

## **Trawl Sampling**

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## Introduction

Prior to January 1, 2011, 70% of all WCGOP observer sea days were aboard trawlers. After January 1, 2011 Non Catch Share Observers only cover Trawl vessels in the CA halibut and pink shrimp fisheries. 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. Almost all West Coast trawlers deliver to shore-based processors.

## Trawl Gear and Fish Strategy

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 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.

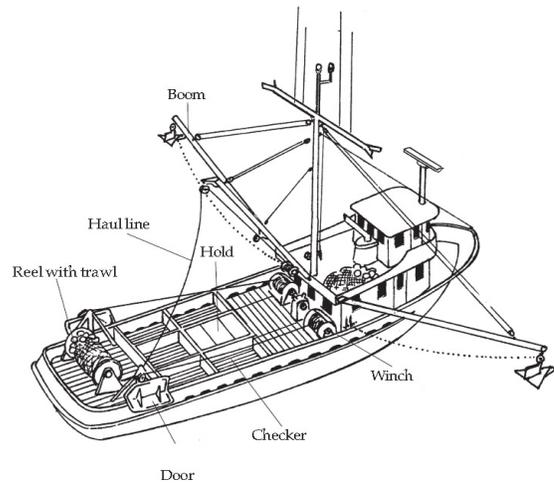
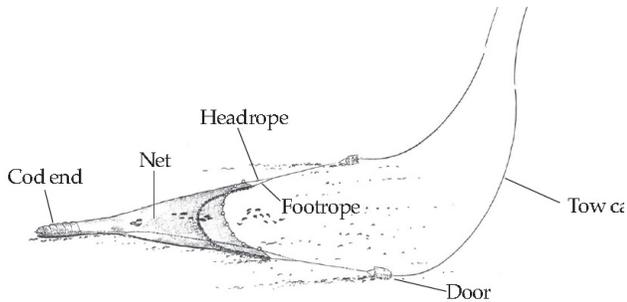


Figure 4-1: Trawl Vessel



Figure 4-2: Side hauling versus stern hauling

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



**Figure 4-3: Trawl Net**

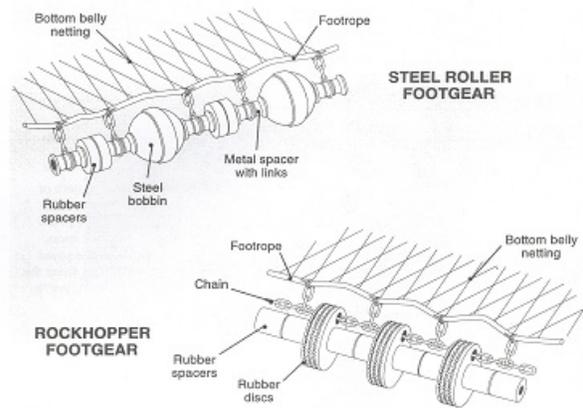
The footrope or groundrope is attached directly to the bottom, leading edge of the mouth of the net. The purpose of the footrope is to separate the target species from the seabed and raise the netting far enough above the seabed to prevent damage. The footrope may be weighted with chain or may be rope-wrapped 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.

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'.



**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 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.

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

- 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.
- 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.

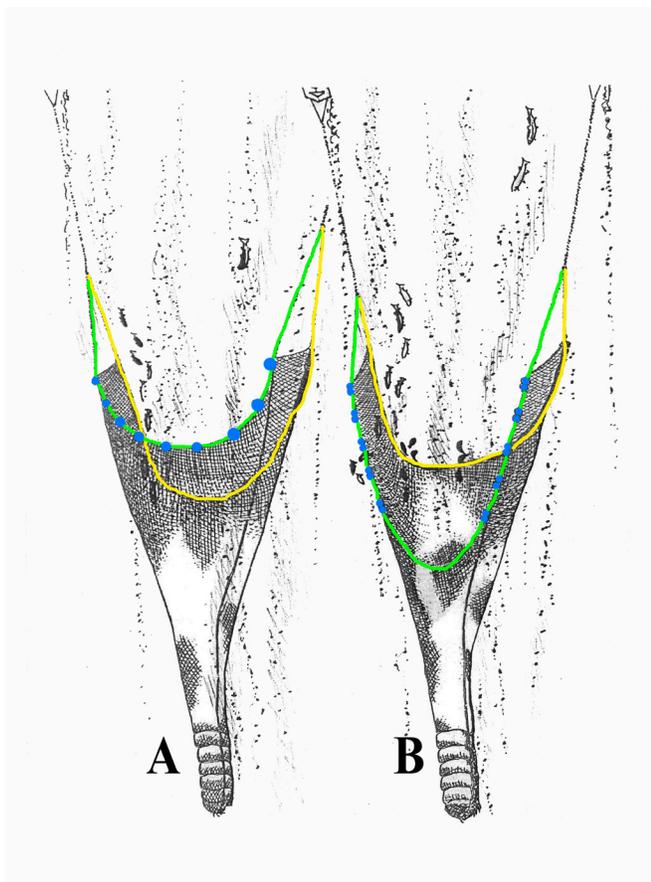


Figure 4-5: (A) Trawl net compared to (B) OR Set-back Flatfish net. The yellow lines show the footropes, the green lines show the headropes. The blue circles are the floats.

