Appendix A

Fixed Gear Guide:

California, Oregon, and Washington Commercial Fisheries

Trap/pot, gillnet, and longline/set line





NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NOAA
U.S. DEPARTMENT OF COMMERCE

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Photos on cover: Top Left: Rock crab fishing; Top Center: Hagfish bucket traps; Top Left: Longline hook; Bottom Left: Trinidad, California; Middle Right: Westport, Washington; Bottom Right: Dungeness crab traps.. Courtesy of Lauren Saez.

Updated February 2012

Quick Reference Guide

	Line		Buoy/Float			Trap				Net	
	Floating	Sinking	Bullet	Poly Ball	High Flyer	Round	Rectangle	Metal	Plastic	Twine	Mono-filament
California Nearshore Live Fish (p 18)	X		X				X	X			
Coonstripe Shrimp (p 20)	X		X	X	X	X		X			
Dungeness Crab (p 22)	X		X			X		X			
Hagfish (p 24)	X			X	X	X			X		
Rock Crab (p 26)	X		X	X		X	X	X	X		
Pacific Halibut (p 36)		X		X	X						
Sablefish (p 28, 34)	X	X		X	X	X	X	X			
Spiny Lobster (p 30)	X		X				X	X			
Spot Prawn (p 32)	X			X	X	X	X	X			
California Halibut/ White Seabass Set Gillnet (p 38)	X	X		X	X					X	X
Small Mesh Drift Gillnet (p 15)	X	X		X	X						X
Large Mesh Drift Gillnet (p 15)	X	X		X	X					X	

Introduction

Information included in this document was collected from a variety of sources, including: federal, state, and tribal fishery managers, current laws and regulations, interviews with fisherman, and published literature. The photos and diagrams are intended to show representative fishing gear used by each commercial fishery, but some variation is expected.

Maps

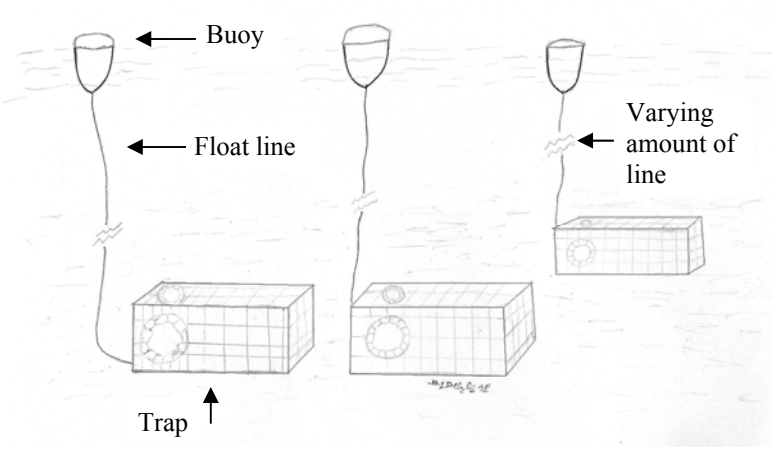
The maps included in this document show the potential fishing area utilized by each commercial fishery. The fishing areas for each fishery, shown in blue, were created using bathymetry lines as boundaries to delineate the common fishing depths. The fishing areas were then restricted to water adjacent to ports where fish were landed in the years 2004-2008. The major assumption is that the fish landed into a port were caught in the common depth range of the ocean waters adjacent to the port for the individual fishery.

Definitions

Anchor: heavy metal object used to weigh down fishing gear.
Buoy: used for marking the end of a float line and for flotation. Mostly made of plastic.
Destructive device/Escape panel: a link of material on a trap that degrades over a set period of time, leaving an escape panel, rendering the trap inoperable, should the trap be lost at sea. The link material is often cotton twine or magnesium.
Drift gillnet: any gillnet that drifts freely in the water, unattached to the ocean floor, though one end may also be tied off to a vessel which also drifts.
Escape port/ring: an opening, separate from the destructive device, that allows undersized fish or crustaceans to escape a trap/pot.
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. (See p. 46)
Float: used primarily for flotation, but can be used as a surface marker. Placed along the top of a gillnet to keep it upright in the water column. Mostly made of PVC plastic.
Float line: the line attaching a trap, net, or ground line to the surface buoy.
Gillnet: a type of net where the mesh size is designed to allow the head of the fish to enter, but not the body. The fish is prevented from escaping due to the anatomy of its gills. Can be set with an anchor or drift freely.
Ground line: leaded (lead line) or sinking line used in setting strings of traps or bottom set longlines, often weighted at each end and attached to a float line or used along the bottom of a gillnet.
Line: cord 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 fish along the ocean bottom or in the water column.
Longline snap: stainless metal clip for attaching a fishing hook or trap to a longline.
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.
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.
Set gillnet: any gillnet used to take fish that is anchored to the bottom on each end 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.
Trap/ pot: a portable, enclosed device with one or more entrances designed to catch crustaceans or fish with one or more lines attached to a surface float.
Twine: string made from light weight fibers such as cotton. Synthetic fibers are also used.

Gear Configuration Basics

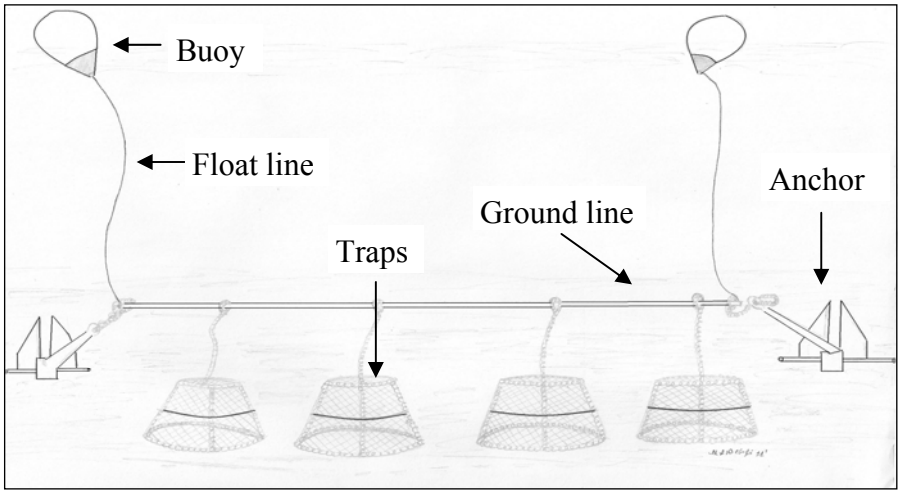
Single trap with one or more buoys



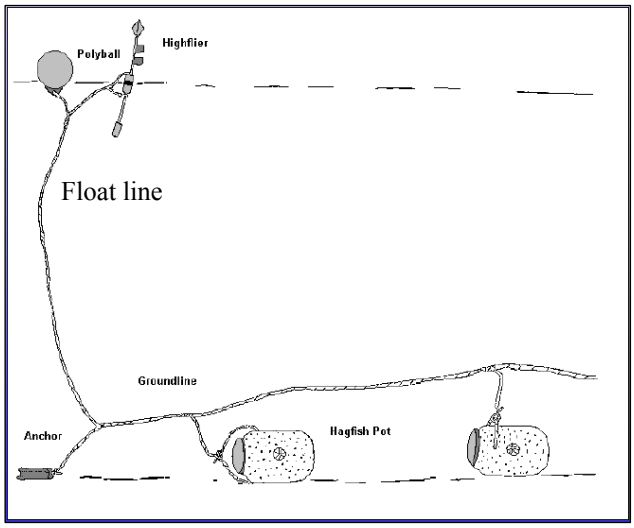
Fisheries:

- California near-shore live fish
- Dungeness crab
- Sablefish caught with trap (open access)
- Spiny lobster

Traps attached to a common ground line (string)



Sablefish trap configuration



Hagfish trap configuration

Fisheries:

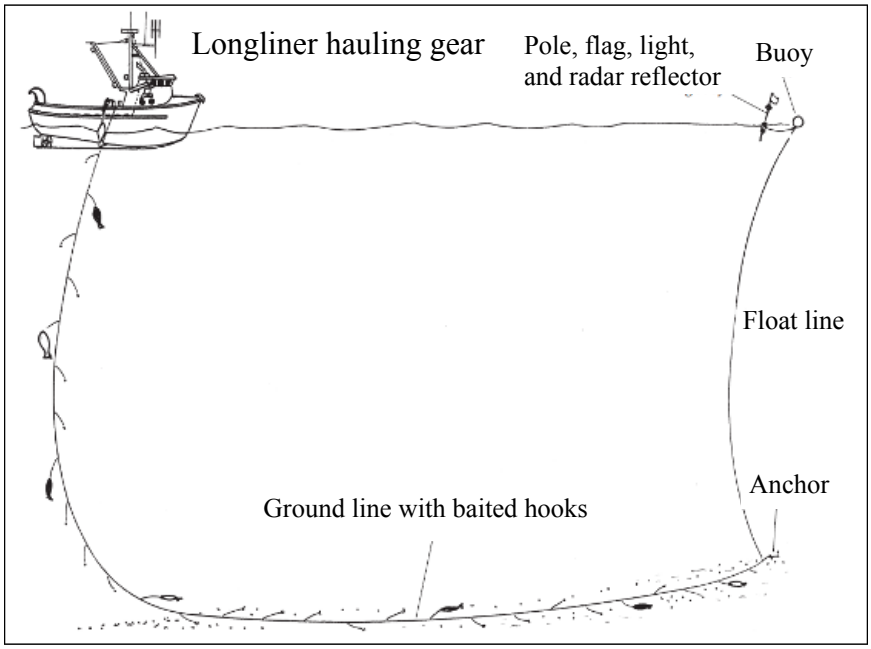
- Coonstripe shrimp
- Hagfish
- Rock crab
- Sablefish caught with traps (open access and limited entry)
- Spot Prawn

Gear Configuration Basics

Bottom set longline

Fisheries:

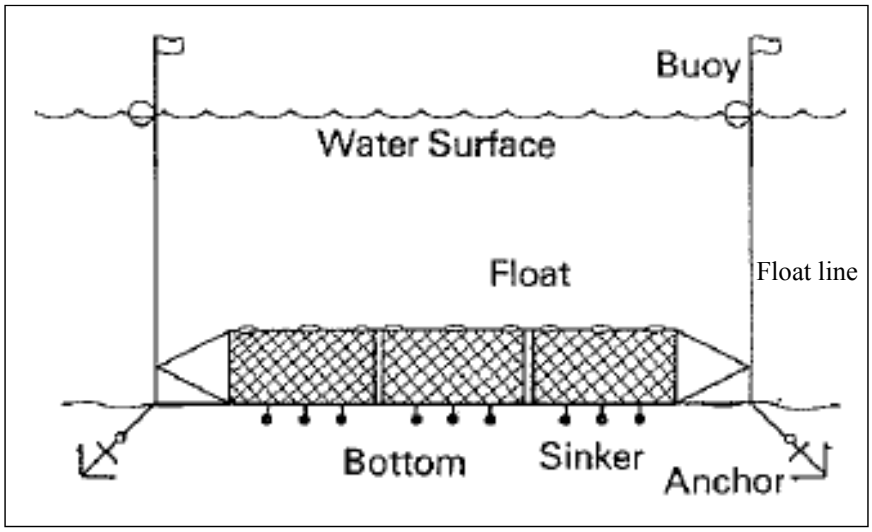
- Pacific Halibut
- Sablefish



Set gillnet

Fisheries:

