

**NORTHWEST FISHERIES SCIENCE CENTER**  
**WEST COAST GROUND FISH OBSERVER PROGRAM**  
**LIMITED ENTRY TRAWL ANNUAL REPORT**

January 2005

**Introduction**

**Objective**

The West Coast Groundfish Observer Program (WCGOP) collects information on discarded fish from commercial fishing vessels off the west coast of the U.S. This information is vital for determining the amount of discard and total catch of groundfish species in this region. The WCGOP observers collect at-sea data onboard the limited entry groundfish trawl fleet, limited entry groundfish fixed gear fleets, nearshore fisheries targeting groundfish, and other fisheries that take groundfish as bycatch. WCGOP observers are not deployed on the at-sea and shoreside whiting fleets<sup>1</sup>. This report describes the WCGOP and summarizes data collected from the limited trawl fleet between September 2003 and August 2004.

**The West Coast Groundfish Fishery**

The groundfish fishery off the west coast of the United States operates from the Canadian to the Mexican border. Multiple vessel types participate in this fishery. Vessels delivering to shoreside processors range in size from 8' kayaks to 120' trawlers. They fish in both nearshore and offshore waters. The vessels use various types of gear including bottom trawls, midwater trawls, pots, longlines, and other hook and line gear to catch over 80 species. Trawlers take the majority of groundfish. The catch can be very diverse. Fish size and overall volume of catch can vary widely. In many cases, a portion of the catch is retained, while another portion is discarded at sea. The catch may be discarded at sea because it is unmarketable or is in excess of management limits.

Active management of the fishery began in the early 1980's with the establishment of Optimum Yields (OYs) for several managed species and trip limits for widow rockfish, the Sebastes complex, and sablefish. The objective of trip limits has been to slow the pace of landings to maintain year-round fishing, processing, and marketing opportunities. Since the 1980's,

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<sup>1</sup> The at-sea Pacific whiting fleet is monitored by another section of the WCGOP. The shoreside Pacific whiting fleet operates under an Experimental Fishing Permit (EFP) and electronic monitoring of this fleet is being tested.

management regulations have evolved to the current use of cumulative 2-month landing limits for most species.

Fisheries managers use state-issued sales receipts (fish tickets) and vessel logbooks to monitor landings. Fish ticket and vessel logbook data are transferred to the Pacific Fisheries Information Network (PacFIN) by state fisheries agencies in Washington, Oregon, and California. The fish tickets are useful in tracking the pace of the fishery throughout the year. Trip limit amounts may be changed throughout the year based on this information. But fish tickets provide information only on the amount of fish that are brought ashore. In order to ensure that total catches do not exceed annual OYs, managers also need information on the discard of each species. One of the best means of acquiring accurate data needed to estimate the amount of discarded catch is through an at-sea observer program.

### **West Coast Groundfish Observer Program**

On May 24, 2001, NOAA Fisheries (NMFS) established the WCGOP to implement the Pacific Coast Groundfish Fishery Management Plan (50 CFR Part 660). This regulation requires all vessels that participate in the groundfish fishery to carry an observer when notified to do so by NMFS or its designated agent. The program deploys approximately 40 observers, depending on seasonal variation in fishing activity. These observers are stationed along the coast from Bellingham, WA to San Diego, CA. The observer program's goal is to improve estimates of total catch and discard.

### **Program Goals**

During the first year of coverage, the sampling goal for the WCGOP was to observe 10% of the coast wide limited entry trawl landings of groundfish species other than whiting (as reported in fish tickets). An additional goal was to provide pilot observer coverage in the limited entry fixed gear sablefish and rockfish fisheries (The observer coverage plan is available at: <http://www.nwfsc.noaa.gov/research/divisions/fram/Observer/>). During the second year of coverage, the program's goal was to increase coverage of trawl fisheries and to expand coverage of the limited entry fixed gear sablefish and nearshore fisheries targeting rockfish. For the third year of coverage, the program's goal is to maintain coverage levels of the limited entry trawl, the limited entry fixed gear sablefish, nearshore fisheries targeting rockfish, and fisheries that take groundfish as bycatch. .

