Fixed Gear Sampling

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I. Introduction

Many of WCGOP observer days are spent on fixed gear vessels. These vessels target sablefish, thornyheads, rockfish, cabezon, lingcod, and a variety of other nearshore species. Fixed gear catch is generally more homogeneous than trawlers, with only the target and a few bycatch species being caught on a set. Trips aboard fixed gear vessels range from one to ten days.

II. Diversity of Fleet and Effects on Sampling

The fixed gear fleet on the West Coast is very diverse. Therefore, there are two manual sections devoted to sampling on fixed gear vessels: Chapter 5, "Fixed Gear Sampling" and Chapter 6, "Fixed Gear Sampling on Small Boats". Observer sampling aboard all fixed gear vessels follows a consistent protocol. However, characteristics including vessel size, target fishery, and average landing weight affect observer sampling. Below is a list of characteristics that influence catch sampling. Under each characteristic is an explanation of what is covered in Chapter 5, "Fixed Gear Sampling" versus Chapter 6, "Fixed Gear Sampling on Samll Boats".

Fixed gear vessels range in size from kayaks to 70'.

Fixed gear vessels land between 50 lbs. and 10,000 lbs. per trip.

- **Size:** Although the amount of catch on fixed gear vessels is usually small, limited deck space may cause difficulties when sampling. Lack of storage space for catch can affect sample size and often there is not room for a platform scale, making it necessary to rely on hand scales.
    - **Chapter 5, "Fixed Gear Sampling"**: Generally vessels ranging in size from 35 feet to 70 feet. Platform scale can be used.
    - **Chapter 6, "Fixed Gear Sampling on Small Boats":** Generally vessels ranging in size from kayaks to 35 feet. Platform or hand scales might be used.
- **Landing Weight**: The majority of fixed gear vessels participate in the open access portion of the fishery. Open access vessels may catch less than 100 pounds of fish per day. However, there are also Limited Entry fixed gear vessels that land thousands of pounds per trip.
    - **Chapter 5, "Fixed Gear Sampling":** Generally land over 1500lbs in a single delivery.
    - **Chapter 6, "Fixed Gear Sampling on Small Boats"**: Generally land 50 to 500 lbs in a single delivery.

- **Gear** : There are many gear types employed in the West Coast Fixed Gear fisheries.
  - **Chapter 5, "Fixed Gear Sampling":** Conventional longline and strings of pots.
  - **Chapter 6, "Fixed Gear Sampling on Small Boats":** Vertical longline (portuguese set), stick, cable, troll, rod-and-reel, and individual pots or traps.
- **Live vs. Dead:** Many vessels participate in live fish fisheries. Skippers vary on their willingness to have the observer weigh live retained fish. In a number of fisheries, including the live fish and dory fleets, discarded fish are frequently released alive. This requires the observer to be conscientious about not increasing the mortality of discard.
  - **Chapter 5, "Fixed Gear Sampling":** Dead fish fishery.
  - **Chapter 6, "Fixed Gear Sampling on Small Boats**": Live or dead fish fisheries.

Total # of Hooks for the Trip Form = the total number of hooks or pots for that set

- **Total # of Hooks** : Counting hooks can be tricky. On certain gear types, this means not only counting the number of hooks/skates/poles/tubs/etc. but also counting the number of times each skate/pole/tub/etc. is brought above the waterline.
  - **Chapter 5, "Fixed Gear Sampling":** Over 1500 hooks set in a day. Large sections of gear retrieved in sets with discernible start and end points.
  - **Chapter 6, "Fixed Gear Sampling on Small Boats"**: Fewer total hooks fished. Small sections or pieces of gear set and retrieved repeatedly throughout day.
- **Sets**: Longline gear or strings of pots are easily defined as a set. However, in many of the other fisheries defining a set is difficult. In these fisheries sets are often defined by geographic area, depth, gear type, and species composition. If none of those factors change during a day of fishing, then all gear pulled that day is considered one set.
  - **Chapter 5, "Fixed Gear Sampling":** Easily defined sets with start and end buoys.
  - **Chapter 6, "Fixed Gear Sampling on Small Boats":** Small sections or pieces of gear set and retrieved repeatedly throughout day. Sets are often determined by location, depth and time.

III. Fixed Gear and Fishing Strategy Descriptions

Fixed gear types encountered on larger boats have the following WCGOP Gear Type Codes and each gear type is reviewed in the following section.

10 - Fish Pot
19 - Longline (Fixed hooks)
20 - Longline (Snap-on hooks)

Gear Type 10 - Fish Pot

The words "pot" and "trap" are used interchangeably to mean baited cages set on the ocean floor to catch fish and shellfish. They can be circular, rectangular or conical in shape. The pots may be set out individually or as strings with multiple pots attached to a groundline. Larger vessels tend to set gear in strings of pots (Chapter 5, "Fixed Gear Sampling") whereas smaller vessels often set traps individually (Chapter 6, "Fixed Gear Sampling on Small Boats"). All pots contain entry ports and escape ports that allow undersized or unwanted species to escape. Additionally, all pots must have biodegradable escape panels or fasteners that prevent the pot from continuing to fish if lost.

Strings of pots are marked at each end with a pole and flag, and sometimes a light or radar reflector. Individual pots are marked with surface buoys.

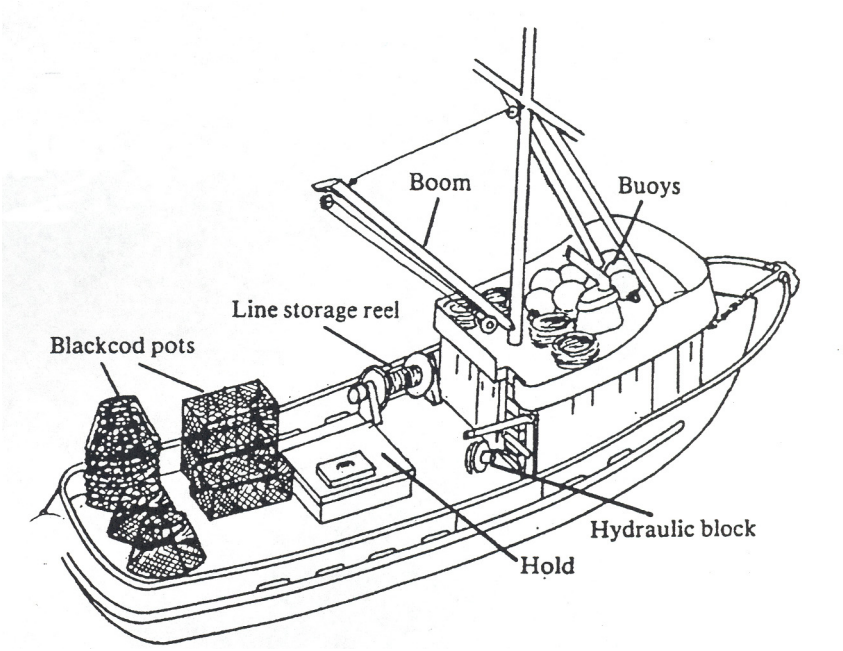


Figure 5-1: Trap Vessel

Sablefish Pots

Sablefish pots are fished in strings weighted with anchors at each end and marked at the surface with buoys and flagpoles. The pots are rectangular, trapezoidal, basket, or cylindrical in shape and usually weigh less than 50 pounds (See Figure 5-2). Basket-shaped pots have collapsible bottoms so more pots can be stacked on deck. Pots are set and retrieved using line haulers, hydraulic blocks and overhead hoists. Pots are baited with squid, hake, or herring.

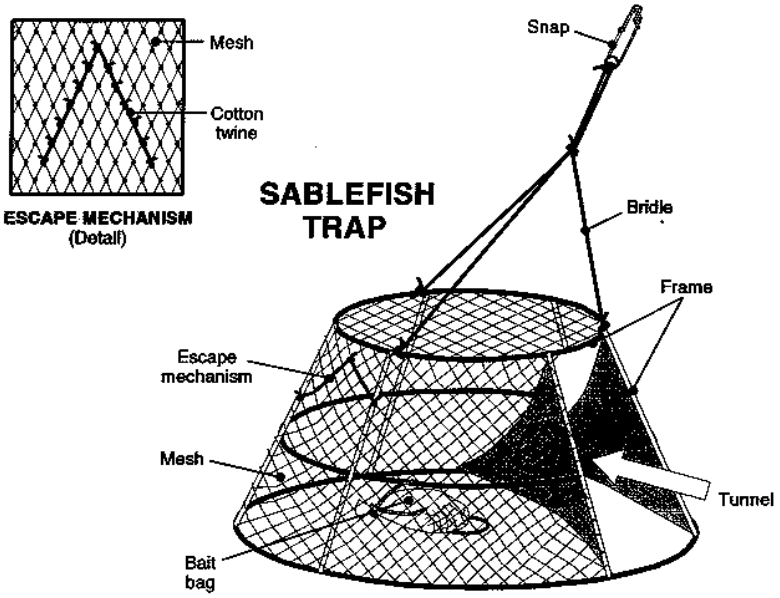


Figure 5-2: Sablefish Trap

Groundline/Mainline: The length of line to which all of the hooks are attached. This line is the "backbone" of the longline gear.

Gangion: The length of line that connects the hook to the groundline. It is often one to two feet long.

Skates/Tubs: A segment of longline gear. Skates/tubs are tied together to form a set.

Gear Type 19 - Longline Gear (fixed hooks)

This gear type involves the setting out of a long horizontal line (**groundline/mainline**) to which other short lines (**gangions**) with baited hooks are attached. The groundline is secured between anchored lines and identified by floating surface buoys, bamboo poles, and flags. The groundline is laid along or just above the ocean floor (bottom longline) (See Figure 5-3).

Longline fishers usually further divide their gear into smaller segments in order to handle it aboard the vessel. A "set" consists of several segments of gear with the groundlines tied to one another. Segments of gear are usually referred to as **skates** or **tubs**.

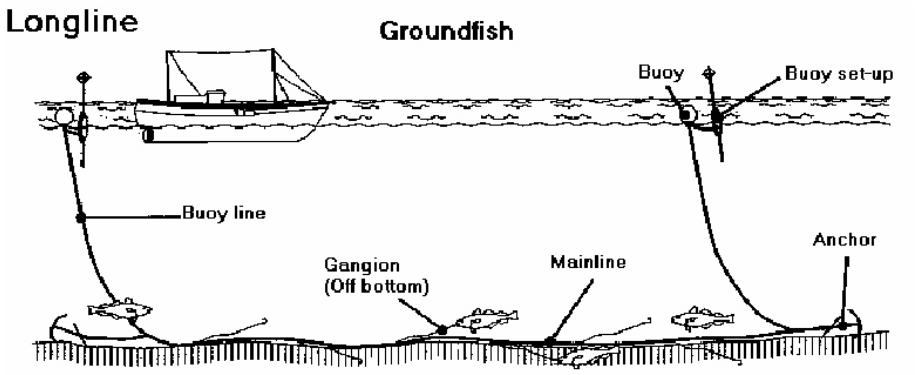


Figure 5-3: Longline Gear Set-Up

To deploy longline gear, the vessel sets the first anchor and then steams ahead, following a selected pathway with the groundline and baited hooks being set off the stern of the boat. Hooks are usually baited by hand with squid, herring, octopus, or cod. Hooks of various sizes are attached to gangions of various lengths that are tied on or snapped onto the line at desired intervals. Hook size and spacing, depth, and soak time (fishing time) vary.