**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.

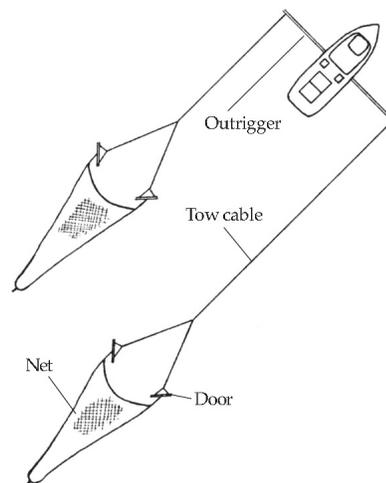


Figure 4-6: Paired bottom trawls double rigged

**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.

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

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. In the Non Catch Share program only vessels targeting pink shrimp and CA halibut are typically observed.

### 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 not much space.

2. **Duration of tow:** Tow duration can vary greatly. If a vessel is making long tows, over 3 hours, observers will have plenty of time to sort and weigh 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.
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 with the crew that samples will be collected from discard only is key to fulfilling sampling requirements.

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

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

**Duration:** Trawl tows range from 45 minutes to 20 hours.

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

**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 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.

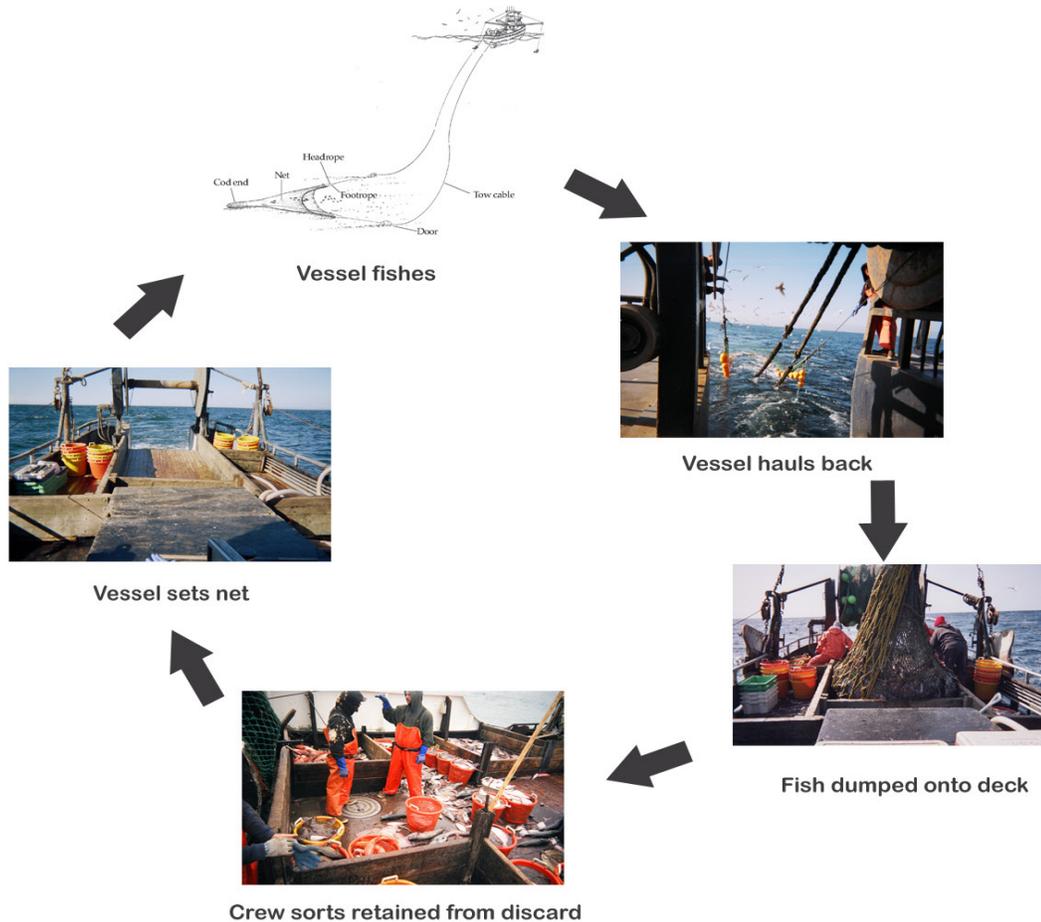


Figure 4-7: Typical activity of a trawl vessel.

### Trawler Operations

The flow chart above (Figure 4-7) 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 cause 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 by WCGOP Non-Catch Share:

- CA halibut (open access)
- CA pink shrimp (open access)
- OR pink shrimp (open access)
- WA pink shrimp (open access)

Observers collect the following information on trawl vessels:

- Fishing Effort
- Total Catch
- Catch Category Weight
- Species Composition
- 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."

### 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, (See Figure 4-8). Observers copy information out of this book onto the Trip Form – Haul Locations for groundfish trawlers.

Figure 4-8: The Washington-Oregon-California Groundfish Logbook.

**Haul:** A haul is the amount of fish taken in a single pull of a net. If the net is fished and then pulled in and landed on the vessel; it is a haul, whether or not it is dumped prior to letting the net back out to fish again

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.

## Observer Total Catch Estimates (OTC)

The total catch weight 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 their estimates in the Observer Logbook, Vessel Diagrams section. Use their estimate, as well as the area of the trawl alley and other resources, to visually estimate the total weight of each haul. Record the visual estimate on the Catch Form.

### Weight Method 6 – Other

This weight method should never be intentionally used.

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 paperwork.

## Trip Form Instructions

See "Figure 4-9: Trip Form (front)" and "Figure 4-11: Back of the Trip Form".

