

## Trawl Sampling

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## Introduction

West Coast trawlers target a variety of species, including Dover sole, sablefish, thornyheads, Petrale sole, Arrowtooth flounder, and CA halibut. Trawl catch is often very heterogeneous, containing multiple species of fish and invertebrates in each haul. A trawl trip can last from one to seven days. All West Coast trawlers, with the exception of mothership catcher-vessels, deliver to shore-based processors.

## Trawl Gear and Fishing Strategy

### Trawl Gear

Most trawl vessels on the west coast are stern trawlers. They use one net that is set and retrieved off the sloping stern ramp at the back of the vessel. However, there are also side haulers. These vessels set and retrieve their nets over the side of their vessels (See Figure 4-1 and Figure 4-2).

Trawling involves the towing of a funnel-shaped net behind the fishing vessel (See Figure 4-3). Trawl nets may be towed on or near the seafloor or in the water column. West coast trawlers use “doors” in front of and on each side of the net to spread the mouth of the net horizontally. The doors are pushed apart and down by hydrodynamic forces and by their own weight. Aluminum or plastic floats laced to the headrope on the upper lip of the net

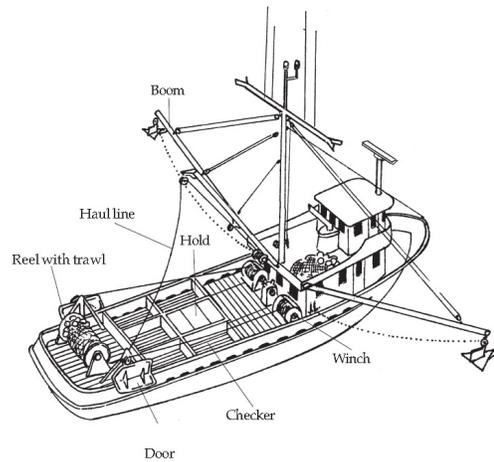
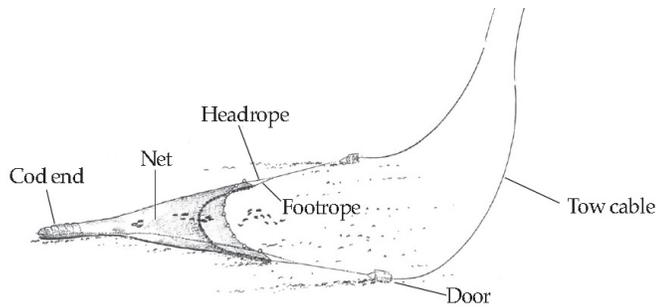


Figure 4-1: Trawl Vessel



Figure 4-2: Side hauling versus stern hauling

and a weighted footrope, laced to the lower lip of the net, hold the net mouth open vertically. The length of the cable (**main wire**) dragging the net behind the vessel determines the towing depth. Trawl nets can be 100' or greater in width across the opening and over 150' long.



**Figure 4-3: Trawl Net**

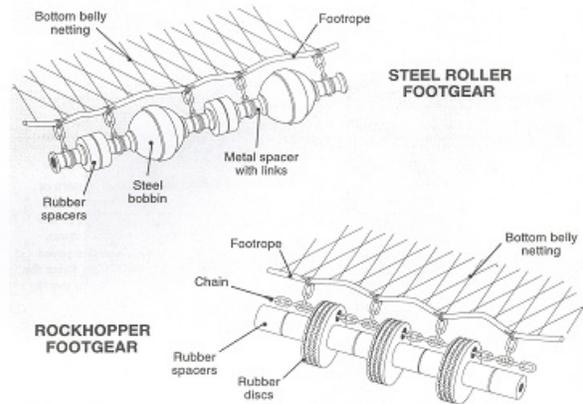
The footrope or groundrope is attached directly to the bottom, leading edge of the mouth of the net. The purpose of the footrope is to separate the target species from the seabed and raise the netting far enough above the seabed to prevent damage. The footrope may be weighted with chain or may be rope-wrapped wire or cable when fishing on a soft bottom. If the net is towed over rough bottoms (as for rockfish) steel bobbins, rubber disks or rubber rollers ('tires') are attached to the footrope. The bobbins are designed to roll and drag over the bottom (See Figure 4-4).

Regulations governing harvest levels in the groundfish trawl fleet have a footrope component. There are two "sizes" of footropes used in the groundfish trawl fleet.

**Large Footrope:** Any footrope that includes one or more rollers that is greater than 8 inches in diameter.

**Small Footrope:** Any footrope where all rollers are less than or equal to 8 inches in diameter.

**Main wire:** The two large cables used to connect the trawl net to the fishing vessel while fishing.



**Figure 4-4: Roller Gear**

There are a variety of types of trawl gear:

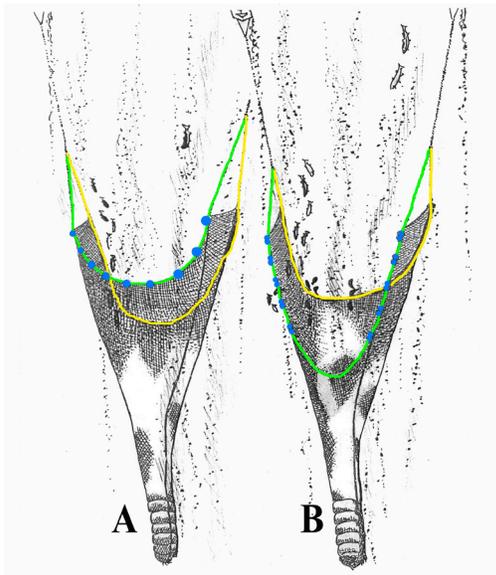
**Bottom Trawl:** One net is towed with the footrope in contact with the seabed. Bottom trawlers include roller (also called bobbin) trawls and Danish and Scottish seine gear. A bottom trawl is generally towed at a speed of two to four knots on or above the sea floor.

- **Selective Flatfish Trawl (Pineapple Trawl):** This net is a type of bottom trawl (See Figure 4-5). It was designed by **WOC fishers** to reduce the catch of rockfish and other overfished species. Fishers used the net in an experimental fishery for two years to prove the efficiency. Based upon the findings, the PFMC now mandates its use in certain areas and/or increases quotas for vessels that use the selective flatfish trawl. The characteristics of this net include:

- A headrope that is cut back and at least 30% longer than the footrope, which allows fish a greater area to escape.
- The expected rise, how high the headrope is above the bottom of the net, at the center is less than or equal to five feet.

Fishing regulations state that gear type 17-Pineapple Trawl/ Selective flatfish net must be used when fishing shoreward of the RCA, North of 40°10'.

- No floats are on the center half or third of the headrope. Floats are only allowed on the wings.
- A two seam, rather than four seam, net.
- A small footrope can only be used with this net.



**Figure 4-5: (A) Trawl net compared to (B) OR Set-back Flatfish net. The yellow lines show the footropes, the green lines show the headropes. The blue circles are the floats.**

**Paired Bottom Trawls (Double Rigged):** Two nets are towed, one net off each side of the vessel from large **outriggers** lowered at 60° angles. The nets are folded on deck or hung from booms when not fishing. They have two sets of doors, one set for each net. Paired nets are often used for pink shrimp (not covered in the Catch Share program).

**Midwater Trawl:** Midwater trawls are generally towed above the ocean floor, although they may be used near the bottom. They are generally towed faster than bottom trawls to stay with the schooling fish they target. All midwater trawls must have a protected footrope without bobbins and rollers. Midwater trawl nets are used to catch Pacific Whiting (Hake), on both shoreside and mothership catcher vessels. Occasionally, they are used to catch certain species of schooling rockfish (e.g., Widow, Yellowtail).

### Fishing Strategy

Trawl gear is used to harvest:

- Deep Water Slope Fish: Sablefish, Dover Sole, Shortspine and Longspine Thornyheads.
- Shelf and Slope Rockfish.
- Midwater Rockfish (Widow, Yellowtail, and Chilipepper).
- Shelf and Slope Flatfish.
- Pacific cod.
- Pacific hake.
- California halibut.
- Pink shrimp.

Trawl gear varies depending on the species sought and the size and horsepower of the boats used.

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**WOC fishers:** Washington, Oregon, and California fishers.

**Outrigger:** Any pole that can be lowered over the side of a boat and used to enhance stability and aid in fishing.



Record Fishing Effort Information



Determine OTC



Vessel sorts Retained from Discarded

# TRAWL SAMPLING



Sample for Species Composition



Observer estimates catch category(s) weight

Figure 4-6: Typical activity of a trawl vessel.

## Trawler Operations

The flow chart above represents typical activity of a trawl vessel.

## Safety Concerns on Trawlers

The equipment used by trawlers can cause serious injury if you are not aware while on deck.

Trawl nets are heavy and in rough seas, tend to roll around the trawl alley or bin. Be careful to avoid putting

any part of your body between the codend and the trawl alley/bin boards, as you can be crushed.

Be especially aware of the main wire and other cables being used to haul in a codend. If these snap, they fly in many directions and can cause major damage to the vessel and serious injury to the crew. Check for fraying on the wires during your first haul back. *Stay in the wheelhouse, with the hatch closed, while the crew is hauling in the codend.* If you are on deck during haul back, always wear your safety helmet.

Be aware that working on trawl vessels often requires a lot of lifting. Take care to use proper lifting techniques on these vessels and wear a back brace if appropriate. Filling baskets partially instead of all the way to the top is a good way to reduce the amount of weight lifted at one time and can reduce the occurrence of back injuries. See Chapter 9, *Health and Safety*, for more information on reducing the risk of back and wrist injuries

## Data Collection on Trawlers

The following trawl fisheries are observed in the WCGOP Catch Share Program:

- Groundfish Trawl (Bottom/Mid-water)
- Shoreside Hake
- Mothership Catcher-Vessel
- CA Halibut

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**Vessel size:** Trawl vessels on the West Coast range from 40-80 feet.

**Duration:** Trawl tows range from 10 minutes to 20 hours, depending on fishery and/or target species..

## Groundfish Trawl Catch Share (limited entry)

Observers collect the following information on trawl vessels:

1. Fishing Effort
2. Total Catch Estimate
3. Catch Category Weight
4. Species Composition
5. Biological Data

This section of the manual is organized in the above order. This order is also the sequence you will normally use to collect data on trawl vessels. Biological Data collection is described in detail in Chapter 7, *Biological Sampling*, and Chapter 8, *Protected Resources*.

## Diversity of Fleet and Effects on Sampling

Although vessel characteristics make the fleet very diverse, sampling protocols are consistent for all net vessels. There are, however, a number of vessel characteristics that influence catch sampling. The most important characteristics that influence sampling are:

1. **Vessel size:** The size and layout of a vessel is often a limiting factor when sampling. A vessel with a small deck may not have enough deck space to hold all the discard. Therefore, the vessel may sort the discard directly out a scupper, over the side or down the stern ramp. On small vessels, observers may not have a designated sample area or a sample area with much space.
2. **Duration of tow:** Tow duration can vary greatly. If a vessel is making long tows, over three hours, observers will have plenty of time to sort and weigh

**Tow composition:** Trawl tows can have as few as five species and as many as 45 species..

samples. Observers on vessels that haul every hour have a limited amount of time to complete sampling duties.

3. **Size of tow:** Vessel size and size of tow are related. Problems are created when a small vessel has a large tow because there is very little room for the work up of samples. It can also create a dangerous working environment.
4. **Composition of tows:** Most tows encountered will have a large diversity of fish species. This is not necessarily a problem for experienced observers that are able to identify species easily. However, the species composition of the tow will affect the sample size. If the vessel has a bag full of tiny thornyheads or flatfish, it may be necessary to reduce the sample size. In the Catch Share program, the proportion on IFQ to non-IFQ species will be an important factor in deciding how to sample.
5. **Sorting technique of crew:** Each vessel will have a unique sorting method. Discuss with the crew prior to the first haul how they sort and the best way to collect samples. Communicating sampling needs to the crew is key to fulfilling sampling requirements. In the Catch Share program the crew is responsible for sorting catch into IFQ groupings.

All of the factors above are interrelated. For example, if a small vessel has short tow durations and large tows, how the combination of these factors affect sampling options needs to be considered.

## Observer Total Catch Estimates (OTC)

Total catch is defined as any organic or inorganic material confined within a trawl net as the net is being landed, as well as any visually discernible catch lost during the

retrieval process that can be reasonably attributed to the vessel. Total catch estimates are visually determined by an observer as the net is being landed or after the catch is dumped on deck.

Observer Total Catch (OTC) is an independent estimate of total catch (retained and discard), made by the observer. OTC must be estimated for all hauls. There are two options for obtaining OTC on trawlers:

- Weight Method 14: Visual Experience
- Weight Method 6: Other

### Weight Method 14 – Visual Experience

Visual estimates are the **preferred** option for total catch weight on trawlers. Prior to the first haul on the vessel, ask the skipper or crew how much their codend holds (by weight) and how much their trawl alley holds. Record the crew's estimates in the Observer Logbook, Vessel Diagrams section. Visually estimate the total weight of each haul. Initially base your estimates on the crew's estimates, as well as the area of the trawl alley and other resources. Record the visual estimate on the front of the Catch Form.

