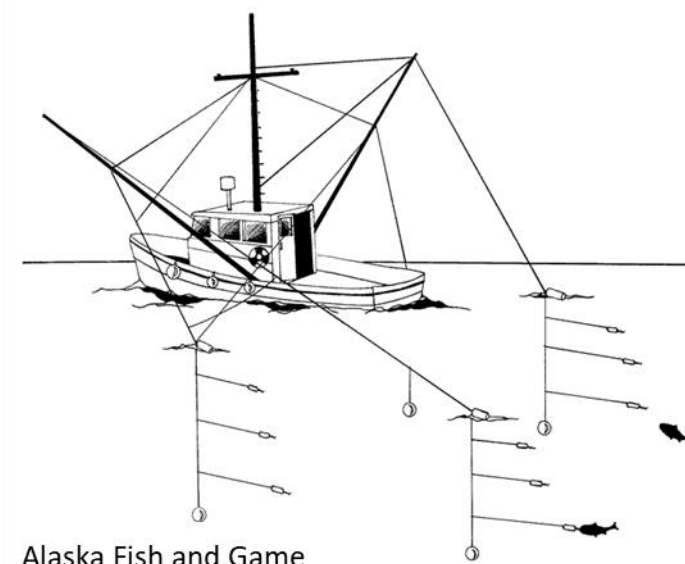
Hook and line fisheries involve attracting fish by natural or artificial bait placed on a fixed hook at the end of a line (Nedelec and Prado, 1990). There are various examples shared here including: troll, longline (e.g., bottom set and pelagic), buoy gear (standard and linked), stick gear, and rod and reel (e.g., mechanical jigging, non-mechanical jigging, and dinglebar).

Trolling

Trolling is a surface and sub-surface fishing method in which lines with baits or lures are dragged behind a vessel (FAO, 2014). Hooks are attached to lines deployed from outriggers (long poles) that extend on each side of the boat and are pulled through the water to attract fish with flashers (CA Sea Grant, 2020). To retrieve hooked fish, the main lines are wound about small, onboard spools via hand crank (e.g., hand trollers) or with hydraulic power (e.g., power trollers) and the fish are gaffed when alongside the vessel (adapted from Alaska Fish and Game and California Sea Grant, 2020).

Target species

- Albacore
- Salmon
- Pacific halibut, California halibut, white seabass, yellowtail
- Tuna, sharks, and other pelagic fish
- Rockfish and other groundfish, flatfish and skates



Alaska Fish and Game



Flashers used to attract fish. Photo: Lauren Saez

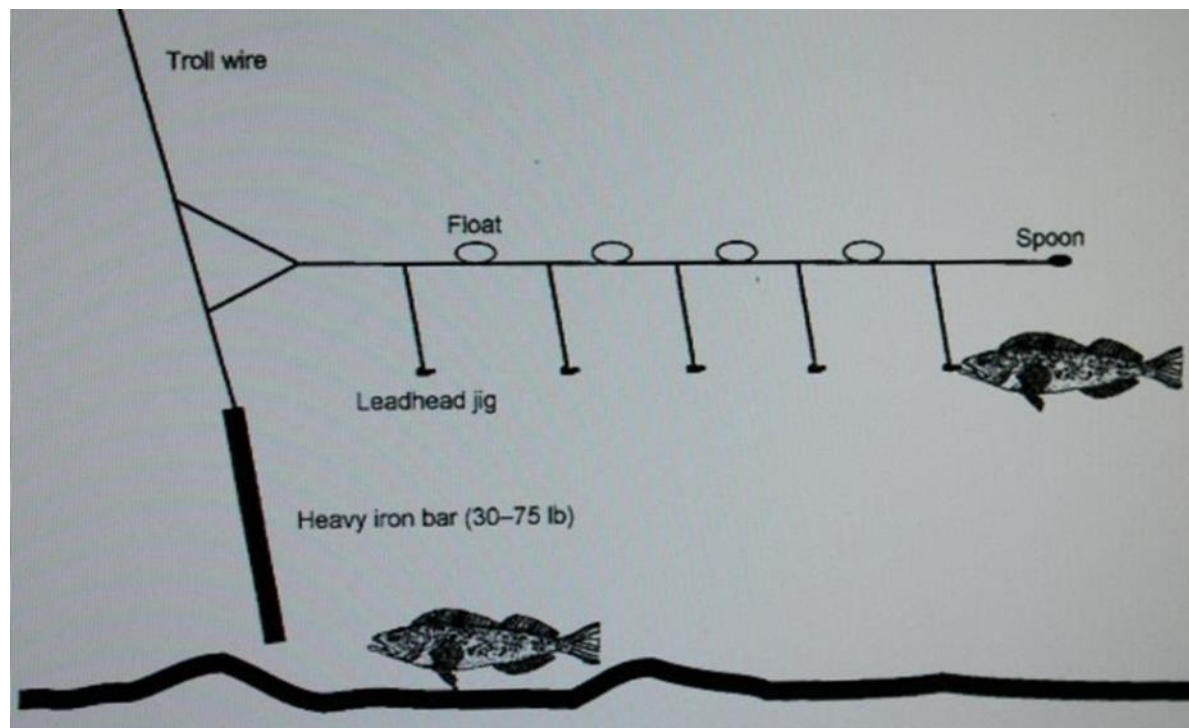
Hook and line

Dinglebar

A dinglebar is a steel bar that is attached to a troll wire and has a single horizontal spread of about 10 jigs secured about 3 feet above the dinglebar on the main troll wire. The heavy bar bounces along the seafloor and creates a noise and disturbance that is helpful to attract groundfish to the passing hooks. The fisherman does not use trolling poles (such as when fishing for salmon) but instead the trolling wire runs directly off the block and into the water. This allows the fisherman to keep a hand on the wire and get a feel for biting fish or to determine the dinglebar is hitting the bottom.

Target species

- Lingcod

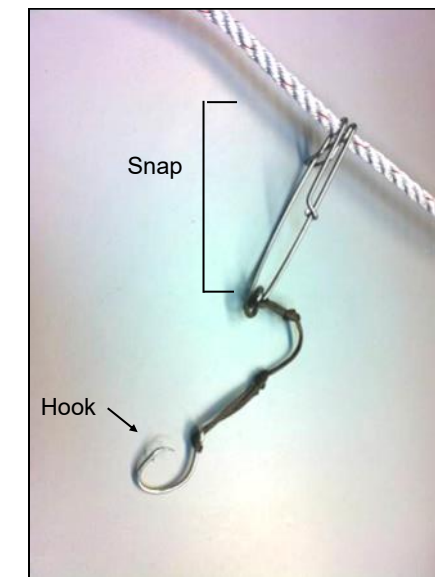


Dinglebar fishing diagram. Alaska Fishery Research Bulletin 1(2): 140-152. Copyright 1994 by ADFG.

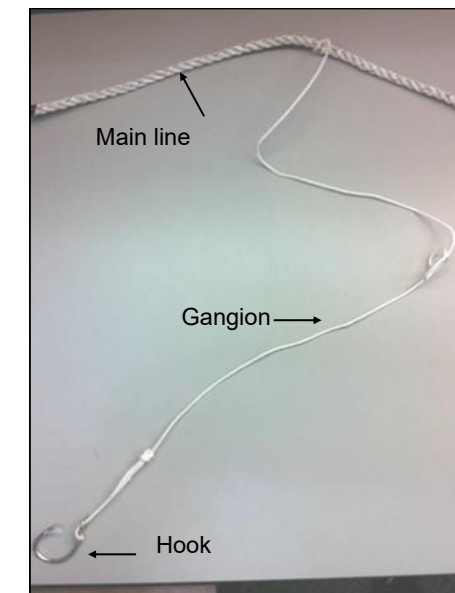
Hook and line

Longline

Longline is a fishing gear in which short lines carrying hooks are attached to a longer main line at regular intervals. Hooks are typically attached to the main line using gangion line (see photo), and are either fastened permanently to the main line (set gear) or attached during gear set and removed during haul back (snap on gear; see photo). Depending on the target species, longlines are laid on the bottom using anchors, or suspended horizontally at a predetermined depth with the help of surface floats (FAO, 2014). Longlines are typically marked with a buoy/float on each end of the gear, called a "set".



Snap and hook that attaches to main line



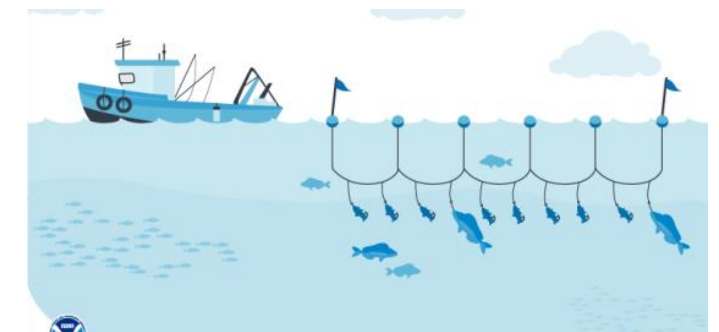
Hook attached to main line with gangion

Pelagic longline

Pelagic longline comprises a main line suspended at the target fishing depth with monofilament branch lines baited with hooks (adapted from Alaska Fish and Game). Only deep-set longline is used off the U.S. West Coast and is allowed only outside the U.S. West Coast EEZ.

Target species

- Tuna, and other pelagic fish



Hook and line

Benthic/bottom set longline

A longline, set with anchor(s) on the seafloor with baited hooks attached at regular intervals, is designed to target bottom fish species. The line is marked at the surface with a buoy, and possibly pole, flag and/or light.

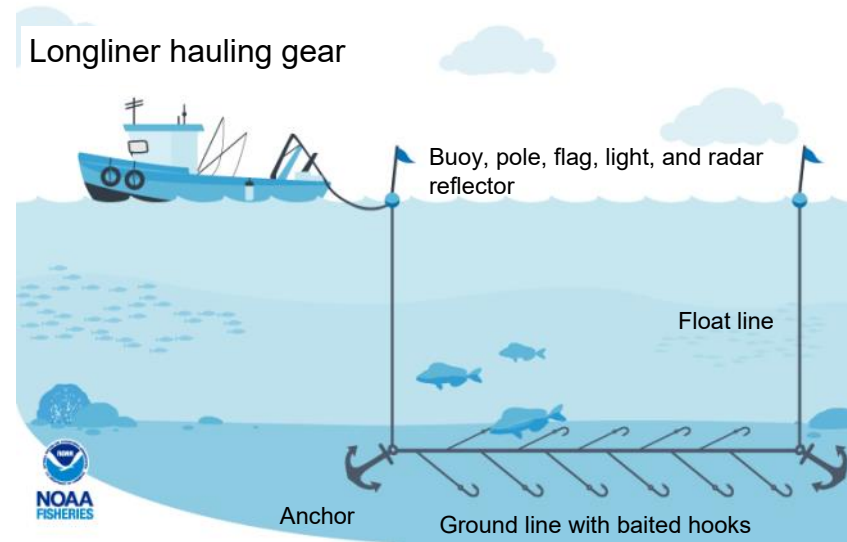


Diagram: NOAA Fisheries

Target species

- Pacific halibut
- Sablefish
- Pacific cod
- White seabass
- Yellowtail
- Pacific octopus
- Rockfish and other groundfish
- Flatfish and skates

Vertical longline/dropline

A line is suspended vertically weighted on the bottom or anchored to the seafloor and attached to a buoy at the sea surface. Short lines are attached to the main vertical line at intervals, each with a baited hook at the end.

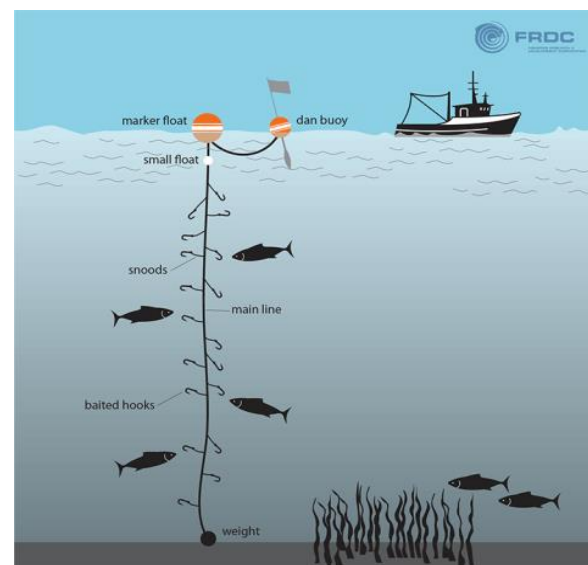


Diagram: <https://fish.gov.au/fishing-methods/hook-and-line>

Target species

- Pacific halibut
- Sablefish
- Pacific cod
- White seabass
- Yellowtail

Hook and line

Deep-set buoy gear

Standard deep-set buoy gear

Standard deep-set buoy gear consists of vertical lines fished individually that contain gangions with 1-3 hooks set at intervals; with the shallowest set being more than 90 m deep and the deepest set at 400 m deep. The line is suspended by a buoy array of at least 3 buoys. The common fishing depth is 250 m to 400 m.

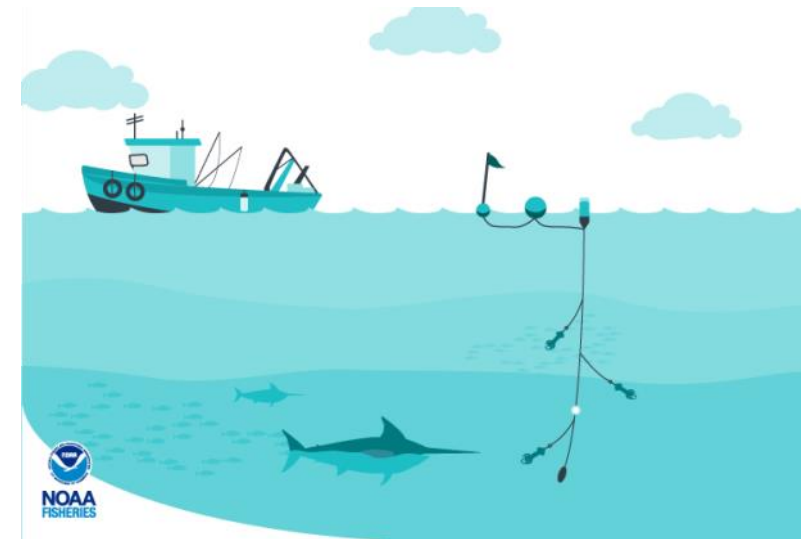


Diagram: NOAA Fisheries

Target species

- Swordfish

Linked deep-set buoy gear

Linked deep-set buoy gear consists of U-shaped links strung together to up to 10 units. Each U-shaped link has 3 gangions with hooks, which are set along a horizontal line at the 90 m to 400 m depth range and the whole array is suspended by buoys at the end of each "leg" of the U-shape.

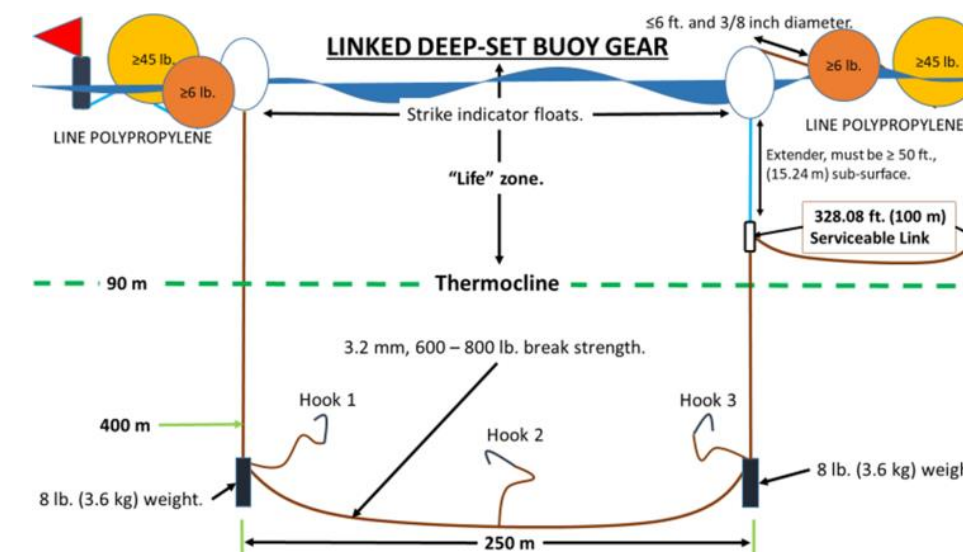


Diagram: Jody Van Niekerk

Target species

- Swordfish

Hook and line

Stick gear

Stick gear, similar to a vertical longline but more rigid, uses a PVC pipe weighted at one end, held vertically in the water column and buoy at the sea surface. Leaders are attached to the PVC pipe at regular intervals, each with a hook at the end to catch bottom or near-bottom species, especially for the live fish market (California Sea Grant, 2020).

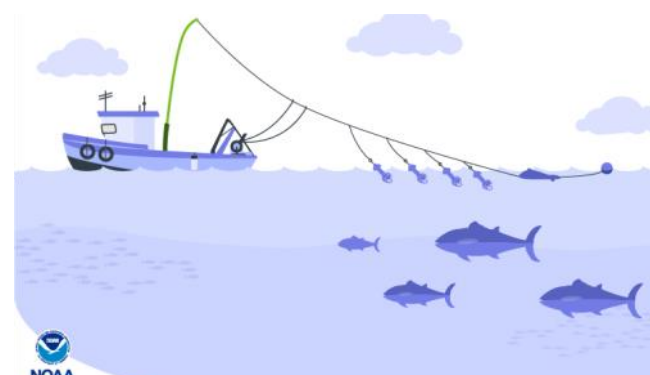


Diagram: NOAA

Target species

- Rockfish and other groundfish
- Flatfish and skates
- White seabass

Rod and reel

Rod and reel gear consists of rigid rods with fishing line that can be reeled out or in to lower or raise a baited circle hook or J-hook. Hooks are baited with squid, sardine, mackerel, fish skin or artificial lures, dependent upon target species and area of fishing.

Mechanical jigging

Mechanical jigging consists of a rod and reel that uses an artificial lure to entice fish to bite. The lure is made of lead, shaped in the form of a bait fish with hooks on the bottom and middle end. The lure can be various colors, usually resembling the target species' prey. The lure is "jigged" by bouncing the rod upward then using its weight to drop back down. This is done without actually using the reel, until a fish is hooked and then the fisherman reels the fish in.

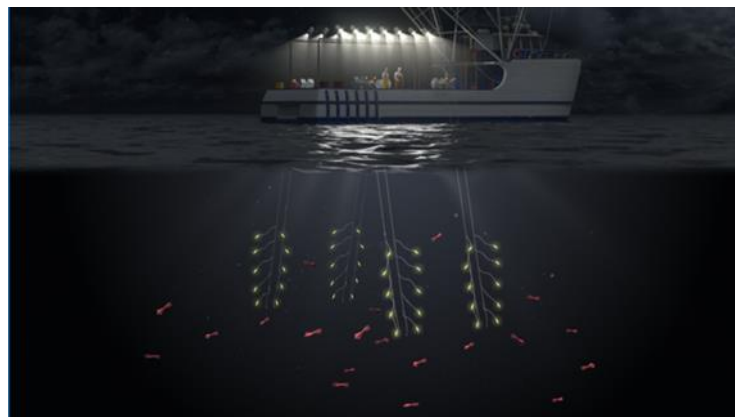


Diagram: Seafood Watch

Target species

- Rockfish and other groundfish
- Pacific cod
- Sablefish
- Squid
- Pacific halibut

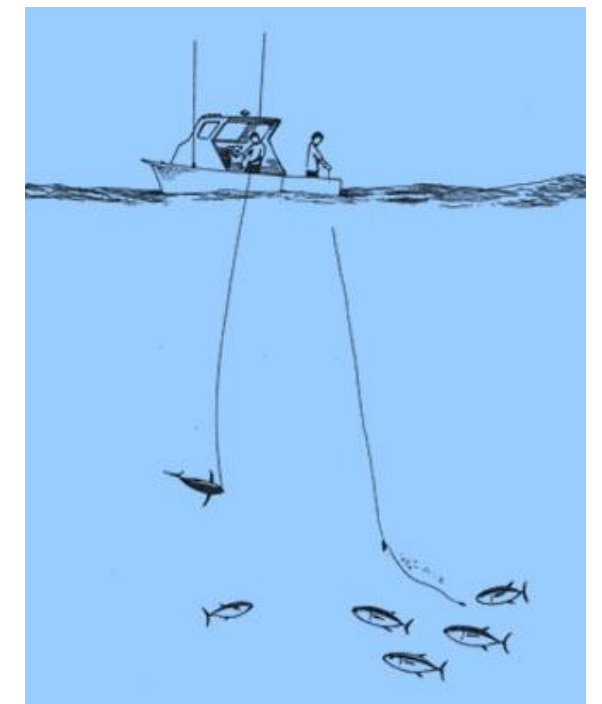
Hook and line

Non-mechanical jigging (hand line)

Non-mechanical jigging uses the same principles as mechanical jigging, except the line is not affixed to a rod and reel. Instead, the fisherman only uses a handline that is tied to the vessel.

Target species

- California halibut
- Tuna



Handline fishing illustration by Les Hata

Miscellaneous gear types

Harpoon

Harpoons are typically built from a wood pole having a steel point with one or more fixed or movable barbs at its forward end. Harpoons are usually connected with a retrieving line. Modern harpoons are shot by guns. When a target species is sighted, the fishing vessel is steered toward the fish, and the fisherman positions himself on the stand with the harpoon directing the helmsman so he can make his strike, capturing the target fish (FAO, 2014).



Example harpoon vessel. Photo: Jody Van Niekerk

Target species

Swordfish

Hand/Mechanical collection

The methods used for hand collection of targeted species can include shovels, hand pumps (especially for most clams), rakes, trowels, and hands (bare or protected). Hand powered tools are generally used in intertidal areas only. Methods for mechanical collection, especially for baitfish and aquaria species in nearshore or intertidal waters, can include dip nets, hand pumps (for bait shrimp), and small trawl nets, along with numerous other devices.

Target species

Groundfish

Diving

SCUBA gear or a "hookah rig" are allowed in all three states where dive gear is used for commercial harvesting. The hookah rig consists of an air compressor with supply hoses that distribute air to divers. Divers do use SCUBA for picking and scouting, but when a harvest area is identified the hookah method is predominantly used. The states of California and Washington allow divers to use nitrox and scooters, although Oregon prohibits the use of mixed gas.

Target species

Sea urchin, sea cucumber, geoduck clams

Buoys and floats

Bullet buoys

Varying sizes (diameter x length): 5"x11", 6"x14", 7"x15" or 8"x15"

- Provides flotation to trap float line
- Can be used as marker buoy or trailer buoy



Different size bullet buoys



Bullet buoys: warped from high current



Variety of colors

Small round floats

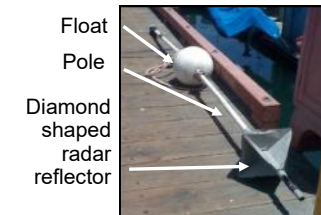
Varying sizes (diameter x length) : 2" x 3" or 3" x 4 3/4"

- Used mainly to supplement flotation of endline buoy, along the float line of a gill-net, used to keep trawl nets open



High flyer with float and flag

- Pole is made from aluminum or Calcutta cane, radar reflector is diamond shaped, made of aluminum, placed at top of the pole
- Pole weighted with lead (30lbs) on bottom, so it remains upright in the water
- Attached, as a marker, to terminal end of a string of traps, longline, or gillnet
- Required in Washington and Oregon on all longlines and trap gear (OAR 635-004-0035, WAC 220-44-030)



Float
Pole
Diamond shaped radar reflector

Photos on page: Lauren Saez

Buoys and floats

Polyball (Polyform)

Size range (diameter x length):

- Round: 11" x 15" to 39" x 54"
- Oblong: 8.6" x 19" to 15.5" x 37"
- Used as flotation of endline and for marking terminal end of strings of traps. Also as flotation for top of some drift gillnet.
- Color: orange is most common, but a wide variety exists.



View from water



Oblong Round

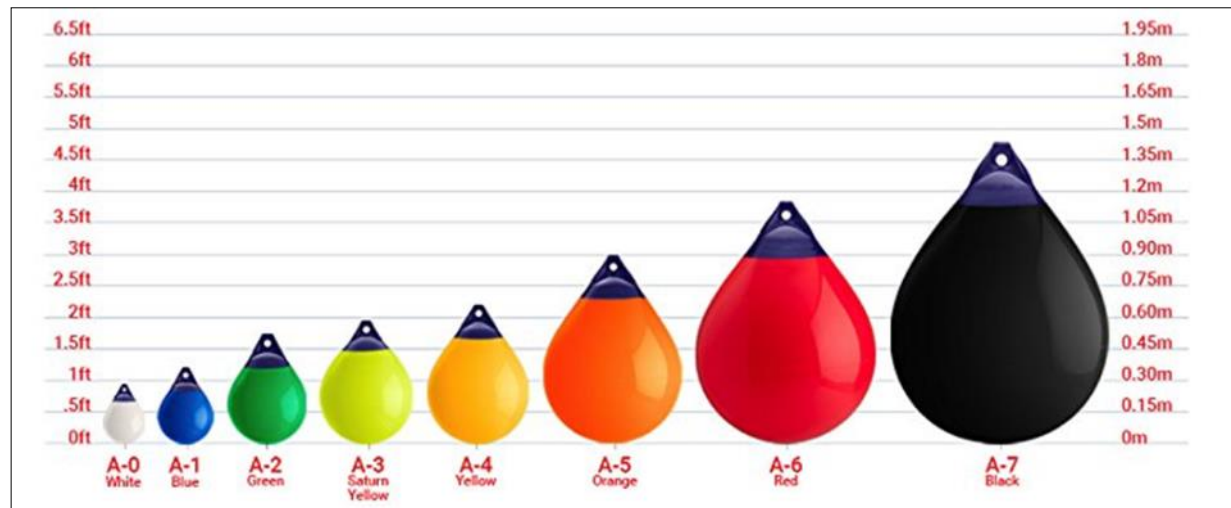


Variety of colors



Single boat can use more than one shape

Photos on page: Lauren Saez



Polyform A series buoys

Special gear marking requirements

West Coast fixed gear identification and marking

50 CFR § 660.219

- 1) Limited entry fixed gear (longline, trap or pot) must be marked at the surface and at each terminal end, with a pole, flag, light, radar reflector, and a buoy.
- 2) Buoy used to mark fixed gear must be marked with a number clearly identifying the owner or operator of the vessel. The number may be either: vessel number, commercial fishing license number, buoy brand number, or vessel documentation number issued by the USCG.

California commercial buoy marking

FGC § 9006 and 9006; Title 14, Section 180.5

Identification number	Identification letter	Fishery
Operator's commercial fishing license number + Identification Letter	B	Sablefish
	C	Coonstripe shrimp
	P	Lobster
	S	Spot prawn
	X	Rock crab
Vessel's commercial boat registration number + Identification Letter	Z	Nearshore finfish
	T	Tanner crab

Buoys that are 4" in diameter or greater shall have identification letters marked on 4 opposing sides. Buoys that are smaller than 4" in diameter shall have identification letters marked on two opposing sides. All identification numbers and identification letters on a buoy shall be clearly and distinctly marked, and in a color that contrasts with the buoy. The numbers and letters shall be applied and maintained so that they are visible and legible.

Washington tribal fisheries

Buoys branded with 2 digit number unique for each tribe followed by fisherman's unique ID number.

California commercial lobster tag

(14 CCR § 122.1)

Deployed lobster traps and those possessed by a lobster operator permit holder aboard a vessel shall have a valid department issued trap tag directly attached to the trap.



Photos: CDFW

Special gear marking requirements

California, Oregon & Washington

OAR 635-005-0055, WAC 220-52-040

Buoy tags for Dungeness traps

Implemented as part of a trap limit system. Tag is attached to first buoy closest to the trap, commonly referred to as the main buoy. (See pictures below)

For more information see the Dungeness crab fishery reference sheets.



Photo: CDFW



Photo: ODFW



Photo: WDFW



Washington coastal summer buoy tag
Photo: WDFW

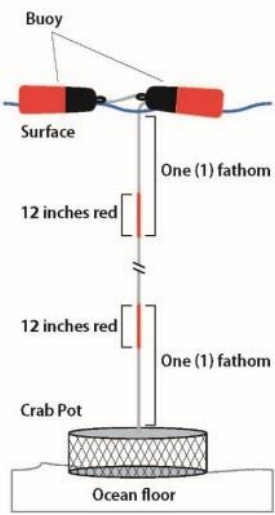


Diagram: WDFW

Washington commercial Dungeness crab requirements

- Line marking (coastal): 12" of red in at least two places; no more than one fathom from the main buoy and no more than one fathom from the pot; see diagram below (WAC-220-340-430)
- Coastal: Summer buoy tag required May 1 through September 15
- Puget Sound: Buoys cannot be both red and white in color (WAC 220-340-430)

Recreational Dungeness crab

California: Single main buoy and single red marker buoy, marked with 10 digit CDFW GO ID number or commercial boat registration number for commercial passenger fishing vessels.

Oregon: All surface buoys marked with owner's full name or business name and at least one of the following: phone number, permanent address, ODFW Angler ID number or vessel ID number.

Washington: Buoys must be half red and half white and marked with the owner's full name and mailing address.



Special gear marking requirements

Alaska groundfish gear marking requirements

Each end of a set of longline pot gear must have attached a cluster of four or more marker buoys, a flag mounted on a pole, and a radar reflector. One hard buoy in the buoy cluster must be marked with the capital letters "LP" in addition to the federal fisheries permit number of the vessel deploying the gear or the Alaska Department of Fish & Game vessel registration number for longline pot gear. The markings must be at least 4 inches in height and 0.5" in width in a contrasting color visible above the water line and must be clearly visible.

Some groundfish pots have one ID tag issued by ADF&G on main buoy or on trailer buoy if more than one buoy is attached to the pot. At least one buoy on each groundfish pot must be legibly marked with the permanent ADF&G vessel license plate number of the vessel operating the gear. The buoy may bear only a single number - that of the vessel operating the gear. The number must be placed on the top 1/3 of the buoy in numerals at least 4" high, 1/2" wide, and in a color that contrasts with the color of the buoy.

Fisheries currently requiring buoy tags placed on the main or trailer buoy

Check ADF&G website for updated information.

Fishery	Region	Tag shape	Tag
Dungeness crab	Kodiak, Chignik, South Alaska Peninsula, North Alaska Peninsula, Aleutian Islands	Small rectangular	
Tanner crab and Pacific cod	Kodiak, Chignik, South Alaska Peninsula, Eastern Aleutian Islands, Dutch Harbor	Oval	
Tanner crab and Pacific cod	Prince William Sound	Zip tie	
Red king crab Golden king crab Tanner crab	Southeast, Norton Sound Southeast, Pribilof Islands, St. Matthew Island Southeast	Conical	

Photos: ADF&G

Nets

How to measure mesh

Stretch a square of net by two knots so that the other two knots meet in the middle. Measure, in inches, inside the knots while keeping the mesh stretched. If the meshes do not meet, the mesh is damaged.

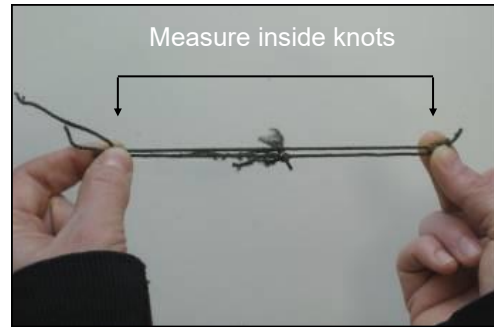


Photo: Lauren Saez

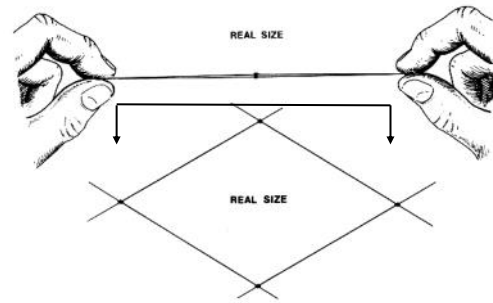
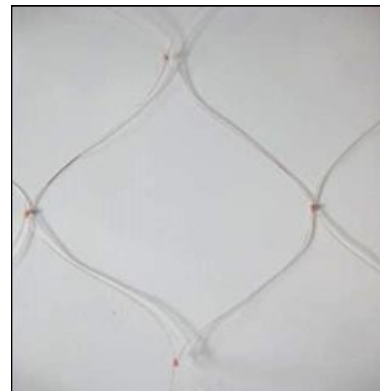
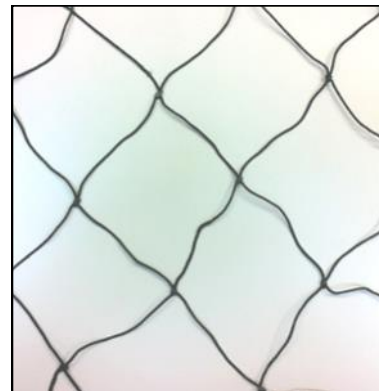


Diagram: FAO, 1980



Monofilament. Photo: Lauren Saez



Twine. Photo: Lauren Saez



Trawl. Photo: Kari Fenske



Seine. Photo: Kim Raum-Suryan

Nets

Types of net construction

There are various types of net construction used in the WCR and Alaska (Figure 1 through 6). The two types of strands are twisted and braided; the mesh is formed into knotted, double knotted, or knotless joints (all photos from Alaska Marine Stewardship Foundation 2015).