- California Halibut/White Seabass

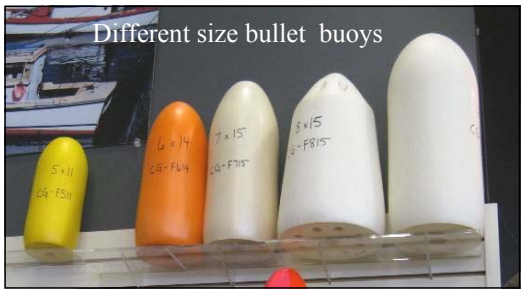


Buoys and Floats

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
- *Fisheries*: California nearshore live fish, coon-stripe shrimp, Dungeness crab, rock crab, and spiny lobster



Different size bullet buoys

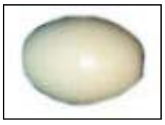

Bullet buoys: warped from high current


Variety of colors

Small Round Floats

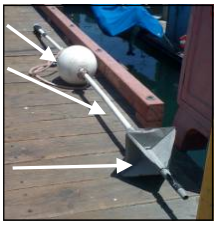
Varying sizes (diameter x length) : 2" x 3" or 3" x 4 3/4"

- Used mainly to supplement flotation of endline of a longline and along the float line of a gillnet
- *Fisheries*: Dungeness crab, rock crab, spiny lobster, and small mesh gillnet



High Flyer with Float and Flag

- Pole is made from aluminum or Calcutta cane, radar reflector is diamond shaped, made of aluminum, and 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)
- *Fisheries*: California halibut/white seabass set gill-net, coonstripe shrimp, hagfish, large and small mesh drift gillnet, sablefish, and spot prawn



Buoys and Floats

Poly Ball (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 drift gillnet.
- Color: orange is most common, but a wide variety exists
- *Fisheries*: California halibut/white seabass set gillnet, coonstripe shrimp, hagfish, large and small mesh drift gillnet, rock crab, sablefish longline, and spot prawn

View from water

Oblong Round

Variety of colors

Single boat can use more than one shape

Special Buoy Marking Requirements

California
FGC § 9006

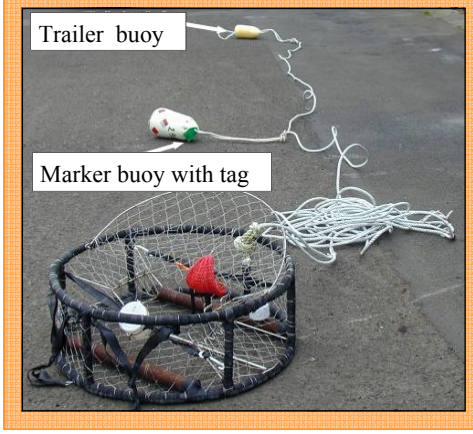
Buoy Marking	Fishery
License number + "B"	Sablefish
License number + "Z"	Other Finfish
License number + "P"	Lobster

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 the first buoy from the trap. (See pictures below)
For more information see the Dungeness crab fishery reference, page 22.

Washington Indian tribes: Buoys branded with 2 digit number unique for each tribe followed by fishermen's unique ID number



Trap Key

1

1a. Trap made of mainly metal **2**
1b. Trap made of mainly plastic..... **7**

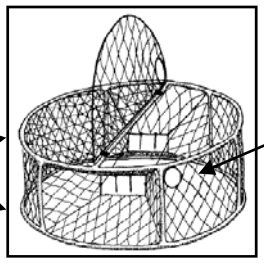
2

2a. Round frame..... **3**
2b. Rectangular frame..... **5**

3

3a. Outer rings equal diameter, approximately three foot ring diameter:

Dungeness Crab
p. 22



3b. Outer rings not equal diameter, tapered shaped..... **4**

4

4a. 0.5 inch cord mesh, bottom ring diameter ≥ 3 feet:

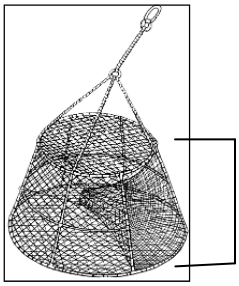
Coonstripe Shrimp **p. 20**

4b. 0.8 - 1.5 inch cord mesh,
bottom ring diameter ≥ 3 feet:

Spot Prawn **p. 32**

4c. ≥2 inch cord mesh, bottom ring diameter 3 or 6 feet, trap height between 28 and 32 inches:

Sablefish
p. 28



Trap Key

5

5a. Frame top/bottom equal size..... **6**

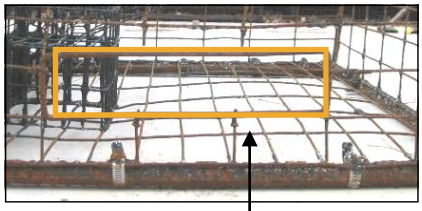
5b. Frame top/bottom not equal (trapezoid):

Sablefish
p. 28

6

6a. 2"x4" wire mesh, rectangular escape port:

Spiny Lobster
p. 30



Rectangular escape port
Highlighted for emphasis

6b. 1"x1" wire mesh, cone shaped entry port, no escape ring:

Spot Prawn
p. 32

6c. 2"x2" wire mesh, rigid metal ring on entry funnel:

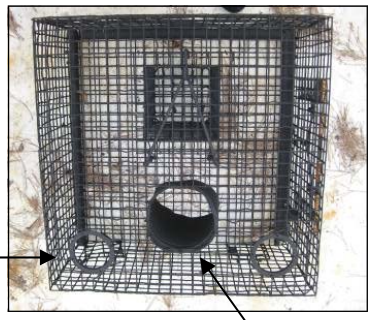
Nearshore Live Fish
p.18

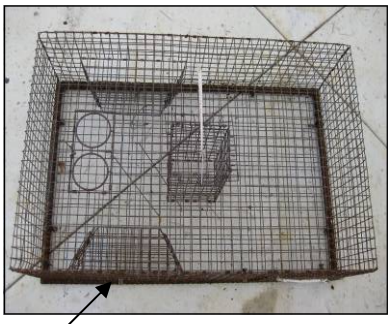
Rigid metal ring on entry funnel
Highlighted for emphasis

Trap Key

6d. 1"x1", 2"x2" or 2"x4" wire mesh, 2 escape rings on top half of trap:

Rock Crab
p. 26



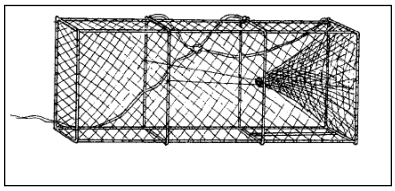


Escape rings

Entry funnel on top or side

6e. 2"x2" nylon mesh, approximately five feet tall:

Sablefish
p. 28



7

7a. Trap is plastic and oval shaped.....**9**
7b. Trap is a plastic bucket, barrel, or tube..... **8**

8

8a. Five gallon bucket with 1 or 2 funnel(s) on top lid :

Hagfish
p. 24

Funnel
on lid

Funnel

8b. Fifty five gallon barrel with funnels on side and top:

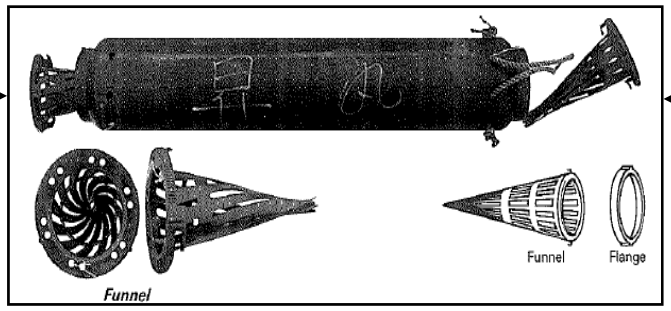
Hagfish
p. 24

Funnel on side

Funnel on top

8c. Cylindrical tube with a funnel at each end:

Hagfish
(Korean Trap)
p. 24



Funnel at each end

9

9a. Plastic trap, oval shaped with round escape rings on top half of trap:

Dungeness Crab **p. 22**
or Rock Crab **p. 26**

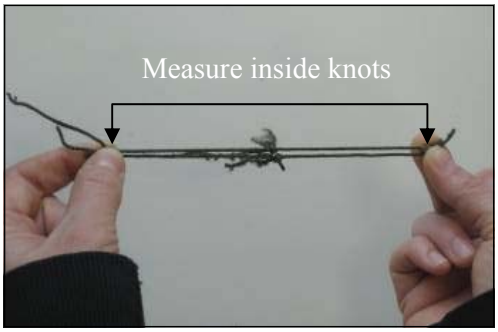
Escape ring

9b. Plastic trap, oval shaped with no escape rings on top half of trap:

Spot Prawn
p. 32

Net Key

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.



1

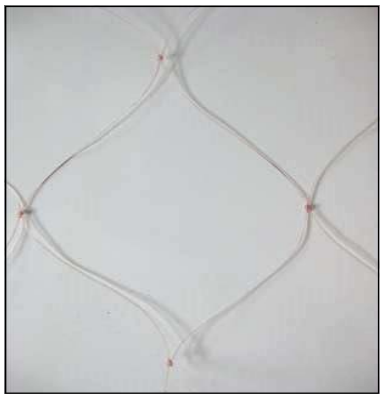
1a. Net mesh made of twine.....2
1b. Net mesh made of monofilament.....3

2

2a. Mesh size greater than 14 inches, commonly 18 inches, green, black or brown in twine color .....**Large mesh drift gillnet (p. 15)**
2b. Mesh size greater than 3.5 inches and less than 14 inches. green, black or brown in twine color, no anchors .....**Small mesh drift gillnet (p. 15)**

3

3a. Mesh size greater than 6 inches, anchors attached, float line marked with fishermen's ID.....**California halibut/white seabass set gillnet (p.14)**
3b. Mesh size greater than 3.5 inches and less than 14 inches, no anchors, monofilament can be pink, blue, or green....**Small mesh drift gillnet (p. 15)**



