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# The 2003 to 2008 U.S. West Coast Bottom Trawl Surveys of Groundfish Resources

## off Washington, Oregon, and California: Estimates of Distribution, Abundance, Length, and Age Composition

December 2011

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# Executive Summary

The Northwest Fisheries Science Center's Fishery Resource Analysis and Monitoring Division conducts an annual West Coast Groundfish Bottom Trawl Survey (WCGBTS) from May to October each year. The WCGBTS is a continuation of a number of transect-based surveys conducted between 1977 and 2002. This report summarizes the results of the annual WCGBTSs from 2003 to 2008.

WCGBTSs collects data on more than 90 species described in the Pacific Coast Groundfish Fishery Management Plan to fulfill the mandates included in the Magnuson-Stevens Fishery Conservation and Management Act. The surveys are designed to provide fisheries-independent indices of stock abundance, which support stock assessment models for commercially and recreationally harvested groundfish species. The surveys also monitor long-term trends in distribution and abundance of West Coast groundfish species. Since 2003 the surveys have adopted a stratified-random sampling design and included the continental shelf (depth 55–183 m) and the continental slope (depth 184–1,280 m).

WCGBTSs have been conducted each year by chartered commercial fishing vessels from mid-May until late October. An Aberdeen-type net with a small mesh codend liner has been used to sample fish biomass. Tows were made within randomly selected cells in three depth zones (55–183 m, 184–549 m, and 550–1,280 m) and five International North Pacific Fisheries Commission statistical areas. In 2004 the survey was subsequently grouped into two geographic strata, north and south of Point Conception, California.

From 2003 to 2008, 3,971 successful tows were completed along the U.S. Pacific Coast south of Cape Flattery (47°20′N), Washington, and north of the U.S.-Mexico border (32°40′N). During this time, 750,000 individual lengths and 136,000 age structures were collected from species of management concern. In this report, we document operations and results of the 2003–2008 groundfish surveys with intent to summarize the data available for the creation of indices of abundance for stock assessment purposes.

# Acknowledgments

The West Coast Groundfish Bottom Trawl Survey is indebted to owners, captains, and crew of the fishing vessels *B.J. Thomas*, *Blue Horizon*, *Captain Jack*, *Excalibur*, *Ms. Julie*, *Noah's Ark*, and *Raven*, as well as the numerous dedicated biologists who participated in the survey. Julia Clemons and Curt Whitmire created the GIS products for this report. Ian Taylor provided assistance with figure design.

# Introduction

The U.S. West Coast groundfish fishery is supported by more than 90 commercially valuable species. It spans the area between Canada and Mexico along the U.S. Pacific Coast from nearshore to depths less than 2,000 m. Multiple vessel types, ranging in size from kayaks to trawlers, participate in the fishery. The fishery sectors deploy mobile and fixed gear including bottom trawls, midwater trawls, pots, longlines, and other hook and line gear; however, trawlers account for the majority of landed groundfish. Active management of the fishery began in the early 1980s with the establishment of optimum yields and trip limits for several managed species. Management measures currently include landings limits, size limits, gear restrictions, and time and area closures. The management measures are designed to avoid overfishing and rebuild overfished stocks.

The primary objective of the Northwest Fisheries Science Center's (NWFSC) annual West Coast groundfish bottom trawl survey (WCGBTS) is to provide the fishery-independent data necessary to support the assessment of the status and trends of fish species inhabiting trawlable habitat along the upper continental slope (184–1,280 m) and shelf (55–183 m) of the U.S. West Coast. Coast-wide sampling cruises were undertaken by the NWFSC beginning in 1998 to establish an ongoing time series of groundfish catch, fishing effort, and individual fish measurement data (Turk et al. 2001, Builder Ramsey et al. 2002, Keller et al. 2005, 2006a, 2006b, 2007a, 2007b, 2008).

Although the NWFSC assumed responsibility for the slope portion of the groundfish survey starting in 1998, the time series began as the West Coast continental slope survey conducted by the Alaska Fisheries Science Center (AFSC) from 1984 to 2001. The AFSC slope survey was conducted triennially from 1984 until 1988, when it was conducted annually.

Beginning in 2003, the NWFSC expanded the depth coverage to include the continental shelf, replacing the continental shelf survey conducted triennially by the AFSC from 1977 to 2001. Consequently, in the current sampling design, the WCGBTS now encompasses the area historically monitored by the continental shelf survey (1977–2001) and the continental slope survey (1984–2001) conducted by the AFSC. The NWFSC's groundfish survey currently replaces the two AFSC time series and provides an annual snapshot of groundfish stock status.

Prior to 1998, surveys conducted by the AFSC were the principal source for fishery-independent data about groundfish resources along the upper continental slope and shelf of the U.S. West Coast (Methot et al. 2000). The AFSC slope surveys were conducted with the NOAA research vessel *Miller Freeman* while the triennial survey used chartered Alaska fishing vessels. Both slope and shelf surveys used a transect-based sampling design until 2003. Spatial coverage of the West Coast surveys, as conducted by AFSC, varied between years due to constraints imposed by annual budget levels and availability of NOAA ship time (Lauth 2001).

Since their inception in 1998, the NWFSC groundfish surveys have used chartered fishing vessels from the West Coast commercial fishing industry. Chartered fishing vessels provide the surveys with the expertise of skilled fishing captains familiar with the challenges of fishing off the West Coast, and fulfill the cooperative research provisions of the Magnuson-Stevens Fishery Conservation and Management Act. The results of the surveys provide measures of change in relative abundance, distribution, and condition of groundfish stocks over time, which is of interest to fisheries managers, fishers, and concerned citizens. In this report, we document operations and results of the 2003–2008 groundfish surveys with intent to summarize the data available for the creation of indices of abundance for stock assessment purposes.

# Methods and Results

## Survey Design

The WCGBTS spans from 48°10′N to 32°30′N latitude and is geographically subdivided into the five International North Pacific Fisheries Commission (INPFC) statistical areas: U.S.-Vancouver, Columbia, Eureka, Monterey, and Conception (Figure 1 and Figure 2). The survey area extends from northern Washington (U.S.-Canada border) to southern California (U.S.-Mexico border) in waters ranging in depth from 55 to 1,280 m. The survey operations occur from mid-May to late October. The WCGBTS is conducted in two completed cycles of operations or passes. Four chartered West Coast bottom trawlers, two per pass, are used to conduct the survey. All vessels start operations from Newport, Oregon, heading north to Cape Flattery, Washington, and progress south along the coast, finishing south of San Diego, California.

Since 2003, the surveys have utilized a stratified random sampling design. The entire U.S. West Coast (55–1,280 m water depth) has been subdivided into 13,000 adjacent cells of equal area (1.5 nautical miles [nm] longitude by 2.0 nm latitude, Albers Equal Area projection) (Figure 1). The cells were stratified by geographic location and depth. The geographic allocation was based on a simple north-south division at lat 34°30′N (Point Conception, California), with 80% of effort in the northern portion of the survey and 20% in the southern range. The survey area was further divided into three depth strata (55–183 m, 184–549 m, and 550–1,280 m). The percentage of sampling stations allocated to each depth range in the northern and southern geographic areas was based on the proportion of the area within each depth stratum. North of Point Conception, 40% of the area was located within the shallow depth stratum (55–183 m) and 30% within each of the two remaining strata (mid depth and deep). South of Point Conception, 25% of the area was located within the shallow depth stratum, 45% within the mid depth zone, and the remaining 30% within the deep zone.

Cells located on major shipping lanes, munition dump sites, and marine conservation areas were excluded. In addition, cells can be documented as untrawlable by survey personnel. When a cell cannot be successfully trawled because of rough bottom, shipwrecks, or other obstacles, it is designated untrawlable. A cell that has been designated untrawlable three times and has never been trawled successfully is also excluded.

Each year, the total number of sites targeted for the survey was apportioned across geographic area and depth categories according to the scheme described above. Primary stations were then drawn from the survey cell pool by strata, using a pseudorandom number generator. Each cell was sequentially assigned to an individual vessel. The process was repeated to identify two alternate sampling sites per location. Additional constraints were imposed to ensure that alternate sites were neither so close to an untrawlable primary site that they exhibited the same untrawlable features, nor were an impractical transit distance (see Appendix A for primary and alternative station selection). Each randomly selected cell was searched for trawlable ground.

Once an acceptable site was found, a standard tow was made, targeted for 15-minutes bottom time.

## Vessels

As a cooperative research effort, the WCGBTSs charter commercial trawlers to conduct survey operations. Chartered fishing vessels ranged in size from 19.8 to 28.0 m (65 to 92 feet) and in power from 450 to 1,200 horsepower. Each vessel was rigged as a stern trawler, with a rear gantry housing one or two net reels to set and retrieve trawl gear. Vessels were outfitted with split trawl winches and equipped with modern electronics including global positioning systems (GPS), multiple depth sounders, and radar. Prior to the start of the survey, NWFSC provided each vessel with two, ⅝″ steel core trawl cables, each 2,288 m (1,250 fathoms) in length. Cables were measured side by side and marked at 25 fathoms increments while being spooled onto the vessel's winches. The markings provided real-time verification of the release of equal warp length from both winches while setting a tow.

## Gear Description

WCGBTS vessels were equipped with a standard four-panel, single-bridle, Aberdeen-type trawl spread by 5 x 7 ft (1.5 x 2.1 m) steel V doors weighing 590 kg (Figure 3). The headrope and footrope measured 25.9 and 31.7 m, respectively. Each net had an additional liner (1.5 inch [3.81 cm] stretched measure, #24 twisted polypropylene) extending from the middle of the intermediate, through the codend, to retain smaller fish and invertebrates. The 85/104 Aberdeen trawl nets were manufactured by Nor'Eastern Trawl Systems (Bainbridge Island, Washington) and certified by NWFSC personnel. Each vessel was outfitted with a primary and secondary net, and the NWFSC provided additional nets to vessels during survey if severe net damage occurred. To ensure continuity, fishing operations were conducted in compliance with national and regional protocols detailed in Stauffer (2004).

## Trawling Protocol

Standard trawl operations are followed to minimize differences in sampling (fishing) efficiency across the range of conditions encountered during the survey. Trawling protocols are described in detail in Stauffer (2004). Trawling operations are limited to the daylight period. The initial tow each day begins (net on seafloor) following official sunrise, and the last tow of the day ends (net off seafloor) before official sunset.

Once a vessel is in the preselected sampling area (1.5 x 2.0 nm cell), the captain is instructed to observe the following search rules to identify a specific tow site: 1) search within the specified depth range, 2) remain fully within specified area, and 3) complete the search for trawlable ground within 1 hour. If no trawlable site is found within the 1-hour limit, the cell is designated as untrawlable and the vessel proceeds to the secondary cell. If the secondary cell also proves untrawlable, a search of the tertiary cell is attempted. If a tow is attempted but judged unsatisfactory or if the tow is aborted, an attempt is made to redo the tow before proceeding to secondary or tertiary cells. Rarely do the primary, secondary, and tertiary cells fail to produce an acceptable tow.

Vessel speed varies between 2.2 and 5 knots while the gear is set. When the net contacts the seafloor, the target towing speed is 2.2 ± 0.5 knots (nm $hr^{-1}$) over ground. Two Wide Area Augmentation System (WAAS) GPS units (Garmin 152, Garmin International Inc., Olathe, Kansas) display speed instantaneously during a tow. Position, course over ground, and speed over ground are logged continuously. The captain, with oversight from the chief scientist, is responsible for maintaining the target speed during the tow. Tows are declared unsatisfactory and repeated if the target speed is not maintained throughout the tow.

The target tow duration is 15 minutes (15 minutes at 1.13 m $sec^{-1}$ = 0.55 km). Tows begin when the footrope contacts the seafloor and end when the footrope lifts off the seafloor during retrieval. Initial bottom contact is determined in real time by a headrope height sensor, which detects the bottom as the net approaches. Once the footrope touches down, the vessel starts towing at the target speed.

A pair of bottom contact sensors (BCSs, AFSC, Seattle, Washington) are attached 4 feet from the center point of the footrope, on either side of the net. The BCS is a tilt meter housed in a heavy steel case that is vertical when the net is off the bottom and horizontal when the net is in contact with the bottom. Data from the BCSs are downloaded after the completion of each haul.

# Net Performance and Trawl Analysis

## Sensors and Trawl Monitoring

The performance and geometry of trawls are measured with Simrad Integrated Trawl Instrumentation System (ITI), Simrad PI44 Catch Monitoring System (Simrad Fisheries, Lynnwood, Washington), and BCSs. The Simrad ITI and PI44 systems are used to monitor and record net position and performance for each haul. Sensors mounted on the center of the headrope provide information on the vertical opening of the trawl, distance from the headrope to the seafloor, footrope clearance above the seafloor, ambient temperature, and depth. Paired spread sensors are attached on port and starboard wings to measure net width. The Simrad trawl instruments display gear performance in real time and provide georeferenced trawl positions relative to ship position, supplying means to track the trawl location along the seafloor throughout each tow. The ITI and PI44 data streams are monitored and continuously recorded during fishing operations.

Aspects of net performance of (e.g., spread between net wings and distance from the headrope to the footrope) are recorded using acoustic and bottom contact instruments attached to the net during each deployment. Adequate wingspread and door spread indicate that the net is making consistent bottom contact and that proper amount of scope was deployed. Extreme or prolonged periods of abnormal spread are indicative of net performance problems.

## Sensor Data and Point Estimation

Upon completion of a trawl, the BCS data are downloaded. All features of the trawl event (from the commencement of net deployment to completion of net retrieval), including trawl mensuration data, are then synchronized based on time stamps.

BCS data indicate when the net landed on and lifted off bottom, and are used to determine tow duration and distance fished. The Simrad ITI and PI44 trawl instruments record net mensuration data and provide georeferenced trawl positions relative to ship position, supplying a means to track trawl location along the seafloor throughout each tow. Position data, collected at 2-second intervals, are used to monitor ground speed, track the vessel path, and estimate distance fished. Standard survey haul positions are estimated from GPS data—generally the midpoint between the net touchdown and net liftoff positions. A Garmin WAAS GPS navigation unit is used to monitor towing speed during each haul. Average net speed over ground and distance fished is calculated from the position data and actual bottom time (Keller et al. 2008). Gear depth and bottom depth are estimated from Simrad ITI and PI44 sensor readings of headrope depth and headrope distance from bottom. Gear depth is provided by the headrope depth sensor and bottom depth was calculated as the sum of headrope depth and distance of the headrope from bottom.

Mean net widths (m) and distances fished (km) are calculated for each haul. When net mensuration data are available, the mean net width for each tow is calculated, excluding the initial and final 10% of the tow duration. The mean net width was 13.9 m, based on data from 3,753 hauls that had available net mensuration measurements and exhibited good trawl performance. The mean net widths ranged from 9.8 to 17.6 m with a standard deviation of 0.96 m (Figure 4). When the net mensuration instrumentation did not function properly, the mean of net width per tow was estimated using multiple linear regressions of net width as a function of net height and inverse scope for the individual chartered vessel (Table 1). Distances fished were calculated by estimating the length that the net traveled on the seafloor from the point where it touched down to the point where it lifted off (Wallace and West 2006).

## Sensor Data Quality

Instrumentation played an important role in monitoring trawl performance, with mensuration data used to facilitate detection and correction of gear malfunction and identify deviation from standardized fishing procedures. In addition to their role in evaluating trawl performance, three sensors—BCS, ITI, and GPS—provided data used to estimate effort following the completion of the survey. Because of the occasional erratic readings inherent to acoustic data, sensor streams were reviewed prior to use.

Since sensor readings should be consistently present during a tow, recorded values of zero were treated as missing values and filtered prior to estimation of depth, net geometry, and temperature. Exclusion of extreme points was more difficult: large isolated spikes in depth, net geometry, and temperature readings were frequent and assumed to be the result of acoustic or electronic noise and were removed prior to processing. When multiple extreme points occurred in sequence, they were more difficult to evaluate because large swings in sensor data are expected during tows over sloped and irregular substrates. Trawl execution problems also produced data sets with large fluctuations in readings. Consequently, extreme values recorded where expected—either as part of a continuous variation in magnitude or during a particularly variable stretch of readings—were not excluded prior to analysis.

To ensure reliability of on-bottom readings, sensor data used to estimate depth, net width, and height were restricted to a subset of values collected from the center 80% of the tow duration. In the vast majority of tows, this criterion did not appreciably reduce the number of observations, but did effectively exclude small timing offsets between the BCS and ITI sensor systems and noise introduced by net touchdown and liftoff.

For some tows, only a few sensor readings (depth, net geometry, and temperature) fell within the estimation time interval. The extent to which these single or few point subsamples were representative of the entire tow was necessarily a subjective judgment. If the points seemed in alignment with the trajectory of points outside the subset time interval, they were used as the basis for estimation. Notations, hand recorded at sea during a tow, provided an additional level of data quality control. These notations were subsequently evaluated and potentially impacted the decision whether to accept or reject a tow.

# Haul and Catch Data

The WCGBTSs have been progressively increasing the number of cells sampled since 2003. In 2008 each vessel was assigned 188 randomly selected cells per vessel (752 total cells). Between 2003 and 2008, the survey sampled 3,791 cells. In a total area of 135,538 $km^2$, the average sampling density per year is 4.66 hauls/1,000 $km^2$. In the strata 1, 2, and 3, the average sampling densities are 7.22, 6.28, and 2.54 hauls/1,000 $km^2$, respectively. Table 2 describes the sampling effort by year, stratum, and INPFC area. The trend in total catch of 46 fisheries management plan (FMP) species plus grooved tanner crab (*Chionoecetes tanneri*) and giant grenadier (*Albatrossia pectoralis*) from 2003 to 2008 is negative (Figure 5).

# Catch per Unit Effort and Biomass Estimates

Relative density was calculated as catch per unit effort (CPUE) for individual species in each INPFC area and depth stratum by dividing total catch weight (kg) per species by area swept (ha) per tow (*j*),

$$CPUE_j = \frac{C_j}{a_j} \tag{1}$$

where CPUE is catch per unit effort in kg $ha^{-1}$, $C_j$ is catch per tow in kg for a given species, and $a_j$ is area swept (ha). Area swept was estimated by multiplying the mean net width for each tow by the distance fished. The distance fished was measured from the point the net touched down to the point the net lifted off the seafloor.

Mean estimates were initially calculated for each depth stratum within an INPFC area by averaging all tow-specific CPUE estimates, including those with zero CPUE, by species. Mean CPUE was calculated as:

$$\overline{CPUE}_i = \frac{\sum_j CPUE_{ij}}{n_i} \tag{2}$$

where *i* is the INPFC-specific depth stratum and $n_i$ is the number of hauls within *i*.

The mean CPUE of 46 important FMP groundfish species plus grooved tanner crab and giant grenadier for each INFPC area and depth stratum is described in Table 3 through Table 7. Figure 6 through Figure 149 show the geographical distribution and relative abundance of select groundfish species. They were created with ArcGIS software (ESRI, Redlands, California). The maps show haul location where species were caught. Relative abundance is categorized as follows: 1) greater than zero but less than or equal to the mean CPUE, 2) greater than the mean CPUE but less than or equal to 1 SD from the mean, 3) between 1 and 2 SDs greater than the mean CPUE, 4) more than 2 SDs greater than the mean CPUE, and 5) no catch. During survey years 2003–2008, species-specific CPUE (kg $ha^{-1}$) varied by latitude and depth stratum (Figure 150 through Figure 155).

Mean biomass estimates (metric tons) were similarly calculated by multiplying the weighted mean CPUE for total area, depth strata, or INPFC region by the appropriate area of the stratum or region,

$$\hat{b} = \sum_{i=1}^{n} (\overline{CPUE}_i \times A_i)/1000 \tag{3}$$

where $\hat{b}$ is the mean biomass estimate in metric tons, $\overline{CPUE}$ is the mean CPUE in $ha^{-1}$ calculated as noted above by weighting the initial mean by area, *A* is area of the stratum or region in ha, and n = 3 when depth strata (shallow, mid, and deep) were combined within an INPFC area, or n = 5 if individual INPFC areas were combined or if depth strata for all areas were combined (see above). For all depth strata and INPFC areas, the dominant FMP species varied from year to year. Species-specific biomass (mt) by year and depth stratum are displayed in Figure 156 through Figure 161. Variance for mean biomass estimates (within and among INPFC areas and depth strata) was calculated as

$$Var(\hat{b}) = \sum_{i=1}^{n} (Var(\overline{CPUE}_i) \times A_i^2) \tag{4}$$

after first adjusting for differences in units and with symbols as defined in equation 3.

## Biological Data Collection

The surveys encountered more than 380 species or groups of fish and at least 540 species or groups of invertebrates from 2003 to 2008. Frequency of occurrence, depth range, and latitudinal range for all identified fish and invertebrates are listed in Appendix B.

All fishes and invertebrates were sorted to species (or the lowest possible taxon), and then weighed using an electronic, motion-compensated scale (Marel, Reykjavik, Iceland). Any unidentified species were labeled, frozen, or preserved in formalin and retained for later identification. Subsamples of selected management species were randomly selected for individual measurements (length and weight) and biological sampling (age structure, sex determination, or stomach content analysis). Up to 100 sex determinations and length measurements (to the nearest cm) were collected per haul from each of these species. Although fork length (or total length) is generally measured for most species, anal length was recorded for spotted ratfish (*Hydrolagus colliei*) and Pacific grenadier (*Coryphaenoides acrolepis*). Carapace width was recorded for Dungeness crab (*Cancer magister*) and grooved tanner crab.

Otoliths were removed to determine age, except for lingcod (*Ophiodon elongatus*) (fin rays) and spiny dogfish (*Squalus acanthias*) (dorsal spines). A subset of fish selected for length measurement was also randomly selected for ageing. Age structures for up to 100 individuals per species were collected per haul. For other species, only total counts and weights were recorded. From 2003 to 2008, the surveys collected more than 750,000 individual length measurements and 136,000 age structures. The species with the greatest number of length measurements and age structures include Dover sole (*Microstomus pacificus*), English sole (*Parophrys vetulus*), longspine thornyhead (*Sebastolobus altivelis*), Pacific hake (*Merluccius*

*productus*), Pacific sanddab (*Citharichthys sordidus*), rex sole (*Glyptocephalus zachirus*), sablefish (*Anoplopoma fimbria*), shortspine thornyhead (*Sebastolobus alascanus*), splitnose rockfish (*Sebastes diploproa*), and stripetail rockfish (*Sebastes saxicola*). Those 10 species represented more than 60% of total length measurements taken during the 2003–2008 surveys. Table 8 through Table 10 describe the length and age structure collection effort by species and year.

## Length and Age Composition

Figure 162 through Figure 208 show frequency of lengths for FMP species encountered during the 2003–2008 surveys. Only FMP species with greater than 500 length measurements are shown. Length frequencies are subset by year, stratum, and sex. If the number of individuals within a depth stratum was less than 10% of the total, then the panel was omitted. Females (F) are represented by a solid line; males (M) by a dashed line; and unknown (U) by a bold gray line. The mean length for each gender classification (F, M, and U) is displayed in each figure panel. Unsexed individuals were included only when the number of individuals with unknown sex was more than 2% of the total. Lengths are fork length, except for skates and spiny dogfish (total length), and pacific grenadier and spotted ratfish (anal length). The length frequencies represent the sum of all measured individuals. They are unweighted and not adjusted for relative collection efforts between years or strata.

Age frequencies were analyzed for 14 species for each year collected. The relative frequency for each 1-year age bin is shown in Figure 209 through Figure 222. Ages were determined from otoliths, dorsal fin rays, or dorsal spines. The age frequencies represent the sum of all measured individuals. They are unweighted and not adjusted for relative collection efforts between years.

## Weight-length Relationships

Individual measurements of weight (kg) and length (cm) were fit to the following weight-length relationship using a nonlinear least squares regression. The length-weight allometric relationship is expressed as

$$W = a \times L^b \qquad (5)$$

where W is fish weight in kg, L is fish length in cm, and a and b are fitted parameters from nonlinear least squares regression. The results of these analyses, including number sampled and the coefficient of determination ($r^2$), are reported in Table 11. As noted, fork length (or total length) was measured for most species; however, anal length was recorded for Pacific grenadier. The weight-length relationships for commercially important species (Dover sole, petrale sole [*Eopsetta jordani*], sablefish, and shortspine thornyheads) varied during 2003–2008 (Figure 223 and Figure 224). Generally, the weight for a given length has decreased with time. In 23 of 33 cases, the value of the exponent b was lower in 2008 than it was in 2003.

# Fish Community Metrics

Fish community metrics were calculated for the latitudinal range (32.2°N to 49.2°N) of the survey in one degree increments for each year. Latitude increments are centered on a geographic break at Cape Mendocino (40.2°N) and progress toward the northern and southern bounds of the survey. Values are displayed at the midpoint of each latitude bin. Each latitude increment was divided into three depth strata (55–183 m, 184–549 m, and 550–1,280 m). Measurements of richness, diversity, and evenness were calculated based on the species encountered within each specific latitude and depth bin. Individual counts were estimated based on the species average weight (within bin).

Only fish identified to species were considered for the community analyses. Because genus and family level classifications overlap with species level identifications, individuals that were identified to a more general taxonomic classification could not be counted. For example, individuals identified only as *Sebastes* were discarded, so individuals identified to species within *Sebastes* could be included. The inclusion of overlapping classifications would lead to overestimation of species richness.

However, fish identified within the families Bathylagidae or Myctophidae were included in the diversity and richness analyses at the family level and not the species level. These families were encountered often and identified to the family level frequently. Identification to species within these families was less common. In the special cases of Bathylagidae and Myctophidae, discarding the more general classification in favor of species level classification would result in ignoring more than half of the encounters with members of these families.

Species diversity index ($H'$) was estimated according to Shannon's diversity index,

$$H' = -\sum_{i=1}^{S} p_i \ln p_i \tag{6}$$

where $S$ is the total number of species, $p_i$ is the proportion $S$ comprised of the $i$th species. Species evenness ($E$) was estimated according to the following equation,

$$E = \frac{H'}{lnS} \tag{7}$$

where $H'$ is Shannon's diversity index and $S$ is the total number of species.

Measurements of fish community richness, diversity, and evenness vary by depth, latitude, and year (Figure 225 through Figure 233). Overall, species richness (the total number of species) varied more by year than latitude. In all strata, higher richness values were typically found south of Cape Mendocino (40.02°N). The lowest richness values were found in stratum 1. Patterns of species diversity and eveness demonstrated few trends. Stratum 3 exhibited the lowest species diversity and evenness. Variation between years was greater than variation between strata or latitudes, although variation between years decreased north of 44.2°N.

In stratum 1, the highest richness values were found off Cape Flattery, Washington (48.2–49.2°N), and Cape Mendocino (40.2–41.2°N) and Point Conception (35.2–36.2°N), California. In 2008 species richness was 21 at 32.7°N. This is the largest value found in stratum 1 (Figure 225). Species diversity varied among years. North of 44.2°N, species diversity and evenness increased with latitude and there was less variability among years (Figure 234).

In stratum 2, there was a consistent species richness peak between 46.2 and 47.2°N and a consistent depression between 34.2 and 35.2°N (Figure 228). Richness was also elevated between 36.2 and 40.2°N. The lowest species richness was found between 44.2 and 46.2°N. Areas of higher diversity were found from 44.2 to 45.2°N and from 47.2 to 48.2°N. A consistent depression in diversity was located between 46.2 and 47.2°N. As latitude decreased species evenness became more variable. Low values of evenness and diversity coincided between 33.2 and 34.2°N.

In stratum 3, the sampling stations off Cape Flattery (48.2–49.2°N) and south of Cape Mendocino (37.2–40.2°N) were the most species rich (Figure 231). Areas of high diversity and evenness were located from 48.2 to 49.2°N, from 42.2 to 43.2°N, and south of 37.2°N. Between 41.2 and 42.2°N, diversity and evenness were consistently low in all years.

There was a negative relationship between species diversity and richness in stratum 1 ($P < 0.01$, $r^2 = 0.13$) and stratum 2 ($P < 0.01$, $r^2 = 0.278$). In stratum 3 there was no relationship between diversity and richness, but diversity was negatively related to latitude ($P < 0.01$, $r^2 = 0.1816$) (Figure 235). There was no relationship between species diversity and evenness.

# Figures 1–235

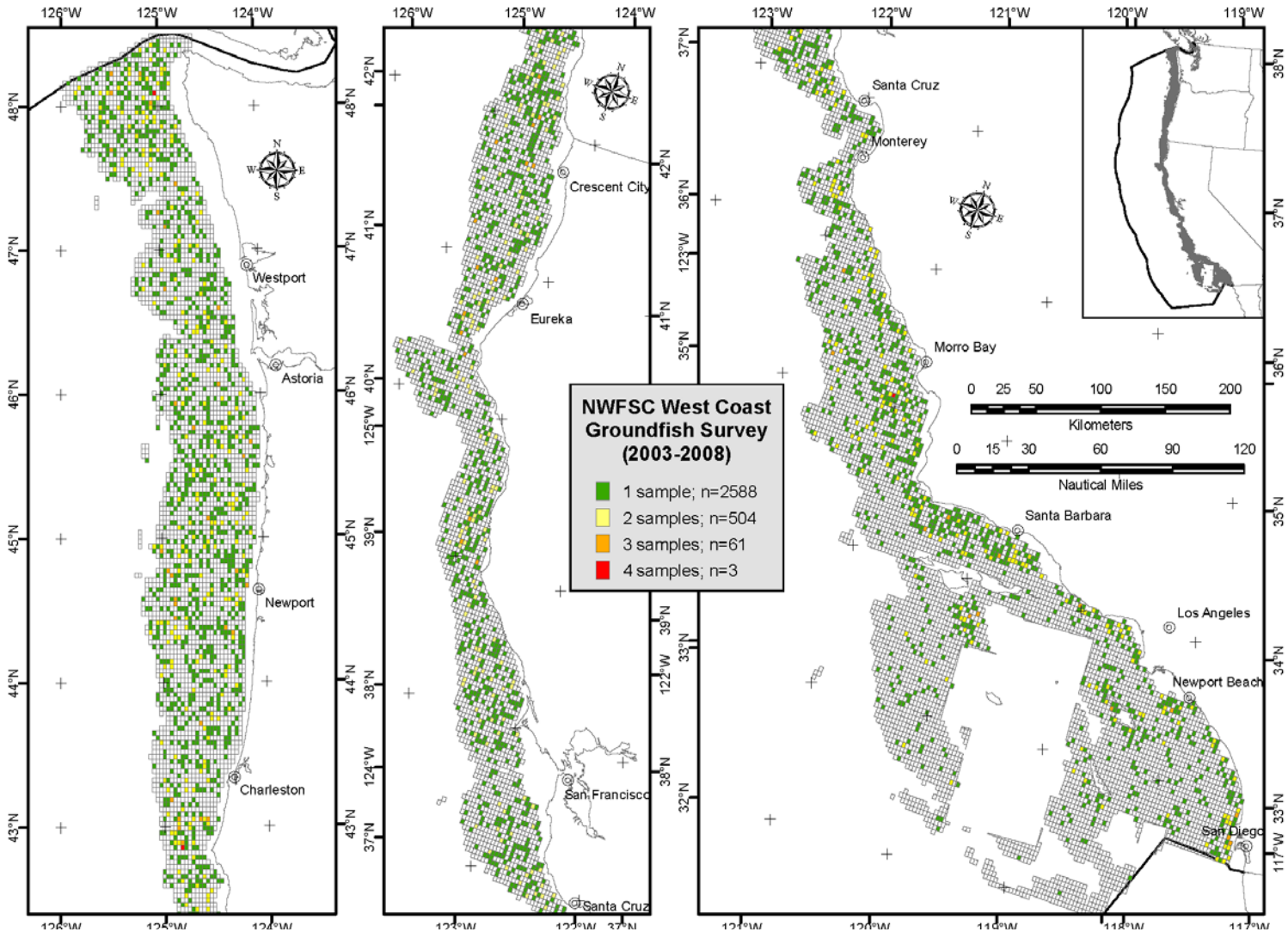


Figure 1. Total survey area and sampling stations during the 2003–2008 surveys. Color of sampling stations or cells is based on the number of times sampled. Green cells have been sampled once, yellow twice, orange three times, and red four times. Neutral cells were not sampled during the time period.

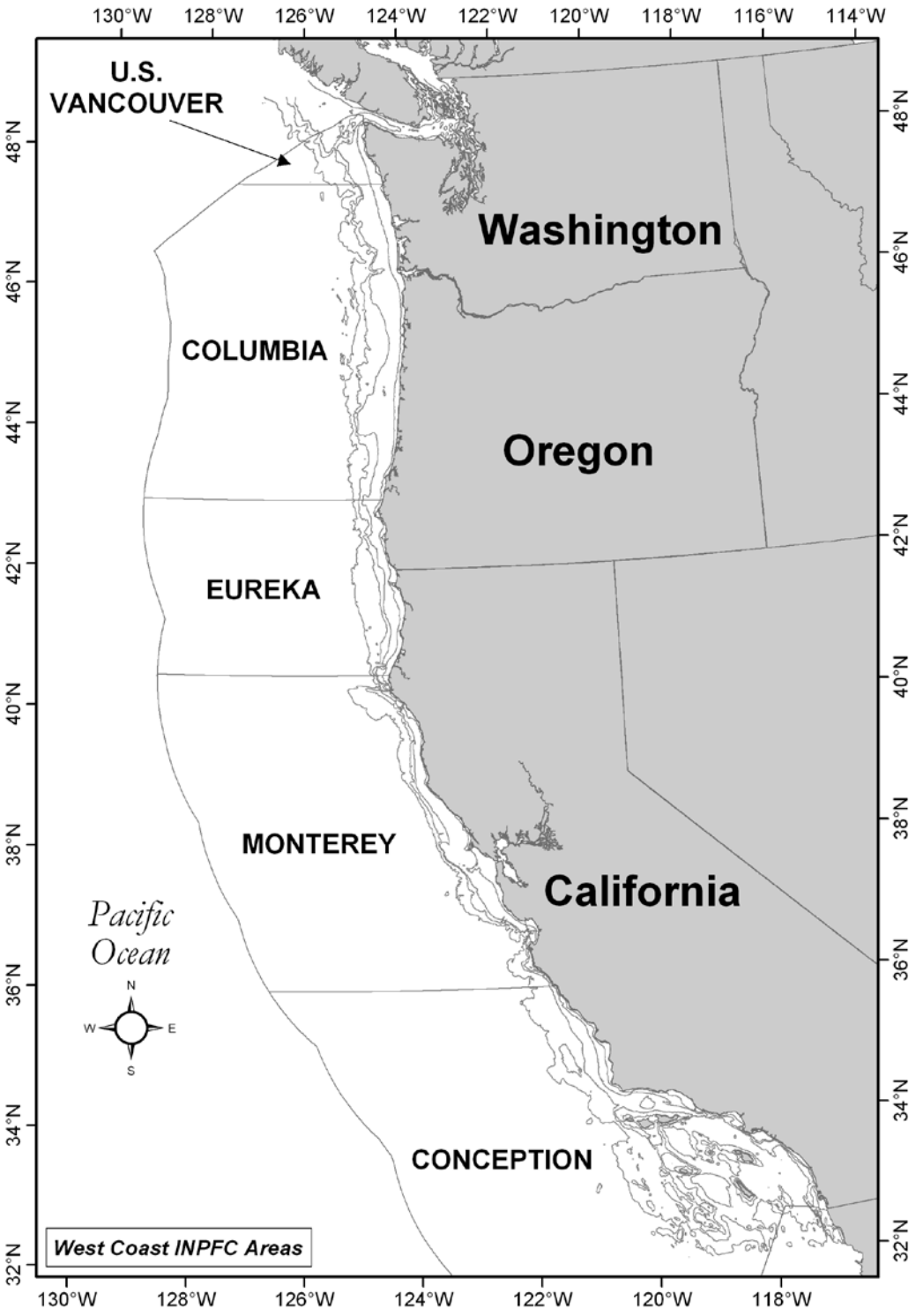


Figure 2. Geographic extent of the surveys subdivided into INPFC areas. Four main survey strata isobaths are shown (55, 183, 549, and 1,280 m).

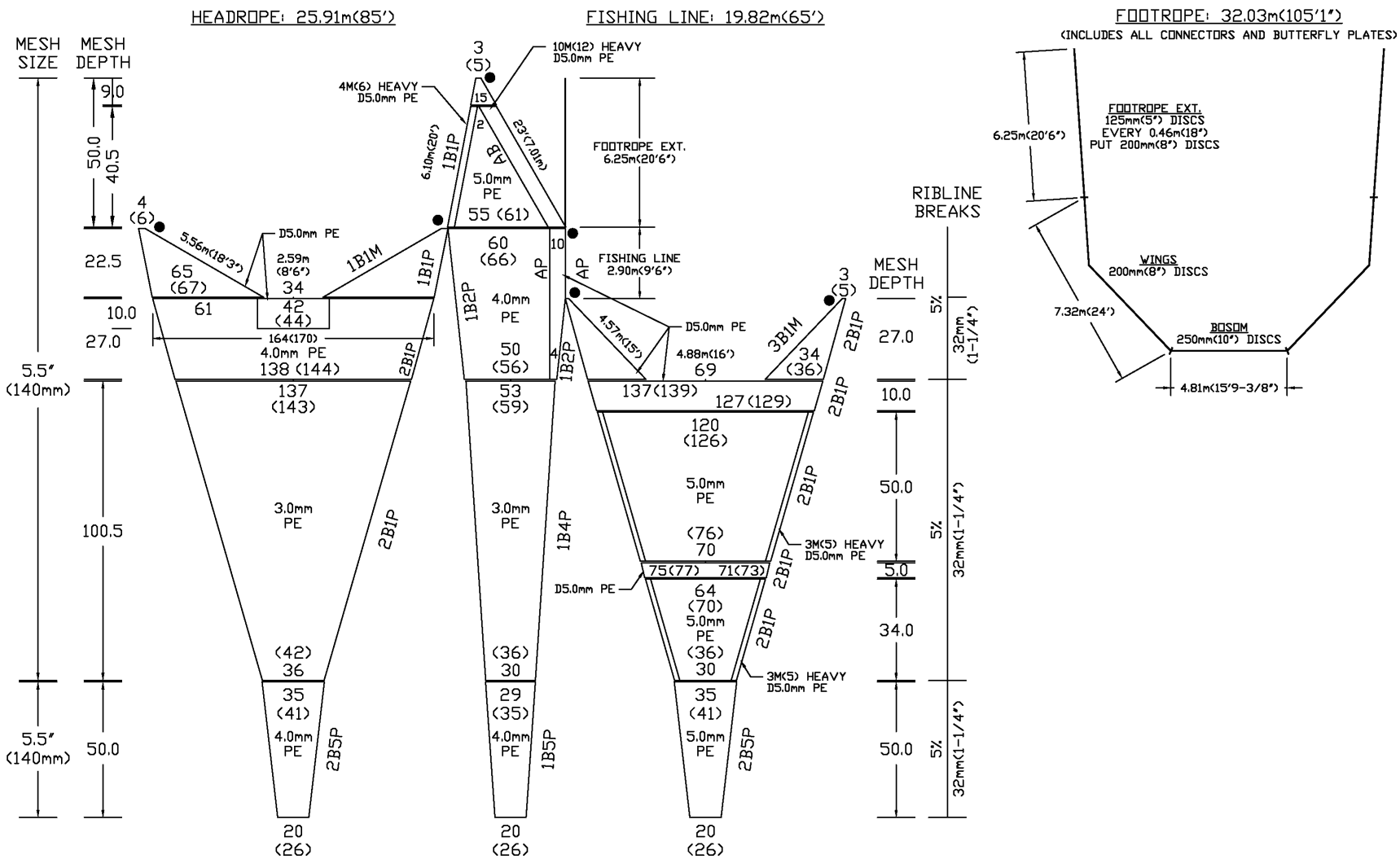


Figure 3. Schematic of Aberdeen-type sampling trawl used during the surveys. Headrope, fishing line, and footrope dimensions are meters (and feet). The depth and width of net sections are measured by mesh count. Each section is composed of 3, 4, and 5 mm polyethylene line where indicated. For further details, see Stauffer (2004).

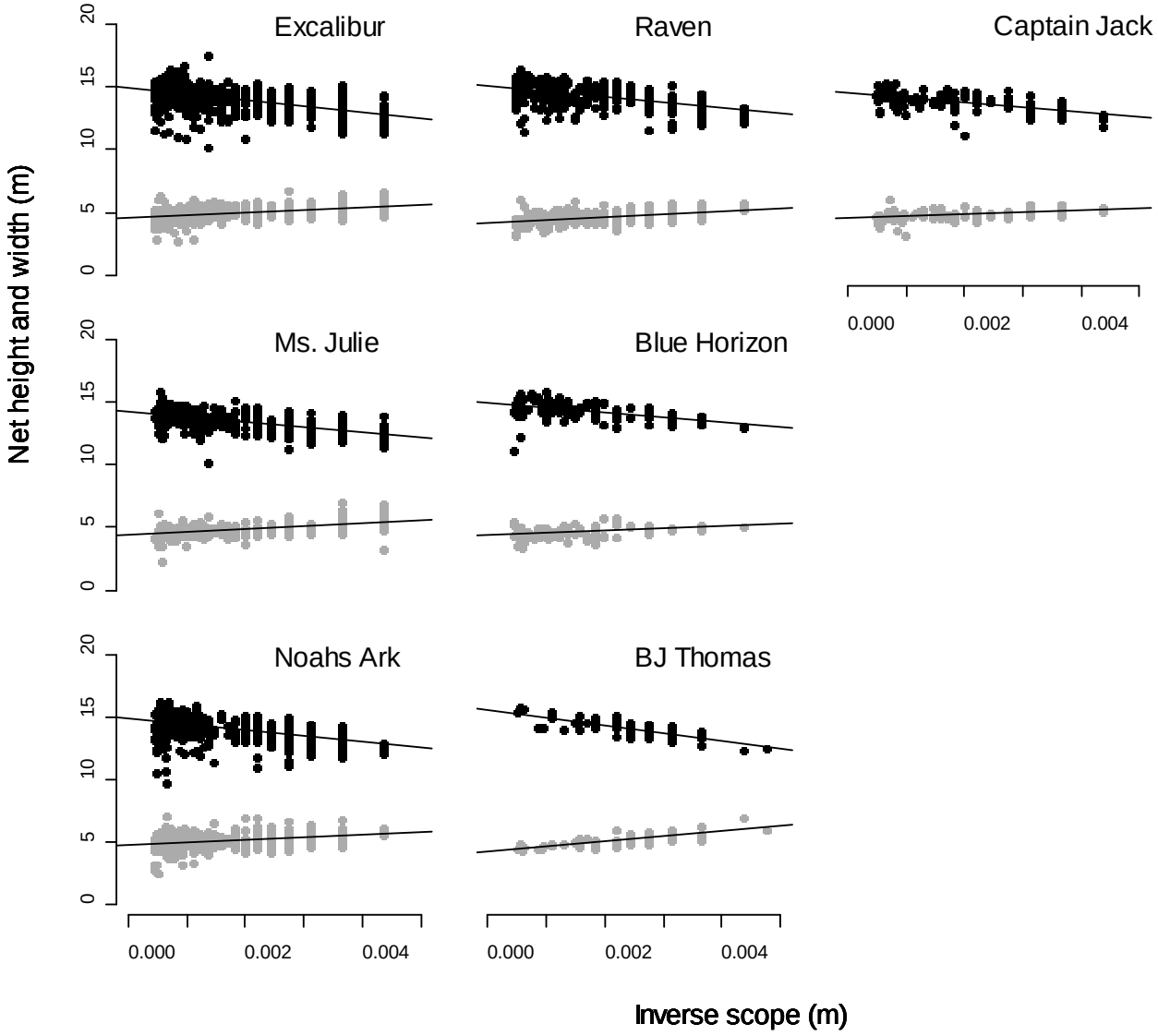


Figure 4. Mean net width and height for trawls conducted as part of the surveys for years 2003–2008. Width (●) and height (●) estimates are grouped by vessel and plotted relative to inverse scope (1/meters). Coefficients and intercepts of linear regressions are reported in Table 12.

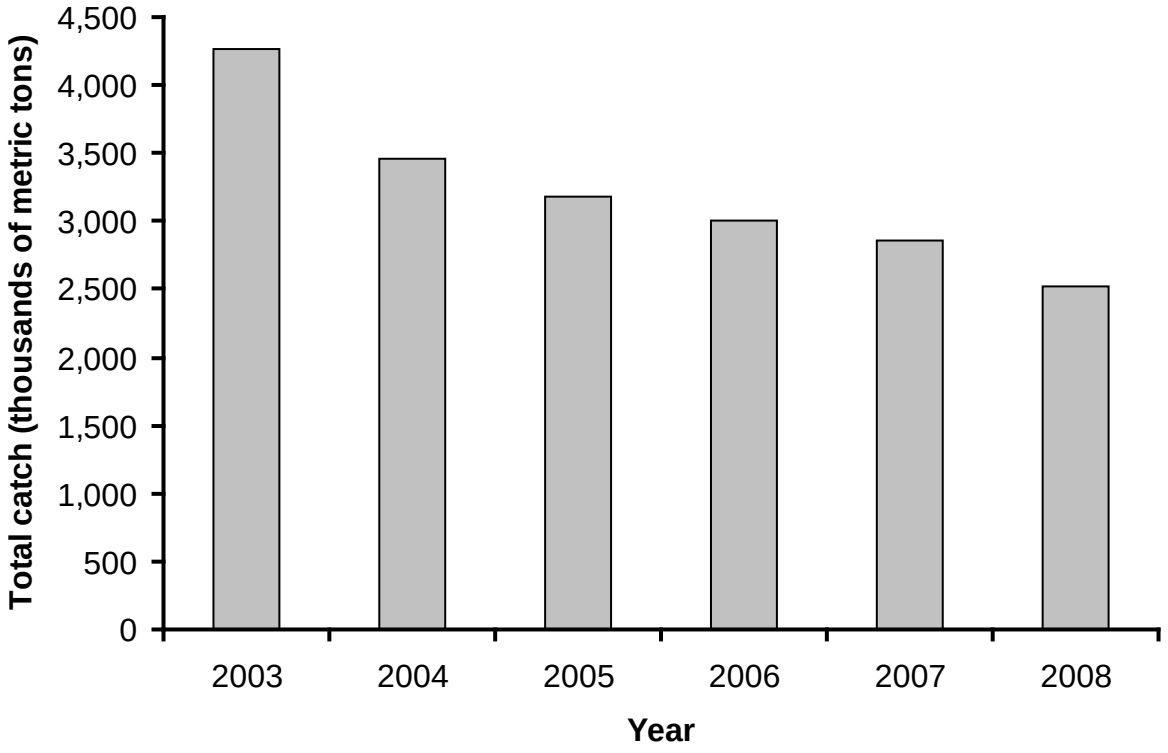


Figure 5. Trends in total catch of 46 FMP species plus grooved tanner crab and giant grenadier in the surveys from 2003 to 2008.

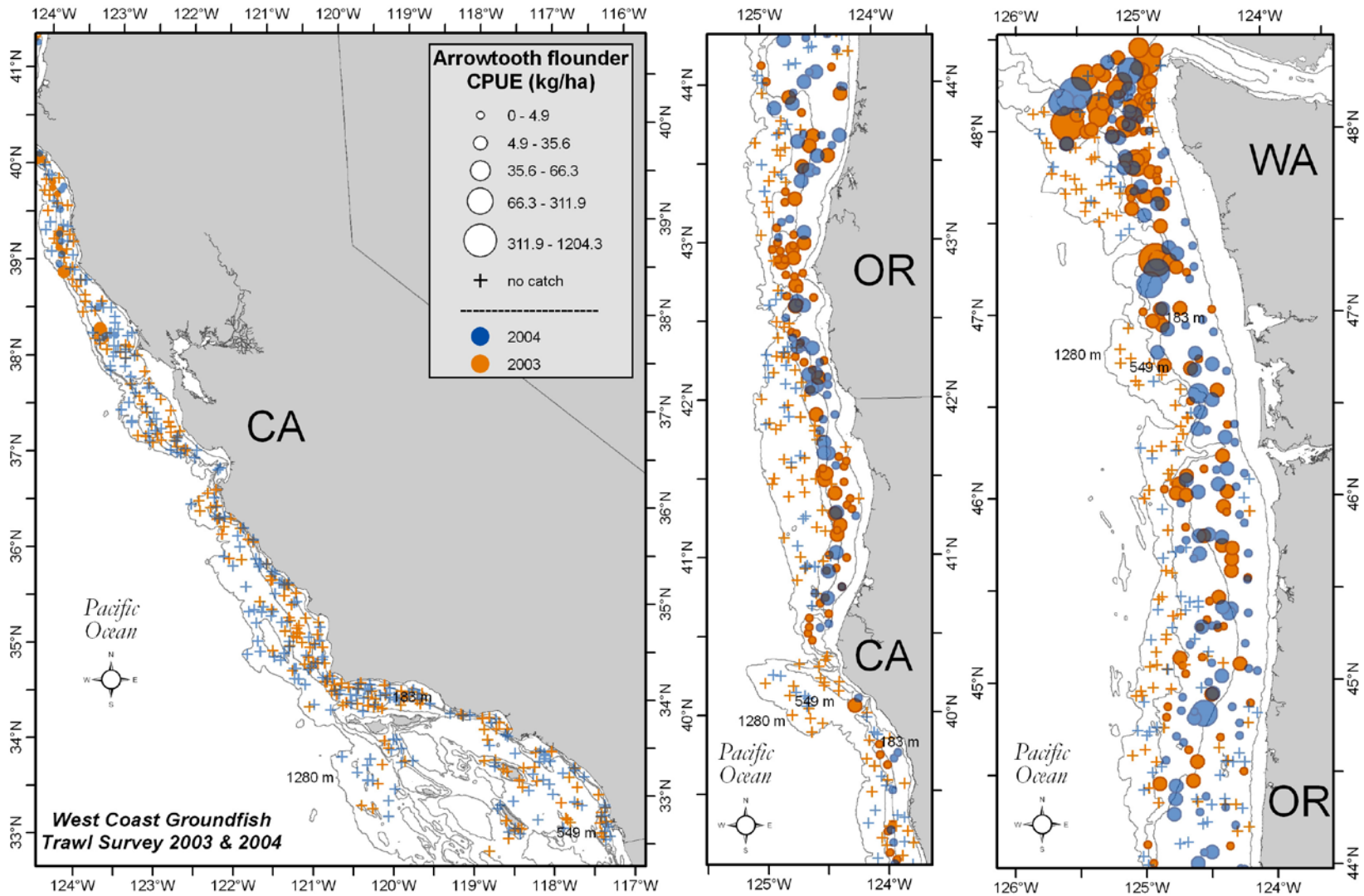


Figure 6. Arrowtooth flounder (*Atheresthes stomias*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

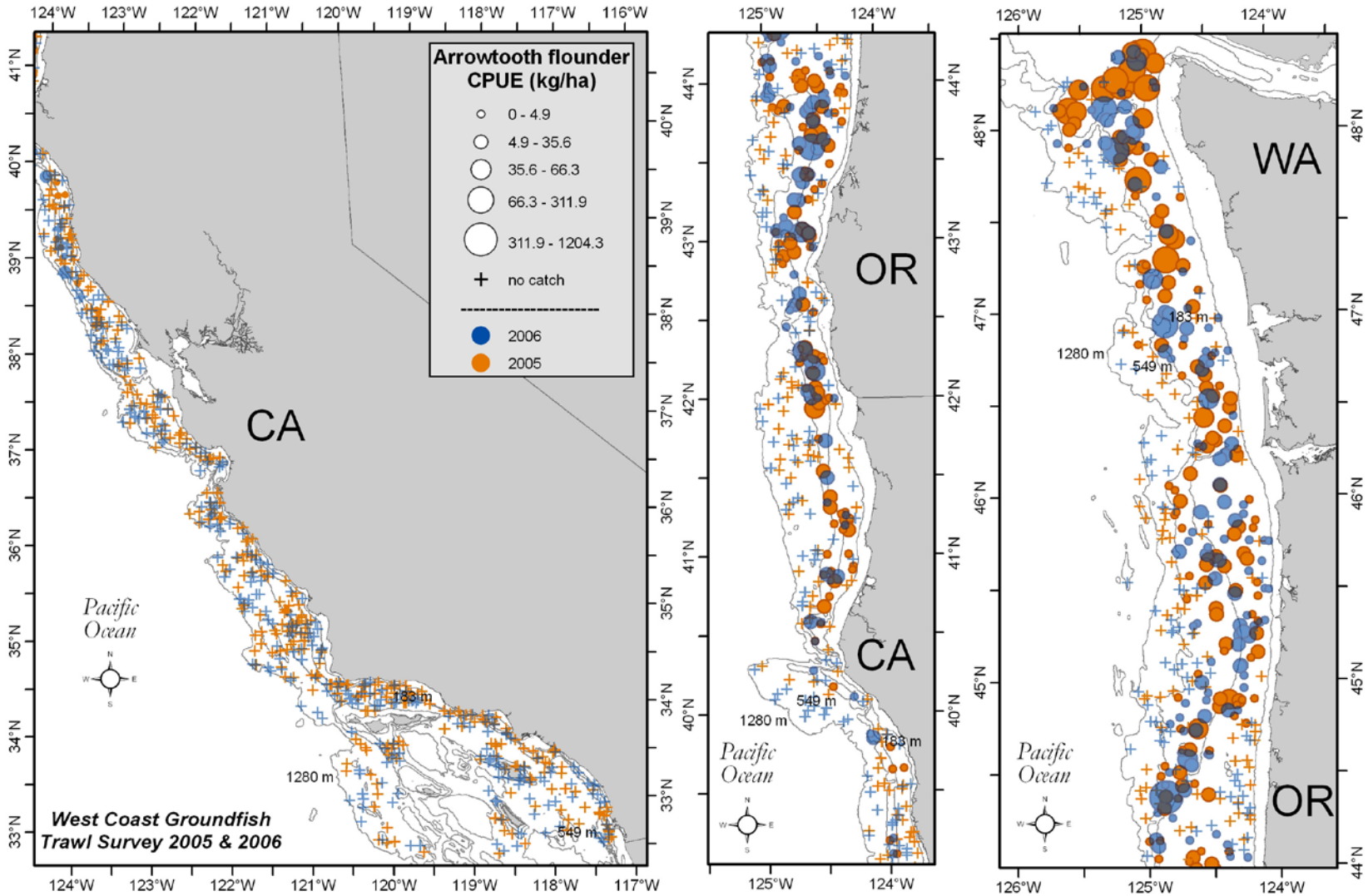


Figure 7. Arrowtooth flounder distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

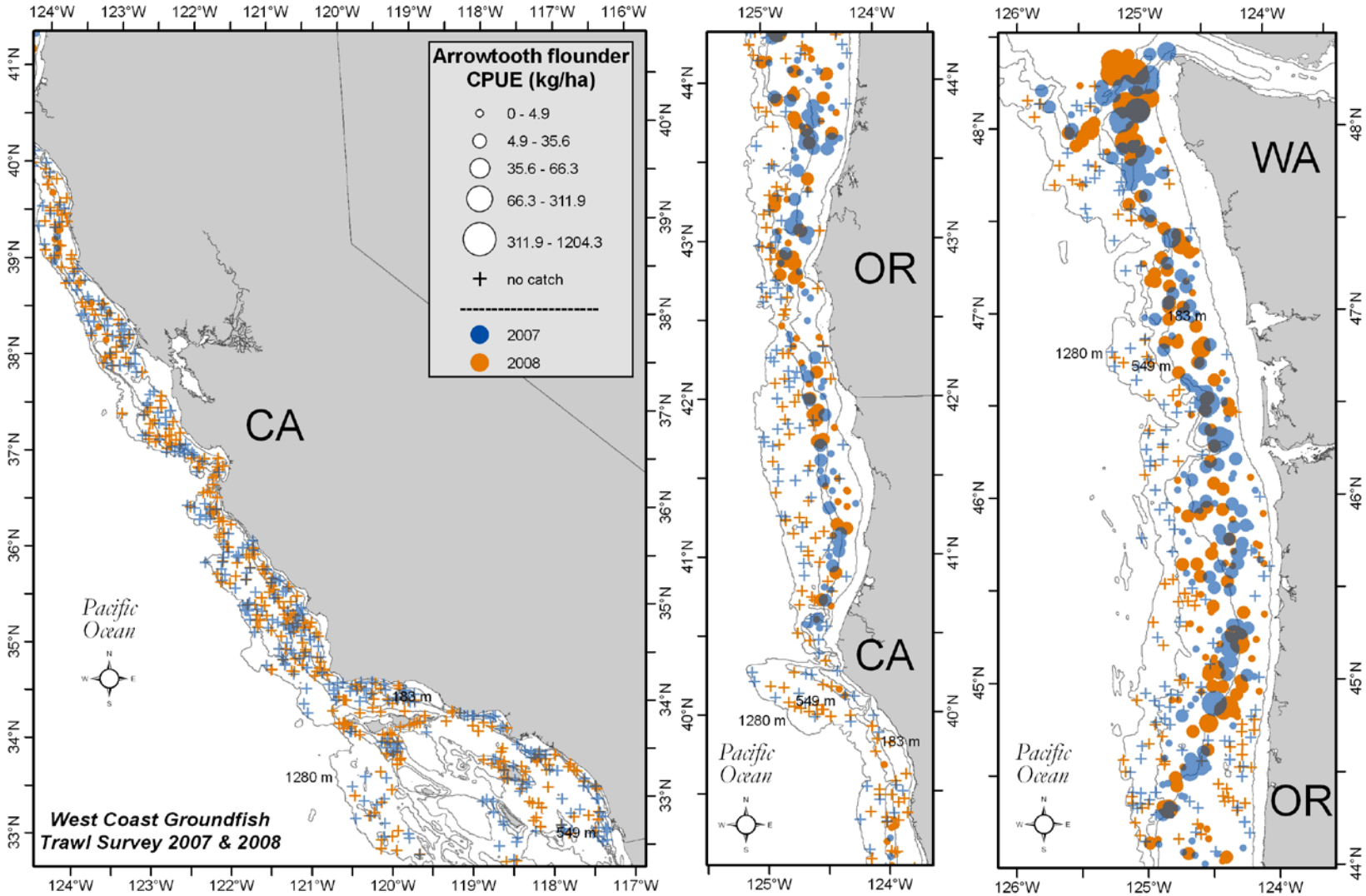


Figure 8. Arrowtooth flounder distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

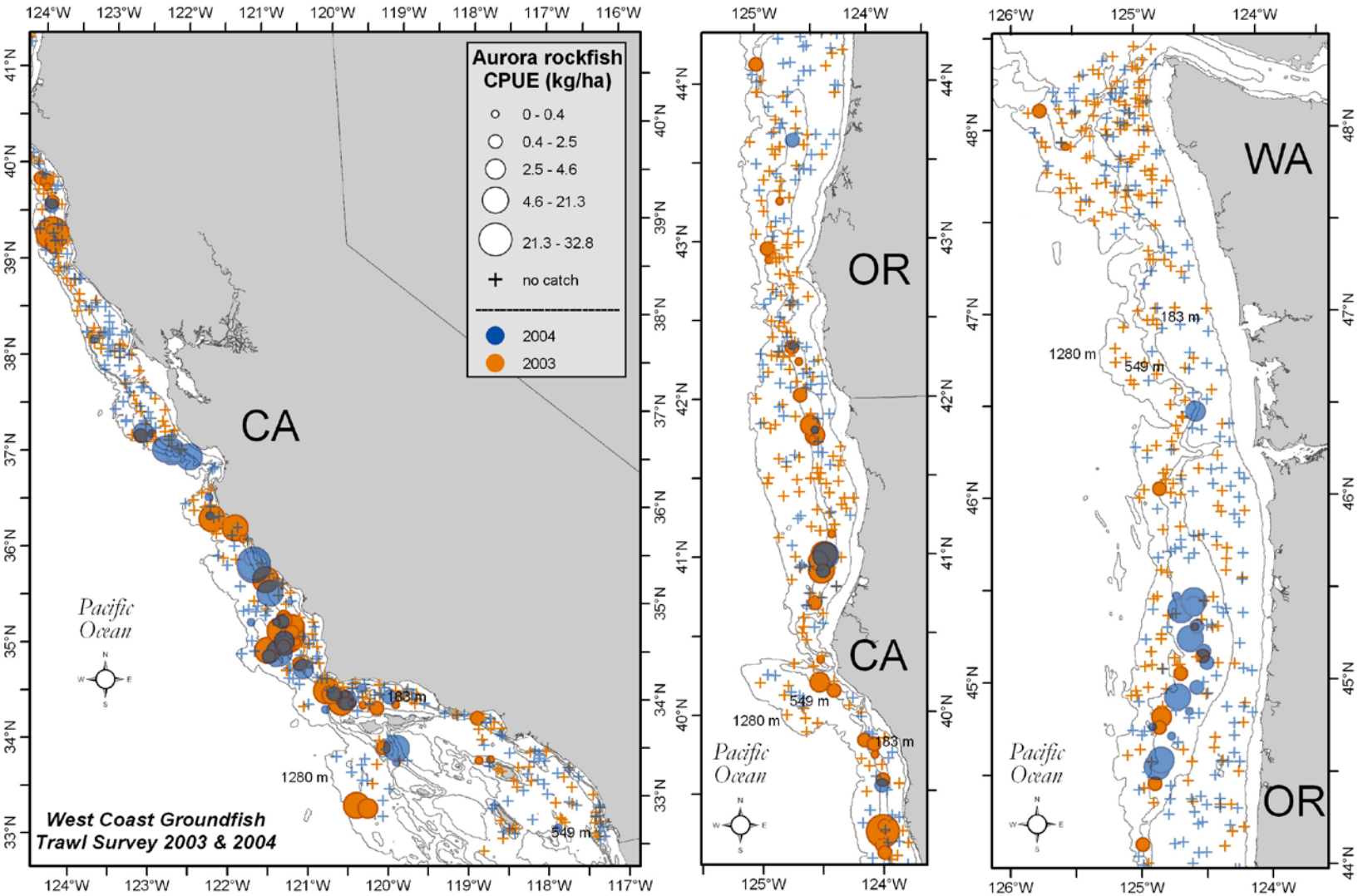


Figure 9. Aurora rockfish (*Sebastes aurora*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

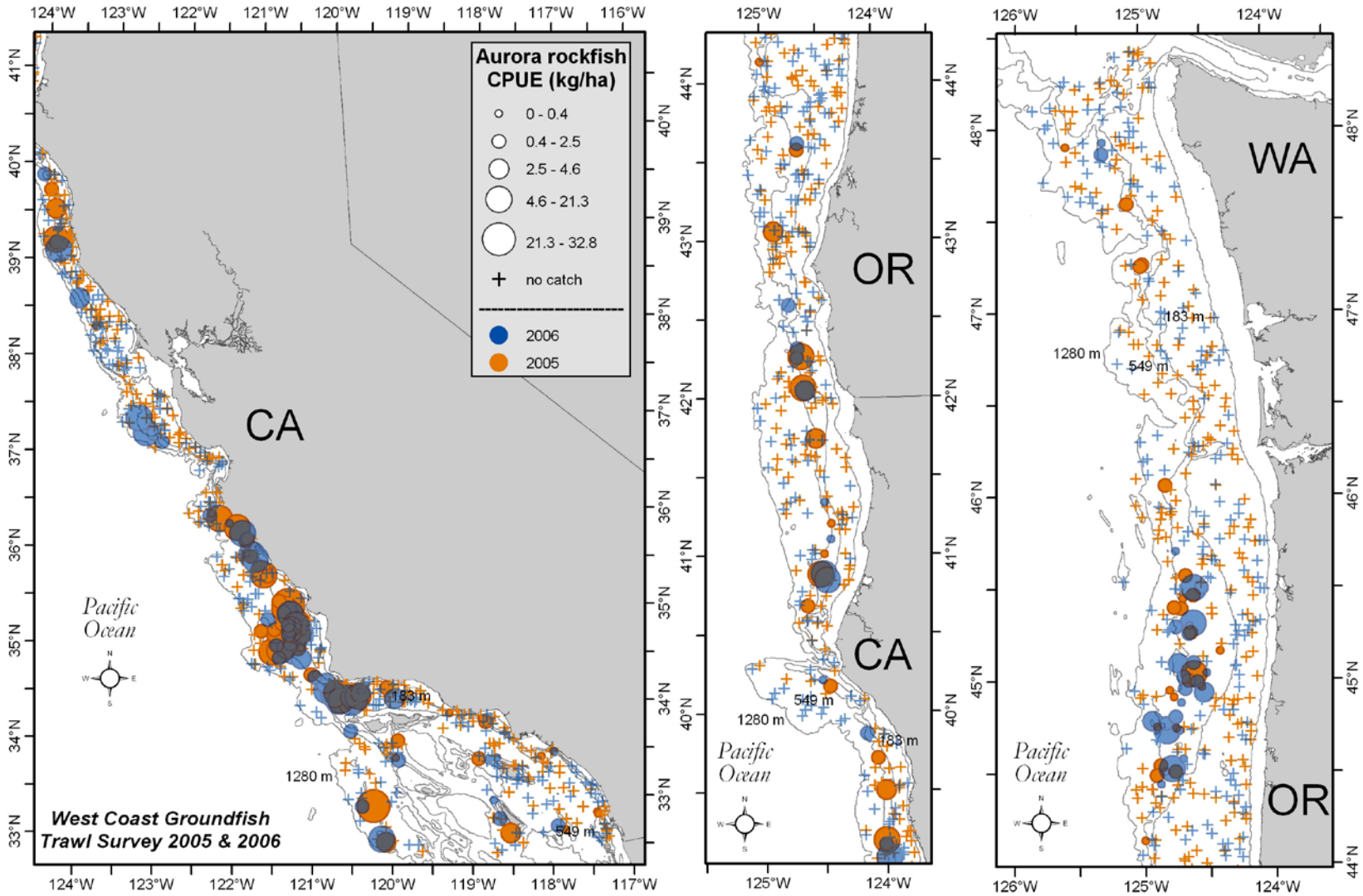


Figure 10. Aurora rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

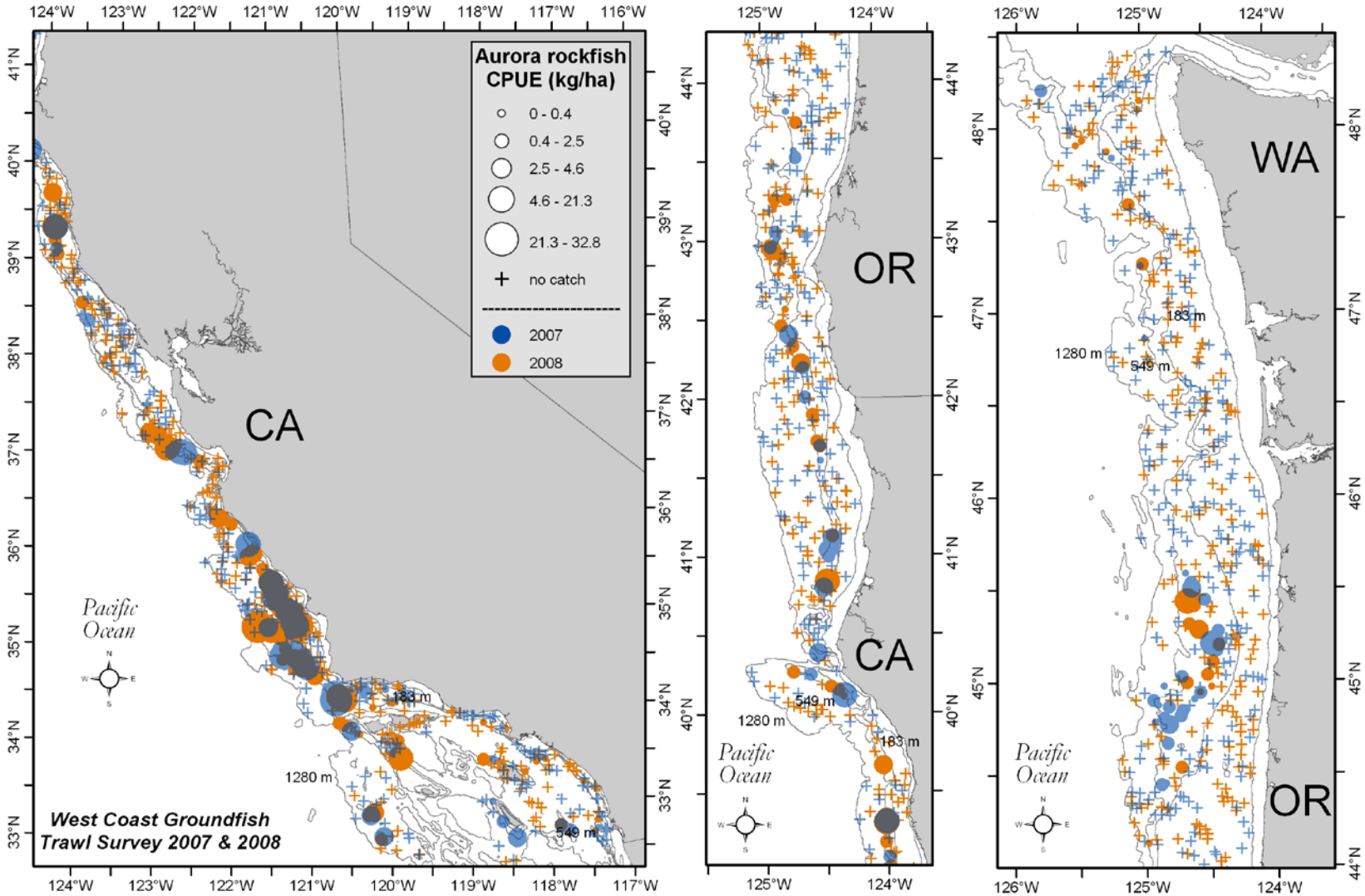


Figure 11. Aurora rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

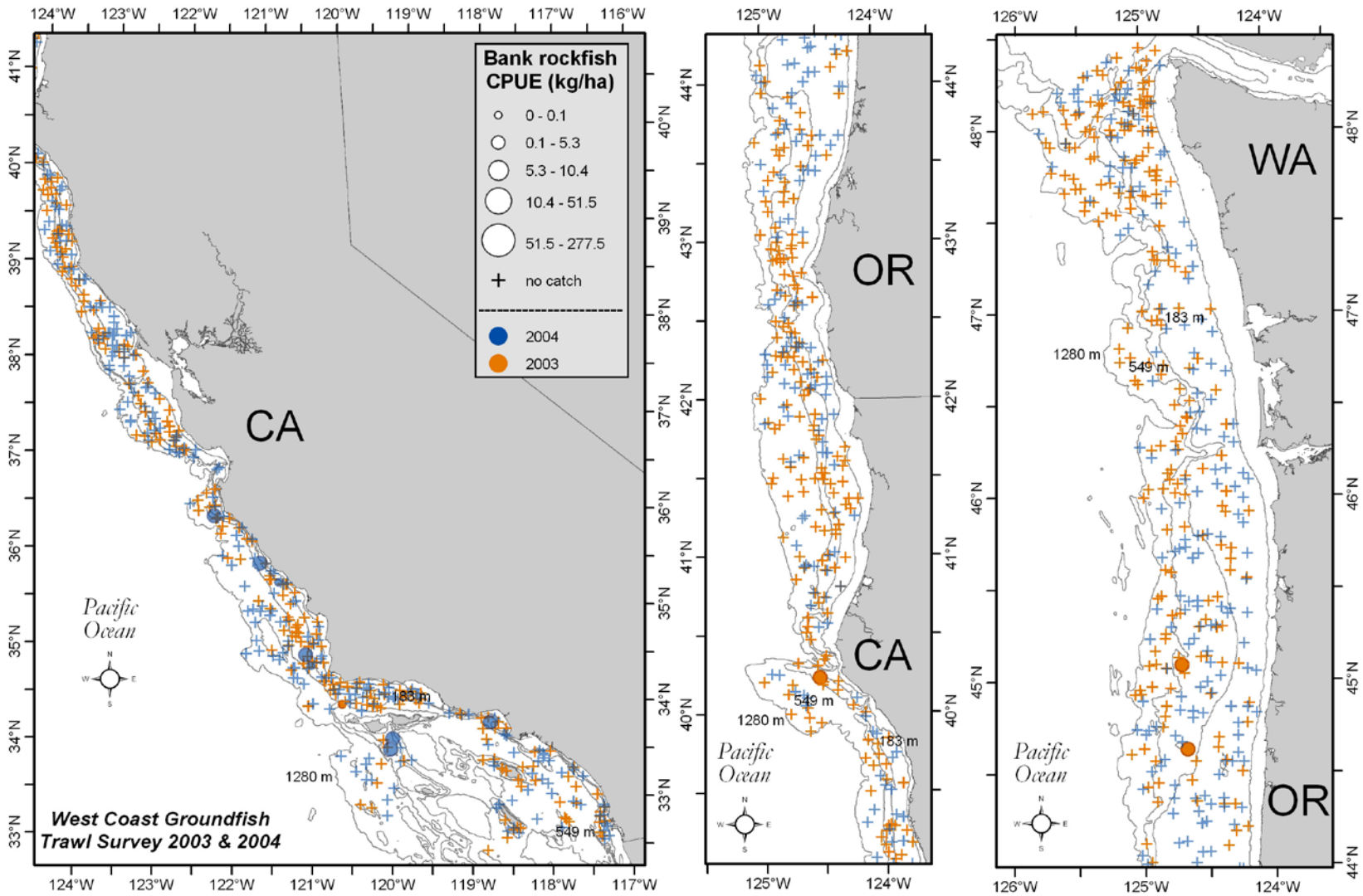


Figure 12. Bank rockfish (*Sebastes rufus*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

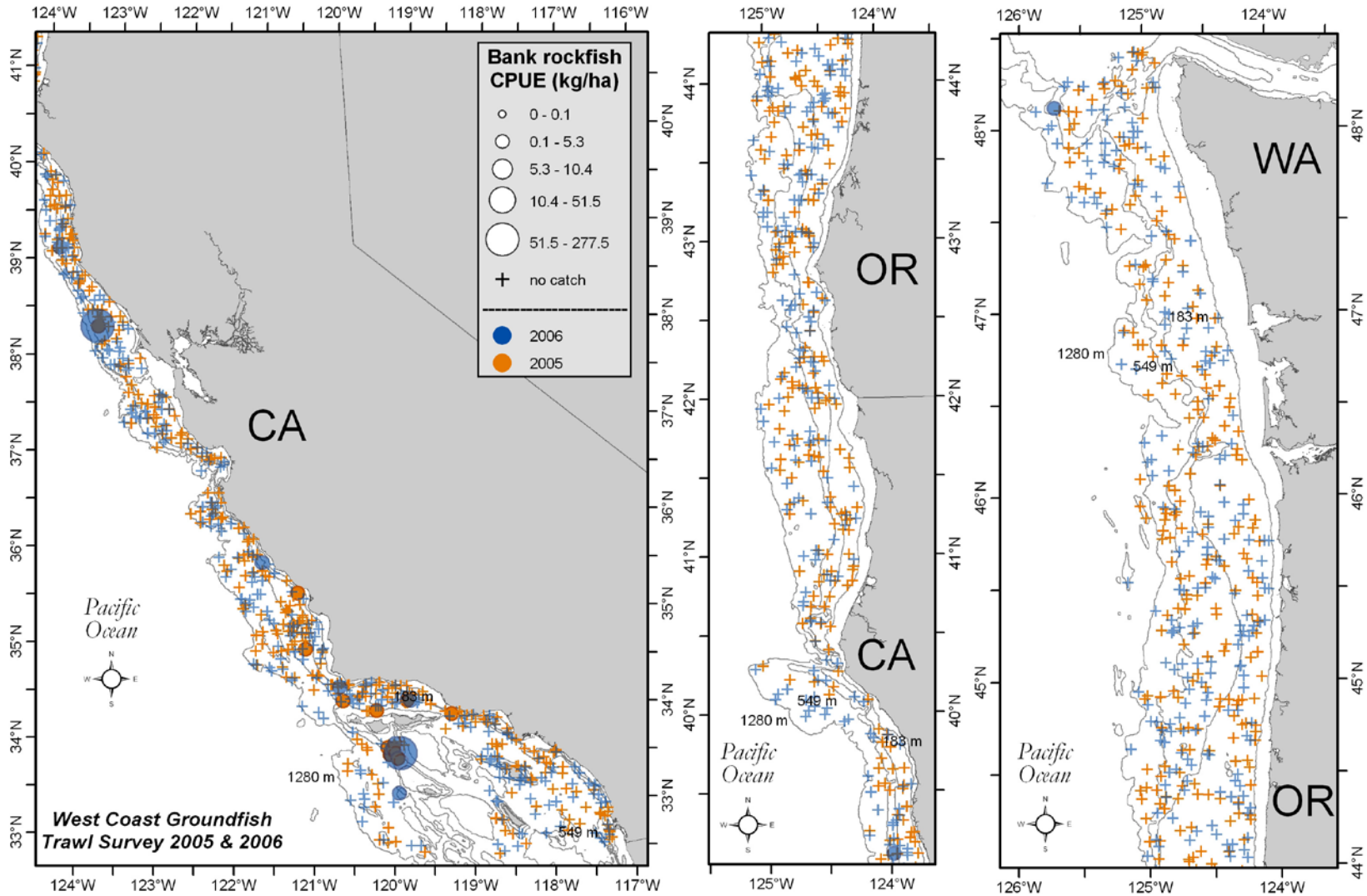


Figure 13. Bank rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

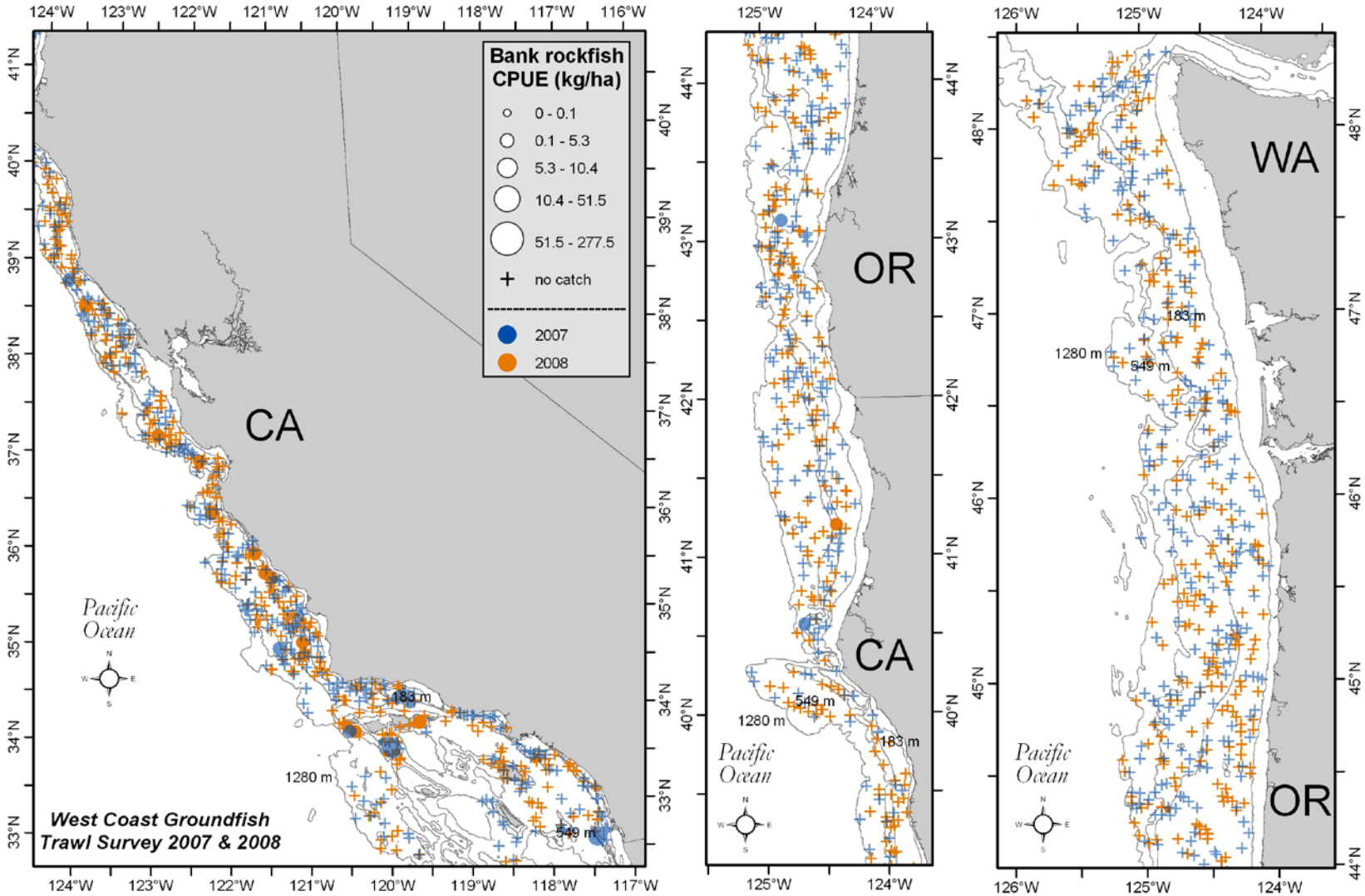


Figure 14. Bank rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

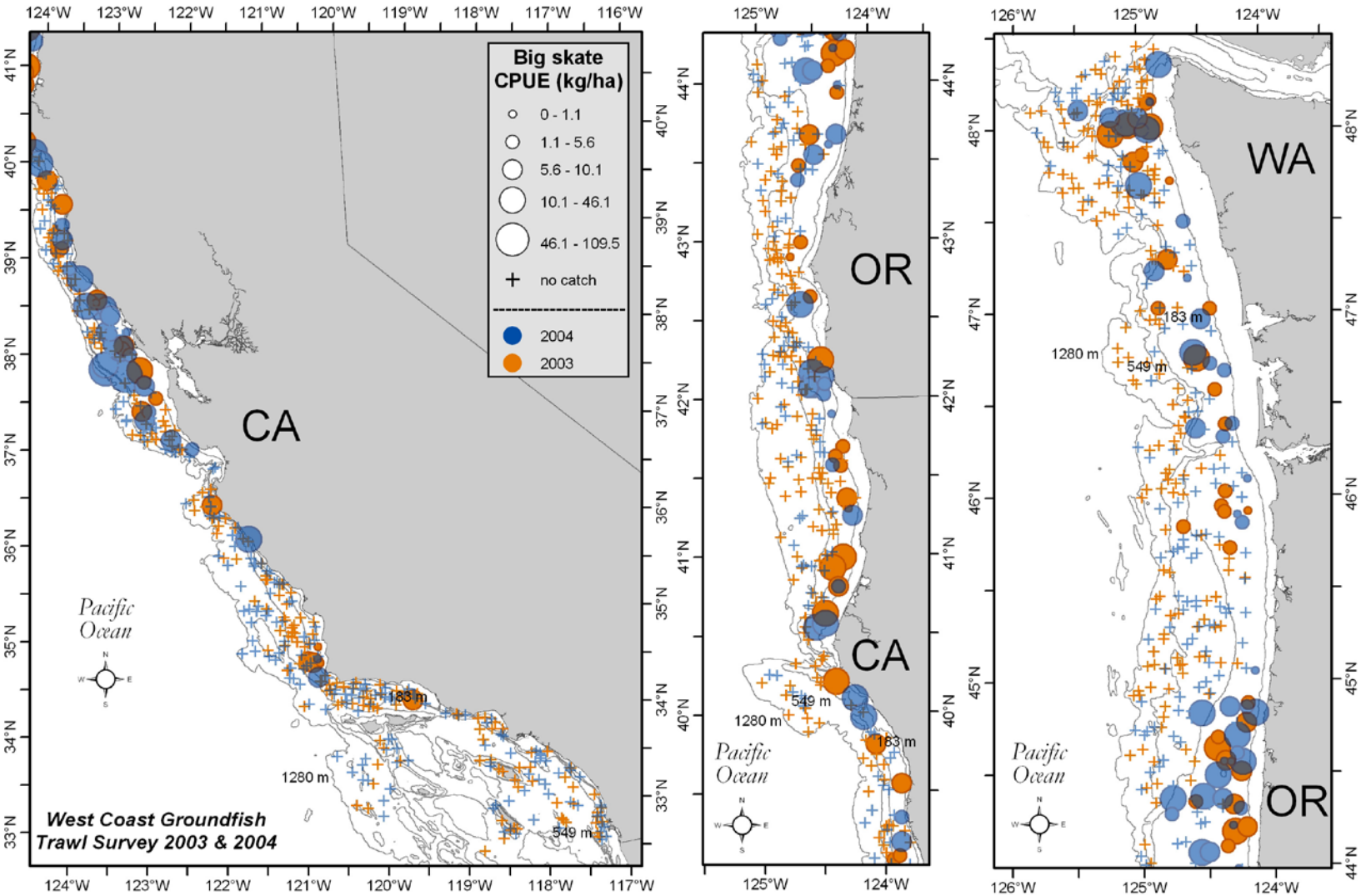


Figure 15. Big skate (*Raja binoculata*) distribution and relative abundance (kg ha–1) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

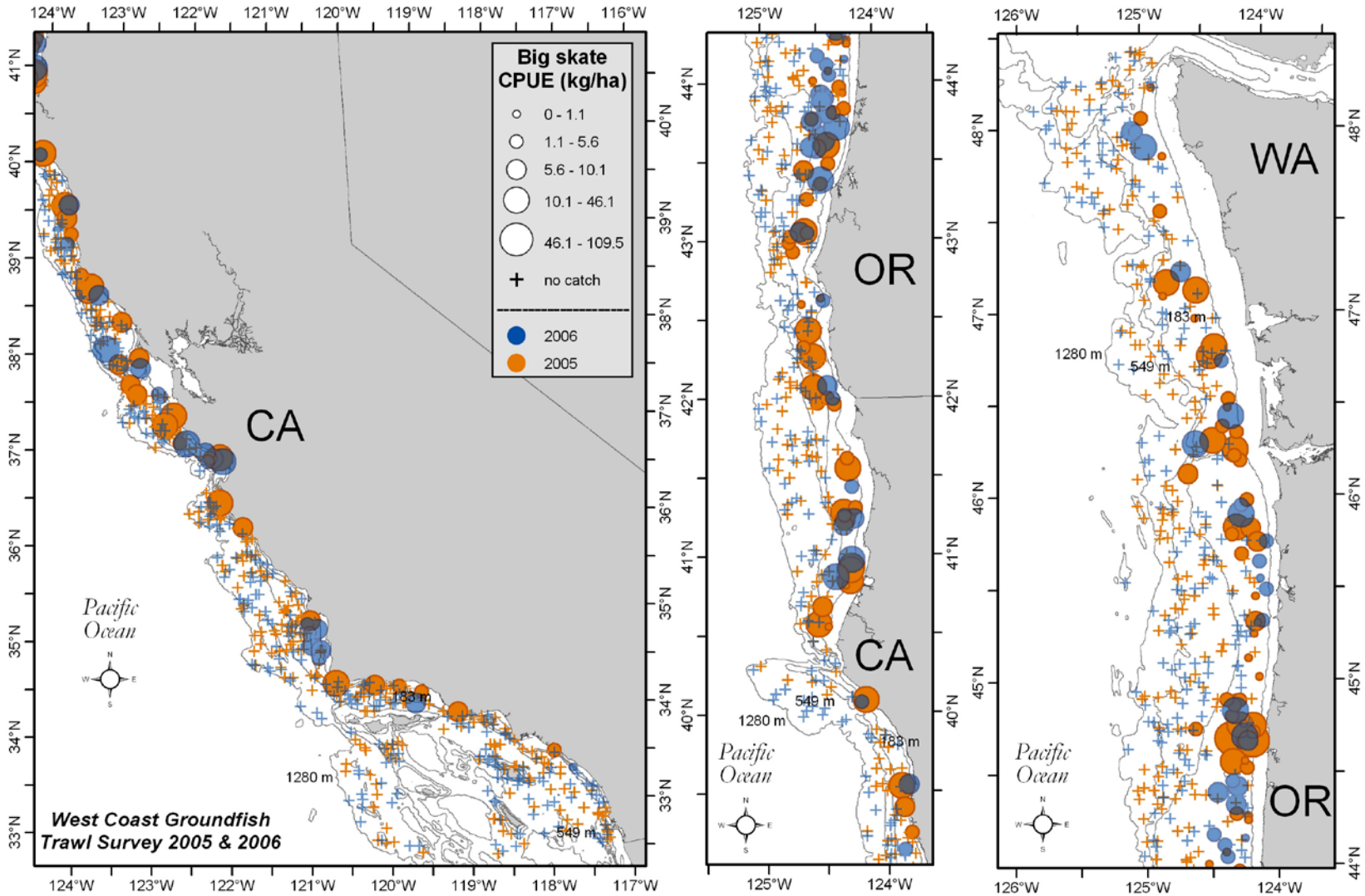


Figure 16. Big skate distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

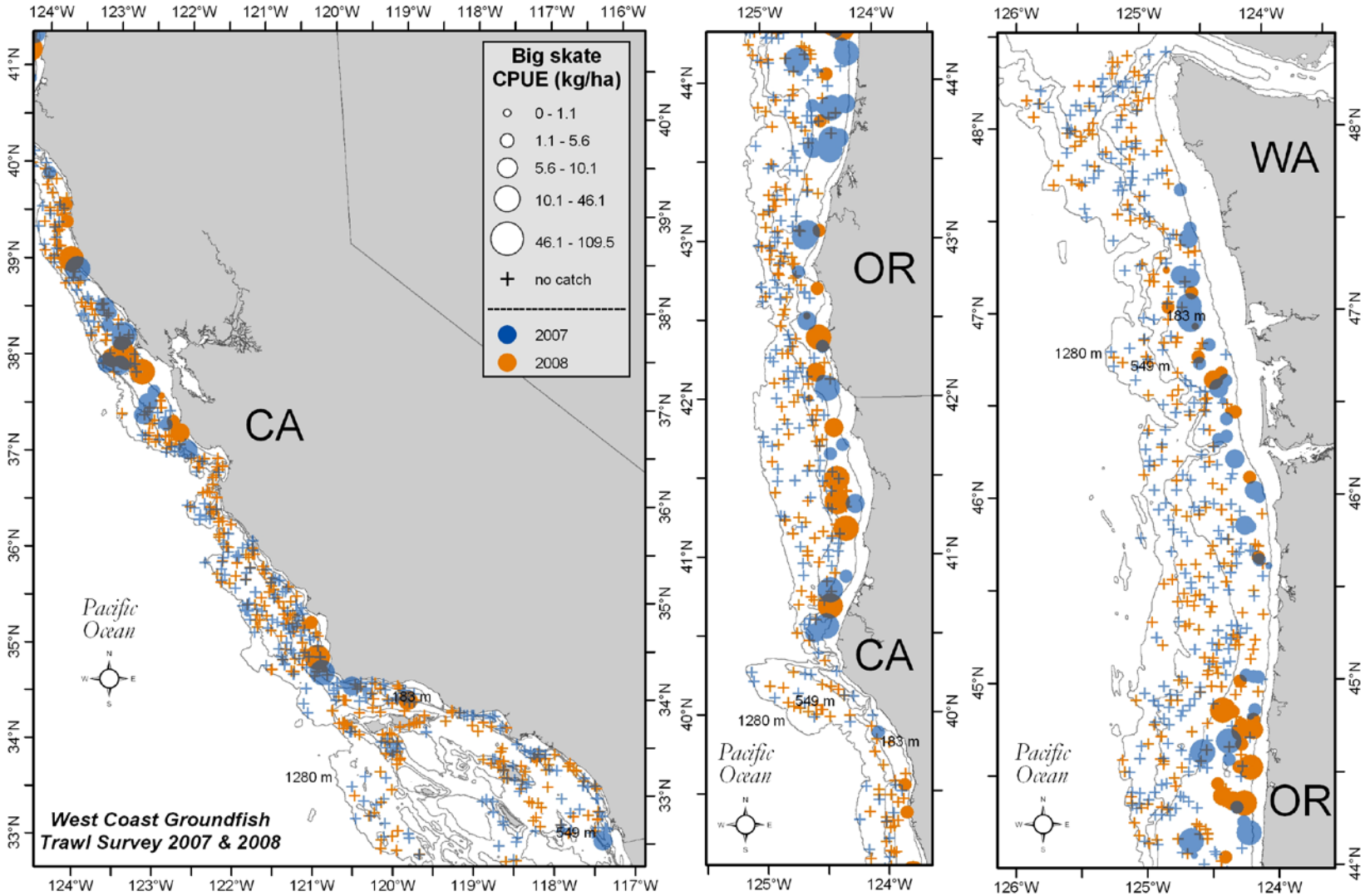


Figure 17. Big skate distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

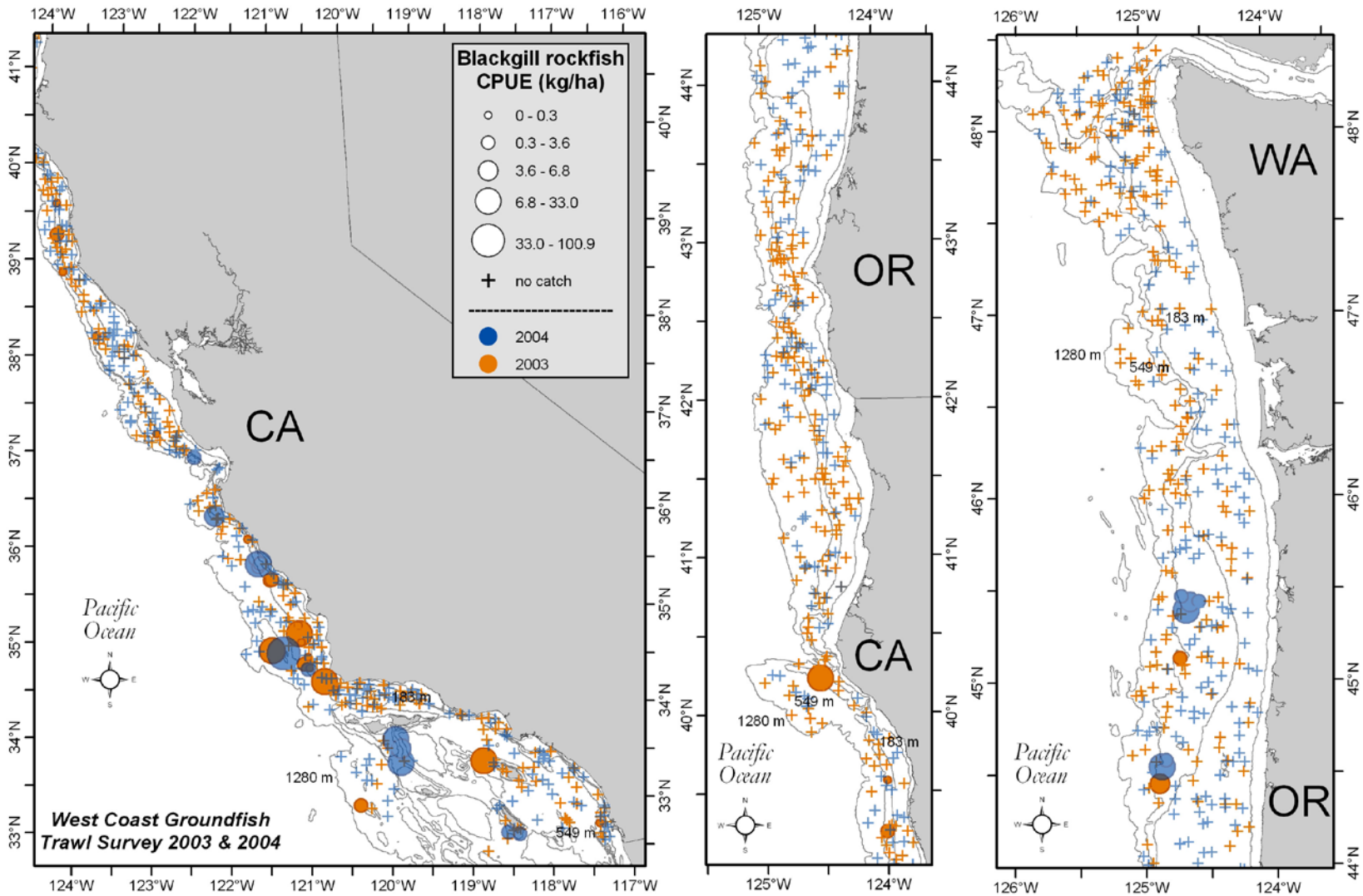


Figure 18. Blackgill rockfish (*Sebastes melanostomus*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

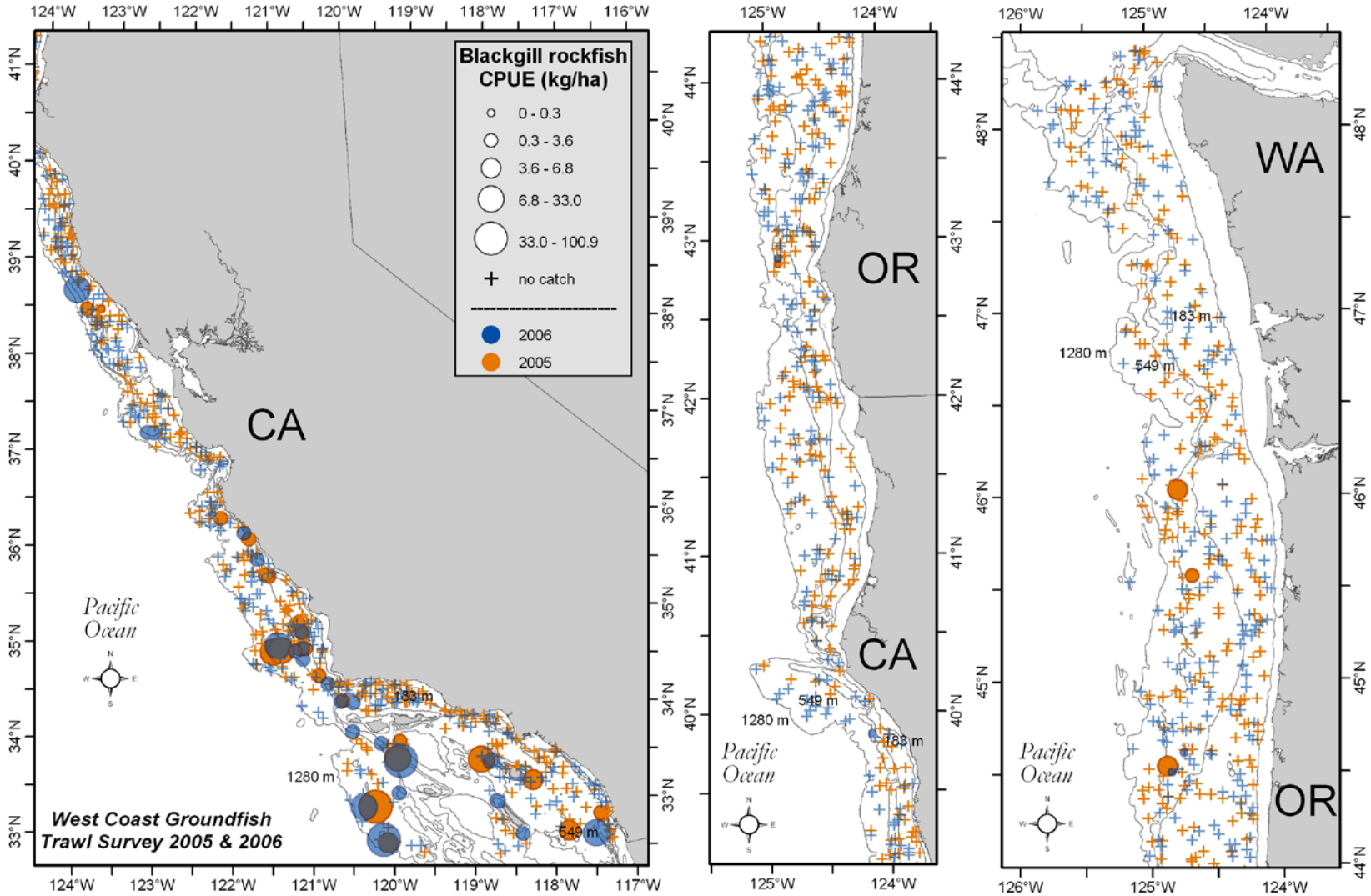


Figure 19. Blackgill rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

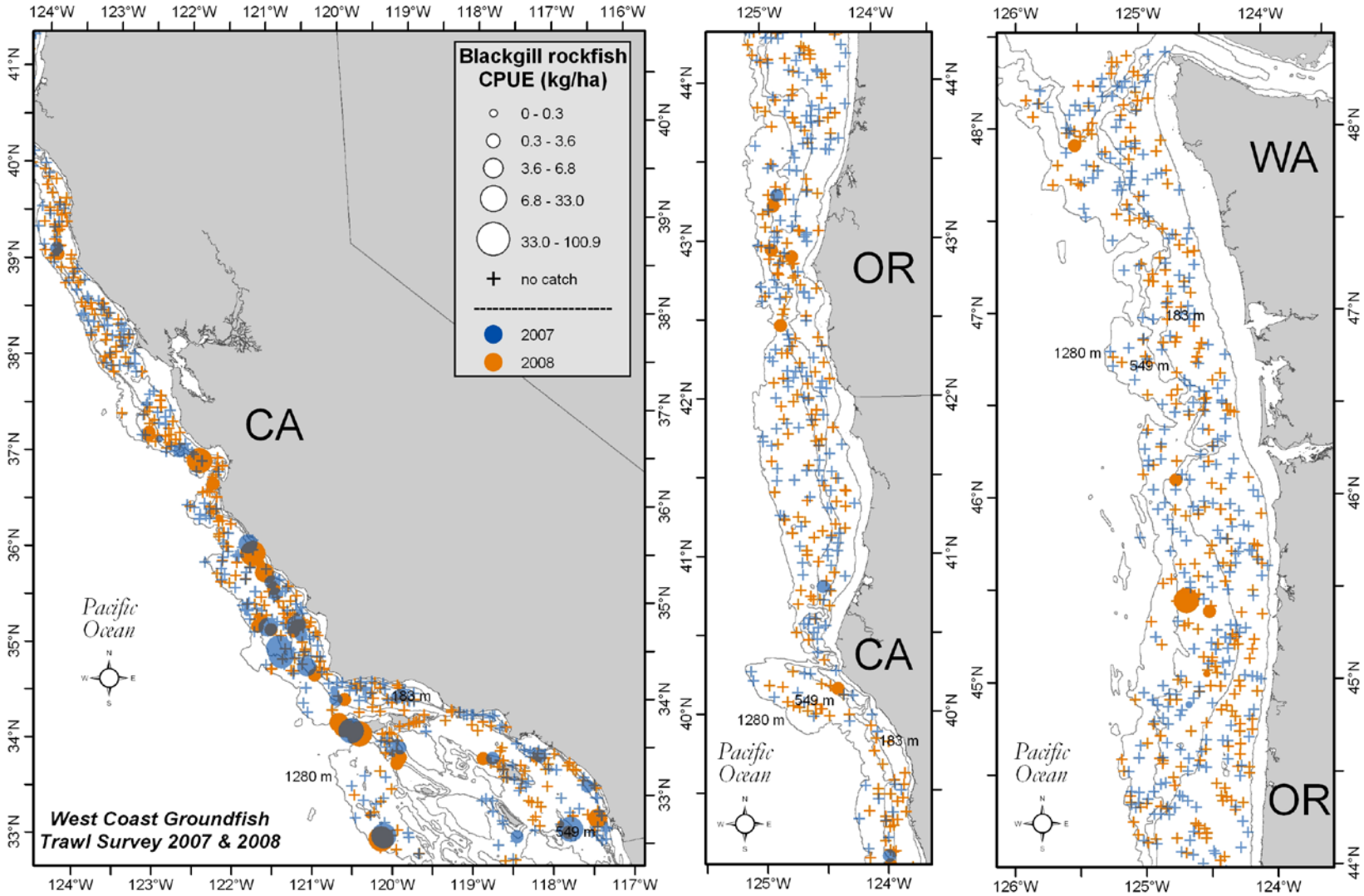


Figure 20. Blackgill rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

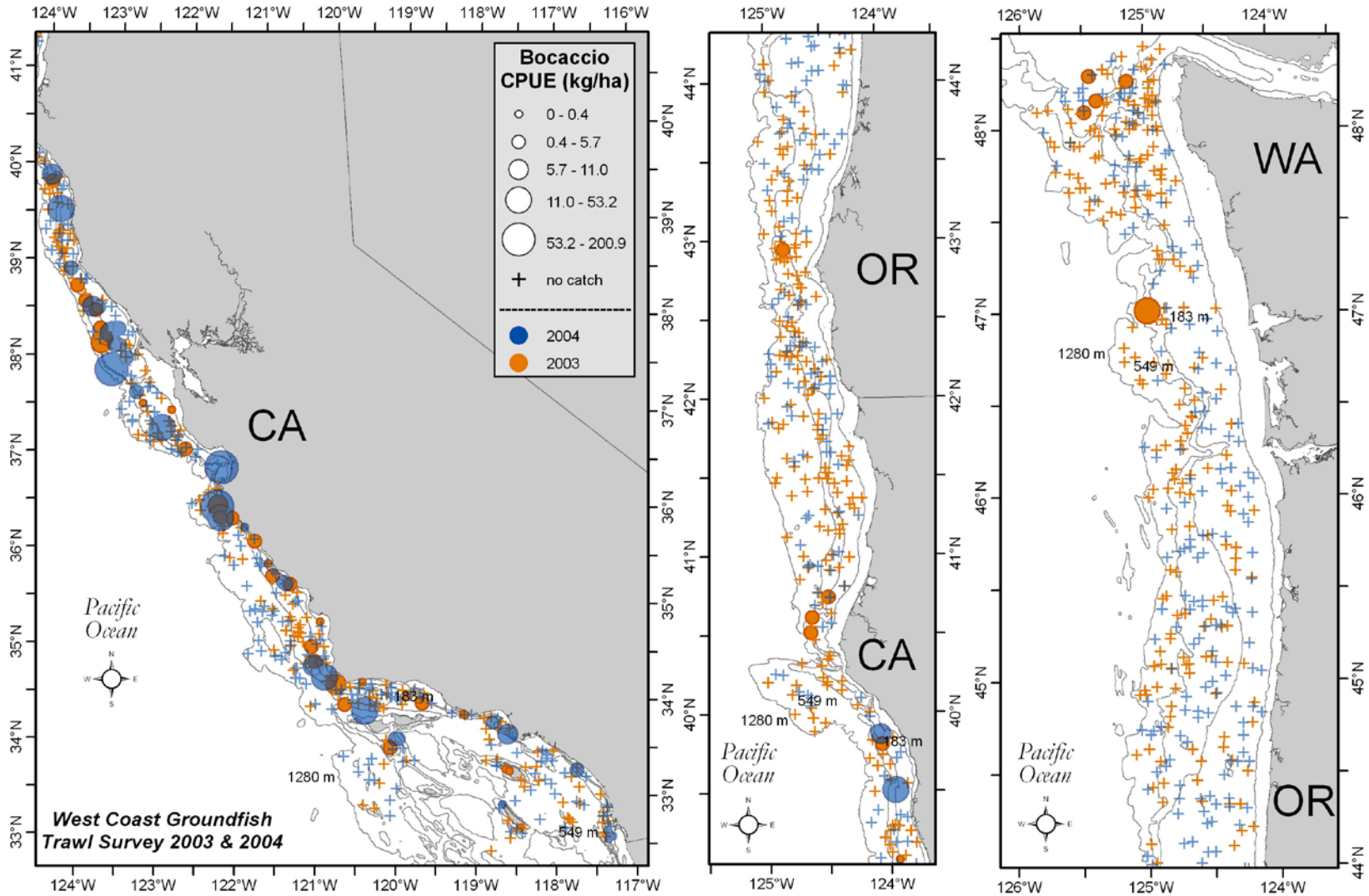


Figure 21. Bocaccio (*Sebastes paucispinis*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

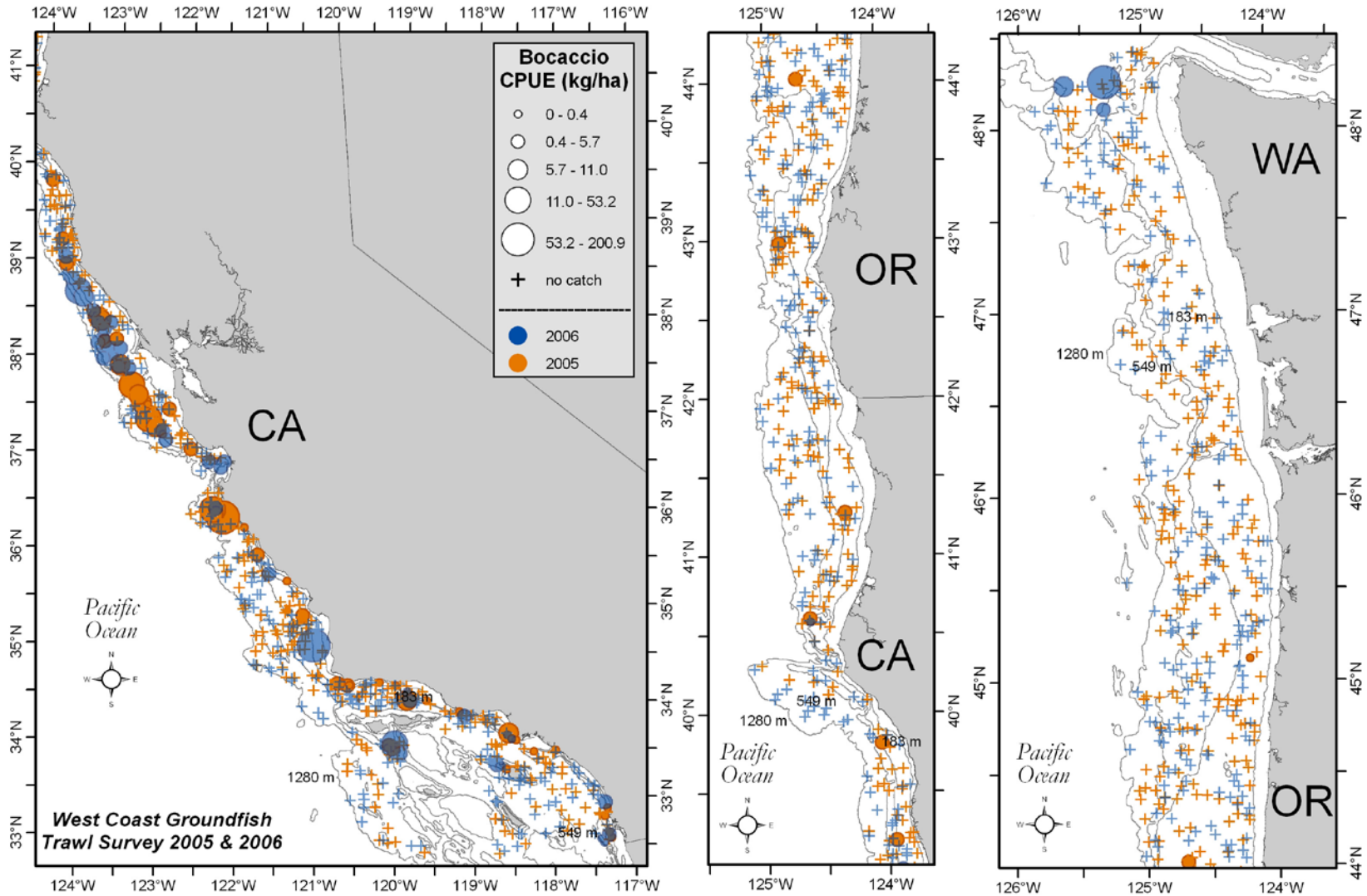


Figure 22. Bocaccio distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

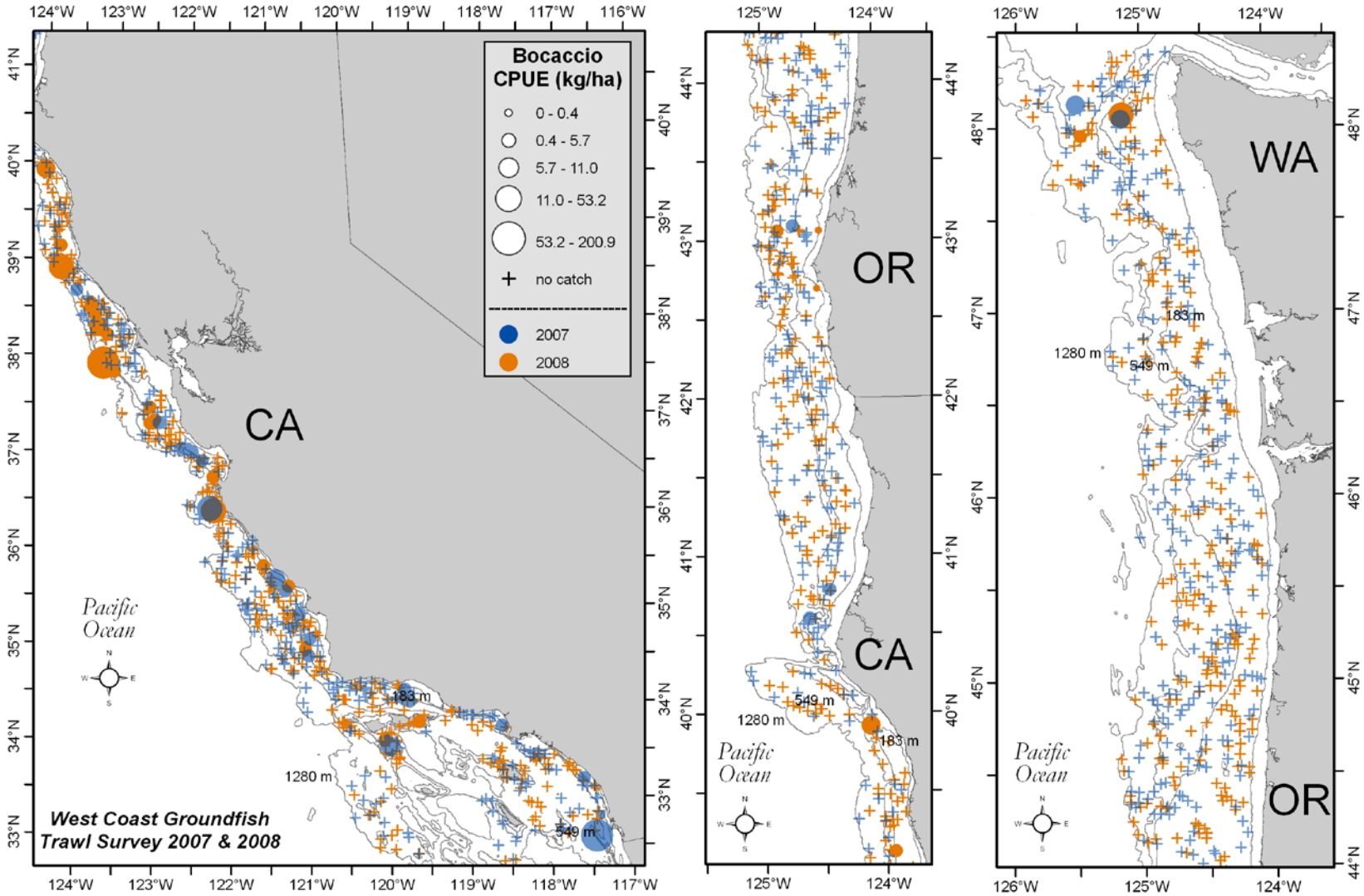


Figure 23. Bocaccio distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

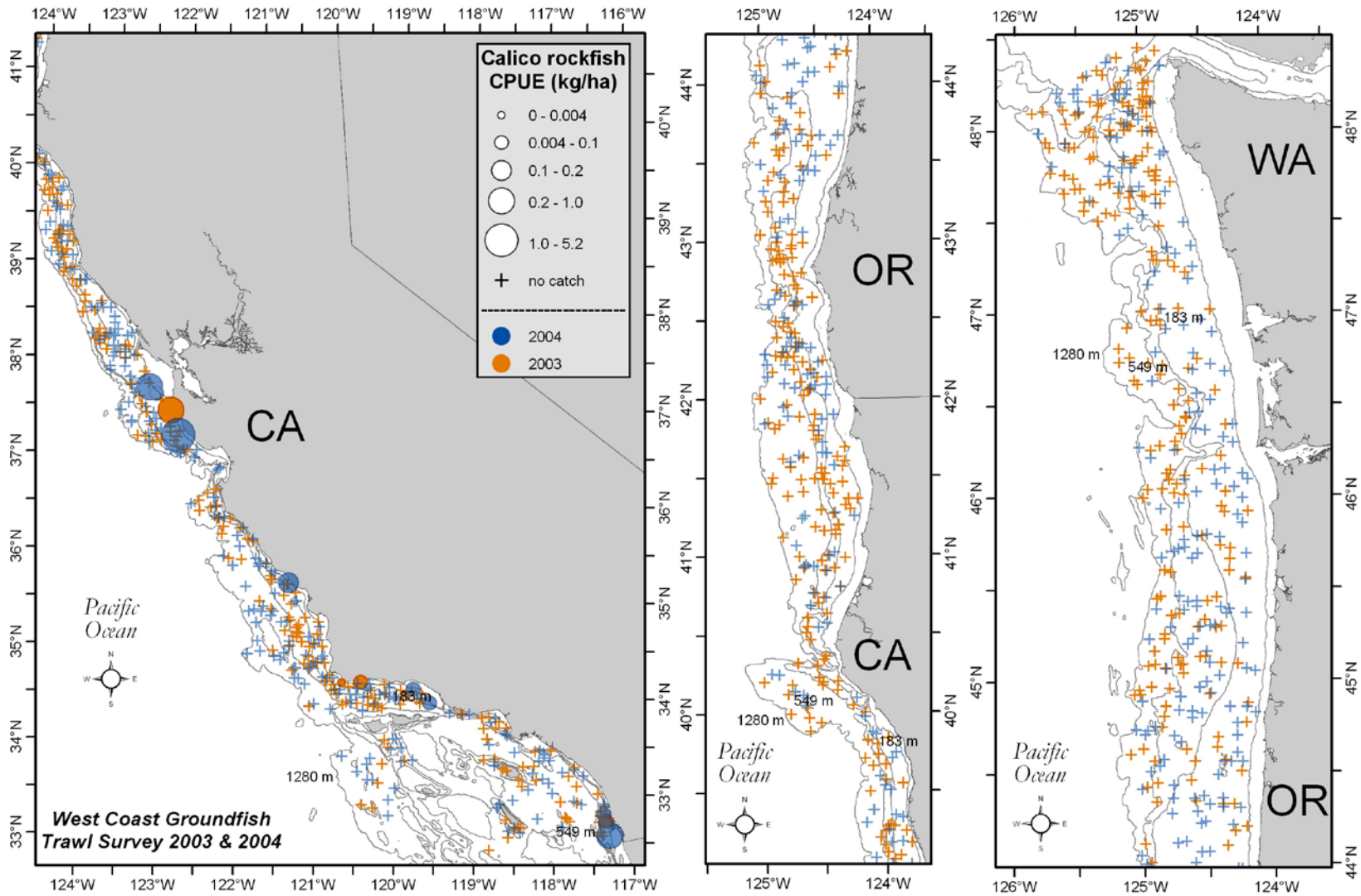


Figure 24. Calico rockfish (*Sebastes dalli*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