### Weight Method 6 – Other

This weight method should only be used for unobserved hauls and when gear is lost. It should not be intentionally used in other circumstances because it creates confusion for end users and debriefers because it does not indicate how the weight was actually derived. It is typically used on trawl vessels when If this method is used, document

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Crew sorting techniques on groundfish trawl vessels:

1. Crew sorts retained into bins or baskets while leaving discard on deck.

2. Crew sorts out scupper-retained fish. They are taken out of the flow of fish while discards are flushed directly off the vessel.

3. Crew sorts retained into bins or baskets. Discards are tossed or scooped overboard.

4. Crew pre-sorts certain species.
5. Crew sorts from chute that discards directly overboard.

what happened in the observer logbook and on the paperwork.

## Fishing Effort Information

Fishing Effort information includes where vessels fish, how long it takes fishers to catch fish, what fishers are attempting to catch, what type of gear is being used, and how much is being caught. All of this information is recorded on the Trip Form. The front side of the form includes total catch and gear performance information while the back side is the haul location information. The specifics of estimating total catch are discussed in the next section.

## Vessel Logbooks

All trawl vessels are required to record fishing activities in a current logbook, with the exception of Mothership Catcher Vessels (See Figure 4-7). Observers copy information out of this book onto the Trip Form – Haul Locations for groundfish trawlers.

If a logbook is not available, captains often keep a personal journal of fishing effort information that you can use with their permission. If they do not, ask them to record the information on a piece of paper. Some observers may have a handheld GPS to use for coordinates also.

**Tip:** It is important for observers to complete the Trip Form-Haul Locations after each haul. Some vessels may not fill in their Logbook until the steam in and/or record more or fewer hauls than actually occurred. If the Vessel Logbook is reviewed and copied after each haul, the risk of erroneous data recording is reduced.

**EFP:** Permits that allow fishing activities that would be prohibited. The permits are usually written by the states and must pass a vote by the PFMC.

**Trip:** A trip is generated each time a vessel leaves the dock with a catch share observer on board.

Figure 4-7: The Washington-Oregon-California Groundfish Logbook.

## Trip Form Instructions

See "Figure 4-8: Trip Form (front)" on page 4-12 and "Figure 4-10: Trip Form - Haul Locations (back)" on page 4-14.

- **Fishery Sector** (along top right hand border): Circle the fishery type the vessel participated in. Catch share observers will always circle CS. (CS = Catch Share, LE = Limited Entry, OA = Open Access, or EFP = Exempted/Experimental Fishing Permit).
- **Page number:** All Trip Forms are numbered together by trip and separate from all other forms. If there are five trip forms on one trip, number them 1/5 through 5/5.
- **Trip number:** This is an automatically generated number by the database. Complete this field once the trip has been started in the database.
- **USCG number:** Record the six or seven digit USCG vessel number posted on the exterior of the vessel or

Observers must be present for all haulbacks, to observe the process and watch for protected resources. Always choose a safe vantage point.

found in the database. *If the vessel does not have a USCG number, leave field blank and fill in the State Registration Number field.*

- **State registration number:** Use this field only if the vessel does not have a USCG number. The state registration number will begin with a CF in California, OR in Oregon, and WN in Washington.
- **Observer name:** Record your first and last name.
- **Year:** Fill in with appropriate year.
- **Vessel name:** Record the full name of the vessel as it appears on the vessel. For example, record Capt John, not Captain John.
- **Partial trips:** This is a Non-Catch Share field only. Leave this field blank.
- **Total # of fishing days (KNOWN):** This is a Non-Catch Share field only. Leave this field blank.
- **Fishery:** Record the name of the fishery the vessel was selected for: Catch Share, Mothership Catcher-Vessel, or Shoreside Hake.
- **Vessel logbook name:** Record the name of the logbook the vessel is using to record fishing effort information. The following logbook can be used:

Fishery	Vessel Logbook Name
Catch Share	WOC Trawl Logbook

- **Permit number:** Document, the permit number being used. Catch Share vessels use at least one groundfish permit which starts with GF, in capital letters, and is followed by 4 digits, all with no spaces. For example: GF0432. Permit numbers should be acquired by asking the captain of the vessel or can be looked up at: <http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Permits/index.cfm>

- **Vessel logbook page number:** The Vessel Logbook number is the page number(s) where the skipper is recording the trip information. Do not record the number of the entire logbook! Logbook page numbers are located in the bottom left corner of the Washington-Oregon-California logbook. If multiple page numbers were used during a trip, enter only the first page number into the database field. Enter additional page numbers into the trip notes section of the database.

Vessel Logbook Name	Page Number Location
WOC Groundfish Logbook	Bottom left corner (See Figure 4-7)

- **Observer logbook number:** Record the number on the front page of the Observer Logbook used to document information about the trip.
- **Skipper's name:** Record the first and last name of the skipper. If your skipper is not in the database, contact your debriefer to have it added.
- **Number of crew (including captain):** Document the number of crew on the vessel. This should include the skipper, but not yourself.
- **Departure date/time:** Document the date and time the vessel left port. Date must be documented as MM/DD/YYYY. Time must be documented using military time (e.g. 1400).
- **Return date/time:** Document the date and time the vessel returns to port. Date must be documented as MM/DD/YYYY. Time must be documented using military time (e.g. 1400).
- **Departure port:** Document the port the vessel departs from.
- **Return port:** Document the port the vessel returns to.

- **Fish ticket number(s):** Obtain the numbers of all landing receipts (fish tickets) from the vessel skipper, the port biologist, or the fish plant. This is a required field for all fisheries and trips!
  - CA fish tickets begin with a letter followed by six digits.
  - OR fish tickets are seven digits.
  - WA fish tickets begin with a letter followed by six digits.
- **WOC:** The state agency code is: C - for California deliveries, O - for Oregon deliveries, or W - for Washington deliveries.
- **Date:** Document the date in MM/DD/YY that is recorded on the fish ticket.
- **# Hooks/Pots Lost:** Leave this field blank. This is for fixed gear only.
- **Gear Performance:** Record one of the following codes to document gear performance:
  - 1 - No problem
  - 2 - Pot was in the haul
  - 3 - Net hung up
  - 4 - Net ripped
  - 5 - Trawl net or codend lost, pot(s) lost, other gear lost
  - 7 - Other problem: Document other gear related problem in the comments section.
- **Seabird Avoidance Gear:** This column will be blank on all trawlers.

### Haul Information Instructions

- **Haul/set number:** Number hauls consecutively, starting with 1 for each trip.
- **Observer Total Catch estimate (OTC):** Record the total catch estimate in pounds. This should match the Visual OTC field at the top of your species composition form. Leave this field blank if the haul was unsampled or gear was lost.
- **Weight Method:** Enter the number that represents the weight method used to obtain the observer total catch estimate. The weight methods that may be used for Trawl OTC's are:
  - 6 - Other
  - 14 - Visual Experience
- **Comments:** Document any important information about the haul that is not adequately conveyed by the other fields. This should include notes on any hauls with gear performance 7 (other)

**Note:** See Appendix for a complete list of weight methods.

- **Total # of Hooks/ Pots:** This column will be blank on all trawlers.



### Trip Form: Haul Locations Instructions

See "Figure 4-10: Trip Form - Haul Locations (back)" on page 4-14. Starred (\*) fields indicate information that can be obtained from the "Washington-Oregon-California Groundfish Logbook".

- **Trip notes:** Document any information pertinent to understanding the trip.
- **Haul/Set number:** Number hauls consecutively, starting with 1 for each trip. Each haul must correspond to a haul on the front of the form.
- **Start and end date\*:** Document the date the haul was set and the date the haul was retrieved as MM/DD.
- **Start and end time\*:** Document in Pacific Standard Time (PST) when haul was set and retrieved in 24-hour notation (military time). A haul starts when the net has reached fishing depth and ends when the brake is released and haul back begins.
- **Start and end latitude\*:** Document the latitude (in degrees, minutes, 1/100th of a minute) that the haul was set and retrieved.

**Tip:** When an observer boards a vessel that has a GPS, check to be sure that it is recording in degrees, minutes, 1/100th of a minute. If not, ask the captain to change the view to 1/100th of a minute instead of seconds. (See Figure 4-9)

- **Start and end longitude\*:** Document the longitude (in degrees, minutes, 1/100th of a minute) that the haul was set and retrieved.



Figure 4-9: GPS Showing Latitude and Longitude

- **Depth:** Document the fishing depth in fathoms. The "Washington-Oregon-California Groundfish Logbook" only requires the vessel to document the depth at which most of the fish were caught. If only one depth is documented, use it for both depth fields.
- **Gear Type\*:** Enter a code for the gear type based on the configuration of the gear, rather than how it is being fished. Use the Trawl Net Identification Key in the Observer Logbook to determine groundfish trawl gear type.
  - 1 - Groundfish Trawl, Footrope < 8 inches (Small footrope, Not pineapple trawl)
  - 2 - Groundfish Trawl, Footrope > 8 inches (Large footrope)
  - 3 - Midwater Trawl
  - 4 - Danish/Scottish Seine
  - 5 - Trawl Other Gear
  - 12 - Shrimp Trawl: Single Rigged (one net)
  - 13 - Shrimp Trawl: Double Rigged (two nets)
  - 14 - All Net Gear, except Trawl
  - 17 - Pineapple Trawl (small footrope)

**Loran:** If the vessel is using Loran C and the degrees of latitude and longitude cannot be obtained while at sea, document the Loran coordinates and convert them

to degrees after the trip. See Appendix for the conversion formulas.

**Fathoms:** 1 fathom = 6 feet

**Lat/ Long:** Always round to two decimal places (1/100th of a minute)



## Sampling Catch

On Catch Share vessels, once the catch is dumped on deck, the crew will begin sorting retained individuals from discarded individuals and sorting fish into IFQ fish groupings (as stated in the regulations).

Due to the large quantity of fish, observers are provided with a list of priorities in order to help them manage their time on deck. Observers are expected to spend more time on higher priority species, such as discarded and retained IFQ species and less time on non-IFQ species.

In the Catch Share program, observers are responsible for estimating the total weight of all overfished IFQ species (e.g. Yelloweye, Dark-blotched, Bocaccio, Cowcod, Canary, Pacific Ocean Perch and Petrale), both retained and discarded. All other retained catch can be estimated using vessel estimates. Observers are also expected to sample all Pacific Halibut and non-overfished IFQ discards. Non-IFQ discards are the lowest priority, but observers should make an effort to sample these species, as well, unless doing so interferes with sampling of higher priority species.

## Catch Categories

Chapter 3, *Observer Basics*, discusses catch categories briefly. This section provides a review and more specific information regarding catch categories on trawl vessels. As a review, there are two general rules that apply to catch categories:

- Retained and discarded individuals are always documented in separate catch categories.

- Individuals are grouped in the same catch category when they are sampled together. All individuals in the grouping must have the same weight method and sample method.

## Naming Catch Categories

A list of catch categories and the corresponding three or four letter PacFin codes can be found in the Appendix.

When naming catch categories:

1. If the catch category is species composition sampled, the name of the catch category is irrelevant and usually named ZMIS.
2. If a catch category is not sampled for species composition, the contents must be documented using the most descriptive catch category code possible. To determine catch category code, in order of preference, use:
  - Species specific code (e.g. ARRA - Aurora rockfish)
  - Species grouping code (e.g. NSLP - North Slope Rockfish).

**Tip:** In the Catch Share program, unsampled species must be placed in IFQ and/or non-IFQ groupings.

  - If neither exists, use one of the following codes ONLY if no species composition exists:
    - INVT: Invertebrate discard.
    - MBOT: Miscellaneous bottom items, including rocks, mud, logs, bones, garbage, etc.
    - ZMIS: Mixed catch which can include fish species, invertebrates, and bottom items (like rocks, logs, etc.). ZMIS should only be used as a last resort when no species composition samples exist.

- **NIFQ/ IFQM:** These are the acceptable catch category codes for unsampled hauls and catch categories on trawl vessels in the Catch Share program. Species-specific IFQ catch category codes may NOT be used in conjunction with IFQM or any other grouping codes that include that species. These codes are mutually exclusive. This rule does not apply to NIFQ species.
- **UNST:** This is an acceptable catch category for unsorted catch that contains both Retained and Discarded species. UNST is most commonly used when an overfilled net is bled. It is also used for unsorted catch that gets washed overboard.

### Retained catch on trawlers

In the Catch Share program, observers will only sample retained catch if it is one of the seven overfished IFQ species, all other retained catch is not independently estimated for weight by the observer. Fishers are required to record the weight of retained species by catch category in a vessel logbook. Observers copy these estimates for retained catch exactly, unless:

- The observer is aboard a Catch Share vessel and the vessel is retaining one or more overfished IFQ species (e.g. Yelloweye Rockfish)
  - Observers must whole haul all Cowcod, Bocaccio, Yelloweye, and Canary rockfish.
  - Visual estimates are required for all other retained overfished IFQ species. No species composition is required for these species.
  - If an independent estimate of overfished retained rockfish is made, and there are additional

retained rockfish present, a visual estimate of these remaining rockfish must be made by the observer. This visual estimate should be recorded as NSLP, SSLP, NSLF, or SSLF and should not include the previously estimated overfished rockfish. This sampling change is meant to address “double counting” of retained overfished rockfish species. If no overfished rockfish are present in the tow the skippers estimate of NSLP, SSLP, NSLF, or SSLF can be used.