## **Methods**

### **Vessel Selection Process**

The WCGOP aggregates ports along the west coast into “port groups”. Limited entry trawl permits in each port group are selected randomly for observation for an entire two-month cumulative trip limit period. The vessels are selected without replacement during the year. Once the entire fleet has been selected, the selection cycle begins again. This selection process is designed to produce a distribution of observations along the coast. Based on this design and its present level of funding, the program cycles through the limited entry trawl fleet every eight months.

### **Data Collection**

Fisheries observers are trained professionals who monitor and record catch data on commercial fishing vessels, following the protocols in the WCGOP Manual (NMFS, NWFSC, 2004, unpublished report).

The data collected by the observers on a trip basis include:

- Start time, end time, depth and location of tow/set
- Gear type and fishing strategy

The data collected by the observers on a haul basis include:

- Estimated total catch weight (including tows/sets for which there is 100% discard)
- Weight of discard by catch category
- Reason for discard by catch category or species
- Species composition of discard by catch category
- Weight of fish retained by catch category
- Species composition of retained by catch category
- Estimate catch weight of prohibited species
- Record incidental takes of protected species
- Size composition, tags, and viability assessments for Pacific halibut
- Size composition of discarded fish (from randomly selected categories)
- Basic taxonomic composition of non-fish bycatch
- Biological collections (otoliths, maturity, food habits, genetic samples, etc.)

Observers using a multiple step process sample the discarded catch. The most straightforward scenario is the crew first sorts the catch. The crew separates the retained catch into catch categories and the estimated weight of each catch category is recorded in the vessel logbook. A catch category is a single species or group of fish species categorized by a four-letter code in the Pacific Fisheries Information Network (PacFIN) that is used to record retained catch and landings on the west coast.

After the crew sorts out the retained catch, the observer samples the remaining catch. Depending on the amount and composition of the remaining catch and the time available to the observer, the observer may record it as one catch category or sort it into multiple catch categories to amplify the sampling of rarer species. The observer records the estimated weight and species composition of each catch categories and enters the data into the observer database once back on land.

### **Processing the Data**

The WCGOP uses the following procedure to ensure that the quality of the data collected is maintained. Data are collected at-sea by the observer following the protocols in the WCGOP Manual (NMFS, NWFSC, 2004, unpublished report). During 2004, WCGOP used a web-based graphical user interface (GUI) that allows observers to directly enter data into a centralized Oracle database located at the Northwest Fisheries Science Center (NWFSC). Data within the Oracle database are accessible via the web-based GUI or by direct SQL queries to the database. A list of data tables is located in Appendix A. For quality control of calculations and sampling methods, a debriefer or lead observer checks all computations made by the observer and reviews the form. The observers are also debriefed after every two-month cumulative trip limit period. Observer debriefing includes a vessel survey, a review of observer logbooks, data correction, and observer evaluation. The database is then corrected after debriefing. For quality control, the electronic data is compared to the raw data forms, and queries are run to detect data that fall outside specified ranges and other inconsistencies between data elements. The data issues detected by the QC queries are then reviewed and the electronic data is updated. Finally, the data are considered complete and ready for analysis.

### **Analysis**

After the quality control, the raw data are then processed and merged with fish ticket data to provide more accurate estimates of bycatch. First, the subsamples of catch categories are expanded to the

entire catch category at the tow level. Second, the WCGOP data are matched to fish tickets and the observer estimates of total weights of the catch categories are adjusted to match the fish tickets weight, which are actual weights from the processors. Finally, the catch categories found only on the fish tickets were distributed across the tows by multiplying the weight in the catch category by the percent weight of the observed catch in each tow.