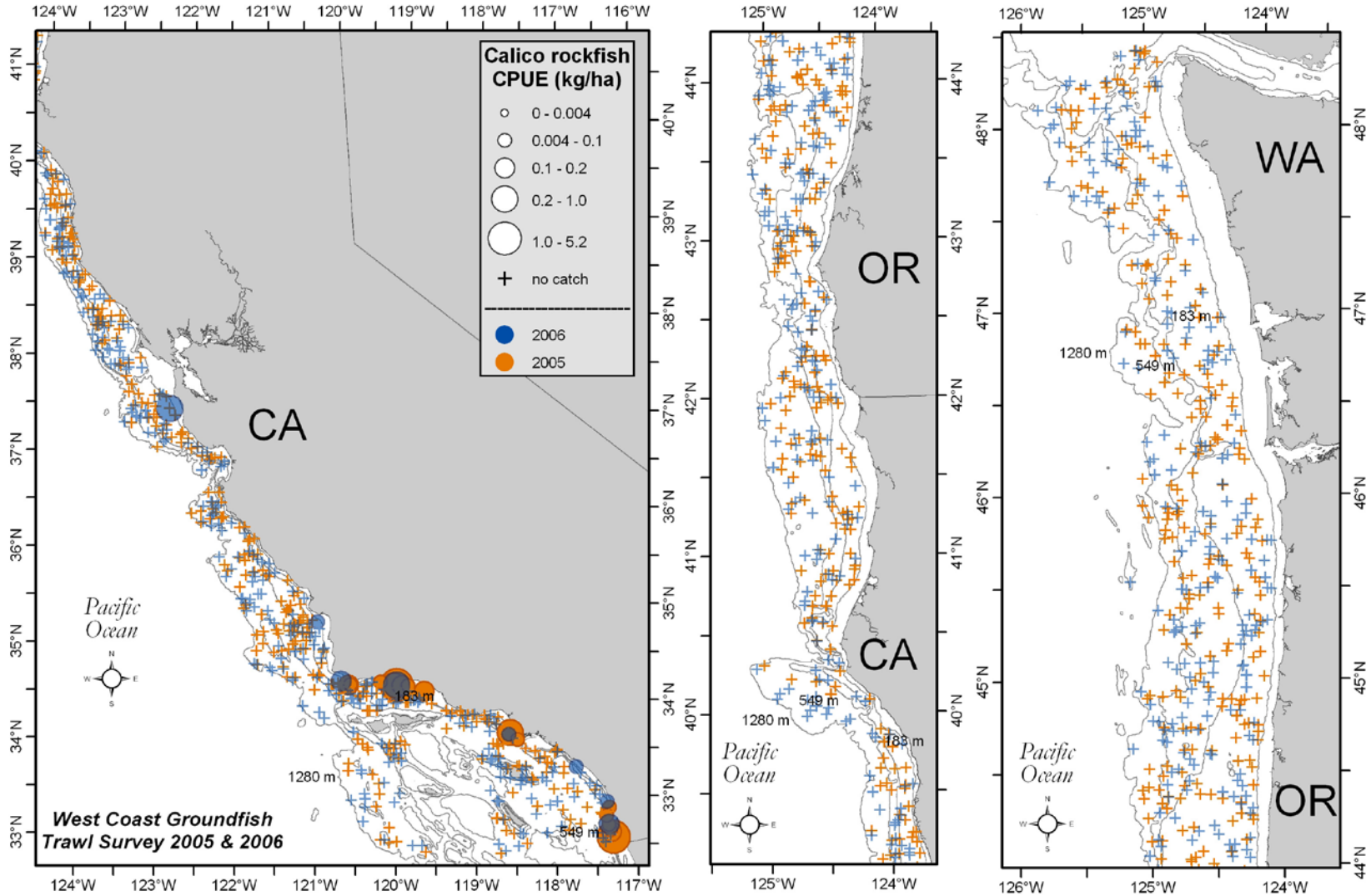


Figure 25. Calico rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

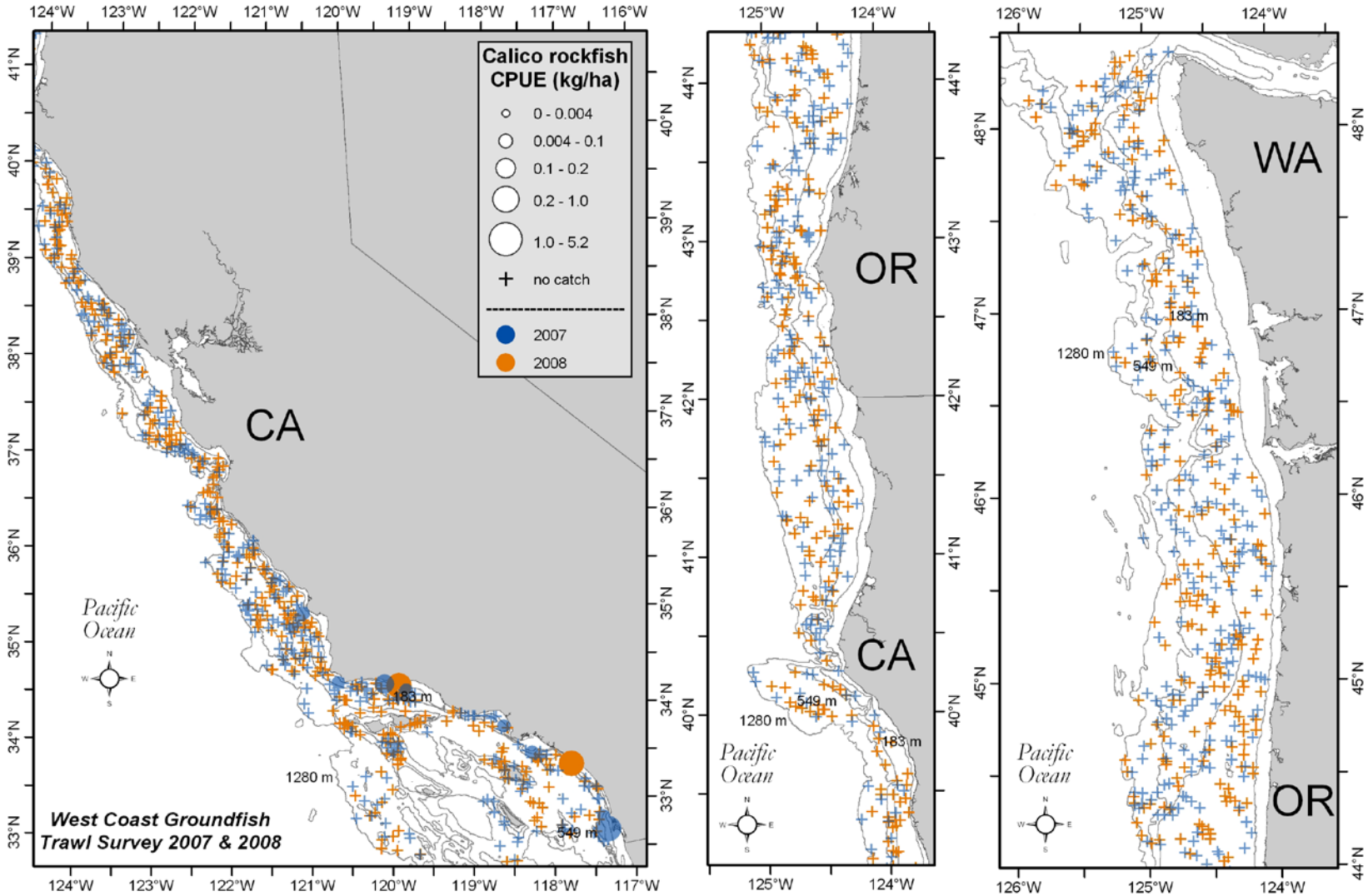


Figure 26. Calico rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

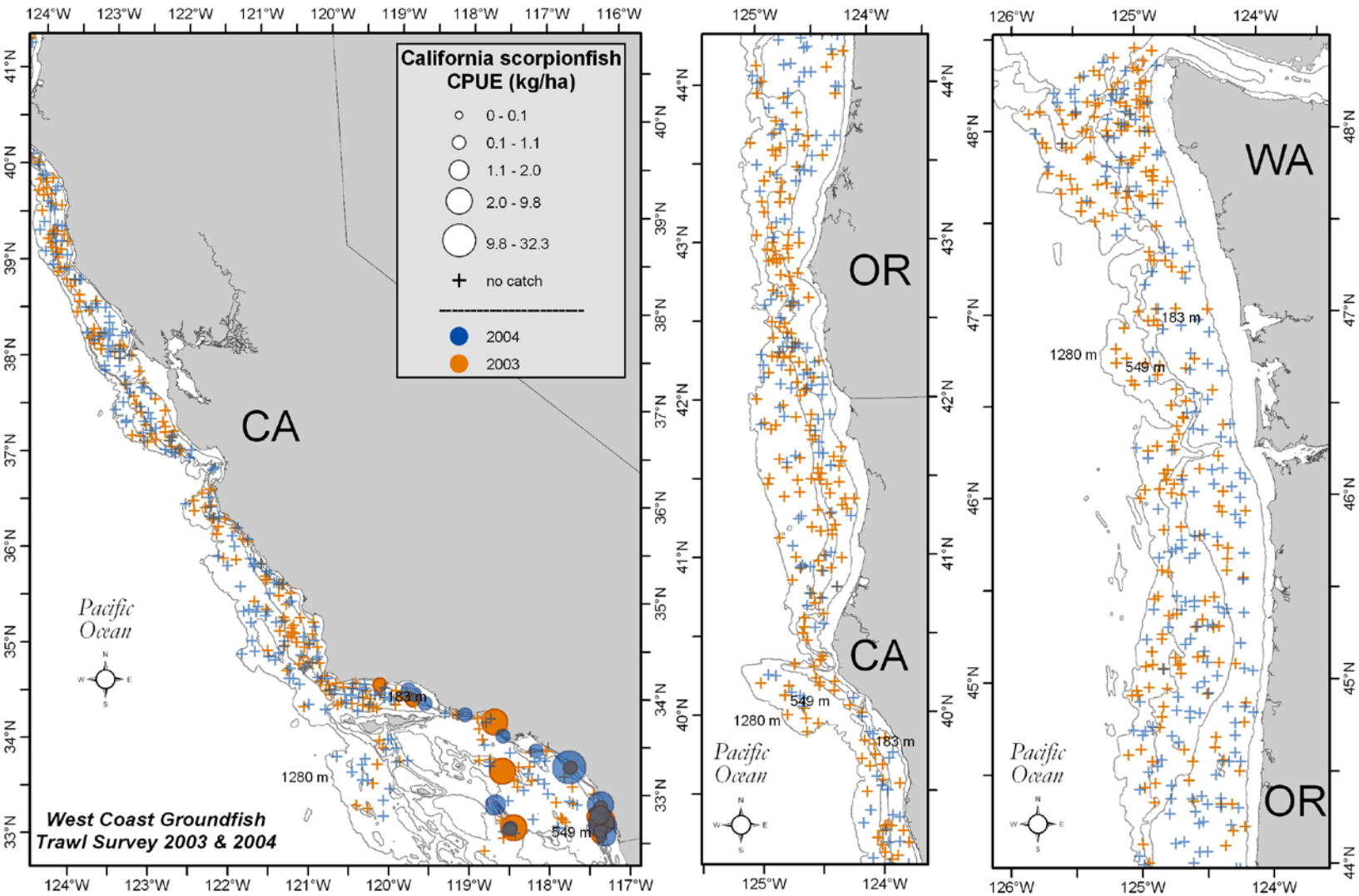


Figure 27. California scorpionfish (*Scorpaena guttata*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

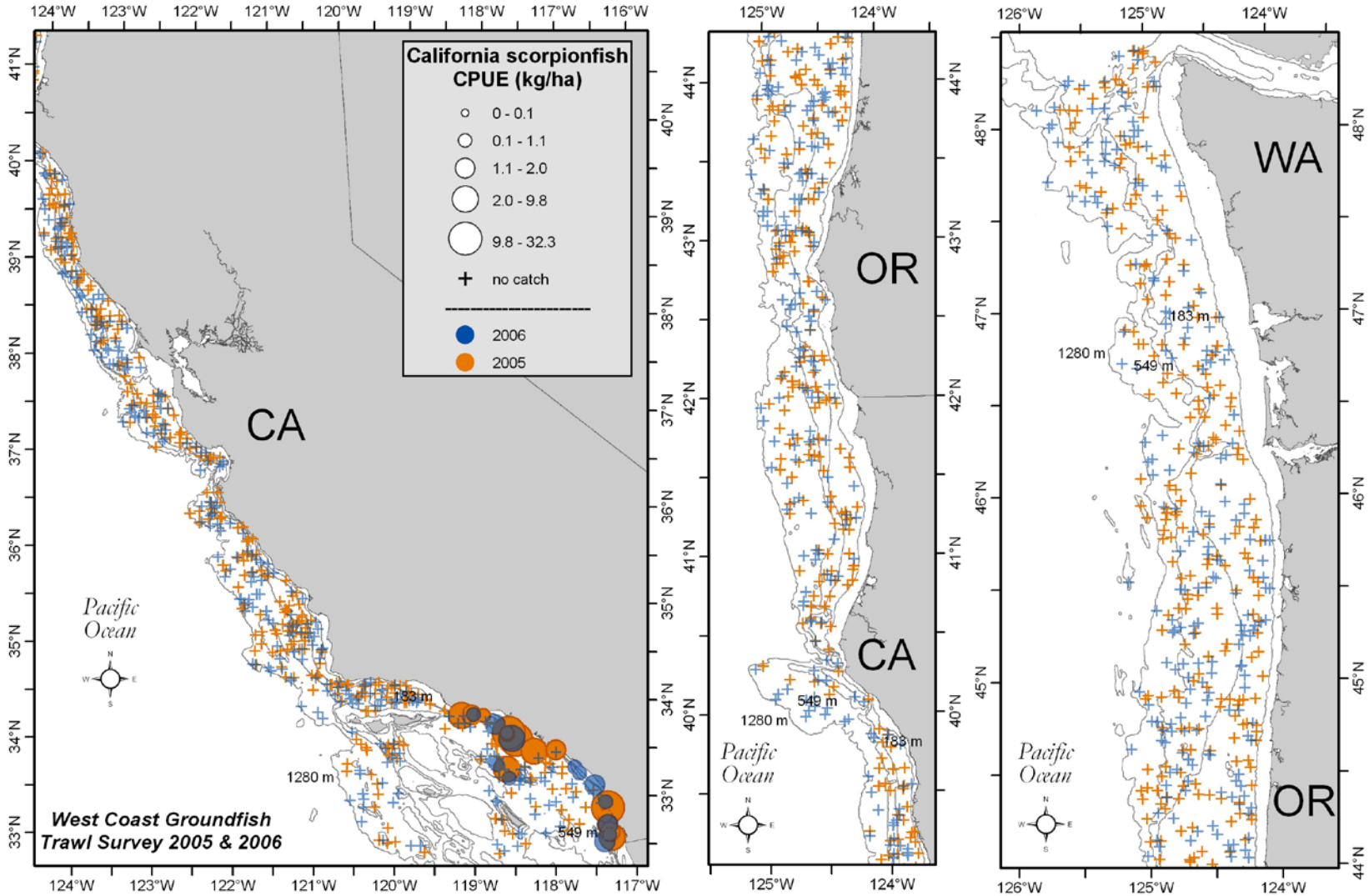


Figure 28. California scorpionfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

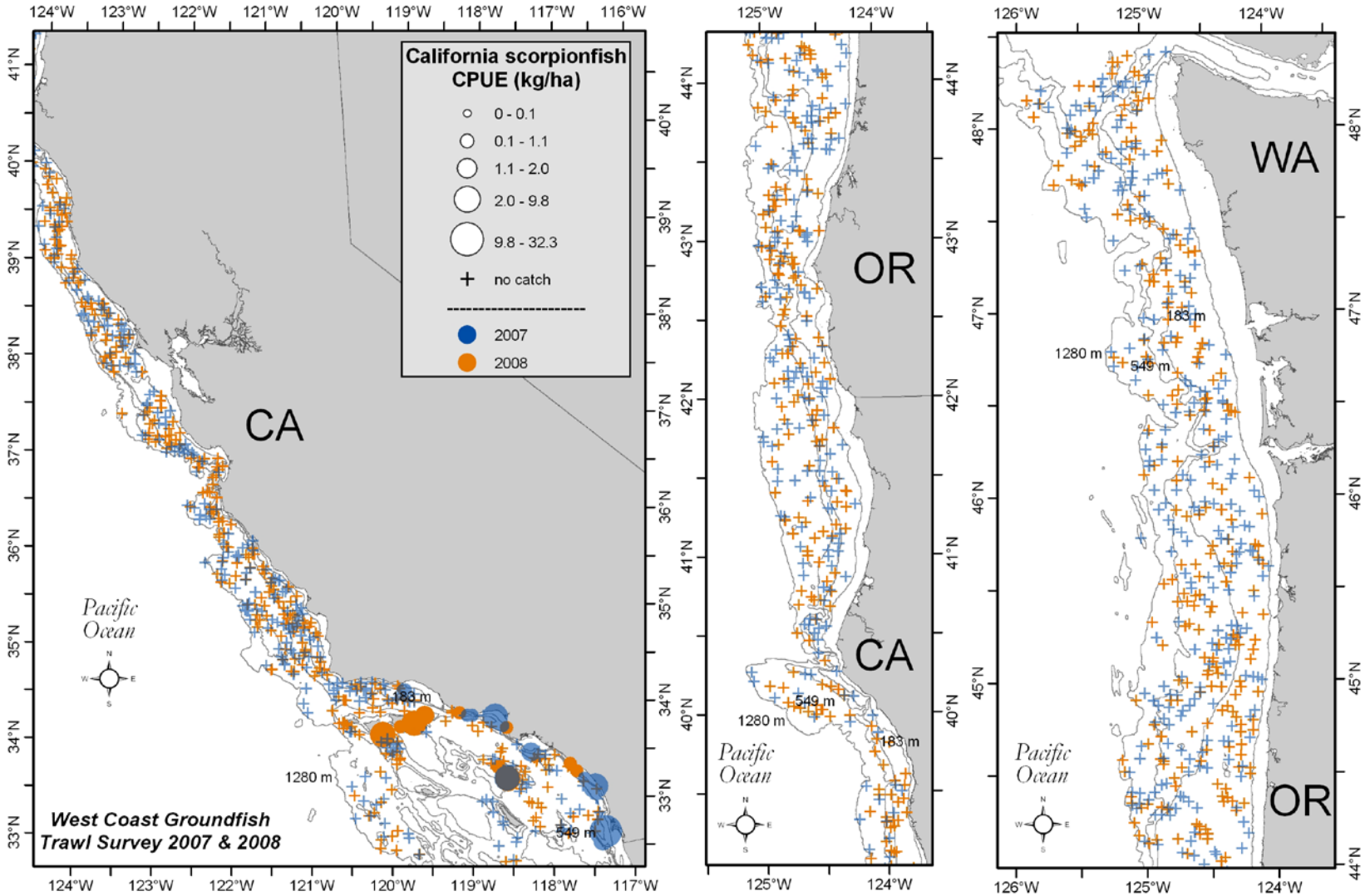


Figure 29. California scorpionfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

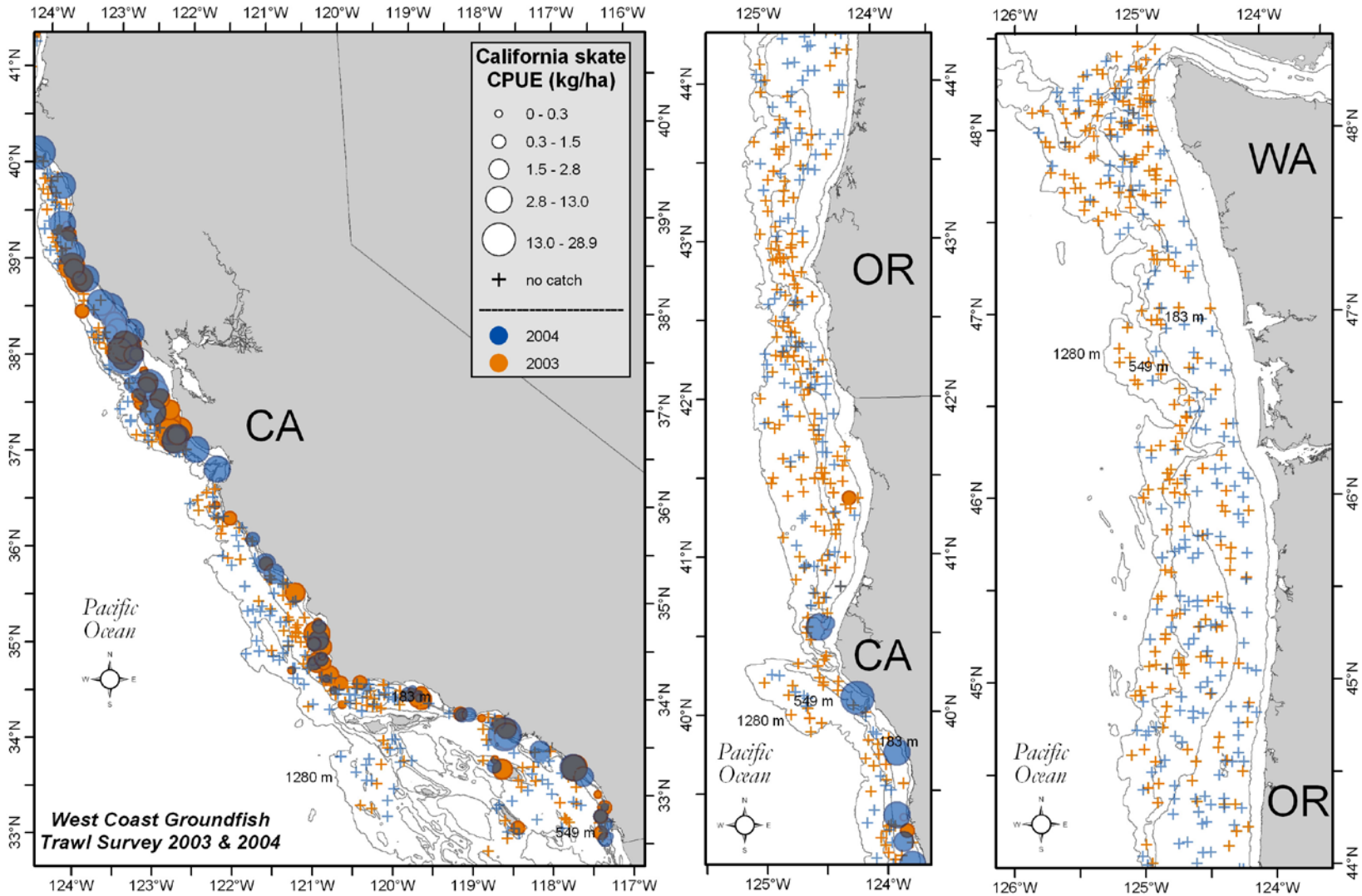


Figure 30. California skate (*Raja inornata*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

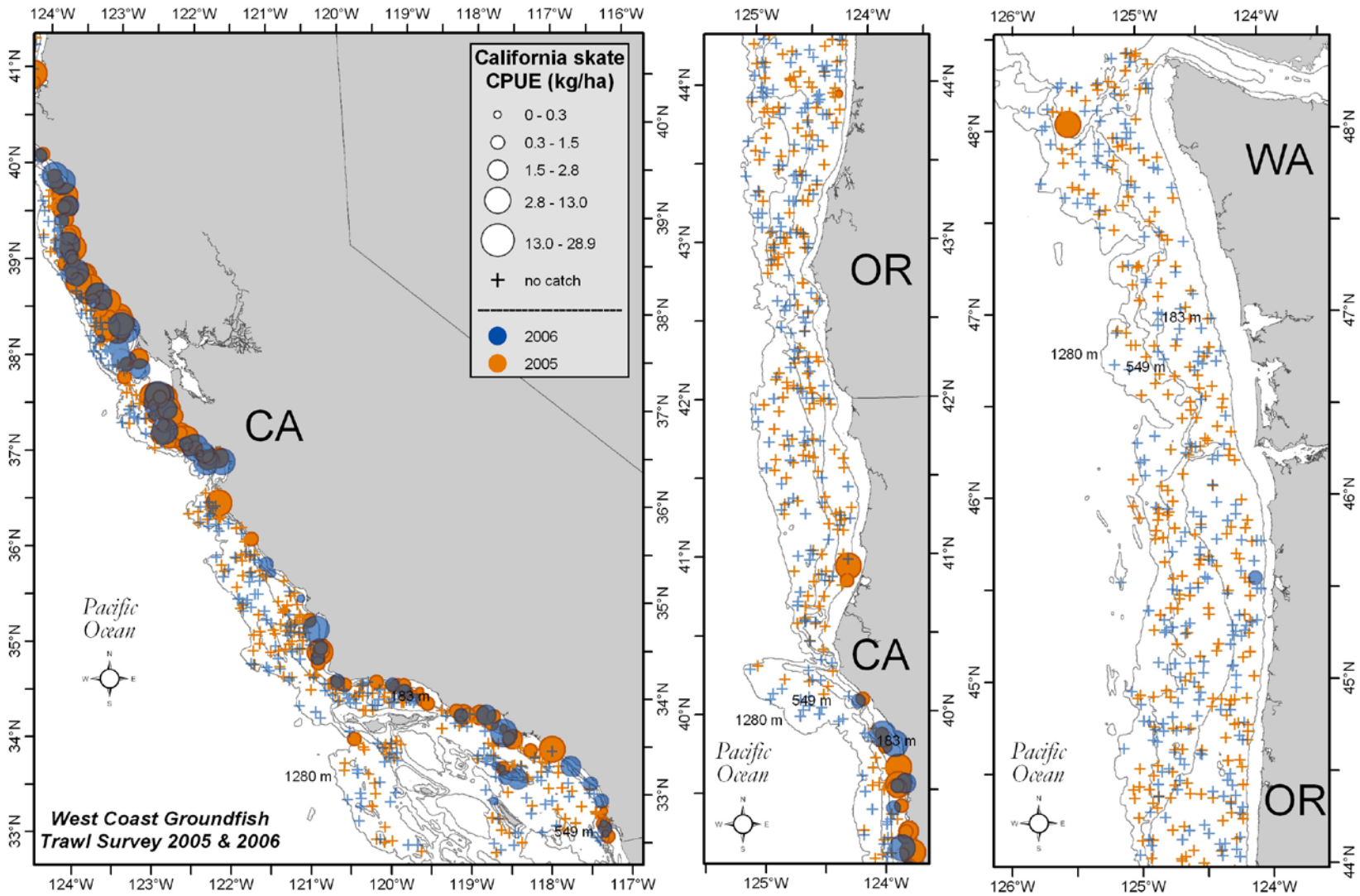


Figure 31. California skate distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

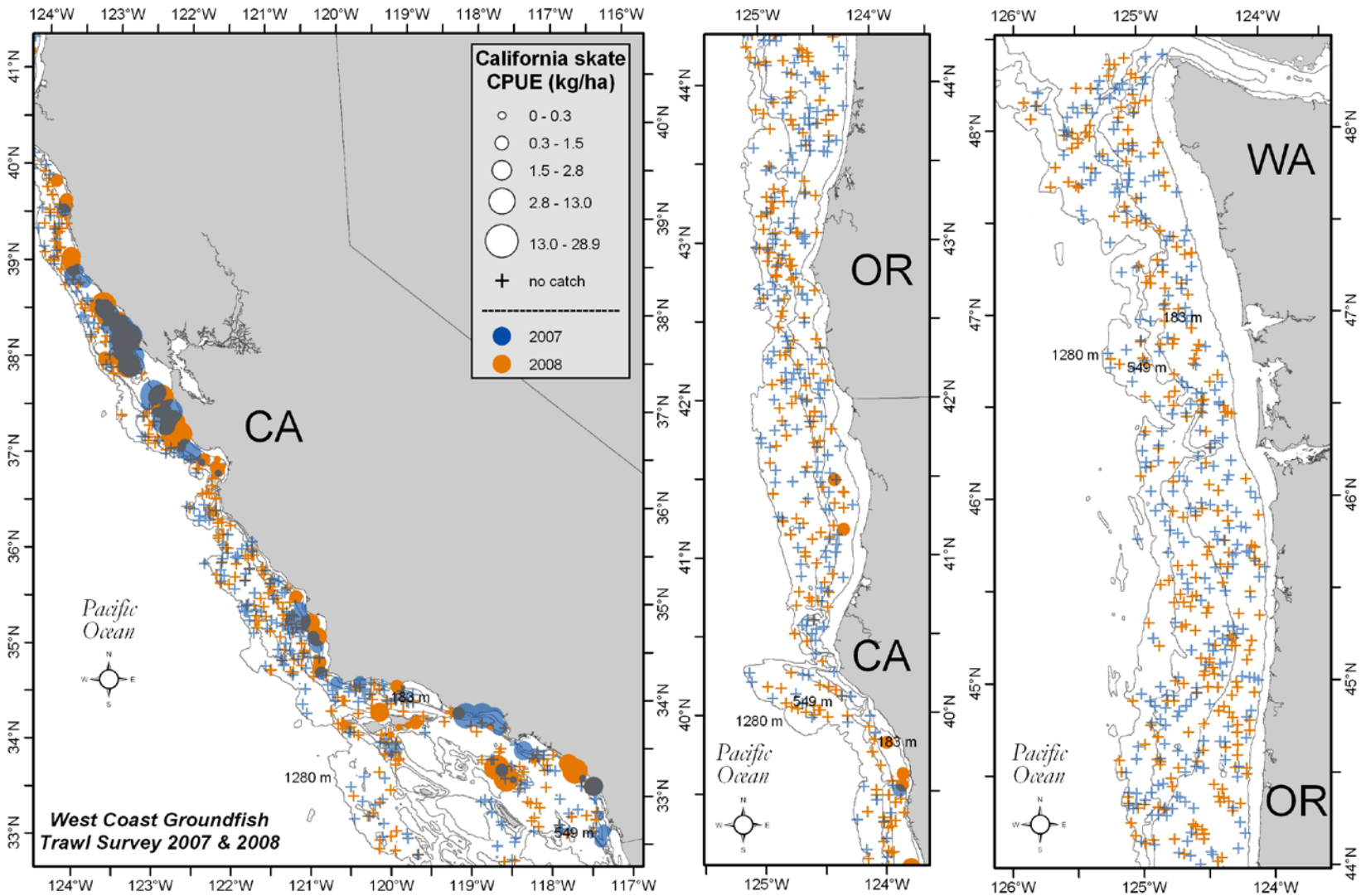


Figure 32. California skate distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

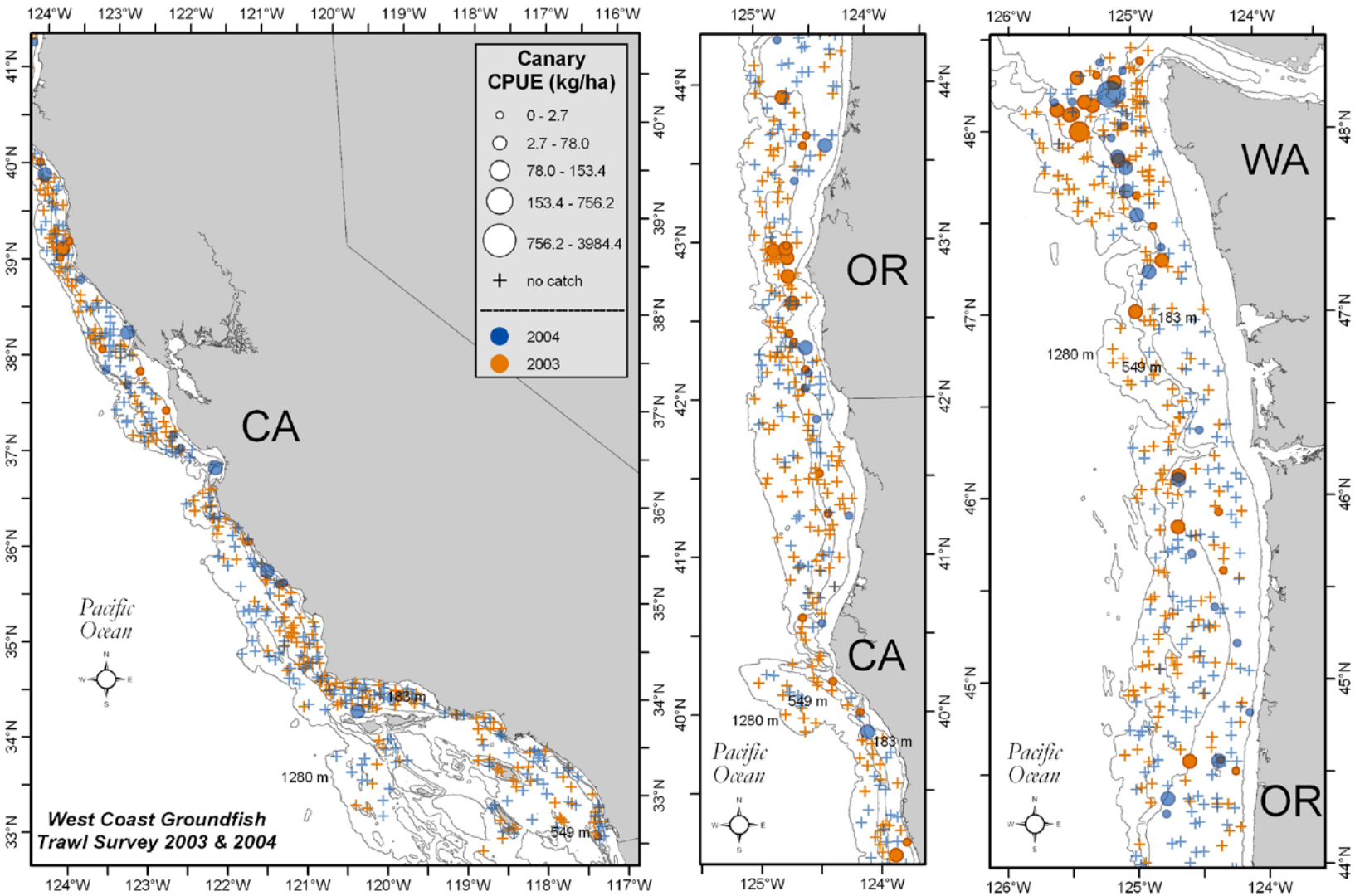


Figure 33. Canary rockfish (*Sebastes pinniger*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

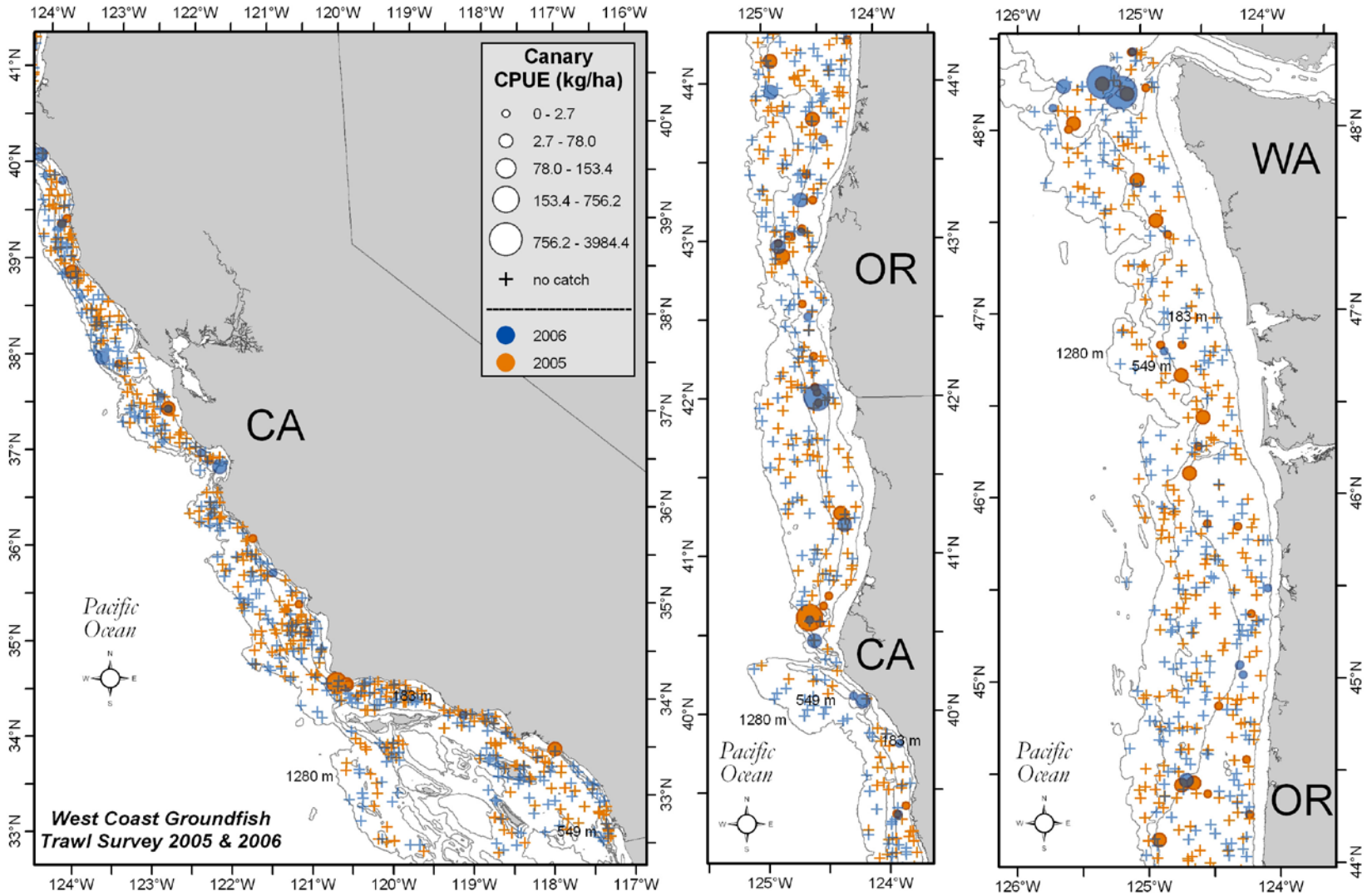


Figure 34. Canary rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

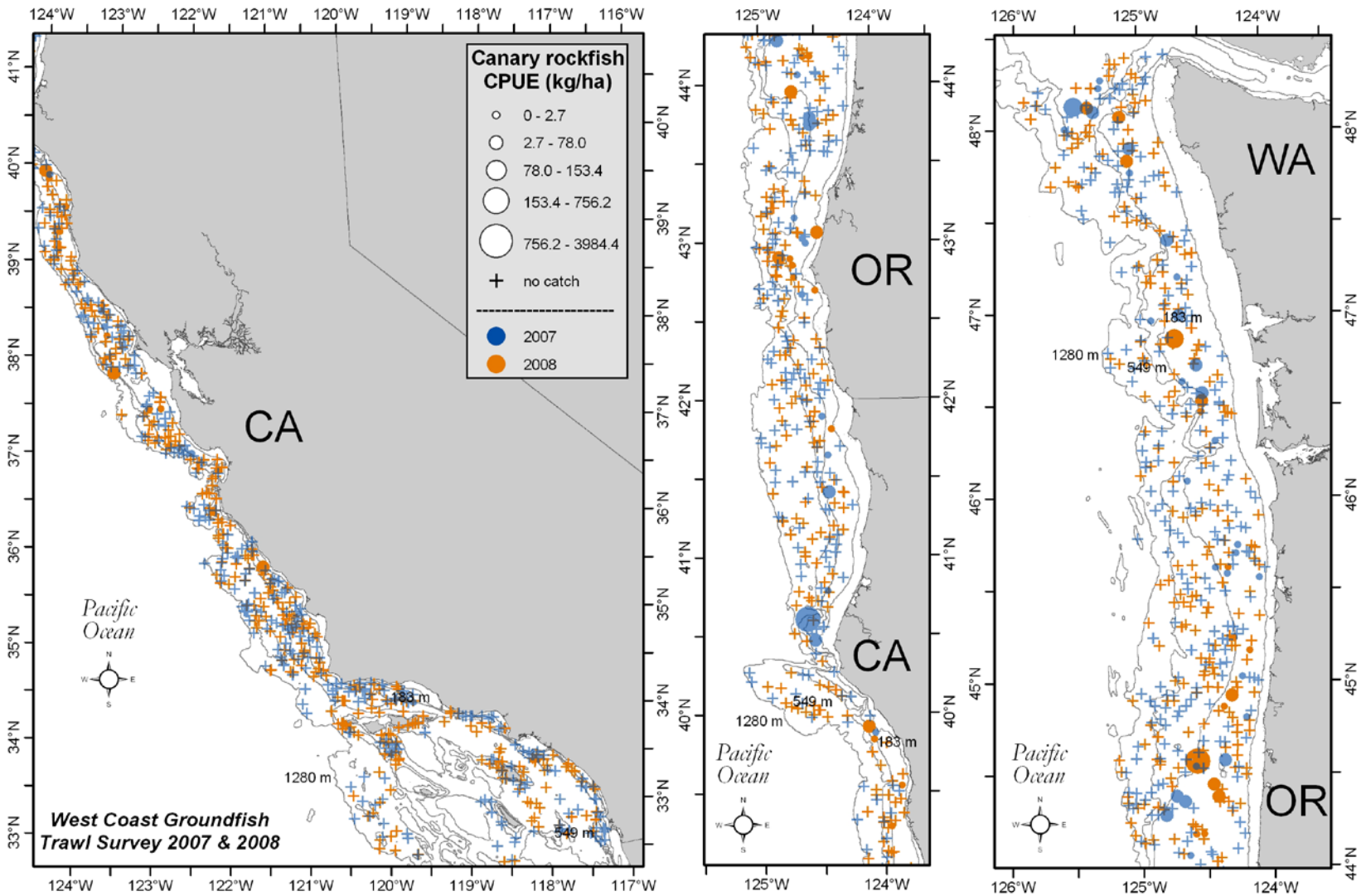


Figure 35. Canary rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

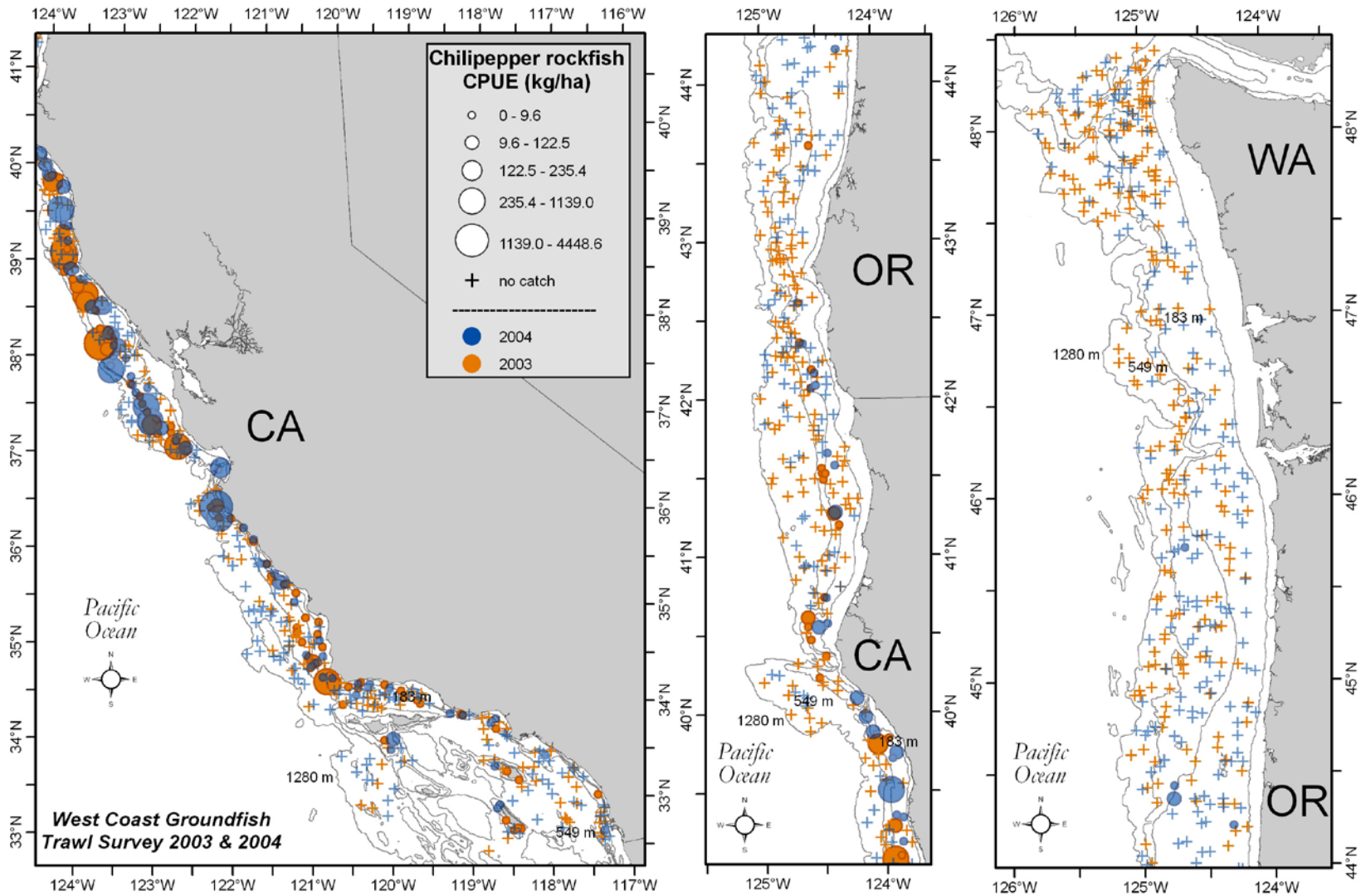


Figure 36. Chilipepper rockfish (*Sebastes goodei*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

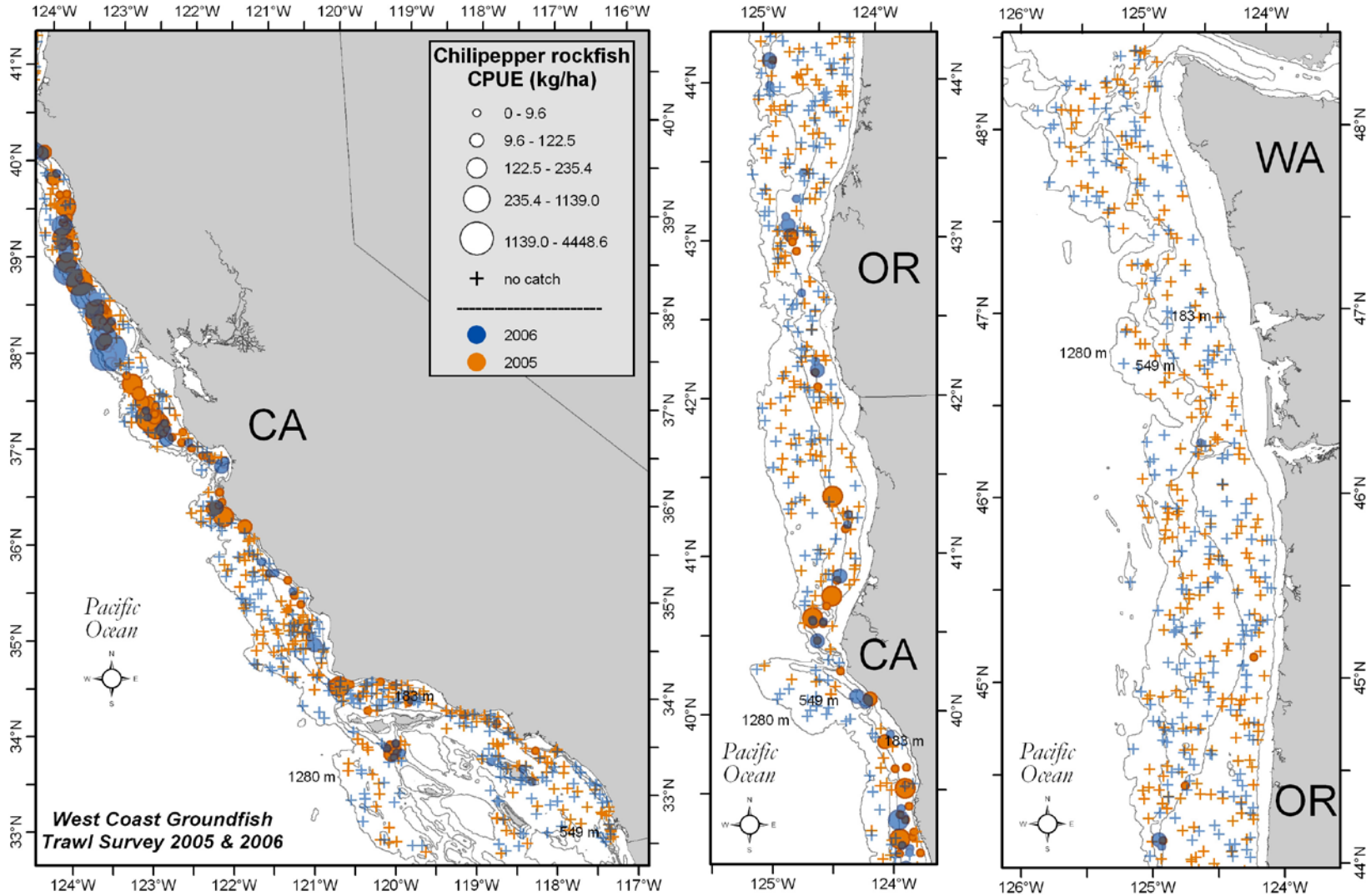


Figure 37. Chilipepper rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

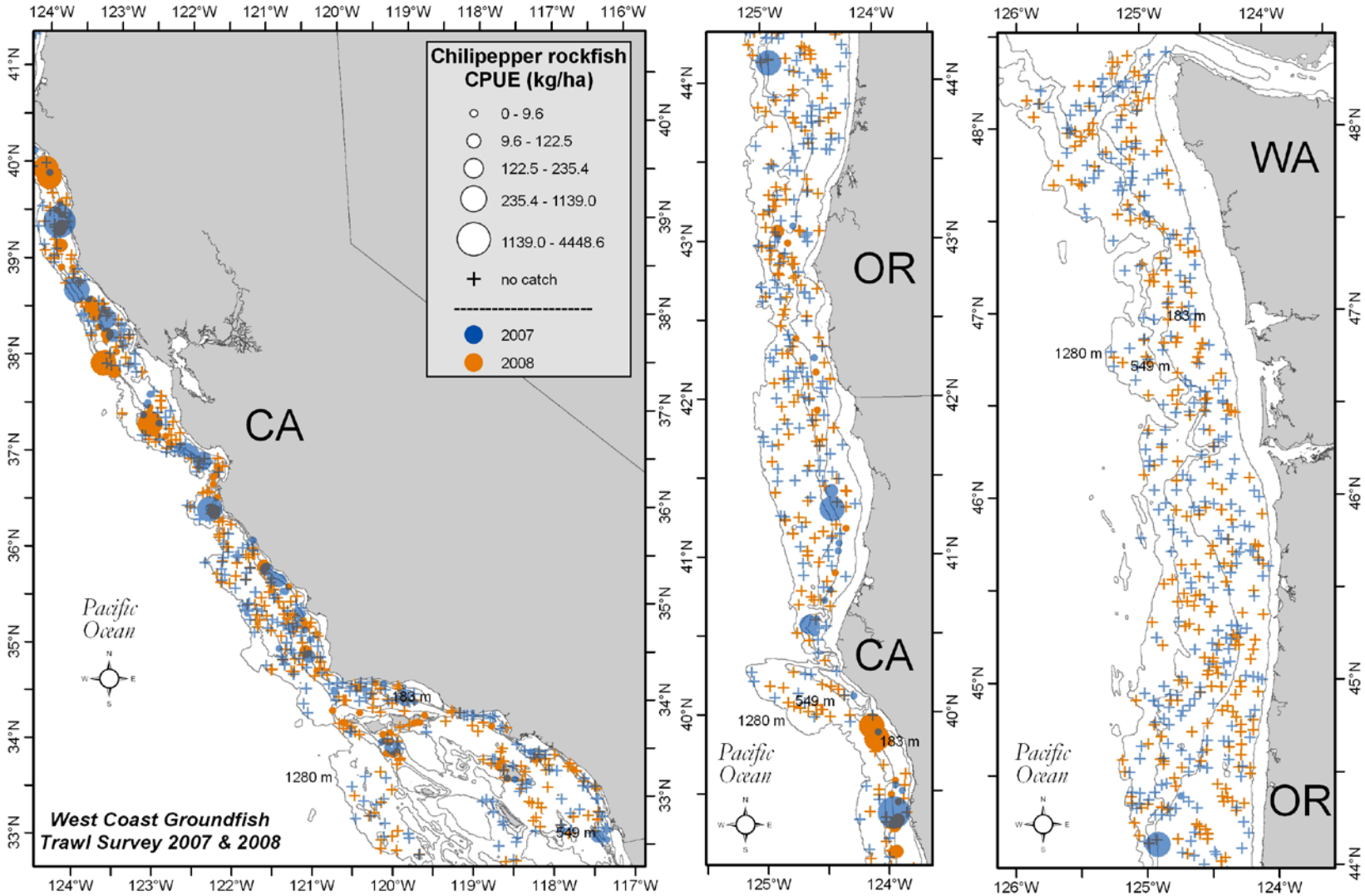


Figure 38. Chilipepper rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

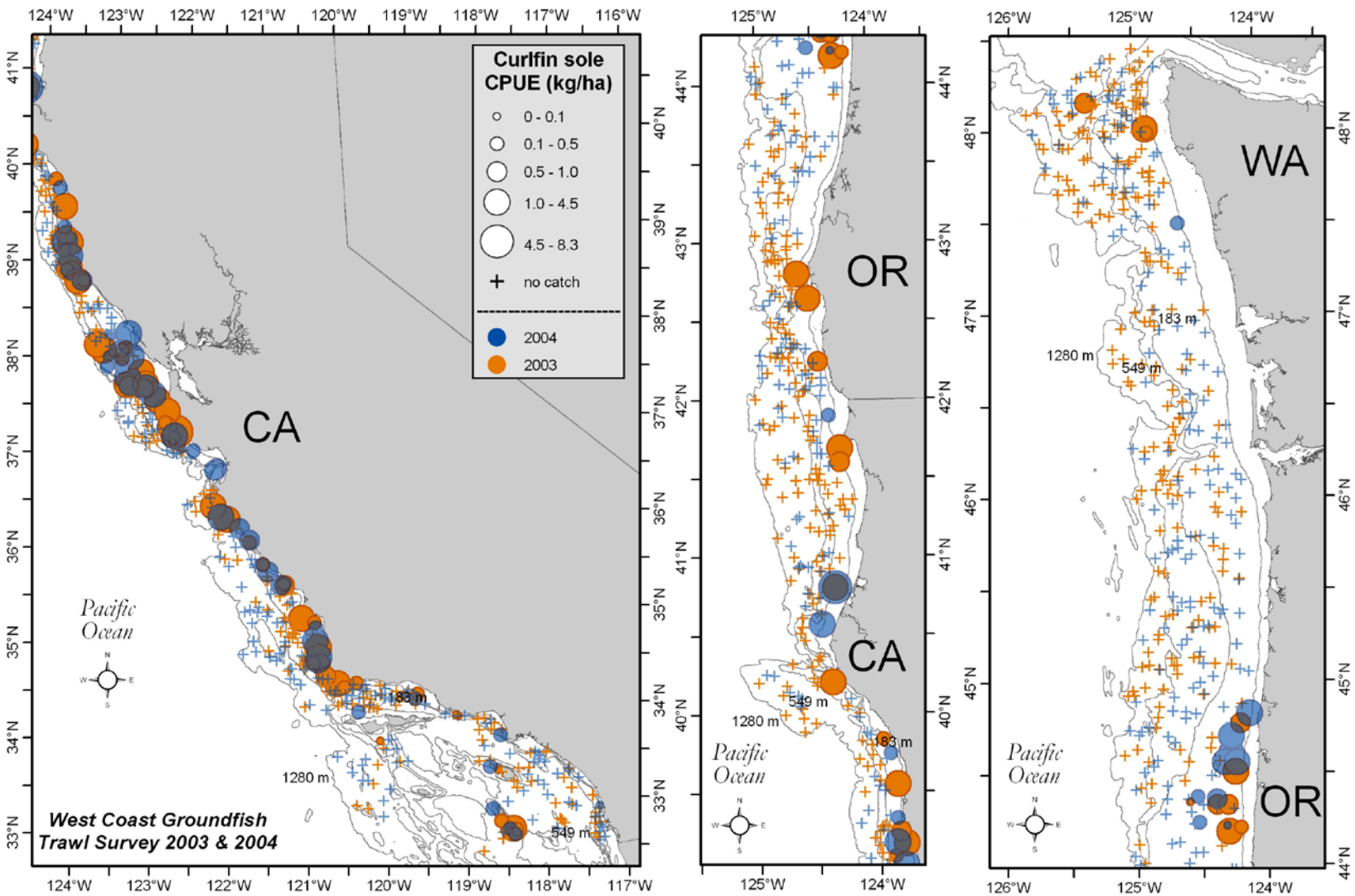


Figure 39. Curlfin sole (*Pleuronichthys decurrens*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

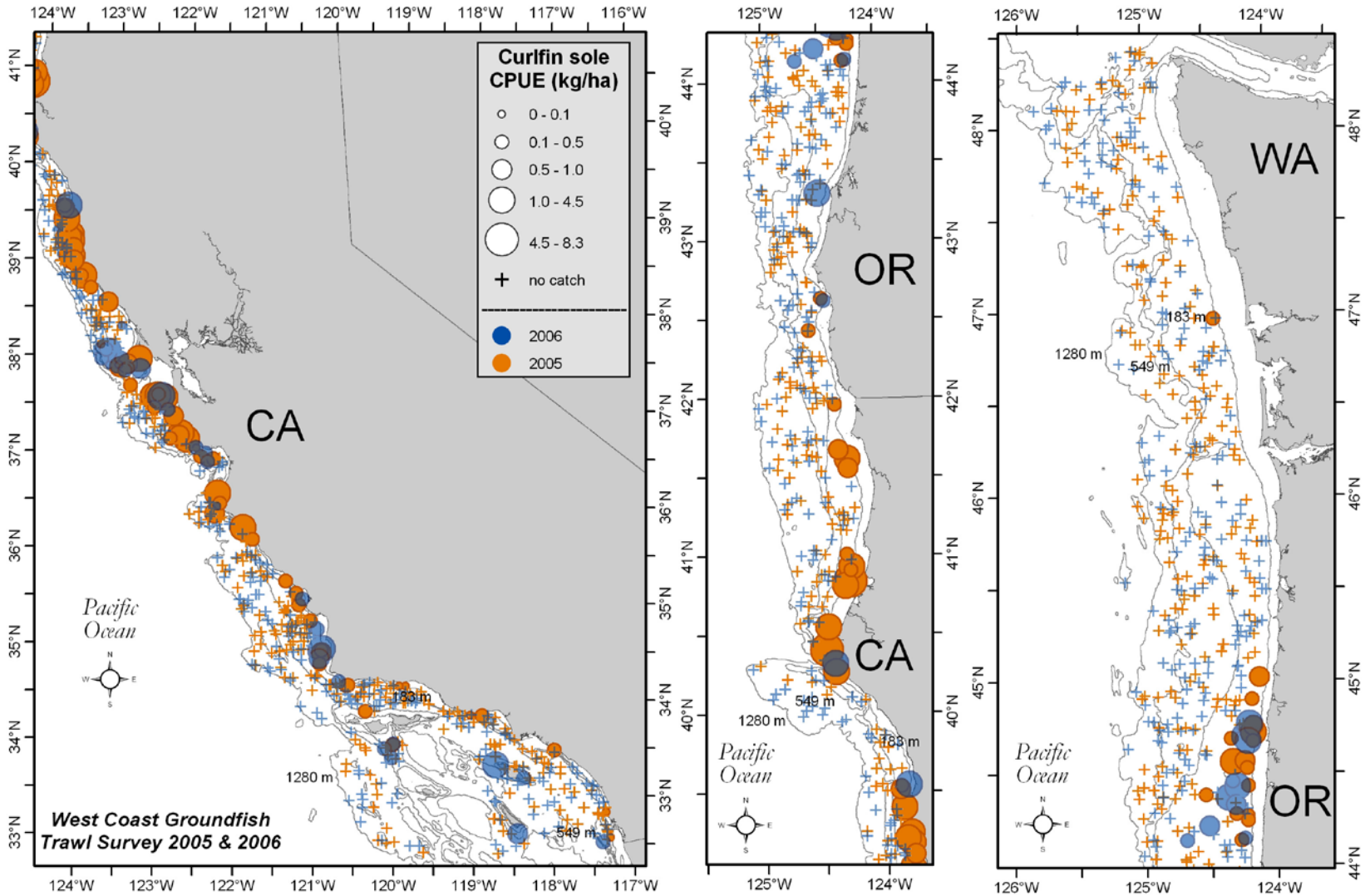


Figure 40. Curlfin sole distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

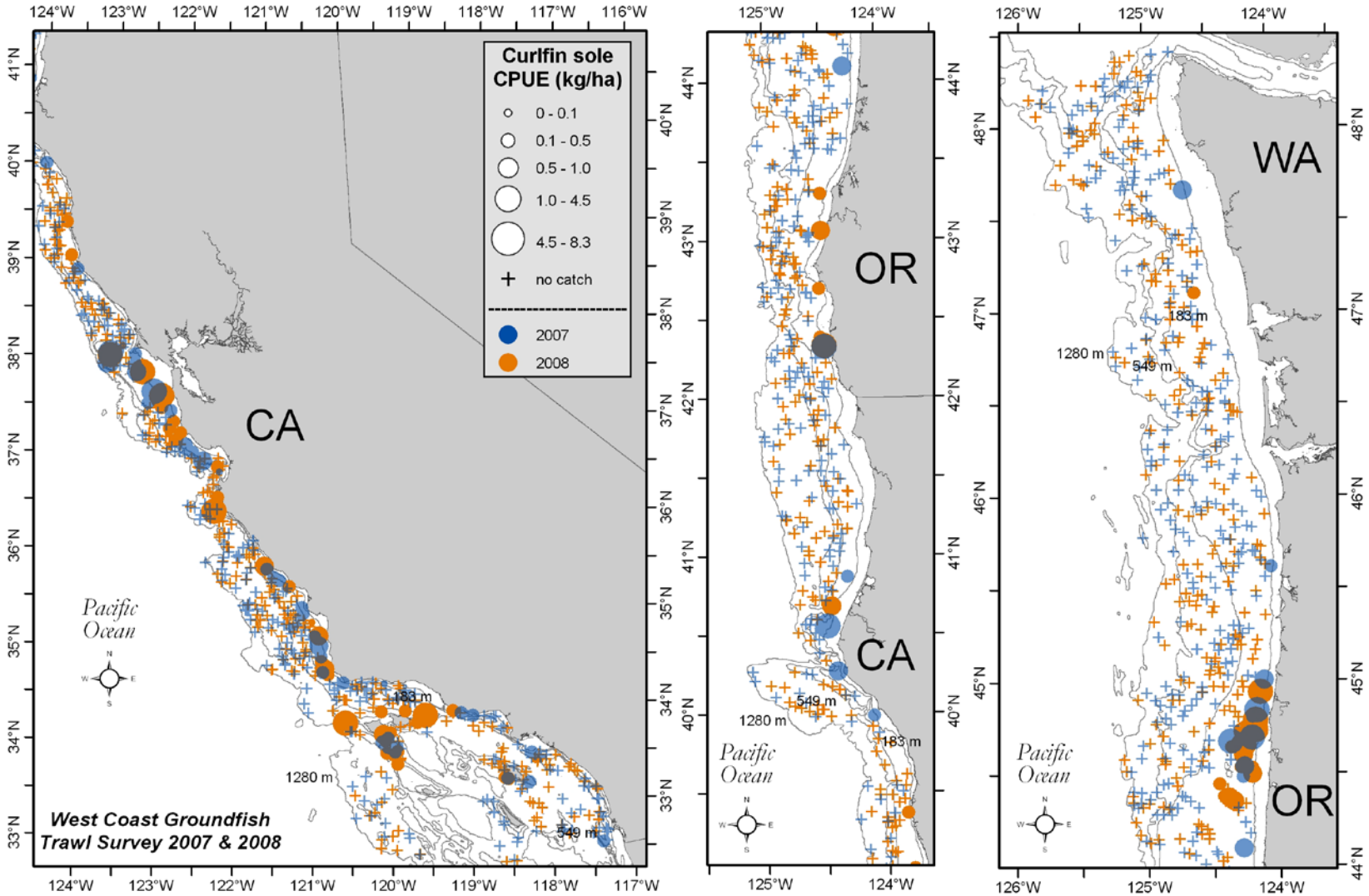


Figure 41. Curlfin sole distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

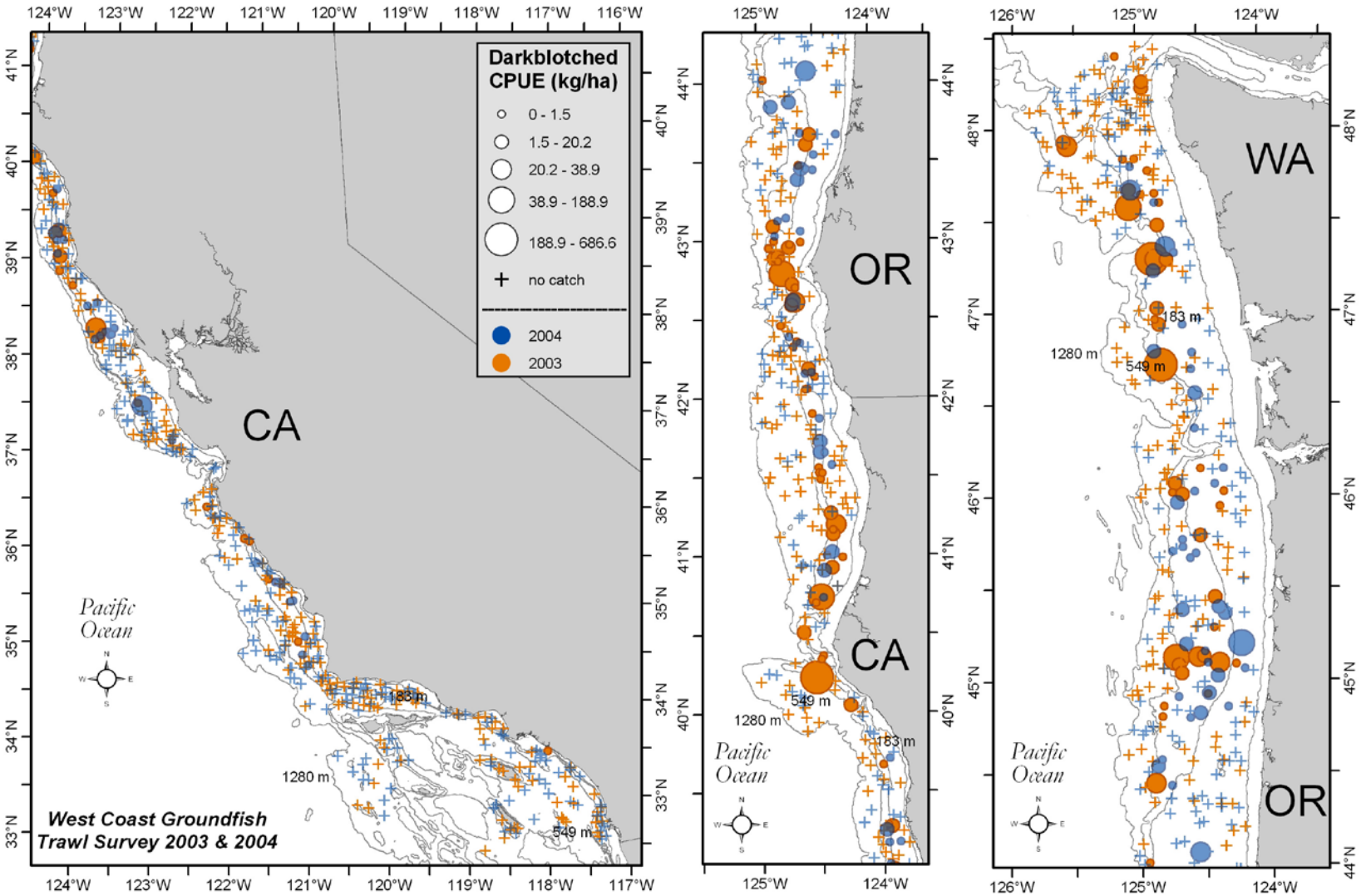


Figure 42. Darkblotched rockfish (*Sebastes crameri*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

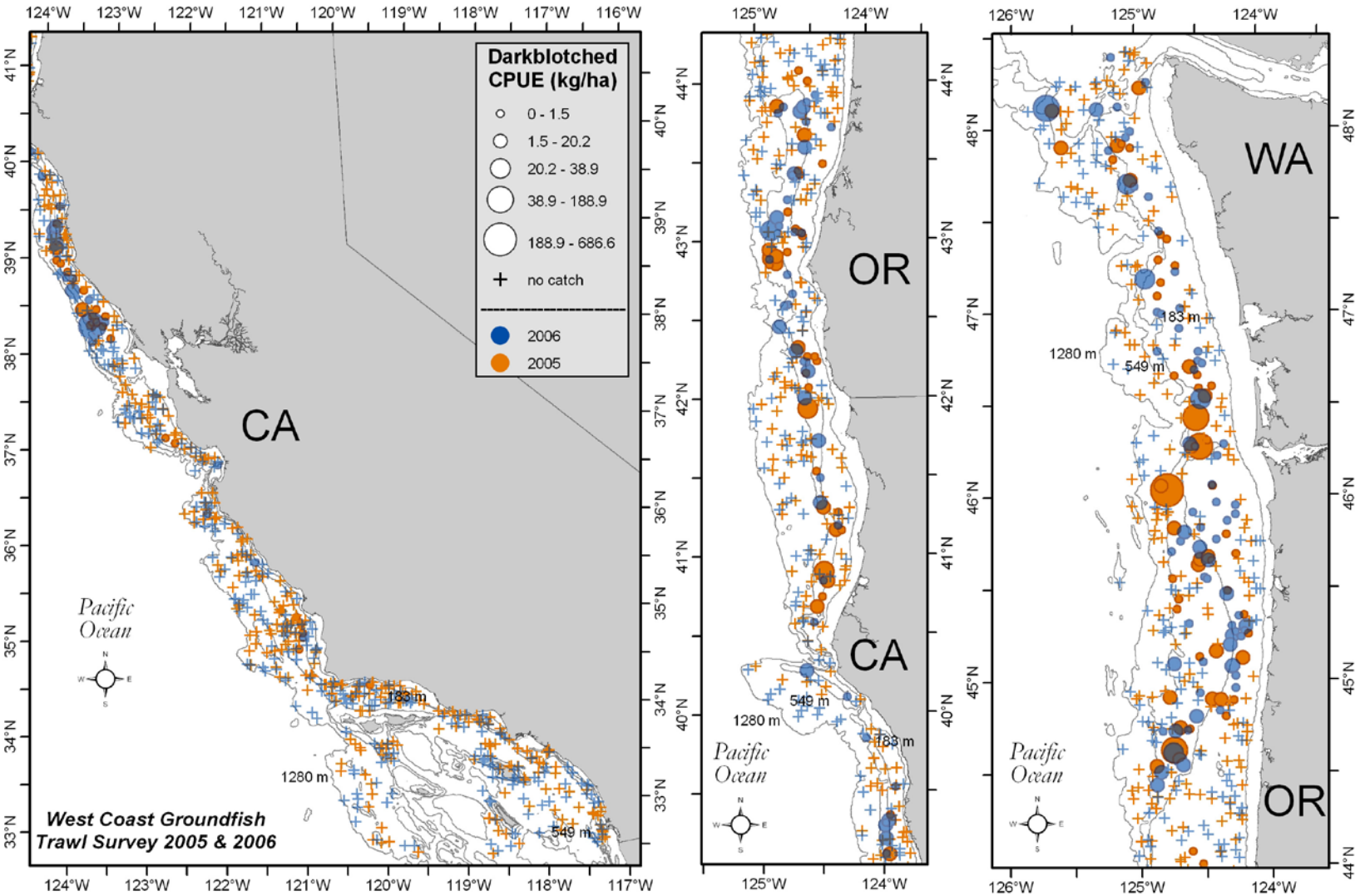


Figure 43. Darkblotched rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

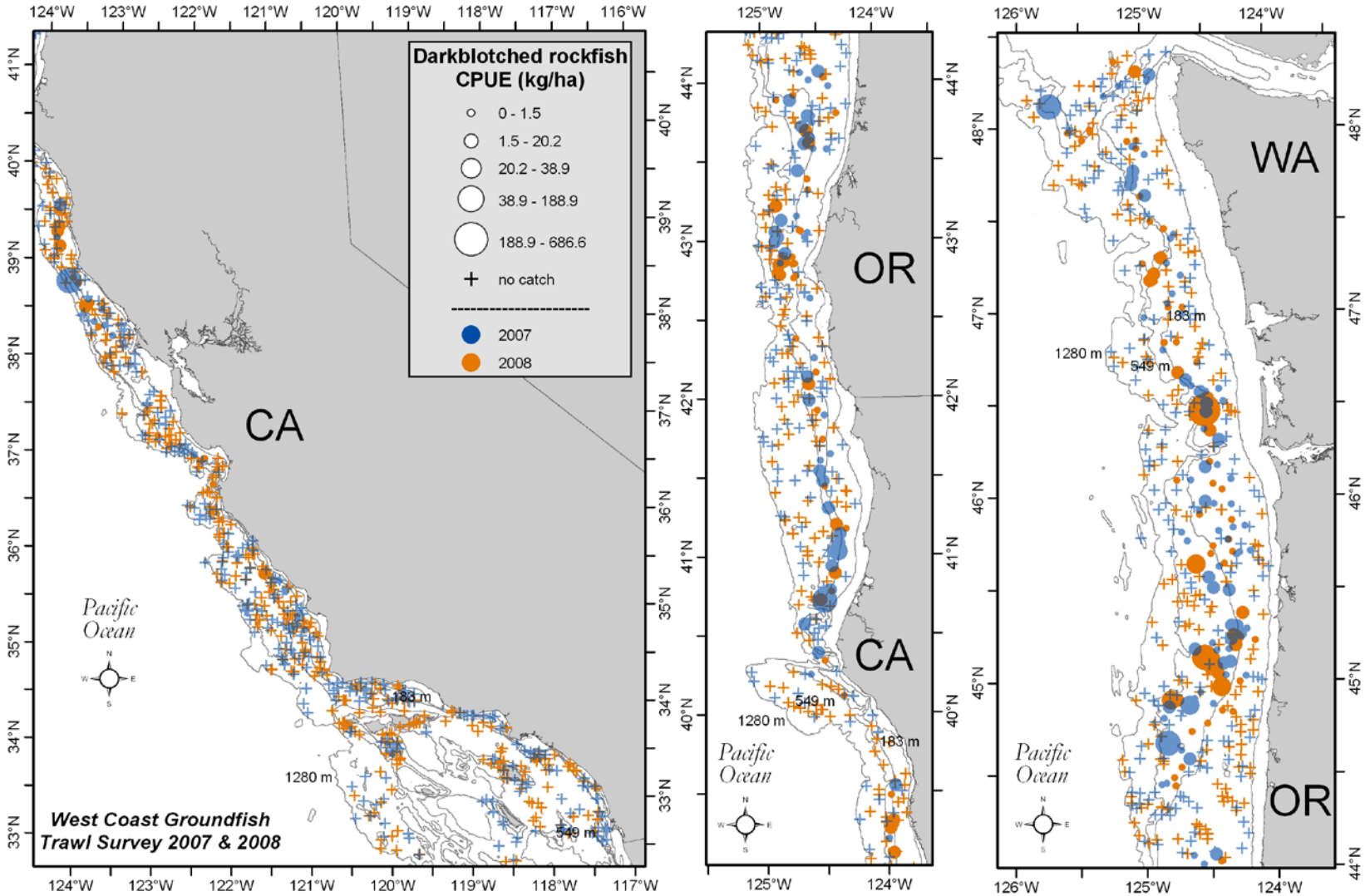


Figure 44. Darkblotched rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

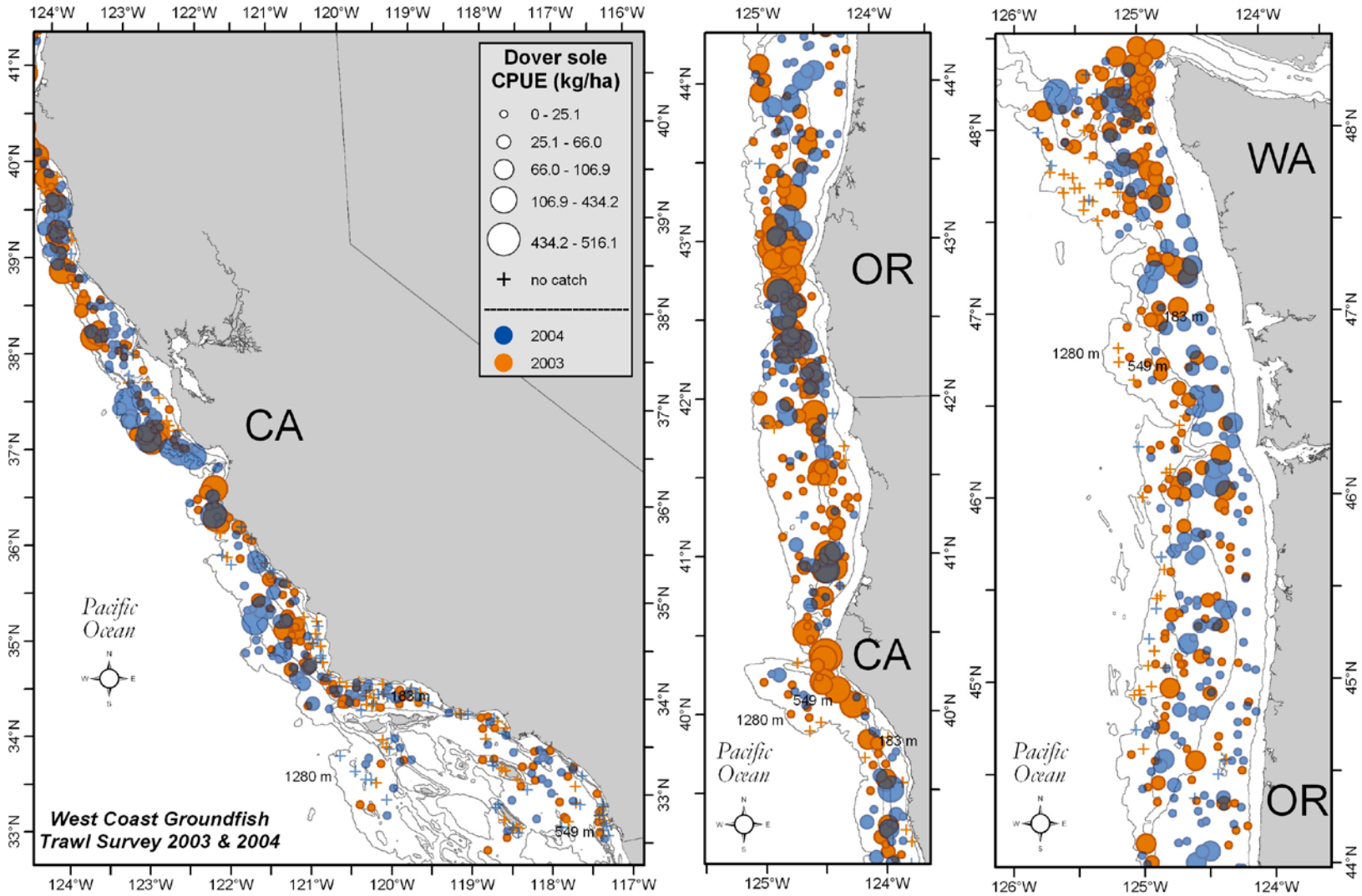


Figure 45. Dover sole distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

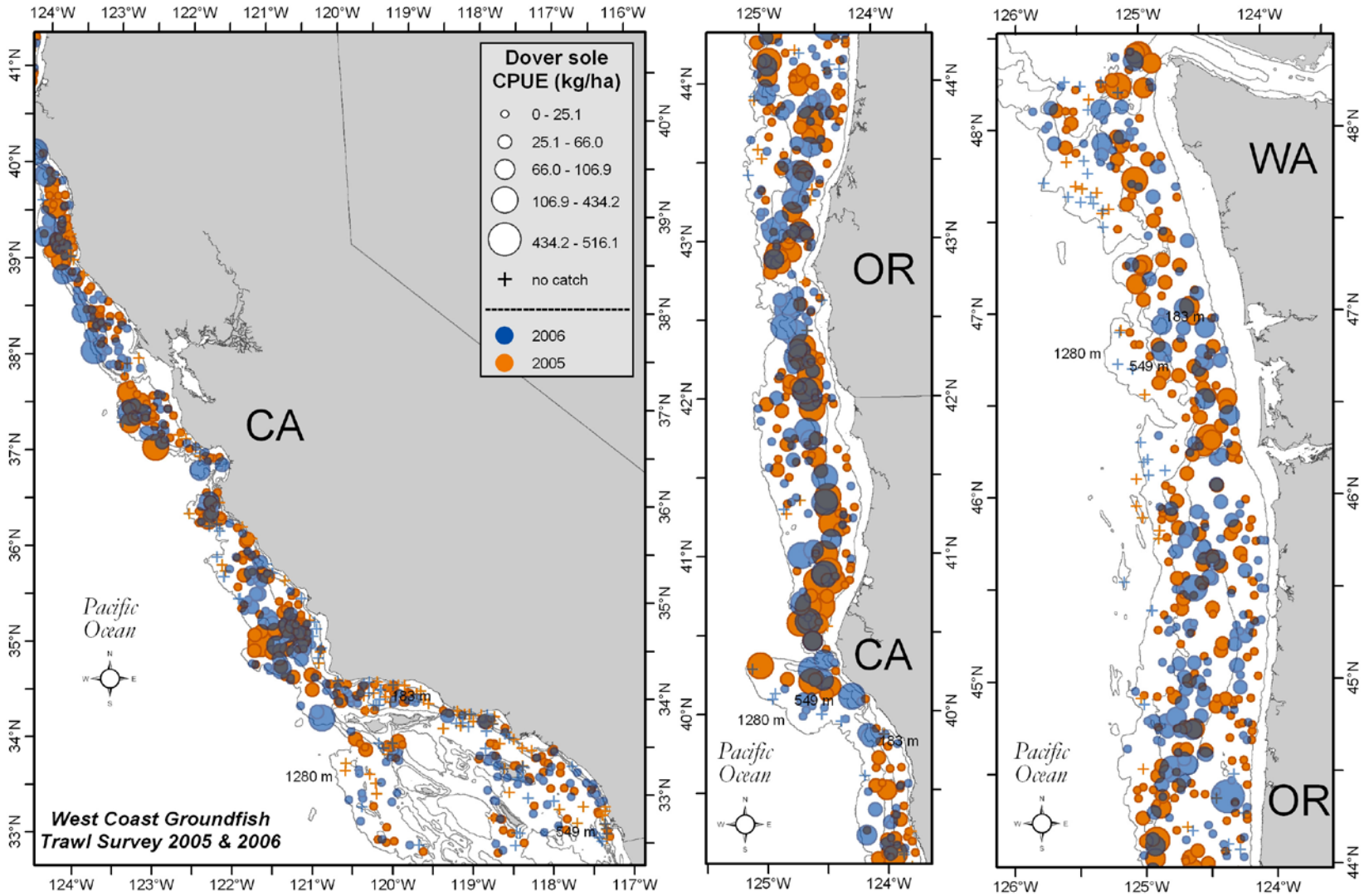


Figure 46. Dover sole distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

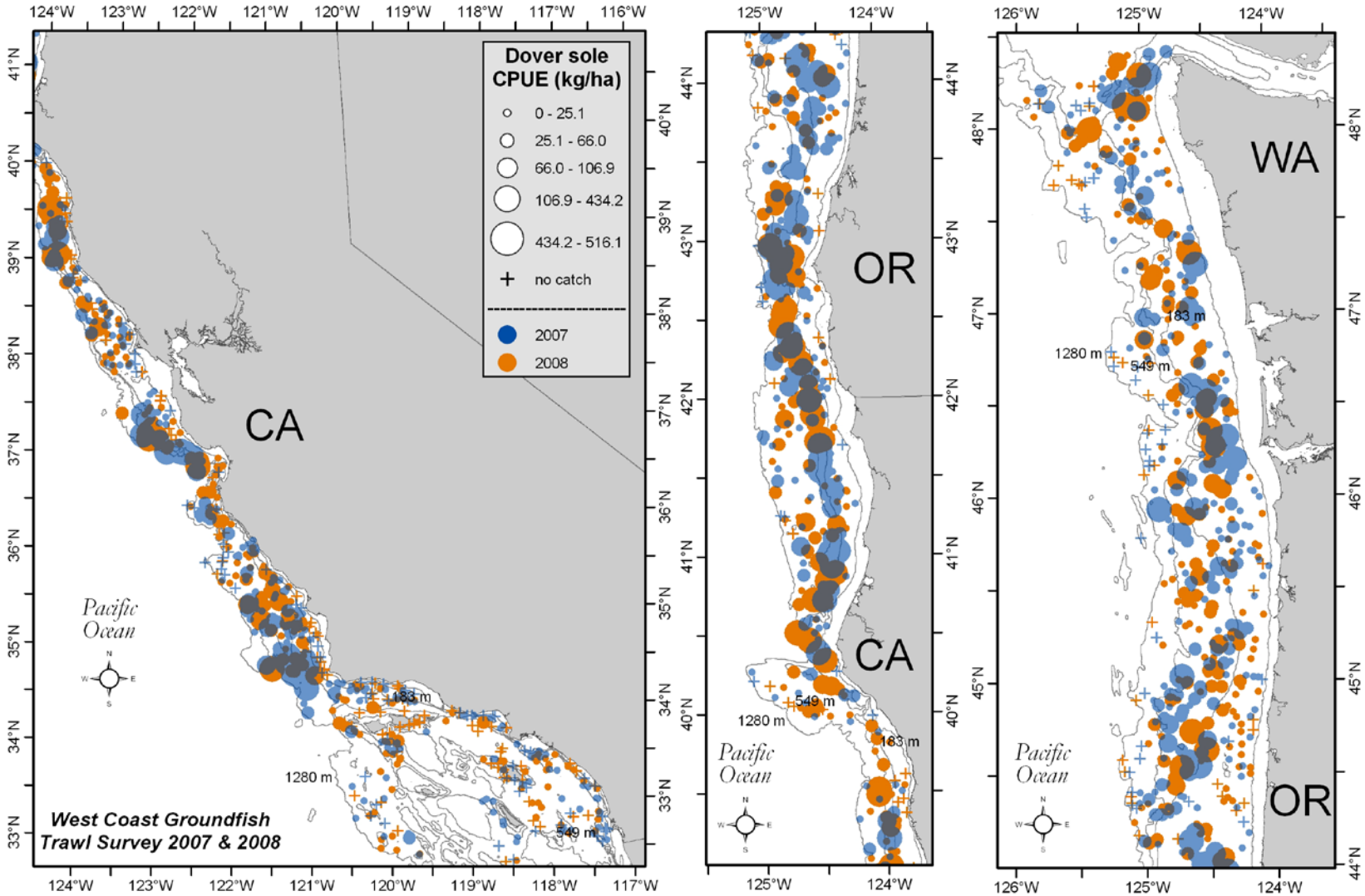


Figure 47. Dover sole distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

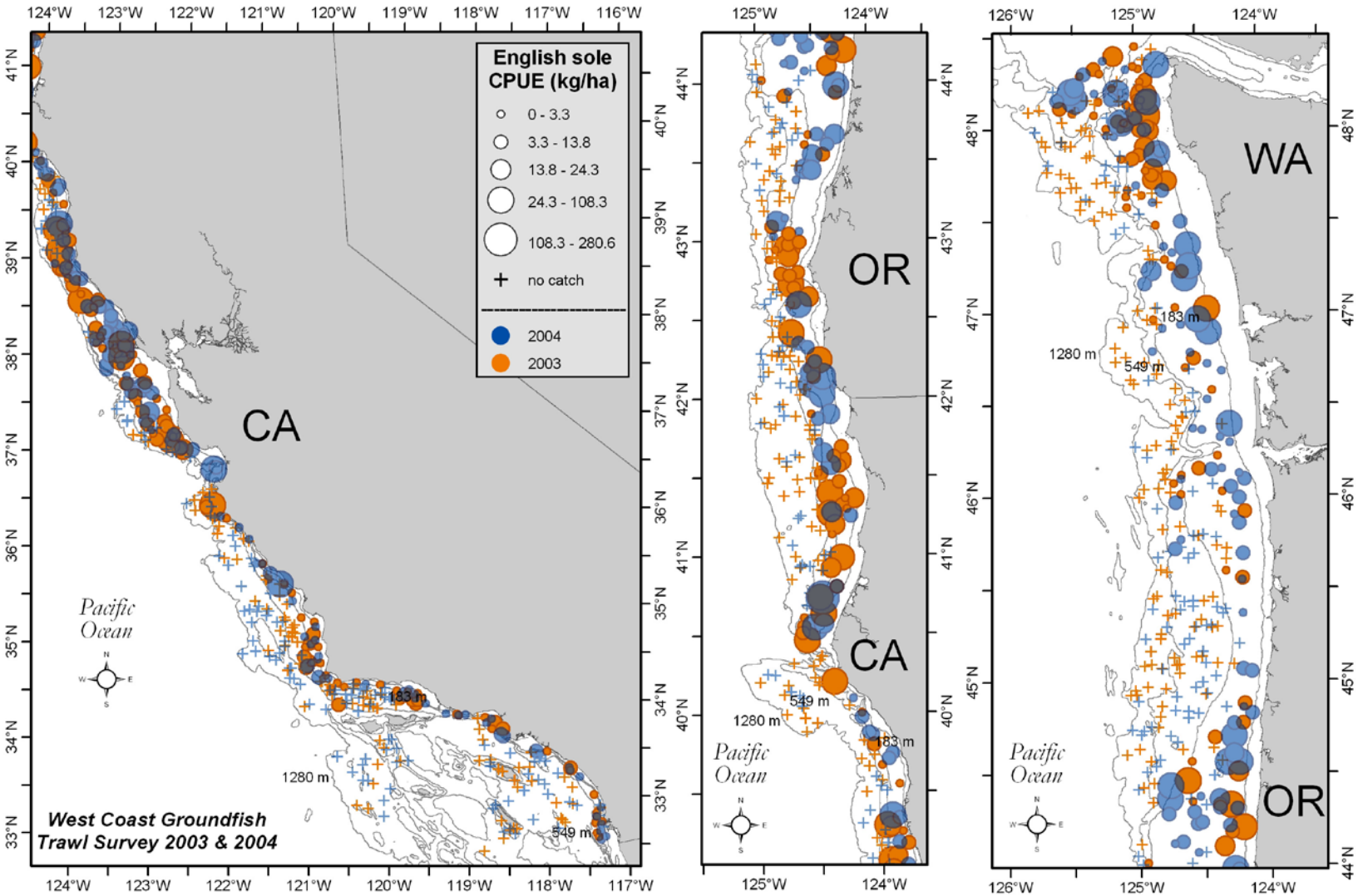


Figure 48. English sole distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

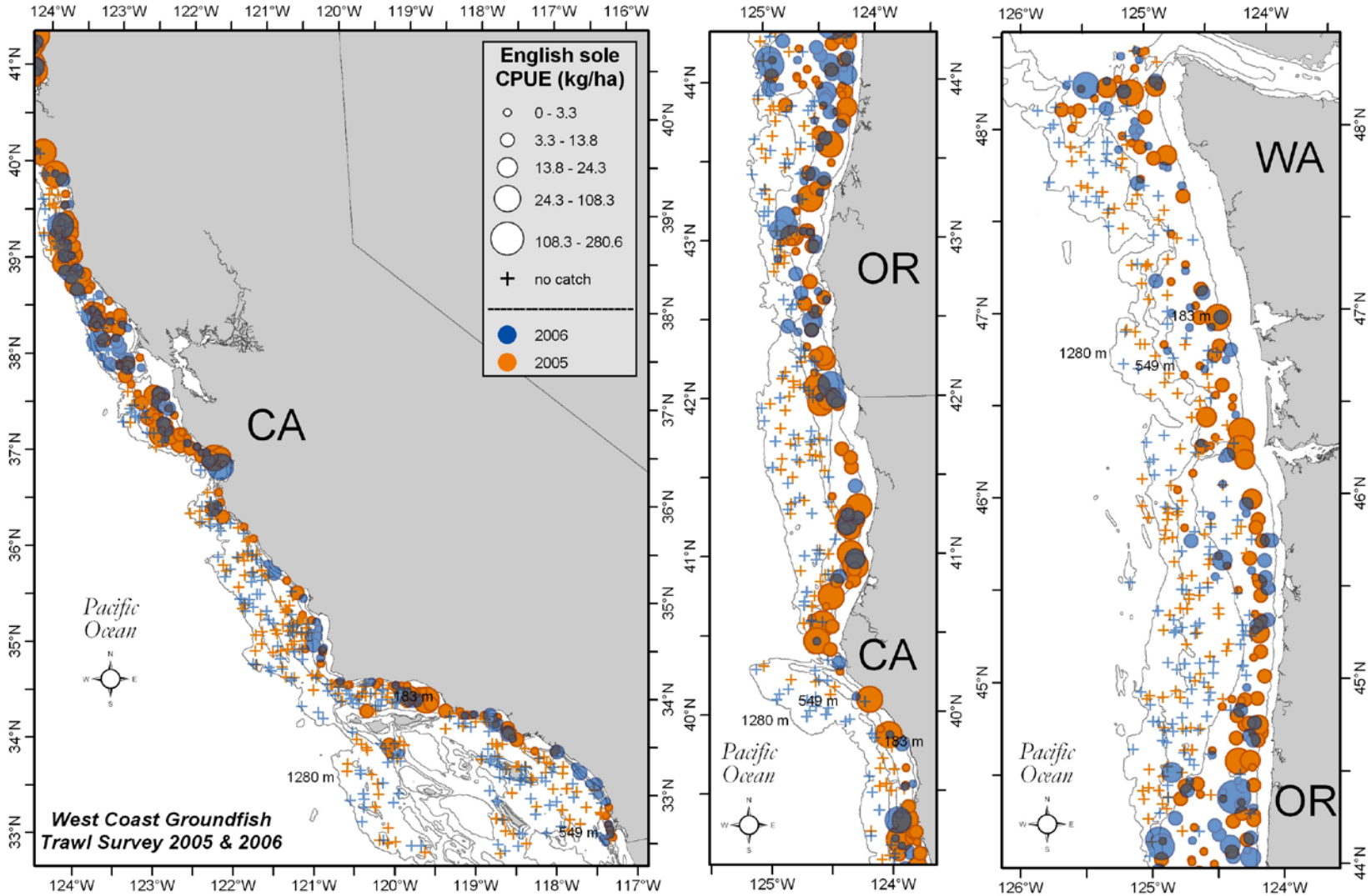


Figure 49. English sole distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

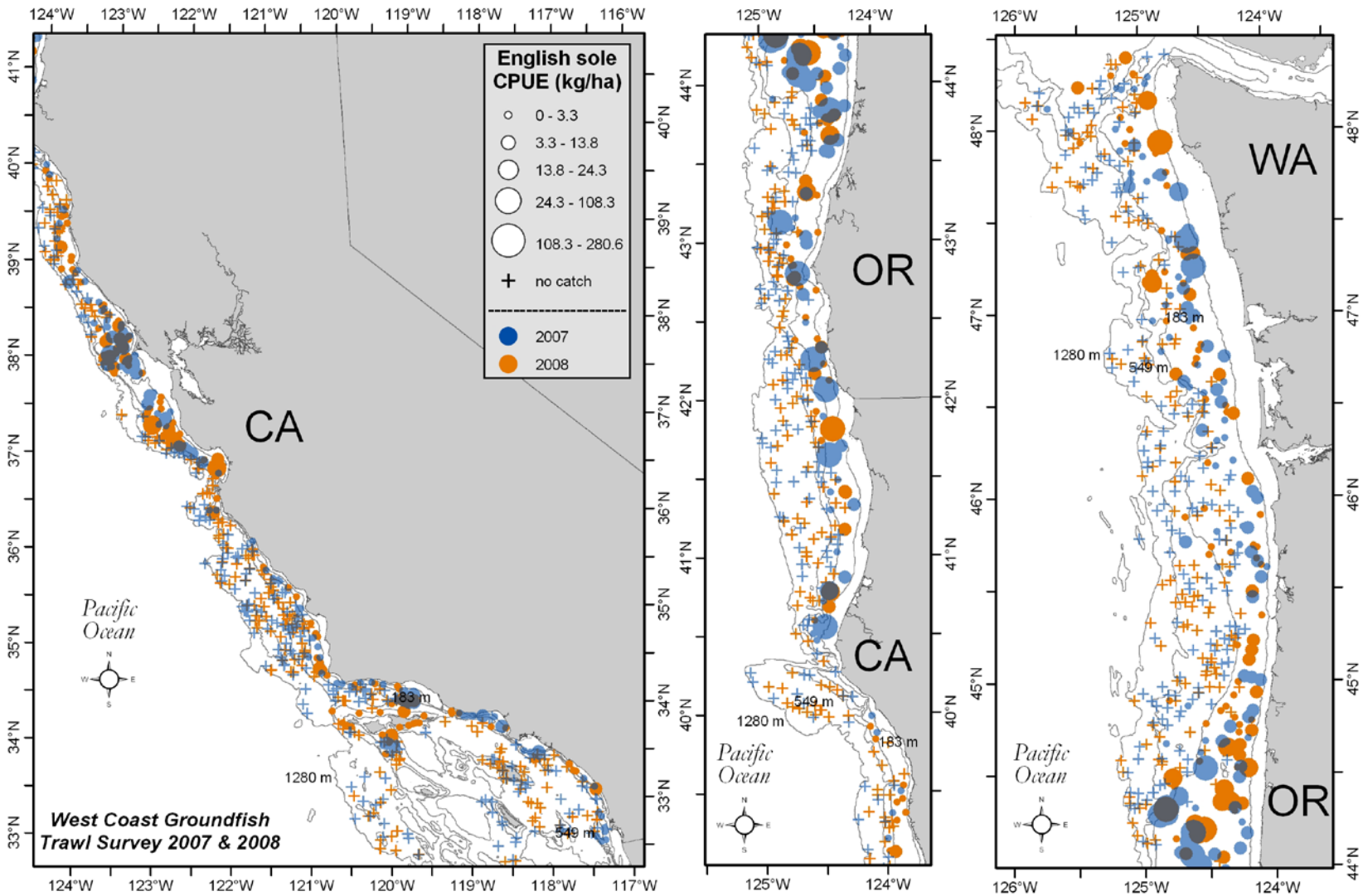


Figure 50. English sole distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

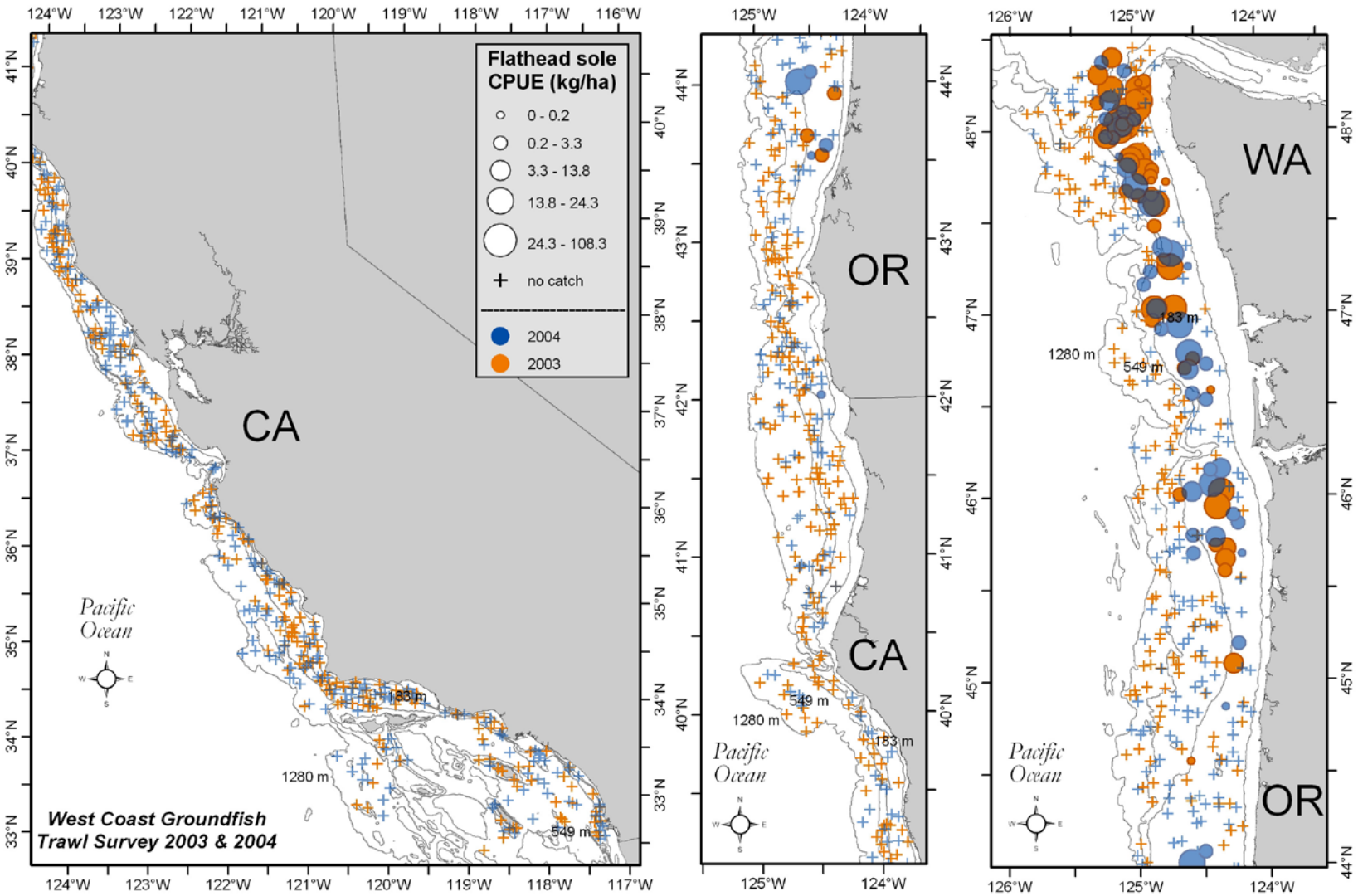


Figure 51. Flathead sole (*Hippoglossoides elassodon*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

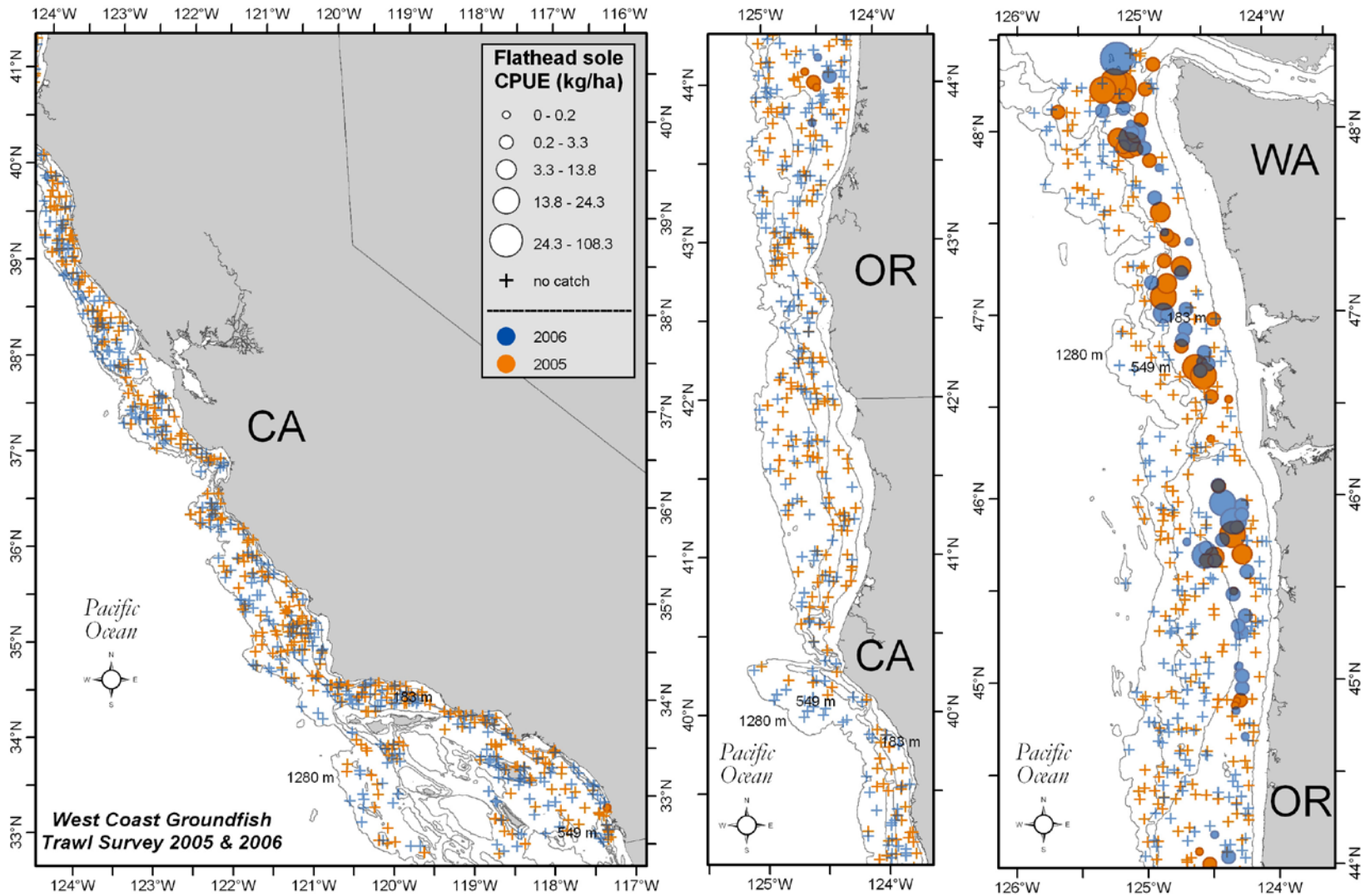


Figure 52. Flathead sole distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

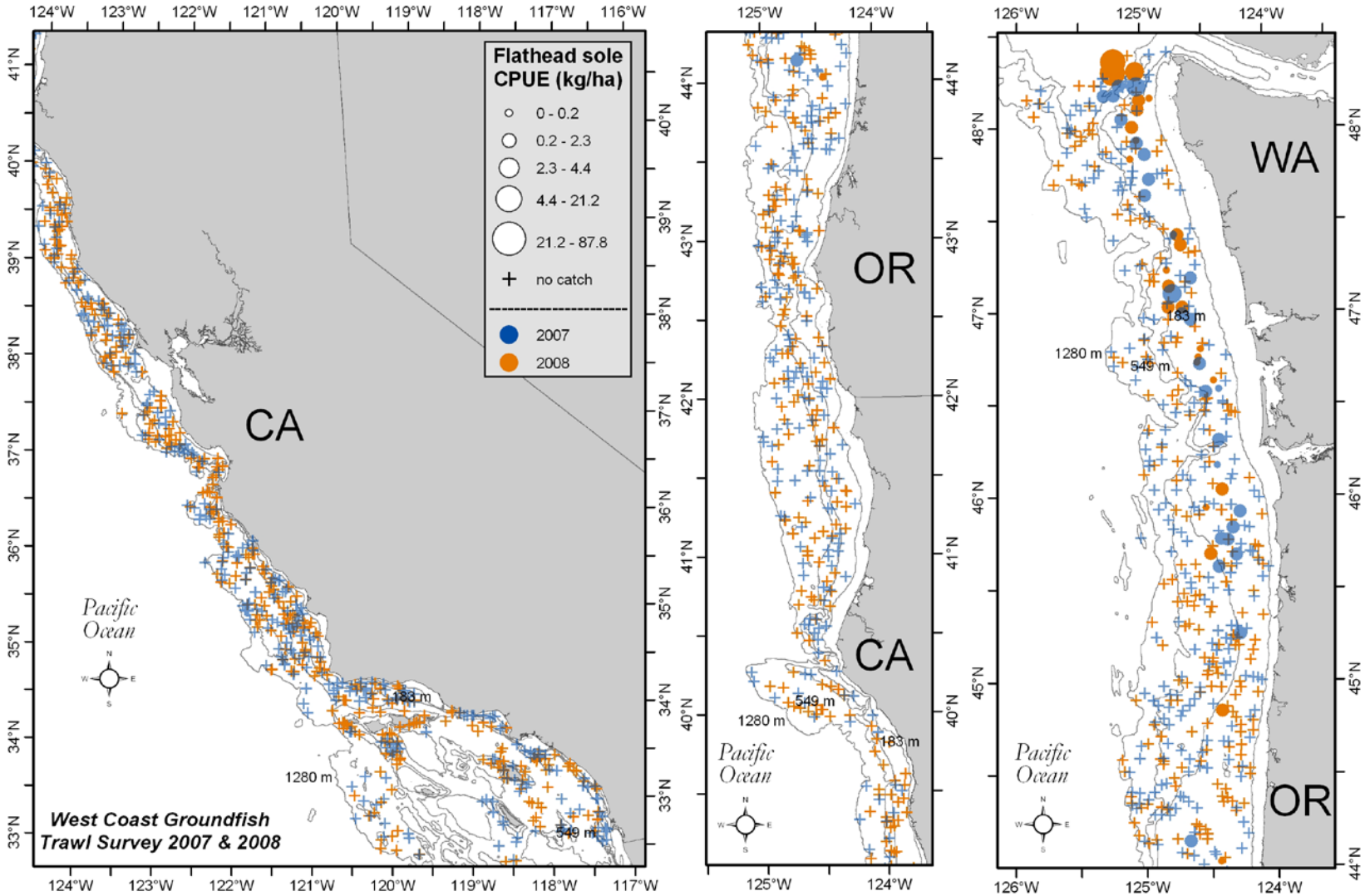


Figure 53. Flathead sole distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

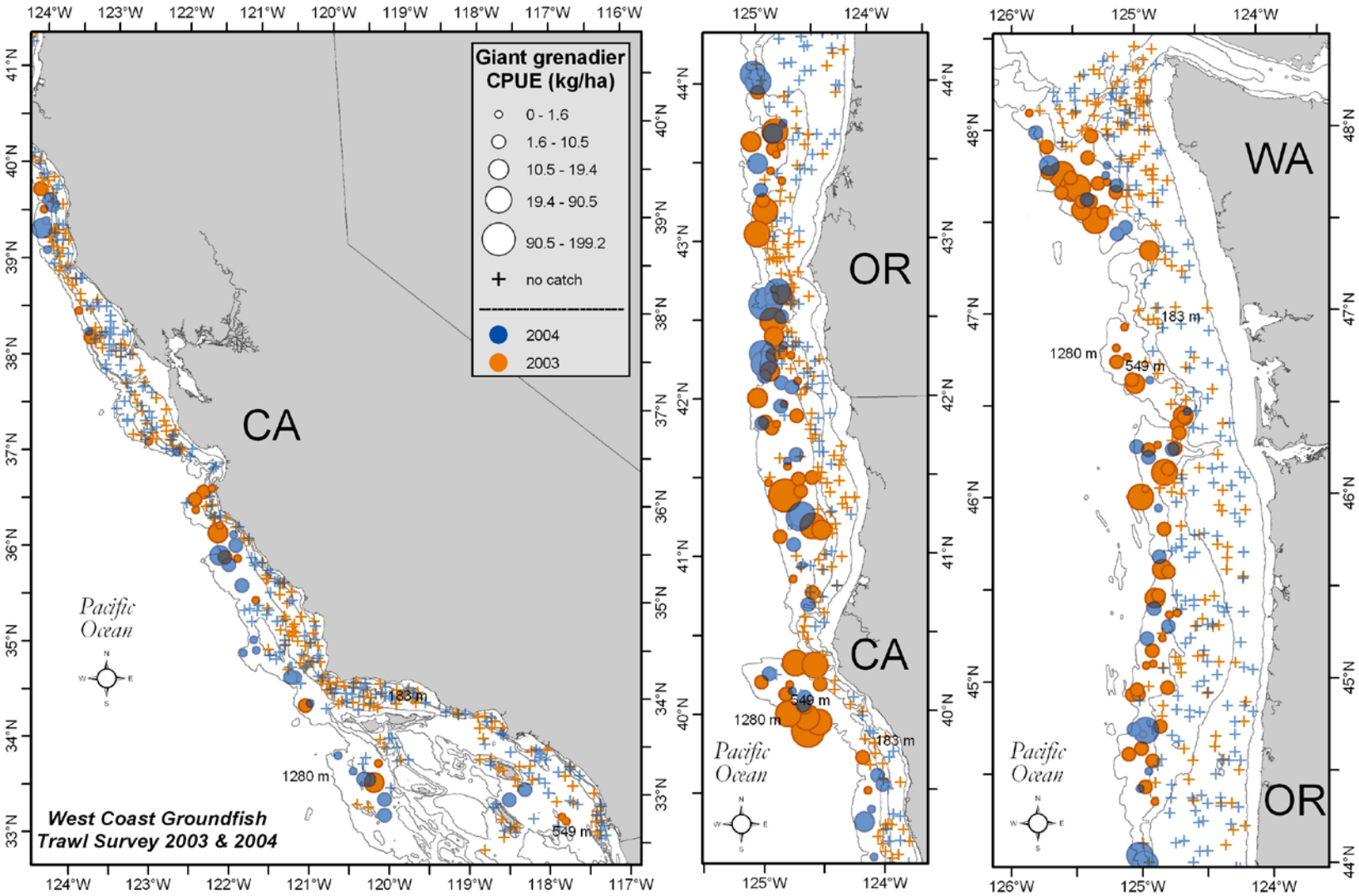


Figure 54. Giant grenadier distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

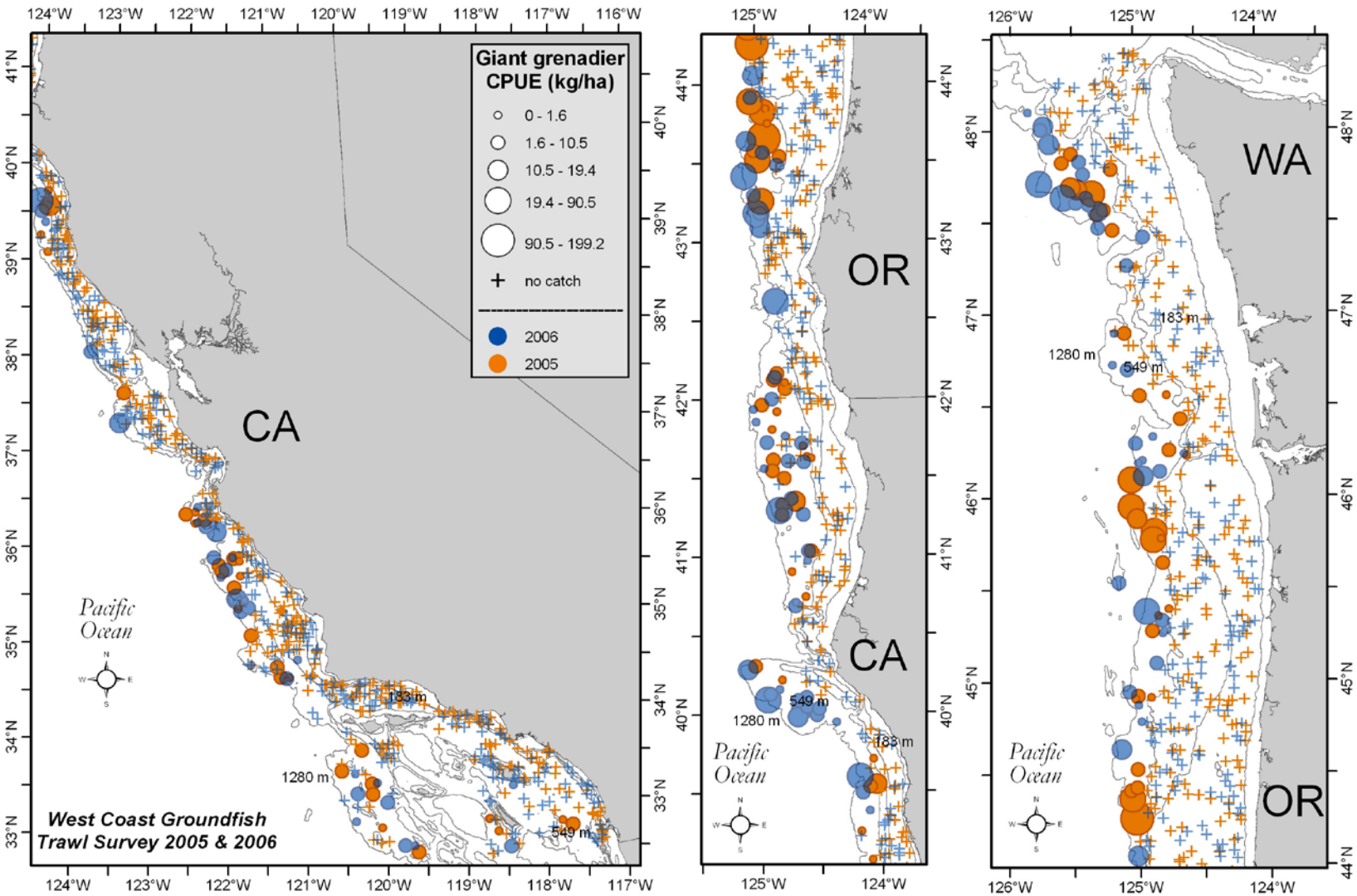


Figure 55. Giant grenadier distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

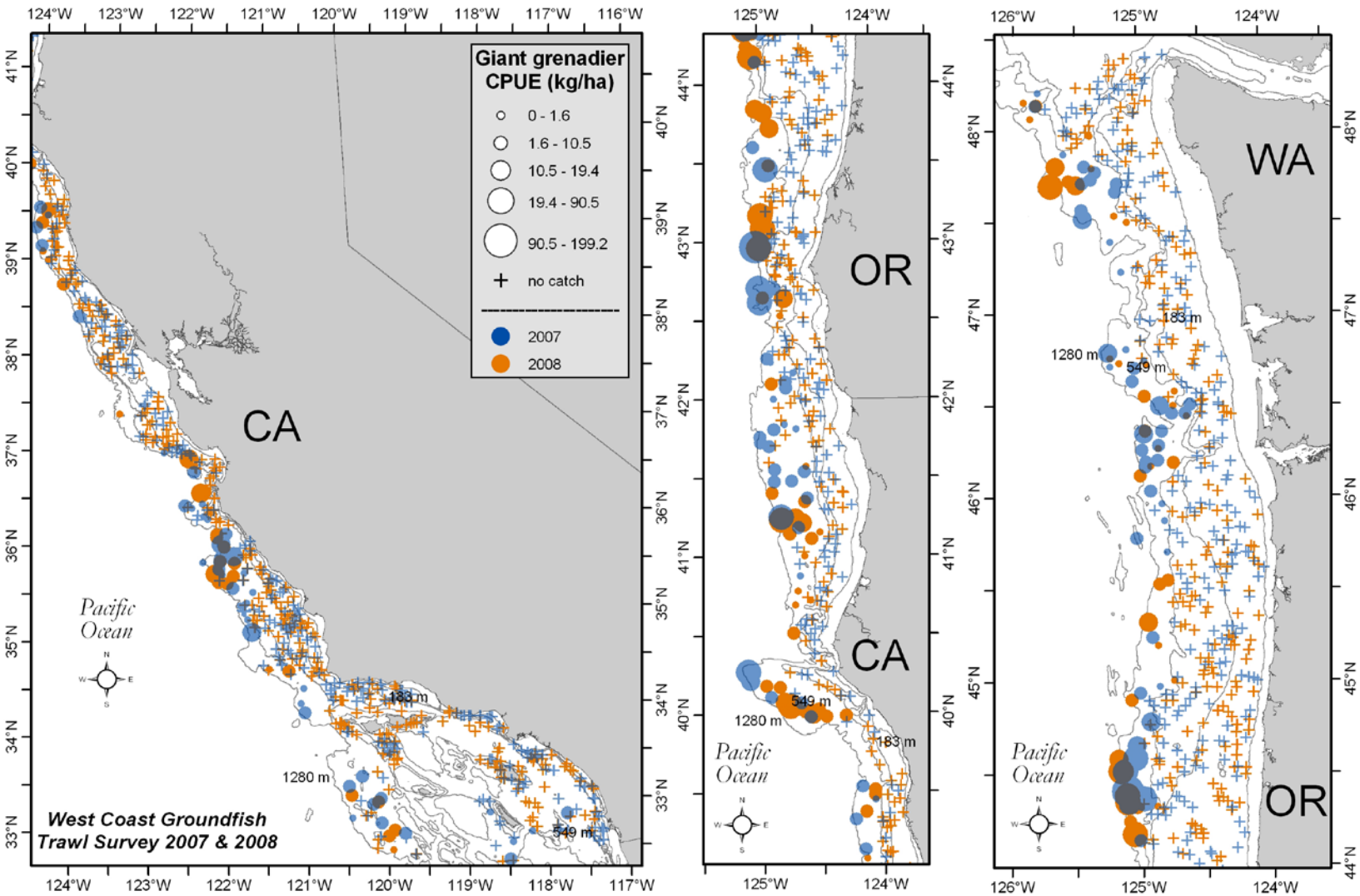


Figure 56. Giant grenadier distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

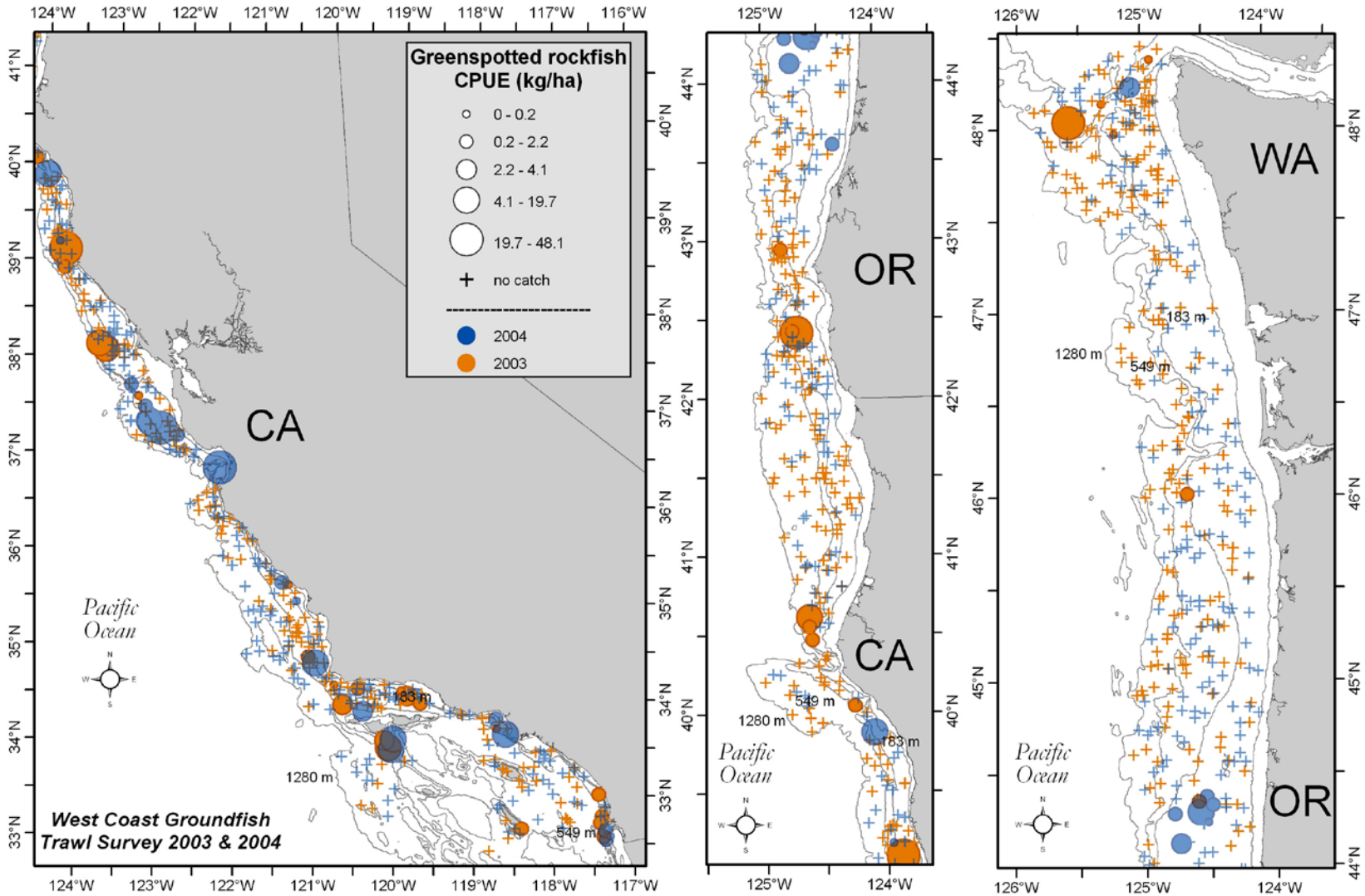


Figure 57. Greenspotted rockfish (*Sebastes chlorostictus*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