Longline gear is retrieved by pulling in the groundline and landing one gangion and hook at a time. On most longliners (See Figure 5-4), the vessel pulls the buoy aboard then pulls up the anchor using a **block**. The **rollerman** transfers the groundline to the block and begins hauling the groundline. The line comes in over the rollers, through the **crucifier**, over the block, and then is coiled. A rollerman stands at the railing of the vessel and helps the fish aboard. Some longliners on the West Coast manually pull the buoy, anchor and groundline aboard. Sablefish, Pacific halibut, spiny dogfish, and other groundfish are often targeted with longline gear.

Block: A hydraulically driven wheel into which the groundline is placed during gear retrieval. As the wheel spins the groundline is drawn aboard.

Rollerman: A crewman who stands where the fish are coming in and brings them aboard using a gaff. The rollerman lands any commercially valuable fish and excludes any non-commercially valuable fish from being landed.

Crucifier: A pair of rollers or steel pegs which stand vertically with only enough room for the groundline to pass between. During gear retrieval, the groundline passes between the rollers and the hooks are pulled out of the fish

Gear Type 20 - Longline Gear (snap-on hooks)

Snap, or tube, gear is a variation on longline gear (See Figure 5-5). On snap gear, the gangions are "snapped" onto the groundline as it is being set and

"tubes" refer to the garden hose gangions. The gangions are typically garden hose "tubes", but monofilament line and other types of line are used. Snap gear does not have skates, which is the most significant difference between it and conventional longline gear.

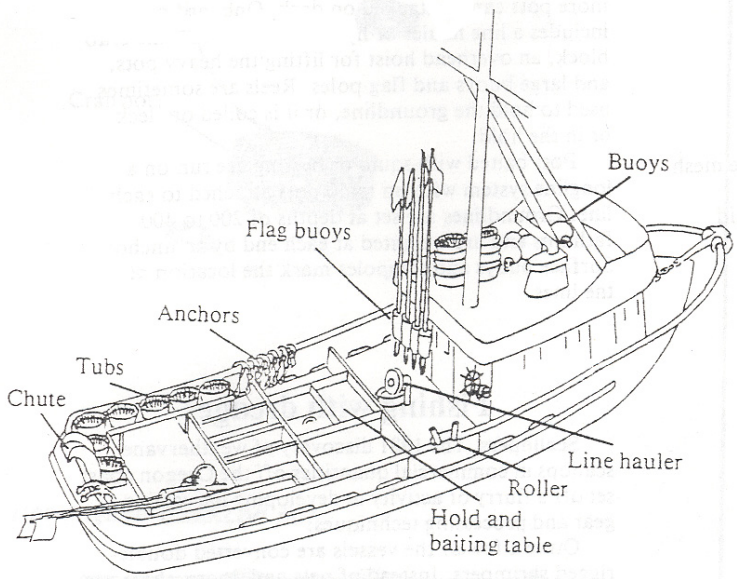


Figure 5-4: Longline Vessel

Boats that use this gear type typically have a large drum on the back of the vessel that carries all the groundline. They set just as conventional longliners but typically have a tub of baited gear on the stern and snap on the gangions as the mainline is being set.

Figure 5-5: Examples of snap gear hooks.

Operations of a fixed gear vessel

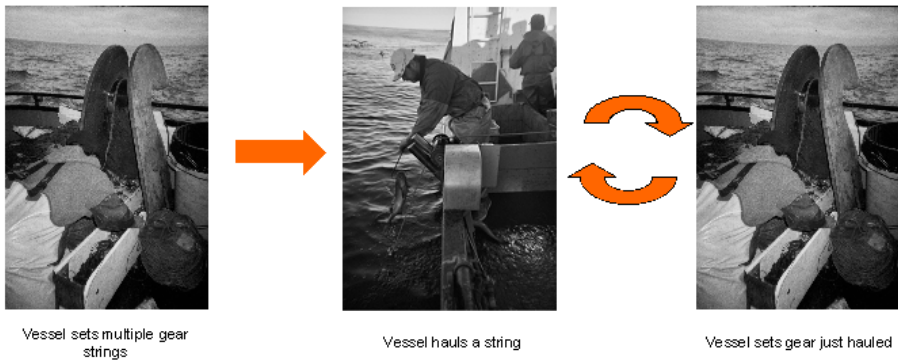


Figure 5-6: Operations of a Fixed Gear Vessel

Safety Concerns on Fixed Gear Vessels

There are several safety concerns on fixed gear vessels of which observers should be especially aware. Remember: Safety First!!

It may be necessary to sample near the roller station or the block where moving hooks or pots pose a serious threat. It is not uncommon for crew members to be seriously injured by incoming and outgoing hooks or pots.

While aboard pot vessels, observers should be conscious of their surroundings at all times. Be aware of coils of line attaching the buoys to the pot. These are deployed as the pot is launched and have been known to wrap around ankles and drag crew overboard.

Decks are often awash with water, fish entrails, and whole fish, making them very slippery. In order to reduce the risk of injury, always be conscious of dangers in the immediate area.

IV. Data Collection on Fixed Gear Vessels

There are six fisheries that may use conventional longline and pot strings.

Sablefish Endorsed (limited entry)*
Non-Sablefish Endorsed (limited entry)*
OR Black/Blue Rockfish Nearshore (open access)
OR Black/Blue Rockfish (open access)
CA Nearshore (open access)

WC Open Access Fixed Gear (open access)

*Most commonly use conventional longline, snap gear and pot strings. Other fisheries often use gear discussed in Chapter 6, "Fixed Gear Sampling on Small Boats" .

Terms often used when discussing sampling long-line gear:

Set: Aset is another word for haul.

Skate: String of hooks that can be tied together to form a set.

Skate: String of hooks that can be tied together to form a set.

Tally count: Also called tally sampling, which is counting all the retained and discarded fish with a hand clicker or slash marks in the raw data.

Tally period: Block of time when observer is tally counting retained and discard catch.

NON- tally period- a block of time where tally counting is suspended and fish are collected for actual weight data.

Managers have the same data needs for fixed gear vessels as they do for trawl. The data flow for sampling fixed gear vessels is:

1. Defining a Set.
2. Determining Amount of Gear in a Set.
3. Tally Sampling.
4. Recording Catch, Species Composition, and Fishing Effort Information.
5. Collecting Biological Data

Tip: Biological Data is collected on every haul if possible. Biological Data collection is described in detail in Chapter 7, "Biological Sampling" and Chapter 8, "Protected Resources".

On the Steam Out

There are a few pieces of information that should be learned prior to the first set or retrieval.

1. Ask the skipper how many hooks or pots the vessel will fish with during the trip. Also ask him how many sets are typically retrieved every day

   Tip: On the steam out is a good time to conduct hook counts on the gear which is used to determine average hooks per skate or tub. A minimum of 1/5 of the total gear on board should have hook counts conducted..

2. Determine the normal operational pattern. This will help determine a good sampling plan. Find out if the vessel haul-sets, haul-sets, haul-sets or hauls-hauls-hauls, sets-sets-sets.

V. Defining a Set

Defining a set of conventional longline or pot gear is straightforward. A set begins at a buoy and ends at a buoy. The set includes all of the hooks or pots in between the two buoys.

Generally, conventional longline sets have thousands of hooks and span two or more miles. Pot sets range from 10 to 50 pots per string. All hooks or pots set

together in a string, **even those lost prior to retrieval**, are considered a set and included.

VI. Determining Amount of Gear in a Set

In order to devise an appropriate sampling frame, you must determine the amount of gear in the set. There are two types of longline gear.

- The first type of gear has no divisible units, rather it is one long line with hooks. An example of this type of gear is snap gear.
- The second type is gear that can be divided into units, called skates or tubs. Vessels fishing with skate gear can vary how many hooks are fished in each set by increasing or decreasing the number of skates tied together.

Interview your captain to determine whether or not the gear is divisible into skates. Determining the number of hooks/pots in a set is dependent on the type of gear being used.

Pot, snap longline or other gear that is not divided into skates

To determine the number of hooks/pot set, you will need to count all of the hooks or pots in the set. The options for counting hooks/pots, in order of preference, are:

1. Count hooks/pots while they are being baited.
2. Count hooks/pots while the gear is stored on the vessel.
3. Count hooks/pots during gear deployment (the setting of gear).
4. Count hooks/pots while gear is being retrieved on sampled hauls and ask skipper if any gear was lost. This can be extremely difficult, especially when you need to sample for species composition at the same time. Also, counting hooks in the evening, morning, and night can be difficult.
5. Counting hooks/pots while gear is being retrieved on unsampled hauls. If you do not believe you can obtain an accurate hook/pot count while sampling, then you can take one haul off per day to count hooks/pots. **This only works if all sets have the same number of hooks/pots.**

Snap Gear requires every hook be counted and tally sampled.

Document all hook counts in your logbook and show calculations used to determine average hooks per skate. Document in your logbook when hook counts were conducted and why. This is useful information for your debriefer when they are reviewing your data.

Gear that is divided into skates

Determining the number of hooks set can be easier with this type of gear. There are two things you must determine:

- Average number of hooks per skate.
- Number of skates in a set.

Tip: Any calculations made to determine average number of hooks per skate should not be rounded to the nearest whole number.

Average number of hooks per skate:

Vessels generally have a consistent number of hooks per skate. Always document in the Observer Logbook when average hook counts were done and why that time was chosen.

1. Count the number of hooks on a skate for at least **1/5** of the gear being used **each trip**. It is usually possible to count hooks while gear is being baited or set.
2. Sum the hook counts for all the skates counted and divide by the number of skates counted to determine average number of hooks per skate.

Calculation

$$\text{Average \# Hooks per Skate} = \frac{\sum \text{Hooks Counted}}{\text{\# of Skates Counted}}$$

Number of skates in a set:

Count the number of skates in a set:

1. During deployment of gear.
2. During retrieval of gear. If skate counts are done during retrieval of gear, ask skipper if any gear was lost. It can be difficult to count the number of skates during retrieval, as skate markers are sometimes hard to distinguish, especially at dawn and dusk.

If you cannot get an accurate count of the total number of skates set, ask the captain for an estimate. If you need to rely on the captain's estimate, a verification of skates per set must be done once each day. This can be accomplished by counting skates during one of the following times:

1. While gear is being set.
2. After a set is completed and all gear is on board vessel.
3. While gear is being retrieved.

