



## Observer Basics

### Focus Questions:

- What are Observer's duties and priorities?
- How are data forms completed?
- How are Logbooks completed?
- What types of information can the WCGOP provide the fisheries managers?
- What is Random sampling?

### Chapter Outline:

- I. Introduction
- II. Duties and Priorities
- III. Recoding Data
- IV. Observer Logbooks
- V. Data Collected
- VI. Catch Categories
- VII. Data Forms
- VIII. Weight Methods and Sample Methods
- IX. Introduction to Random Sampling Theory

## I. Introduction

This chapter presents the foundations of duties, sampling, and documentation of WCGOP Observers. The application of the principles will be discussed in Chapters 4 and 5.

## II. Duties and Priorities

Observer duties are listed below in order of priority. Observers should use this list as a reminder of all the different tasks that need to be accomplished for each haul and to recognize which are of a higher priority. There will be times when all the listed duties cannot be accomplished during a single haul. If all the duties listed cannot be completed due to lack of time, illness, or bad weather, concentrate on duties with higher priority. Observer duties in order of priority are:



1. Record incidental takes of endangered species and marine mammals. Collect appropriate biological specimens.
2. Estimate total catch weight, even for tows with 100% discard.
3. Estimate the weight of catch categories.
4. Document reasons for discard for each species and/or catch category.
5. Sample discarded catch to determine species composition for each catch category.
6. Record weight, length, sex, and take necessary dissections from tagged fish.

7. Take biological samples such as sexed lengths, otoliths, stomachs, etc.
8. Sample retained catch to determine species composition for each catch category.
9. Maintain the Observer Logbook, including: Daily notes, sampling techniques (in a clear, legible and logical manner); scale tests, and sample area diagrams.
10. Record weight, length, and viability of Pacific Halibut.

### III. Recording Data

Eleven standardized forms and an Observer Logbook are used for data documentation. This section provides the basic rules that ensure consistency between all Observers' data.

#### Completing and Organizing Forms

During an average day on a vessel, Observers will fill out at least three different forms (usually several of each!). **All data forms should be completed in pencil.** Only Observer Logbooks should be completed in ink.



**TIP\*** Always have the manual near when filling out paperwork. Review the form instructions prior to completing forms and refer to the examples often. This will save time by ensuring the forms are filled out correctly and completely the first time.

## Legibility

It is required that all data be clear and legible. If the data documentation is unclear, it could be entered into the database incorrectly. During debriefing, these errors will need to be fixed and if the debriefer is unsure of a number, the Observer will need to be present to interpret all the data. This will lengthen the debriefing process and, if questions cannot be resolved, may cause some data to be lost. To ensure legibility:

- Write carefully in clear, dark writing.
- Record the data in an organized manner.
- Document formulas and label all calculations.

## Recording Time

When recording time, use the 24-hour clock (0000-2359) and Pacific Standard Time (PST). Note that no colons are used with the 24-hour clock and should not be recorded on any forms.



**TIP\*** Some digital watches can be set to a 24-hour clock, which can make tracking and recording time easier.

## Rounding Data Rules

**When performing a calculation, carry the numbers out full field until the final product is determined.** Full field is all the numbers on the calculator. Rounding within a calculation reduces its precision. Do not round any numbers within the calculation!

To round the final product:

- Look only at the first digit to the right of the number being rounded.
- If  $X \geq 5$  round up, if  $X < 5$  round down.

For Example:

Observer counts 49 fish but can only weigh 12 fish.

The weight of 12 fish = 54.63 lbs.

The calculated average weight =  $54.63/12 = 4.5525$  lbs.

- **INCORRECT:** Weight of 49 fish if average weight is rounded to 2 decimal places:  $49 \text{ fish} * 4.55 \text{ lbs.} = 222.95 \text{ lbs.}$
- **CORRECT:** Weight of 49 fish if average weight is kept full field:  $49 \text{ fish} * 4.5525 \text{ lbs.} = 223.0725 \text{ lbs.}$  This value would be rounded to 223.07 lbs.

If average weight were rounded, an incorrect value would be recorded on the data form for the weight of the 49 fish.