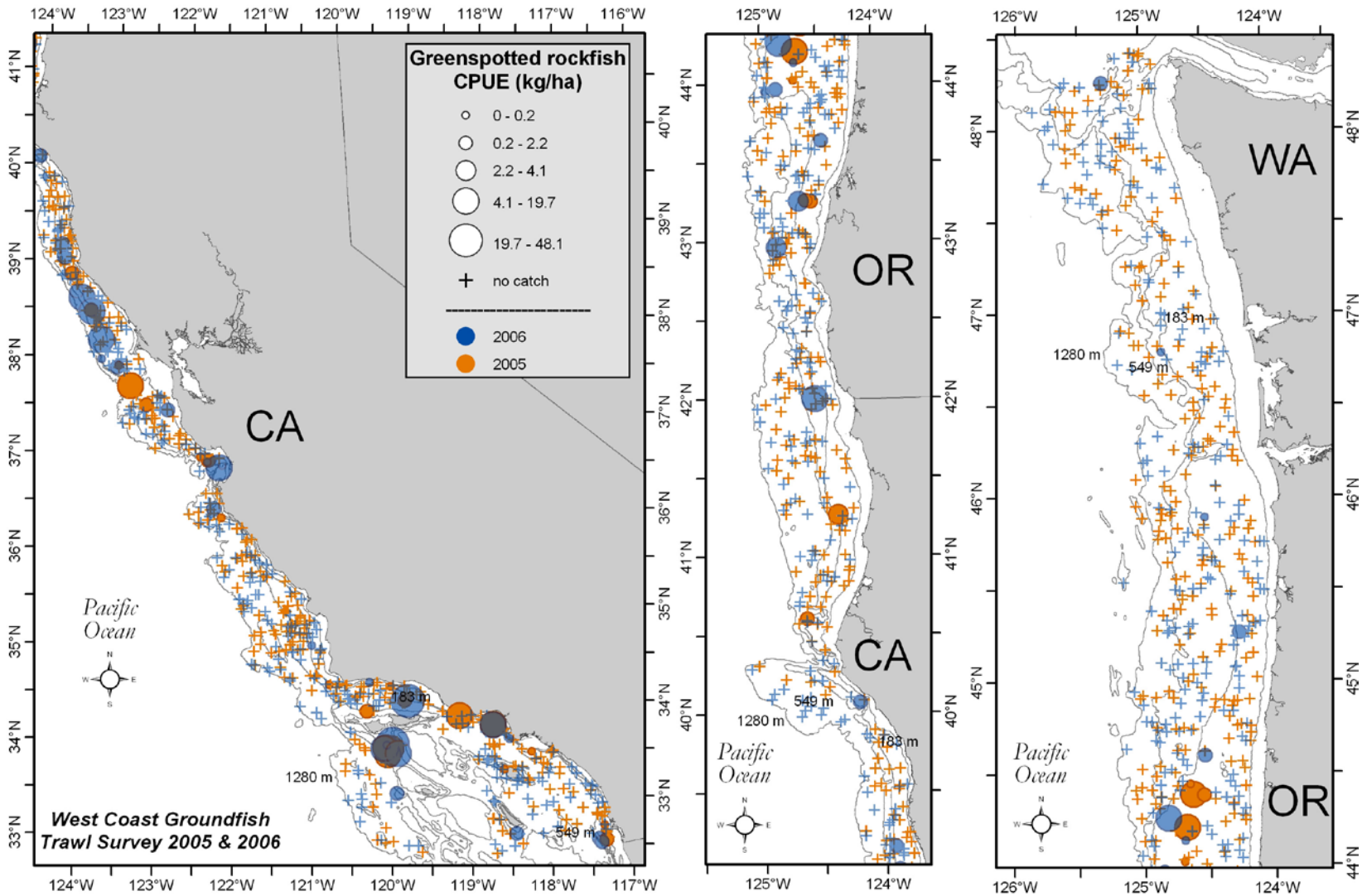


Figure 58. Greenspotted rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

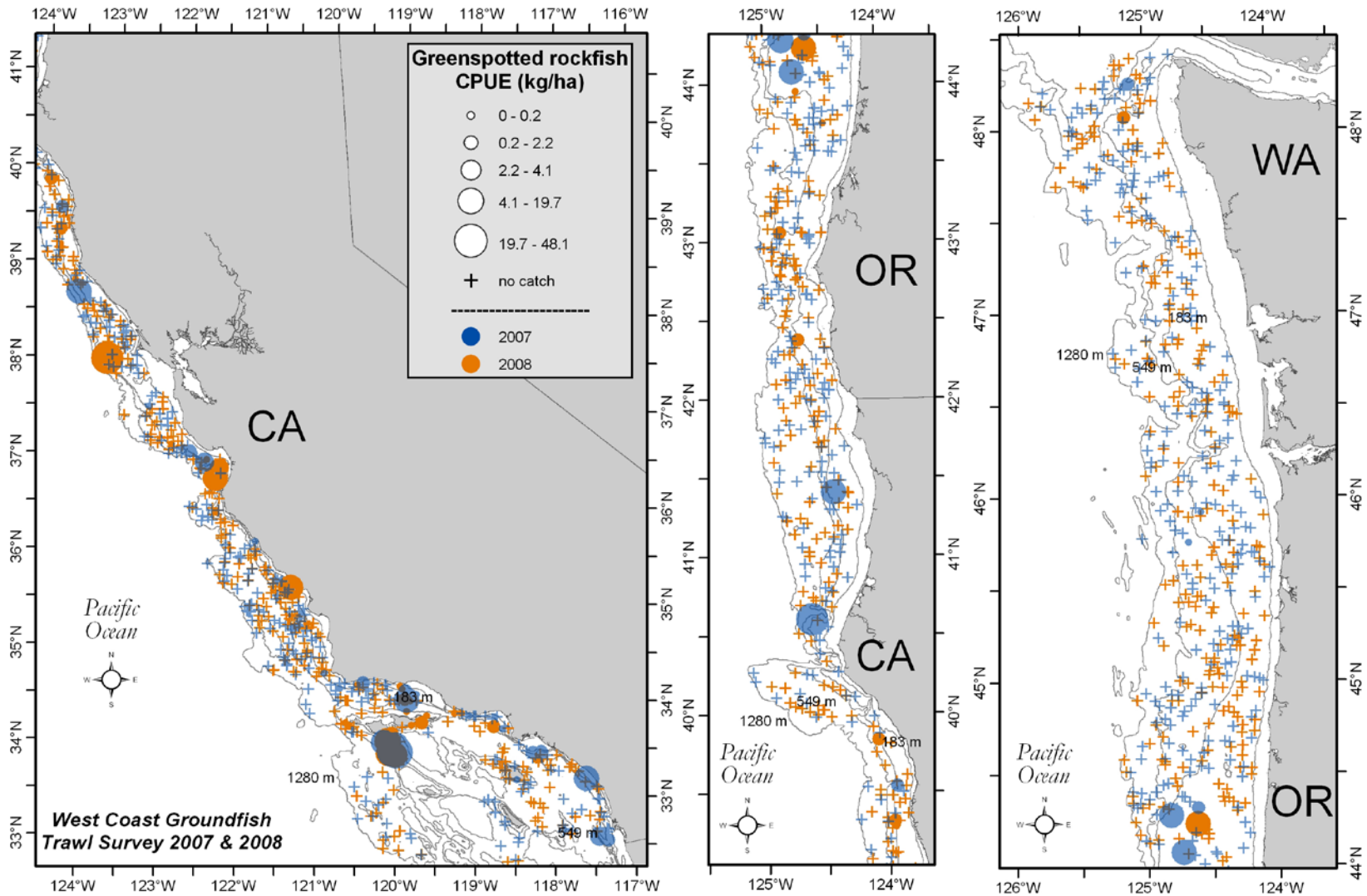


Figure 59. Greenspotted rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

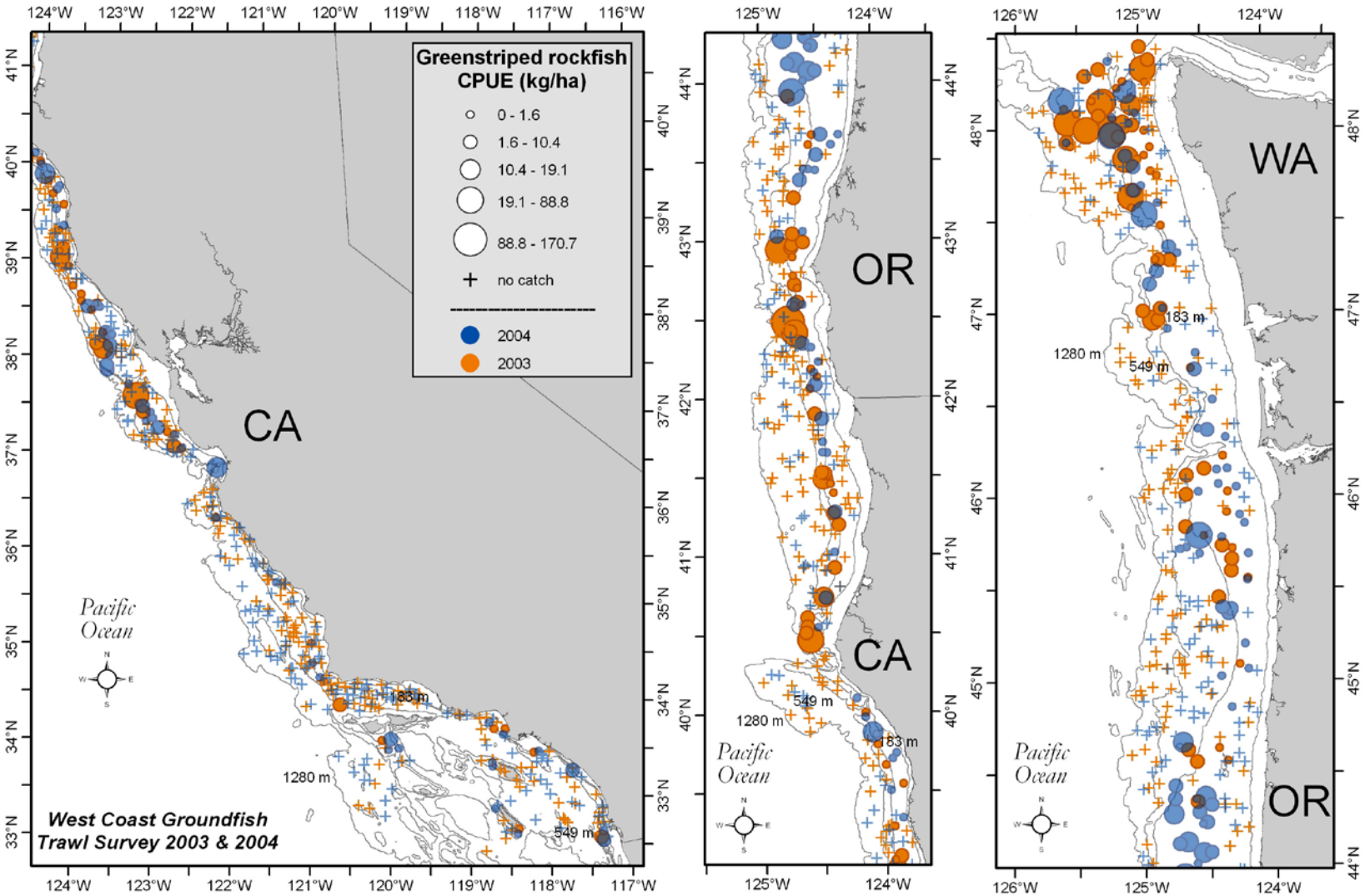


Figure 60. Greenstriped rockfish (*Sebastes elongatus*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

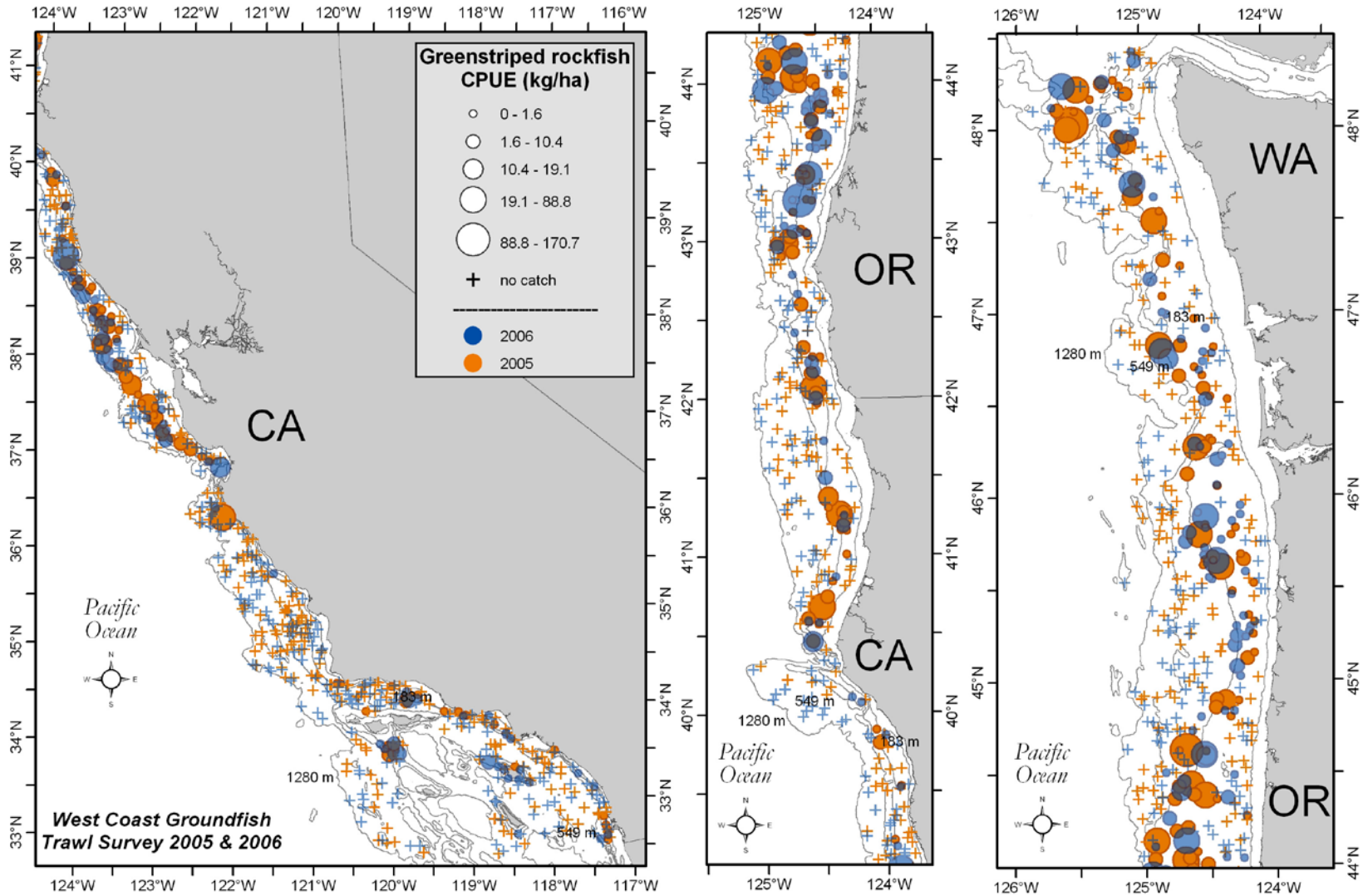


Figure 61. Greenstriped rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

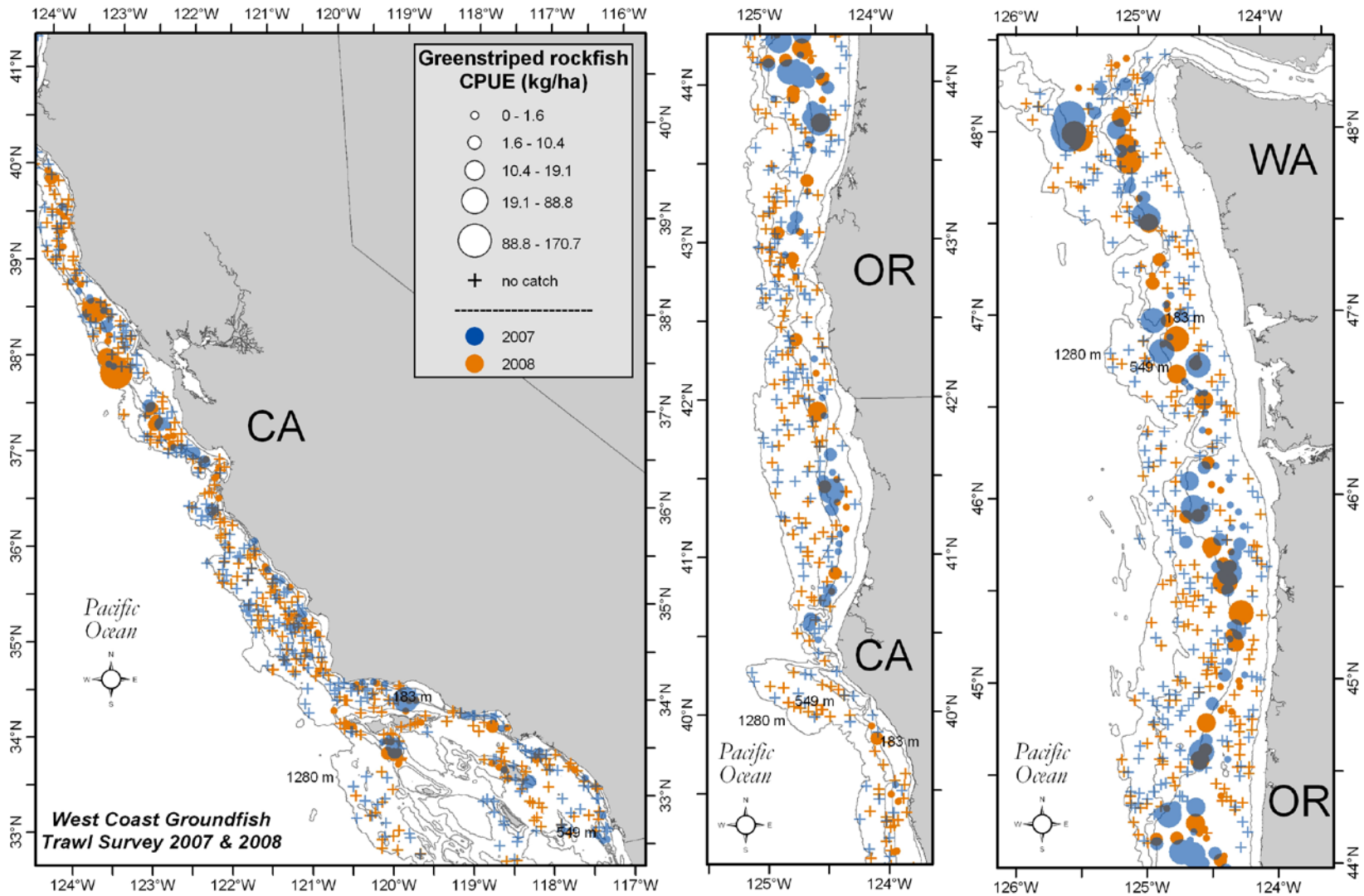


Figure 62. Greenstriped rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

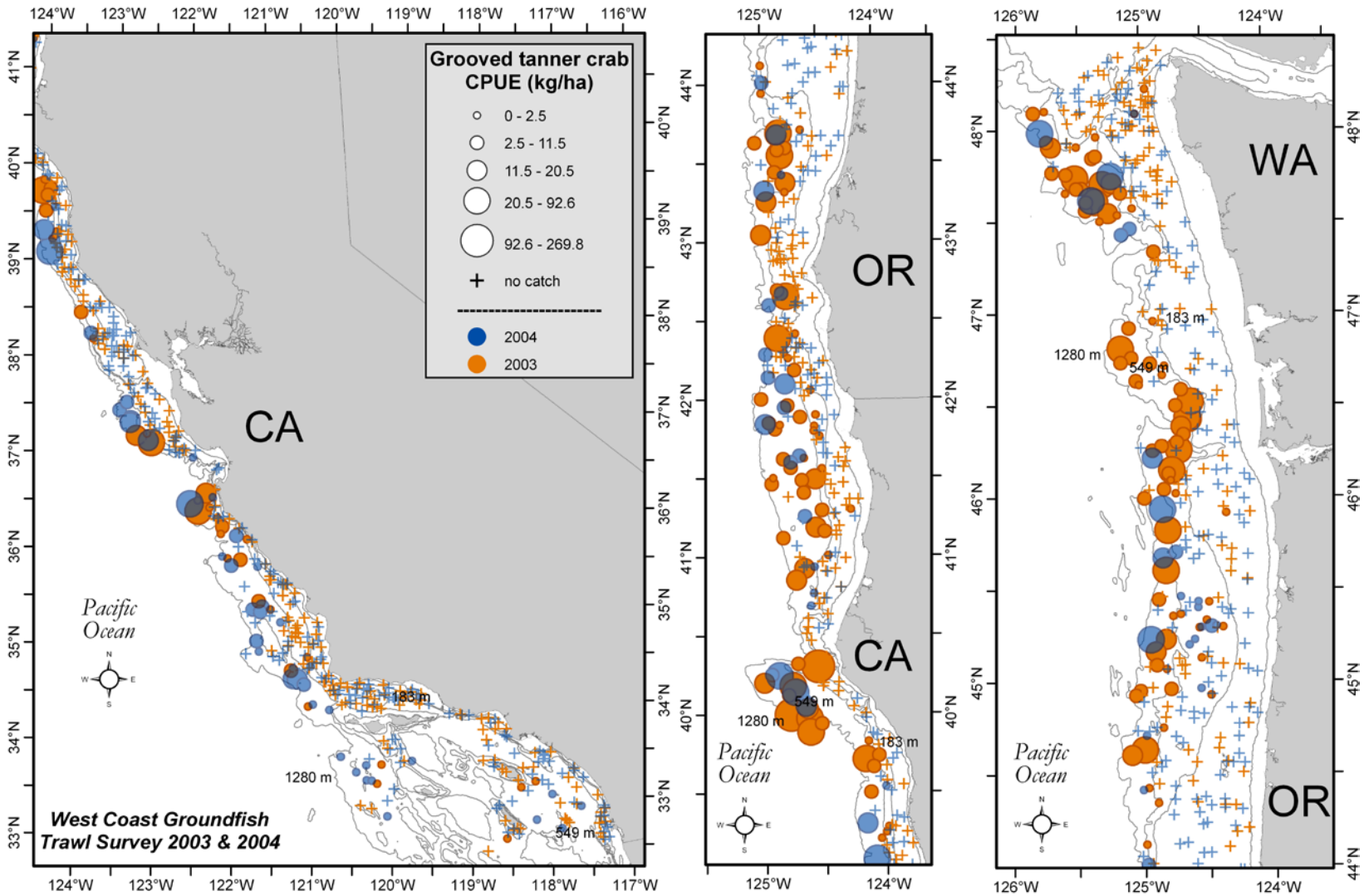


Figure 63. Grooved tanner crab distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

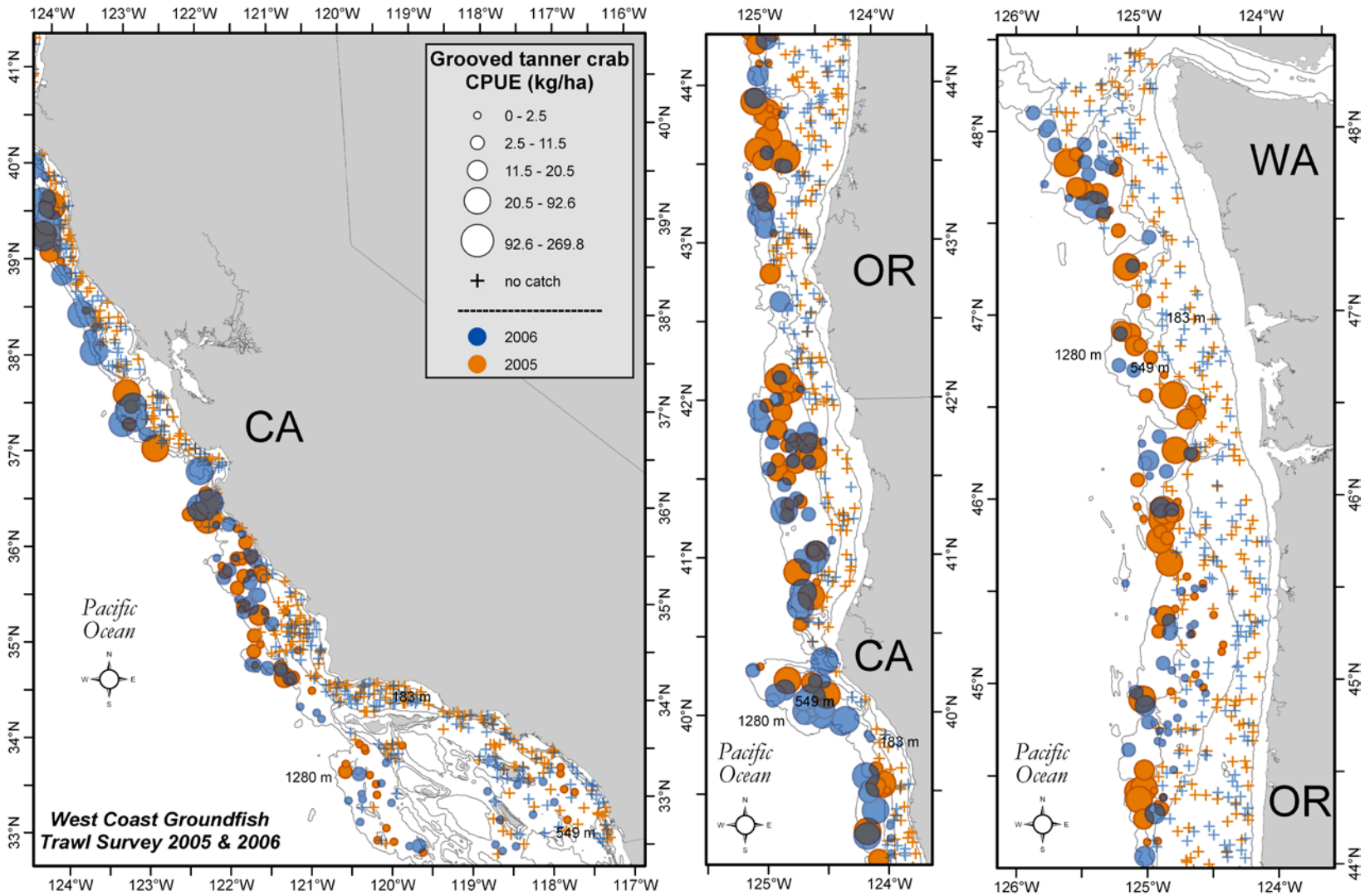


Figure 64. Grooved tanner crab distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

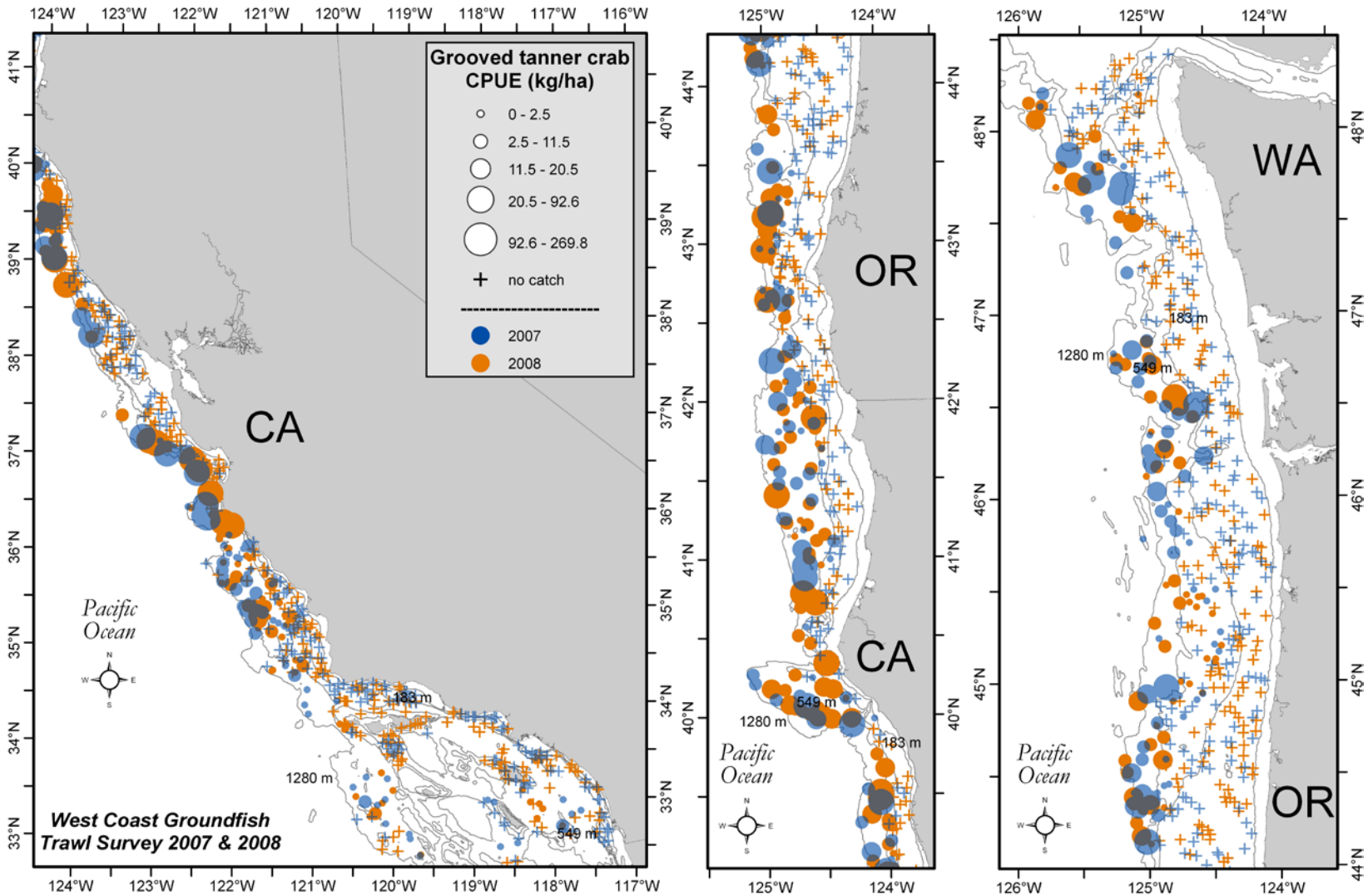


Figure 65. Grooved tanner crab distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

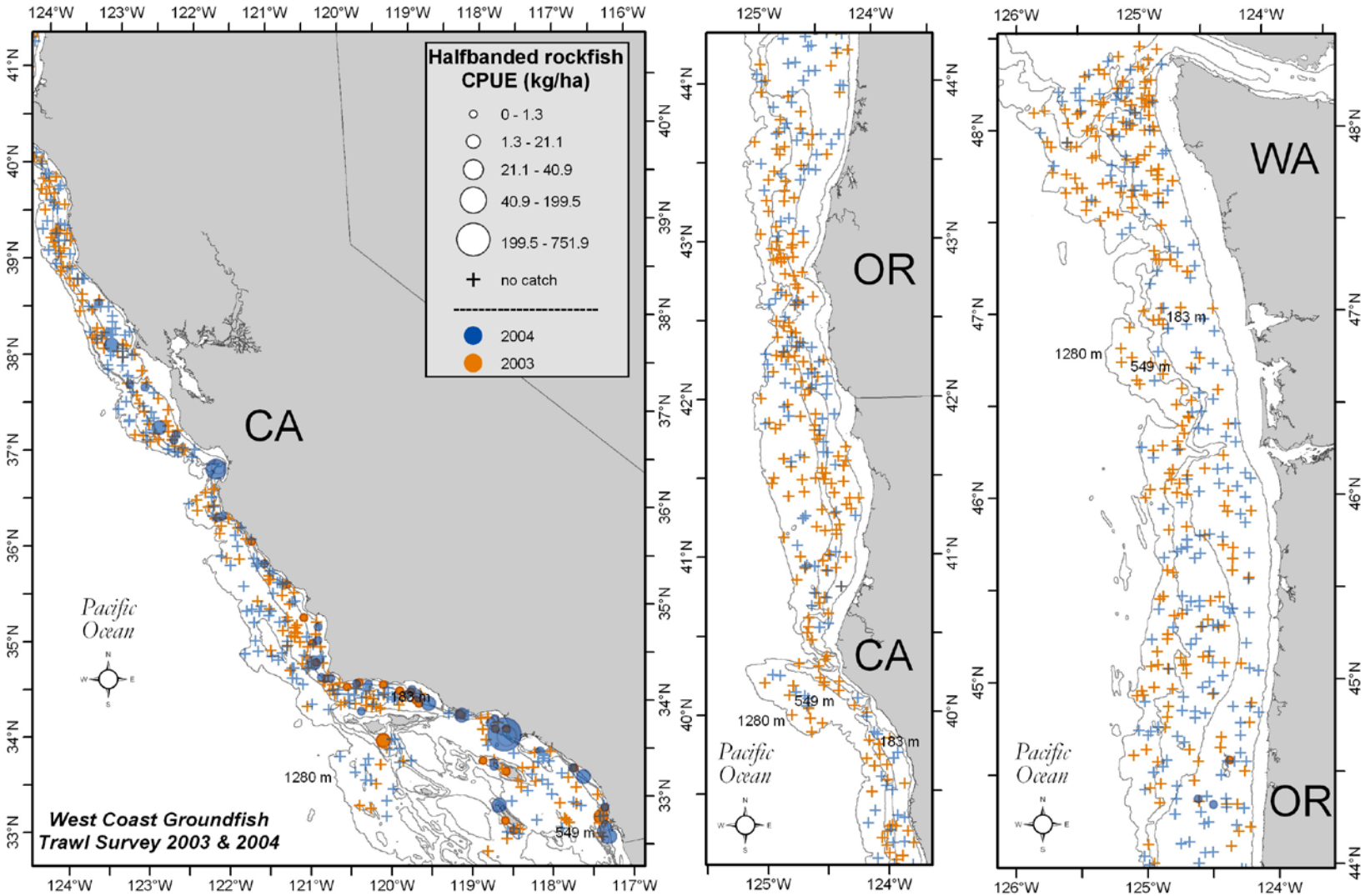


Figure 66. Halfbanded rockfish (*Sebastes semicinctus*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

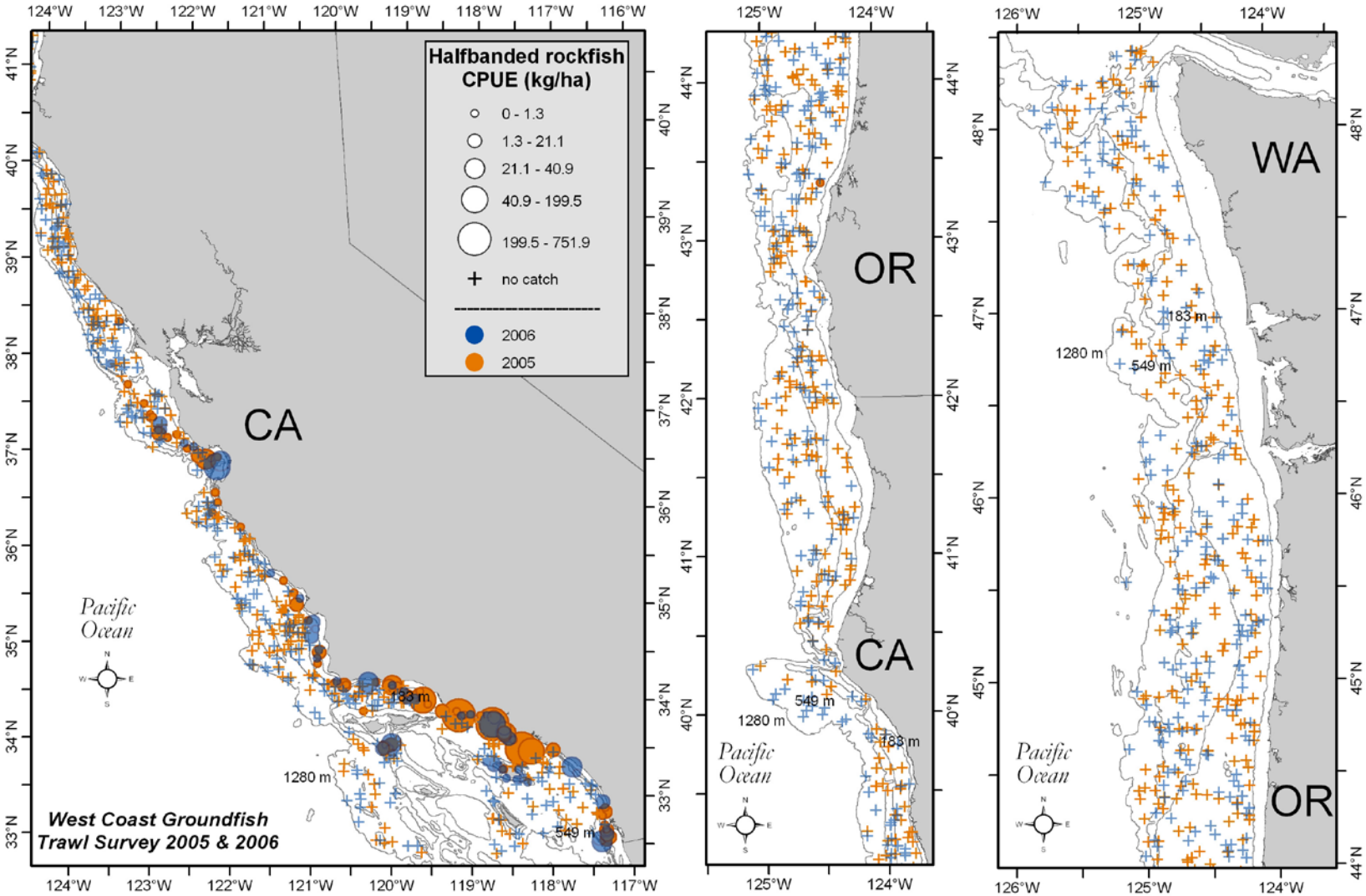


Figure 67. Halfbanded rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

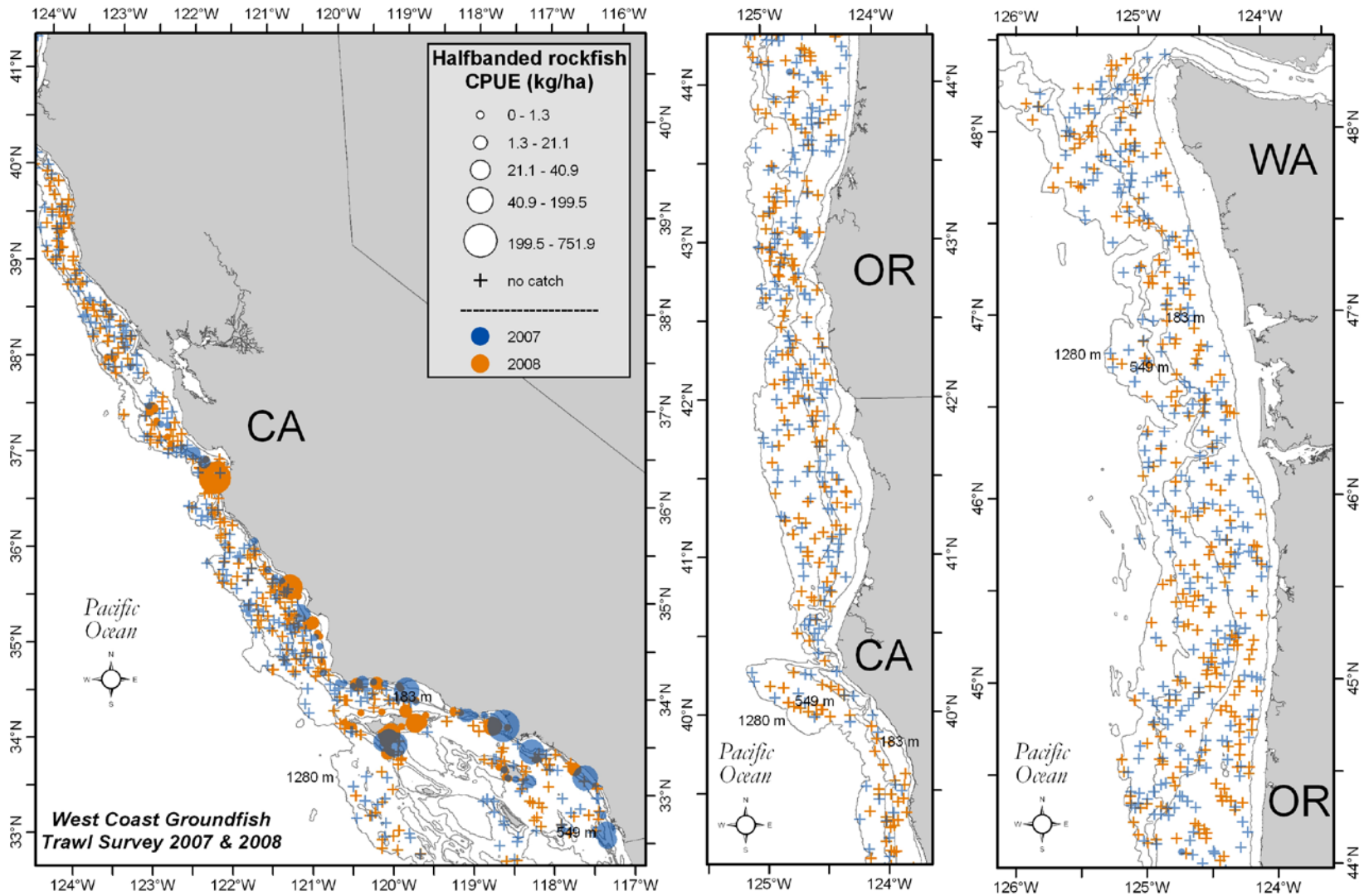


Figure 68. Halfbanded rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

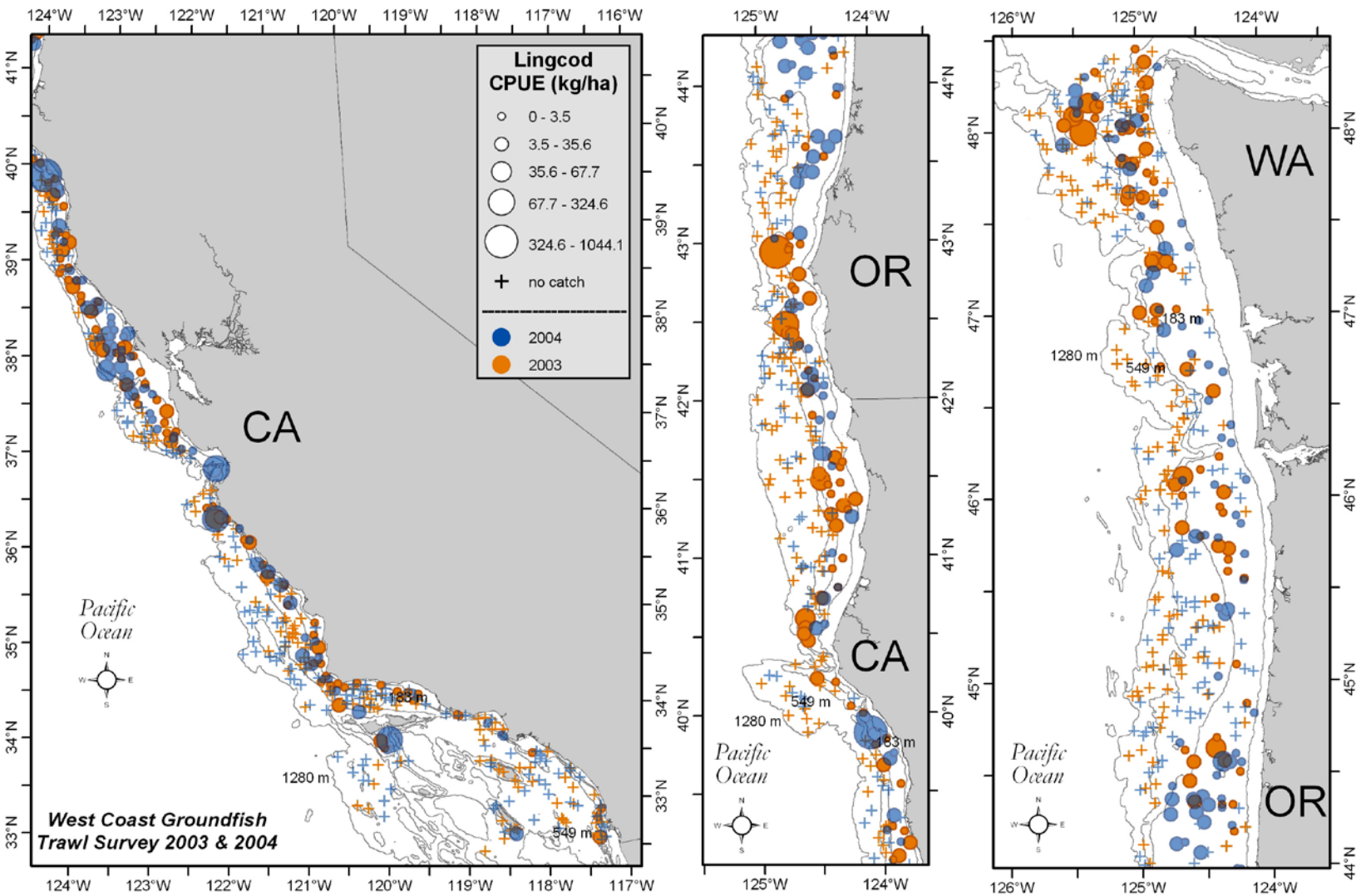


Figure 69. Lingcod distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

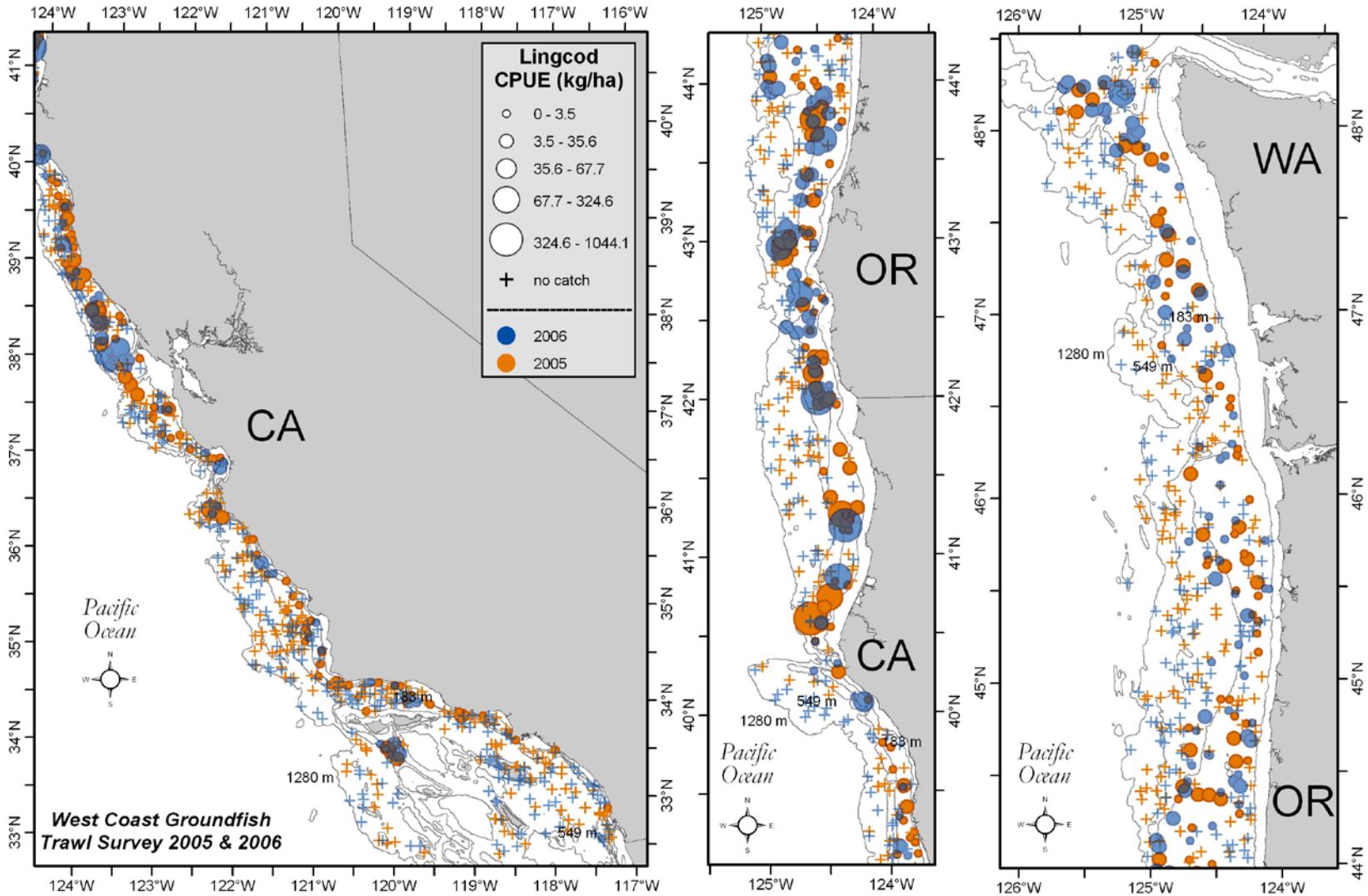


Figure 70. Lingcod distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

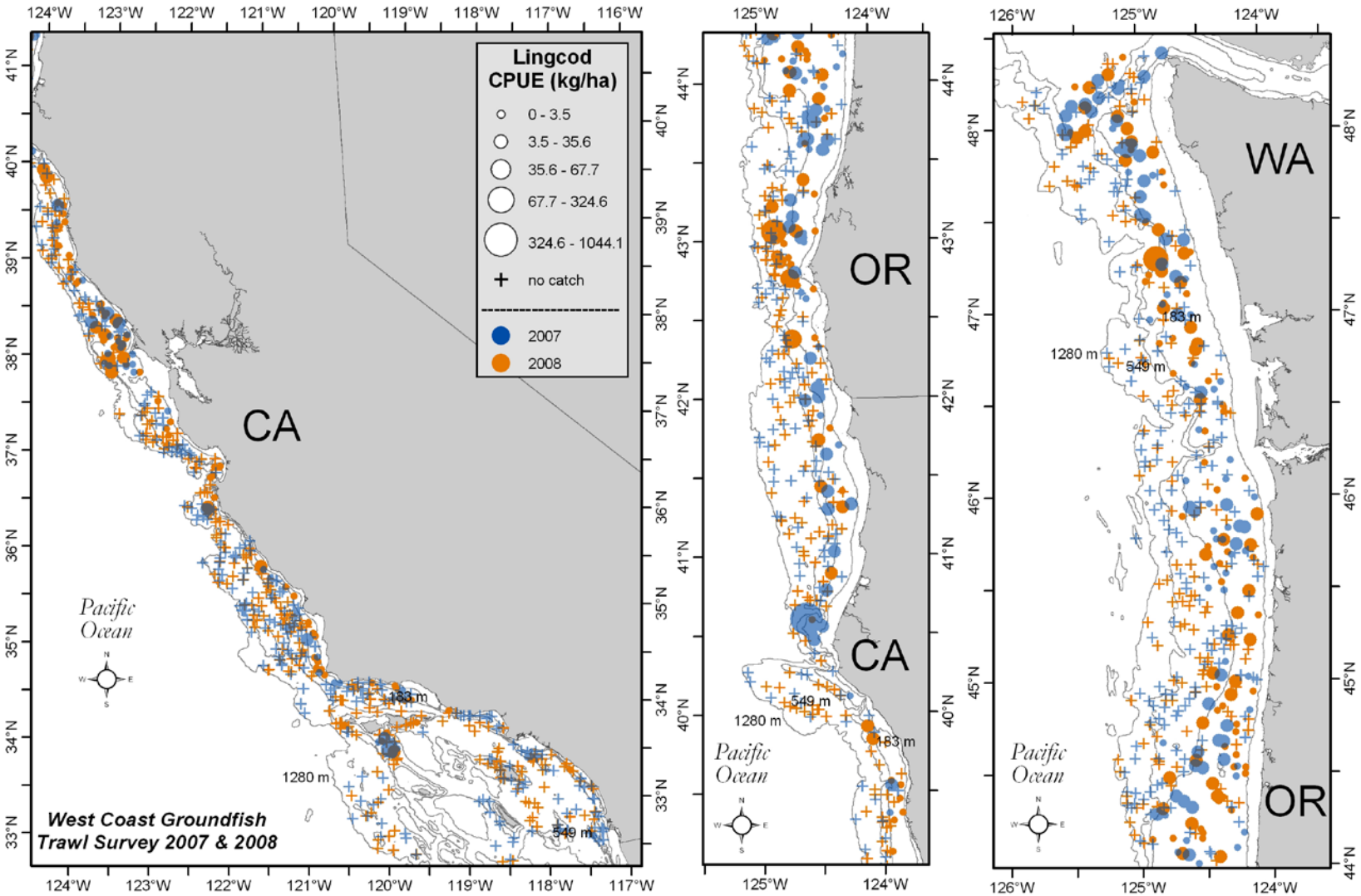


Figure 71. Lingcod distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

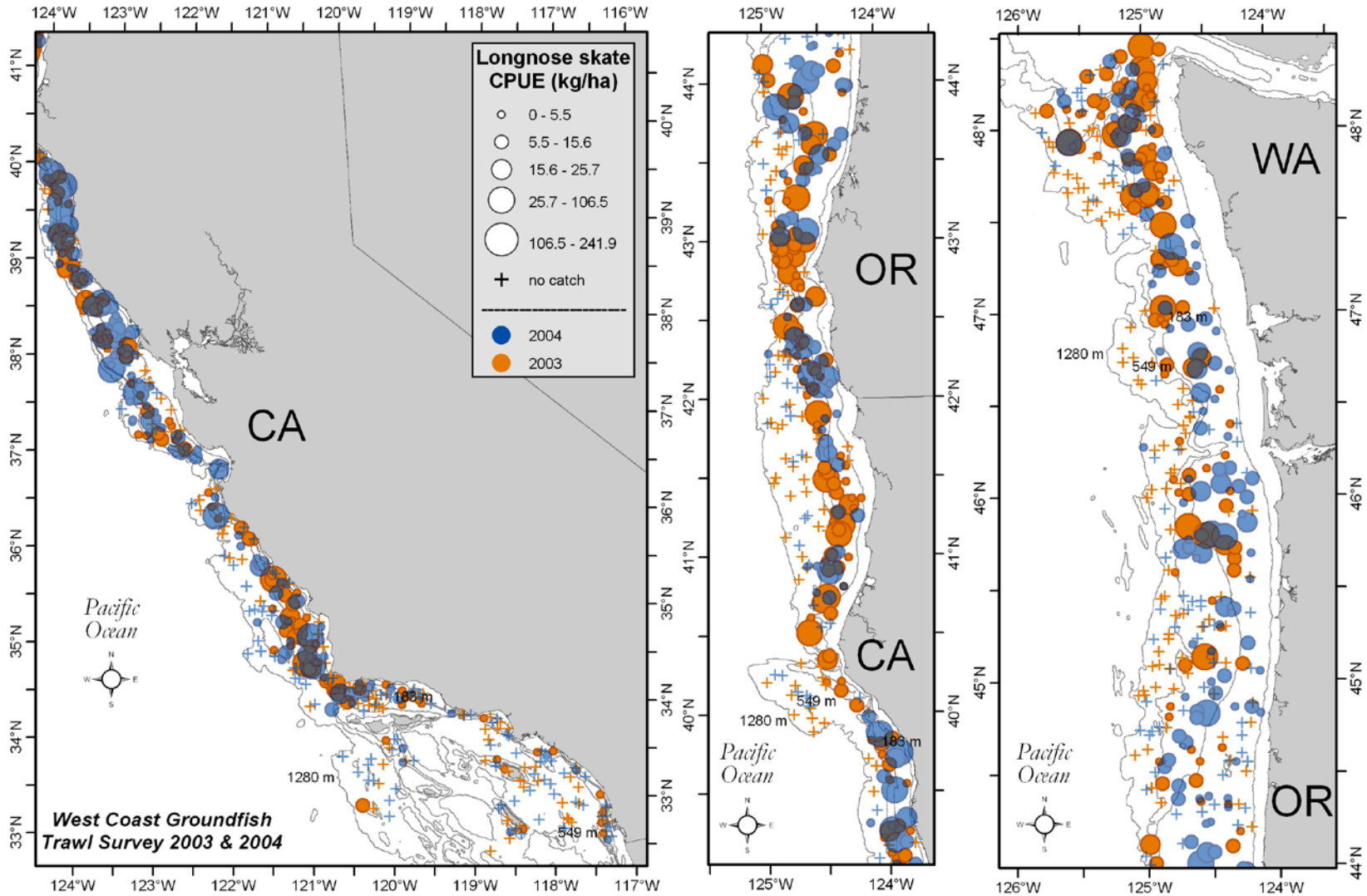


Figure 72. Longnose skate (*Raja rhina*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

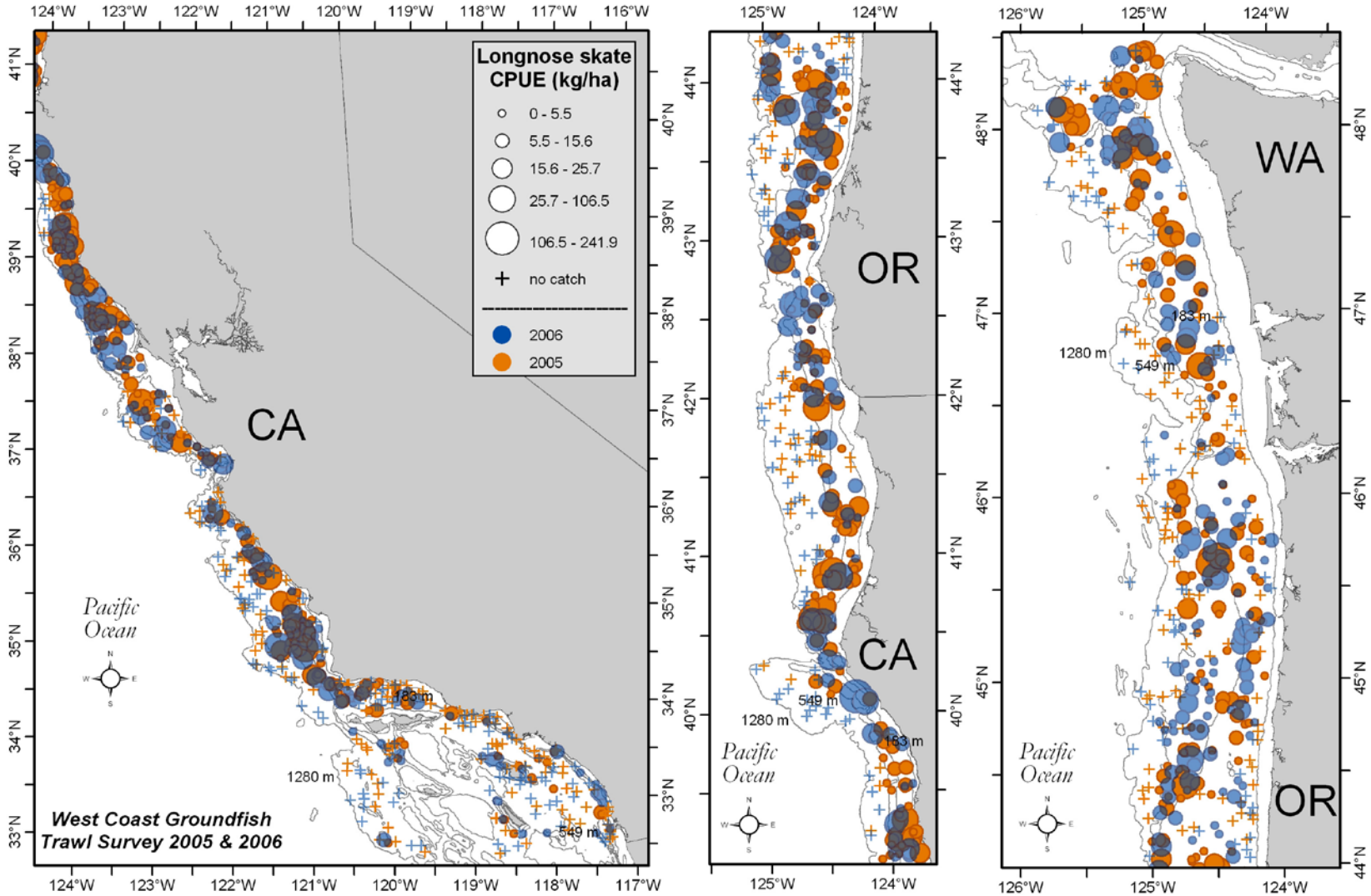


Figure 73. Longnose skate distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

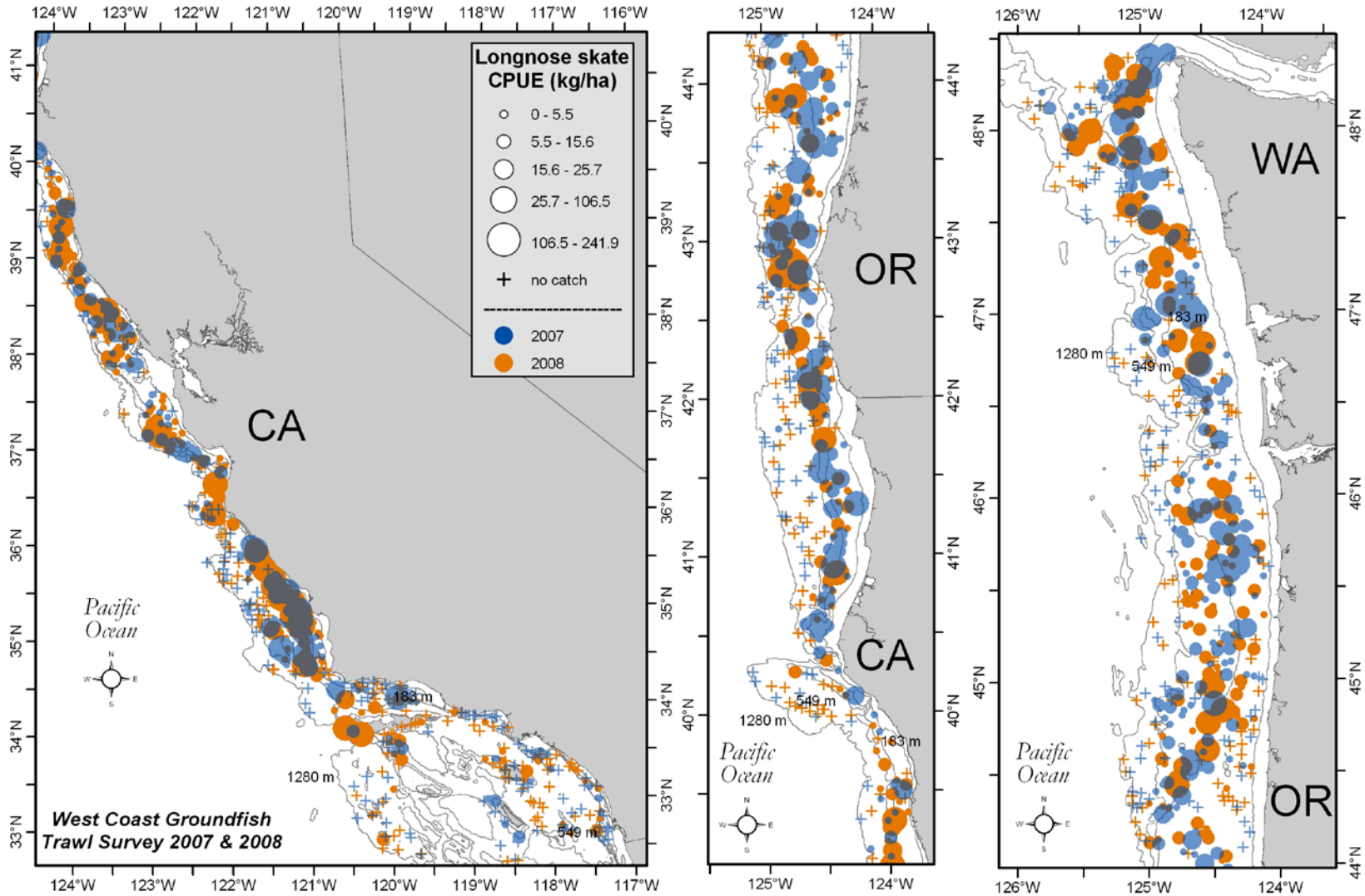


Figure 74. Longnose skate distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

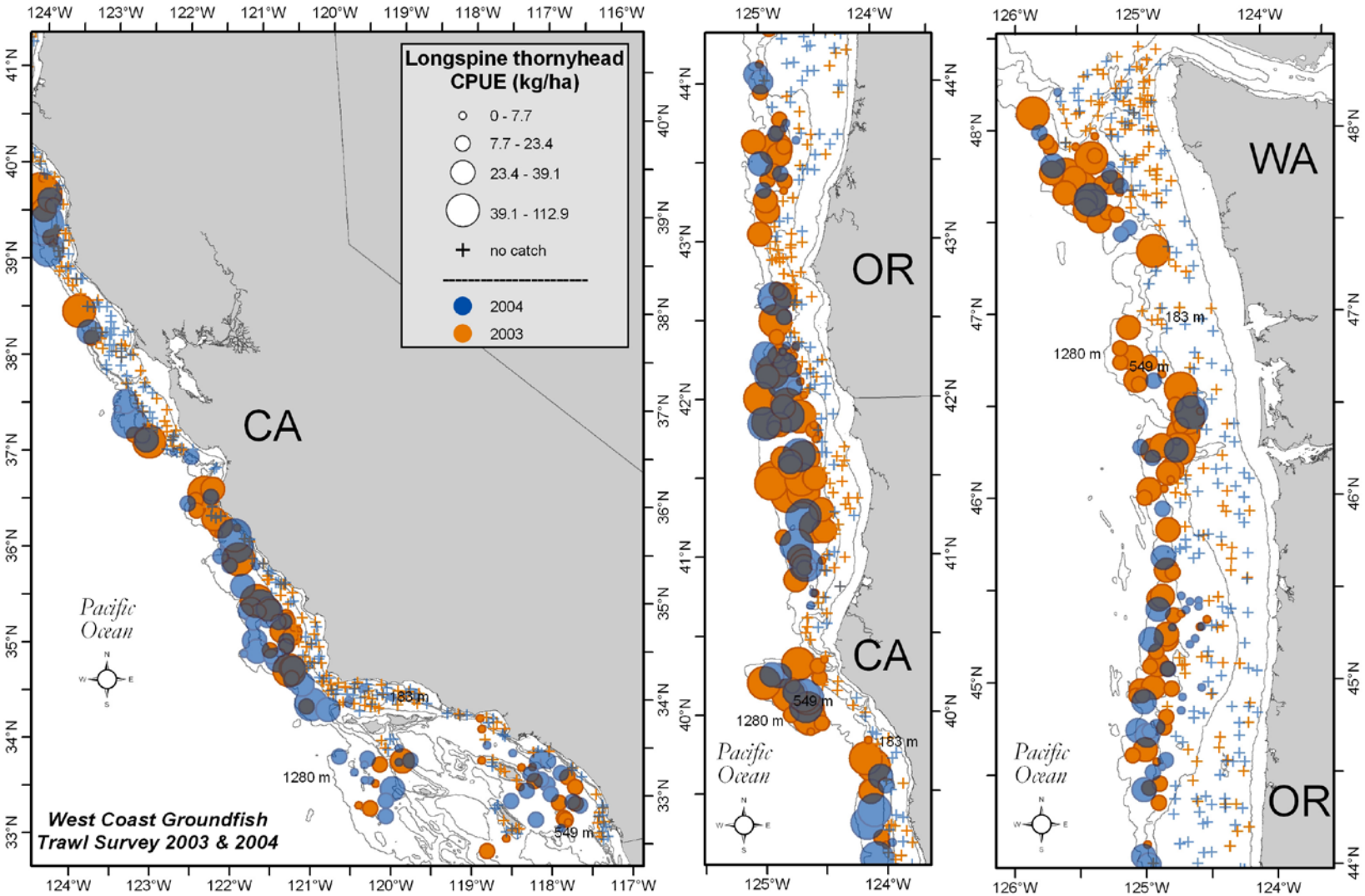


Figure 75. Longspine thornyhead distribution and relative abundance (kg ha–1) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

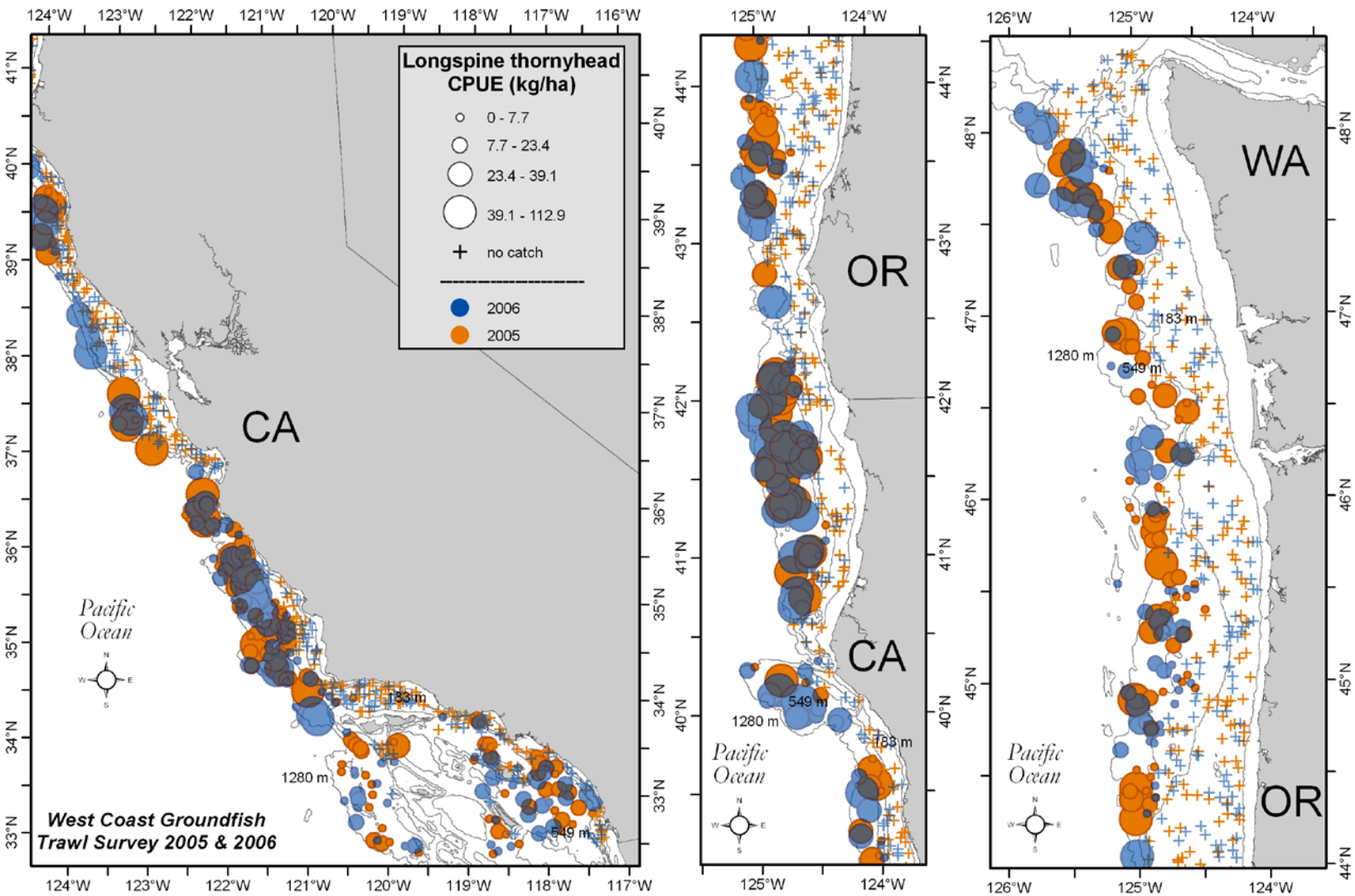


Figure 76. Longspine thornyhead distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

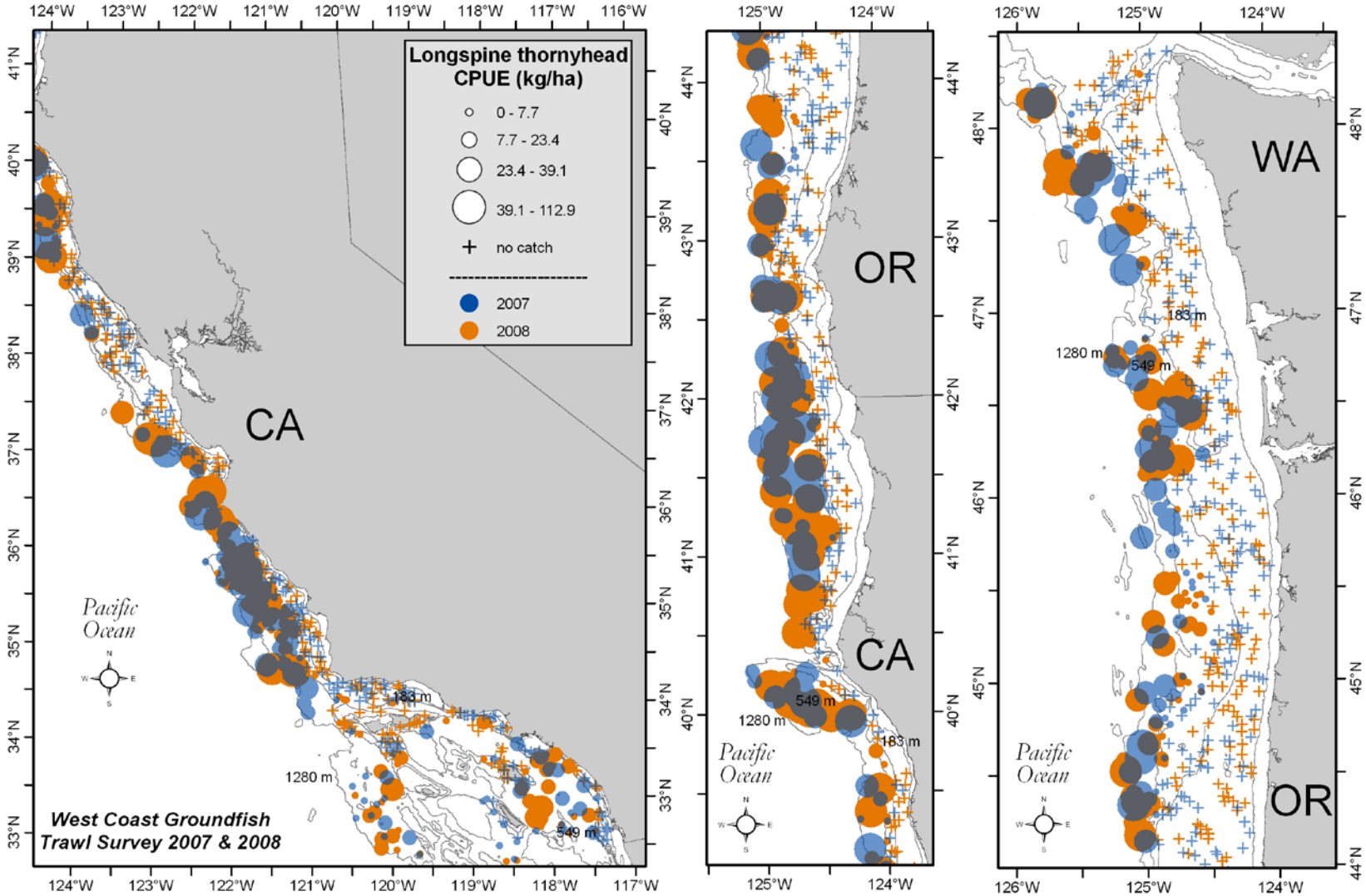


Figure 77. Longspine thornyhead distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

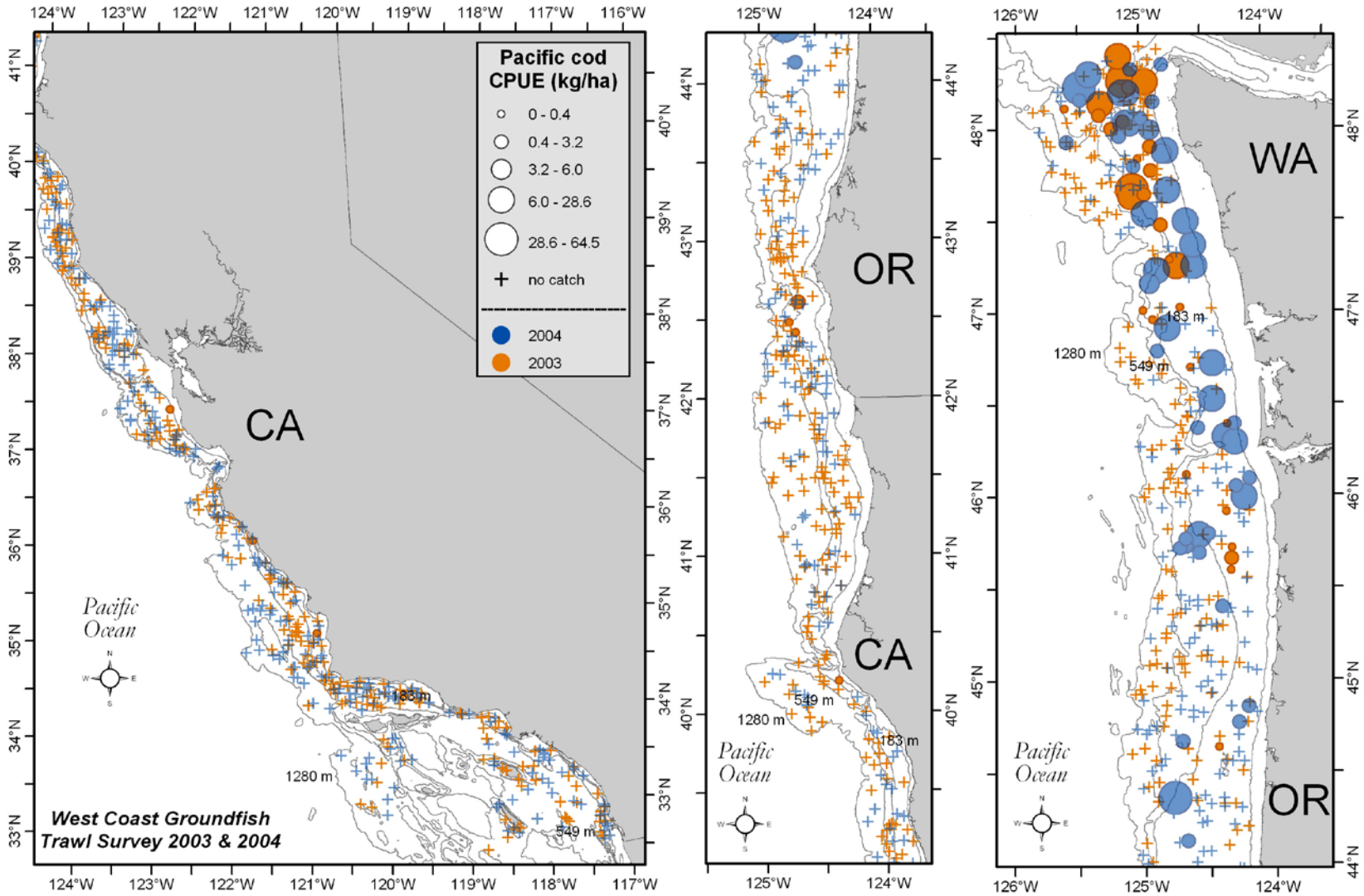


Figure 78. Pacific cod (*Gadus macrocephalus*) distribution and relative abundance (kg ha–1) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

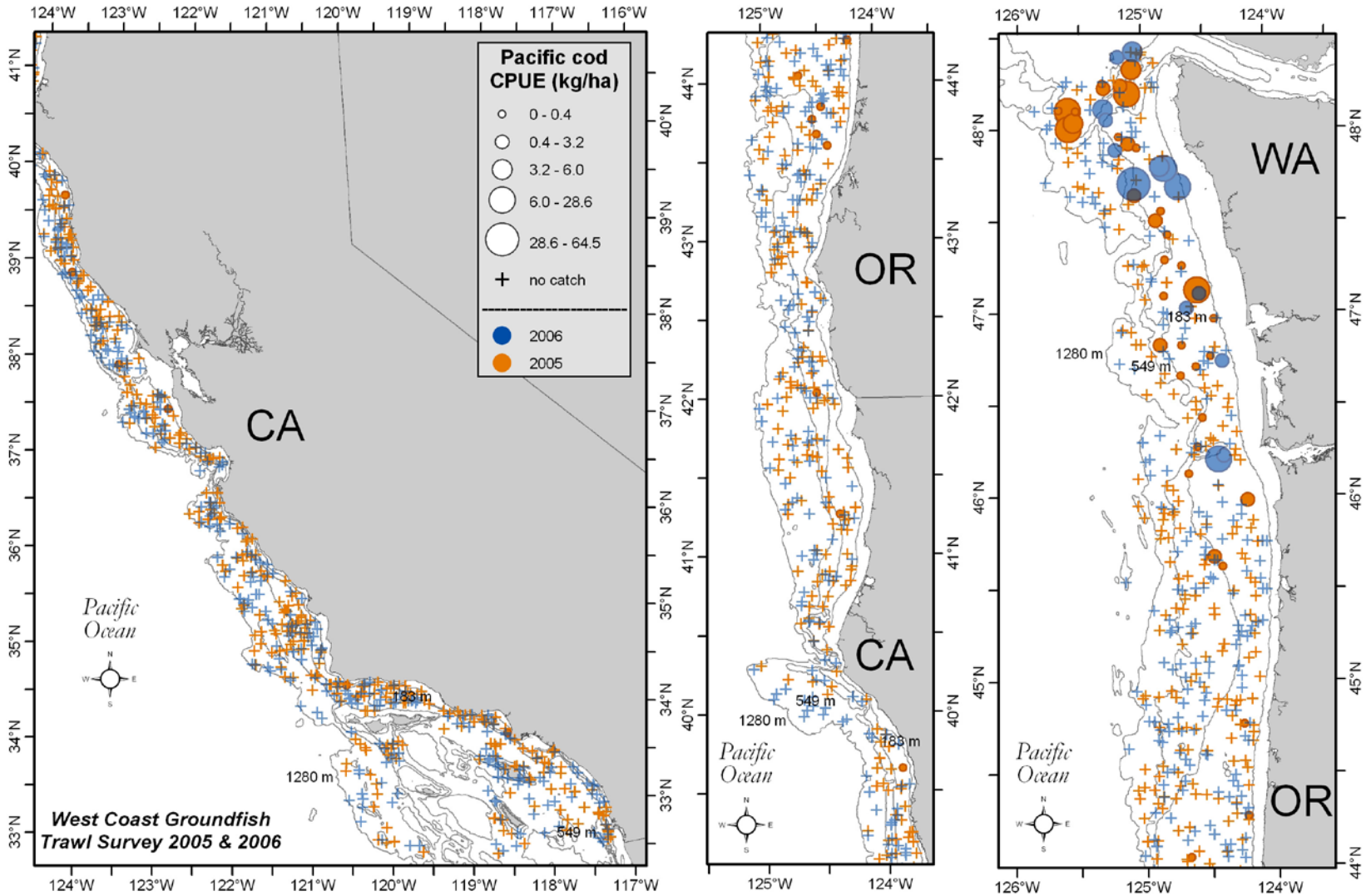


Figure 79. Pacific cod distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

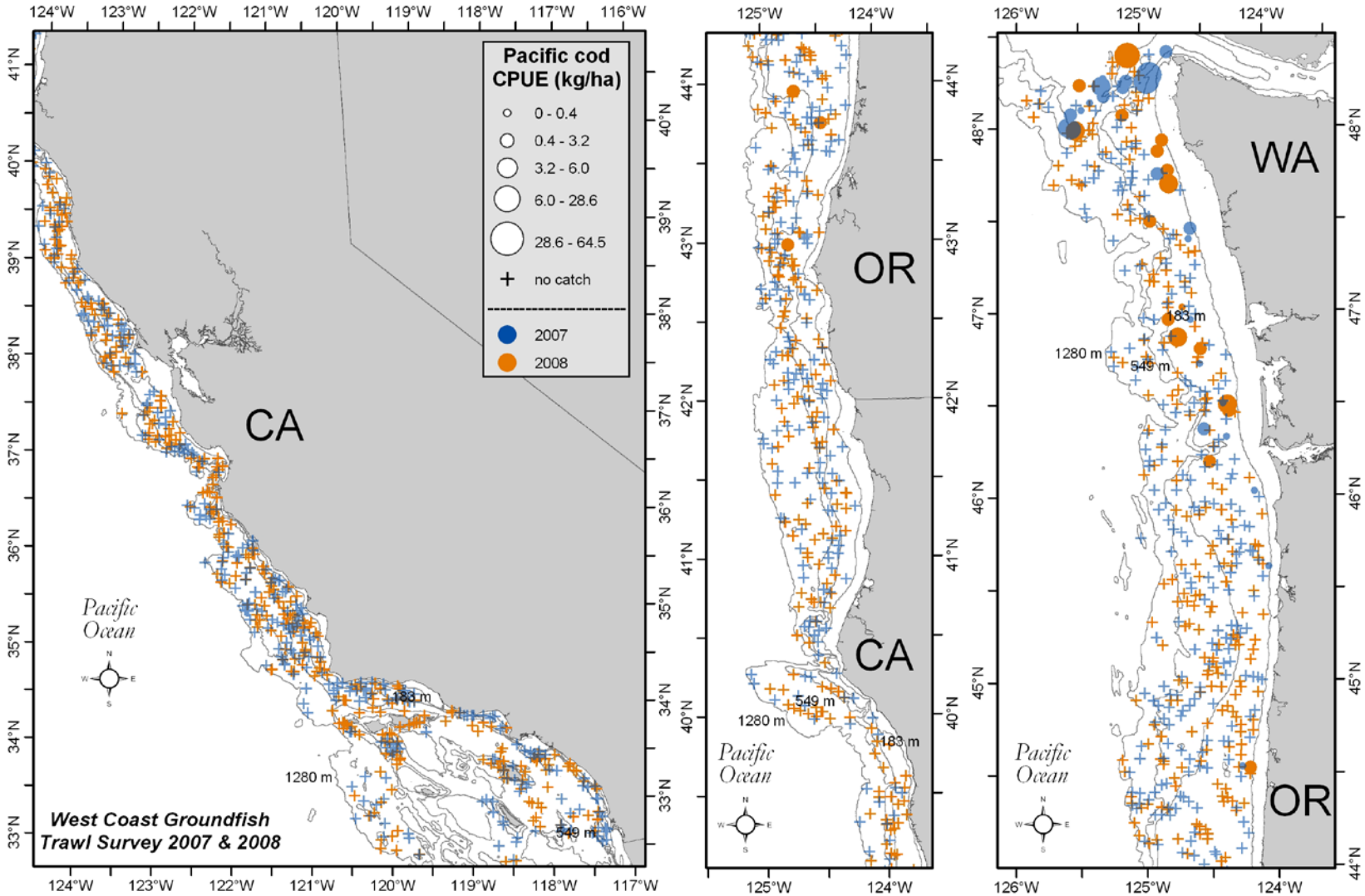


Figure 80. Pacific cod distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

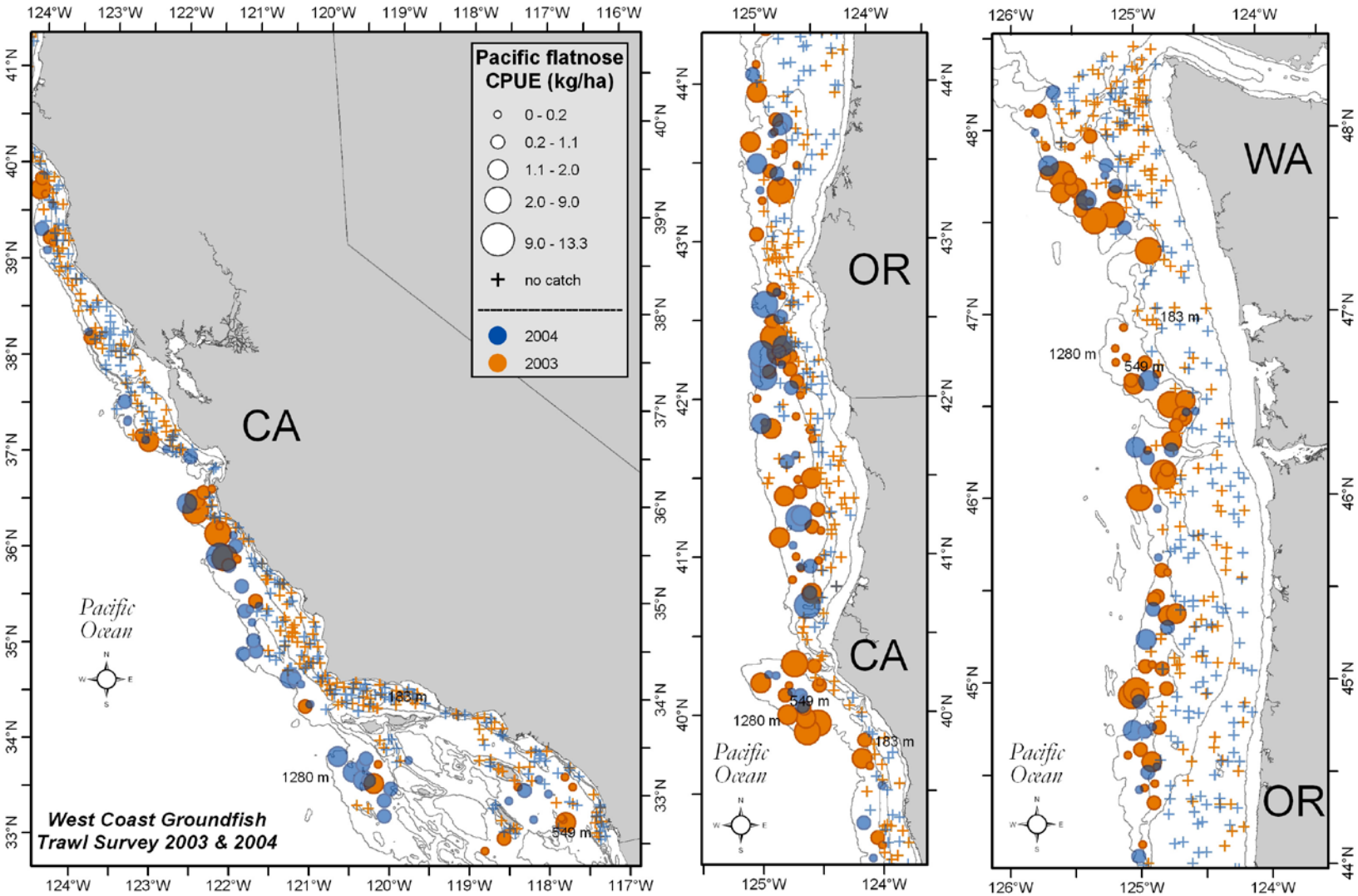


Figure 81. Pacific flatnose (*Antimora microlepis*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

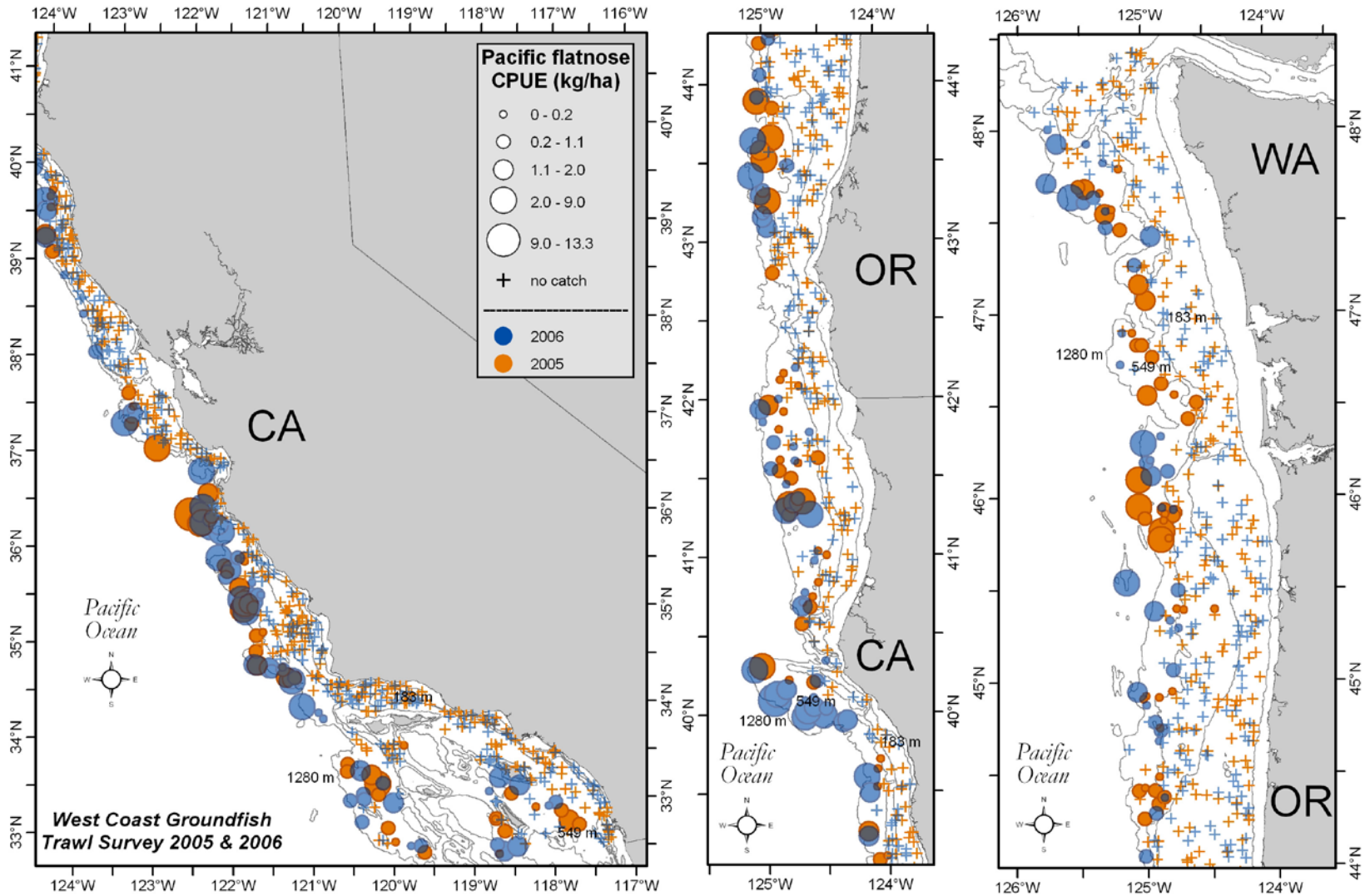


Figure 82. Pacific flatnose distribution and relative abundance (kg ha–1) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

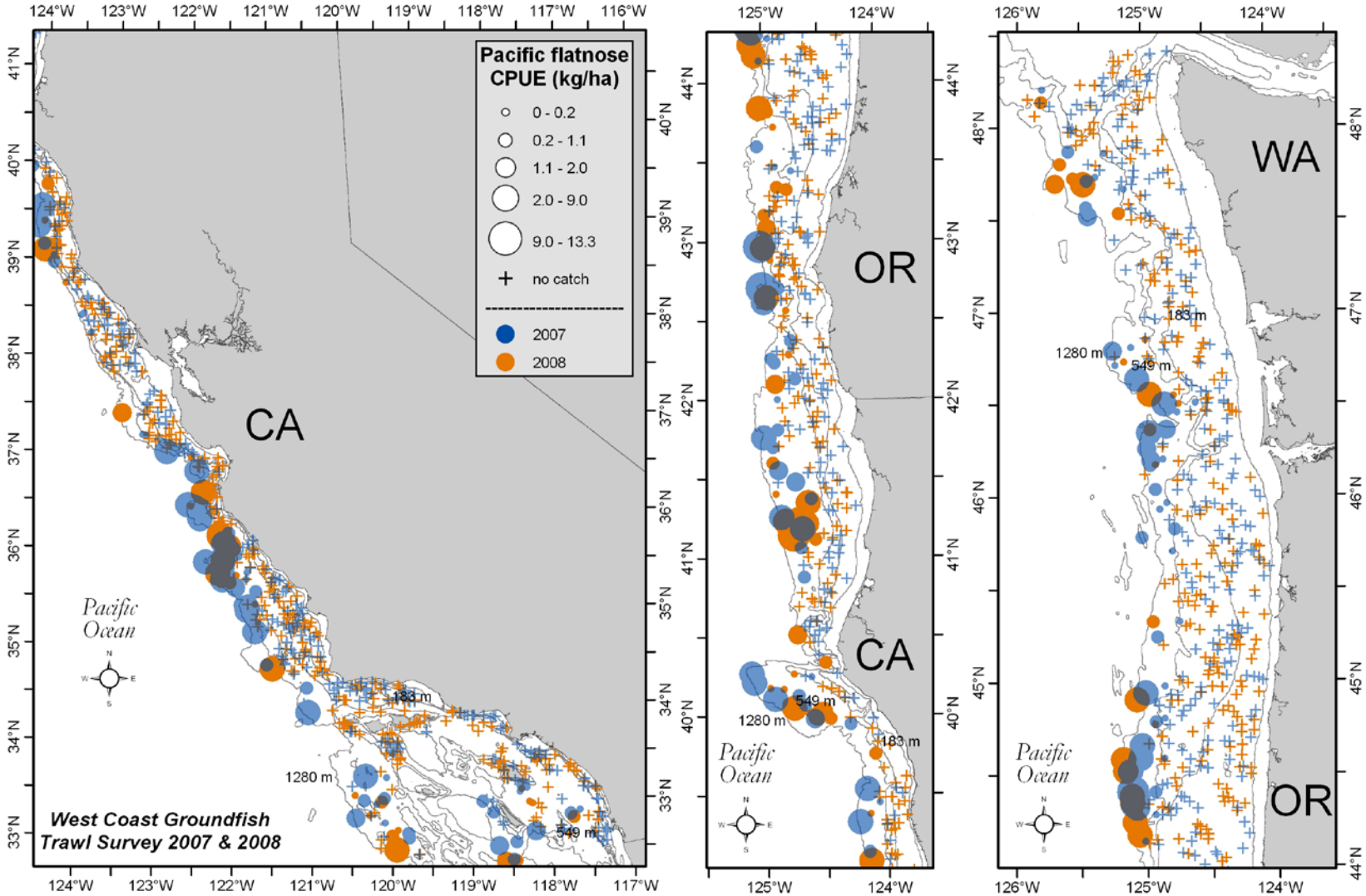


Figure 83. Pacific flatnose distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

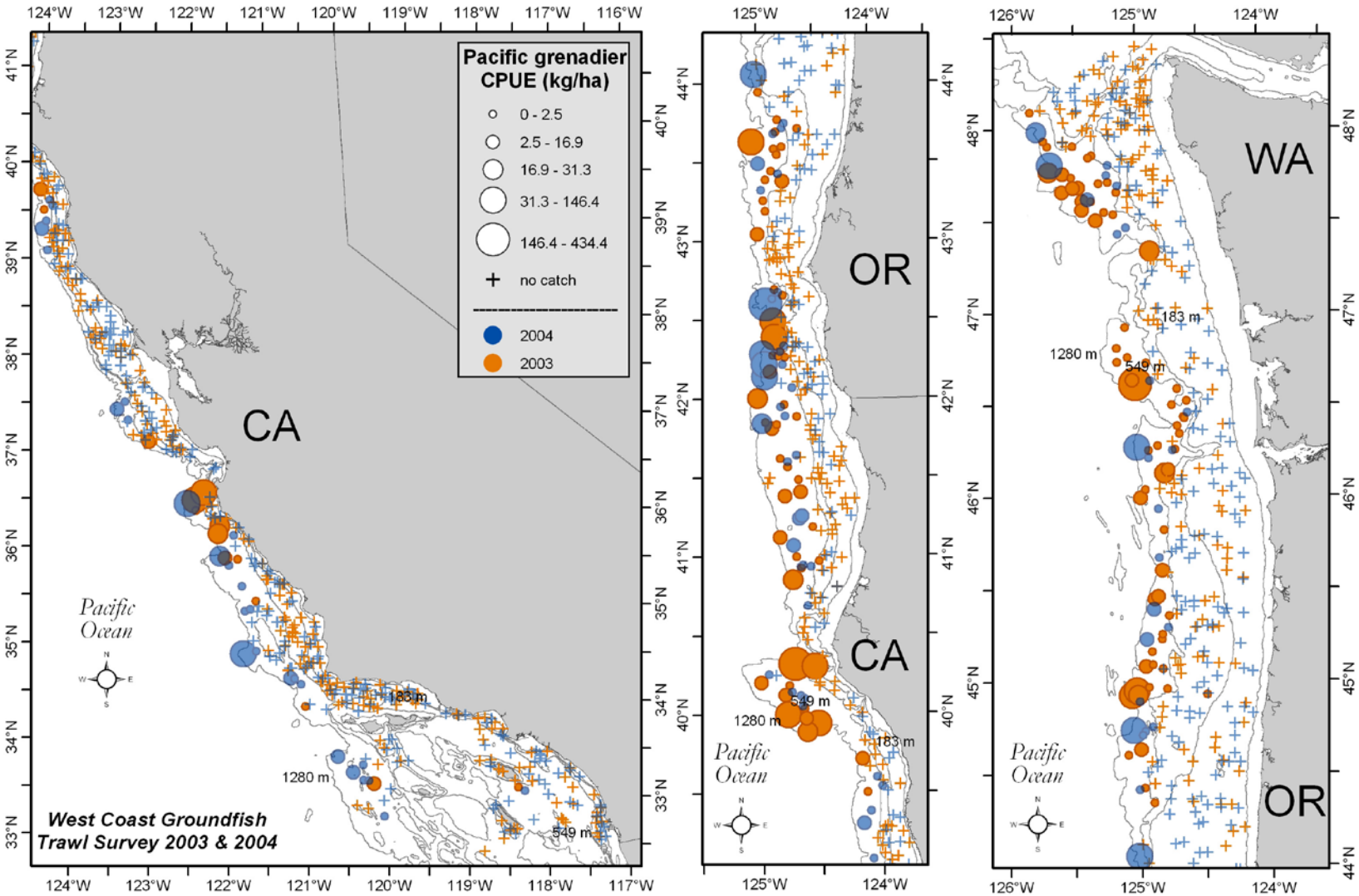


Figure 84. Pacific grenadier distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

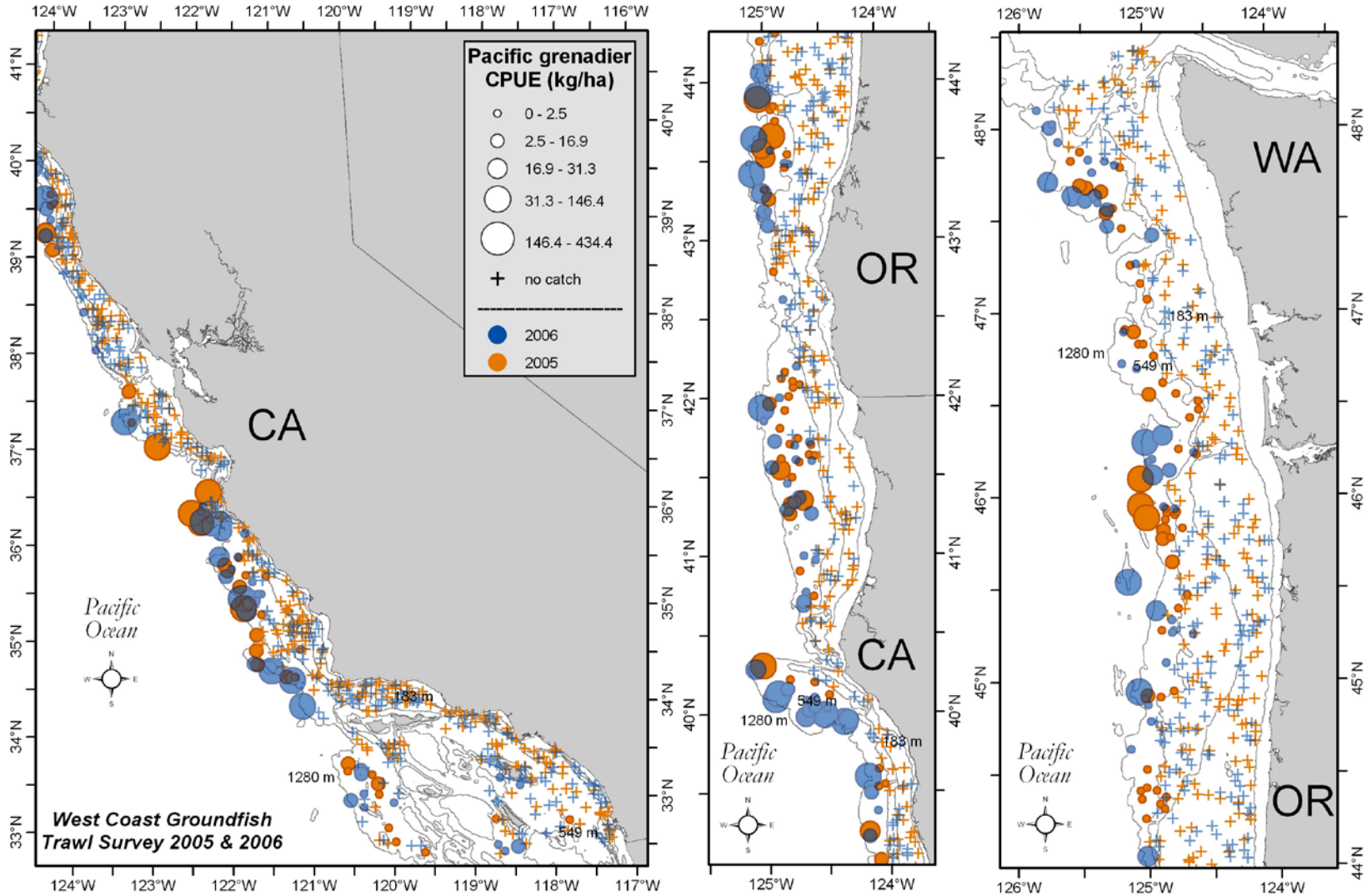


Figure 85. Pacific grenadier distribution and relative abundance (kg ha–1) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

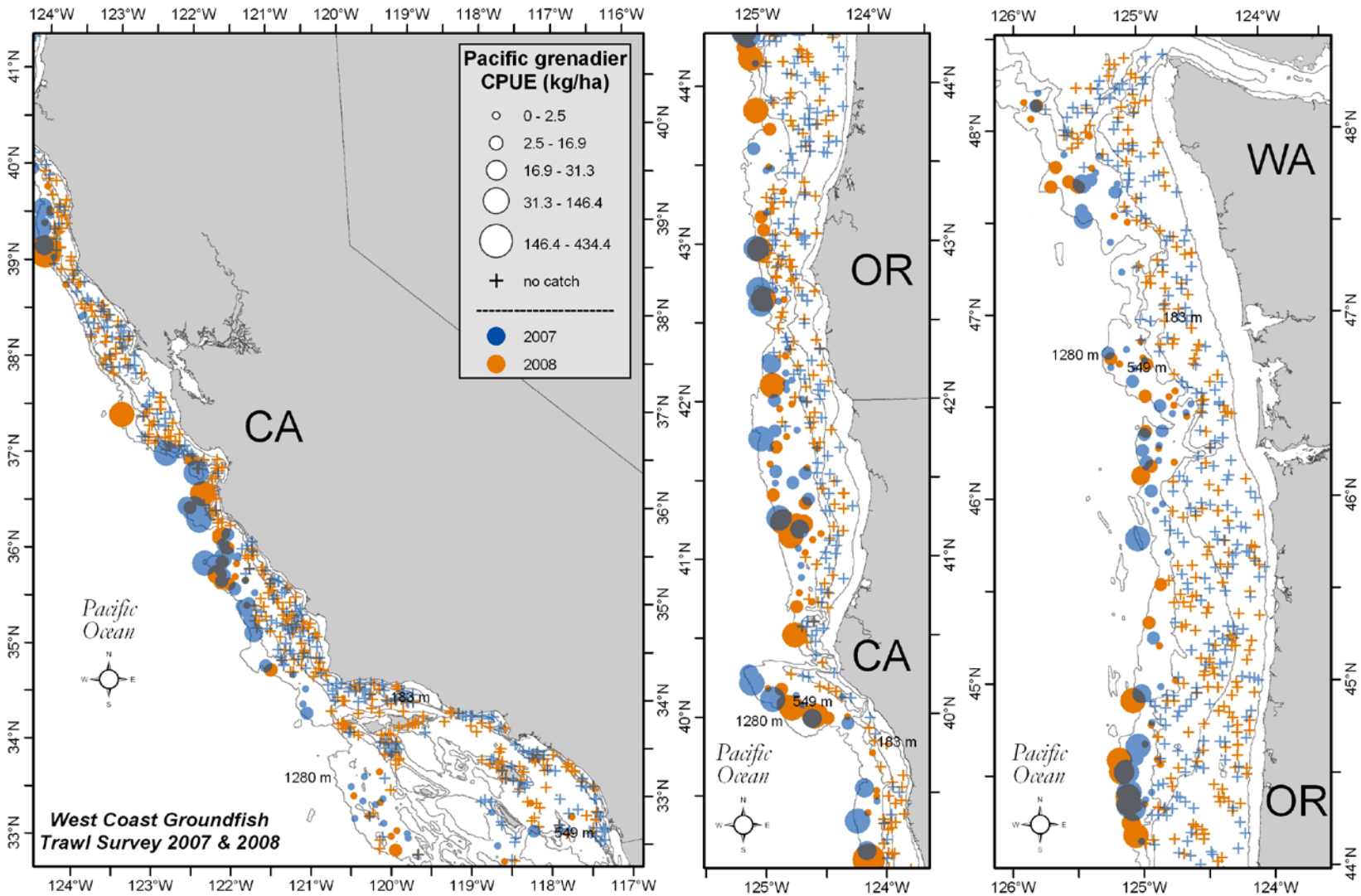


Figure 86. Pacific grenadier distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

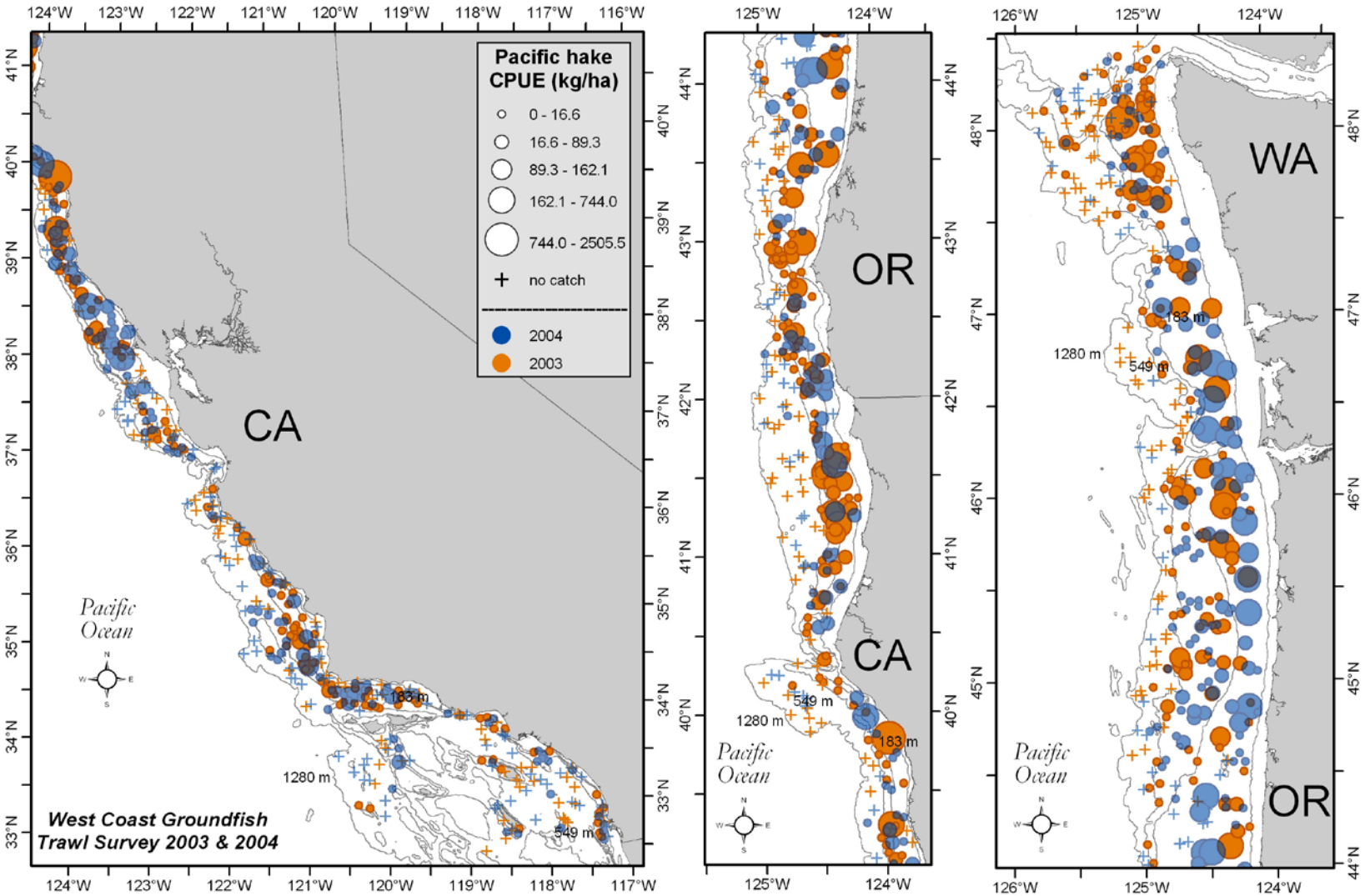


Figure 87. Pacific hake distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

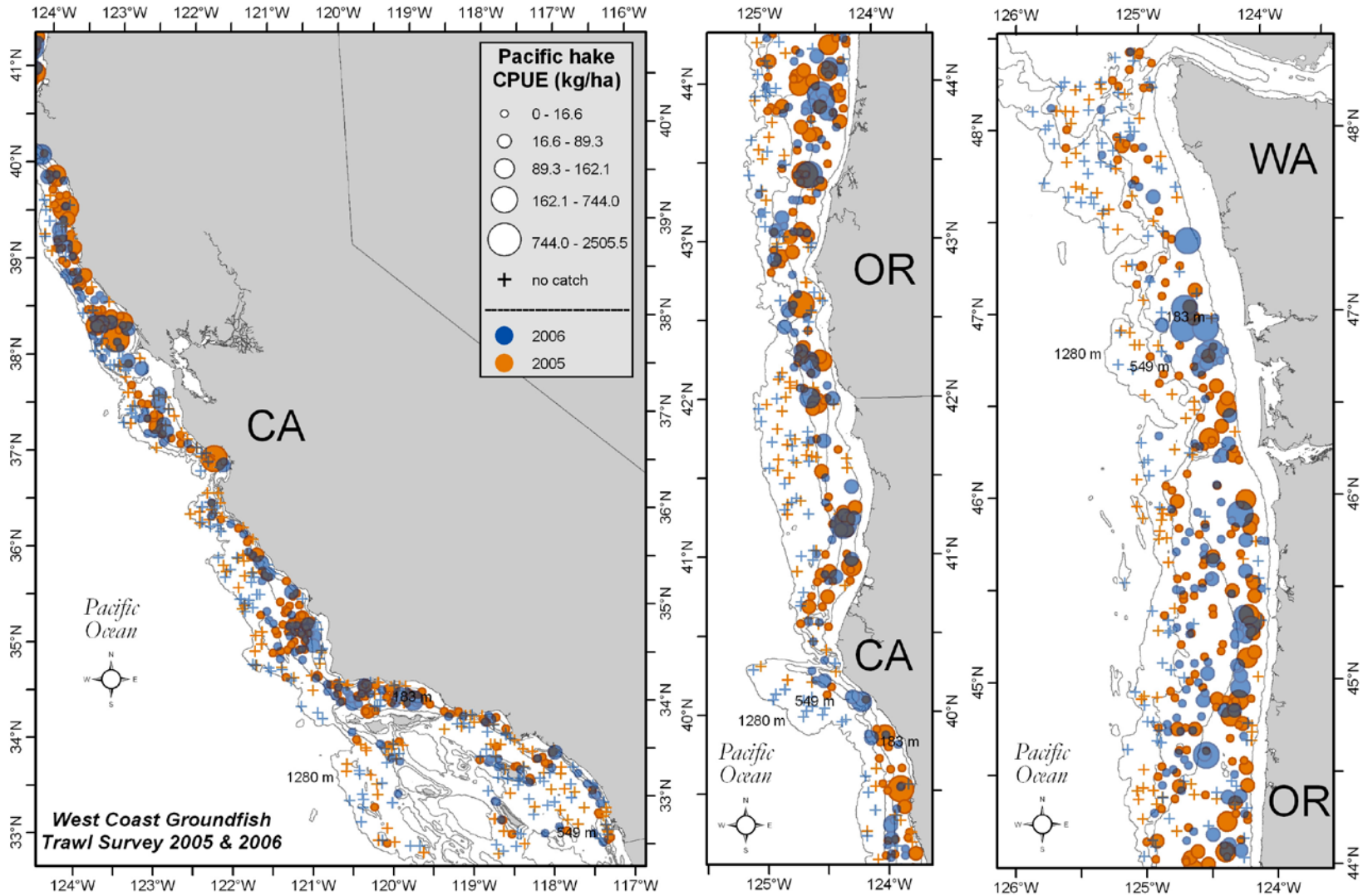


Figure 88. Pacific hake distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