Determining the Total Number of Hooks in a Set

Calculation
Total Hook Count = Total # of Skates x Average # Hooks per Skate

Vessels Where Hook Counts Are Impossible

There are a few vessels in Southern California and Port Orford fishing longline gear where it is impossible for observers to verify hook counts. The following circumstances combine to make counting hooks impossible:

1. All hooks must be tallied. This situation can occur for one of two reasons:
   - Single unit longline gear is being fished.
   - The skate knots marking the break between gear units are not readily discernible during gear retrieval.
2. Vessel is retaining live fish and discarding live fish so the observer must weigh fish quickly during the retrieval.
3. Gear is baited at an alternate location. Many fishers pay to have their gear baited. After a trip, they give their gear to the baiters who take it to a shop and bait it. When the gear is returned, it's ready to be set.

To determine the number of hooks per skate on these vessels:

1. Ask the skipper after EACH skate/tub how many hooks were on that specific skate/tub.

AND

2. Ask the skipper after EACH haul how many hooks were hauled. This is a way to double-check that the skate counts are correct. If there is a large discrepancy between the count the skipper gave you for each skate/tub and the total count for the haul, interview the skipper further about why this discrepancy occurred. **If the skippers estimates are used, the reason MUST be thoroughly documented in the Observer Logbook daily notes section. Notes should also indicate perceived accuracy of hook counts provided.**

VII. Sampling Fixed Gear

Tally sampling (counting all the retained and discarded catch) on fixed gear vessels is conducted as the gear is being retrieved. When tallying on a line vessel, the observer counts every individual that comes up on the line, including drop-offs. When tallying on a pot vessel, the observer counts every individual in a pot. The observer has to determine if 100% of the gear can be

tally sampled or if less than 100% of the gear can be tally sampled. If less than 100% of the gear is sampled, the tally sampling process can divided into blocks of time, tally periods (when only tally counting of the catch is conducted) and non-tally periods (when sub-samples of discarded fish are weighed and other duties are completed as needed).

Determining the Amount of Gear to Sample

The most important thing to remember when tally sampling is to always tally the same number of hooks or pots for all retained and discarded species.

1. Vessels that use snap gear or gear that is NOT divided into skates or pots, 100% of a hooks in a set must be tallied sampled.
2. Vessels that use line gear, that IS divided into skates or pots/traps, must be tallied sampled at a minimum of **1/2 (50%)** of the hooks in each set.

If less than 100% of a set is going to be sampled, a random sampling frame must be designed. There are two choices for designing a random sample frame:

- Systematic Spatial (preferred).
- Random (Non-systematic) Spatial.

Spatial sampling involves randomly selecting individual or groupings of skates to sample. Fixed-gear vessels routinely set over a depth gradient or across different bottom types. Therefore, the catch can vary significantly along a set. The best way to account for the variability caused by setting across a depth gradient or different bottom types is to use a systematic sampling frame. Examples of systematic and non-systematic spatial sampling follow:

Step-by-Step Instructions for Systematic Spatial Sampling

1. Determine the number of skates in the set.
   - Examples A and B: 50 skates
2. Divide the number of skates in the set into equal units. This can be one skate or a grouping of skates (5 skates).
   - Example A: 50 units (1 skate = 1 unit)
   - Example B: 10 units (5 skates = 1 unit)
3. Number all sample units.
   - Example A: Number units 1 - 50.
   - Example B: Number units 1 - 10.

4. Determine how many of the sample units will be sampled (minimum 1/2 of set).
   - Examples A: Sample 1/2 of set = 25 skates.
   - Example B: Sample 1/2 of set = 5 units
5. Divide total number of sample units by the number of units that will be sampled. The outcome is considered "n" in the following steps.
   - Example A: 50/25 = 2
   - Example B: 10/5 = 2
6. Randomly select a number between 1 and "n". This will be the first sample unit in your sample.
   - Example A: 1 randomly selected
   - Example B: 2 randomly selected
7. Sample every n^{th} unit thereafter.
   - Example A: The following skates would be sampled: 1, 3, 5, 7, 9....49.
   - Example B: The following skates (sampling units) would be sampled: 6 - 10 (2), 16 - 20 (4), 26 - 30 (6), 36 - 40 (8), and 46 - 50 (10).

Step-by-Step Instructions for Random Spatial Sampling

1. Determine the number of skates in the set.
   - Examples A and B: 100 skates
2. Divide the number of skates in the set into equal units. This can be one skate or a grouping of skates (5 skates).
   - Example A: 4 units (25 skates = 1 unit)
   - Example B: 10 units (10 skates = 1 unit)
3. Number all sample units.
   - Example A: Number units 1 - 4.
   - Example B: Number units 1 - 10.
4. Determine how many of the sample units will be sampled (minimum of 1/2 of set).
   - Examples A: Sample 2/3 of set = 3 units.
   - Example B: Sample 2/3 of set = 7 units

Tip: Note that minimum sample size changed to 1/2 of the total gear set in 2010.

5. Randomly select numbers between 1 and the maximum sample unit. These will be the skates you will include in your sample.
   - Example A: select 3 numbers between 1 and 4: 1, 2, 3. Sample the selected skates: 1-25 (1), 26-50 (2), 51-75 (3).

- Example B: select 7 numbers between 1 and 10: 1, 2, 5, 8, 9, and 10 randomly selected. Sample the following skates: 1-10 (1), 11-20 (2), 41-50 (5), 71-80 (8), 81-90 (9), 91-100 (10)..

Tip: Always tally the same number of gear units for retained and discarded species. (For example, **do not** tally 1/2 of a set for retained species and the whole set for discard species.

General Instructions for Tally Sampling

1. Determine the amount of gear to tally sample.
   - As discussed in the prior section, either 100% of the gear will be sampled or less than 100% of the gear will be sampled. If less than 100% of the gear is sampled, retained and discarded fish will be counted during the randomly selected tally periods. No counts are taken during the non-tally period.
2. Collect the equipment needed to tally sample:
   - A clipboard and pencil, three to six hand counters, and the Fixed Gear Catch Form. *The tally sample raw data is documented on the back of the Fixed Gear Catch Form.* The next section will discuss how to document tally samples.
3. Place two or more observer baskets next to the rollerman for discarded species to be thrown in.
   - Be aware of vessel space constraints. These discarded fish will be weighed by the observer and used for the average weight calculations.
4. Find a location on deck to tally sample, which is known as the "tally station".
   - The tally station should be no more than six meters from where the fish are brought aboard and have a clear line of sight. From the tally station, observers must be able to clearly identify fish to species as they come aboard and see drop-offs and individuals preyed upon. Discuss your needs with the crew and work with them to determine the best location that is a safe distance from where the gear is hauled aboard and that reduces interference with the crew as much as possible.
5. Count each individual that comes up on the line or in the pot during the randomly selected tally periods.

Tip: An actual count of individuals is required for all fixed gear data.

Tips for Documenting Tally Samples

- The back of the Fixed Gear Catch Form is divided into two sections, Retained and Discarded. Write down species names that are likely to be caught down the middle of the form

Tip: See examples of how to document tally sampling in the raw data on Trip Examples at the end of the chapter and (See Figure 5-7 and Figure 5-8).

- Drop-offs and Predation of retained species- While tally sampling, some fish that *would have been retained* **drops off the line or is preyed upon and discarded. These discarded fish, which would have been retained, should be documented in the raw data** as such. **Be prepared by creating an area on the deck form to document all drop-offs and individuals preyed upon for the retained target species (See Figure 5-7).**
- Small individuals of retained species - While tally sampling, some fish that *would have been retained* **are considered** too small by the vessel to keep and are discarded. **These discarded fish, which would have been retained, should be documented in the raw data** as such. Create a space on the back of the Fixed Gear Catch Form to document "smalls" of the retained target species (See Figure 5-7).
- Pacific halibut - Normally, actual weights cannot be obtained from Pacific halibut due to their large size and because vessels often don't bring them aboard. Observers can make a visual estimate of PHLB length in centimeters. **Be prepared by creating an area on the deck form to document PHLB visual lengths and clearly indicate its a visual estimate (See Figure 5-7).** This will allow for a quick documentation of PHLB while tally sampling. **If an** actual length measurements of all Pacific halibut is obtained, designate an area of the form to document this data and clearly indicate its an actual weight

Species that are known to be retained by the vessel will have some fish that are discarded. Tally sample these separately in the raw data:

Drop-off: Fish that fall off the line as they leave the water line. These individuals do not make it aboard the vessel.

Predation: Fish that have been damaged by whales, sand fleas, hagfish, lingcod or other animals.

Smalls: Fish that are considered by the vessel to be to small and not profitable to keep.

Tip: See examples of how to document tally sampling in the raw data on Trip Examples at the end of the chapter and (See Figure 5-7 and Figure 5-8).

- **Species similar in appearance** - Some species, such as Shortraker and Rougheye rockfish and Shortraker or Shortspine and Longspine rockfish, are similar in appearance and cannot be distinguished unless they are examined closely in the observers hand. For these species when the observer if not confident of a fishes identity they can be grouped together in the raw data. Tally count them as a mixed group naming them "Rougheye/Shortraker" or "Shortspine/Longspine".

Official Total Catch Calculations

Gear Units Sampled

Average Soak Time/Gear Unit:

hooks/gear unit:

Retained

Discarded

Drop-off | Predation | Smalls

Sablefish

Spiny Dogfish Shark

PHLB (vis) CM
50
60
70
80
90
100
110

Figure 5-7: Example of Fixed Gear Catch Form Before Sampling with commonly used labels written in.

During each tally sampling period, count each species that comes up on the line or in the pot by disposition (retained versus discarded). Species that are caught in small numbers can be accounted for by placing hatch marks in the raw data next to their common names. For species that are caught in large quantities, use a hand counter to keep track of fish counts and write these counts in the raw data labeled with the word “tally” next to their common name.

.