A tow-level expansion is needed to estimate the total amount retained and discarded of each species in the catch because of the sampling procedure that derives the species composition. If the species composition of a catch category is mixed, an observer may take a subsample from the catch category. The following equation is used to calculate the weight of the subsample by summing across the observed weights of the individual species:

$$w_j = \sum_i x_{ij},$$

where

$x_{ij}$  = observed weight of the species  $i$  in catch category  $j$  in the subsample,

$w_j$  = weight of the subsample from catch category  $j$ .

The sampling ratio used to scale the subsample weights to the amount in the catch category is calculated by dividing the weight of the subsample by the total weight of the catch category using the equation:

$$R_j = w_j / y_j$$

where

$y_j$  = the total weight of the catch category  $j$ .

The tow-level expanded weight of the species  $i$  in the category  $j$  which is calculated by dividing the species weight in the subsample by the sampling ratio is:

$$X_{ij} = x_{ij} / R_j$$

where

$X_{ij}$  = the weight of the  $i$  in catch categories  $j$ .

Tallying the weight ( $X_{ij}$ ) of the species  $i$  across all categories  $j$ 's within a tow would give the total landings of the species retained or discarded.

Fish tickets are trip-aggregated sales receipts for marketable species/categories. They are used as the basis for catch monitoring and stock assessment. Fish ticket information is loaded into the PacFIN database monthly and is subject to update frequently thereafter. The WCGOP data is linked to fish tickets by either direct fish ticket number(s) obtained by the observer and by comparing the

return date recorded by the observer with the dates of fish tickets from the vessel. For trips with multiple fish tickets, the fish ticket data is combined for analysis. For trips with missing fish tickets, the WCGOP data is not adjusted.

The WCGOP data is adjusted so that the total trip lbs of retained fish in a catch category (as recorded by the observer) matches the total trip lbs in the fish ticket because the fish ticket weight is often more accurate. To match the total trip pounds, the weights within each observer retained catch category are scaled up or down by the ratio of fish ticket and observer trip weights for that category, using the following equation to calculate the adjustment factor:

$$A_{jm} = x_{jkm} / \sum_k x_{jkm}$$

where

$x_{ikm}$  = lbs in catch category  $j$  in tow  $k$  in trip  $m$

$A_{jm}$  = adjustment factor used for catch category  $j$  in tow.

The adjusted WCGOP data is:

$$x'_{jkm} = A_{jm} \cdot C_{jm}$$

where

$C_{jm}$  = lbs in catch category  $j$  for trip  $m$  recorded on the fish ticket.

When a catch category in the WCGOP data cannot be matched to a fish ticket species category, the WCGOP data was not adjusted.

The catch categories only found on the fish tickets were distributed across the tows using the proportion of the observed catch per tow divided by the total observed catch per trip using the following equation:

$$B_{km} = \text{Total weight per haul} / \text{Total weight per trip} = \sum_j \sum_i x_{ijkm} / \sum_k \sum_j \sum_i x_{ijkm}$$

$$C_{jkm} = B_{mk} \cdot C_{jm}$$

where

$B_{km}$  = the proportion of observed catch in tow  $k$  in trip  $m$

$C_{jkm}$  = lbs in catch category  $j$  for tow  $k$  in trip  $m$  recorded on the fish ticket.

The data analyzed included bottom trawlers using both large and small footropes. Trawlers using mid-water gear, danish/scottish seine, or experimental fishing permits (EFP permits) are excluded from this analysis. The exception is that EFP trips are included in figures 1 and 2 because separating

the EFP from the non-EFP trips is not trivial. Also, Figures 1 and 2 may include open access trawl trips.