- Vessel does not record one or more species of retained catch (often happens with species retained in small quantities).
- Vessel uses an invalid PacFin code or a code that is not the most descriptive possible. (Select most applicable name from Catch Category list, see the Appendix for a list of the Catch Categories).
- Vessel estimates of retained catch not representative of the weight and/or composition of the catch.

If a vessel is not estimating retained catch by catch category, the observer is responsible for obtaining estimates. This can be done by simply asking the skipper for an estimate or by obtaining an independent estimate using one of the weight methods discussed later in this chapter.

### Discarded catch on trawlers

The amount of fish discarded on trawlers is extremely variable, from close to 0% to 100% of the total catch. Observers sort the discard into one or multiple groupings (catch categories). Typically, discards are placed in a ZMIS catch category, which is then sampled for species composition, and a PHLB catch category. There are three

The most common reason for a catch category not to be species composition sampled is when species weights are visually estimated.

A haul containing an IFQM catch category for discards cannot contain any other discarded IFQ catch categories (e.g. ARTH, THDS). When using IFQM, it must represent all IFQ discards in the haul, including PHLB.

**Vessel sort example:** Often vessels “presort”, or remove quickly, some of the hardier species. Presorted species often fall into a separate catch category than those species not presorted.

factors that distinguish discarded catch categories from each other on trawl vessels:

**Vessel/Observer sorting:** If the entire discard is not weighed and the crew sorts species in different ways, then the species will fall into catch categories based on the way the crew sorted them. Observer sorting of discard may also lead to species falling into different catch categories. In the Catch Share program, more emphasis is placed on IFQ species, therefore, species should be sorted in such a way as to allow for the most accurate sampling to be done for IFQ species.

**Weight method:** The method used to obtain the weight estimate of the species or grouping of species can be used to determine the number of discarded catch categories. If portions of the catch have different weight methods, they **MUST** be in different catch categories.

**Sample method:** If species have the same weight method but are sampled for species composition differently, this also requires them to be in different catch categories.

### Sampling Priorities on Trawlers

Use this list as a reminder of data to be collected and to prioritize when all duties cannot be accomplished. Observer duties for the IFQ Fishery, in order of priority are:

1. Record incidental takes and collect appropriate biological information from protected species: marine mammals, sea turtles, seabirds, green sturgeon, and salmon.

2. Record interactions of marine mammals, sea turtles, and seabirds with fishing gear.
3. Record fishing effort information, including location, time date, and depth for all hauls/sets.
4. Estimate total catch weight (OTC), even for tows with 100% discard.
5. Estimate weights of IFQ species, in the following order:
  - Mixed catch categories must be sampled for species composition.*
  - Collect actual weights of **retained and discarded** priority rockfish species: Boccaccio, Canary, Cowcod and Yelloweye.
  - Determine **discarded** weight of other overfished species: Darkblotched, POP, and Petrale sole.
    - If catch weight is less than 1000 lbs., use Actual Weight, Bin Volume, or Basket Weight Determination.*
    - If catch weight is greater than 1000 lbs., the use of Visual Spatial is allowed.*
  - Estimate weight of Pacific halibut by tallying 100% and taking actual lengths/viabilities on all, or a randomly selected subsample.
  - Determine **discarded** weight of all other (non-overfished) IFQ species.
  - Make visual estimates of **retained** overfished Darkblotched, POP, and Petrale sole.
6. Estimate **discarded** weight of non-IFQ species.
7. Complete the IFQ Priority Species Tracking Form (non-hake fisheries only).

***Priorities 1–7 must be completed on ALL hauls***

8. Sample **discarded** non-IFQ species for species composition.  
*At a minimum, non-IFQ discard must be sampled for species composition on every third haul.*
9. Record weight, length, sex, and take necessary dissections from tagged fish.
10. Complete species identification forms.
11. Take biological samples, including length, sex, otoliths, tissue, etc. from discarded individuals
12. Maintain observer logbook.
13. Document sightings of ESA listed species.
14. Document sightings of non-ESA listed marine mammals and seabirds.
15. Compile data and enter trip within three days of disembarking.

Catch Share observers' effort on trawlers is focused on obtaining the most accurate estimates of IFQ retained and discarded catch AND Non-IFQ discarded catch as possible. Remember that through the use of catch categories, more precise methods of estimation can be used for those higher priority groups (prohibited species and overfished IFQ species). All discarded catch weight must be estimated using one of the weight methods explained below.

#### Discarded IFQ species (non-overfished)

Arrowhead flounder	Harlequin rockfish	Sablefish
Aurora rockfish	Honeycomb rockfish	Sand sole
Bank rockfish	Lingcod	Sharpchin rockfish
Blackgill rockfish	Longspine thornyhead	Shortraker rockfish
Bronzespotted rockfish	Mexican rockfish	Shortspine thornyhead
Butter sole	Pacific cod	Silvergray rockfish
Chameleon rockfish	Pacific halibut	Speckled rockfish
Chilipepper rockfish	Pacific Sanddab	Splitnose rockfish
Curlfin sole	Pink rockfish	Squarespot rockfish
Dover sole	Pinkrose rockfish	Starry flounder
English sole	Pygmy rockfish	Starry rockfish
Flag rockfish	Redbanded rockfish	Stripetail rockfish
Flathead sole	Redstripe rockfish	Swordspine rockfish
Freckled rockfish	Rex sole	Tiger rockfish
Greenblotched rockfish	Rock sole	Vermillion rockfish
Greenspotted rockfish	Rosethorn rockfish	Yellowmouth rockfish
Greenstriped rockfish	Rosy rockfish	Yellowtail rockfish
Halfbanded rockfish	Rougheye rockfish	Widow rockfish

## Weight Methods for Estimating Catch Category Weights

There are eleven weight methods that can be used to determine catch category weights on trawlers:

- 1 Actual weight
- 2 Bin volume/Trawl alley estimate
- 3 Basket Weight Determination (BWD)
- 5 OTC - retained
- 6 Other
- 7 Vessel estimate - retained only
- 8 Extrapolation
- 9 Pacific halibut length/weight conversion
- 14 Visual experience
- 15 Visual spatial
- 19 Pacific halibut length/weight extrapolation

The weights obtained by these methods are recorded on the Catch Form.

### Weight Method 1: Actual Weights

When actual weight is commonly used:

1. On Catch Share vessels, this should **always** be used for both retained and discarded Yelloweye, Bocaccio, Canary and Cowcod rockfish.
2. Total discard is less than 1000 to 1500 lbs and vessel has enough deck space for all discard.
3. Priority species: Actual weight should be used for salmon species, overfished species, and all rockfish species whenever possible.

#### Step-by-Step Instructions

1. Place all of the individuals from the catch category in observer baskets.

2. Weigh baskets. There will be one catch category for all of the species in the baskets.

#### Calculation

$$\text{Catch Category Wt (lbs)} = \sum \text{Basket Weights}$$

OR

1. Sort all of the individuals in the catch category by species.
2. Weigh each species group

#### Calculation

$$\text{Catch Category Wt (lbs)} = \sum \text{all species groups in catch category}$$

### Weight Method 2: Bin Volume/Trawl Alley Estimate

When Bin Volume is commonly used:

1. All discard is placed in a bin or left in the trawl alley.
2. Overfished IFQ species that are sorted into checker bins to be retained.
3. Species/species grouping is initially sorted into a bin because vessel plans on retaining it. However, at end of sort, vessel decides to discard all or a portion of the species/species grouping.

#### Step-by-Step Instructions

1. **Determine the appropriate volume formulas for each area of the bin(s)** (see the Appendix for Weight Measures and Conversions). Most bins will be rectangular, however, some will have odd shaped areas (See Figure 4-12).

**Example:** Bin is rectangular, therefore length, width, and height measurements needed.

2. **Measure the length and the width of the bin in meters.** If the bin is rectangular, no calculations need to be done. Simply measure the length and the width

of the bin and document these measurements on the Catch Form.

**Calculation**

$$\text{Total Area (m}^2\text{)} = \Sigma \text{ of Areas (m}^2\text{) of All Bins}$$

**Example:** The length of the bin = 2.43 meters and the width of the bin = 1.59 meters

- 3. Measure the height of the discard in the bin in meters.** The height of the fish in the bin provides the final dimension needed to obtain the volume. Height is measured by placing a measuring stick into the bin to measure the depth of fish at three points.

**Calculation**

$$\text{Average height of fish in bin, (m)} = \frac{\text{Height A (m)} + \text{Height B (m)} + \text{Height C (m)} + \dots}{\text{number of height measurements taken}}$$

**Example:** The height of the fish in the bin varied, therefore three height measurements were taken. They were: .47 meters, .31 meters, and .25 meters. The average height =  $(.47\text{m} + .31\text{m} + .25\text{m})/3 = 0.34333333$  meters.

- 4. Determine volume of bin(s).** Make sure that all of the measurements are as precise as possible. To obtain volume of the catch category:

**Calculation**

$$\text{Volume of catch category (m}^3\text{)} = \text{Total area of bin (m}^2\text{)} \times \text{Average height of fish in bin (m)}$$

**Example:** Volume of the bin =  $2.43\text{m} \times 1.59\text{m} \times 0.34333333\text{m} = 1.326536998$  m<sup>3</sup>.

- 5. Obtain baskets for Density measurements.** Once the volume of the bin(s) has been determined, randomly select area(s) to take density baskets from.

- Visually divide the bin into sections of equal size.
- Use a random number table or a watch to select one or two areas from which one or more baskets will be taken.

<b>1</b>	<b>2</b>
<b>3</b>	<b>4</b>

- 6. Fill baskets to the top, using individuals from the selected section(s).** Collect fish by moving down and out through the fish, being sure to reach the deck.

**Example:** Two baskets filled to the very top.

- 7. Weigh baskets.**

**Example:** Baskets weigh 71.05 lbs and 68.60 lbs.

- 8. Determine the average basket weight.**

**Calculation**

$$\text{Average basket weight (lbs)} = \frac{\text{Weight of Basket A (lbs)} + \text{Weight of basket B (lbs)} + \dots}{\text{number of baskets weighed}}$$

**Example:**  $(71.05 \text{ lbs} + 68.60 \text{ lbs})/2 = 69.825$  lbs

- 9. Determine the density of the bin(s)**

**Calculation**

$$\text{Density (lbs/m}^3\text{)} = \frac{\text{Average weight of basket (lbs)}}{\text{Volume of baskets (m}^3\text{)*}}$$

**\*The volume of the yellow basket is a known. The volume of a basket filled to the top of the basket equals .040m<sup>3</sup>.**

- 10. Determine Catch Category weight:**

**Calculation**

$$\text{Catch category weight (lbs)} = \text{Volume of bin (m}^3\text{)} \times \text{Density (lbs/m}^3\text{)}$$

**Example:** Catch category weight =  $1.326536998 \text{ m}^3 \times 1745.375 \text{ lbs/m}^3 = 2315.3045$  lbs



Figure 4-11: WCGOP Observer Basket Volumes



Figure 4-12: Trawl Alleys and Bins

### Weight Method 3: Basket Weight Determinations (BWD)

When Basket Weight Determination is commonly used:

1. Total discard weighs less than 1500lbs.
2. A large quantity of a single species or a mix of similar species is discarded. Species this commonly applies to are Arrowtooth flounder and Spiny dogfish shark. Groupings of species this commonly applies to are flatfish species and Splitnose/Aurora rockfish.

#### Step-by-Step Instructions

1. Visually estimate the number of baskets it will take to hold the entire catch category.

**Example:** Estimate it will take 28 baskets to hold entire catch category.

2. Devise a sampling plan to randomly select baskets to use to determine average basket weight. *A minimum of four baskets must be weighed when using the BWD weight method.* Use a spatial, systematic, or temporal frame. See "Method to Randomly Select Baskets for Weights" on page 4-22.

**Example:** Decide to use seven baskets to determine average basket weight. Using a systematic random sampling frame, divide 28 (estimated number of baskets) by 7 = 4 (n). Randomly select a number between 1 and 4, 1 selected. Save the 1st, 5th (1 + 4(n) = 5), 9th (5 + 4 (n) = 9), 13th, 17th, 21st, and 25th baskets of discard collected.

3. Place **all** species/items from catch category into baskets to obtain the total basket count. Each basket should be filled to the **same level** and contain a random sample of catch category composition. Document the total number of baskets filled in your raw data.

**Example:** Filled 27 baskets of discard. One partial basket also collected.

**Tip:** In most cases when BWD is used, the last basket will be less full than all other baskets. Be sure to weigh this partial basket separately.

4. Weigh each randomly selected basket. *A minimum of four baskets must be weighed when using the BWD weight method*, but observers are encouraged to weigh at least 6 – 10 baskets. Document all baskets weights and the number of baskets weighed in the raw data.

**Example:** Seven baskets of discard are collected and together weighed 551.20 lbs.

- Calculate average basket weight by summing all the basket weights and dividing by the number of baskets sampled

**Calculation**

$$\text{Average basket weight (lbs)} = \frac{\sum \text{Basket weights}}{\text{number of baskets sampled}}$$

Example: 551.20 lbs/ 7 baskets =78.74285714 lbs.

- If a partial basket remains, record the weight and add it to the calculated BWD estimate.

Example: Weight of partial basket = 35.85 lbs.