- **Fishery Sector** (along top right hand border): Circle the fishery type the vessel participated in: 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 of 5 through 5 of 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 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.

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

- **Partial trips (NCS only):** Check the box if the trip included more days than were observed. (Fish ticket includes unobserved catch.)
- **Total # of fishing days (KNOWN):** Document the total number of days the vessel fished before landing. **This field is only completed when the trip is a partial trip.**
- **Fishery:** Record the name of the fishery the vessel was selected for:
  - CA halibut
  - CA pink shrimp
  - OR pink shrimp
  - WA pink shrimp
- **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
CA Halibut	Shrimp/Prawn Trawl Logbook
CA pink shrimp	Scallop/Shrimp Logbook
OR pink shrimp	OR Scallop/Shrimp Logbook
WA pink shrimp	no official logbook

- **Permit/License #:** Document the permit/license number being used. Only one permit/license number should be used on trawl vessels.
- **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

Vessel Logbook Name	Page Number Location
WOC Groundfish Logbook	Bottom left corner (See Figure 4-8)
CA Shrimp/Prawn Trawl Logbook	Top of page, to the right of header
OR Scallop/Shrimp Logbook	Bottom right corner

- **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 the observer.
- **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!

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

- 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.

### 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 the Catch form. Leave this field blank if the haul was unsampled or the 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

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

- **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.

8 - Retrieved gear

- **Total Hooks/ Pots Set:** This column will be blank on all trawlers.
- **# Hooks/ Pots Lost:** This column will be blank on all trawlers.
- **Seabird Avoidance Gear:** This column will be blank on all trawlers.
- **Avg. Soak Time:** This column will be blank on all trawlers.
- **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).



## Trip Form: Haul Locations Instructions

(See Figure 4-11). 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 4-10)

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



Figure 4-10: 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)

*Be very careful when documenting gear type on trawlers. Remember, regulations state that gear type 17-Pineapple Trawl/Selective flatfish net must be used when fishing shoreward of the RCA (depth generally less than 150 fathoms), north of 40° 10'.*

*\*If the fishing vessel is not using one of the above gear types, this is most likely the wrong section of the manual. Please refer to Chapter 5 “Fixed Gear Sampling” and/or Chapter 6 “Fixed Gear Sampling on Small Boats”.*

**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

- **Excluder Presence:** Document whether or not an excluder was used for the haul.

- 1 - Present
- 2 - Absent

- **Target Strategy:** Enter the vessel's target strategy. Only one target strategy may be documented. If the vessel documents more than one target strategy, use the species or grouping that is most prevalent in the haul. Only PacFin codes may be used. If the skipper documents something other than a PacFin code, use the code that most closely represents the target strategy and add a note in the comments.

**Trip Notes:**

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**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,  
 7-Vertical Hook and Line  
 8-Pole (Commercial)  
 9-Other Hook and Line  
 10-Fish Pot  
 12-Shrimp trawl single rigged  
 13-Shrimp trawl double rigged  
 14-All net gear except trawl  
 15-All Troll gear  
 16-All other Miscellaneous gear  
 17-OR set back flatfish net (pineapple net)  
 19-Longline (fixed hooks)  
 20-Longline (snap-on hooks)

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

TRIP FORM - HAUL LOCATIONS

Haul/ Set #	Date	Time	Latitude		Longitude		Depth of Catch (fathoms)	Gear Type	Excluder Presence	Target Strategy
			Month	Day	Degrees	Minutes				
	Start									
	End									
	Start									
	End									
	Start									
	End									
	Start									
	End									
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	End									
	Start									
	End									

Figure 4-11: Back of the Trip Form

## Sampling Catch

Once the catch is dumped on deck, the crew will begin sorting retained individuals from discarded individuals. Due to the large quantity of fish, observers only sample discarded catch on trawlers. Observers should document estimates of retained catch, but these are usually skipper estimates. **Remember, on trawlers, the observer's primary responsibility is to sample the discarded portion of the catch.**

## Catch Categories

Chapter 3, "Observer Basics," discussed 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.

## Retained Catch on Trawlers

As mentioned previously, observers do not independently estimate the weight of retained catch on trawlers. 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:

- Vessel does not record catch category (often happens with species retained in small quantities).
- Vessel uses an invalid PacFin code or a code

---

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

that is not the most descriptive possible. (Select most applicable name from Catch Category list, see Appendix Catch Categories List and Target Strategies).

- 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 grouping(s) (catch categories). There are three 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 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.

**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.

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

**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

The priorities for observer sampling on trawlers are:

1. Discarded prohibited species: Marine mammals, sea turtles, seabirds, green sturgeon, salmon species, Dungeness crab (North of Point Arena) and Pacific halibut.
2. Discarded overfished species: Cowcod, Dark-blotched rockfish, Pacific Ocean Perch, Canary rockfish, Yelloweye rockfish, Bocaccio rockfish, and Petrale sole.
3. Discarded rockfish species.
4. Species that are both retained and discarded. Because some species are high-graded or have size restrictions, a sample of the discarded individuals is very important.
5. All other Discarded species.
6. Biological Sampling. (See details in Chapter 7, "Biological Sampling" and Chapter 8, "Protected Resources.")

#### ***Priorities 1 - 6 must be completed on ALL hauls***

7. Retained species not recorded by vessel.
8. Retained overfished species.
9. Retained rockfish species.
10. Retained mixed species catch categories. Vessels will mix flatfish or rockfish species. If the crew is mixing species, take a species composition sample from the mixed group.
11. Other Retained Species.