Monofilament

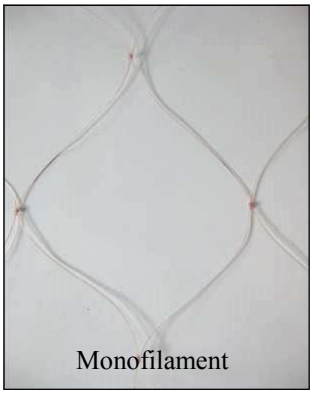
Twine

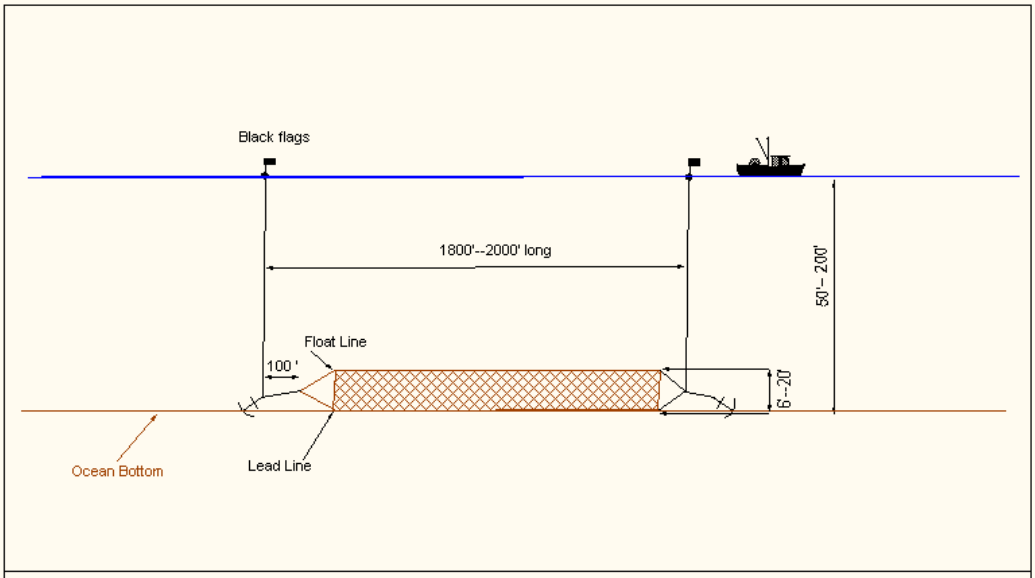
Gillnets

<u>California halibut/white seabass set gillnet</u>—stretched mesh size ≥ 8.5 inches for California halibut or ≥ 6 inches for white seabass

- Net constructed from monofilament line
  - Common monofilament line color: pink, blue, green, clear
- Can be set anytime during a 24 hour period
- Depth of water ranges from 10-50 fathoms with most between 10-35 fathoms
- No more than 9,000 feet of gillnet may be fished in combination for California halibut and angel shark (FGC § 8625c)
- Net will be anchored to bottom and have less floats than drift gillnets
- California gear marking requirements:
  - Buoys (polyball) must be marked with fisherman's ID
  - Float line must be marked with fishermen's ID at least every 270 feet (FGC § 8601.5b)


Pole and radar reflector


Monofilament

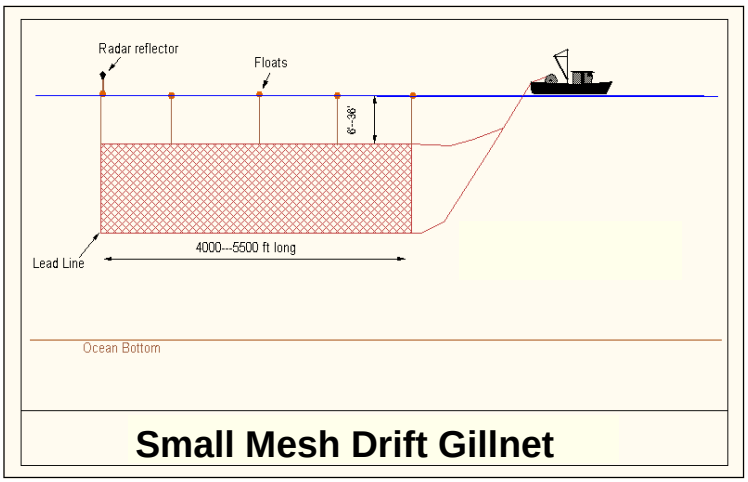


Bottom Gillnet/ Set Gillnet

Gillnets

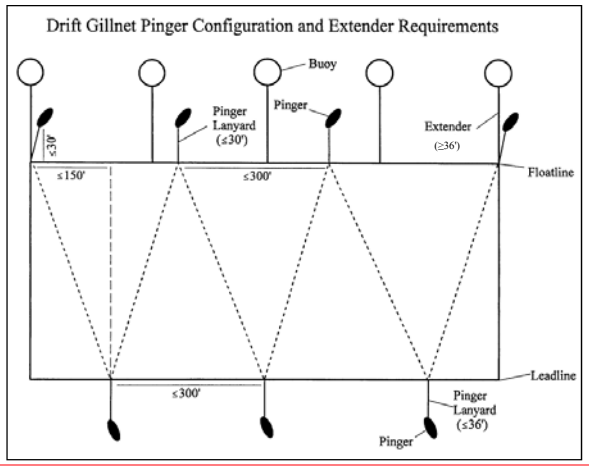
Yellowtail, barracuda, and white seabass small mesh drift gill-net— stretched mesh size between 3.5 inches and 14 inches

- Net constructed from twine or monofilament line
  - See common colors listed in other descriptions
- Nets only set at night
- Drift gillnets are up to 6,000 feet long and are set below the surface (see drift gill-net diagram)
- The mesh size depends on target species:
  - Yellowtail and barracuda: ≥ 3.5 inches
  - White seabass: ≥ 6 inches



Thresher shark/swordfish large mesh drift gillnet—stretched mesh size ≥ 14 inches

- Net constructed from twine
- Most common twine color: green, black, and brown
- Nets attached to boat and only set during the night
- Gillnet can be up to 6,000 feet in float line length (FGC § 8573 b)
- Stretched mesh size usually 18 to 22 inches



Line

Three main types of line used in commercial fishing

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

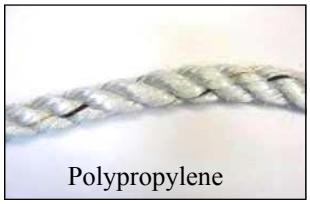
Common line diameter

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

Poly-line

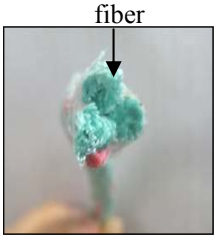
Polypropylene

- 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



Polysteel™, Blue Steel™

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

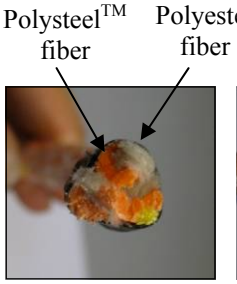


Polyester

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

Hydropro™ Neutral Buoyancy

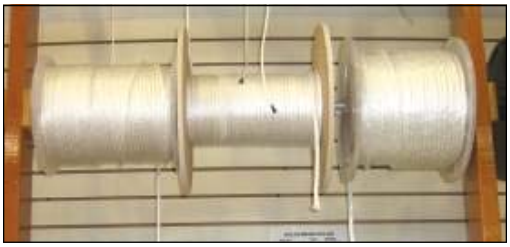
- Orange colored
- Polysteel™ fibers mixed with polyester
- Originally designed for use by crab and lobster fishermen on the east coast to reduce right whale entanglements; available on west coast



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

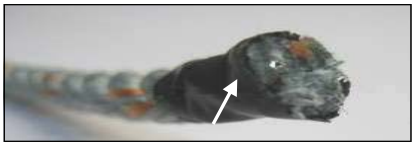


Nylon

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

Other line types

Nylon twine

- Color: brown, green, tan, or white
- Multifilament, three twisted strands
- Used as mesh in drift gillnets

Monofilament

- Color: many colors, including clear
- Single strand of material
- Used as mesh in gillnets

Cotton twine (untreated)

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

Fishery Reference Sheets

California Nearshore Live Fish

Line
Material: Poly-line
Width: 5/16th inch
Color: Various colors

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

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

Configuration
- Single trap with one or more buoys

Special Considerations
- California nearshore trap permit allows for the commercial take of: black-and-yellow rockfish, gopher rockfish, kelp rockfish, California scorpionfish, greenlings, China rockfish, grass rockfish, California sheephead, and cabezon
- Can not leave gear to fish out overnight, trap door can be left open (FGC § 9001.7d)
- Deeper nearshore permit available but not included on map

Trap limit
- No more than 50 traps may be used in state waters along the mainland shore (FGC § 9001.7h)

2 x 2 inch mesh

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

Cabezon

California Nearshore Live Fish

Fishery distribution
Common depths fished: 0-20 fm

Geographic Range of Effort

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

General Fishing Season/Structure

	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)							

Coonstripe Shrimp

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

Buoys
Bullet buoy or polyball with clear identification of owner
Pole, flag, light, radar reflector are also required in Oregon.

Trap Description
- Tapered circular traps (Ladner Traps)
- ½ inch square cord mesh over a steel frame
- 39 inches in diameter by 16 inches tall
- Entry funnel = 3 inch diameter
- Destructive device required by law (FGC § 9003)

Configuration
- Set of 10 to 15 traps connected to a long line
- Weighted at both ends and marked with a bullet buoy or polyball

Marking Requirements
- California: Buoy needs to be marked with license number (FGC §9006)
- Oregon: Marked at each terminal end with a pole and a flag, light, radar reflector, and a buoy showing clear identification of the owner or operator (OAR 635-004-0035)

Trap limit
- No limit, fishermen use 500 traps or less

Drawstring on bottom of trap


Coonstripe shrimp

Coonstripe Shrimp

Fishery distribution
Common depths fished: 20-30 fm

Geographic Range of Effort

- Concentrated around Crescent City, California
- Some recent effort in southern Oregon, Brookings

General Fishing Season/Structure

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
California					(CCR §180.15, Title 14)							
Oregon	(OAR 635-005-0205)											

Dungeness Crab

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

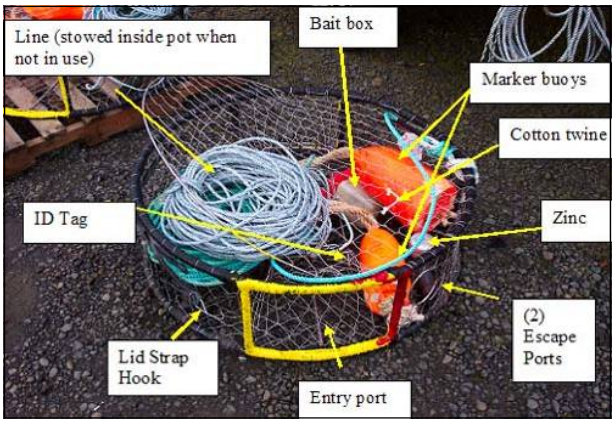
Buoys
Bullet buoy with clear identification of owner
Trap tags required in Oregon and Washington

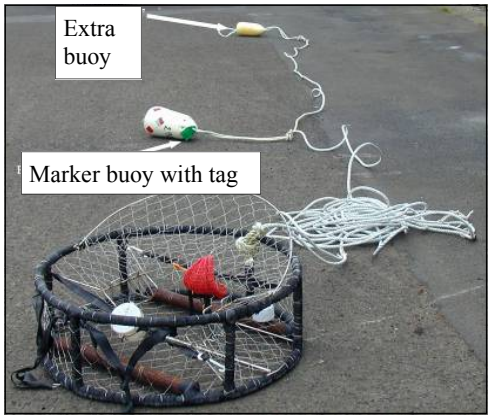
Trap Description
- Mainly circular steel frame, wrapped in rubber (some use plastic Fathoms Plus traps)
- 3 to 3.5 feet diameter is the most common
- Stainless steel wire mesh, 2"x 2"
- Traps weigh 60 to 120 pounds
- Two rigid circular escape rings greater than 4.5 inches inside diameter on the top or side of the trap, required in all three states
- Destructive device required by law in all three states; common material is untreated cotton twine or other natural fiber (FGC § 9003, OAR 635-005-0055, WAC 220-52-035)