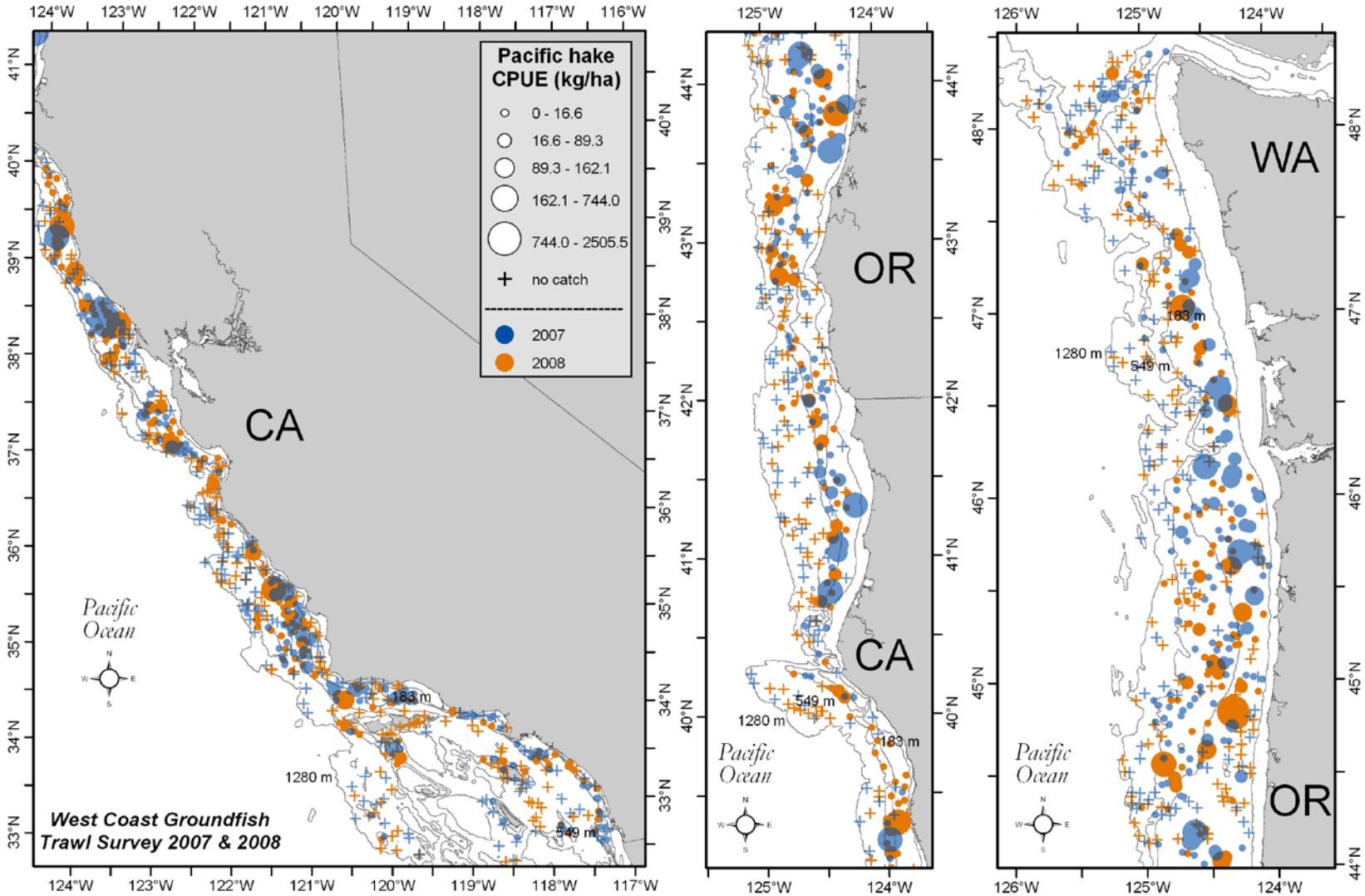


Figure 89. Pacific hake distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

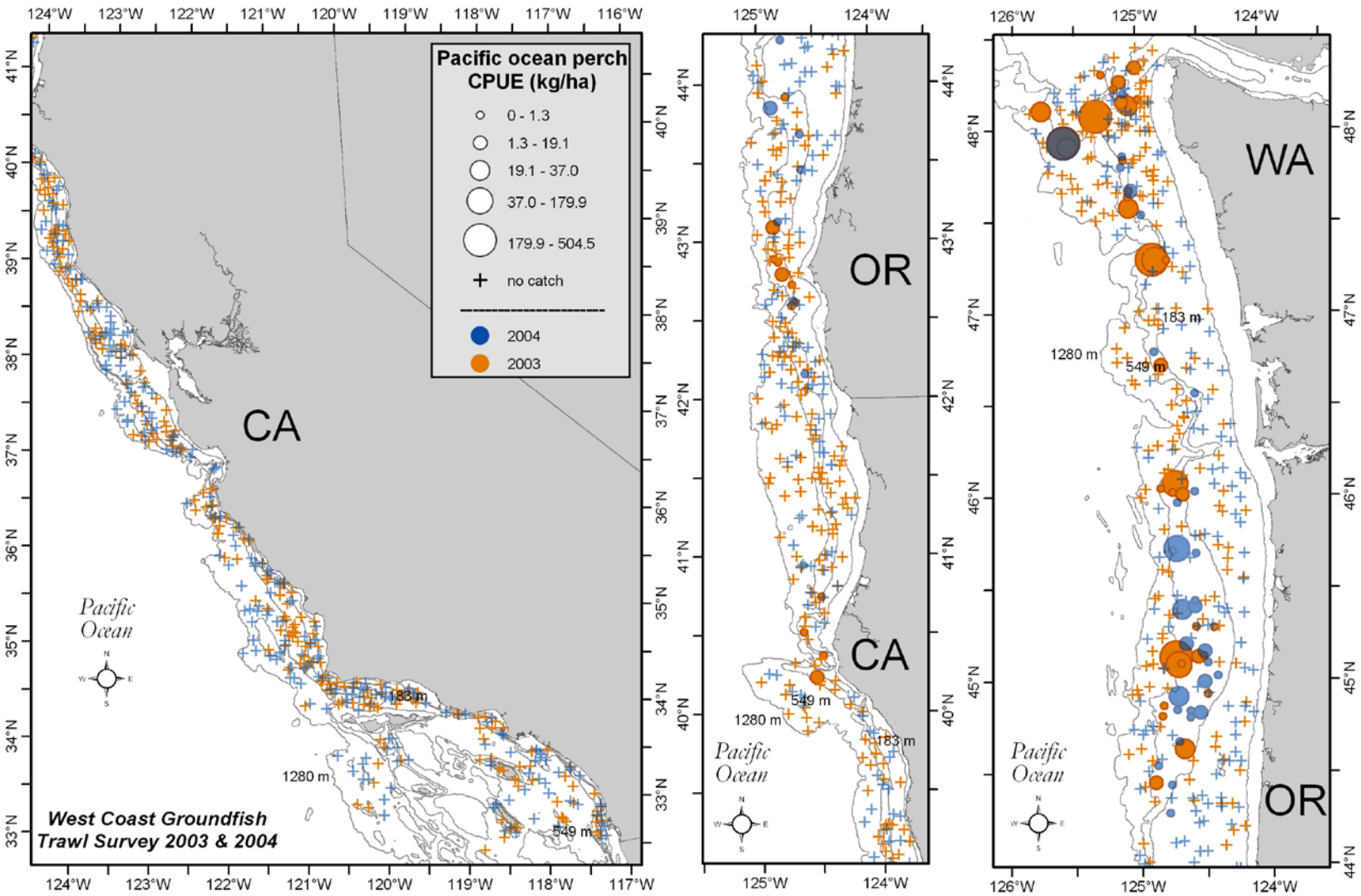


Figure 90. Pacific ocean perch (*Sebastes alutus*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

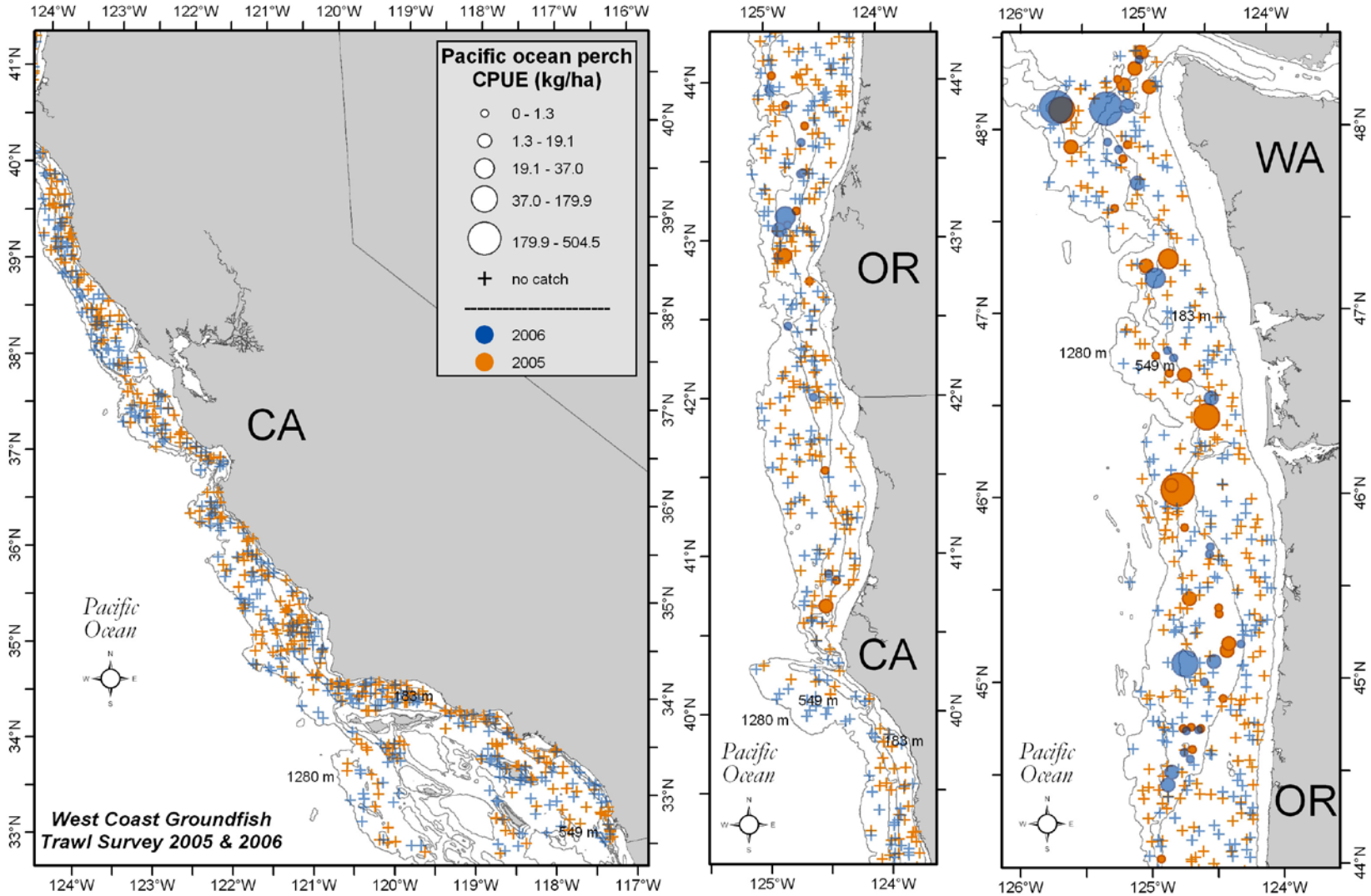


Figure 91. Pacific ocean perch distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

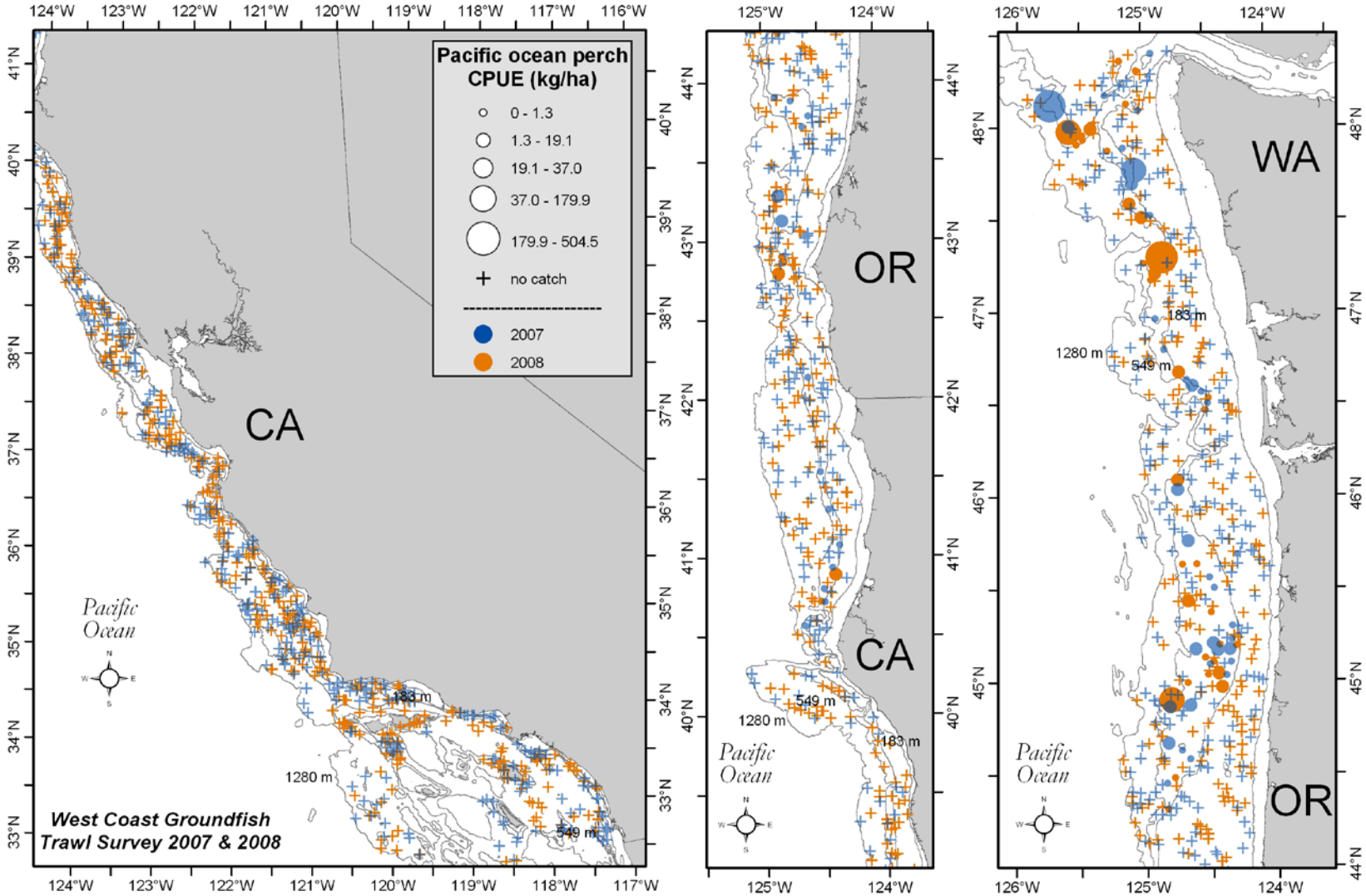


Figure 92. Pacific ocean perch distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

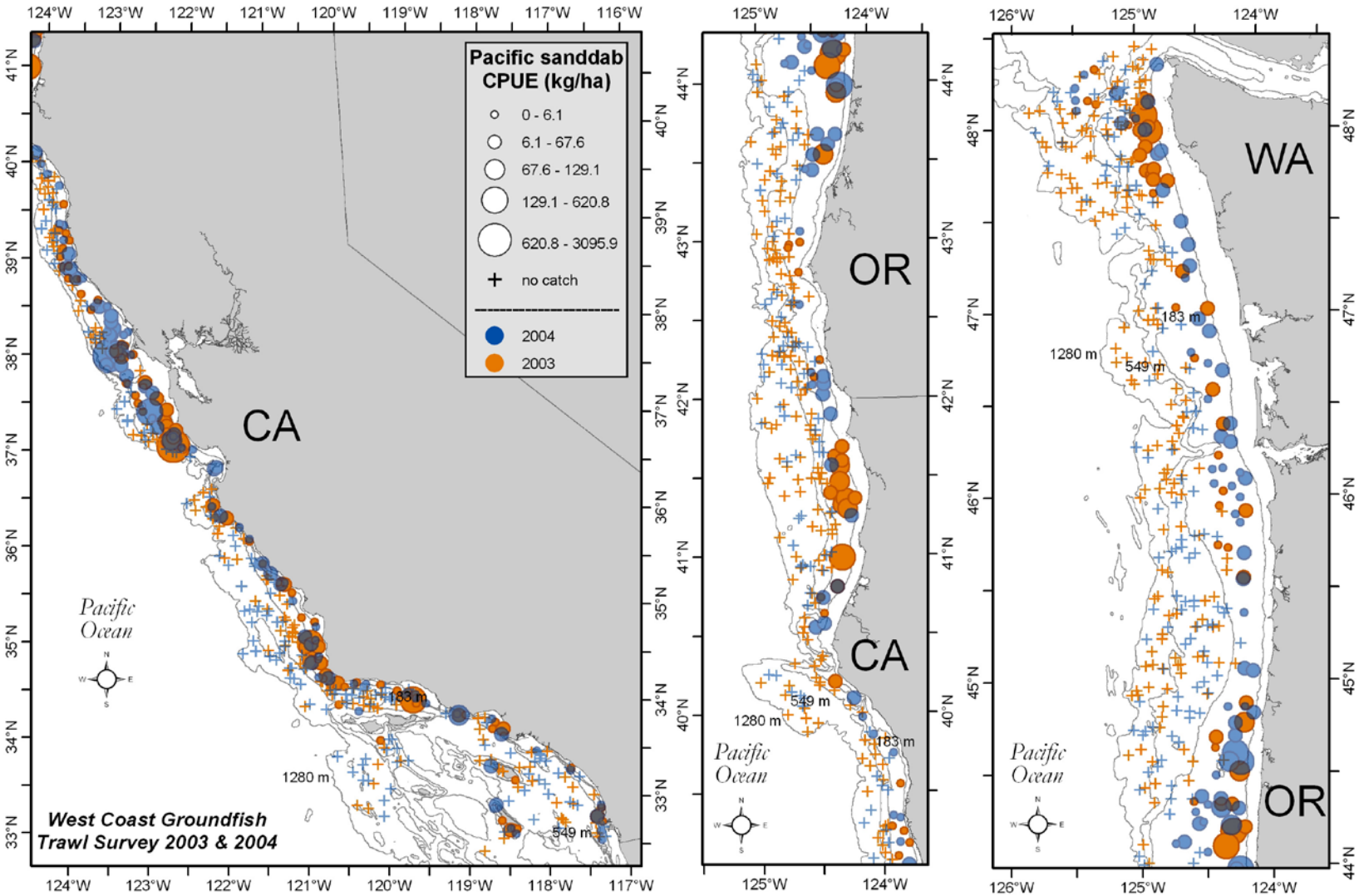


Figure 93. Pacific sanddab distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

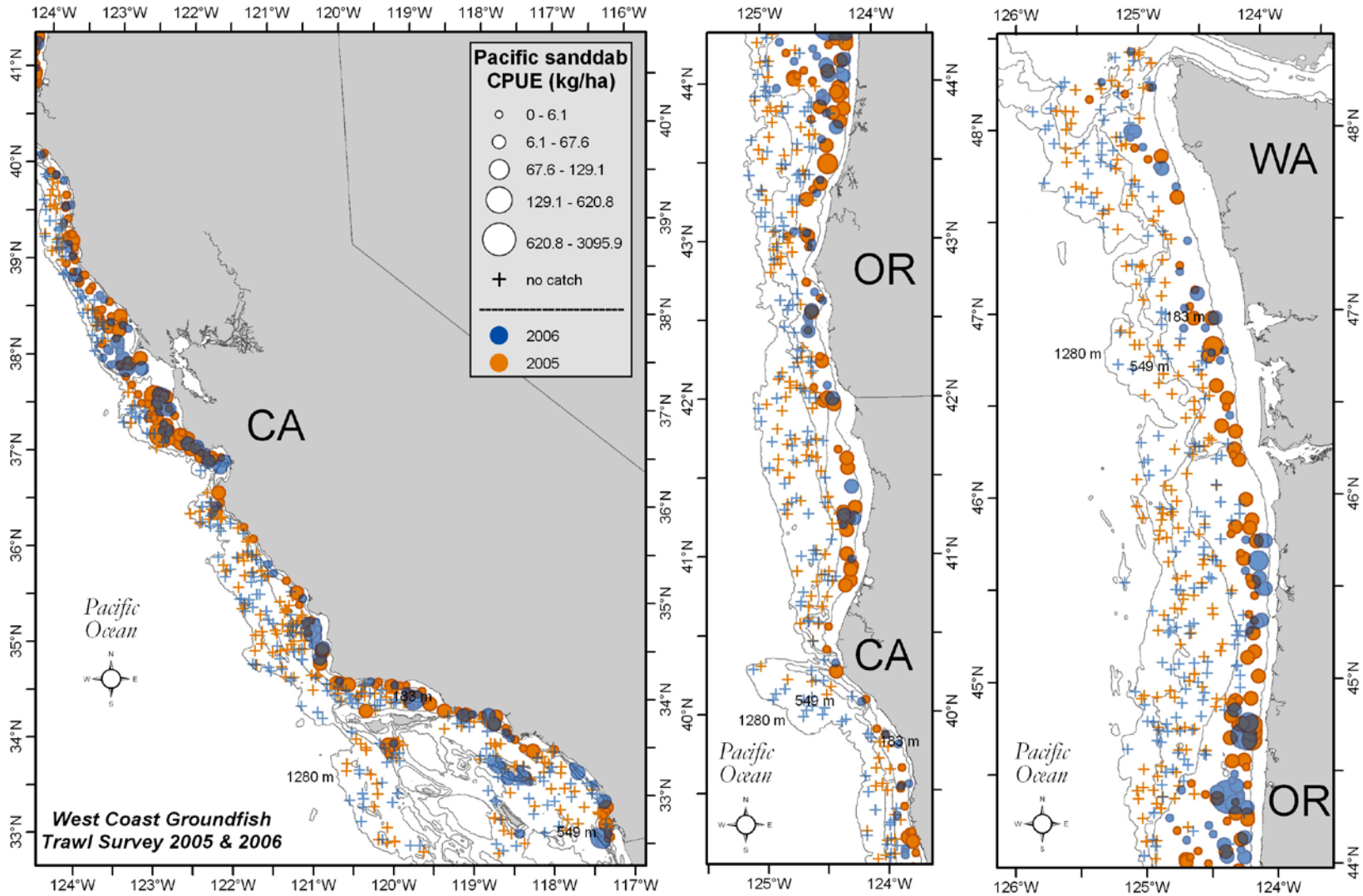


Figure 94. Pacific sanddab distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

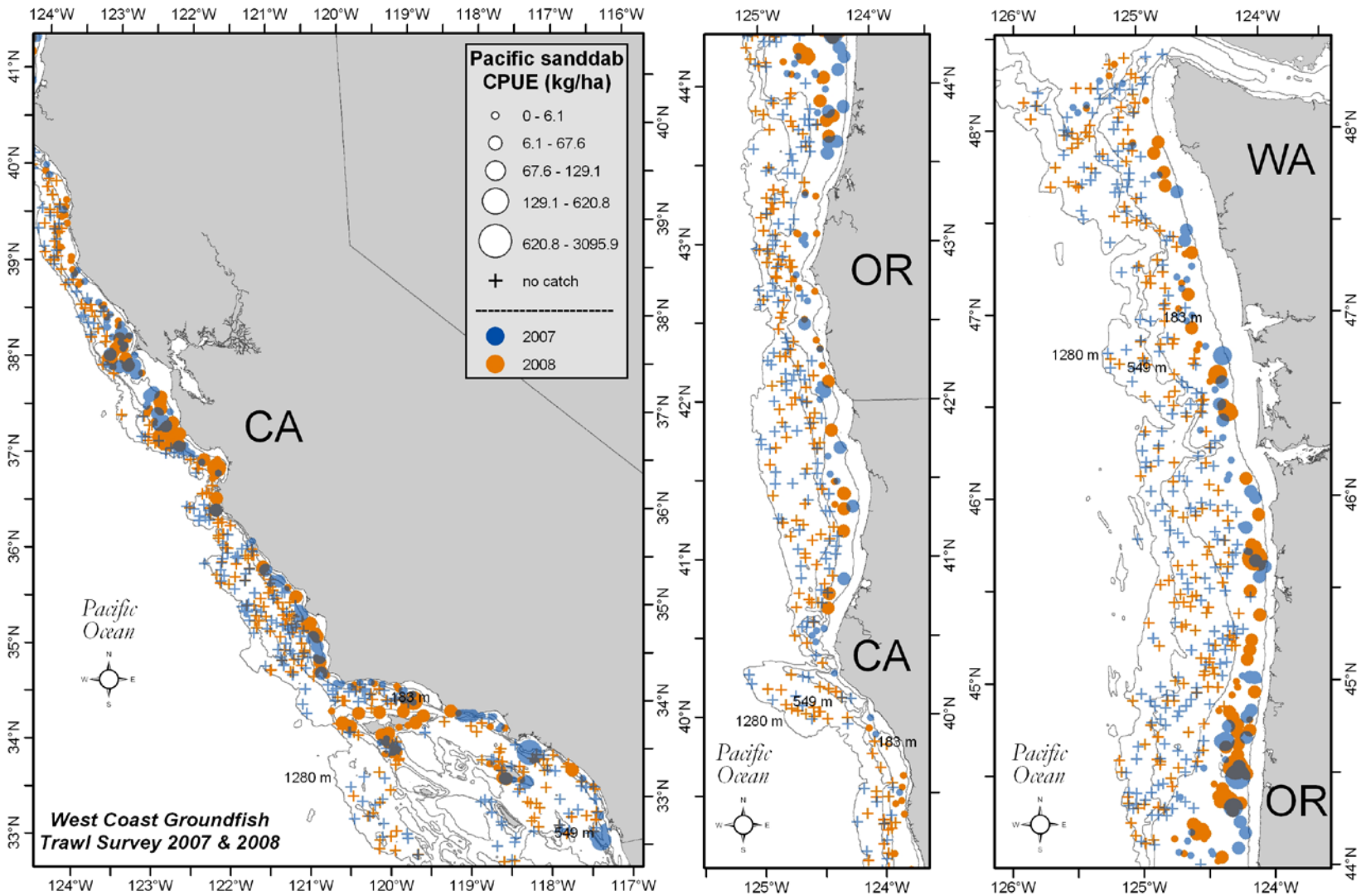


Figure 95. Pacific sanddab distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

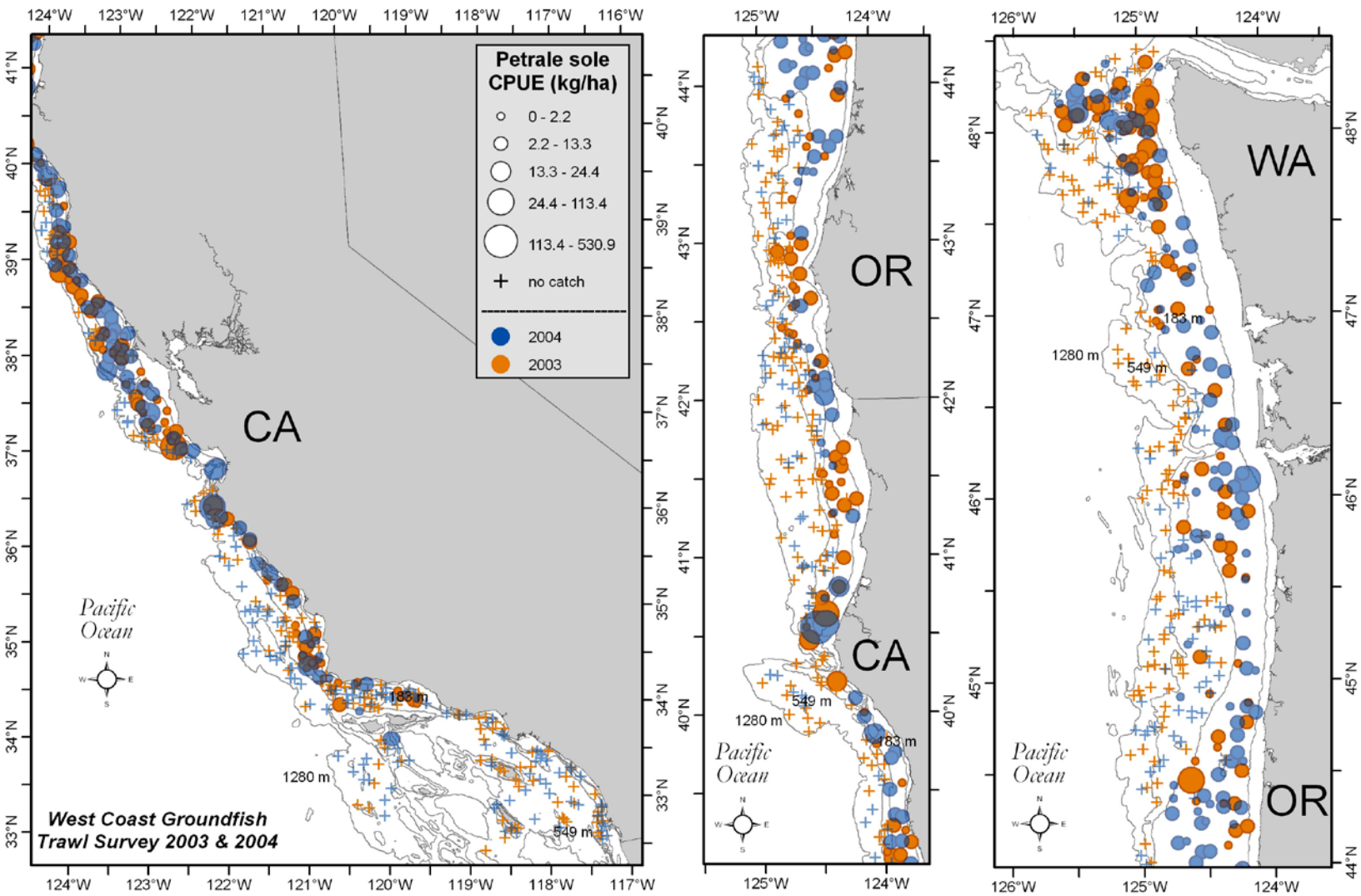


Figure 96. Petrale sole distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

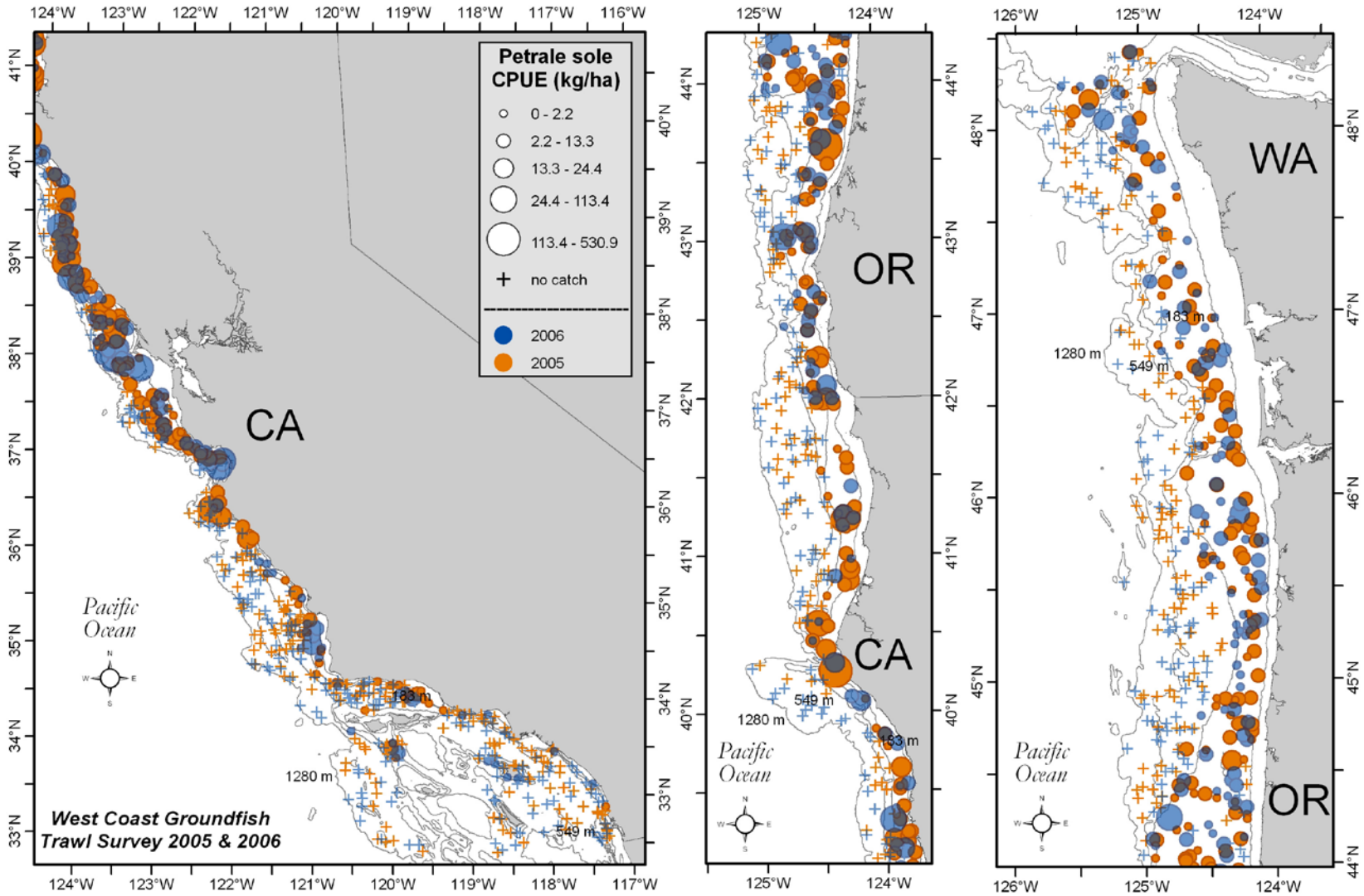


Figure 97. Petrale sole distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

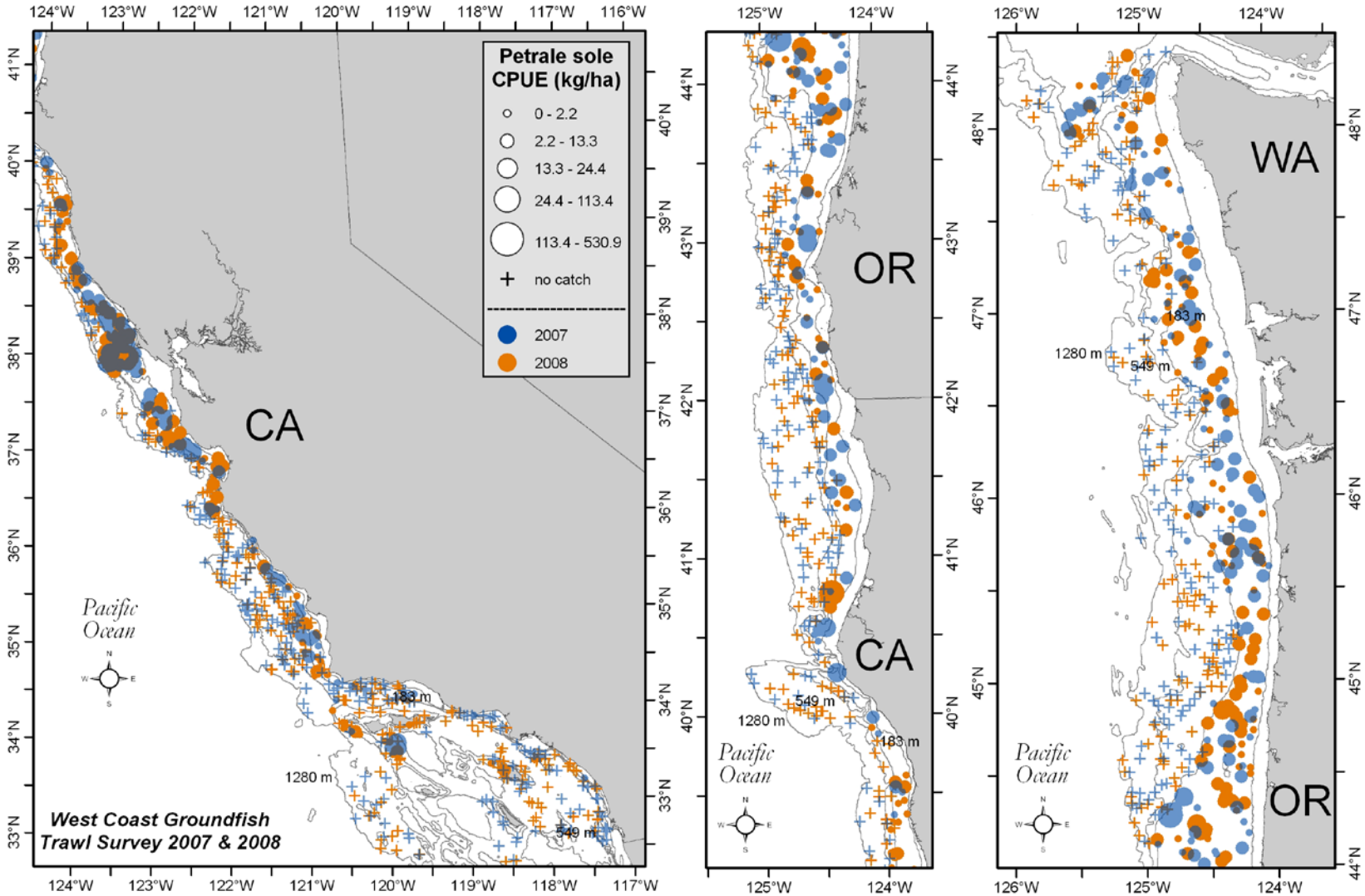


Figure 98. Petrale sole distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

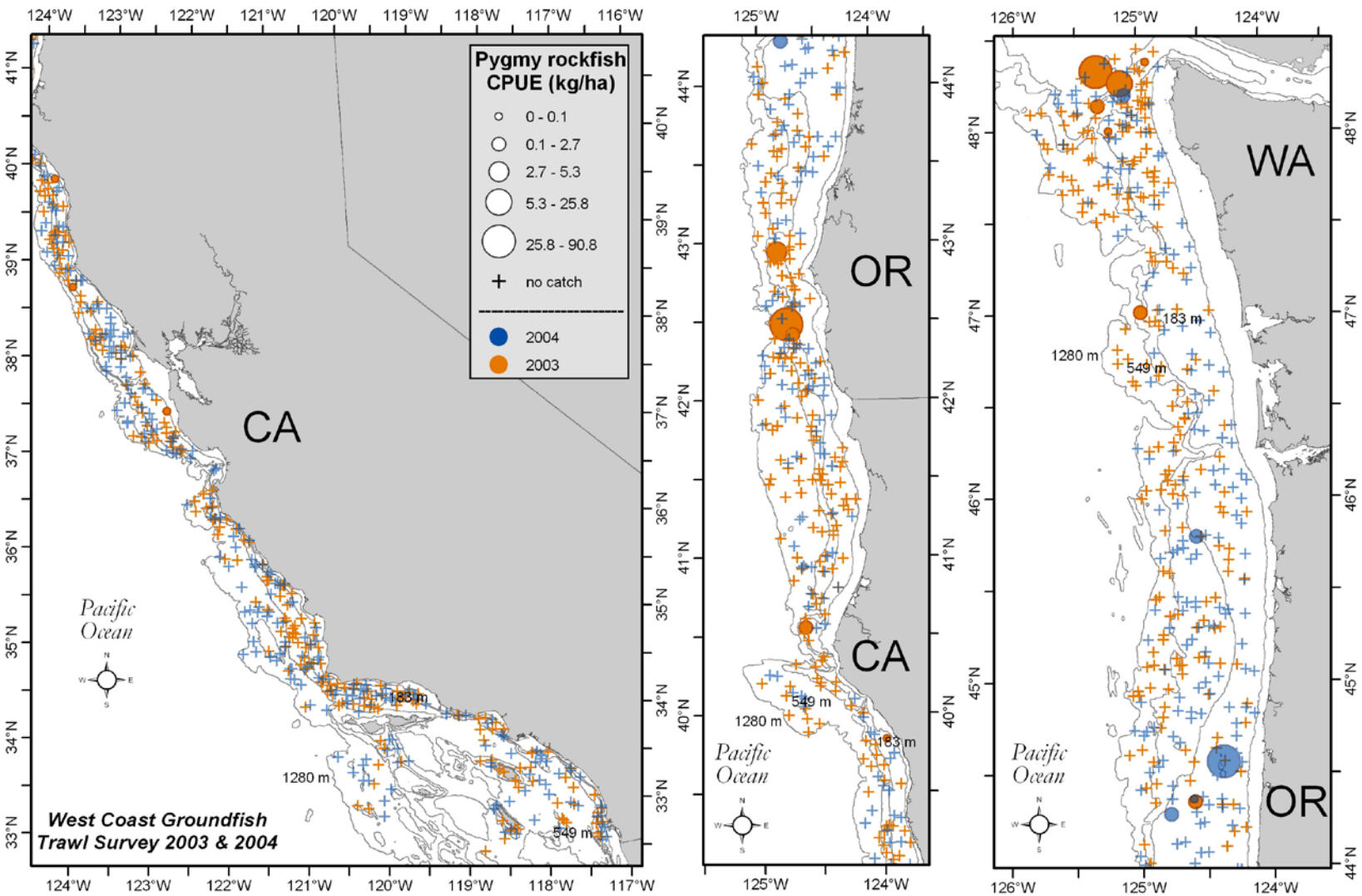


Figure 99. Pygmy rockfish (*Sebastes wilsoni*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

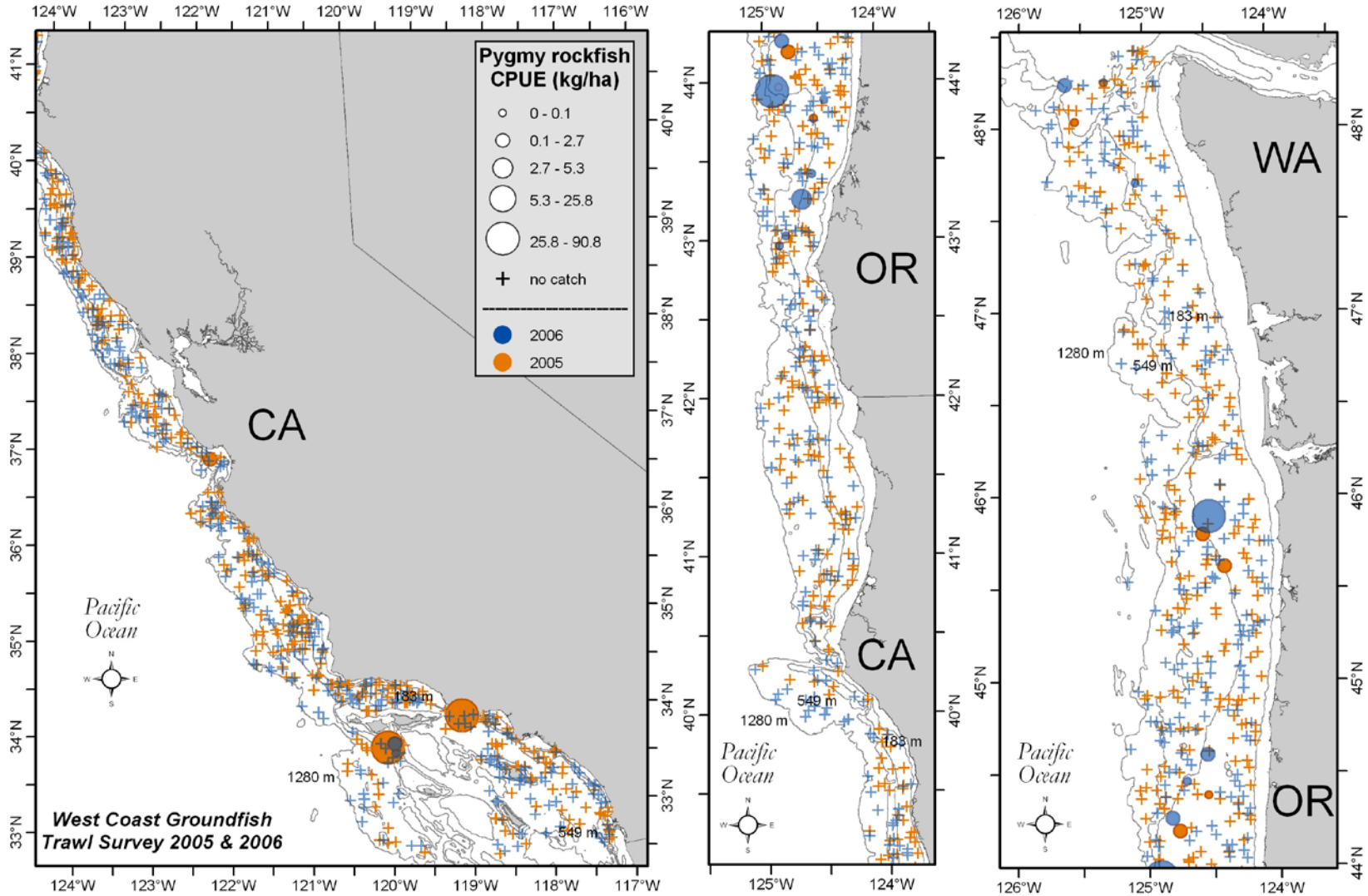


Figure 100. Pygmy rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

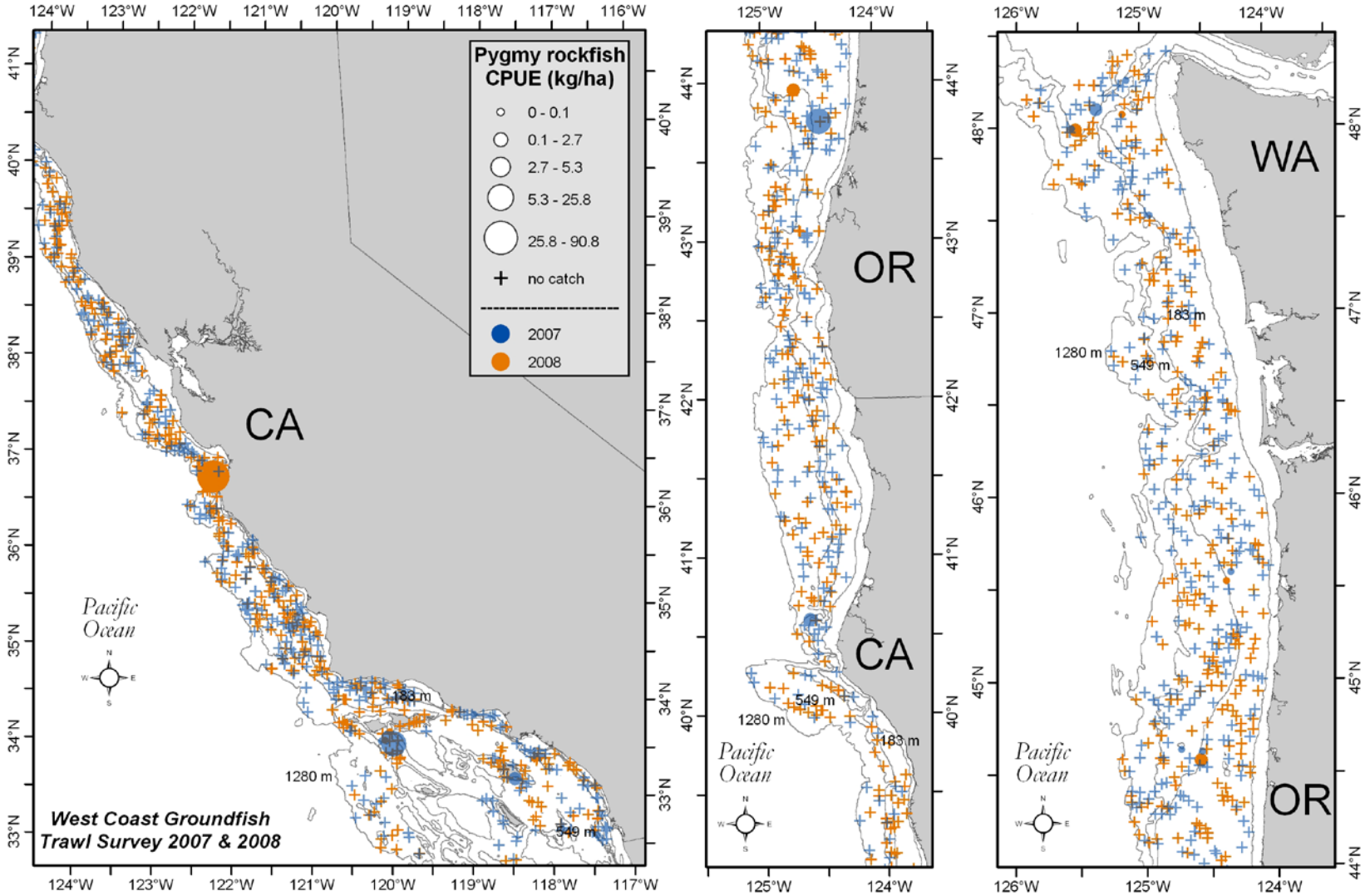


Figure 101. Pygmy rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

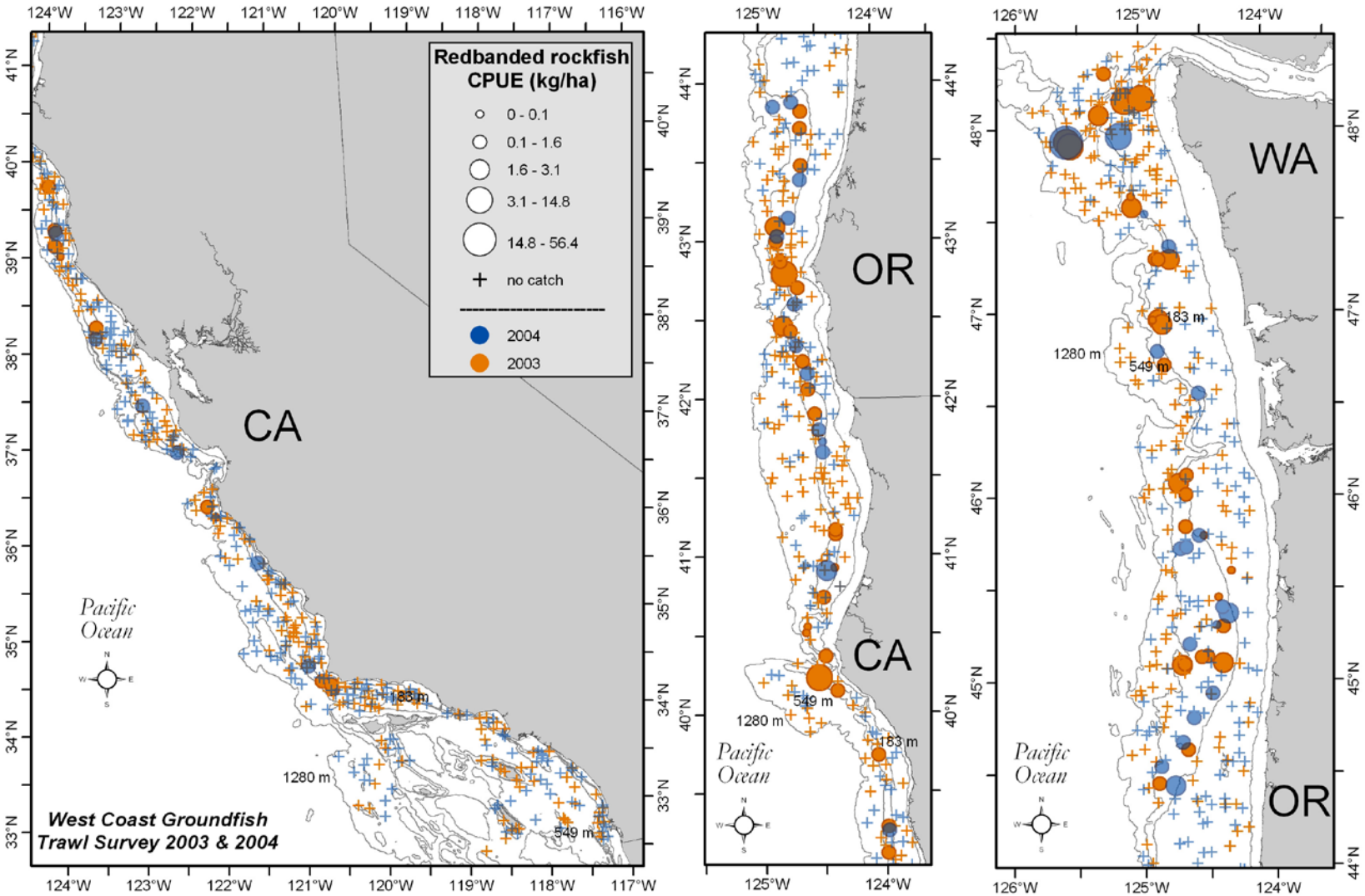


Figure 102. Redbanded rockfish (*Sebastes babcocki*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

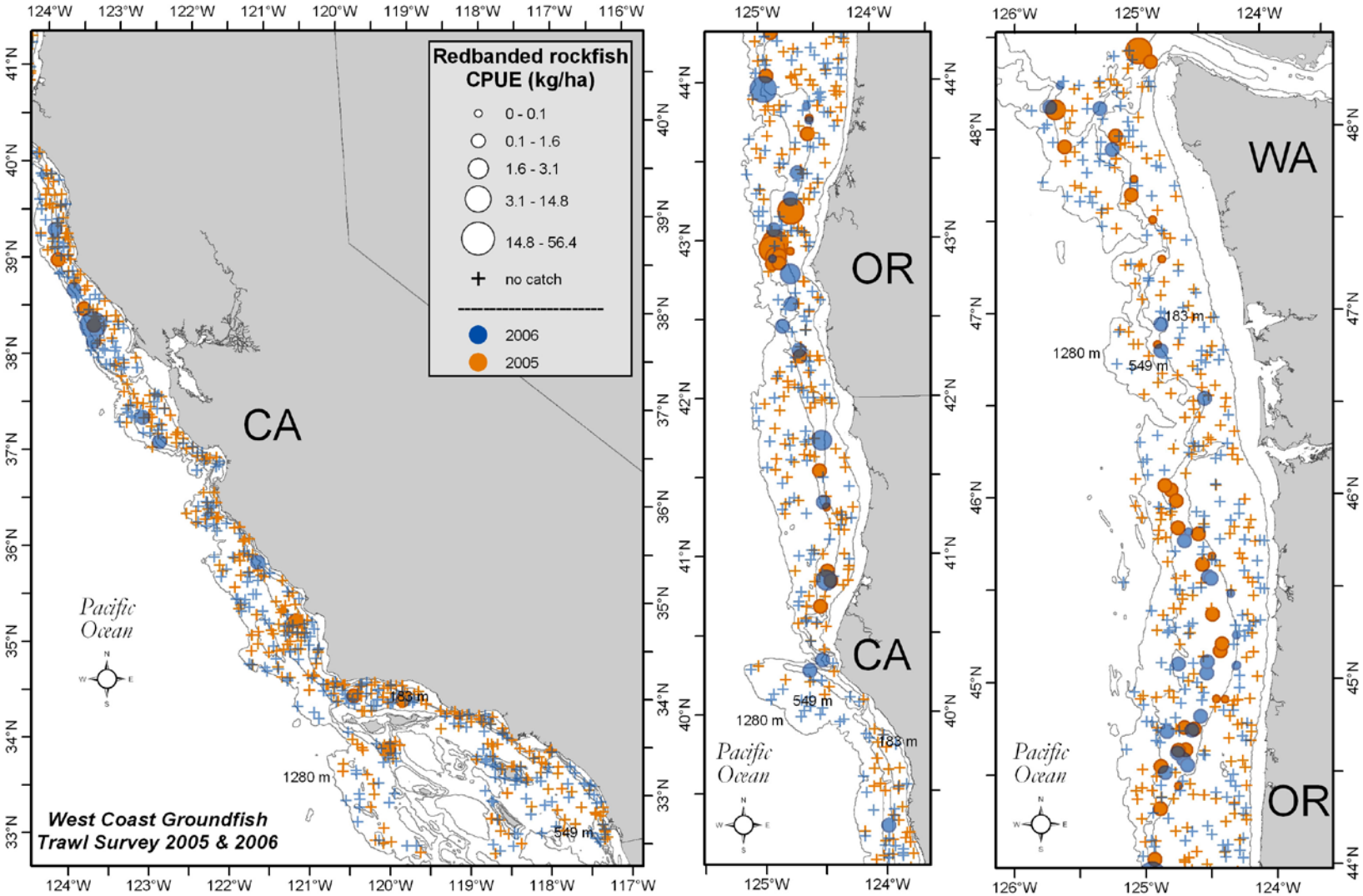


Figure 103. Redbanded rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

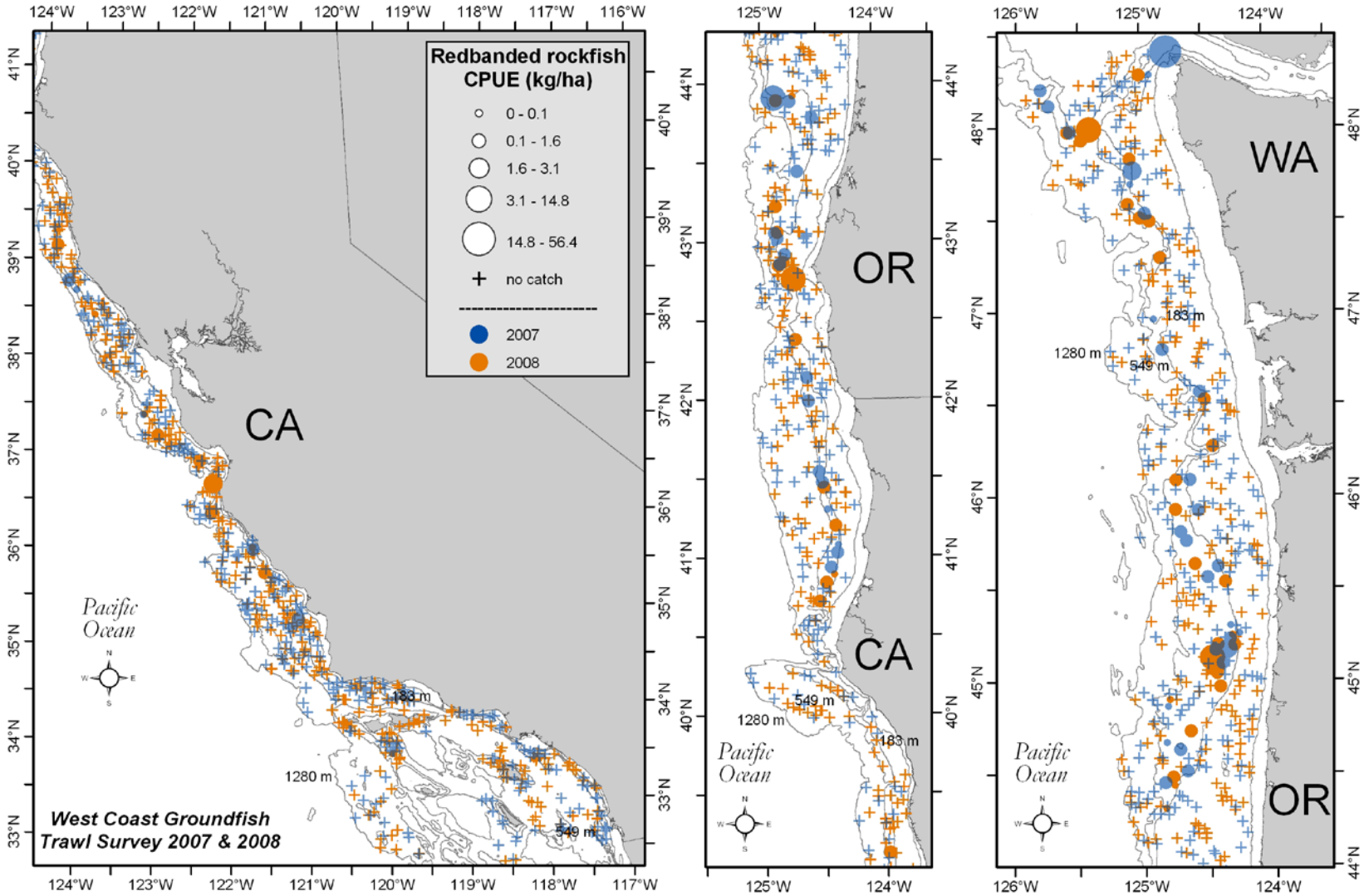


Figure 104. Redbanded rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

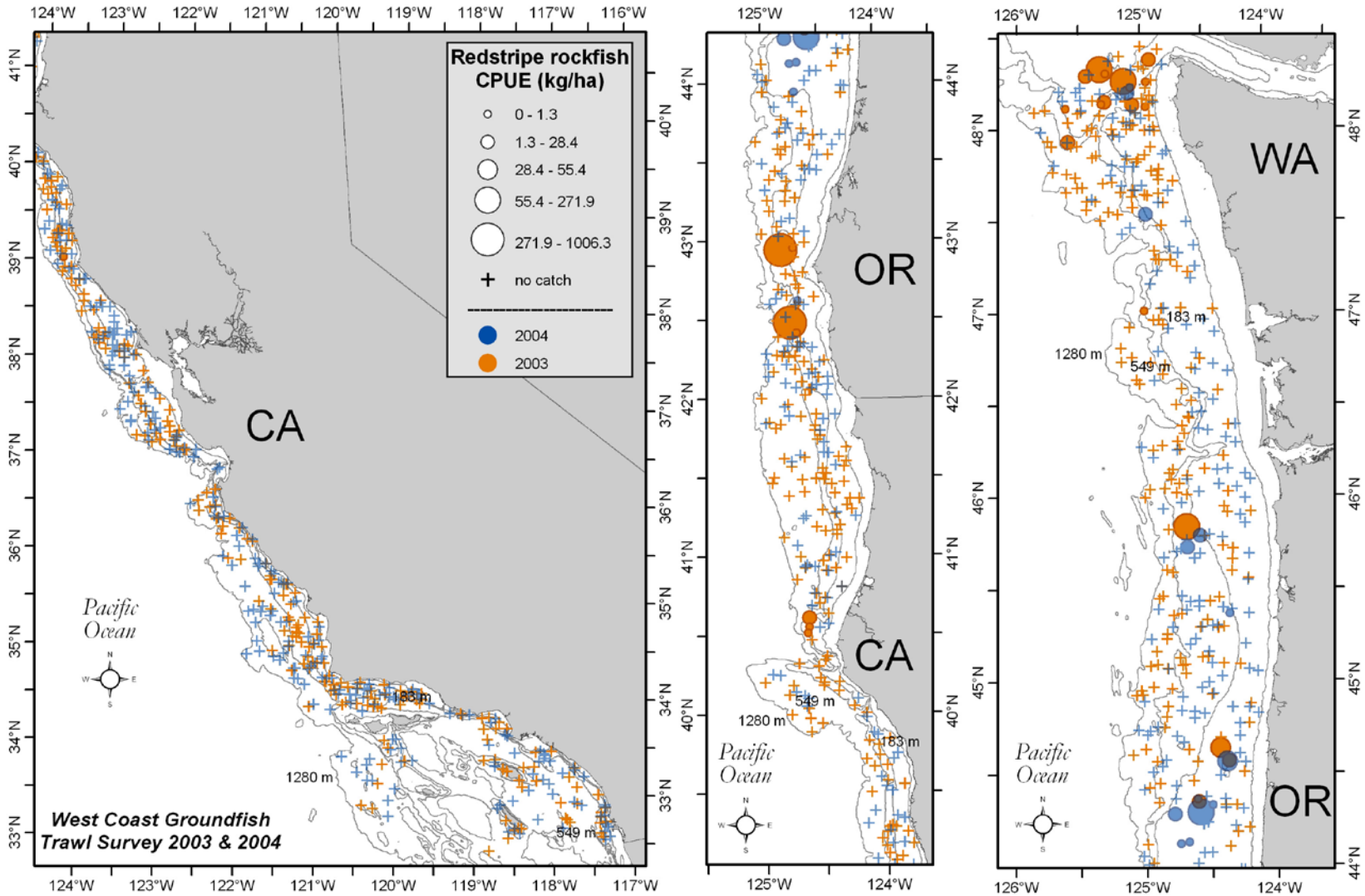


Figure 105. Redstripe rockfish (*Sebastes proriger*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

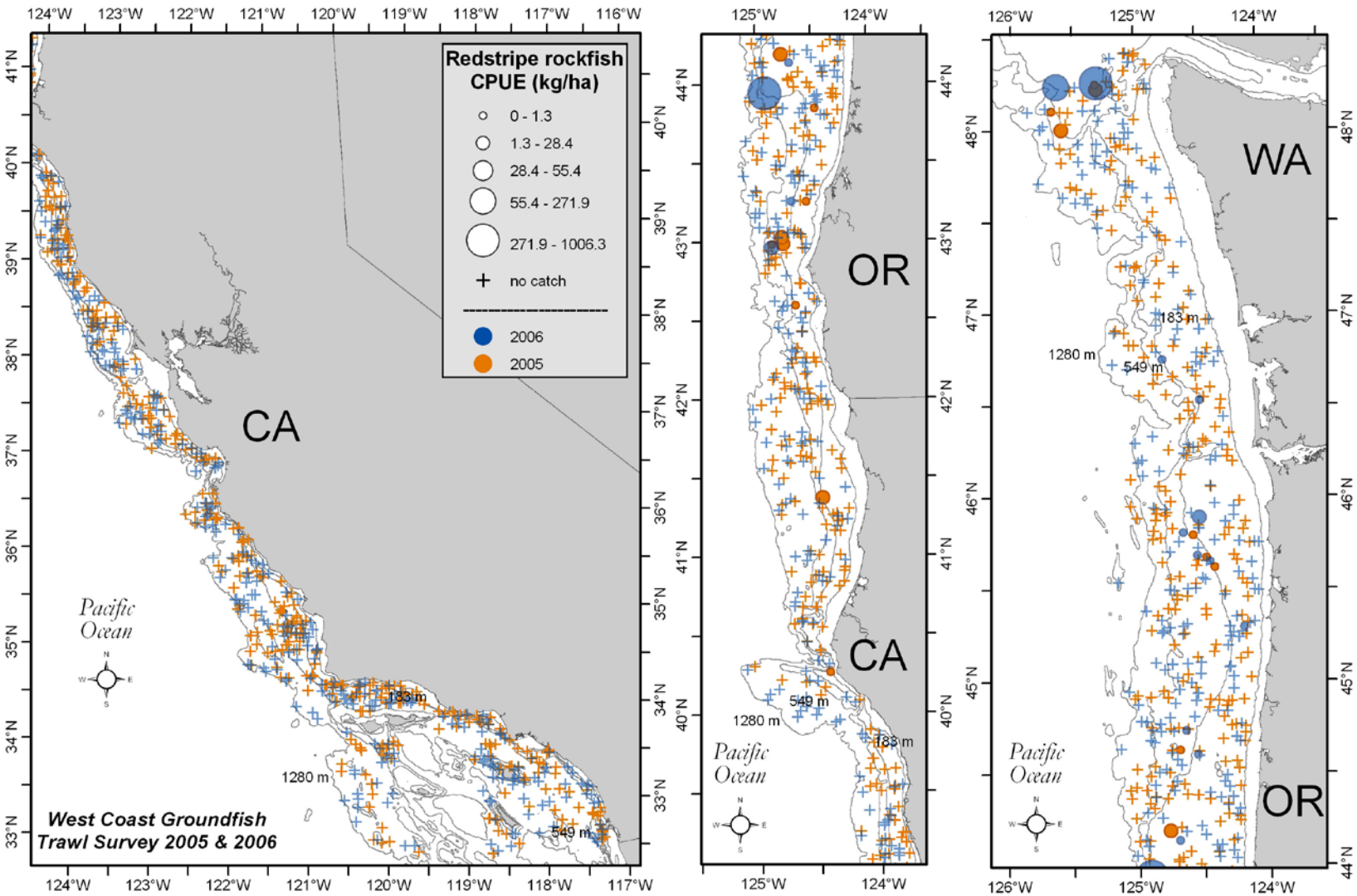


Figure 106. Redstripe rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

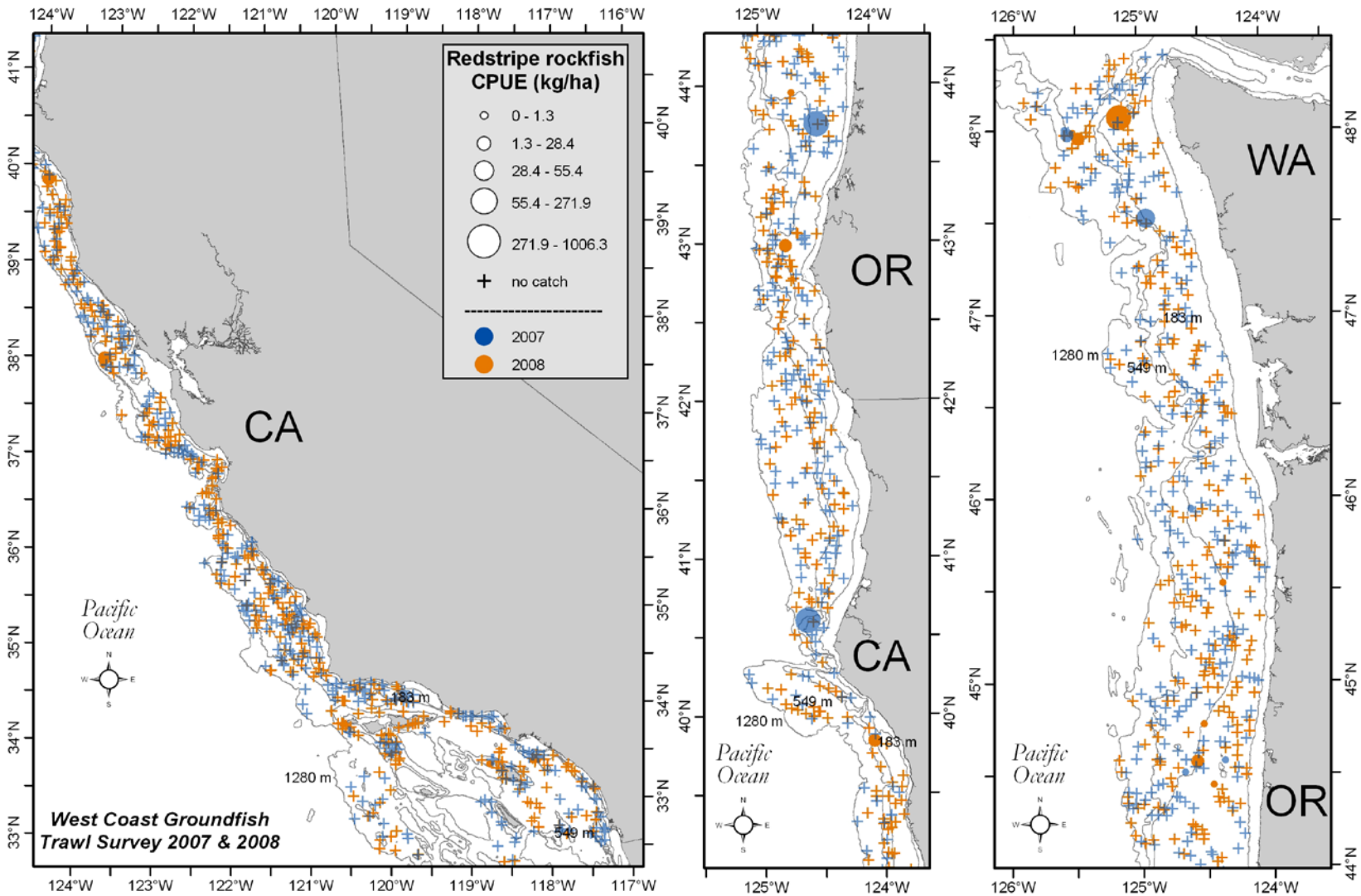


Figure 107. Redstripe rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

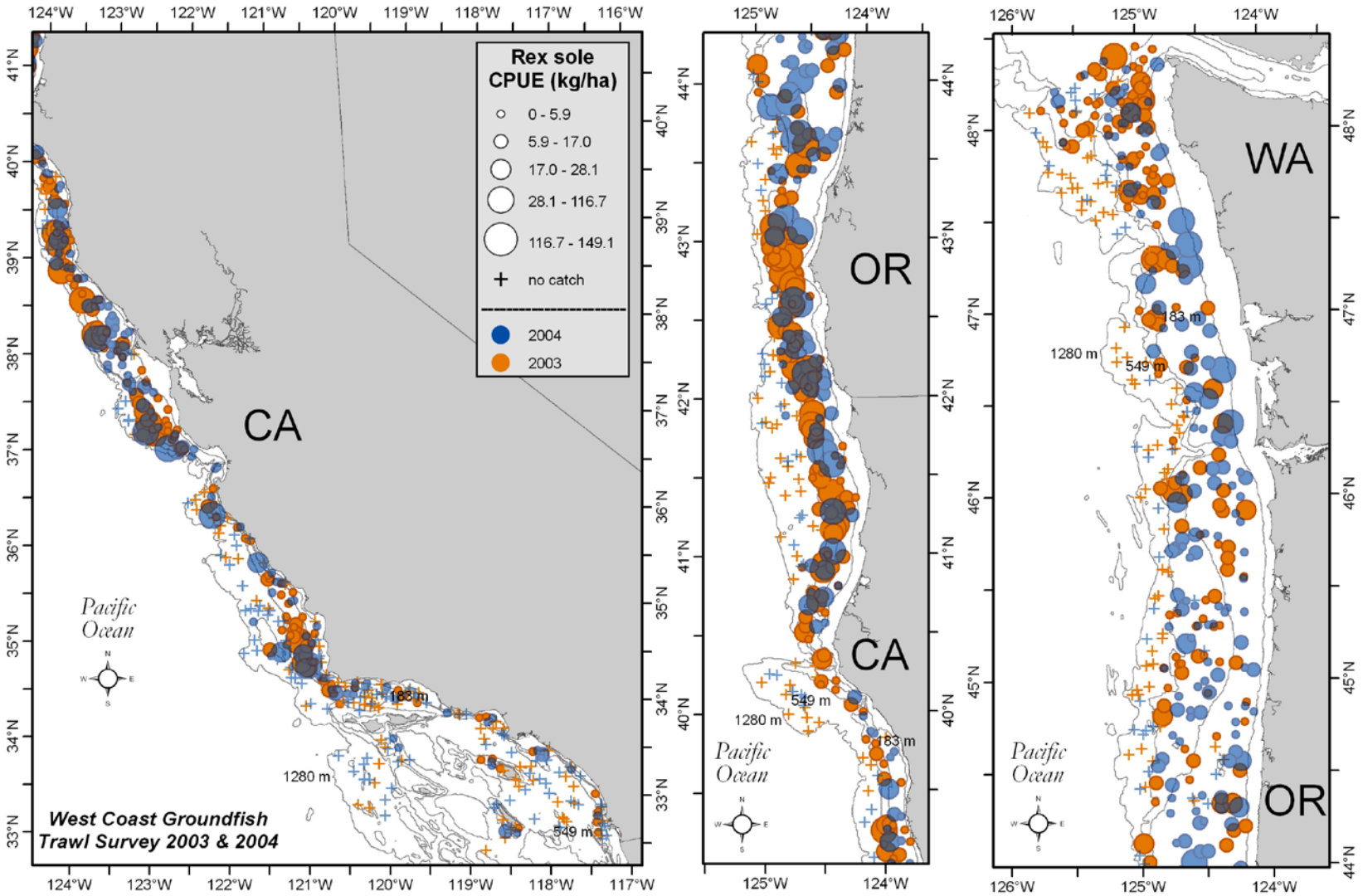


Figure 108. Rex sole distribution and relative abundance (kg ha–1) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

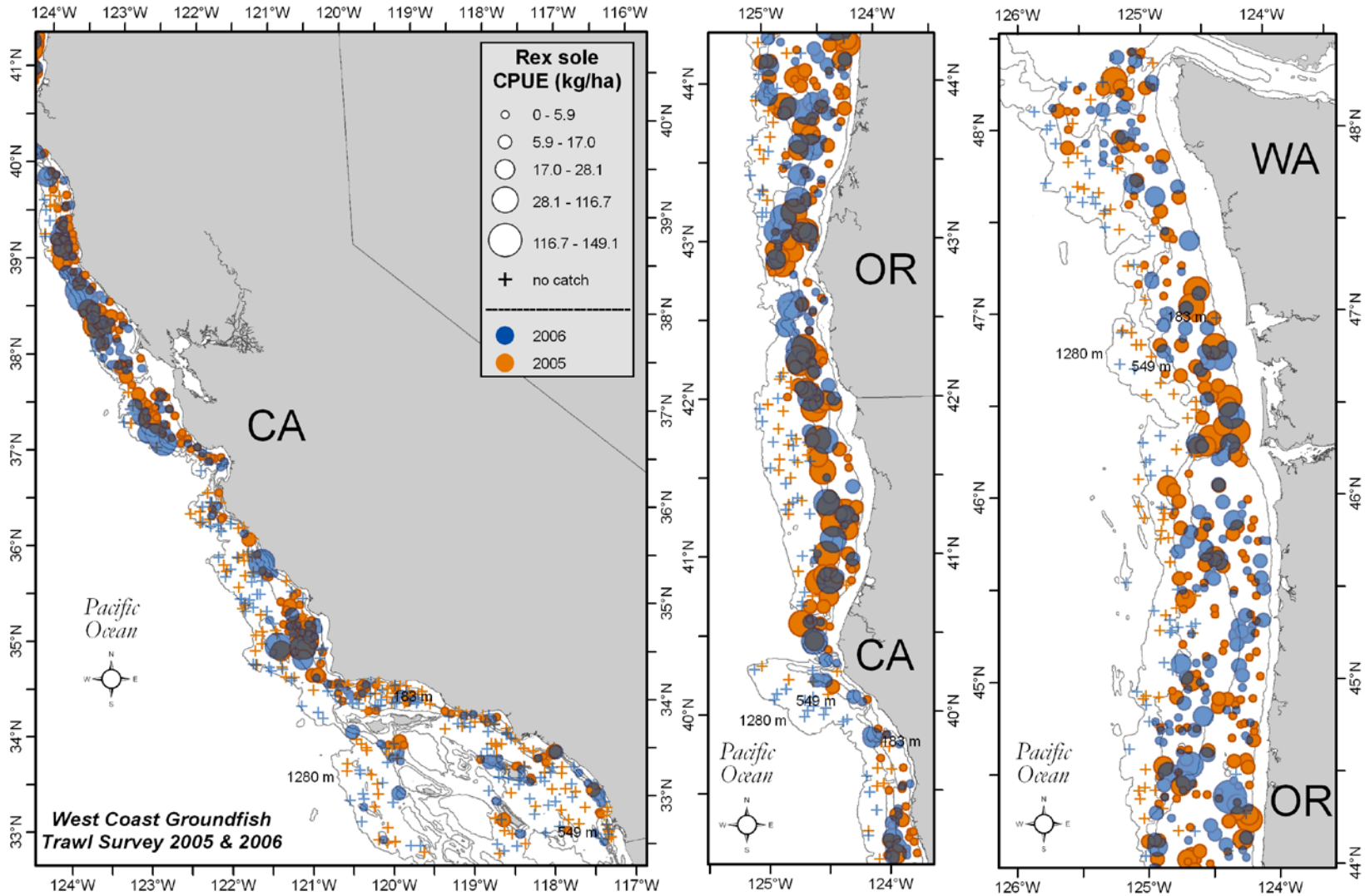


Figure 109. Rex sole distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

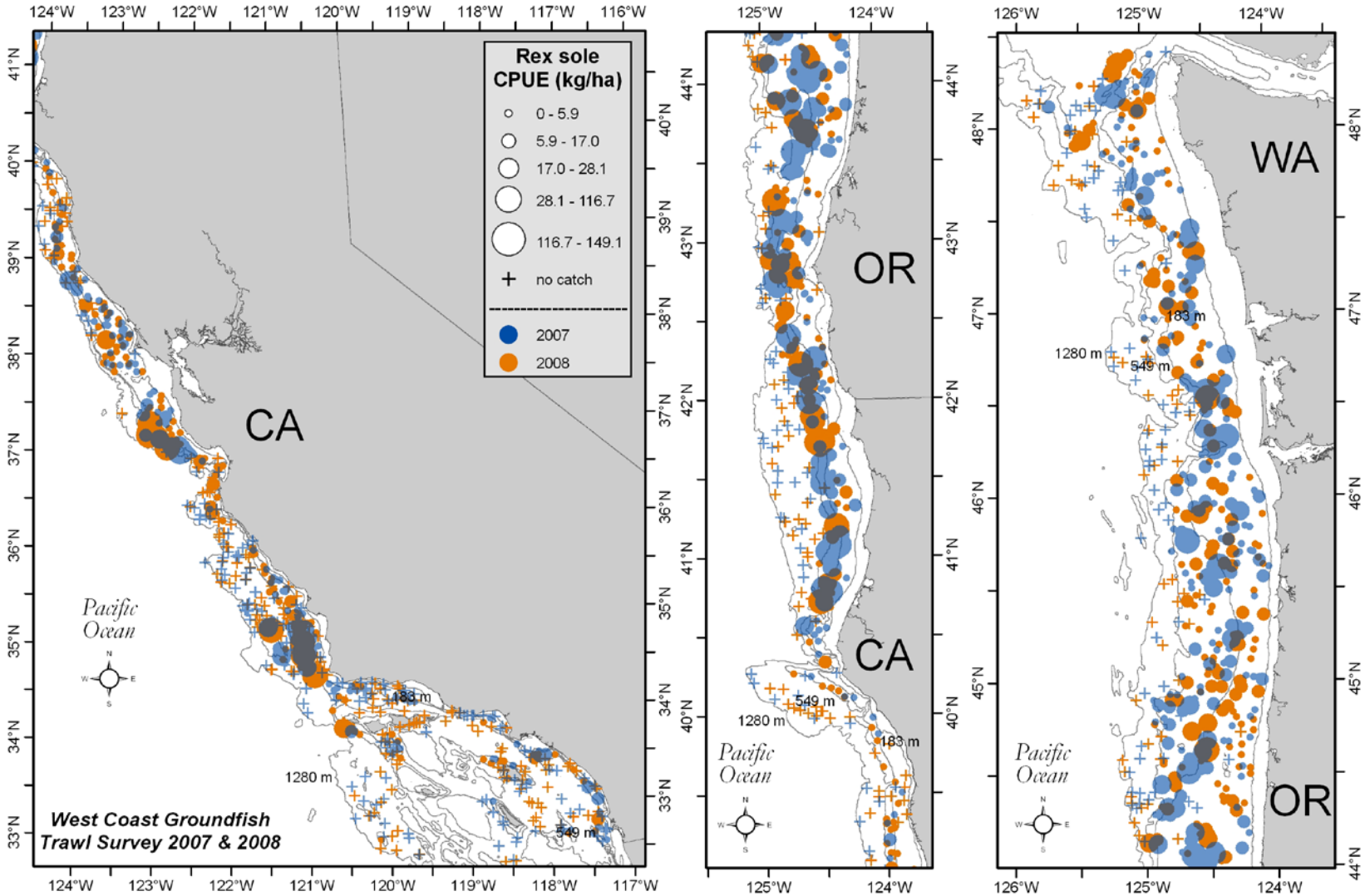


Figure 110. Rex sole distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

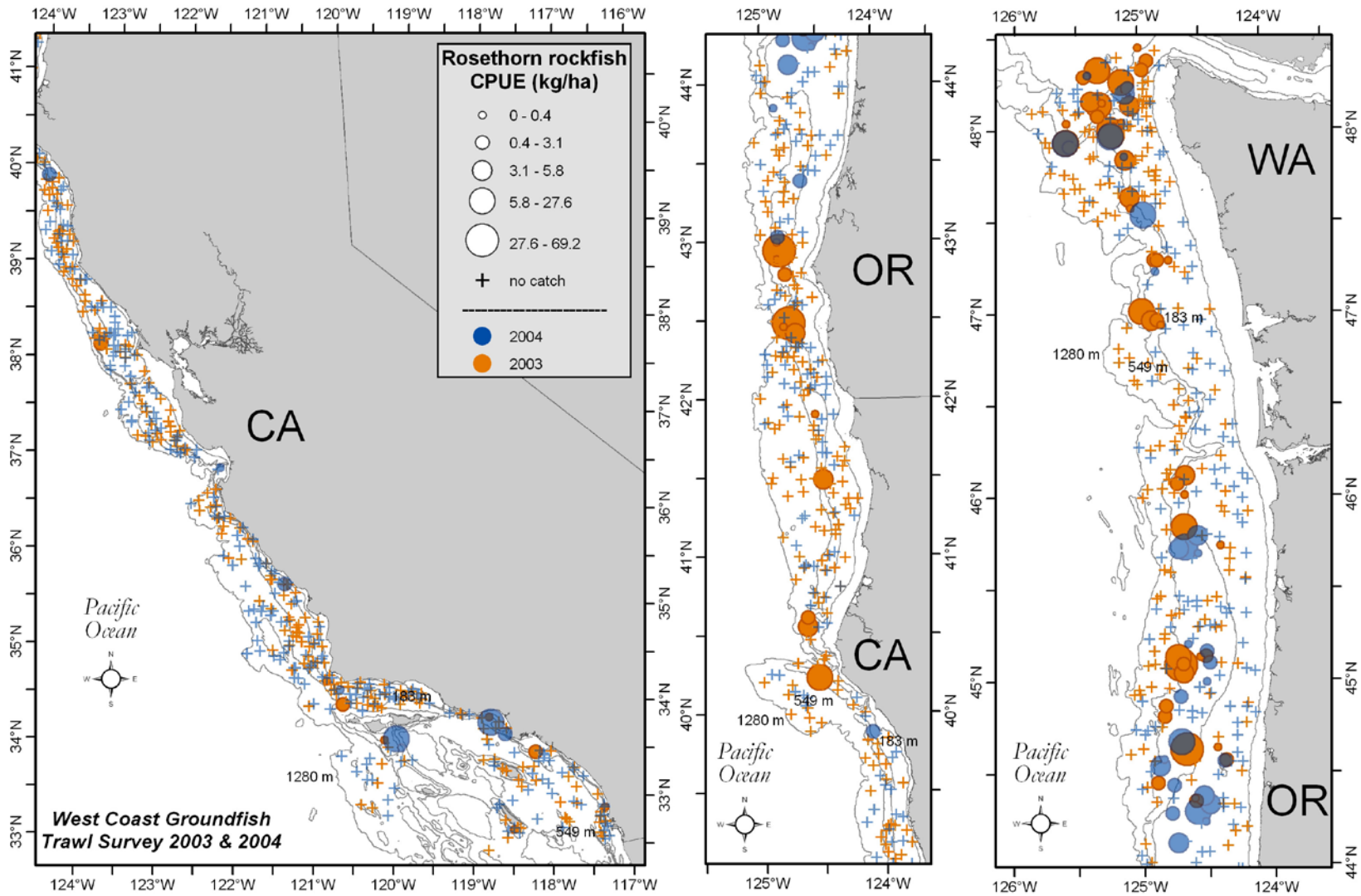


Figure 111. Rosethorn rockfish (*Sebastes helvomaculatus*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

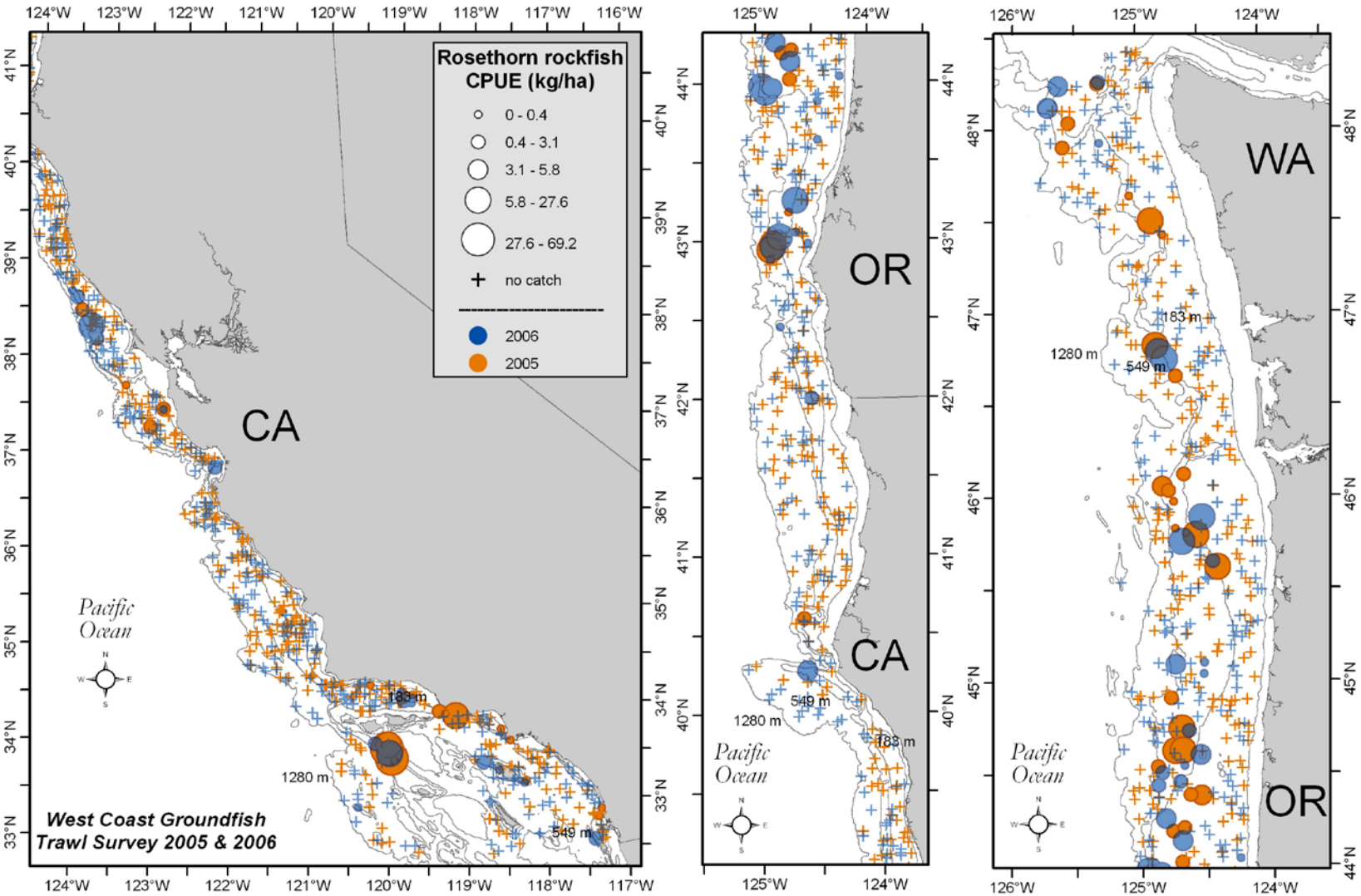


Figure 112. Rosethorn rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

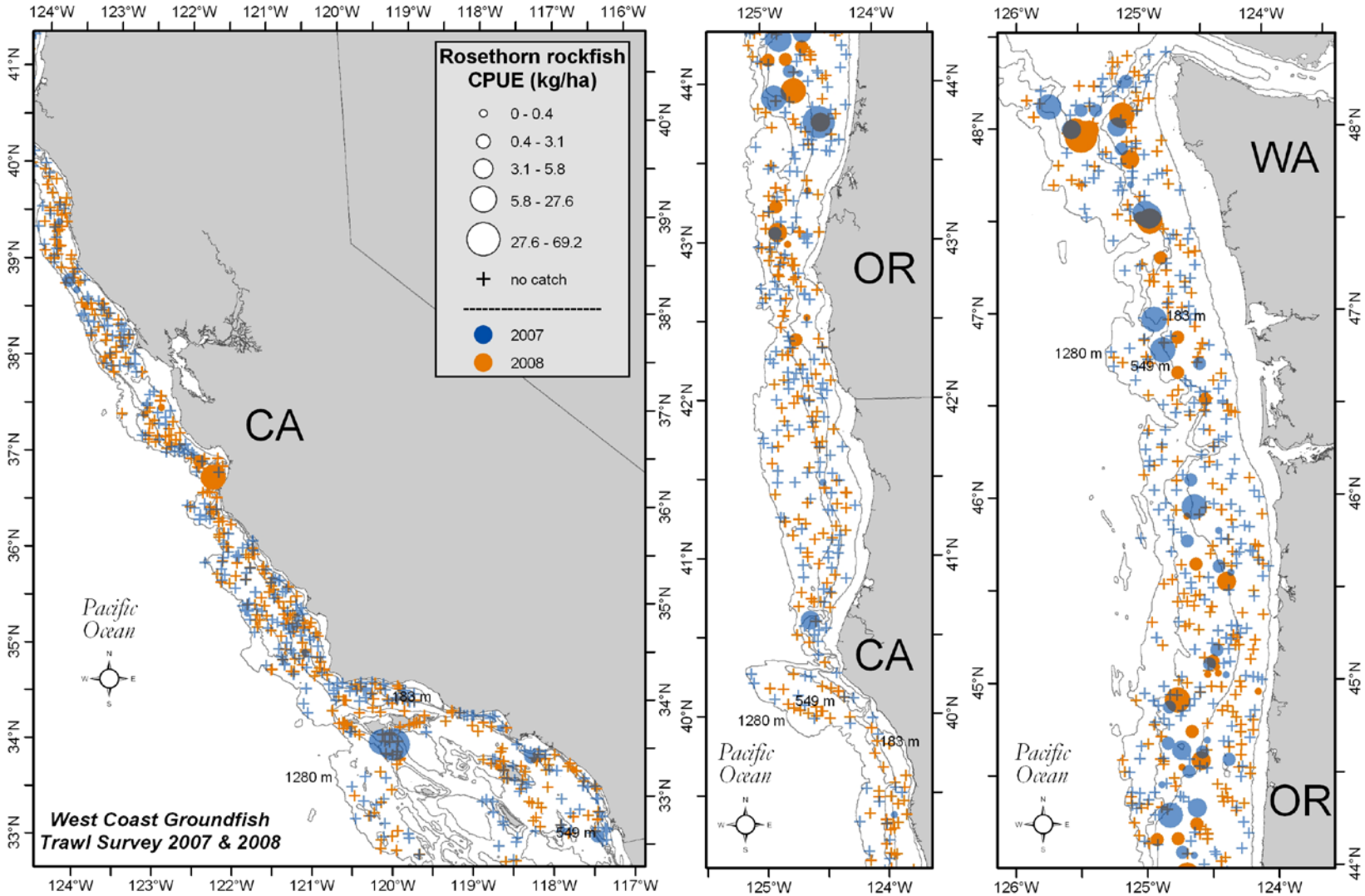


Figure 113. Rosethorn rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

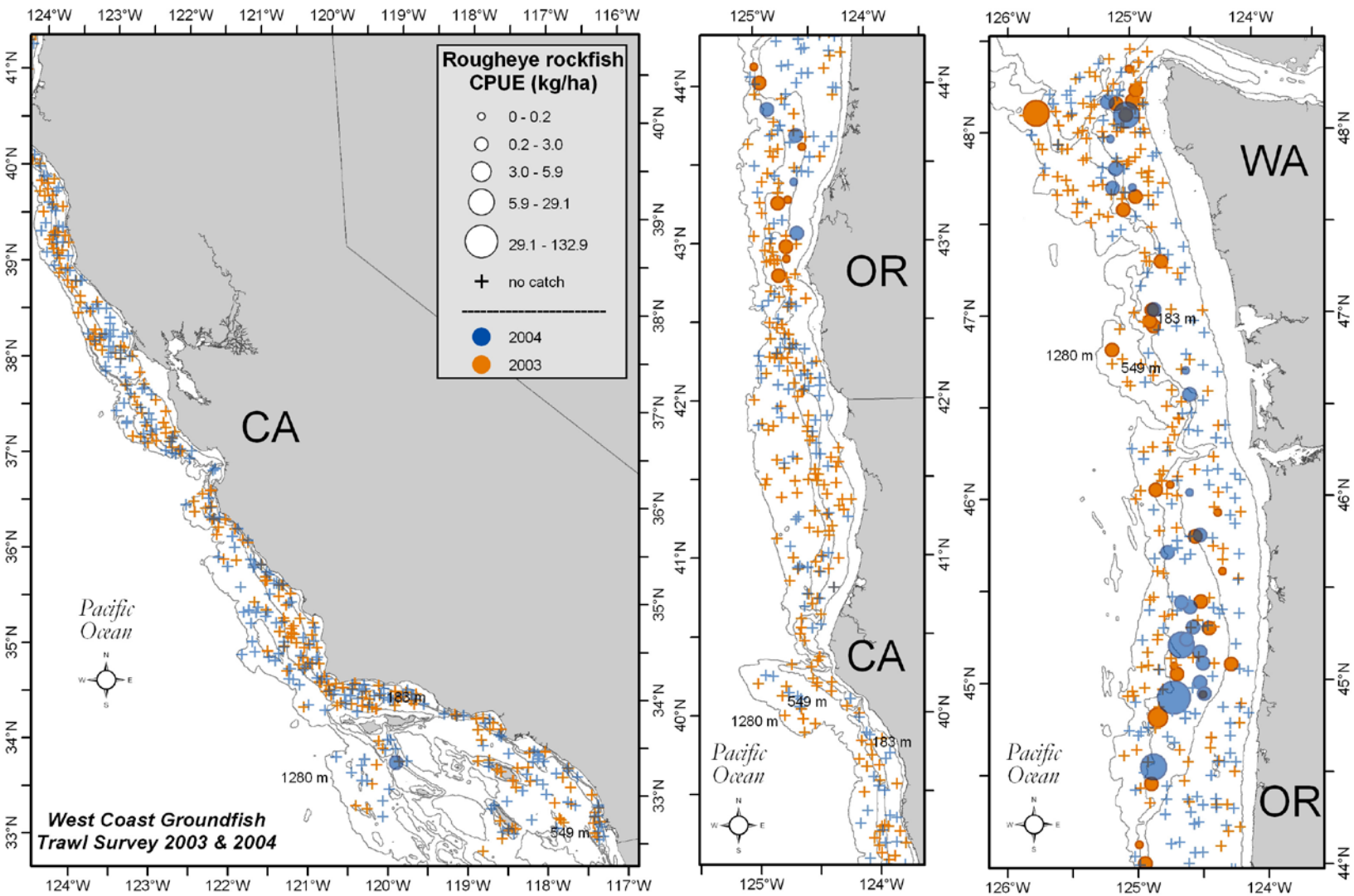


Figure 114. Rougheye rockfish (*Sebastes aleutianus*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

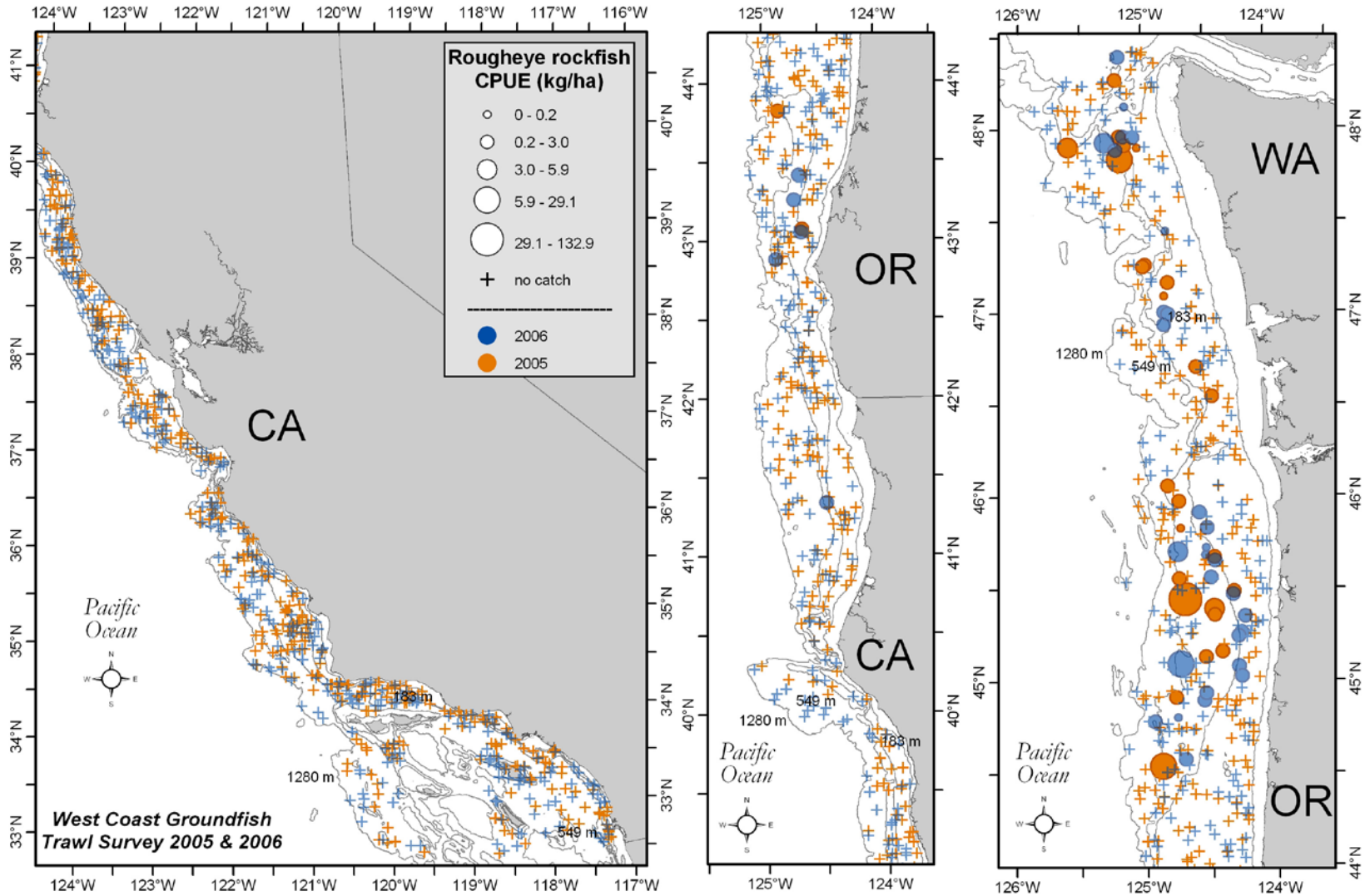


Figure 115. Rougheye rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

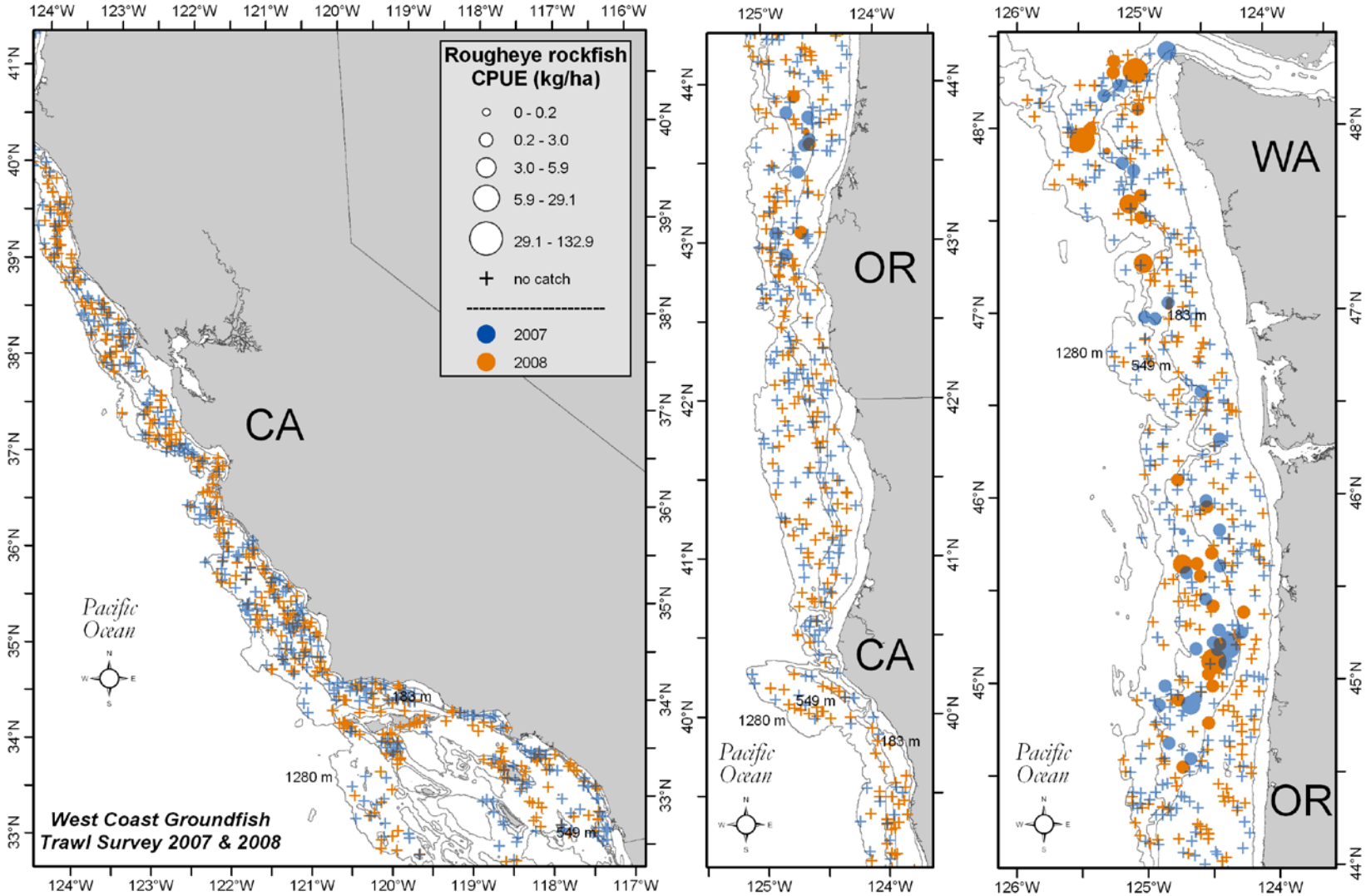


Figure 116. Rougheye rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

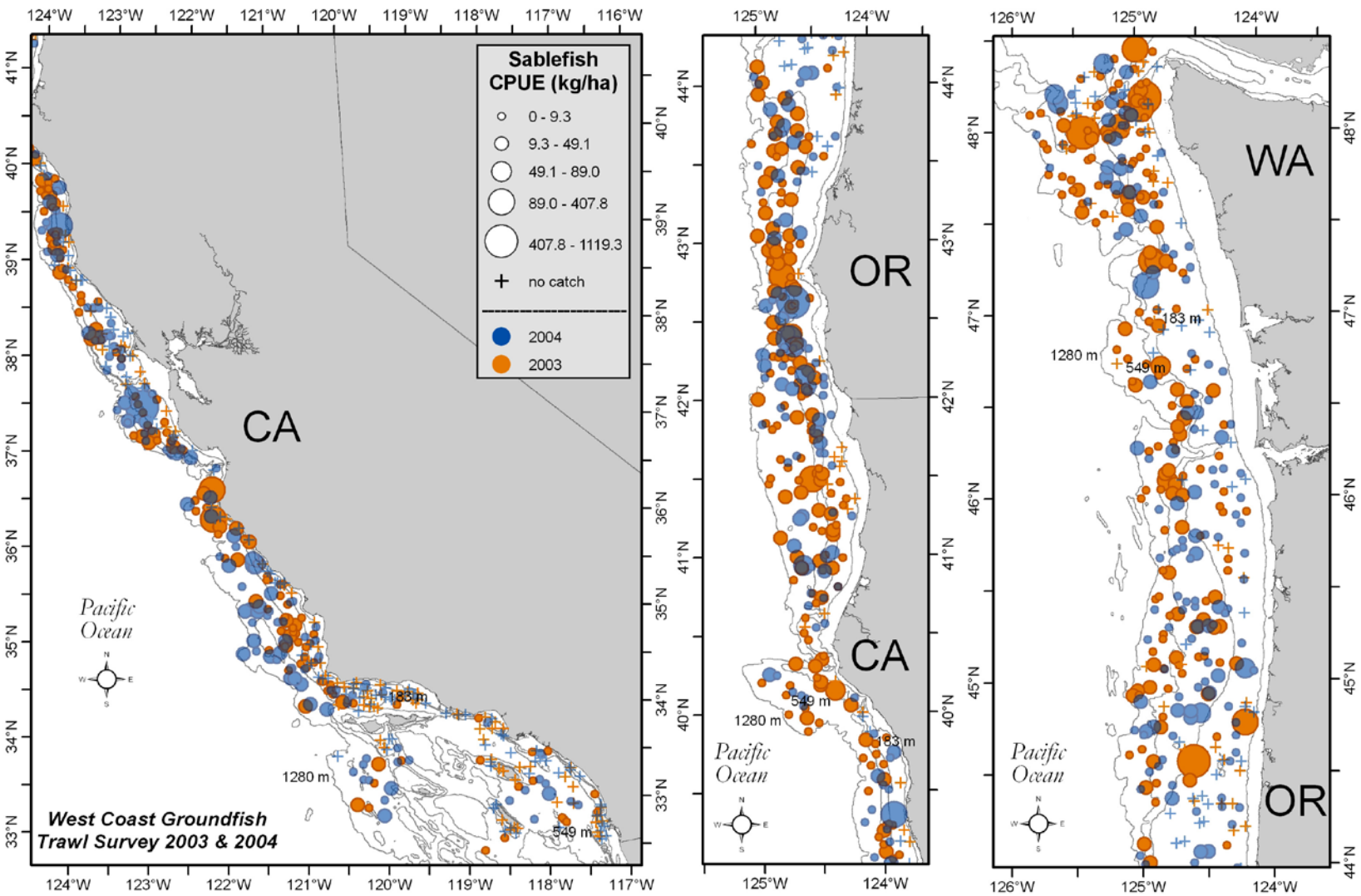


Figure 117. Sablefish distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

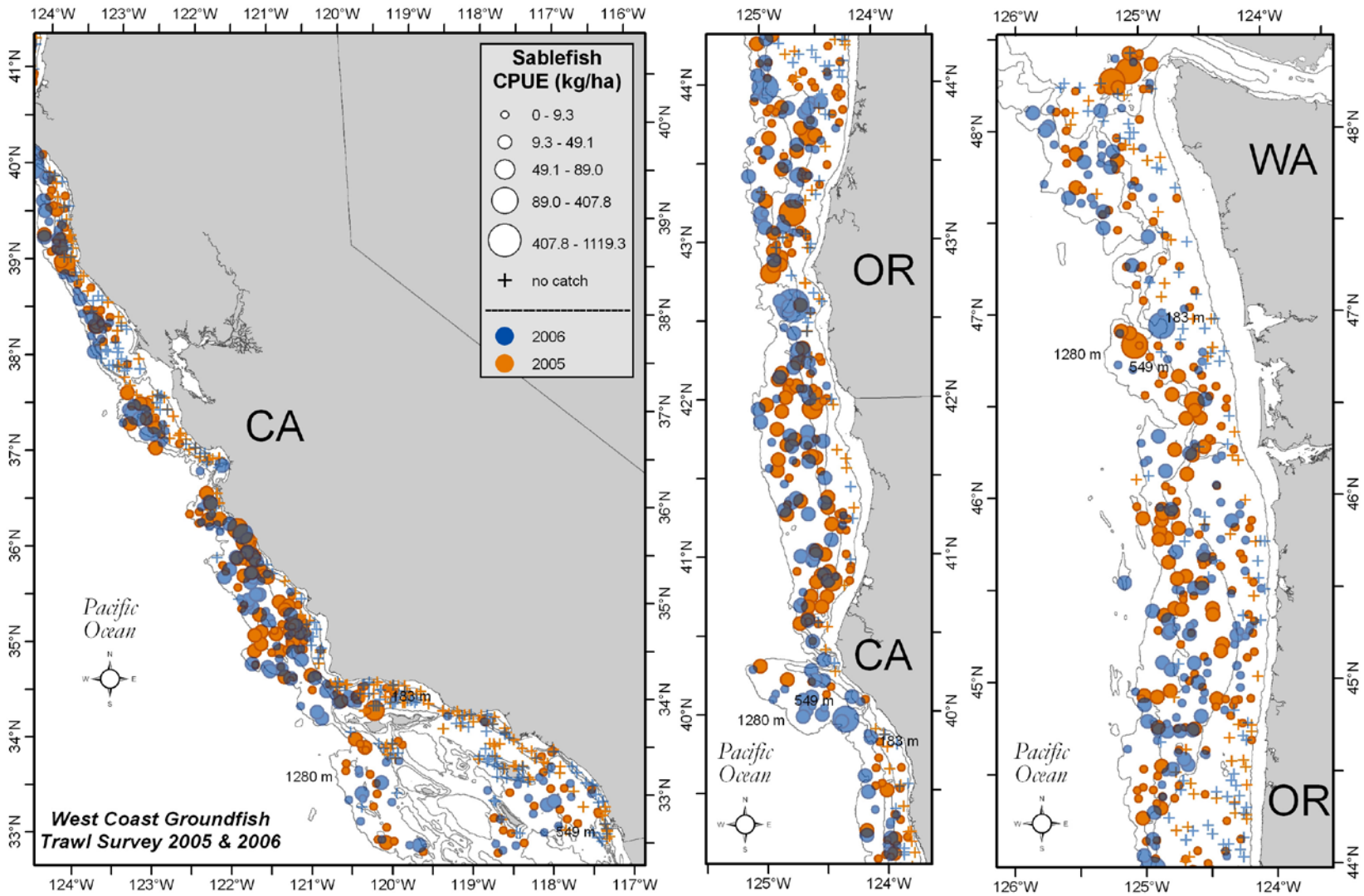


Figure 118. Sablefish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

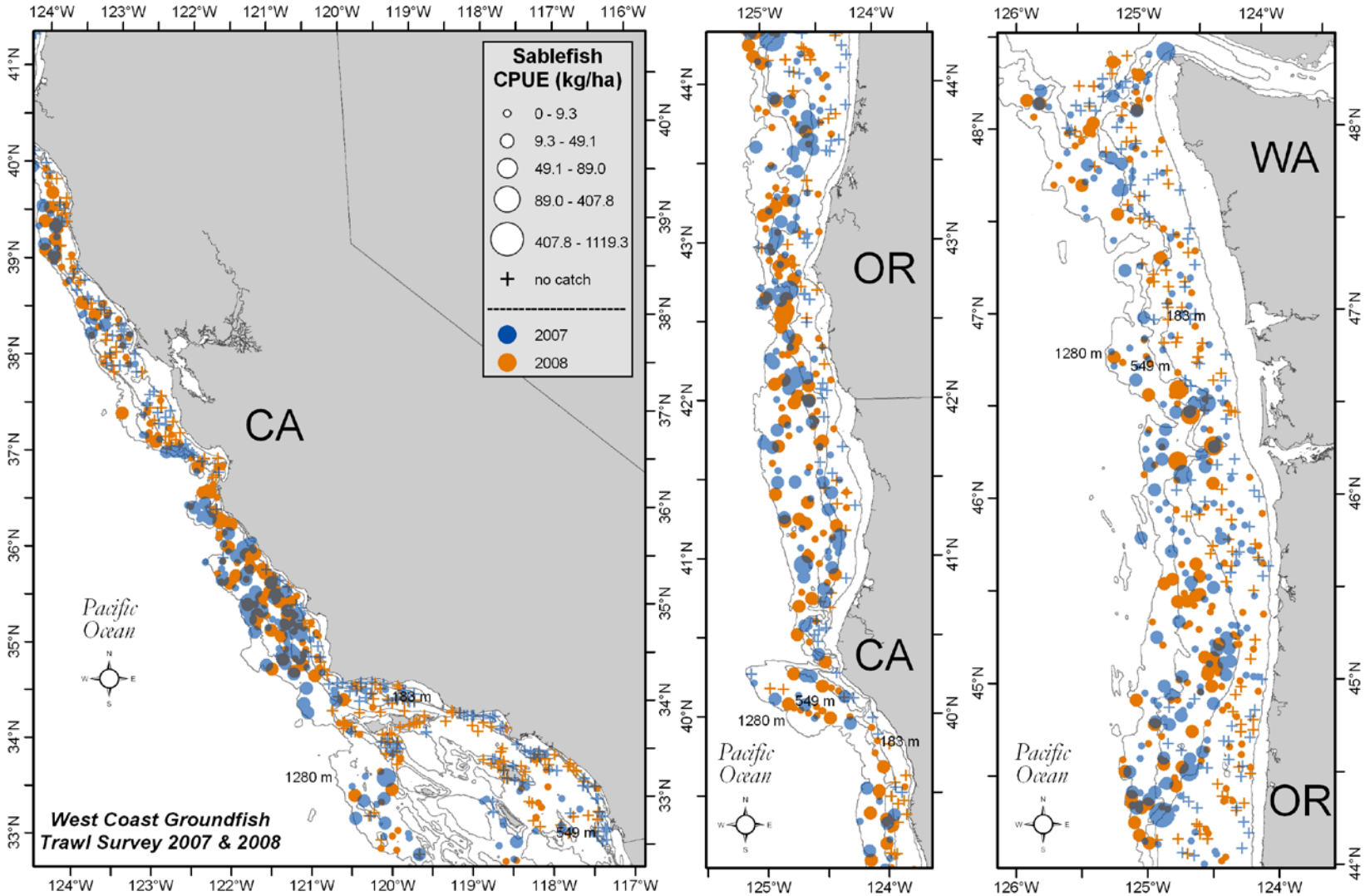


Figure 119. Sablefish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

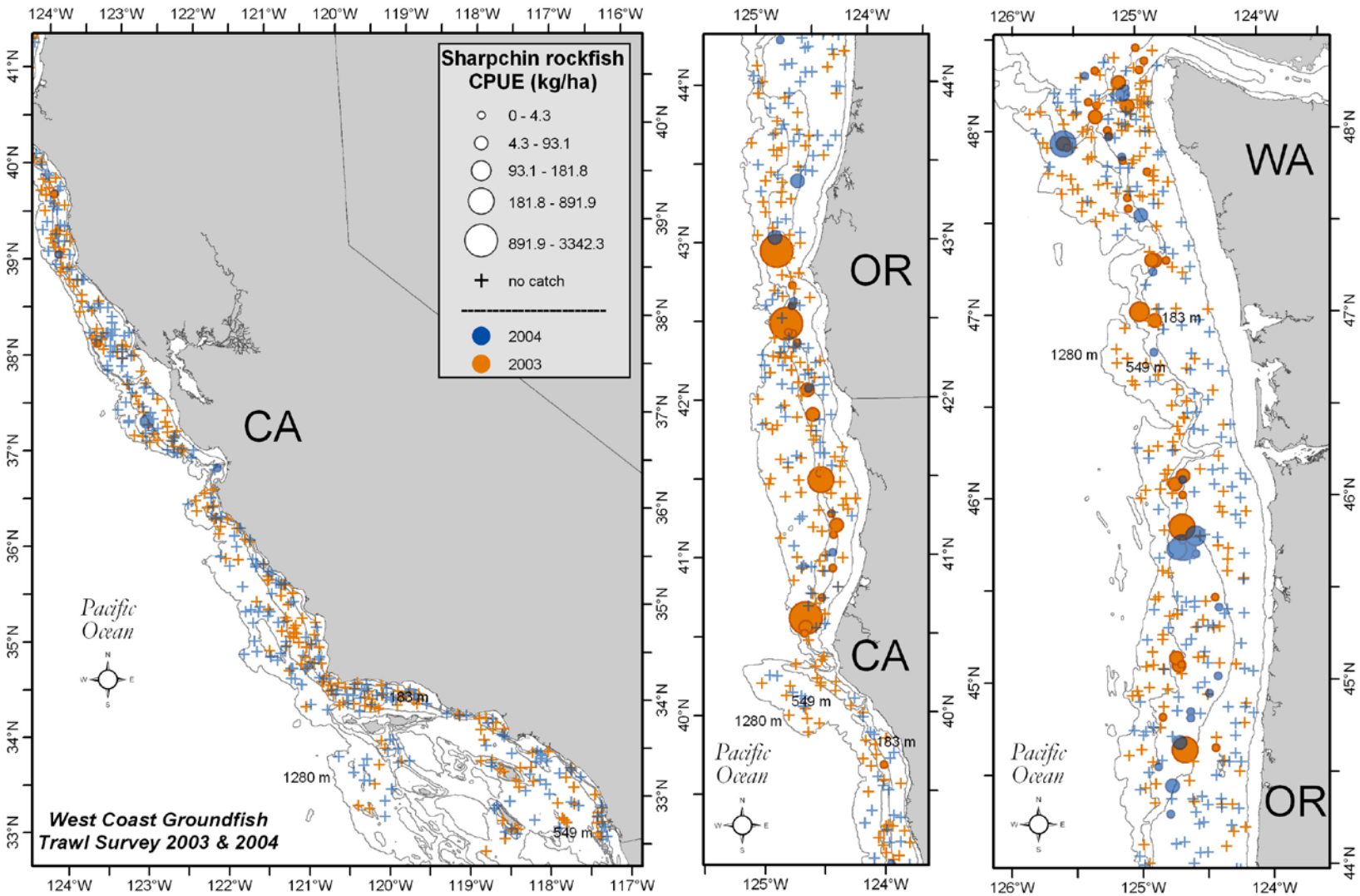


Figure 120. Sharpchin rockfish (*Sebastes zacentrus*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