Observer effort on trawlers is focused on obtaining the most accurate estimates of discarded catch possible. Through the use of catch categories, more precise methods of estimation can be used for those higher priority groups (prohibited species, overfished species, rockfish). However, all discarded catch weight must be estimated using one of the weight methods explained below.

Sample sizes of discarded catch can vary greatly when sampling on trawl vessels. There will be hauls where observers may weigh 100% of the discard, and on others only a small sample will be used to estimate the discard weight.



**Figure 4-12: Shrimp sorting belt**

## Weight Methods for Estimating Catch Category Weights

There are ten 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

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

### Weight Method 1: Actual Weight

When actual weight is commonly used:

- Total discard is less than 1000 to 1500 lbs. and vessel has enough deck space for all discard.
- 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

Catch Category Wt (lbs) =  $\Sigma$ Basket Weights

OR

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

#### Calculation

Catch Category Wt (lbs) =  $\Sigma$ all species groups in catch category

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

When Bin Volume is commonly used:

- All discard is placed in a bin or left in the trawl alley.
- 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 4-13).

**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, simply measure the length and the width of the bin and document these measurements on the Catch Form. If there are variations in the shape of the bin, multiple measurements of length and width should be made.

#### Calculation

Total Area (m<sup>2</sup>) =  $\Sigma$  of Areas (m<sup>2</sup>) of All Bins

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



**Figure 4-13: Trawl Alleys and Bins**

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 calibrated stick into the bin to measure the depth of fish at three points.

**Calculation**

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

**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 = (.47m + .31m + .25m)/3 = 0.3433333 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**

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

**Example:** Volume of the bin = 2.43m X 1.59m X 0.343333333m = 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.

- Visually divide the bin into sections of equal size. For example:

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

- Use a random number table or a watch to select one or two areas from which one or more baskets will be taken.

6. **From the selected section, fill baskets to the top.** Collect fish by moving down and out through the fish, being sure to reach the deck. It is required that the baskets used for density measurement are filled to the top of the basket (See Figure 4-14).

**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

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

Example: (71.05 lbs + 68.60 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>.

Example: Density = 69.825 lbs/ .040 m<sup>3</sup> = 1745.625 lbs/ m<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 m<sup>3</sup> X 1745.625 lbs/m<sup>3</sup> = 2315.636147 lbs



Figure 4-14: WCGOP Observer Basket Volumes

Weight Method 3: Basket Weight Determinations (BWD)

When Basket Weight Determination is commonly used:

- Total discard weighs less than 1500lbs.
- 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".

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.

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 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.

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

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

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

**Example:** 551.20 lbs/ 7 baskets =78.74285714 lbs.

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

Example: Weight of partial basket = 35.85 lbs.

7. To determine catch category weight

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

**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.

1. **Define population:** All baskets of fish in the catch category.
2. **Define sample frame:** Spatial systematic, based on baskets of fish.
3. **Define sample units:** Single baskets of fish.

4. **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.
5. **Decide how many of the sample units you will weigh:** Decide to weigh five baskets.
6. **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.
7. **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.
8. 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.

### Step-by-Step Instructions

1. Visually estimate total catch weight (OTC).
2. 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.
3. To determine total discard weight:

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

**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 never be intentionally used. 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:

- All estimates of retained catch categories on trawlers.

### 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:

- 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 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.

## Methods for Randomly Selecting Individuals

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

**Presort:** Vessels will attempt to get harder, 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.

## 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 about 60 sablefish presorted. In order to get 15 individuals, divides  $60/15=4$ . 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 3d, 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

Pacific halibut are not actually weighed on trawl vessels. Rather, this method describes the technique where the measured length of the fish is used to estimate the weight based on a conversion table.

When PHLB length/weight conversion is used:

- Used only for Pacific halibut (PHLB).

### 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. The database will be used to determine catch category weight. First, enter "weight method 9" and the number of PHLB on the catch page. Then, enter the length and viability values into the specimens page. The database will sum the weights of all the Pacific halibut, and the resulting value will be displayed on the catch page.

**Tip:** The catch weight for P. halibut will be generated based on values entered in the specimens page or the lengths page of the database.

3. Document the catch weight generated by the database on to the Catch form, and include this value in the Catch Weight keypunch check.

---

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.

**Tip:** Retained and discarded Pacific halibut must be in separate catch categories.

When recording Pacific halibut in the raw data, use a standard format to document the following information:

- A label which identifies the lengths as being “actual” (as opposed to visual estimates)
- Lengths recorded in whole centimeters
- Viability assessment (Excellent, Poor, or Dead)
- Example:

PHLB: Actual Lengths	
73cm	P
90cm	E
73cm	P
122cm	D

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

### Weight Method 14: Visual Experience

When Visual Experience is commonly used:

- Species that are too large to weigh, such as marine mammals, large skates, and sharks.
- Estimates of total discard weight when two hauls are dumped on each other.
- Hauls observer is unable to sample.
- Weight of discard when all catch is dumped at-sea.
- 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 grouping of discarded species, it's very important to get a species composition sample.

- Weight of a single discarded species that has a large quantity. Commonly, the species this applies to are Arrowtooth flounder and Spiny dogfish shark.

### 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:

- Mixed discarded species when a large quantity of fish are discarded.
- 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, 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 (ie two or four).