Configuration
- CA/OR/WA: Single trap fished per line with one or more buoys attached

Gear Marking Requirements
- California: Buoy marked with license number (FGC §9006)
- Oregon: Trap tag, buoy tag, and buoy marked with identification of vessel or owner (ORS §509.415, OAR 635-005-0055)
- Washington: Trap tag, buoy tag, and buoy marked with vessel identification or license number plus phone number; buoy colors unique to a license (WAC 220-52-040)
- Washington Indian tribes: Buoys branded with two digit number unique for each tribe followed by fishermen's unique ID number

Trap limits
- California: No limit*
- Oregon: 200, 300, or 500 per permit
- Washington: 300 or 500 per permit





* As of 2013, a 7-tier trap limit system will be implemented, ranging from 175 to 500 traps per permit. Buoy tags will also be required, similar to Oregon and Washington

Dungeness Crab

Geographic Range of Effort

- Entire coastline, north of Point Conception, California

General Fishing Season/Structure

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Washington State/Tribes	(WAC 220-52-046)											
	(No specific regulations)											
Oregon	(OAR 635-005-0045)											
N. California	(FGC § 8276)											
S. California	(FGC § 8276)											

Hagfish

Line
Material: Nylon, poly-blend and nylon blend
Width: 5/16th or 3/8th inch
Color: Various colors

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

Trap Description

California

- 5 gallon buckets
- Korean cylindrical trap: molded plastic cylinder, not to extend 24 inches long and 6 inches 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 inch opening (WAC 220-88E-030)

Configuration

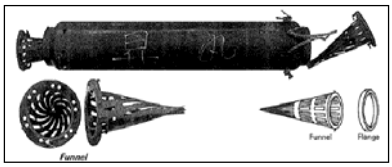
- Strings of 10 to 20 traps, 20 drums per string is common
- Float line attached to ground line, weighted at both ends, traps attached to ground line at regular intervals
- Some use longline snaps to attach traps, some tie the trap to the line, depending on effort

Trap limits

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

Funnel

Korean cylindrical trap



5 gallon buckets

Entry funnels on top, escape holes on side

55 gallon plastic drums

Entry funnels on top and sides, escape holes on side

Hagfish

Fishery distribution
Common depths fished: 50-125 fm

Geographic Range of Effort

- 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)											

Rock Crab

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

Buoys
Bullet buoy or polyballs marked with license number; 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 ¼" diameter), two rings required if using less than 1 7/8 x 3 7/8 inch wire mesh (FGC § 9011)
- Destructive device required by law (FGC § 9003)
- Some use plastic Fathoms Plus traps

Configuration

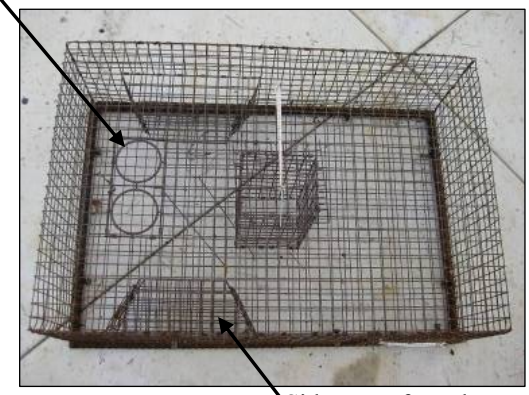
- Most fish single traps with a single buoy
- Some fish 5 to 25 traps connected to a common ground line

Trap limit

- No limit, 200 traps is common

Wire mesh trap with entry funnels and escape rings on top

Fathoms Plus brand plastic traps are sometimes used



Rock Crab

Fishery distribution
Common depths fished: 10-35 fm

Geographic Range of Effort

- 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)											

Sablefish Trap

Line
Material: Nylon, poly-blend, and nylon blend
Width: 5/16th or 3/8th inch
Color: Various colors

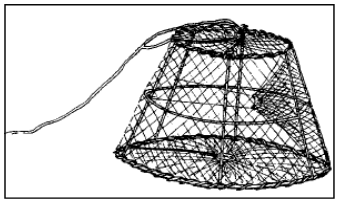
Buoys
Large polyball with clear identification of owner, pole, flag, light, and radar reflector
California: License number + "B" (FGC § 9006)

Trap Description
- Rectangular , conical, and trapezoidal traps
- 2"x 2" nylon mesh opening
- Conical shaped pots have collapsible bottoms
- Common sizes are 36" and 72" diameter
- Common height is between 28" to 32"
- California trap size limit: 96" diameter or less (FGC § 9001.8)
- Destructive device required by law on all traps: must leave 8 inch diameter opening (FGC § 9003, OAR 635-004-0035, WAC 220-44-030)

Configuration
- Open access fishery: One to four traps attached to float line, large polyball and pole, some use stings of traps
- Limited access fishery: Strings of traps, weighted at each end, 20 to 50 pots per line

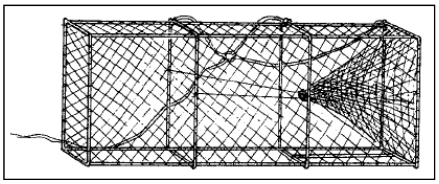
Trap limit
- No limit, fisherman use 500 traps or less

Management
- Managed by the Pacific Fishery Management Council
- There are two ways to fish for sablefish: with a limited entry permit or open access
- 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



Conical trap

Trapezoid trap



Rectangular trap

Sablefish Trap

Fishery distribution
Common depths fished: 100-375 fm

Geographic Range of Effort

- Fishing depths vary for open access and limited entry permit,
- 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 entry	(Regulated by Federal Fishery Management Plan)											
All States, Tier endorsed limited entry				(Regulated by Federal Fishery Management Plan)								

Spiny Lobster

Line
Material: Poly-blend
Width: 3/8th inch
Color: All, yellow and blue common

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

Trap Description

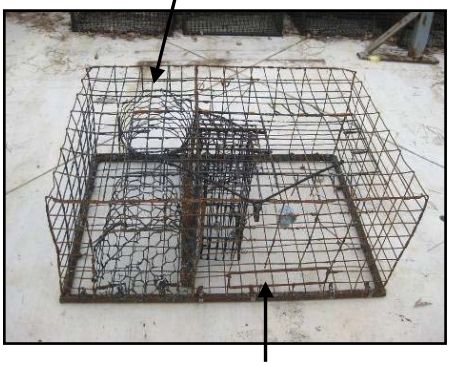
- Rectangular traps made of wire or plastic
- 2"x 4" inch wire mesh
- Dimensions vary from 28"x 36"x 14" tall to 36"'x 48" x 20" tall
- Heavier wire used along base of the trap if fishing at shallow depths: surf zone to 20 fm
- Rectangular escape port required by law: $2^{3/8}$ x $11^{1/2}$ inches parallel 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

- No limit, 150 traps is common



Lobster traps with blue and red poly-line and long bullet buoys

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

Bullet buoys and small floats used in combination

Spiny Lobster

Fishery distribution

Common depths fished: 0-16.6 fm, effort to 40 fm

Geographic Range of Effort

- 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)											

Spot Prawn

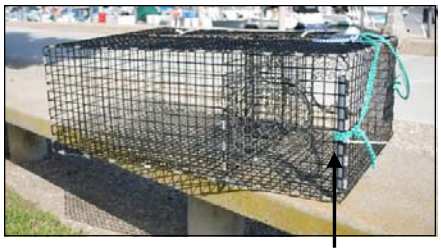
Line
Material: Poly-blend or nylon
Width: 5/16th inch
Color: All colors

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

Small mesh funnel

Trap Description

- Rectangular wire mesh traps most common in California; round cord mesh traps most common in Oregon and Washington
- 1"x 1"mesh size is common
- Fathom Plus plastic traps can be used
- Wire trap dimensions: 3'x 1.5'x 1' with two chambers
- Traps attached to ground line with a pot snap (p. 34)
- Washington: maximum dimensions: 153" bottom perimeter and max 24" height (WAC 220-88B-040)
- Oregon: fish traps (p. 10) and sablefish traps (p. 9, 11) may also be used
- Destruction device required by law; escape size:
    - California: 5" diameter (§ 180.2, Title 14)
    - Oregon: 8 "diameter (OAR 635-004-0035)
    - Washington: 3"x 5" (WAC 220-88B-040)



1 x 1 inch wire mesh, no escape ring

Configuration

- Strings of traps can be up to one mile long
- Traps set 100 to 400 feet apart
- One large heavy weight at the front end of the string of traps
- California: 10-50 traps/string, Oregon: 60-80 traps/string, Washington: 50-100 traps/ string

Round trap used in Oregon and Washington

Trap limits

- California: 300 or 500 per permit
- Oregon: currently no limit
- Washington: 500 per permit

Spot Prawn

Fishery distribution
Common depths fished:
California: 100-150 fm
Oregon: 80-140 fm
Washington: 70-120 fm

Geographic Range of Effort

- Pockets of fishing effort in southern California, southern Oregon, and Washington

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)											
N. California	(§ 180.1, Title 14)											
S. California		(§ 180.1, Title 14)										

Sablefish Longline

Line
Material: Sinking leaded line, nylon, or some are using poly-blend
Width: 5/16th inch
Color: Dark with lead core or various colors

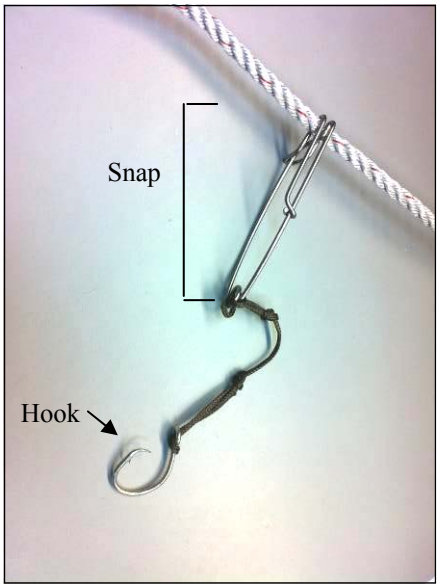
Buoys
Large polyball with clear identification of the owner and each terminal end marked with a pole, flag, light, and radar reflector

Configuration

- The ground line is set on the bottom with an anchor (25-50 pounds) at each end
- Ground line can be up to 1.5 nautical miles
- Hooks are attached to the ground line every 3 to 4 feet using either a snap or tied on using a "gangion" made of nylon or mono-filament line (see photo to left and photo on p. 36)
- Circle hooks, size 7/0, are common