- To determine catch category weight

**Calculation**

$$\begin{aligned} \text{Catch category weight} = \\ (\text{number of full baskets} \times \text{Average basket weight}) \\ + \text{Weight of partial basket:} \end{aligned}$$

Example: 78.74285714 lbs x 27 baskets + 35.85 lbs = 2161.907142 lbs

## Method to Randomly Select Baskets for Weights

### Systematic (preferred)

Other methods for selecting baskets are possible, but this is the preferred method.

- Define population:** All baskets of fish in the catch category.
- Define sample frame:** Spatial systematic, based on baskets of fish.
- Define sample units:** Single baskets of fish.
- Number all sample units:** This may require estimating how many baskets the catch category will fill; for example, estimate that catch category will fill 15 baskets - Number baskets 1 – 15.

- Decide how many of the sample units you will weigh:** Decide to weigh five baskets.
- Divide the total number of sample units by the number of units you want to weigh:** This gives you your value for “n”.  $n = 15/5 = 3$ .
- Randomly select a number between 1 and n:** This will be the first sample unit in your sample. Use random number table to select a number between 1 and 3. – Randomly select 1.
- Weigh the selected basket and then every nth basket after that:** Weigh baskets 1, 4(1+3), 7(4+3), 10(7+3), and 13(10+3).

## Weight Method 5: OTC – Retained

When OTC - Retained is commonly used:

- Observer is sick or injured and unable to sample. This is the least preferred method for estimating discard. When unable to sample, always attempt to take visual estimates of discard. In the Catch Share program, the observer should also visually estimate the amounts of IFQ and non-IFQ species in unsampled hauls.

### Step-by-Step Instructions

- Visually estimate total catch weight (OTC).
- Estimate weight of retained fish using one or more of the weight methods. Vessel estimates are the most commonly used weight method for retained catch.
- To determine total discard weight:

**Calculation**

$$\begin{aligned} \text{Catch category Weight (lbs)} = \\ \text{OTC} - \text{Retained species weights (lbs)} \end{aligned}$$

**Tip:** Be sure to document in the observer logbook why the haul or catch category was not sampled

### Weight Method 6: Other

This weight method should only be used for unobserved (no OTC) hauls and lost gear. Otherwise, it creates confusion for end users and debriefers because it does not indicate how the weight was actually derived. If this method is used, document what happened in the Observer Logbook and on the deck sheets.

### Weight Method 7: Vessel Estimate

When Vessel Estimate, is commonly used:

1. All estimates of retained catch categories on trawlers, that are NOT one of the 7 overfished IFQ species.

#### Step-by-Step Instructions

1. Copy retained catch category estimates from the vessel's logbook.

OR

1. Ask skipper for retained catch category estimate.

### Weight Method 8: Extrapolation

When Extrapolation is commonly used:

1. Species that are presorted, such as Dungeness crab, lingcod, and sablefish.

**Tip:** Pacific halibut are also presorted but do not use extrapolation in this case. See weight method 19 and WM 9 for sampling of Pacific halibut.

#### Step-by-Step Instructions

**Tip:** When weight method 8 is used, an actual count of individuals is REQUIRED!! The actual count must be recorded on the Catch Form in the Fish # column.

1. Devise a sampling plan to randomly select individuals from the presorted fish for average weights. Use a systematic, spatial, or temporal frame. Specifics on implementing each type of sampling frame are described below.

**Example:** Sablefish are being presorted on deck by 3 crew members. The observer determines they could count ALL the sablefish being thrown over by all the crew. The observer determines that they could get a weight from all the sablefish thrown over by just ONE crew member. Number the deckhands 1 - 3 and randomly select one of the numbers. In this example, all the sablefish from deckhand 3 will be collected and ALL the presorted sablefish will be tally counted.

2. Count the number of individuals, by species.

Example: 56 Sablefish presorted by all three crew members.

3. Determine the average weight of species

Example: Collected 21 Sablefish from just one deckhand (#3) which weighed 65.75 lbs. Average weight = 65.75 lbs/ 21 fish = 3.13095238 lbs/ fish.

#### Calculation

$$\text{Average weight} = \frac{\sum \text{Individuals weight(lbs)}}{\text{number of individuals weighed.}}$$

4. To determine catch category weight, apply the average weight to the total number of individuals of that species to obtain the catch category weight.

#### Calculation

$$\text{Catch category weight} = \text{Average weight} \times \text{Total number of Individuals caught}$$

Example: Catch category weight = 3.13095238 lbs/ fish x 56 total fish = 175.3333332 lbs.

**Tip:** If extrapolation is used for more than one species, place each species in its own catch category.

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**Presort:** Vessels will attempt to get some hardier, live fish back into the water quickly. After a codend has been dumped, the crew will sort through the catch, pull out

individuals of these species and toss them overboard. This usually happens before any other sorting.

## Methods for Randomly Selecting Individuals

- Systematic Random Selection.
- Spatial Random Selection.
- Temporal Random Selection.

### Systematic Selection (preferred method)

Select individuals based on when they leave deck.

1. Estimate number of fish of particular species caught.
2. Break the number of fish into sampling units (n) by dividing the number of fish needed for average weights by the number of fish likely to be on deck.
3. Choose which fish to take first by selecting a random number that is between 1 and the sample unit (n).
4. Then collect every nth individual after that.
5. Weigh all selected individuals and divide by the number of individuals weighed to determine average weight.

**Example:** It is estimated there are 60 sablefish are usually presorted. In order to get 15 individuals, divide  $60/15=4$ . This means one of every four fish should be taken for average weights. Using the random number table, a number between one and four is randomly selected. Three is chosen. This results in the observer collecting the 3rd, 7th (3+4), 11th (7+4), etc. individuals for average weights.

### Spatial Selection

Select all individuals from a designated area on the deck.

1. Visually divide the deck into equal units.
2. Randomly select a unit to take individuals from.
3. Take all individuals in that unit.
4. Weigh all selected individuals and divide by the number of individuals weighed to determine average weight..

### Temporal Selection

Select all individuals sorted or on deck during a unit of time. Estimate the time it will take to sort out species.

1. Randomly select a designated time during sort to take individuals or randomly select a time to begin taking individuals.
2. Take all individuals during randomly selected interval or take individuals until enough have been collected.
3. Weigh all selected individuals and divide by the number of individuals weighed to determine average weight

### Weight Method 9: Pacific Halibut Length/Weight Conversion

When PHLB length/weight conversion is used:

1. Used only for Pacific Halibut (PHLB), when numbers are low enough (~10) to take actual lengths and viabilities for all individuals in the catch category.

#### Step-by-Step Instructions

1. Actually measure the length and assess the viability (i.e. Excellent, Poor, or Dead) of all Pacific halibut in the catch category. Record lengths to the nearest whole centimeter.

**Example:** 2 PHLB @ 73 cm, 1 PHLB @ 90 cm, and 1 PHLB @ 122 cm.

2. To determine catch category weight, sum the weights of all the Pacific Halibut.

#### Calculation

Catch Category Wt (lbs) =

$\sum$  Pacific halibut Wts from Length/ Weight Conversion Table

Example: (10.05 lbs X 2) + 19.80 lbs + 53.07 lbs = 92.97 lbs.

**Tip:** Retained and discarded Pacific halibut must be in separate catch categories. Typically trawlers have no retained halibut.

Recording Pacific Halibut raw data should include the following information and format on the data forms: A label which identifies the lengths as being “actual” (as opposed to visual estimates), lengths recorded in whole centimeters, viability (Excellent, Poor, or Dead), and converted weights from the P. halibut length/weight conversion table (in the appendix). See example below.

PHLB: Actual Lengths	
73cm P	10.05lbs.
90cm E	19.80lbs.
73cm P	10.05lbs.
122cm D	53.07lbs

**E = Excellent P = Poor D = Dead**

### Weight Method 14: Visual Experience

When Visual Experience is commonly used:

1. Species that are too large to weigh, such as marine mammals, large skates, and sharks.
2. Estimates of total discard weight when two hauls are dumped on each other (not permitted in Catch Share program).
3. Hauls observer is unable to sample.
4. Weight of discard when all catch is dumped at-sea.
5. Weight of mixed discarded catch category species when other weight methods cannot be used. Although this is the least preferred method for determining catch category weight, it may be the only estimate possible. If this method is used for a mixed

In addition to collecting lengths, observers will be required to assess each sampled PHLB for viability, using the *Key to Injury Codes for Trawl Caught Pacific*

*Halibut* in the Appendix. Be sure to use the correct key as there is a separate one for each gear type.

grouping of discarded species, it's very important to get a species composition sample.

6. Weight of a single discarded species that has a large quantity. Commonly, the species this applies to are Arrowtooth flounder and Spiny dogfish shark.
7. Retained overfished species, other than the four highest priority species, and mixed retained NSLP catch categories.

### Step-by-Step Instructions

1. Based upon previous experience, visually estimate the weight of the species or the catch category.
2. If the actual number of a species is known, document the actual count, otherwise leave the # of Fish column blank.

**Tip:** It may be helpful to ask the crew members for estimates of species or discard weight on new vessels or the first time a species is encountered. Do not rely on their estimates but use them to help gauge the independent estimate.

### Weight Method 15: Visual Spatial

When Visual Spatial is commonly used:

1. Mixed discarded species when a large quantity of fish are discarded.
2. Mixed discarded species on vessels with small decks, that bring up hauls back-to-back.

### Step-by-Step Instructions

1. Visually divide the trawl alley into areas or sections of equivalent size. The visual grid can contain 2 or more sections. Document the total number of sections on the Catch Form.

**Tip:** If time and space is restricted on deck and the observer determines a smaller sample size is required, increase the visual grid sections (ie,

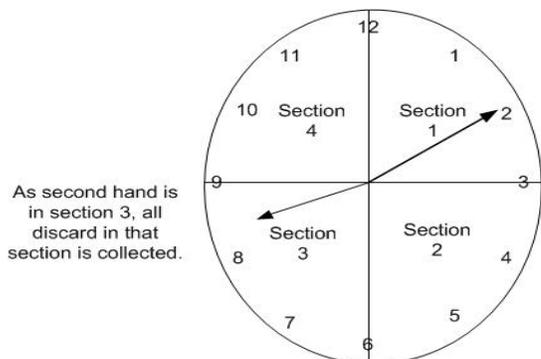
Visual estimates can be used for large amounts of mud, rocks and miscellaneous junk.

10 or 12 sections). If time and space on deck allows for a larger sample to be collected, use a visual grid with fewer sections (i.e. two or four).

2. Number each section.

<b>1</b>	<b>2</b>
<b>3</b>	<b>4</b>

3. Randomly select one or more sections(s) from which all discard will be collected. A watch or the random number table can be used to select random numbers. Document the number of sections selected on the Catch Form.



4. Collect all the discard from the selected section(s).

5. Weigh all the discard collected.

**Example:** The observer divided the trawl alley into a total of 4 visual sections and randomly choose to sample all the discard in ONE section. All the discard in section 3 = 564.10 lbs.

6. Determine catch category weight using the following equation:

**Calculation**

$$\text{Catch Category Wt} = \frac{\text{Weight of sample (lbs)} \times \text{Total \# of sections}}{\text{\# of section(s) discard collected from}}$$

**Example:** The total catch category weight is calculated as:

$$\frac{564.10\text{lbs} \times 4 \text{ total sections}}{1 \text{ section sampled}} = 2256.40\text{lbs}$$

**Tip:** When using weight method 15, keep in mind that more than ONE section of the visual grid can be sampled. An observer may determine that two or three sections of the visual grid could be sub-sampled. For example, the observer visually divides the discard in the trawl alley into eight sections and determines that all the discard in section three (randomly chosen) can be weighed. The total catch category weight would be calculated as:

$$\frac{664.12\text{lbs} \times 8 \text{ total section}}{3 \text{ sections sampled}} = 1770.99\text{lbs}$$

7. Document total weight on the Catch Form.

**Weight Method 19: Pacific Halibut Length/Weight Extrapolation**

When PHLB length/weight conversion is used:

- Used only for Pacific Halibut (PHLB), when numbers are **too high** to take actual lengths and viabilities for all individuals in the catch category.

**Step-by-Step Instructions**

- Obtain an actual count (tally) of all Pacific Halibut found in the haul. Document this number on the Catch Form.
- Actually measure the length and assess the viability (Excellent, Poor, or Dead) of a minimum of 10 Pacific Halibut. Record lengths to the nearest whole centimeter. Depending on the number of PHLB present in the haul, use one of the following methods to randomly select individuals for length/assessment:
  - Devise a random systematic sampling frame in order to get lengths and viabilities for at least 10 individuals from throughout the haul.

- For hauls containing 50 or more PHLB, use a random systematic sampling frame to collect 1/5 of the individuals for lengths and viabilities
3. Use the Pacific Halibut length/weight conversion table to obtain a weight for each individual (see Appendix for Halibut Length/Weight Conversion Table).
  4. To determine catch category weight, sum the weight of all the Pacific Halibut.

**Calculation**

Catch Category Wt =

$$\frac{\sum \text{PHLB Wts (from conversion table) (lbs)} \times \text{Total \# PHLB tallied}}{\text{\# of PHLB sampled (lbs)}}$$

5. Document the lengths and viabilities on the Biospecimen Form.

**Tip:** Retained and discarded Pacific halibut must be in separate catch categories. Typically trawlers have no retained halibut.

Pacific Halibut raw data should be documented in the raw data. Include the actual length, viability, and total count.