## IV. Observer Logbooks

### Observer Logbook Entries

The Logbook is probably the single most important piece of data an Observer will return with because it contains detailed and supportive information about all other data. Have the Logbook present whenever paperwork is completed so notes regarding data collection and compliance issues can be documented.



**TIP\*** Many Observers make notes on their deck forms in order to jog their memory of particular events that happened while they were out on deck. Set aside time each day to write in the Daily Notes section. Remember that events that seem ordinary on this vessel may be unusual to the fleet or fishery, so don't hesitate to write down any information that affects sampling or day-to-day life aboard a vessel.

The Observer Logbook is a field biology notebook and must be treated as such; do not use it as a personal journal. Document any interference or inappropriate behavior but avoid venting frustrations or making derogatory remarks. The Logbook must be kept private while on the vessel, but it is a public document and is turned over to NOAA Fisheries during debriefing. The contents of the Logbook and the Observers' name may be released if a Freedom of Information Act (FOIA) request is approved.

### **The Logbook as Evidence**

Logbooks are archived and used as a reference to give more information about the data. They may also be used as evidence if regulatory infractions were noted. If corrections need to be made, draw a single line through the incorrect word(s) and continue with the correct wording.

**Do not black out anything, use correction fluid, or tear out pages or parts of pages! Always use INK!**

If any part of an original entry is completely obscured, it leaves the reader wondering what was originally documented. This may affect the validity of the Logbook and data.

## Completing the Logbook

Logbooks are to be completed on a trip limit basis and are mailed along with completed data at the end of each two month period. The Observer Logbook is made up of twelve sections, each of which should be completed before mailing. Below is a brief description of each section.

### *Title Page*

The Observers' name and the date range of the trip limit period for which the Logbook was used should be clearly indicated here.

### *List of Vessels*

This section is used to list each vessel the Observer embarks on and the dates associated with the vessel. It is very likely that more than one vessel will be observed during each trip limit period. List the vessel names and USCG registration number or the state registration number, as applicable. Write the name of the captain that ran the vessel. If there was more than one skipper during a trip limit period, indicate this and include all names. In the "Inclusive Dates" lines, list the dates on which the vessel embarked as well as the dates the vessel returned to port. **It is only necessary to list each vessel once.**

### *Calendar*

A calendar is provided for Observers to use.

### *Vessel Safety*

Prior to boarding a vessel for the first time, the Observer is required to check the vessel for safety equipment required by U. S. Coast Guard regulations. The "Vessel Safety" section lists items that should be inspected before leaving on the first trip on the vessel. The "Vessel Safety Orientation Checklist" pages should be used to document that each item was checked, to make comments on each

item, and to document the appropriate dates associated with some items.

A copy of the Vessel Safety Orientation Checklists must be mailed to the Observer's coordinator prior to leaving on the first trip onboard the vessel. Logbook pages should never be torn out, rather photocopies should be made.



**TIP\*** It may prove useful to carry pre-addressed, stamped envelopes with you.

### *Observer Safety Equipment Checklist*

Each Observer is issued safety equipment by the WCGOP. All equipment must be maintained and inspected on a regular basis to ensure that it is in proper working condition. The "Observer Safety Equipment Checklist" should be completed on a monthly basis. Document the actual date of the gear inspection and go through the list with the equipment at hand. It is important to notify the Observer coordinator or PSMFC if any of the items do not pass inspection.

### *Scale Calibration Record*

To calibrate the Chatillon Platform Scale:



1. Test the Chatillon platform scale every 5<sup>th</sup> observed day at a minimum.
2. Test the scale with two different weights:
  - 5 lbs weight provided by WCGOP
  - Three, one gallon sealed bottles of water purchased from the grocery store

**TIP\*** Buy three sealed one gallon water jugs prior to the first fishing trip. Use the same three gallons of water throughout your contract as a

West Coast Observer, since there may be a weight variance between gallons.

3. Use the bars in the appropriate manner.
  - First, use the 5 lbs bar to get the weight to the nearest 5 lbs.
  - Second, use the 1 lb bar on the left to get the weight to the nearest pound.
  - Finally, use the tenth bar on the right to get the weight to the tenth of the pound.
  - Record the tested weights in the appropriate section in the Observer Logbook.