The bycatch rates were calculated for pounds of a species discarded per hour of towing, pounds of species discarded per pounds of groundfish retained, and pounds of species caught per pounds of retained ground fish. The ratio estimator technique (Cochran 1977) is used to estimate bycatch and discard rates for 23 selected species (Tables 6-7). The fish species selected are the all overfished stocks, prohibited species (salmon, Pacific halibut), and the other assessed stocks. The ratio estimates ( $R_{ijkl}$ ) are calculated by area ( $i$ ), depth range ( $j$ ), target strategy ( $k$ ), and period ( $l$ ):

$$R_{ijkl} = \frac{\sum_t y_{ijklt}}{\sum_t x_{ijklt}}$$

where  $y_{ijklt}$  is the discarded or retained pounds of a species in the tow  $t$ . Three denominators ( $x_{ijklt}$ ) are presented here: duration in hours of the sampled tow  $t$ , the total catches in pounds of the target species, and the total catches of all groundfish in the tow  $t$ . The first denominator is an unstandardized catch per unit effort for the area-depth-strategy-period stratum. The second and third denominators are used to provide different perspectives for these preliminary analyses. The variance of  $R_{ijkl}$  is approximated by using the following equation (Pikitch et al. 1998):

$$Var(R_{ijkl}) = \left( \frac{\bar{y}_{ijkl}}{\bar{x}_{ijkl}} \right)^2 \left[ \frac{s^2(y_{ijkl})}{\bar{y}_{ijkl}^2} + \frac{s^2(x_{ijkl})}{\bar{x}_{ijkl}^2} - \left( \frac{s^2(y_{ijkl})s^2(x_{ijkl})}{\bar{y}_{ijkl}^2 \bar{x}_{ijkl}^2} \right) \right]$$

where  $\bar{x}_{ijkl}$ , and  $\bar{y}_{ijkl}$  are the means of  $x_{ijklt}$  and  $y_{ijklt}$  over the tows and  $s(x_{ijkl})$  and  $s(y_{ijkl})$  are the standard errors of  $x_{ijklt}$  and  $y_{ijklt}$ . Note that  $Var(R_{ijkl})$  cannot be calculated when  $y_{ijklt} = 0$  or  $x_{ijklt} = 0$  for all tows.

## **Results**

### **Overall Coverage Levels**

For the period covering September 2003 to August 2004, the limited entry bottom trawl trips observed by the WCGOP accounted for 29% of the coastwide groundfish tonnage landed on all bottom trawl trips including EFP trawl trips (Table 1). This represents an increase of 45% in the level of covered tonnage from the preceding 12-month period and an 81% increase from the first year of the program.

### **Spatial Distribution of Observations**

The percentage of landed tonnage that was covered by observers during 12 months ending in August 2004, was higher in all the port groups north of Morro Bay than either of the preceding 12 month periods (Table 1). Groundfish landings in the Morro Bay port group accounted for only 4% of the trawl fleet landings and its coverage was only slightly lower than in the first year of observation. There are very few trawl landings made in the Los Angeles and Santa Barbara port groups. They accounted for just 0.2% of the fleet groundfish tonnage during the third year of observer coverage. From Morro Bay north, at least 17% of the bottom-trawl groundfish tonnage landed in each port group was covered by observers; and only the Morro Bay and Crescent City port groups were less than 23%. In addition, most of the vessels in the Puget Sound port group were involved with EFPs, in which they targeted large volumes of arrowtooth flounder, and were covered by state observers when not selected by the WCGOP.

Table 2 reports the number of trips that were observed within each port group during each 2-month period. At this level, the highly variable nature of observer coverage is revealed. Not only does the number of observed trips vary dramatically throughout the year within a port group, but so does that group's share of the coastwide total observed trips. Several factors contribute to this variability: weather-related impacts on fishing activity; the regional importance of seasonal alternative fisheries, such as shrimp and crab; regional differences in trip limits; and differences in the number and characteristics of vessels between port groups.