Management

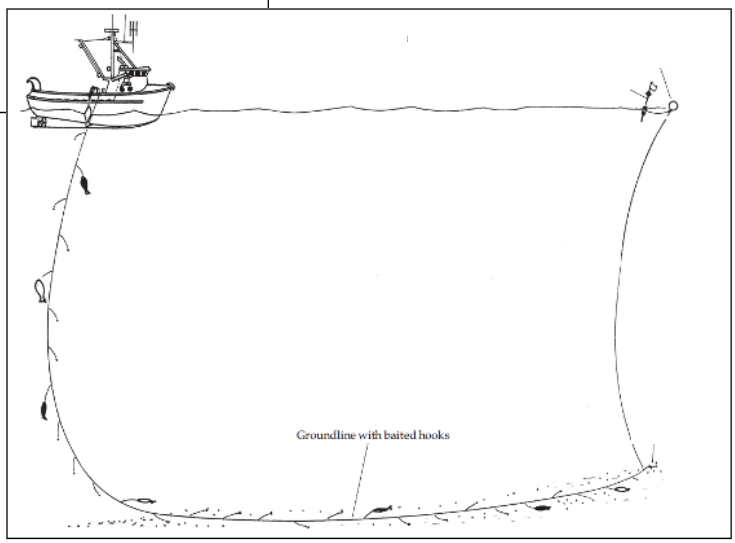
- Managed by the Pacific Fishery Management Council
- There are two ways to fish for sablefish: with a limited entry permit or open access
- Limited entry permits are endorsed by gear type



Snap and hook that attaches to ground line

Sablefish longline hook

Tubs of longline gear



Sablefish Longline

Fishery distribution
Common depths fished: 100-450 fm

Geographic Range of Effort

- Fishery operates along the entire coastline
- Main landings occur in Washington, Oregon and northern California

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 entry	(Regulated by Federal Fishery Management Plan)											
All States, Tier endorsed limited entry				(Regulated by Federal Fishery Management Plan)								

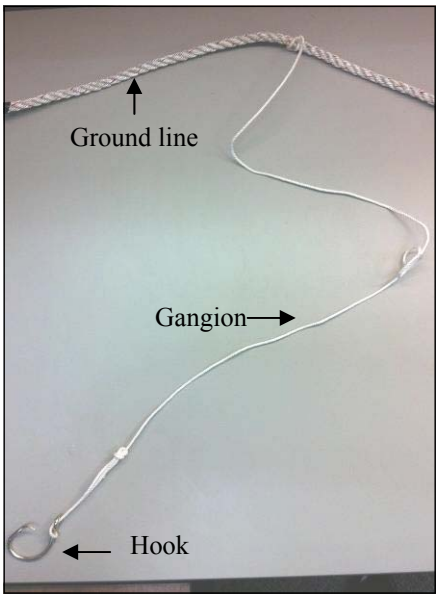
Pacific Halibut Longline

Line
Material: Sinking leaded line or nylon
Width: 5/16th to 3/8th inch
Color: dark with lead core

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

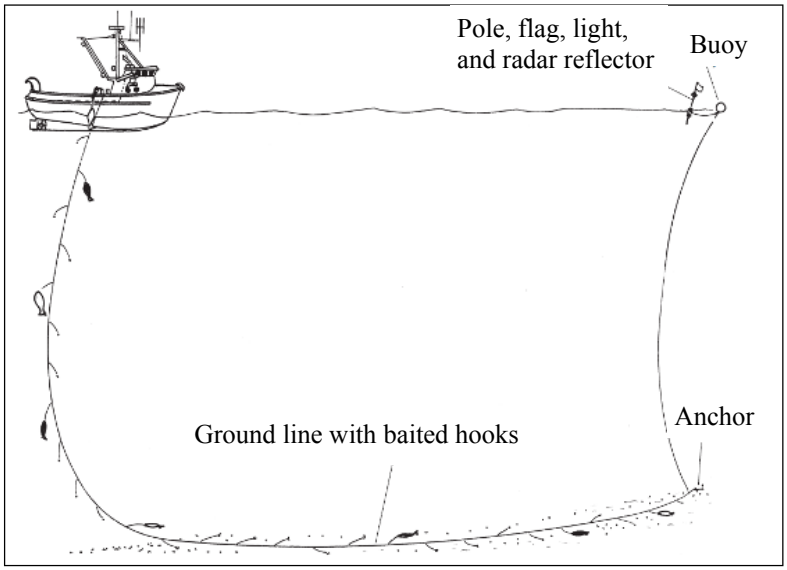
Configuration
- The ground line is set on the bottom with an anchor (25-50 pounds) at each end
- Ground line can be 3 nautical miles or more
- Up to 800 hooks are used per line
- Circle hooks, size 16/0, are common
- Hooks are attached to the ground line using a "gangion" made of nylon or monofilament line; can be tied (see photo) or attached via snap (p.34)

Management
- Managed by the International Pacific Halibut Commission (Area 2A: CA, OR, WA)
- Directed commercial fishery is restricted to ten-hour periods; fishing period based on vessel size



Hook attached to ground line with gangion


Pacific halibut longline hook



Pacific Halibut Longline

Fishery distribution
Common depths fished: 30-150 fm

Geographic Range of Effort

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

General Fishing Season/Structure

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Directed Commercial						(Federally managed)						
Treaty Indian tribes			(Federally managed)									

California Halibut/White Seabass Set Gill Net

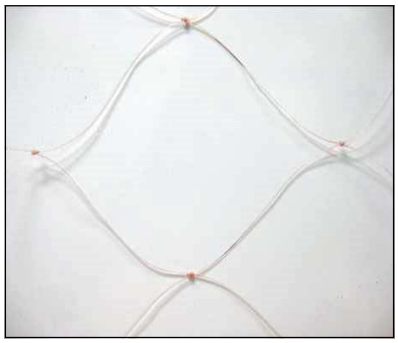
Net
Mesh Size: depends on the target species, 8.5 to 12 inches for California halibut or 6 inches for white seabass (FGC§8625, §8623)
Color: monofilament is clear with slight pink, green, or blue coloration.

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

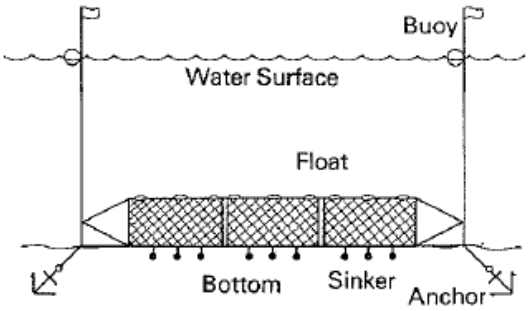
Configuration
- Multiple panels of netting are connected and set using anchors
- Sinkers, or additional weight, may be attached to the lead line (see diagram)
- No more than 9000 feet of gillnet may be fished in combination (FGC §8625c)

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 feet (FGC § 8601.5)