## Catch Form Instructions

The Catch Form is the standardized form used to document Catch Categories, catch weight and catch weight methods. Each Catch Form provides a snapshot of an entire haul; therefore, everything in that haul must be represented on this form. A Catch Form should be completed for all hauls (See Figure 4-13).

- **Haul #:** Record the number of the haul.
- **Date:** Record the date as MM/DD/YY.
- **Trip Number:** This number is automatically

generated by the database. Complete this field once the trip has been started in the database.

- **Page \_ of \_:** Number forms sequentially within each haul. Haul forms (Catch, Species Composition, Length Frequency, and Biospecimen) are numbered consecutively, separate from Trip forms.
- **Visual OTC:** Record the Observer's visual estimate of OTC.
- **Catch #:** Number the catch categories consecutively, starting with one for each haul. The numbers on the paper Catch Form must match the numbers assigned by the database when data is entered.
- **R or D:** Record whether the catch category is from retained or discarded catch. Record R – Retained or D – Discarded.
- **Catch Category:** Record, in capital letters, the catch category sampled, using a 3 or 4-letter PacFin code. For a list of PacFin catch category codes, see the Appendix, page 12.
- **Catch/Sample Weight:** Record the **catch** weight of the catch category in pounds to two decimal places.
- **Volume:** If weight method 2 (Bin volume) was used to estimate the catch category weight, record the volume, to two decimal places, in m<sup>3</sup>.
- **Density:** If weight method 2 (Bin volume) was used to estimate the catch category weight, record the density, to two decimal places, in lbs/m<sup>3</sup>.
- **Fish #:** Record the total number of fish in the catch category if weight methods 8 (Extrapolation), 9 (PHLB Length/Weight Conversion) and WM 19 were used (required). Record for weight method 14, if actual number is known. Do not record the total number of fish for weight methods other than 8, 9, and 14 and 19.

- **# Hooks/Pots sampled by catch category:** Fixed gear only. Leave blank.
- **Weight Method:** Document the weight method used to estimate the catch category weight.

- 1 Actual Weight
- 2 Bin Volume/Trawl Alley Estimate
- 3 Basket Weight Determination (BWD)
- 5 OTC - Retained
- 6 Other
- 7 Vessel Estimate (retained only)
- 8 Extrapolation
- 9 Pacific Halibut Length/Weight Conversion
- 14 Visual Experience
- 15 Visual Spatial
- 19 PHLB Length/Weight Extrapolation

- **Catch Purity:** If catch category was sampled for species composition, record M - Mixed if more than one species was within sample. Record P - Pure if there was only one species in species composition sample.

**Tip:** If the catch category was not sampled for species composition, record as P-Pure if the catch category is composed of 95% or greater of a single species. Record M-Mixed if the catch category is composed of less than 95% of a single species.

- **Discard Reason:** Record the skipper/crew's reason for discard for unsampled (no species composition sample taken) discarded catch categories only. (Refer to Chapter 3, *Observer Basics* for more information on these codes)

- 11 Incidental/Accidental
- 12 Drop-off
- 13 Market
- 14 Other

- 15 Predation
- 16 Regulation
- 17 Safety
- 18 Market (dockside only)
- 19 Utilized on board

- **Comments:** Document anything important about each category. Important information could include the composition of a mixed unsampled catch category. **Species names should be recorded here if the catch category is not accompanied by a species composition sample and the catch category name does not indicate species** (e.g. SKAT). All comments should be manually entered into the database exactly as they are documented on the data form.
- **Keypunch Checks:** This is a required field for **Catch Weight** and **Fish#**. Sum up the entries in each column and place the total in the corresponding keypunch box at the bottom of the form.

*Note: the back of the catch form can be used for raw data, but no data is required on this side for trawl sampling.*

---

Record numbers of fish for weight method 14-Visual Experience only when an actual count of individuals has been obtained. Do not record extrapolated numbers on the Catch Form for trawl trips.



# Collecting and Documenting Species Composition

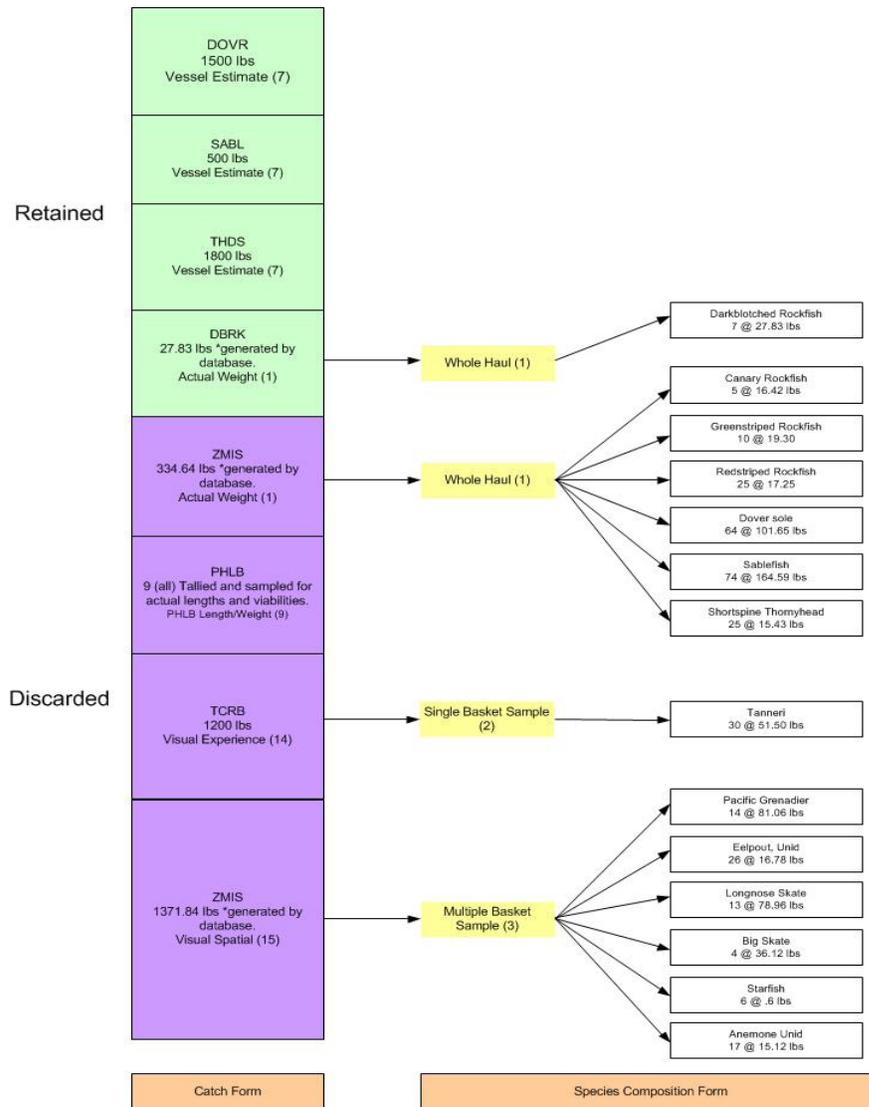


Figure 4-14: Catch to Species Composition

Once the catch has been placed into catch categories, a species composition sample can be taken from all, some, or only one of the catch categories. (See Figure 4-14) Species composition samples can consist of every individual in the catch category or a subsample of the individuals in the catch category. Subsamples must be representative of the entire catch category. The most important thing to remember when species composition sampling on trawlers is that every fish/item in the sample **MUST** be weighed.

## Methods for Species Composition Sampling

### *Sample Method 1 - Whole Haul*

1. Sort all individuals in catch category to species.
2. Weigh and count all individuals by species.

### *Sample Method 2 - Single Basket*

1. Randomly take one representative basket from the catch category.
2. Sort individuals in basket to species.
3. Weigh and count all individuals by species.

### *Sample Method 3 - Multiple Basket*

1. Randomly take two or more representative baskets from catch category.

**Tip:** Multiple basket samples should weigh at minimum 500 lbs.

2. Sort individuals in baskets to species.
3. Weigh and count individuals by species.

---

If Weight Method 1-Actual Weights and Sample Method 1-Whole Haul are used and the whole haul weight is different than actual weight, record the whole haul weight on the Catch Form.

## Average Number Subsamples

On trawl vessels, all species on the Species Composition Form must have an actual weight. However, observers do not have to count every individual in the species composition sample. Average number calculations are used when a species composition sample contains more than one species and all individuals cannot be counted. Consider using average number calculations to estimate the number of individuals when:

- The catch category contains many small individuals of a given species/species group, such as juvenile rockfish.
- The catch category contains many individuals of the same species and counting all of them would greatly reduce the size of the species composition sample (e.g. flatfish species).

### *Step-by-Step Instructions*

1. Randomly select a basket (or partial basket) of the species that were collected for the species composition sample.

**Tip:** When doing average number calculations, count and weigh as many individuals as possible. At minimum, 30 individuals should be weighed and counted for target retained species and 15 individuals should be weighed and counted for non-target retained and discarded species.

2. Weigh and count all the individuals in the selected basket(s).
3. Simply weigh all other individuals of the species that appear in the species composition sample.
4. To determine the total number of individuals:

### Calculation

Total Fish # =

$\frac{\text{\# of individuals counted}}{\text{Wt. of individuals counted (lbs.)}} \times \text{Total Wt. of species in sample (lbs.)}$

**Example:** An observer has collected 2 baskets of Slender Sole, weighing a total of 89.5 lbs. Because individual Slender Sole are so small, the observer decides to randomly select a portion of this sample to use for an average number estimate. After successive basket dumps, the observer now has an 8.65 lb subsample of Slender Sole. She counts out all of the individuals in this subsample and there are 52. Finally, she determines the total number of individuals in her original 2 baskets:

$$\frac{52 \text{ Slender Sole}}{8.65 \text{ lbs}} \times 89.50 \text{ lbs} = 538.034682 = 538 \text{ Slender Sole}$$

## Species Composition Form Instructions

Species composition information is recorded on the Species Composition Form (See Figure 4-15). Species composition sampling on trawlers is documented on the **front** of the species composition form while the back of this form is reserved for calculations and notes that are pertinent to the data. This is encouraged by the program to reduce transcription errors made by the observers copying raw data from another location (i.e. back of catch form or back of the species composition form) to the front of the species composition form.

- **Haul #:** Record the number of the haul that the sample came from.
- **Date:** Record the date as MM/DD/YY.
- **Trip #:** This number is automatically generated by the

database. Complete this field once the trip has been started in the database.

- **Fit # and Calibration Weight:** Record the Fit number from your marine calibration followed by the displayed weight of your 5KG test weight in pounds on every haul. This field will not be entered into the database.
- **Visual OTC:** Record your visual estimate of the total catch on every haul.
- **Trawl Biosampling List:** Circle the number that corresponds to the trawl biosampling list used on the haul. (See Chapter 7, *Biological Sampling* for more information)
- **Page \_ of \_:** Number forms sequentially within each haul. Haul forms (Catch, Species Composition, Length Frequency, and Biospecimen) are numbered consecutively, separate from Trip forms.
- **Catch #:** Record the number that corresponds to the catch category on the Catch Form.
- **Catch Category:** Record, in capital letters, the catch category sampled using a 3 or 4-Letter PacFin code. For a list of PacFin catch category codes, see Appendix page 12.
- **Sample Method:** Record the method used to sample the catch category.
  - 1 Whole haul
  - 2 Single basket
  - 3 Multiple baskets
- **KP Weight and KP Number:** Sum the total weight of all species in the catch category sample and place the total weight in the Keypunch (KP) Weight box. Sum up the total number of all species in the catch category sample and place the total number in the Keypunch (KP) Number box

- **Species:** Record the common name of each species in the sample. This column must be filled in with the species name. Do not simply enter the species code! The common name listed on the paperwork must match the common name used in the database.

**Tip:** Catch category codes (e.g. DSRK, ARTH) can be used in the common name field for those species with species specific codes.

- **Species Code:** Record the species code of the corresponding species. This field is used to ease data entry, therefore it is not necessary to be filled in on-deck. (See Appendix for species codes).
- **Sample Weight:** Record the total weight of the species in the sample. **This weight MUST be an actual weight.**
- **Fish #:** Record the number of fish of each species in the sample. This number must be an actual count (preferred) or extrapolated.
- **Discard Reason:** Record the skipper/crew's reason for discard. (Refer to Chapter 3, *Observer Basics* for more information on these codes).

- 11 Incidental/Accidental
- 13 Market
- 14 Other
- 15 Predation
- 16 Regulation
- 17 Safety
- 18 Market (dockside only)
- 19 Utilized on board

- **Release Method:** Leave this field blank for all trawl vessels (fixed gear only).
- **Basket Weight and # or Raw Data:** Use this column on deck to document numbers and weights of species. Be sure to fill in the "Sample Weight"

column with the total weight of the species in the sample and the "Fish #" column with the total number of individuals of the species in the sample.

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#### Single species catch

**categories:** Only record individuals that have been BOTH actually weighed AND counted on the Species Composition Form. Fish # calculations are unnecessary in this situation



## Trawl Complications

### Mixed Hauls

Mixing of Tows is not permitted in the Catch Share program. The crew may not dump another tow on deck, until all catch from the previous tow has been removed from the deck or stored in a location isolated from the new haul's catch. All sampling from the first haul must be completed before the crew can begin sorting the second haul.