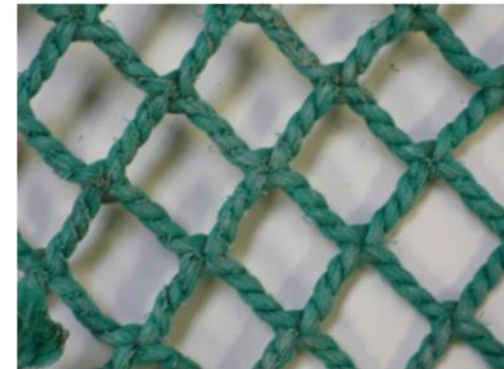


Figure 1. Twisted knotless

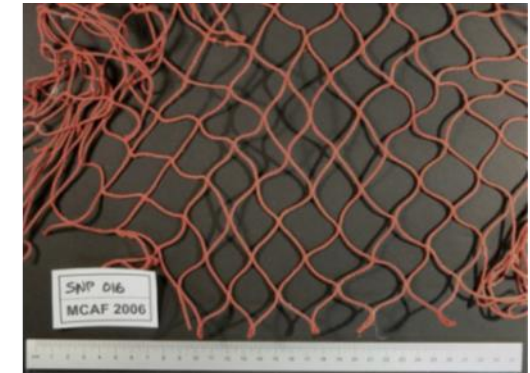


Figure 2. Braided knotless



Figure 3. Twisted knotted



Figure 4. Twisted knotted x2

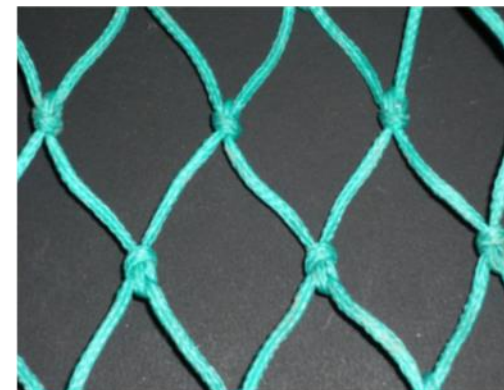


Figure 5. Braided knotted



Figure 6. Braided knotted x2

Line

Four main types of line used in commercial fishing

1. Poly-line
2. Nylon
3. Lead line
4. Monofilament

Common line diameter

5/16"	Lighter traps & longlines
3/8"	↓
7/16"	Heavier traps
1/2"	↓
1"	Strings of heavy traps

Poly-line

Polypropylene

- Can be brightly colored, yellow is standard
- Synthetic fiber line
- Floats and does not absorb water
- Not UV stable
- Used for individual traps, strings of traps



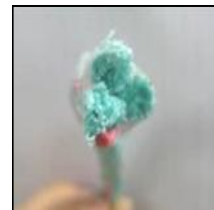
Polypropylene



Polypropylene

Polysteel™ Blue Steel™

- Brightly colored, blue is common
- Floats but is slightly heavier than polypropylene
- High strength
- UV stable
- Used for individual traps and longlines



Polysteel™ fiber



Polysteel™

Polyester

- Usually white in color
- Soft fiber
- Negatively buoyant
- Can be mixed with polypropylene to create neutral or negative buoyancy (i.e., Esterpro™ & Ice Blue™)



Polyester fiber



Esterpro™

Hydropro™ neutral buoyancy

- Orange colored
- Polysteel™ fibers mixed with polyester
- Originally designed for use by fishermen on the east coast to reduce entanglements; used more commonly on the west coast



Polysteel™ and polyester fibers



Hydropro™

All photos: Lauren Saez

Line

Nylon

- Usually white
- Synthetic fiber line, high stretch capability
- Absorbs water
- Used for anchoring or mooring
- UV stable
- Used for strings of trap (as the ground line) and longline
- Negatively buoyant



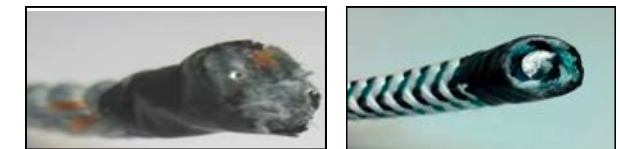
Nylon

Lead line

- Bright and multi-colored
- Poly-line with a lead core
- Heavier weight and less flexible when compared to poly- or nylon line
- Used for bottom longline or gillnet
- Negatively buoyant, can be classified as "sinking line"



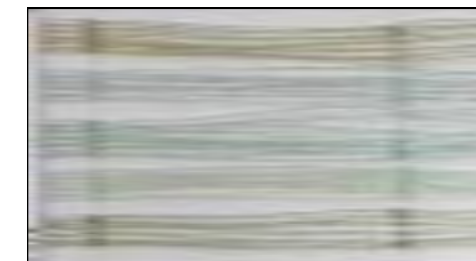
Leaded line



Leaded line showing lead core

Monofilament

- Color: many colors, including clear
- Single strand of material
- Range in diameter depending on the fishery; smaller for rod/reel and troll, heavier for mainlines used in longline and buoy gear
- Can be used as mesh in gillnets



Monofilament

Other line types

Nylon twine

- Color: many colors; brown, black, green, tan or white
- Multifilament, three twisted strands
- Can be used as mesh in drift gillnets



Nylon line

Cotton twine (untreated)

- Color: white
- Degrades over time
- Used on traps for destructive device



Cotton twine

All photos: Lauren Saez

Line

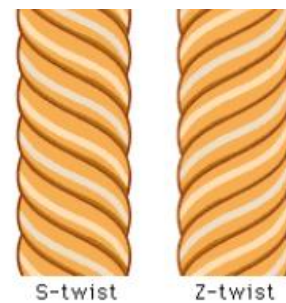
Rope construction

Rope is constructed in two basic ways, laid and braided, although there are variations on the theme. The first is “3 strand” line. The direction of twist is called the lay of the rope. Three strand twisted line can be “laid” right or left, and should always be coiled with the lay of the line. This rope is described as S-laid (left-laid) or Z-laid (right-laid) according to whether the twist follows the line of the center part of the letter S or Z. Most three strand rope is Z-laid (right-laid). If you hold a length of 3 strand, right-hand laid twisted line at arm’s length and eyeball it, you will see the wrap of the line twisting to the right.

(<http://www.boatsafe.com/marlinespike/rope.hmt>)



Braided



The construction of stranded line, whether natural or synthetic, is much the same. Individual fibers are twisted into yarns, the yarns are twisted into strands and the strands are twisted into line. Right-laid is twisted clockwise and left-laid is twisted counterclockwise. The fibers are twisted in the same direction as the strands, however the yarns are twisted in the opposite direction. The right, left, right for right-laid line helps give strength, keeps the line from kinking and holds its shape.

The other construction type is braided line. This type of line does not stretch to the degree that twisted line does, and is more difficult to splice. However, it goes through a pulley or block very well because of its rounded shape, and is stronger than its equivalent-sized twisted line. Braided line also tends to snag when used as docking line if the pilings are rough.

A variety of braided lines are available:

Braid on braid has a braided core inside a braided sheath. It will stretch less and has less flexibility than a hollow braid.

Multibraid is braided with two pairs of Z-laid and two pairs of S-laid strands. It is flexible and does not kink.

Parallel core has a braided sheath over a core of straight or lightly twisted yarns. It is very strong.

Hollow braid has no core. It is very flexible but can flatten during use. It is only found in small sized ropes.

Fishery Reference Sheets

Each reference sheet contains information on target species, gear type (line, buoys, traps, net material), common or required gear configurations, geographic distribution and season limits, general fishing depths, and other relevant fishery management requirements or considerations.

Each reference sheet also contains information about the association(s) of fisheries being described in each sheet with how fisheries are named on the MMPA List of Fisheries (LOF). Where the name of the fishery being described in the sheet corresponds with the current fishery name on the LOF, we do not provide any further reference or clarification. For instances where the fisheries being described in each sheet have different and/or multiple associations with fisheries as named on the LOF, we clarify the associations on the LOF with what is being described on each reference sheet. More information on the LOF can be found at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries>.

Maps

Similar to the 2010 Fixed Gear Guide, maps are provided to accompany descriptions of some fisheries to illustrate areas potentially or actually utilized by those fisheries. For most fixed gear and some non-fixed gear fisheries in the WCR, the potential fishing areas for each fishery, shown in blue, were created using bathymetry lines as boundaries to delineate the common fishing depths. The fishing areas were then restricted to water adjacent to ports where fish were landed in the years 2016-2020 according to the organizational structure of WCR landings data (e.g., Port Complex) in PacFIN¹. Fishery closure areas, such as marine protected areas, were used to constrain the mapped fishery areas, as appropriate. In order to protect personal information, port areas are not shown when there are fewer than 3 vessels or dealers represented. The major assumption is that the fish landed into a port were caught in the common operational fishing depth range of the ocean waters adjacent to the port for the individual fishery.

The Gear Guide also serves as a companion to the U.S. West Coast gear guide data portal, where you can access the latest in participant counts, seasonal diagrams, interactive fishery maps, and links for NOAA WCR LOF references.

West Coast Gear Guide data portal: <https://apex.psmfc.org/pacfin/f?p=501:3001>

For other WCR and AKR fisheries, we use illustrations that are provided in other state or federal fishery management documents and websites.

U.S. West Coast Region Fishery Reference Sheets



Moss Landing photo: Lauren Saez

CA nearshore finfish trap fishery

Commonly used line

Material: Poly-line
 Width: 5/16"
 Color: Various colors

Buoys

Bullet buoy with clear identification of owner
 CA nearshore trap permit: License number + "Z" (FGC § 9006)

Trap description

- 2" x 2" mesh is common
- Finfish traps between Point Arguello and Point Montera shall have a rigid metal ring not greater than 5" in diameter affixed to opening of funnel (CCR § 180.4, Title 14)
- Destructive device required by law (FGC § 9003)

Configuration

- Single trap or multiple traps in a string with one or more buoys

Special considerations

- Cannot leave gear to fish out overnight, trap door can be left open (FGC § 9001.7d)
- Regional Nearshore Fishery Permit required from CDFW
- Deeper Nearshore Permit available from CDFW but common fishing depths not included on map

Trap limit

- California nearshore trap permit: No more than 50 traps may be used in state waters along the mainland shore (FGC § 9001.7h)

Target species

Cabazon
 California sheephead
 Greenlings
 Rockfish (black, blue, brown, calico, China, copper, gropher, grass, kelp, olive, quillback and treefish)



Cabazon

Photo: California Sea Grant



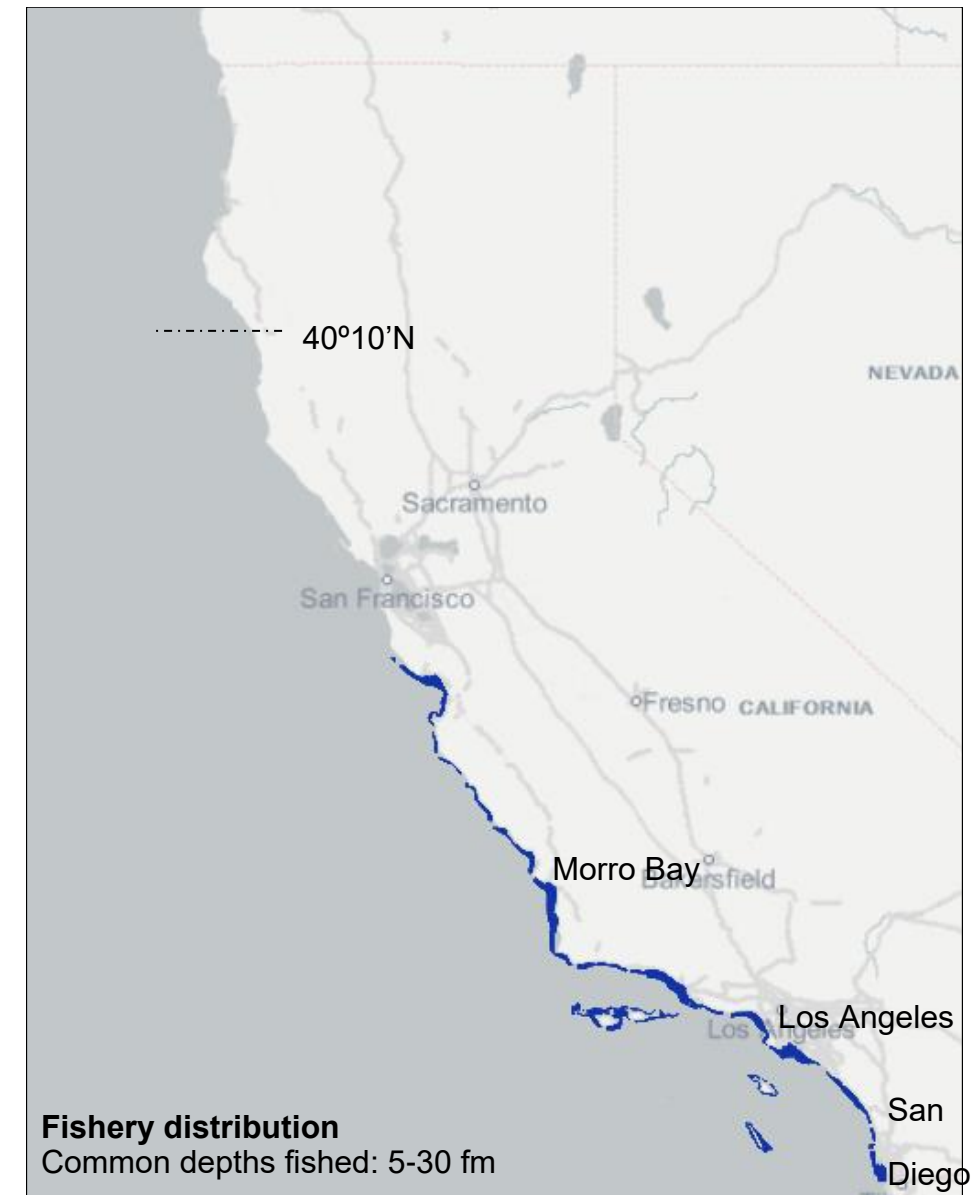
2 x 2 inch mesh



Rigid metal ring at opening of funnel
 (not actually white, highlighted in picture)

Photos: Lauren Saez

CA nearshore finfish trap fishery



See p.54 for map methodology

Geographic range

- Entire coastline of California, up to five miles offshore
- Main ports include Morro Bay, Los Angeles, and San Diego

General fishing season/

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
North of 40°10'N	(Check Federal Register)											
South of 40°10'N	(Check Federal Register)											

CA coonstripe shrimp pot fishery

Commonly used line

Material: Nylon and poly-blend common
 Width: 5/16" or 3/8"
 Color: white nylon or multicolored poly-blend

Buoys

Polyball with operator's commercial fishing license number + C (FGC § 9006 and 9006)

Trap description

- Tapered circular traps
- 1/2 " square cord mesh over a steel frame
- 39" in diameter by 16" tall
- Entry funnel = 3" diameter
- Destructive device required by law (FGC § 9003)

Configuration

- Set of 10 to 30 traps connected to a long line
- Weighted at both ends and marked with a polyball or flagpole

Marking requirements

- California: Buoy needs to be marked with license number + "C" (FGC §9006)

Trap limit

- No limit, fishermen use 500 traps or less

Target species

Coonstripe shrimp pot

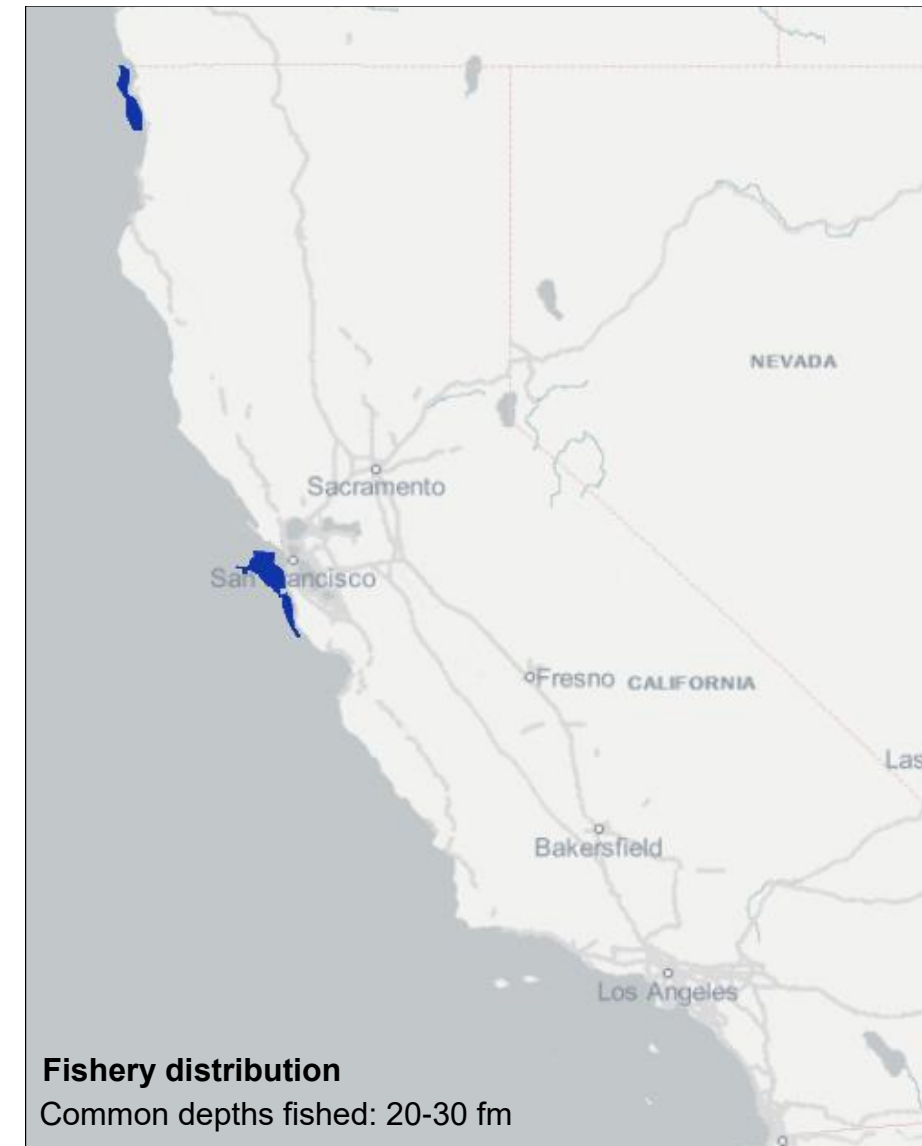


Drawstring on bottom of trap. Photo: CDFW



Coonstripe shrimp. Photo: WDFW

CA coonstripe shrimp pot fishery



See p.54 for map methodology

Geographic range

- Concentrated around Crescent City with some effort in the Gulf of the Farallones

General fishing season/structure

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
California					(CCR §180.15, Title 14)							

CA Dungeness crab

Commonly used line

Material: Poly-blend, poly, or nylon
 Width: 5/16", 3/8th", or 7/16"
 Color: Various colors

Buoys

Bullet buoy with clear identification of owner
 Buoy tags required

Trap description

- Mainly circular steel frame, wrapped in rubber (some use plastic Fathoms Plus traps)
- 3' to 3.5' diameter is the most common
- Stainless steel wire mesh, 2"x 2"
- Traps weigh 60 to 120 pounds
- Two rigid circular escape rings greater than 4.5" inside diameter on the top or side of the trap
- Destructive device required by law; common material is untreated cotton twine or other natural fiber (FGC § 9003, OAR)

Target species

Dungeness crab

Gear marking requirements

Buoy tag and buoy marked with license number
 (FGC §9006, Title 14§132.1, FGC §8276.5)

Trap limits

7 tiers: 175 to 500 per permit

Special considerations

CDFW Director has the authority to restrict the take of Dungeness crab if the fishery poses a significant risk to marine life entanglement.

CDFW developed regulations to support the Risk Assessment and Mitigation Program (RAMP) www.opc.ca.gov/risk-assessment-and-mitigation-program-ramp/

(§FGC 8276.1)

Configuration

- Single trap fished per line with one or more buoys attached
- Limited surface gear (see figure below): (Title 14 §132.6.)
 - No more than two trailer buoys and one end marker buoy (smaller than 5" in diameter and no more than 3' behind the last trailer buoy)
 - Distance between the front end of the main buoy to the tail end of the last trailer buoy is limited to 24' (trap set depth less than 35 fm) or 36' (trap depth set greater than 35 fm)

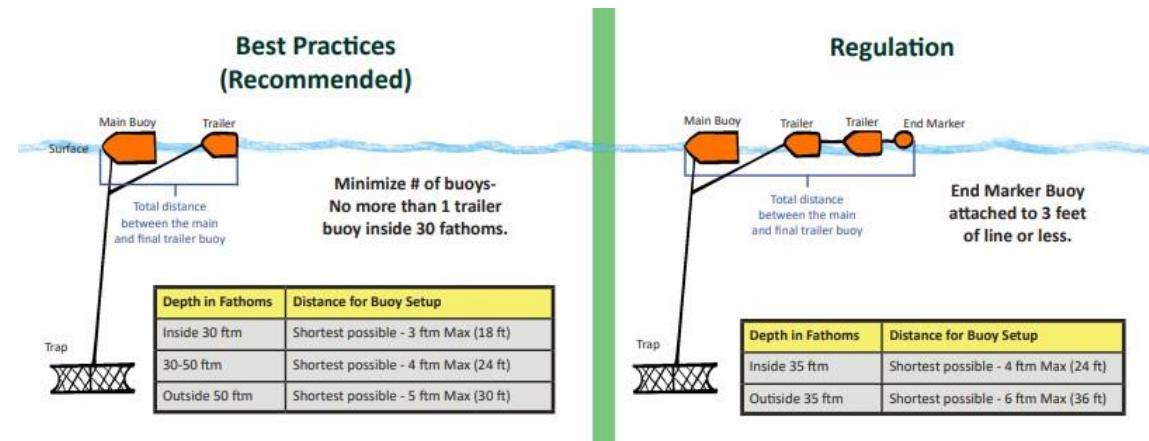


Diagram: CDFW

CA Dungeness crab



See p.54 for map methodology

Geographic range

- Entire coastline, north of Point Conception, California

General fishing season/structure

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	
N. California	(FGC § 8276)												
S. California	(FGC § 8276)												

OR Dungeness crab

Commonly used line

Material: Poly-blend, poly, or nylon
 Width: 5/16th, 3/8th, or 7/16th
 Color: Various colors

Buoys

Bullet buoy with clear identification of owner
 Buoy tags required

Trap description

- Mainly circular steel frame, wrapped in rubber (some use plastic Fathoms Plus traps)
- 3' to 3.5' diameter is the most common
- Stainless steel wire mesh, 2" x 2"
- Traps weigh 60 to 120 pounds
- Two rigid circular escape rings greater than 4.5" inside diameter on the top or side of the trap
- Destructive device required by law; common material is untreated cotton twine or other natural fiber (OAR 635-005-0055.)
- Trap must include a tag that identifies the owner or associated vessel

Target species

Dungeness crab

Configuration

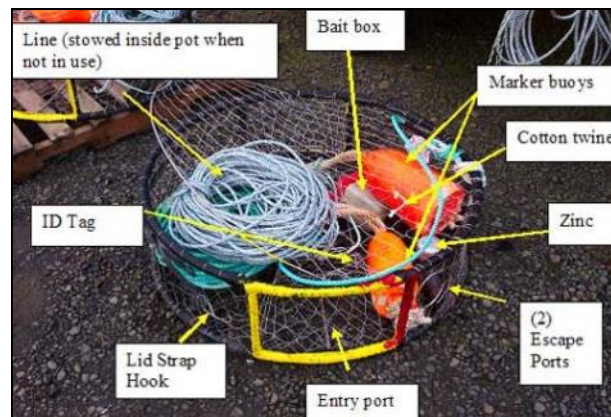
- Single trap fished per line with one or more buoys attached

Gear marking requirements

- Buoy tag and buoy marked with identification of vessel or owner (ORS §509.415, OAR 635-005-0055)
- No replacement tags for lost gear provided
- Late season tag starting May 1
- Unique buoy brand number and buoy color(s) registered with ODFW

Trap limits

- 200, 300, or 500 per permit
- After May 1, 20% pot limit reduction, with late season tag required



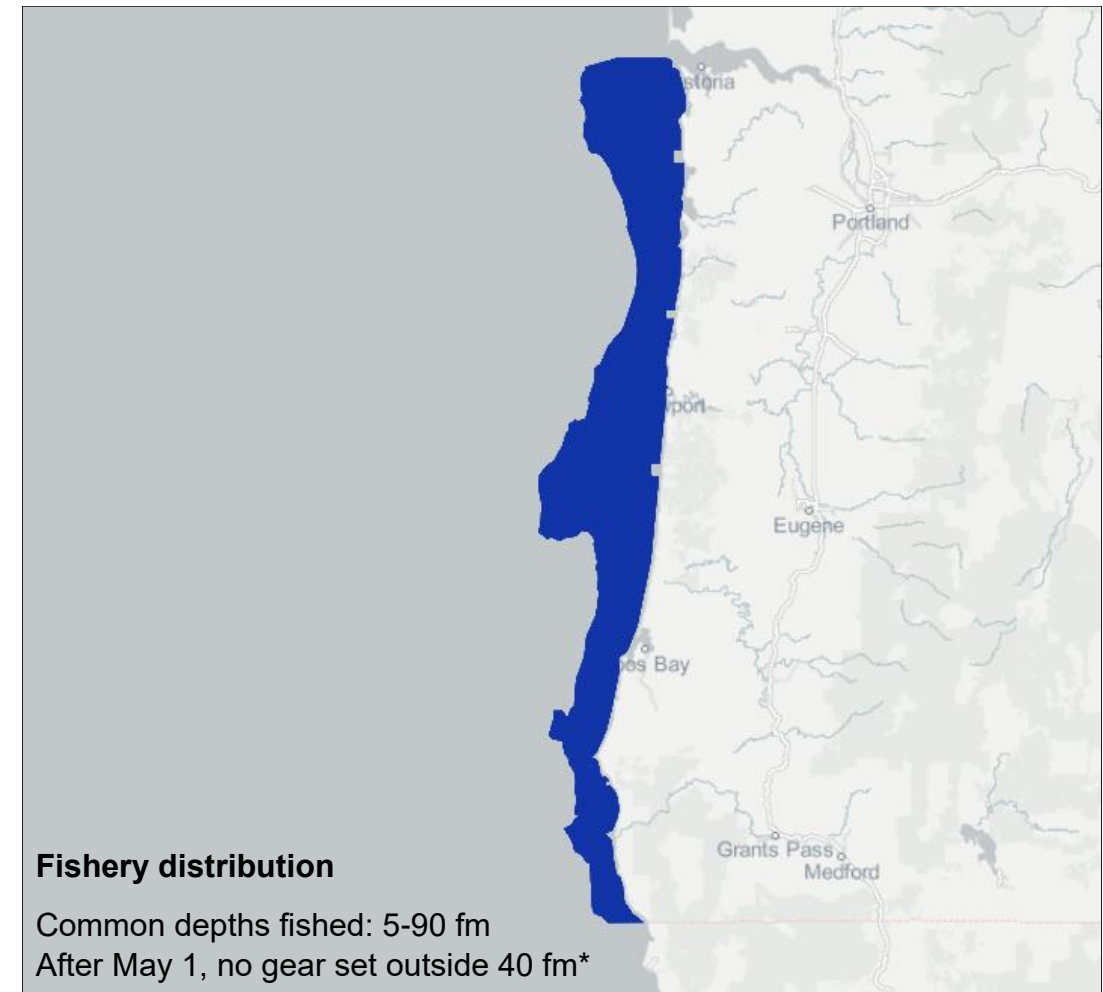
Dungeness crab trap set up Photo: ODFW



Dungeness crab

Photo: NOAA

OR Dungeness crab



See p.54 for map methodology

Geographic range

- Entire coastline

General fishing season/structure

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Oregon	(OAR 635-005-0045)											

WA coastal and Puget Sound Dungeness crab

Commonly used line

Material: Poly-blend, poly, or nylon
 Width: 5/16", 3/8", or 7/16"
 Color: Various colors

Buoys

Bullet buoy with clear identification of owner
 Buoy tags required (different shape for coastal and Puget Sound fisheries)

Trap description

- Mainly circular steel frame, wrapped in rubber
- 3' to 3.5' diameter is the most common
- Stainless steel wire mesh, 1/2" x 1/2" to 2" x 2"
- Traps weigh 60 to 120 pounds
- Two rigid circular escape rings greater than 4.5" inside diameter on the top or side of the trap
- Destructive device required by law; common material is untreated cotton twine or other natural fiber (WAC 220-52-035)

Trap limits

Coastal: 300 or 500 per permit
 Puget Sound: 100 per permit
 Coastal summer management period reduced pot limits; May 1 through September 15:

- 500 reduced to 330 per permit
- 300 reduced to 200 per permit

Target species

Dungeness crab

Configuration

Single trap fished per line with one or more buoys attached

Gear marking requirements

- Buoy tag, pot tag, and buoy marked with vessel identification or license number; buoy colors unique to a license (WAC 220-52-042)
- Buoy brand and color has to be registered with WDFW
- Line marking (coastal): 12" of red in at least two places; no more than one fathom from the main buoy and no more than one fathom from the pot; see diagram below (WAC-220-340-430)
- Coastal: Summer buoy tag required May 1 through September 15
- Puget Sound: Buoys cannot be both red and white in color (WAC 220-340-430)

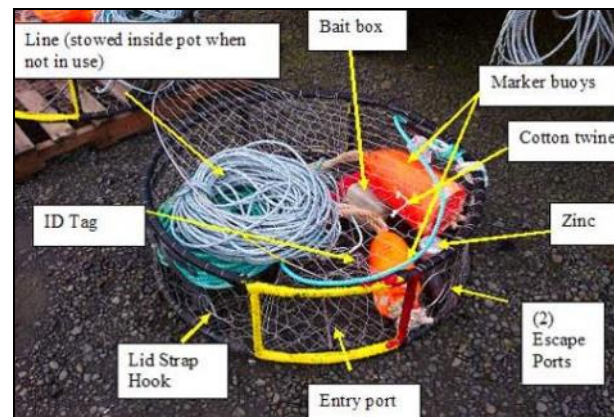
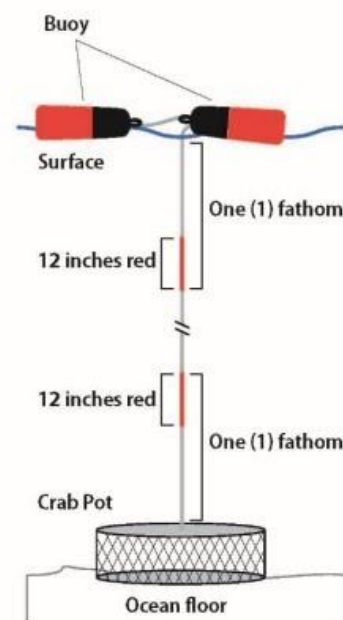
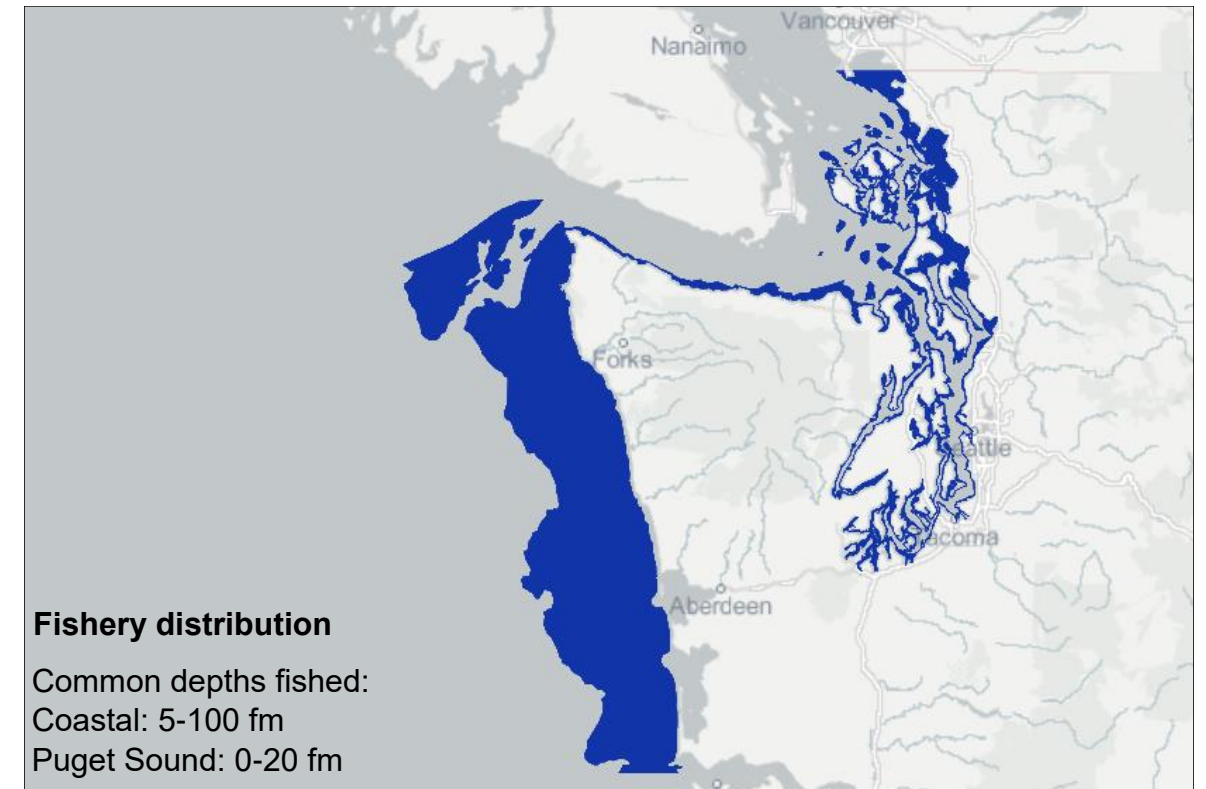


Photo: ODFW



WDFW Line marking diagram

WA coastal and Puget Sound Dungeness crab



Fishery distribution

Common depths fished:
 Coastal: 5-100 fm
 Puget Sound: 0-20 fm

See p.54 for map methodology

Geographic range

- Coastal fishery ranges from the Columbia River to Cape Flattery near Neah Bay
- Crabs are landed throughout Puget Sound

General fishing season/structure

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Washington	(WAC 220-52-046)											
	(No specific regulations)											

WA/OR/CA hagfish pot

Commonly used line
 Material: Nylon, poly-blend and nylon blend
 Width: 5/16" or 3/8"
 Color: Various colors

Buoys
 Large polyballs with clear identification of owner, pole, flag, light, and radar reflector

Trap description
California

- 5 gallon buckets
- Barrel traps (up to 45" x 25")
- Korean cylindrical trap: molded plastic cylinder, not to extend 24" long and 6" in diameter (FGC § 9000.5)
- Destructive device required by law (FGC § 9003)

Oregon

- 5 gallon buckets
- 55 gallon plastic drums
- Destructive device required by law, must be biodegradable to create escape panel (OAR 635-004-0035)

Washington

- 55 gallon plastic drums
- Destructive device required by law, constructed of cotton twine, must leave at least 9.5" square opening (WAC 220-88E-030)

Configuration

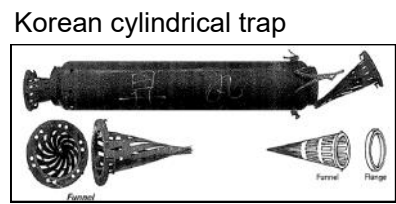
- Strings of 10 to 20 traps, 20 drums per string is common, can be set individually
- Float line attached to ground line, weighted at both ends, traps attached to ground line at regular intervals
- Some use longline snaps to attach traps, some tie the trap to the line

Trap limits

- California: 25 barrels, 200 bucket or 500 Korean cylindrical traps aboard vessel or in water (FGC § 9001.6b)
- Oregon: 200 per fisherman (OAR 635-004-0068)
- Washington: 100 per permit (WAC 220-88E-030)

Target species
 Pacific hagfish

Gear marking requirements
 Washington: end marker buoys will display number of pots on the groundline



Korean cylindrical trap



5 gallon buckets



55 gallon plastic drums

Photo credits: Korean trap diagram: Yamaha Fishery Journal, 1984; 5 gallon bucket: NMFS; 55 gallon plastic drums: ODFW

WA/OR/CA hagfish pot



Fishery distribution
 Common depths fished:
 50-125 fm

See p.54 for map methodology

Geographic range

- Entire coastline, concentrations in coastal Washington, Oregon, and northern California
- Highest landings in the Coos Bay, Oregon region

General fishing season/structure

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
All states	(No specific regulations)											

CA rock crab pot

Commonly used line

Material: Poly-blend or nylon line
 Width: 5/16" or 3/8"
 Color: Various colors

Buoys

Bullet buoy or polyballs marked with license number + "X" (FGC § 9006 and 9006)
 Some fishermen use double bullet buoys for added floatation

Trap description

- Common trap dimensions: 24" x 24" x 12"
- Mesh: 1" x 1", 2" x 2", 2" x 4" wire mesh
- Most traps have entry funnel on the top made of 6" diameter PVC pipe, some have entry funnels on side made of wire mesh
- Must have at least one ring for escapement (3 1/4" diameter), two rings required if using less than 1 7/8" x 3 7/8" wire mesh (FGC § 9011)
- Destructive device required by law (FGC § 9003)
- Some use plastic Fathoms Plus traps

Configuration

- Most fish single traps with a single buoy
- Some fish 5 to 25 trap strings

Trap limit

- No limit, 200 traps is common

Target species

Rock crab (red, brown, yellow)



Diagram: NOAA



Fathoms Plus brand plastic traps are sometimes used

Photo: Lauren Saez



See p.54 for map methodology

Geographic range

- Entire California coastline, including offshore islands
- Main port is Santa Barbara, with lower effort in Morro Bay, Los Angeles, and San Diego, and very little effort above Morro Bay

General fishing season/structure

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
California	(No specific regulations)											

Entry funnel on top of trap, made of PVC Escape rings



Side entry funnel

Photos: Lauren Saez

CA rock crab pot

WA/OR/CA sablefish pot

Commonly used line

Material: Nylon, poly-blend, and nylon blend
 Width: 5/16" or 3/8" or larger
 Color: Various colors

Buoys

Large polyball with clear identification of owner, pole, flag, light, and radar reflector
 California: License number + "B" (FGC § 9006)