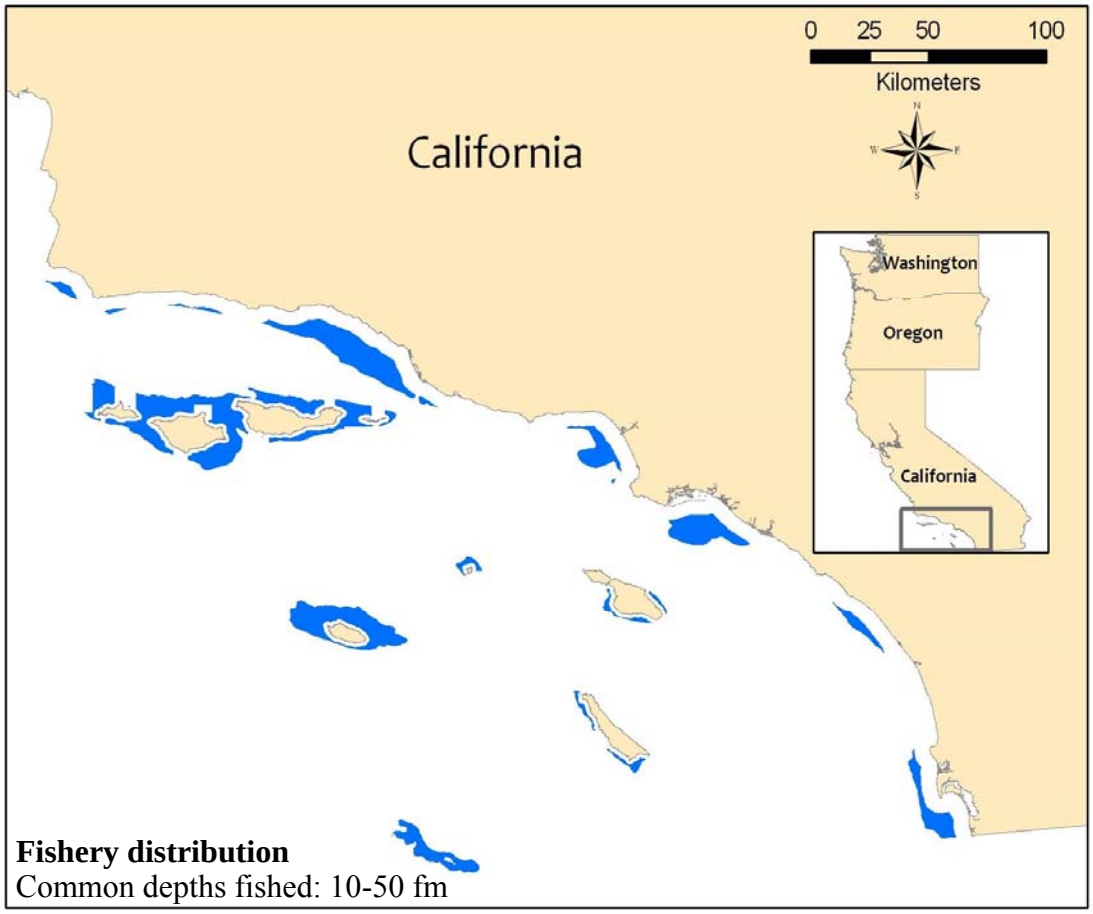


Monofilament mesh

Nylon twine mesh



California Halibut/White Seabass Set Gill Net



Fishery distribution
Common depths fished: 10-50 fm

Geographic Range

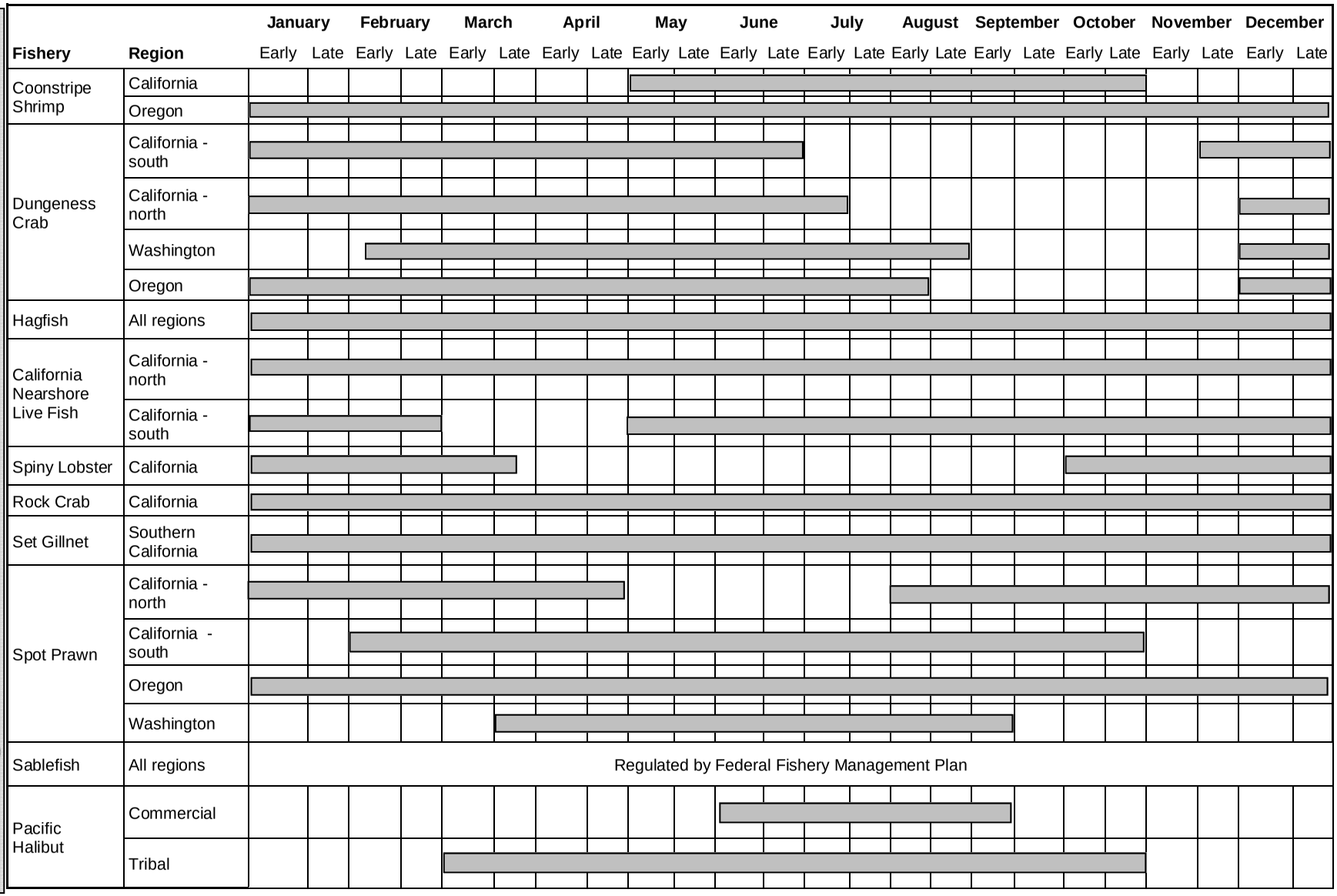
- Southern California only, concentrated between 10 and 35 fathoms
- Main landings: Santa Barbara, Los Angeles, and San Diego
- Fishery restricted from fishing within 3 miles of mainland and 1 mile from off-shore islands (FGC § 8610.1-8610.3)

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)

Fishing Season Overview

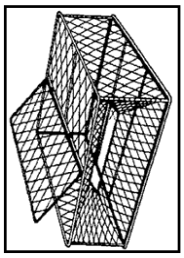


Fishing Gear From Other Regions

Alaska

Traps unique to this area include large conical and rectangular crab traps. The rectangular traps can be retrofitted to fish for Pacific cod, as well. Fishermen in Alaska also fish for prawns and shrimp with conical traps.

Conical crab pot
Dimensions: 88" base diameter x 32" tall, 27.5" top opening



Crab or Pacific Cod

Rectangular crab traps
Made from galvanized steel and are covered with polypropylene mesh
Dimensions: 89" x 89"x 36"

Gear marking: All buoys need to be marked with Alaska Department of Fish and Game numbers. King crab traps are marked individually with a trap tags similar to the dungeness crab fisheries in Oregon and Washington.

British Columbia, Canada

British Columbia commercial fishermen use traps similar to California, Oregon, and Washington for their dungeness crab, rock crab, spot prawn, and sablefish fisheries.

Gear marking: Vessel identification is required on either a tag, float, or buoy which is affixed to the fishing gear.

Sablefish

Spot prawn

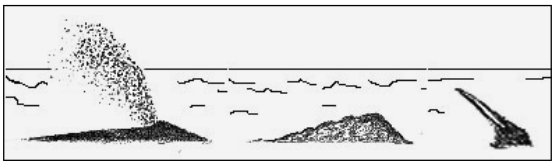
Baja California, Mexico

Baja California has many artisanal fisheries, which use handmade nets and traps. These fisheries likely use a wide variety of line and buoy types. Buoys can include plastic bottles. The Marine Stewardship Council certified a community-based lobster fishery in southern Baja California that uses traps similar to the ones in southern California.

Whale Information

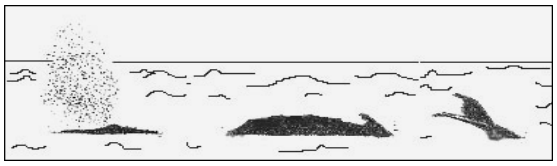
Gray Whale

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 observable October to July.



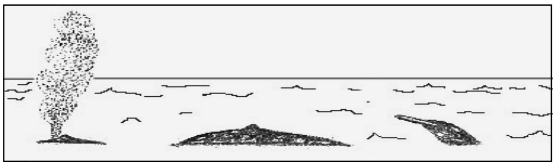
Humpback Whale

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; most observable in May through September; endangered.



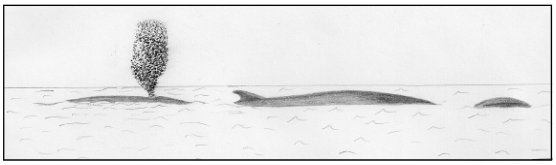
Blue Whale

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 Oregon; most observable from May through September; endangered.



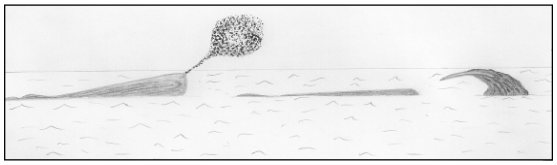
Fin Whale

Body coloration is solid grey 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; can be seen year-round, but typically seen during the summer and winter months; endangered.



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 year-round in California waters; reaches peak abundance from April through mid-June and from the end of August through mid-November; endangered.



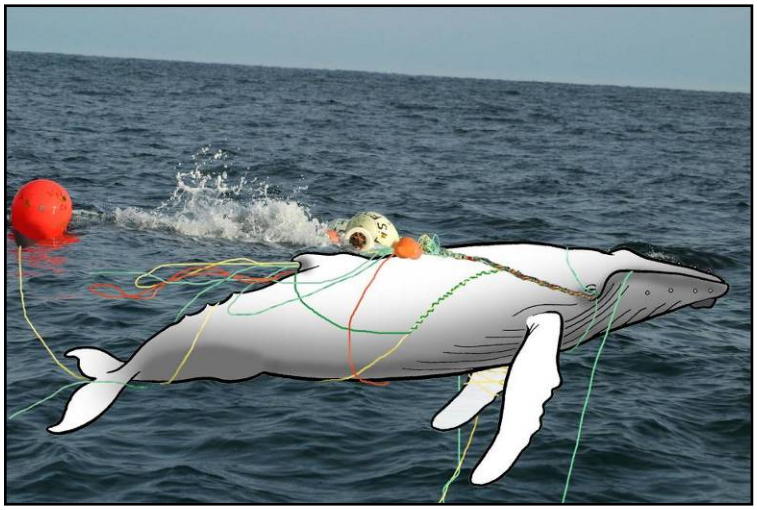
Information from the California Whale Watching Guidelines, Drawing courtesy of Monica DeAngelis

Reporting injured, entangled, stranded or ship-struck whales

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

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



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

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) SOS-WHAL*** 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.

Please be aware that it is sometimes not possible or appropriate to respond to every entanglement or otherwise distressed marine mammal. Ship-struck animals may be monitored and assessed.

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

Entanglement

- Buoy(s)
- Line(s)
- Netting
- Attached trap

Fluke with line and buoy

Head with line

Dorsal area with line and buoys

Head area with netting

Photos provided by Provincetown Center for Coastal Studies taken under NOAA permit 932-1489, under the authority of the U.S. Endangered Species and Marine Mammal Protection Acts

Buoys trailing behind whale

Pectoral fin wrap

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Photo/Diagram credits

Page 5: Sablefish trap configuration: Monica DeAngelis, Hagfish gear configuration diagram: Massachusetts Division of Fisheries

Page 6: Longline diagram: ORESU-G-03-010, Set gillnet diagram: Yamaha Fishery Journal, 1984

Page 7: Radar reflector: Russ Vetter, National Marine Fisheries Service (NMFS)

Page 8: Trap configuration photo: ODFW, Anatomy of a Dungeness crab trap; Oregon Dungeness crab pot tags: DeAnna Erickson and Cyreis Schmitt, ODFW

Page 9: Dungeness crab trap diagram: CDFG; Coonstripe shrimp: Brooke McVeigh, CDFG; Sablefish conical trap diagram: NMFS-AFSC-35; Sablefish trapezoid trap: Ladner traps, black cod

Page 10: Spot prawn and finfish traps: Steve Escobar, commercial fisherman

Page 11: Sablefish rectangular trap: ORESU-G-08-002; Hagfish bucket: Dan Lawson, NMFS; Hagfish funnel: Susan Scott, Honolulu Star; Korean trap: Yamaha Fishery Journal 1984

Page 12: Trap drawing: Fathoms Plus Specifications, 2009

Page 14: Set gillnet drawing: Manny Aschemeyer. 2006. Fishing nets deployed. Marine Exchange of Southern California

Page 15: Small mesh drift gillnet drawing: Manny Aschemeyer. 2006. Fishing nets deployed. Marine Exchange of Southern California, Drift gillnet pinger diagram: 50 C.F.R. Figure 1 to Part 229

Page 16: Special thanks to Englund Marine for supplying samples of fishing line

Page 18: Finfish traps: Steve Escobar, commercial fisherman

Page 20: Coonstripe shrimp trap: Brooke McVeigh, CDFG; coonstripe shrimp: J. Bieraugel