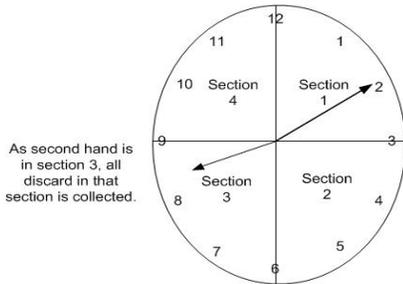
2. Number each section.

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

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.

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

- 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.



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

- 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.

In this case, The total catch category weight would be calculated as:

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

## 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 Number:** 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:** 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 F.

- **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 #:** Only use this column for weight methods 8 (Extrapolation), 9 (PHLB Length/Weight Conversion). or weight method 14 (Visual Experience).

NOTE: Weight method 19 is for catch share observers only.

- **# Hooks/ Pots Sampled by Catch Category:** This column will be blank on all trawlers.
- **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

- **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.

**Note:** 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 entered into the database exactly as they are documented on the data forms.
- **Keypunch Checks:** This is a required field for **Catch/Sample 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.



## Collecting and Documenting 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 4-16) 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.

Sample sizes for species composition will depend upon various factors, however observers should attempt to weigh a minimum of 500 pounds whenever possible. This standard has been applied to tows that are > 4 hours in length. In some fisheries (e.g., pink shrimp), frequent hauls with short tow times, high diversity of catch, and/or discards containing many small individuals may limit the observer's ability to meet this goal. Sample sizes may also be affected by the size of the vessel, the configuration of the back deck and/or the sorting practices of the crew. Always consult your debriefer for guidance on the appropriate sample sizes for the vessels and fisheries you observe.

### Methods for Species Composition Sampling

#### Sample Method 1 - Whole Haul

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

#### Sample Method 2 - Single Basket

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

#### Sample Method 3 - Multiple Basket

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

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

- Sort individuals in baskets to species.
- Weigh and count individuals by species.

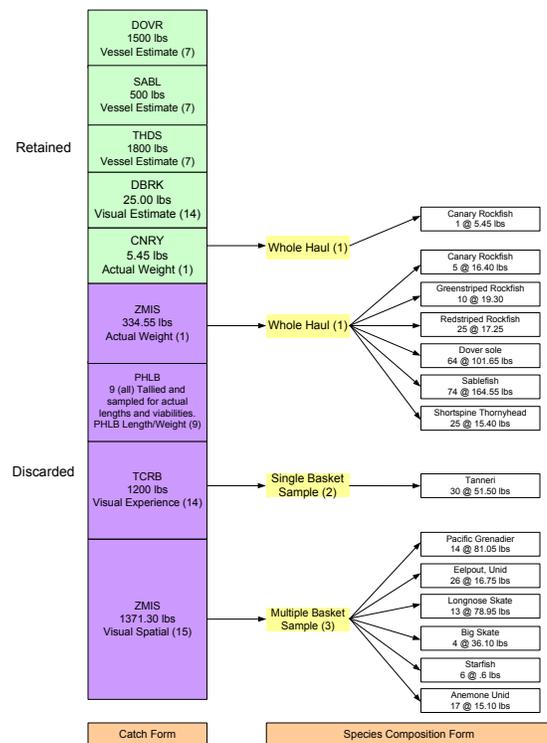


Figure 4-16: Catch to Species composition

## 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. This is especially helpful when sorting out hundreds of small discarded shrimp or rockfish or small flat fish.

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, eelpouts or shrimp.
- 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. Weigh all individuals of a species to determine the total weight
2. Randomly select a subsample of the species. A subsample can be 50 - 100 fish, a full basket of fish, or a partial basket of fish. Ensure that you only use fish from your species composition sample and do not take fish from outside this sample. Using the "basket dump" technique is especially helpful in this situation.

**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.

3. Weigh and count all the individuals in the selected subsample. To determine the total number of individuals complete the following extrapolation calculation:

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

## 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 Number:** Record the number of the haul that the sample came from.
- **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.
- **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.

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If weight method 1-Actual Weight and sample method 1-Whole Haul are used on a haul, the KP Number on the species composition form

should match the Catch Weight on the catch form.

### Single species catch

**categories:** Document only those individuals that have been actually weighed AND counted on the Species Composition Form.

- **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 Number:** 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 F.
  - **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 A through E for Species Codes).
  - **Sample Weight:** Record the total weight of the species in the sample. **This weight MUST be an actual weight.**
  - **Fish Number:** 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 Number 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.
-



## Mixed Hauls

Occasionally, a vessel will dump a haul on top of a previous haul. There are two options for documentation and sampling when this occurs.

1. If you have taken a species composition sample from the first haul prior to the second haul being dumped on top:
  - Record the two hauls as separate hauls.
  - Use a visual estimate for the OTC of the second haul.
  - Visually estimate or use other weight methods to estimate the weight of discard from first haul.
  - Record species composition from first haul.
  - If possible, visually estimate the weight of discard on second haul. If not possible, use OTC - Retained weight on Catch Form.
  - Do not take a species composition sample from second haul.
2. If you have not taken a species composition sample from the first haul prior to the dump:
  - Record the hauls as one haul, using the start time/location/etc. from the first haul and the end time/location/etc. from the second. Be sure to document in notes that they were recorded as two separate hauls in vessel logbook.
  - Sum total catch estimates of first and second haul and record as OTC. If two weight methods were used to determine total catch, document as weight method 6 - Other and document how weight was estimated in Haul Comments.
  - If vessel records as two separate hauls, copy retained catch categories and weights (sums of weights if same catch category) from both hauls onto one Catch Form.