Trap description

- Rectangular, conical, and trapezoidal traps
- 2" x 2" nylon mesh opening
- Conical pots have collapsible bottoms
- Common sizes are 36" and 72" diameter
- Common height is between 28" to 32"
- California trap size limit: 72" diameter or less (FGC § 9001.8)
- Destructive device required by law on all traps: must leave 8 inch diameter opening (50 CFR 660.230(b)(4), FGC § 9003, OAR 635-004-0035,

Configuration

- Open access fishery: 1 to 8 strings of 3 to 4 pots, each with a float line and buoy stick
- Limited access fishery: Strings of 20 to 30 pots

Trap limit

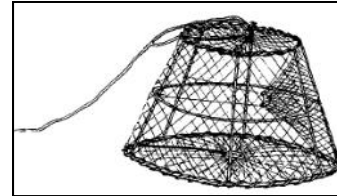
- No limit, fishermen use 500 traps or less

Management

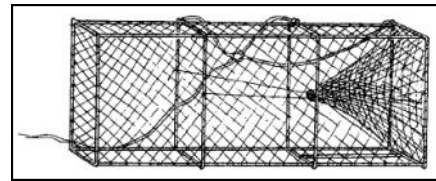
- Managed by the Pacific Fishery Management Council
- Multiple management approaches: limited entry, open access, and catch shares
- Both the limited entry and open access fisheries are bound by trip limits (with associated tiers), limited entry has higher trip limits
- Limited entry permits are endorsed by gear type
- "Gear switching" allowed to harvest catch share quotas

Target species

Sablefish



Conical trap
 Credit: ORESU-G-08-002



Rectangular trap
 Credit: ORESU-G-08-002



Trapezoidal trap
 Photo: ADFG

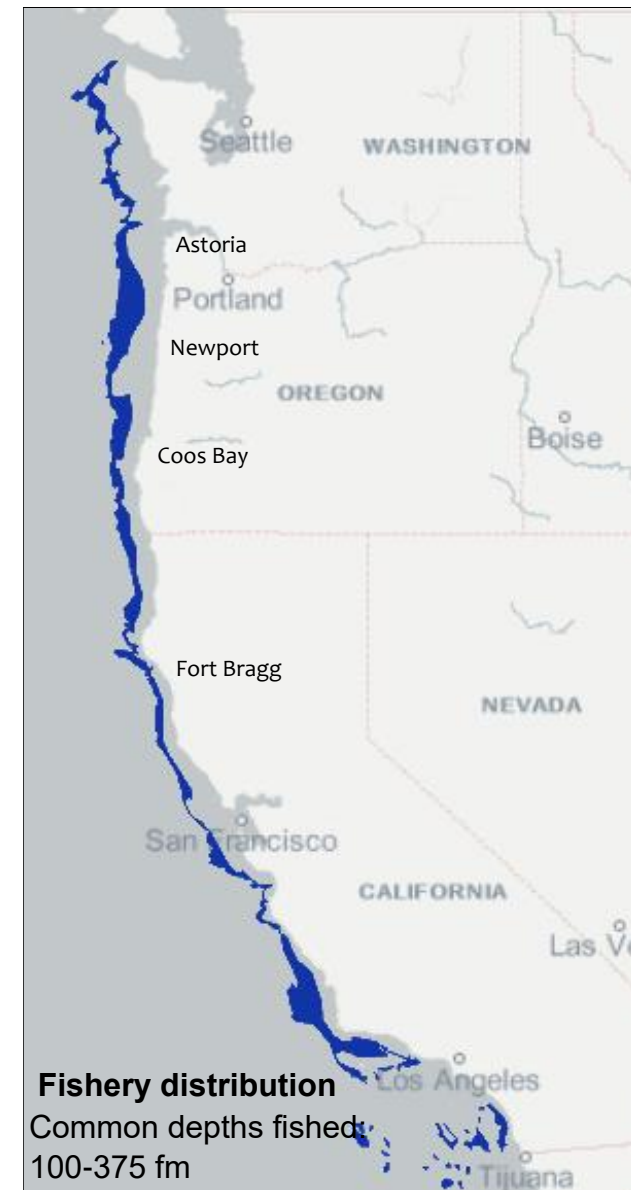


Round fish traps
 Photo: www.longlinepots.com



Photo credit: NOAA

WA/OR/CA sablefish pot



See p.54 for map methodology

Geographic range

- Fishing depths can vary depending on fishery access privileges
- Main ports: Newport, Astoria, Coos Bay, and Fort Bragg

General fishing season/structure

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
All states, open access and non-tier endorsed limited												
	(Regulated by Federal Fishery Management Plan)											
All states, tier endorsed limited												
	(Regulated by Federal Fishery Management Plan)											

CA spiny lobster pot

Commonly used line

Material: Poly-blend
 Width: 3/8"
 Color: All; yellow and blue common

Buoys

Bullet buoy with clear identification of owner
 License number + "P" (FGC § 9006)

Trap description

- Rectangular traps made of wire or plastic
- 2" x 4" wire mesh; mesh no less than 1.5" x 3.5" inside measurement
- Dimensions vary from 28" x 36" x 14" tall to 36" x 48" x 20" tall
- Heavier wire used along base of the trap if fishing shallow depths - surf zone to 20 fm
- Rectangular escape port required by law: 2^{3/8"} x 11^{1/2"} parallel to floor (FGC § 9010)
- Destructive device required by law; magnesium clips that degrade over time placed on trap door (FGC § 9003)
- Two entry funnels from outside, one funnel internally leading to holding area and bait

Configuration

- Single trap per line attached to one or more bullet buoys or small round floats
- Some fishermen attach lead every 20 feet to sink the float line in order to reduce risk of the line being cut by boat propellers

Trap limit

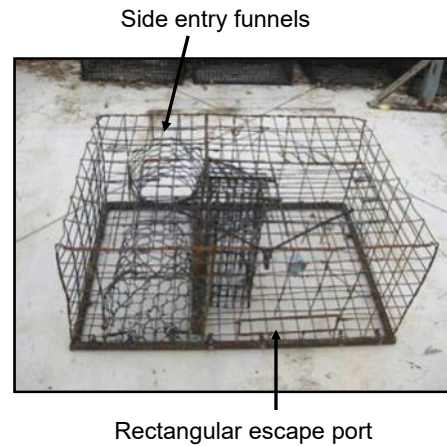
- 300 (FGC § 122.1)

Target species

Spiny lobster

Marking requirements

Yellow trap tag attached to trap (14 CCR § 122.1)
 Buoy marked with license number + "P" (FGC § 9006)



Lobster traps with blue poly-line and freshly marked bullet buoys



Bullet buoys and small floats used in combination

Photos: Lauren Saez

CA spiny lobster pot



See p.54 for map methodology

Geographic range

- California only – Point Conception to U.S./Mexico border
- Main ports: Santa Barbara, Los Angeles, and San Diego

General fishing season/structure

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
California		(FGC § 8251)										



Diagram: NOAA

CA spot prawn pot

Commonly used line

Material: Poly-blend or nylon
 Width: 5/16"
 Color: All colors

Buoys

Large polyball with the commercial fishing license number + "S"
 Pole, flag, light, and radar reflector also used

Trap description

- Tapered, circular, or rectangular traps used
- 7/8" to 1" x 1" mesh size is common
- Wire trap dimensions: 3' x 1.5' x 1' with two chambers
- Traps attached to ground line
- Destruction device required by law; escape size: 5" diameter (§ 180.2, Title 14)

Configuration

- Strings of traps can be up to one mile long, both ends weighted and marked with a polyball or flagpole
- Traps set 100' to 400' apart
- One large heavy weight used as an anchor at the front end of the string of traps

Trap limits

- California: 150 or 500 per permit
- Maximum of 300 traps within state waters

Target species

Spot prawn



Spot prawn; credit: NOAA



Small mesh funnel
 Photos: Lauren Saez



1 x 1 inch wire mesh, no escape ring
 Photos: Lauren Saez



Round trap
 Photo: CDFW

CA spot prawn pot



See p.54 for map methodology

Geographic range

- Pockets of fishing effort in southern and central California

General fishing season/structure

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
N. California	14 CCR § 180.1											
S. California		14 CCR § 180.1										

WA/OR shrimp pot

Commonly used line

Material: Poly-blend or nylon
Width: 5/16"

Buoys

Large polyball with clear identification of owner, pole, flag, light, and radar reflector

Trap description

- Round cord mesh traps most common in Oregon and Washington
- Mesh size:
 - Oregon: 1/2" mesh size is common
 - Washington: 7/8" minimum
- Oregon: 39" diameter and 16" tall with entry tunnel between 1.5" and 3" at the widest point
- Traps attached to ground line with a pot snap
- Washington coastal: maximum dimensions: 153" bottom perimeter and max 24" height (WAC 220-88B-040)
- Washington Puget Sound: maximum dimensions: 10' perimeter and max 18" height
- Destruction device required by law; escape size:
 - o Oregon: 8" diameter (OAR 635-004-0035)
 - o Washington: 3" x 5" (WAC 220-88B-040)

Configuration

- Strings of traps can be up to one mile long
- Traps set 100' to 400' apart
- One large heavy weight used as anchor at the front end of the string of traps
- Oregon: 10-15 traps/string, Washington: 50 traps/string is common

Trap limits

- Oregon: currently no limit
- Washington:
 - Coastal: 500 pots per fisherman
 - Puget Sound: 100 pots per fishery management area



Round trap used in Oregon and Washington
Photo: CDFW

Target species

Coonstripe shrimp
Spot shrimp
Humpback shrimp and pink shrimp are also targeted in Washington



Pink shrimp

Credit: NOAA



Spot shrimp

Credit: NOAA

WA/OR shrimp pot



Fishery distribution

Common depths fished:
Washington: coastal:
70-100 fm;
inland: 15-75 fm

* Effort occurs in Oregon but not shown for confidentiality reasons
See p.54 for map methodology

Geographic range

- Washington:
 - Coastal fishing takes place 20-40 miles offshore; subject to total allowable catch per vessel
 - Puget Sound fishing effort concentrated near Strait of Juan de Fuca and near the San Juan Islands, opened by emergency rule (WAC 220-340-530)
- Oregon: Most effort takes place near the Oregon/Washington border, some effort in southern Oregon*

General fishing season/structure

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Washington						(WAC 220-52-052)						
Oregon	(OAR 635-005-0205)											

CA tanner crab pot

Commonly used line

Material: Poly-line
 Width: 5/16"
 Color: Various colors

Buoys

Buoy on each end of string marked with clear identification of owner using the vessel's commercial boat registration number + "T" (FGC § 9006)

Trap description

- No mesh size requirements
- Tanner crab traps must not be more than 10' long and not more than 10' wide and not more than 42" high, as measured by the greatest distance in each dimension
- Escape port requirement: three openings of at least 4.5" in diameter in the side or upper panels of the trap to allow for escapement of undersized crab
- Destructive device required by law (FGC § 9003)

Configuration

- Not more than six strings with not more than 80 traps per string shall be submerged or otherwise used
- All traps must be fished on a string of traps
- Traps shall only be placed in water depths greater than 300 fathoms

Trap limit

- 480 traps per permitted vessel
- Cumulative two month trip limit of 250,000

Target species

Tanner crab



Tanner crab

Credit: NOAA



Photo: ADFG

<http://www.adfg.alaska.gov/index.cfm?adfg=CommercialKodiakresearch.project&id=17>

CA tanner crab pot



See p.54 for map methodology

Geographic range

- Minimal effort, range unknown
- Map not reflective of active fishing areas

General Fishing Season/Structure

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
California	(No specific regulations)											

Recreational pot/trap fisheries summary

Recreational Dungeness crab

Line

Not standardized

Buoys

- California: Single main buoy (any color) and single red marker buoy, marked with 10 digit CDFW GO ID number or commercial boat registration number for commercial passenger fishing vessels
- Oregon: All surface buoys marked with owner's full name or business name and at least one of the following: phone number, permanent address, ODFW Angler ID number or vessel ID number
- Washington: Buoys must be half red and half white and marked with the owner's full name and mailing address



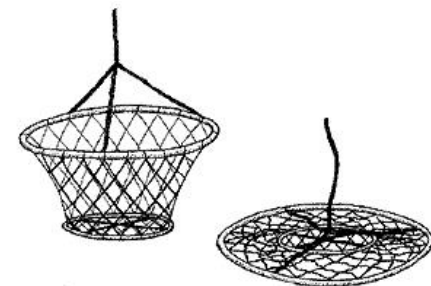
CDFW recreational Dungeness crab buoy marking requirements Photo: CDFW

Trap description

- Crab trap, hoop net, crab loop trap or by hand. Crab traps must have two circular escape openings, minimum 4.5", and have a destruct device leaving an opening of 5 inches in diameter. Washington has a requirement that the max pot size is 13 cubic feet and mesh size no smaller than 1.5"
- Recreational harvest also includes hoop net, crab loop trap, or by hand

Trap limit

- California: 10 traps
- Oregon: no trap limit, 12 crabs per day
- Washington: 2 traps per license, 5 crabs per day (inland), 6 crabs per day (coastal)



Hoop net diagram. Diagram: CDFW

Common fishing depths

10 to 50 fm

Fishing seasons

- California: November 7 through June 20 (Central CA) or July 30 (Northern CA)
- Oregon: October 16 through November 30; bays and estuaries year-round
- Washington coastal: December 1 through September 15
- Washington inland: July 1 through Labor Day, Thursday through Monday weekly

Special considerations: the Director of CDFW has authority to take in-season action to reduce marine life entanglement risk. There is also a trap validation program to determine participation level.

Recreational pot/trap fisheries summary

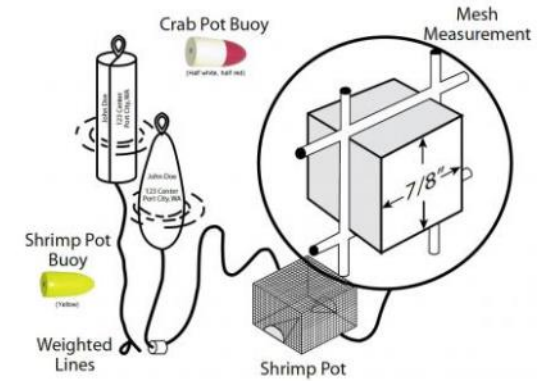
Recreational spot prawn

Line

Not standardized

Buoys

- California: Main buoy marked with 10 digit CDFW GO ID number
- Washington: Buoys must be yellow or fluorescent yellow



WDFW sportfishing gear regulation diagram Diagram: WDFW, <https://wdfw.wa.gov/fishing/shellfishing-regulations/gear-rules>

Trap description

- California: oval or rectangular traps
- Washington: shrimp pots may not exceed 10' in perimeter and 1.5' height. Mesh size: 1/2" inside 20 fathoms, 1" outside 20 fathoms (coastal); 1" (inland)

Trap limit

- California: no trap limit, 35 spot prawn per day
- Washington: 2 traps per license; 80 spot prawn per day (inland), 25 pounds per day (coastal)

Common fishing depths

- California: 400' to 1,000' along submarine canyons or shelf breaks
- Washington: 150' to 350' (inland)

Fishing seasons

- California: February to October, closed May to August north of Point Arguello
- Washington coastal: year-round
- Washington inland: first Saturday in May until quota has been reached

General fishing season/structure

Recreational fishing	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	
CA Dungeness crab	[Shaded]											[Shaded]	
OR Dungeness crab										[Shaded]			
WA coastal Dungeness crab	[Shaded]											[Shaded]	
WA inland Dungeness crab							[Shaded]						
California spot prawn					[North closed]								
WA coastal spot prawn	[Shaded]												
WA inland spot prawn						[Shaded]							

CA thresher shark/swordfish drift gillnet

Net
 Mesh size: stretched mesh size commonly between 18" - 22" with a 14" minimum
 Material: twine, most commonly green, black, and brown

Buoys
 Large polyball with clear identification of the owner at terminal end, marked with a pole, flag, light, and radar reflector
 Multiple large polyballs suspend the net in the water column; may be marked with license number

Configuration

- The net is typically attached to the vessel, set at dusk and allowed to drift during the night
- 1,000 fm gillnet, maximum length allowed
- Minimum net extender lengths of 36' and acoustic warning devices (e.g., pingers) are mandatory

Target species
 Common thresher shark and Pacific broadbill swordfish; other species include albacore, tunas, dorado, opah, louvar, barracuda, Pacific bonito, and white seabass



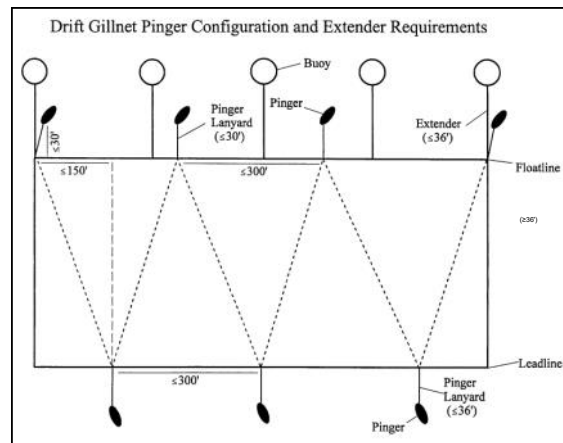
Photos: Nylon twine mesh



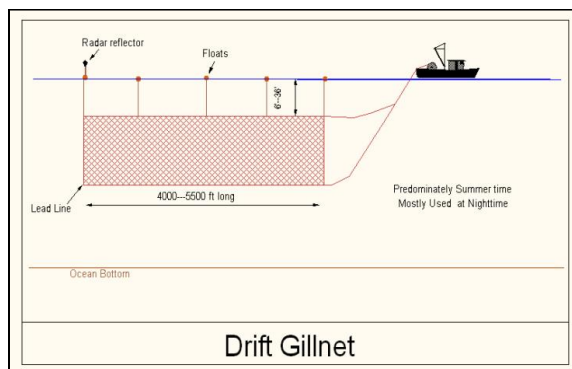
Common thresher shark
 Credit: NOAA



Pacific broadbill swordfish
 Credit: NOAA

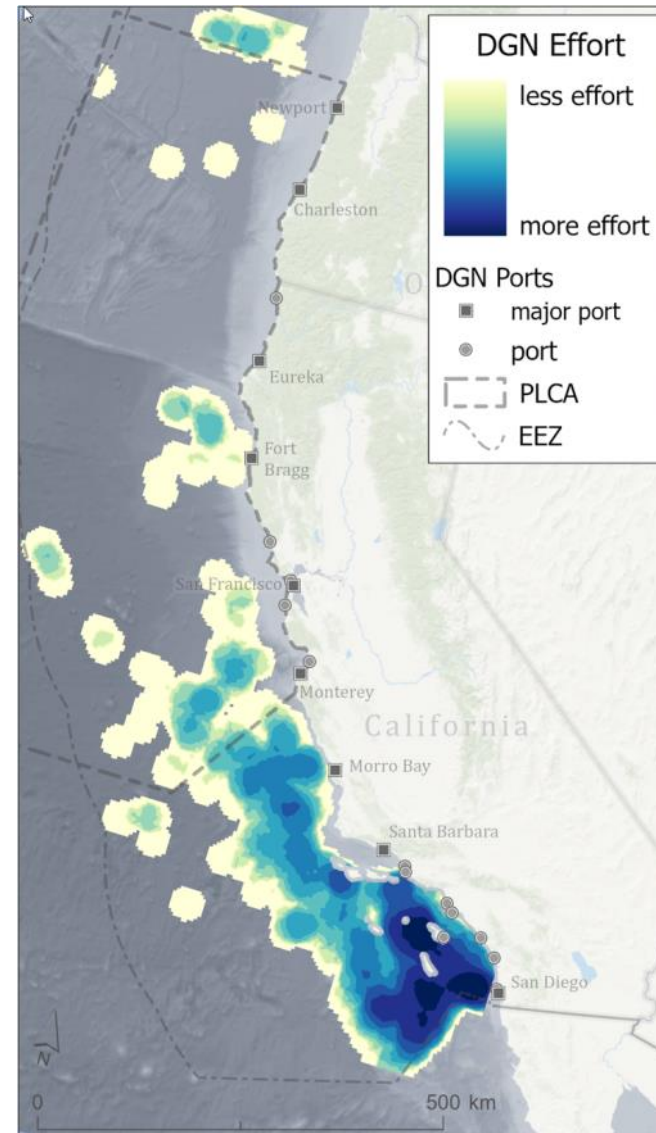


Drift gillnet pinger configuration and extender requirements
 Credit: 50 CFR Appendix Figure 1 to Part 229



Credit: Manny Aschemeyer, 2006

CA thresher shark/swordfish drift gillnet



Drift gillnet (DGN) fishing effort heat map, produced by NMFS WCR (Suter, *et al.* 2022); Map includes fishing effort shown as a gradient from light (less effort) to dark blue (more effort), major ports, Pacific Leatherback Conservation Area (PLCA), and the U.S. Exclusive Economic Zone (EEZ)

- Geographic range**
- Ranges from the U.S./Mexico border northward to waters off Oregon
 - Pacific Leatherback Conservation Area (PLCA) prohibits drift gillnet fishing August 15—November 15; during El Nino years, loggerhead sea turtle closure south of Point Conception and east of 120° W from June-August
- Season**
- May 1 - January 31
 - May 1 - August 14 fishing effort must be more than 75 nm from shore
 - August 15 - January 31 fishing effort must be more than 12 nm from shore
 - February 1 - April 30 fishing effort must be more than 200 nm from shore
- Management**
- Limited entry fishery managed under the federal Highly Migratory Species (HMS) Fishery Management Plan and by federal regulations under the Pacific Offshore Cetacean Take Reduction Plan
 - Permits terminated as of January 31, 2024

General fishing season

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Drift gillnet												
	200+ nm offshore											

CA halibut/white seabass and other species set gillnet

Net
 Mesh size: depends on the target species

- California halibut: 8.5" to 12"
- White seabass 6", mesh size can range from 3.5" to 6" (FGC§8625, §8623)

Color: monofilament is clear with slight pink, green, or blue coloration.

Commonly used line
 Float line: Polypropylene
 Lead line: leaded poly-line
 Mesh: monofilament common; can use nylon

Buoys
 Large polyball with clear identification of the owner and each terminal end marked with a pole, flag, light, and radar reflector

Configuration

- Multiple panels of netting are connected and set using anchors
- Sinkers, or additional weight, may be attached to the lead line (see diagram)
- No more than 9,000' of gillnet may be fished in combination (FGC §8625c)
- Off Santa Barbara County, the net length max is 10,000 fm

Gear marking

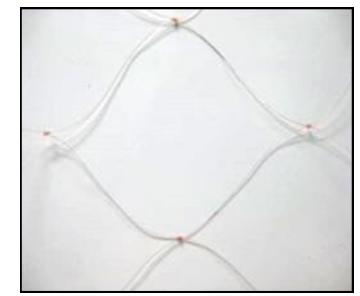
- Marked at terminal ends with buoys displaying fisherman's identification (FGC § 8601.5)
- Each panel of net shall be marked along the top (float line) with fisherman's identification number at least every 270' (FGC § 8601.5)

Target species
 California halibut, white seabass, and angel sharks



California halibut

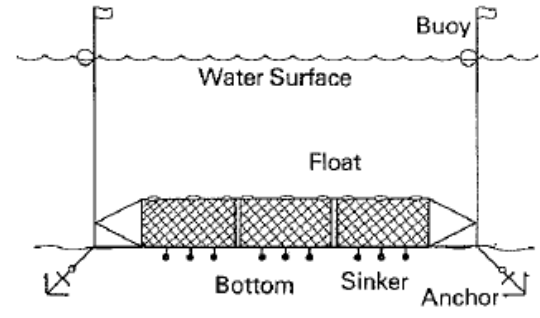
Credit: NOAA



Monofilament mesh

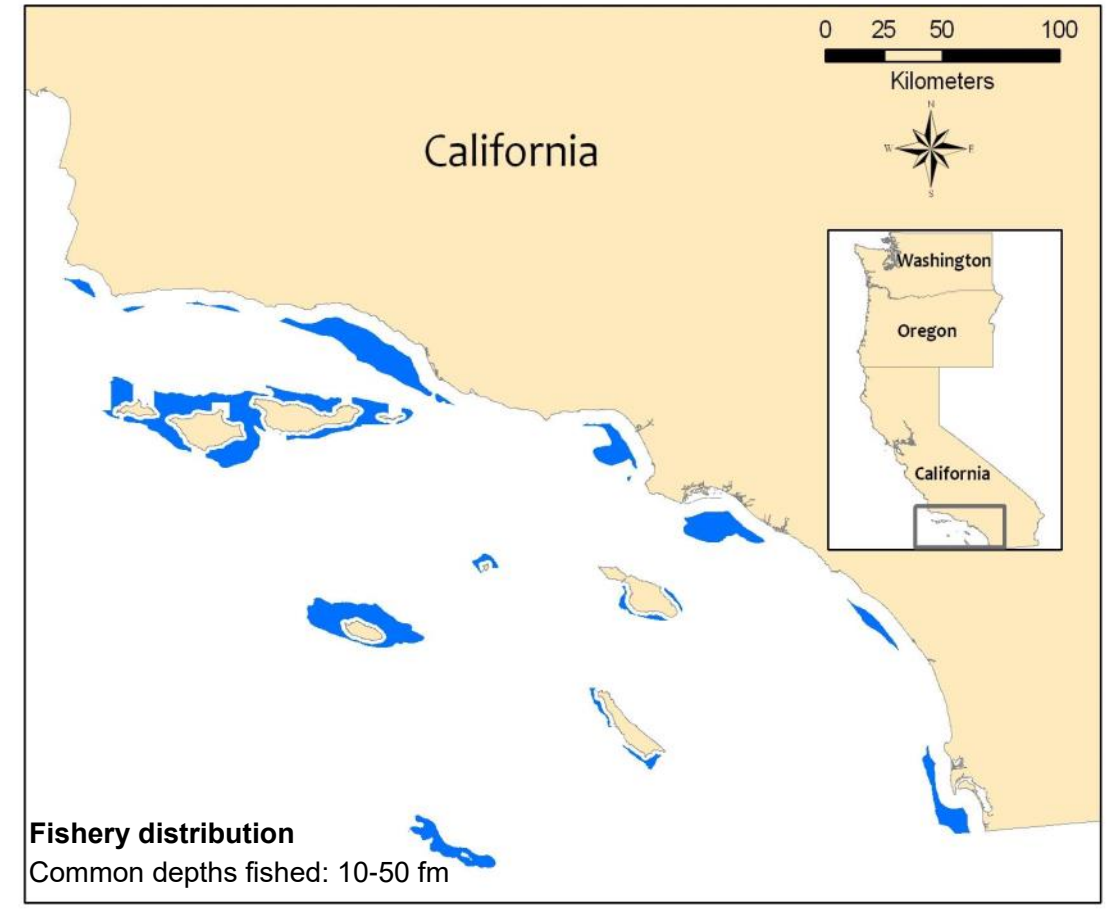


Nylon twine mesh



Credit: Manny Aschemeyer, 2006

CA halibut/white seabass and other species set gillnet



See p.54 for map methodology

Geographic range

- Southern California only, concentrated between 10 and 35 fm
- Main landings: Santa Barbara, Los Angeles, and San Diego
- Fishery restricted from fishing within 3 miles of mainland and 1 mile from offshore islands (FGC § 8610.1-8610.3)

Management

- Limited entry fishery management by CDFW
- Mandatory breakaway and anchor features when using nets at certain depths and locations

General Fishing Season/Structure

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
California halibut	(No specific regulations)											
White seabass	(CCR §155, Title 14)											

Pacific northwest salmon gillnet summary sheet

WA Puget Sound Region salmon drift gillnet

List of Fisheries: WA Puget Sound Region salmon drift gillnet (includes all inland waters south of U.S.-Canada border and eastward of the Bonilla-Tatoosh line-Treaty Indian fishing is excluded)

Target species

Sockeye, Chinook, pink, coho, and chum salmon

Mesh size: from 5" to 7"

Net material: monofilament mesh

Configuration

- Larger drift gillnet
 - Suspended in the water column by buoys tied every 50 fm to the float (cork) line
 - Max length 300 fm; max net depth 90 meshes
- Smaller skiff gillnet
 - Max length 100 fm, and it is retrieved by hand only

Gear marking

Two red buoys are attached within 5' of each end of the net with the name and gillnet license number of the fisherman. The cork line portion of the net shall be marked every 50 fm of the net with size A-1 polyballs (WAC 220-354-140)

Geographic range

Fishing effort within the Puget Sound, located along the northwestern coast of Washington, includes all inland waters south of the U.S.-Canada border and eastward of the Bonilla-Tatoosh line (Treaty Indian fishing is excluded).

Season

Season varies every year for start and end dates. Usually starts around mid-July and extends until early December

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Washington												

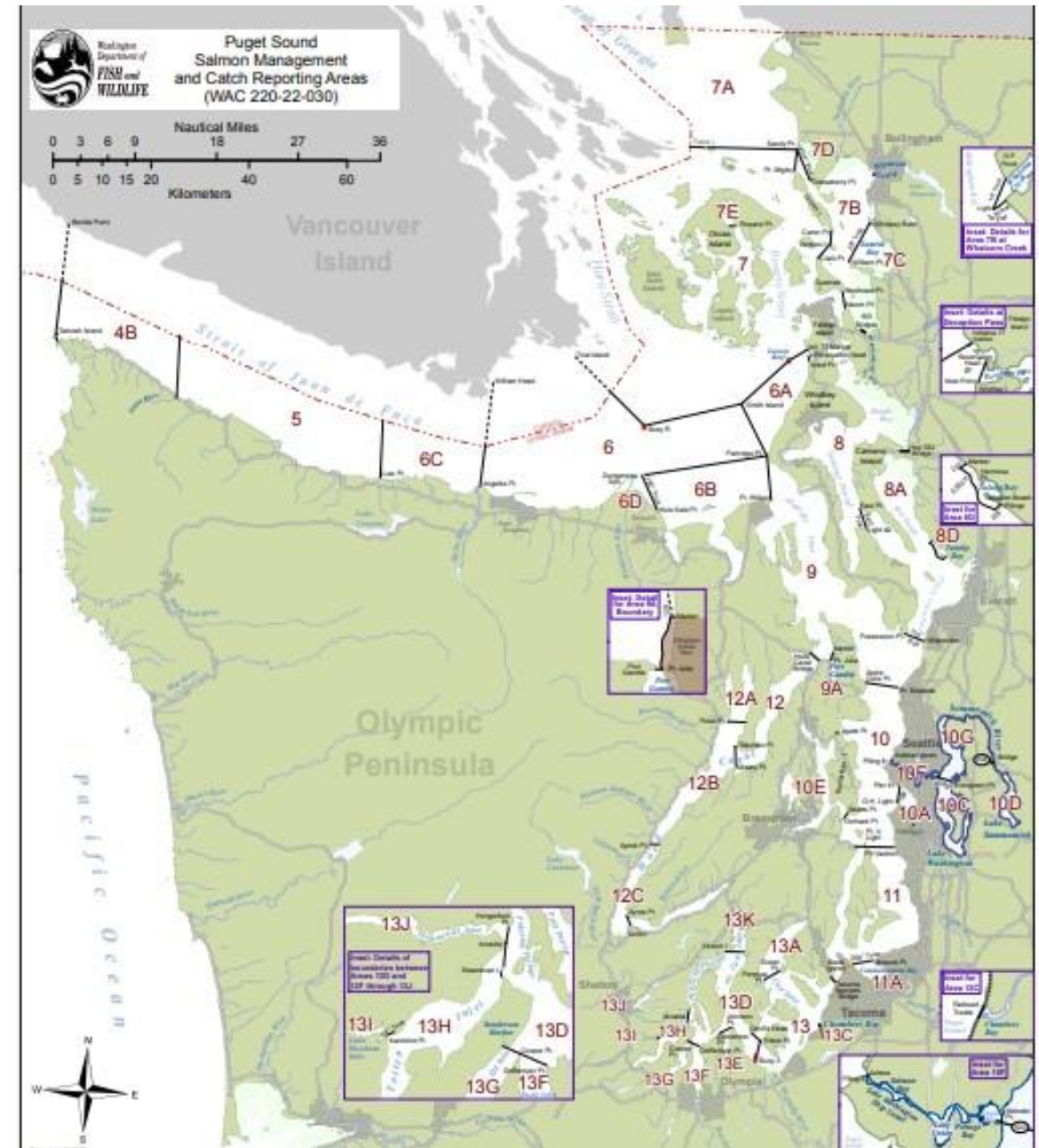
Management

- Jointly managed by WDFW, NMFS, and the Pacific Fishery Management Council (PFMC)
- Net soak time limited to 45 minutes



Sockeye salmon
Credit: NOAA

Pacific northwest salmon gillnet summary sheet



WDFW Puget Sound salmon management map. Applicable for all Washington salmon related fisheries.

https://wdfw.wa.gov/sites/default/files/2019-03/wac_220-022-030.pdf

Pacific northwest salmon gillnet summary sheet

WA Grays Harbor salmon gillnet

List of Fisheries: WA Grays Harbor salmon drift gillnet (excluding treaty Tribal fishing)

Target species

Salmon (Chinook, coho, and chum) and shad

Mesh size:

- Areas 2A, 2B and 2D: max mesh size 6.5"
- Area 2C: maximum mesh size 9.0"

Net material: synthetic multifilament mesh

Configuration

- Nets are attached at one end of the vessel, drifting with the vessel
- May not exceed 1,500' in length
- Drift usually limited to 45 mins

Gear marking

Two red buoys are attached within 5' of each end of the net with the name and gillnet license number of the fisherman. The cork line portion of the net shall be marked every 50 fm of the net with size A-1 polyballs (WAC 220-354-140)

Geographic range

Grays Harbor, WA; divided into four management areas; shown in the map: https://wdfw.wa.gov/sites/default/files/2019-02/2012_gh_map.pdf

Season

Open from mid-August to July 4, with time limits set for each area adjusted for each season depending on fish stock abundance

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Washington	WAC 220-354-280											

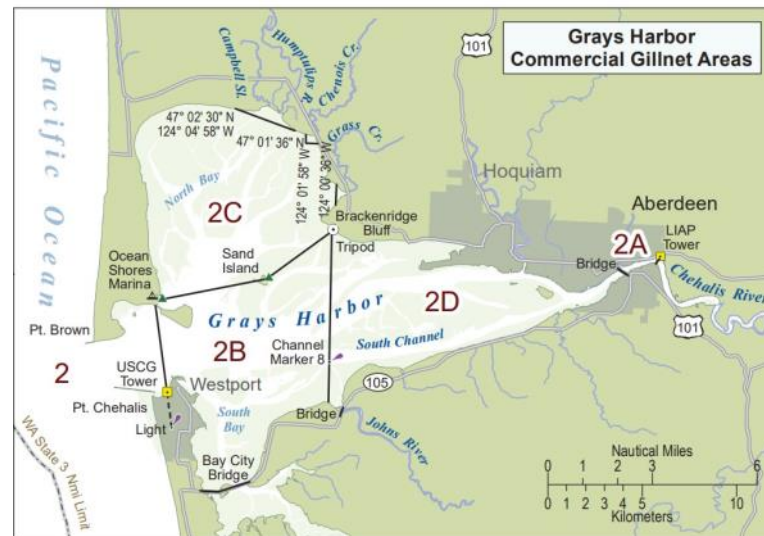
Management

- Limited entry fishery managed by WDFW, in conjunction with PFMC and NMFS



Chinook salmon

Credit: NOAA



Pacific northwest salmon gillnet summary sheet

WA Willapa Bay drift gillnet

List of Fisheries: WA Willapa Bay drift gillnet

Target species

Coho, chum, and Chinook salmon

Mesh size: 4¼" to 6½"; mesh size requirements may vary within the various areas, on specific days and at certain times, depending on salmon stock status and size limits

Net material: monofilament mesh

Configuration

Drift gillnet length can be up to 1,500'

Gear marking

Two red buoys are attached within 5' of each end of the net with the name and gillnet license number of the fisherman. The cork line portion of the net shall be marked every 50 fm of the net with size A-1 polyballs (WAC 220-354-140)

Geographic range

Willapa Bay, WA; detailed depiction of the commercial fishing areas in Washington can be found here: https://wdfw.wa.gov/sites/default/files/2019-02/2013_wb_map.pdf

Management

- Limited entry fishery managed by WDFW, in conjunction with PFMC and NMFS
- Recovery box usage is mandatory to ensure survival of fish bycatch
- Soak times are limited to 45 minutes.