References

Page 22: Configuration photos: ODFW, Anatomy of a dungeness crab trap; Dungeness crab trap drawing: CDFG
Page 24: Hagfish funnel: Susan Scott, Honolulu Star; Korean trap diagram: Yamaha Fishery Journal, 1984; 5 gallon bucket: Dan Lawson, NMFS; Gear configuration diagram: Massachusetts Division of Fisheries
Page 28: Conical and rectangular trap diagrams: ORESU-G-08-002; Trapezoid trap: Ladner traps, black cod; Gear configuration diagram: NMFS-AFSC-35
Page 32: Bottom photo: Steve Escobar, commercial fisherman
Page 34: Configuration diagram: ORESU-G-03-010
Page 38: Configuration diagram: Yamaha Fishery Jouranl, 1984
Page 41: Conical crab trap: Klas Stolpe, Alaska Journal of Commerce. 'Phenomenal' domestic demand for bay's red king crab. October 30, 2009; King crab trap diagram: FAO, Fishing with traps and pots; Rectangular crab trap: United States Coast Guard, Press Release October 11, 2005.; Sablefish trap: Canadian Sablefish Association; Spot prawn trap: http://wildbcspotprawns.com, Pacific Prawn Fisherman's Association
Page 42: Diagrams courtesy of Monica DeAngelis and the California Whale Watching Guide
Page 43: Provincetown Center for Coastal Studies taken under NOAA permit 932-1489, under the authority of the U.S. Endangered Species and Marine Mammal Protection Act
Page 44: Bottom left: Ryan Burns, Times-Standard April 15, 2008, http://www.times-standard.com/ci_8929145?IADID=Search-www.times-standard.com-www.times-standard.com; All other photos: Provincetown Center for Coastal Studies taken under NOAA permit 932-1489, under the authority of the U.S. Endangered Species Act and Marine Mammal Protection Act
**Unless noted above, all photos were taken by Lauren Saez, NMFS

Acknowledgements

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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 metre (1 m) = 3.281 feet	1 foot = 0.305 m
1 metre (1 m) = 0.546 fathoms	1 fathom = 1.83 m

Appendix—Scientific Names

Black-and-yellow rockfish	*Sebastes chrysomelas*
Blue whale	*Balaenoptera musculus*
Cabezon	*Scorpaenichthys marmoratus*
California barracuda	*Sphyraena angentae*
California halibut	*Paralichthys californicus*
California scorpionfish	*Scorpaena guttata*
California sheephead	*Semicossyphus pulcher*
California spiny lobster	*Panulirus interruptus*
China rockfish	*Sebastes nebulosus*
Coonstripe shrimp	*Pandalus danae*
Dungeness Crab	*Cancer magister*
Fin whale	*Balaenoptera physalus*
Gopher rockfish	*Sebastes carnatus*
Grass rockfish	*Sebastes rastrelliger*
Gray whale	*Eschrichtius robustus*
Hagfish	*Eptatretus stoutii*
Humpback whale	*Megaptera novaengliae*
Kelp Greenling	*Hexagrammos decagrammus*
Kelp rockfish	*Sebastes atrovirens*
Pacific angel shark	*Squatina californica*
Pacific halibut	*Hippoglossus stenolepis*
Rock Crab (yellow, brown, red)	*Cancer anthonyi, Cancer antennarius, Cancer productus*
Sablefish	*Anoplopoma fimbria*
Shortfin mako shark	*Isurus oxyrinchus*
Sperm whale	*Physeter macrocephalus*
Spot prawn	*Pandalus platyceros*
Swordfish	*Xiphias gladius*
Thresher shark	*Alopias vulpinus*
White seabass	*Atractoscion nobilis*
Yellowtail	*Seriola lalandi*

Contact Information

Protected Resources Division
Southwest Regional Office
National Marine Fisheries Service
501 West Ocean Boulevard
Long Beach, CA 90802-4213
Website: http://swr.nmfs.noaa.gov/psd/prd.htm
Phone: (562) 980-4000
February 2012

Appendix B

Fishery definitions: unique target species/gear type combinations

Fishery	Target Species	Gear Type
California nearshore live finfish	Black and yellow rockfish, cabezon, California sheephead, California scorpionfish, China rockfish, grass rockfish, greenlings in genus *Hexagrammos*, gopher rockfish, and kelp rockfish	Trap
Coonstripe shrimp	Coonstripe shrimp	Trap
Dungeness crab	Dungeness crab	Trap
Hagfish	Hagfish	Trap
Pacific halibut longline	Pacific halibut	Longline
Rock crab	Brown rock crab, red rock crab, yellow rock crab	Trap
Sablefish trap	Sablefish	Trap
Sablefish longline	Sablefish	Longline
California halibut/white seabass set gillnet	California halibut, white seabass, flatfish, Pacific angel shark	Gillnet
Spiny lobster	Spiny lobster	Trap
Spot prawn	Spot prawn, spot shrimp	Trap

Appendix C
PacFIN data request and processing

PacFIN general information, database tables, column descriptions, and code lists can be found at: http://pacfin.psmfc.org/pacfin_pub/data.php

Fishery codes from PacFIN used for data request:

1. Coonstripe Shrimp: **C 817, O 808, W 572**
2. Dungeness Crab: **C 800, O 824, W 561**
3. Hagfish: **UHAG**
4. Rock Crab: **RCRB**
5. Sablefish **SABL**
6. Spiny Lobster: **LOBS**
7. Spot Prawn: **SPRW**
8. CA set gillnet: **CHLB** and **WBAS**
9. All Groundfish: MGRP **= GRND**
10. Pacific Halibut: **PHLB**

Data request: Yearly average landings per fishery, per gear type, per port complex, per quarter over 5 year time periods. Time periods: 2004-2008, 1999-2003, 1994-1998.

<u>Example PacFIN SQL code</u>

1. Rock Crab

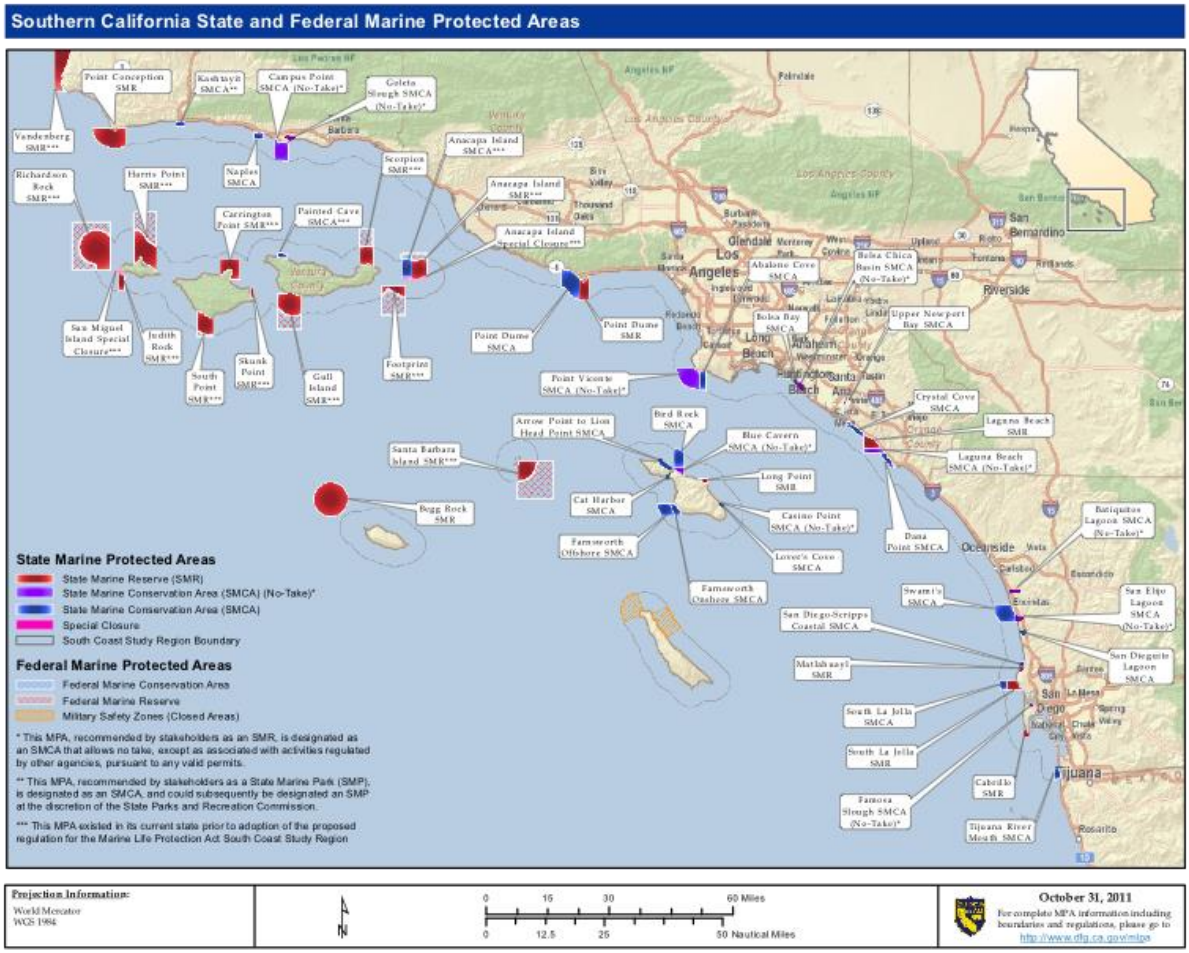
```
select
ft.drvid,ft.ftid,cname,gr.grgroup,gr.description,pcgroup,(round(sum(landed_wt)))
from ft,ftl,agr,apr,pc,asp,sp,gr
where ft.agid=ftl.agid and ft.ftid=ftl.ftid and ft.year=ftl.year and
      ft.month=ftl.month and ft.day=ftl.day and ft.pargrp=ftl.pargrp
      and (agr.agid=ftl.agid and agr.gear=ftl.gear)
      and (apr.agid=ft.agid and apr.port=ft.port)
      and (apr.agid=pc.agid and apr.pcid=pc.pcid)
      and (ftl.category=asp.category and ftl.agid=asp.agid)
      and (ftl.gear = agr.gear and ftl.agid =agr.agid)
      and (agr.grid = gr.grid)
      and asp.spid= sp.spid
      and ft.year between 2004 and 2008
      and ft.month in ('10','11','12')
      and gr.grgroup in ('POT','HKL','NET')
      and cname = 'ROCK CRAB'
      and pcgroup = 'CWA'
group by ft.drvid,ft.ftid,cname,gr.grgroup,gr.description,pcgroup
order by ft.drvid,ft.ftid,cname,gr.grgroup,gr.description,pcgroup
/
```