### Working Smarter, Not Harder

When sampling on deck, think about ways to minimize the amount of effort, especially lifting, that needs to be accomplished. Here are some things to consider:

1. **Don't weigh fish more than once.** For instance, if you are going to whole haul a catch category, do not weigh the full baskets and then sort and weigh the individual species. Instead, sort into species and weigh, then use the sum of all the weights as the catch category weight
2. **Sample small individuals separately from larger individuals.** Small flatfish or thornyheads are hard to handle and time consuming to identify. One option for dealing with them is to split small species into their own catch category. By sampling larger specimens first, time is saved and deck space is freed up. Determine the catch category weight of the small individuals and take a one or two basket sub-sample for species composition.
  - **Thornyheads and Splitnose/Aurora-** When large quantities of thornyheads or small rockfish species are discarded or when the discarded individuals are small, it is very important to get the proportion of shortspine to longspine thornyheads or splitnose to aurora rockfish in the discard. Use one of the following methods when sampling discarded thornyheads, splitnose/aurora discard or any other discard of similar species that meet the above criteria:
    - If all discard is actually weighed and whole hauled, place thornyheads/splitnose/aurora in the ZMIS catch category with other discard. All individuals must be identified to species (e.g. do not use thornyhead, unid on Species composition form).
    - If all discard is not actually weighed and whole hauled, then either identify all thornyheads/splitnose/aurora to species in the species composition sample or place them in their own catch category, estimate total weight of thornyhead/splitnose/aurora's in the haul, and take a single basket species composition.
    - **Thornyhead, unid should not be used on the Species composition form!**
3. **When there is a large amount of discard of a single species, estimate the weight of that species separately from other discarded species.** For instance, some hauls have a large amount of arrowtooth flounder or spiny dogfish shark discard. Observers can visually estimate (based on experience) the total weight of these species in the haul, take a single basket species composition sample, and then use a more accurate weight method for the weight of other discarded species.
4. **Bottom line:** Get creative. Remember that there are 9 weight methods (not including OTC - Retained and Other) that can be used to determine catch category weights on trawlers. Using a combination

of methods on a single haul often results in better estimates of discard and less work for you. Talk with your debriefer or experienced observers for ideas for specific fisheries and/or vessels.

### **Unsampled Hauls and Unsampled Catch Categories**

There may be times when a haul cannot be sampled due to illness, injury, or weather conditions. When a Catch Share haul is not sampled, visual estimates of the catch are highly encouraged. If a Catch Share observer is not able to sample, the vessel is required to return to port within 36 hours. When unable to sample a haul, make an effort to collect OTC and estimates of both IFQ and Non-IFQ discards. Fishing effort information and the vessel's estimates of retained MUST be recorded for these hauls.

#### ***Hauls Where No OTC or Discard Estimates Are Made***

There may be times when an observer is physically not able to see the haul and estimate OTC or discard. In these instances, please document the data in the following manner.

#### **Trip Form**

- Record location, gear, and other information just like it is recorded for a sampled haul.
- **Observer Total Catch Estimate:** Leave the OTC blank, and use weight method 6 - Other.
- Gear performance cannot be 5- lost gear. If gear was lost, follow the procedure in the "Lost Gear" section.

#### ***Unsampled Catch Categories***

There will be other instances where a Catch Share haul is sampled, however there may be some discarded catch categories that were not sampled for species composition. In these cases, it is best to make weight estimates of species or species groups (e.g. NSLP, POP, PWHT etc.), instead of general catch categories such as ZMIS, IFQM and NIFQ. If any of the unsampled catch categories are ZMIS, IFQM or NIFQ, the following rules apply:

- Unsampled IFQM catch categories may not exist in the same haul with any other catch category containing any IFQ species.
- Unsampled ZMIS and unsampled THDS catch categories may not exist in the same haul.
- Unsampled ZMIS and unsampled NIFQ catch categories may not exist in the same haul.

#### **Trip Form**

- Record location, gear, and other information just like it is recorded for a sampled haul.
- **Observer Total Catch Estimate:** At minimum, make a visual estimate of the total catch weight.

#### **Catch Form**

- Record vessel estimates of retained catch categories.
- When possible, attempt to visually estimate the amounts of IFQ and non-IFQ discard in the haul. At a minimum, estimate the total amount of discard in the haul.
- Document the appropriate reason for discard for the catch category.

## Lost Gear

Occasionally a vessel will hang up and lose an entire net. If this happens, document the time and position of the vessel when it hung up or began to lose the net. Document the data in the following manner:

### Trip Form

- Record location, gear, and other information just like it is recorded for a sampled haul. Use the time and position of when the vessel hung up or started to lose the net as the end time and position for the haul.
- Observer Total Catch Estimate: Leave the OTC blank with a weight method of 6 - Other.
- Gear Performance will be 5 - gear lost.

### Catch Form

- Do not document anything on the catch form.

## Discard That Cannot Be Attributed To A Specific Haul

On rare occasions, a vessel will discard fish from the hold. This happens if market conditions change during a trip or if they are catching larger fish that are worth more money. Record discard that cannot be attributed to a specific haul on the Trip Discard Form (See Figure 4-16).

The Trip Discard Form is not entered into the database system. Document the information from the Trip Discard Form in the Trip Comments on the Trip Page.

## Trip Discard Form Instructions

- **Trip Number:** This number is automatically generated by the database. Complete this field once the trip has been started in the database
- **Date:** Document the month (MM) and day (DD) that the trip discard took place.
- **Time:** Document the time, in PST military time, that the trip discard took place.
- **Species:** Document the common name of the species that was discarded.
- **Weight:** Document the weight, in pounds, of species discarded.
- **Number of Fish:** Document the number of fish discarded (if known).
- **Weight Method:** Document the weight method used to estimate the species weight.
  - 1 Actual Weight
  - 2 Bin/Trawl Alley Estimate
  - 3 Basket Weight Determination
  - 6 Other
  - 7 Vessel Estimate (retained only)
  - 8 Extrapolation
  - 9 PHLB L/W Conversion
  - 14 Visual Experience
  - 15 Visual Spatial
  - 19 PHLB L/W Extrapolation
- **Discard Reason:** Record the skipper/crew's reason for discard.
  - 11 Incidental/Accidental
  - 12 Drop-off
  - 13 Market
  - 14 Other

- 15 Predation
- 16 Regulation
- 17 Safety
- 18 Market (dockside only)
- 19 Utilized on board

- Comments: Document any additional information that is important.



## Shoreside Hake and Mothership Catcher-Vessel Sampling

### Overview of Pacific hake fisheries

The hake fishery has several sectors, including catcher processors, motherships along with their associated catcher vessels, and a shoreside fleet. The motherships and catcher processors have been carrying observers since the late 1970s; however, vessels that participate in the shoreside hake and mothership catcher-vessel fisheries began carrying Catch Share observers for the first time in 2011.

The hake fishery is conducted with midwater (pelagic) gear and is a high volume fishery with low bycatch levels. Typical hake tows are ~98% hake. Occasionally, high bycatch tows do happen and there are several species of concern which can be impacted, including salmon, canary, darkblotched, POP, and widow rockfish.

### Shoreside Hake observers: Duties and Information

The shoreside sector is characterized by 1-2 day trips, in which codends are brought on board and dumped straight into the hold. It is expected that observers will do minimal sampling at sea, as most hauls will be retained entirely and then sampled by catch monitors at the plants. However, these vessels may choose to discard full or partial codends without bringing them aboard or they may hand pick and discard fish that overflow while the bag is being dumped into the hold. If discards at sea do occur, the observer will need to sample the discards

according to Catch Share sampling protocols, including biological sampling duties (see the Field Manual for more info).

### **Regulations on discarding**

*(2) Whiting maximized retention vessels. Maximized retention vessels participating in the Pacific whiting IFQ fishery may discard minor operational amounts of catch at sea if the observer has accounted for the discard (i.e. a maximized retention fishery).*

*(3) Whiting vessels sorting at-sea. Vessels participating in the Pacific whiting IFQ fishery that sort their catch at sea (whiting vessels sorting at-sea) may discard IFQ species/species groups, provided such discards are accounted for and deducted from QP in the vessel account. Whiting vessels sorting at sea must discard Pacific halibut and such discard mortality must be accounted for and deducted from IBQ pounds in the vessel account. Whiting vessels sorting at-sea may discard non-IFQ species and non-groundfish species. The sorting of catch, weighing and discarding of any IFQ or IBQ species must be monitored by the observer.*

Some shoreside hake vessels may choose to sort their catch at sea completely (as stated above in (3)). In this case the observer will sample according to general Catch Share sampling guidelines. Before embarking, the observer should ask the Captain if the vessel intends to discard at sea, so that the observer can be ready to sample, if need be.

## Data to be collected

1. Trip and haul data: Trip form, Catch form, Species Composition form (if necessary), Length Frequency form (if necessary), Biospecimen form (if necessary), and Trip Discard form (if necessary).

Gear type = 3 mid-water trawl

Fishery = Shoreside hake

2. Marine mammal, sea turtle, and seabird interactions, takes, and sightings data.
3. Salmon: genetic tissue samples and snouts (to check for coded wire tags) should be collected from any salmon discarded at sea (See Field Manual for specific protocols).

## Gear

- Safety gear
- All of the usual Catch Share gear

## Dumping/discarding at sea

If the vessel is not sorting catch, the observer should use the first set of sampling priorities, listed below.

If individual fish are being hand-picked and discarded from the catch while it's being dumped/shoveled into the hold, the observer should sample these fish as per normal Catch Share sampling protocols (See Field Manual for details regarding biological data collection).

## Sampling priorities for vessels NOT SORTING CATCH (dumping codend directly into the hold)

1. Record incidental takes and collect appropriate biological information from protected species:

marine mammals, sea turtles, seabirds, green sturgeon, and salmon.

2. Record interactions of marine mammals, sea turtles, and seabirds with fishing gear.
3. Record fishing effort information, including location, time date, and depth for all hauls.
4. Estimate total catch weight (OTC), even for tows with 100% discard
5. Estimate weight of all at-sea discards, including "minor operational discards".
  - For tows that are fully or partially discarded at-sea (prior to net being brought on board):
    - If the catch appears to be >75% hake, record the visually estimated weight in a PWHT catch category.
    - If the catch is <75% hake, estimates of the discard amounts per species are recorded.
      - Record discarded catch, using the most discrete catch category names available.
      - All salmon should be recorded as salmon unidentified (SAMN).
      - Do not lump IFQ species together into IFQM.
      - Non-IFQ species discards may be grouped together as NIFQ, when necessary.

**Example:** 20,000 lbs. of fish were discarded at-sea, consisting of 10,000 lbs. of hake and 10,000 lbs. of widow rockfish. Documentation on Catch Form would show 10,000 lbs. in a PWHT catch category and 10,000 lbs. in a WDOW catch category.

6. Estimate **discarded** weight of any hand-sorted species using normal sampling protocols.
7. Record weight, length, sex, and take necessary dissections from tagged fish.

8. Complete species identification forms if there are hand-sorted species.
9. Maintain observer logbook.
10. Document sightings of ESA listed species.
11. Document sightings of non-ESA listed marine mammals and seabirds.
12. Compile data and enter trip within three days of disembarking.

### Sampling priorities for vessels SORTING CATCH at sea (STANDARD IFQ TRAWL PRIORITIES)

Follow the standard trawl priorities as found in "Sampling Priorities on Trawlers" on page 4-17

### Hake Mothership Catcher Vessel Observers: Duties and Information

Motherships usually have 2 to 5 associated catcher vessels on a rotating delivery schedule. Mothership catcher vessels (MSCV) typically make 2-4 tows per day. Tows can last between 15 minutes and 6 hours, with haul backs lasting 30-45 minutes. When a tow is complete, the vessel will bring the net up to the stern and tie off the open end, preparing it for delivery to the mothership. When fishing is good, the vessel may end their tow, but not deliver it to the mothership immediately. In this case, they bring the doors up and slow down, taking the net out of fishing configuration. Then the vessel will jog, slowly, until the mothership is ready for the delivery. The nets used by MSCV vary greatly in capacity, from around 60,000 to 225,000 lbs. Many of the nets contain "vents" or "blow-out panels", which prevent the net from filling beyond the point where it can be tied off. These vessels are expected

to stay out at sea for 2-3 weeks at a time and may end up in a different port than they departed from, depending on where fishing occurs.

The purpose of deploying observers on these catcher vessels is to record any catch that is not delivered to the mothership (i.e. dumped or spilled at sea). Catcher vessels tie off and deliver their codends to the motherships where they are weighed and sampled by the observers on board the mothership. Observers aboard MSCV will simply record visual estimates of catch that is dumped or spilled at sea. There will not be any actual species composition sampling on the MSCV, as fish will not be brought on board. However, all MSCV observers should take their usual sampling gear with them. If a dead marine mammal, sea turtle, or seabird does end up on board, the observer will be expected to collect samples following normal Catch Share protocols (see Catch Share Manual Chapter 8, *Protected Resources*).

#### **Regulations on discarding**

*(i) Retention requirements. Catcher vessels participating in the MS Coop Program may discard minor operational amounts of catch at sea if the observer has accounted for the discard (i.e. a maximized retention fishery).*

#### **Data to be collected**

1. Trip and haul data: Trip form, Catch form.

Record which mothership the catcher vessel is delivering to in the Trip Notes. If deliveries are made to multiple motherships, clearly document the haul numbers delivered to each mothership.