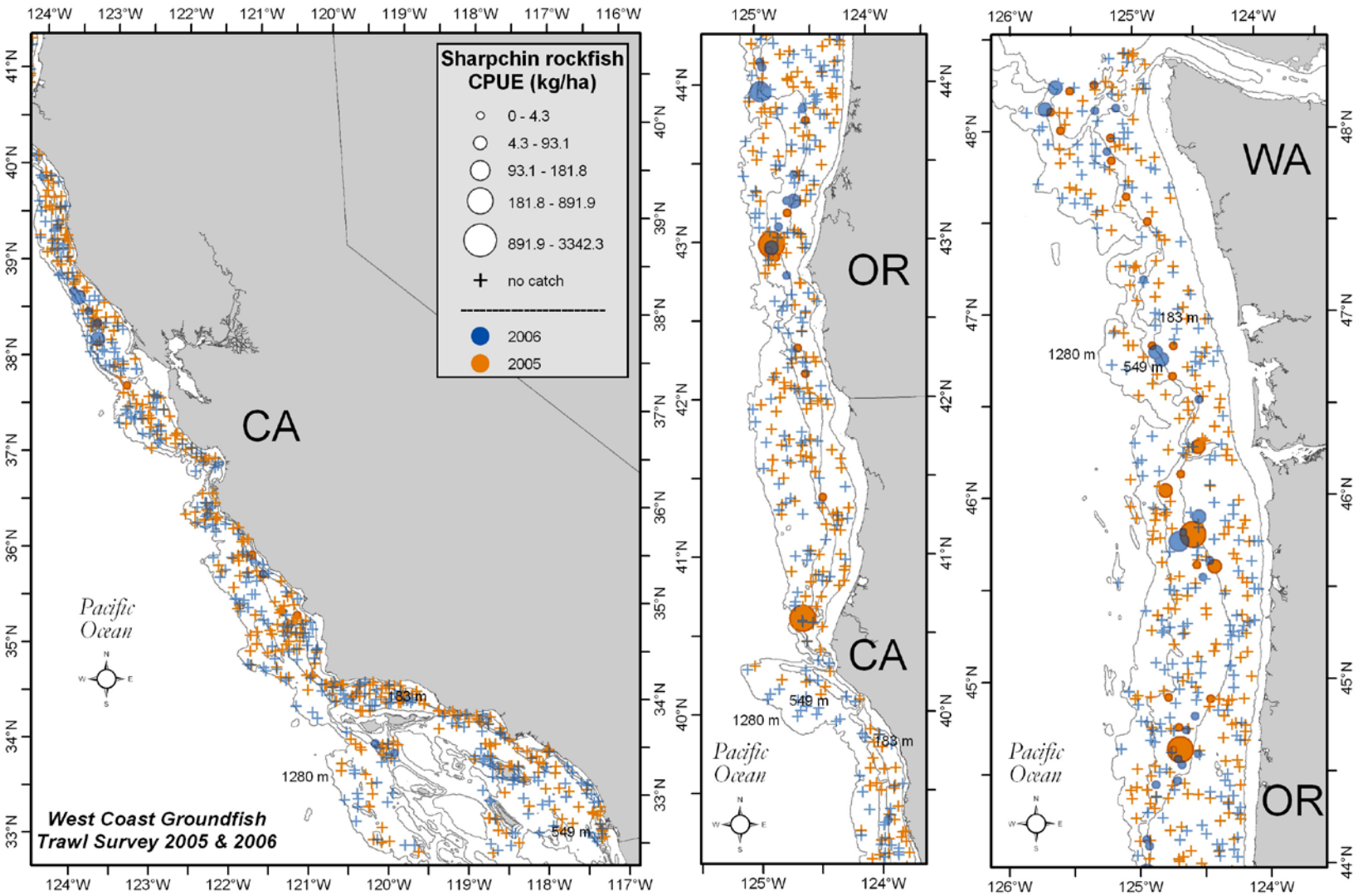


Figure 121. Sharpchin rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

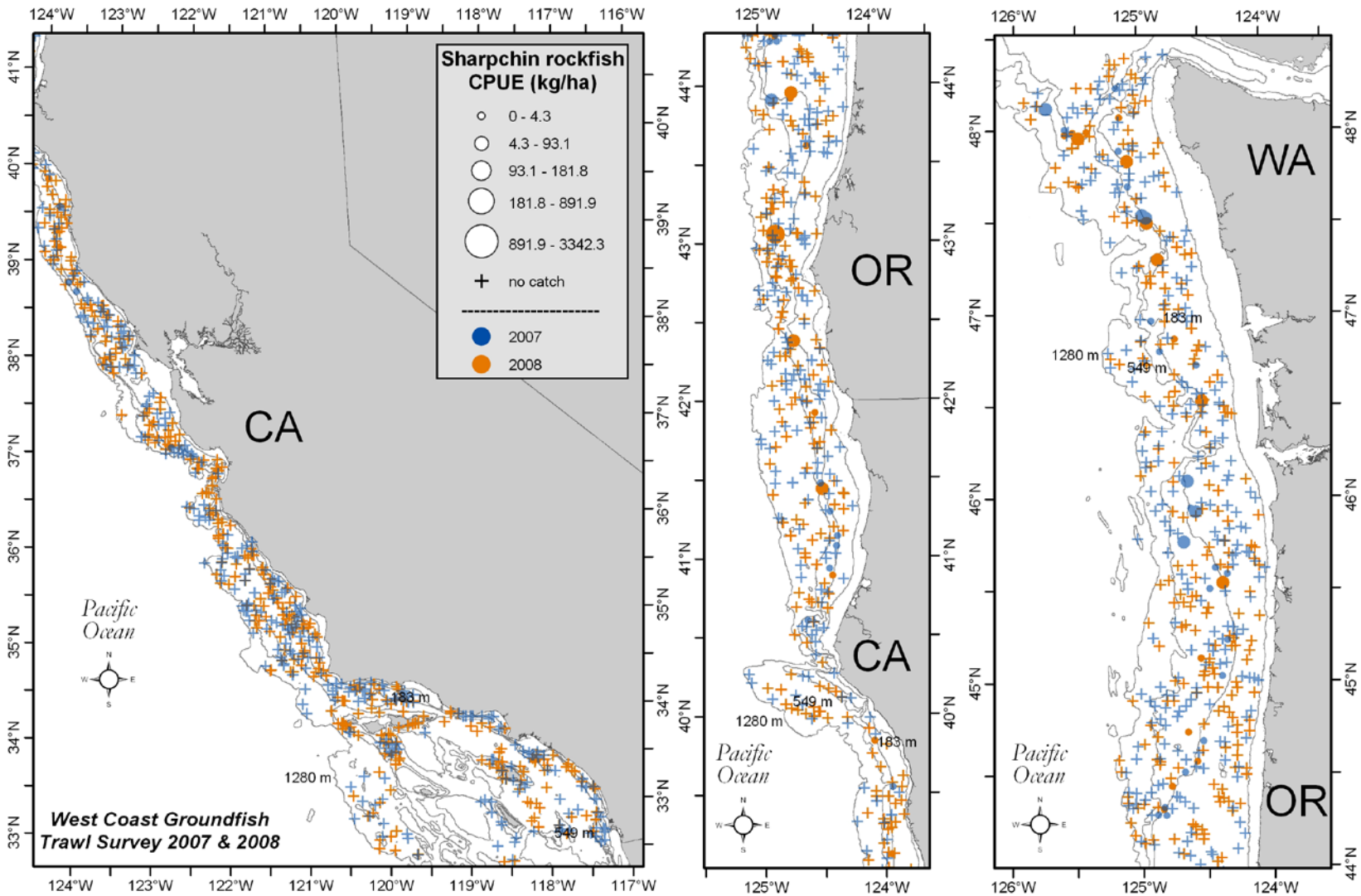


Figure 122. Sharpchin rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

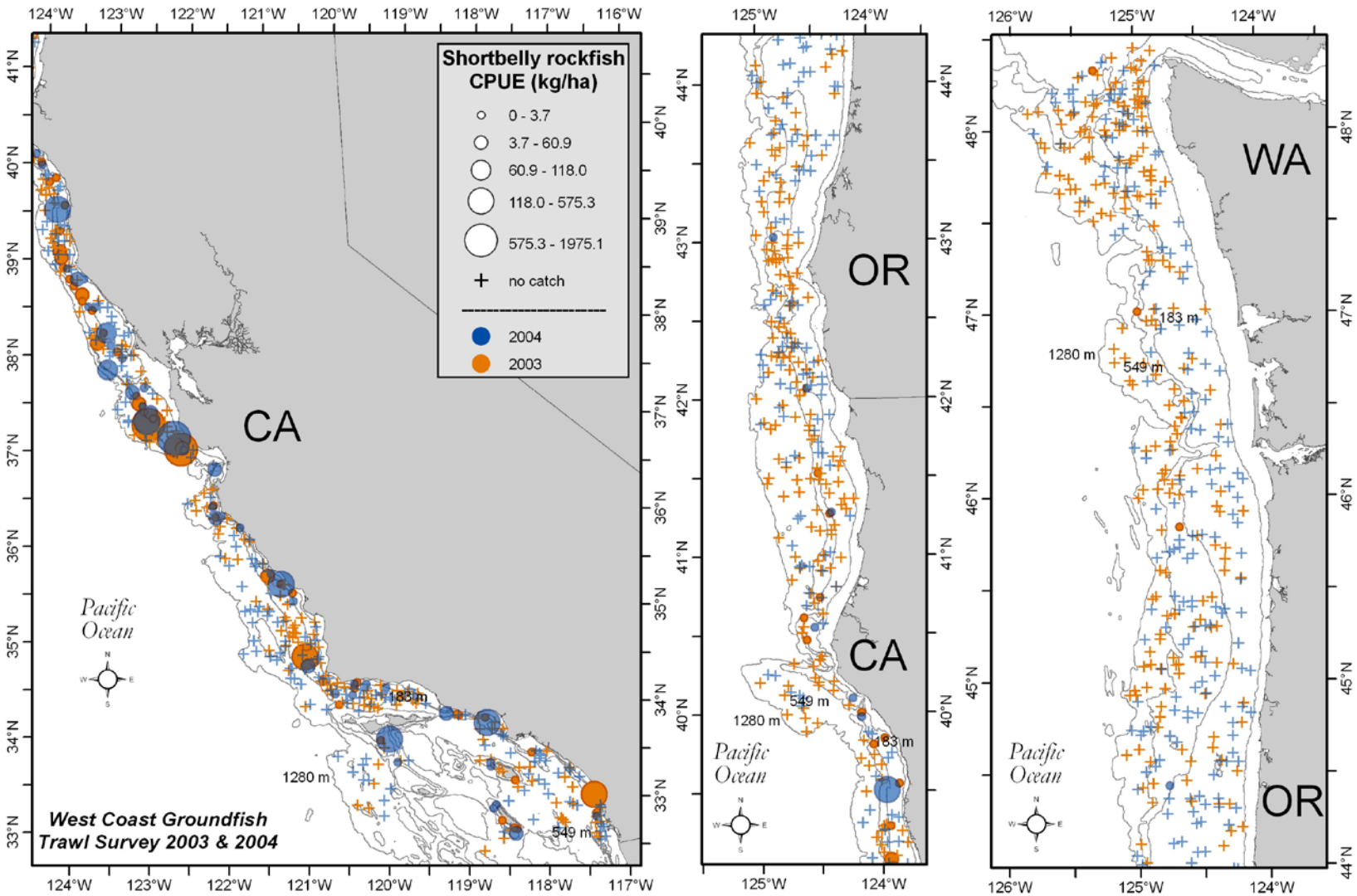


Figure 123. Shortbelly rockfish (*Sebastes jordani*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

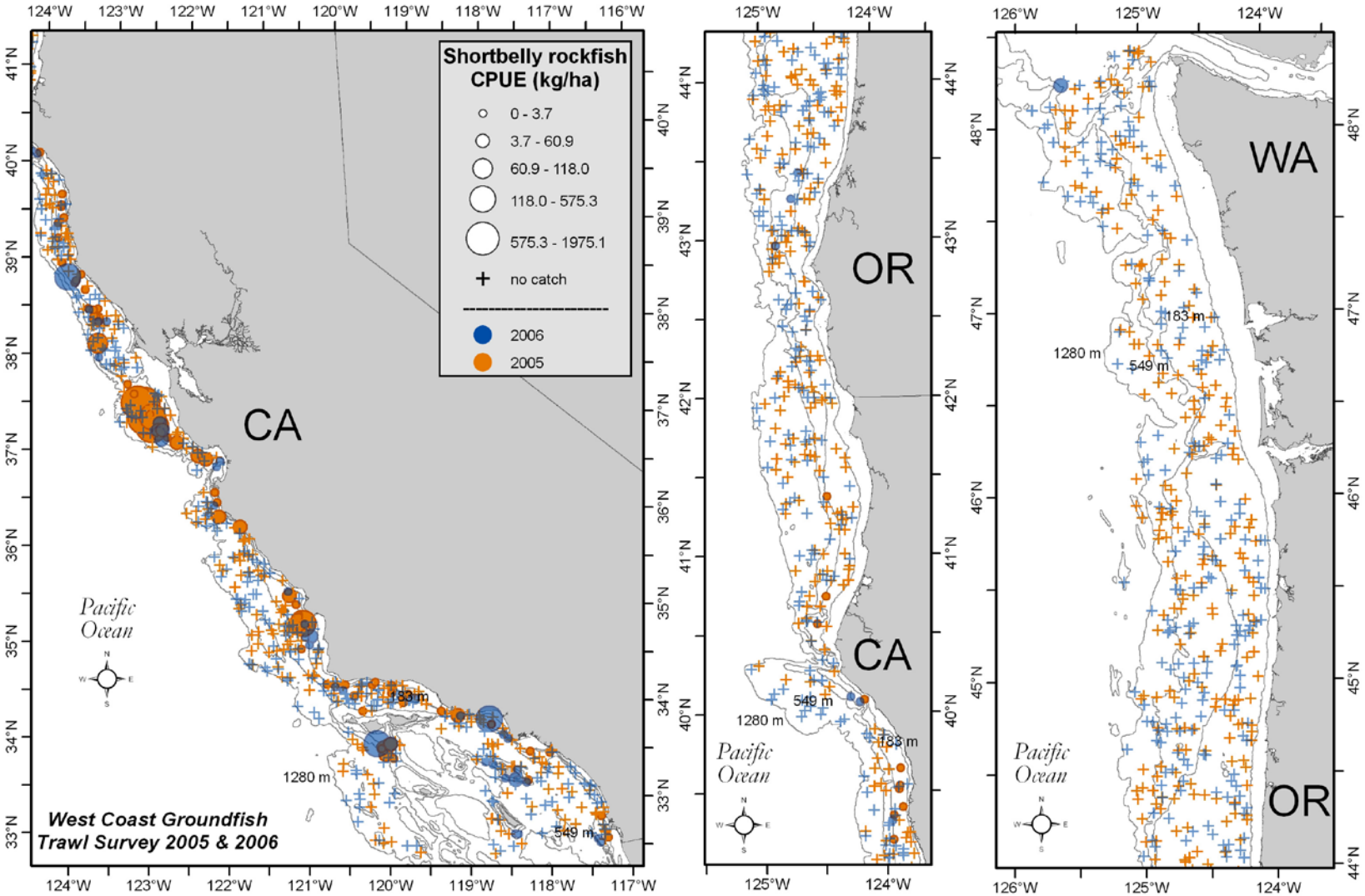


Figure 124. Shortbelly rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

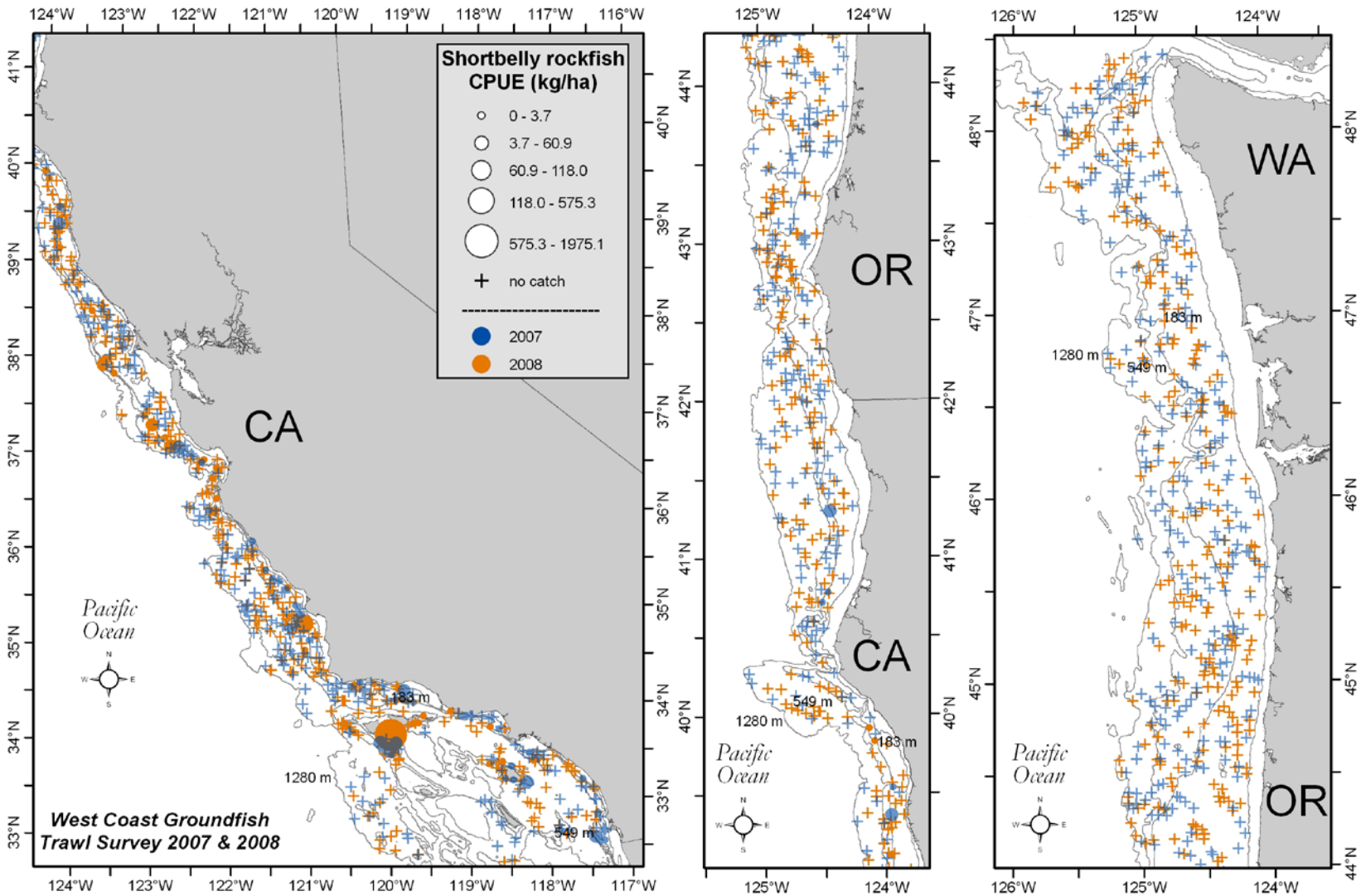


Figure 125. Shortbelly rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

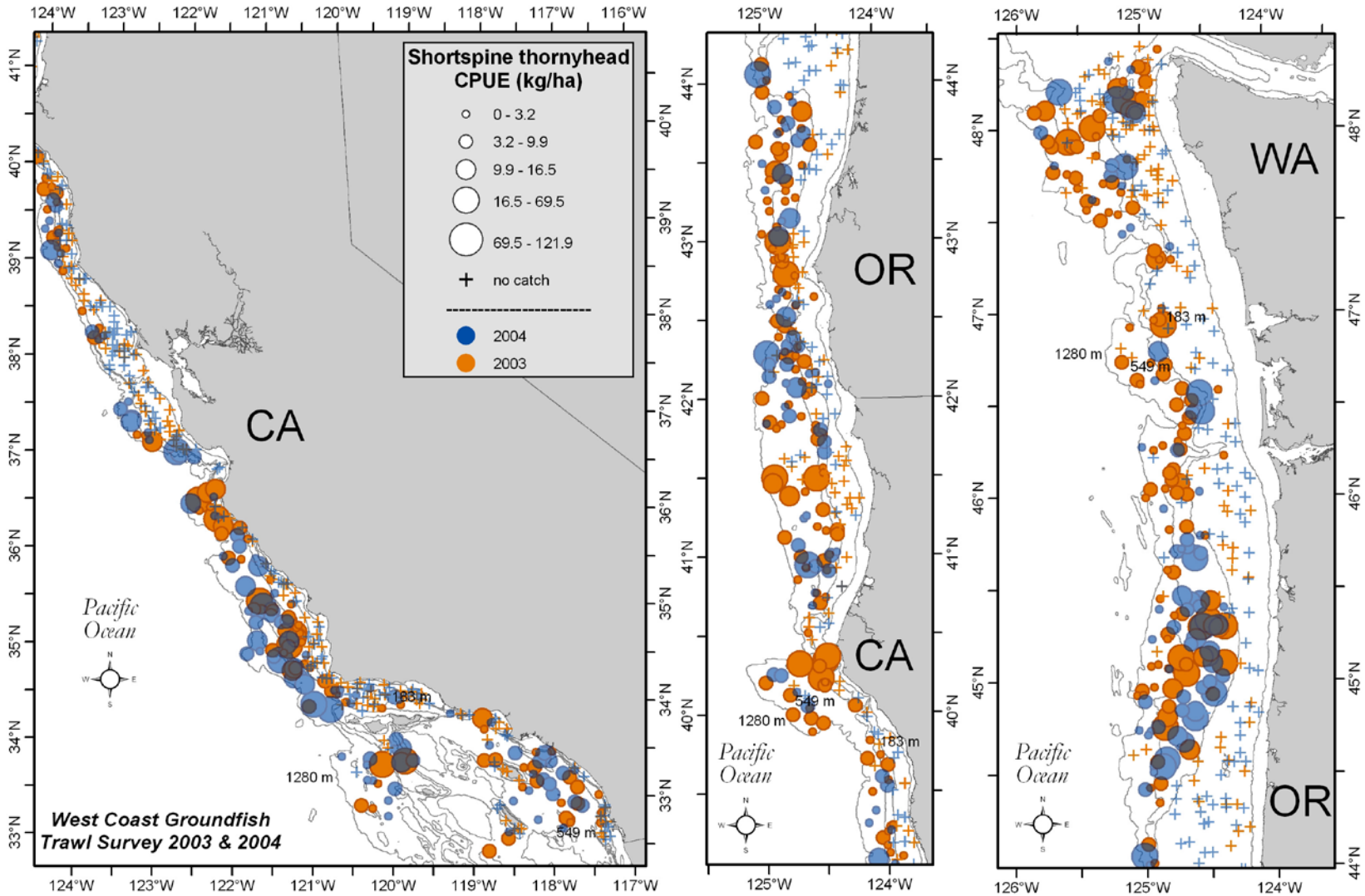


Figure 126. Shortspine thornyhead distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

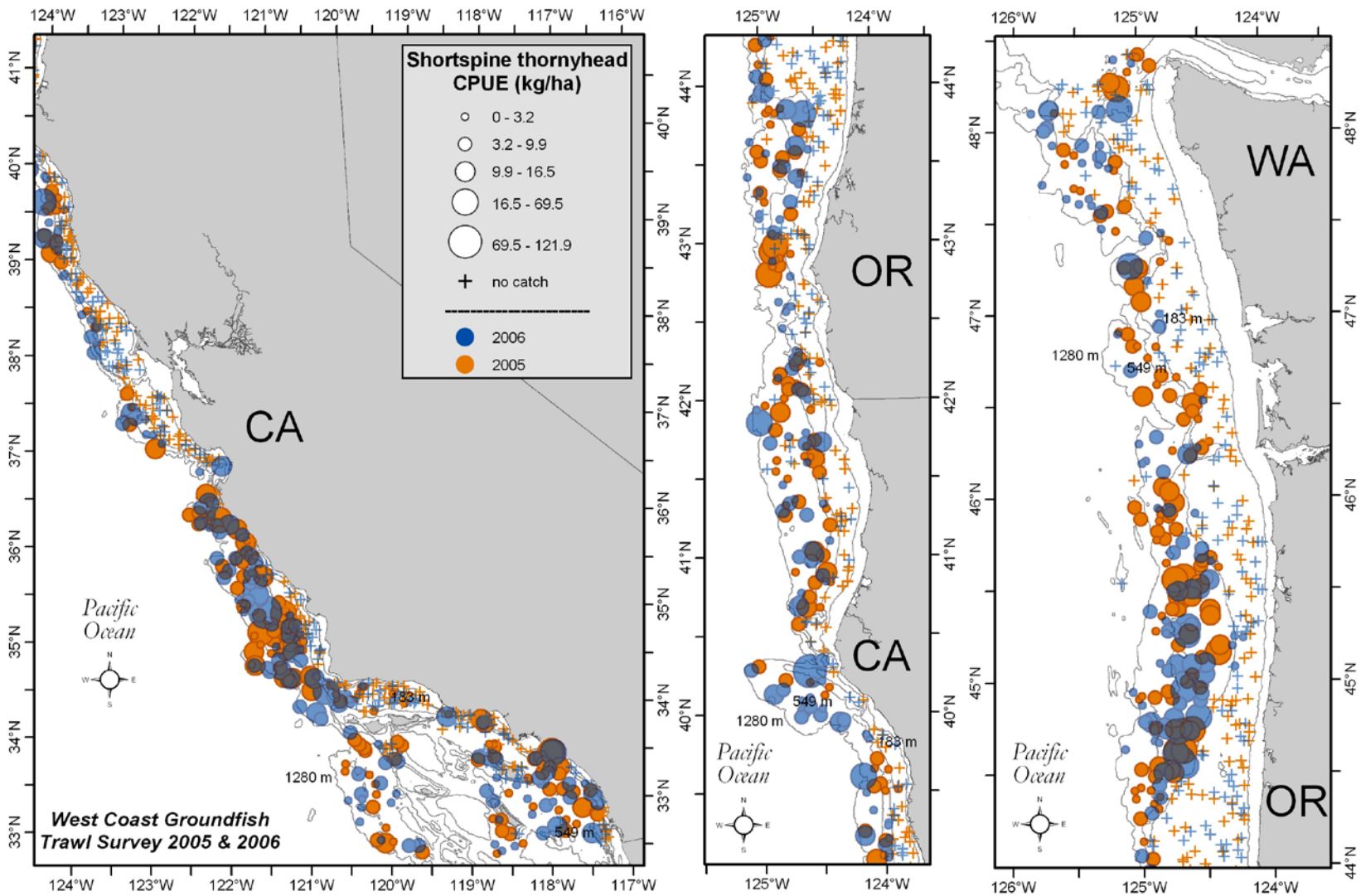


Figure 127. Shortspine thornyhead distribution and relative abundance (kg $ha^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

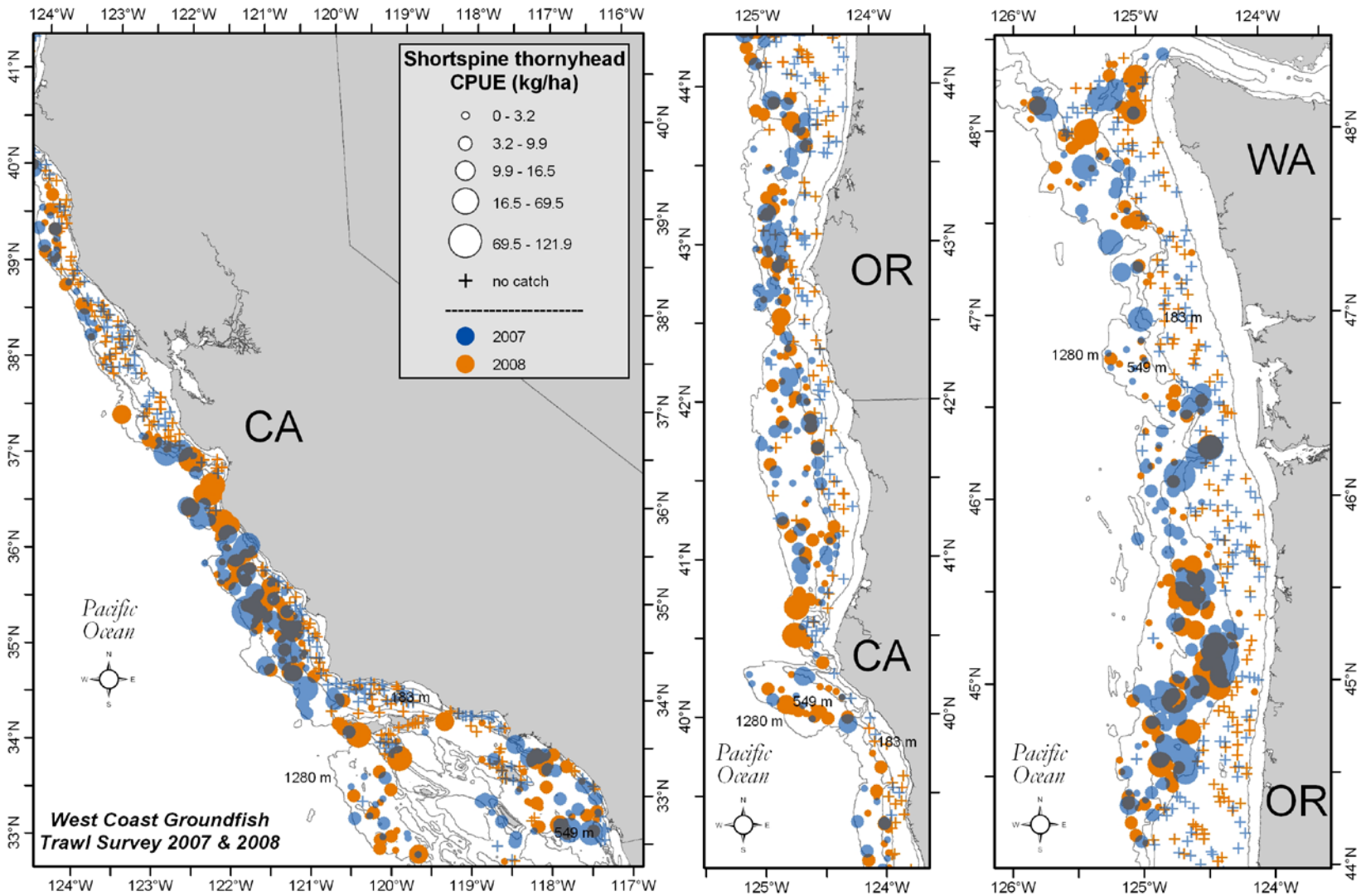


Figure 128. Shortspine thornyhead distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

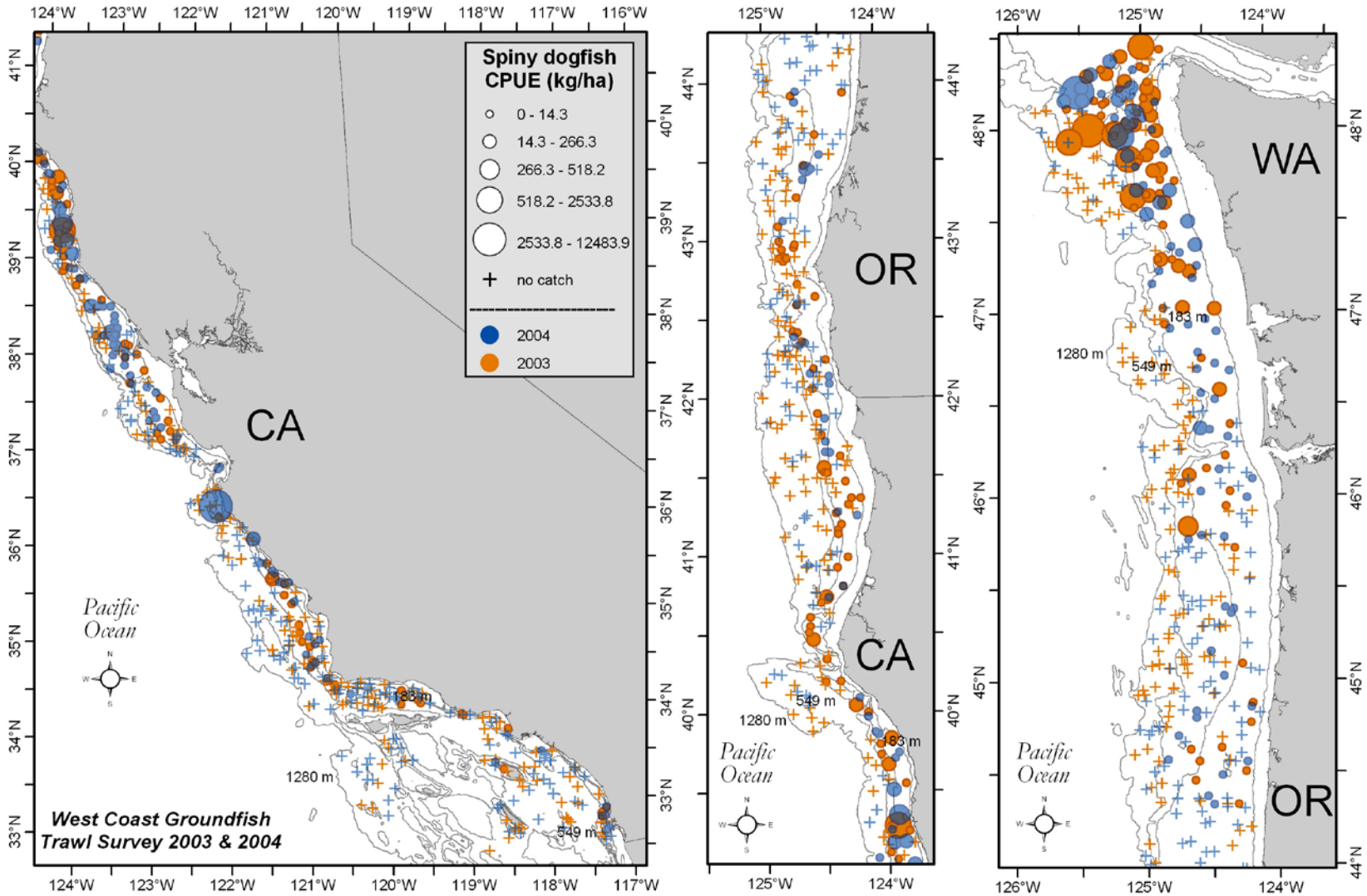


Figure 129. Spiny dogfish distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

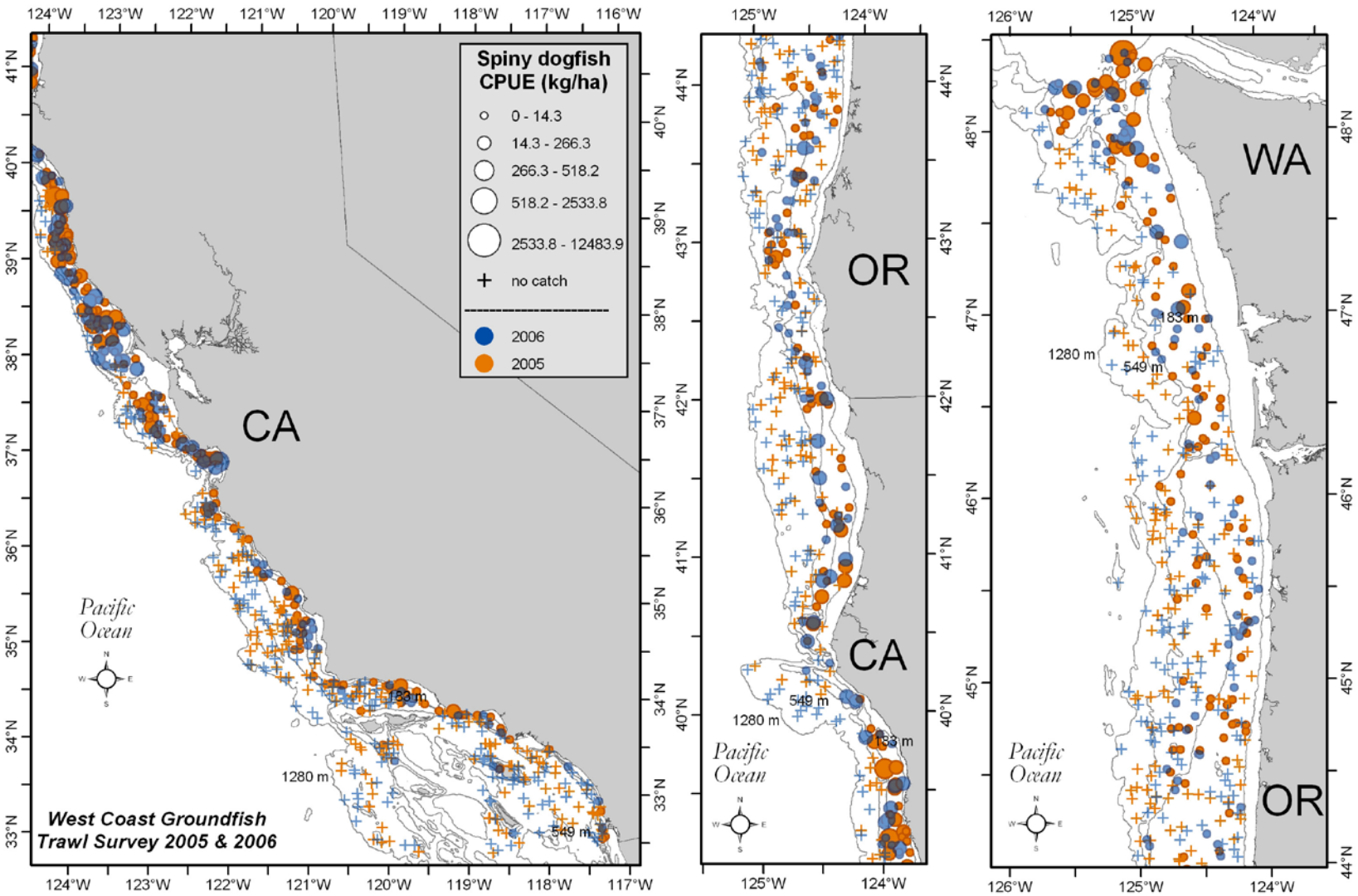


Figure 130. Spiny dogfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

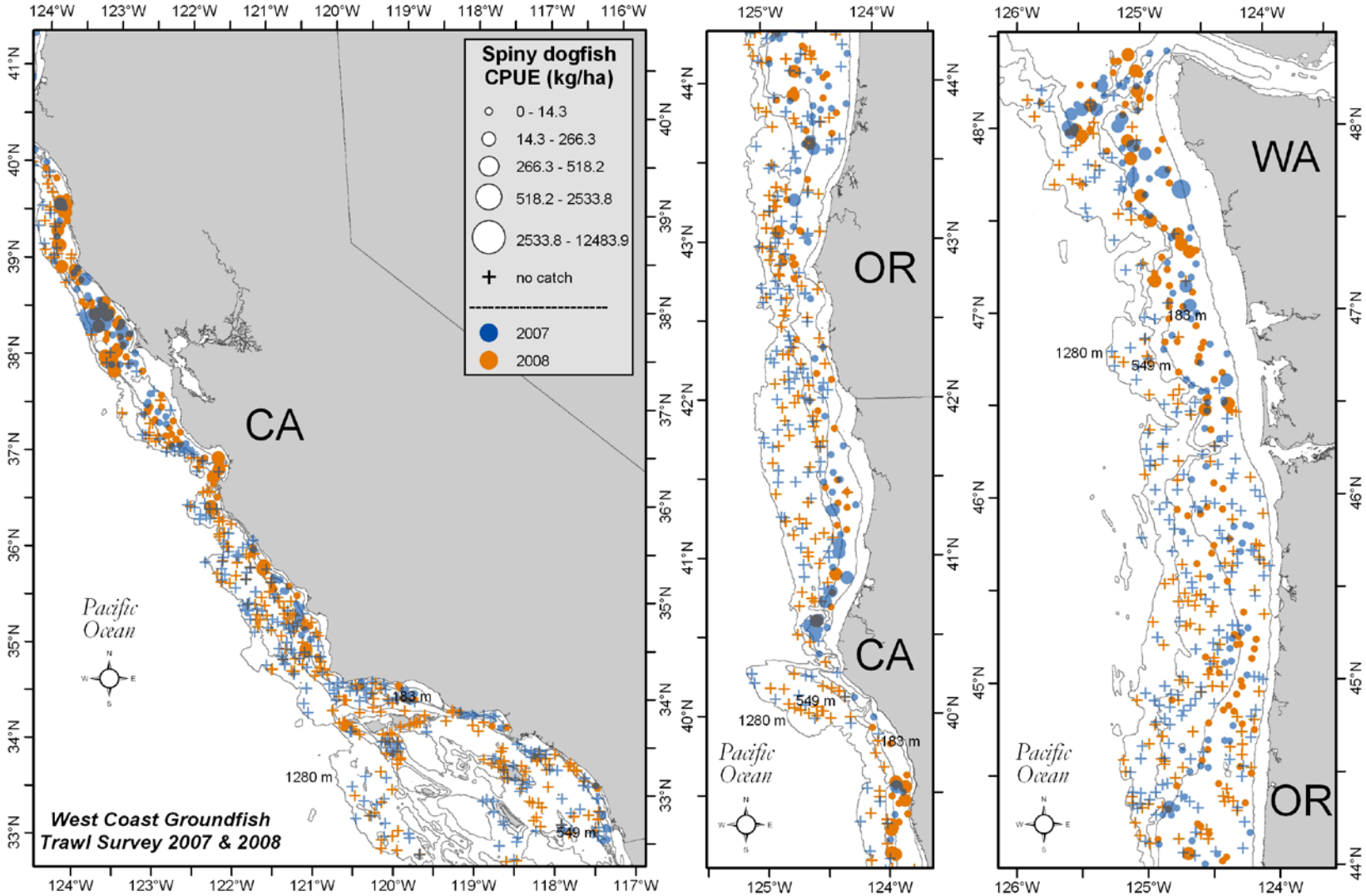


Figure 131. Spiny dogfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

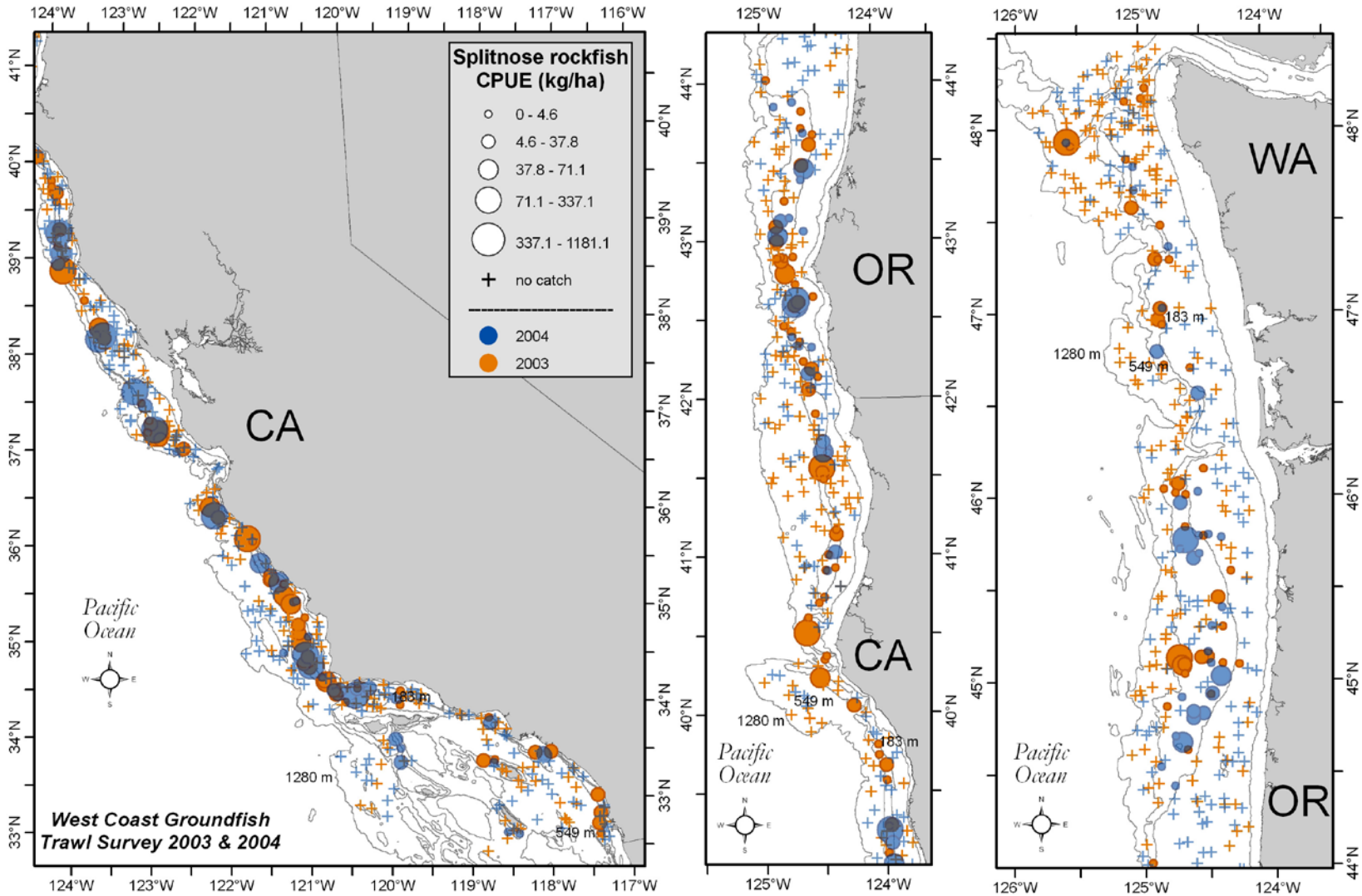


Figure 132. Splitnose rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

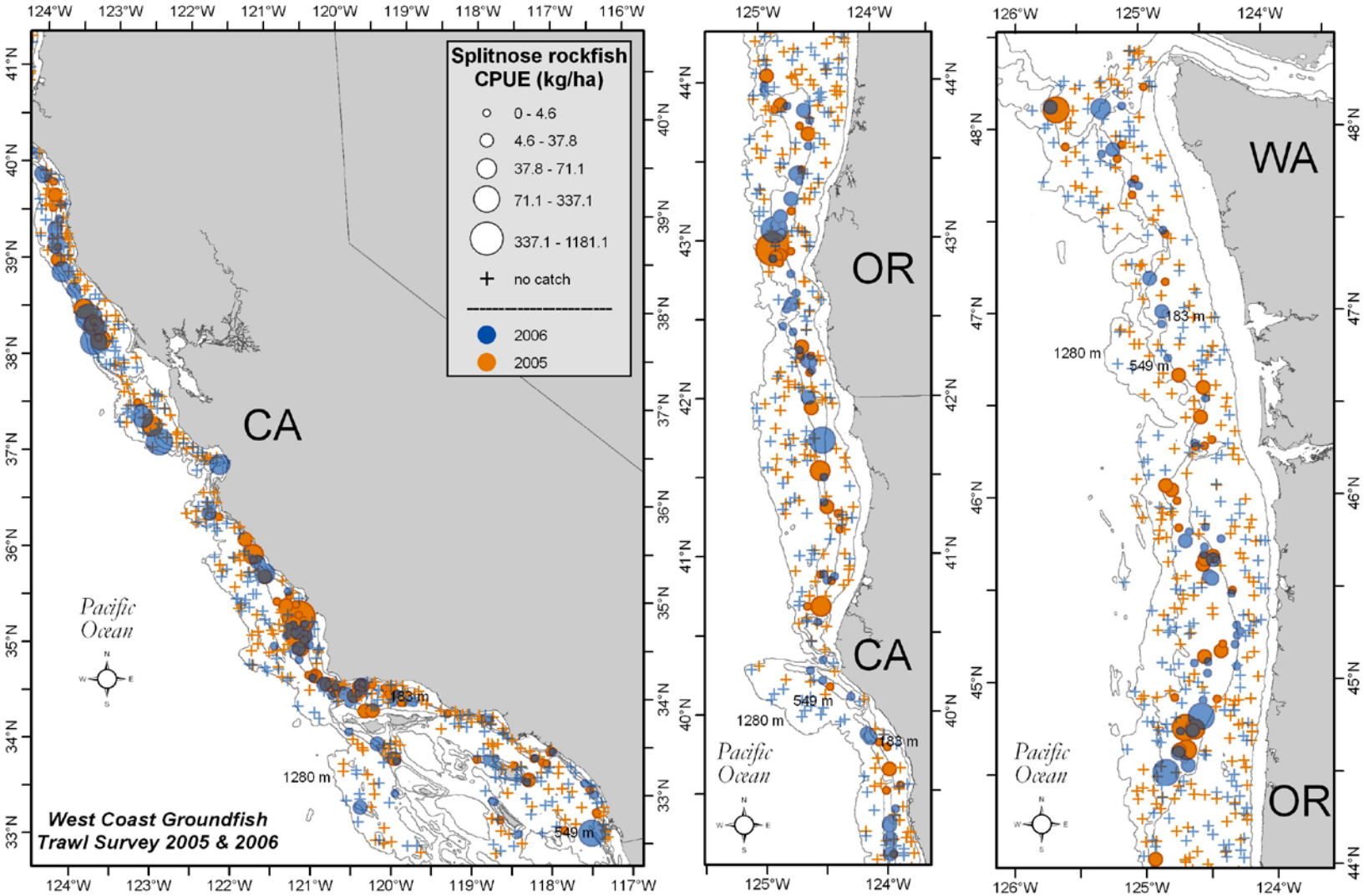


Figure 133. Splitnose rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

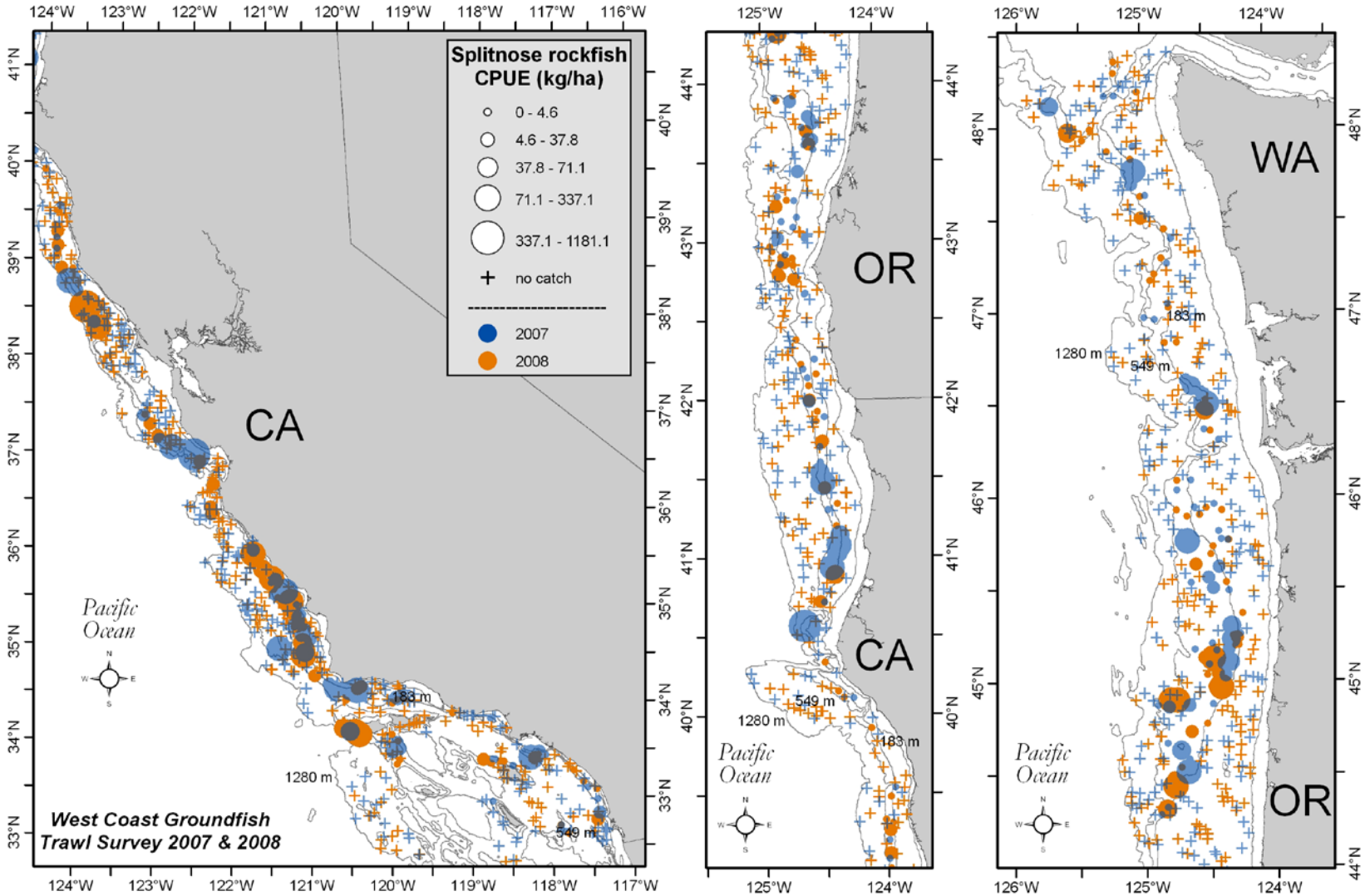


Figure 134. Splitnose rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

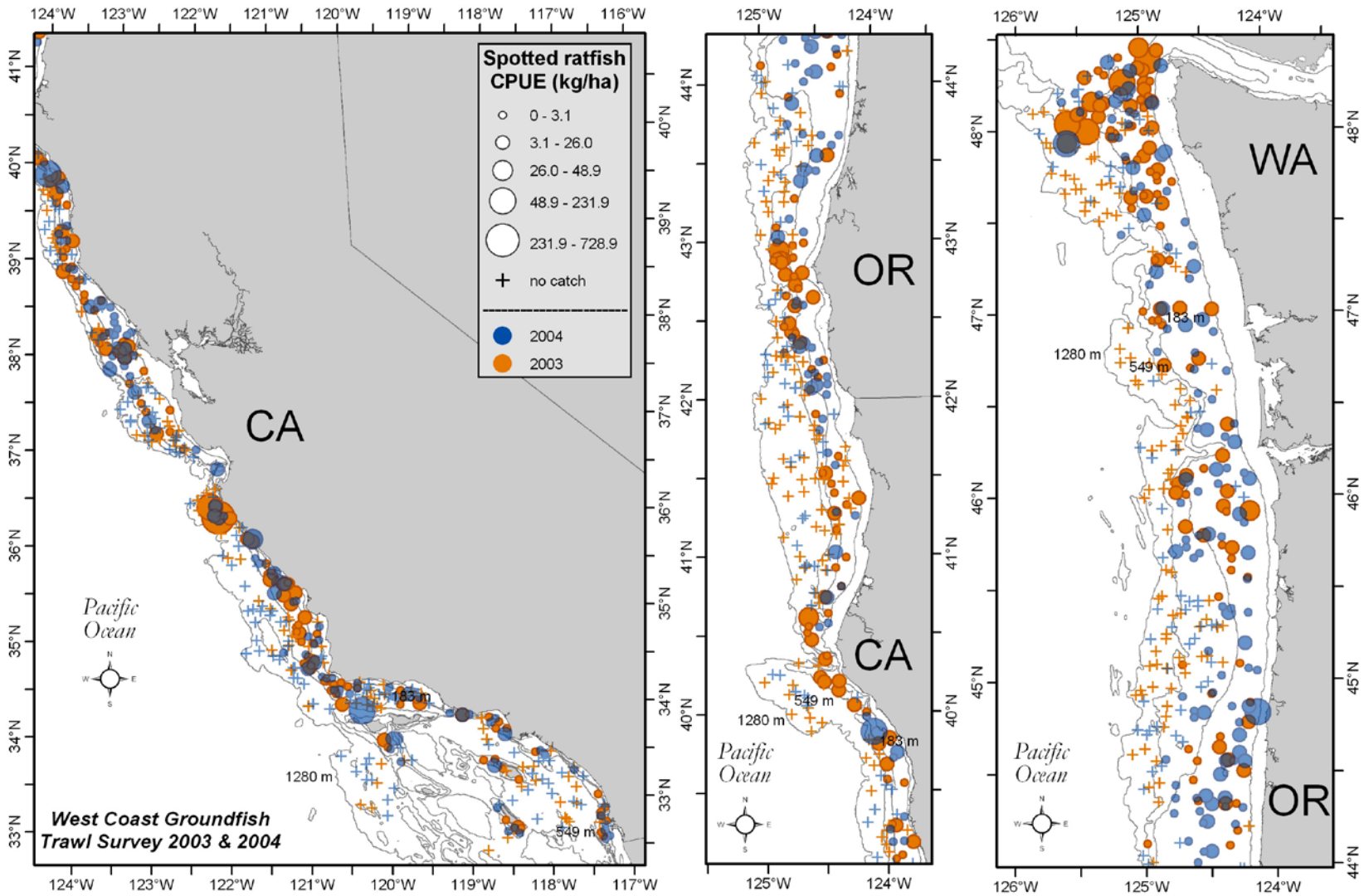


Figure 135. Spotted ratfish distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

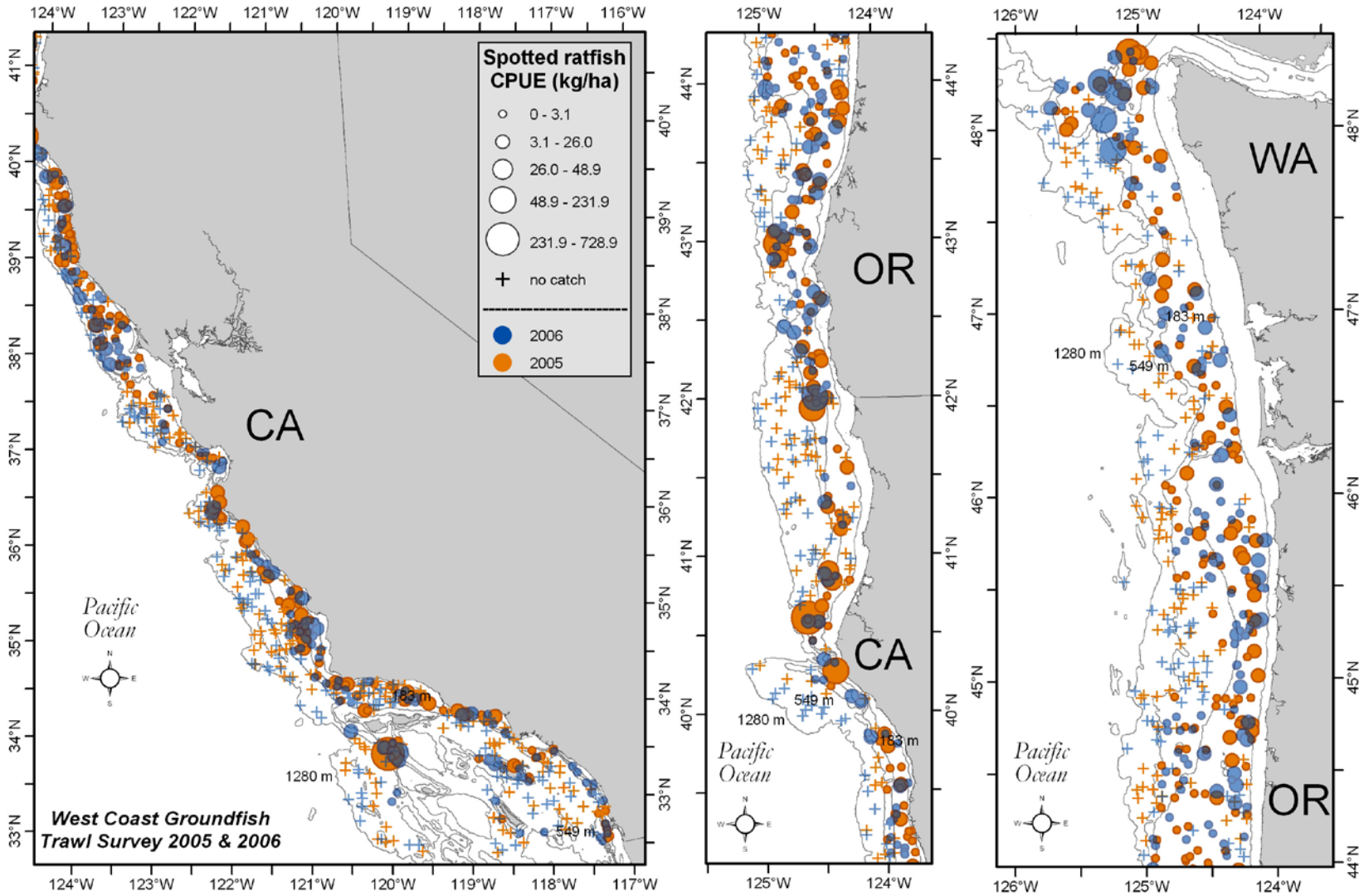


Figure 136. Spotted ratfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

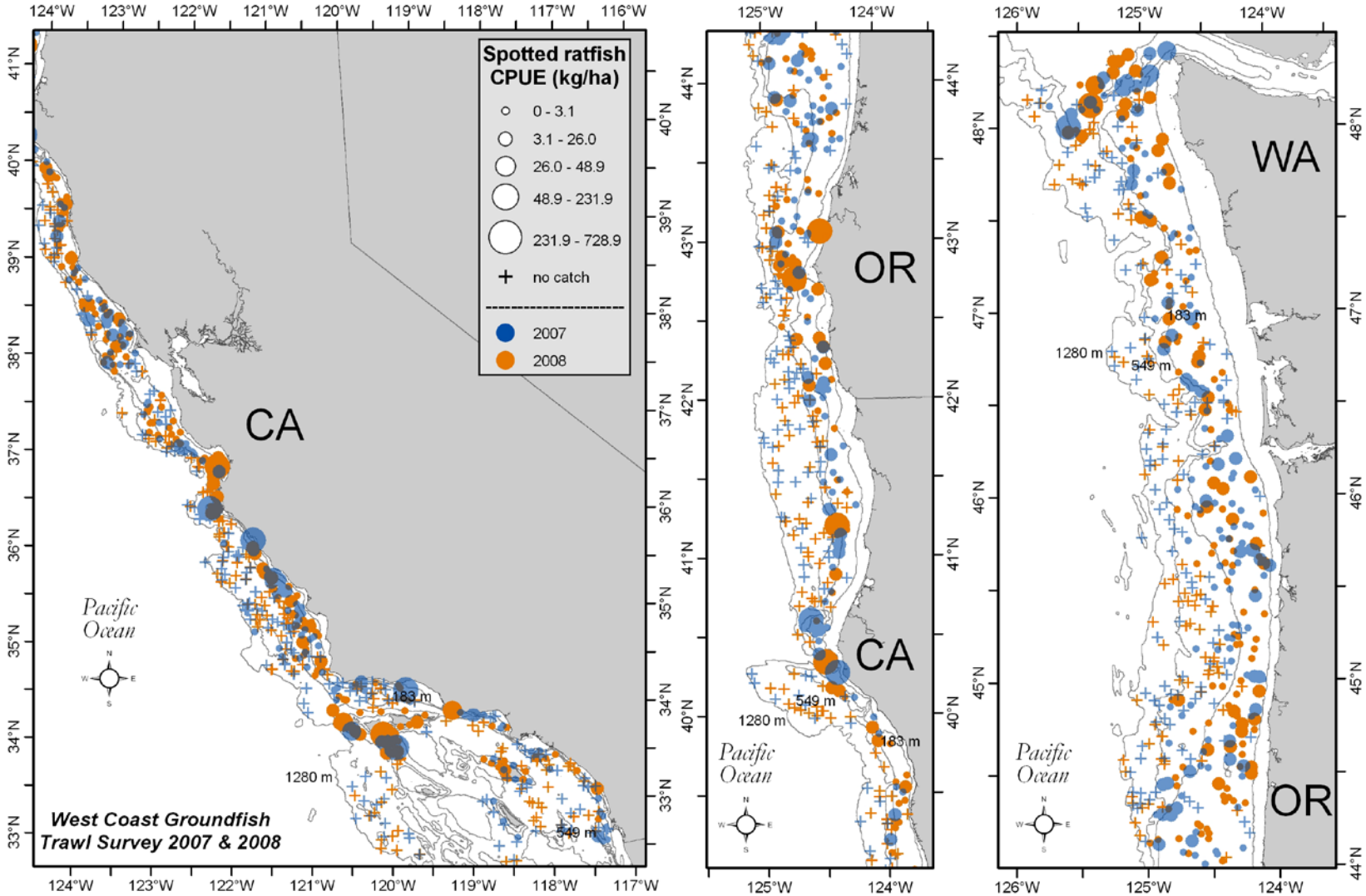


Figure 137. Spotted ratfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

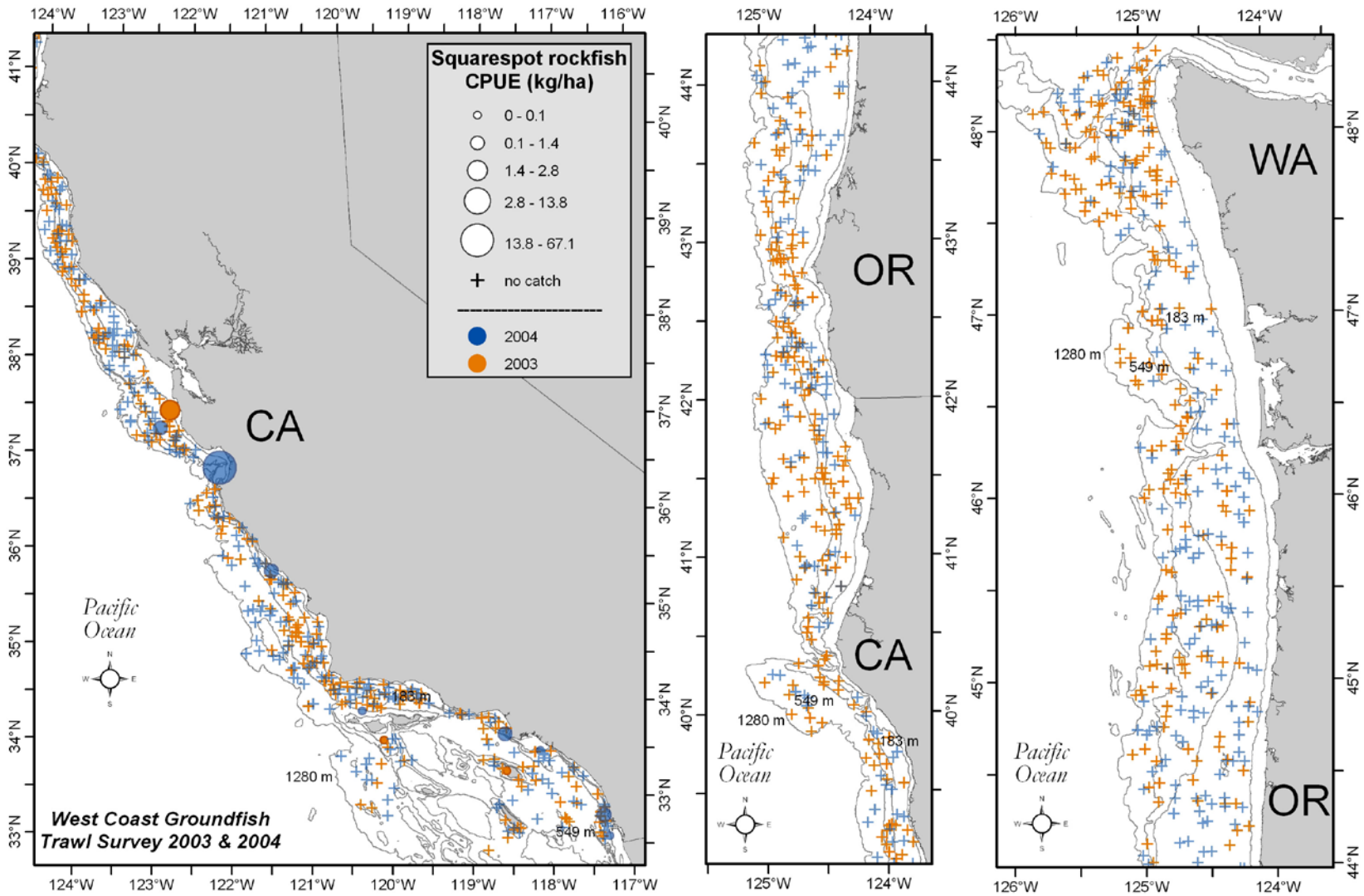


Figure 138. Squarespot rockfish (*Sebastes hopkinsi*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

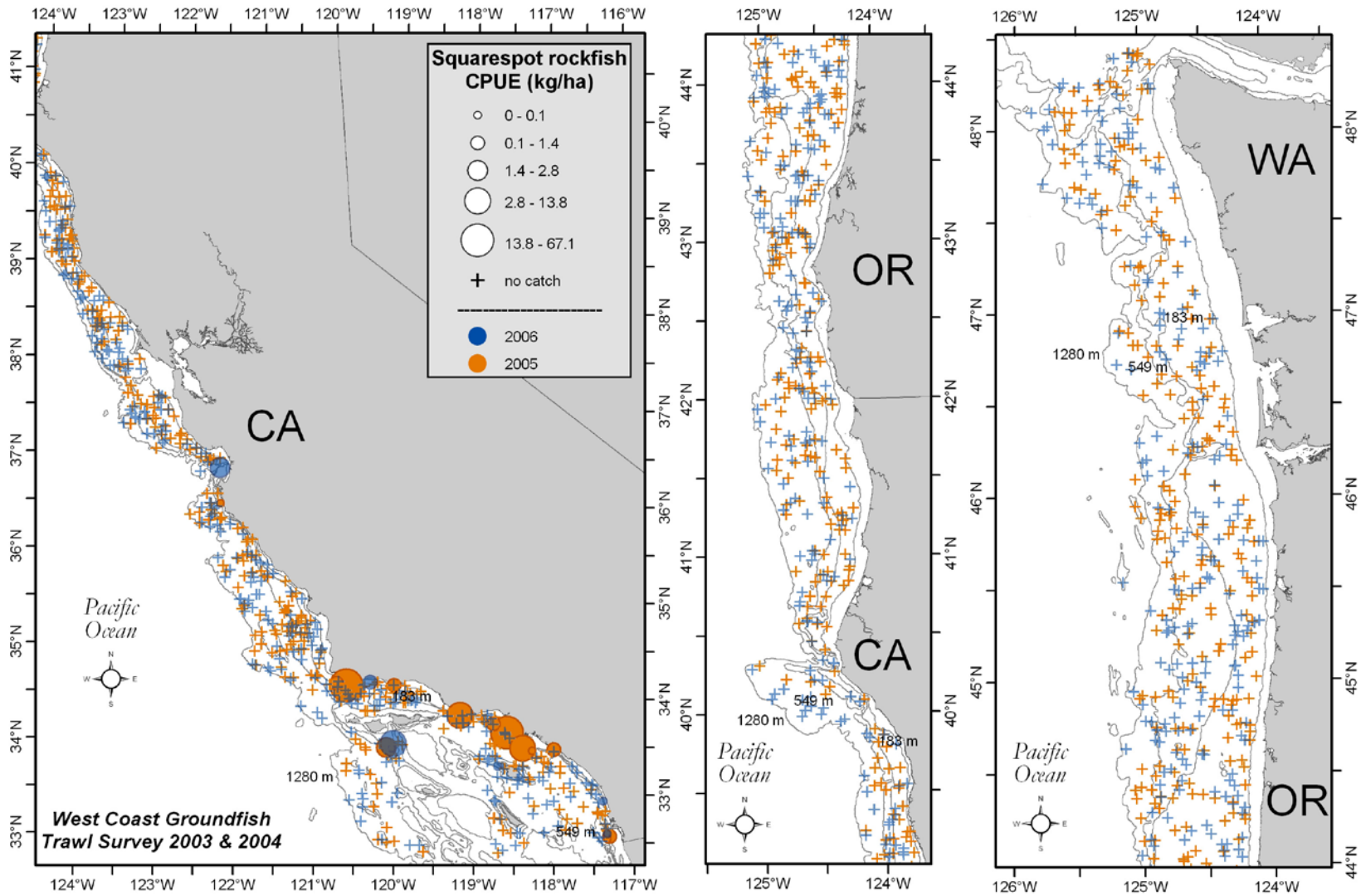


Figure 139. Squarespot rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

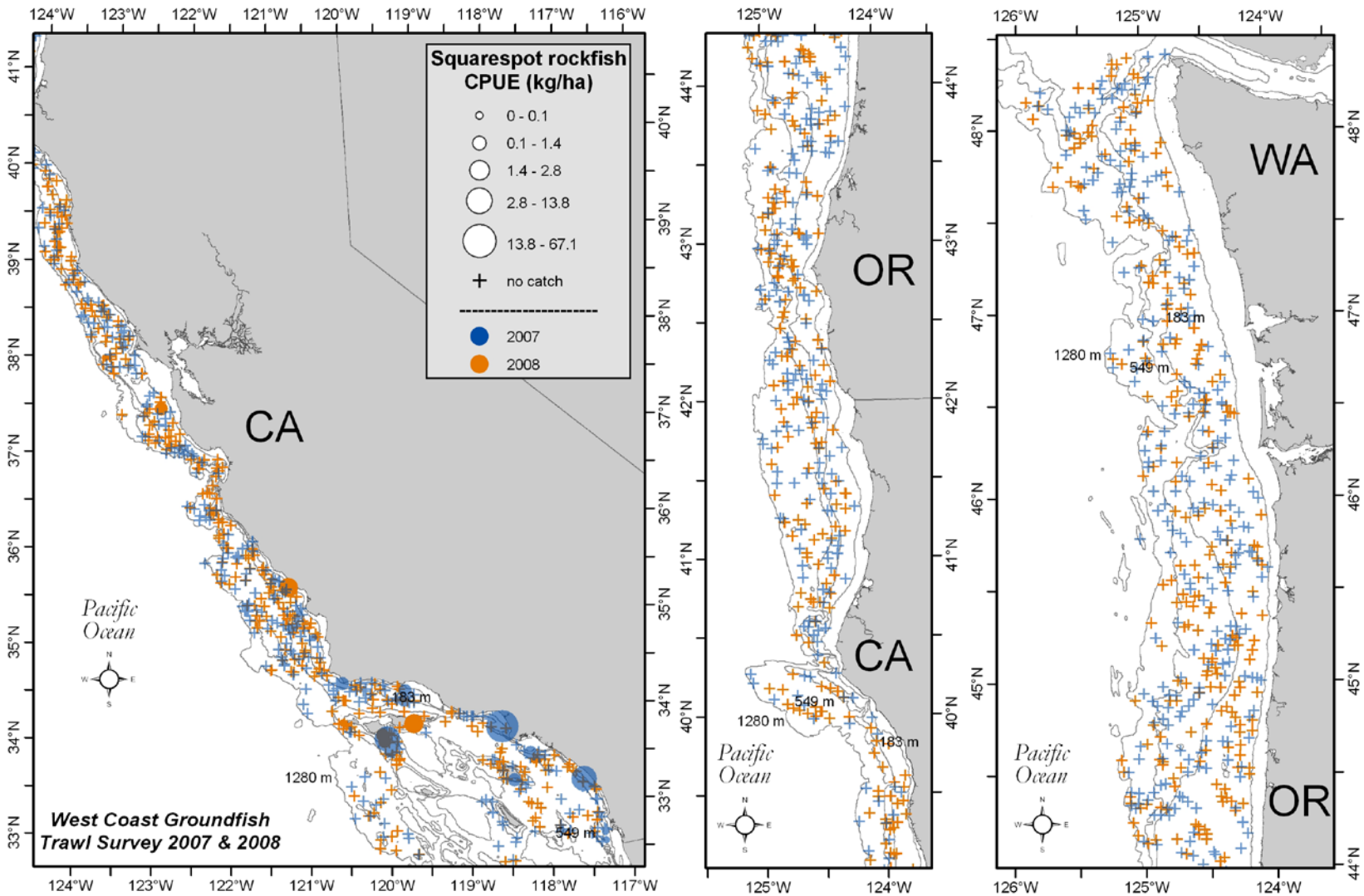


Figure 140. Squarespot rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

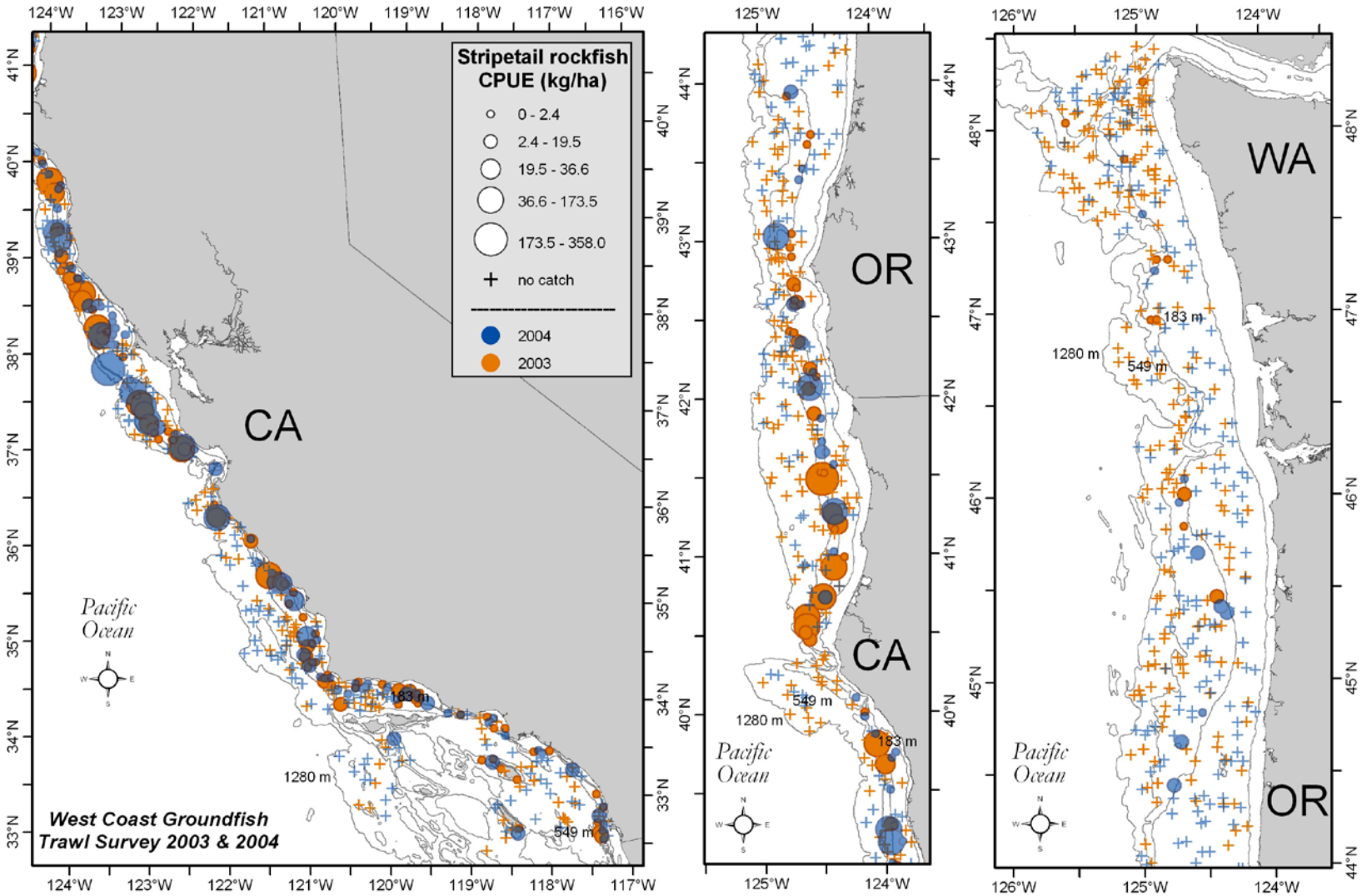


Figure 141. Stripetail rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

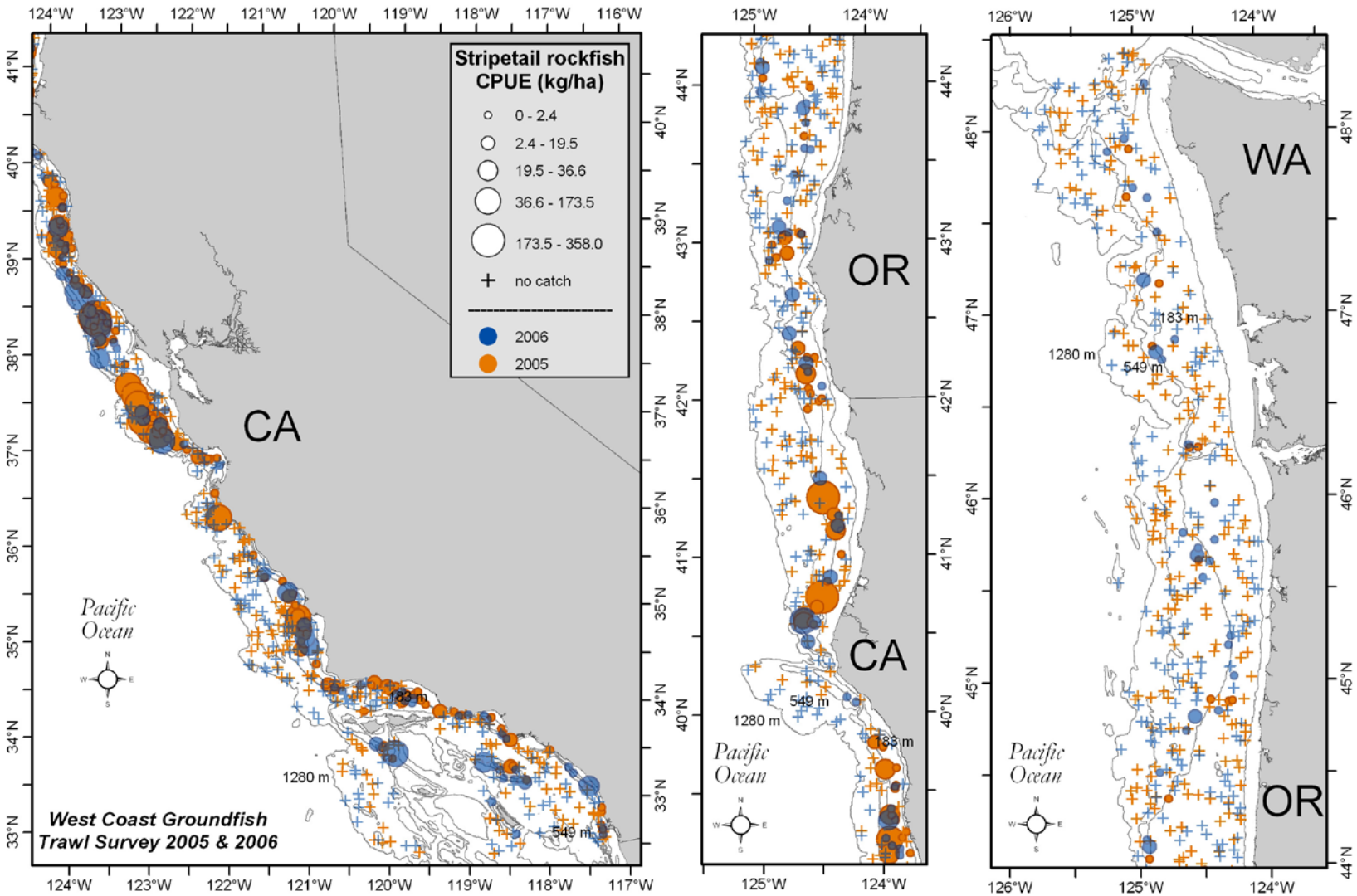


Figure 142. Stripetail rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

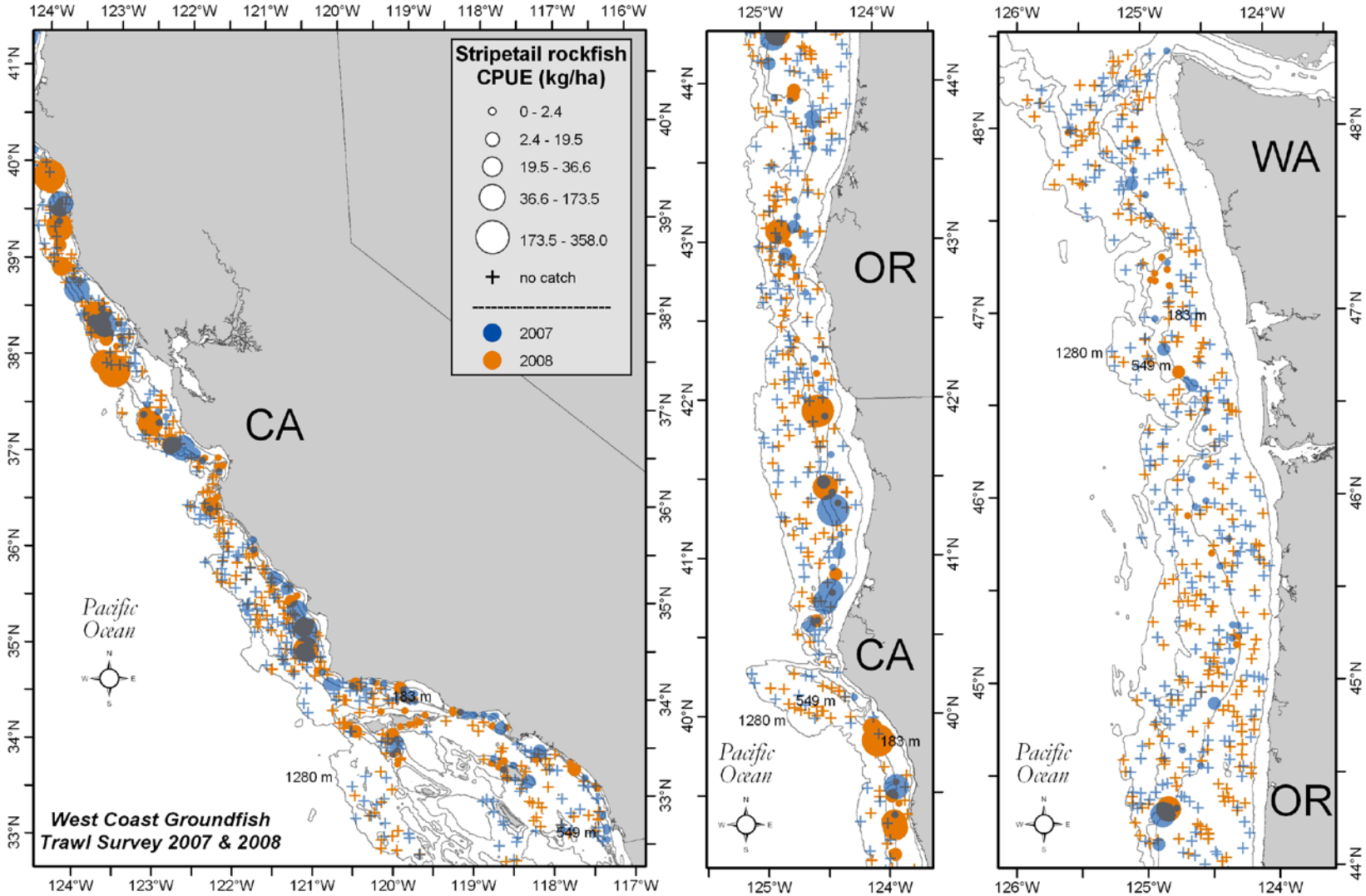


Figure 143. Stripetail rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

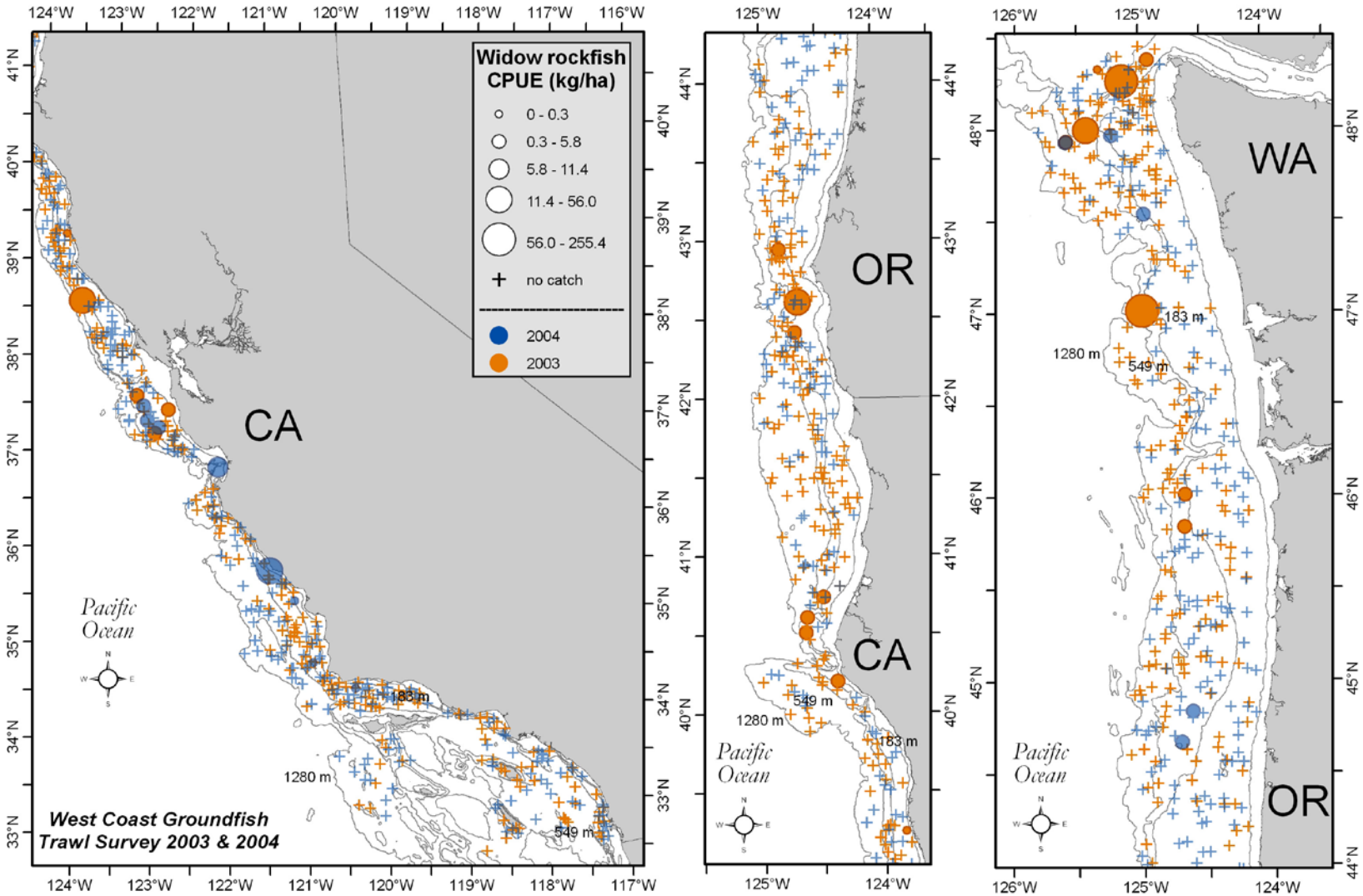


Figure 144. Widow rockfish (*Sebastes entomelas*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

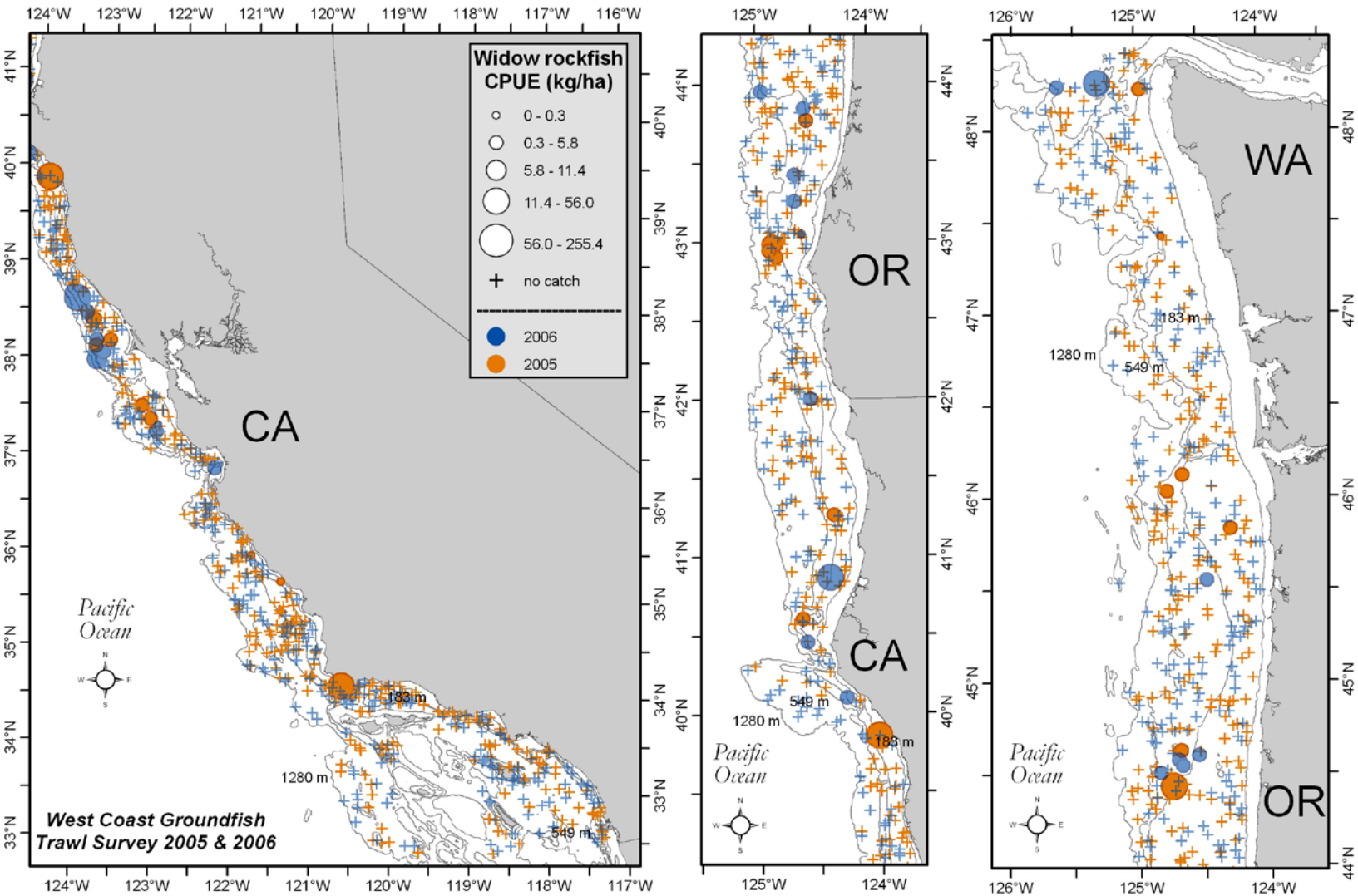


Figure 145. Widow rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

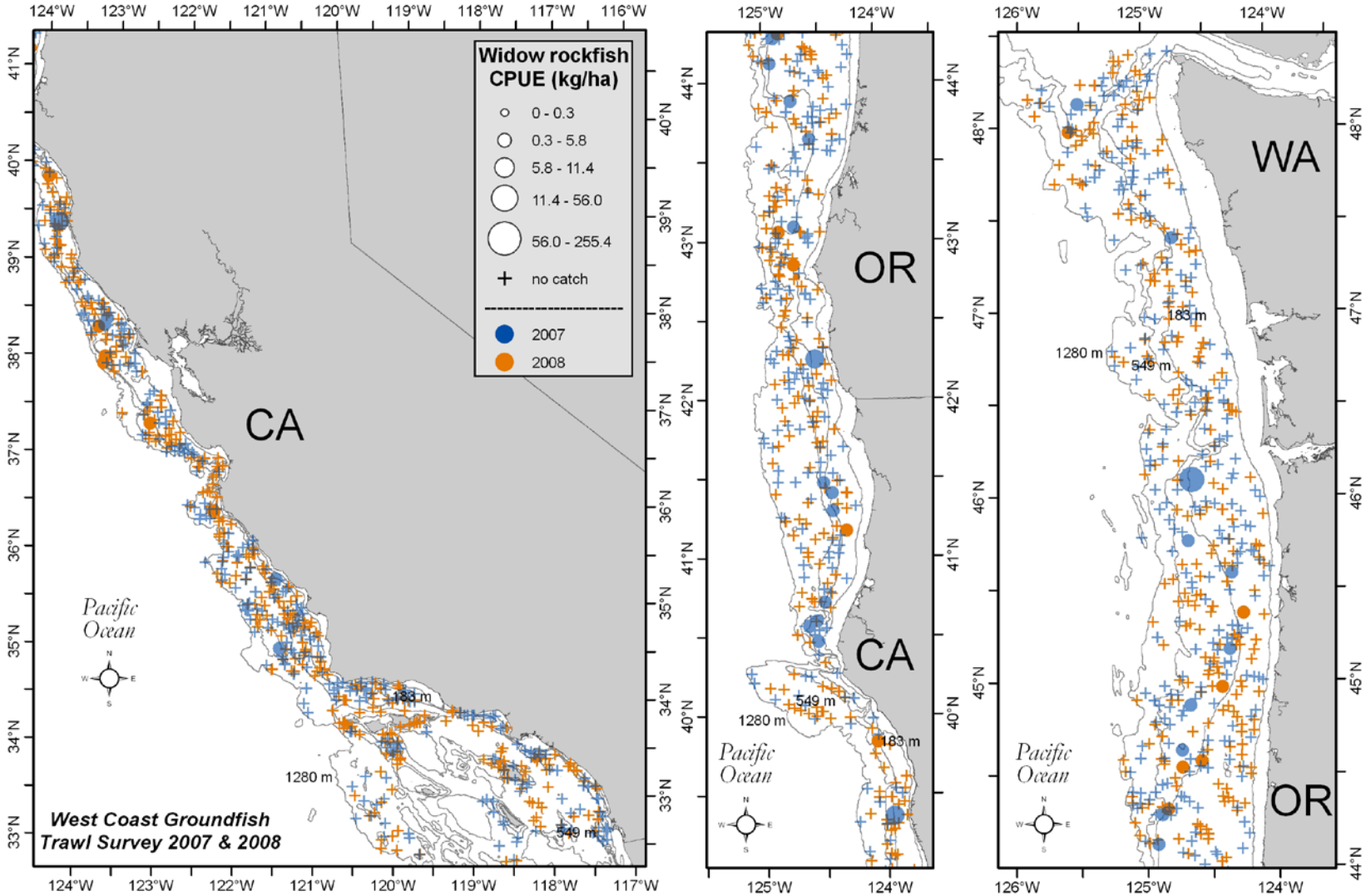


Figure 146. Widow rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

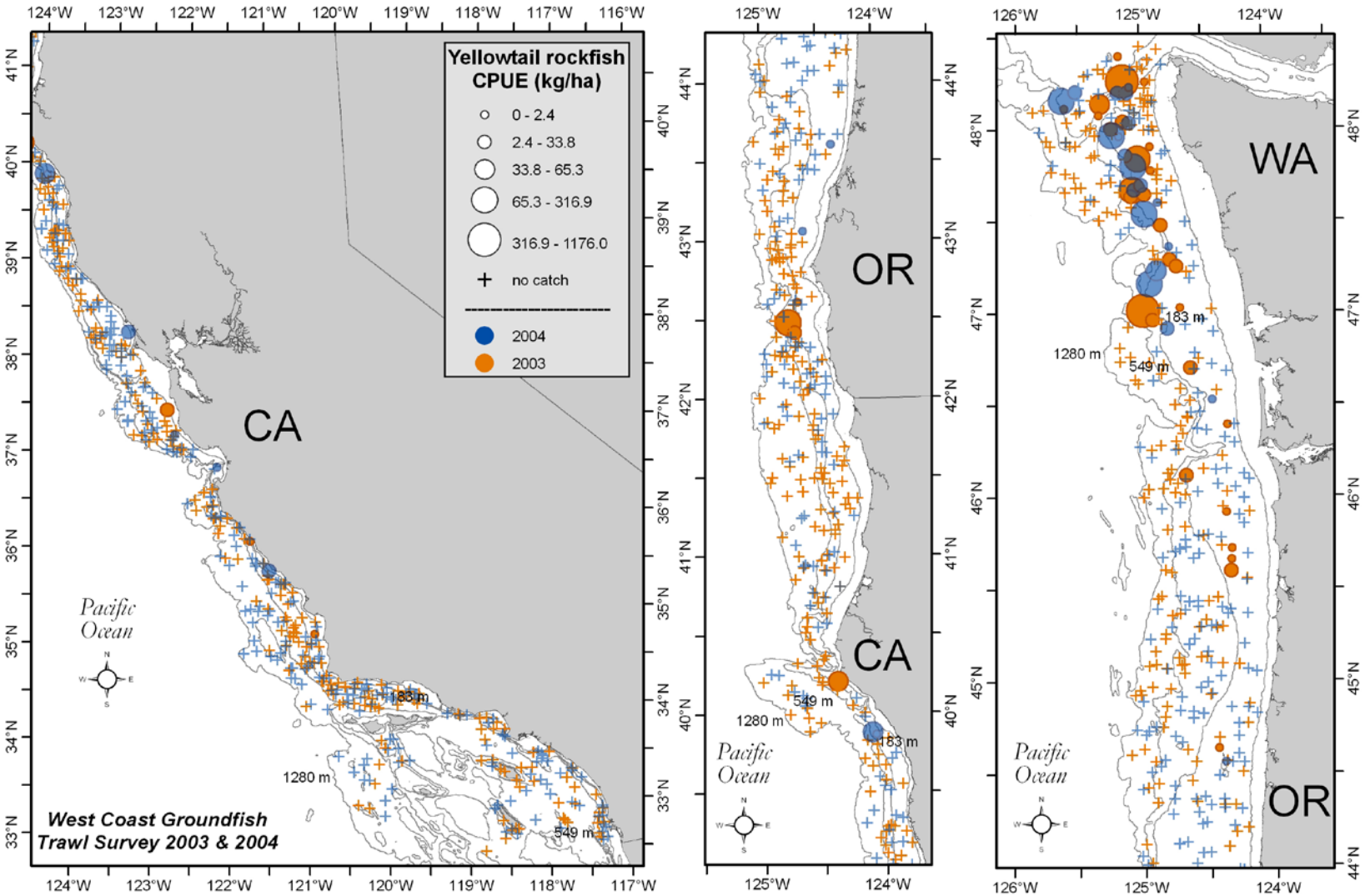


Figure 147. Yellowtail rockfish (*Sebastes flavidus*) distribution and relative abundance (kg ha$^{-1}$) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

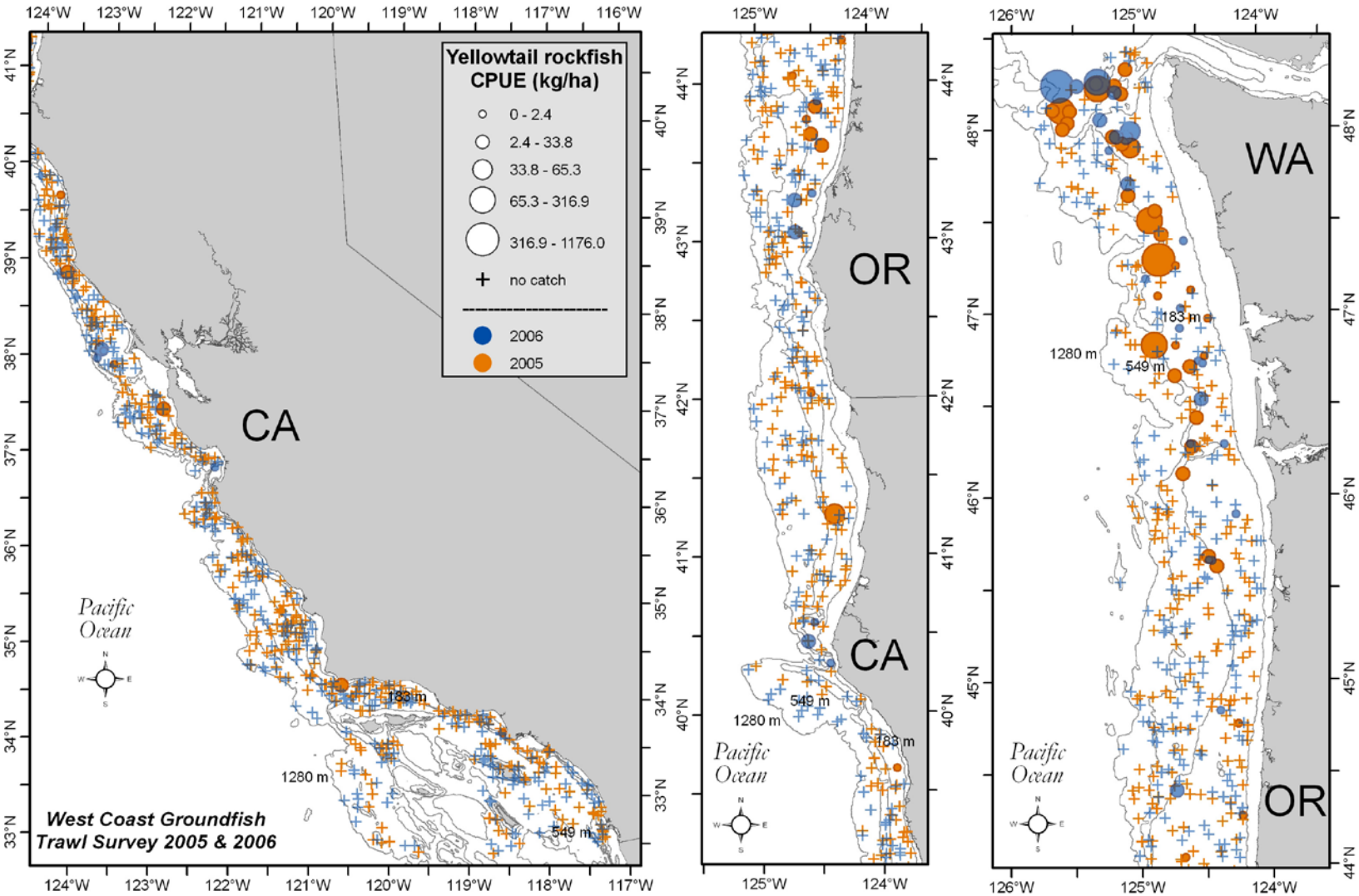


Figure 148. Yellowtail rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

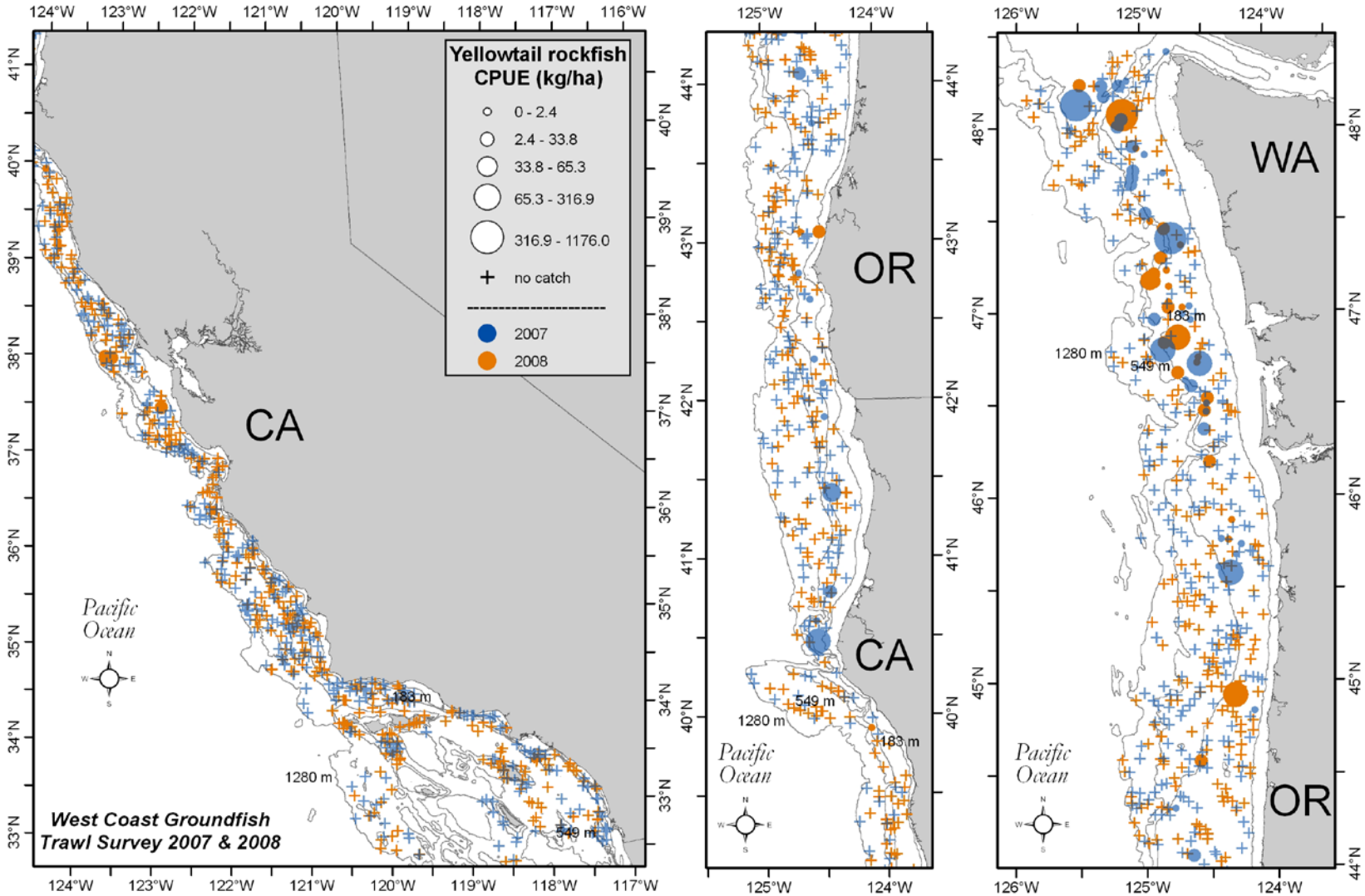


Figure 149. Yellowtail rockfish distribution and relative abundance (kg ha$^{-1}$) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and 3 SDs > mean CPUE, and more than 3 SDs > mean CPUE.