- Estimate the total weight of discard from both hauls. Record weight on Catch Form.
- Take a random, non-biased, representative species composition sample from the combined hauls.

OR

- Record the hauls as separate hauls.
- Copy vessel's estimate of retained catch categories for each haul on separate Catch Forms.
- Visually estimate discard weight for each haul. If unable to independently estimate, use OTC - Retained for discarded catch category estimates.
- Do not take species composition samples for either 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.

### Working Smarter on Pink Shrimp vessels

Pink shrimp tows generally contain less total discard than those of other trawl fisheries. However, due to short tow times and high numbers of small individuals, it is often difficult or impossible to whole haul for all species. When unable to whole haul, consider using the following sampling strategies.

- Many observers will collect an Actual Weight for all discard, while randomly selecting 1 or more baskets for species composition sampling. Begin by estimating the amount of discard in the haul and the number of baskets it will fill. Then randomly select one or more baskets for Species Composition. Weigh all baskets of discard and collect species composition/biological information from the randomly selected basket(s).
- Since any one species may be represented by hundreds or even thousands of individuals in a haul, use extrapolated values for the numbers of fish. Count and weigh as many individuals as possible of each species (with very small individuals it is recommended that you count and weigh at least 100) and then just weigh the rest and apply an average number calculation.
- When a tow contains a large amount of Hake or Rockfish, the crew will oftentimes “float” it. The hopper is filled with water, causing the Hake and/or Rockfish to float to the top, while most other species settle on the bottom. The “floaters” are then scooped off the top. These fish can be treated as a separate

catch category, since they are handled differently than other discard in the haul.

- Oftentimes, there will be large numbers of unidentifiable juvenile rockfish. If Rockfish Unid. is used on the Species Composition form, do not take lengths for any Rockfish spp. in the haul. Be sure to take pictures or bring back specimens of any unidentified Rockfish spp. encountered.

### Working Smarter with Pacific Halibut

Consider all options when a haul has a large number of Pacific halibut. Crew members will usually presort as much of the Pacific halibut as possible. This usually occurs very quickly and can be very overwhelming for observers. When large numbers of Pacific halibut are in the haul, consider using one of the following methods:

- Most observers will visually estimate the lengths of PHLB and use weight method 9 - PHLB Length/Weight Conversion to determine Catch Weight.
- A combination of both actual and visual lengths can be handled in the same way and can be combined into one Catch Category. When this method is used, be sure to clearly label actual and visual lengths, as such.

The following examples are not commonly used, but might be useful when PHLB numbers are extremely high (~100+):

- Split Pacific halibut into two catch categories. Visually estimate the length of all the halibut thrown over by a given crew member or during a randomly selected time. Tally (count) all those Pacific halibut that you are not estimating the length of. You will have two catch categories on the Catch Form. One catch category will include the PHLB that were visually lengthed and will be documented with

weight method 9 - PHLB Length/Weight. The second catch category will include those halibut that were tally sampled. To determine the weight of these halibut, multiply the average weight from the visually lengthed PHLB by the number tallied. Document the catch category with a weight method of 14 - visual experience. The “# of Fish” column on the Catch Form should be completed for both PHLB catch categories.

- Split Pacific halibut into two catch categories. Visually estimate the length of all the halibut in a randomly selected section of deck or time period. These will be in a PHLB catch category with weight method 9 - PHLB Length/Weight. For the rest of the PHLB not visually estimated, create another catch category of PHLB, with a weight method of 14 - visual experience. Determine the average weight of the PHLB sampled by weight method 9 and multiply it by the proportion of deck/time not sampled (1/2, 1/4). The “#’s of Fish” column will be blank for this catch category.

### Unsampled Hauls

There may be times when a haul cannot be sampled due to illness, injury, or weather conditions. When a haul is not sampled break the discard into species specific catch categories (e.g. OFLT, SKAT, ROCK). Avoid using ZMIS catch category for a unsampled catch categories. Take the following steps when a haul is unsampled:

#### Trip Form

- Record location, gear, and other information just like it is recorded for a sampled haul
- Observer Total Catch Estimate: If you can get an OTC, use weight method 5 OTC-Retained.

Otherwise, 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.
- The comments field must be completed with an explanation of why the haul was not sampled.

### Catch Form

- Record vessel estimates of retained catch categories.
- When possible, visually estimate the discard in discrete catch categories. If not able to do this, use an unsampled ZMIS to estimate discard.
- 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 4-18).

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

- **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.



## Example

Observer Marlin Upton embarks at 4:30 AM on May 24, on the Archer (USCG # 600881) out of Coos Bay OR, the permit # is 51263. Prior to the trip, Marlin did a thorough vessel safety walk through and documented it in his logbook # 5555. This vessel is targeting pink shrimp using double-rigged trawls in the open access fishery, and they are using a bycatch excluder device. The captain is Joey Lawrence and his deckhand is Pete. Marlin started the trip before he left the house and the database assigned the trip # 5680. The Captain said he should be back to the docks by noon the following day, so Marlin will finish entering the trip in the database then.