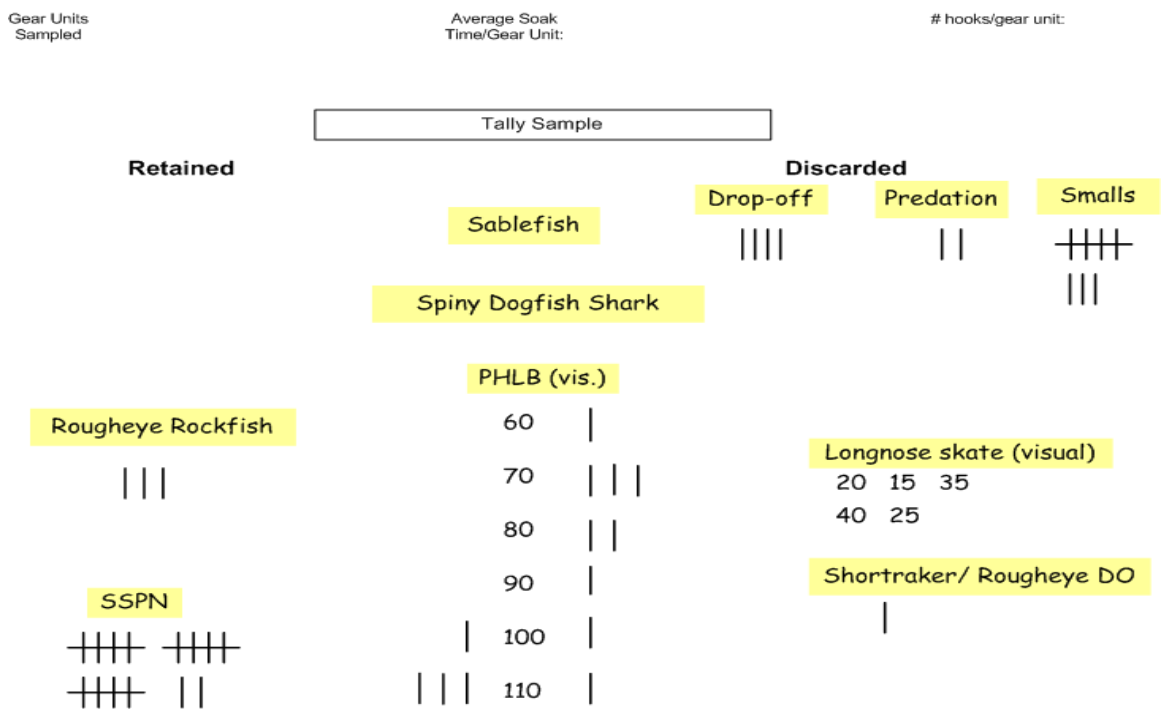


Figure 5-8: Example of raw data on fixed gear vessel for species similar in appearance.

Collecting Weights

During each set/haul, the observer is responsible for counting each individual that is on the line or in the pot (i.e.. tally sampling) and collecting weights for each fish species. During each set/haul the observer sometimes will be able to collect weights for 100% of the catch and sometimes will be able to collect weights for LESS than 100% of the catch. There are 5 methods for determining weights on fixed gear vessels. They are listed below in order of preference:

Extrapolation of fish weight- To determine the total weight of a species when less than 100% are weighed during a set. The average weight per fish is determined and this value is then multiplied by the total number of fish in the tally sample.

1. Extrapolated or actual weights from individuals in same set. **Extrapolated** weights are used if only a subsample of the total fish caught are weighted.
2. **Actual weights from individuals outside the set.** If an actual weight of a species was not collected during a set, then an actual weight from similar set (called a "like" set) can be used in the extrapolation calculation.
3. Visually estimated weight.
4. PHLB Length/Weight Conversion (only for Pacific Halibut)
5. Fish ticket weights (Retained species only)

Tip: Weight estimates for drop-offs and fish affected by predation are based on the average weight for retained individuals of the same species

Extrapolated or actual weights from individuals within the same set

Individuals can be collected to weigh during a tally sampling period or during the non-tally periods.

- **During tally period**: The preferred method for discarded species and non-target retained species is to collect individuals during the tally period. When individuals are collected during the tally period, it ensures that all species in the sample are present.
- **During non-tally period:** Target species are often collected during the non-tally period due to space limitations and/or time constraints. *Be aware:* If non-target individuals are collected only during the non-tally period, all species that occur in the tally sample may not be present.

Tip: Collect, at minimum, 15 individuals from non-target species for average weight calculations. Count and weigh at least 30 individuals from target species

Tip: Fish carcasses or skeletons should not be weighed. These fish are tallied as fish discarded due to predation. Use the average weight derived for the species from whole specimens.

Extrapolated Weight from "Like" Sets

"LIKE" Sets - Like sets are
1. Close in proximity
2. In same depth range
3. Similiar in soak time

There may be one or more species for which it was not possible to collect individuals to determine average weight of the species. This usually happens if only a few individuals of a given species are caught. If this occurs, use the average weight of the same species from a similiar haul.

Visually Estimated Weights of Large Organisms and Discarded Catch

It may necessary to visually estimate the weight of large organisms and some discarded species.

- Large organisms, such as sharks and skates, often fall off the line prior to being brought aboard or are too large/awkward to handle. Visually estimate the weight of each individual by species while tally sampling.
- If a species that would not have been retained drops-off the line, is deteriorated due to predation, or if no individuals of a species is collected for weights on the set or on previous sets, then visually estimate it's weight while tally sampling. This in only common when only one or two individuals of the species are caught.

Visual Estimates for Retained Species

If possible, observers should actually weigh retained species or obtain a subsample of retained individuals to determine average weights. In some of the fixed gear fisheries, the vessel may be delivering live fish. In these fisheries, the vessel may not want the observer to handle the retained fish. If this occurs, the weight of the retained species will need to be visually estimated by one of the following methods (in order of preference):

- Record visual estimate of every retained individual as it comes aboard and sum estimates by species.
- For more abundant species, use a systematic sampling strategy (described above) to visually estimate the weight of every nth fish. Determine the average of these visual estimates and multiply by the total number tallied.
- When a retained species is consistent in size, apply a visually estimated average weight to the total tally. With this method, rather than visually estimating the weight of individual fish, the tally is multiplied by an "overall" average weight estimate for that species.

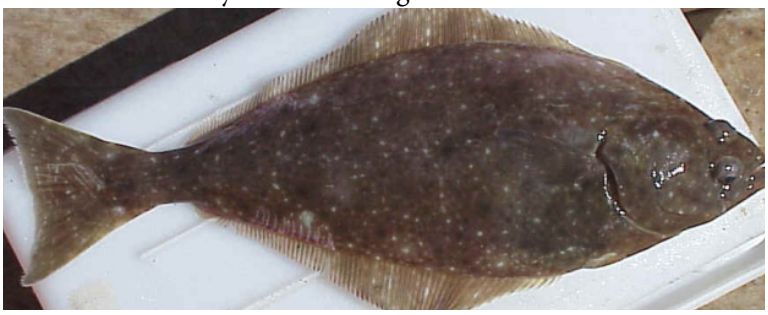
Note: When visual estimates are used for retained species, the same average weights must be applied to fish of the same species that are discarded due to drop-off or predation. These are also recorded as visual estimates.

Pacific Halibut

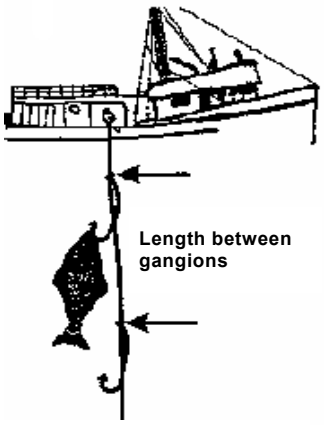
Pacific halibut are often too large to obtain an accurate weight with the scales provided, and large individuals may not be brought on board the vessel at all. If the fish are small enough to weigh, it is preferred that individuals be collected for an average weight sample and applied to the tallied number. For situations where this is not possible, the

IPHC has developed a length-to-weight table that lists approximate weights of Pacific halibut based on the length in centimeters (See Appendix for P. Halibut Length/Weight Table). It is acceptable to estimate the weight of Pacific halibut

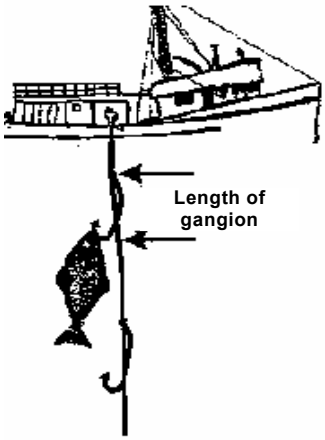
in tally samples using this table. If actual lengths cannot be obtained, it is permissible to use visually estimated lengths.



The following suggestions will help with estimating the length of Pacific halibut:



Estimating halibut length using distance between gangions.



Estimating halibut length using length of gangion.

- Measure the distance from the roller to weld marks on the side of the vessel or the waterline, if weather permits.
- Measure the distance between the gangions on the groundline and measure the length of the gangions themselves. On most longline vessels, the distance between the gangions and the length of the gangions are consistent. During normal operations, the observer will be able to see the fish being pulled by the groundline and gangion. Estimate the length of the Pacific halibut in reference to the length of groundline between the gangions or the length of the gangion itself.
- Use the length of the gaff or the pole gaff to compare to the lengths of the Pacific halibut.
- Pre-measure the length of the longline trough. Some Pacific halibut will be brought on board either to be retained or by accident. Having several marked measurements in the trough will allow the observer to quickly estimate the length of any landed Pacific halibut.

After sampling a set, use the Length-to-Weight Table in the Appendix to determine proper weights. Multiply the number of Pacific halibut for each length by the weight from the table. Sum the weights for all sizes to obtain the total weight of Pacific halibut in the sample. and ensure raw data is clearly labeled as a visual estimate

Tip: Collection of Pacific Halibut viability is considered Biological data. See Chapter 7, “Biological Sampling” for collection of halibut viability data.

Fish Ticket Weights (Retained Species only)

Because fishers participating in the live fish market are extremely concerned about the condition of their fish, collecting samples of retained individuals

may not be possible. If it is not possible to collect and weigh a sample of retained fish for average weights and visual estimates were not made, delivery weights (fish tickets) can be used to calculate the average weights of retained species. When using delivery weights:

1. **Tally ALL retained individuals by species by haul**.
2. Observe the weighing of the fish by species upon landing, if possible. If not, ask the skipper for a copy or look at the weights on the fish ticket.
3. Calculate average weight of species by:

Calculation

$$\text{Average Species Wt} = \frac{\text{Landing Weight of Species (lbs)}}{\text{\# of Individuals of Species Caught During ENTIRE Trip}}$$

4. For each haul, calculate the weight of retained species.

Calculation

Species Wt by Haul = (Average Species Wt) x (# of Individuals Caught in Haul)

Random Sampling for Collecting Average Weights

There are two methods used to randomly collect individuals. These two methods, random spatial and systematic sampling, are detailed below.

Random Spatial Sampling

Spatial sampling is a good method to use for species caught in **small** quantities.

1. Select gear segments to use for collecting individuals using one of the following two methods:
   - Select all non-tally-sampled gear segments.
   - Randomly select one or more gear segments from the entire set.
2. Collect all individuals.
3. Weigh and count the collected individuals to determine average weights.

Example of Random Spatial Sampling

1. The Blue Dragon sets 20 pots.
2. The observer on the Blue Dragon randomly selects 13 of the 20 pots to tally sample by pulling numbers out of a hat.
3. The observer uses the remaining 7 pots to collect and weigh individuals for average weight determinations.

Systematic Sampling

Systematic sampling is a good method to use for species caught in **large** quantities and in **live fish** fisheries.

1. Select gear segments to use for collecting individuals for average weights using one of the following methods:
   - Select all non-tally-sampled gear segments.
   - Randomly select one or more gear segments from the entire set.
   - Sample throughout entire set. (If 100% of the gear was tally-sampled, then sampling throughout the entire set is recommended.)
2. Systematically collect a portion of the total number of individuals.
   - Estimate the total number of individuals that will be caught while individuals are being collected for weights.
   - Divide the estimated total individuals by the number of fish needed (at least 15) to determine the collection frequency (n).
   - Collect every n^{th} individual beginning with a randomly chosen starting point.
3. Weigh and count the collected individuals to determine the average weight.