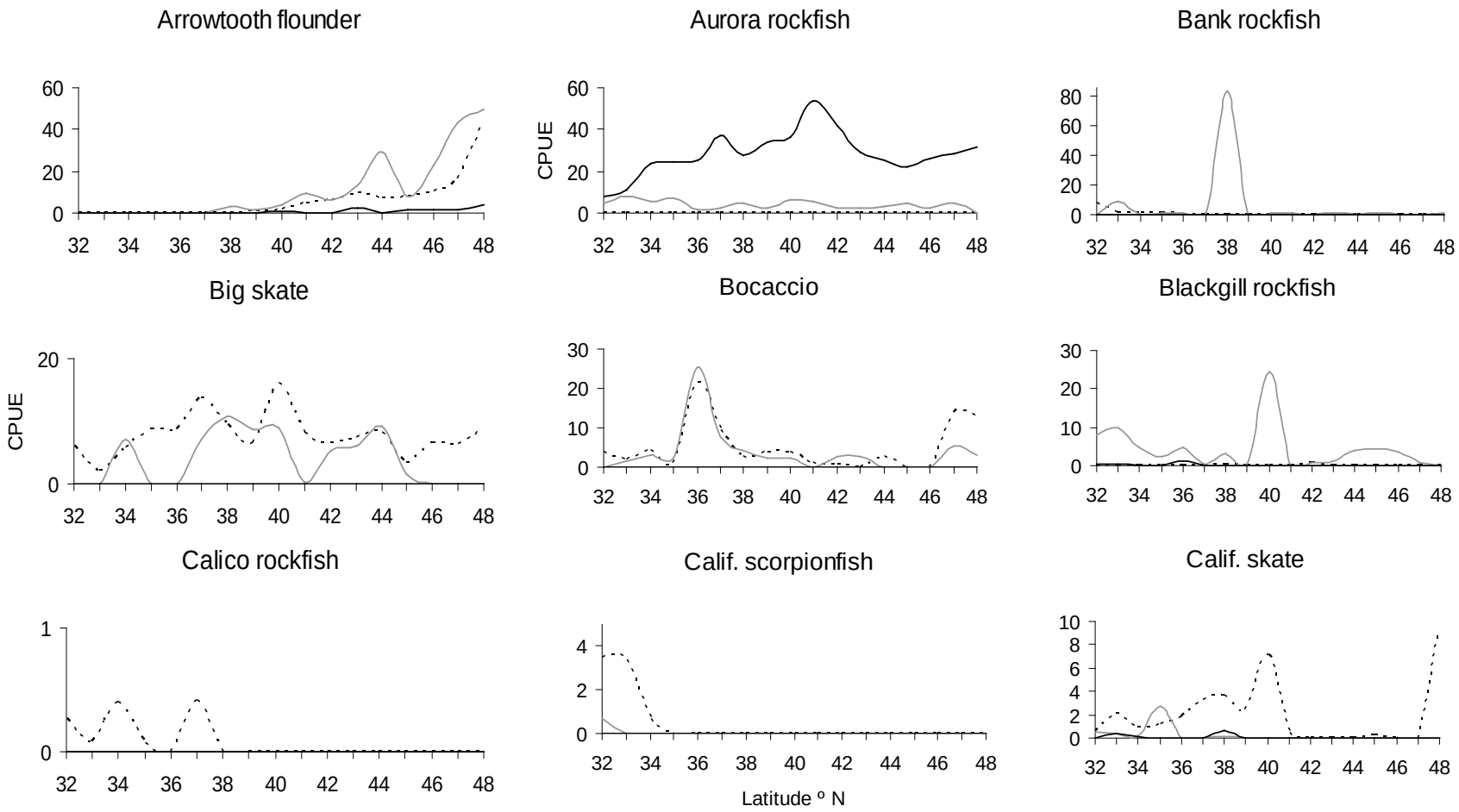


Figure 150. Species specific CPUE (kg ha$^{-1}$) by latitude for survey years 2003–2008 for 9 of 46 FMP species. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

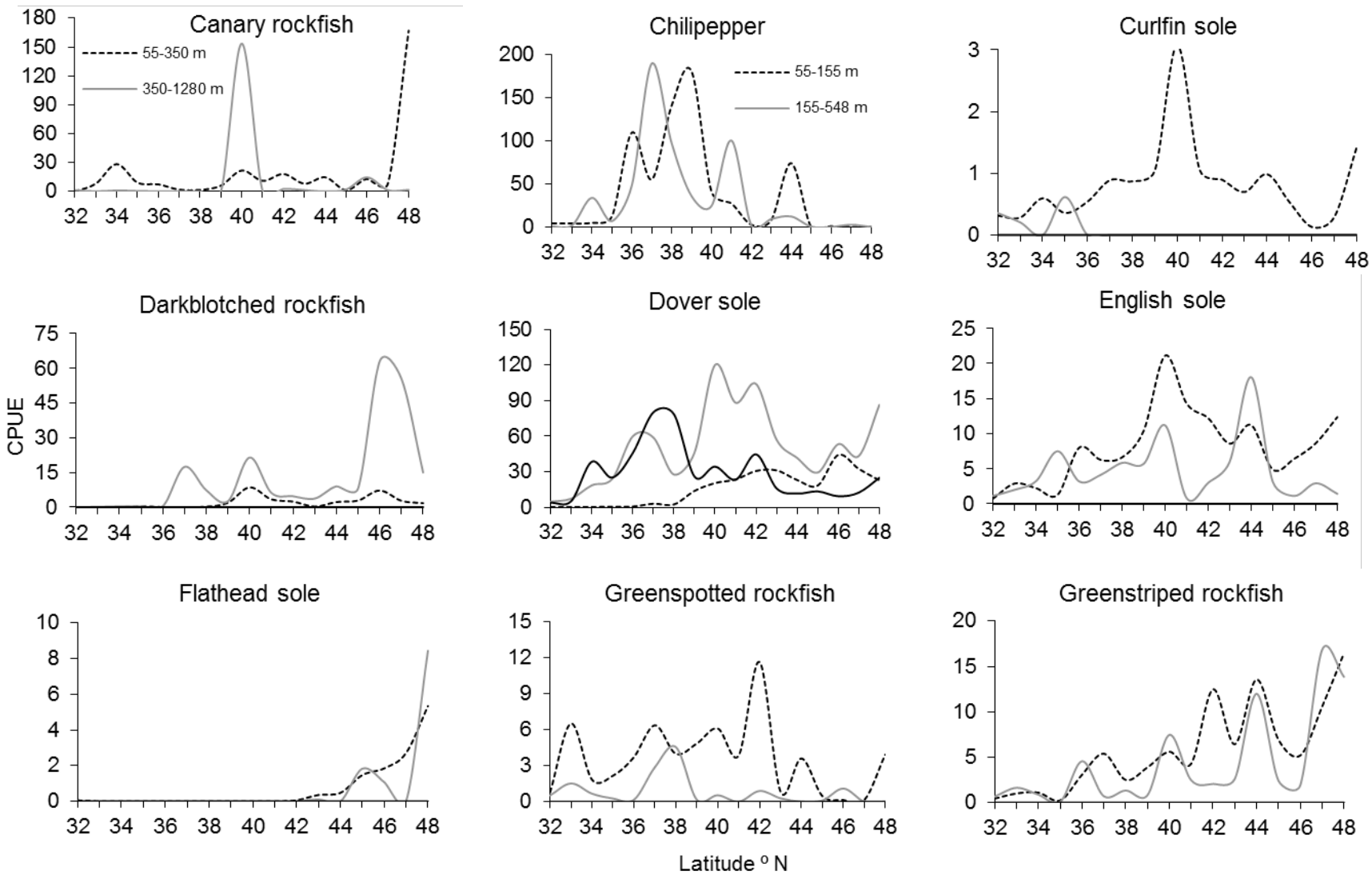


Figure 151. Species specific CPUE (kg ha–1) by latitude for survey years 2003–2008 for 9 of 46 FMP species. Except for canary rockfish and chilipepper, indicated above, the dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

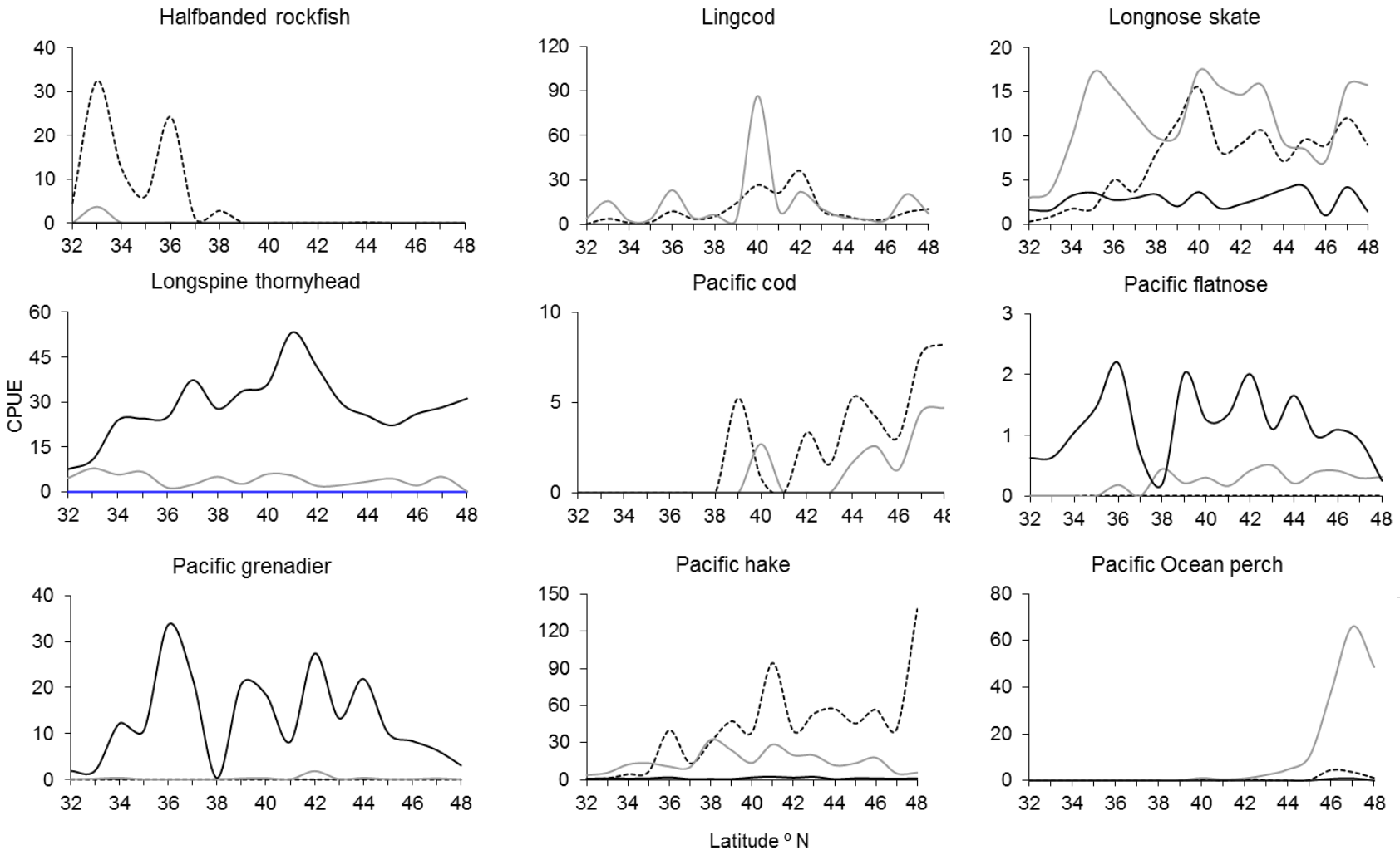


Figure 152. Species specific CPUE (kg ha–1) by latitude for survey years 2003–2008 for 9 of 46 FMP species. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

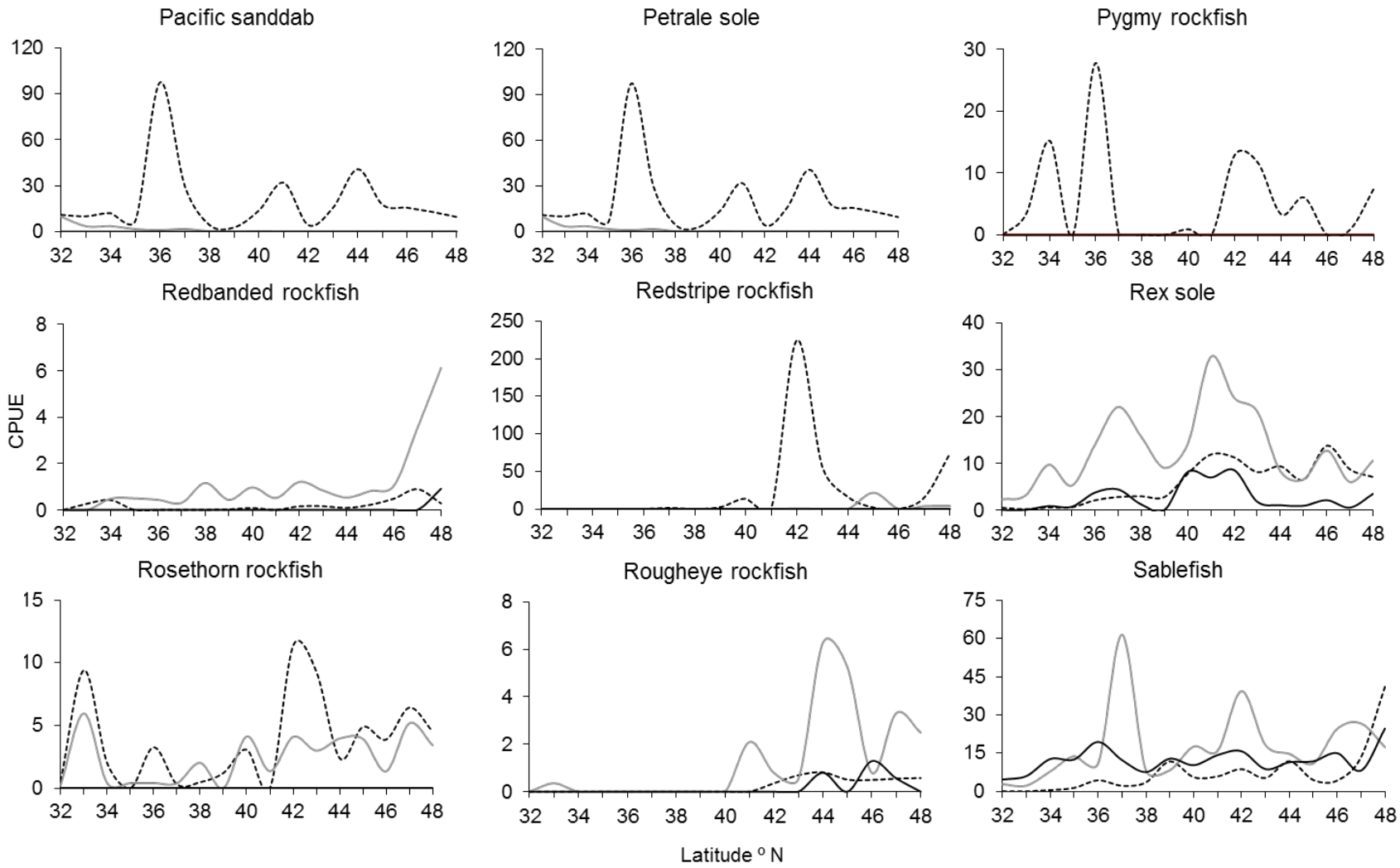


Figure 153. Species specific CPUE (kg ha$^{-1}$) by latitude for survey years 2003–2008 for 9 of 46 FMP species. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

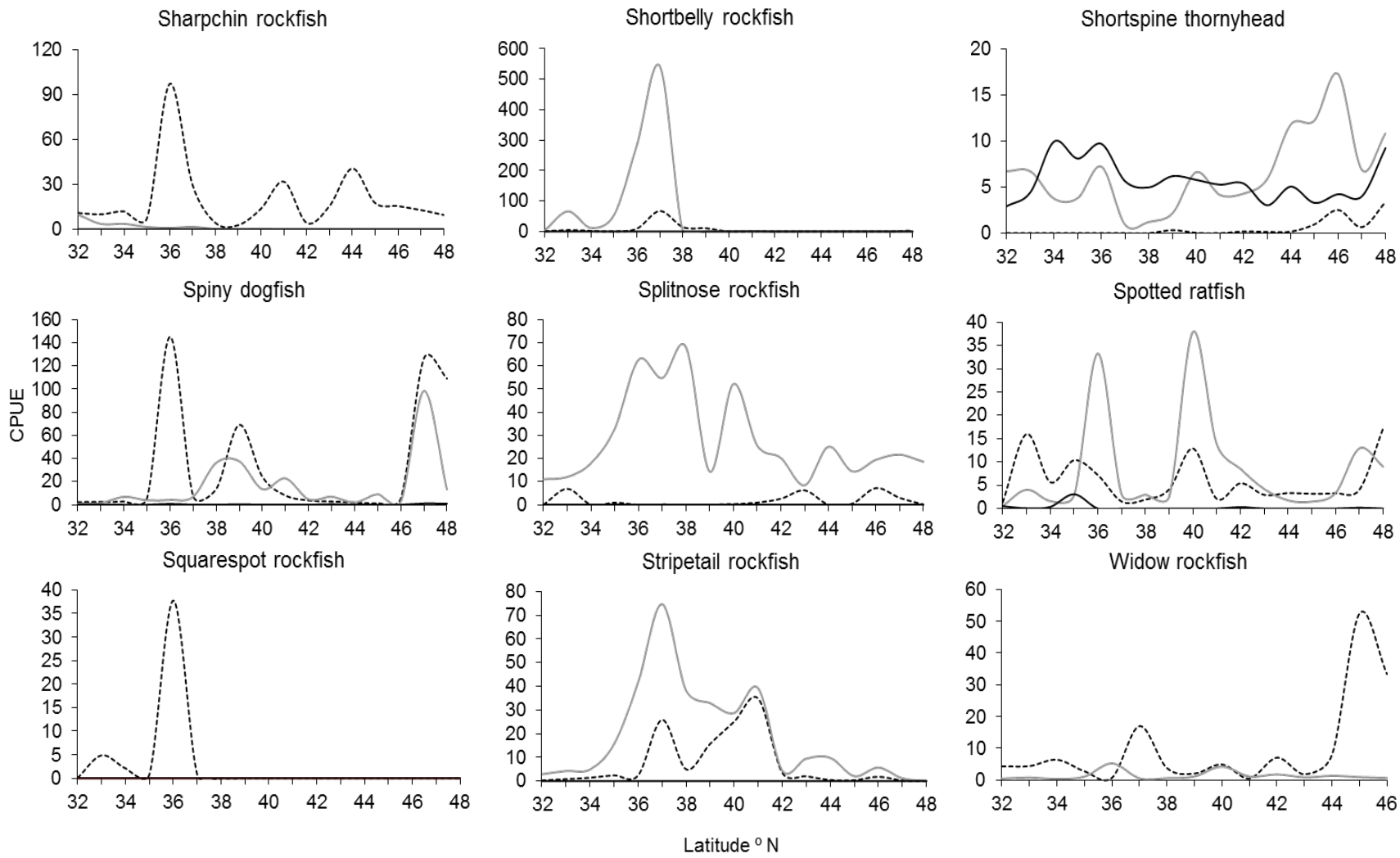


Figure 154. Species specific CPUE (kg ha–1) by latitude for survey years 2003–2008 for 9 of 46 FMP species. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

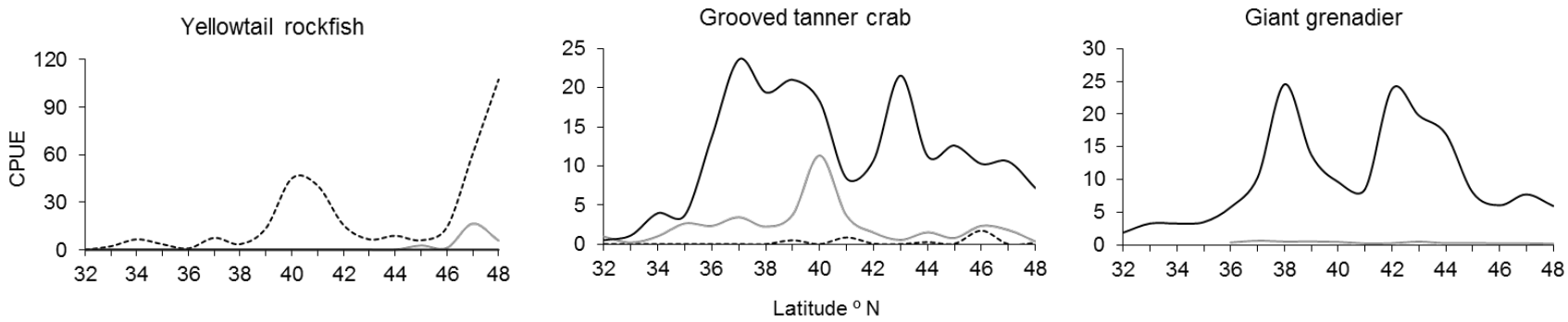


Figure 155. Species specific CPUE (kg ha$^{-1}$) by latitude for survey years 2003–2008 for 1 of 46 FMP species plus grooved tanner crab and giant grenadier. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

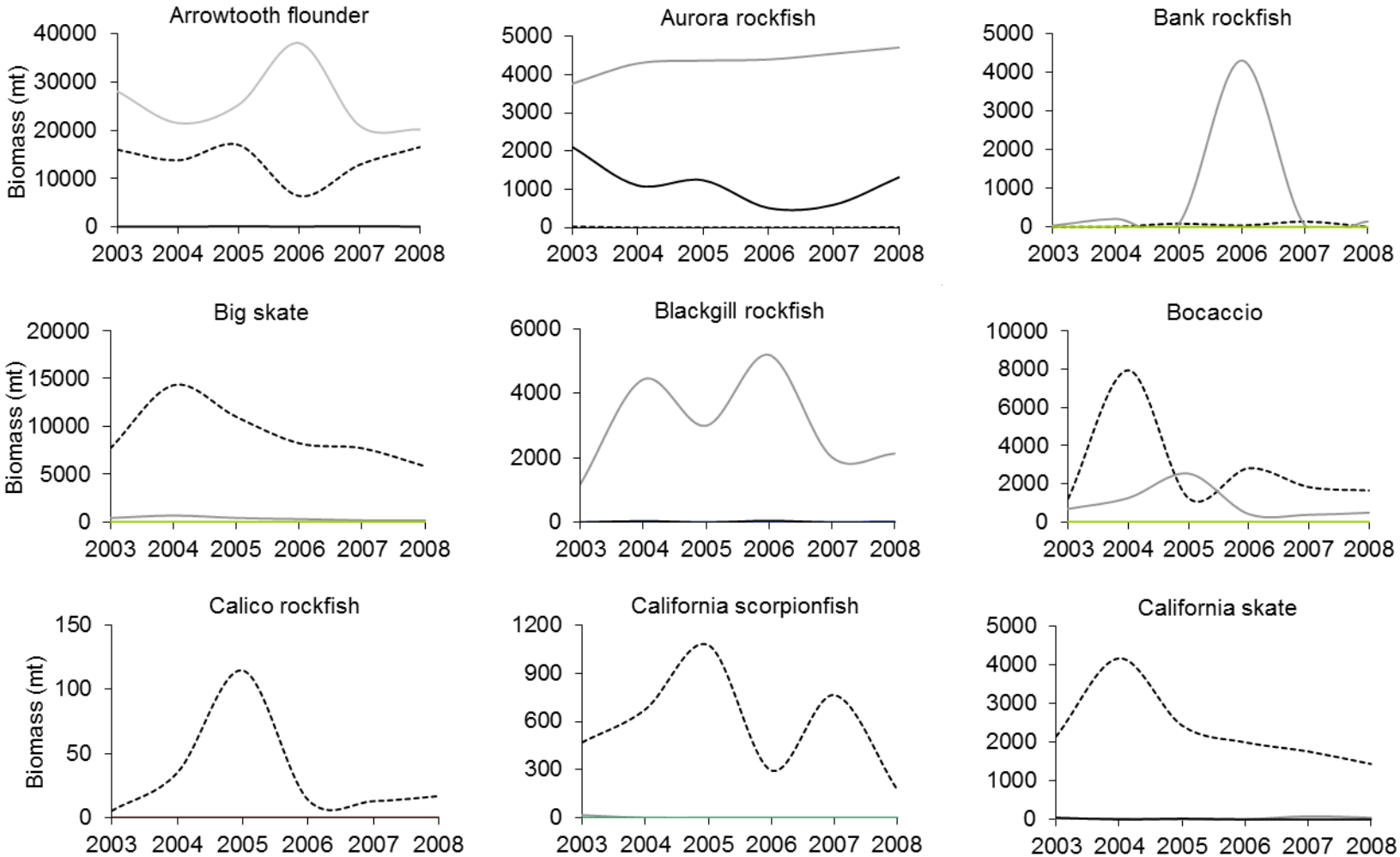


Figure 156. Species specific biomass (mt) by year for 9 of 46 FMP species. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

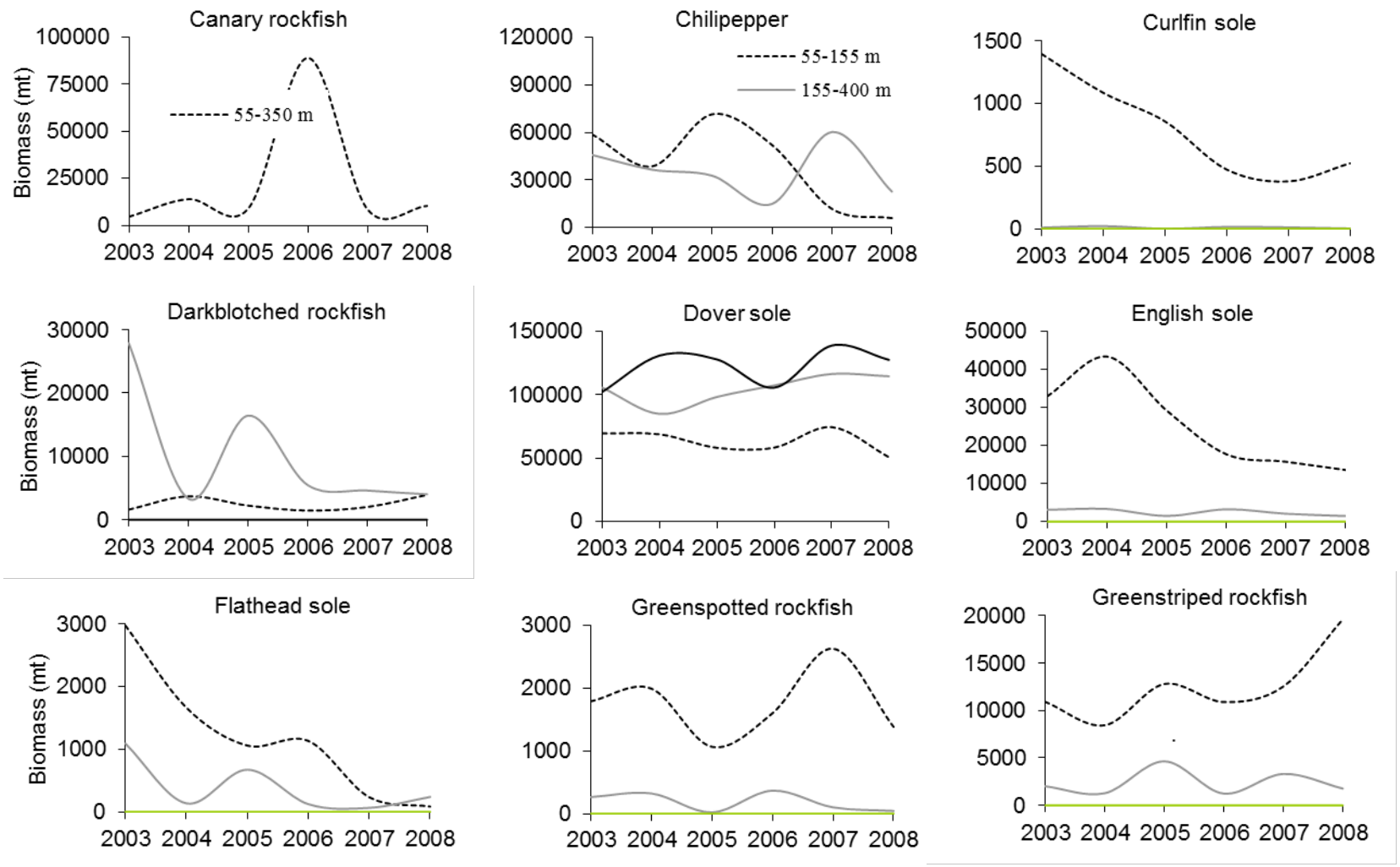


Figure 157. Species specific biomass (mt) by year for 9 of 46 FMP species. Except for canary rockfish and chilipepper, indicated above, the dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

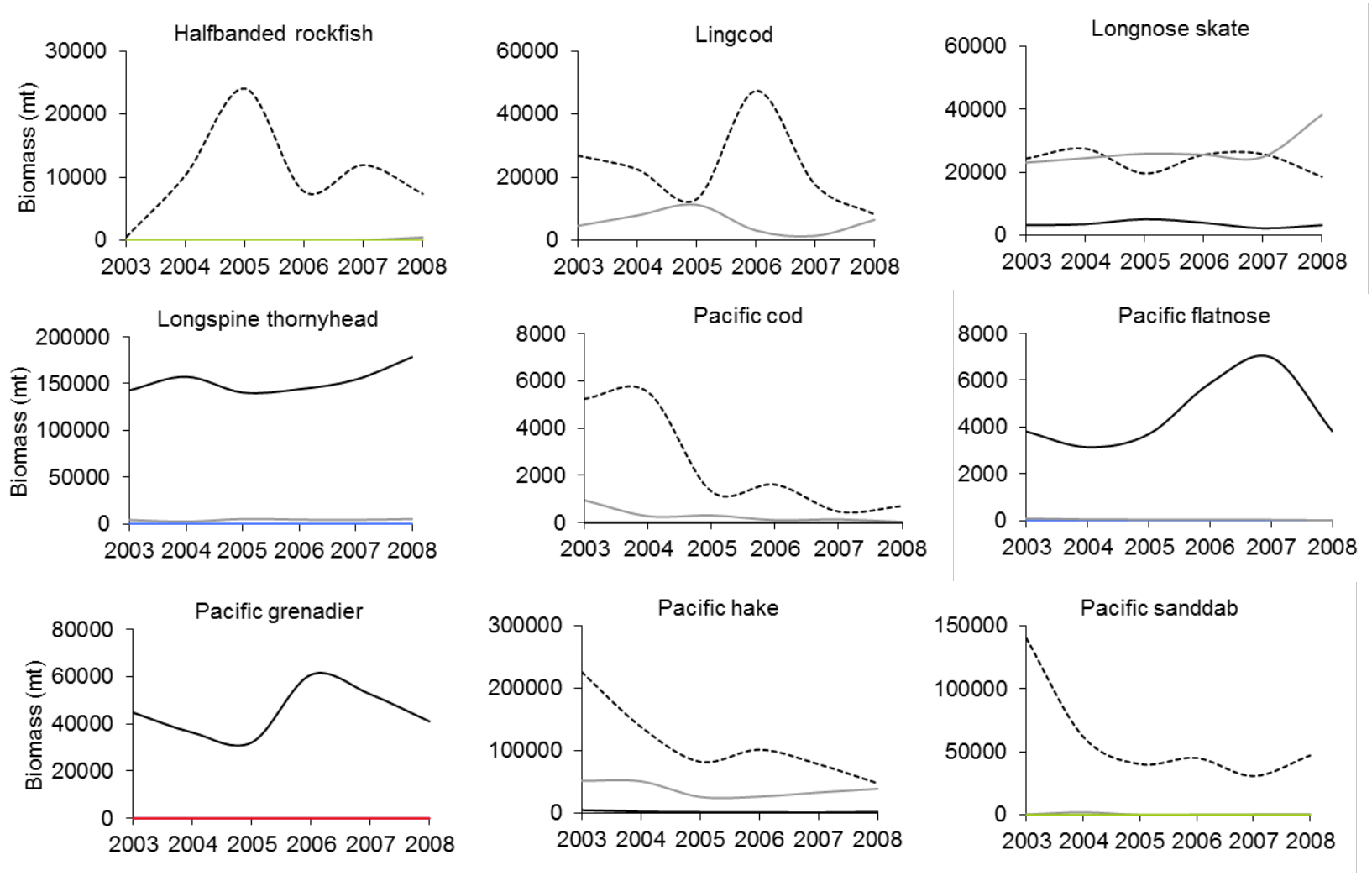


Figure 158. Species specific biomass (mt) by year for 9 of 46 FMP species. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

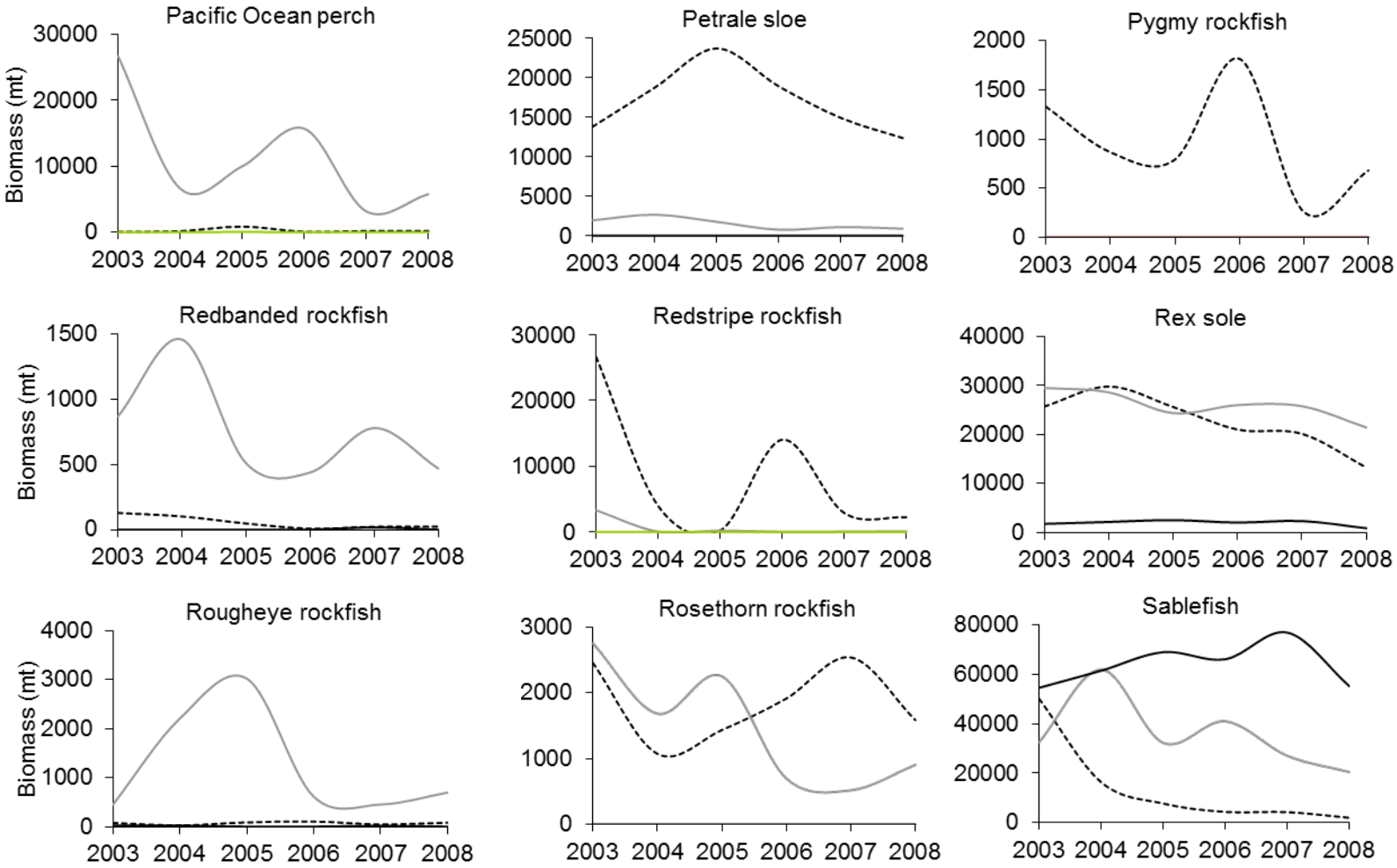


Figure 159. Species specific biomass (mt) by year for 9 of 46 FMP species. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

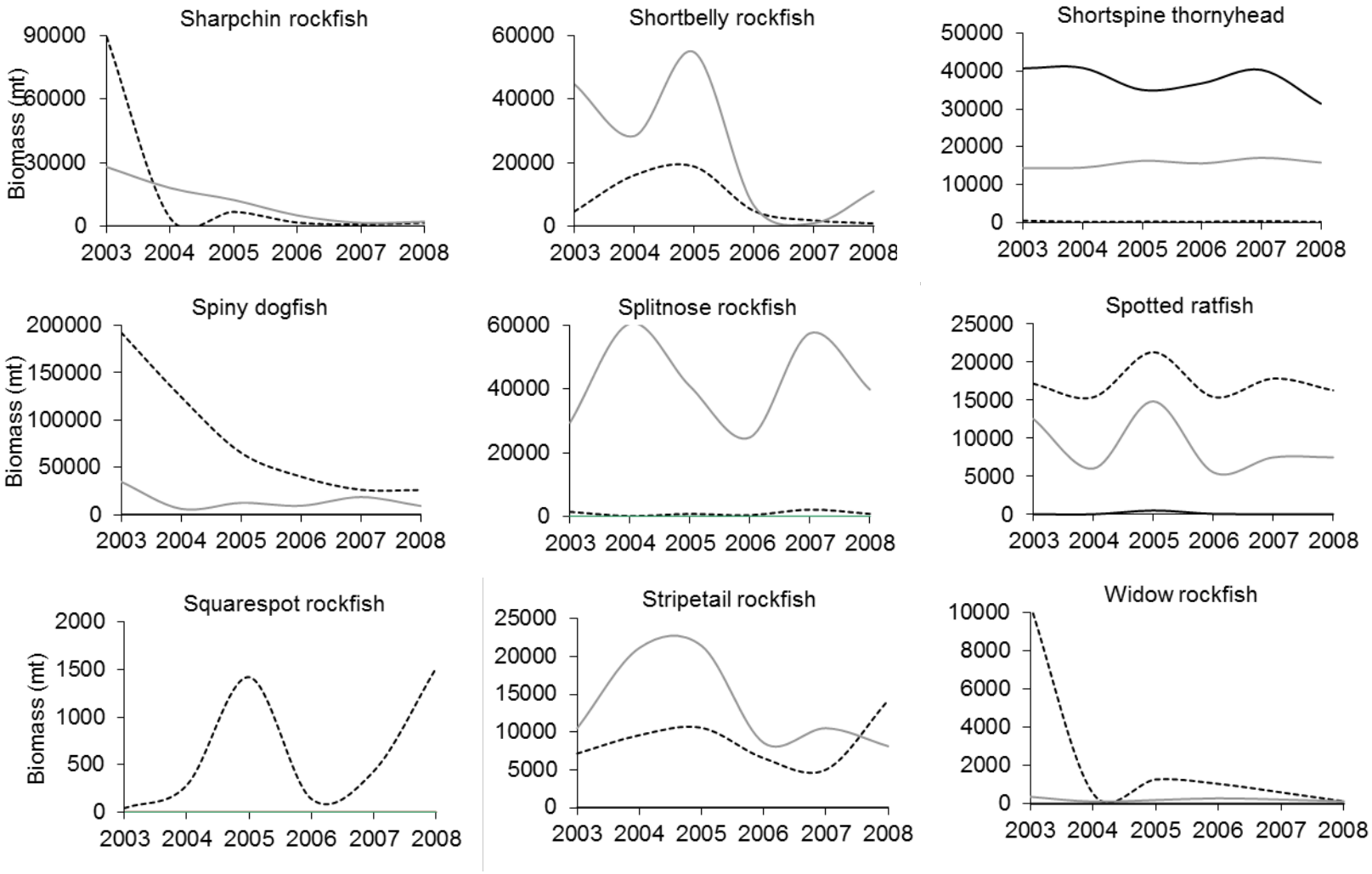


Figure 160. Species specific biomass (mt) by year for 9 of 46 FMP species. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

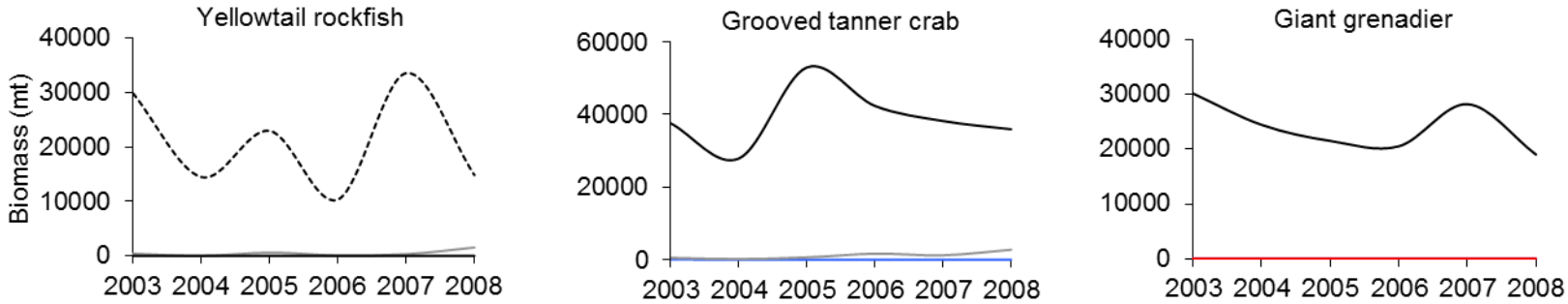


Figure 161. Species specific biomass (mt) by year for 1 of 46 FMP species plus grooved tanner crab and giant grenadier. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

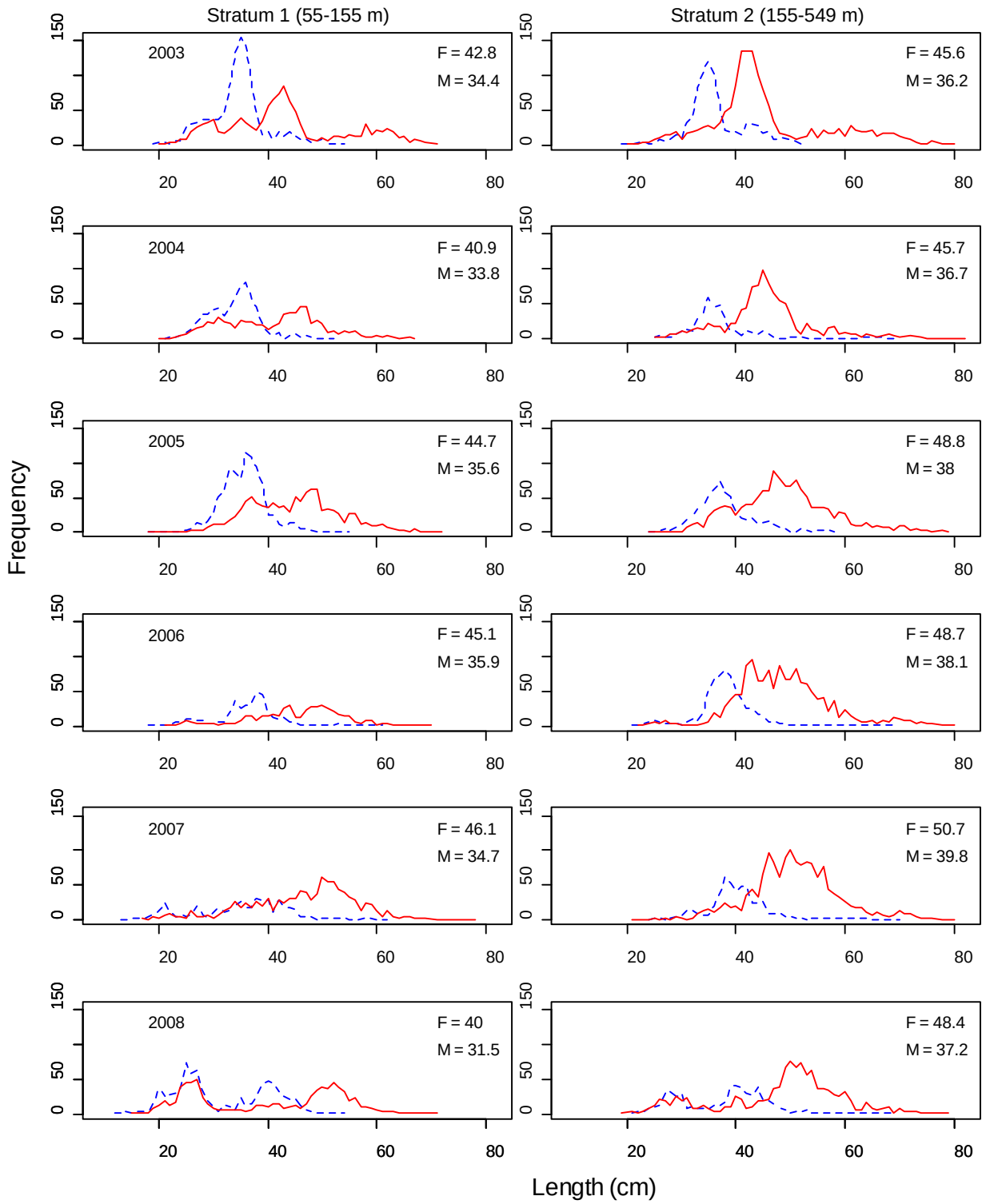


Figure 162. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for arrowtooth flounder from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

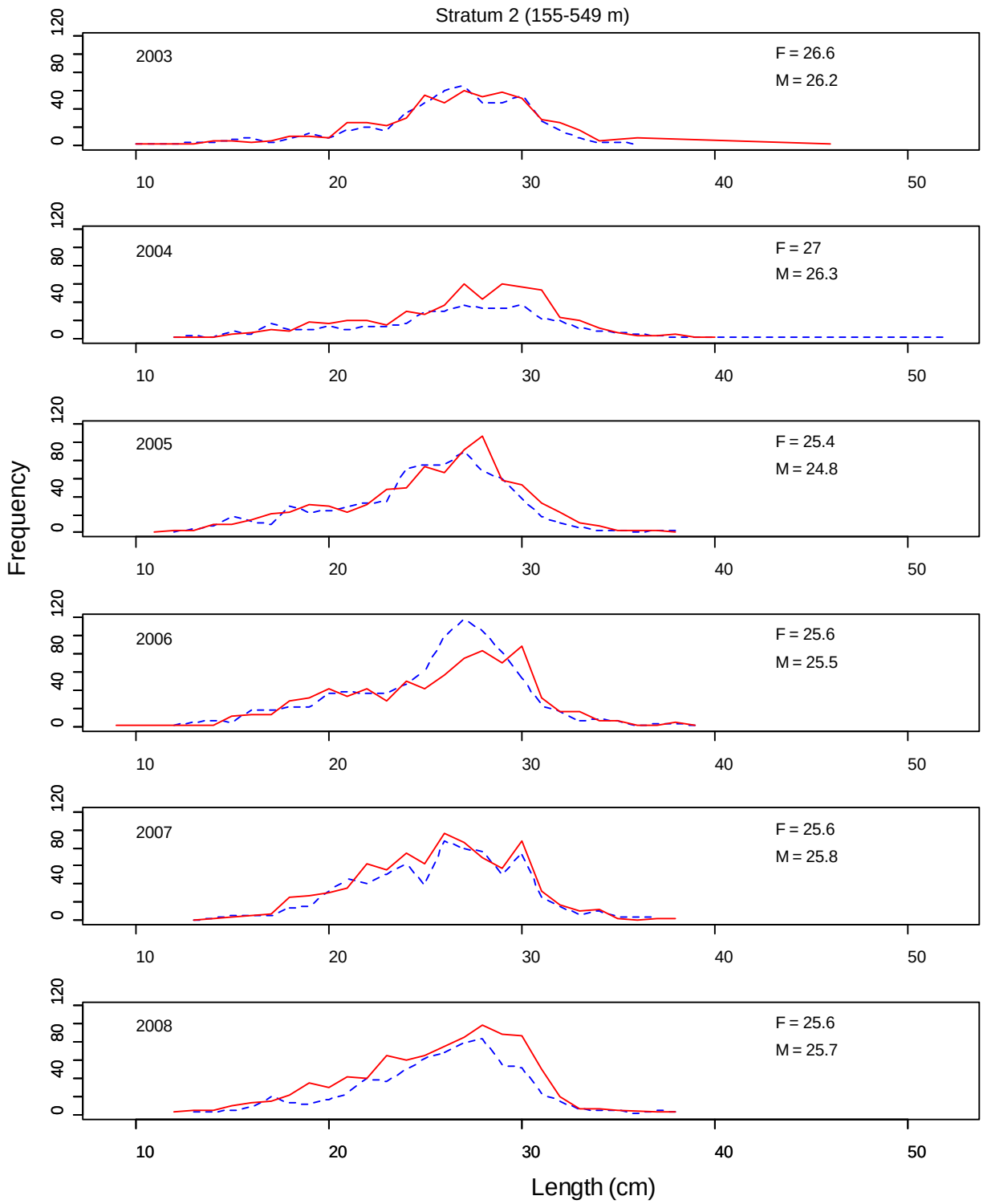


Figure 163. Frequency of lengths by gender in stratum 2 for aurora rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

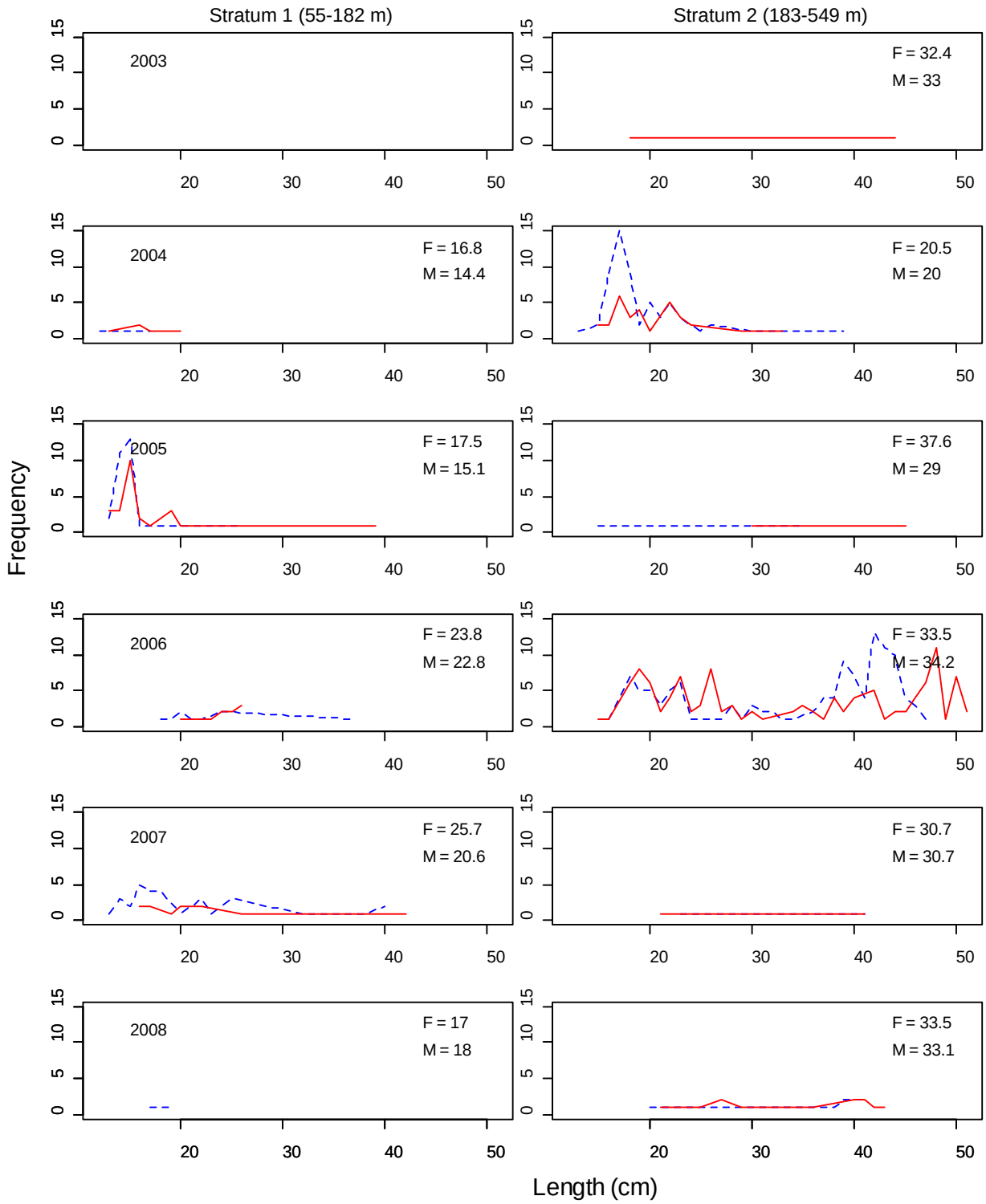


Figure 164. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for bank rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

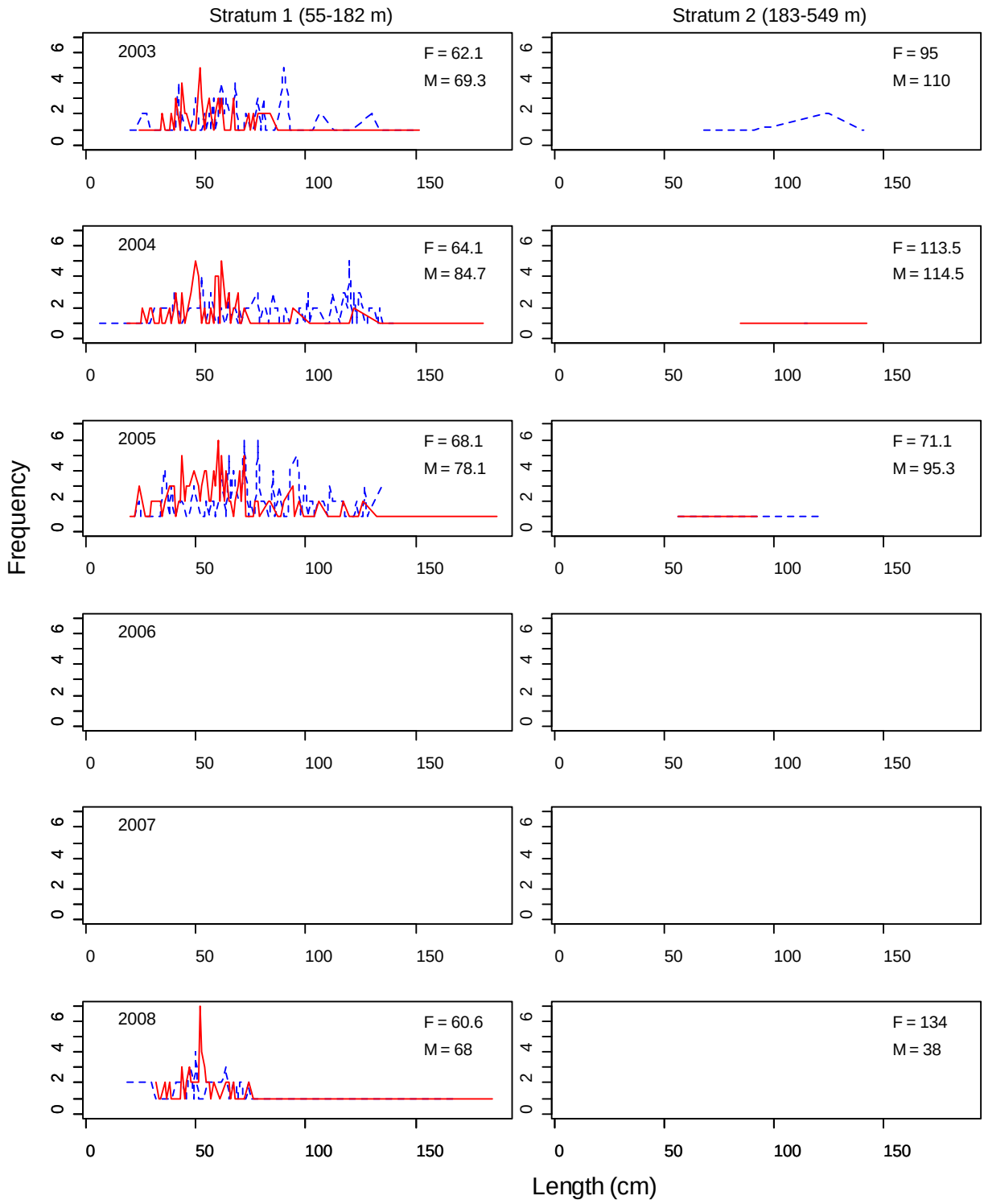


Figure 165. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for big skate from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

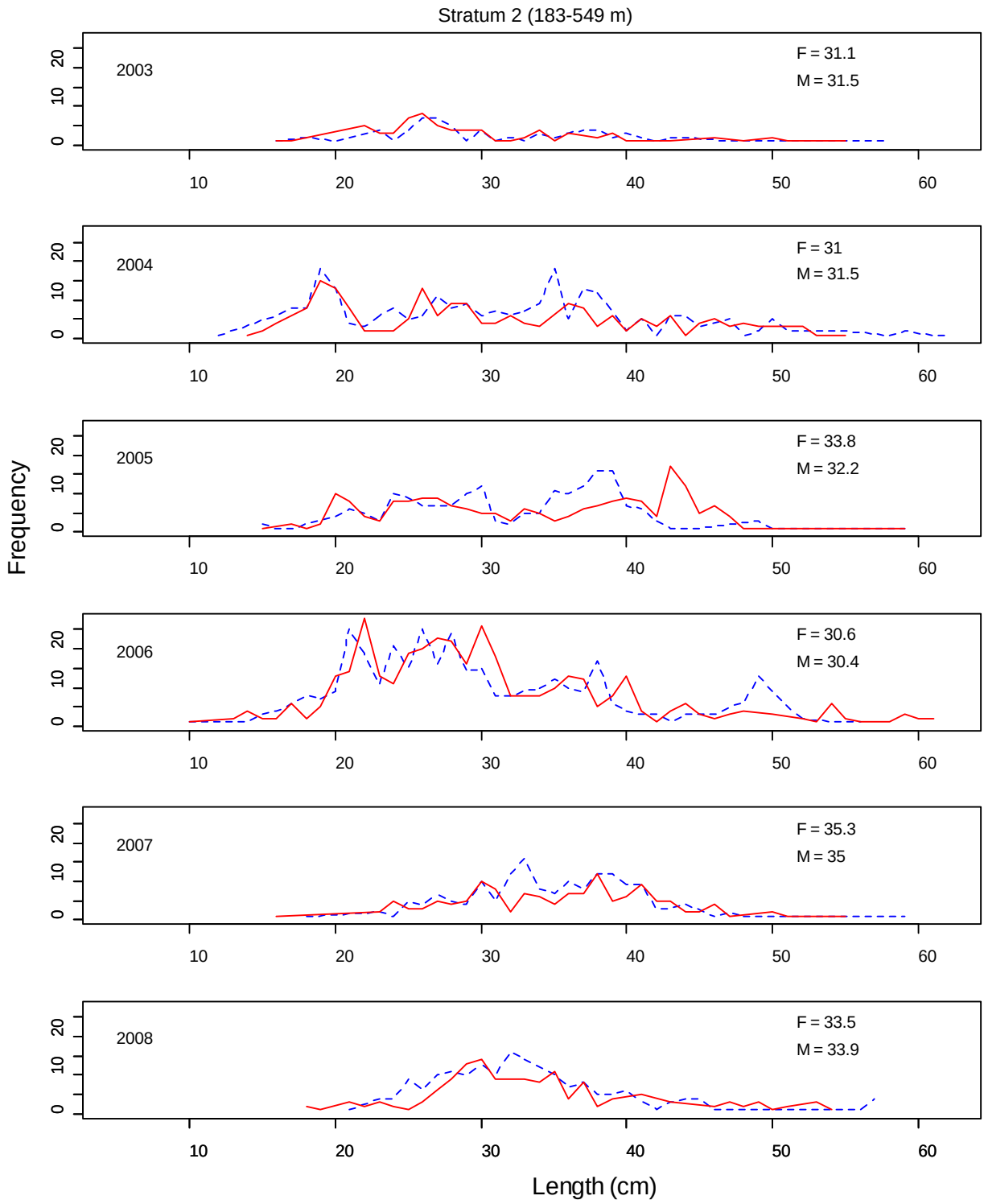


Figure 166. Frequency of lengths by gender in stratum 2 for blackgill rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

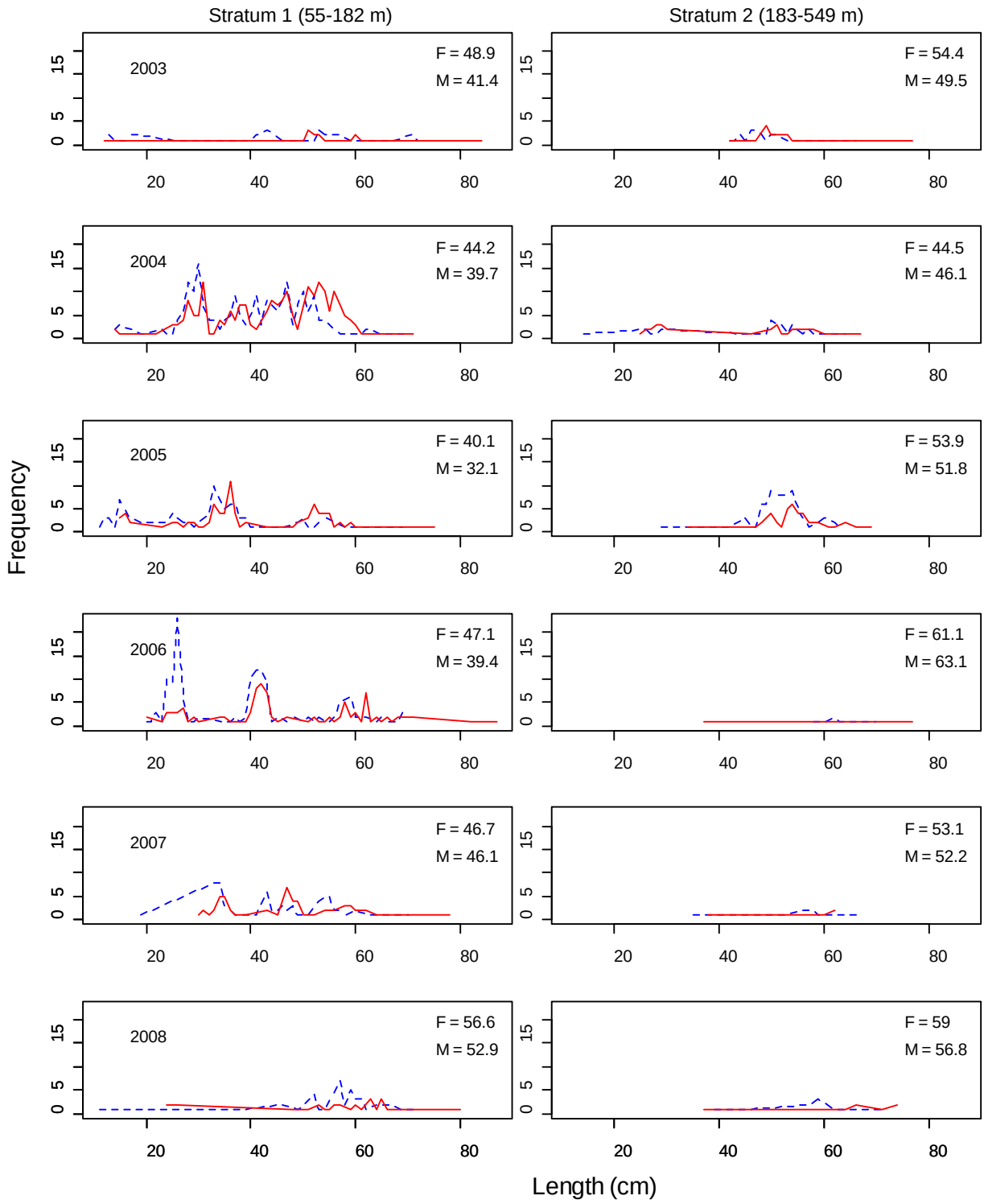


Figure 167. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for bocaccio from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

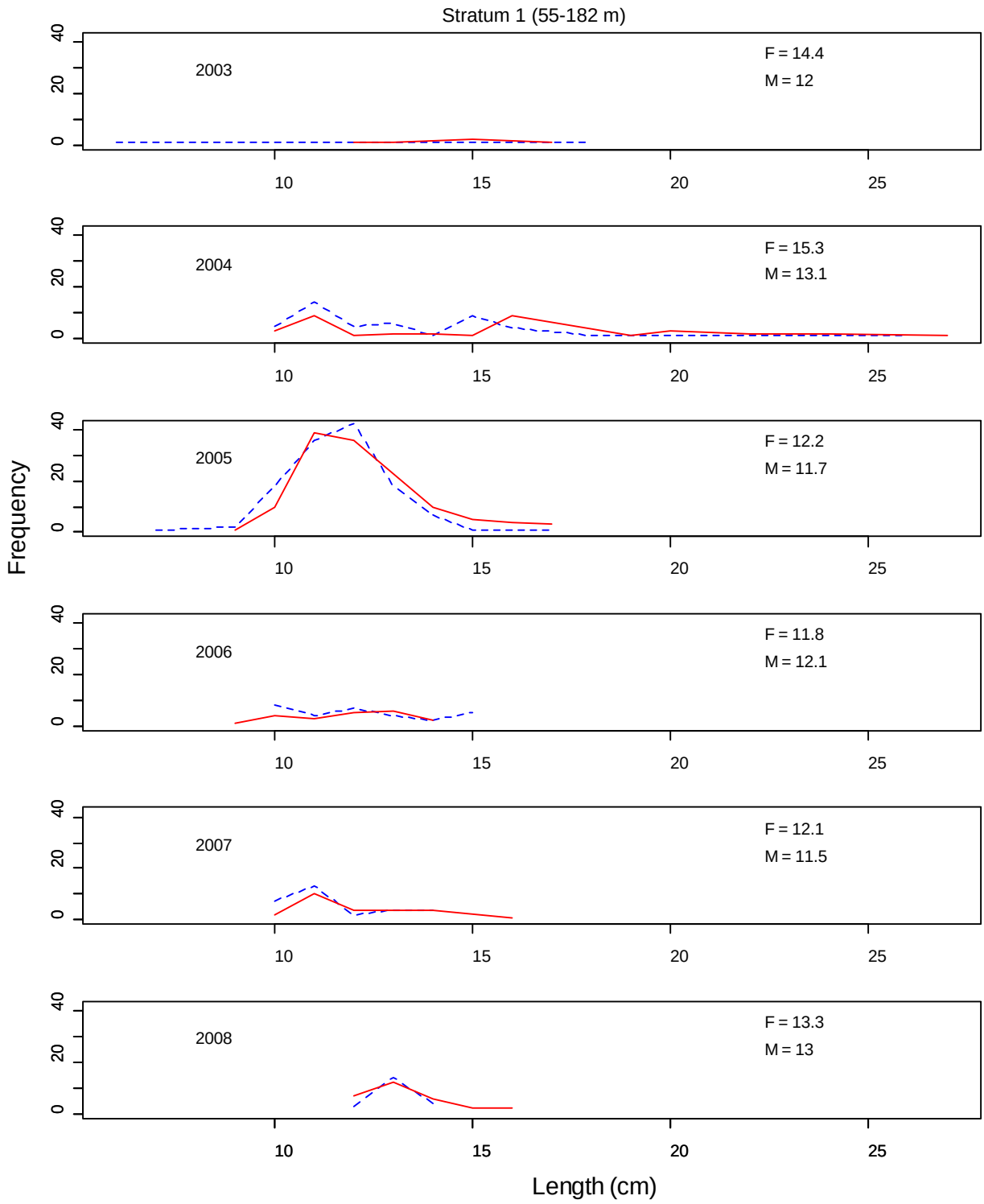


Figure 168. Frequency of lengths by gender in stratum 1 for calico rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

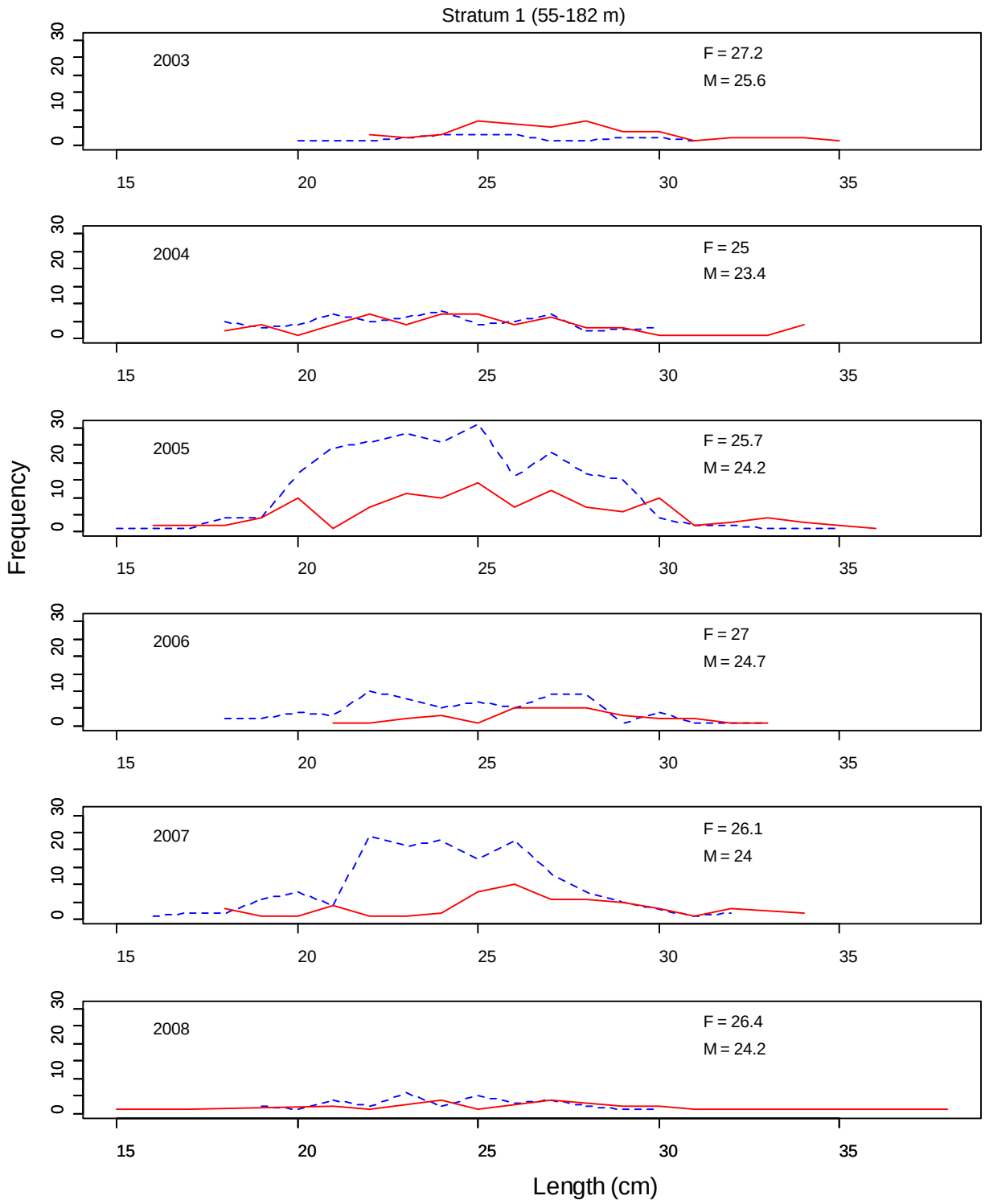


Figure 169. Frequency of lengths by gender in stratum 1 for California scorpionfish from the 2003−2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

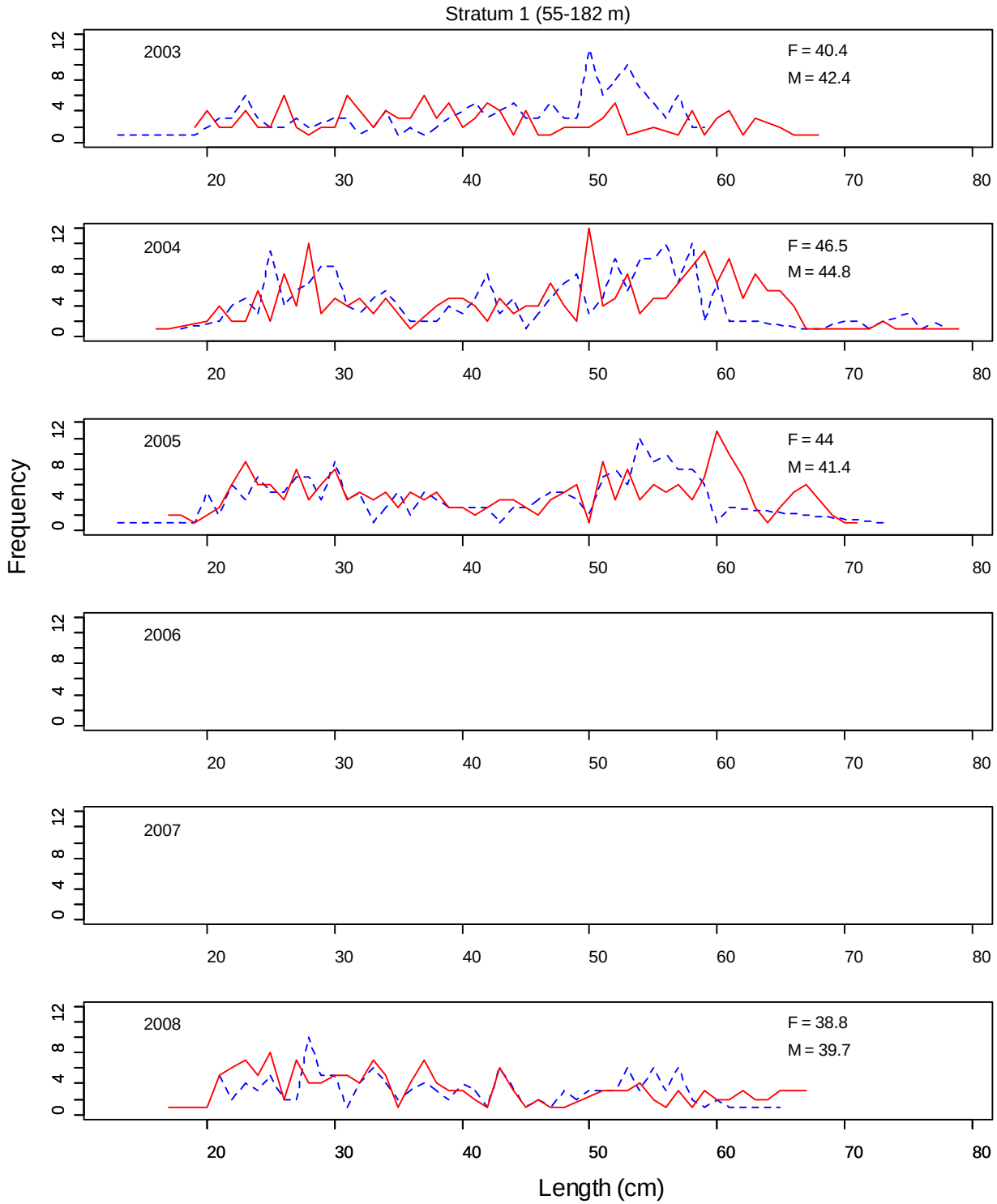


Figure 170. Frequency of lengths by gender in stratum 1 for California skate from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

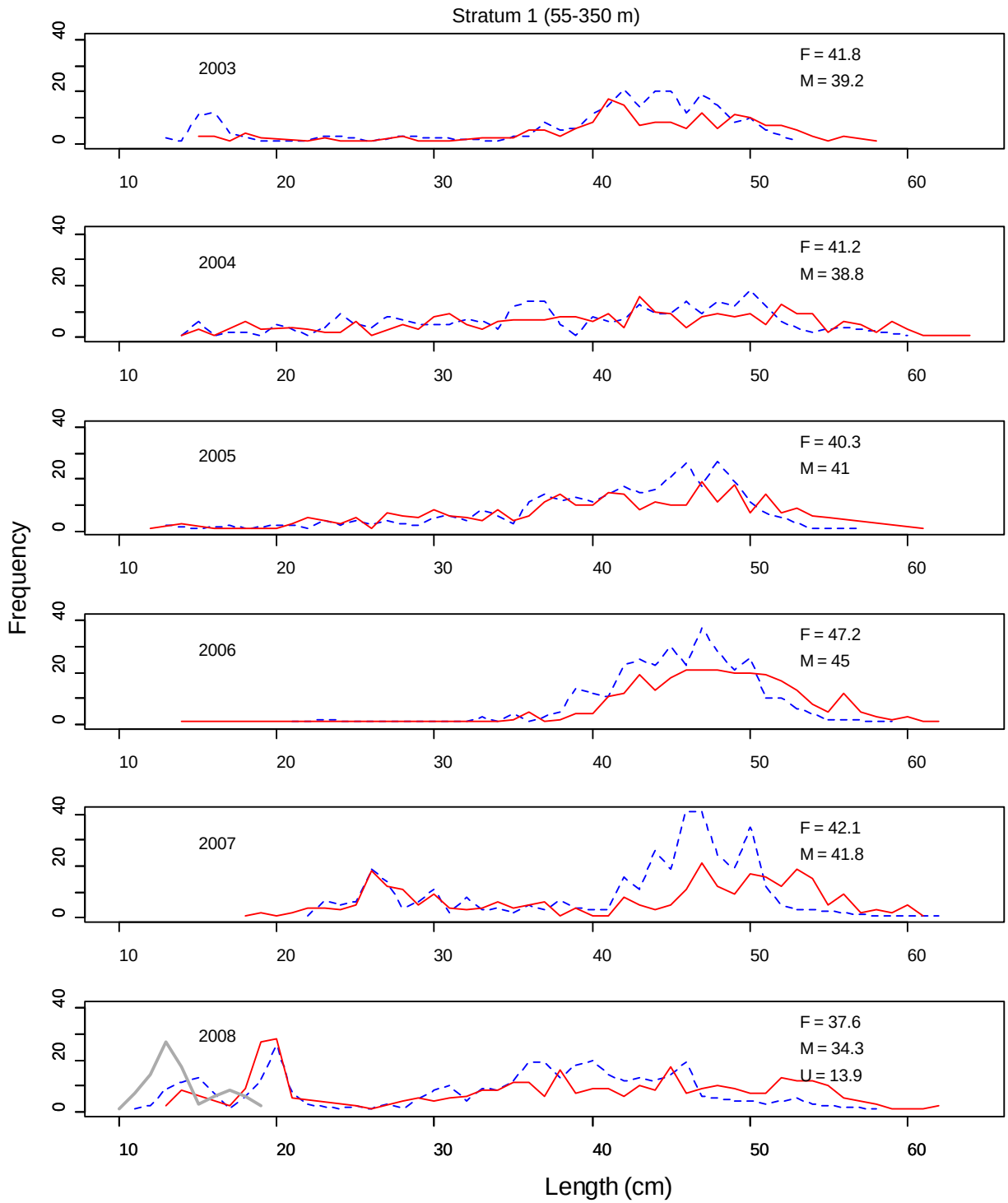


Figure 171. Frequency of lengths by gender in stratum 1 for canary rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U [unknown]) is displayed in each panel.

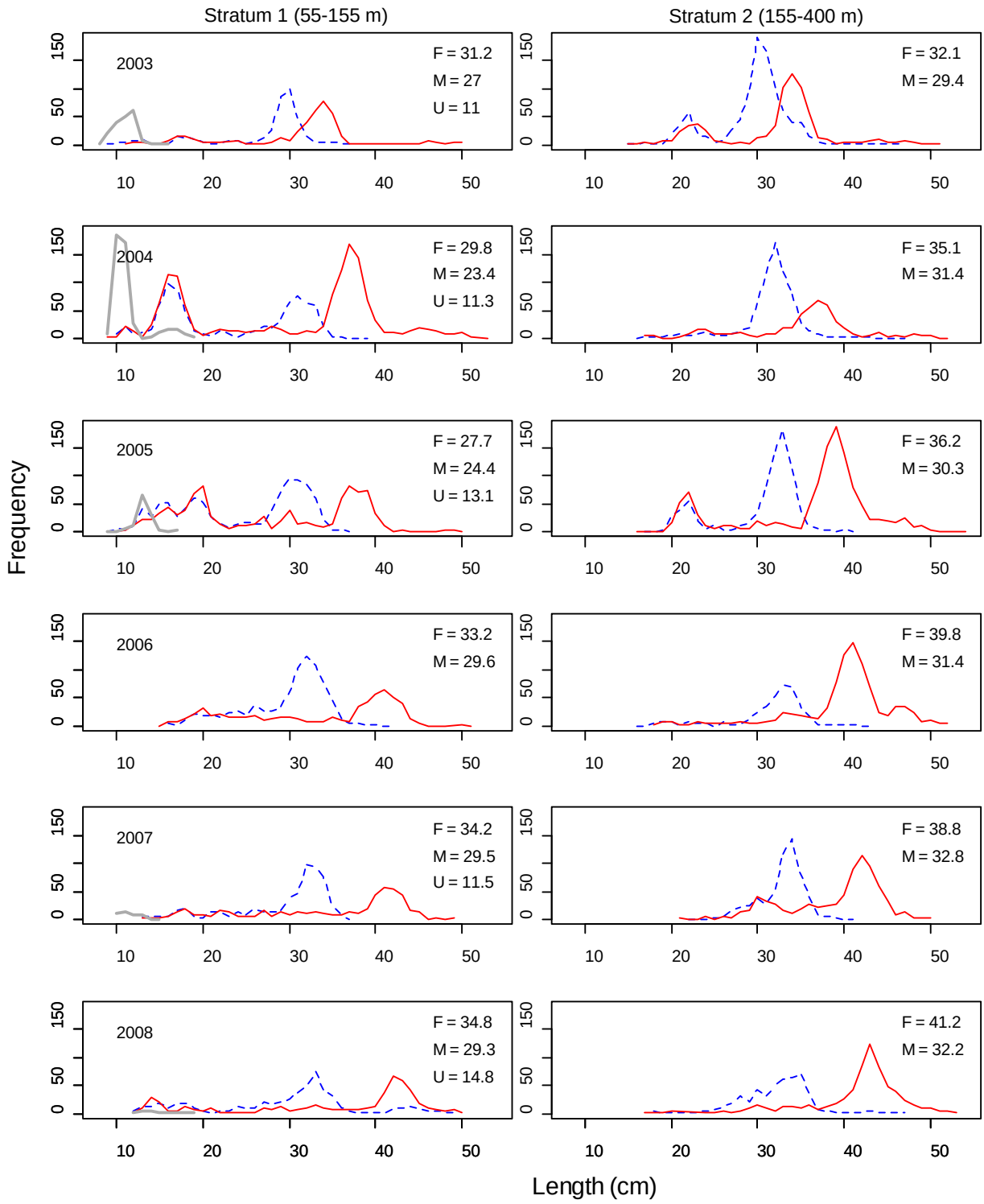


Figure 172. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for chilipepper rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

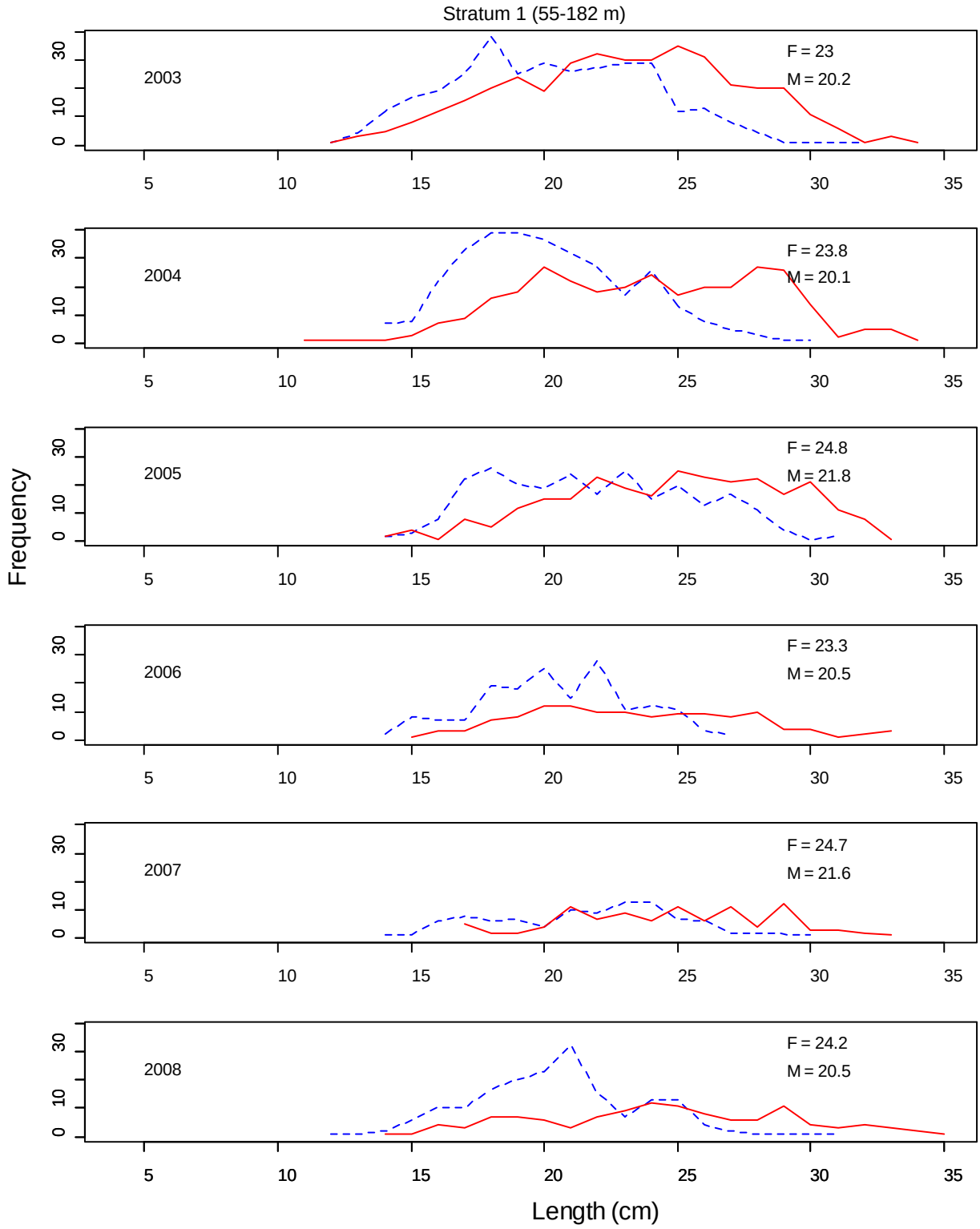


Figure 173. Frequency of lengths by gender in stratum 1 for curlfin sole from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

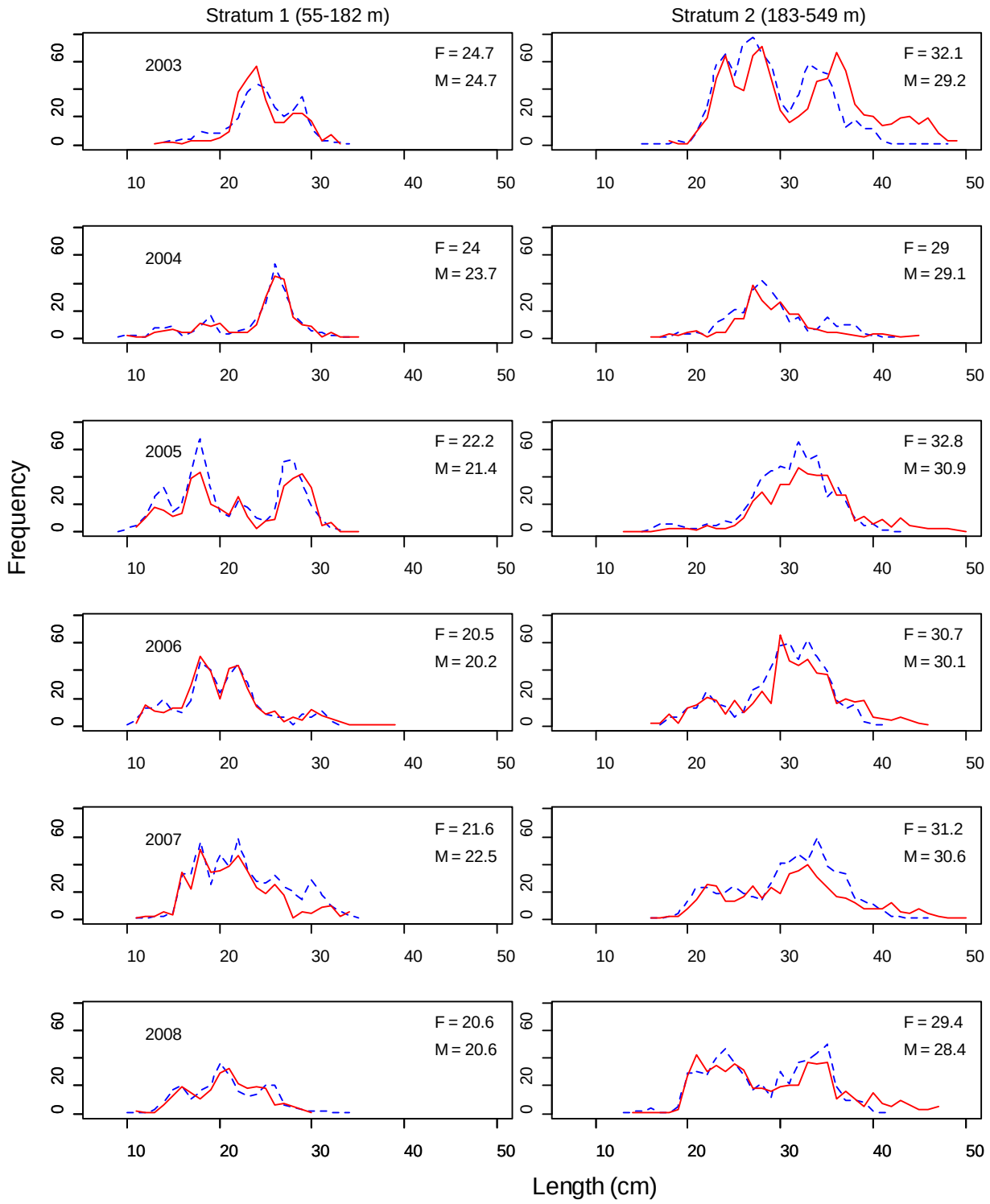


Figure 174. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for darkblotched rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

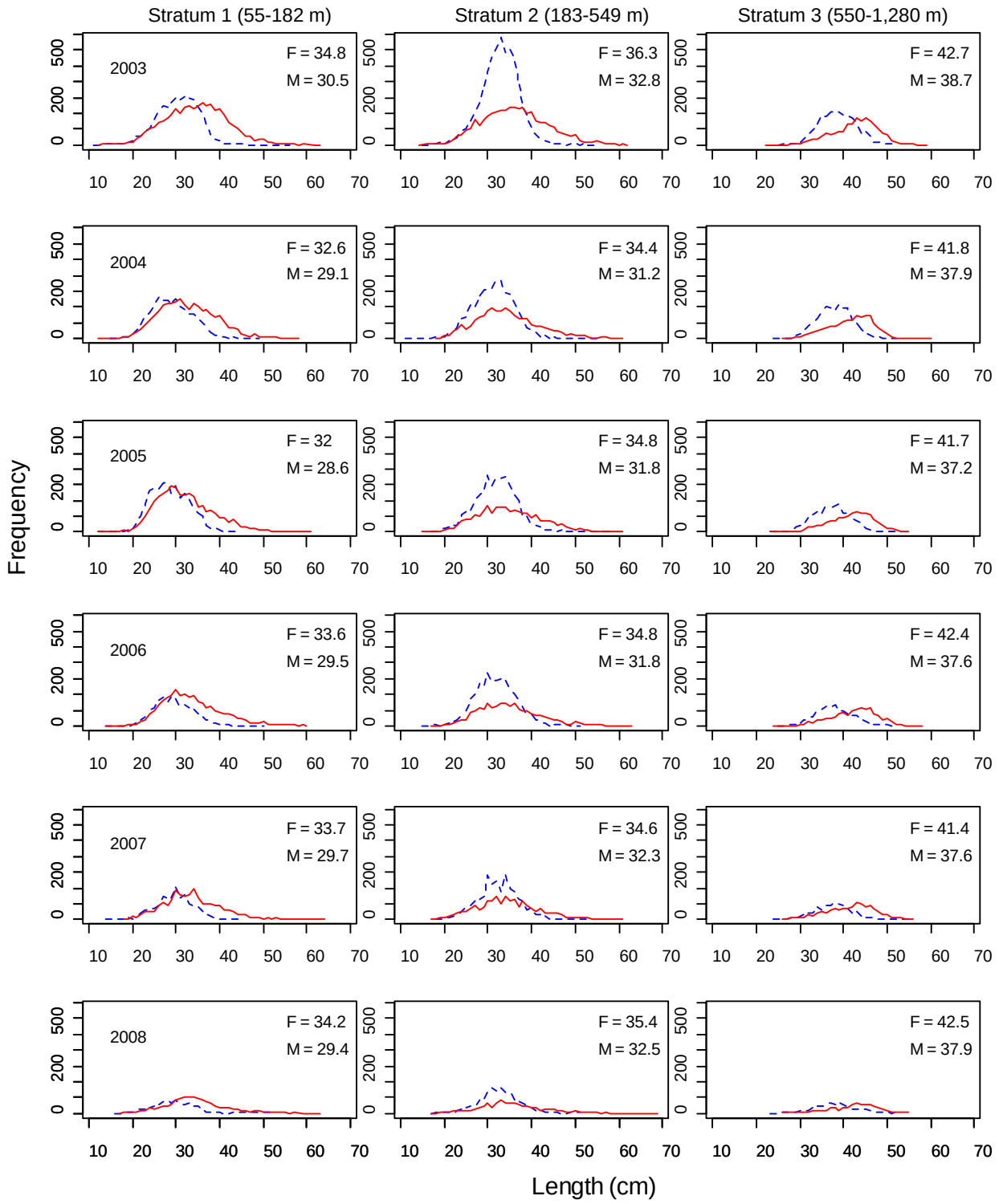


Figure 175. Frequency of lengths by gender in stratum 1 (left column), stratum 2 (middle column), and stratum 3 (right column) for Dover sole from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

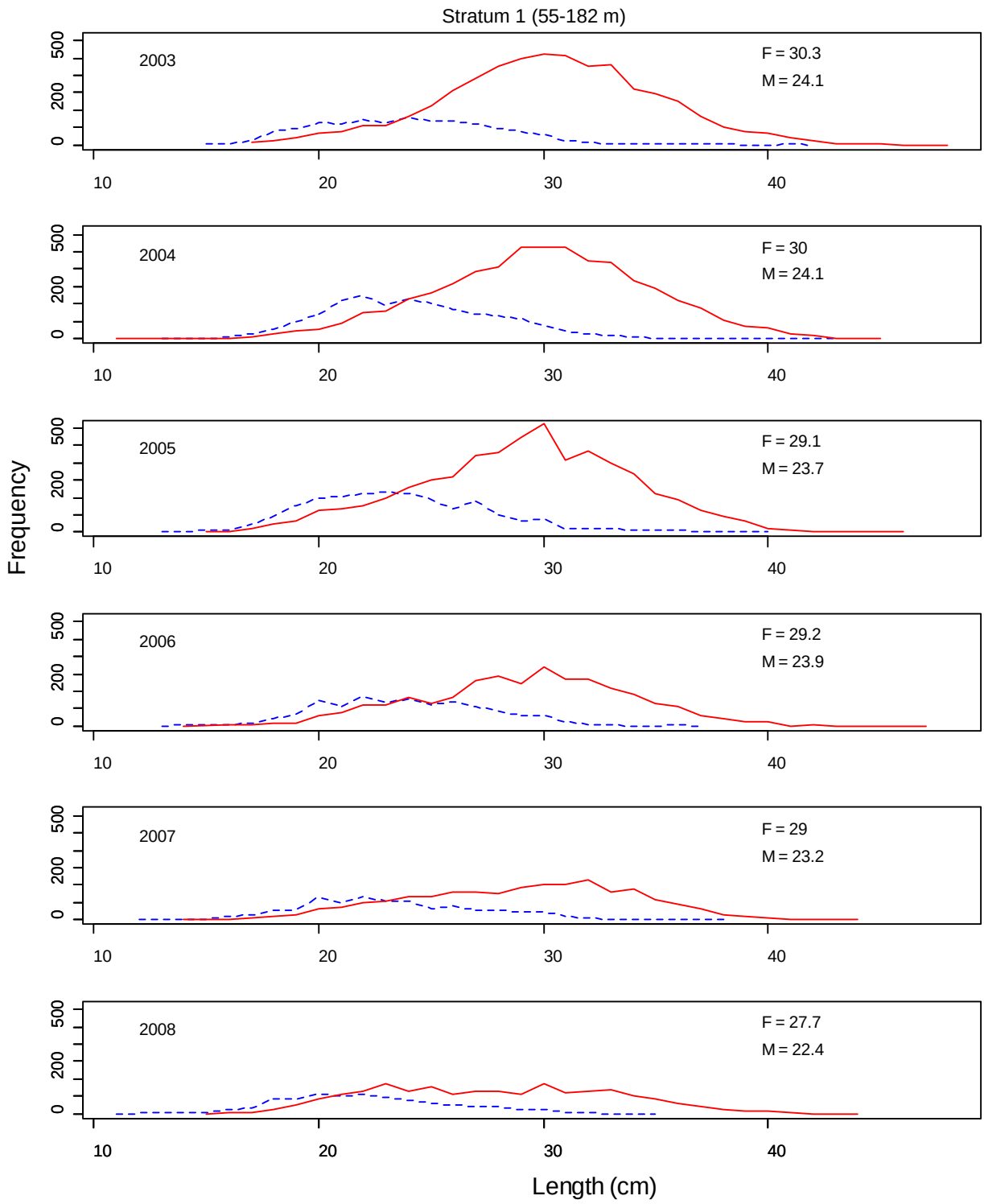


Figure 176. Frequency of lengths by gender in stratum 1 for English sole from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

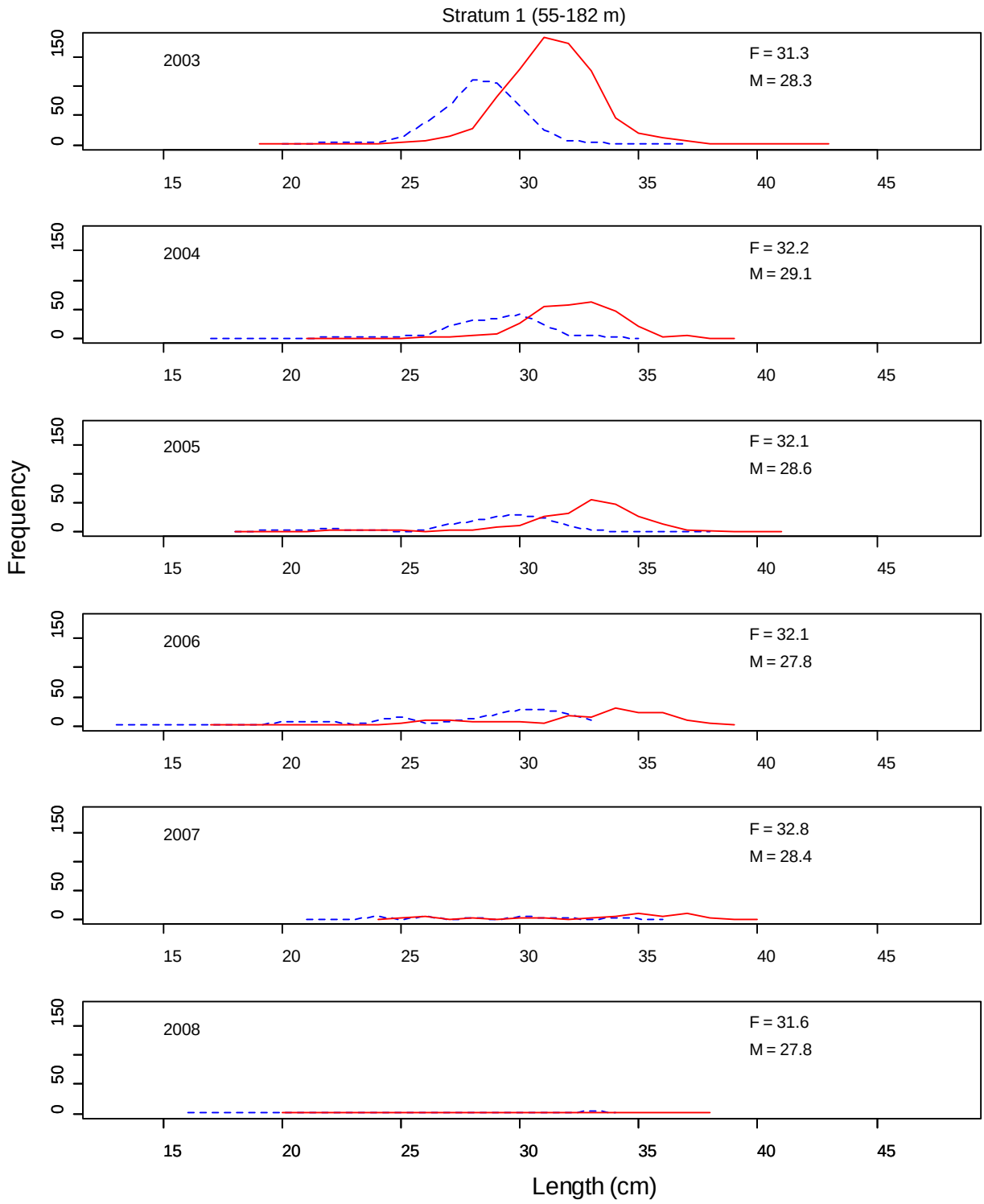


Figure 177. Frequency of lengths by gender in stratum 1 for flathead sole from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

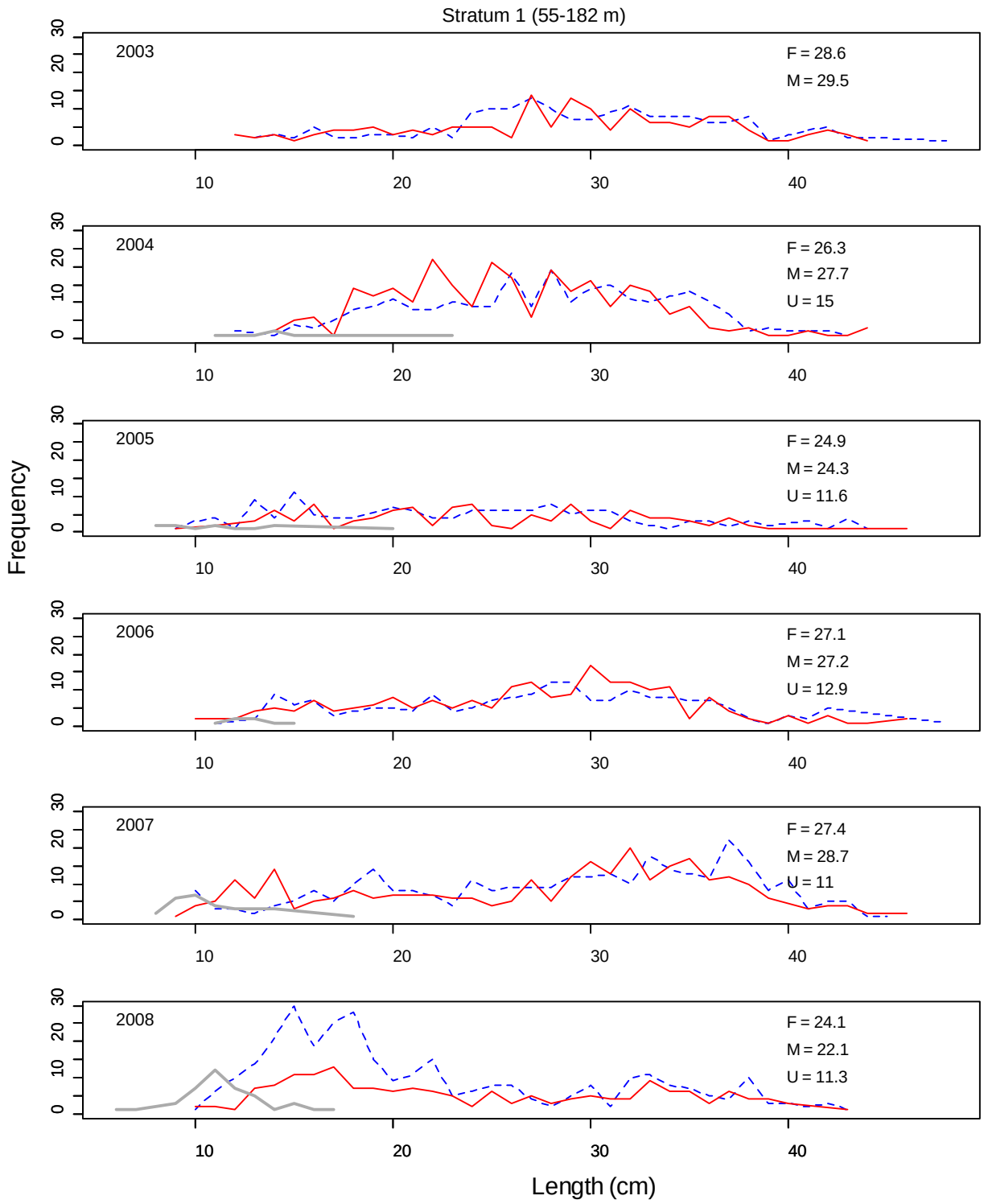


Figure 178. Frequency of lengths by gender in stratum 1 for greenspotted rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

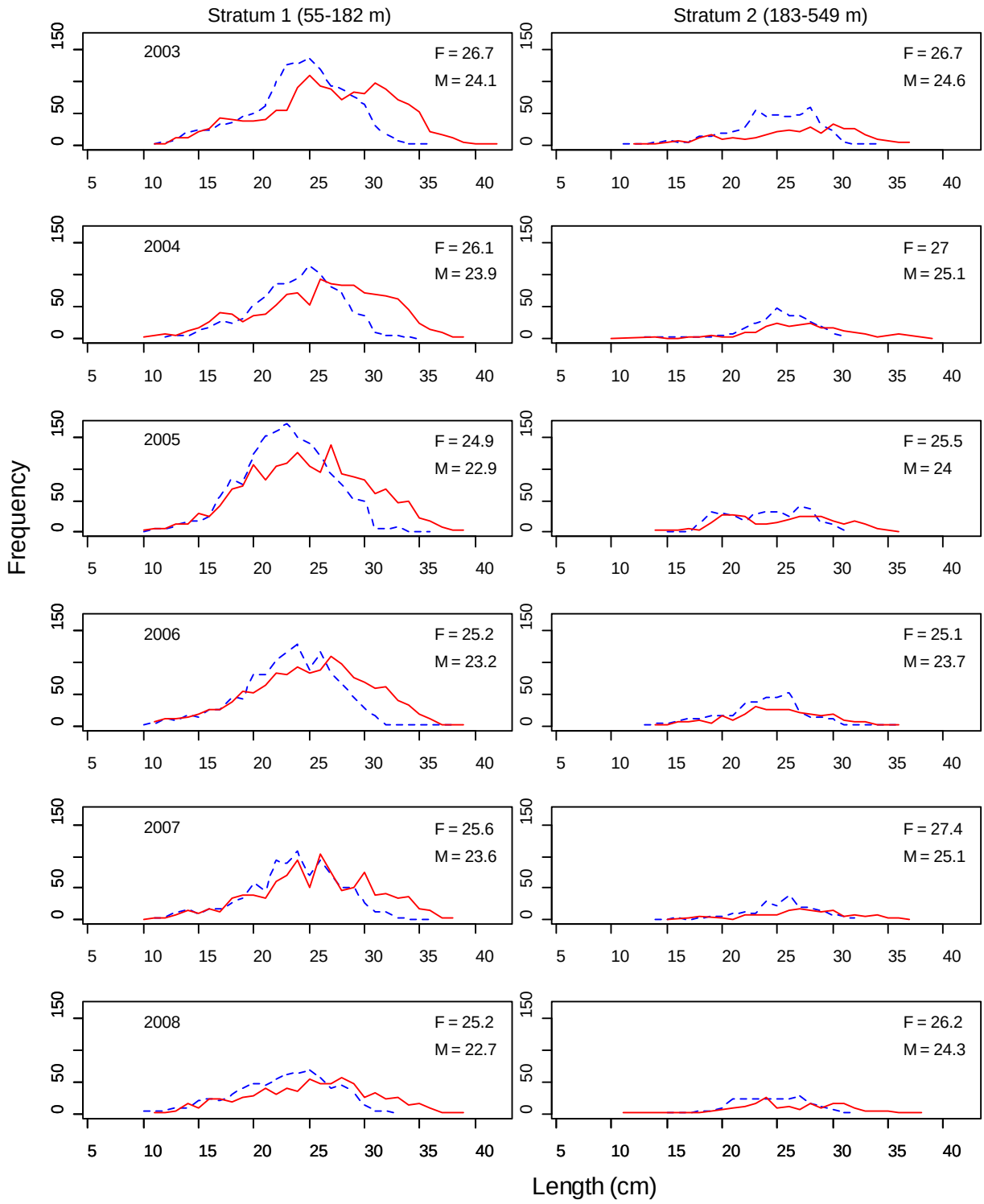


Figure 179. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for greenstriped rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

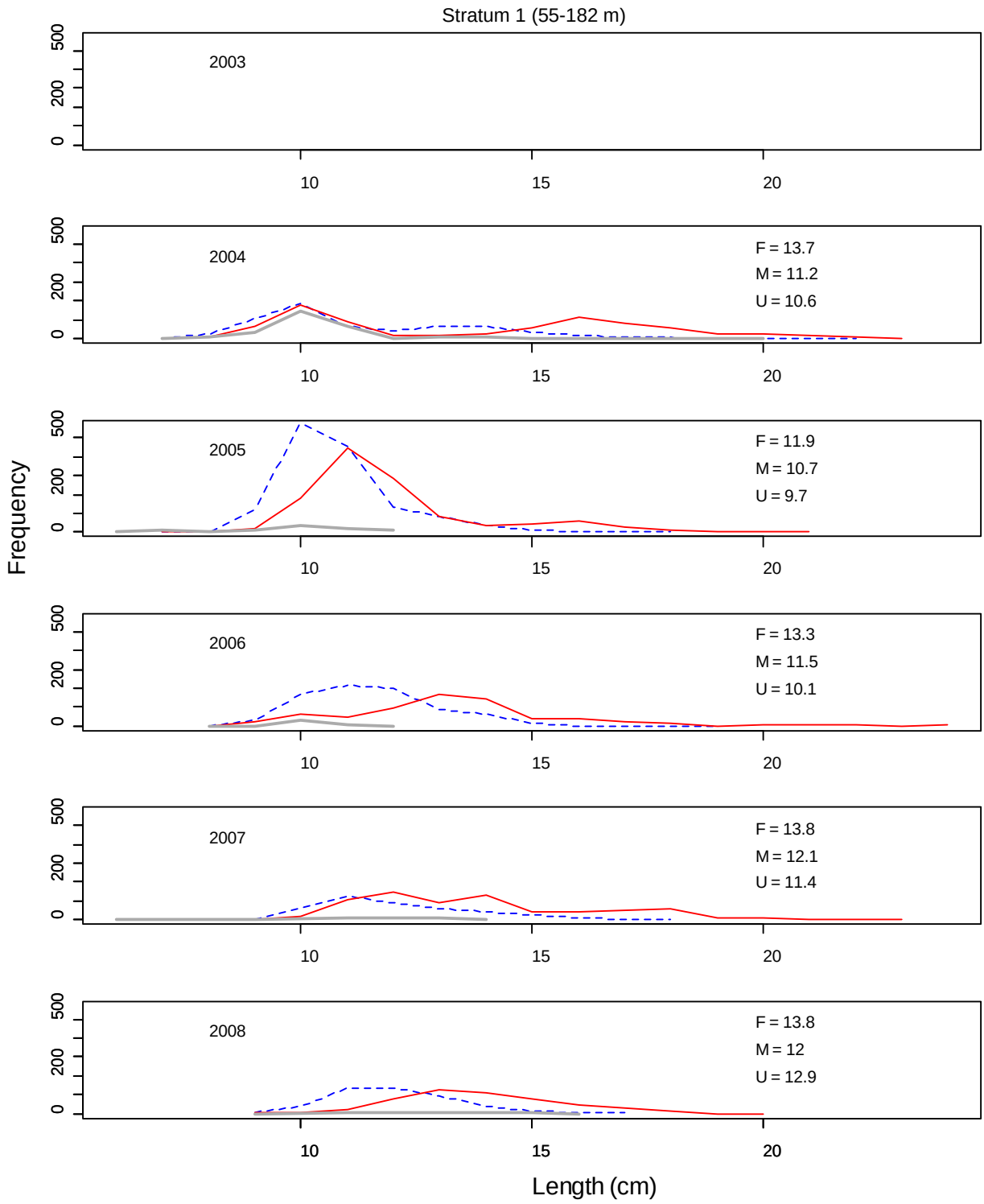


Figure 180. Frequency of lengths by gender in stratum 1 for halfbanded rockfish from the 2003–2008 surveys. Females are represented by a solid line; males by a dashed line; and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

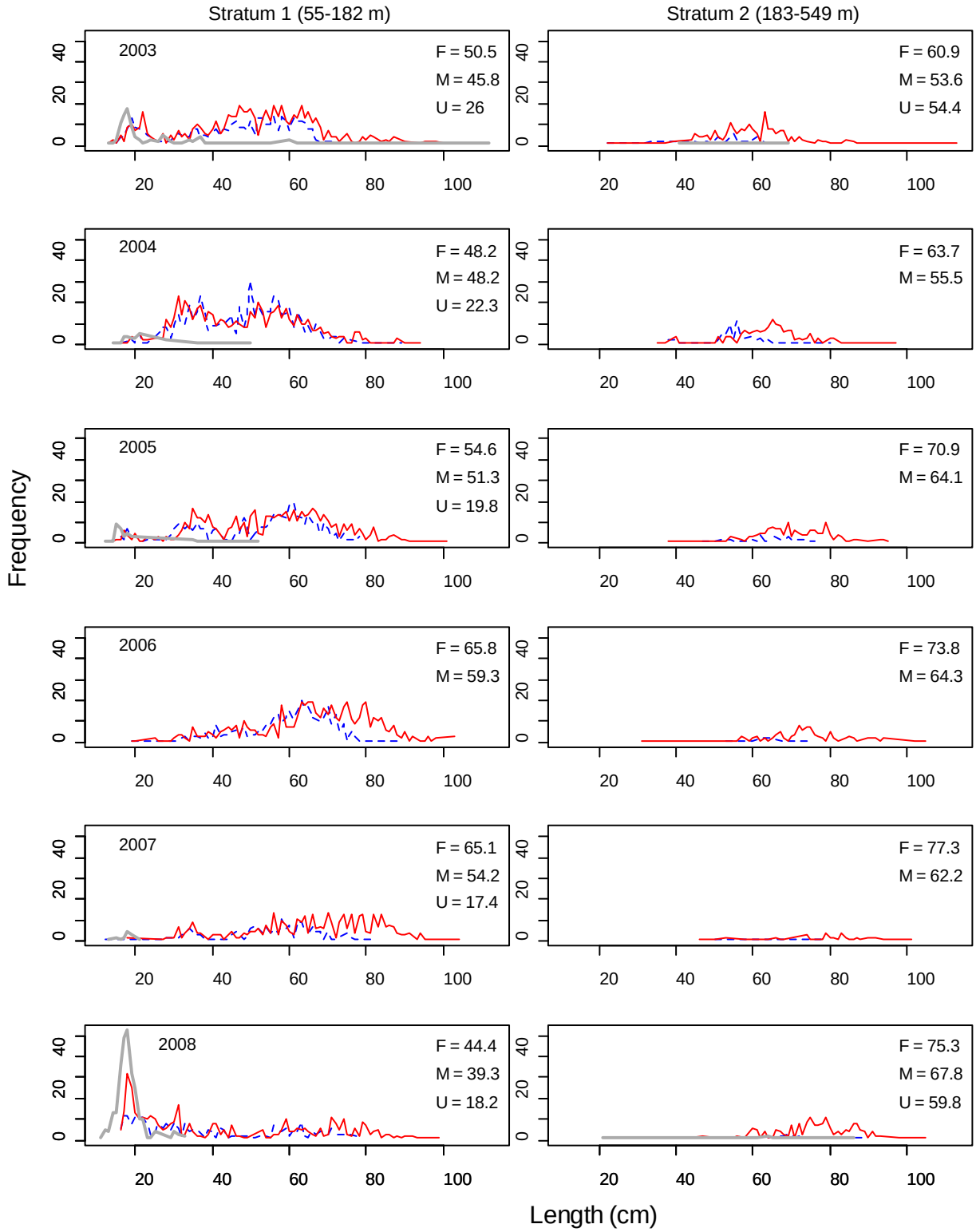


Figure 181. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for lingcod from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

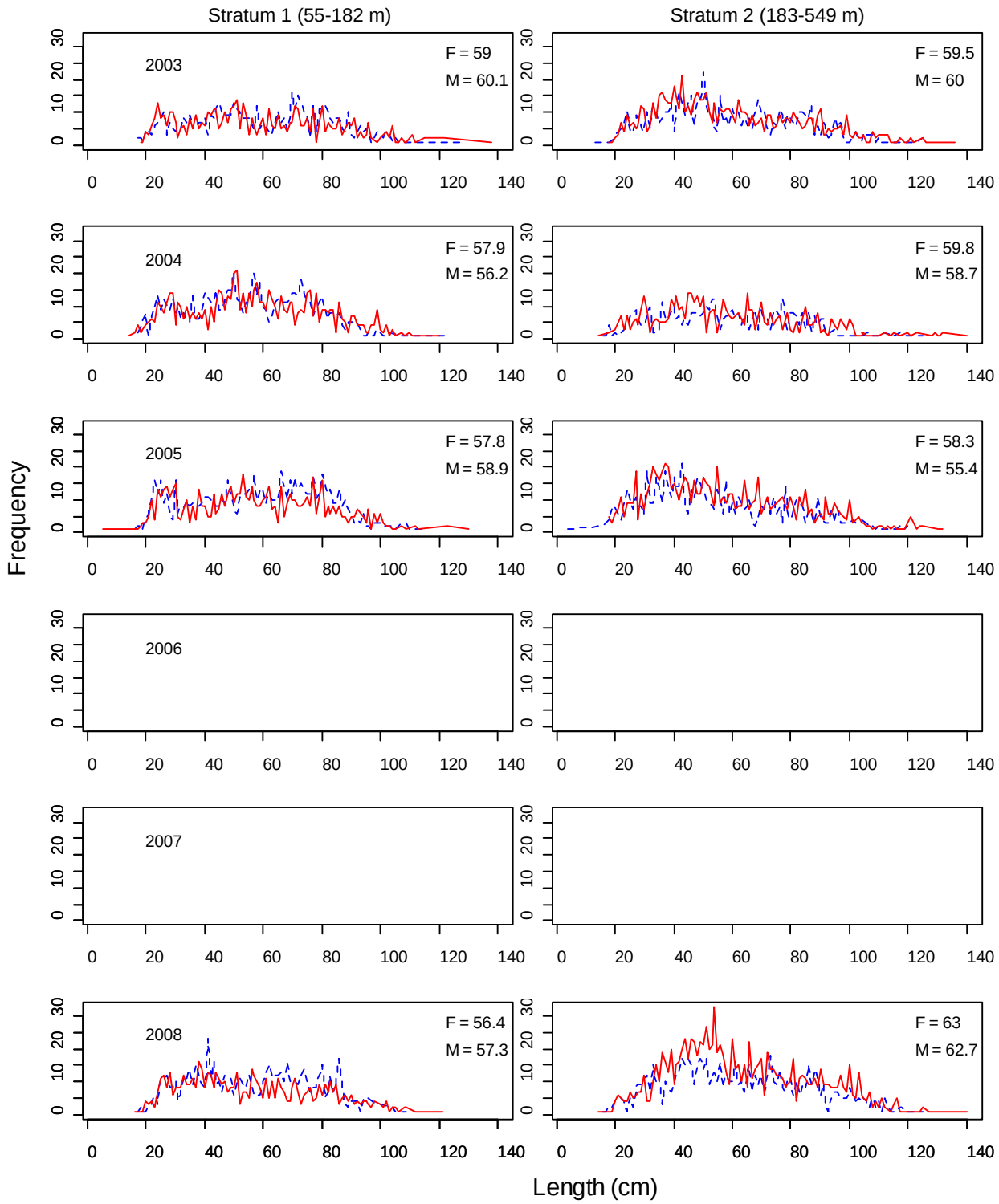


Figure 182. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for longnose skate from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

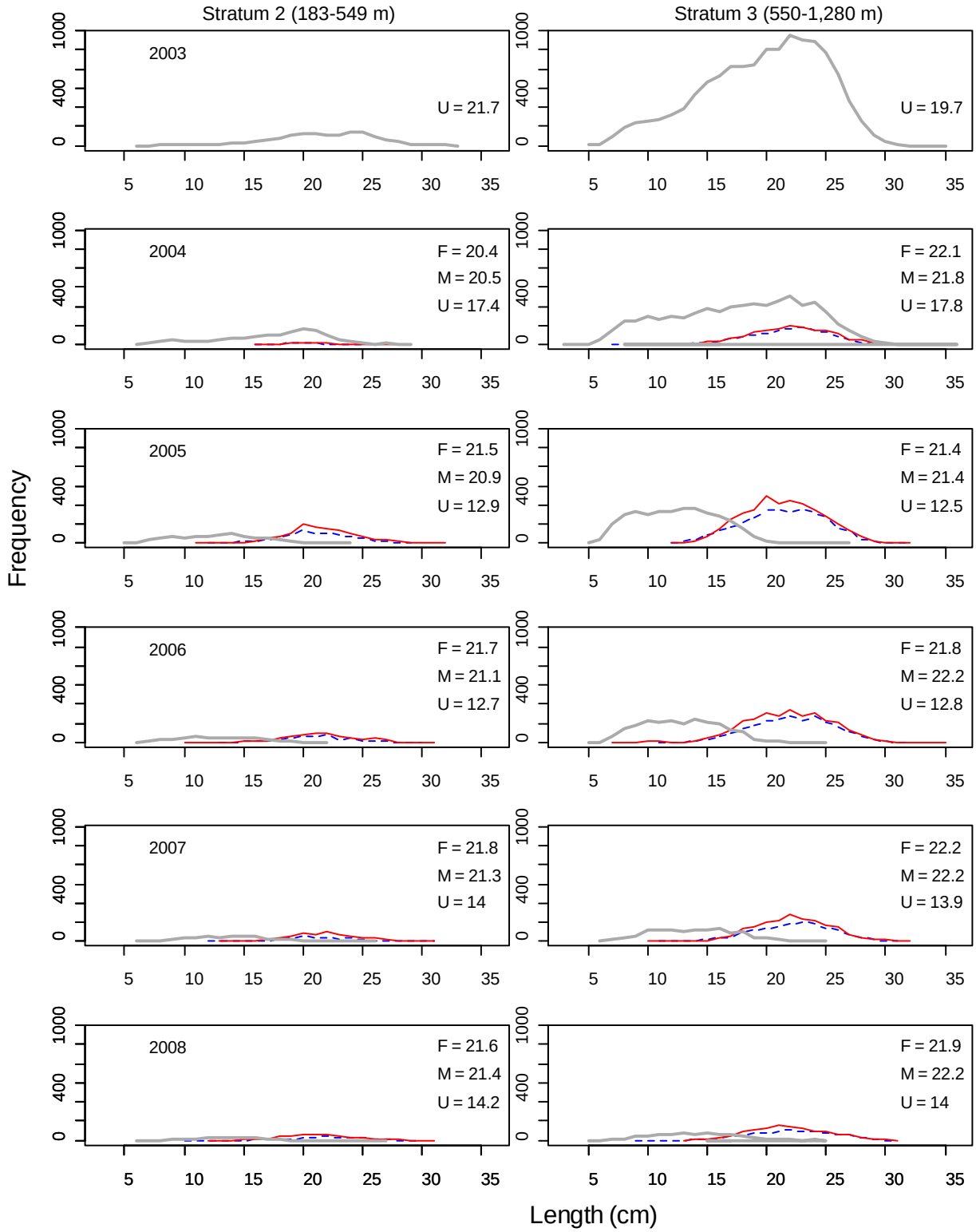


Figure 183. Frequency of lengths by gender in stratum 2 (left column) and stratum 3 (right column) for longspine thornyhead from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

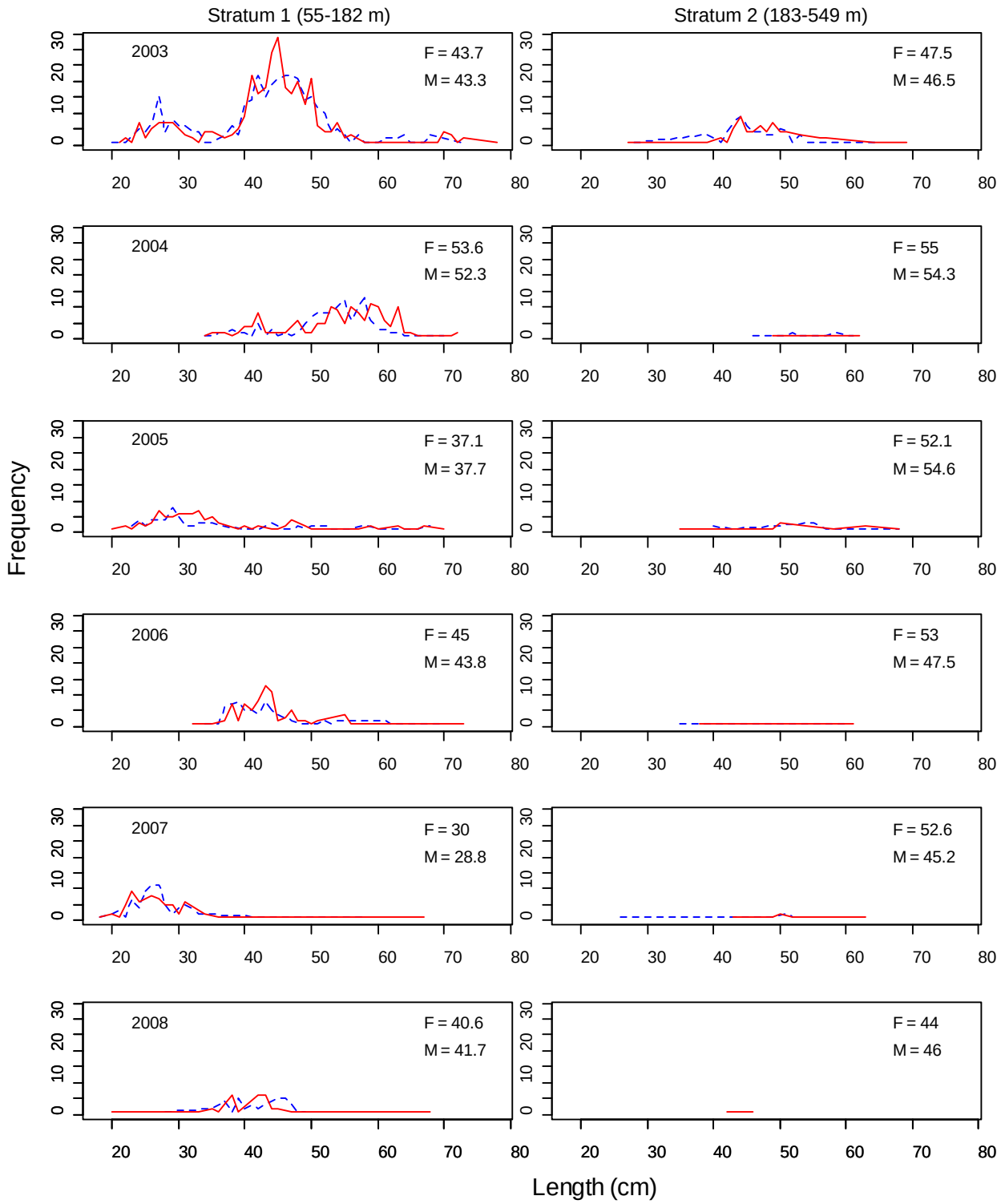


Figure 184. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for Pacific cod from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

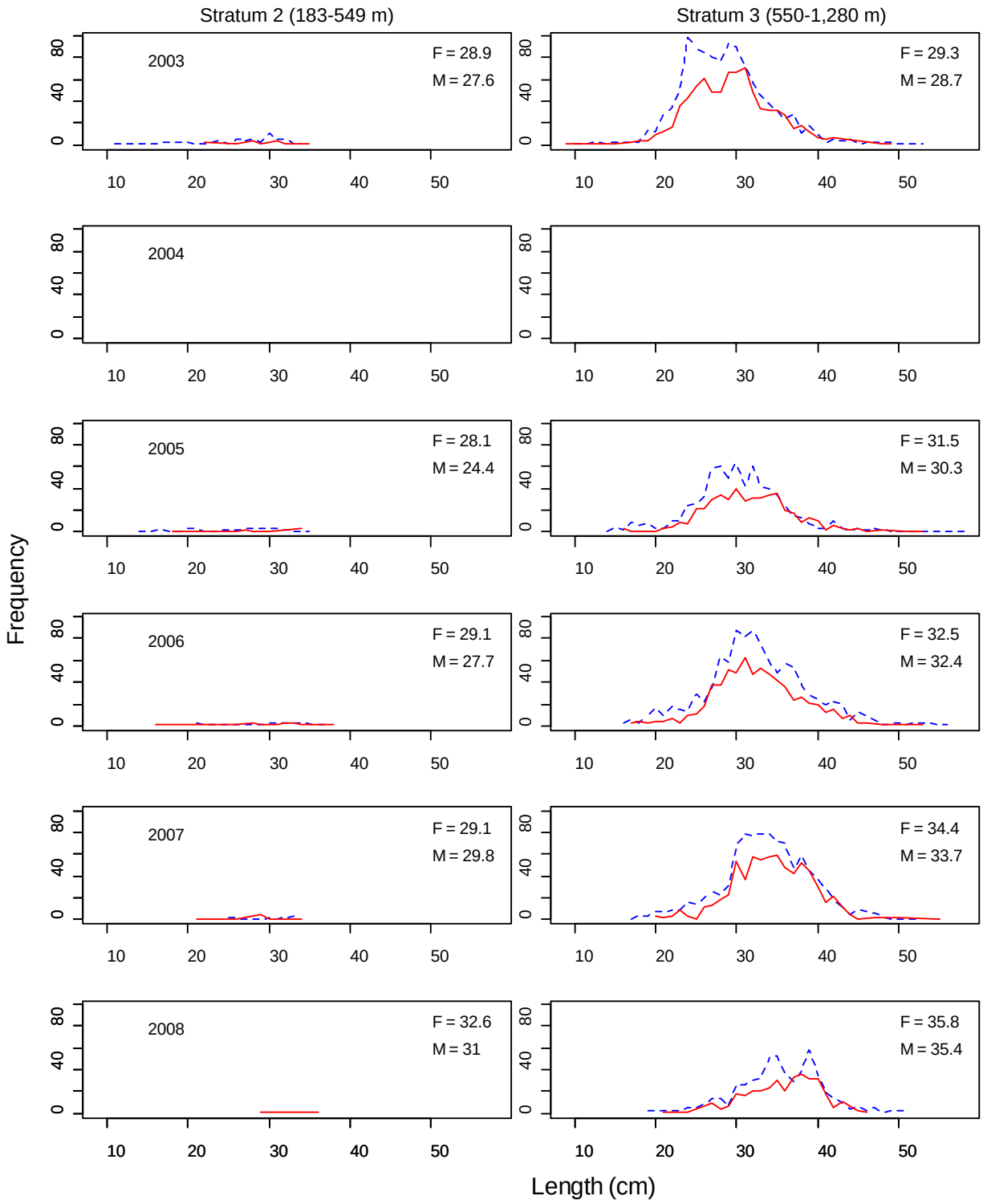


Figure 185. Frequency of lengths by gender in stratum 2 (left column) and stratum 3 (right column) for Pacific flatnose from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