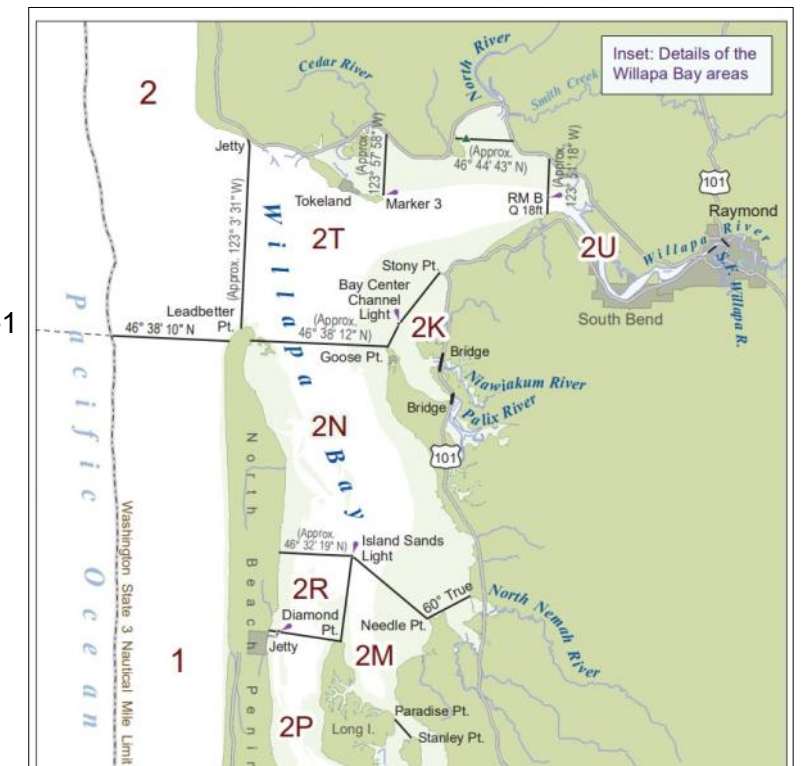
General fishing season/structure

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Washington	WAC 220-354-240											



Chum salmon

Credit: NOAA



Pacific northwest salmon gillnet summary sheet

WA/OR lower Columbia River drift gillnet

List of Fisheries: WA/OR lower Columbia River (includes tributaries) drift gillnet

Target species

Coho (fin-clipped only), pink, and Chinook salmon

Mesh size: maximum mesh size of 9¾"

Net material: multifilament mesh

Configuration

- Drift gillnets with a maximum length of 250 fm
- Minimum mesh size varies; commonly 9-inch mesh in August and 8-inch in September
- No slacker or stringer lines may be used to slacken the net vertically, but the gillnet hang ratio is not restricted
- May include an optional steelhead excluder device that must adhere to particular specifications if used, including placement of two red corks at each end of the net

Gear marking

Two red buoys are attached within 5' of each end of the net with the name and gillnet license number of the fisherman. The cork line portion of the net shall be marked every 50 fm of the net with size A-1 polyballs (WAC 220-354-140)

Geographic range

Mouth of the Columbia River upstream to Kelley Point, Oregon. The area of the lower Columbia river where effort occurs is divided into four zones, which includes approximately 140 river miles available to commercial salmon drift gillnet fishing. A clear depiction of each of the zones can be found at: <https://www.dfw.state.or.us/fish/OSCRP/CRM/docs/2013/Columbia%20River%20Commercial%20Zone%201-6%20Map.pdf>

Management

- Limited entry fishery managed by WDFW, in conjunction with PFMC and NMFS
- Soak times are limited to 30 minutes

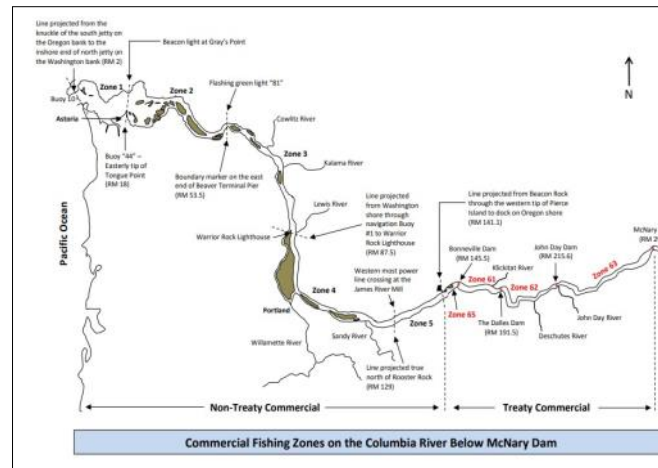
General fishing season/structure

- Season opens by emergency rule



Coho salmon

Credit: NOAA



Pink salmon

Credit: NOAA

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Columbia River	WAC 220-358-030											

Other WCR gillnet summary sheet

CA yellowtail, barracuda, and white seabass drift gillnet

List of Fisheries: CA yellowtail, barracuda, and white seabass drift gillnet

Target species

Yellowtail, barracuda, and white seabass

Mesh size: Between 3.5" and 14", depending on target species:

- Yellowtail and barracuda: $\geq 3.5"$
- White seabass: $\geq 6"$

Net material: twine or monofilament mesh

Configuration

Drift gillnets are up to 6,000' long; set around sunset and hauled around sunrise

Gear marking

Each buoy is marked with the number of the vessel the net is being fished from

Geographic range

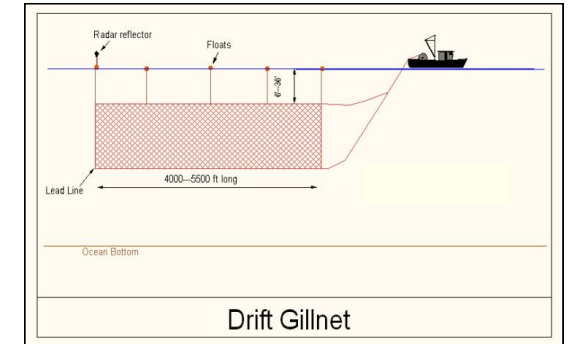
- Fishery operates in federal waters (3-200 nautical miles or nm) with majority of effort between 3 and 10 nm. Effort primarily south of Point Conception, including around San Clemente Island and San Nicolas Island
- CDFW prohibits gillnet fishing in ocean water depths of 60 fathoms or less from Point Reyes to Point Arguello
- No map created

Season

Management

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
California	14 CCR § 155											

- Limited entry fishery managed by CDFW



Credit: Manny Aschemeyer, 2006

Other WCR gillnet summary sheet

CA herring set gillnet

List of Fisheries: CA herring set gillnet

Target species

Pacific herring

Mesh size: 2 to 2.5"

Net material: nylon mesh

Configuration

Differs by area:

- San Francisco Bay and Tomales Bay - fishermen use up to two gillnets that are not more than 65 fm (390') long measured at the cork line (float line); maximum net depth of 120 meshes
- Crescent City Harbor and Humboldt Bay - fishermen fish with up to two nets that are not more than 150 fm (900') combined; maximum net depth of 120 meshes
- The nets are anchored by 35 lb weights on each end; suspended in the water column by attaching buoys on each end



Pacific herring

Credit: NOAA

Gear marking

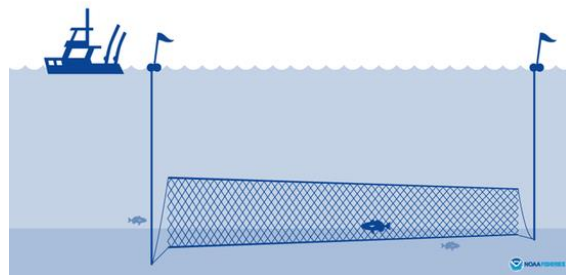
Each buoy is marked with the number of the vessel the net is being fished from

Geographic range

Operates in and around San Francisco Bay, Crescent City Harbor, Humboldt Bay, and Tomales Bay

Season

Winter fishery running from January 2 until March 15



Set gillnet

Credit: NOAA

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
California	14 CCR § 163.1											

Management

- Limited entry fishery managed by CDFW depending on stock abundance
- New regulations implementing the California Pacific Herring Fishery Management Plan commenced during the 2020 – 2021 season. A quota system dictates the amount of effort the fishery will occur each season.

Other WCR gillnet summary sheet

WA/OR Mainstream Columbia River eulachon gillnet

List of Fisheries: WA/OR mainstream Columbia River eulachon gillnet

Target species

Eulachon

Mesh size: 2"

Net material: monofilament mesh

Configuration

- The nets are suspended below the surface by dropper lines
- Usually 2 or more gillnets are used, with each net being fished by repeatedly drifting through the fishing area until the net is full
- Nets set during the turn of the tide and during the flood tide when the fish are present at intermediate depths (required under Washington and Oregon rules)



Eulachon

Credit: NOAA

Gear marking

None required

Geographic range

Lower Columbia River downstream from Bonneville Dam

Season

December 1 to March 31, restricted to a few days a week because of conservative fishery management

- Oregon and Washington manage the fishery under the congressionally approved Columbia River Compact

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Columbia River	WAC 220-358-060											

WCR trawl summary sheet

CA halibut bottom trawl

List of Fisheries: CA halibut bottom trawl

Target species

California halibut

Mesh size:

- Webbing material up to 7 mm in diameter
- Mesh size for the codend is a minimum of 7^{1/2}"
- Federal waters: the codend net mesh size is a minimum of 4^{1/2}"

Net material: nylon - braided or twisted mesh

Configuration

- Vessels use otter trawl gear consisting of two doors, one door deployed on each side of the net to spread the mouth of the net open. The mouth of the net is held open vertically with floats attached to the head rope (top of the net) and weights on the footrope (bottom of the net)
- "Dropped-loop" style chain consists of chain link loops that hang from the footrope to provide weight while decreasing the surface area that comes in contact with the bottom
- Only light touch trawl gear may be used to catch California halibut in the California Halibut Trawl Grounds (CHTG). This includes: trawl doors weighing no more than 500 lbs; headrope only up to 90' in length of chain, rope or wire; footrope not to exceed 1/4" in diameter and can be rope or wire; no rollers or bobbins on footrope

Gear marking

Not regulated

Geographic range

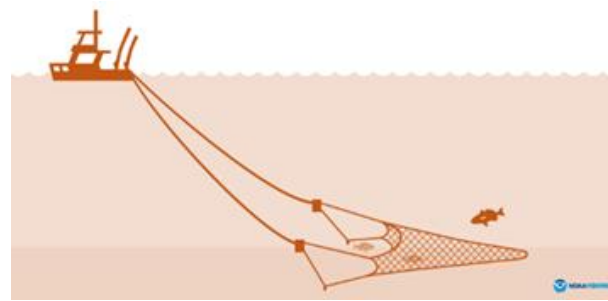
- Federal waters off central California from Point Reyes southward to Point Sal, and throughout the Southern California Bight
- Majority of effort in southern California occurs within the CHTG, which is limited to state of California waters from 1-3 nm along the mainland shore between Port Arguello and Point Mugu

Season

Year-round in federal waters, but is prohibited in state waters outside the CHTG with a trawl season from June 16 to March 14

Management

- Limited entry fishery managed by CDFW
- In federal waters, trawlers are subject to federal groundfish regulations such as conservation area restrictions and requirements, daily and monthly incidental trip limits for groundfish species, federal at-sea observer coverage, and vessel monitoring system requirements to monitor compliance with closed areas



Bottom trawl

NOAA

WCR trawl summary sheet

CA sea cucumber trawl

List of Fisheries: CA sea cucumber trawl

Target species

Sea cucumber

Mesh size:

- State waters: range from 1^{3/4}" to 2^{1/4}"
- Federal waters: minimum allowable is 4^{1/2}"

Net material: nylon mesh

Configuration

- Trawl net consists of either a single-walled or double-walled codend deployed via a single or double rigged trawl vessel
- In the CHTG, use of "light touch" trawl gear is required

Gear marking

None required

Geographic range

Only allowed in Southern California, from Point Conception to San Diego

Common operational fishing depths

30 - 70 fm

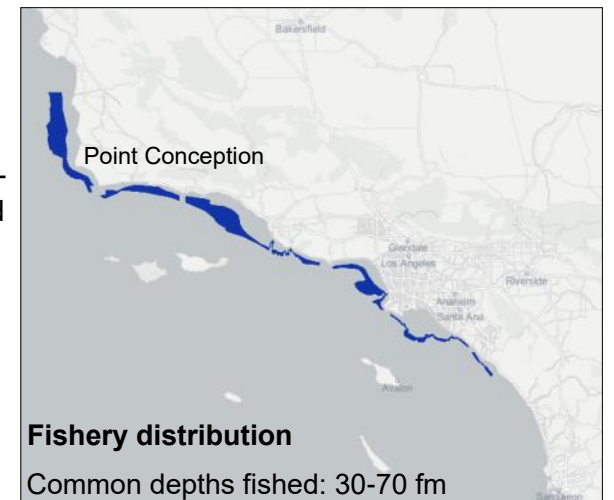
Season

Open year-round in federal waters; variety of time/area restrictions depending on the species of sea cucumber

Management

Limited entry fishery managed by the State of California

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
California halibut bottom trawl	[Hatched]		[Solid Grey]			Restricted to CHTG 14 CCR §8496						
CA sea cucumber trawl	[Solid Grey]											



Fishery distribution

Common depths fished: 30-70 fm

See p.54 for map methodology

For more information: See commercial trawl closed areas at: <https://www.fisheries.noaa.gov/west-coast/sustainable-fisheries/west-coast-groundfish-closed-areas>

WCR trawl summary sheet

WA/OR/CA shrimp trawl

List of Fisheries: WA/OR/CA shrimp trawl

Target species

Pink shrimp, ridgeback prawn, golden prawn

Mesh size: minimum is 1^{1/2}"; California minimum is 1^{3/8} "

Net material: nylon mesh

Configuration

- Benthic trawl gear
- Most of the West Coast: double rigged (i.e., having two otter trawl nets) vessels with semi-pelagic fine-meshed shrimp nets are used the majority of the time
- In southern California: single rigged (one net) vessels are most common
- Puget Sound: only beam trawls are allowed with a minimum mesh size of 1^{1/2}"
- Maximum beam size is 60' in Strait of Juan de Fuca; maximum beam size in the San Juan Islands is 25'
- Bycatch Reduction Device (BRD) can be mandatory; consisting of either a rigid gate excluder (preferred) or a soft-panel excluder, along with footrope lighting devices

Gear marking

No marking requirements

Geographic range

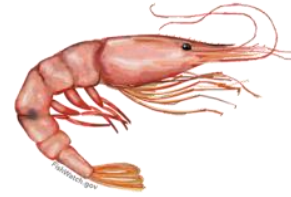
- Generally occurs in federal waters and also in Puget Sound, Washington
- Pink shrimp are generally caught at depths of 40-150 fm on sandy and muddy bottoms during daylight hours due to their vertical migration to the ocean floor during the day
- Trawling cannot occur in waters shallower than 100 feet in Puget Sound
- Ridgeback prawn is caught in southern California south of Point Conception at depths of 10-110 fm

Season

- The fishery is closed in all three states from November 1 through March 31; other state and species-based restrictions
- Northern pink shrimp in the Strait of Juan de Fuca (May 1 through September 30) and other species in the San Juan Islands (May 16 to October 15)
- The fishery for ridgeback and golden prawns in southern California is closed from June 1 through September 31
- WAC 220-340-500, OAR 635-005-0260, 14 CCR §120, 120.3, WAC 220-340-530

Management

Limited entry state-managed fisheries



Pink shrimp
Credit: NOAA



Fishery distribution
Common depths fished:
40-150 fm
See p.54 for map methodology

WCR trawl summary sheet

WA/OR/CA groundfish trawl

List of Fisheries:

WA/OR/CA groundfish trawl

Target species

Pacific whiting (hake), and other groundfish such as sablefish, widow rockfish, yellowtail rockfish, thornyheads, Dover sole, petrale sole, and lingcod

Mesh size:

- Bottom trawl nets: no minimum mesh size
- Midwater (pelagic) trawl nets: no minimum mesh size

Net material: nylon mesh

Configuration

- Midwater trawl used for Pacific whiting; some are catcher-processor vessels
- Midwater and bottom trawl nets used for groundfish
- Bottom trawlers use a large footrope with a diameter larger than eight inches (prohibited to be larger than 19") encircled with chains rollers, bobbins, or other materials
- Midwater trawlers use unprotected footrope gear

Gear marking

No marking requirements

Geographic range/season

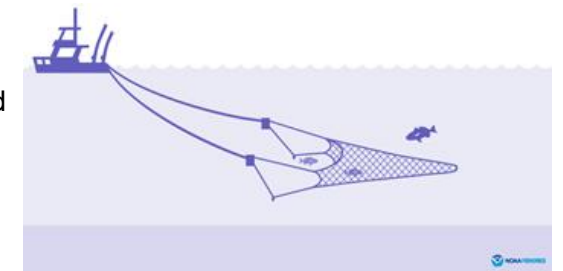
- Year-round in federal waters off Washington, Oregon and California
- Pacific whiting: May to December
- The bulk of the catch in this fishery is off Oregon and Washington

Management

Jointly managed by NMFS and U.S. West Coast states through the PFMC



Pacific whiting
Credit: NOAA



Midwater trawl
Credit: NOAA

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Shrimp trawl				Other state and species-based restrictions								
Groundfish trawl	50 CFR §660											

WCR purse seine summary sheet

WA/OR sardine purse seine

List of Fisheries: WA/OR sardine purse seine

Target species

Pacific sardines, Pacific mackerel

Mesh size: can vary from 0.6" to 0.8"

Net material: twisted nylon mesh

Configuration

- Purse seine: floats adhered to the "float line" of the seine net with a lead line threaded through rings at the bottom; skiff encircles fish, lead line at bottom of seine is pulled in
- Must place a grate over the intake of the hold of the vessel to sort out larger species of fish; openings between the bars in the grate may exceed 2³/₈"

Gear Marking

None required

Geographic range

Off the coast of Oregon and Washington

Common depth

Water column above the continental shelf

Season

Differing seasonal periods throughout the year, generally late spring and summer; coastal Washington

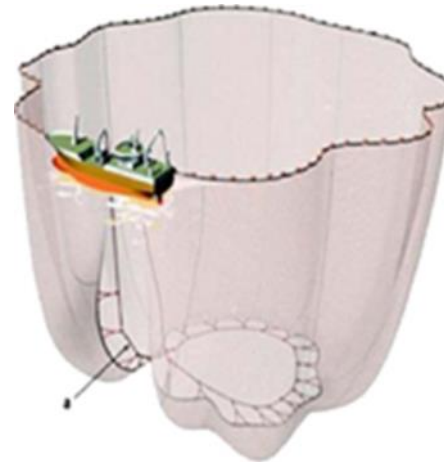
Management

Sardine is a Coastal Pelagic Species (CPS) jointly managed by the PFMC, ODFW and WDFW; actively managed under federal CPS Fishery Management Plan



Pacific sardine

Credit: NOAA



Purse seine
Credit: NOAA

CA anchovy, mackerel, sardine purse seine

List of Fisheries: CA anchovy, mackerel, sardine purse seine

Target species

Northern anchovy, Pacific mackerel, jack mackerel, and Pacific sardine

Mesh size: can vary from 0.6" to 0.8"

Net material: twisted nylon mesh

Configuration

- Floats adhered to the "float line" of the seine net with a lead line threaded through rings at the bottom; skiff encircles fish, lead line at bottom of seine is pulled in



Northern anchovy

Credit: NOAA

WCR purse seine summary sheet

CA anchovy, mackerel, sardine purse seine (cont.)

Geographic range

- Federal waters (3 nm – 200 nm) off California
- The fishery occurs throughout the coast but mainly operates in San Diego, Oceanside, Dana Point, San Pedro, and Monterey

Common depth

Water column above the continental shelf extending from the surface to roughly 555 fm deep

Season

Operates year-round

Management

- Managed under the PFMC CPS Fishery Management Plan (FMP); requires a limited entry permit unless caught for the live bait market

CA squid purse seine

List of Fisheries: CA squid purse seine

Target species

Market squid

Mesh size: can vary from 0.6" to 0.8"

Net material: twisted nylon mesh

Configuration

- Purse seine: floats adhered to the "float line" of the seine net with a lead line threaded through rings at the bottom; skiff encircles fish, lead line at bottom of seine is pulled in
- Can use lights of up to 30,000 watts in order to attract squid; market squid light boat permit is required

Geographic range

- North of Point Conception, mainly around Monterey Bay; operates from April through September
- South of Point Conception is most active from October through March
- Majority of fishing is at night

Common depth

Close to shore; 3 - 20 nm

Management

- Limited entry fishery managed by the State of California, under the Market Squid Fishery Management Plan (MSFMP), a state fishery management plan
- Market squid is included under the PFMC CPS Fishery Management Plan (FMP)



Market squid

Credit: NOAA

WCR purse seine summary sheet

WA/OR herring, anchovy, smelt, squid purse seine or lampara

List of Fisheries: WA/OR herring, anchovy, smelt, squid purse seine or lampara

Target species

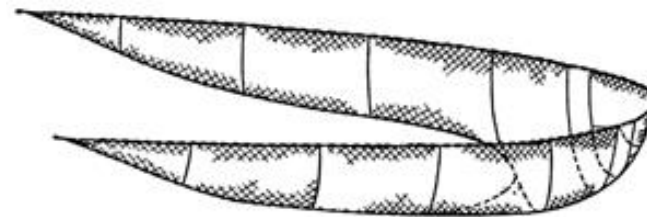
Herring, anchovy, smelt, market squid, and other baitfish

Minimum mesh size: ½" stretched mesh

Net material: twisted nylon mesh

Configuration

- Floats adhered to the "float line" of the seine net with a lead line threaded through rings at the bottom; skiff encircles fish, lead line at bottom of seine is pulled in
- Puget sound: lampara nets are allowed to be up to 200' in length
- Maximum length of purse seine nets varies by location: ranging from 300 feet maximum inland Oregon up to 1,400' in the offshore and coastal waters of Washington
- Drag seines used in Willapa Bay, Grays Harbor, and the Lower Columbia River can be a maximum of 350' long with a 1 ¼" minimum stretch measure net mesh size
- Dip net bags, in Washington, maximum diameter of 10' and maximum size of 18', and a minimum mesh size of 1"



Lampara net
Diagram: FAO

Gear marking

None required

Geographic range

Inland and coastal waters of Oregon and Washington

Season

Some portions of the fishery are generally open year-round, but there are other variations depending on target species and gear type (WAC-220-356-110)

Management

- Managed under the PFMC CPS Fishery Management Plan in coastal and offshore waters
- Additional state regulations govern the harvest of some species

WCR purse seine summary sheet

CA tuna purse seine

List of Fisheries: CA tuna purse seine

Target species

Yellowfin, Pacific bluefin, skipjack, and Pacific bonito

Mesh size: ranges from 2" to 2.75"

Net material: twisted nylon mesh

Configuration

- Floats adhered to the "float line" of the seine net with a lead line threaded through rings at the bottom; skiff encircles fish, lead line at bottom of seine is pulled in
- No limit on size, purse seine nets can be more than 6,500' in length
- Artificial "Fish Aggregating Devices" (FAD's) and light attractions are sometimes used to concentrate the fish; there is a limit to the number of FADs allowed, which can change annually

Gear marking

None required

Geographic range

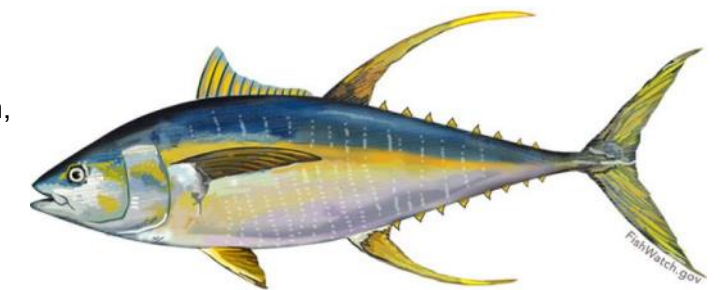
Pacific bluefin are mostly caught within federal waters; whereas the other tuna species are targeted in international waters beyond 200 nm.

Common depths

Maximum where fish are targeted is about 164 fm

Management

- Open access fisheries targeting highly migratory species (HMS), including tuna, require a federal HMS permit
- Catch limits change per calendar year for bluefin, not for other tuna species



Pacific yellowfin tuna
Credit: NOAA

Other seine/net summary sheet

WA/OR Lower Columbia River salmon seine

List of Fisheries: WA/OR Lower Columbia River salmon seine

Target species

Coho and adipose fin-clipped Chinook salmon

Mesh size: stretched mesh size no larger than 3^{1/2}"

Net material: nylon - braided or twisted mesh

Configuration

- Seine nets cannot be longer than 200 fm or have a depth greater than 200 meshes
- Can include a chafing strip panel: 5' deep, mesh no greater than 3^{1/2}" for beach seines and 5" for purse seines

Gear marking

Red corks are required at 25 fm intervals and must contrast with other corks used on the net

Geographic range

Lower mainstream of the Columbia River in both Oregon and Washington; includes the stretch of the Columbia River between the Bonneville Dam and the river mouth to the Pacific Ocean

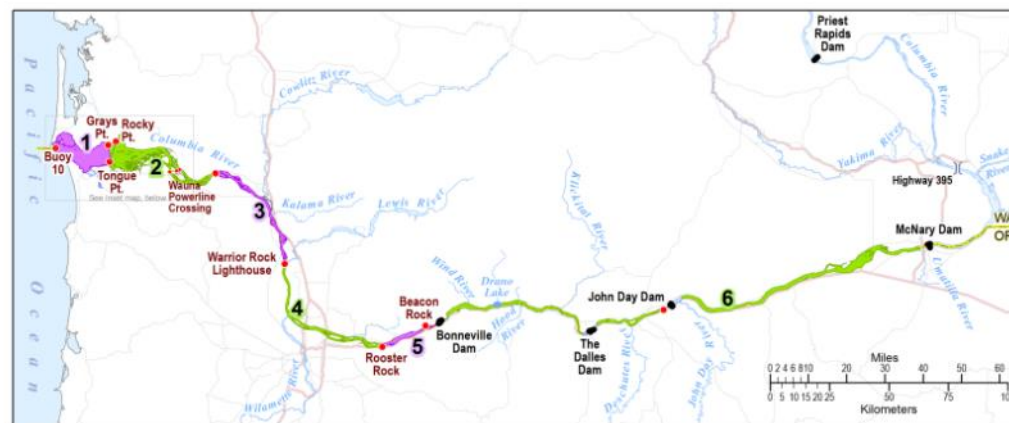
Season

Mid-August to late September

Management

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Columbia River												

WDFW and ODFW jointly manage the limited-entry fishery and authorize participants



Columbia River commercial fishing areas
Credit: WDFW



Coho salmon
Credit: NOAA

Other seine/net summary sheet

WA salmon seine

List of Fisheries: WA salmon seine

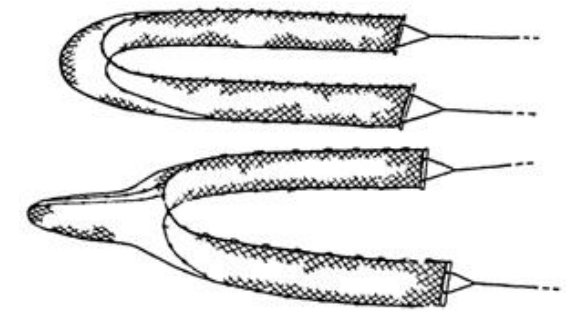
Target species:

- Purse seine: sockeye, Chinook, pink, coho, and chum salmon
- Beach seine: Chinook and coho salmon

Mesh size:

- Purse seine: minimum mesh size is 3^{1/2}"
- Beach seine: mesh must be between 3" and 4"

Net material: twine mesh (cannot be made of a twine-size smaller than 210/30d nylon, 12-thread cotton, or an equivalent diameter material)



Beach seine
Diagram: FAO

Configuration

- Purse seine: maximum length of 1,800' along the cork line; net and lead line combined cannot exceed 2,200'
- Beach seine: net cannot be longer than 990' or more than 200 meshes in depth.

Gear marking

None required

Common depths

Fishing effort occurs close to the surface

Geographic distribution

- Purse seine fishery occurs in central Puget Sound, the San Juan Islands, and Hood Canal
- Beach seine only authorized in Hood Canal, catch management areas 12A and 12C

Season

- Purse seine: mid-July and extends until early December, with individual regions opening and closing at different times within the overall fishing season
- Beach seine: July to late September and November

Management

- Limited entry fishery jointly managed by: WDFW, Puget Sound Treaty Tribes, and NMFS

For more information: <https://wdfw.wa.gov/fishing/commercial/salmon/rules>

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Purse seine								WAC 220-354-210				
Beach seine								WAC 220-354-120				

Other seine/net summary sheet

WA salmon reef net

List of Fisheries: WA salmon reef net

Target species

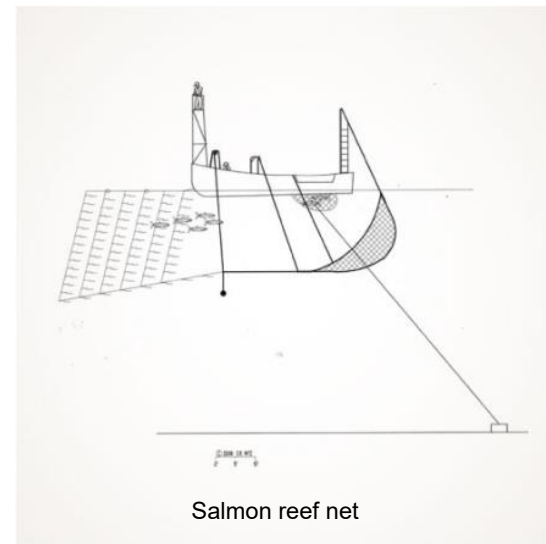
Sockeye, Chinook, pink, coho, and chum salmon

Mesh size: equal to or greater than 3^{1/2}"

Net material: Multifilament and nylon mesh

Configuration

- Reef nets are a maximum of 300 meshes on either side and have only two leads. The leads are a maximum of 200' in length from the anchor boat bow to the nearest end of the head buoys
- Reef nets are suspended between two anchored boats upstream from the river mouth that the salmon use to pass through on their way to freshwater spawning grounds
- Bottom ropes create an incline, which gradually raises up to catch the salmon when passing over the net
- Utilize daytime tide, "flood" tide, to push the salmon to follow the lead lines over webbing and into the bunt of the net
- Vessels and gear are anchored in one place for the duration of the season



<https://lummiislandwild.com/why-reefnetting/>

Gear marking

None required

Common depths

80'-120' deep

Geographic range

Currently reef nets are only allowed in an area around the San Juan Islands

Season

Usually extended from mid-September until early November

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Washington												

Management

- Limited entry salmon harvest fishery jointly managed by WDFW, Puget Sound Treaty Tribes, and NMFS

For more information: <https://wsg.washington.edu/wordpress/wp-content/uploads/Salmon-Reefnetters.pdf>

Other seine/net summary sheet

CA squid dip net

List of Fisheries: CA squid dip net

Target species

Market squid

Mesh size: 3/16" to 1/4"

Net material: wire, nylon or cloth mesh

Configuration

- Brail gear such as dip nets (long handle) and scoop nets (no handle) are used to harvest market squid; both are hand nets, which consists of a mesh basket held open by a hoop
- Lights of up to 30,000 watts may be used in order to attract squid

Gear marking

None required

Geographic range

Majority of effort takes place at night, close to shore (3 - 20 nm)

Season

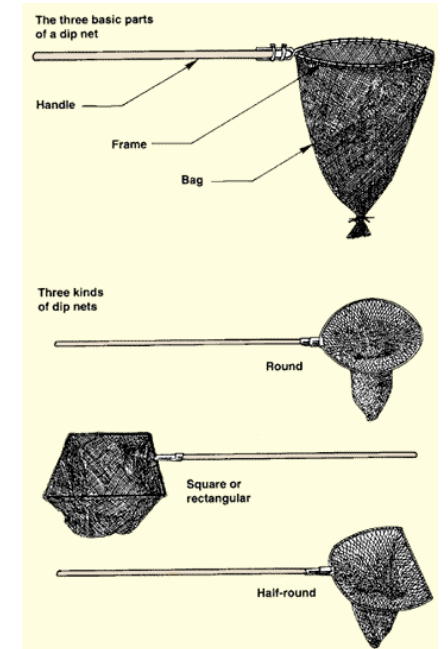
- North of Point Conception, mainly around Monterey Bay, April through September
- South of Point Conception is most active from October through March

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
North												
South												

Management

- Managed by CDFW under the Market Squid Fishery Management Plan
- Market brail and market squid vessel permit required

For more information visit: <https://www.fisheries.noaa.gov/species/california-market-squid>



Squid dip net

Credit: FAO

WCR longline summary sheet

WA/OR/CA groundfish, bottom-fish longline/set line

List of Fisheries: WA/OR/CA groundfish, bottom-fish longline/set line

Target species

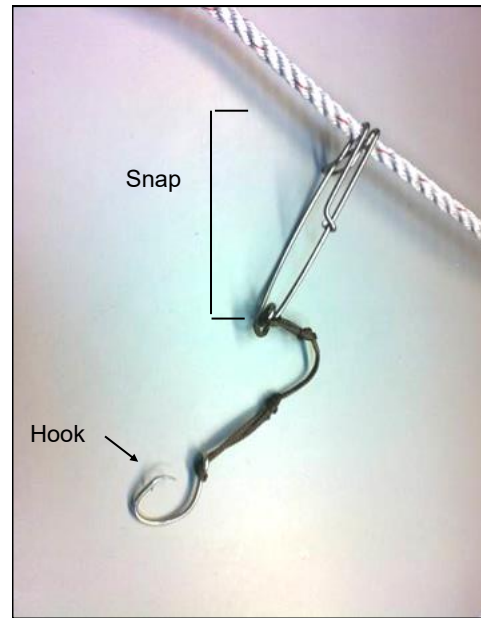
Sablefish are the primary species, rockfish are also targeted (60 different species of rockfish that may also be taken, although a handful of species make up the majority of the catch thornyhead, rougheye, and blackgill rockfish)

Commonly used line

- Material: Sinking leaded line, nylon, or poly-blend (main line made of multifilament line/rope or monofilament line)
- Width: 5/16" (dark color with lead core)

Configuration

- The ground line is set on the bottom with an anchor (25-50 lb) at each end
- Ground line can be up to 2 nm
- Hooks are attached to the ground line every 3' to 4' using either a snap or tied on using a "gangion" made of nylon or monofilament line
- Fitted with up to 2,000 small gangions tied at intervals along the main line terminating in a baited hook
- Circle hooks, size 7/0, are common



Snap and hook that attaches to ground line

Credit: Lauren Saez

Gear marking

Large polyball with clear identification of the owner and each terminal end marked with a pole, flag, light, and radar reflector. Any gear that is not attached to the vessel must be attached to buoys floating on the surface and marked on the upper half with the commercial fishing license identification number at least 2" in height.

Geographic range

Fishery operates along the entire coastline; main landings occur in Washington, Oregon and northern California

Common depths

10-400 fm, up to 722 fm

Season

Main season is April through October, can occur year-round



Tubs of longline gear
Credit: Lauren Saez

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
WA/OR/CA												

WCR longline summary sheet

WA/OR/CA groundfish, bottom-fish longline/set line (cont.)