**IF THE SCALE READS + or - 5% FROM WHAT IT SHOULD FOR EITHER THE 5 LB WEIGHT OR THE 3 WATER JUGS, CONTACT A COORDINATOR IMMEDIATELY!**

### *Vessel Diagrams*

Vessel diagrams should be done for each vessel observed. These diagrams help detail the layout of the vessel and help debriefers better understand the Observer's sampling conditions while onboard. It is especially important to thoroughly document any vessels and gear types that are not typically observed. Diagrams should be large, detailed, and well labeled. All calculations and formulas used should be documented in the "Vessel Diagram Calculations" pages.

### *Description of Observer Total Catch Sampling*

This section is used to indicate which weight methods were employed to estimate OTC and to detail how each method was applied. This section is used to describe a general sampling frame and any deviations from this frame must be

documented in the “Daily Notes” section. Each method will likely be used more than once and on more than one vessel. There are spaces provided to list each vessel on which a particular method was employed.

#### *Description of Catch Category Sampling*

This section is similar to the previous one, however it is used to describe weight methods used to estimate catch category weight. Again, these descriptions will generally describe a general sampling frame. It is very important that random sampling be detailed.

#### *Communication Log*

The “Communication Log” can be used to aid in tracking communications with vessels, coordinators, other Observers, AOI, or any other program related staff. This log is not mandatory but may be helpful for reference. It is important to note that all communications with *vessels* MUST be entered into the database system. Vessel communications may be listed here as well, but it is not required. Communications listed here may include:

- Calls to WCGOP staff regarding sampling problems.
- Calls to other Observers regarding data or vessel coverage.
- Calls to NMFS enforcement.
- Calls to the Coast Guard.
- Calls to port biologists and port samplers.
- Calls to harbor masters.
- Calls to PSMFC state liaisons.

*Photo Log*

Each contract, a disposable camera will be issued for taking photos of marine mammals and work-related activities. These cameras are not for personal use. The Photo Log should be used to document photographs taken. It is best to document each photo soon after taking the picture. When issued, the camera should have a barcode label. Note the number on the barcode label in the Photo Log. All cameras should be returned to the Seattle field office for developing.

*Daily Notes Section*

Use the Daily Notes section to record specific notes on problems that occur while aboard vessels and any illnesses or injuries suffered. Record the circumstances surrounding any violation witnessed. Any problems or challenges encountered while sampling should also be documented here, including times in which the Observer was unable to sample. Make an entry for each day, describing the day's events, even if it was considered an "ordinary day." The more self-explanatory the trips are, the better. Logbooks may be referred to months, or even years, after the trips are completed.



## V. Data Collected

There are 5 data types Observers can provide for managers. These are as follows:

1. **Fishing Effort Information** – This data is used by managers to understand where people fish, gear used, and target species.
2. **Catch Information** – This information includes how much was caught, what species made up the catch, and how much of each species was retained and discarded.
3. **Species Composition** – Species composition data is used to estimate relative abundance of each species in a haul. It includes the species specific weights and counts.
4. **Biological Data** – Biological data is used by stock assessors to gauge the age composition of the population, the length to age ratio, the potential spawning population, and the male to female ratio. It includes sex, lengths, weights, and otoliths for individual fish.
5. **Other** – This includes data not necessarily used by fisheries managers but important to ecosystem management. This data type includes information about marine mammals, sea turtles, and seabirds.

## VI. Catch Categories

Catch information on the West Coast is categorized in a unique way. Due to the difficulty of identifying rockfish species, processors often group them in easy to identify assemblages (groupings) based on their coloration or cohabitation. These groupings are referred to as market or catch categories. Market categories are used by both buyers

and vessels to record landed catch. From now on, these categories will be referred to as Catch Categories.

**Catch categories are species groupings that are based on either marketing categories or naturally occurring associative species complexes. A catch category may be confined to a single species or may include several species.**

Observer data must be recorded in catch categories in order to be analyzed in conjunction with landing data.

## VII. Data Forms

Eleven standardized forms are used to record data. Each form functions to collect specific information related to one of the 5 data types managers need.