2. Spot Prawn

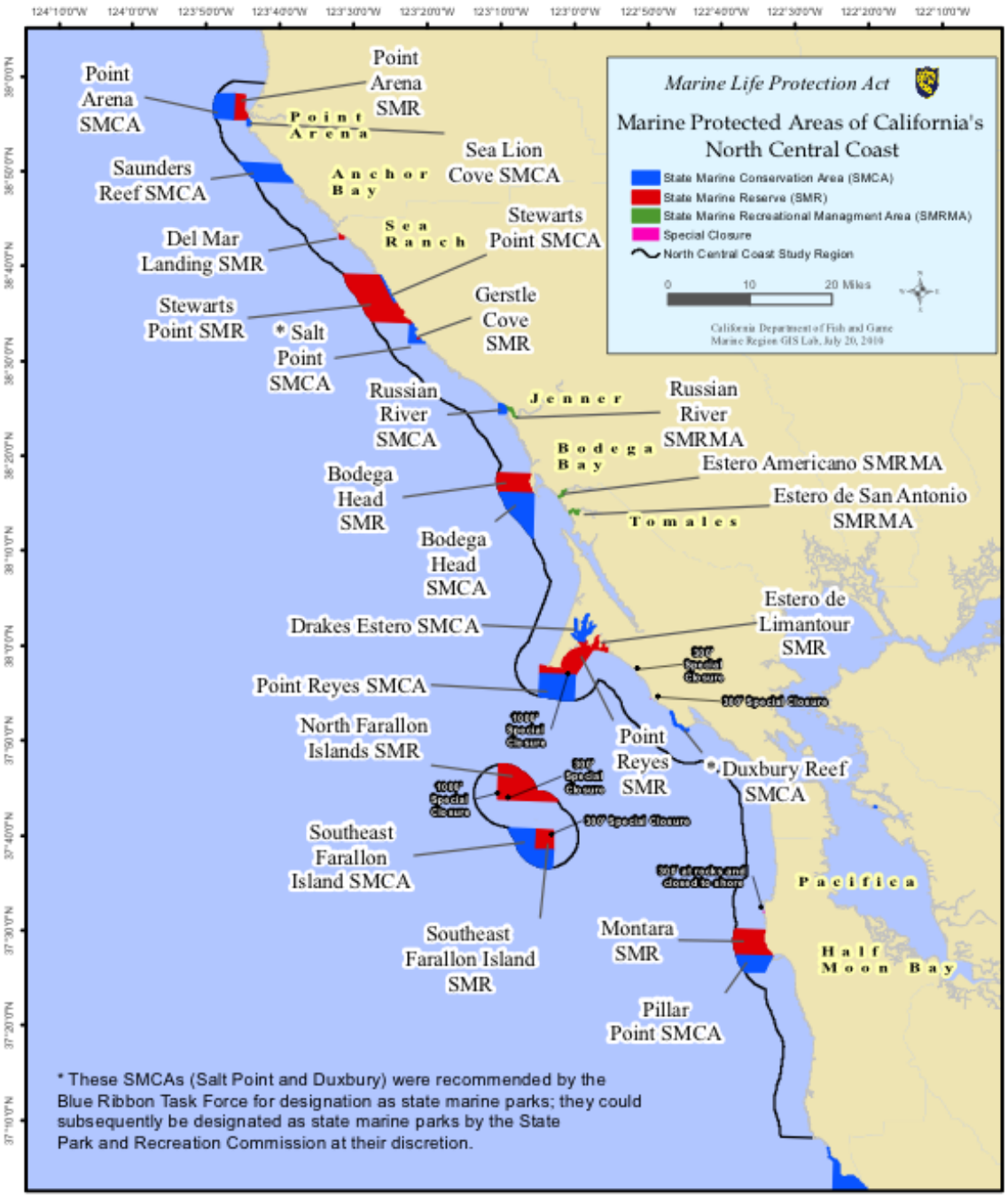
```
select
'2004_2008','Q4',sp.cname,asp.description,ft.agid,gr.grgroup,gr.description,pcgroup,
(round(sum(landed_wt),2))/5,
round(avg(landed_wt),2),count(distinct ft.ftid)
from ft,ftl,agr,apr,pc,asp,sp,gr
where ft.agid=ftl.agid and ft.ftid=ftl.ftid and ft.year=ftl.year and
      ft.month=ftl.month and ft.day=ftl.day and ft.pargrp=ftl.pargrp
      and (agr.agid=ftl.agid and agr.gear=ftl.gear)
      and (apr.agid=ft.agid and apr.port=ft.port)
      and (apr.agid=pc.agid and apr.pcid=pc.pcid)
      and (ftl.category=asp.category and ftl.agid=asp.agid)
      and (ftl.gear = agr.gear and ftl.agid =agr.agid)
      and (agr.grid = gr.grid)
      and sp.spid = asp.spid
      and ft.year between 2004 and 2008
      and ft.month in ('10','11','12')
      and gr.grgroup in ('POT','HKL','NET')
group by '2004_2008','Q4',sp.cname,asp.description,ft.agid,gr.grgroup,gr.description,pcgroup
order by '2004_2008',sp.cname,asp.description,ft.agid,gr.grgroup,gr.description,pcgroup
/
```

Appendix D

California Marine Life Protection Act Marine Protected Areas



SMCA = state marine conservation area SMP = state marine park
SMR = state marine reserve SMRMA = state marine recreational management area



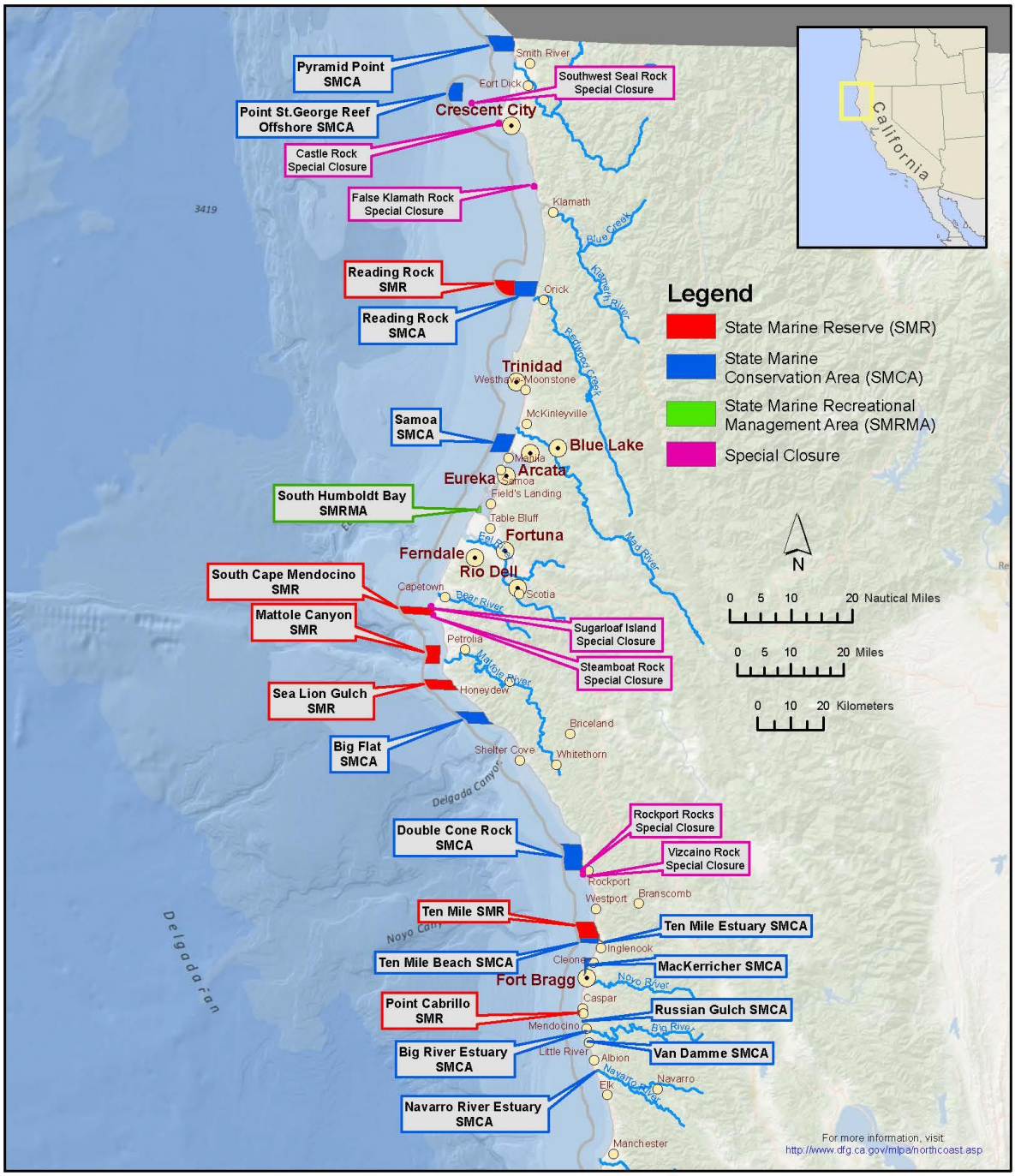
North Central Coast Study Region

California Fish and Game Commission Preferred Alternative

This marine protected area (MPA) proposal was selected on June 11, 2008 by the California Fish and Game Commission (CFGC) as its preferred alternative. The proposal integrated elements from three proposals developed by the North Central Coast Regional Stakeholder Group (NCCSRG) (proposals 1-3, 2-XA, and 4). The preferred alternative was subsequently adopted by the Commission on August 6, 2009 and went into effect on May 1, 2010.

Northern California Marine Protected Areas

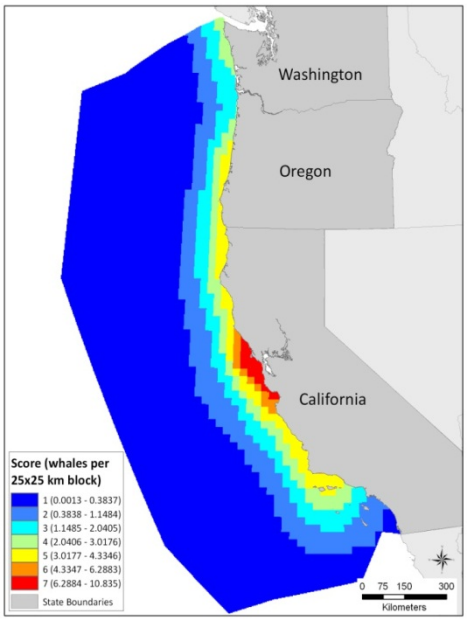
Adopted June 6, 2012



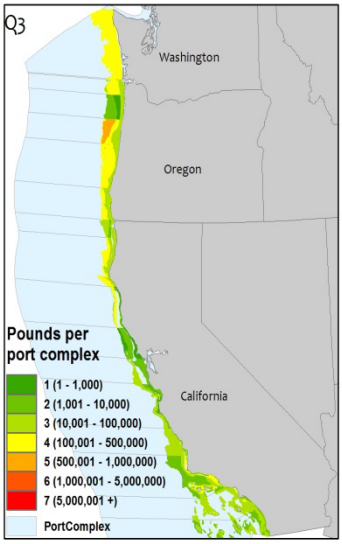
Created by CDFG Marine Region GIS - June 13, 2012 - mr_gis@dfg.ca.gov

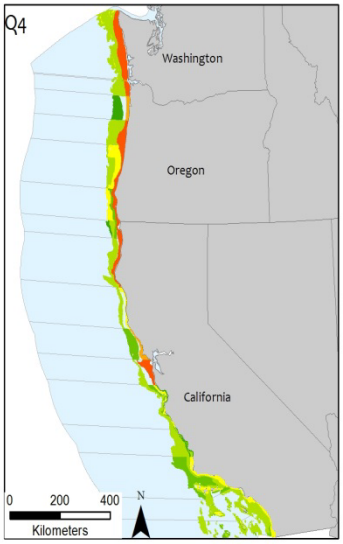
Appendix E: Co-occurrence model walk through

Humpback whale



Fixed gear commercial fisheries





Scaled whale density (1 to 7) multiplied by scaled fixed gear commercial fishing effort (1 to 7) results in a co-occurrence score (1 to 49)