Management

- Managed by the Pacific Fishery Management Council through a fishery management plan
- Applicable federal and state regulations that describe where fishing can take place, including various area and time closures (e.g., Rockfish Conservation Areas)

For more information:

<https://www.fisheries.noaa.gov/national/bycatch/fishing-gear-bottom-longlines>

<https://www.pcouncil.org/fact-sheet-groundfish/>



WA/OR/CA Pacific halibut longline

List of Fisheries: WA/OR/CA Pacific halibut longline

Target species

Pacific halibut

Commonly used line

Material: Sinking leaded line, nylon, or a polyurethane-blend used for the main line

Width: 5/16" to 3/8"

Configuration

- The ground line is set on the bottom with an anchor (25-50 lbs) at each end
- The main line (ground line) can be up to 1^{1/2} nm long
- Up to 800 hooks are used per line
- Circle hooks, size 16/0, are common baited with live squid, mackerel heads or artificial bait resembling sardine or anchovy
- Hooks are attached to the ground line every 3' to 4' using a "gangion" made of nylon or monofilament line; can be tied or attached via snap

WCR longline summary sheet

WA/OR/CA Pacific halibut longline (cont.)

Gear marking

Large polyball with clear identification of the owner and each terminal end marked with a pole, flag, light, and radar reflector

Geographic range

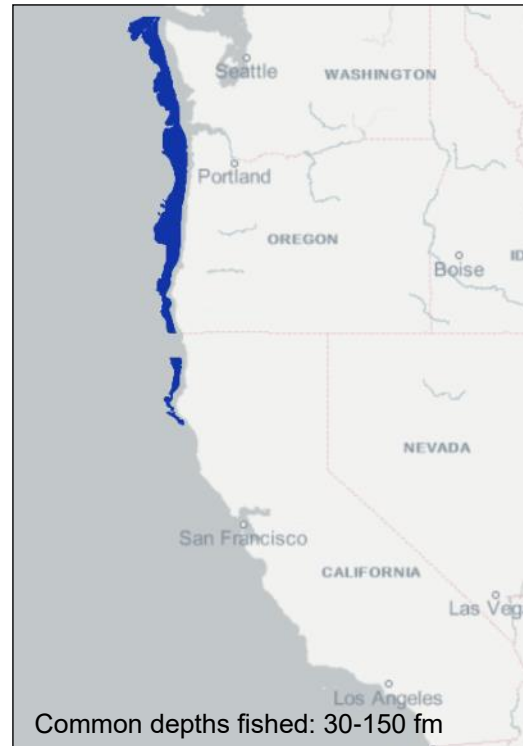
Directed commercial fishery operates primarily along the coastlines of Oregon and Washington; restricted from fishing north of Point Chehalis where Treaty tribes fish

Common depths

30-150 fm

Season

The Area 2A non-tribal directed commercial fishery usually occurs in summer, generally from June - July, although in some years it could be extended until August (50 C.F.R. § 300, Subpart E)



See p.54 for map methodology

Management

- Managed by the International Pacific Halibut Commission (Area 2A: CA, OR,

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
WA/OR/CA												

WA); sets the total allowable catch for Pacific halibut

- Directed commercial fishery is restricted to 10-hour periods; fishing period based on vessel size
- Open access fishery requiring permits obtained from the IPHC whether targeted using longline gear or caught incidentally in fixed gear (longline) sablefish fisheries, with strict size and catch limits

For more information

<https://www.fisheries.noaa.gov/national/bycatch/fishing-gear-bottom-longlines>

<https://iphc.int/management/fisheries>

WCR longline summary sheet

West Coast pelagic longline

List of Fisheries: West Coast pelagic longline

Target species

Bigeye, yellowfin, and skipjack tuna; along with opah and other HMS

Commonly used line

Material: mainline is monofilament

Width: approximately 3.2-3.5 mm thick

Configuration

- 45-60 nm long main line suspended at the target fishing depth by floats via float lines made of monofilament or braided line
- Attached to the main line are 2000-3500 monofilament branch lines (usually 15-30 between each float); each 26-50 ft in length
- Lines culminate in a swivel weight from which a monofilament or wire leader line of 1.5 to 3.2 ft extends to a size 16/0-18/0 baited offset circle hook

Gear marking

Radio buoys (commonly 7 to 9) used to show the location and footprint of the gear on the radar of the fishing vessel

Geographic range

Generally extends south to the 20° North latitude, and west to the 140° West longitude; can be fished north of the equator and east of 150° West

Common depth

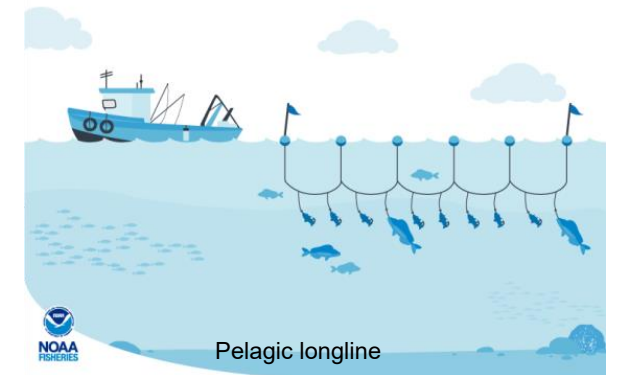
Hooks set to anywhere between 136 and 218 fm during the daytime; regulations state that the mainline is set greater than 55 ft below the surface

Management

- This fishery is domestically managed under the highly migratory species fishery management plan (HMS FMP) by the PFMC
- Permit requirements: Federal HMS permit, a CDFW permit, and registration with the Inter American Tropical Tuna Commission (IATTC)
- Use of a vessel monitoring system (VMS), attendance in protected species workshops, and the possession/use of sea turtle and seabird mitigation gear and safe handling techniques are required. The use of light sticks or any other light emitting devices is prohibited
- Fishery observers are mandatory for at least 20% of the total trips for the calendar year

For more information:

<https://www.fisheries.noaa.gov/national/bycatch/fishing-gear-pelagic-longlines>



Deep-set buoy gear summary sheet

Standard deep-set buoy gear (SBG) and Linked deep-set buoy gear (LBG)

Target species

Swordfish

Commonly used line

3.2 mm monofilament nylon line; for vertical (SBG and LBG) and horizontal (LBG) main lines

Buoys

Minimum of 3 surface buoys (per vertical line for LBG), one must be a 45 lb non-compressible buoy, followed by a minimum 6 lb buoyancy buoy (polyball) and a mandatory strike indicator buoy (bullet); max connecting length is 6' to prevent incidental entanglement

Configuration

SBG:

- Surface buoys attached to the monofilament nylon line that hangs vertically, up to 218 fm
- Maximum of three circle hooks, size 16/0 or 18/0, allowed on vertical line; attached via gangions roughly 3' to 4'
- Lead weight (8 lb) attached above end hook to keep vertical line taut

LBG:

- Horizontal monofilament line suspended between two 50 to 218 fm vertical lines attached to surface buoys
- Maximum of three circle hooks (size 16/0 or 18/0) allowed on horizontal line; attached via gangions roughly 3' to 4'
- Lead weights (8 lb) attached on bottom ends to keep vertical lines taut
- Generally 10 pieces of LBG are strung together with serviceable link at a minimum of 50 ft depth



Surface buoy array; Credit: Pflieger Institute of Environmental Research

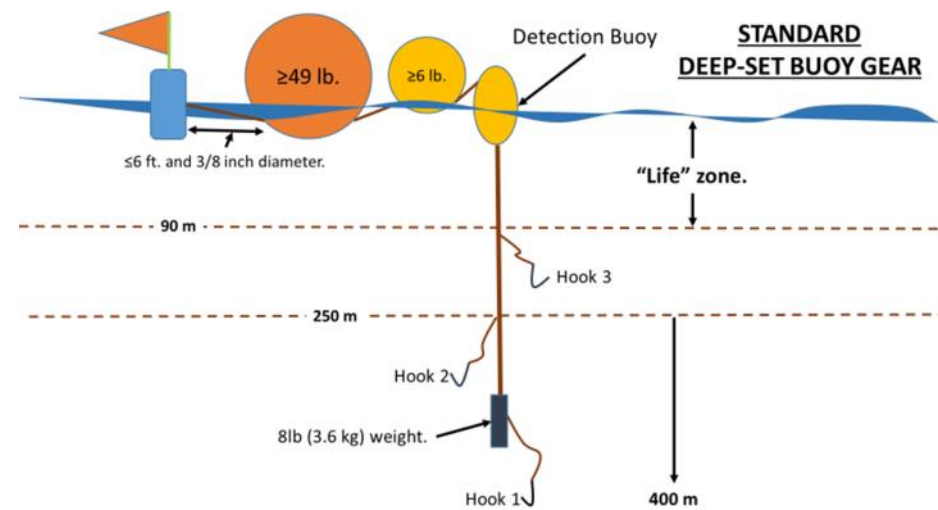


Diagram of deep-set buoy gear configuration. Credit: Jody Van Niekerk

Deep-set buoy gear summary sheet

Deep-set buoy gear (cont.)

Gear marking

Marked with a flag, a radar reflector and a strobe; flag and buoys marked with vessel's official number or USCG vessel number

Gear limit

No more than 10 pieces of gear are allowed in the water at any one time, can combine gear types

Common depths

Depths of 50 to 218 fm; most common depth targeted is 250 m to 400 m

Geographic range

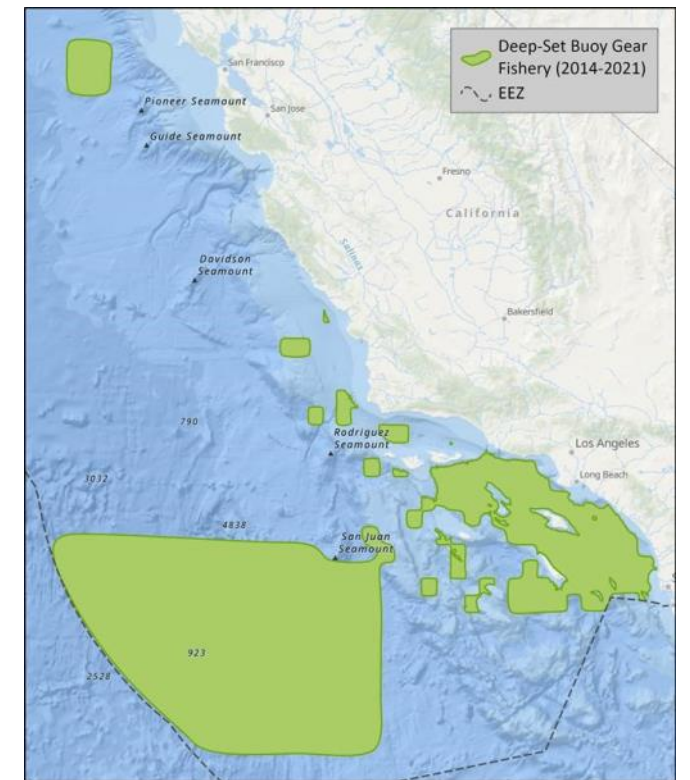
In Federal waters (3 nm to 200 nm); Southern California Bight (SCB) is where most of the effort takes place; with limited entry permit. Little effort occurs north of Point Conception with open access fishing

Fishing season

Year-round; effort generally starts during late spring/early summer and starts dropping off towards late fall, early winter

Management

Deep-set buoy gear recognized as a federal fishery October 2023.



Deep-set buoy gear fishery effort map, produced by NMFS WCR

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
SBG/LBG												

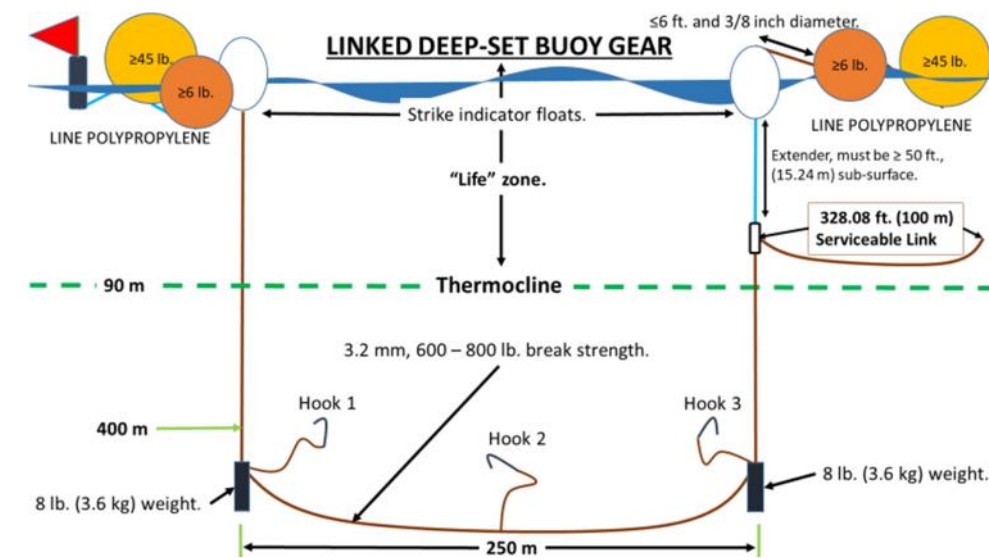


Diagram of linked deep-set buoy gear configuration. Credit: Jody Van Niekerk

Troll/pole/handline/other hook and line summary sheet

CA/OR/WA salmon troll

List of Fisheries: CA/OR/WA salmon troll

Target species

Chinook and coho salmon, Chinook only in California; Pacific halibut may be taken incidentally

Commonly used line

- Stainless steel wire is connected to each outrigger. Two to six of these lines are used and each line is limited to 4 monofilament leaders (spreads), attached at intervals of 2-4 fm. Each leader culminates into a lure, which can consist of a variety of artificial types. Hoochies and tuna jigs are the most commonly used types. A 10 - 50 lb weight (cannon ball) takes each line to the desired depth
- Outrigger poles are 3" - 6" in diameter and can be up to 20' long. The wire leaders are 1/16" in diameter, the length of which depends on how far out behind the vessel the captain intends to troll. The leaders, called tuna leaders, are made up of solid braided nylon cord. Breaking strength (size) used include 150 lb, 200 lb, 300 lb, and 450 lb

Configuration

- Trollers fish for salmon by towing lures or baited hooks through the water
- Fishing lines are rigged to outriggers that prevent the lines from being entangled or caught in the vessel prop
- The barbless lures can be fished from just under the surface, down to 80 fathoms, trolled at speeds of 1-4 knots

Gear marking

None required

Geographic range

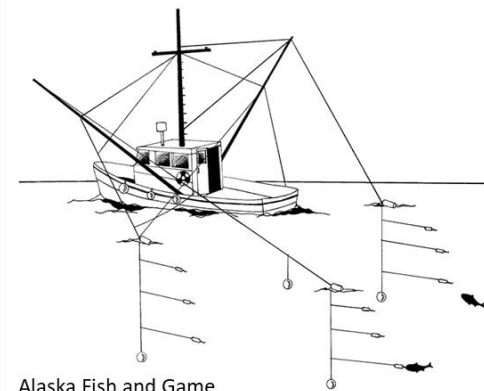
- Effort occurs across all three U.S. West Coast states
- Up to 50 nm offshore, but generally most of the salmon trolling effort occurs within 10 nm from shore including both state and federal waters.
- CA: the majority of effort takes place in the central and northern coast, but can extend all the way into the Southern California Bight

Season

Primarily during the summer and fall, with limited effort occurring during the spring in certain areas during certain years; regulations vary each year

Management

Limited entry fishery managed under the federal Pacific Coast Salmon FMP along with individual state regulations



Alaska Fish and Game

Salmon troll

Troll/pole/handline/other hook and line summary sheet

CA halibut, white seabass, yellowtail hook and line/handline

List of Fisheries: CA halibut, white seabass, yellowtail hook and line/handline

Target species

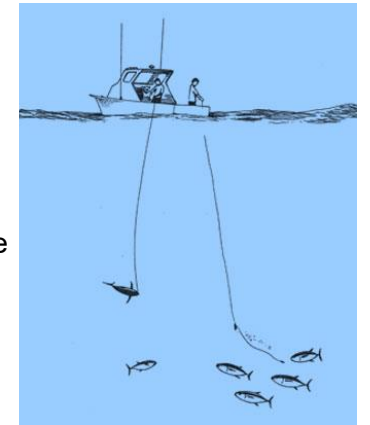
California halibut, white seabass, and yellowtail

Commonly used line

- Monofilament nylon

Configuration

- Rod-and-reel: Includes a rigid rod equipped with a reel and line with one or more lures or baited hooks
- Handline: Includes line and hooks used without a rigid rod
- Longline:
 - Bottom longline with a main line extending horizontally along the seafloor with short lines attached to it at intervals, each culminating into a baited hook; marked at both ends with a buoy at the surface
 - Vertical longline with a line that is weighted on the bottom end that is anchored to the seafloor, attached to a buoy (or buoys) at the sea surface that suspends the line vertically; short lines attached to the main vertical line culminating into baited hooks
- Troll and hand lines are limited to 900' or less; only longlines can exceed this limit



Handline
Diagram: Les Hata

Gear marking

Any gear that is not attached to the vessel must be attached to buoys floating on the surface and marked on the upper half with a commercial fishing license identification number at least 2 inches in height

Geographic range

Throughout the coast of California, although much of the effort for certain species occurs in the Southern California Bight

Common depth

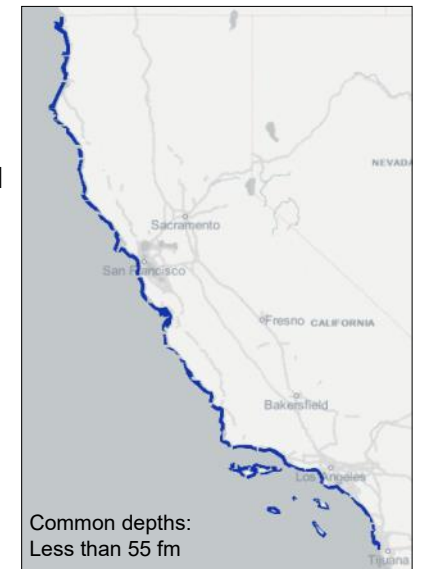
Less than 55 fm of water, and within 3 nm of the shoreline

Management

Open access fishery requiring a California Resident Commercial fishing license FGC 8391

For more information: See the following map for a clear representation of the districts for halibut:

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=169280&inline>



Common depths:
Less than 55 fm

See p.54 for map methodology

Troll/pole/hand line/other hook and line summary sheet

WA/OR/CA albacore surface hook and line/troll

List of Fisheries: WA/OR/CA albacore surface hook and line/troll

Target species

North Pacific albacore tuna

Commonly used line

- Troll: 1.15 mm braided polyester line, 50 lb test
- Pole and line: 0.1 mm to 0.25mm monofilament line

Configuration

- Troll: Includes one or more lines with lures or baited hooks attached that are drawn (“trolled”) through the water column at various depths, depending on species targeted; towing 10-20 lines pulled through surface water at 4-8 knots; tuna jig is used
- Pole and line: Rigid rods or poles with lines and baited hooks; barbed or barbless J hook

Gear marking

None required

Common depths

Fishing depths vary depending on the time of day; generally occurs 30 - 100 nautical miles offshore

Season

Fishing allowed year-round; most effort occurs from late summer to early fall due to the warm currents in the region attracting the fish

Management

Part of the HMS fishery, managed under the HMS Fishery Management Plan with the Pacific Fishery Management Council, Inter-American Tropical Tuna Commission, and Western and Central Pacific Fisheries Commission



Pacific albacore tuna
Credit: NOAA

CA/OR/WA non-albacore HMS hook and line

List of Fisheries: CA/OR/WA non-albacore HMS hook and line

Target species

Tuna (bluefin, yellowfin and skipjack), common thresher shark, shortfin mako shark, dorado, occasionally swordfish

Commonly used line

Braided polyester line



Pacific skipjack tuna
Credit: NOAA

Troll/pole/handline/other hook and line summary sheet

CA/OR/WA non-albacore HMS hook and line (cont.)

Configuration

- One or more lines with lures or baited hooks attached that are trolled through the water column at various depths, depending on species targeted

Gear marking

None required

Geographic range

Mostly in the SCB with very little effort occurring north of Point Conception

Season

Operates year-round; effort generally starts during late spring/early summer and starts dropping off towards late fall/early winter, depending on the availability and movement patterns of HMS species

Management: All HMS species require a federal HMS permit and additional state permits may apply; all U.S. West Coast non-albacore HMS hook and line fisheries are open access

WA/OR/CA groundfish/finfish hook and line

List of Fisheries: WA/OR/CA groundfish/finfish hook and line

Target species

Rockfish* (primarily black, vermilion, brown, and gopher), lingcod, cabezon, greenling and sablefish

Configuration

- Troll: one or more lines with lures or baited hooks attached that are drawn (trolled) through the water column at various depths, depending on species targeted
- Pole-and-line: Rigid rods or poles with lines and baited hooks
- Vertical longline/dropline: line suspended vertically; weighted on the bottom or anchored to the seafloor, attached to a buoy at the surface; short lines with baited hooks are attached to the main line at intervals
- Stick gear: 3 to 6 ft length of rebar or PVC pipe with leader attached at intervals to catch bottom or near-bottom species; see stick gear sheet for more information

Gear marking

- Buoys on the ocean surface marked with the commercial fishing license number
- In CA: Any gear that is not attached to the vessel must be attached to buoys floating on the surface and marked on the upper half with the commercial fishing license identification number followed by the letter “Z” at least 2” in height

Geographic range

The fishery takes place all along the U.S. West Coast

* Rockfish not retained in inland Washington waters

Troll/pole/handline/other hook and line summary sheet

WA/OR/CA groundfish/finfish hook and line (cont.)

Common depths

Range from 11 - 722 fm

Season

Year-round

Management:

- Federal and state regulations must be adhered to including various area and time closures, including rockfish conservation areas (RCAs)
- In CA: troll lines and stick gear cannot be fished in waters less than 1 nm from shore

CA nearshore hook and line/stick gear

List of Fisheries: Subset of WA/OR/CA groundfish/finfish hook and line

Target species

At or near-bottom species; including rockfish, especially for live fish market

Commonly used line:

- Vertical line: typically thinner nylon or poly
- Stick gear: 3" to 6" monofilament branch lines connected to 3' to 6' length of rebar or PVC pipe (1/2" to 3/4" thick)

Configuration

- Rebar or PVC pipe with leaders attached at intervals. Each stick has several short monofilament branch lines ending in baited circle hooks or artificial lures
- The top end of the stick is connected to a line tied to a float
- 150 hooks total; no more than 15 per line

Gear marking

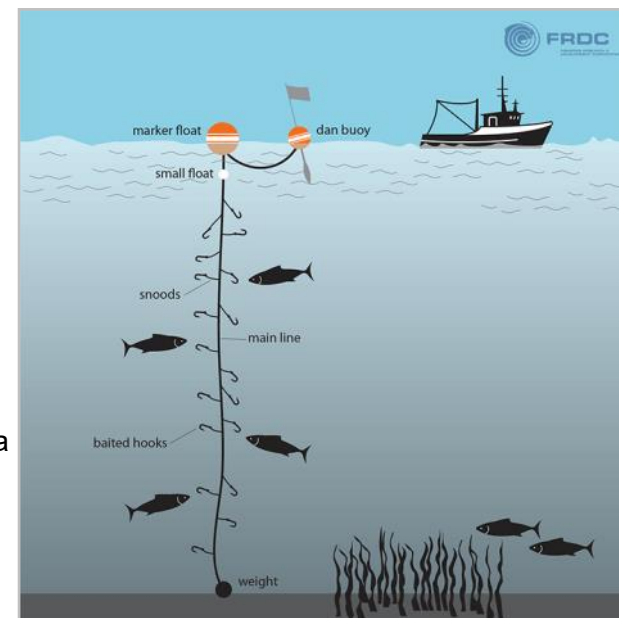
Float clearly marked with commercial fishing license number and "L"

Geographic range

Ocean water including offshore rocks and islands; extending from the shore to a depth of 20 fm

Season

Year-round; total allowable catch and allocation apply which, when reached, will close the fishery for the rest of the year



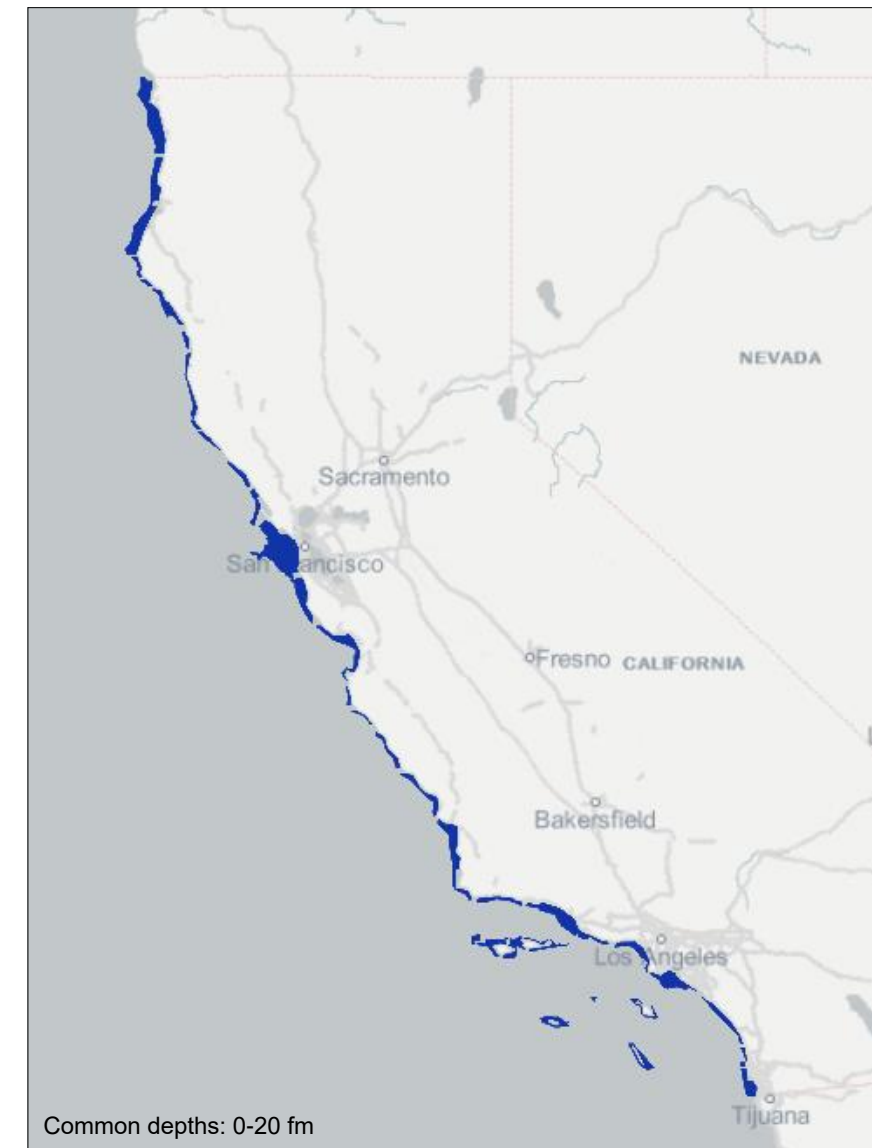
Example show vertical line/drop line, stick gear is similar but more stiff. Diagram: Fisheries research and development corporation

Troll/pole/handline/other hook and line summary sheet

CA nearshore hook and line/stick gear (cont.)

Management

- California's nearshore fishery is managed under the state's Nearshore Fishery Management Plan (NFMP) in state waters and the federal Pacific Coast Groundfish Management Plan in federal waters
- Uses hook-and-line gears and pots and stick gear in state waters
- Most nearshore fishermen operate under the Open Access sector of the federal groundfish fishery, although some have limited entry permits



Common depths: 0-20 fm

See p.54 for map methodology

Alaska Region Fisheries Reference Sheets



The fishing community of Sitka, Alaska. Credit: Marysia Szymkowiak, NOAA Fisheries



Trawl vessels at their home port in Sand Point, Alaska. Credit: NOAA Fisheries

Nearshore crab pot fishery summary sheet

List of Fisheries

- AK Bering Sea, Aleutian Island crab pot
- AK Gulf of Alaska crab pot
- AK Southeast crab pot

Target species

Dungeness crab

Commonly used line

- Material: poly-line or lead line
- Width: usually between 5/16" and 7/16"; depends on pot weight

Pot/trap

- Pots are round and range from 3.3 to 4.9 ft in diameter and about 1.3 to 1.6 ft high
- Ring nets are also used
- Dungeness crab pots have two escape rings that allow undersized crabs to leave the pot
- Mesh: pots may have stretched or rigid webbing
- Destructive device requirements, two options:
 - A sidewall opening of 18" or more located parallel to the base and no more than 6" from the base of the trap secured with single piece of untreated cotton twine that has less than 30 thread count (for a rigid mesh pot, an opening equal to or exceeding 10" by 6" rectangle)
 - The pot lid may be secured with untreated cotton twine that has less than 60 thread count (which will degrade over time and allow the pot to open in the event that the pot is lost or abandoned)

Configuration

- Single pot with a line extending from each pot to the surface with one or more buoys to mark its location. They are typically fished in shallow bays and estuaries

Gear marking

- Each pot must have one buoy legibly marked with the ADF&G vessel license plate number or federal fisheries permit number of the vessel operating the gear
- ADF&G buoy identification tags are required on either the main or trailer buoy and are color coded (for Area A: AAC 32.126)
- Buoy color, shape, size, and marking for Dungeness pots operating under one registration must be the same

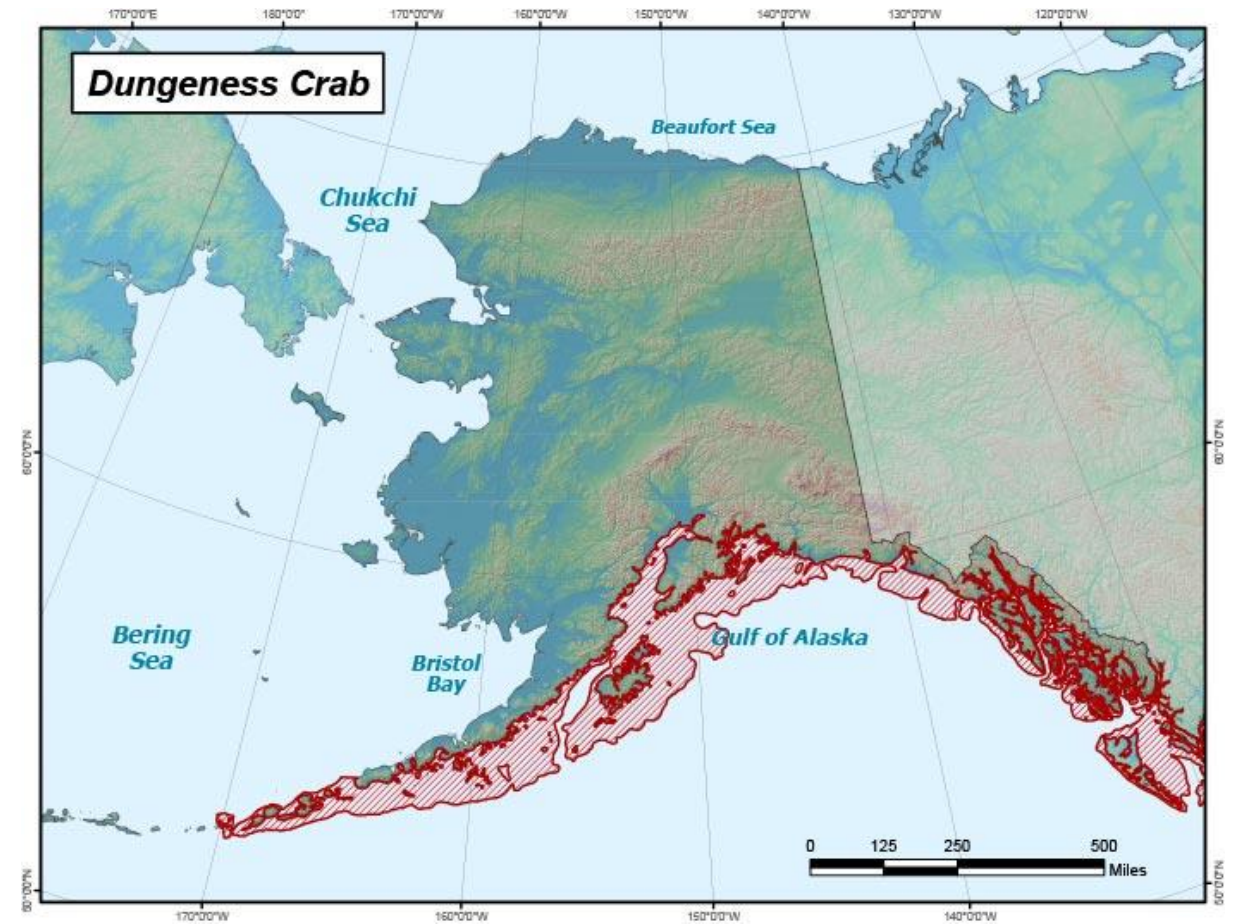
For more information:

Visit [here](#) or contact an ADF&G biologist for their local knowledge on gear being used.



Dungeness crab
Credit: NOAA

Nearshore crab pot fishery summary sheet



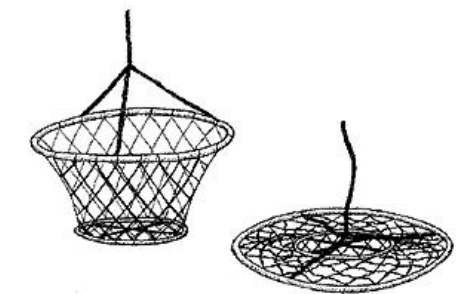
Dungeness crab range map for Alaska. Commercial fishing may occur throughout the range.