Plots summarizing the distribution of all limited-entry bottom trawls recorded in state logbooks and those tows which were observed are presented for three sections of the coast in Figures 1a-c. For these figures, tows were assigned to a 10 km by 10 km grid block based on the starting location of the tow. The shading of each block reflects the number of logbook tows, with darker shading indicating more tows. The circles overlaid on each block reflect the number of observed tows, with larger circles indicating more tows. Blocks with the darkest shading and the smallest circles indicate fishing locations that received relatively less observer coverage.

Figure 1a depicts the portion of the coast north of Coos Bay, Oregon. In this area, 33 blocks had more than 50 logbook tows. Of these, 26 had at least 16 observed tows and only one had fewer than 4 observed tows. Only two blocks that had more than 10 logbook tows had none that were observed. Figure 1b shows the area from Coos Bay south to just north of San Francisco, California. During the third year of observation, there were only four blocks in this area that had more than 50 logbook tows, and each had more than 15 observed tows. However, there were eight blocks in the vicinity of Crescent City, California that had between 11 and 50 logbook tows and no observed tows. This pattern is consistent with the fact that the percentage of groundfish tonnage landed on observed trips was less than 20% in the Crescent City port group (Table 1). Table 1c shows the remainder of California, as far south as Santa Barbara. This area had eight blocks with more than 50 logbook tows. All of these blocks had at least four observed tows and five had more than 15 observed tows. There were seven blocks that had between 11 and 50 logbook tows where none were observed. Three of these were in the general vicinity of San Francisco, one just south of Morro Bay and three near Santa Barbara. Within each of these areas, and for the coast as a whole, the spatial distribution of limited-entry trawl tows appears to have been generally well-sampled by observers during the third year of coverage.

The distribution of fleet and observed tows can also be examined in terms of latitude and depth, as depicted in Figures 2a-2c.. Figure 2a shows fleet and observed tow locations from the third year of observation. The vertical lines at 150 fm and 75 fm provide reference points for evaluating the effect of the trawl Rockfish Conservation Area (RCA) on fishing location. Tows occurring within this depth range during the third year of observation are generally part of Exempted Fishing Permit programs. The transition from no RCA during the first year of observation (Figure 2c), through partial implementation during year 2 (Figure 2b) to complete implementation is clearly evident in

these three figures. Table 3 summarizes the depth distribution of observed tows by area and two-month period.

### **Discard Estimates**

Fish tickets could not be found for 12 of the 632 observed trips. So no adjustments to estimate discard could be made to these trips.

In addition, a number of species being assessed this year had very little or no observed discard in groundfish tows. Therefore, they are not incorporated into the bycatch tables. Kelp greenling was observed in five tows for a total of 38 lbs in the northern area at less than 75 fathoms. Cabezon was observed in only one tow with only 14lbs of fish in the northern area at less than 75 fathoms. Vermillion rockfish was observed in one tow with 7.8 lbs in the southern area at 75-150 fathom depth. No Gopher Rockfish or California scorpionfish were observed in groundfish tows.

Amounts of discarded and retained catches for 26 species or species groups of groundfish are provided in Table 4. This table also summarizes the distribution of observed discarded and retained fish by depth and the disposition of each species within a depth category. The data are categorized by area and depth zone. Table 5 provides comparable information for California halibut, Pacific halibut, and combined salmon species.

Though not in the Groundfish FMP, California halibut is a bottom trawl target for some vessels with limited entry permits. Pacific halibut and salmon cannot be retained while fishing with trawl gear.

Three different ratio estimators for discard of 29 groundfish and non-groundfish species or species groups are presented in Table 6. The three estimators are (1) discard per hour towed, (2) discard per pound of retained groundfish, and (3) discard of each species/group per pound of its own catch. Standard errors are also reported for each of these ratios. These results are summarized by area, depth zone, and 2-month period.

In many area-depth-period strata, the number of observed tows was very small, and caution is urged in interpreting results from those strata. As a rule, rates of discard calculated relative to hours towed and retained groundfish exhibit the same direction of change across strata, however the

magnitudes of change are not proportional. There is no consistent relationship between the percentage of a species that is discarded and the other two measures.