Example of Systematic Sampling

1. The Miss Fish sets a longline with 10 skates.
2. The observer randomly selects skate 2 for obtaining the average weight of sablefish by selecting a number from a random number table.
3. The observer estimates that 250 sablefish will be caught in skate 2.
4. The observer wants to collect 30 sablefish to use for an average weight determination.
5. The observer determines the frequency to collect sablefish by dividing 250 by 30 to get a collection frequency of 8.
6. The observer randomly chooses a number between 1 and 8 from a random number table and gets the number 4. Starting at the beginning of skate 2, the observer collects the 4th fish and then every 8th sablefish after (12, 20, 28, etc.) until the end of skate 2 is reached.
7. The observer weighs the sablefish and divides the weight by the actual number of fish collected to calculate the average sablefish weight.

VIII. Documenting Tally Samples

The tally sample is normally documented on the back of the Fixed Gear Catch Form (See Figure 5-9: Tally Sample Example on page 25), along with the

weights of individuals of each species weighed. Once sampling for the haul is complete, the Catch Form and Species Composition Forms can be completed.

Catch Categories on Fixed Gear Vessels

As a review, there are two rules that apply to catch categories:

- Retained and discarded individuals are always in separate catch categories.
- Individuals are grouped in the same catch category when they are sampled together. All individuals in the catch category must have the same weight method and sample method. Typically, it is only when a visual estimate or P. halibut length/ weight conversion is used to determine weight that a species is not grouped with the catch category.

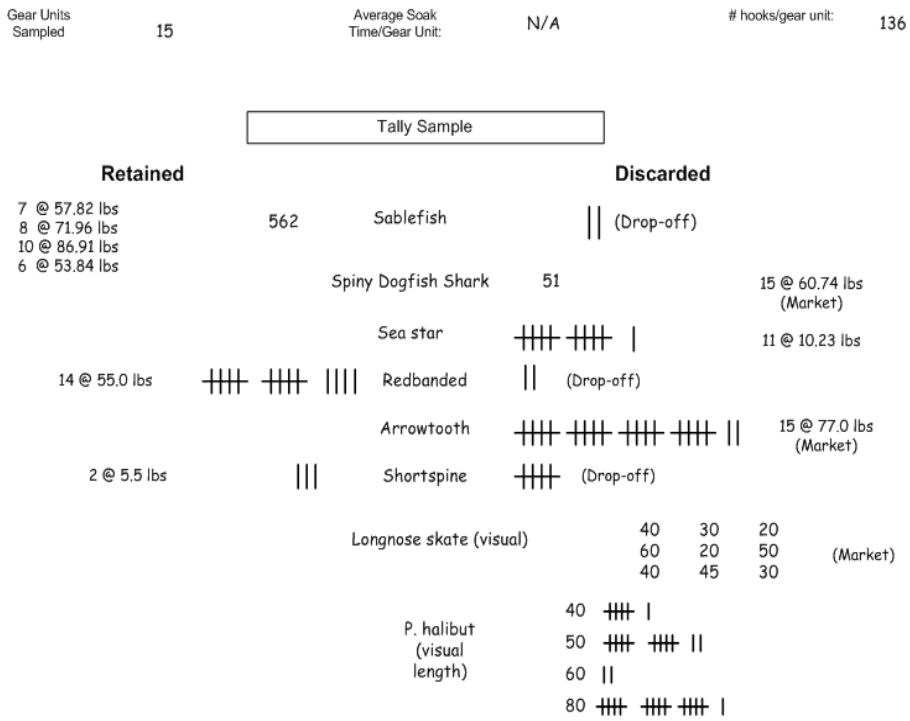


Figure 5-9: Tally Sample Example

Grouping, Assigning Weight Methods, and Naming Catch Categories on Fixed Gear Vessels

On fixed gear vessels, catch category grouping depends upon the method used to obtain the weight of the species (actual weight/extrapolation, visual estimate, fish ticket, etc.).

- All species whose weight was determined by an actual or extrapolated weight from the same set or from "like" sets, should be grouped in the same catch category by disposition (retained and discarded). On the Fixed Gear Catch Form, these catch categories will have **Weight Method 13 - Tally Sample**.
    - As these catch categories will have a species composition sample, the name of the catch category is irrelevant. ZMIS is most commonly used.
- Species whose weight was determined by a visual estimate should be placed in their own catch categories. On the Fixed Gear Catch Form, these catch categories will have **Weight Method 14 - Visual Experience**.
    - As these catch categories will *not* have a species composition sample, the most descriptive catch category code possible should be used. To determine catch category code, in order of preference, use:
        - Species specific code (i.e. ARRA, Aurora rockfish)
        - Species grouping code (i.e. NSLP, North Slope Rockfish)
        - **FISH:** Single fish species that is discarded. (Describe species in comments)
        - **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.).
- Pacific halibut whose weight is determined using the length-to-weight table should be placed in it's own catch category, by disposition. The catch category weight method on the Fixed Gear Catch Form will be **WM-9 P. Halibut Length/Weight Conversion**. Weight Method 9 - P. Halibut Length/Weight Conversion will be used when lengths are visually estimated OR actually lengthed and the *weights* are derived from the Appendix P. Halibut Length/Weight Table.
    - As these catch categories will *not* have a species composition sample, the most descriptive catch category code, PHLB, should be used.
    - The visually estimated lengths will be documented on the Length Frequency form using sample method 10 -P. Halibut visual length estimate. The actual lengths taken will be documented on the Biospecimen form.
- All retained species whose weight was determined by fish ticket weights should be grouped in a single catch category. On the Fixed Gear Catch Form, these catch categories will have **Weight Method 13 - Tally Sample**.
    - As these catch categories will have a species composition sample, the name of the catch category is irrelevant. ZMIS is most commonly used.

Based upon these rules, complete the Fixed Gear Catch Form, as much as possible.

Tip: The "Sample Weight" field should not be filled in for catch categories with weight method "13 - Tally Sample" until after the Species Composition Form is completed.

Fixed Gear Catch Form Instructions

The Fixed Gear Catch Form (See Figure 5-10) is used to document sample weight and other catch information. A Catch Form should be completed for all hauls.

Tip: The "weight" column is filled out differently on the Fixed Gear Catch Form than on the Trawl/Prawn Catch Form. For Fixed Gear, the weights recorded are sample weights; for Trawl/Prawn, the weights represent total weight estimates for the catch category.

- **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.

Tip: Some observers find it easier to start a trip prior to leaving port. Doing this allows the observer to fill in the Trip Number while at-sea rather than when the observer returns to port

- **USCG #**: Record the USCG vessel number posted on the exterior of the vessel or request this six or seven digit number from the vessel skipper or a coordinator. **If the vessel does not have a USCG number, leave field blank.**
- **Page _ of:** Number forms sequentially with in a haul.
- **Catch #**: Number the catch categories consecutively, starting from 1 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 **R** – Retained or **D** – Discarded.
- **Catch Category:** Record, in capital letters, the catch category sampled in the 3 or 4-letter PacFin code. For a list of PacFin catch category codes, see Appendix Catch Categories List and Target Strategies.
- **Sample Weight**: Record the weight of the tally sample for the catch category in pounds

Tip: The "Sample Weight" field should not be filled in for catch categories with weight method 13 until after the Species Composition Form is completed. At this stage, only complete the "Sample Weight" column for catch categories with weight methods 9 or 14.

Tip: If there is a species composition sample for the catch category, the Sample Weight should be the same as the Keypunch Weight on the Species Composition Form!! (If not, there is a problem.

- **Numbers of Fish**: The total number of fish in the catch category MUST be documented if weight method 14 – Visual Experience or 9 – P. Halibut Length/Weight conversion. Do not record the number of fish for weight method 13 – Tally Sample.
- **Hooks/Pots Sampled:** Record the number of hooks or pots that were tally sampled.
- **Weight Method**: Document the weight method used to estimate the catch category.

  6 - Other
  13 – Tally sample
  14 – Visual Experience
  9 – P. Halibut Length/Weight Conversion

- **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.

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

- **Discard Reason:** Record the skipper/crew's discard reason for discarded catch categories for **Weight Method 9 - PHLB Length/Weight Conversion** and **Weight Method 14 - Visual Experience**.

  11 - Incidental/Accidental
  12 - Drop-off
  13 - Market
  14 - Other
  15 - Predation
  16 - Regulation
  17 - Safety
  18 - Market (Dockside only)

Tip: Look only at the primary reason for discard. For instance, if the vessel is not retaining Starry Flounder and one drops-off, do not record the reason for discard as drop-off. Even if it had made it on the vessel, the fish would not have been retained. This also applies to fish preyed upon that drop-off. If a fish that would have been retained drops off because it's been preyed upon, the reason for discard should be predation (even if the fish made it aboard it would not have been retained due to predation).

- **Average Time on Deck :** T:his column should not be used in 2010 (Present on form v. 6).
- **Comments:** Document anything important about each catch category. Species names should be recorded here if catch category is not accompanied by a species composition sample and catch category name does not indicate species.
- **Keypunch Checks:** These are required fields for **Sample Weight**, **#'s of Fish**, and **#'s of Hooks/Pots Sampled** columns. Sum up the entries in each column and place the total in the corresponding keypunch box at the bottom of the form.

Haul # ☐☐ **FIXED GEAR CATCH FORM*** Page ____ of ____

Date ☐☐☐☐☐☐ Trip Number ☐☐☐☐☐ USCG # ☐☐☐☐☐☐☐

Catch #	R or D	Catch Category	Sample Weight	#'s of Fish Req. for wt. methods 6, 9 14,	# Hooks/Pots sampled by catch category	Weight Method	Catch Purity	Discard Reason	Comments
Keypunch Checks									

*Gear Types 7, 8, 9, 10, 15, 16, 19, 20

Fixed Gear Catch Form v. 7 January 2010
OMB Control No. 0648-0593 expires 9-30-2012

Figure 5-10: Fixed Gear Catch Form

IX. Completing the Species Composition Form

In order to complete the Species Composition Form, the total weight of each species in the tally sample needs to be determined. Average weight calculation will need to be done for species whose weight was determined by:

1. A random subsample of all individuals caught were weighed (all individuals of species not weighed).
2. Fish ticket weights use for retained species AND trip had more than one haul.

Average Weight Calculations

For species that all the individuals in the tally sample were not weighed, an average weight calculation is used to calculate the sample weight of the species. To determine sample weight:

1. Weigh and count randomly selected individuals by species.
2. Divide the weight of individuals weighed by the number of individuals weighed and then multiply by the total number of individuals of that species in tally sample.