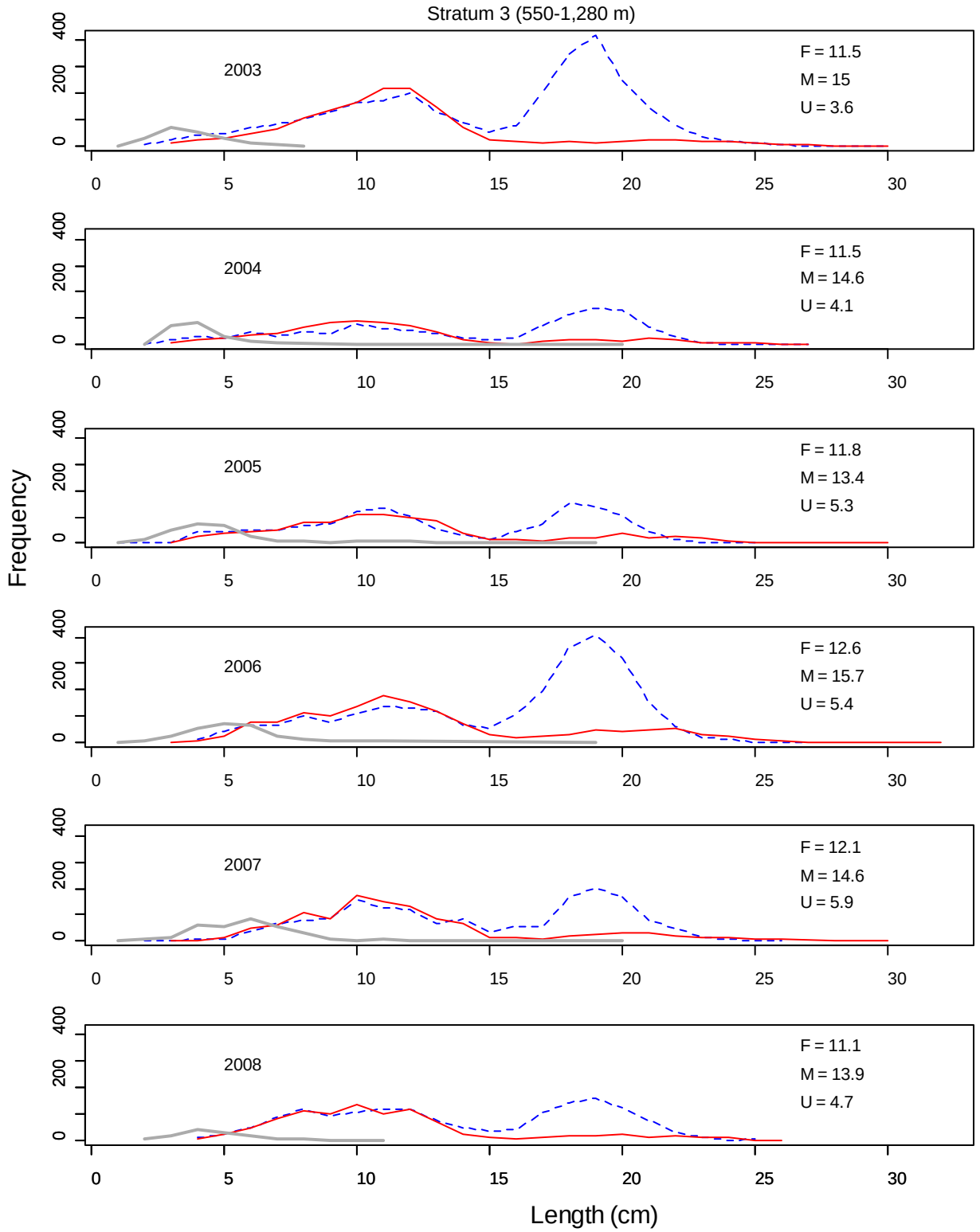


Figure 186. Frequency of lengths by gender in stratum 3 for Pacific grenadier from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

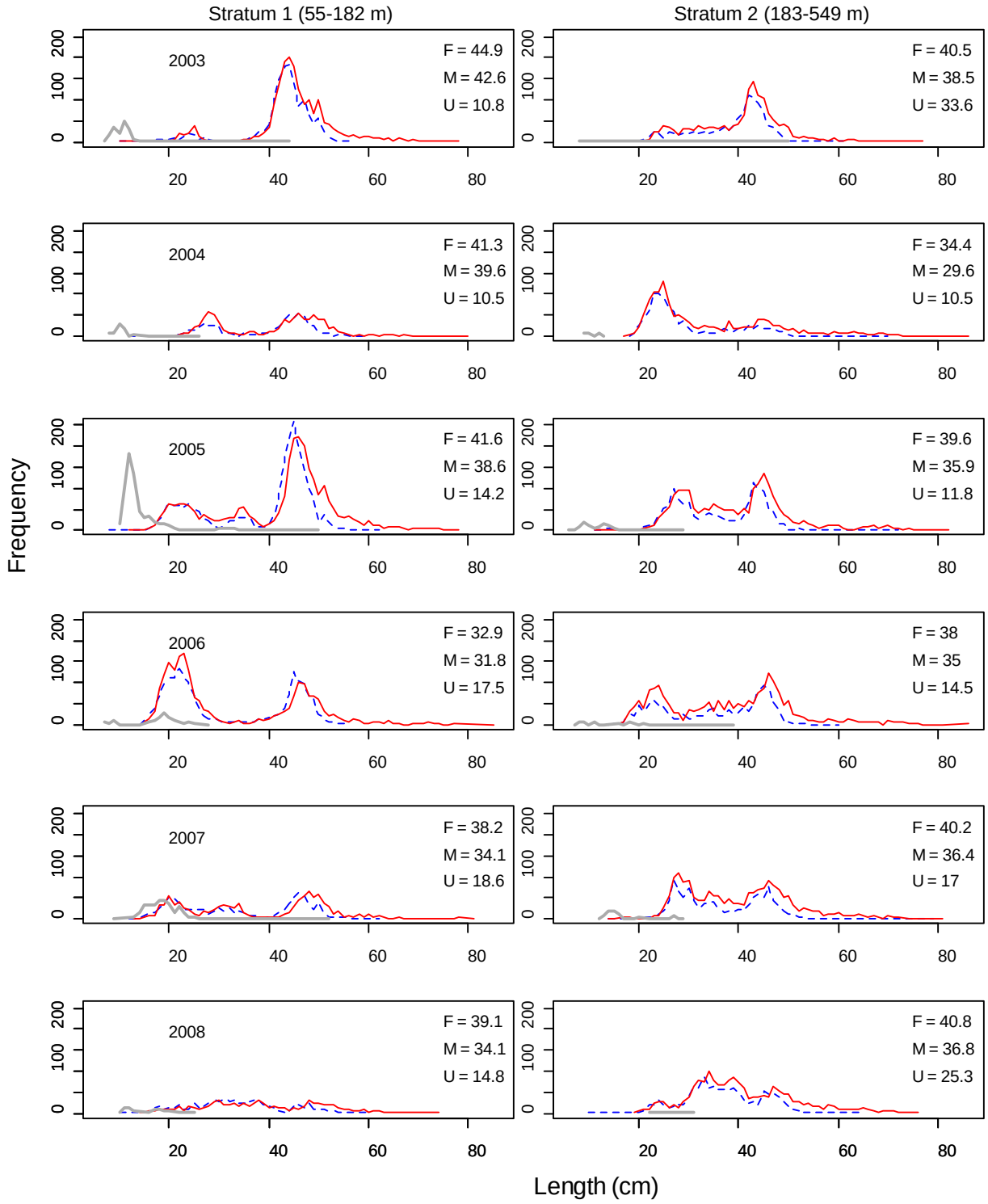


Figure 187. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for Pacific hake from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

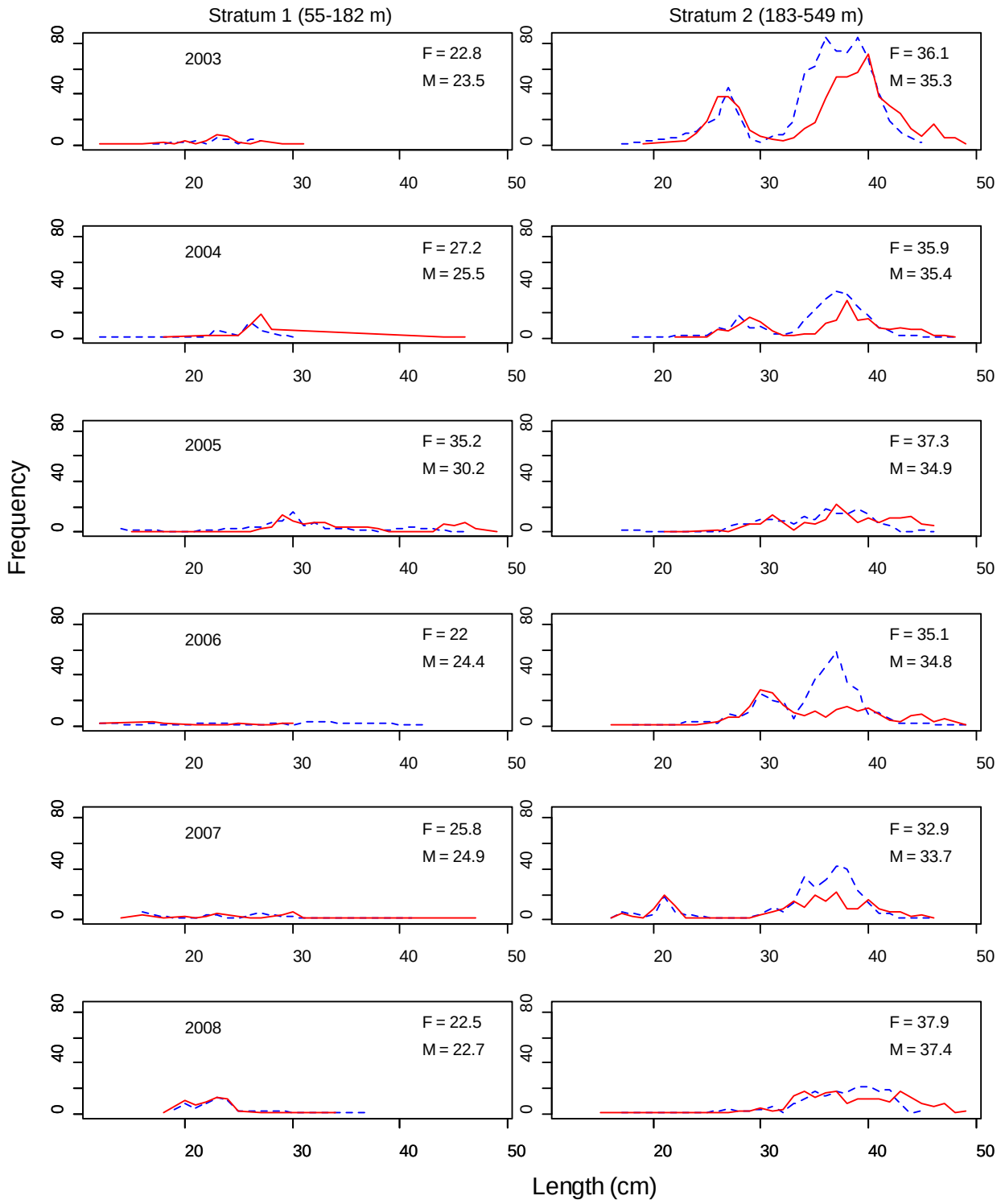


Figure 188. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for Pacific ocean perch from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

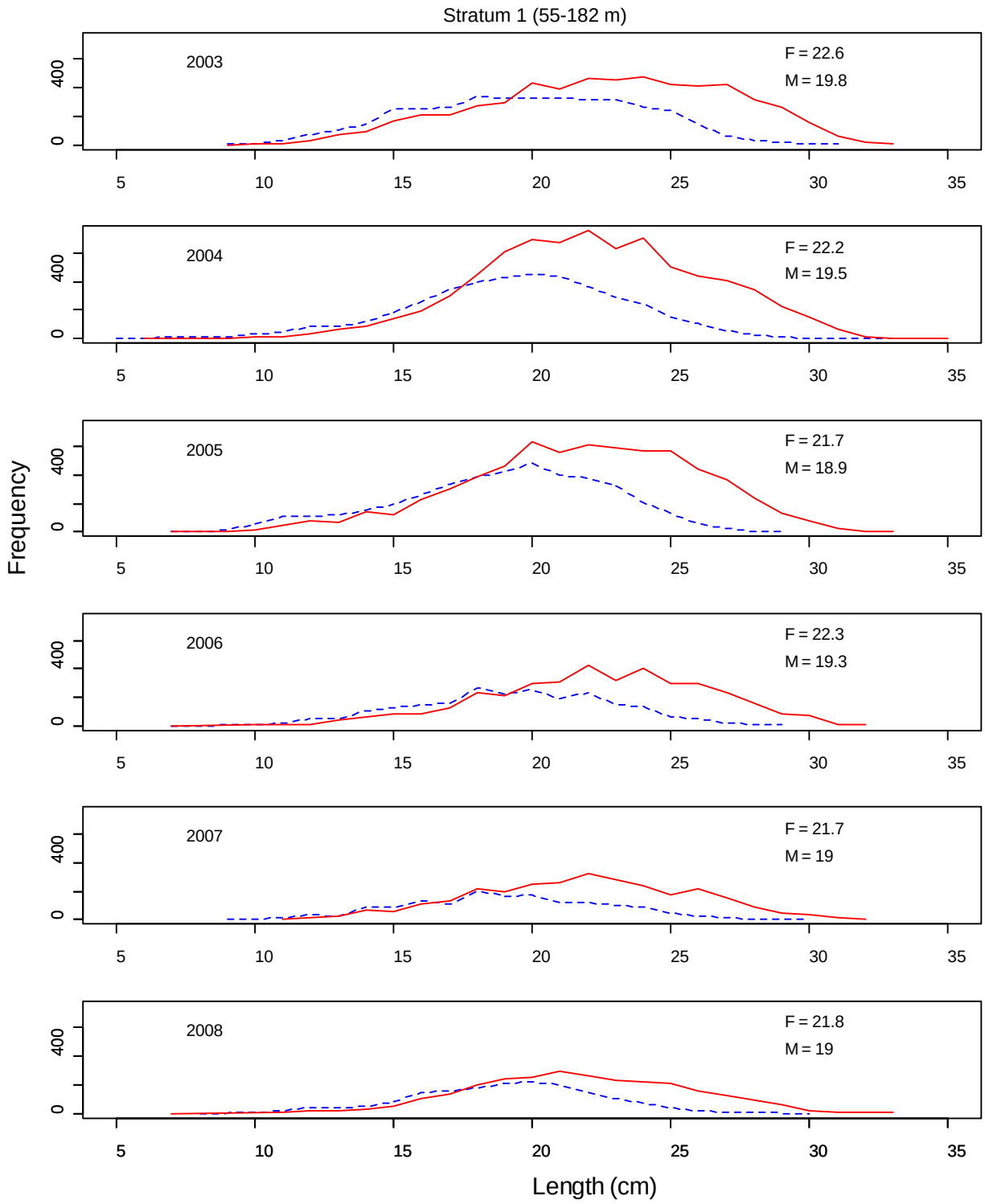


Figure 189. Frequency of lengths by gender in stratum 1 for Pacific sanddab from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

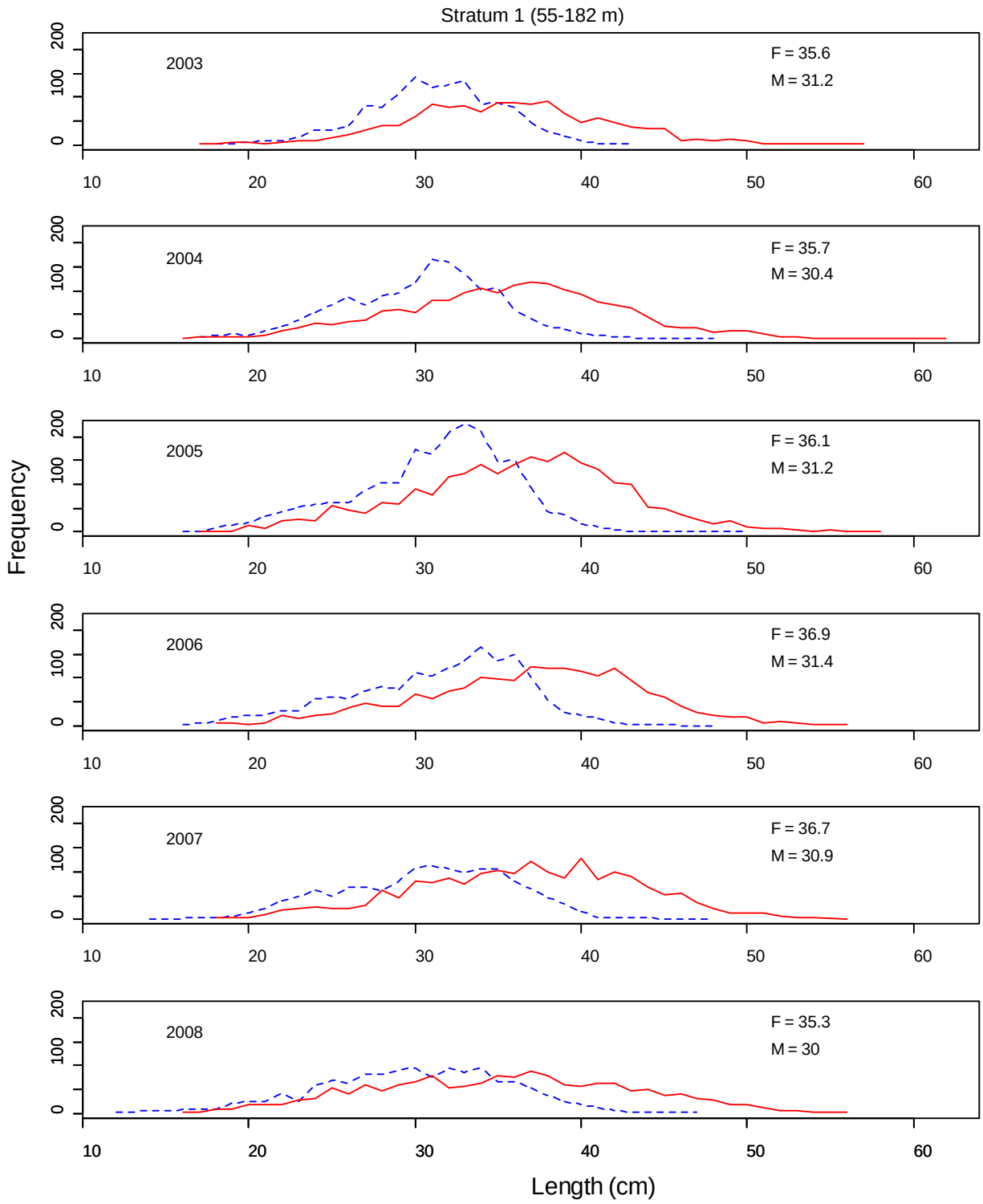


Figure 190. Frequency of lengths by gender in stratum 1 for petrale sole from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

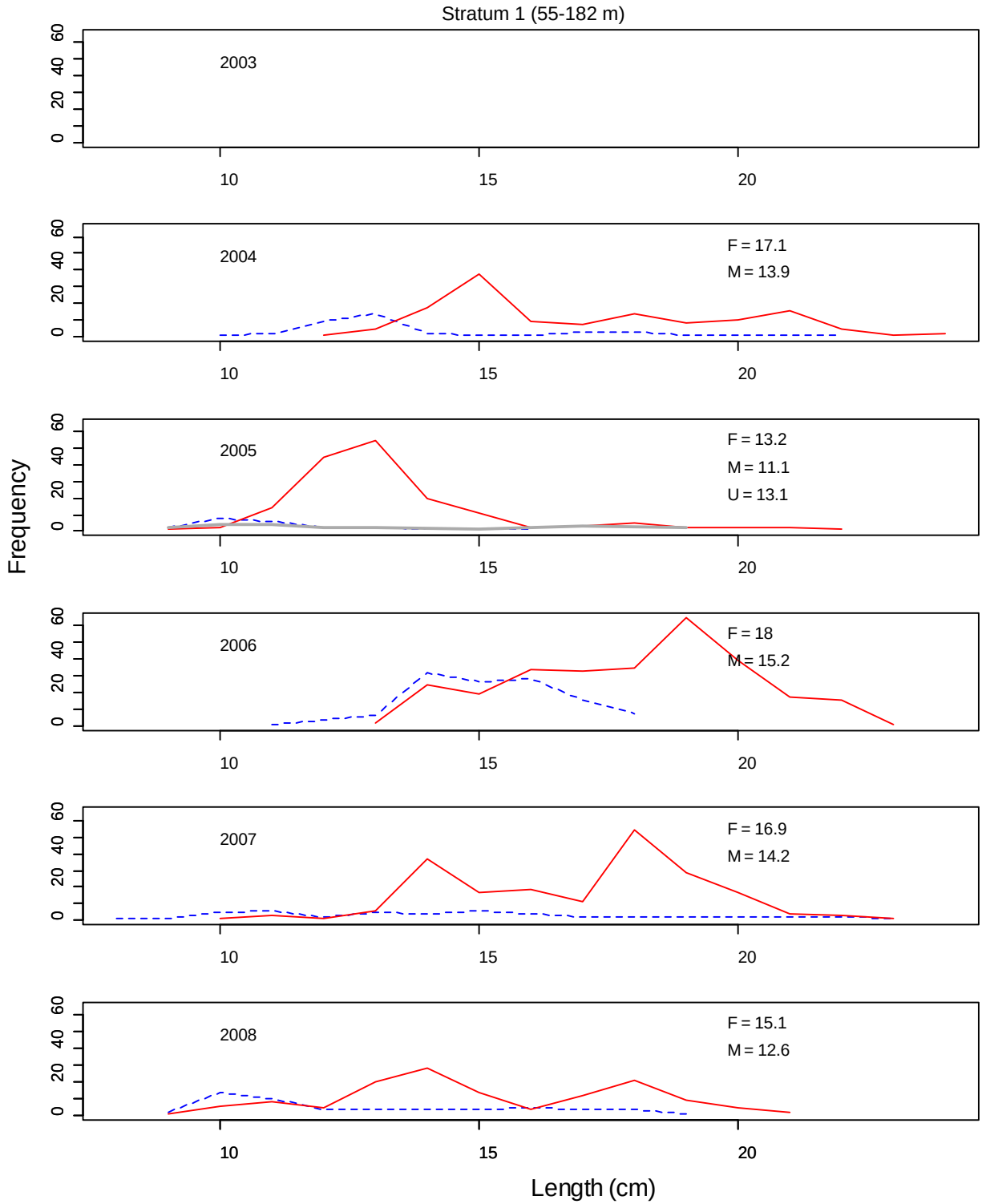


Figure 191. Frequency of lengths by gender in stratum 1 for pygmy rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

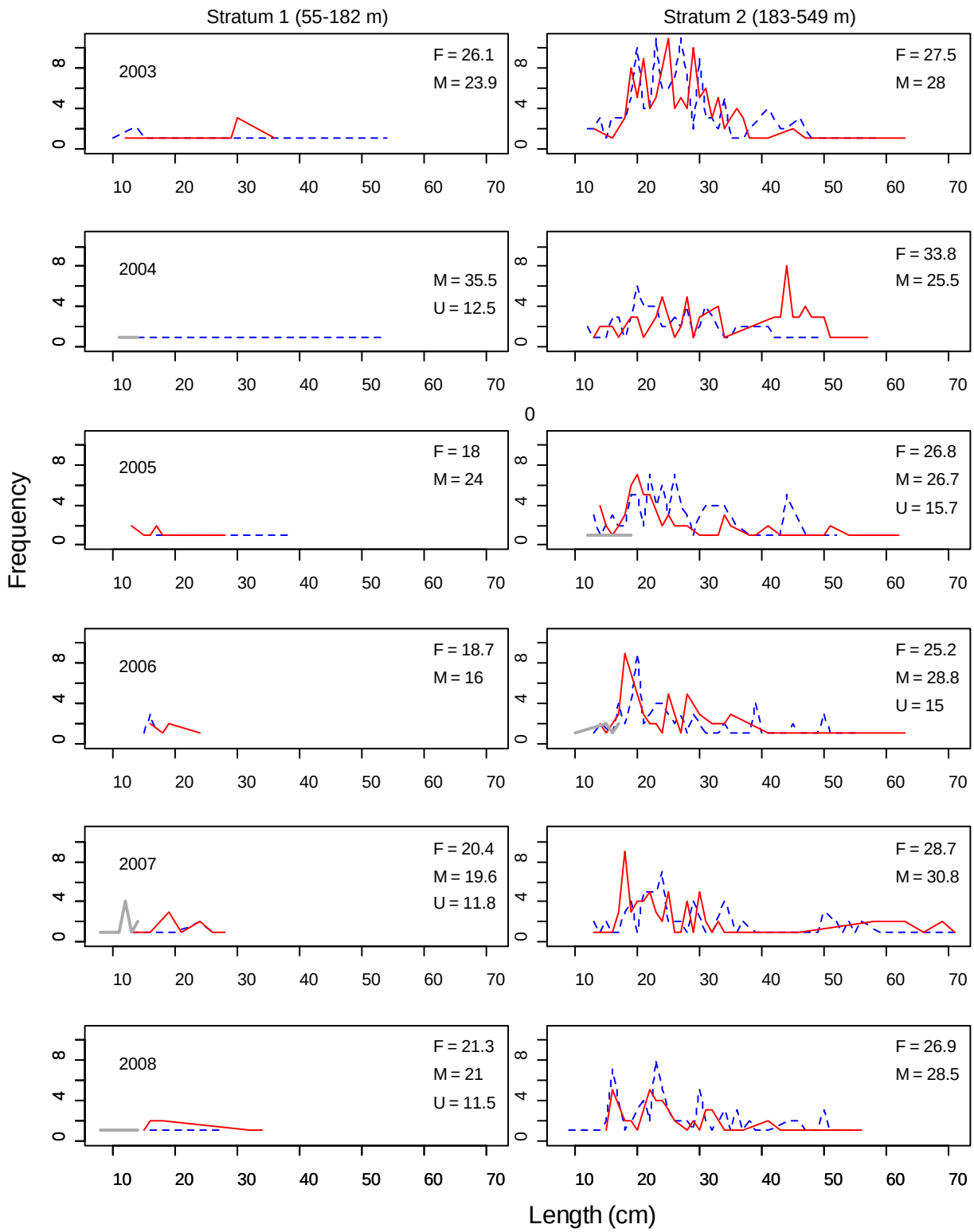


Figure 192. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for redbanded rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

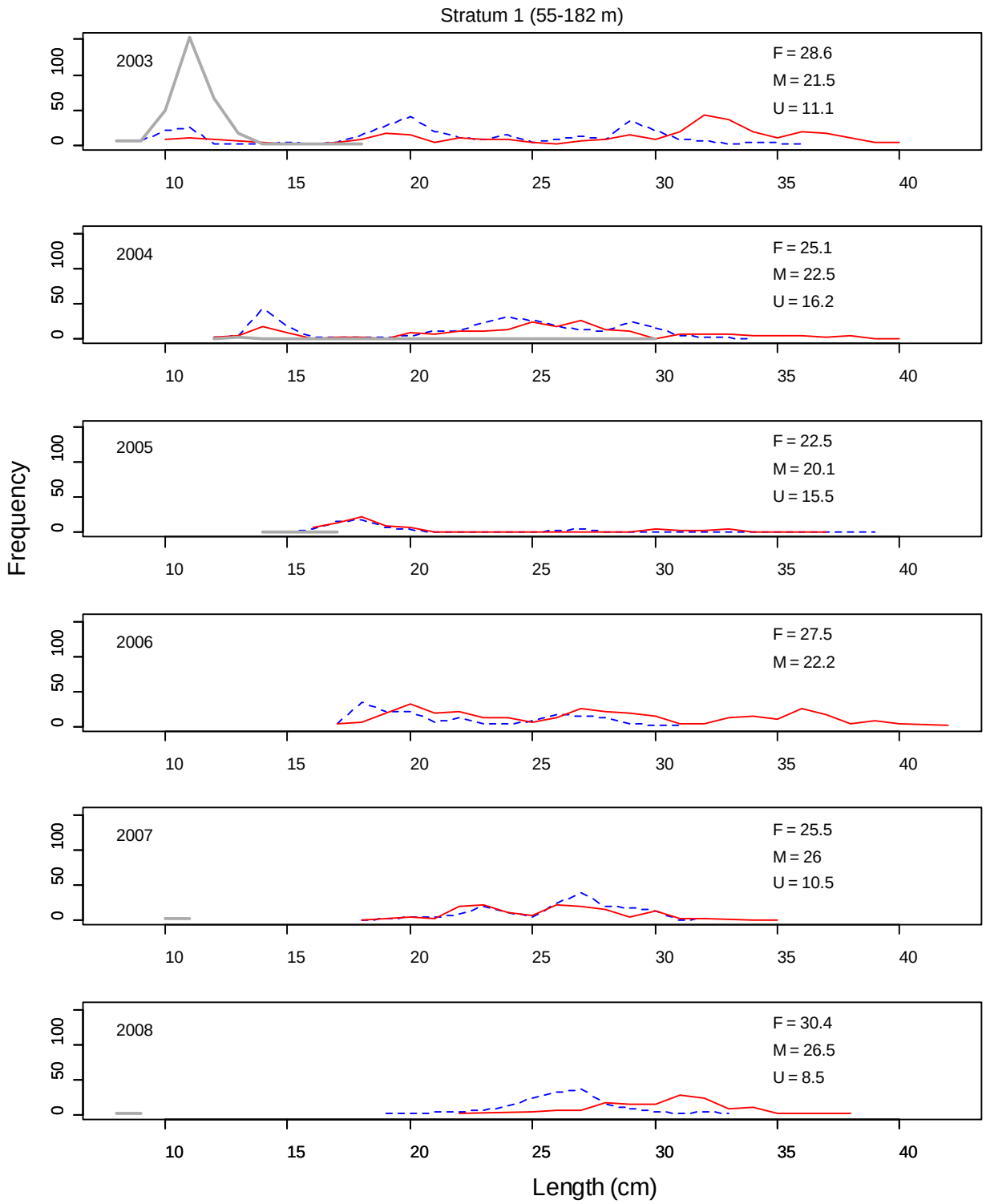


Figure 193. Frequency of lengths by gender in stratum 1 for redstripe rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

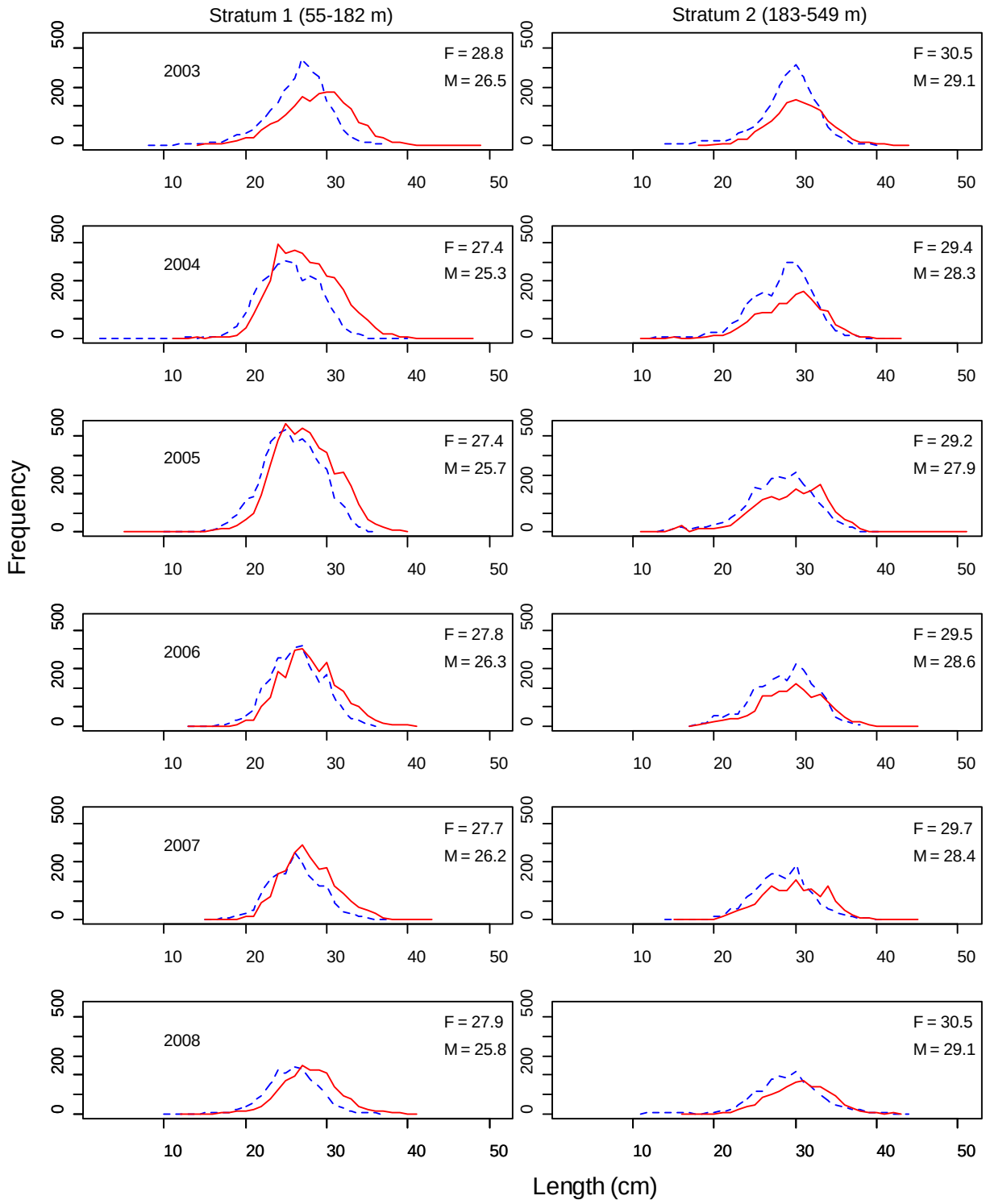


Figure 194. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for rex sole from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

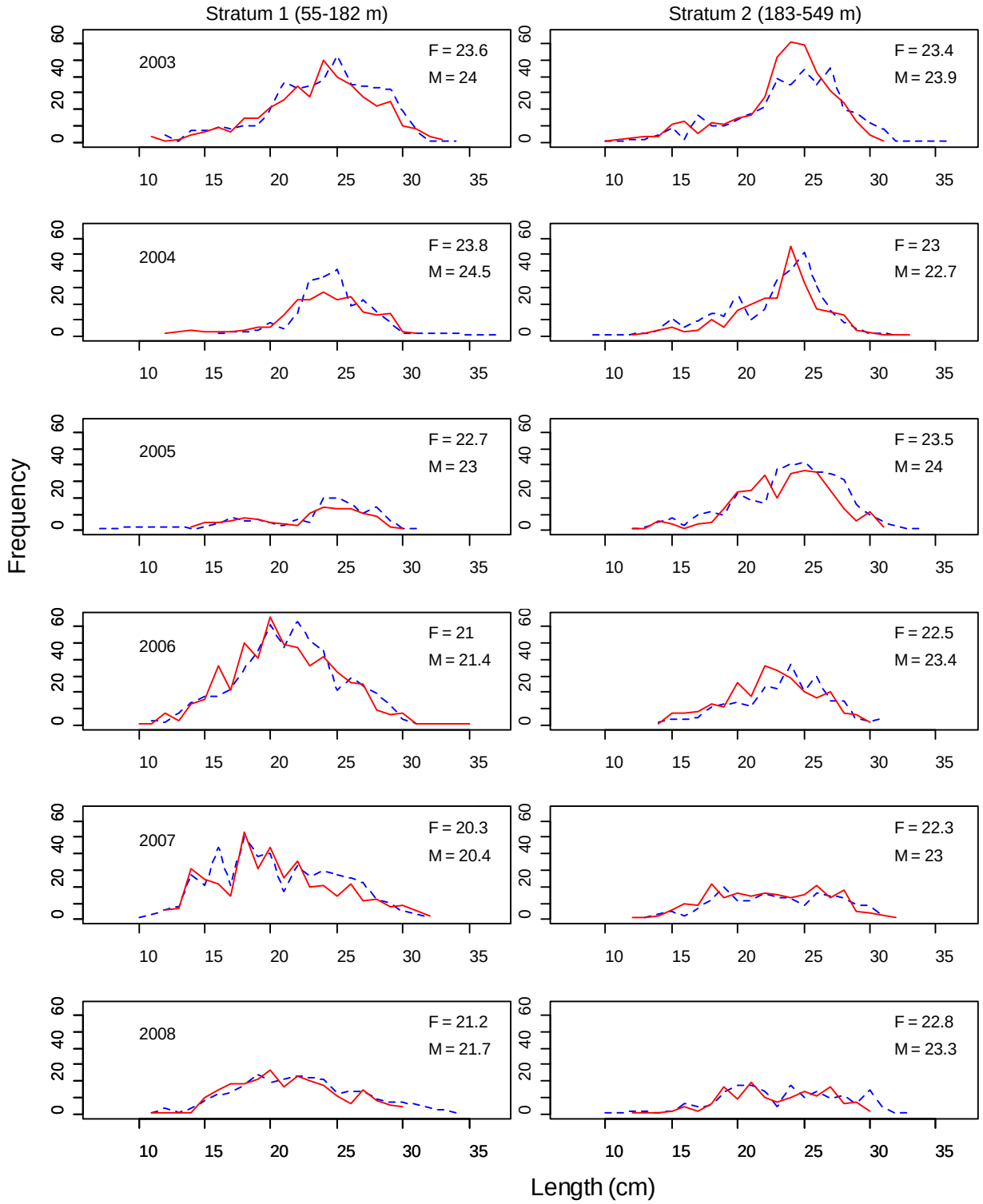


Figure 195. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for rosethorn rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

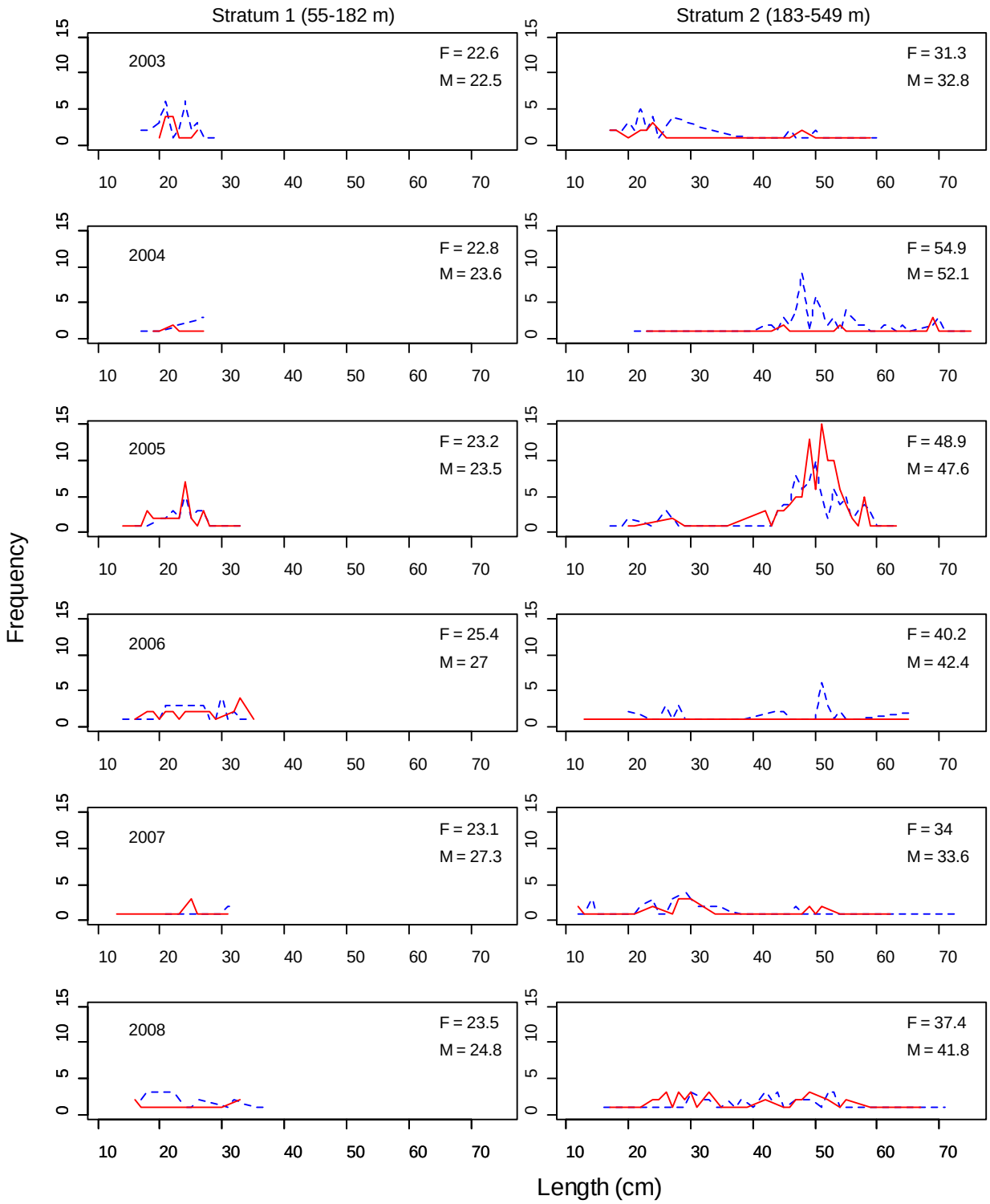


Figure 196. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for rougheye rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

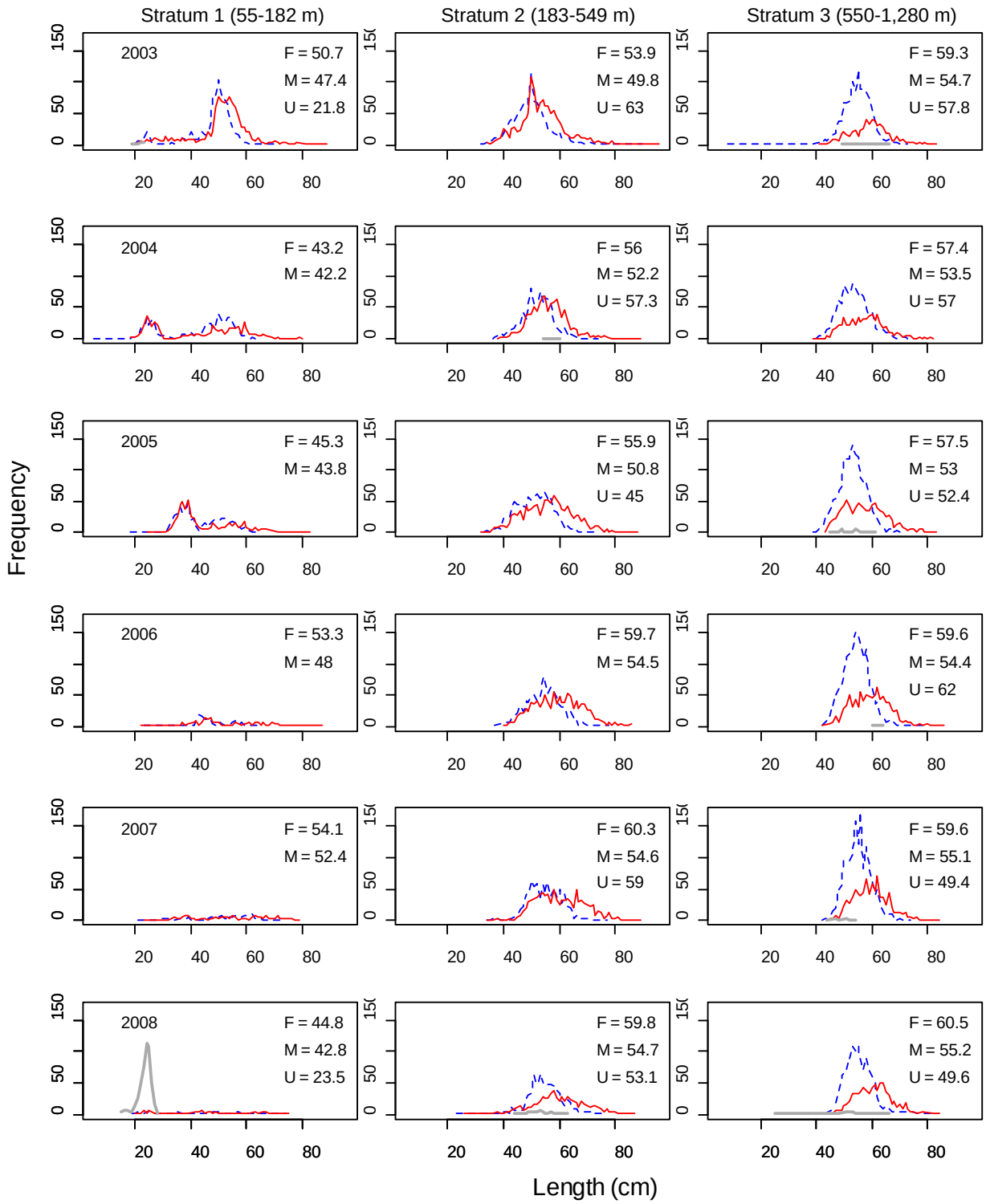


Figure 197. Frequency of lengths by gender in stratum 1 (left column), stratum 2 (middle column), and stratum 3 (right column) for sablefish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

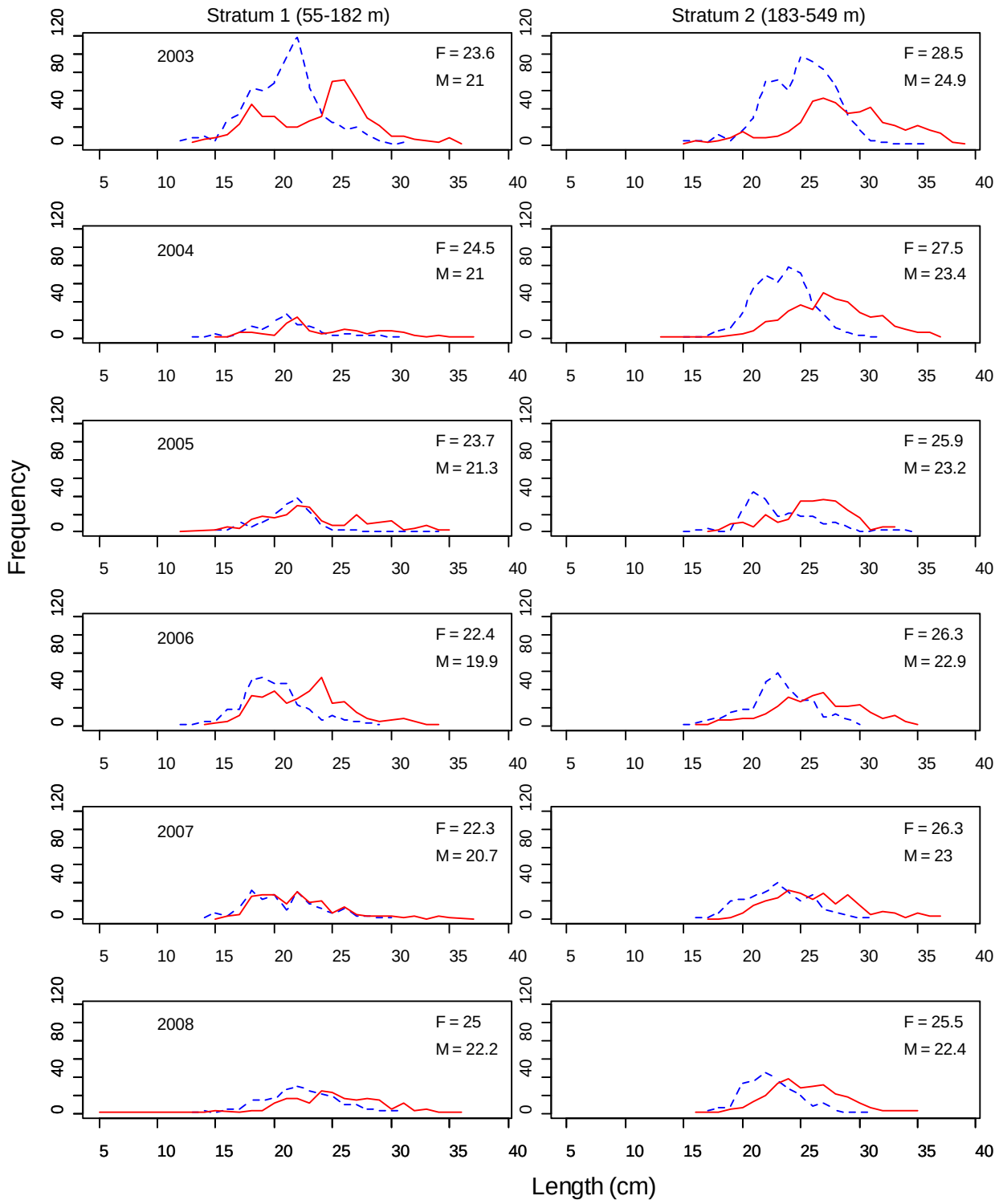


Figure 198. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for sharpchin rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

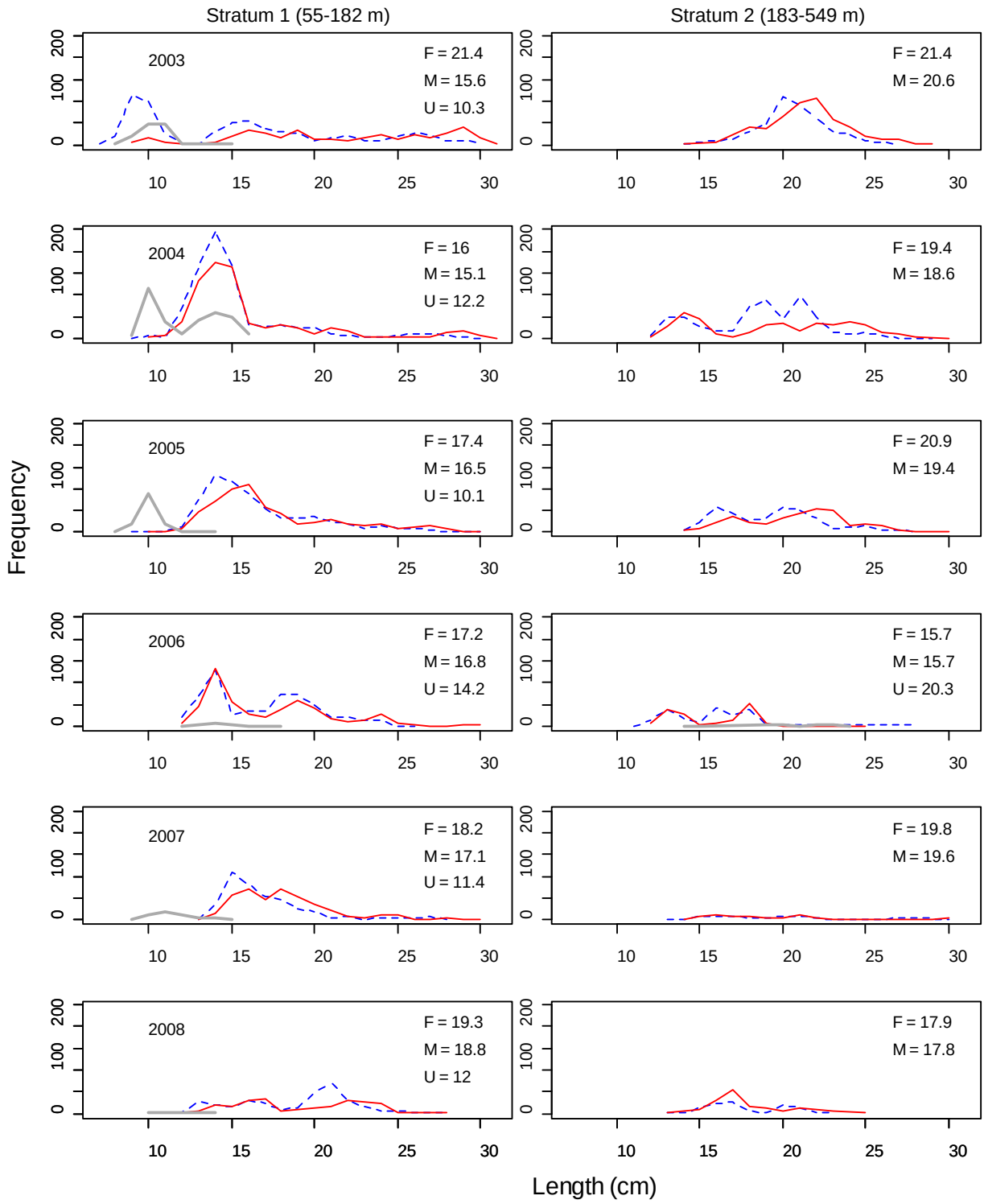


Figure 199. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for shortbelly rockfish from the 2003–2008 surveys. F emales are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

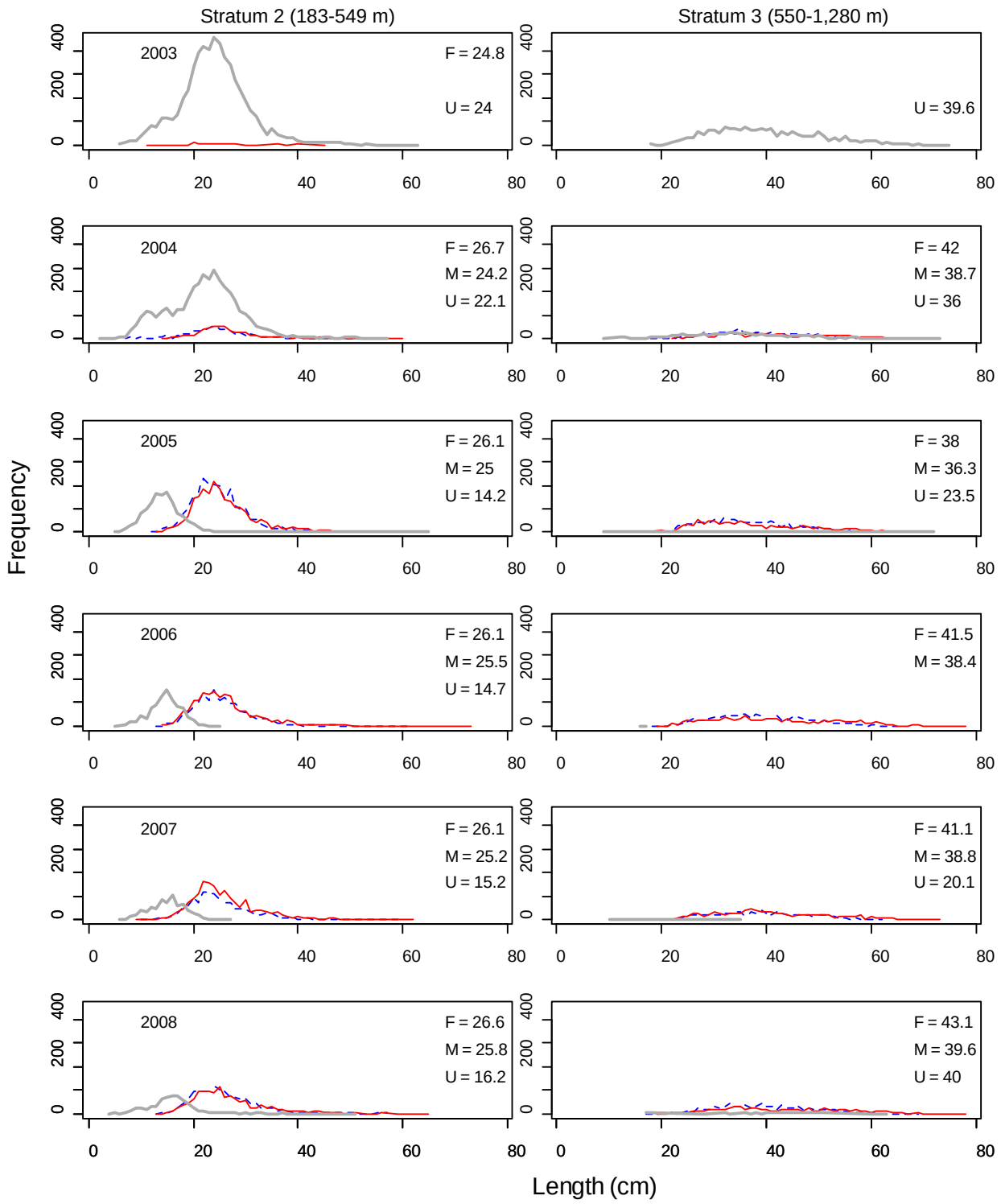


Figure 200. Frequency of lengths by gender in stratum 2 (left column) and stratum 3 (right column) for shortspine thornyhead from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

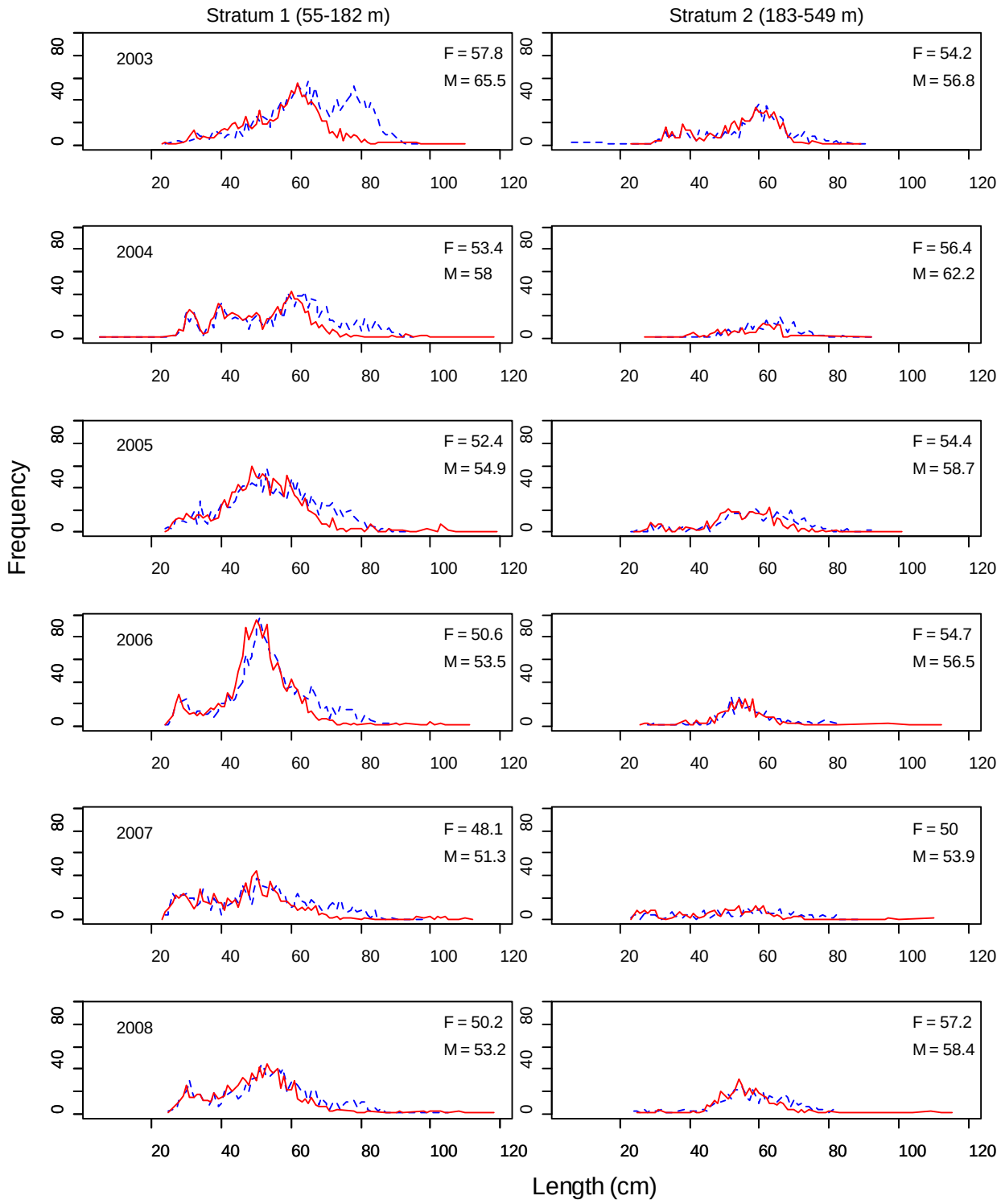


Figure 201. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for spiny dogfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

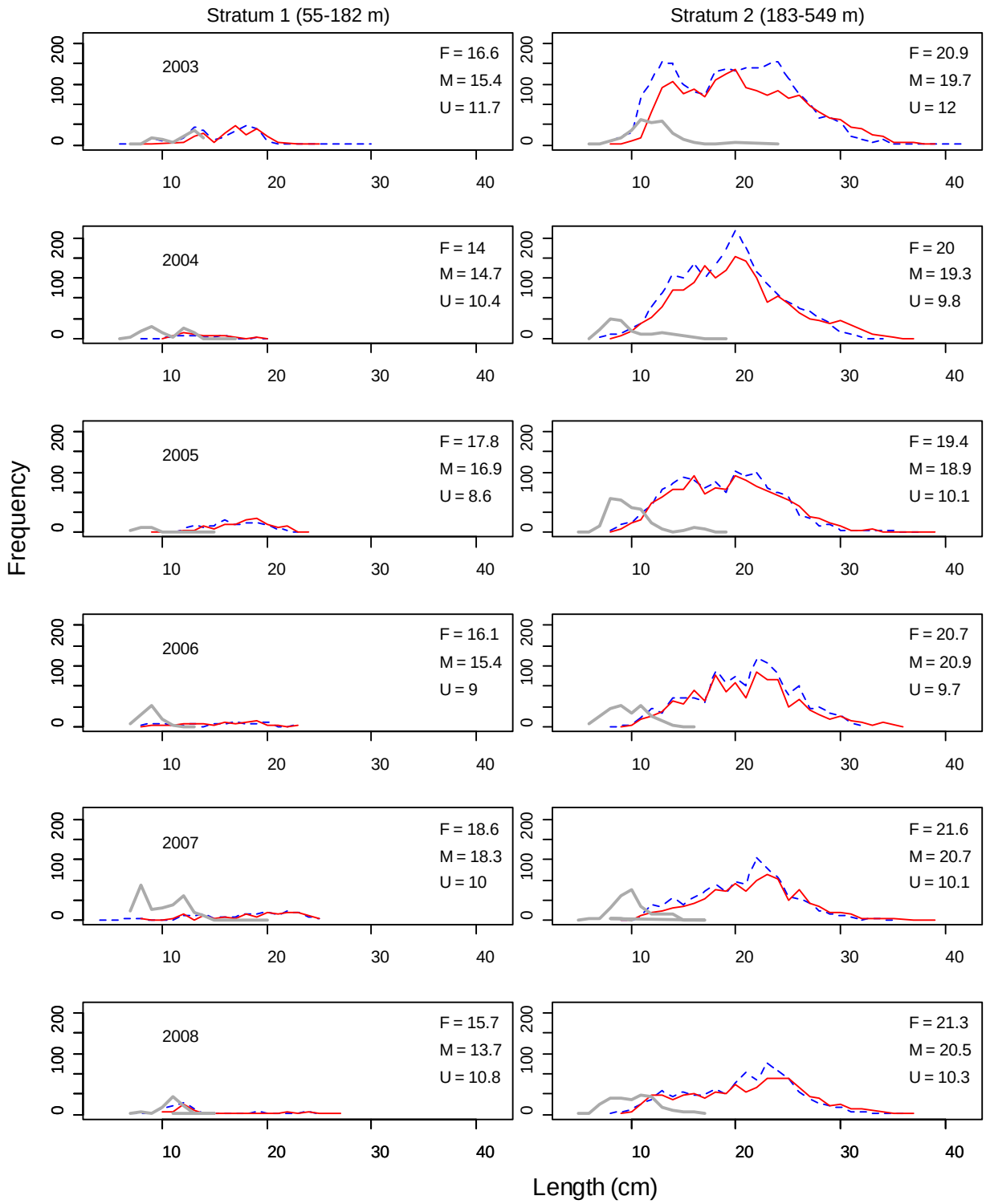


Figure 202. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for splitnose rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

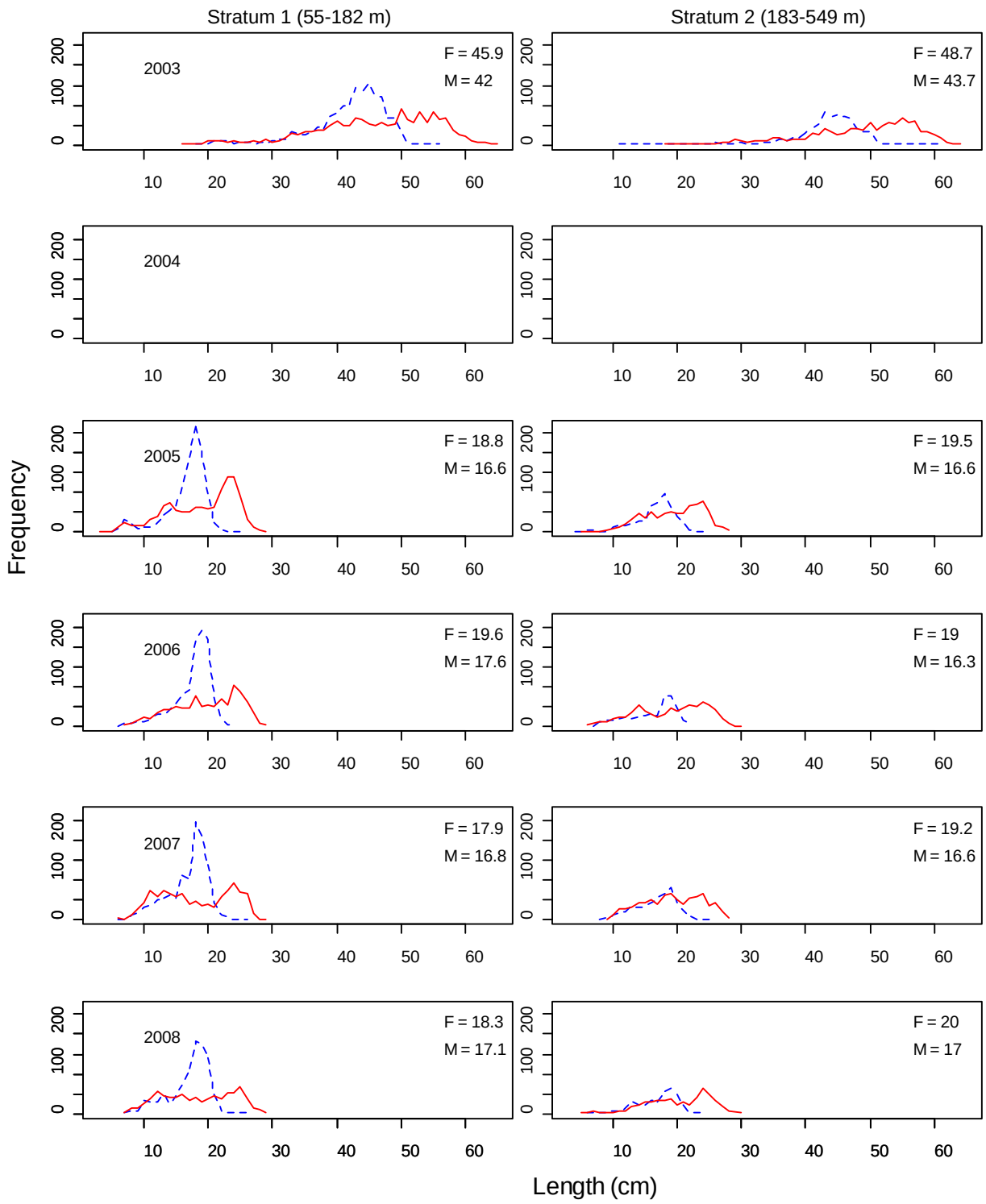


Figure 203. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for spotted ratfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

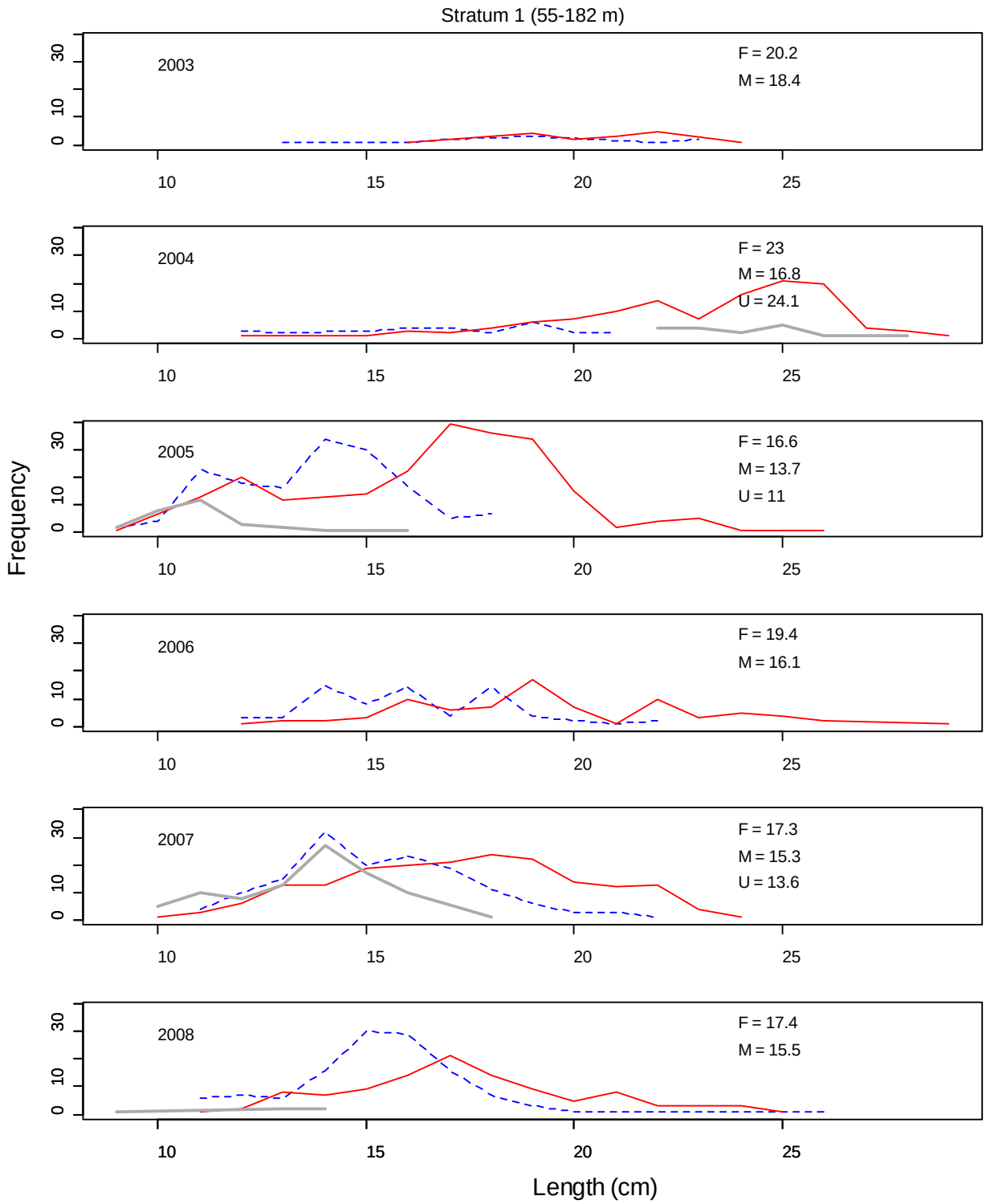


Figure 204. Frequency of lengths by gender in stratum 1 for squarespot rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

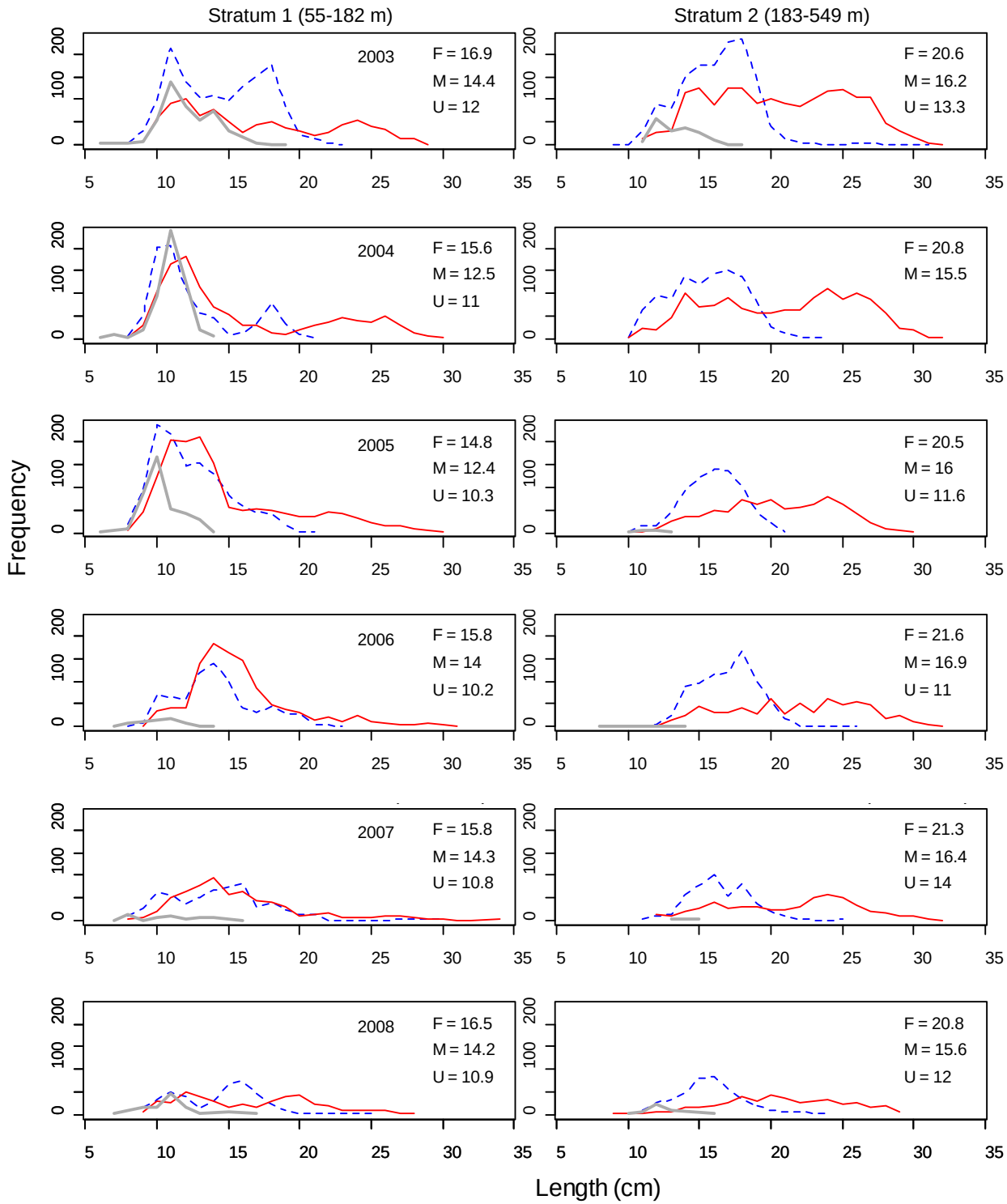


Figure 205. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for stripetail rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

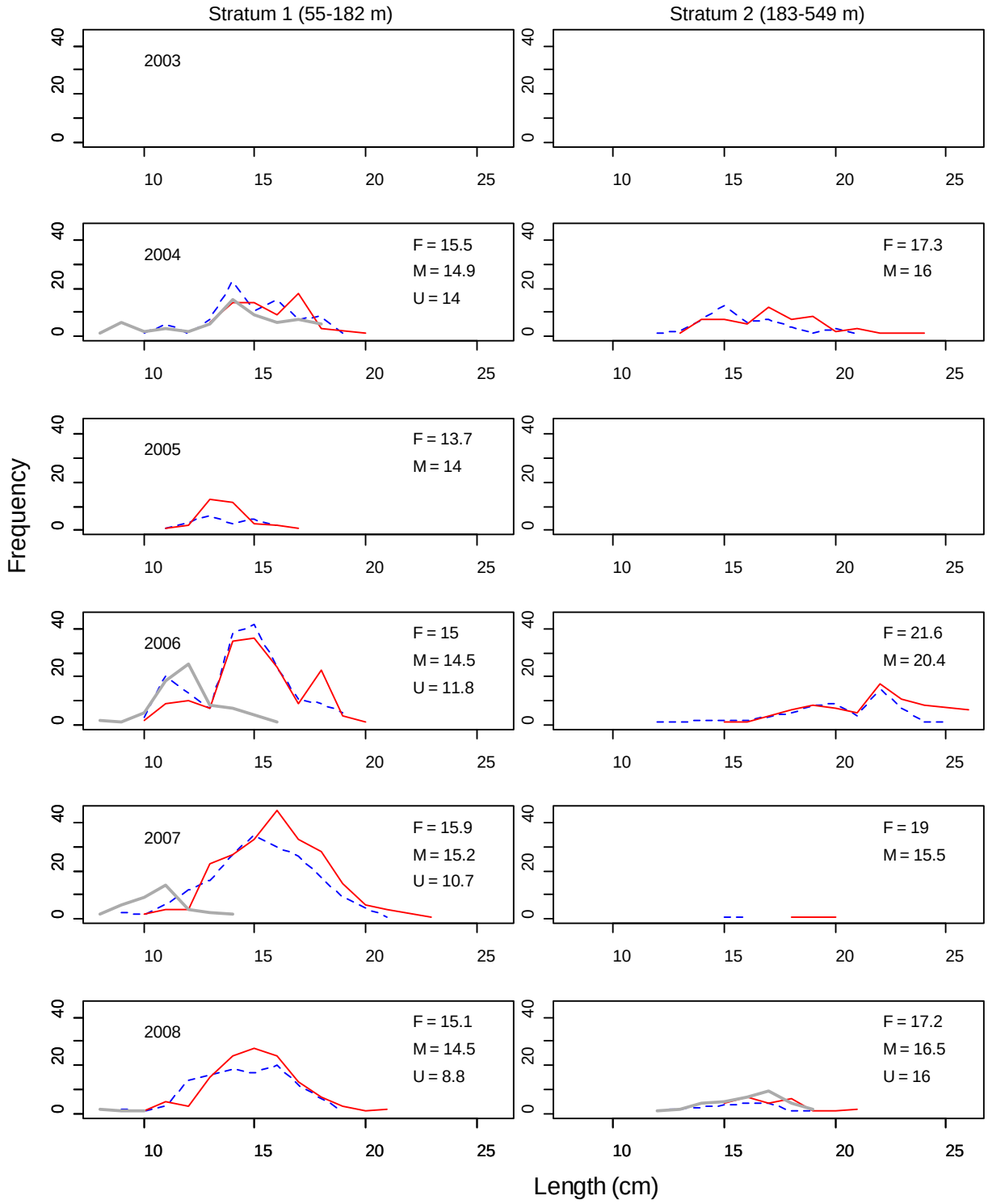


Figure 206. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for swordspine rockfish (*Sebastes ensifer*) from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed in each panel.

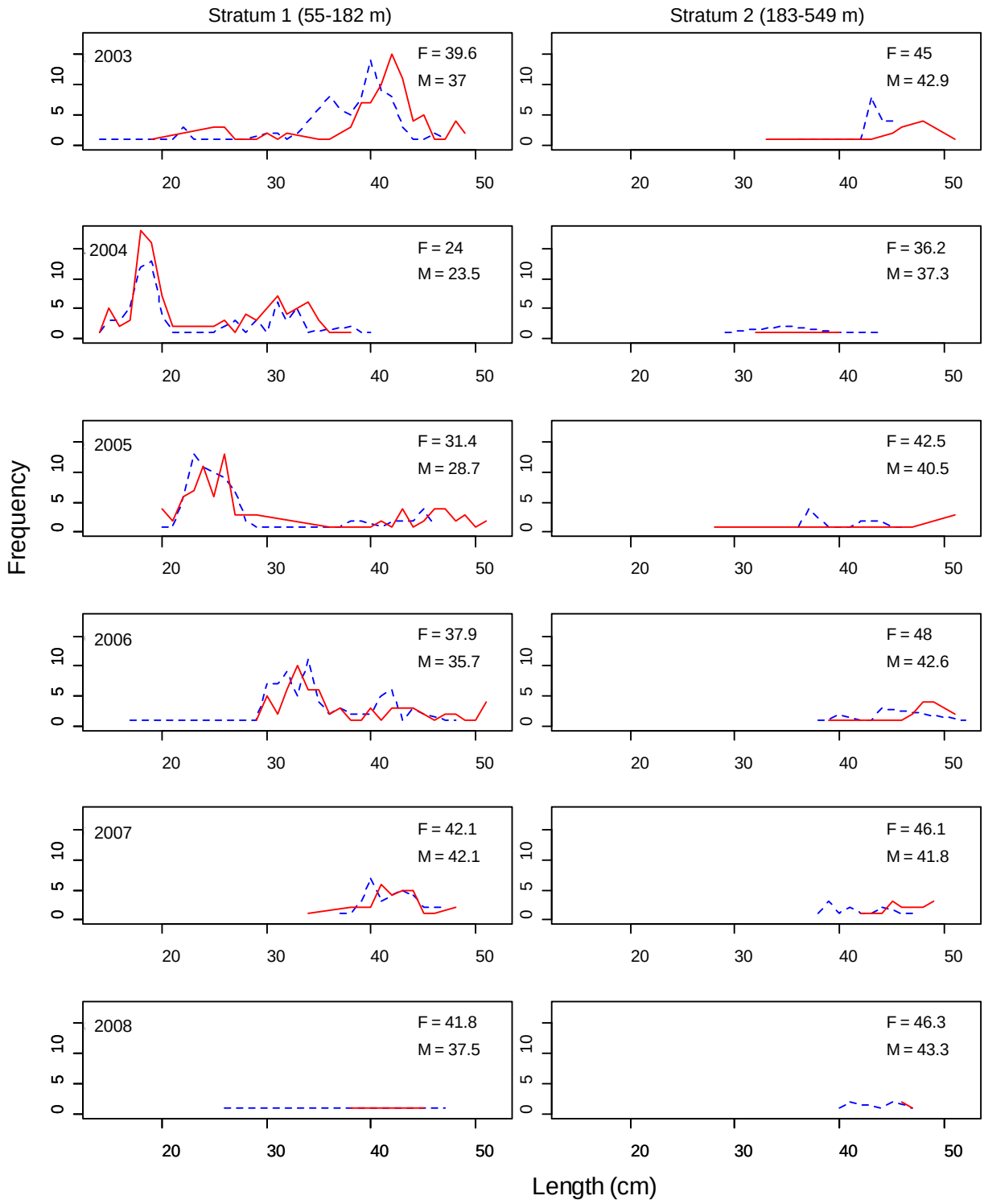


Figure 207. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for widow rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

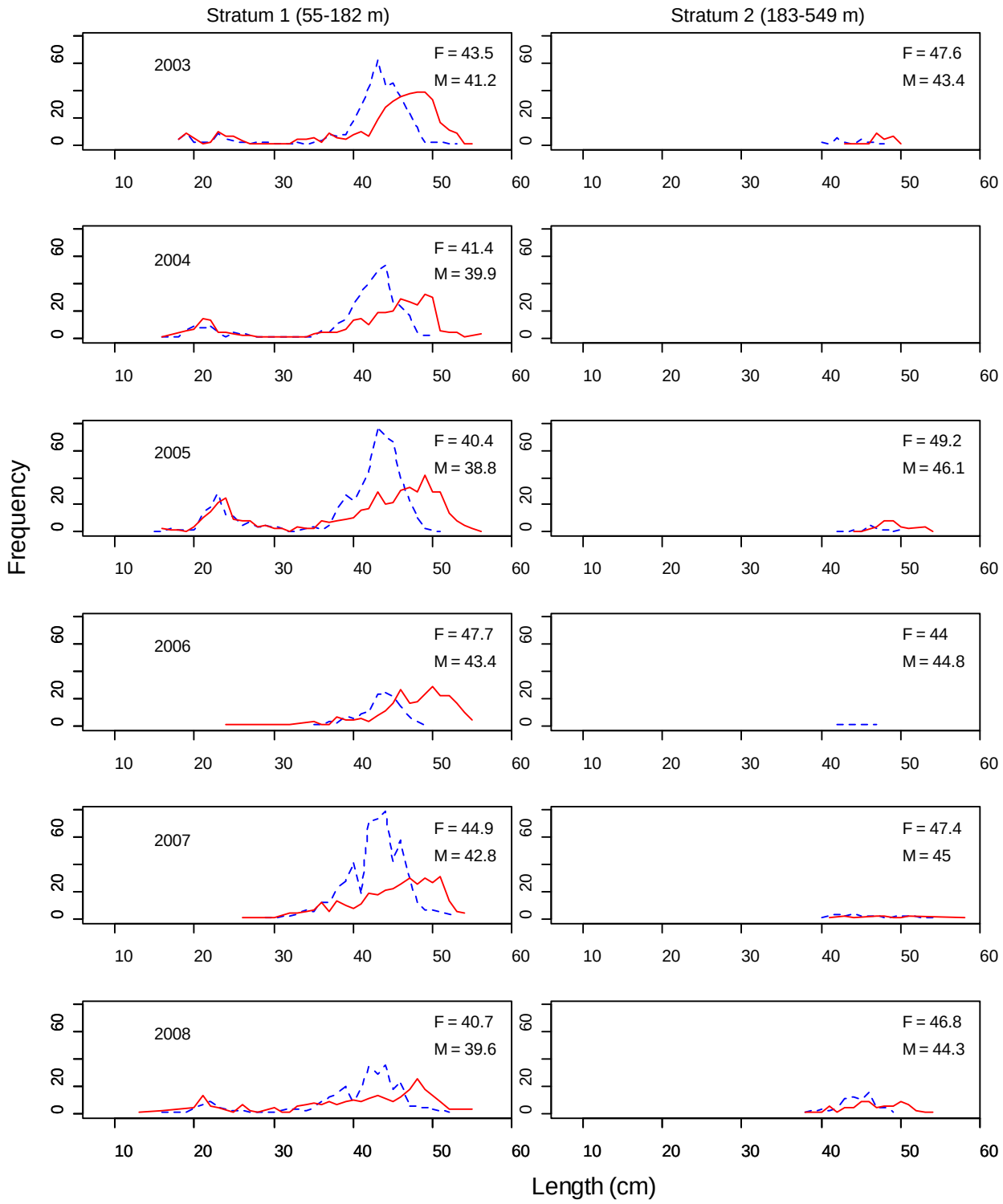


Figure 208. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for yellowtail rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

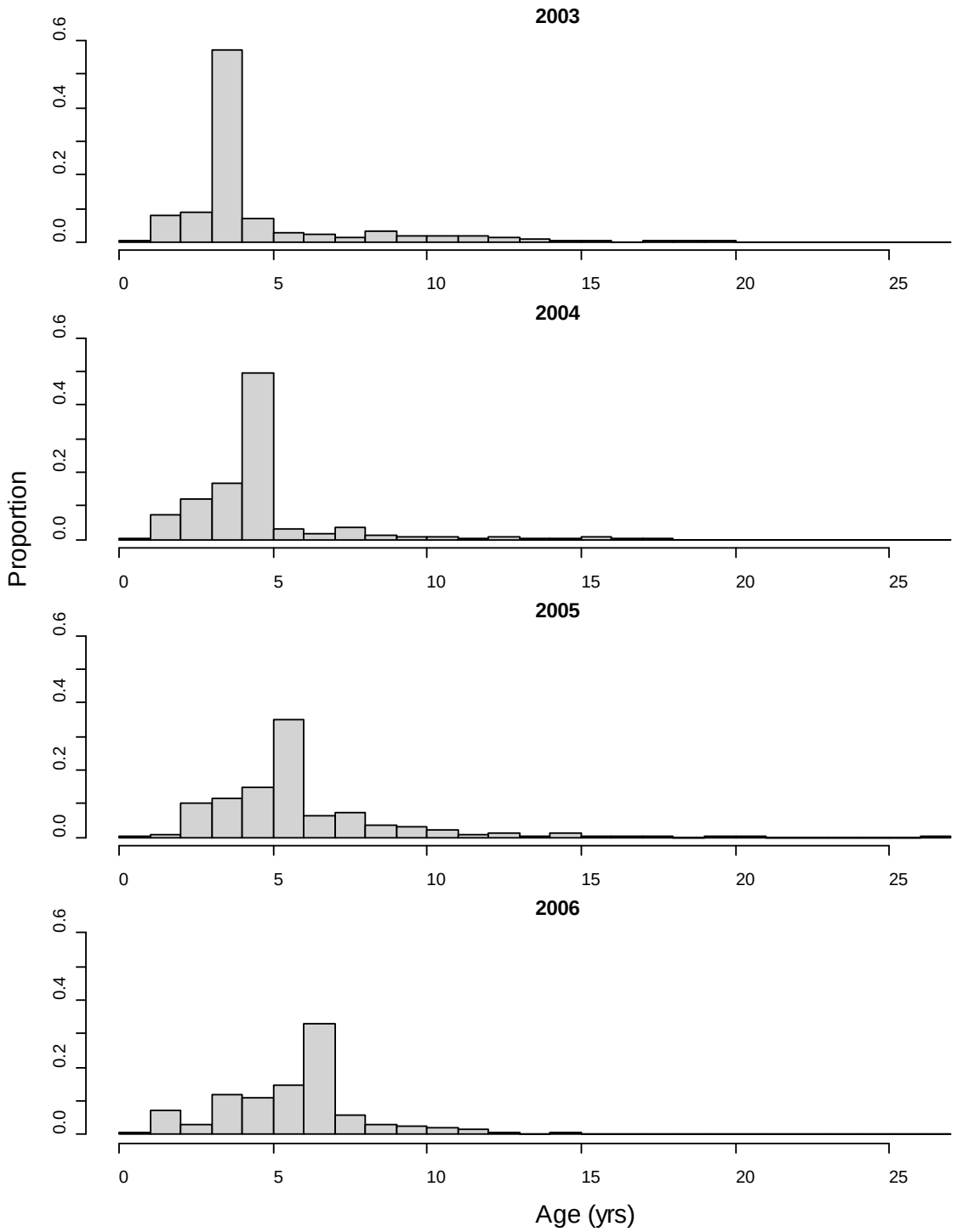


Figure 209. Age distribution for arrowtooth flounder sampled during the surveys from 2003 to 2006.

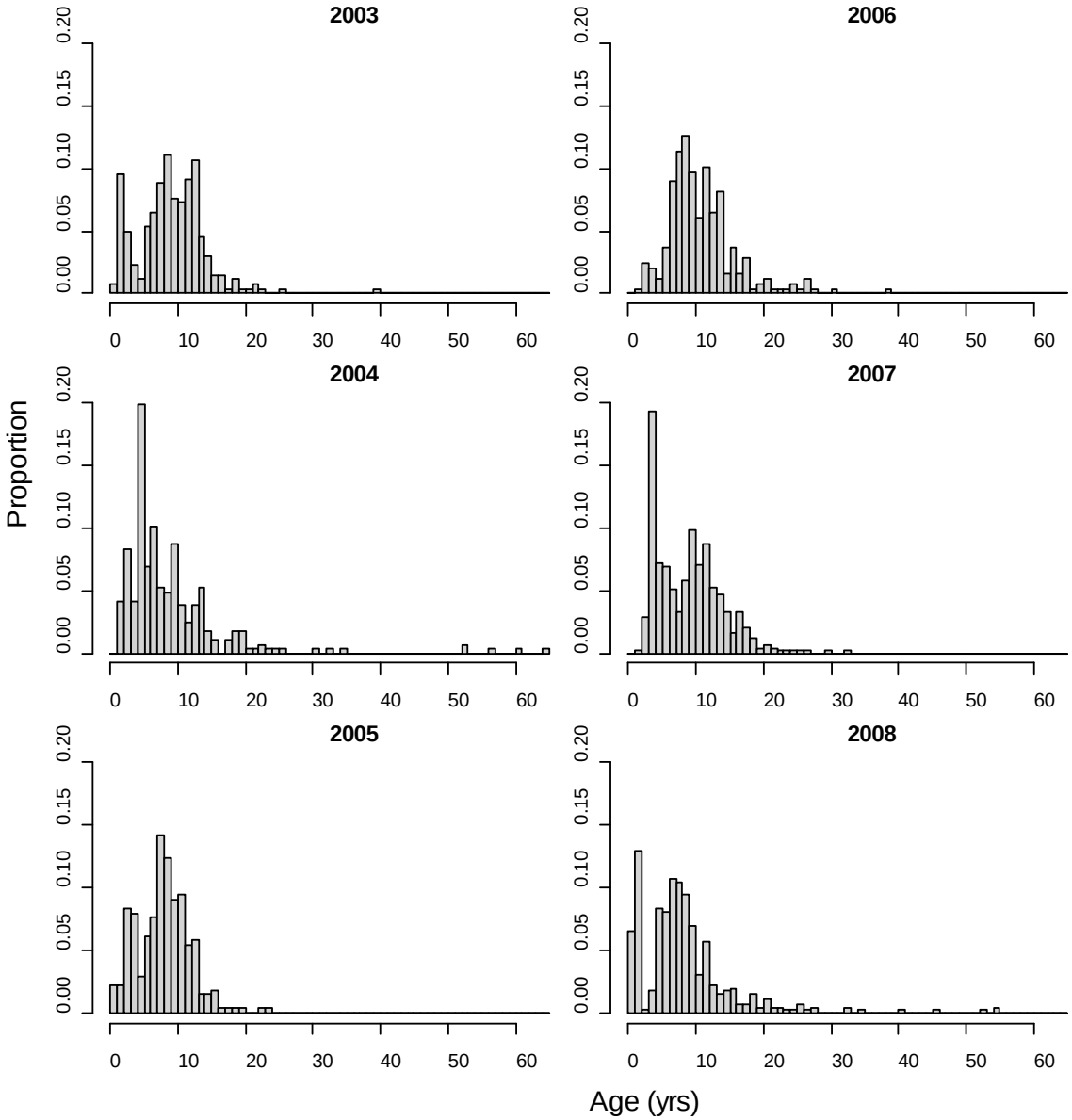


Figure 210. Age distribution for canary rockfish sampled during the surveys from 2003 to 2008.

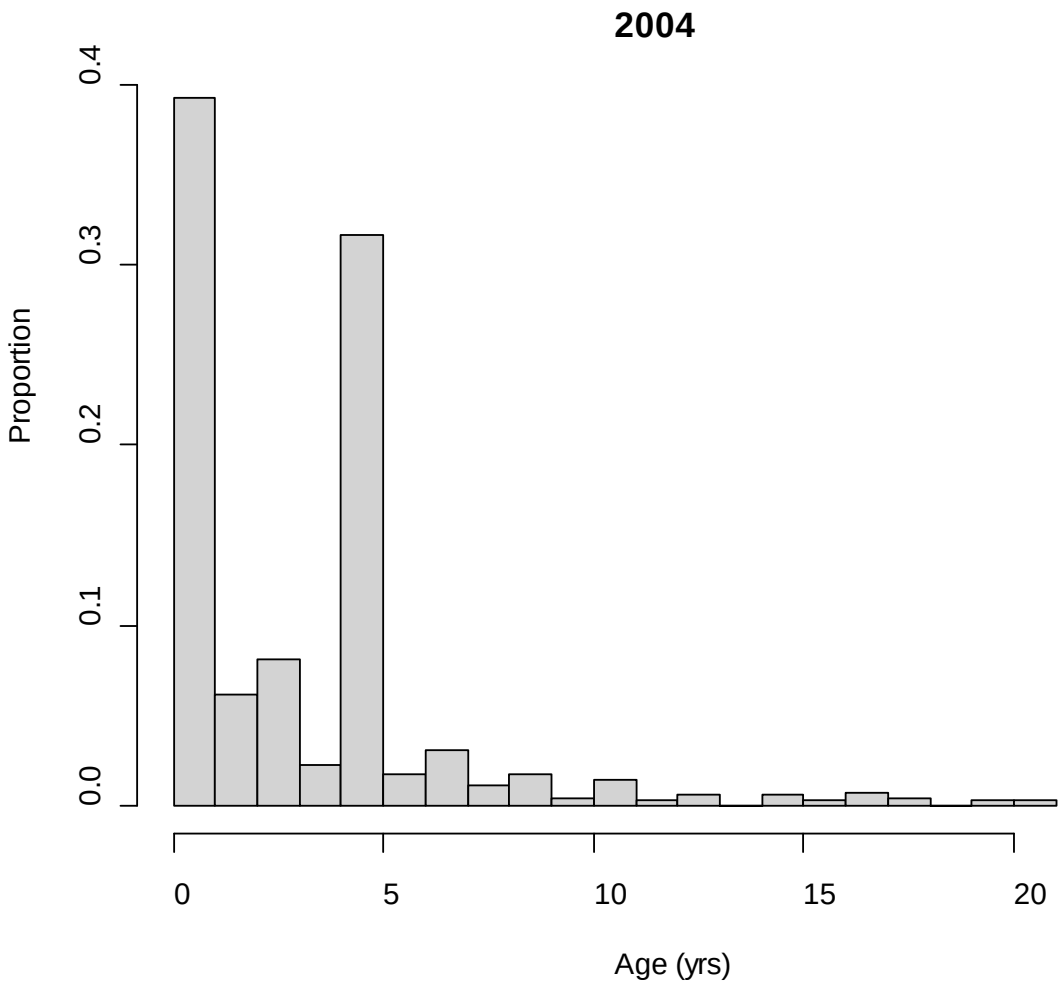


Figure 211. Age distribution for chilipepper rockfish sampled during the 2004 survey.

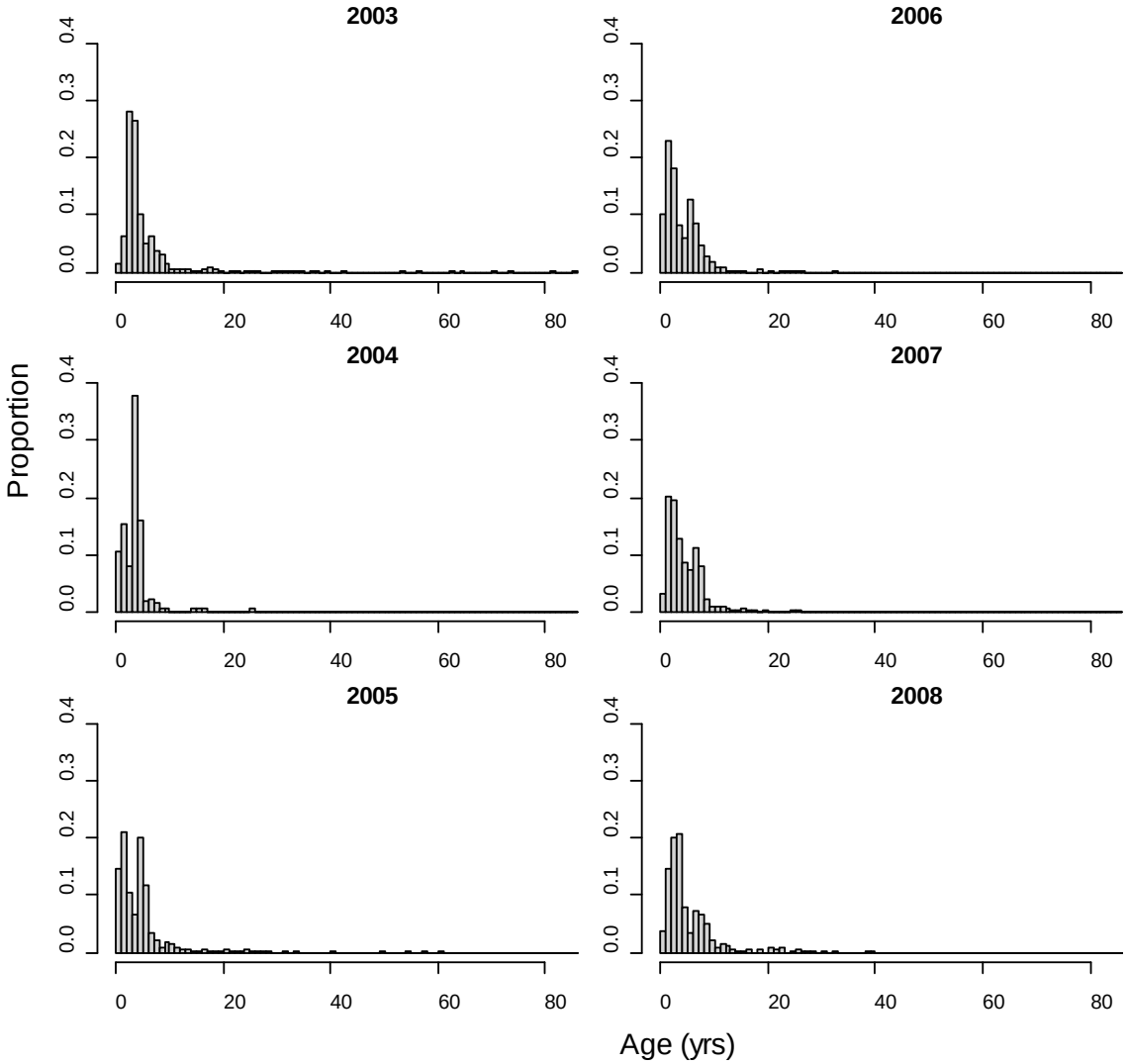


Figure 212. Age distribution for darkblotched rockfish sampled during the surveys from 2003 to 2008.

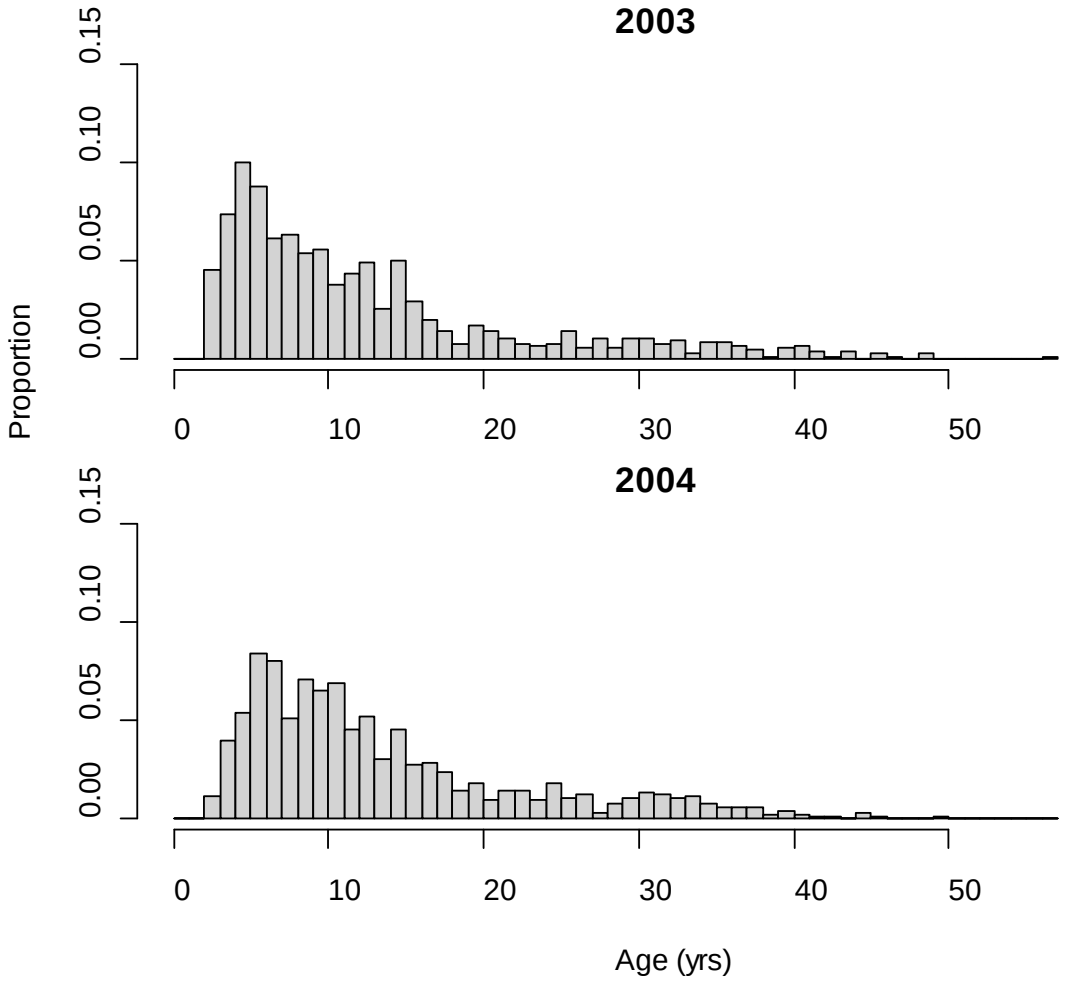


Figure 213. Age distribution for Dover sole sampled during the surveys from 2003 to 2004.

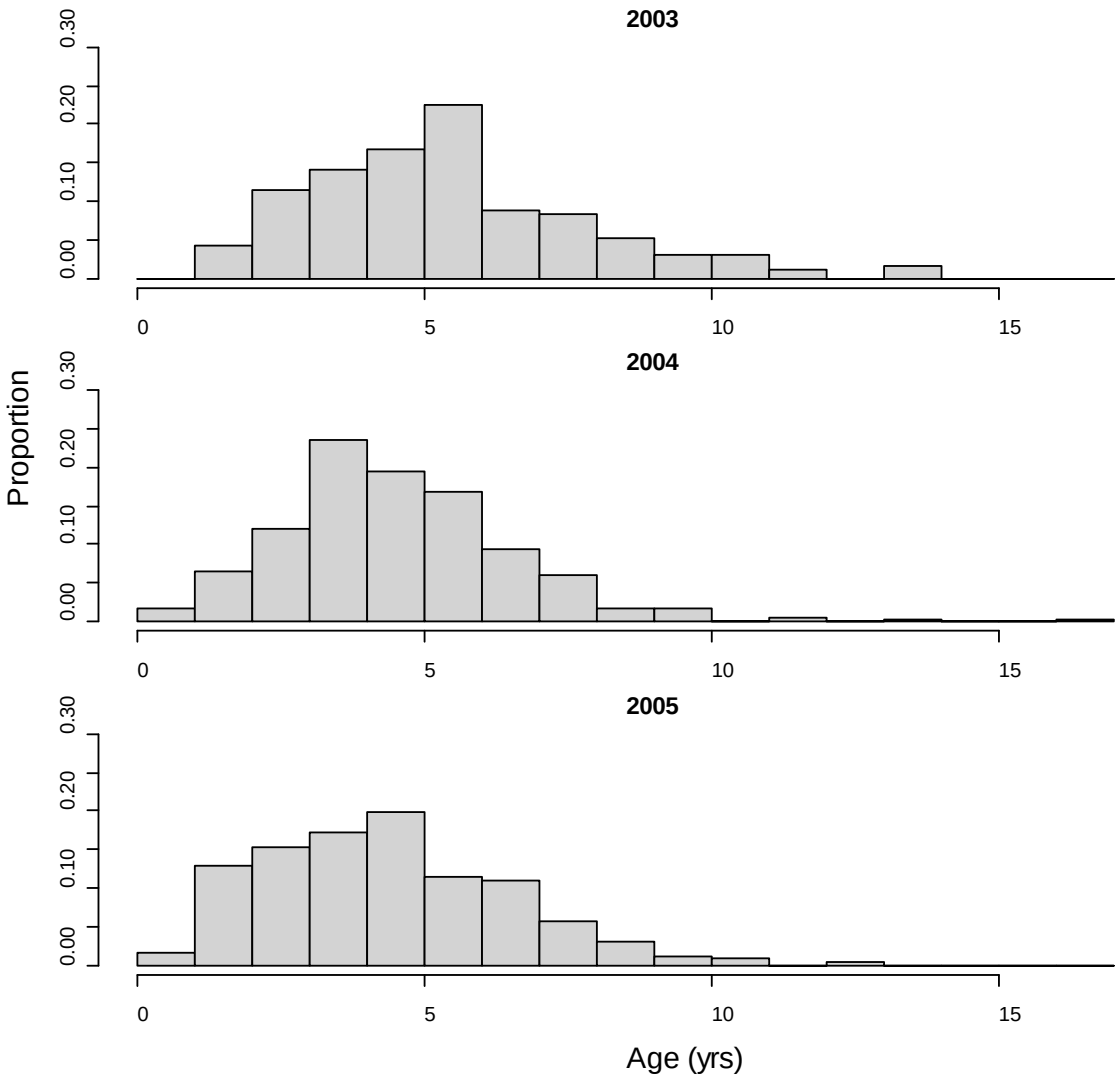


Figure 214. Age distribution for English sole sampled during the surveys from 2003 to 2005.

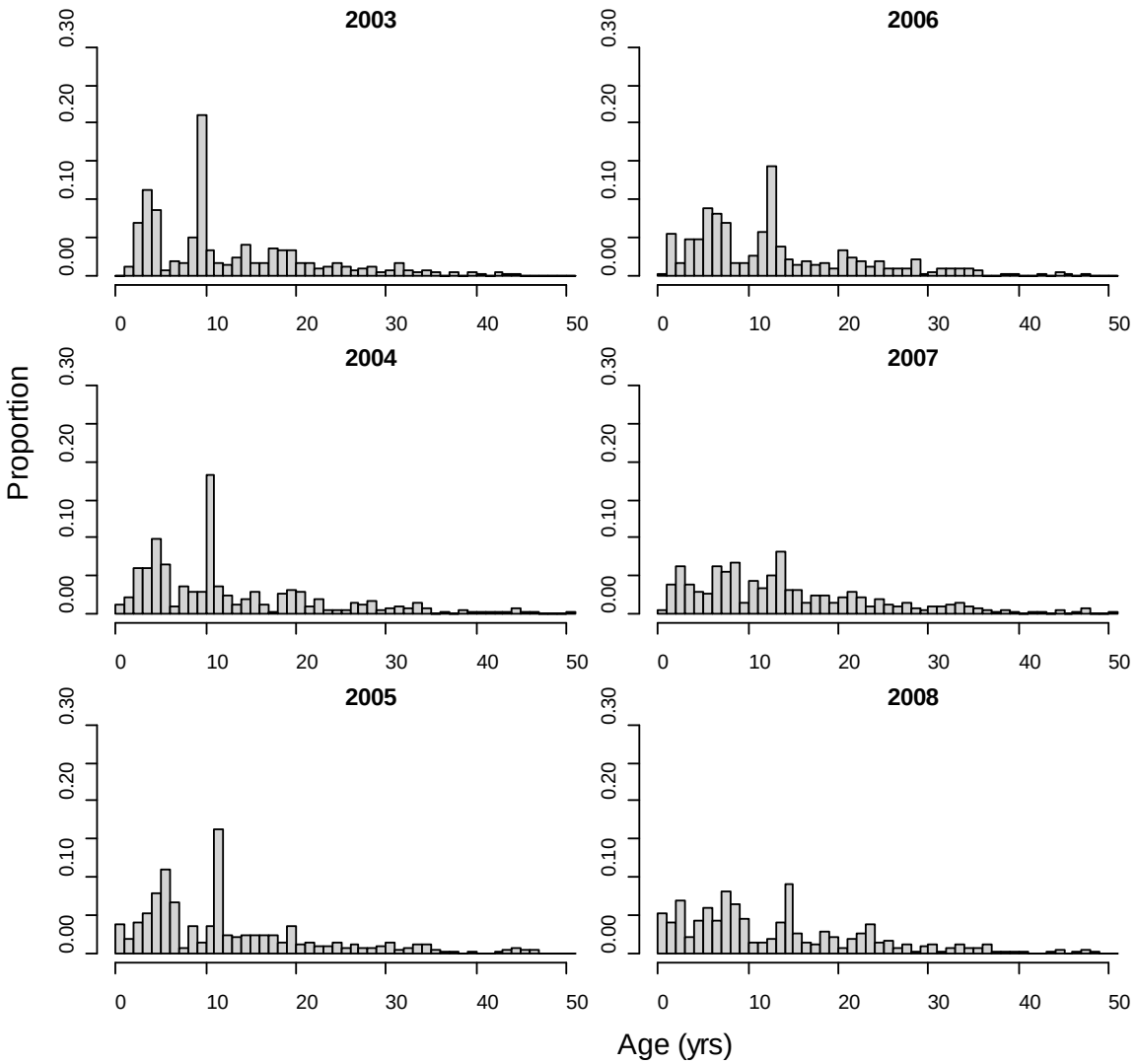


Figure 215. Age distribution for greenstriped rockfish sampled during the surveys from 2003 to 2008.

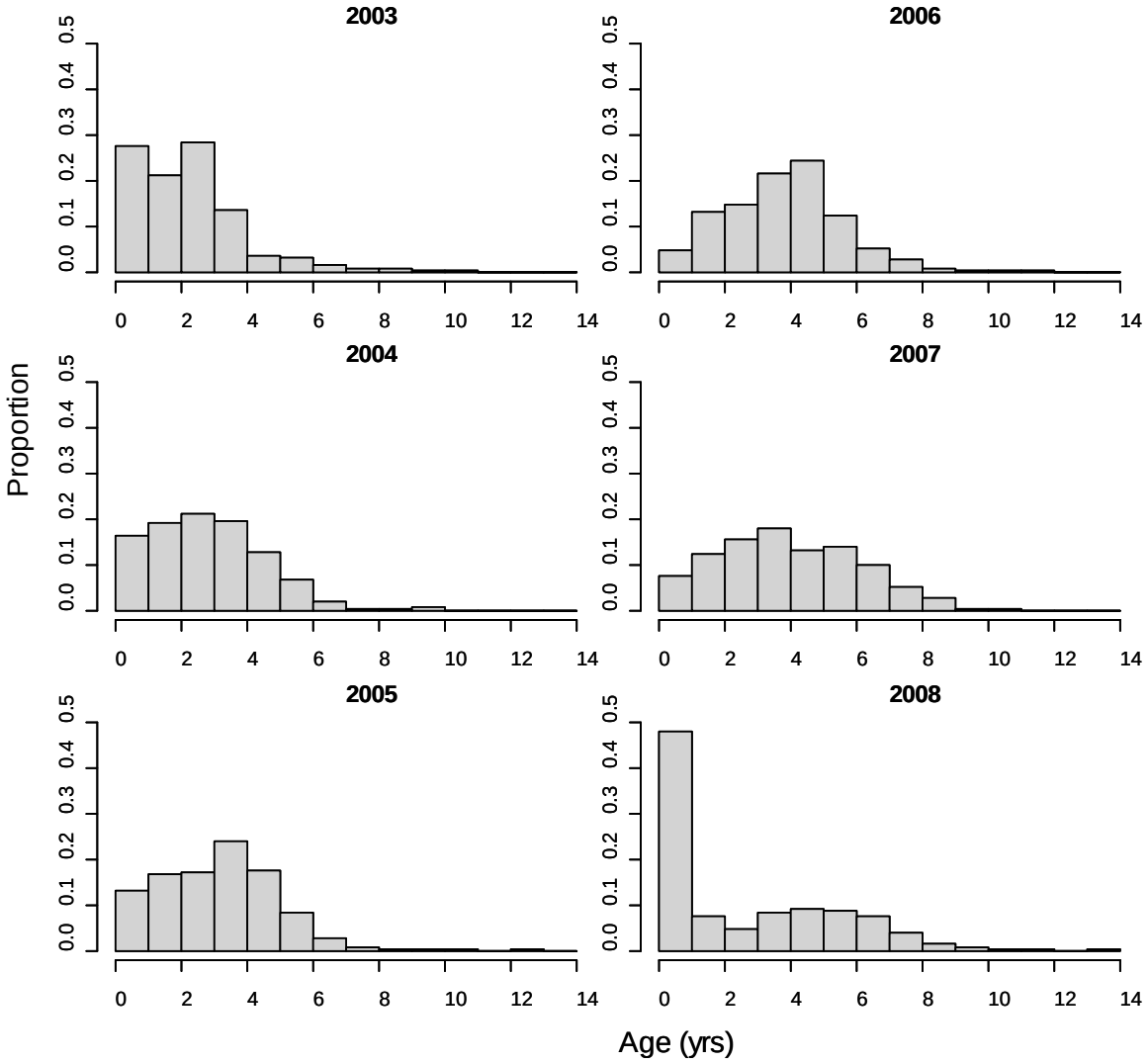


Figure 216. Age distribution for lingcod sampled during the surveys from 2003 to 2008.

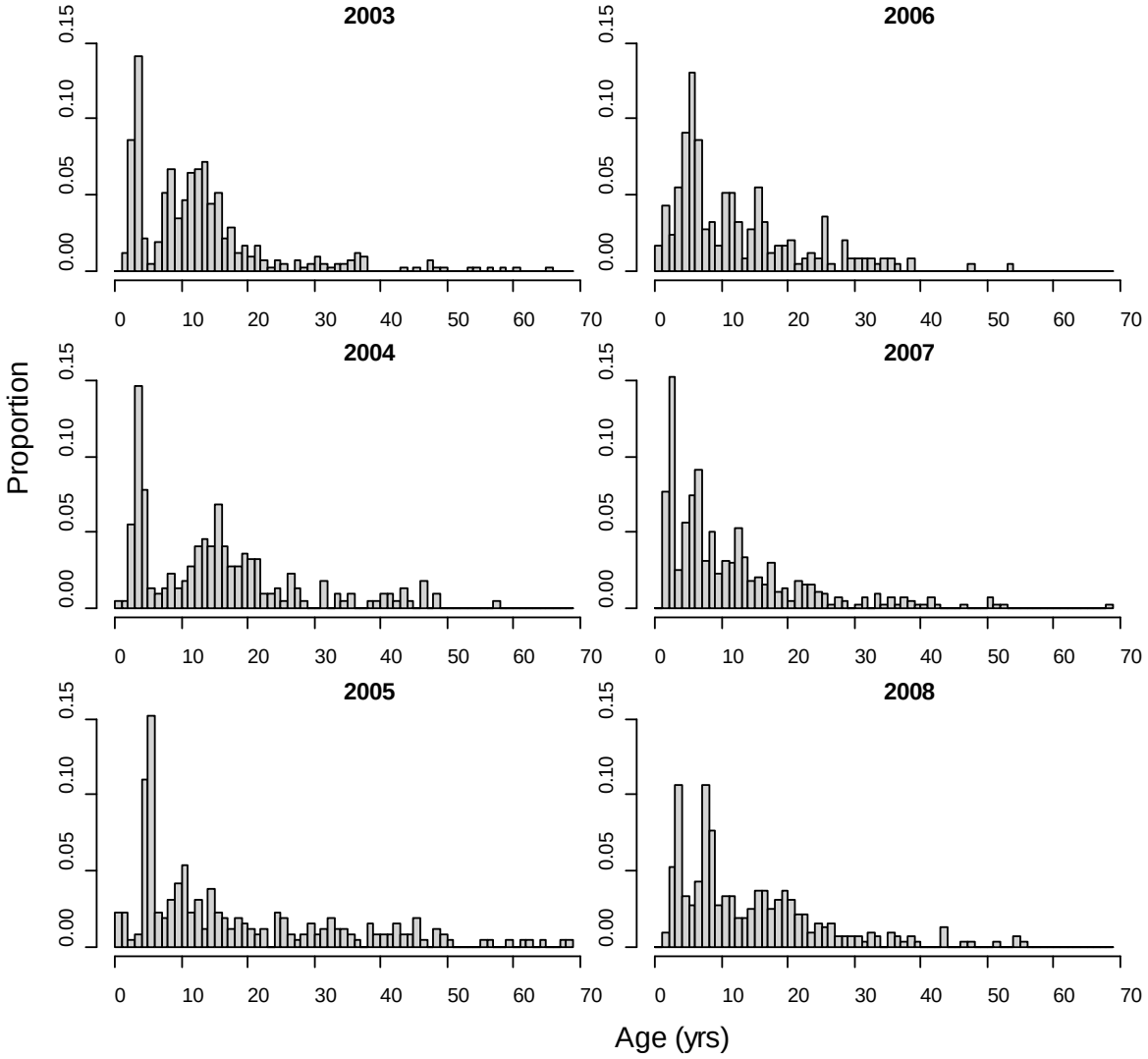


Figure 217. Age distribution for Pacific ocean perch sampled during the surveys from 2003 to 2008.