Map: ADF&G. <https://www.adfg.alaska.gov/index.cfm?adfg=animals.listinvertebrates>



Dungeness crab pot

Photo: Lauren Saez



Ring nets

Photo: CDFW

Deepwater crab fishery summary sheet

List of Fisheries

AK Bering Sea, Aleutian Island crab pot

AK Gulf of Alaska crab pot

AK Southeast crab pot

Target species

King crab, Tanner crab, snow crab

Commonly used line

- Material: poly-line and lead line
- Width: usually between 5/16" and 1"; depends on pot weight and configuration (single pot vs. longline)

Pot/trap

- Steel-framed rectangular or conical pot
- Ring nets are also used commercially for southeast Tanner crab
- Rectangular king crab pots are modified to retain smaller Tanner and snow crabs by placing plastic slats in the tunnel eye of the king crab pots to prevent large crabs from entering
- Mesh: pots may have stretched or rigid webbing
- Destructive device requirements: for a mesh webbed pot, a sidewall opening of 18" or more located parallel to the base and no more than 6" from the base of the trap secured with a single piece of untreated cotton twine that has less than 30 thread count; for a rigid mesh pot the opening must be equal to or exceed a 12" by 8" rectangle



King crab

Credit: NOAA



Rectangular crab pot

Photo: ADF&G



Conical crab pot

Photo: Kals Stolpe, Alaska Journal of Commerce

Configuration

- Single rectangular or conical trap with line extending from each pot to the surface with one or more buoys that mark its location; several configurations for commercial pots, in some areas pots are permitted to be longlined (multiple traps per line)

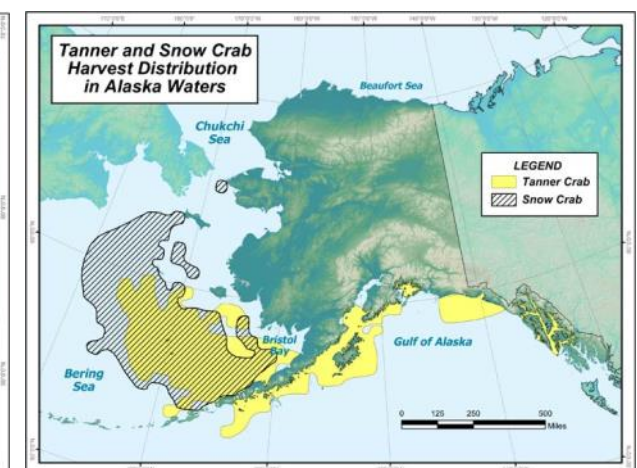
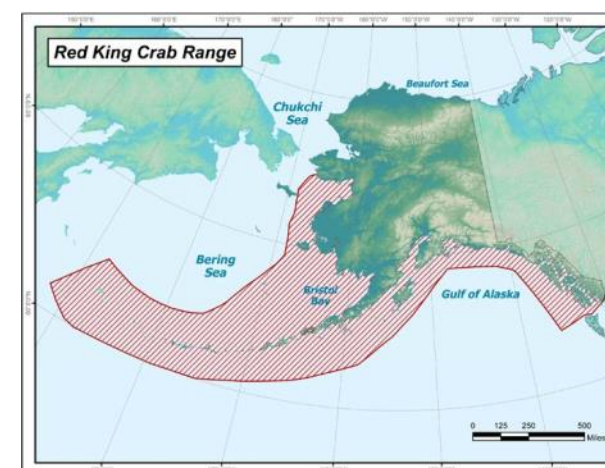
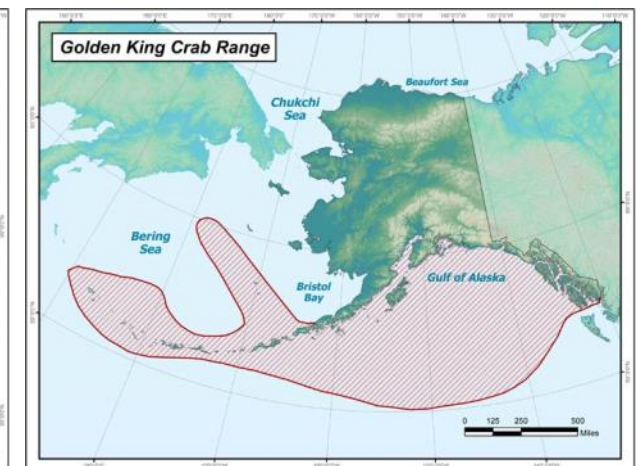
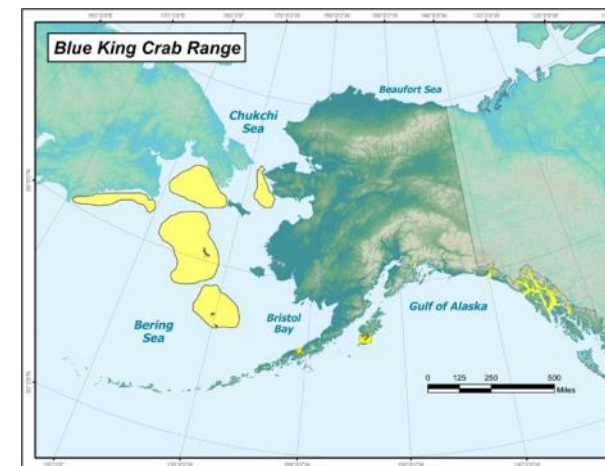
Deepwater crab fishery summary sheet

Gear marking

- Each pot must have one buoy legibly marked with the ADF&G vessel license plate number of the vessel operating the gear
- ADF&G buoy identification tags are required for some crab fisheries, tag will be attached on either the main or trailer buoy and are color coded
- If pots are longlined they require a cluster of 4 buoys with one marked "SL" for shellfish longline

For more information

Visit [here](#) or contact an ADF&G biologist for their local knowledge on gears being used



Range maps of blue king, golden king, red king, Tanner and snow king crabs for Alaska. Commercial fishing may occur throughout the range.

Maps: ADF&G. https://www.adfg.alaska.gov/index.cfm?adfg=animals_listinvertebrates

Pacific octopus pot

List of Fisheries

AK octopus/squid pot

Target species

Pacific octopus

Commonly used line: not standardized

Pot/trap

- Pots are lair-type and simple open ended pots designed specifically for octopus, but ring nets and other commercial pots can also be used
- Pots can be made of wood, earthenware, or plastic
- Mesh size: mesh is not a requirement for octopus pots
- Destructive device requirements: all pots must include an escape mechanism in accordance with shellfish harvest regulations depending on which pot type is being used

Configuration

- Pots set specifically for octopus are usually open-ended, unbaited, and designed to mimic an octopus den
- Multiple pots can be set with a ground line attached to a buoy

Gear marking

- Each pot must have one buoy legibly marked with the ADF&G vessel license plate number of the vessel operating the gear

For more information:

Visit [here](#) or contact an ADF&G biologist for their local knowledge on gears being used



Octopus lair pots

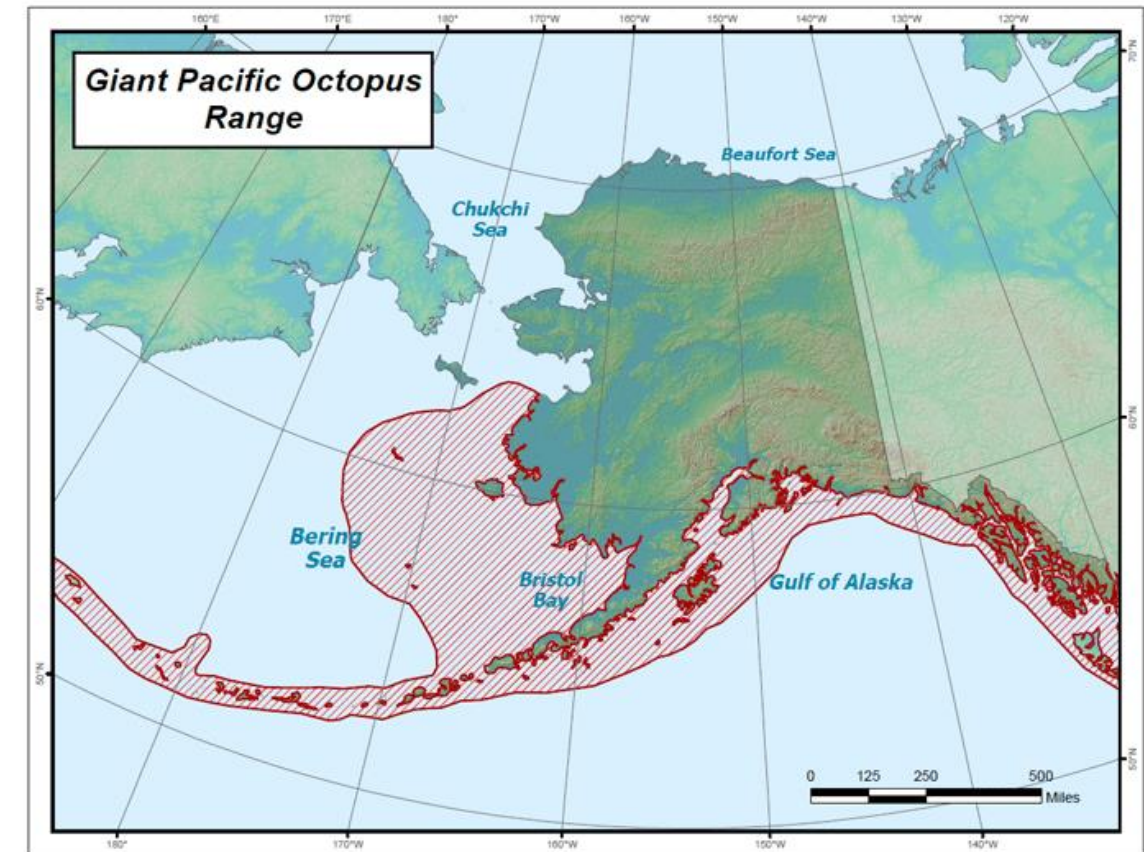
Photo: ADF&G



Plastic pot

Photo: ADF&G

Pacific octopus pot



Giant Pacific octopus range map for Alaska. Commercial fishing may occur throughout the range.

Map: ADF&G. <https://www.adfg.alaska.gov/index.cfm?adfg=animals.listinvertebrates>



Pacific octopus

Photo: ADF&G

Sablefish pot

List of Fisheries

AK Bering Sea, Aleutian Islands sablefish pot

AK Gulf of Alaska sablefish pot

Target species

Sablefish, otherwise known as black cod

Line

- Material: polypropylene, nylon, or a combination
- Width: line width depends on pot weight and configuration (single pot vs. longline) but is usually between 5/16" and 1"

Pot/trap

- Pot: rectangular, conical, or pyramid pots
- Round, tunnel shaped, collapsible pots also known as "slinky" pots are permitted
- Tunnel opening: each pot used to fish for groundfish must be equipped with a rigid tunnel opening that is no wider than 9" and no higher than 9"; or a soft tunnel opening with dimensions no wider than 9"
- Mesh size varies
- Escape rings: size and presence are optional on sablefish pots
- Destructive device requirements: a sidewall with an opening equal to or exceeding 18" in length that must be secured together by a single length of untreated 100 percent cotton twine no larger than 30 thread count; opening must be within 6 inches of the bottom of the pot and run parallel to it

Configuration

- Each pot is fitted with a bait container and attached to a line with a buoy marking its location
- In some areas, pots may be on a longline, which means gear is stationary, buoyed, and has an anchored line with two or more pots attached



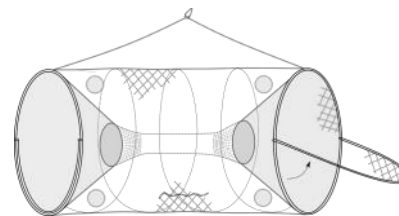
Conical pots

Credit: ADF&G



Pyramid pots

Credit: ADF&G



Slinky pots

Diagram: Jane Sullivan, ADF&G

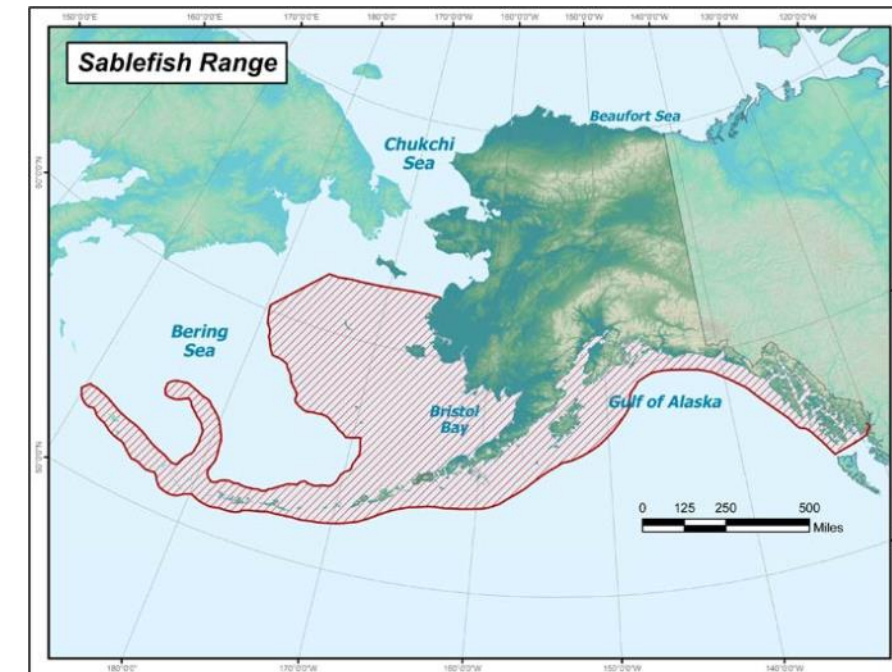
Sablefish pot

Gear marking

- At least one marker buoy on each groundfish pot set has to be marked with the vessel's federal fisheries permit number or ADF&G vessel registration number
- In state waters, groundfish pots may be required to have one identification tag issued by ADF&G placed on the main or trailer buoy issued for the year the fishery is occurring
- NMFS does not require pot gear tags in federal waters
- If groundfish pots are longlined, then only each end of the longline requires a buoy and one buoy must be labeled "GFL" to designate the gear as groundfish longline pot gear

For more information:

Visit [here](#) or contact an ADF&G biologist for their local knowledge on gear being used



Sablefish range map for Alaska. Commercial fishing may occur throughout the range.

Map: ADF&G. <https://www.adfg.alaska.gov/index.cfm?adfg=animals.listfish>



Sablefish

Credit: NOAA

Pacific cod pot

List of Fisheries

AK Bering Sea, Aleutian Islands Pacific cod pot
AK Gulf of Alaska Pacific cod pot

Target species

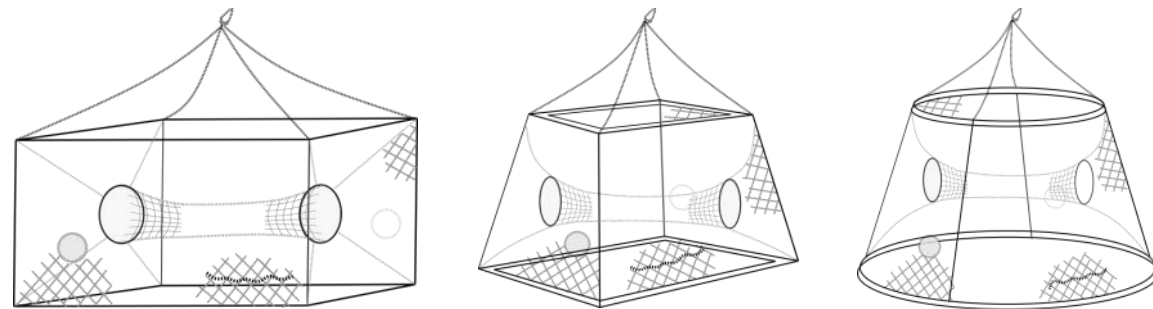
Pacific cod

Commonly used line

- Width: usually between 5/16" and 1"; depends on pot weight and configuration (single pot vs. longline)

Pot/trap

- Rectangular, pyramid, or conical shaped pots; king and Tanner crab pots may not be used to take groundfish
- Tunnel opening: each pot used to fish for groundfish must be equipped with a rigid tunnel opening that is no wider than 9" and no higher than 9"; or a soft tunnel opening with dimensions no wider than 9"
- Mesh size: net webbing mesh size varies
- Destructive device requirements: a sidewall with an opening equal to or exceeding 18" in length that must be secured together by a single length of untreated 100 percent cotton twine no larger than 30 thread count. The opening must be within 6" of the bottom of the pot and run parallel to it



Rectangular, pyramid, and conical shaped pots can be used for Pacific cod. Diagrams: Jane Sullivan, ADF&G



Pacific cod

Credit: NOAA

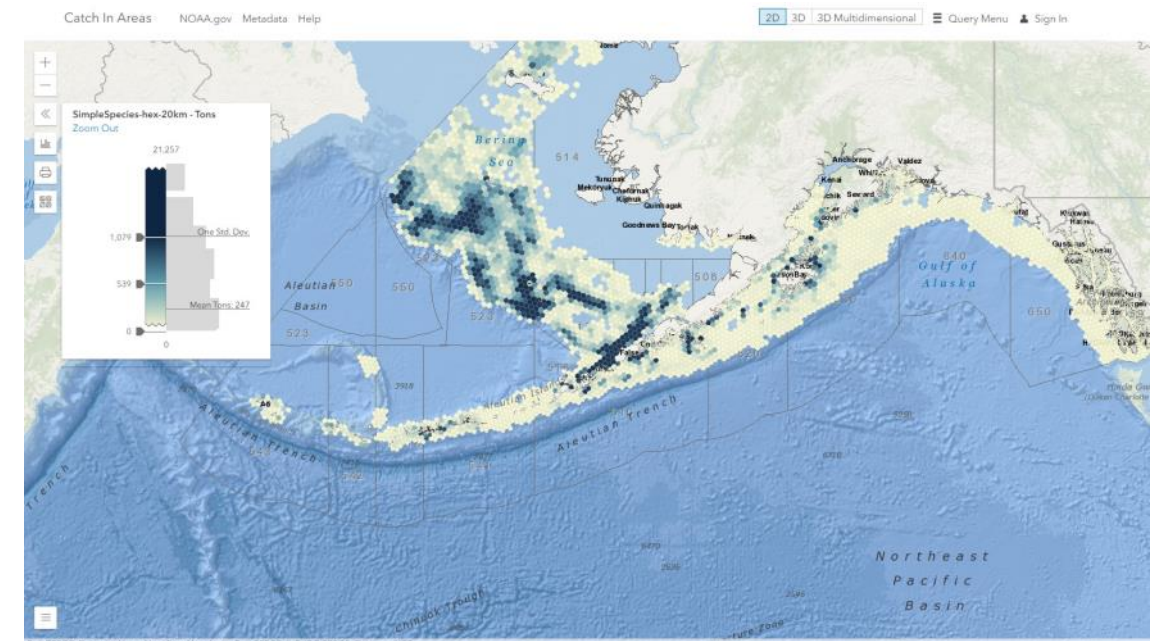
Pacific cod pot

Gear marking

- At least one marker buoy on each groundfish pot has to be marked with the vessel's federal fisheries permit number or ADF&G vessel registration number
- If groundfish pots are longlined, then each end of the longline requires a buoy and one buoy must be labeled "GFL" to designate the gear as groundfish longline pot gear
- Each groundfish pot must have one identification tag issued by ADF&G placed on the main or trailer buoy issued for the year the fishery is occurring

For more information:

Visit [here](#) or contact an ADF&G biologist for their local knowledge on gears being used



Map showing Pacific cod (non-trawl) data from the Catch Accounting System between 2015 and 2020. Produced using the Catch In tool at <https://alaskafisheries.noaa.gov/mapping/CIA/>

Shrimp pot fishery summary sheet

List of Fisheries

AK Southeast shrimp pot
AK shrimp pot, except Southeast

Target species

Northern spot shrimp and coonstripe shrimp

Commonly used line

- Material: poly-line and lead line
- Width: usually between 5/16" and 1"; depends on pot weight and configuration

Pot/trap

- Pot used to catch shrimp must have a bottom perimeter of less than 12.75 ft and may not exceed a volume of 25 cubic feet
- Mesh size: net webbing or rigid mesh must cover half of the vertical sides of the pot; mesh size can vary but a 7/8" diameter by 12" long wooden dowel when inserted into the mesh must drop completely through by its own weight
- Destructive device requirements:
 - Net mesh pot opening must be 6" in length whereas the opening for a rigid mesh pot must be equal to or exceed a 4" square; lower edge of the opening must be parallel to and within 6" of the bottom of the pot
 - Rigid mesh pot opening may be covered with a single panel secured to the pot with untreated cotton twine with less than a 30 thread count

Configuration

- Single pot with line extending from the pot to the surface of the water with a buoy marking its location
- Shrimp pots may be on a longline, which means gear is stationary, buoyed, and has an anchored line with two or more pots attached

Gear marking

- Each pot must have one buoy legibly marked with the ADF&G vessel license plate number of the vessel operating the gear
- If pots are on a longline, a buoy is not required for each pot but a buoy must mark the set

For more information:

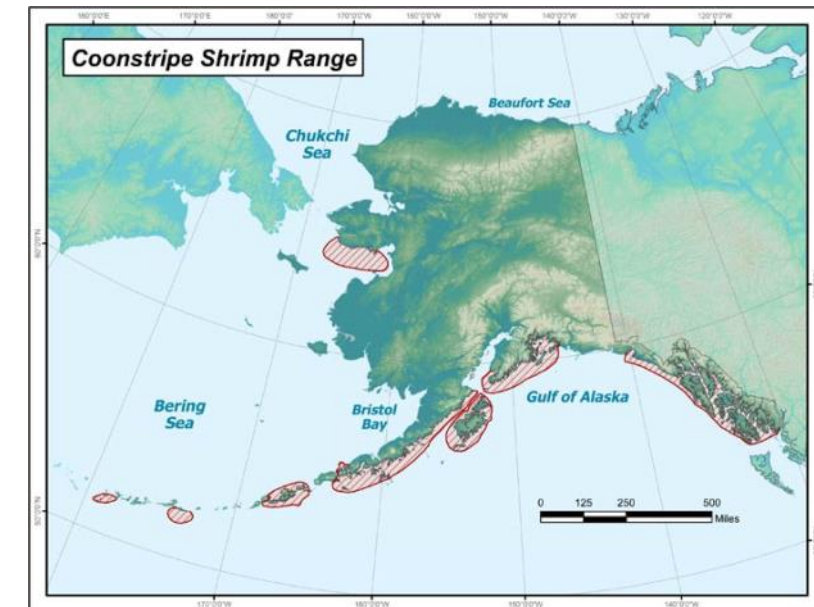
Visit [here](#) or contact an ADF&G biologist for their local knowledge on gears being used



Spot prawn

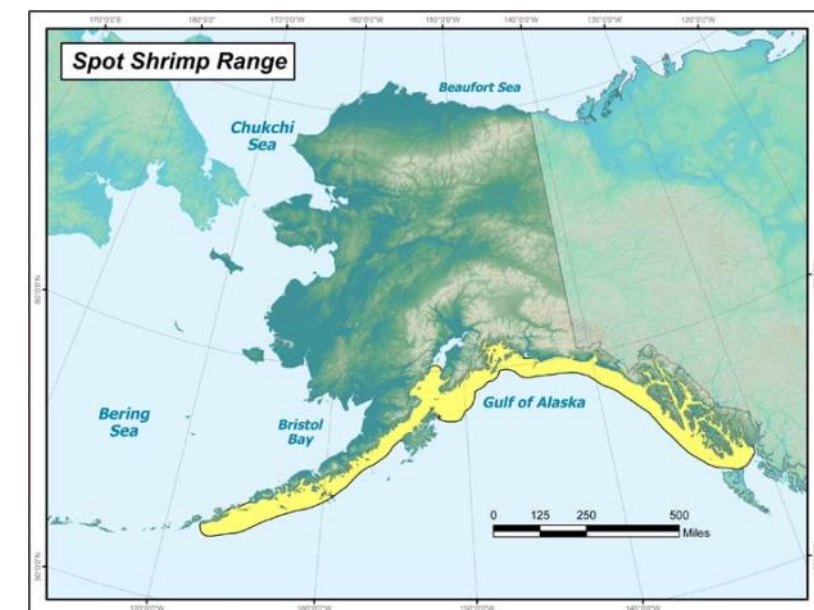
Credit: NOAA

Shrimp pot fishery summary sheet



Coonstripe and spot shrimp range maps for Alaska. Commercial fishing may occur throughout the range.

<https://www.adfg.alaska.gov/index.cfm?adfg=animals.listinvertebrates>



Gillnet fisheries summary sheet

List of Fisheries

- AK Southeast salmon drift gillnet
- AK Cook Inlet salmon drift gillnet
- AK Peninsula/Aleutian Islands salmon drift gillnet
- AK Prince William Sound salmon drift gillnet
- AK Bristol Bay salmon drift gillnet
- AK Bristol Bay salmon set gillnet
- AK Kodiak salmon set gillnet
- AK Cook Inlet salmon set gillnet
- AK Peninsula/Aleutian Islands salmon set gillnet
- AK Yakutat salmon set gillnet
- AK Prince William Sound salmon set gillnet
- AK roe herring and food/bait herring gillnet



Chinook salmon



Herring

Credit: NOAA

Target species

Salmon, herring

Net

- Mesh size:
 - Salmon 5 - 8"
 - Herring 2 1/8" - 2 1/2" unless otherwise specified (*Note: rules and regulations change often, look back at the actual opener requirements of previous months*)
- Net material: Monofilament mesh net connected to a float line (typically polyethylene ground line fitted with white floats) and a lead line (typically polyethylene ground line or leaded line with lead weights attached to help it sink and spread the net out)

Configuration

A gillnet is a wall of netting that hangs in the water column, typically made of monofilament or multifilament nylon. Mesh sizes are designed to allow fish to get only their head through the netting, but not their body. The net has a float line on the top and a weighted lead line on the bottom. The mesh openings are designed to be just large enough to allow the male fish, which are usually larger, to get their heads stuck, or gilled in the mesh. Much larger fish and the smaller females are not so readily gilled. Gillnet vessels are usually 30 to 40 feet long. They are easily recognized by the drum on either the front (bow picker) or the stern (stern picker) on which the net is rolled. Net retrieval is by hydraulic power that turns the drum. Fish are removed from the net by hand, picking them from the mesh as the net is reeled onboard

Gillnet fisheries summary sheet

There are two main types of gillnets:

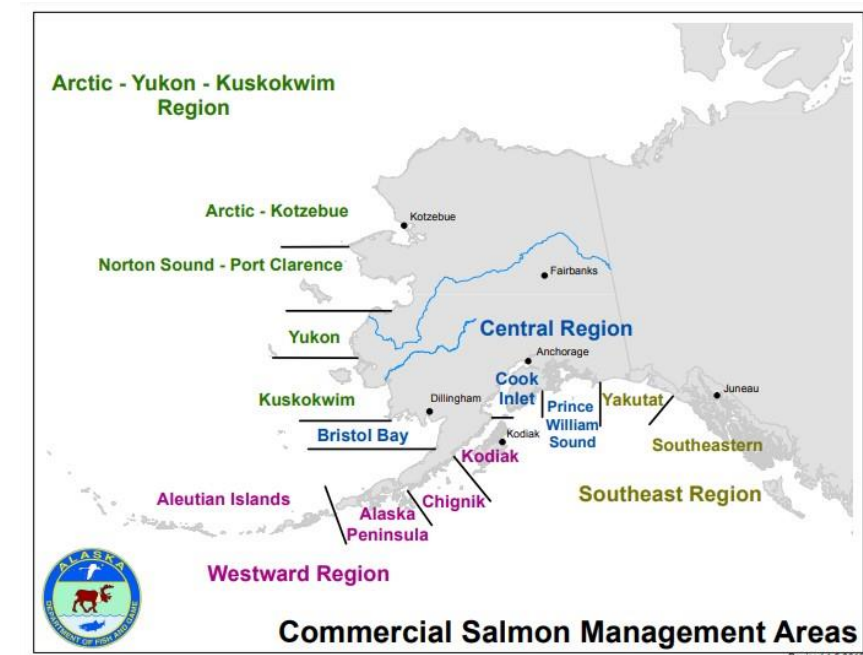
- Set gillnets** are gillnets fixed to one location rather than to a mobile vessel. These are used in commercial, subsistence, and personal use fisheries; can be used in oceanic waters or in rivers
- Drift gillnets** are not fixed in location; deployed by a boat and kept afloat at the proper depth using a system of weights and buoys attached to the headrope, footrope, or floatline

Gear marking

- End buoy (red polyball/keg buoy or cluster of floats) has ADF&G number in 4" high lettering
- At least one float/cork every 10 fathoms needs to have ADF&G number clearly marked on it

For more information

- See Commercial Fishing Regulations, Alaska Department of Fish and Game for details on openings/gear specs/etc. for current fisheries
- Contact ADF&G area biologists for their local knowledge on the recent openers and gears being used



Commercial salmon management areas map, courtesy of ADF&G.

Pelagic trawl fishery summary sheet

List of Fisheries

- AK Bering Sea, Aleutian Islands pollock trawl
- AK Bering Sea, Aleutian Islands Pacific cod trawl
- AK Gulf of Alaska Pacific cod trawl
- AK Gulf of Alaska pollock trawl
- AK Kodiak food/bait herring otter trawl

Target species

Alaska pollock, Pacific cod, Pacific herring

Net

Gear materials are not specified by NMFS regulation

Configuration

- Pelagic trawling involves towing a large net through the water column
- Designed to capture and trap the target species inside the codend as the net is hauled through the water

Gear marking

- No gear marking requirements
- Nearly all trawl fisheries have complete observer coverage and it is assumed that most marine mammal serious injury and mortality that is directly caused by these fisheries is documented

For more information

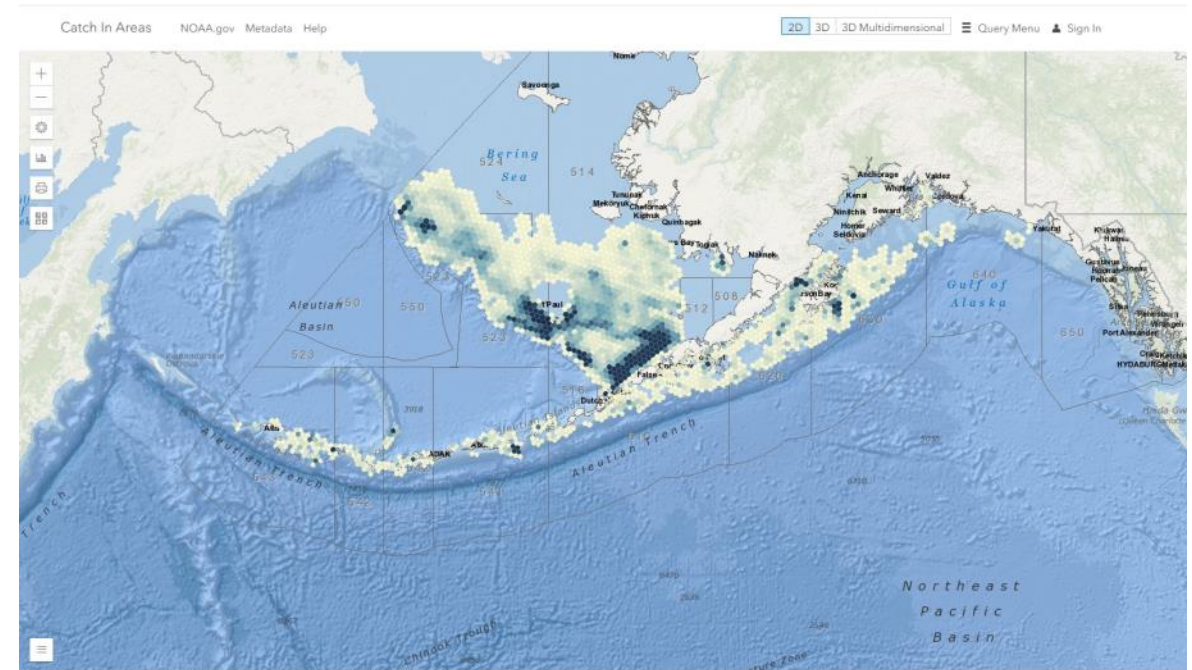
Visit [here](#) for details or contact NMFS biologists for their local knowledge on the recent openers and gears being used



Pelagic trawl

Credit: NOAA Fisheries

Pelagic trawl fishery summary sheet



Map showing multiple Alaska trawl fisheries data from the Catch Accounting System for 2015 to 2020. Produced using the Catch In tool at <https://alaskafisheries.noaa.gov/mapping/CIA/>



Pacific cod



Pacific herring



Alaska pollock

Credit: NOAA

Benthic trawl fishery summary sheet

List of Fisheries:

- AK Bering Sea, Aleutian Islands flatfish trawl
- AK Bering Sea, Aleutian Islands rockfish trawl
- AK Bering Sea, Aleutian Islands atka mackerel trawl
- AK Bering Sea, Aleutian Islands Pacific cod trawl
- AK Gulf of Alaska flatfish trawl
- AK Gulf of Alaska rockfish trawl
- AK Gulf of Alaska Pacific cod trawl
- AK State-managed waters of Prince William Sound, groundfish trawl
- AK shrimp otter trawl and beam trawl

Target species

Yellowfin sole, rockfish, atka mackerel, Aleutian Islands Pacific ocean perch, flathead sole, rock sole, sablefish and shrimp (northern pink shrimp, sidestripe shrimp)

Net

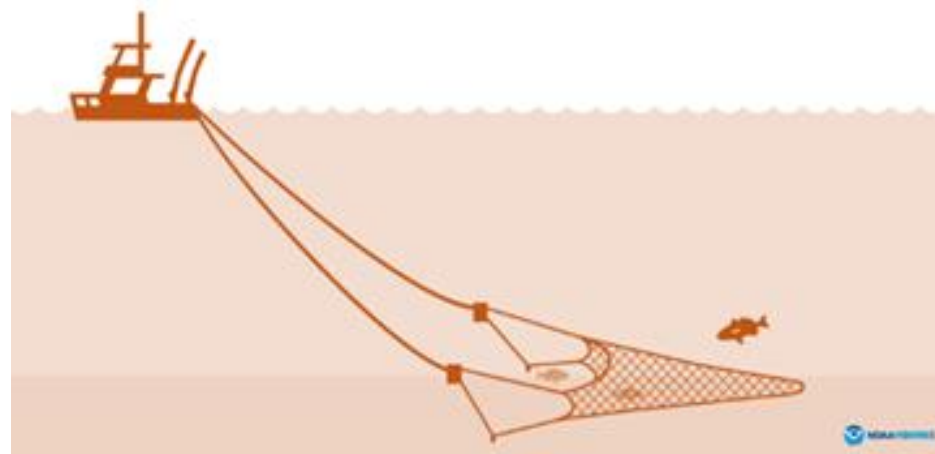
Gear materials are not specified by NMFS regulation

Gear marking

- No gear marking requirements
- Nearly all trawl fisheries have complete observer coverage and it is assumed that most marine mammal serious injury and mortality that is directly caused by these fisheries is documented

For more information

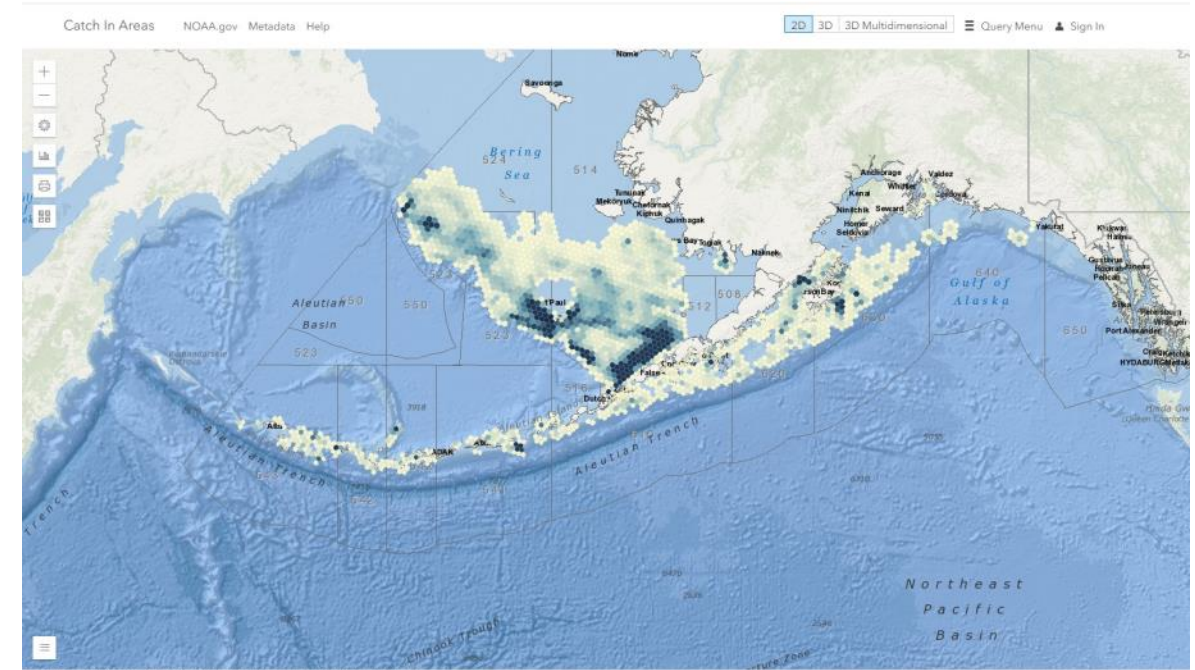
- See Commercial Fishing Regulations, Alaska Department of Fish and Game for details on openings/gear specs/etc. for current fisheries
- Groundfish trawl fishery management program: [here](#)
- Contact ADF&G area biologists for their local knowledge on the recent openers and gears being used



Benthic trawl

Credit: NOAA Fisheries

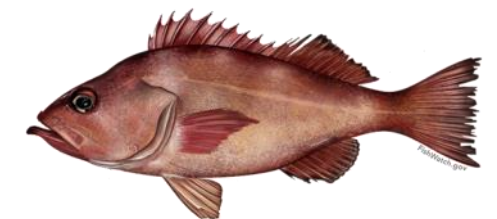
Benthic trawl fishery summary sheet



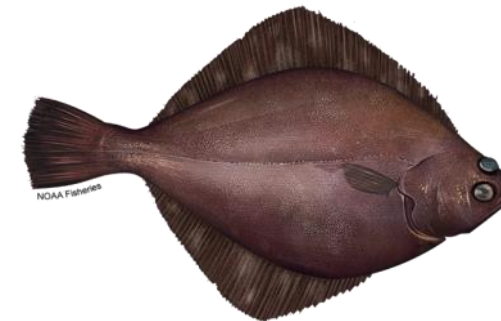
Map showing multiple Alaska trawl fisheries data from the Catch Accounting System for 2015 to 2020. Produced using the Catch In tool at <https://alaskafisheries.noaa.gov/mapping/CIA/>