Gear type = 3 mid-water trawl

## Fishery - Mothership Catcher-Vessel

2. Marine mammal, sea turtle, and seabird interactions, takes, and sightings data.

### Gear

- Safety gear
- All of the usual Catch Share gear

### Mothership Catcher Vessel Observer Priorities

1. Record incidental takes and collect appropriate biological information from protected species: marine mammals, sea turtles, seabirds, green sturgeon, and salmon.
2. Record interactions of marine mammals, sea turtles, and seabirds with fishing.
3. Record fishing effort information, including location, time, date, and depth for all hauls.
4. Estimate total catch weight (OTC) for all tows, including those with 100% discard.
5. Record retained estimate from vessel logbook (no retained sampling is required).
  - If no vessel estimate is available, use Weight Method 14-Visual Experience to estimate retained weights.
6. Estimate weight of all at-sea discards, including “minor operational discards”.
  - For tows that are partially discarded at-sea, but still delivered to a mothership vessel:
    - Simply record the total amount discarded. The mothership observer’s species composition sample will be attributed to these discards.
    - All discard should be placed in a single catch category, ZMIS.

- For tows that are NOT delivered to the mothership (fully discarded at-sea):
  - Sample according to Shoreside Hake protocol. Make visual estimates of discard using the most descriptive Catch Category codes available.
  - Document the reason for the discard in Catch Notes.
  - Contact your debriefer to report an entire codend was not delivered.

**Example:** Due to a gear malfunction, an entire codend was discarded at-sea, estimated at 30,000 lbs. Documentation on Catch Form would show 30,000 lbs. in a PWHT catch category.

7. Maintain observer logbook.
8. Document sightings of ESA listed species.
9. Document sightings of non-ESA listed marine mammals and seabirds.
10. Compile data and enter trip within three days of disembarking.

### In-season accounting of discard data

The catcher vessel captain will transmit haul data to the mothership captain on a regular basis. In addition to haul information, your discard estimates will be transmitted and recorded in the mothership vessel logbook. Observers on the mothership will attribute your discard estimates to the appropriate hauls. Mothership data is used in-season, so it is essential that your discard estimates are accurate. Please record information about reasons for discards in the Catch Notes for each haul (e.g., “discard due to overfilled codend” or “rough weather caused fish to spill out of top of codend”).

## In-season reporting of significant discard events

### *When is a phone call required?*

The observer program must be called within one day when:

- The codend is not delivered to a mothership OR
- A discarding event occurs AND the estimated total discard weight is greater than or equal to 10,000lbs

### *Who do you call?*

- If you need to report a discard event you should call your debriefer during NORMAL BUSINESS HOURS.
  - Request to use the vessel's communication equipment (satellite or cell phone).
  - Leave a message if you don't get an answer.
  - Information to provide to debriefer about discard event:
    - Vessel name
    - Haul date and time
    - Haul number
    - Deployment and retrieval locations
    - Intended mothership
    - Visual estimate of total fish lost (lbs)
    - Species composition
    - If species of concern present, estimated amount
    - Reason for discard (e.g. mechanical failure)
    - Interaction with crew about discard event.
-

## Trawl Example

Macy Fields observed aboard the F/V Allegiance (USCG # 769243), a 63-foot trawler captained by Greg Sampson. Onboard were 2 additional crew members. Macy recorded sampling, safety, and other important information in her logbook, number 54. The vessel used a selective flatfish net (Pineapple net) on all three hauls. No bycatch mitigation device (excluder) was in use.

Upon return, the catch was documented on fish ticket 3956983, issued on 04/21/20--. The vessel completed the following logbook page:

Vessel Name: Allegiance Date: 04 18 -- Time: 1900 Port: Westport\_OR  
Month Day Year

Federal Document No. 769243 Date: 04 21 -- Time: 0500 Port: Westport\_OR  
Month Day Year

Crew Size (including Captain): 3

Buyer(s): Ocean Gold Seafood

Date Mo/Day	Time Local 24-hour clock	LATITUDE		LONGITUDE		Avg Depth of Catch (fathoms)	NET TYPE	Target Strategy	Estimated pounds retained catch per tow – enter 4-letter code from code list provided									
		Degrees	Minutes	Degrees	Minutes				EGLS	PTRL	REX	NSLP	SKAT	YTRK	CNRY	LCOD	ARTH	
04/19	Set	1820	39	52.61	128	01.32	80	B	NSM	25	300	10		120	120		200	
	Up	2040	39	46.23	127	59.01												
04/20	Set	0725	39	44.04	128	03.62	71	B	NSM	450	700	150	25	650		65	2000	
	Up	1035	39	44.17	128	03.64												
04/20	Set	1415	39	44.36	128	03.84	71	B	NSM	500	900	300		300			150	1400
	Up	1735	39	44.35	128	03.83												
	Set																	
	Up																	
	Set																	
	Up																	

Remarks:

64347

Signed: \_\_\_\_\_

To be completed by agency

Vessel	Fish Receiving Ticket No.
Port	

The vessel steamed out to the grounds and set the first haul. Macy checked the vessel logbook to be sure the captain was recording the fishing effort information and then waited for haul back. The vessel hauled back its first tow and Macy visually estimated the total catch to be 7000lbs. The codend was dumped on deck and while the crew was resetting Macy performed a scale calibration. She recorded a fit # of 14 and the test weight weighed 11.0 lbs. She had selected Biolist 1 previously by looking at the galley clock. The crew began to presort small Lingcod first. Macy estimated there were about 30 total fish and decided to weigh half of them. She used the random number table to randomize the starting point for collecting every other fish. The sampled Lingcod came out to 17 LCOD@36.5lbs and Macy tallied an additional 18 presorted Lingcod. Next, the crew worked quickly to get the Spiny dogfish off the vessel. Macy did a quick visual estimate, based on experience. She estimated that 4000lbs of Spiny dogfish was discarded.

The remainder of the haul was sorted normally and mostly retained. Macy recorded an independent visual weight of the retained Petrale sole because they are on the overfished IFQ list. Macy counted 5 orange vessel baskets as the crew put Petrale down, each one visually estimated @ ~65 lbs. All other retained weights were copied from the captain's logbook.

A manageable pile of bycatch was left in the trawl alley. Macy speciated the discard and weighed and counted it all:

Lingcod 12 @ 27.6lbs	Dungeness crab 7 @ 8.0lbs
Starfish 6 @ 7.2lbs	Arrowtooth Flounder 15 @ 15.3lbs, 73 @ 71.2
Pacific Sanddab 150 @ 66.2, ? @ 47.1 lbs	Ratfish 1 @ 1.1lbs
Big Skate 10 @ 62.1 lbs, 7 @ 43.5lbs	Longnose Skate, 16 @ 68.3lbs, ? @ 51.8lbs, 15 @ 53.0lbs, ? @ 29.8lbs
Sandpaper Skate 1 @ 1.5lbs	Jellyfish 2 @ 1.3lbs
Pacific hake 1 @ 0.8lbs	Flathead sole 5 @ 4.5lbs
Petrable sole 1 @ 1.0lbs	Rex sole 3 @ 0.9lbs

Macy asked Greg why he was discarding each species. He told her that the Dungeness crab and Lingcod were discarded due to regulation. The rest were discarded due to market reasons.

-----

Before the vessel brought the second haul aboard Macy calibrated her scale, she recorded a fit # of 3 with a test weight of 11.05lbs. This tow has a variety of species and Macy visually estimated total weight at 10000lbs. When the vessel dumped the bag on deck, Macy noticed lots of Pacific halibut which she knew would be presorted. She visually estimated there were about 60 P. halibut in the tow and decided to sample every 5th fish for lengths and viabilities (starting with the randomly selected 4th fish).

The lengths and viabilities for the sampled *P. halibut* are as follows:

51 cm Excellent	76 cm Poor	61 cm Poor	79 cm Poor
109 cm Poor	87 cm Dead	123 cm Excellent	55 cm Dead
82 cm Excellent	93 cm Excellent	47 cm Poor	70 cm Dead

There were an additional 47 tallied PHLB.

Macy wanted to use actual weight for all discarded high priority species and employ visual spatial for all remaining bycatch, due to the high volume of discard. So, she asked the crew to basket all Dungeness crab and discarded overfished IFQ species separately. Then she divided the trawl alley into four equal parts and randomly selected one section. All discard was collected from the selected section and used for her species composition sample. When she sorted her baskets she found:

Big Skate 21 @ 42.2lbs	Rex sole 57 @ 28.9lbs
Lingcod 2 @ 4.4lbs	Arrowtooth flounder 17 @ 44.2lbs
Urchins 52 @ 10.5 lbs, ? @ 4.7lbs	English sole 25 @ 13.5lbs
Spiny dogfish 16 @ 65.1lbs, ? @ 74.6lbs, 17 @ 59.7lbs, ? @ 71.2lbs, 10 @ 46.5lbs, ? @ 70.85 lbs	Pacific sanddab 81 @ 19.3lbs
Ratfish 12 @ 20.6lbs	Dover sole 3 @ 1.4lbs

Once the sort was finished, Macy collected all the discarded overfished rockfish and prohibited species set aside by the crew. There were a lot of Darkblotched so Macy performed a basket dump to select ~30 fish for

average weight. After counting and weighing these species she found:

Darkblotched rockfish ? @ 72.0lbs 34 @ 16.35lbs.	Canary rockfish 4 @ 6.1lbs	Dungeness crab 4 @ 4.7lbs
--	-------------------------------	------------------------------

Before the crew started putting fish down Macy verified the overfished species retained weights. The crew had one basket of Canary rockfish that contained 30 CNRY @ 68.7 lbs. To prevent potential double counting by the vessel, she also made an independent visual estimate of 30 lbs. for a bin of mixed retained North Slope rockfish.

There was also a large amount of retained Petrale Sole. Macy kept track of full baskets throughout the sort and estimated there were 11 baskets of Petrale at approximately 65lbs. each sent down.

Macy asked again about the reasons for discard. Greg told her the *P. halibut*, Dungeness, and Lingcod were all discarded due to regulation. Everything else was unmarketable.

-----

The vessel brought up the final haul of the trip. It was almost as big as the last one, so Macy visually estimated it at 9000lbs. A crab pot and line were tangled in the net's head rope, Macy visually estimated it's mass at 80lbs. While the crew worked the pot free, Macy performed her scale calibration and recorded a fit value of 9 with a test weight reading of 11.05 lbs. The catch that was

dumped on deck was mixed with mud and contained what Macy guessed was at least ~500 lbs. of rock and clay. The crew washed the catch and began presorting. Macy asked them to let her know if they were throwing something over. She randomly collected Dungeness crabs for average weights and tallied the rest. Macy counted a total of 67 crabs, including the single basket of 17 DCRB @ 34.7 lbs. she weighed for average weight. She noticed some Darkblotched rockfish that the crew intended to discard, so she threw out a basket for them to fill. Near the end of the sort she collected these to count and weigh and recorded 29 DBRK @ 41.6lbs. For the remaining discard, she decided to employ a random spatial frame, as the crew was leaving the discard in the trawl alley. She took all discard from a randomly selected 1/4 of the trawl alley. As sorting progressed, Macy noticed that there were several PHLB buried in the haul. She asked the crew to let her take actual lengths for all PHLB, before throwing them overboard. There turned out to be 8 PHLB, measuring 52cm (dead), 93cm (poor), 47cm (dead), 62cm (dead), 74cm (dead), 52 cm (poor), 100cm (dead), and 122cm (dead).

From her randomly selected sample section, Macy collected 9 discard baskets to sort and count for species

composition. For species in high numbers Macy counted only a single basket.

Sandpaper skates 3 @ 5.4lbs	Longnose skates 6 @ 52.3lbs
Sablefish 12 @ 31.8lbs	Urchin 25@ 3.3lbs, ?@ 24.9 lbs
Spiny dogfish 15 @ 91.2lbs, ? @ 75.6lbs, 17 @ 81.2lbs, ? @ 64.8lbs, 6 @ 58.3lbs	Arrowtooth flounder 20 @ 50.2lbs, 16@ 42.6lbs
American shad 5 @ 8.4lbs	Rex sole 32 @ 9.5lbs
English sole 9 @ 8.2lbs	Starfish 4 @ 3.5lbs
Pacific sanddab 40 @ 7.2lbs, 34 @ 6.4lbs	Lingcod 12 @ 38.5lbs

The crew had filled one checker with retained Petrale sole, which Macy estimated to be 1000 lbs.