1. **Trip Form** – This form is used to record fishing effort information. This includes latitude, longitude, depth, date and time, target species and gear used. Observers also record total catch estimates, hook counts (when needed), and gear performance. A trip form is completed for every fishing trip observed.
2. **Catch Form** – Catch category information is recorded on one of the two versions of the Catch Form:
  - Trawl/Prawn Catch Form is used on vessels using trawl or other net gear and all vessels targeting prawns. It records the **total weight** of each catch category in the haul.
  - Fixed Gear Catch Form is used when sampling (on most) vessels using hook or pot gear. It records the **Observer sample weight** of each catch category in the haul.



3. **Species Composition Form** - This form is used to record the composition of the haul by catch category and the reason each species is discarded.
4. **Length Frequency Form** – This form is used to record sexed and unsexed lengths of fish when no other biological data is collected.
5. **Biospecimen Form** – This form is used when biological information on individuals other than simple sexed lengths is taken and any time a dissection is taken.
6. **Trip Discard Form** – This form is used to document any discarded fish that cannot be attributed to a specific haul. For example, a vessel may decide to discard fish that have already been put into the hold. These fish can only be attributed to the trip as a whole, not to a specific haul.
7. **Species Identification Form - Observers are required to fill out a species identification form for every new species encountered.** (There are three different Species Identification Forms:
  - Rockfish Species Identification Form (See Appendix V)
  - Flatfish Species Identification Form (See Appendix U)
  - Miscellaneous Species Identification Form (See Appendix W)

Observers' data quality hinges on the ability of the Observers to correctly identify fish to species. Observers are trained in species identification during the initial training. They are also required to take yearly fish identification tests and complete Species Identification Forms for every new species

encountered. These procedures provide the WCGOP evidence of each Observers fish identification competency.



**TIP\*** When filling out species ID forms, it is imperative that Observers are still holding the fish. Do not fill out the forms using only the fish books after the fish has been discarded. There are certain characteristics that are important to document, such as head spine counts on rockfish or the presence of an accessory dorsal branch and its length on flatfish. Be concise and document as much information as possible. If the fish is similar to others, be sure to include distinguishing characteristics.

If a species is encountered in a haul that cannot be identified **REMEMBER: Never guess on the identification of a species.**

### UNIDENTIFIED FISH

If there is an individual fish or crab that cannot be identified, fill out a Species Identification Form with as much information as possible. Observers may come across a more identifiable specimen of the same species later, so organize the unidentified fish descriptions with names such as “unidentified black rockfish #1,” or “mystery fish #5” as appropriate. Use these same names on the Species Composition Deck Form, so that the data can be changed if the fish is identified later. Always take some photographs of the specimen for ID purposes and bring the specimen back to NOAA Fisheries.

If a species caught is not listed in the species code list in the manual or in the database, contact a coordinator and database manager and they will add it to the species list in the database.

8. **Marine Mammal Sighting and Interaction Form** – This form is used to document sightings of marine mammals as well as interactions that occur between marine mammals and fishing operations.
9. **Sea Turtle Information Form** – This form is used to document specific characteristics of Sea Turtles that have interacted with the fishing operations.
10. **Tagged Fish Form** – This form is used to record specific information from tagged fish.
11. **Seabird Sighting and Interaction Form** – This form is used to document sighting of seabird species of interest and banded seabirds. It also documents interactions between seabirds and fishing operations.

### **Page Numbering**

It is important to use a standardized method of page numbering for the data forms for each trip. All Observers must use the same page numbering method for their data forms. This allows debriefers to easily and quickly review data and aids data editors in detecting missing information.

#### **Trip Form: Haul Locations/ Hauls**

These forms are numbered sequentially within a trip.

#### **Trip Discard Form**

These forms are numbered sequentially within a trip.

**Catch Form, Species Composition Form, Length Frequency Form, and Biospecimen Form-** These forms are numbered sequentially within a haul.

**Marine Mammal, Sea Turtle, Seabird and Tagged Fish Forms** – These forms are not numbered.

For Example: The observed fishing trip lasts one day, and there are two hauls that were sampled. On the way to the processor, the vessel discarded some fish from the hold. The page numbering would be:

Trip Form – 1 of 1

Trip Discard form – 1 of 1

	<u>Haul 1</u>	<u>Haul 2</u>
Catch form –	1 of 5	1 of 3
Species Composition form –	2 & 3 of 5	2 of 3
Length Frequency form –	4 of 5	none
Biospecimen form –	5 of 5	3 of 3

## VIII. Weight Methods and Sample Methods

It is important that Observer data is clearly documented as to which sampling protocols were used so that present day and future data users are able to easily determine how the Observer sampled. Weight Methods and Sample Methods are used to this end. A brief description of each weight and sample method follows. More detailed explanations are included in Chapters 4 and 5.