Pacific cod



Pacific ocean perch



Flathead sole



Yellow sole

Credit: NOAA

Seine fishery summary sheet

List of Fisheries:

- AK southeast salmon purse seine
- AK Cook Inlet salmon purse seine
- AK Kodiak salmon purse seine
- AK roe herring and food/bait herring beach seine
- AK roe herring and food/bait herring purse seine
- AK salmon beach seine
- AK salmon purse seine (Prince William Sound, Chignik, Alaska Peninsula)

Target species

Salmon, herring

Net

- Mesh size:
 - Salmon 5 - 8"
 - Herring 2 1/8" - 2 1/2" unless otherwise specified (*Note: rules and regulations change often, look back at the actual opener requirements of previous months*)
- Net material: Multiple twisted or braided nylon, or more modern technology (e.g., Spectra line)

Configuration

- Purse seine is deployed by boat/skiff; can be up to 2,000 (herring) full meshes in deep with purse line at bottom that can tighten
- Up to 250 fathoms long, depending on the area
- Beach seine is deployed from shore - generally smaller than purse seine; ~ 50 fm long

Geographic range

- Areas for herring: Kodiak, Norton Sound, Kotzebue, Southeast Alaska
- Areas for salmon: Southeast Alaska

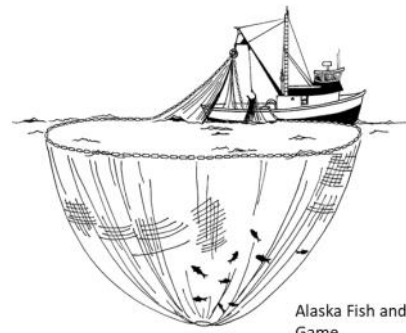
For more information

- See Commercial Fishing Regulations, Alaska Department of Fish and Game for details on openings/gear specs/ etc. for current fisheries
- Contact ADF&G area biologists for their local knowledge on the recent openers and gears being used



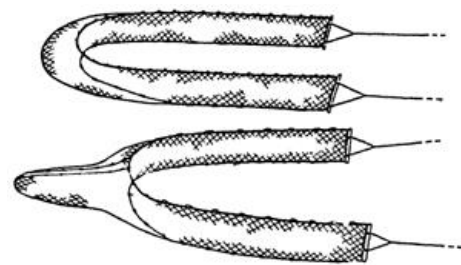
Coho salmon

Credit: NOAA



Purse seine

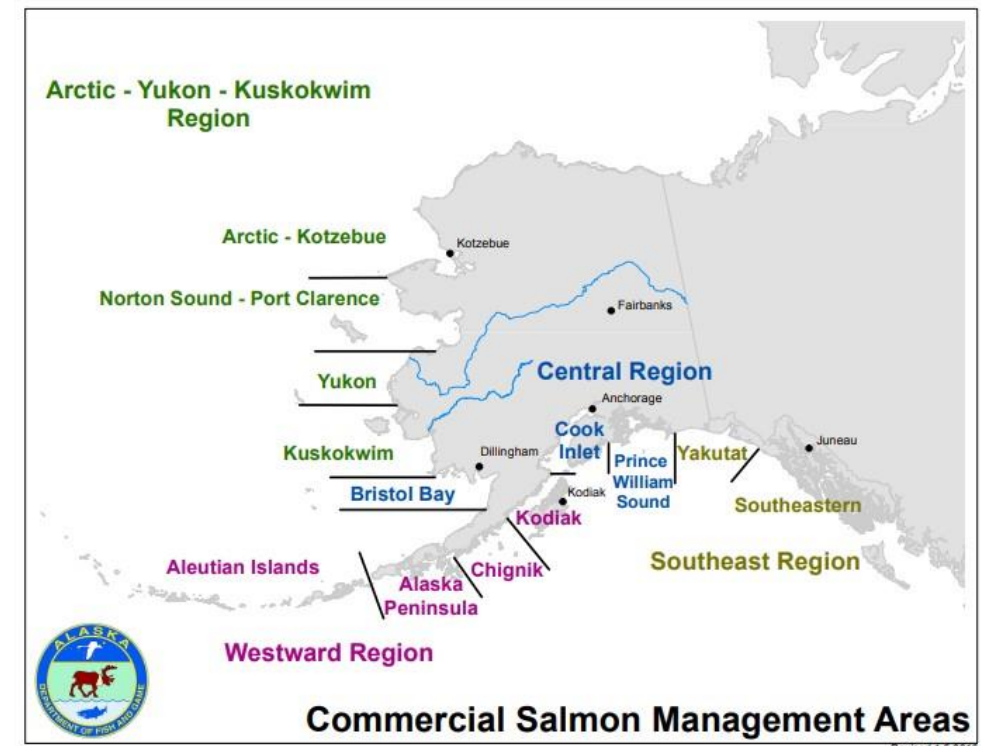
Alaska Fish and Game



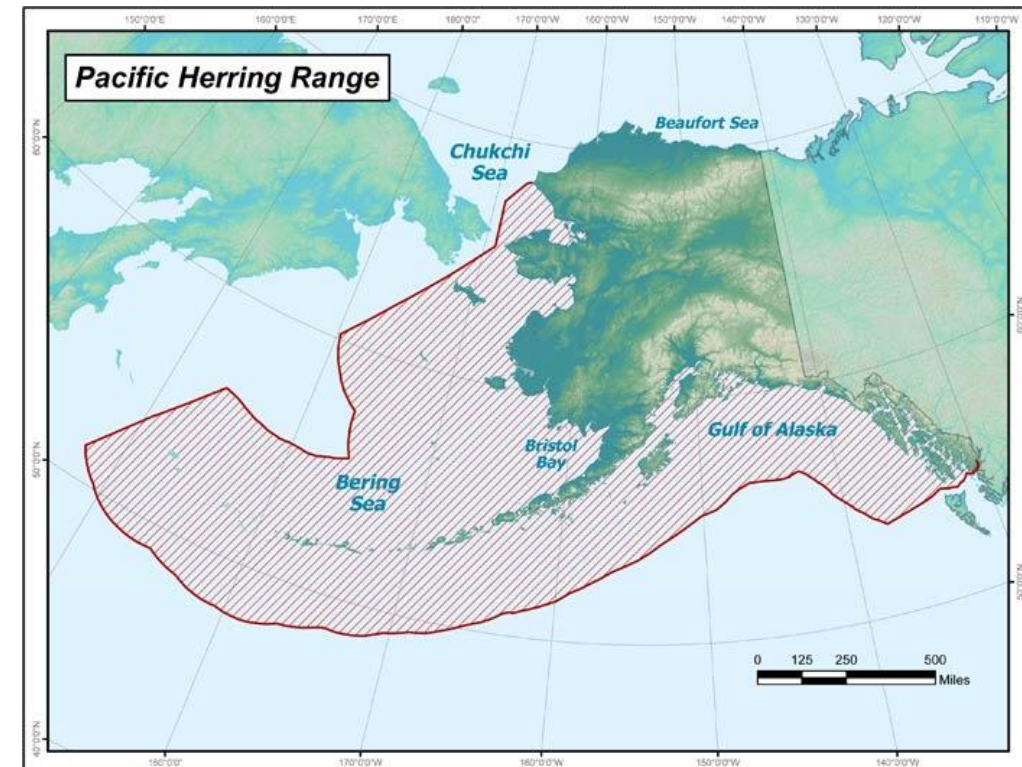
Beach seine

Credit: FAO

Seine fishery summary sheet



Alaska commercial salmon management areas. Courtesy of ADF&G.



Pacific herring range map for Alaska. Commercial fishing may occur throughout the range. Map: ADF&G. <https://www.adfg.alaska.gov/index.cfm?adfg=animals.listfish>

Groundfish longline fishery summary sheet

List of Fisheries

- AK State-managed waters longline/setline (including sablefish, rockfish, lingcod, and miscellaneous finfish)
- AK Gulf of Alaska sablefish longline
- AK Bering Sea, Aleutian Islands sablefish longline
- AK Gulf of Alaska Pacific cod longline
- AK Bering Sea, Aleutian Islands Pacific cod longline
- AK Bering Sea, Aleutian Islands Greenland turbot longline
- AK Bering Sea, Aleutian Islands halibut longline
- AK Gulf of Alaska halibut longline



Sablefish

Credit: NOAA

Target species

Sablefish, Pacific cod, Pacific halibut, sole, turbot, plaice, flounder, rockfish

Commonly used line

The material, width, and color of the line will be variable depending on if the line is groundline or buoy line, the capacity of the vessel, and whether the vessel uses an autobaiter

Configuration

- Longlines consist of a mainline, gangions, and baited hooks
- Most of the Alaska fleet uses circle hooks. Hook type varies with different catch species; J-hooks also used
- Sablefish are targeted with smaller hooks (12/0, 13/0, 14/0) and narrower hook spacing (1-4 m); whereas halibut hooks are larger (14/0, 15/0, 16/0) and spacing is much wider (4-6+ m)
- Many fishermen target both sablefish and halibut; therefore there may be more 14/0 fished 3 to 4 m apart



Gangion with snap



Circle hooks

Groundfish longline fishery summary sheet

Configuration (continued)

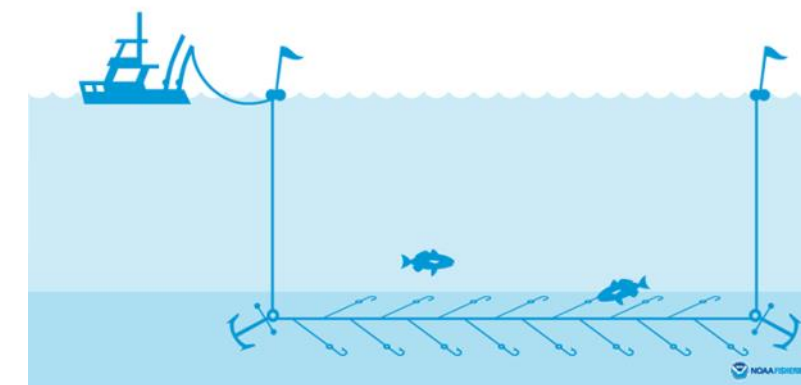
- The fishing gear used by longliners is normally composed of 100 fathom (600 foot or 183 meter) lengths of sinking hard laid line that contains a lead core or wire called groundline. The groundline has an anchor and a float attached at its ends. Up to 100 baited hooks are attached to the groundline at regular intervals with short leaders or gangions
- Often weights (e.g. 10 kg cannonball weights) are attached to the groundline between skates (groups of hooks), especially when fishing in high relief habitat
- Some fishermen use "fixed gear" where the gangions are permanently attached to the longline. Others use "snap on gear" where the hook/bait/gangion is attached and unattached to the longline during deployment and retrieval using a stainless steel snap (see photos)

Gear marking

- The lines are anchored at each end of each set. Lines at the ends run to the surface and are marked with a buoy and flag
- All commercial longline gear buoys, or kegs and buoys for groundfish pots, must be marked with the permanent ADF&G vessel license plate number of the vessel operating the gear

For more information

- See [here](#) for details on openings/gear specs, etc. for current fisheries
- Contact ADF&G area biologists for their local knowledge on the recent openers and gears being used



Groundfish longline

Credit: NOAA Fisheries

Groundfish hand troll/dinglebar summary sheet

List of Fisheries

AK Bering Sea, Aleutian Islands groundfish hand troll and dinglebar troll

AK Gulf of Alaska groundfish hand troll and dinglebar troll

Target species

Lingcod, halibut, sablefish, rockfish

Configuration

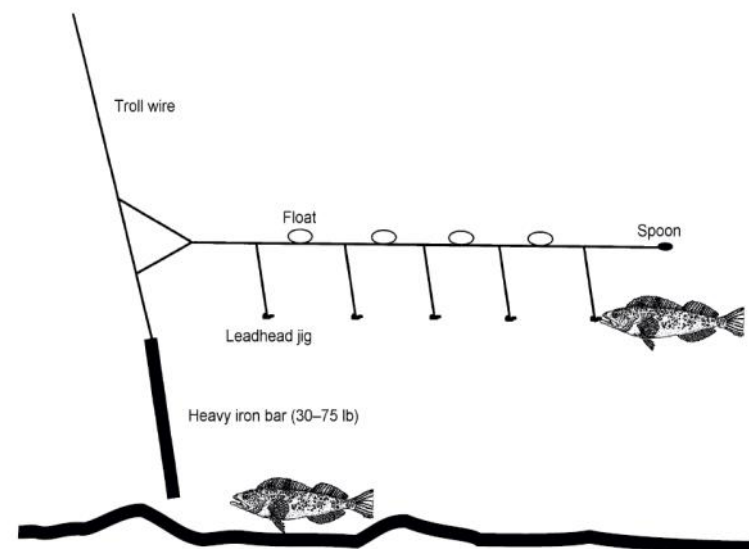
- Dinglebar troll gear is configured as a single horizontal spread of lead-headed jigs extended from an attachment about 1 m above a 1 - 3 m (3.3 to 9.8 ft) steel bar
- Troll wire is run directly into the water off a block
- Dinglebar troll gear is retrieved and set with a troll gurdy or hand troll gurdy, with a terminally attached weight from which one or more leaders with one or more lures or baited hooks are pulled through the water while a vessel is making way

Gear marking

No requirements

For more information

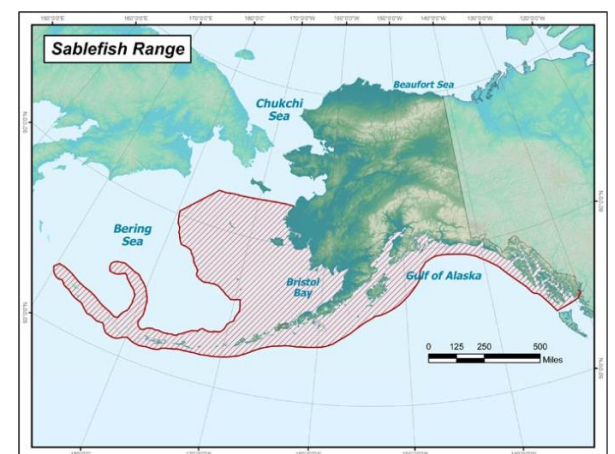
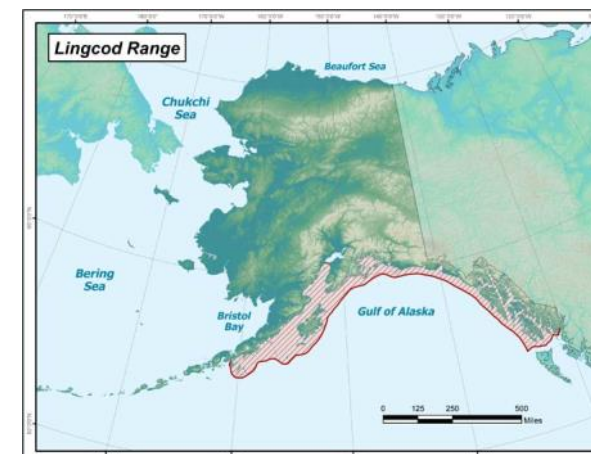
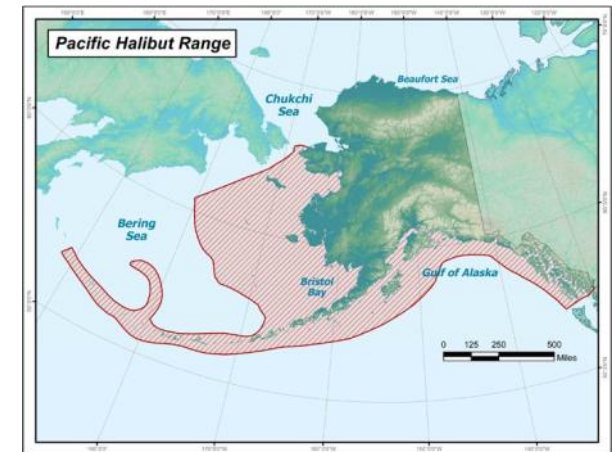
- See [here](#) for details on openings/gear specs, etc. for current fisheries
- Contact ADF&G area biologists for their local knowledge on the recent openers and gears being used



Dinglebar fishing configuration

Figure reproduced from Alaska Fishery Research Bulletin 1(2): 140-152. 1994. Copyright 1994 by the Alaska Department of Fish and Game.

Groundfish hand troll/dinglebar summary sheet



Commercial groundfish management activities map; Pacific halibut, lingcod and sablefish range map for Alaska. Commercial fishing may occur throughout the range.

Maps: ADF&G. <https://www.adfg.alaska.gov/index.cfm?adfg=animals.listfish>



Lingcod

Credit: NOAA



Pacific halibut

Credit: NOAA

Jigging fisheries summary sheet

List of Fisheries:

- AK Bering Sea, Aleutian Islands groundfish jig
- AK Gulf of Alaska groundfish jig
- AK halibut jig



Pacific halibut

Credit: NOAA

Target species

Sablefish, rockfish, Pacific cod, Pacific halibut

Configuration

- A mechanical jigging machine is a device that deploys a single line with lures or baited hooks and retrieves that line with electrical, hydraulic, or mechanically powered assistance
- A mechanical jigging machine allows a line to be fished only in the water column, in a manner that the hooks connected to the line are fished above the seafloor; a mechanical jigging machine line may not be anchored to the seafloor or operated unattached from the vessel
- No more than five mechanical jigging machines may be operated from a vessel with no more than 30 hooks per line operated from a mechanical jigging machine

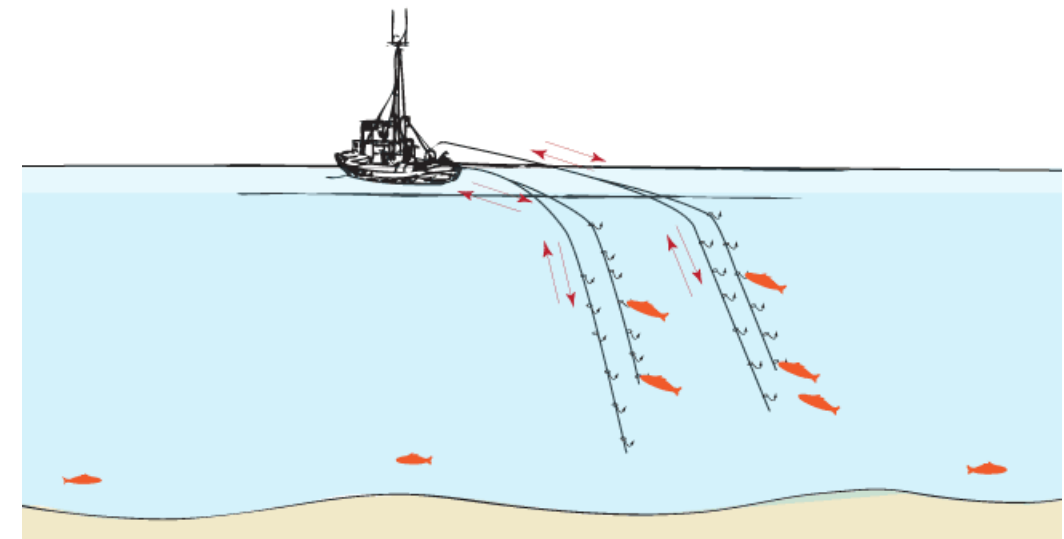
Gear marking

No requirements

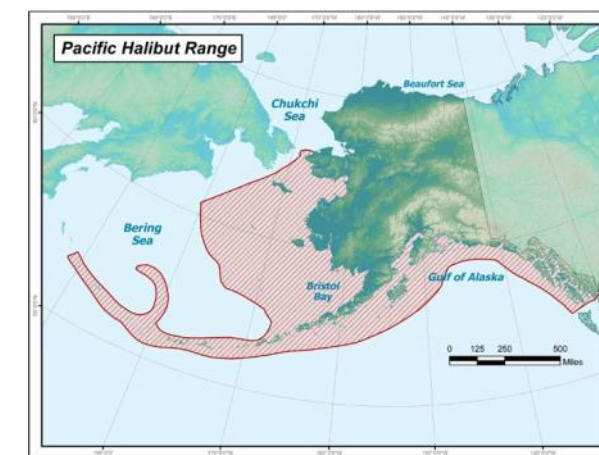
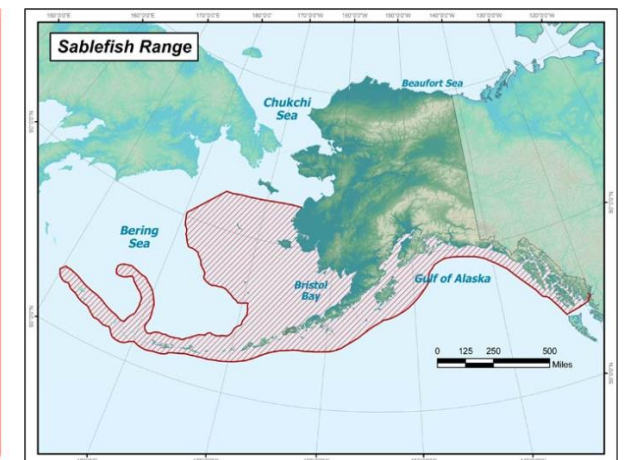
For more information

- See [here](#) for details on openings/gear specs, etc. for current fisheries
- Contact NOAA's Alaska Region Inseason Management Branch: [here](#)
- Contact ADF&G area biologists for their local knowledge on the recent openers and gears being used

Jigging fisheries summary sheet



Jigging credit: <https://thefishingadvice.com/automatic-jigging-machines/>



Commercial groundfish management activities map; sablefish and Pacific halibut map for Alaska. Commercial fishing may occur throughout the range. Map: ADF&G. <https://www.adfg.alaska.gov/index.cfm?adfg=animals.listfish>

Salmon troll fisheries summary sheet

List of Fisheries: AK salmon troll

Target species

King, coho, chum, pink, and sockeye salmon

Commonly used line

- Material: usually monofilament of variable pound test (pound test is a measurement of how much stress, in pounds, can be put on fishing line before it breaks)



Sockeye salmon

Credit: NOAA

Configuration

- Trolling is a method of fishing where one or more fishing lines, baited with lures or bait fish, are drawn through the water
- Typically, four to six main wire lines are fished, each of which may have up to a 50 pound lead or cast iron sinker on its terminal end, and 8 to 12 monofilament or braided leaders spaced out along its length, each of which ends in either a lure or baited hook and attaches to the wire with a hand-size snap, sometimes with a rubber snubber
- To be effective, trolling baits and lures must have the visual ability to attract fish and intrigue them with the way they move through the water. Most trolling lures are designed to look and behave like dying, injured, or fast moving fish. They include:
 - Flashers: lures made of brightly colored plastic that have colored tape on both sides. The narrow tapered end is the front. The taper makes the flasher spin as it is trolled. The wider rear section of the flasher kicks back and forth to attract the salmon with strong vibrations. Conventional 8" and 11" flashers have been used by commercial and sport fishermen for decades. Flashers are used with bait or artificial lures such as plastic squid (hoochies)
 - Plugs: lures have a fishlike body shape and as they troll through the water they make various movements caused by instability due to a scoop under their heads
 - Swimbait: a minnow-like soft plastic bait. Some have swimming tails
 - Spoon lures: resemble the inside of a table spoon. They flash in the light while randomly wobbling or darting due to their shape

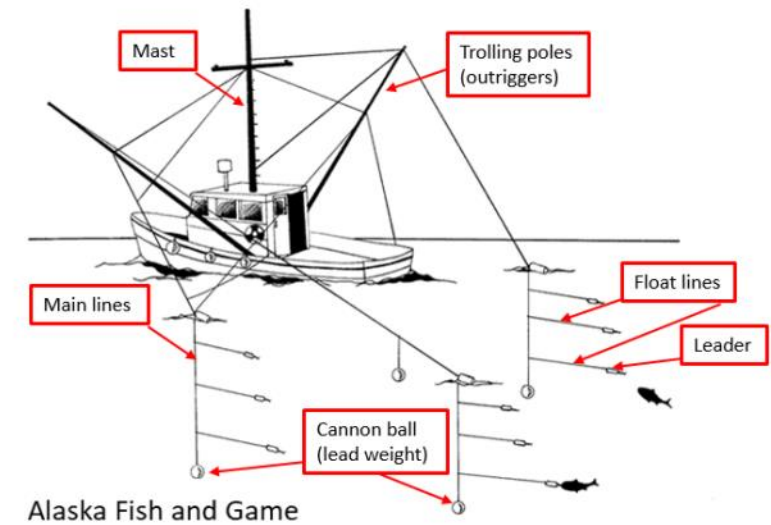
Gear marking

No requirements

For more information

- See [here](#) for details on openings/gear specs, etc. for current fisheries
- Contact ADF&G area biologists for their local knowledge on the recent openers and gears being used

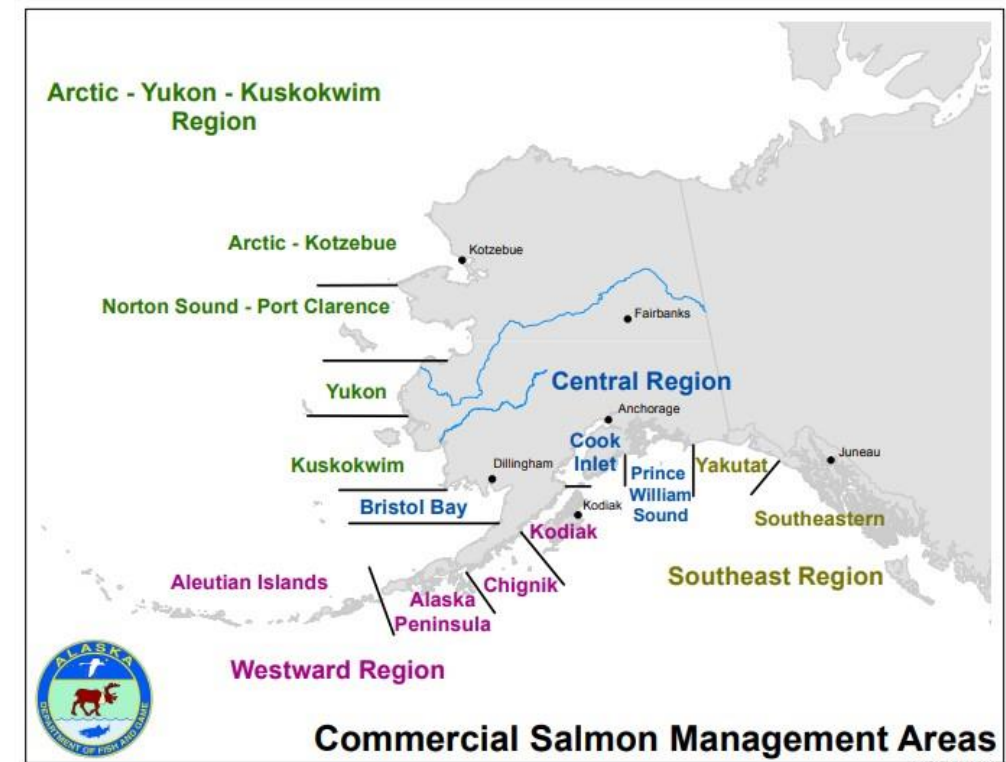
Salmon troll fisheries summary sheet



Alaska Fish and Game

Salmon troll

Diagram: ADF&G



Alaska commercial salmon management areas. Courtesy of ADF&G

Entanglement information

In the following sections, we transition from fishery-specific information to information about marine mammal entanglements. Whales and pinnipeds are at risk of becoming entangled in fishing gear (active and lost), marine debris, moorings, and other non-fishery-related gear. It is important to collect information about each entanglement in order to learn about the source and hopefully reduce and/or prevent future entanglements. These sections are included in the Gear Guide since entanglement in fishing gear is a concern for many of the species found off the U.S. West Coast and Alaska.

Whale information

The whale information section includes identification guides for whale species found in the WCR and Alaska and information on how to document and report an entanglement.

COMMON LARGE WHALES OF ALASKA

- HUMPBACK**
Long paddle-shaped pectoral fins. Small, but prominent dorsal fin.
- BELUGA**
Adults are white, calves are gray. Bulbous head.
- KILLER WHALE**
Black & white. Prominent, tall dorsal fin.
- BOWHEAD**
Black, with no dorsal fin. Arctic range.
- GRAY WHALE**
Speckled, light gray. Short broad pectoral fins.
- SPERM WHALE**
Square-shaped head. Wrinkled & gray. Narrow lower jaw with teeth.

DETAILS TO REPORT

- WHALE SPECIES
- DATE & TIME
- LOCATION (LAT/LONG)
- CONDITION OF ANIMAL
- DESCRIPTION OF ENTANGLING GEAR
- DIRECTION WHALE IS HEADING

BECOME A LEVEL 1 FIRST RESPONDER FOR LARGE WHALE ENTANGLMENTS

SCAN ME

Whale entanglement outreach material from the Alaska Regional Office

Reporting injured, entangled, stranded or ship-struck whales

24/7 hotline: WCR (877) SOS-WHAL (767-9425)

AK (877) 925-7773

Record the following information to help responders

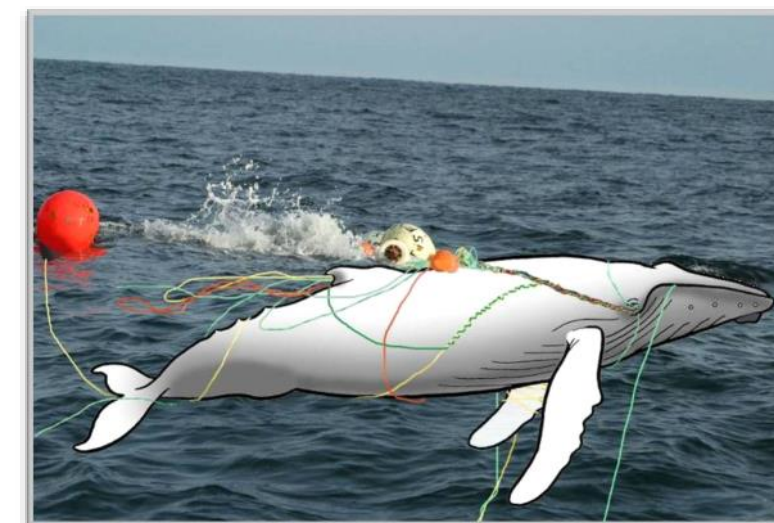
- Species
- Nature of distress
- General condition of whale
- General or specific location (GPS)
- Date
- Time of last sighting
- Approximate size/age class
- Is the animal moving?
 - Speed & heading
- Weather/seas (wind, swell, visibility)
- Your name, vessel name/call sign

Ocean users can play an important role in efforts to save whales in distress from pain, deformity, and death. Please report injured, entangled, and ship-struck whales to the 24/7 hotline (877) 767-9425 (WCR) or (877) 925-7773 (AK) or hail the U.S. Coast Guard on **VHF CH-16**. Prompt reporting is the best way to help the distressed animal. Standing by until responders can arrive is also valuable. The information you provide is necessary to launch an appropriate response and may also help reduce incidents in the future.

Safety first! Rescue attempts can be dangerous for would-be rescuers and the animal. Do not assist distressed marine mammals without guidance from authorities. Stay a safe distance away—100 yards minimum. Don't touch, feed, pursue, disturb, or otherwise approach marine mammals unless authorized to do so.

If possible, draw an approximation (similar to diagram above) of the entanglement indicating lines, objects, color, and distinguishing marks on the whale. <https://www.fisheries.noaa.gov/resource/document/large-whale-entanglement-photo-documentation-checklist>

Please be aware that it is sometimes not possible or appropriate to respond to every entangled or otherwise distressed marine mammal.

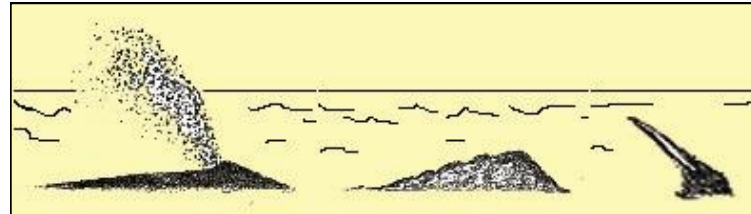


Provincetown Center for Coastal Studies. WR-2007-26. Taken under Canadian permit.

Whale identification

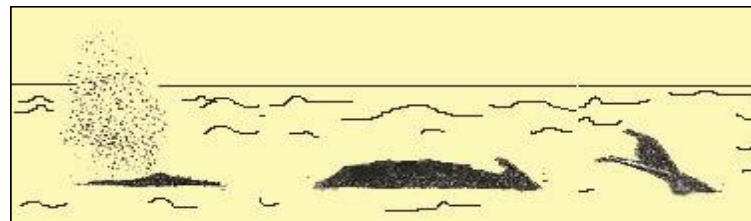
Gray whale

Body coloration mottled gray; frequently with whale lice on head; no dorsal fin; bumps, ridges or knuckles on tail stock; heart-shaped blow; flukes raised high above surface before deep dives; up to 46 feet in length; migrates from Alaska to Baja California. Most gray whales belong to a non-ESA listed population, but there is one endangered population. Most observable off WCR in October to July; Alaska in July to October.



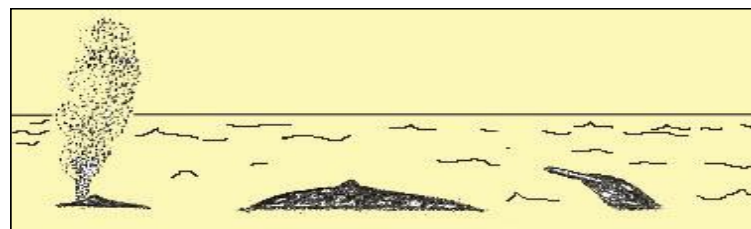
Humpback whale

Body coloration dark grayish with black and white patches on underside; long white/black flippers (nearly 1/3 of body length); head covered with knobs or nodules; two-step dorsal fin; single rounded bushy blow; flukes raised before deep dives; up to 52 feet in length; migrates from coastal Central America and Mexico to southern British Columbia. Some populations are endangered, threatened and non-ESA listed. Most observable off WCR in May through September; Alaska in June and July.



Blue whale

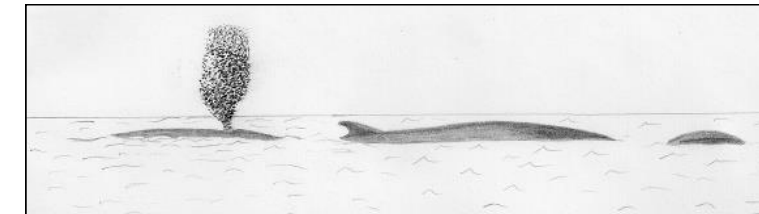
Body coloration mottled bluish gray; very small dorsal fin situated far on the back; flukes often raised before dives; tall columnar blow; largest living animal up to 85 feet in length; migrates from coastal Mexico and Costa Rica to Washington. All blue whales are endangered. Most observable off WCR in May through September; Alaska in July and August.



Drawings: Monica DeAngelis

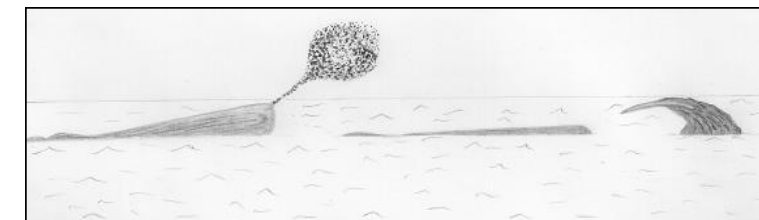
Fin whale

Body coloration is solid gray to black above and white below with a chevron pattern behind head often visible from above; long streamlined body; sharp, variably shaped dorsal fin; tall columnar blow; rarely raises flukes when diving; up to 79 feet in length; the second-largest species of whale. All fin whales are endangered. Present year-round in WCR, but typically seen during the summer and winter months; not found in Alaska.