As illustrated in Figure 3, the vast majority of tows had no discard of the eight overfished species. For example, only 12 out of 648 observed tows south of 40°10' N. lat. discarded any cowcod (Figure 3). For lingcod, darkblotched rockfish, and Pacific ocean perch, most tows had less than 30 pounds of discard. In a few cases (3% of tows), more than 140 lbs. were discarded. The tows with the largest amounts of darkblotched, Pacific ocean perch, and lingcod discard were widely dispersed among strata. For bocaccio, widow, and canary rockfish, nearly all tows had less than 30 pounds of discard, but each species had 2-5 tows with more than 150 pounds of discard. In all cases, these few tows with larger discards accounted for a substantial share of discarded pounds. The extreme values of a few observations can result in standard errors for the ratio estimators that are large, relative to the ratios themselves.

For each of eight overfished species, Table 7 reports the ratio estimate (and standard error) of total bycatch (discarded plus retained pounds) per pound of groundfish landed, for each area, depth zone, and 2-month period. The method of calculating these bycatch ratios is very similar to that employed in developing parameters for the trawl bycatch model used by the Council for management of the fishery. These bycatch rates are calculated using total retained groundfish as the denominator. The denominator used to calculate the rates in the bycatch model equals the sum of landed flatfish, thornyheads, sablefish, and slope rockfish.

In Table 8, the 12-month summary bycatch rates for each species from Table 7 are presented along with the 12-month rates from the first and second years of observation. Throughout the coast, very little trawling occurred between 75 and 150 fm, so changes in year-3 bycatch rates from previous years in that depth stratum are less significant than in the deeper and shallower strata.

For the species that are commonly found on the shelf in the area south of 40°10' N. Lat., bycatch rates in depths less than 75 fm increased between the second and third years of observation. This was the case for bocaccio, canary, lingcod, and cowcod. In part these increases are likely the result of changes in the shoreward RCA boundary between 2003 and 2004. In 2003, trawling in this area was constrained to depths shallower than 50-60 fm, whereas trawling was allowed out to 75 fm

during 2004. This change allowed flatfish trawling to occur in depths that contain higher densities of these four species. For bocaccio and lingcod, it is also possible that recruitment events and/or increases in biomass contributed to the higher bycatch rates. Although the bycatch rate for widow in the southern shallow depths also increased, it remains at a very low level.

In the area North of 40°10' N. Lat., bycatch rates for canary, lingcod, widow, and yelloweye all declined in depths less than 75 fm between the second to third years of observation. Bycatch of POP in the north remained roughly the same in the depths greater than 150 fm. However, the bycatch rate for darkblotched increased substantially in this depth range. Here again, management changes during 2004 are likely responsible for much of the observed increase. Throughout 2003 and the first four months of 2004, the seaward boundary of the RCA in this area was set at the 200 fm line or deeper. But from May through August in 2004, the seaward boundary was set at 150 fm. The combination of greater access to depths with higher densities of darkblotched and substantially higher trip limits for slope rockfish (including darkblotched) led to a rapid increase in darkblotched landings during those four months. Bycatch of predominantly juvenile darkblotched in depths less than 75 fm also increased. On the positive side, the percentage of darkblotched catch that was discarded declined dramatically between the second and third year's of observation. Overall, 25% of the observed darkblotched were discarded in Year 3 (Table 4), compared to 60% in Year 2 (2004 Report, Table 4).