### Weight Methods

Weight methods are used on the Trip Form to explain how the weight of the total catch was determined. Weight methods are also used on the Catch Form to explain how the weight of each catch category was determined. Because the WCGOP covers a very diverse fleet, 13 weight methods have

been developed to obtain total catch and/or catch category weights.

Some of the factors that lead to such diversity in the fleet include:

- **Vessel Size** – The covered fleet ranges from kayaks to 90-foot trawlers.
- **Gear Type** – Vessels that use line or pot gear differ substantially from those using net gear.
- **Total Weight Caught** – Trawl catches range in size from 100 lbs to over 20,000 lbs. In the open access fisheries, less than 1000 lbs of fish can be landed per day.

### Weight Methods

**1 - Actual Weight:** When everything within a catch category or a haul is weighed, it is an actual weight. This method can be used for total catch and catch category weights.

**2 - Bin/Trawl Alley Volume:** For large catches, weighing everything is impossible. If the total catch or a catch category is placed within a measurable unit, then a volume and density can be used to calculate the total weight. This method can be used for total catch and catch category weights.

**3 - Basket Weight Determination:** All of the individuals within a catch category or haul are placed in Observer baskets. Only a portion of the baskets are actually weighed (5 baskets out of 10 baskets, for instance). An average weight of an Observer basket is applied to the total number of baskets filled. This method can be used for total catch and catch categories.

**4 - Visual Estimates:** Visual estimates can be based on experience or they can be based on a known. This method is used extensively for catch categories on net vessels. This method can also be used for total catch weight.

**5 - OTC – Retained:** Subtracting retained estimates from Observer total catch weight (OTC) gives the total discard weight. This method is used when a haul is not sampled due to injury or illness on net vessels. This method can be used for discarded catch category weight only.

**6 - Other:** This can mean a variety of things. The most important thing when using a weight method of OTHER is to thoroughly document how sampling was done. This method can be used for total catch and catch category weights.

**7 - Vessel Estimate:** The vessel estimates how much is caught by catch category. This method is used for total catch and retained catch categories.

**8 - Extrapolation:** The total number of individuals of a species is multiplied by an average weight to estimate the catch category weight. In situations where weighing all individuals of a species is impossible but it is possible to count them, this method is used. A variation of this method can also be used to estimate total catch on fixed gear vessels.

**9 - Length/Weight Conversion:** The lengths of individual Pacific halibut are visually estimated or actually measured. A length-to-weight conversion table is then used to arrive at a weight. This method is used only for Pacific halibut catch categories.



**10 - Codend Estimate:** The codend is measured and a density is taken to calculate the total weight of fish in the codend. This method is used on net vessels only. This method is used for total catch and catch category weight estimates.

**11 - Retained + Discarded:** If all of the catch is sampled on a hook or pot vessel, the sum of the catch categories is used for total weight. This method is used for total catch only.

**13 - Tally Sample:** The weight of catch categories that are tally sampled is the sum of the species weights in the catch category. This method is used for catch categories on hook or pot vessels only.

### Sample Methods

Sample Methods are also used on Length Frequency and Biological Specimen Forms. Refer to Chapter 6 for more information.

Sample methods are used to explain the method used to take a species composition sample of a catch category. One of the following sample methods is documented on the Species Composition Form for each catch category sampled:



**1 - Whole Haul** – When all individuals within a catch category are weighed and counted.

**2 - Single Basket** – When a single basket species composition sample is taken from a catch category.

**3 - Multiple Basket** – When more than one basket is taken for a species composition sample of a catch category.

**4 - Fixed Gear Sample** – When all individuals within a catch category are counted and multiplied by average weights to obtain total species weights.

This was a basic introduction to the key concepts of sampling for the WCGOP. These concepts will be applied to specific situations in Chapters 4 and 5.