Calculation

$$\text{Total Sample Wt} = \frac{\text{Wt of Subsample x Total \# in Tally Sample}}{\text{\# in subsample}}$$

Using Delivery Weights for Average Weights of Tallied Individuals

1. Observe the weighing of the fish by species upon landing, if possible. If not, ask the skipper for a copy or look at the weights on the fish ticket.
2. Calculate average weight of species by:

Calculation

$$\textbf{Average Species Wt} = \frac{\textbf{Landing Weight of Species (lbs)}}{\textbf{\# of Individuals of Species Caught During ENTIRE Trip}}$$

For each haul, calculate the weight of retained species.

Calculation
Species Wt By Haul = (Average Species Wt)x(# of Individuals Caught in Set)

Sample Methods on Fixed Gear Vessels

There are three sample methods that describe species composition sampling on fixed gear vessels. Remember, only catch categories with weight method 13 - Tally sample will have species composition samples.

Sample Method 4 – Fixed Gear Sample

Used for species whose weight is determined by:

1. Extrapolated or actual weight from individuals in the same set.

   Tip: It is not necessary to place a species whose weight is extrapolated in a different catch category than species where each individual was weighed. They should ALWAYS be in the same catch category.

2. Extrapolated weight from individuals in a "like" set.

Tip: If an average weight from like "set(s)" is used, be sure to document in raw data the haul number(s) that were used.

Sample Method 5 - Fixed Gear Fish Ticket Verified

Used for species whose weight is determined by using the fish ticket (landing receipt) weight AND when the observer has "verified" that the weight on the fish ticket represents the number of individuals per species in the retained tally sample. **For a fish ticket weight to be considered verified, the observer must monitor the landing and be 100% confident that all fish in the tally sample are weighed at landing.**

Sample Method 6 - Fixed Gear Fish Ticket Unverified

Used for species whose weight is determined by using the fish ticket (landing receipt) weight AND when the observer was not able to see the landing or is not confident all individuals in the tally sample were included in the fish ticket weight.

Species Composition Form Instructions

Species composition information is recorded on the Species Composition Form (See Figure 5-11).

- **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.

Tip: Some observers find it easier to start a trip prior to leaving port. Doing this allows the observer to fill in the Trip Number while at-sea rather than when the observer returns to port.

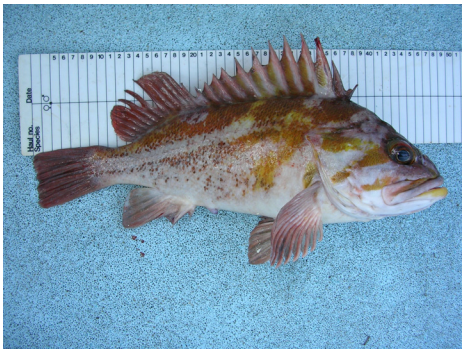
- **USCG #:** Record the USCG vessel number posted on the exterior of the vessel or request this six or seven digit number from the vessel skipper or a coordinator. **If the vessel does not have a USCG number, leave field blank.**
- **Trawl Biosampling List:** Do not complete on fixed gear vessels.
- **Page _ of _:** Number forms sequentially with in a haul.
- **Catch #**: Record the number that corresponds to the catch category on the Catch Form.
- **Catch Category:** Record, in capital letters, the catch category in the 3 or 4-letter PacFin code. For a list of PacFin catch category codes, see Appendix Catch Categories List and Target Strategies.
- **Sample Method**: Record the method used to sample the catch category.

  4 – Fixed Gear
  5 - Fixed Gear Fish Ticket Verified
  6 - Fixed Gear Fish Ticket Unverified

- **KP Weight and KP Number**: Sum up 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 individuals in the catch category sample and place the total number in the Keypunch (KP) Number box.

Tip: Check to be sure the KP Weight on the Species Composition Form is the same as the Catch Category Sample Weight on the Catch Form!! (If not, there is a problem)

- **Species**: Record the common name of the 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.



- **Species Code:** Record the species code number of the corresponding species. This can be done prior to entering data and not on deck. See Appendix for Species Codes.
- **Sample Weight:** Record the total weight of the species in the sample (**can be extrapolated**).
- **Fish Number**: Record the number of fish of each species in the sample (**can NOT be extrapolated**).
- **Reason for Discard:** Record the skipper's/crew's reason for discard for each discarded species.

  11 - Incidental/Accidental
  12 - Drop-off
  13 - Market
  14 - Other
  15 - Predation
  16 - Regulation
  17 - Safety
  18 - Market (Dockside only)

Tip: Look only at the primary reason for discard. For instance, if the vessel is not retaining Starry Flounder and one drops-off, do not record the reason for discard as drop-off. Even if it had made it on the vessel, the fish would not have been retained. This also applies to fish preyed upon that also drop-off. If a fish that would have been retained drops off because it's been preyed upon, the reason for discard should be predation (even if the fish made it aboard it would not have been retained due to predation)

- **Release Method:** This column is documented in the Nearshore fishery only. See Chapter 6, "Fixed Gear Sampling on Small Boats".
- **Basket Weight and Number**: Use these columns on deck to document numbers and weights. These columns are not commonly used for fixed gear data. Tally sample raw data is usually recorded on the back of the Catch Form.

Once the Species Composition Form is completed, fill in the "Sample Weight" column on the Fixed Gear Catch Form with the "Keypunch Weight" for those catch categories with weight method 13.

Haul # ☐☐

SPECIES COMPOSITION FORM

Trawl Biosampling List
1 2 3

Page ____ of ____

Date ☐☐☐☐☐☐ Trip Number ☐☐☐☐☐ USCG # ☐☐☐☐☐☐☐

Catch #	Catch Category	Sample Method	KP Weight / KP Number	Species	Species Code	Sample Weight	Fish #	Discard Reason	Release method	Basket Weight	#	Basket Weight	#

Trawl Sample Methods : **1**-Whole haul species **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 only)
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 v.10 Jan 2010

OMB Control No. 0648-0593 expires 9-30-2012

Figure 5-11: Species Composition Form

X. Determining OTC on Fixed Gear Vessels

The following weight methods may be used to calculate OTC on fixed gear vessels.

Weight Method 6 - Other

There are two situations where weight method 6 - Other is used on fixed gear vessels:

- Hauls not sampled: Sum of like sets used for OTC
- Hauls were the number of hooks sampled is not consistent for all catch categories.

Weight Method 8 - Extrapolation

This method is used when less than 100% of the gear is tally sampled.

Calculation

$$\text{OTC} = \left(\frac{\sum \text{All Catch category weights on Catch Form}}{\text{Number of hooks sampled}}\right) \times \left(\text{Total \# of Hooks in Set}\right)$$

Note: When GEAR IS LOST, Weight Method 8 - Extrapolation must be used to calculate OTC in order to account for the unsampled (lost) gear. An extrapolation for lost gear is made when a gear segment, such as a stick or trap is lost, but NOT when individual hooks break off.

Weight Method 11 - Retained + Discarded

This method is used when 100% of the gear is tally sampled.

Calculation

$$\text{OTC} = \sum \text{All Catch Categories on Catch Form}$$

XI. Recording Fishing Effort Information and Total Catch Estimates

Fishing effort information must be recorded for every set a vessel makes while the observer is on board. The fishing effort information is recorded on the Trip Form.

Seabird Avoidance Gear

Vessels that fish with hook and line gear often have seabirds following the vessel, attacking hooks as they are set. In order to prevent bait from being stolen and birds from dying, some vessels use a seabird avoidance device while setting their gear. Common types of seabird avoidance gear include:

WCGOP seabird avoidance gear codes are:

0 - No
2 - Streamer Line(s)
3 - Buoy Line
4 - Weights
5 - Night Setting (Exclusively)
6 - Other (Describe in haul comments)

Common types of seabird avoidance gear include:

2-Streamer/Tory Lines (Single and Paired)

Streamer/tory lines consist of a length of line, streamers (smaller pieces of line) attached along a portion of the length, and one or more floats at the terminal end. Paired streamer lines consist of two streamer lines, one deployed on each side of the main groundline.

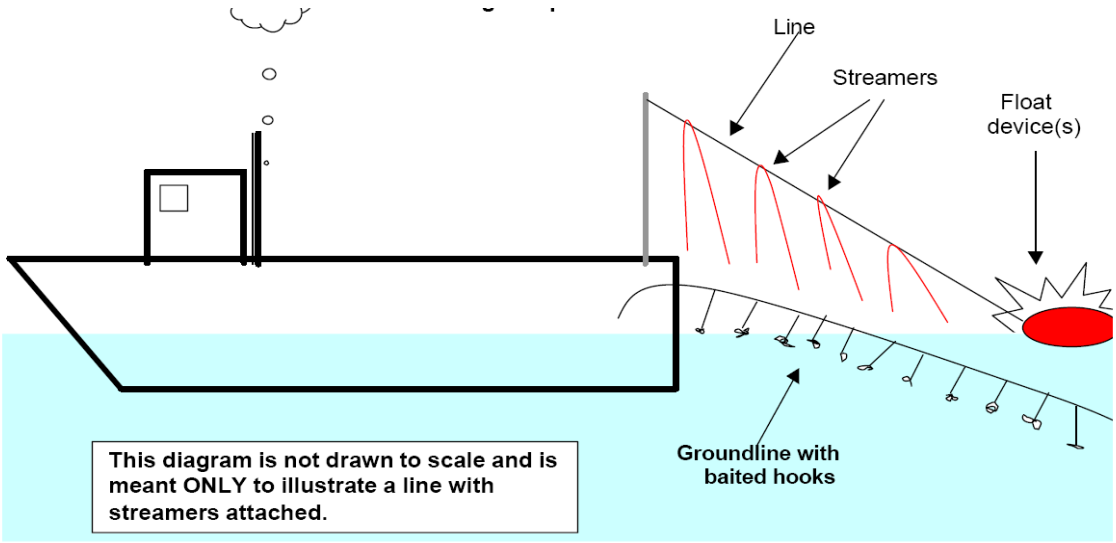


Figure 5-12: Streamer Line Diagram

3 - Buoy Bag Line

A buoy bag line consists of a length of line (no streamers attached) and one or more float devices at the terminal end.

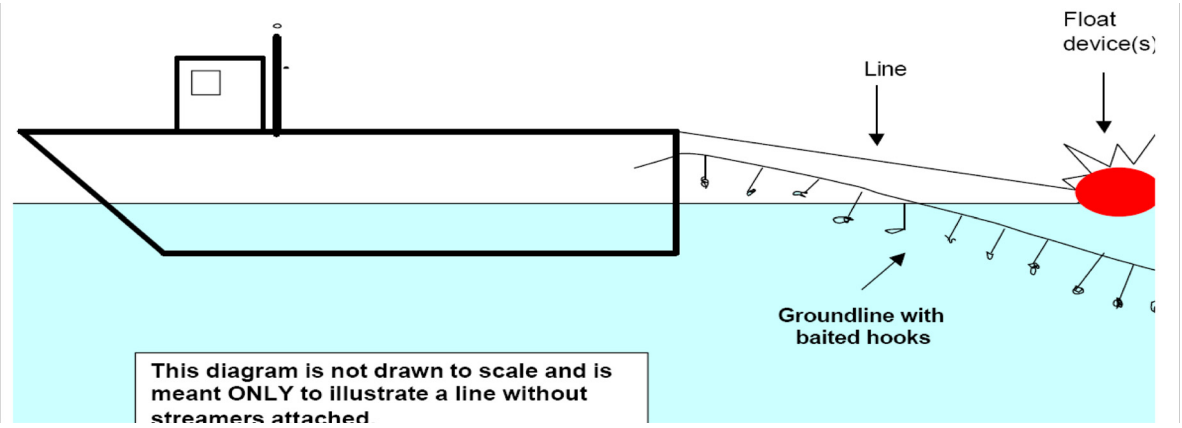


Figure 5-13: Buoy Line Diagram

4 - Weights

Crew adds extra weights to the groundline for the purpose of sinking gear more quickly.