Macy asked the skipper one final time about reason for discard. He said the Longnose skates should all have been kept, but the crew must have been tired. The P. halibut and lingcod were regulatory discard, and everything else was the same as in previous hauls. On the way in, Macy had time to record haul locations and double check her sampling form completion. After the offload at Ocean Gold Seafoods, she entered the trip in the WCGOP database, it was assigned # 12112. She verified the permit # with her debriefer as GF0001

\* Length and Bio forms were not completed for this example

**Trip Information**

Trip # 1 2 1 1 2 USCG # 7 6 9 2 4 3 or State Reg #                     

Observer Name Macy Fields Year 2 0 1 4

Vessel Name Allegiance Partial Trip  Total # of Fishing Days (KNOWN)

Fishery Catch Share Vessel Logbook Name WOC Trawl

Permit/License # GF0001 Vessel Logbook Page # 64347

First Receiver Ocean Gold Seafood Observer Logbook # 54

Skipper's Name Greg Sampson # of Crew 3  
(including captain, not including observer)

Departure Date/Time 04 / 18 / 20-- 1900 Departure Port Westport, OR

Landing Date/Time 04 / 21 / 20-- 0500 Landing Port Westport, OR

Fish Ticket #	WOC	Date	Fish Ticket #	WOC	Date
<u>3 9 5 6 9 8 3</u>	<u>O</u>	<u>04/21/ --</u>			

**Haul Information**

Haul/ Set #	OTC Estimate	Weight Method	Gear Perf	Total Hooks/ Pots Set	# of Hooks/ Pots Lost	Seabird Avoidance (Gears 7, 9, 19, & 20)	Avg. Soak Time m = minutes, h =hours	Comments
1	7000	14	1				< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
2	10000	14	1				< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
3	9000	14	2				< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
KP Checks	26000							

Gear Performance: 1- No Problem, 2- Pot in Haul, 3- Net hung up, 4- Net ripped, 5- Net, pot(s) or other gear lost, 7- Other  
Seabird Avoidance: 0- No, 2- Streamer Line(s), 3- Buoy Line, 4- Weights, 5- Night Setting (Exclusively), 6- Other

CS LE OA EFP

OMB Control No. 0648-0583 expires 11-30-2015  
December 2012  
Trip Form v. 12

TRIP FORM - HAUL LOCATIONS

Haul/ Set #	Date		Time	Latitude		Longitude		Depth of Catch (fathoms)	Gear Type	Excluder Presence	Target Strategy
	Month	Day		Degrees	Minutes	Degrees	Minutes				
1	Start	04 19	1820	39	52.61	128	01.32	80	17	2	NSM
	End	04 19	2040	39	46.23	127	59.01	80			
2	Start	04 20	0725	39	44.04	128	03.62	71	17	2	NSM
	End	04 20	1035	39	44.17	128	03.64	71			
3	Start	04 20	1415	39	44.36	128	03.84	71	17	2	NSM
	End	04 20	1735	39	44.35	128	03.83	71			
	Start										
	End										
	Start										
	End										
	Start										
	End										
	Start										
	End										
	Start										
	End										
	Start										
	End										
	Start										
	End										
	Start										
	End										

Trip Notes:

**Gear Type Codes:**  
 1-Trawl; small footrope (<8 inches)  
 2-Trawl; large footrope (>8 inches)  
 3-Midwater trawl  
 4-Danish/Scottish Seine  
 5-Other trawl gear  
 6-Vertical Hook and Line  
 7-Pole (Commercial)  
 8-Other Hook and Line  
 9-Fish Pot  
 10-Shrimp trawl single rigged  
 11-Shrimp trawl double rigged  
 12-All net gear except trawl  
 13-All Troll gear  
 14-OR other Miscellaneous gear  
 15-OR set back flatfish net (pineapple net)  
 16-Longline (fixed hooks)  
 17-Longline (snap-on hooks)

**Excluder Presence Codes:**  
 1 - Present  
 2 - Absent  
 Leave field blank if not collected



Haul # 0 1

**SPECIES COMPOSITION FORM**

Page 2 of 2

Date 0 4 1 9 - -

Trip # 1 2 1 1 2

Fit # 14  
Cal. Wt. 11.0

Trawl Biosampling List  
1 2 3

Catch #	Catch Category	Sample Method	KP Weight		Species	Species Code	Sample Weight	Fish #	Discard Reason	Release method	Basket Weight	#	Basket Weight	#
			KP Number											
1	LCOD	2	36.5		Lingcod	603	36.5	17	16					
			17											
3	ZMIS	1	562.2		Lingcod	603	27.6	12	16					
			453											
					Starfish	20	7.2	6	13					
					P. Sanddab	137	113.3	257	13		66.2	150	47.1	-
					Big Skate	550	105.6	17	13		62.1	10	43.5	7
					Sandpaper Skate	206	1.5	1	13					
					Hake	206	0.8	1	13					
					Petrale	112	1.0	1	13					
					DCRB	12	8.0	7	16					
					Arrowtooth	141	86.5	88	13		15.3	15	71.2	73
					Ratfish	99	1.1	1	13					
					Longnose Skate	554	202.9	52	13		68.3 53.0	16 15	51.8 29.8	- -
					Jellyfish	35	1.3	2	13					
					Flathead sole	103	4.5	5	13					
					Rex Sole	105	0.9	3	13					

**Trawl Sample Methods**  
1 - Whole haul  
2 - Single basket  
3 - Multiple basket

**Fixed Gear Sample Methods**  
4 - FG Sample  
5 - FG(Verified Fish Ticket)  
6 - FG(Unverified Fish Ticket)

**Reasons for Discard**  
11-Incidental/Accidental 12-Drop off 13-Market  
14-Other 15-Predation 16-Regulation 17-Safety  
18-Market (Dockside) 19-Utilized on board

**Release Methods for RF (Nearshore Fisheries Only)**  
TO-Tossed over MV-Mostly Vented DC-Mostly released at depth by cage DW-Mostly released at depth weighted line DO-Mostly released at depth other method OM-Other release method used NC-Not Collected

Species Composition Form  
October 2013  
OMB Control No. 0648-0593  
Expires 11-30-2015

Species	Species Composition Measurements and Calculations
ZMIS3  Pac sanddab  Longnose Skate	$150 \text{ fish} / 66.2 \text{ lbs.} \times 113.3 \text{ lbs.} = 256.7220543 \text{ fish}$  $31 \text{ fish} / 121.3 \text{ lbs.} \times 202.9 \text{ lbs.} = 51.85408067 \text{ fish}$
LCOD	Tally = $18 + 17 = 35$  Catch Weight: $36.5 \text{ lbs} / 17 \text{ fish} \times 35 \text{ fish} = 75.1470588 \text{ lbs.}$
PTRL	5 retained baskets ~325 lbs. vis



Haul # 0 2

**SPECIES COMPOSITION FORM**

Page 2 of 2

Date 0 4 2 0 - -

Trip # 1 2 1 1 2

Fit # 3  
Cal. Wt. 11.05

Trawl Biosampling List  
1 2 3

Catch #	Catch Category	Sample Method	KP Weight	Species	Species Code	Sample Weight	Fish #	Discard Reason	Release method	Basket Weight	#	Basket Weight	#
			KP Number										
2	ZMIS	3	577.65	Big Skate	550	42.2	21	13					
			390										
				Lingcod	603	4.4	2	16					
				Urchins	54	15.2	75	13		10.5	52	4.7	-
				Pacific Dogfish	66	387.95	97	13		65.1	16	74.6	-
										69.7	17	71.2	-
									46.5	10	70.85	-	
				Ratfish	99	20.6	12	13					
				Rex sole	105	28.9	57	13					
				Arrowtooth	141	44.2	17	13					
				English Sole	108	13.5	25	13					
				P. Sanddab	137	19.3	81	13					
				Dover sole	107	1.4	3	13					
3	ZMIS	1	99.15	Darkblotched	311	88.35	184	13		72.0	-	16.35	34
			192										
				Canary	314	6.1	4	13					
				DCRB	12	4.7	4	16					
4	CNRY	1	68.7	Canary	314	68.7	30						
			30										

**Trawl Sample Methods**  
 1 - Whole haul  
 2 - Single basket  
 3 - Multiple basket  
**Fixed Gear Sample Methods**  
 4 - FG Sample  
 5 - FG(Verified Fish Ticket)  
 6 - FG(Unverified Fish Ticket)  
**Reasons for Discard**  
 11-Incidental/Accidental 12-Drop off 13-Market  
 14-Other 15-Predation 16-Regulation 17-Safety  
 18-Market (Dockside) 19-Utilized on board  
**Release Methods for RF (Nearshore Fisheries Only)**  
 TO-Tossed over MV-Mostly Vented DC-Mostly released at depth by  
 cage DW-Mostly released at depth weighted line DO-Mostly released at  
 depth other method OM-Other release method used NC-Not Collected  
 Species Composition Form  
 October 2013  
 OMB Control No. 0648-0593  
 Expires 11-30-2015

Species	Species Composition Measurements and Calculations	
ZMIS 2	Catch Weight= 577.65 lbs. / 1 section x 6 sections = 3465.9 lbs.	
DSRK	43 fish / 171.3 lbs. x 387.95 lbs. = 97.383829 fish	
Urchin	52 urchin / 10.5 lbs. x 15.2 lbs. = 75.27619047 urchin	
ZMIS 3		
DBRK	34 fish / 16.35 lbs. x 88.35 lbs. = 183.724770 fish	
PTRL (R)	Visual 11 baskets @ 65lbs. = 715 lbs.	
NSLP (R)	Visual 30 lbs.	
PHLB	Lengths Viability x Lbs. 51 E 3.15 109 P 36.84 82 E 14.64 61 P 5.62 123 E 54.48 47 P 2.43 76 P 11.44	WM 19 Tally = 47 + 12 = 59  Catch Weight = 194.14 lbs. / 12 PHLB x 59 total = 954.521664lbs.
	87 D 17.75 93 E 22.02 79 P 12.99 55 D 4.01 70 D + 8.77 <hr/> 194.14 lbs.	



Haul # 0 3

**SPECIES COMPOSITION FORM**

Date 0 4 2 0 - -

Trip # 1 2 1 1 2

Fit # 9  
Cal. Wt. 11.05

Trawl Biosampling List  
1 2 3

Catch #	Catch Category	Sample Method	KP Weight	Species	Species Code	Sample Weight	Fish #	Discard Reason	Release method	Basket Weight		#	Basket Weight		#
			KP Number												
2	DCRB	2	34.7	DCRB	12	34.7	17	16							
			17												
3	DBRK	1	41.6	Darkblotched	311	41.6	29	13							
			29												
5	ZMIS	3	663.3	Sandpaper skate	555	5.4	3	13							
			468												
				Sablefish	203	31.8	12	13							
				Spiny Dogfish	66	371.1	61	13			91.2 81.2	15 17	75.6 64.8	- -	
										58.3	6				
				American Shad	606	8.4	5	13							
				English sole	108	8.2	9	13							
				Pac Sanddab	137	13.6	74	13			7.2	40	6.4	34	
				Longnose Skate	554	52.3	6	11							
				Urchin	54	28.2	214	13			3.3	25	24.9	-	
				Arrowtooth	141	92.8	36	13			50.2	20	42.6	16	
				Rex	105	9.5	32	13							
				Starfish	20	3.5	4	13							
				Lingcod	603	38.5	12	16							

Trawl Sample Methods  
1 - Whole haul  
2 - Single basket  
3 - Multiple basket

Fixed Gear Sample Methods  
4 - FG Sample  
5 - FG(Verified Fish Ticket)  
6 - FG(Unverified Fish Ticket)

Reasons for Discard  
11-Incidental/Accidental 12-Drop off 13-Market  
14-Other 15-Predation 16-Regulation 17-Safety  
18-Market (Dockside) 19-Utilized on board

Release Methods for RF (Nearshore Fisheries Only)  
TO-Tossed over MV-Mostly Vented DC-Mostly released at depth by cage DW-Mostly released at depth weighted line DO-Mostly released at depth other method OM-Other release method used NC-Not Collected

Species Composition Form  
October 2015  
OMB Control No. 0648-0593  
Expires 11-30-2015

Species	Species Composition Measurements and Calculations																														
ZMIS 5	Sampled 1/4 alley Catch Weight = 663.3 lbs. x 4/1 sections = 2653.2 lbs																														
DSRK	38 fish / 230.7 lbs. x 371.1 lbs = 61.126137 fish																														
Urchin	25 urchin / 3.3 lbs. x 28.2 lbs = 213.6363 urchin																														
PHLB	<table border="0"> <thead> <tr> <th>Length</th> <th>Viability</th> <th>Lbs.</th> </tr> </thead> <tbody> <tr> <td>52</td> <td>D</td> <td>3.35</td> </tr> <tr> <td>93</td> <td>P</td> <td>22.02</td> </tr> <tr> <td>47</td> <td>D</td> <td>2.43</td> </tr> <tr> <td>62</td> <td>D</td> <td>5.93</td> </tr> <tr> <td>74</td> <td>D</td> <td>10.49</td> </tr> <tr> <td>52</td> <td>P</td> <td>3.35</td> </tr> <tr> <td>100</td> <td>D</td> <td>27.87</td> </tr> <tr> <td>122</td> <td>D</td> <td>+ 53.07</td> </tr> <tr> <td></td> <td></td> <td><u>128.51 lbs.</u></td> </tr> </tbody> </table>	Length	Viability	Lbs.	52	D	3.35	93	P	22.02	47	D	2.43	62	D	5.93	74	D	10.49	52	P	3.35	100	D	27.87	122	D	+ 53.07			<u>128.51 lbs.</u>
Length	Viability	Lbs.																													
52	D	3.35																													
93	P	22.02																													
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62	D	5.93																													
74	D	10.49																													
52	P	3.35																													
100	D	27.87																													
122	D	+ 53.07																													
		<u>128.51 lbs.</u>																													
DCRB	<p>Total count = 67 crabs</p> <p>Catch Weight = 34.7 lbs. / 17 crab x 67 crab = 136.7588234 lbs.</p>																														
PTRL (R)	~1000lbs visual																														