The vessel hauled up the first tow and Marlin made a visual estimate of 4000 lbs. His fit number was 20 with a calibration weight of 11.00 lbs. Due to the small amount of discard, he decided to actually weigh all discard. However, the individuals were very small and numerous so he decided to take a single basket subsample for species composition. He visually estimated that there would be approximately 6 baskets of discard, and he used the RNT to select basket #3 as his species composition sample. The unsorted baskets weighed:

Basket #	Weight
1	46.40 lbs.
2	51.25 lbs.
3	species comp basket
4	53.05 lbs.
5	42.00 lbs.
6	46.10 lbs.
7	24.90 lbs

This single basket subsample contained:

Species	Weight	Number	Discard Reason
Eulachon smelt	7.50 12.30 lbs	100 ??	Market
Arrowtooth flounder	1.80	11	Market
Dover sole	.75	2	Market
Slender sole	1.60	64	Market
Hagfish	.25	1	Market
Eelpout, unid.	.75	15	Market
Darkblotched rockfish	1.00	38	Market
Shortbelly rockfish	.05	1	Market
Poacher	.05	5	Market
Non-Humboldt squid	.05	1	Market
Rex sole	.20	1	Market
P. hake	.10	1	Market
Shrimp	.50 4.10	50 ??	Incidental

The skipper estimates that they retained 3600 lbs of shrimp that haul.

The second haul comes aboard. Marlin visually estimates the total catch weight to be 2500 lbs. He gets a fit number of 17 and the calibration weight is again 11.00lbs. The vessel discards in two separate ways. First, they pull off all the floating fish from the top of the hopper. There's a lot of discarded fish, so he decided to use a basket weight determination. Marlin fills up a total of 14 baskets with discard and a small partial basket. He weighed 5 of the full baskets and they weigh 58.75 lbs, 62.10 lbs, 63.20 lbs,

59.00 lbs, and 56.40 lbs. The partial basket weighs 12.75 lbs. Marlin randomly select one of the baskets of discard to pour off a small amount for species composition sampling. It contains:

Species	Weight	Number	Discard Reason
Pacific hake	13.55	362	Market
Shrimp, Unid	0.40	47	Market
Pacific herring	0.10	1	Market

The crew then begins to run the fish out of the hopper onto the sorting belt. Marlin will weigh it all, so he asked the crewman to push the discard into his baskets placed at the end of the sorting belt. He weighed each basket and then dumped them over. These baskets weigh 60.90 lbs, 57.10 lbs, 66.35 lbs, 59.50 lbs, 62.15 lbs, 49.30 lbs, and 13.50 lbs. Marlin again randomly selected one of the baskets to get a small species composition sample:

Species	Weight	Number	Discard Reason
Pacific hake	2.90 8.80	100 ??	Market
Shrimp, Unid	1.45	184	Market
Pacific herring	0.6	9	Market
Slender sole	0.3	3	Market
Eulachon	0.05	1	Market

The skipper estimates that they retained 1100 lbs of shrimp on the second haul.

On the steam in Marlin updates his daily notes in his observer logbook. He also reviewed the captain's logbook to see that he correctly copied the lat and long information after each haul. The vessel gets into port at 12pm, just as the captain said. The next day Marlin called the captain for the fish ticket number. He informs Marlin

that he delivered on the 26th and that the fish ticket number is 3345667.

Vessel Name: Archer

Date: 05 24 --  
Month Day Year

Time: 0430

Port: Coos Bay

Federal Document No. 600881

Date: 05 25 --  
Month Day Year

Time: 1200

Port: Coos Bay

Crew Size (including Captain): 2

Buyer(s): Pacific Choice

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				SRMP	STRY	OFLT	SKAT					
05/24	Set	0709	43	28.80	124	33.15	80 / 85	SRMP	3600								
	Up	0820	43	29.10	124	33.13											
05/25	Set	0912	43	32.30	124	31.10	90/94	SRMP	1100								
	Up	1048	43	34.90	124	32.95											
	Set																
	Up																
	Set																
	Up																
	Set																
	Up																
	Set																
	Up																
	Set																
	Up																
	Set																
	Up																
	Set																
	Up																

Remarks:

**85499** \*\*NOTE: this logbook page is not an actual shrimp logbook vessel page, just an example.

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

To be completed by agency	
Vessel	Fish Receiving Ticket No.
Port	



TRIP FORM - HAUL LOCATIONS

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  
 7-Vertical Hook and Line  
 8-Pole (Commercial)  
 9-Other Hook and Line  
 10-Fish Pot  
 12-Shrimp trawl single rigged  
 13-Shrimp trawl double rigged  
 14-All net gear except trawl  
 15-All Trawl gear  
 16-All other Miscellaneous gear  
 17-OK, set back flatfish net (pineapple net)  
 19-Longline (fixed hooks)  
 20-Longline (snap-on hooks)

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

Haul/ Set #	Date		Time	Latitude		Longitude		Depth of Catch (fathoms)	Gear Type	Excluder Presence	Target Strategy
	Month	Day		Degrees	Minutes	Degrees	Minutes				
1	Start	05 24	0709	43	28.8	124	33.15	80	13	1	SRMP
	End	05 24	0820	43	29.10	124	33.13	85			
2	Start	05 25	0912	43	32.30	124	31.10	90	13	1	SRMP
	End	05 25	1048	43	34.90	124	31.20	94			
	Start										
	End										
	Start										
	End										
	Start										
	End										
	Start										
	End										
	Start										
	End										
	Start										
	End										