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.

5 - Night Setting (Exclusively)

The vessel sets at night to avoid seabird bycatch.

6 - Other

Vessel uses a different method to avoid/reduce seabird bycatch. Describe method used in observer logbook and in haul comments.

Trip Form Instructions

A Trip Form must be completed for all observed trips. (See Figure 5-14)

- **Fishery Type** (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 #:** All Trip Forms are numbered together by trip.
- **Trip Number:** This number is automatically generated by the database. Complete this field once the trip has been started in the database.

Tip: Some observers find it easier to start a trip prior to leaving port. Doing this allows the observer to fill in the Trip Number while at-sea rather than when the observer returns to port

Q: What's a trip?

A: A trip is a fishing activity that typically results in the completion of a fish ticket (landing receipt). The exception is when the vessel fished but did not retain any species.

- **USCG #:** Record the USCG vessel number posted on the exterior of the vessel or request this six or seven digit number from the vessel skipper or a coordinator. **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.
- **Vessel Name:** Record the full name of the vessel.
- **Partial Trips:** Check the box if the trip included more days than were observed. (Fish ticket includes unobserved catch.)

Tip: Partial trips usually occur when a vessel fishes multiple day trips in a row

- **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**.

Tip: Do not guess or make an assumption to complete this field. If you do not know how many days the trip lasted, leave column blank.

- **Fishery:** Record the name of the fishery the vessel was selected for:

  Limited Entry Sablefish
  Limited Entry Zero Tier
  CA Nearshore
  OR Blue/Black Rockfish Nearshore
  OR Blue/Black Rockfish
  WC Open Access Fixed Gear

- **Vessel Logbook Name:** Record the name of the logbook the vessel is using to record fishing effort information. The following logbooks can be used:

Fishery	Vessel Logbook Name
Limited Entry Sablefish	No logbook required, however, if vessel is recording information in a logbook, document the logbook's name. If logbook name is not available in the database, contact the Database Manager.
Limited Entry Zero Tier	No logbook required, however, if vessel is recording information in a logbook, document the logbook's name. If logbook name is not available in the database, contact the Database Manager.

Fishery	Vessel Logbook Name
CA Nearshore	No logbook required, however, if vessel is recording information in a logbook, document the logbook's name. If logbook name is not available in the database, contact the Database Manager.
OR Black/Blue Rockfish and OR Black/Blue Rockfish Nearshore	OR Nearshore
WC OA Fixed Gear	OR Fixed Gear (Oregon vessels only) California and Washington do not require logbooks. However, if vessel is recording information in a logbook, document the logbook's name. If logbook name is not available in the database, contact the Database Manager.

Q: Why do observers record logbook page numbers?

A: The fishing locations of vessels carrying observers are compared to the fishing locations of vessels not carrying observers to ensure vessel activity has not changed with observers on board.

- **Permit/License #:** Document the permit/license number being used. All fixed gear fisheries, with the exception of WC Open Access Fixed Gear, must have a permit/license number documented. Limited Entry Sablefish vessels can have up to three permits stacked. All permit numbers associated with the vessel must be documented. Contact your coordinator for permit lists.
- **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!
- **Observer Logbook #:** 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.
- **# of Crew** (including captain): Document the number of crew, including the captain, on the vessel.

Q: Why are observers required to record Fish Ticket Numbers?

A: When observer data is analyzed, the total landed weight from the Fish Ticket is used to estimate the amount of discard by species per landed weight of target(s).

- **Departure Date/Time**: Document the date and time the vessel left port.
- **Departure Port:** Document the port the vessel departs from.
- **Landing Date/Time:** Document the date and time the vessel returns to port.
- **Landing Port:** Document the port to which the vessel returns.
- **Fish Ticket Number:** Obtain the numbers of all landing receipts (fish tickets) from the vessel skipper, the port biologist, or the state liaison. **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 will be **C** - for California deliveries, **O** – for Oregon deliveries, or **W** – for Washington deliveries.
- **Date:** Document the date in MM/DD/YY of fish ticket issuance.

Haul Information Instructions

- **Haul/Set Number:** Number hauls consecutively, starting with 1 for each trip.

Tip: **Hauls must be numbered in the order retrieved!!** If hauls are numbered in the order they were set, all Catch, Species Composition, and Trip Information will need to be renumbered at debriefing

- **Observer Total Catch Estimate (OTC) :** Record the total catch estimate to two decimal places. Observer Total Catch estimate is recorded in pounds.
- **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 fixed gear OTC's are:

  6 - Other
  8 - Extrapolation
  11 - Retained + Discarded

- **Total Hooks/Pots:** Record the total number of hooks or pots in the set. This number should include lost gear.
- **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 (Gear types 7, 9, 19, & 20 only):** Document the number that describes that type of seabird avoidance gear used or document "No" if not used.

  0 - No
  2 - Streamer Line(s)
  3 - Buoy Line
  4 - Weights
  5 - Night Setting (Exclusively)
  6 - Other (Describe in haul comments)

- **Avg. Soak Time:** If set was NOT defined by buoy to buoy and gear type is NOT pole, document the average range of soak time of a single unit of gear. (Gear types 7 and 9 always; Gear types 10, 19 and 20 sometimes).

  < 1 minute
  1 to 5 minutes
  5 to 15 minutes
  15 to 30 minutes
  30 to 45 minutes
  45 to 60 minutes
  60+ minutes
  1-2 hours
  6 hours
  12 hours
  24 hours
  36+ hours

- **Comments:** Document any information that is important about the haul.
- **OTC Keypunch Check:** Sum the OTC's for an entire trip and record total weight of trip in the OTC keypunch check box. (If more than one Trip Form is used, sum total catch estimates of ALL hauls to obtain keypunch check.)
- **Total Hooks/Pots Keypunch Check:** Sum all of the hooks/pots counts for an entire trip and record total hooks/pots count of trip in this column. (If there are multiple Trip Forms, add total hooks/pots counts of ALL hauls to obtain keypunch check.)

Trip Information

Page ___ of ___

LE OA EFP

Trip # ☐☐☐☐☐ USCG # ☐☐☐☐☐☐☐ or State Reg # ☐☐☐☐☐☐☐☐

Observer Name _____ Year 2 0 1 ☐

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

Fishery _____ Vessel Logbook Name _____

Permit/License # _____ Vessel Logbook Page # _____

_____ Observer Logbook # _____

_____

Skipper's Name _____ # of Crew _____
(including captain, not including observer)

Departure Date/Time ___/___/___ _____ Departure Port _____

Landing Date/Time ___/___/___ _____ Landing Port _____

Fish Ticket #	WOC	Date

Fish Ticket #	WOC	Date

Haul Information

Haul/ Set #	Observer Total Catch Estimate	Weight Method	Total Hooks/Pots	Gear Perf	Seabird Avoidance (Gears 7, 9, 19, & 20)	Avg. Soak Time m = minutes, h =hours	Comments
						< 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	
						< 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	
Key-punch Check							

Trip Form v.9 January 2010 OMB Control No. 0648-0593 expires 9-30-2012

Figure 5-14: Trip Form

Trip Form – Haul Locations

Tip: Observers are often required to record haul location information on their own.

(See Figure 5-16)

- **Trip Notes:** Document any information pertinent to understanding the trip.
- **Haul/Set Number:** Number hauls consecutively, starting with 1 for each trip.
- **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 the Pacific Standard Time (PST) when the first hooks were put into the water for the start time. **Document the time when the last hook is brought on board during retrieval for the end time.**
- **Start and End Latitude:** Document the latitude (in degrees, minutes, 1/100th of a minute) that the haul was set and retrieved.

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 so that you can convert the positions to degrees after the trip. See the Appendix for Loran Infomation and how to convert Loran C coordinates to latitude and longitude positions.

Fathoms: 1 Fathom = 6 Feet

Tip: When an observer boards a vessel that has a GPS, check to be sure the it's recording in degrees, minutes, 1/100th of a minute. If it's not, ask the captain to change the view to 1/100th of a minute instead of seconds. (See Figure 5-15)

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

Figure 5-15: GPS Showing Latitude and Longitude

- **Depth:** Document the fishing depth in **fathoms**.
- **Gear Type:** Enter a code for the gear type based on the configuration of the gear, and how it is being fished. (Example: If the vessel is using a

fishing pole while under way (trolling), the gear type would be recorded as 15 - All Troll Gear.)

7 - Vertical Hook and Line
8 - Pole
9 - Other Hook and Line Gear
10 - Fish Pot
15 - All Troll Gear
16 - All Other Miscellaneous Gear
19 - Longline (Fixed hooks)
20 - Longline (Snap-on hooks)

If the fishing vessel is not using one of the above gear types, this is most likely the wrong section of the manual.

- **Target Strategy:** Enter the vessel's target strategy. Refer to Appendix Catch Categories List and Target Strategies.

TRIP FORM - HAUL LOCATIONS

Trip Notes:

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

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Figure 5-16: Trip Form - Haul Locations

XII. Unsampled Sets

Every set retrieved during a trip MUST have an OTC, even if it has not been sampled. For sets that are not sampled, employ a "sum of like sets" to determine OTC. Using a "sum of like sets" provides an estimation of catch based on sets from similar areas, depths, and times.

Never use the vessel's estimate for OTC on a fixed gear vessel.

When estimating the OTC for an unsampled set, use more than one "like set" for the calculation. **"Like sets" should be close in proximity, at the same depth, and of similar soak time as the unsampled set.** In most

circumstances, observers will be able to use the sets just before and after the unsampled set. The lengths of the set or the number of hooks in the comparison sets do not need to be similar for the calculation of "like sets."

Calculation

$$\text{OTC of Unsampled Set} = \frac{\text{Total Wt of "Like" Set A + Total Wt of "Like" Set B x \# Hooks Unsampled Set}}{\text{Total \# of Hooks in Set A + Total \# of Hooks in Set B}}$$

The weight method for the OTC of an unsampled set should be recorded as 6 - Other on the Trip Form and it should be noted in the Haul Comments that a "sum of like sets" was used.