### **Discussion**

The data that are presented in this document reflect only the discards and bycatch on observed trips. The estimation of total amounts of discard or bycatch requires combining rates from these observed trips with fleet-wide effort data. Although important for management, such estimates are beyond the scope of this data report. With regard to the distribution of observer coverage, it is important to note that WCGOP controls only the selection of vessels. The program does not have control or influence over where, when, or for what species the selected vessels choose to fish. Where port groups have diverse trawl vessels and dynamic seasonal opportunities for groundfish and non-groundfish species, the percentage of tonnage observed and the spatial distribution of coverage may vary greatly within and between years. However, in the future, if patterns in vessel activity emerge, the coverage levels can be influenced through the adaptation of vessel sampling protocols.

### **Continuing Unresolved Data Issues**

Accurate calculation of bycatch rates requires linking observer discard estimates to a database that includes official weights for species measured at the time of landing. Without the database, the observers must rely on the hailed weights, which are usually a best guess. The two principal sources of landings data are fish tickets and logbooks that have been adjusted using fish tickets. It remains difficult to match WCGOP data with fish tickets and the logbooks, due to differences in data protocols among the states of Washington, Oregon, and California, and between the states and the WCGOP.

Since the catch categories on the fish tickets are recorded only at the trip level distributing landed weight across tows is inevitably imprecise when a catch category is not present in the WCGOP data. This is particularly true when a trip contains tows from several different depth zones. While the current approach is to distribute these landings in proportion to each tow's percentage of the trip's total retained groundfish, future work will evaluate the incorporation of additional information that may improve these assignments. For catch categories that exist in both fish ticket and WCGOP records, this uncertainty in assigning poundage differences between observed trip retained weights and their corresponding fish tickets is reduced, although not eliminated, by knowledge of the pattern of hailed catches throughout the trip.

Each of the states employs different procedures for using fish ticket landings to adjust logbook retained catches (Sampson and Crone, 1997; Pearson and Erwin, 1997; Clark, 1986a, 1986b, 1988a, 1988b). Linking WCGOP records with corresponding logbook tow data is often difficult and time-consuming, due to the inconsistent adjustment protocols and other factors such as: i) Incomplete logbook submission; ii) A significant number of logbook trips where tows are not recorded in chronological order; iii) The absence of some tows in logbooks, especially where no groundfish are retained; and iv) Inaccurate recording of tow locations, depth, and date. If these issues were resolved, the analysis of WCGOP data could be more comprehensive and timely.

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## Appendix A. Oracle Database

### *Database Table Hierarchy*

TRIPS

- ▶ FISHING\_ACTIVITIES
  - ▶ FISHING\_LOCATIONS
  - ▶ CATCHES
    - ▶ SPECIES COMPOSITION
      - ▶ SPECIES\_COMPOSITION\_ITEMS
    - ▶ BIO\_SPECIMENS
      - ▶ BIO\_SPECIMEN\_ITEMS
        - ▶ DISSECTIONS

### *Database Table Descriptions*

The database tables listed in the table below are a subset of the total tables contained in the Oracle database. They represent the tables that are actually used to contain the WCGOP data collected by the WCGOP.

BIO_SPECIMENS	Sets of species physical measurements resulting from sampling catches occurring in a tow or set
BIO_SPECIMEN_ITEMS	Physical measurements collected for an individual fish, mammal or bird occurring in a biological sample
CATCHES	PacFIN catch category based on estimates of fish caught during a tow or set
CATCH_CATEGORIES	PacFIN catch categories
DISSECTIONS	Physical specimens collected for an individual fish, mammal or bird
FISHING_ACTIVITIES	Fishing tows or sets occurring during a trip
FISHING_LOCATIONS	Locations of tows or sets
PORTS	Coastal cities where fishing activity is based out of
SPECIES	Fish, mammal, and bird species that might be encountered during fishing
SPECIES_COMPOSITIONS	Sets of species weights and counts resulting from sampling catches occurring in a tow or set
SPECIES_COMPOSITIONS_ITEMS	Weights and counts for individual species occurring in a species composition sample
TRIPS	Sets of fishing activities that occur between the time a vessel leaves port and when it returns
VESSELS	Trawl, longline, pot, or other fishing vessels