Haul # 1

**SPECIES COMPOSITION FORM**

Date 0 5 2 4 1 4

Trip # 2 5 6 8 0

Fit # 20  
Cal. Wt. 11.00

Trawl Biosampling List  
1 2 3

Catch #	Catch Category	Sample Number	KP Weight		Species	Species Code	Sample Weight	Fish #	Discard Reason	Release method	Basket Weight	#	Basket Weight	#
				KP Number										
2	ZMIS	2	31.00	864	Eulachon	601	19.80	264	13		7.50	100	12.30	--
						ARTH	141	1.80	11	13				
					Dover Sole	107	.75	2	13					
					Slender Sole	111	1.60	64	13					
					Hagfish	77	.25	1	13					
					Eelpout, Unid.	250	.75	15	13					
					DBRK	311	1.00	38	13					
					Shortbelly RF	318	.05	1	13					
					Poacher, Unid	450	.05	5	13					
					Non-Humboldt Squid	1264	.05	1	13					
					Rex Sole	105	.20	1	13					
					P. hake	206	.10	1	13					
					Shrimp, Unid.	70	4.6	460	11		.50	50	4.10	--

**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)

**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

WCGOP CS Species Composition Form  
 September 2012  
 OMB Control No. 0648-0593  
 Expires 11-30-2016

Species	Species Composition Measurements and Calculations																	
ZMIS  Eulachon	7.50 lbs @ 100 fish 12.30lbs@ x	19.80lbs x 100fish/ 7.50 lbs. = 264 fish																
Shrimp	.50 lbs @ 50 fish 4.10lbs @ x	4.60 lbs x 50 fish/ .50 lbs = 460 fish																
ZMIS catch weight	<table border="0"> <thead> <tr> <th data-bbox="464 911 568 940">Basket #</th> <th data-bbox="568 911 724 940">Weight</th> </tr> </thead> <tbody> <tr> <td data-bbox="464 940 568 970">1</td> <td data-bbox="568 940 724 970">46.40 lbs</td> </tr> <tr> <td data-bbox="464 970 568 999">2</td> <td data-bbox="568 970 724 999">51.25 lbs</td> </tr> <tr> <td data-bbox="464 999 568 1029">3</td> <td data-bbox="568 999 724 1029">24.90 lbs</td> </tr> <tr> <td data-bbox="464 1029 568 1058">4</td> <td data-bbox="568 1029 724 1058">53.05 lbs</td> </tr> <tr> <td data-bbox="464 1058 568 1087">5</td> <td data-bbox="568 1058 724 1087">42.00 lbs</td> </tr> <tr> <td data-bbox="464 1087 568 1117">6</td> <td data-bbox="568 1087 724 1117">46.10 lbs</td> </tr> <tr> <td colspan="2" data-bbox="464 1117 724 1146">species comp= 31.00 lbs</td> </tr> </tbody> </table>	Basket #	Weight	1	46.40 lbs	2	51.25 lbs	3	24.90 lbs	4	53.05 lbs	5	42.00 lbs	6	46.10 lbs	species comp= 31.00 lbs		Total ZMIS= 294.70 lbs.
Basket #	Weight																	
1	46.40 lbs																	
2	51.25 lbs																	
3	24.90 lbs																	
4	53.05 lbs																	
5	42.00 lbs																	
6	46.10 lbs																	
species comp= 31.00 lbs																		

Haul #

**CATCH FORM\***

Page 1 of 2

Date       Trip Number

Visual OTC 2500

Catch #	R or D	Catch Category	Catch/Sample Weight	Volume	Density	Fish # <small>Req. for WMs 8,9,19 &amp; 14 (if actual)</small>	# Hooks/Pots sampled by catch category	Wt Method	Catch Purity	Discard Reason	Comments
1	R	SRMP	1100					7	P		
2	D	ZMIS	851.21					3	M		Hopper
3	D	ZMIS	368.80					1	M		Belt
Keypunch Check			2320.01								

\*Combined form for all gear types

OMB Control No. 0648-0593 expires 11/30/2015  
Combined Catch Form v.1 September 2013

Haul #

**SPECIES COMPOSITION FORM**

Date

Trip #

Fit # 17  
Cal. Wt. 11.00

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 Weight	KP Number										
2	ZMIS	2	14.05	410	P. hake	206	13.55	362	13					
					Shrimp	70	.40	47	13					
					P. herring	611	.10	1	13					
3	ZMIS	2	14.10	600	P.hake	206	11.7	403	13		2.90	100	8.80	--
					Shrimp Unid.	70	1.45	184	13					
					P. herring	611	.6	9	13					
					Slender sole	111	.3	3	13					
					Eulachon	601	.05	1	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)  
**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  
 WCGOP CS Species Composition Form  
 September 2012  
 OMB Control No. 0648-0593  
 Expires 11/30/2015

Species	Species Composition Measurements and Calculations
ZMIS3 (Belt sort)  P.hake	P. Hake 100 fish@2.90 lbs  $(100\text{fish} / 2.90 \text{ lbs}) \times 11.7 \text{ lbs} = 403.4482758 = 403 \text{ fish}$
ZMIS2 catch weight	Hopper sort: ZMIS 2 - Basket weight determination Full basket tally= 14 + one partial = 12.75 lbs.  weighed 5 baskets 58.75 lbs 62.10
	63.20 59.00 +56.40 =299.45 lbs  Ave basket wt. = 299.45 lbs/ 5 baskets = 59.89 lbs/basket ZMIS = (59.89 lbs/basket x 14 baskets) + 12.75 lbs partial = 851.21 lbs
ZMIS3 catch weight	Belt sort: ZMIS 3 - Actual wt.  Basket wts. 60.90 lbs 57.10 66.35 59.50
	62.15 49.30 +13.50 (partial) =368.80 lbs