XIII. Lost Sets

Occasionally, vessels lose an entire set. If this happens record the following on the forms:

1. Record the fishing effort information the same as with any other set except use the Landing date and time from the Trip Form as the haul end time.
2. Document gear performance code 5 - Gear lost on the Trip Form.
3. Leave the OTC column blank on the Trip Form.
4. Leave the Catch Form blank and write notes on the back of it describing what happened.
5. Document what happened thoroughly in the logbook.

Occasionally, vessels lose an part of a set. They may loose a group of hooks or skates due to entanglement of gear. (If a vessel looses individual hooks the OTC does not need to be extrapolated) If groups of hooks or skates are lost record the following on the forms:

1. Trip form use weight method 8 and document total hooks set. The hook on the trip form should include any lost gear. In trip notes document hooks lost and how many.
2. Catch form, # hooks sampled should reflect the total hooks sampled. Do not include the lost hooks on this form.

XIV. Trip Discard

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 5-17).

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

- **Trip Number** : This number is automatically generated by the database. Complete this field once the trip has been started in the database.

Tip: Some observers find it easier to start a trip prior to leaving port. Doing this allows the observer to fill in the Trip Number while at-sea rather than when the observer returns to port.

- **USCG #:** Record the USCG vessel number posted on the exterior of the vessel or request this six or seven digit number from the vessel skipper or a coordinator. **If the vessel does not have a USCG number, leave field blank and fill in the State Registration Number field.**
- **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.
- **# 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
  6 - Other
  7 - Vessel Estimate
  8 - Extrapolation
  9 - P. Halibut Length/Weight
  14 - Visual Experience

- **Discard Reason:** Record the skipper/crew's **primary** reason for discard.

  11 - Incidental/Accidental
  12 - Drop-off
  13 - Market
  14 - Other
  15 - Predation
  16 - Regulation
  17 - Safety
  18 - Market (Dockside only)

- **Comments:** Document any additional information that is important.

Trip Discard Form

Page ____ of ____

Trip Number | | | | | | USCG # | | | | | | | |

Date		Time	Species	Weight	# of Fish	Weight Method	Discard Reason	Comments
Month	Day							

Trip Discard Form v.4 January 2010 OMB Control No. 0648-0593 expires 9-30-2012

This form should be used only if the discard can NOT be attributed to a specific haul!

Figure 5-17: Trip Discard Form

XV. Examples

In these examples, be aware that the biological sampling duties that observer's are responsible for on every haul are not addressed. Biological sampling is described in detail in Chapter 7, "Biological Sampling " and Chapter 8, "Protected Resources" .

Hook and line

Haul # 0 1 **FIXED GEAR CATCH FORM*** Page 1 of 2

Date 0 8 1 6 0 8 Trip Number 9 1 1 0 USCG # 5 6 0 4 9 7

Catch #	R or D	Catch Category	Sample Weight	#'s of Fish Req. for wt. methods 6, 14, 9	# Hooks/Pots sampled by catch category	Weight Method	Catch Purity	Discard Reason	Comments
1	R	ZMIS	2574.06		4200	13	M		
2	D	ZMIS	607.62		4200	13	M		
3	D	LSKT	65	2	4200	14	P	13	
4	D	PHLB	385.09	15	4200	9	P	16	
Keypunch Checks			3631.77	17	16800				

*Gear Types 7, 8, 9, 10, 15, 16, 19, 20

Fixed Gear Catch Form v. 7 January 2010
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Haul/Set #		Date	Time	Latitude Degrees	Latitude Minutes	Longitude Degrees	Longitude Minutes	Depth (fm)	Gear Type
	Start								
	End								
	Start								
	End								

Gear Units Sampled: 𝍸 𝍸 𝍸 𝍸 |

Average Soak Time/Gear Unit:

Total hooks = 21 skates x 200 hks / skate = 4200 hks

hooks/gear unit: 200 Avg. hooks

Tally Sample

Retained

Sable
4 @ 39.5
3 @ 25.4
3 @ 15.5
7 @ 42.2
6 @ 35.8
4 @ 25.8
6 @ 31.4
6 @ 41.0
6 @ 43.4
5 @ 33.2
6 @ 43.4
6 @ 44.7
6 @ 40.0
6 @ 35.6

PTRL 1 @ 3.5

PHLB -VISUAL (discard)

CM	
60	
70	|
80	| | | |
90	| |
100	
110	𝍸 |
120	|
130	|

Discarded

Tally 381

Sable	small | | |	DO 𝍸 𝍸 | | 𝍸	Pred |	
	1 @ 2.7			
8 @ 7.7 5 @ 4.5	SSPN	small - 1@.6	DO | |	
Longnose skate	1 @ 23.6 1 @ 5.9 1 @ 8.2 1 @ 11.5	1 @ 13.8 1 @ 26.5 1 @ 14.2 1 @ 15.7	Visual – 1 @ 35 Visual – 1 @ 30	
Giant Wrymouth	1 @ 13.8			
Spiny Dogs	| 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 3 @ 11.2 5 @ 18.6 3 @ 9.4	4 @ 13.6 5 @ 15.5		
Redbanded	| |	1 @ 2.9		
Rose thorn	1 @ 1.2	1 @ .9		
Arth	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 9 @ 49.7 4 @ 19.4	8 @ 44.9 8 @ 43.0	| | | |	
urchin 1 @ .3				
Starfish 2 @ .9				
Sandpaper	1 @ 2.3	1 @ 3.1		
Hagfish 1 @ .9				

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Haul # 0 1

SPECIES COMPOSITION FORM

Trawl Biosampling List 1 2 3

Page 2 of 2

Date 0 8 1 6 0 8 Trip Number 9 1 1 0 USCG # 5 6 0 4 9 7

Catch #	Catch Category	Sample Method	KP Weight / KP Number	Species	Species Code	**Sample Weight**	**Fish #**	Discard Reason	Release method	Basket Weight	#	Basket Weight	#
1	ZMIS	4	2574.06 / 395	SABL	203	2558.36	381						
				SSPN	350	12.2	13						
				PTRL	112	3.50	1						
2	ZMIS	4	607.62 / 118	SABL	203	8.10	3	13					
				SABL	203	80.58	12	12					
				SABL	203	6.71	1	15					
				SSPN	350	0.6	1	13					
				SSPN	350	1.88	2	12					
				Longnose Skate	554	119.4	8	13					
				Giant Wrymouth	760	13.8	1	13					
				Spiny Dogfish	66	122.94	36	13					
				Redbanded	308	5.8	2	13					
				Rosethorn	309	2.1	2	13					
				Arth	141	238.21	44	13					
				Urchin	54	.3	1	13					
				Starfish	20	.9	2	13					
				Sandpaper	555	5.4	2	13					
				Hagfish	67	.9	1	13					

Trawl Sample Methods : **1**-Whole haul species **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 only)
Release Methods (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

Species Composition Form v.9 June 2009

Species Composition Measurements and Calculations

Species	Measurements, Formulas, and Calculations
	SABL 74 @ 496.9 lbs SABL= 496.9 lbs / 74 fish x 381 fish = 2558.363513 Discarded DO = 496.9 lbs / 74 fish x 12 fish = 80.57837836
	Pred = 496.9 lbs / 74 fish x 1 fish = 6.714864864 Small Sabl 2.7 lbs / 1 fish x 3 fish = 8.1 lbs
	SSPN (DO) 12.2 lbs / 13 fish x 2 fish = 1.876923076 DSRK 68.3 lbs / 20 fish x 36 fish = 122.94 lbs
	Redbaned 2.9 lbs / 1 fish x 2 fish = 5.8 lbs ARTH 157 lbs / 29 fish x 44 fish = 238.2068965
PHLB-visual	Wts from L/W table 8.77 (1) 13.51 (4) 19.8 (2) = 385.09 lbs 27.87 (6) 50.29 (1) 65.17 (1) 15

Pots Example

Haul # 2

FIXED GEAR CATCH FORM*

Page 1 of 2

Date 0 7 0 4 0 8 Trip Number 9 9 9 9 USCG # 4 2 0 6 1 3

Catch #	R or D	Catch Category	Sample Weight	#'s of Fish Req. for wt. methods 6, 14, 9	# Hooks/Pots sampled by catch category	Weight Method	Catch Purity	Discard Reason	Comments
1	R	SABL	221.30		12	13	P		
2	D	ZMIS	260.27		12	13	M		
Keypunch Checks			481.57		24				

*Gear Types 7, 8, 9, 10, 15, 16, 19, 20

Fixed Gear Catch Form v. 7 January 2010
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				Latitude		Longitude			
Haul/Set #		Date	Time	Degrees	Minutes	Degrees	Minutes	Depth (fm)	Gear Type
	Start								
	End								
	Start								
	End								

Gear Units Sampled 23 total pots set

Average Soak Time/Gear Unit:

hooks/gear unit:

Retained

Tally Sample

Discarded

WTS
3 @ 16.94
5 @ 27.85
3 @ 17.78
6 @ 32.88
8 @ 44.27
6 @ 50.84

SABL	Smalls (market)	smalls
	Predated	1 @ 3.78 1 @ 3.99 1 @ 4.03 2 @ 7.05
Tanner	191 – tallied	tanner 19 @ 15.83 34 @ 21.35
Viper fish	1 @ .10	
Crinoids		5 @ .20 lbs
Hair Crab		2 @ 3.17

OTC = $\frac{481.57 \text{ lbs}}{12 \text{ pots}}$ x 23 pots = 923.0091665 lbs

Haul # 0 2

SPECIES COMPOSITION FORM

Trawl Biosampling List 1 2 3

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Date 0 7 0 4 0 8 Trip Number 9 9 9 9 USCG # 4 2 0 6 1 3

Catch #	Catch Category	Sample Method	KP Weight / KP Number	Species	Species Code	**Sample Weight**	**Fish #**	Discard Reason	Release method	Basket Weight	#	Basket Weight	#
1	SABL	4	221.30 / 36	SABL	203	221.30	36						
2	ZMIS	4	260.27 / 233	SABL	203	30.16	8	13					
				SABL	203	92.21	15	15					
				Tanner Unid	3	133.99	191	13					
				Viper fish	805	.10	1	13					
				Crinoids	53	.64	16	13					
				Hair Crab	17	3.17	2	13					

Trawl Sample Methods : **1**-Whole haul species **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 only)
Release Methods (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

Species Composition
Form v.10 Jan 2010

OMB Control No. 0648-0593 expires 9-30-2012

Species Composition Measurements and Calculations

Species	Measurements, Formulas, and Calculations
SABL	SABL 31 @ 190.56 190.56 lbs x 36 fish = 221.2954838 31 fish Predated (D) 190.56 lbs x 15 fish = 92.20645161 lbs 31 fish
ZMIS	SABL (13) 5 @ 18.85 18.85 lbs x 8 fish = 30.16 lbs 5 fish Tanner 53 @ 37.18 lbs 37.18 lbs x 191 = 133.9883018 lbs 53 fish
	Crinoids 5 @ .20 lbs .20 lbs x 16 fish = .64 lbs 5 fish