Sperm whale

Body coloration is dark gray-brown; somewhat bushy blow angles forward and left; low, thick dorsal fin; adult males can reach 60 feet in length (females typically more than 36 feet); triangular flukes lift high at start of dive; usually encountered offshore in deep water; found throughout the north Pacific. All sperm whales are endangered. Present year-round off WCR and Alaska.



Information from the California whale watching guidelines and NMFS Alaska Region.

Drawing courtesy of Monica DeAngelis.

Additional information about whales

Marine mammals of the West Coast:

https://media.fisheries.noaa.gov/dam-migration/mm_of_us_west_coast.pdf

Marine mammals of the U.S. North Pacific:

<https://media.fisheries.noaa.gov/dam-migration/marine-mammals-alaska-arctic.pdf>

Be whale wise:

<https://www.bewhalewise.org/wp-content/uploads/2021/07/Be-Whale-Wise-Brochure-2021.pdf>

Photographing Whales in Distress

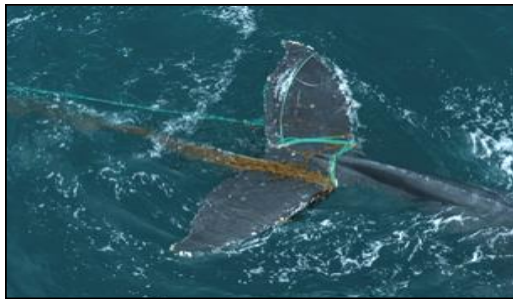
Prompt reporting is the best way to help the distressed whale. Photographing the nature of the distress is very important, but please stay at least 100 yards away from the whale.

Whale

- Dorsal area (back)
- Fins
- Fluke (tail)
- Head
- Notable injury

Entanglement

- Buoy(s)
- Line(s)
- Netting
- Attached trap
- Tags or markings (numbers/letters)



Fluke with line and kelp



Underside of fluke for identification



Dorsal area with line and buoys



Head area with netting



Buoys trailing behind whale



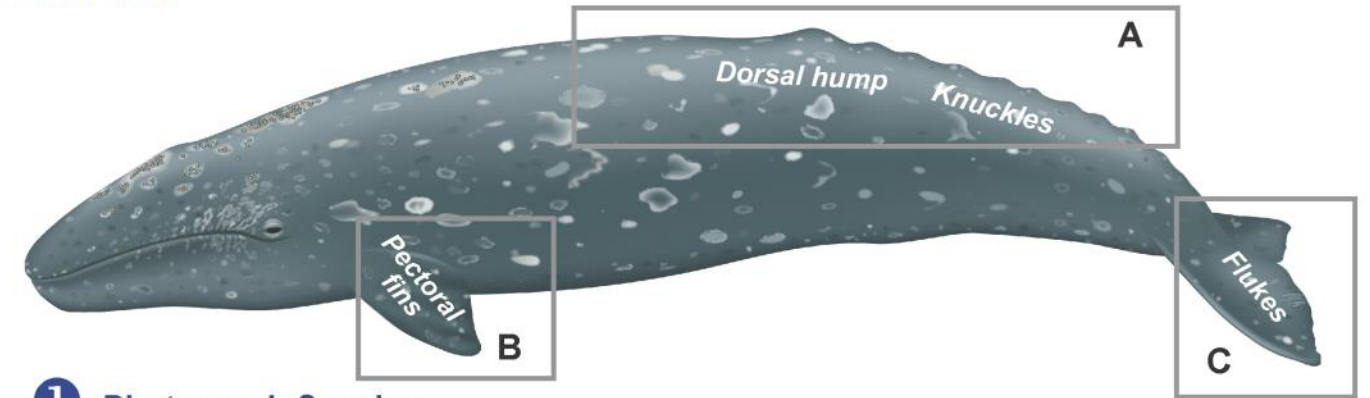
Mouth and pectoral fin wrap

Photos provided by NMFS West Coast Region taken under NOAA permit 18786-06 under the authority of the U.S. Endangered Species Act and Marine Mammal Protection Act



Large Whale Entanglement Photo Documentation Checklist

Gray whale



Entanglement Reporting Hotline:
1-877-SOS-WHAL or
1-877-767-9425

1 Photograph Species, Overall Condition, & Entanglement

- Dorsal hump (Box A above)
- Pectoral fins (Box B above)
- Flukes, especially underside if raised (Box C above)
- Any part of the body where the entanglement or gear may be present

2 Photograph Fishing Gear

- Buoys (and other gear if present)
- Lines on the body
- Netting if present
- Other gear if present
- Tags (color, numbers, and letters if present)
- Trailing lines including the distance from the whale
- Line Markings - colored sections of line if present

3 Submit the photos and identifying information

Email photographs to wcr.entanglement@noaa.gov. Underwater documentation can also be obtained but only by trained large whale entanglement responders.

Camera Specifics

A high quality camera (Single Lens Reflex (SLR) for example) is ideal to document an entangled whale as it results in higher resolution. A cell phone can also be used if that is the only option.

Entangled whales are unpredictable and dangerous.
Keep a safe distance. Do not approach the whale.
Watch for lines in the water that may entangle your boat.

Learn more about the West Coast Large Whale Entanglement Response Program:
www.fisheries.noaa.gov/west-coast/marine-mammal-protection/west-coast-large-whale-entanglement-response-program

Whale entanglements

NMFS collects, verifies, documents, and responds to reports of large whale entanglements from a variety of sources including boaters, fishermen, law enforcement, marine resource agencies, and the public. Through these efforts, NMFS aims to identify the source of each entanglement through examination of the available information from each report that may include verbal or written descriptions provided by reporting parties or entanglement responders, photographs and/or video of the entanglement, and any gear removed and recovered during an entanglement response. Whale entanglement reporting locations do not always reflect the geographic area where this gear originated from. Information described in this Gear Guide has been critical in helping NMFS WCR and AKR staff accurately evaluate and identify the sources of many of the entanglements that have been reported, especially since the publication of the original Gear Guide. To help provide context for the importance of understanding the difference between gear used in different fisheries and promoting improved documentation of the gear involved in entanglements when reported, we summarize key knowledge of whale entanglements that has been gained through our efforts.

Large whale interaction and entanglement with gear deployed or discarded in the ocean poses a threat to animals worldwide. Entanglement can cause mortality or minor to significant injuries that may compromise the health of the individual animal and impact their ability to feed or reproduce. Additionally, there are economic impacts associated with large whale entanglements including expenses that may be incurred by fishing industries due to lost gear, gear modifications, and increased regulations aimed to reduce entanglements.

West Coast Region

In the WCR, whale entanglements have been reported across the entire U.S. West Coast, with additional entanglements reported from bordering countries of Canada and Mexico involving entanglement gear originating from the U.S. West Coast.

Species

From 2000-2020, gray whales and humpback whales were the species most frequently reported as entangled in WCR (Figure 1). Blue whales, fin whales, minke whales, killer whales, and sperm whales have also been reported as entangled in gear.

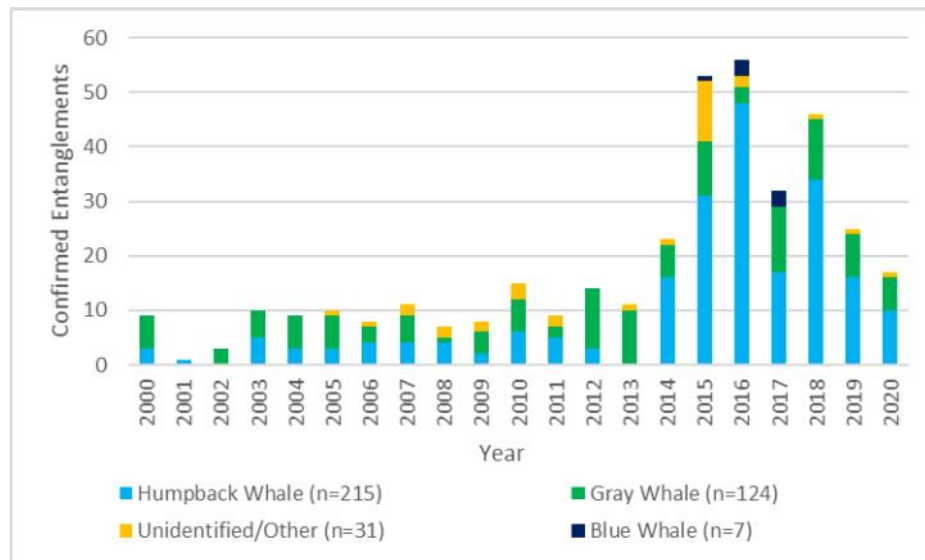


Figure 1. Confirmed whale entanglements for the U.S. West Coast from 2000 to 2020 by whale species. From the NMFS 2020 West Coast whale entanglement summary.

Report timing

In the WCR, entanglement reports have been received in every month of the year (Saez et al. 2021). For the U.S. West Coast, the months with the highest number of entanglement reports are March and April. This aligns with the northern migration of gray whales along the U.S. West Coast, as well as early presence of feeding humpback whales.

Gear types

Whales off the U.S. West Coast have been confirmed as entangled with nets, pot/traps, hook and line, weather buoys, mooring buoys, and unidentified gear. “Unidentified” is the general category for an entanglement report where entangling gear material is unidentifiable to a specific source, often including entanglements with only line visible with no identifying markings. NMFS is investing significant time into better understanding the entangling gear types and factors related to the whale entanglement risk.

Table 1. Confirmed fishery type, by whale species, in confirmed entanglement records for the WCR, 2000-2020. Modified from Saez, et. al., 2021.

	Blue	Fin	Gray	Humpback	Killer	Minke	Sperm	Unidentified	Total
Hk/Ln - Salmon troll	0	0	1	0	0	0	0	0	1
Net - Drift gillnet	0	0	2	2	0	1	2	0	7
Net - Gillnet	0	0	26	12	0	0	0	1	39
Net - Netting	0	0	4	7	0	1	0	1	13
Other - Weather buoy	0	0	0	1	0	0	0	0	1
Other - Salmon cables	0	0	1	0	0	0	0	0	1
Pot - Dungeness crab commercial	3	0	24	65	2	0	0	2	96
Pot - Dungeness crab and rock crab	0	0	0	1	0	0	0	0	1
Pot - Dungeness crab recreational	0	0	0	4	0	0	0	0	4
Pot - King crab	0	0	1	0	0	0	0	0	1
Pot - Lobster	0	0	1	1	0	0	0	0	2
Pot - Rock crab	0	0	1	0	0	0	0	0	1
Pot - Sablefish	0	0	0	5	0	0	0	0	5
Pot - Spot prawn commercial	0	0	0	10	0	0	0	0	10
Pot - Spot prawn recreational	0	0	0	1	0	0	0	0	1
Unidentified	4	7	63	106	0	1	1	12	194
Total	7	7	124	215	2	3	3	16	377

Alaska Region

Entanglements in Alaska are primarily reported along the Gulf of Alaska.

Species

From 2007 to 2020, humpback whales were the species most commonly reported as entangled (Figure 2). Gray whales, beluga whales, fin whales, bowhead whales, killer whales, minke whales, sperm whales, and unidentified whales have also been reported as entangled in gear.

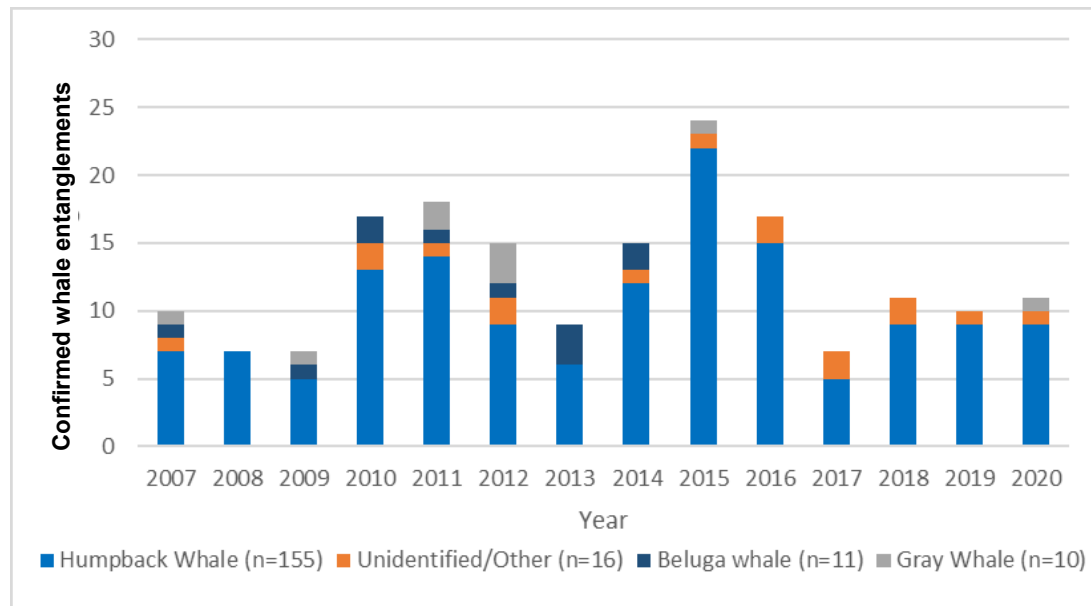


Figure 2. Confirmed whale entanglements reported in Alaska from 2007 to 2020 by whale species. Data from the Alaska Marine Mammal Health and Stranding Response Program.

Report timing

In Alaska, entanglement reports have been received in every month of the year. Reports are more common between May and October with the highest number of entanglement reports in July, followed by June and August. This aligns with the presence of feeding humpback whales, which are the primary species reported as entangled.

General gear types

In Alaska, whales have been documented as entangled with nets, pots, longlines, anchor chains, cables, and unidentified gear. Humpback whales are most commonly reported as entangled in gillnets, pot fisheries, longlines, and unidentified gear.

For more information

Visit the NMFS West Coast Large Whale Entanglement Response Program page:

<https://www.fisheries.noaa.gov/west-coast/marine-mammal-protection/west-coast-large-whale-entanglement-response-program>

Visit the NMFS Alaska Large Whale Entanglement page:

<https://www.fisheries.noaa.gov/alaska/marine-life-distress/large-whale-entanglements-alaska>

National report on large whale entanglements confirmed in 2018:

<https://www.fisheries.noaa.gov/resource/document/national-report-large-whale-entanglements-confirmed-united-states-2018>

Pinniped entanglements

Similar to large whales, pinnipeds are often reported as entangled in fishing gear. NMFS collects, verifies, documents, and responds to reports of pinniped entanglements from a variety of sources. The reports come into NMFS directly, through Level A marine mammal stranding event reports. These reports are mostly opportunistic and may miss other areas and gear types that are associated with entanglements.

U.S. West Coast

From 2007 to 2020, California sea lions were most commonly reported as entangled on the U.S. West Coast (Figure 3). Harbor seals, Steller sea lions, Guadalupe fur seals, northern elephant seals, and northern fur seals have also been reported as entangled in gear.

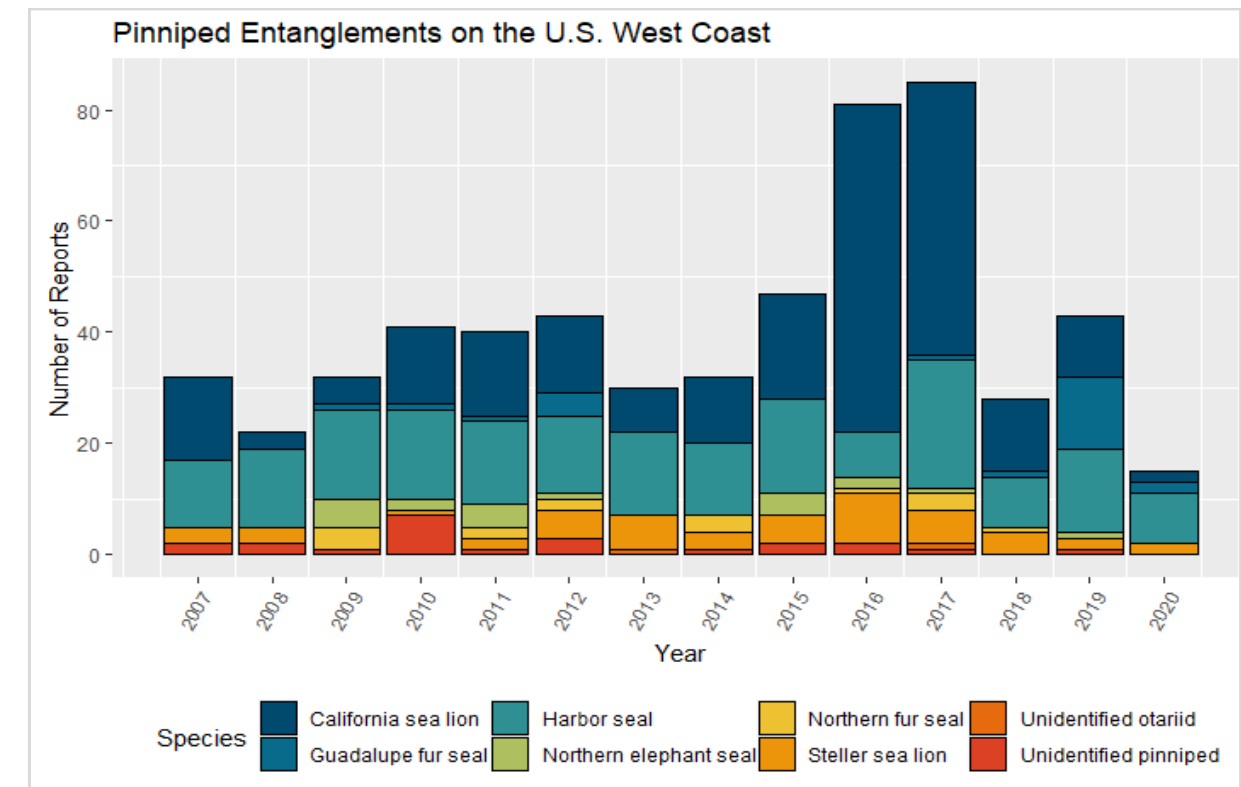


Figure 3. Pinniped entanglements on the U.S. West Coast by species from 2007 to 2020. Data from the NMFS Stranding Network database, unpublished.

Report timing

In the WCR, pinniped entanglement reports have been received in every month of the year. The months with the highest number of pinniped entanglement reports are November and October, although there were more reports in general between August and November.

Gear Types

Pinnipeds are most often reported as entangled in net gear, especially trawl nets (Figure 4). Hook and line gear, including flashers, are also commonly included in reports of entanglement. Pinnipeds are regularly reported as having some kind of gear entangled around their neck. This can often involve packing bands, rubber bands, or monofilament line. It may be difficult to determine whether gear is still around an animal or whether it is a wound post-entanglement.

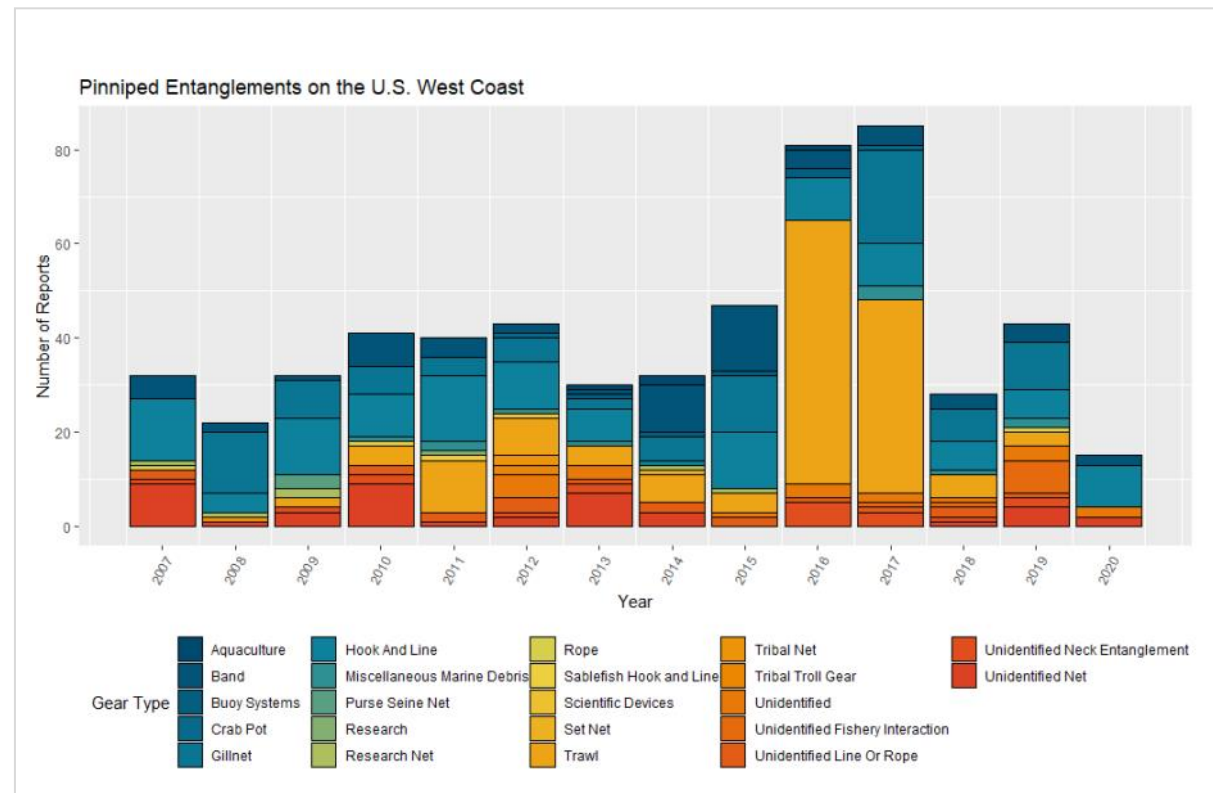


Figure 4. Pinniped entanglements on the U.S. West Coast by gear type from 2007 to 2020. Data from the NMFS Stranding Network database, unpublished.

For more information about pinniped entanglements

Visit human-caused mortality and injury of NMFS-managed marine mammal stocks tech reports:

<https://repository.library.noaa.gov/gsearch?collection=noaa%3A5&terms=human+caused+mortality>

Visit Alaska annual stranding reports:

<https://www.fisheries.noaa.gov/resource/document/alaska-region-marine-mammal-annual-stranding-reports>

Pinniped identification



Northern fur seal

Callorhinus ursinus
 Weight: 140 pounds (females) to 600 pounds (males)
 Length: 5 feet (females) to 7 feet (males)
 Region: Alaska, West Coast



California sea lion

Zalophus californianus
 Weight: 240 pounds (females) to 700 pounds (males)
 Length: 6 feet (females) to 7.5 feet (males)
 Region: Alaska, West Coast



Guadalupe fur seal

Arctocephalus townsendi
 Weight: 110 pounds (females) to 400 pounds (males)
 Length: 5 feet (females) to 7 feet (males)
 Region: Alaska, West Coast



Steller sea lion

Eumetopias jubatus
 Weight: 800 pounds (females) to 2,500 pounds (males)
 Length: 9.5 feet (females) to 11 feet (males)
 Region: Alaska, West Coast



Harbor seal

Phoca vitulina
 Weight: 180 to 285 pounds
 Length: 5 to 6 feet
 Region: Alaska, West Coast



Northern elephant seal

Mirounga angustirostris
 Weight: 1,300 to 4,400 pounds
 Length: 10 to 13 feet
 Region: Alaska, West Coast



Bearded seal

Erignathus barbatus
 Weight: 575 to 800 pounds
 Length: 7 to 8 feet
 Region: Alaska



Ringed seal

Phoca (pusa) hispida
 Weight: 110 to 150 pounds
 Length: 4 to 4.5 feet
 Region: Alaska



Ribbon seal

Histiophoca fasciata
 Weight: 200 to 300 pounds
 Length: 5 to 6 feet
 Region: Alaska



Spotted seal

Phoca largha
 Weight: 140 to 250 pounds
 Length: 4.5 to 5.5 feet
 Region: Alaska

Diagrams and information from NOAA Fisheries

<https://www.fisheries.noaa.gov/seals-sea-lions#by-species>

Keys to identifying common pinniped entanglement sources are found on the next three pages.

Pinniped entanglement sources

Key to ID troll gear:

If you see a large lure (flasher) hanging from the mouth, it indicates the sea lion has swallowed a hook. The hook can be anywhere from 36-54 inches from the flasher.



© AK Dept. Fish & Game, taken pursuant to a NMFS research permit



© AK Dept. Fish & Game, taken pursuant to a NMFS research permit

Key to ID black rubber bands:

Associated with pot fisheries. Rubber bands are used to hold the top of a pot open. Bands can be purchased or can be made by cutting inner tube tires. These black rubber bands come in many sizes.



© AK Dept. Fish & Game, taken pursuant to a NMFS research per-

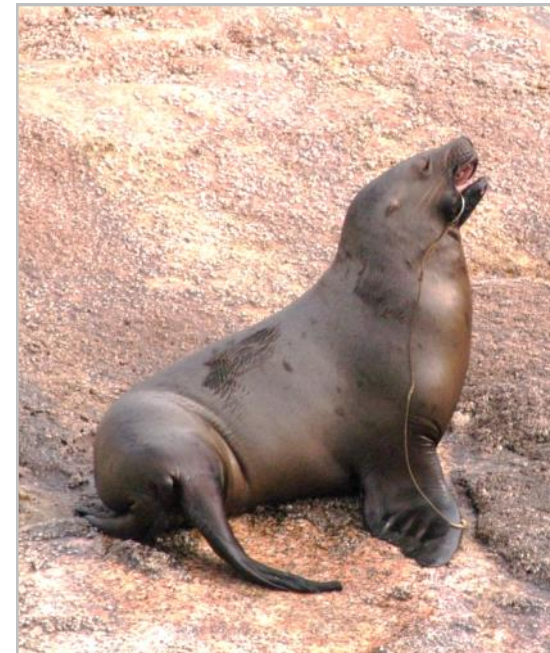


© AK Dept. Fish & Game, taken pursuant to a NMFS research permit

Pinniped entanglement sources

Key to ID longline gear:

Circle hooks with gangions attached to hook. Sea lions, especially juveniles, are commonly hooked in the lip.



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© AK Dept. Fish & Game, taken pursuant to a NMFS research permit

Key to ID trawl gear:

If you see green, orange, or gray nylon netting, it usually indicates trawl gear.



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Pinniped entanglement sources

Key to ID gillnet gear:

If you see monofilament or twine netting, it usually indicates gillnet gear.



NMFS MMHSRP permit #: 18786-06, credit: PSU

Plastic bands (straps)

- Used on all types of shipping boxes, bait boxes, etc.
- Plastic packing bands come in a variety of sizes and colors.
- Color: Most common is white. Other colors include yellow, blue, green, black, beige, red, and multiple colors.
- Most common source of neck entanglement for Steller sea lions



Key to ID plastic packaging bands:

If you see thin strands curling or fraying from a band around the neck of sea lion, it is a packing band.



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Pinniped outreach

Alaska marine mammal viewing

<https://www.fisheries.noaa.gov/alaska/marine-life-viewing-guidelines/alaska-marine-mammal-viewing-guidelines-and-regulations>

Pinniped entanglements

<https://www.fisheries.noaa.gov/resource/educational-materials/keep-sea-entanglement-free>

<https://pinnipedentanglementgroup.org/>

Do not feed pinnipeds

<https://www.fisheries.noaa.gov/resource/educational-materials/take-lead-do-not-feed>

Steller sea lion wheelhouse guide

<https://www.fisheries.noaa.gov/resource/educational-materials/steller-sea-lion-wheelhouse-guide-commercial-fishermen>



Credit: NOAA

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Unit conversions

1 millimetre (1 mm) = 0.039 inch	1 inch = 25.38 mm
1 centimetre (1 cm) = 0.393 inch	1 inch = 2.54 cm
1 meter(1 m) = 3.281 feet	1 foot = 0.305 m
1 meter (1 m) = 0.546 fathoms	1 fathom = 1.83 m

Acknowledgements

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Appendix - Scientific Names

Common name	Scientific name
Alaska pollock/Walleye pollock	<i>Gadus chalcogrammus</i>
Alaska plaice	<i>Pleuronectes quadrituberculatus</i>
American shad	<i>Alosa sapidissima</i>
Arrowtooth flounder	<i>Atheresthes stomas</i>
Atka mackerel	<i>Pleurogrammus monopterygius</i>
Bearded seal	<i>Erignathus barbatus</i>
Black rockfish	<i>Sebastes malanops</i>
Black-and-yellow rockfish	<i>Sebastes chrysomelas</i>
Blackgill rockfish	<i>Sebastes melanostomus</i>
Big skate	<i>Beringraja binoculata</i>
Bigeye thresher shark	<i>Alopias superciliosus</i>
Bigeye tuna	<i>Thunnus obesus</i>
Big-eye opah/moonfish	<i>Lampris megalopsis</i>
Blue halibut/Greenland turbot	<i>Reinhardtius hippoglossoides</i>
Blue rockfish	<i>Sebastes mystinus</i>
Blue whale	<i>Balaenoptera musculus</i>
Boccaccio	<i>Sebastes paucispinis</i>
Box crab (brown)	<i>Lopholithodes foraminatus</i>
Brown rockfish	<i>Sebastes auriculatus</i>
Cabazon	<i>Scorpaenichthys marmoratus</i>
California barracuda	<i>Sphyrna argentata</i>
California halibut	<i>Paralichthys californicus</i>
California sea lion	<i>Zalophus californianus</i>
California scorpionfish	<i>Scorpaena guttata</i>
California sheephead	<i>Semicossyphus pulcher</i>

Appendix: Scientific Names, continued

Common name	Scientific name
California skate	<i>Beringraja inornata</i>
California spiny lobster	<i>Panulirus interruptus</i>
Canary rockfish	<i>Sebastes pinniger</i>
Chilipepper rockfish	<i>Sebastes goodei</i>
China rockfish	<i>Sebastes nebulosus</i>
Chinook salmon/king salmon/Quinnat salmon/Tyee	<i>Oncorhynchus tshawytscha</i>
Chum salmon/dog salmon/keta salmon	<i>Oncorhynchus keta</i>
Cod (gray, grayfish, Pacific)	<i>Gadus macrocephalus</i>
Coho salmon/silver salmon	<i>Oncorhynchus kisutch</i>
Commander squid/Magister armhook squid	<i>Beryteuthis magister</i>
Common thresher shark	<i>Alopias vulpinus</i>
Coonstripe shrimp/humpback shrimp/king shrimp/dockside shrimp	<i>Pandalus hyposinotus, Pandalus danae</i>
Dolphinfish/dorado	<i>Cyrophæna hippurus</i>
Dover sole/black sole	<i>Solea solea</i>
Dungeness crab	<i>Cancer magister</i>
Dusky rockfish/light dusky rockfish	<i>Sebastes ruberrimus, Sebastes variabilis</i>
Eulachon/candlefish	<i>Thaleichthys pacificus</i>
Flathead sole	<i>Hippoglossoides elassodon</i>
Fin whale	<i>Balaenoptera physalus</i>
Giant grenadier/giant rattail	<i>Albatrossia pectoralis</i>
Golden prawn	<i>Penaeus californiensis</i>
Gopher rockfish	<i>Sebastes carnatus</i>
Grass rockfish	<i>Sebastes rastrelliger</i>
Gray whale	<i>Eschrichtius robustus</i>
Guadalupe fur seal	<i>Arctocephalus townsendi</i>
Guitarfish (shovelnose, banded, mottled)	<i>Rhinobatos productus</i>
Hagfish (black, Pacific)	<i>Eptatretus deani, Eptatretus stoutii</i>
Harbor seal	<i>Phoca vitulina</i>
Humpback whale	<i>Megaptera novaengliae</i>
Humpy shrimp	<i>Pandalus goniurus/dapifer</i>
Kellet's whelk	<i>Kelletia kelletii</i>
Kelp greenling	<i>Hexagrammos decagrammus</i>
Kelp rockfish	<i>Sebastes atrovirens</i>

Appendix: Scientific Names, continued

Common name	Scientific name
King crab (blue, golden, red)	<i>Paralithodes platypus, Lithodes aequispinus, Paralithodes camtschaticus</i>
Lingcod	<i>Ophiodon elongatus</i>
Longnose skate	<i>Raja rhina</i>
Mackerel (California jack, jack)	<i>Trachurus symmetricus</i>
Market squid	<i>Doryteuthis opalescens</i>
Northern elephant seal	<i>Mirounga angustirostris</i>
Northern fur seal	<i>Callorhinus ursinus</i>
Northern pink shrimp	<i>Pandalus eous</i>
Northern rockfish	<i>Sebastes polyspinus</i>
Pacific albacore/longfin tuna	<i>Thunnus alalunga</i>
Pacific angel shark	<i>Squatina californica</i>
Pacific bluefin tuna	<i>Thunnus orientalis</i>
Pacific halibut	<i>Hippoglossus stenolepis</i>
Pacific herring	<i>Clupea pallasii</i>
Pacific mackerel	<i>Scomber japonicus</i>
Pacific ocean perch	<i>Sebastes alutus</i>
Pacific octopus	<i>Octopus dofleini</i>
Pacific sanddab	<i>Citharichthys sordidus</i>
Pacific sardine	<i>Sardinops sagax</i>
Pacific swordfish	<i>Xiphias gladius</i>
Pacific whiting	<i>Merluccius productus</i>
Pacific yellowfin tuna	<i>Thunnus albacares</i>
Pacific yellowtail	<i>Seriola lalandi</i>
Petræ sole	<i>Eopsetta jordani</i>
Pink salmon	<i>Oncorhynchus gorbuscha</i>
Red salmon/sockeye salmon	<i>Oncorhynchus nerka</i>
Ribbon seal	<i>Histiophoca fasciata</i>
Ridgeback prawn	<i>Eusicyonia ingentis</i>
Ringed seal	<i>Phoca hispida</i>
Rock crab (yellow, brown, Pacific/red)	<i>Cancer anthonyi, Cancer antennarius, Cancer productus</i>
Rock sole	<i>Lepidopsetta bilineata</i>
Rougheye rockfish	<i>Sebastes ruberrimus</i>

Appendix Scientific Names continued

Common name	Scientific name
Sablefish/black cod	<i>Anoplopoma fimbria</i>
Sea cucumber (California, giant red, warty)	<i>Apostichopus californicus, Apostichopus parvimensis</i>
Shortfin mako shark	<i>Isurus oxyrinchus</i>
Shorthead rockfish	<i>Sebastes borealis</i>
Shortspine thornyhead	<i>Sebastolobus alascanus</i>
Sidestripe shrimp	<i>Pandalopsis dispar</i>
Skipjack tuna	<i>Katsuwonus pelamis</i>
Small-eye opah/moonfish	<i>Lampris guttatus</i>
Smelt (longfin, Pacific)	<i>Spirinchus thaleichthys</i>
Sperm whale	<i>Physeter macrocephalus</i>
Spot prawn	<i>Pandalus platyceros</i>
Spotted seal	<i>Phoca largha</i>
Steelhead	<i>Oncorhynchus mykiss</i>
Steller sea lion	<i>Eumetopias jubatus</i>
Starry flounder	<i>Plueronectidae stellatus</i>
Tanner crab	<i>Chionoecetes bairdi, Chionoecetes opilio, Chionoecetes tanneri</i>
Thornback ray	<i>Platyrrhinoidis triseriata</i>
Thresher shark	<i>Alopias vulpinus</i>
Vermilion rockfish	<i>Sebastes miniatus</i>
White seabass/white weakfish	<i>Atractoscion nobilis</i>
Widow rockfish	<i>Sebastes entomelas</i>
Yellowfin sole	<i>Limanda aspera</i>
Yellowtail	<i>Seriola lalandi</i>
Yelloweye rockfish	<i>Sebastes ruberrimus</i>
Yellowtail rockfish	<i>Sebastes flavidus</i>



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