## **IX. Introduction to Random Sampling Theory**

Observers take samples from a population when it is not possible to count, weigh and/or measure every individual within the population. By using a random selection method to draw a sample from the population, you ensure that *every member of the population has an equal probability of occurring in the sample*. If every member of the population is equally likely to occur in your sample, then when you repeat the sampling over time, these repeated samples are representative of the population and can be used to draw conclusions about the population from which they are taken.

### **Advantages of Random Sampling**

The use of a random sample method eliminates all subjectivity and ensures managers, fishers, and other end users that Observer samples are not biased for or against the fleet.

When random sampling methods are used to collect data, the NOAA Fisheries is justified in using statistical methods for estimating population parameters based upon that data.

### **Steps in Taking a Random Sample:**

1. **Define the population.** The population is the total set of items that we wish to draw inferences about. Populations Observers take samples from include:
  - All the individuals in a haul.

- All the individuals in a Catch Category.
2. **Define a sampling frame.** A sampling frame is a conceptual framework, which divides the population into independent, countable sampling units. There are two general categories of sampling frames: spatial and temporal.
- **Spatial** – Based on a unit of space or a unit of gear. Examples are:
    - Space - Bin, Trawl Alley, or Baskets.
    - Gear - Skate, Tub, Pole, Stick, or Pot.
  - **Temporal** – Based on units of time. Examples are:
    - Sample 20 minutes of a 60-minute set.
    - Collect a sample at a pre-selected point in time.
3. **Define your sample segments.** Sample segments are the separate portions of the sampling frame. It must be possible to collect *all* individuals within a single segment. Be sure not to use sample segments that are so large it may be impossible to collect all individuals.
- **Spatial** – A trawl alley is divided into 6 sections. Each of the six sections is a sample segment.
  - **Temporal** – A one-hour sort time is divided into 10-minute sample segments.
4. **Number all of the sample segments in your sampling frame.** If your segments are sections of deck or individual baskets, assign a number to each. If your segments are time increments, number them

consecutively. Gear segments on fixed gear vessels can also be numbered consecutively.

5. **Pick random numbers to choose which segments to sample.** Generate random numbers between 1 and your maximum sample segment number (inclusive) to determine which sample segment(s) to select. You will be given a random number table during training, there is one in the WCGOP Field Manual, and another can be found in Appendix H. Dice, the second hand of a watch, and numbered pieces of paper are other options for generating random numbers.
6. **Select the sample segments corresponding to the random numbers.** This is your sample.
  - **Spatial** - Collect all of the individuals from each randomly selected deck section or gear unit.
  - **Temporal** - Collect all individuals during the time increment.

### **Random Systematic Sampling**

Another way to take a random sample is to set up a random systematic frame. Random systematic sampling can only be used when you know, or have a reasonable estimate of, the total number of sample segments in a set. Systematic sampling involves taking a sample during every “ $n^{\text{th}}$ ” defined sample segment. For a random systematic frame, randomize the selection of your first sample segment and then take every “ $n^{\text{th}}$ ” sample thereafter.. The steps for taking a random systematic sample are as follows:

1. Define the population.
2. Define a sampling frame.

3. Define the sample segments and determine the total number of sample segments in the set.
4. Number all of the sample segments in the sampling frame.
5. Determine how many of the sample segments you want in your sample.
6. Divide the total number of sample segments by the number of segments you want in your sample. This gives you your value for “n”.
7. Randomly select a number between 1 and n. This will be the first sample segment in your sample.
8. Sample every  $n^{\text{th}}$  sample segment thereafter.

Example:

There are 100 baskets of fish that need to be sampled.

1. Define population – 100 baskets of fish.
2. Define sampling frame – Spatial Systematic, using baskets.
3. Define sample segments – Individual baskets of fish.
4. Number all sample segments – Baskets numbered as 1 – 100.
5. Determine how many sample segments to sample – Decide to sample 20 baskets.
6. Calculate value of “n”:  $100/20 = 5$ .
7. Randomly select a number between 1 and “n” – Use random number table to select 2.
8. Sample baskets 2, (2+5), (7+5), (12+5)...(92+5).

Chapters 4, 5, and 6 contain in depth discussions on applying random sampling protocols.