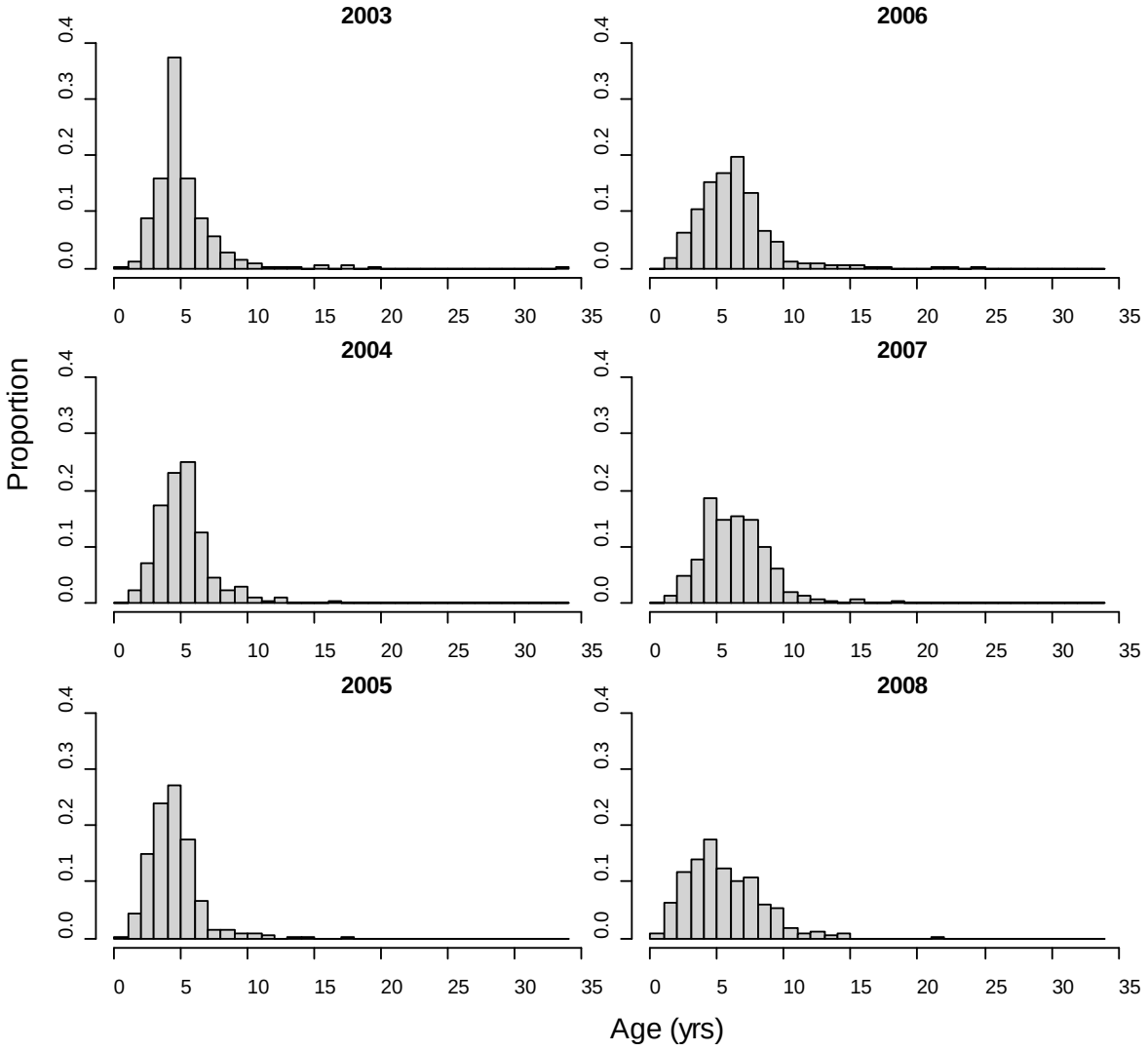


Figure 218. Age distribution for petrale sole sampled during the surveys from 2003 to 2008.

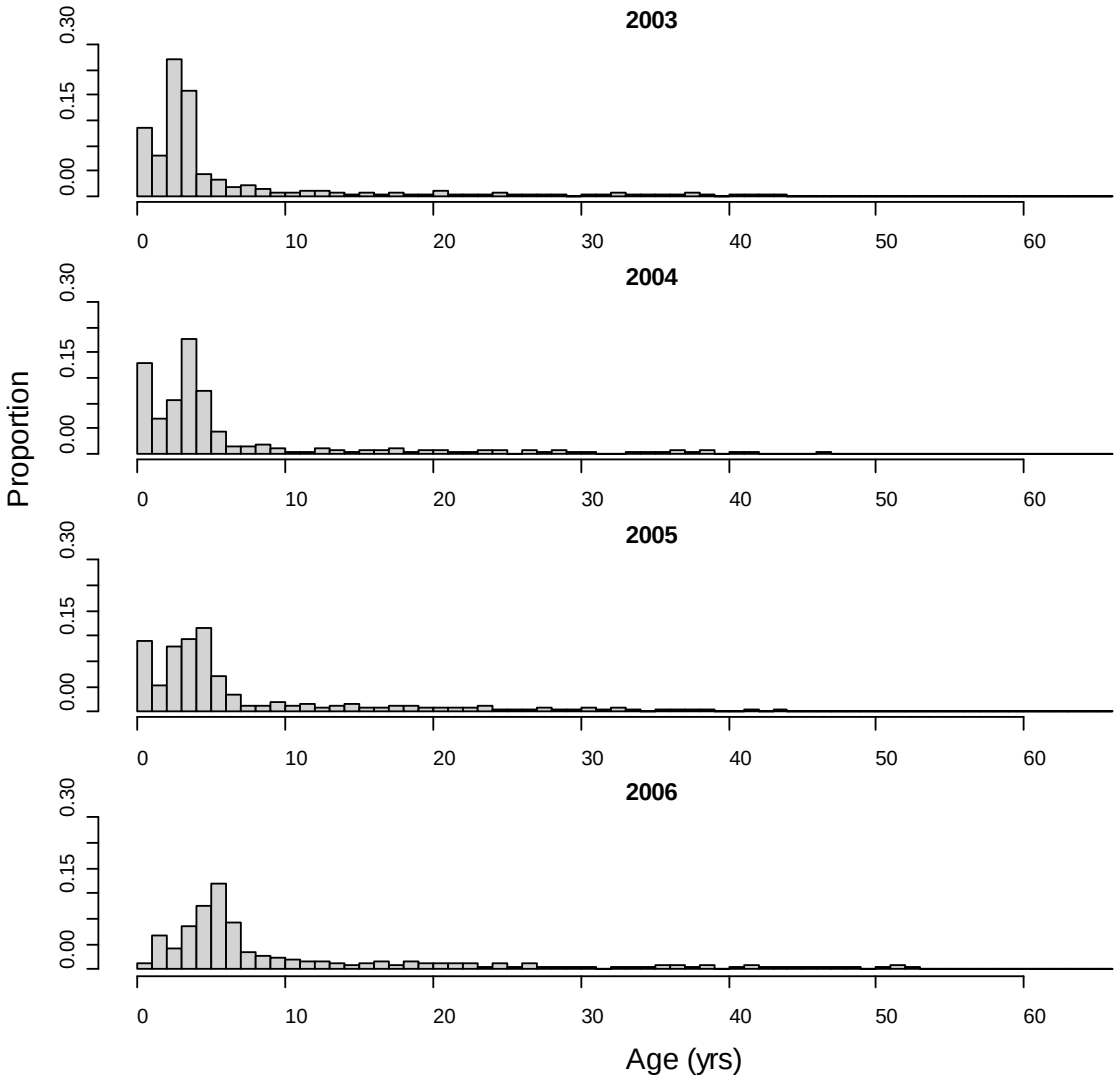


Figure 219. Age distribution for sablefish sampled during the surveys from 2003 to 2006.

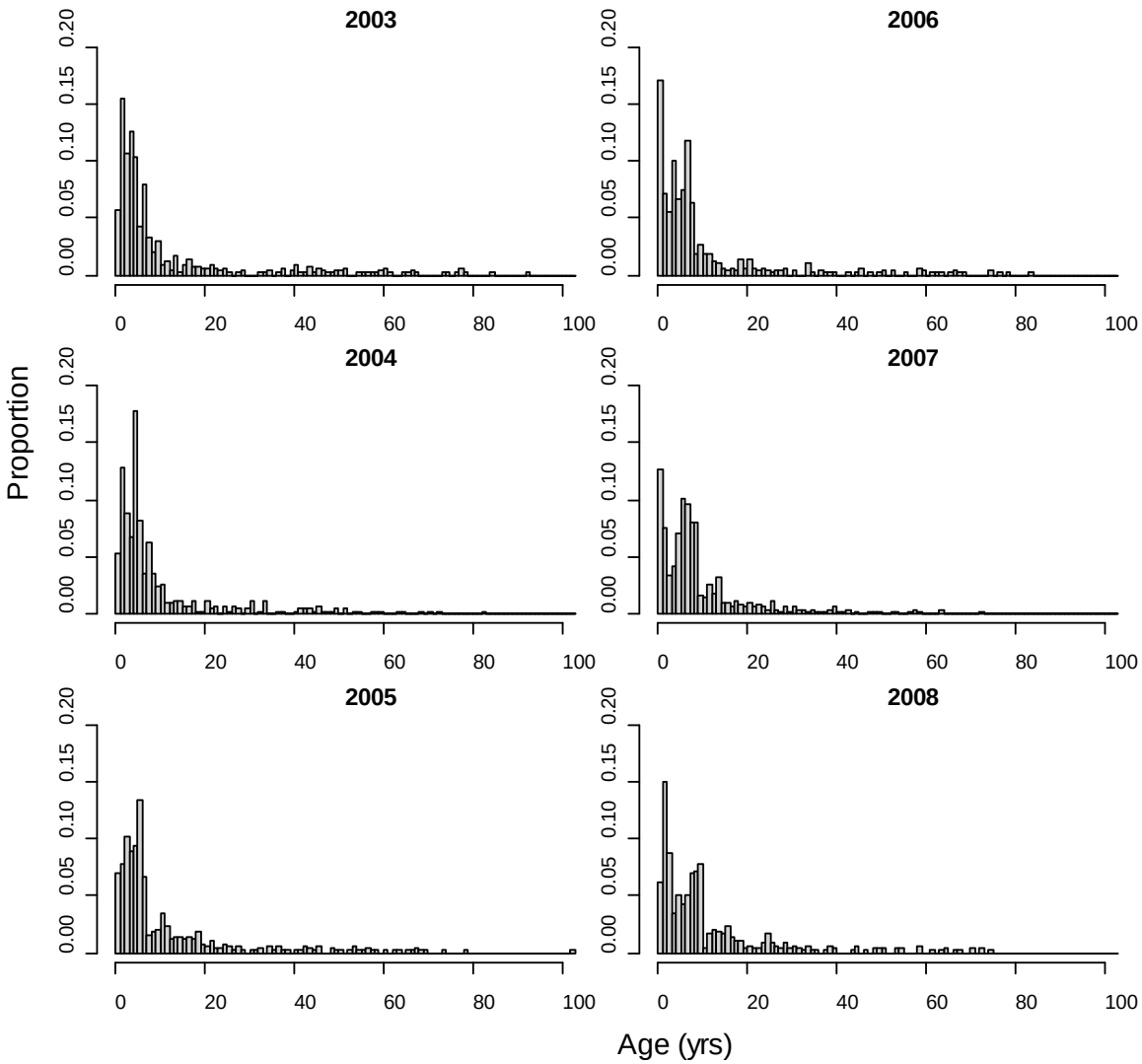


Figure 220. Age distribution for splitnose rockfish sampled during the surveys from 2003 to 2008.

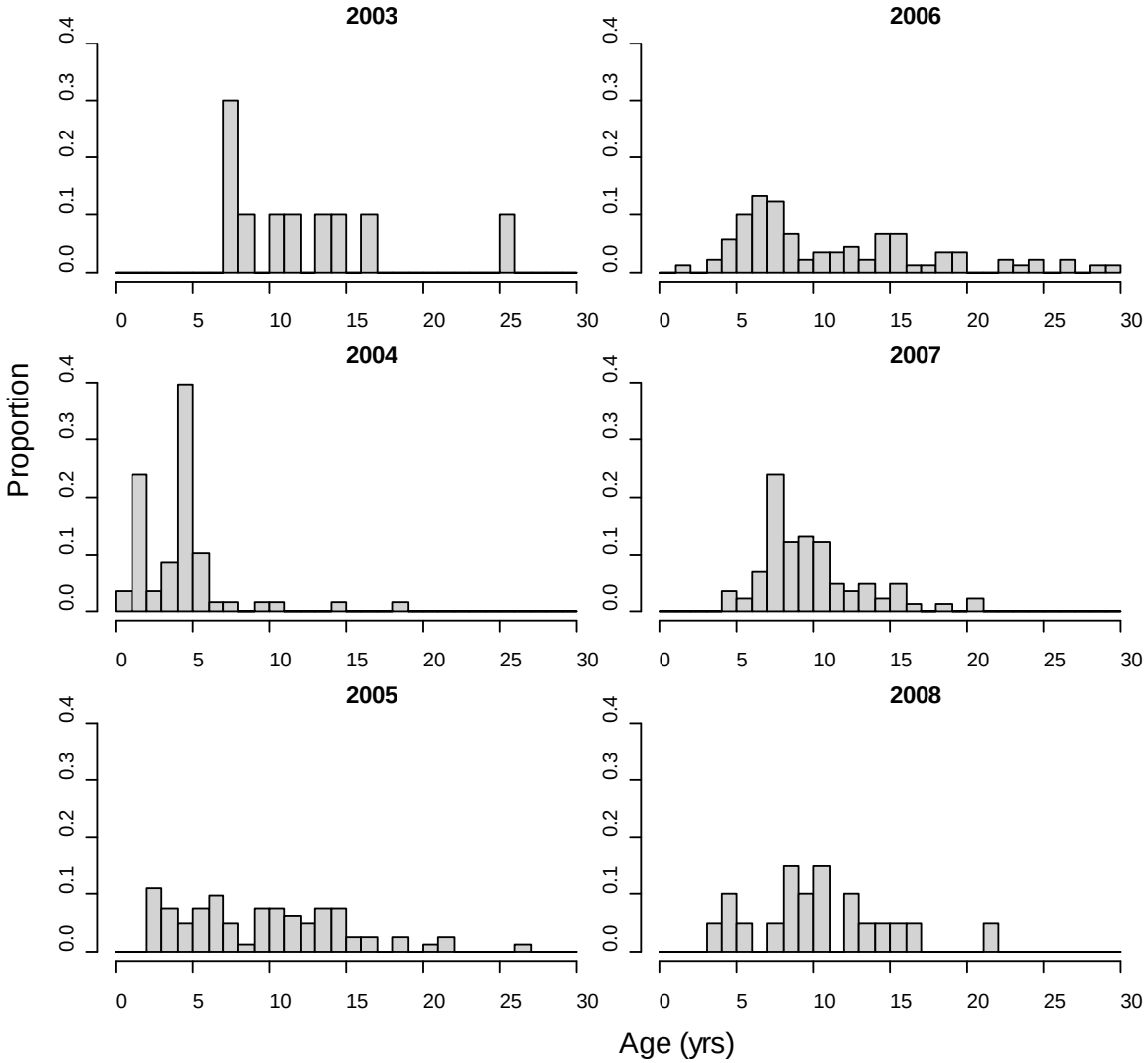


Figure 221. Age distribution for widow rockfish sampled during the surveys from 2003 to 2008.

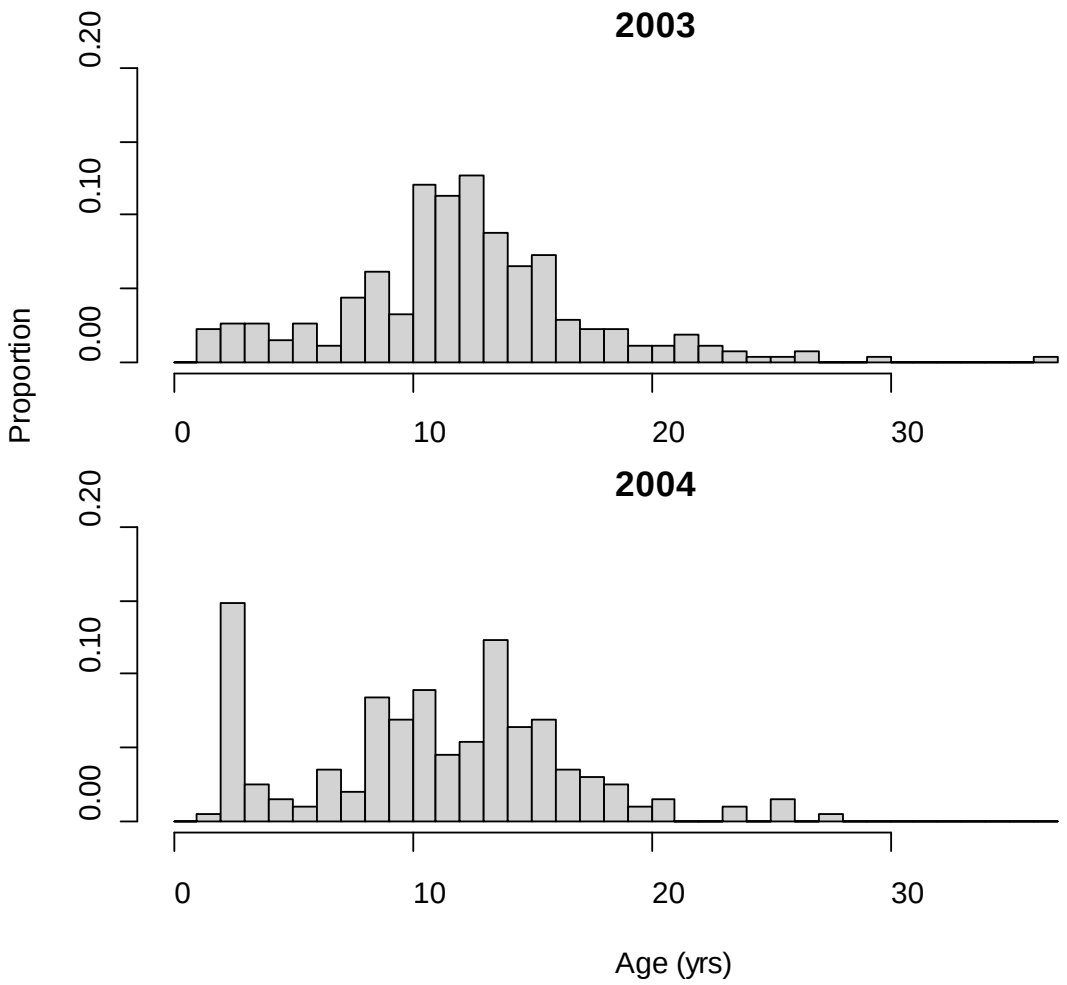


Figure 222. Age distribution for yellowtail rockfish sampled during the 2003 and 2004 surveys.

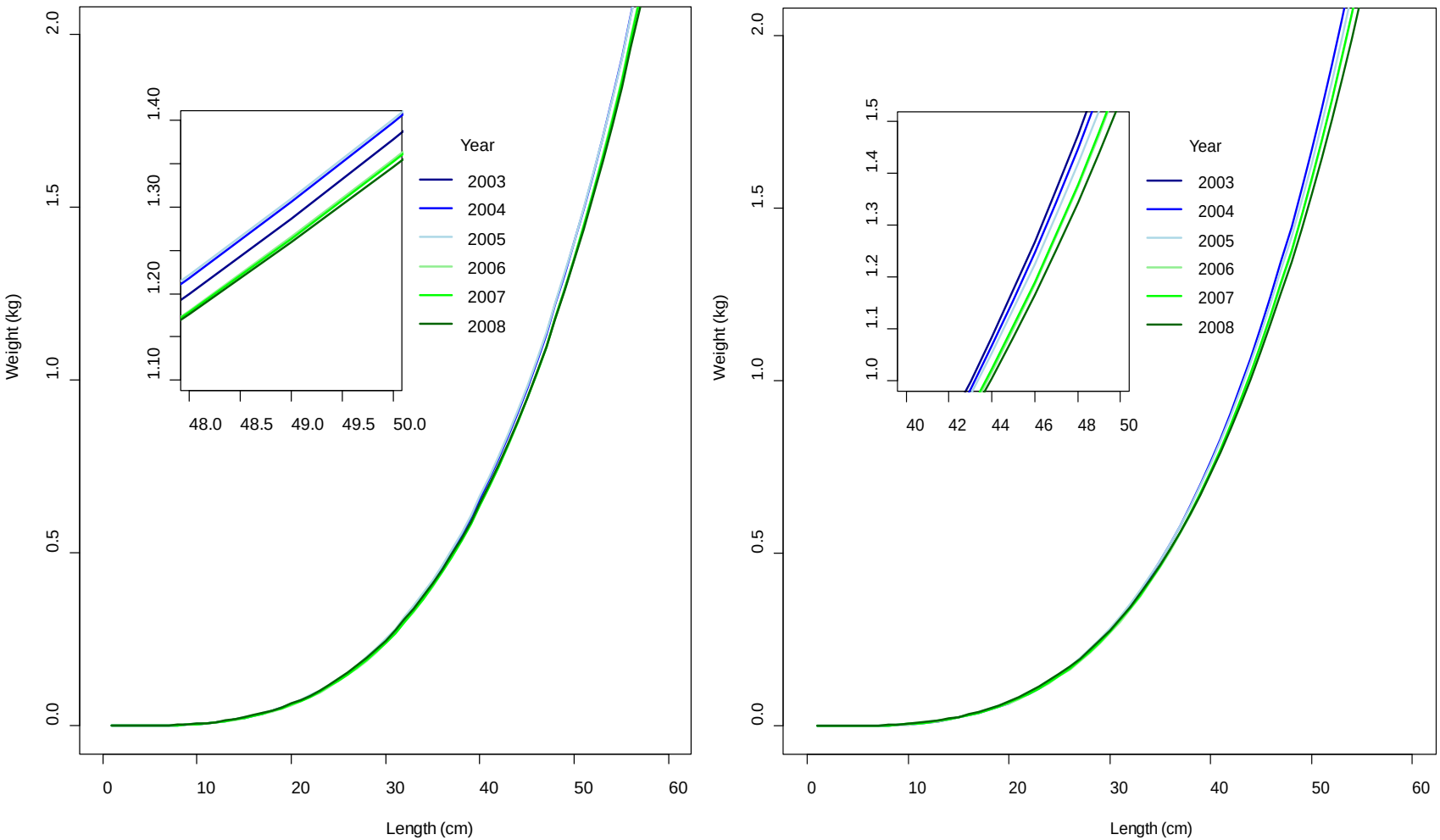


Figure 223. Weight-length relationship observed for Dover sole (left) and petrale sole (right) during the surveys from 2003 to 2008. Inset shows an enlarged view of a subsection of the graph.

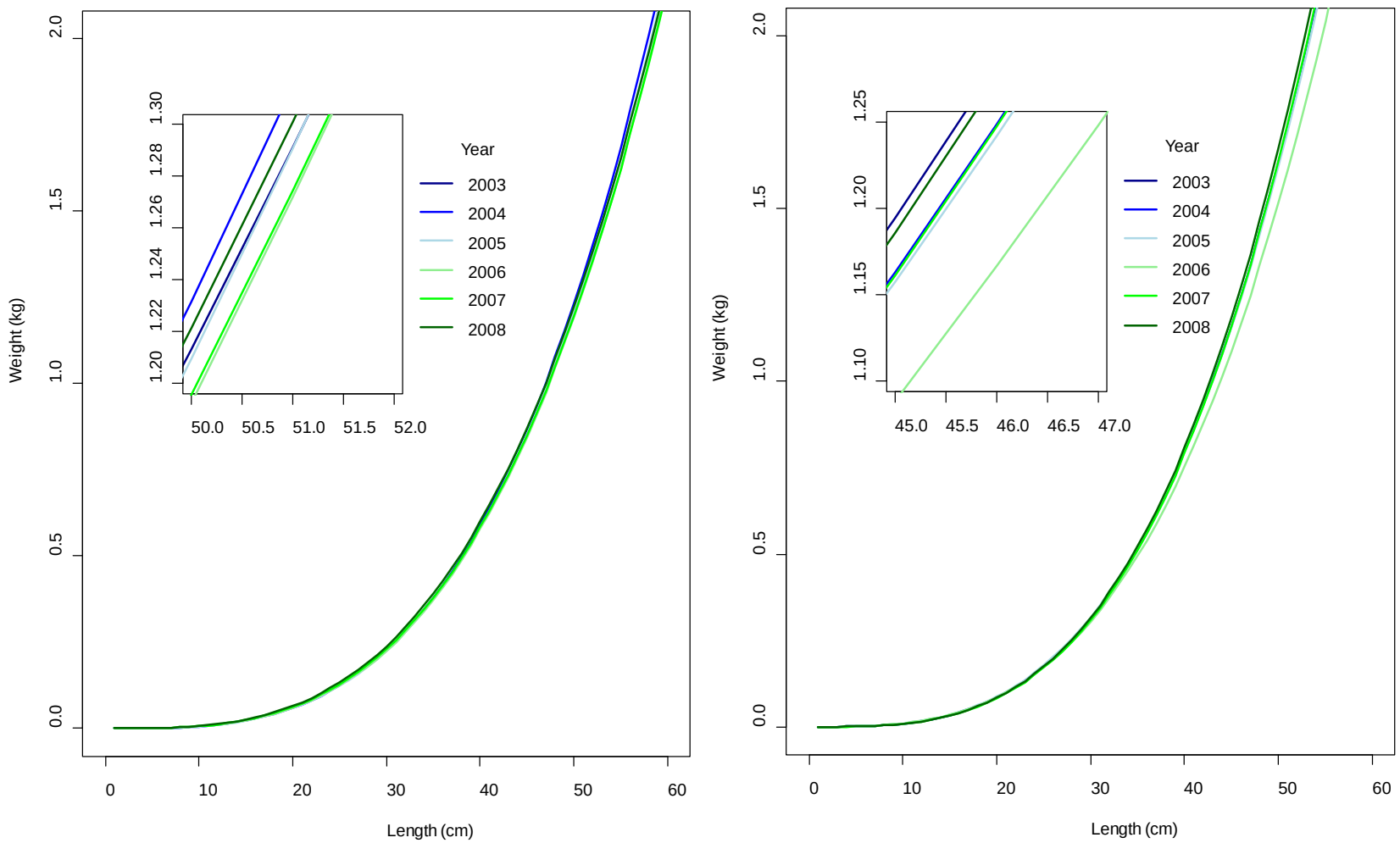


Figure 224. Weight-length relationship observed for sablefish (left) and shortspine thornyhead (right) during the surveys from 2003 to 2008. Inset shows an enlarged view of a subsection of the graph.

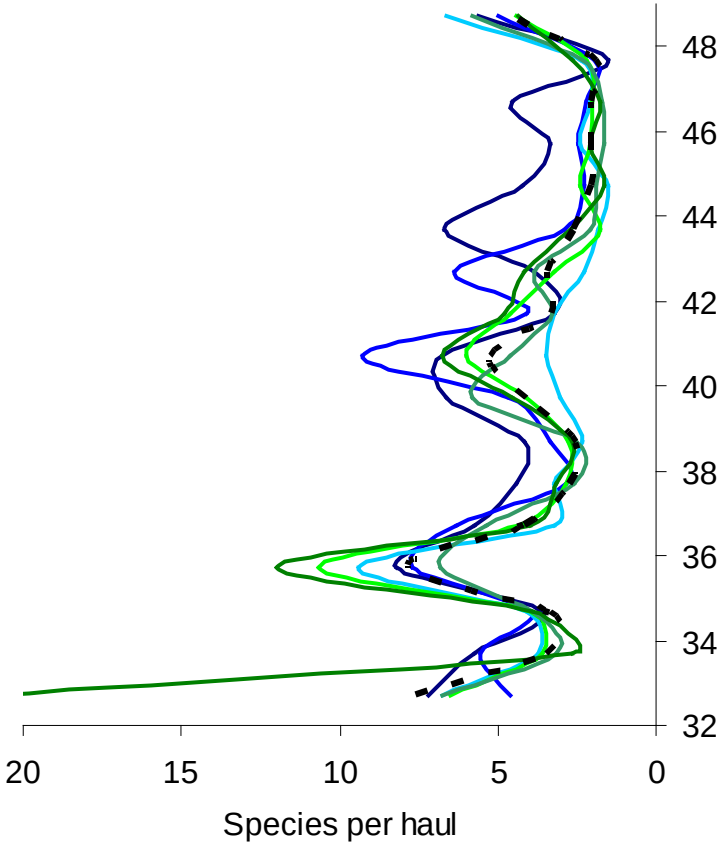


Figure 225. Species richness per tow and per year by latitude for stratum 1 (55–183 m) in the surveys from 2003 to 2008.

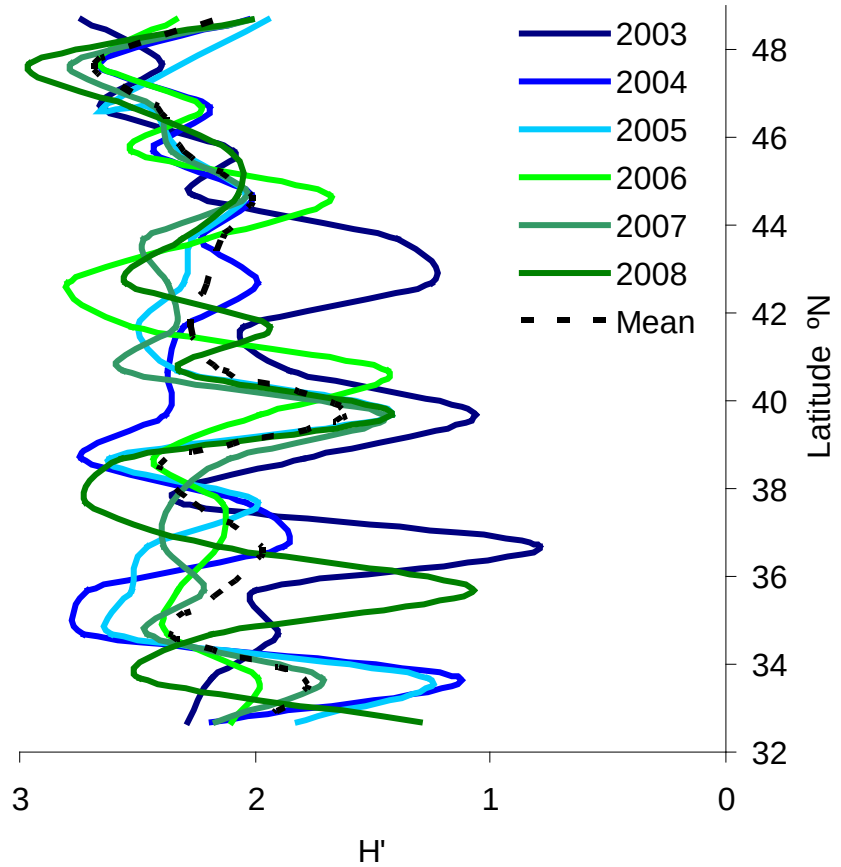


Figure 226. Species diversity by latitude for stratum 1 (55–183 m) in the surveys from 2003 to 2008. The Shannon-Weaver diversity values are based on fish species encountered within each depth strata in 1° intervals of latitude.

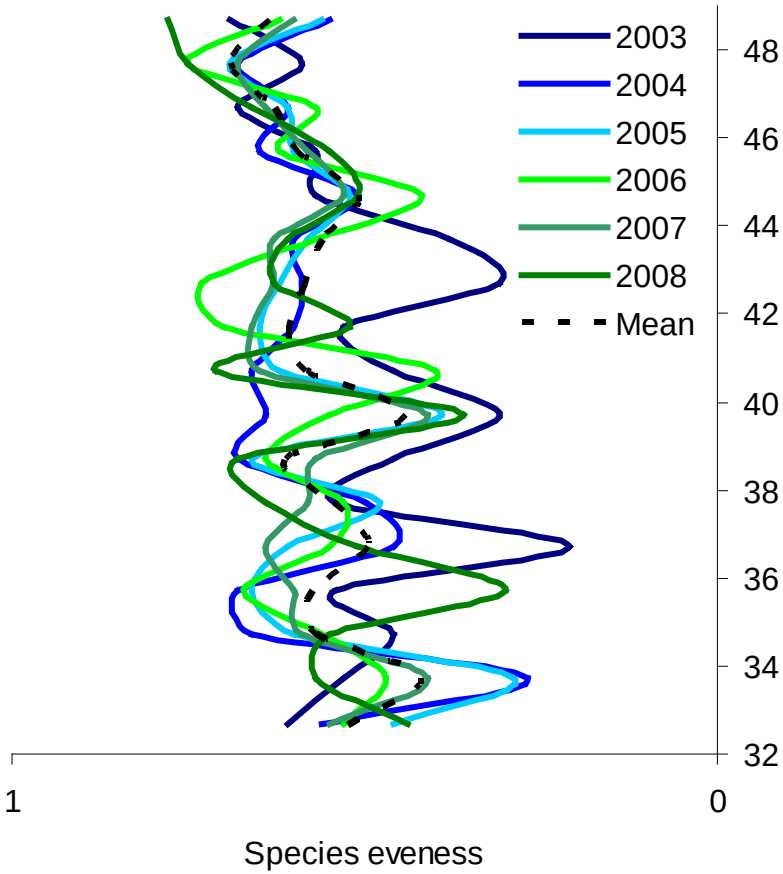


Figure 227. Species eveness by latitude for stratum 1 (55–183 m) in the surveys from 2003 to 2008. The eveness values are based on fish species encountered within each depth strata in 1° intervals of latitude.

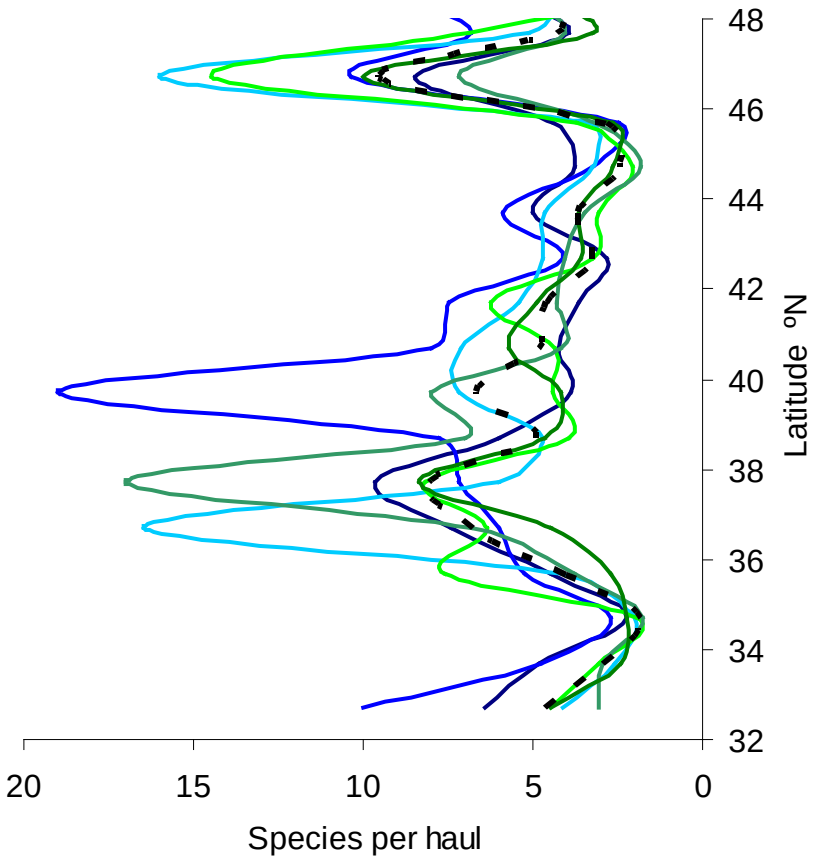


Figure 228. Species richness per tow and per year by latitude for stratum 2 (184–549 m) in the surveys from 2003 to 2008.

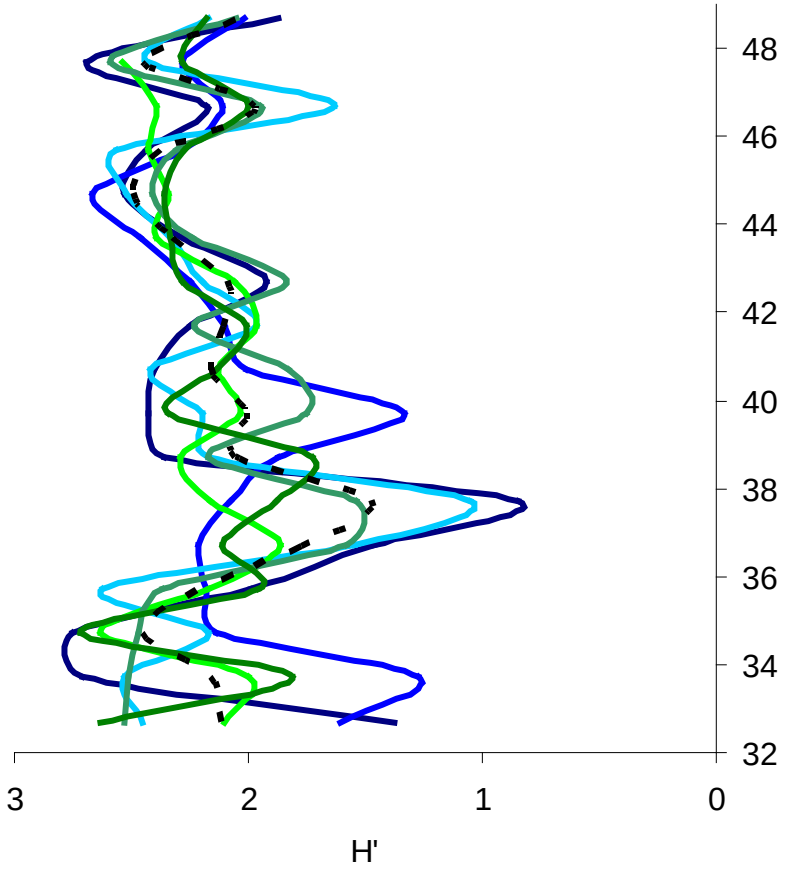


Figure 229. Species diversity by latitude for stratum 2 (184–549 m) in the surveys from 2003 to 2008. The Shannon-Weaver diversity values are based on fish species encountered within each depth strata in 1° intervals of latitude.

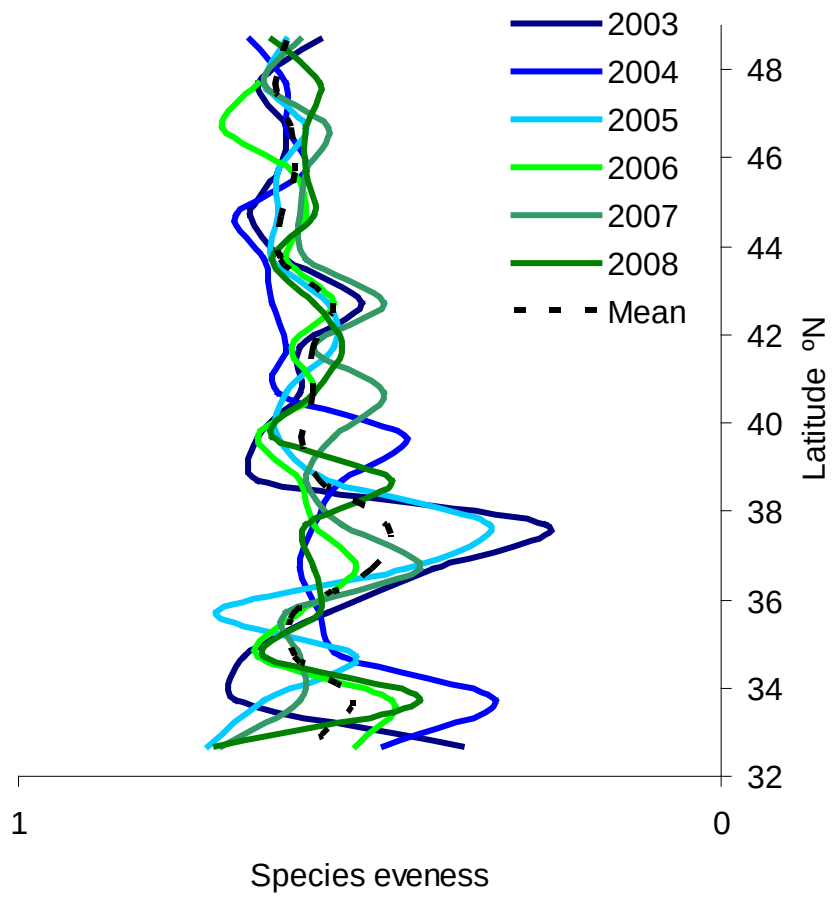


Figure 230. Species eveness by latitude for stratum 2 (184–549 m) in the surveys from 2003 to 2008. The eveness values are based on fish species encountered within each depth strata in 1° intervals of latitude.

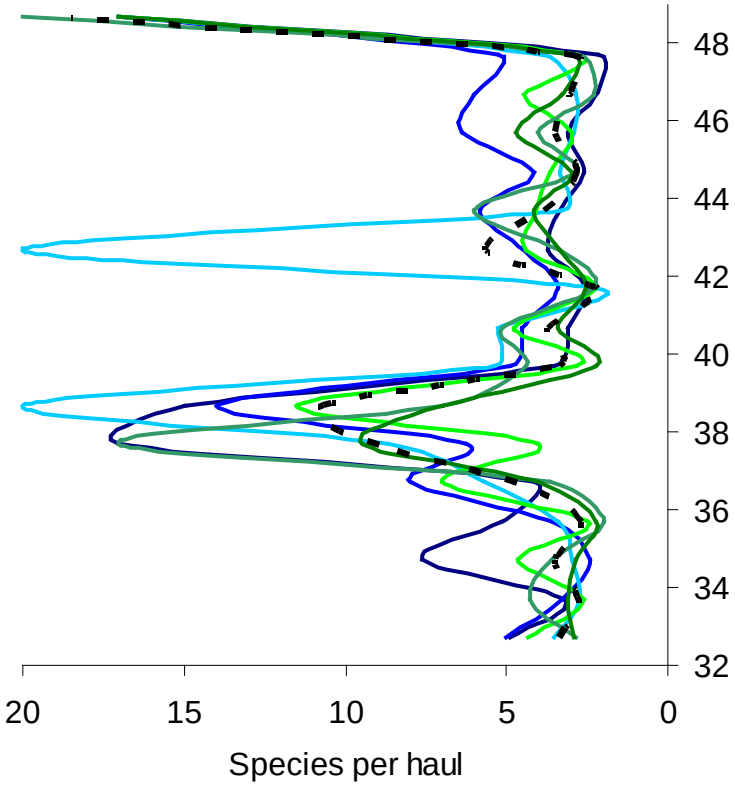


Figure 231. Species richness per tow and per year by latitude for stratum 3 (550–1,280 m) in the surveys from 2003 to 2008.

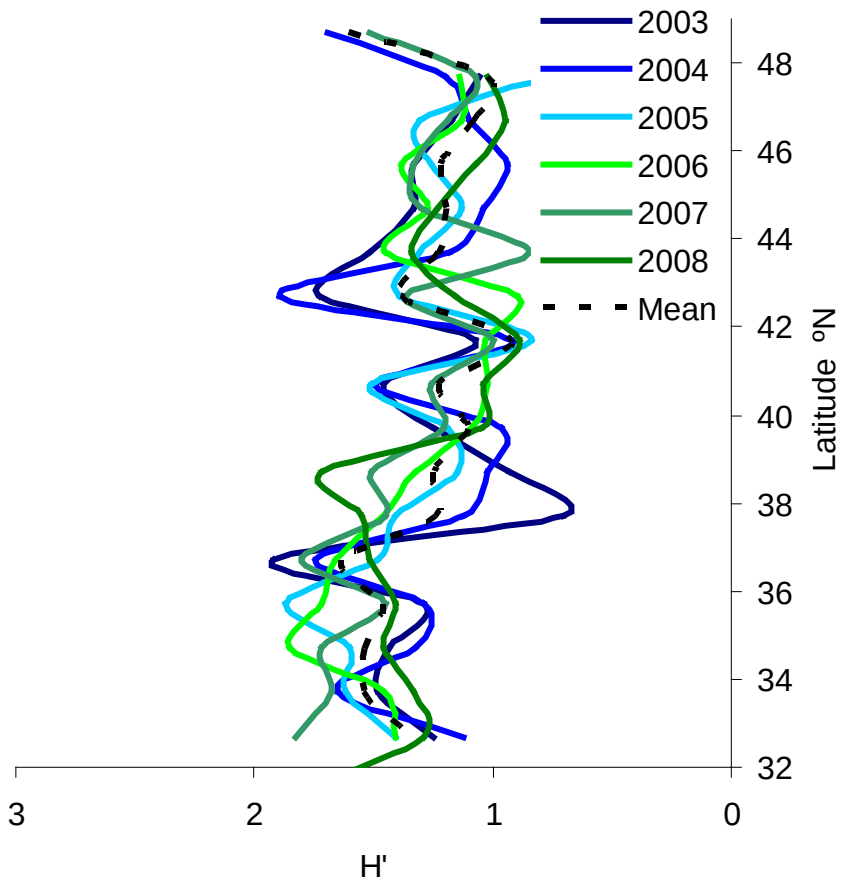


Figure 232. Species diversity by latitude for stratum 3 (550–1,280 m) in the surveys from 2003 to 2008. The Shannon-Weaver diversity values are based on fish species encountered within each depth strata in 1° intervals of latitude.

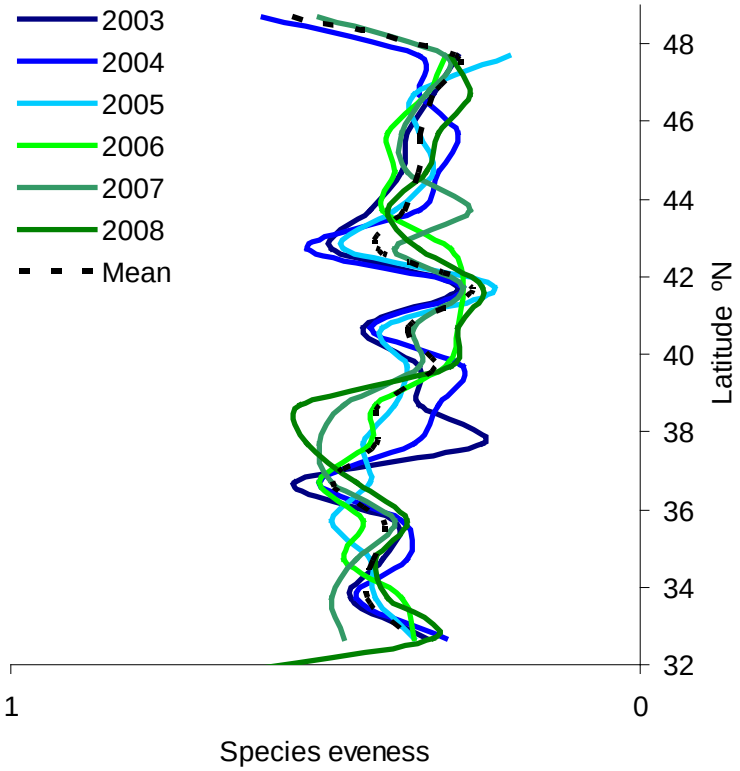


Figure 233. Species eveness by latitude for stratum 3 (550–1,280 m) in the surveys from 2003 to 2008. The eveness values are based on fish species encountered within each depth strata in 1° intervals of latitude.

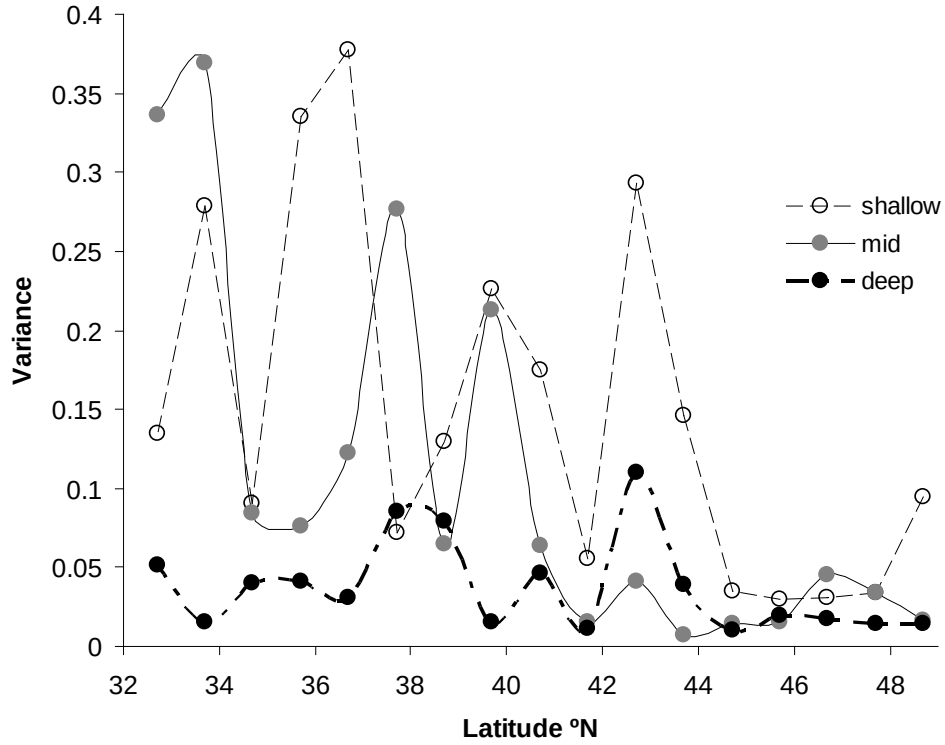


Figure 234. Patterns of variance of H′ in relation to latitude for each depth stratum for all survey years combined. Variance of H′ and latitude are plotted for each 1° latitude bin.

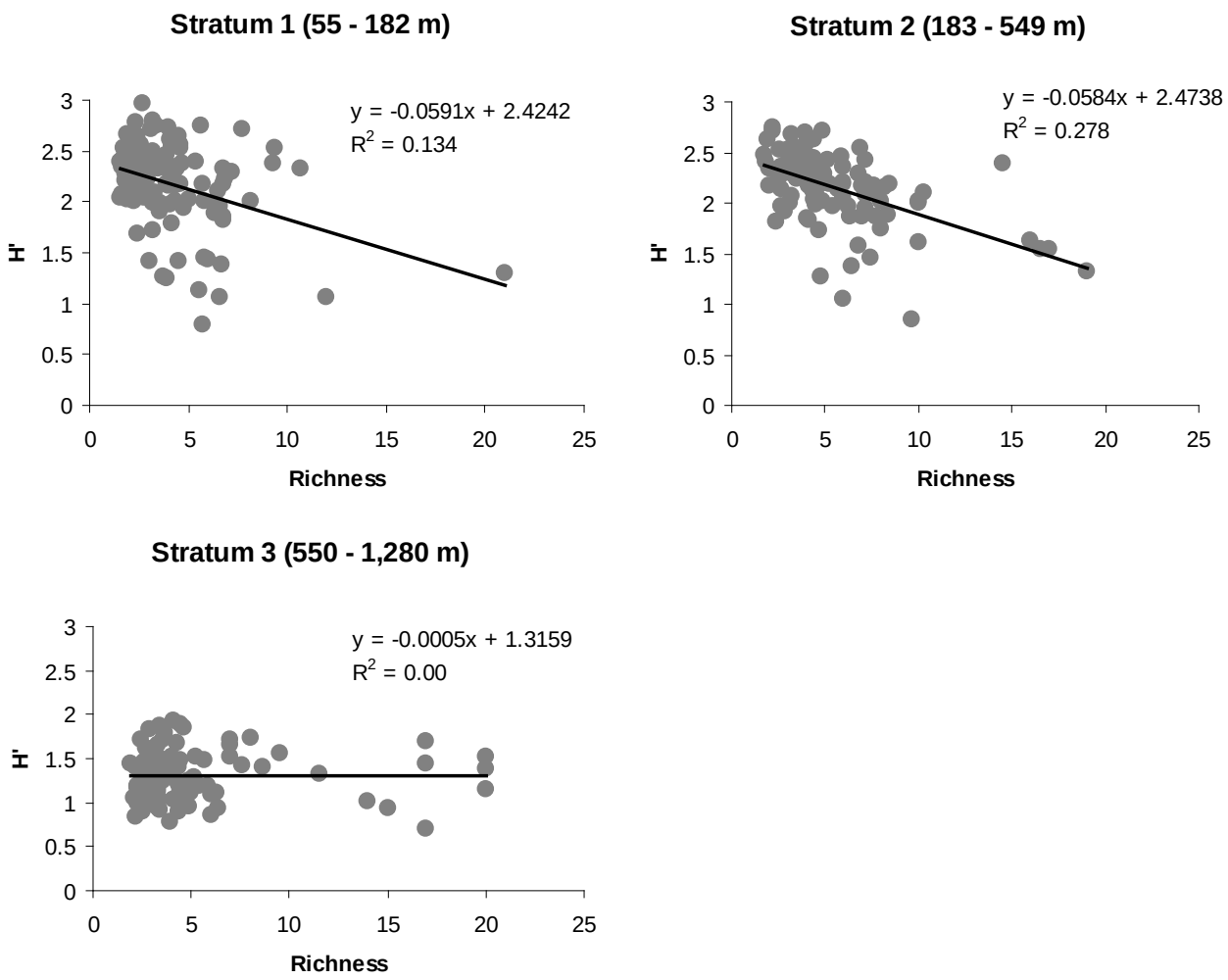


Figure 235. Relationship between species richness and diversity. Richness and diversity values are plotted for each 1° latitude bin in each year of the 2003–2008 surveys.

# Tables 1–12

Table 1. Coefficients for multiple linear regressions of net width as a function of net height and inverse scope for each fishing vessel (FV) by year. Net width = $B_0 + a$x1 + $b$x2 where x1 is net height and x2 is inverse scope. For years with no data, the vessel did not participate in the survey.

| Vessel and year | $B_0$ | $a$ | $b$ |
|---|---|---|---|
| FV *Excalibur* | | | |
| 2003 | 19.62 | –1.10 | –324.022 |
| 2004 | 18.69 | –0.80 | –337.449 |
| 2005 | 22.25 | –1.46 | –290.290 |
| 2006 | 20.78 | –1.17 | –353.574 |
| 2007 | 20.38 | –1.21 | –256.146 |
| 2008 | 17.13 | –0.53 | –415.877 |
| FV *Ms. Julie* | | | |
| 2003 | 17.30 | –0.73 | –274.059 |
| 2004 | 19.31 | –1.11 | –270.333 |
| 2005 | 18.01 | –0.86 | –278.788 |
| 2006 | 17.29 | –0.74 | –210.001 |
| 2007 | 18.67 | –1.08 | –83.643 |
| 2008 | 18.63 | –0.93 | –227.672 |
| FV *Noah's Ark* | | | |
| 2003–2004 | — | — | — |
| 2005 | 20.24 | –0.98 | –426.917 |
| 2006 | 18.21 | –0.62 | –475.140 |
| 2007 | 19.58 | –0.97 | –230.452 |
| 2008 | 19.06 | –0.97 | –213.228 |
| FV *Raven* | | | |
| 2003–2004 | — | — | — |
| 2005 | 18.05 | –0.71 | –320.346 |
| 2006 | 19.79 | –1.14 | –109.761 |
| 2007 | 20.56 | –1.34 | –151.477 |
| 2008 | 17.97 | –0.64 | –372.588 |
| FV *Captain Jack* | | | |
| 2003 | 18.24 | –0.78 | –335.527 |
| 2004–2008 | — | — | — |
| FV *Blue Horizon* | | | |
| 2003 | 19.68 | –1.02 | –308.055 |
| 2004–2008 | — | — | — |

Table 2. Area sampled and sampling density in each depth stratum for each INPFC statistical area based on successful tows during the surveys from 2003 to 2008.

| | Stratum 1 (55–183 m) | | | Stratum 2 (184–549 m) | | | Stratum 3 (550–1,280 m) | | | All strata (55–1,280 m) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **INFPC area** | **Area ($km^2$)** | **No. hauls** | **Hauls/ 1,000 $km^2$** | **Area ($km^2$)** | **No. hauls** | **Hauls/ 1,000 $km^2$** | **Area ($km^2$)** | **No. hauls** | **Hauls/ 1,000 $km^2$** | **Area ($km^2$)** | **No. hauls** | **Hauls/ 1,000 $km^2$** |
| **2003–2008** | | | | | | | | | | | | |
| U.S.-Vancouver 49º 00′–47º 30′N | 2,318 | 164 | 70.75 | 2,853 | 80 | 28.04 | 2,286 | 74 | 32.37 | 7,457 | 318 | 42.64 |
| Columbia 47º 30′–43º 00′N | 14,413 | 597 | 41.42 | 8,621 | 338 | 39.21 | 9,804 | 272 | 27.74 | 32,838 | 1,207 | 36.76 |
| Eureka 43º 00′–40º 30′N | 4,069 | 169 | 41.53 | 2,034 | 148 | 72.76 | 6,365 | 179 | 28.12 | 12,468 | 496 | 39.78 |
| Monterey 40º 30′–36º 00′N | 8,605 | 369 | 42.88 | 3,650 | 150 | 41.10 | 8,646 | 172 | 19.89 | 20,901 | 691 | 33.06 |
| Conception 36º 00′–32º 30′N | 6,994 | 307 | 43.89 | 12,839 | 414 | 32.25 | 42,041 | 358 | 8.52 | 61,874 | 1,079 | 17.44 |
| Total survey area 49º 00′–32º 30′N | 36,399 | 1,606 | 44.12 | 29,997 | 1,130 | 37.67 | 69,142 | 1,055 | 15.26 | 135,538 | 3,791 | 27.97 |
| **2003** | | | | | | | | | | | | |
| U.S.-Vancouver 49º 00′–47º 30′N | 2,318 | 48 | 20.71 | 2,853 | 16 | 5.61 | 2,286 | 23 | 10.06 | 7,457 | 87 | 11.67 |
| Columbia 47º 30′–43º 00′N | 14,413 | 47 | 3.26 | 8,621 | 40 | 4.64 | 9,804 | 61 | 6.22 | 32,838 | 148 | 4.51 |
| Eureka 43º 00′–40º 30′N | 4,069 | 35 | 8.60 | 2,034 | 36 | 17.70 | 6,365 | 33 | 5.18 | 12,468 | 104 | 8.34 |
| Monterey 40º 30′–36º 00′N | 8,605 | 45 | 5.23 | 3,650 | 30 | 8.22 | 8,646 | 26 | 3.01 | 20,901 | 101 | 4.83 |
| Conception 36º 00′–32º 30′N | 6,994 | 52 | 7.43 | 12,839 | 54 | 4.21 | 42,041 | 28 | 0.67 | 61,874 | 134 | 2.17 |
| Total survey area 49º 00′–32º 30′N | 36,399 | 227 | 6.24 | 29,997 | 176 | 5.87 | 69,142 | 171 | 2.47 | 135,538 | 574 | 4.23 |

Table 2 continued. Area sampled and sampling density in each depth stratum for each INPFC statistical area based on successful tows during the surveys from 2003 to 2008.

| | Stratum 1 (55–183 m) | | | Stratum 2 (184–549 m) | | | Stratum 3 (550–1,280 m) | | | All strata (55–1,280 m) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **INFPC area** | **Area ($km^2$)** | **No. hauls** | **Hauls/ 1,000 $km^2$** | **Area ($km^2$)** | **No. hauls** | **Hauls/ 1,000 $km^2$** | **Area ($km^2$)** | **No. hauls** | **Hauls/ 1,000 $km^2$** | **Area ($km^2$)** | **No. hauls** | **Hauls/ 1,000 $km^2$** |
| **2004** | | | | | | | | | | | | |
| U.S.-Vancouver 49º 00′–47º 30′N | 2,318 | 29 | 12.51 | 2,853 | 8 | 2.80 | 2,286 | 6 | 2.62 | 7,457 | 43 | 5.77 |
| Columbia 47º 30′–43º 00′N | 14,413 | 84 | 5.83 | 8,621 | 50 | 5.80 | 9,804 | 28 | 2.86 | 32,838 | 162 | 4.93 |
| Eureka 43º 00′–40º 30′N | 4,069 | 20 | 4.92 | 2,034 | 12 | 5.90 | 6,365 | 25 | 3.93 | 12,468 | 57 | 4.57 |
| Monterey 40º 30′–36º 00′N | 8,605 | 59 | 6.86 | 3,650 | 17 | 4.66 | 8,646 | 21 | 2.43 | 20,901 | 97 | 4.64 |
| Conception 36º 00′–32º 30′N | 6,994 | 47 | 6.72 | 12,839 | 46 | 3.58 | 42,041 | 53 | 1.26 | 61,874 | 146 | 2.36 |
| Total survey area 49º 00′–32º 30′N | 36,399 | 239 | 6.57 | 29,997 | 133 | 4.43 | 69,142 | 133 | 1.92 | 135,538 | 505 | 3.73 |
| **2005** | | | | | | | | | | | | |
| U.S.-Vancouver 49º 00′–47º 30′N | 2,318 | 21 | 9.06 | 2,853 | 14 | 4.91 | 2,286 | 8 | 3.50 | 7,457 | 43 | 5.77 |
| Columbia 47º 30′–43º 00′N | 14,413 | 119 | 8.26 | 8,621 | 51 | 5.92 | 9,804 | 53 | 5.41 | 32,838 | 223 | 6.79 |
| Eureka 43º 00′–40º 30′N | 4,069 | 38 | 9.34 | 2,034 | 23 | 11.31 | 6,365 | 28 | 4.40 | 12,468 | 89 | 7.14 |
| Monterey 40º 30′–36º 00′N | 8,605 | 78 | 9.06 | 3,650 | 21 | 5.75 | 8,646 | 20 | 2.31 | 20,901 | 119 | 5.69 |
| Conception 36º 00′–32º 30′N | 6,994 | 54 | 7.72 | 12,839 | 75 | 5.84 | 42,041 | 72 | 1.71 | 61,874 | 201 | 3.25 |
| Total survey area 49º 00′–32º 30′N | 36,399 | 310 | 8.52 | 29,997 | 184 | 6.13 | 69,142 | 181 | 2.62 | 135,538 | 675 | 4.98 |

Table 2 continued. Area sampled and sampling density in each depth stratum for each INPFC statistical area based on successful tows during the surveys from 2003 to 2008.

| | Stratum 1 (55–183 m) | | | Stratum 2 (184–549 m) | | | Stratum 3 (550–1,280 m) | | | All strata (55–1,280 m) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **INFPC area** | **Area ($km^2$)** | **No. hauls** | **Hauls/ 1,000 $km^2$** | **Area ($km^2$)** | **No. hauls** | **Hauls/ 1,000 $km^2$** | **Area ($km^2$)** | **No. hauls** | **Hauls/ 1,000 $km^2$** | **Area ($km^2$)** | **No. hauls** | **Hauls/ 1,000 $km^2$** |
| **2006** | | | | | | | | | | | | |
| U.S.-Vancouver 49º 00′–47º 30′N | 2,318 | 24 | 10.35 | 2,853 | 7 | 2.45 | 2,286 | 14 | 6.12 | 7,457 | 45 | 6.03 |
| Columbia 47º 30′–43º 00′N | 14,413 | 112 | 7.77 | 8,621 | 63 | 7.31 | 9,804 | 42 | 4.28 | 32,838 | 217 | 6.61 |
| Eureka 43º 00′–40º 30′N | 4,069 | 24 | 5.90 | 2,034 | 20 | 9.83 | 6,365 | 28 | 4.40 | 12,468 | 72 | 5.77 |
| Monterey 40º 30′–36º 00′N | 8,605 | 61 | 7.09 | 3,650 | 32 | 8.77 | 8,646 | 37 | 4.28 | 20,901 | 130 | 6.22 |
| Conception 36º 00′–32º 30′N | 6,994 | 48 | 6.86 | 12,839 | 72 | 5.61 | 42,041 | 70 | 1.67 | 61,874 | 190 | 3.07 |
| Total survey area 49º 00′–32º 30′N | 36,399 | 269 | 7.39 | 29,997 | 194 | 6.47 | 69,142 | 191 | 2.76 | 135,538 | 654 | 4.83 |
| **2007** | | | | | | | | | | | | |
| U.S.-Vancouver 49º 00′–47º 30′N | 2,318 | 25 | 10.79 | 2,853 | 17 | 5.96 | 2,286 | 12 | 5.25 | 7,457 | 54 | 7.24 |
| Columbia 47º 30′–43º 00′N | 14,413 | 124 | 8.60 | 8,621 | 72 | 8.35 | 9,804 | 45 | 4.59 | 32,838 | 241 | 7.34 |
| Eureka 43º 00′–40º 30′N | 4,069 | 28 | 6.88 | 2,034 | 28 | 13.77 | 6,365 | 33 | 5.18 | 12,468 | 89 | 7.14 |
| Monterey 40º 30′–36º 00′N | 8,605 | 56 | 6.51 | 3,650 | 18 | 4.93 | 8,646 | 29 | 3.35 | 20,901 | 103 | 4.93 |
| Conception 36º 00′–32º 30′N | 6,994 | 55 | 7.86 | 12,839 | 85 | 6.62 | 42,041 | 71 | 1.69 | 61,874 | 211 | 3.41 |
| Total survey area 49º 00′–32º 30′N | 36,399 | 288 | 7.91 | 29,997 | 220 | 7.33 | 69,142 | 190 | 2.75 | 135,538 | 698 | 5.15 |

Table 2 continued. Area sampled and sampling density in each depth stratum for each INPFC statistical area based on successful tows during the surveys from 2003 to 2008.

| | Stratum 1 (55–183 m) | | | Stratum 2 (184–549 m) | | | Stratum 3 (550–1,280 m) | | | All strata (55–1,280 m) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **INFPC area** | **Area ($km^2$)** | **No. hauls** | **Hauls/ 1,000 $km^2$** | **Area ($km^2$)** | **No. hauls** | **Hauls/ 1,000 $km^2$** | **Area ($km^2$)** | **No. hauls** | **Hauls/ 1,000 $km^2$** | **Area ($km^2$)** | **No. hauls** | **Hauls/ 1,000 $km^2$** |
| **2008** | | | | | | | | | | | | |
| U.S.-Vancouver 49º 00′–47º 30′N | 2,318 | 17 | 7.33 | 2,853 | 18 | 6.31 | 2,286 | 11 | 4.81 | 7,457 | 46 | 6.17 |
| Columbia 47º 30′–43º 00′N | 14,413 | 111 | 7.70 | 8,621 | 62 | 7.19 | 9,804 | 43 | 4.39 | 32,838 | 216 | 6.58 |
| Eureka 43º 00′–40º 30′N | 4,069 | 24 | 5.90 | 2,034 | 29 | 14.26 | 6,365 | 32 | 5.03 | 12,468 | 85 | 6.82 |
| Monterey 40º 30′–36º 00′N | 8,605 | 70 | 8.13 | 3,650 | 32 | 8.77 | 8,646 | 39 | 4.51 | 20,901 | 141 | 6.75 |
| Conception 36º 00′–32º 30′N | 6,994 | 51 | 7.29 | 12,839 | 82 | 6.39 | 42,041 | 64 | 1.52 | 61,874 | 197 | 3.18 |
| Total survey area 49º 00′–32º 30′N | 36,399 | 273 | 7.50 | 29,997 | 223 | 7.43 | 69,142 | 189 | 2.73 | 135,538 | 685 | 5.05 |

Table 3. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Vancouver INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for arrowtooth flounder, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m; and for canary rockfish, stratum 1 is 54.9–350 m and stratum 3 is defined as 350–1,280.2 m with no stratum 2. These exceptions are noted with an asterisk (*).

| **Stratum 1** | | | | | |
|---|---|---|---|---|---|
| **2003** (number of hauls = 48) | | **2004** (number of hauls = 29) | | **2005** (number of hauls = 21) | |
| Spiny dogfish | 362.95 | Spiny dogfish | 138.46 | Spiny dogfish | 126.87 |
| Pacific hake | 88.94 | Dover sole | 24.48 | Yellowtail rockfish | 35.02 |
| Sablefish | 51.32 | Arrowtooth flounder* | 23.02 | Arrowtooth flounder* | 27.36 |
| Dover sole | 31.32 | Canary rockfish* | 21.25 | Dover sole | 19.42 |
| Arrowtooth flounder* | 25.29 | Yellowtail rockfish | 20.97 | Greenstriped rockfish | 10.06 |
| Spotted ratfish | 13.98 | English sole | 12.67 | Longnose skate | 8.83 |
| Yellowtail rockfish | 13.98 | Greenstriped rockfish | 5.58 | English sole | 6.30 |
| Pacific sanddab | 10.11 | Sablefish | 5.55 | Spotted ratfish | 6.29 |
| Redstripe rockfish | 10.08 | Pacific cod | 5.34 | Rex sole | 5.94 |
| Greenstriped rockfish | 9.51 | Pacific sanddab | 5.15 | Lingcod | 3.73 |
| English sole | 9.11 | Longnose skate | 4.65 | Petrale sole | 3.03 |
| Lingcod | 9.01 | Petrale sole | 4.27 | Pacific hake | 2.94 |
| Pacific cod | 8.49 | Spotted ratfish | 3.93 | Pacific cod | 2.84 |
| Rex sole | 8.20 | Rex sole | 3.68 | Pacific sanddab | 2.41 |
| Longnose skate | 7.59 | Pacific hake | 3.57 | Sablefish | 2.02 |
| Petrale sole | 5.88 | Big skate | 3.23 | Canary rockfish* | 1.46 |
| Widow rockfish | 3.95 | Lingcod | 3.06 | Flathead sole | 1.14 |
| Canary rockfish* | 3.71 | Rosethorn rockfish | 1.14 | California skate | 0.44 |
| Flathead sole | 2.62 | Flathead sole | 1.03 | Rosethorn rockfish | 0.44 |
| Pygmy rockfish | 1.73 | Darkblotched rockfish | 0.95 | Big skate | 0.33 |
| Rosethorn rockfish | 1.56 | Redstripe rockfish | 0.92 | Darkblotched rockfish | 0.24 |
| Big skate | 1.51 | Sharpchin rockfish | 0.57 | Sharpchin rockfish | 0.18 |
| Sharpchin rockfish | 0.64 | Pacific ocean perch | 0.44 | Redstripe rockfish | 0.11 |
| Greenspotted rockfish | 0.49 | Redbanded rockfish | 0.22 | Rougheye rockfish | 0.03 |
| Darkblotched rockfish | 0.29 | Shortspine thornyhead | 0.14 | Pacific ocean perch | 0.01 |
| Bocaccio | 0.24 | Splitnose rockfish | 0.10 | Redbanded rockfish | 0.01 |
| Shortspine thornyhead | 0.23 | Greenspotted rockfish | 0.09 | Pygmy rockfish | 0.01 |
| Pacific ocean perch | 0.08 | Widow rockfish | 0.08 | Splitnose rockfish | <0.01 |
| Curlfin sole | 0.07 | Pygmy rockfish | 0.03 | Stripetail rockfish | <0.01 |
| Splitnose rockfish | 0.02 | Rougheye rockfish | 0.01 | | |
| Rougheye rockfish | 0.01 | Stripetail rockfish | <0.01 | | |
| Redbanded rockfish | 0.01 | | | | |
| Stripetail rockfish | 0.01 | | | | |
| Grooved tanner crab | <0.01 | | | | |
| Shortbelly rockfish | <0.01 | | | | |

Table 3 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Vancouver INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for arrowtooth flounder, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m; and for canary rockfish, stratum 1 is 54.9–350 m and stratum 3 is defined as 350–1,280.2 m with no stratum 2. These exceptions are noted with an asterisk (*).

| **Stratum 1** | | | | | |
|---|---|---|---|---|---|
| **2006** (number of hauls = 24) | | **2007** (number of hauls = 25) | | **2008** (number of hauls = 17) | |
| Canary rockfish* | 171.14 | Yellowtail rockfish | 51.37 | Yellowtail rockfish | 30.36 |
| Yellowtail rockfish | 26.94 | Spiny dogfish | 38.77 | Spiny dogfish | 15.13 |
| Redstripe rockfish | 25.73 | Dover sole | 16.52 | Arrowtooth flounder* | 15.08 |
| Spotted ratfish | 15.87 | Arrowtooth flounder* | 15.30 | Spotted ratfish | 11.97 |
| Dover sole | 12.70 | Greenstriped rockfish | 12.02 | Greenstriped rockfish | 9.60 |
| Spiny dogfish | 9.80 | Longnose skate | 11.05 | Dover sole | 6.35 |
| Lingcod | 8.11 | Lingcod | 8.06 | Longnose skate | 5.80 |
| Longnose skate | 6.23 | Canary rockfish* | 5.35 | Lingcod | 5.37 |
| Arrowtooth flounder* | 6.15 | Spotted ratfish | 4.49 | English sole | 5.37 |
| Greenstriped rockfish | 5.99 | Rex sole | 3.31 | Pacific sanddab | 4.88 |
| Rex sole | 5.51 | Petrale sole | 2.61 | Redstripe rockfish | 4.14 |
| Petrale sole | 4.03 | English sole | 2.27 | Canary rockfish* | 3.53 |
| Pacific cod | 4.00 | Splitnose rockfish | 1.92 | Rosethorn rockfish | 2.66 |
| Bocaccio | 3.26 | Pacific hake | 1.83 | Petrale sole | 2.40 |
| English sole | 2.85 | Sharpchin rockfish | 1.80 | Rex sole | 2.18 |
| Flathead sole | 1.91 | Redstripe rockfish | 1.72 | Sharpchin rockfish | 2.18 |
| Pacific sanddab | 1.83 | Pacific cod | 1.20 | Pacific cod | 1.33 |
| Widow rockfish | 1.34 | Darkblotched rockfish | 1.16 | Bocaccio | 0.71 |
| Big skate | 1.30 | Rosethorn rockfish | 0.95 | Sablefish | 0.35 |
| Pacific hake | 1.22 | Bocaccio | 0.71 | Splitnose rockfish | 0.32 |
| Darkblotched rockfish | 1.12 | Pacific sanddab | 0.70 | Pygmy rockfish | 0.16 |
| Sharpchin rockfish | 1.01 | Sablefish | 0.59 | Rougheye rockfish | 0.13 |
| Sablefish | 0.55 | Pacific ocean perch | 0.32 | Flathead sole | 0.05 |
| Shortbelly rockfish | 0.30 | Big skate | 0.20 | Redbanded rockfish | 0.03 |
| Rosethorn rockfish | 0.22 | Flathead sole | 0.17 | Greenspotted rockfish | 0.03 |
| Shortspine thornyhead | 0.11 | Stripetail rockfish | 0.12 | Darkblotched rockfish | 0.03 |
| Pacific ocean perch | 0.10 | Greenspotted rockfish | 0.04 | Bank rockfish | <0.01 |
| Rougheye rockfish | 0.05 | Widow rockfish | 0.03 | Stripetail rockfish | <0.01 |
| Splitnose rockfish | 0.03 | Curlfin sole | 0.02 | Shortspine thornyhead | <0.01 |
| Greenspotted rockfish | 0.03 | Pygmy rockfish | 0.02 | | |
| Pygmy rockfish | 0.02 | Shortspine thornyhead | 0.01 | | |
| Stripetail rockfish | 0.01 | Redbanded rockfish | 0.01 | | |
| Redbanded rockfish | <0.01 | Longspine thornyhead | <0.01 | | |

Table 3 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Vancouver INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for arrowtooth flounder, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m. These exceptions are noted with an asterisk (*).

| **Stratum 2** | | | | | |
|---|---|---|---|---|---|
| **2003** (number of hauls = 16) | | **2004** (number of hauls = 8) | | **2005** (number of hauls = 14) | |
| Spiny dogfish | 133.75 | Dover sole | 57.47 | Dover sole | 64.93 |
| Dover sole | 63.98 | Sablefish | 29.56 | Arrowtooth flounder* | 58.43 |
| Pacific ocean perch | 39.52 | Pacific ocean perch | 29.13 | Sablefish | 21.89 |
| Arrowtooth flounder* | 38.17 | Arrowtooth flounder* | 26.9 | Longnose skate | 15.77 |
| Longnose skate | 13.11 | Sharpchin rockfish | 24.03 | Pacific ocean perch | 14.46 |
| Shortspine thornyhead | 11.57 | Spiny dogfish | 19.37 | Spiny dogfish | 10.87 |
| Spotted ratfish | 8.89 | Spotted ratfish | 11.47 | Splitnose rockfish | 10.43 |
| Sablefish | 8.19 | Longnose skate | 9.19 | Spotted ratfish | 8.47 |
| Rex sole | 7.83 | Shortspine thornyhead | 8.59 | Rex sole | 6.77 |
| Splitnose rockfish | 6.51 | Redbanded rockfish | 7.05 | Shortspine thornyhead | 4.56 |
| Flathead sole | 6.45 | Rex sole | 5.80 | Flathead sole | 3.80 |
| Pacific hake | 5.16 | Rosethorn rockfish | 2.60 | Greenstriped rockfish | 3.71 |
| Sharpchin rockfish | 4.88 | Pacific hake | 2.08 | Yellowtail rockfish | 3.38 |
| Greenstriped rockfish | 4.64 | Rougheye rockfish | 1.43 | Pacific cod | 1.87 |
| Darkblotched rockfish | 4.60 | English sole | 1.36 | Rougheye rockfish | 1.38 |
| Pacific cod | 3.34 | Lingcod | 1.09 | Redstripe rockfish | 1.24 |
| Lingcod | 2.02 | Flathead sole | 0.76 | Pacific hake | 1.19 |
| Redbanded rockfish | 1.49 | Pacific cod | 0.54 | English sole | 0.79 |
| Rosethorn rockfish | 1.24 | Longspine thornyhead | 0.30 | Darkblotched rockfish | 0.69 |
| Yellowtail rockfish | 1.17 | Petrale sole | 0.16 | Redbanded rockfish | 0.54 |
| Petrale sole | 1.11 | Greenstriped rockfish | 0.15 | Lingcod | 0.37 |
| Rougheye rockfish | 0.81 | Giant grenadier | 0.09 | Sharpchin rockfish | 0.26 |
| English sole | 0.35 | Widow rockfish | 0.08 | Aurora rockfish | 0.12 |
| Redstripe rockfish | 0.28 | Pacific flatnose | 0.07 | Petrale sole | 0.07 |
| Grooved tanner crab | 0.17 | Grooved tanner crab | 0.02 | Rosethorn rockfish | 0.07 |
| Longspine thornyhead | 0.11 | Pacific grenadier | 0.01 | Widow rockfish | 0.03 |
| Widow rockfish | 0.08 | Splitnose rockfish | <0.01 | Grooved tanner crab | 0.01 |
| Aurora rockfish | 0.06 | | | Stripetail rockfish | 0.01 |
| Pacific flatnose | 0.03 | | | | |
| Stripetail rockfish | 0.01 | | | | |
| Pacific grenadier | <0.01 | | | | |

Table 3 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Vancouver INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for arrowtooth flounder, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m. These exceptions are noted with an asterisk (*).

| **Stratum 2** | | | | | |
|---|---|---|---|---|---|
| **2006** (number of hauls = 7) | | **2007** (number of hauls = 17) | | **2008** (number of hauls = 18) | |
| Pacific ocean perch | 88.58 | Dover sole | 55.69 | Dover sole | 96.86 |
| Dover sole | 50.74 | Arrowtooth flounder* | 32.54 | Arrowtooth flounder* | 34.79 |
| Arrowtooth flounder* | 34.74 | Splitnose rockfish | 18.02 | Longnose skate | 19.90 |
| Longnose skate | 20.47 | Greenstriped rockfish | 17.83 | Rex sole | 10.03 |
| Darkblotched rockfish | 12.90 | Pacific ocean perch | 15.25 | Spiny dogfish | 9.51 |
| Sablefish | 11.94 | Longnose skate | 10.64 | Shortspine thornyhead | 9.20 |
| Sharpchin rockfish | 8.96 | Spotted ratfish | 9.94 | Sablefish | 7.19 |
| Splitnose rockfish | 8.56 | Sablefish | 7.59 | Greenstriped rockfish | 4.97 |
| Spotted ratfish | 7.92 | Rex sole | 6.97 | Pacific ocean perch | 4.57 |
| Shortspine thornyhead | 7.83 | Shortspine thornyhead | 6.92 | Pacific hake | 4.54 |
| Rex sole | 5.45 | Spiny dogfish | 5.69 | Spotted ratfish | 4.34 |
| Lingcod | 2.30 | Pacific hake | 5.41 | Splitnose rockfish | 3.85 |
| Spiny dogfish | 1.84 | Darkblotched rockfish | 5.18 | Lingcod | 3.40 |
| Grooved tanner crab | 1.04 | Sharpchin rockfish | 3.80 | Rosethorn rockfish | 2.90 |
| English sole | 0.92 | Redbanded rockfish | 3.36 | Rougheye rockfish | 1.75 |
| Rougheye rockfish | 0.85 | Lingcod | 2.21 | Flathead sole | 1.42 |
| Pacific hake | 0.79 | Yellowtail rockfish | 1.91 | Sharpchin rockfish | 1.06 |
| Pacific cod | 0.68 | Petrale sole | 1.09 | Redstripe rockfish | 0.62 |
| Rosethorn rockfish | 0.57 | Rosethorn rockfish | 1.06 | Redbanded rockfish | 0.51 |
| Longspine thornyhead | 0.48 | Pacific cod | 0.89 | Darkblotched rockfish | 0.31 |
| Bocaccio | 0.42 | Rougheye rockfish | 0.48 | Bocaccio | 0.31 |
| Greenstriped rockfish | 0.41 | Grooved tanner crab | 0.45 | Petrale sole | 0.22 |
| Yellowtail rockfish | 0.31 | Flathead sole | 0.40 | Aurora rockfish | 0.12 |
| Petrale sole | 0.18 | English sole | 0.27 | Widow rockfish | 0.06 |
| Redbanded rockfish | 0.18 | Redstripe rockfish | 0.21 | Blackgill rockfish | 0.05 |
| Aurora rockfish | 0.16 | Longspine thornyhead | 0.08 | English sole | 0.05 |
| Bank rockfish | 0.12 | Stripetail rockfish | 0.04 | Longspine thornyhead | 0.02 |
| Pacific grenadier | 0.11 | Aurora rockfish | 0.02 | Pacific sanddab | 0.01 |
| Flathead sole | 0.08 | Pacific flatnose | 0.01 | Stripetail rockfish | <0.01 |
| Stripetail rockfish | 0.02 | Pacific grenadier | <0.01 | Grooved tanner crab | <0.01 |

Table 3 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Vancouver INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for arrowtooth flounder, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m. These exceptions are noted with an asterisk (*).

| **Stratum 3** | | | | | |
|---|---|---|---|---|---|
| **2003** (number of hauls = 23) | | **2004** (number of hauls = 6) | | **2005** (number of hauls = 8) | |
| Longspine thornyhead | 26.91 | Dover sole | 24.91 | Longspine thornyhead | 29.88 |
| Grooved tanner crab | 9.72 | Sablefish | 21.2 | Grooved tanner crab | 11.71 |
| Giant grenadier | 7.75 | Longspine thornyhead | 21.17 | Giant grenadier | 9.58 |
| Pacific grenadier | 4.99 | Grooved tanner crab | 13.55 | Sablefish | 5.12 |
| Sablefish | 4.56 | Pacific grenadier | 11.88 | Pacific grenadier | 4.79 |
| Shortspine thornyhead | 2.81 | Shortspine thornyhead | 9.80 | Shortspine thornyhead | 1.71 |
| Dover sole | 1.92 | Giant grenadier | 5.99 | Pacific flatnose | 0.55 |
| Pacific flatnose | 0.64 | Pacific flatnose | 0.62 | Dover sole | 0.23 |
| Pacific hake | 0.15 | Rex sole | 0.58 | Longnose skate | 0.15 |
| Longnose skate | 0.12 | Pacific hake | 0.21 | Pacific ocean perch | 0.12 |
| | | Longnose skate | 0.17 | | |
| | | Rougheye rockfish | 0.09 | | |
| | | Arrowtooth flounder* | 0.05 | | |
| **2006** (number of hauls = 14) | | **2007** (number of hauls = 12) | | **2008** (number of hauls = 11) | |
| Longspine thornyhead | 27.86 | Longspine thornyhead | 24.69 | Longspine thornyhead | 32.95 |
| Sablefish | 11.34 | Grooved tanner crab | 13.50 | Sablefish | 8.52 |
| Giant grenadier | 10.69 | Dover sole | 11.50 | Grooved tanner crab | 7.72 |
| Grooved tanner crab | 7.87 | Sablefish | 11.32 | Giant grenadier | 6.67 |
| Dover sole | 6.04 | Shortspine thornyhead | 6.14 | Pacific grenadier | 5.13 |
| Pacific grenadier | 5.40 | Pacific grenadier | 5.47 | Dover sole | 4.78 |
| Shortspine thornyhead | 2.47 | Giant grenadier | 5.13 | Shortspine thornyhead | 3.34 |
| Longnose skate | 1.35 | Arrowtooth flounder* | 0.67 | Pacific flatnose | 0.59 |
| Pacific flatnose | 0.55 | Pacific flatnose | 0.29 | Spiny dogfish | 0.09 |
| Arrowtooth flounder* | 0.34 | Longnose skate | 0.25 | | |
| Spiny dogfish | 0.08 | Pacific hake | 0.19 | | |
| Rex sole | 0.05 | Spiny dogfish | 0.08 | | |
| | | Redbanded rockfish | 0.08 | | |
| | | Aurora rockfish | 0.06 | | |

Table 4. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Columbia INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for arrowtooth flounder, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m; and for canary rockfish, stratum 1 is 54.9–350 m and stratum 3 is defined as 350–1,280.2 m with no stratum 2. These exceptions are noted with an asterisk (*).

| **Stratum 1** | | | | | |
|---|---|---|---|---|---|
| **2003** (number of hauls = 47) | | **2004** (number of hauls = 84) | | **2005** (number of hauls = 119) | |
| Pacific hake | 87.79 | Pacific hake | 65.83 | Pacific hake | 27.73 |
| Pacific sanddab | 30.31 | Dover sole | 28.44 | Dover sole | 25.01 |
| Dover sole | 28.37 | Pacific sanddab | 19.44 | Pacific sanddab | 12.58 |
| Sablefish | 17.26 | English sole | 11.14 | Rex sole | 10.05 |
| Yellowtail rockfish | 14.37 | Rex sole | 11.07 | English sole | 6.15 |
| Rex sole | 9.30 | Longnose skate | 8.29 | Yellowtail rockfish | 6.07 |
| Longnose skate | 9.27 | Sablefish | 5.91 | Arrowtooth flounder* | 5.82 |
| English sole | 7.36 | Lingcod | 4.57 | Longnose skate | 5.28 |
| Arrowtooth flounder* | 5.61 | Arrowtooth flounder* | 4.40 | Petrale sole | 4.84 |
| Widow rockfish | 5.55 | Yellowtail rockfish | 3.96 | Greenstriped rockfish | 4.36 |
| Spiny dogfish | 5.27 | Petrale sole | 3.72 | Sharpchin rockfish | 4.34 |
| Lingcod | 5.08 | Spotted ratfish | 3.47 | Big skate | 3.62 |
| Spotted ratfish | 4.20 | Greenstriped rockfish | 3.05 | Lingcod | 2.62 |
| Petrale sole | 3.24 | Spiny dogfish | 2.93 | Spotted ratfish | 2.61 |
| Sharpchin rockfish | 2.76 | Big skate | 2.59 | Spiny dogfish | 2.36 |
| Big skate | 2.57 | Pacific cod | 2.34 | Sablefish | 2.01 |
| Redstripe rockfish | 1.49 | Redstripe rockfish | 2.33 | Darkblotched rockfish | 1.23 |
| Greenstriped rockfish | 1.39 | Sharpchin rockfish | 2.29 | Canary rockfish* | 0.57 |
| Flathead sole | 1.31 | Darkblotched rockfish | 2.09 | Pacific ocean perch | 0.54 |
| Pacific cod | 1.23 | Canary rockfish* | 1.26 | Splitnose rockfish | 0.51 |
| Canary rockfish* | 0.91 | Flathead sole | 0.83 | Flathead sole | 0.42 |
| Splitnose rockfish | 0.83 | Pygmy rockfish | 0.55 | Rosethorn rockfish | 0.23 |
| Rosethorn rockfish | 0.68 | Rosethorn rockfish | 0.39 | Pacific cod | 0.20 |
| Bocaccio | 0.30 | Greenspotted rockfish | 0.22 | Widow rockfish | 0.20 |
| Darkblotched rockfish | 0.27 | Curlfin sole | 0.15 | Greenspotted rockfish | 0.15 |
| Shortspine thornyhead | 0.22 | Splitnose rockfish | 0.06 | Shortspine thornyhead | 0.11 |
| Curlfin sole | 0.18 | Stripetail rockfish | 0.05 | Stripetail rockfish | 0.08 |
| Redbanded rockfish | 0.08 | Shortspine thornyhead | 0.05 | Curlfin sole | 0.07 |
| Pygmy rockfish | 0.05 | Rougheye rockfish | 0.02 | Redstripe rockfish | 0.07 |
| Stripetail rockfish | 0.04 | Redbanded rockfish | 0.01 | Rougheye rockfish | 0.05 |
| Rougheye rockfish | 0.04 | Halfbanded rockfish | 0.01 | Bocaccio | 0.02 |
| Grooved tanner crab | 0.04 | Pacific ocean perch | <0.01 | Redbanded rockfish | 0.01 |
| Greenspotted rockfish | 0.01 | | | Pygmy rockfish | 0.01 |
| Halfbanded rockfish | 0.01 | | | Grooved tanner crab | <0.01 |
| Pacific ocean perch | <0.01 | | | California skate | <0.01 |
| Shortbelly rockfish | <0.01 | | | Halfbanded rockfish | <0.01 |

Table 4 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Columbia INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for arrowtooth flounder, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m; and for canary rockfish, stratum 1 is 54.9–350 m and stratum 3 is defined as 350–1,280.2 m with no stratum 2. These exceptions are noted with an asterisk (*).

| **Stratum 1** | | | | | |
|---|---|---|---|---|---|
| **2006** (number of hauls = 112) | | **2007** (number of hauls = 124) | | **2008** (number of hauls = 111) | |
| Pacific hake | 45.76 | Dover sole | 36.52 | Dover sole | 25.17 |
| Dover sole | 26.78 | Pacific hake | 29.45 | Pacific hake | 23.19 |
| Pacific sanddab | 15.32 | Pacific sanddab | 9.24 | Pacific sanddab | 15.38 |
| Rex sole | 9.16 | Rex sole | 9.10 | Arrowtooth flounder* | 8.03 |
| Longnose skate | 6.27 | Longnose skate | 8.61 | Rex sole | 6.45 |
| English sole | 5.57 | Yellowtail rockfish | 6.06 | Longnose skate | 6.22 |
| Greenstriped rockfish | 4.29 | Arrowtooth flounder* | 5.92 | Greenstriped rockfish | 5.76 |
| Lingcod | 4.25 | English sole | 5.20 | English sole | 3.96 |
| Petrale sole | 4.23 | Greenstriped rockfish | 4.21 | Canary rockfish* | 3.89 |
| Arrowtooth flounder* | 3.30 | Petrale sole | 3.37 | Spiny dogfish | 3.25 |
| Redstripe rockfish | 3.11 | Lingcod | 3.10 | Petrale sole | 3.13 |
| Spotted ratfish | 2.60 | Big skate | 2.61 | Spotted ratfish | 2.89 |
| Big skate | 2.34 | Spotted ratfish | 2.12 | Lingcod | 2.87 |
| Sablefish | 1.90 | Spiny dogfish | 1.90 | Darkblotched rockfish | 2.49 |
| Spiny dogfish | 1.46 | Sablefish | 1.74 | Yellowtail rockfish | 2.37 |
| Pygmy rockfish | 1.15 | Canary rockfish* | 1.05 | Big skate | 1.31 |
| Sharpchin rockfish | 0.85 | Redstripe rockfish | 0.91 | Sablefish | 0.72 |
| Rosethorn rockfish | 0.74 | Splitnose rockfish | 0.91 | Sharpchin rockfish | 0.60 |
| Darkblotched rockfish | 0.58 | Rosethorn rockfish | 0.87 | Splitnose rockfish | 0.44 |
| Yellowtail rockfish | 0.36 | Darkblotched rockfish | 0.32 | Rosethorn rockfish | 0.35 |
| Flathead sole | 0.29 | Stripetail rockfish | 0.32 | Redstripe rockfish | 0.17 |
| Canary rockfish* | 0.21 | Shortspine thornyhead | 0.18 | Stripetail rockfish | 0.14 |
| Stripetail rockfish | 0.18 | Sharpchin rockfish | 0.14 | Pacific cod | 0.13 |
| Greenspotted rockfish | 0.16 | Greenspotted rockfish | 0.14 | Pacific ocean perch | 0.12 |
| Pacific cod | 0.13 | Widow rockfish | 0.14 | Curlfin sole | 0.10 |
| Curlfin sole | 0.13 | Flathead sole | 0.11 | Greenspotted rockfish | 0.07 |
| Splitnose rockfish | 0.08 | Curlfin sole | 0.08 | Shortspine thornyhead | 0.07 |
| Shortspine thornyhead | 0.07 | Pygmy rockfish | 0.04 | Flathead sole | 0.04 |
| Rougheye rockfish | 0.06 | Pacific ocean perch | 0.04 | Rougheye rockfish | 0.02 |
| Pacific ocean perch | 0.02 | Pacific cod | 0.03 | Widow rockfish | 0.02 |
| Widow rockfish | 0.01 | Rougheye rockfish | 0.03 | Redbanded rockfish | 0.01 |
| Redbanded rockfish | <0.01 | Redbanded rockfish | 0.01 | Pygmy rockfish | <0.01 |
| California skate | <0.01 | Halfbanded rockfish | <0.01 | Bocaccio | <0.01 |
| | | Shortbelly rockfish | <0.01 | | |

Table 4 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Columbia INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for arrowtooth flounder, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m. These exceptions are noted with an asterisk (*).

| **Stratum 2** | | | | | |
|---|---|---|---|---|---|
| **2003** (number of hauls = 40) | | **2004** (number of hauls = 50) | | **2005** (number of hauls = 51) | |
| Dover sole | 38.10 | Dover sole | 30.15 | Dover sole | 34.23 |
| Pacific hake | 32.97 | Sharpchin rockfish | 16.61 | Darkblotched rockfish | 17.76 |
| Sharpchin rockfish | 27.99 | Sablefish | 13.37 | Sablefish | 14.04 |
| Darkblotched rockfish | 27.13 | Pacific hake | 13.04 | Shortspine thornyhead | 9.76 |
| Pacific ocean perch | 25.24 | Arrowtooth flounder* | 12.84 | Arrowtooth flounder* | 9.63 |
| Sablefish | 24.41 | Rex sole | 11.64 | Longnose skate | 9.57 |
| Arrowtooth flounder* | 17.32 | Shortspine thornyhead | 10.90 | Pacific ocean perch | 9.40 |
| Rex sole | 12.40 | Splitnose rockfish | 8.95 | Pacific hake | 8.26 |
| Spiny dogfish | 9.50 | Longnose skate | 7.54 | Rex sole | 7.45 |
| Shortspine thornyhead | 9.17 | Pacific ocean perch | 2.48 | Splitnose rockfish | 7.29 |
| Longnose skate | 8.02 | Stripetail rockfish | 2.45 | Sharpchin rockfish | 4.88 |
| Splitnose rockfish | 6.39 | Rougheye rockfish | 2.43 | Greenstriped rockfish | 3.67 |
| Redstripe rockfish | 4.05 | Aurora rockfish | 1.42 | Rougheye rockfish | 3.48 |
| Rosethorn rockfish | 2.91 | English sole | 1.33 | Longspine thornyhead | 1.84 |
| Lingcod | 2.12 | Longspine thornyhead | 1.29 | Spotted ratfish | 1.24 |
| Spotted ratfish | 1.43 | Spotted ratfish | 1.25 | Rosethorn rockfish | 0.72 |
| Greenstriped rockfish | 0.94 | Darkblotched rockfish | 1.24 | Spiny dogfish | 0.63 |
| Longspine thornyhead | 0.87 | Spiny dogfish | 1.11 | Lingcod | 0.61 |
| Redbanded rockfish | 0.54 | Rosethorn rockfish | 1.05 | Aurora rockfish | 0.52 |
| Pacific cod | 0.50 | Greenstriped rockfish | 0.89 | Grooved tanner crab | 0.47 |
| Petrale sole | 0.47 | Lingcod | 0.87 | Petrale sole | 0.30 |
| Stripetail rockfish | 0.45 | Blackgill rockfish | 0.82 | English sole | 0.28 |
| Rougheye rockfish | 0.39 | Big skate | 0.39 | Redbanded rockfish | 0.24 |
| Grooved tanner crab | 0.38 | Redbanded rockfish | 0.24 | Big skate | 0.22 |
| English sole | 0.36 | Pacific cod | 0.23 | Blackgill rockfish | 0.20 |
| Yellowtail rockfish | 0.28 | Grooved tanner crab | 0.18 | Yellowtail rockfish | 0.09 |
| Big skate | 0.27 | Petrale sole | 0.13 | Flathead sole | 0.09 |
| Aurora rockfish | 0.26 | Redstripe rockfish | 0.05 | Stripetail rockfish | 0.04 |
| Blackgill rockfish | 0.15 | Pacific flatnose | 0.04 | Widow rockfish | 0.04 |
| Flathead sole | 0.09 | Widow rockfish | 0.04 | Pacific grenadier | 0.04 |
| Pacific flatnose | 0.07 | Flathead sole | 0.02 | Pacific flatnose | 0.03 |
| Widow rockfish | 0.06 | Giant grenadier | 0.02 | Pacific cod | 0.02 |
| Bank rockfish | 0.03 | Shortbelly rockfish | 0.01 | Redstripe rockfish | 0.01 |
| Greenspotted rockfish | 0.03 | Pacific grenadier | <0.01 | Bank rockfish | <0.01 |
| Giant grenadier | 0.02 | Bank rockfish | <0.01 | Bocaccio | <0.01 |
| Pacific grenadier | 0.01 | Bocaccio | <0.01 | Calico rockfish | <0.01 |
| Shortbelly rockfish | 0.01 | Calico rockfish | <0.01 | Calif. scorpionfish | <0.01 |

Table 4 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Columbia INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for arrowtooth flounder, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m. These exceptions are noted with an asterisk (*).

| **Stratum 2** | | | | | |
|---|---|---|---|---|---|
| **2006** (number of hauls = 63) | | **2007** (number of hauls = 72) | | **2008** (number of hauls = 62) | |
| Dover sole | 50.26 | Dover sole | 46.14 | Dover sole | 44.28 |
| Arrowtooth flounder* | 26.51 | Sablefish | 15.96 | Pacific hake | 15.14 |
| Sablefish | 15.18 | Shortspine thornyhead | 12.20 | Splitnose rockfish | 10.57 |
| Rex sole | 11.13 | Rex sole | 11.91 | Shortspine thornyhead | 10.14 |
| Longnose skate | 9.50 | Arrowtooth flounder* | 11.5 | Arrowtooth flounder* | 10.02 |
| Pacific hake | 8.92 | Splitnose rockfish | 10.35 | Longnose skate | 9.57 |
| Shortspine thornyhead | 8.82 | Longnose skate | 9.35 | Sablefish | 8.69 |
| Splitnose rockfish | 8.41 | Pacific hake | 5.25 | Rex sole | 8.11 |
| Sharpchin rockfish | 3.35 | Darkblotched rockfish | 2.53 | Pacific ocean perch | 6.21 |
| Darkblotched rockfish | 2.96 | English sole | 1.72 | Lingcod | 5.13 |
| English sole | 2.50 | Spotted ratfish | 1.60 | Darkblotched rockfish | 3.92 |
| Pacific ocean perch | 2.16 | Stripetail rockfish | 1.34 | Spiny dogfish | 2.27 |
| Lingcod | 1.71 | Longspine thornyhead | 1.28 | Sharpchin rockfish | 2.16 |
| Longspine thornyhead | 1.31 | Sharpchin rockfish | 1.18 | Yellowtail rockfish | 1.91 |
| Spotted ratfish | 1.16 | Spiny dogfish | 0.97 | Stripetail rockfish | 1.86 |
| Stripetail rockfish | 0.85 | Pacific ocean perch | 0.91 | Longspine thornyhead | 1.54 |
| Greenstriped rockfish | 0.82 | Lingcod | 0.87 | Spotted ratfish | 1.27 |
| Aurora rockfish | 0.74 | Rougheye rockfish | 0.46 | English sole | 1.00 |
| Spiny dogfish | 0.72 | Aurora rockfish | 0.45 | Greenstriped rockfish | 0.95 |
| Rougheye rockfish | 0.55 | Grooved tanner crab | 0.43 | Rosethorn rockfish | 0.53 |
| Grooved tanner crab | 0.48 | Rosethorn rockfish | 0.36 | Rougheye rockfish | 0.52 |
| Rosethorn rockfish | 0.47 | Greenstriped rockfish | 0.31 | Aurora rockfish | 0.35 |
| Petrale sole | 0.23 | Redbanded rockfish | 0.20 | Grooved tanner crab | 0.35 |
| Big skate | 0.21 | Widow rockfish | 0.18 | Redbanded rockfish | 0.33 |
| Redbanded rockfish | 0.21 | Petrale sole | 0.10 | Blackgill rockfish | 0.24 |
| Flathead sole | 0.14 | Bocaccio | 0.04 | Petrale sole | 0.19 |
| Widow rockfish | 0.11 | Blackgill rockfish | 0.03 | Widow rockfish | 0.08 |
| Yellowtail rockfish | 0.02 | Yellowtail rockfish | 0.02 | Bocaccio | 0.04 |
| Pacific flatnose | 0.02 | Pacific flatnose | 0.01 | Pacific cod | 0.04 |
| Redstripe rockfish | 0.01 | Bank rockfish | 0.01 | Giant grenadier | 0.02 |
| Blackgill rockfish | <0.01 | Redstripe rockfish | <0.01 | Flathead sole | 0.02 |
| Greenspotted rockfish | <0.01 | Greenspotted rockfish | <0.01 | Greenspotted rockfish | 0.01 |
| Shortbelly rockfish | <0.01 | Pygmy rockfish | <0.01 | Pacific grenadier | <0.01 |
| Pacific grenadier | <0.01 | Big skate | <0.01 | Bank rockfish | <0.01 |
| Bank rockfish | <0.01 | Calico rockfish | <0.01 | Pacific flatnose | <0.01 |
| Bocaccio | <0.01 | California scorpionfish | <0.01 | | |
| Calico rockfish | <0.01 | California skate | <0.01 | | |

Table 4 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Columbia INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for arrowtooth flounder, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m. These exceptions are noted with an asterisk (*).

| **Stratum 3** | | | | | |
|---|---|---|---|---|---|
| **2003** (number of hauls = 61) | | **2004** (number of hauls = 28) | | **2005** (number of hauls = 53) | |
| Longspine thornyhead | 26.11 | Longspine thornyhead | 22.71 | Longspine thornyhead | 21.55 |
| Dover sole | 10.70 | Sablefish | 9.55 | Grooved tanner crab | 19.59 |
| Sablefish | 10.44 | Pacific grenadier | 8.86 | Giant grenadier | 14.12 |
| Grooved tanner crab | 9.61 | Grooved tanner crab | 6.82 | Sablefish | 12.81 |
| Pacific grenadier | 8.84 | Giant grenadier | 6.73 | Dover sole | 9.82 |
| Giant grenadier | 6.13 | Dover sole | 5.95 | Pacific grenadier | 9.59 |
| Shortspine thornyhead | 3.55 | Shortspine thornyhead | 3.50 | Shortspine thornyhead | 3.94 |
| Pacific flatnose | 0.83 | Pacific flatnose | 0.54 | Pacific flatnose | 0.90 |
| Pacific hake | 0.57 | Pacific hake | 0.22 | Pacific hake | 0.22 |
| Rex sole | 0.32 | Longnose skate | 0.16 | Longnose skate | 0.18 |
| Longnose skate | 0.29 | Rex sole | 0.07 | Arrowtooth flounder* | 0.14 |
| Arrowtooth flounder* | 0.06 | Aurora rockfish | 0.01 | Rex sole | 0.12 |
| Rougheye rockfish | 0.02 | Spotted ratfish | 0.01 | Aurora rockfish | 0.02 |
| Aurora rockfish | 0.02 | | | Pacific ocean perch | 0.01 |
| **2006** (number of hauls = 42) | | **2007** (number of hauls = 45) | | **2008** (number of hauls = 43) | |
| Longspine thornyhead | 23.49 | Longspine thornyhead | 28.58 | Longspine thornyhead | 32.15 |
| Pacific grenadier | 17.46 | Sablefish | 11.75 | Sablefish | 14.59 |
| Sablefish | 12.39 | Giant grenadier | 10.55 | Pacific grenadier | 12.39 |
| Grooved tanner crab | 7.90 | Grooved tanner crab | 10.54 | Grooved tanner crab | 9.77 |
| Giant grenadier | 6.32 | Pacific grenadier | 10.16 | Dover sole | 8.65 |
| Dover sole | 6.18 | Dover sole | 9.83 | Giant grenadier | 8.00 |
| Shortspine thornyhead | 3.52 | Shortspine thornyhead | 4.56 | Shortspine thornyhead | 3.87 |
| Pacific flatnose | 0.79 | Pacific flatnose | 1.29 | Pacific flatnose | 0.89 |
| Longnose skate | 0.38 | Longnose skate | 0.09 | Longnose skate | 0.67 |
| Pacific hake | 0.10 | Pacific hake | 0.07 | Rex sole | 0.23 |
| Rex sole | 0.04 | Rex sole | 0.04 | Pacific hake | 0.22 |
| Spiny dogfish | 0.01 | Rougheye rockfish | 0.02 | Arrowtooth flounder* | 0.08 |
| Aurora rockfish | 0.01 | Aurora rockfish | 0.02 | | |

Table 5. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Eureka INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for arrowtooth flounder and chilipepper rockfish, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m; and for canary rockfish, stratum 1 is 54.9–350 m and stratum 3 is defined as 350–1,280.2 m with no stratum 2. These exceptions are noted with an asterisk (*).

| **Stratum 1** | | | | | |
|---|---|---|---|---|---|
| **2003** (number of hauls = 35) | | **2004** (number of hauls = 20) | | **2005** (number of hauls = 38) | |
| Sharpchin rockfish | 215.89 | Pacific hake | 43.71 | Pacific hake | 30.38 |
| Pacific hake | 96.75 | English sole | 29.27 | Dover sole | 19.61 |
| Redstripe rockfish | 52.8 | Dover sole | 25.98 | English sole | 16.36 |
| Dover sole | 34.04 | Rex sole | 20.68 | Stripetail rockfish | 15.18 |
| Lingcod | 32.56 | Chilipepper rockfish* | 14.15 | Rex sole | 12.24 |
| Pacific sanddab | 20.17 | Petrale sole | 11.21 | Pacific sanddab | 11.2 |
| English sole | 14.62 | Longnose skate | 9.77 | Canary rockfish* | 10.57 |
| Rex sole | 13.33 | Pacific sanddab | 8.58 | Lingcod | 9.93 |
| Sablefish | 8.54 | Big skate | 7.98 | Petrale sole | 7.98 |
| Longnose skate | 7.22 | Stripetail rockfish | 6.42 | Longnose skate | 6.49 |
| Greenstriped rockfish | 6.29 | Lingcod | 5.53 | Spiny dogfish | 6.05 |
| Spotted ratfish | 5.24 | Sablefish | 4.83 | Big skate | 4.86 |
| Stripetail rockfish | 5.02 | Spotted ratfish | 2.53 | Chilipepper rockfish* | 4.74 |
| Petrale sole | 3.78 | Arrowtooth flounder* | 1.11 | Sablefish | 4.35 |
| Yellowtail rockfish | 3.55 | Greenstriped rockfish | 1.07 | Greenstriped rockfish | 3.06 |
| Big skate | 2.77 | California skate | 0.66 | Yellowtail rockfish | 1.75 |
| Darkblotched rockfish | 2.55 | Curlfin sole | 0.63 | Spotted ratfish | 1.63 |
| Rosethorn rockfish | 2.11 | Spiny dogfish | 0.44 | Arrowtooth flounder* | 1.14 |
| Pygmy rockfish | 1.61 | Canary rockfish* | 0.26 | Darkblotched rockfish | 0.54 |
| Greenspotted rockfish | 1.27 | Darkblotched rockfish | 0.16 | Curlfin sole | 0.5 |
| Canary rockfish* | 1.08 | Shortbelly rockfish | 0.06 | Splitnose rockfish | 0.18 |
| Arrowtooth flounder* | 1.03 | Sharpchin rockfish | 0.03 | Redstripe rockfish | 0.12 |
| Spiny dogfish | 0.86 | Splitnose rockfish | 0.02 | California skate | 0.1 |
| Widow rockfish | 0.66 | Shortspine thornyhead | 0.01 | Greenspotted rockfish | 0.07 |
| Splitnose rockfish | 0.59 | Flathead sole | <0.01 | Bocaccio | 0.03 |
| Pacific cod | 0.55 | | | Shortbelly rockfish | 0.02 |
| Curlfin sole | 0.37 | | | Shortspine thornyhead | 0.02 |
| Bocaccio | 0.19 | | | Pacific ocean perch | 0.01 |
| Shortbelly rockfish | 0.11 | | | Widow rockfish | 0.01 |
| Chilipepper rockfish* | 0.04 | | | Sharpchin rockfish | <0.01 |
| Pacific ocean perch | 0.03 | | | Redbanded rockfish | <0.01 |
| Grooved tanner crab | 0.03 | | | | |
| Rougheye rockfish | 0.02 | | | | |
| California skate | 0.02 | | | | |
| Redbanded rockfish | 0.01 | | | | |
| Shortspine thornyhead | <0.01 | | | | |

Table 5 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Eureka INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for arrowtooth flounder and chilipepper rockfish, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m; and for canary rockfish, stratum 1 is 54.9–350 m and stratum 3 is defined as 350–1,280.2 m with no stratum 2. These exceptions are noted with an asterisk (*).

| **Stratum 1** | | | | | |
|---|---|---|---|---|---|
| **2006** (number of hauls = 24) | | **2007** (number of hauls = 28) | | **2008** (number of hauls = 24) | |
| Lingcod | 84.99 | Pacific hake | 37.76 | Dover sole | 16.41 |
| Pacific hake | 41.46 | Dover sole | 22.31 | Pacific sanddab | 10.92 |
| Spiny dogfish | 19.95 | Lingcod | 20.4 | Greenstriped rockfish | 9.97 |
| Dover sole | 16.97 | Longnose skate | 11 | Stripetail rockfish | 8.77 |
| Canary rockfish* | 13.88 | Spiny dogfish | 9.37 | Longnose skate | 7.12 |
| Chilipepper rockfish* | 12.4 | English sole | 8.7 | English sole | 5.81 |
| Longnose skate | 8.78 | Spotted ratfish | 7.16 | Big skate | 5.64 |
| Spotted ratfish | 8.14 | Canary rockfish* | 7.12 | Petrale sole | 4.7 |
| English sole | 7.53 | Rex sole | 6.72 | Rex sole | 3.43 |
| Pacific sanddab | 7.34 | Petrale sole | 5.95 | Spotted ratfish | 2.42 |
| Petrale sole | 5.56 | Stripetail rockfish | 5.59 | Spiny dogfish | 2.3 |
| Rex sole | 4.98 | Pacific sanddab | 4.71 | Pacific hake | 1.64 |
| Big skate | 3.97 | Big skate | 3.7 | Arrowtooth flounder* | 1.21 |
| Stripetail rockfish | 3.09 | Darkblotched rockfish | 2.25 | Redstripe rockfish | 1.02 |
| Greenstriped rockfish | 1.28 | Redstripe rockfish | 2.21 | Lingcod | 0.79 |
| Sablefish | 1.28 | Yellowtail rockfish | 2.06 | Sablefish | 0.5 |
| Rosethorn rockfish | 0.97 | Sablefish | 1.63 | Splitnose rockfish | 0.23 |
| Widow rockfish | 0.95 | Greenstriped rockfish | 1.62 | Canary rockfish* | 0.18 |
| Splitnose rockfish | 0.82 | Greenspotted rockfish | 1.22 | Curlfin sole | 0.16 |
| Redstripe rockfish | 0.31 | Chilipepper rockfish* | 1.1 | Darkblotched rockfish | 0.12 |
| Greenspotted rockfish | 0.3 | Widow rockfish | 0.52 | Chilipepper rockfish* | 0.09 |
| Sharpchin rockfish | 0.26 | Arrowtooth flounder* | 0.47 | Pacific cod | 0.06 |
| Darkblotched rockfish | 0.26 | Bocaccio | 0.19 | Widow rockfish | 0.04 |
| Arrowtooth flounder* | 0.17 | Rosethorn rockfish | 0.13 | California skate | 0.04 |
| Yellowtail rockfish | 0.02 | Curlfin sole | 0.12 | Blackgill rockfish | 0.03 |
| Curlfin sole | 0.01 | Sharpchin rockfish | 0.07 | Sharpchin rockfish | 0.02 |
| Shortbelly rockfish | <0.01 | Splitnose rockfish | 0.07 | Rosethorn rockfish | <0.01 |
| Pygmy rockfish | <0.01 | Pacific ocean perch | 0.02 | Bocaccio | <0.01 |
| | | Pygmy rockfish | 0.02 | | |
| | | Shortbelly rockfish | 0.02 | | |
| | | Shortspine thornyhead | 0.01 | | |

Table 5 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Eureka INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for arrowtooth flounder and chilipepper rockfish, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m. These exceptions are noted with an asterisk (*).

| **Stratum 2** | | | | | |
|---|---|---|---|---|---|
| **2003** (number of hauls = 36) | | **2004** (number of hauls = 12) | | **2005** (number of hauls = 23) | |
| Dover sole | 94.25 | Pacific hake | 43.71 | Dover sole | 117.87 |
| Rex sole | 25.5 | English sole | 29.27 | Spotted ratfish | 42.55 |
| Pacific hake | 22.27 | Dover sole | 25.98 | Lingcod | 39.68 |
| Sharpchin rockfish | 19.56 | Rex sole | 20.68 | Splitnose rockfish | 37.5 |
| Sablefish | 18.04 | Petrale sole | 11.21 | Sharpchin rockfish | 35.65 |
| Longnose skate | 14.87 | Longnose skate | 9.77 | Rex sole | 30.24 |
| Stripetail rockfish | 10.5 | Pacific sanddab | 8.58 | Chilipepper rockfish* | 21.36 |
| Splitnose rockfish | 9.01 | Big skate | 7.98 | Sablefish | 18.16 |
| Spiny dogfish | 5.69 | Stripetail rockfish | 6.42 | Longnose skate | 18.07 |
| Chilipepper rockfish* | 4.31 | Lingcod | 5.53 | Pacific hake | 17.7 |
| Lingcod | 3.79 | Sablefish | 4.83 | Darkblotched rockfish | 6.65 |
| Darkblotched rockfish | 3.65 | Spotted ratfish | 2.53 | Shortspine thornyhead | 6.27 |
| Shortspine thornyhead | 3.65 | Arrowtooth flounder* | 1.11 | Spiny dogfish | 3.85 |
| Spotted ratfish | 2.73 | Greenstriped rockfish | 1.07 | Arrowtooth flounder* | 3.25 |
| Arrowtooth flounder* | 2.53 | California skate | 0.66 | Stripetail rockfish | 3.14 |
| English sole | 2.23 | Curlfin sole | 0.63 | Greenstriped rockfish | 2.01 |
| Greenstriped rockfish | 1.36 | Chilipepper rockfish* | 0.44 | Rosethorn rockfish | 1.62 |
| Aurora rockfish | 1.09 | Spiny dogfish | 0.44 | Longspine thornyhead | 1.39 |
| Longspine thornyhead | 0.57 | Darkblotched rockfish | 0.16 | Aurora rockfish | 1.01 |
| Big skate | 0.34 | Shortbelly rockfish | 0.06 | Redbanded rockfish | 0.78 |
| Redbanded rockfish | 0.31 | Sharpchin rockfish | 0.03 | English sole | 0.57 |
| Petrale sole | 0.28 | Splitnose rockfish | 0.02 | Pacific ocean perch | 0.51 |
| Rosethorn rockfish | 0.18 | Shortspine thornyhead | 0.01 | Big skate | 0.48 |
| Grooved tanner crab | 0.16 | Flathead sole | <0.01 | Widow rockfish | 0.45 |
| Pacific ocean perch | 0.12 | | | Bocaccio | 0.31 |
| Bocaccio | 0.12 | | | Petrale sole | 0.1 |
| Pacific cod | 0.07 | | | Redstripe rockfish | 0.04 |
| Pacific flatnose | 0.05 | | | Greenspotted rockfish | 0.03 |
| Widow rockfish | 0.05 | | | Pacific flatnose | 0.03 |
| Rougheye rockfish | 0.04 | | | Blackgill rockfish | 0.01 |
| Giant grenadier | 0.02 | | | | |
| Greenspotted rockfish | 0.01 | | | | |
| Pacific grenadier | <0.01 | | | | |
| Redstripe rockfish | <0.01 | | | | |
| Pacific sanddab | <0.01 | | | | |
| Shortbelly rockfish | <0.01 | | | | |

Table 5 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Eureka INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for arrowtooth flounder and chilipepper rockfish, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m. These exceptions are noted with an asterisk (*).

| **Stratum 2** | | | | | |
|---|---|---|---|---|---|
| **2006** (number of hauls = 20) | | **2007** (number of hauls = 28) | | **2008** (number of hauls = 29) | |
| Dover sole | 105.94 | Dover sole | 107.75 | Dover sole | 105.39 |
| Sablefish | 67.55 | Splitnose rockfish | 58.5 | Rex sole | 22.63 |
| Rex sole | 29.68 | Chilipepper rockfish* | 51.1 | Pacific hake | 20.82 |
| Pacific hake | 22.21 | Rex sole | 23.46 | Sablefish | 16.36 |
| Longnose skate | 14.88 | Sablefish | 15.15 | Longnose skate | 15.75 |
| Spiny dogfish | 14.16 | Pacific hake | 14.67 | Spotted ratfish | 7.39 |
| Splitnose rockfish | 6.45 | Stripetail rockfish | 13.71 | Lingcod | 6.13 |
| Arrowtooth flounder* | 4.66 | Longnose skate | 12.89 | Splitnose rockfish | 5.78 |
| Chilipepper rockfish* | 4.65 | Spiny dogfish | 8.68 | Arrowtooth flounder* | 3.02 |
| Spotted ratfish | 4.55 | Shortspine thornyhead | 3.68 | Shortspine thornyhead | 2.96 |
| Stripetail rockfish | 4.41 | Spotted ratfish | 3.41 | Stripetail rockfish | 2.02 |
| Shortspine thornyhead | 2.58 | Darkblotched rockfish | 2.81 | Darkblotched rockfish | 1.96 |
| Lingcod | 2.18 | Arrowtooth flounder* | 2.71 | Spiny dogfish | 1.95 |
| Darkblotched rockfish | 1.38 | Longspine thornyhead | 0.94 | Grooved tanner crab | 1.94 |
| Aurora rockfish | 0.99 | Lingcod | 0.78 | Longspine thornyhead | 1.17 |
| Redbanded rockfish | 0.54 | Aurora rockfish | 0.71 | Sharpchin rockfish | 1.14 |
| English sole | 0.53 | Grooved tanner crab | 0.54 | Aurora rockfish | 0.76 |
| Longspine thornyhead | 0.26 | Greenstriped rockfish | 0.38 | Greenstriped rockfish | 0.64 |
| Greenstriped rockfish | 0.17 | Redbanded rockfish | 0.17 | English sole | 0.31 |
| Rougheye rockfish | 0.15 | Sharpchin rockfish | 0.17 | Chilipepper rockfish* | 0.31 |
| Petrale sole | 0.12 | Widow rockfish | 0.16 | Redbanded rockfish | 0.3 |
| Pacific ocean perch | 0.08 | Shortbelly rockfish | 0.14 | Pacific ocean perch | 0.16 |
| Sharpchin rockfish | 0.07 | Pacific ocean perch | 0.09 | Blackgill rockfish | 0.09 |
| Grooved tanner crab | 0.05 | Pacific grenadier | 0.06 | Petrale sole | 0.05 |
| Rosethorn rockfish | 0.03 | Petrale sole | 0.05 | Rosethorn rockfish | 0.05 |
| Bocaccio | 0.02 | English sole | 0.03 | Greenspotted rockfish | 0.05 |
| Blackgill rockfish | <0.01 | Bank rockfish | 0.02 | Bank rockfish | 0.03 |
| | | Blackgill rockfish | 0.02 | Giant grenadier | 0.02 |
| | | Pacific flatnose | 0.01 | Big skate | 0.01 |
| | | Rosethorn rockfish | 0.01 | Pacific flatnose | <0.01 |
| | | Rougheye rockfish | 0.01 | Pacific grenadier | <0.01 |

Table 5 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Eureka INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for arrowtooth flounder, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m. These exceptions are noted with an asterisk (*).

| **Stratum 3** | | | | | |
|---|---|---|---|---|---|
| **2003** (number of hauls = 33) | | **2004** (number of hauls = 25) | | **2005** (number of hauls = 28) | |
| Longspine thornyhead | 35.72 | Dover sole | 39.07 | Longspine thornyhead | 48.90 |
| Dover sole | 22.89 | Longspine thornyhead | 31.91 | Dover sole | 32.91 |
| Sablefish | 18.48 | Pacific grenadier | 23.41 | Sablefish | 17.91 |
| Giant grenadier | 12.97 | Giant grenadier | 14.32 | Grooved tanner crab | 14.17 |
| Grooved tanner crab | 8.52 | Sablefish | 13.83 | Shortspine thornyhead | 5.56 |
| Pacific grenadier | 6.05 | Shortspine thornyhead | 6.34 | Rex sole | 3.52 |
| Shortspine thornyhead | 5.07 | Grooved tanner crab | 3.14 | Pacific grenadier | 3.03 |
| Rex sole | 1.46 | Rex sole | 2.28 | Giant grenadier | 2.41 |
| Pacific hake | 0.87 | Pacific flatnose | 1.25 | Longnose skate | 1.00 |
| Pacific flatnose | 0.62 | Pacific hake | 0.69 | Pacific flatnose | 0.42 |
| Longnose skate | 0.05 | Longnose skate | 0.42 | Pacific hake | 0.38 |
| Spotted ratfish | 0.02 | Arrowtooth flounder* | 0.03 | | |
| Arrowtooth flounder* | <0.01 | | | | |
| **2006** (number of hauls = 28) | | **2007** (number of hauls = 33) | | **2008** (number of hauls = 32) | |
| Longspine thornyhead | 45.77 | Longspine thornyhead | 53.13 | Longspine thornyhead | 63.14 |
| Dover sole | 31.17 | Dover sole | 36.58 | Dover sole | 36.65 |
| Sablefish | 16.04 | Sablefish | 14.49 | Pacific grenadier | 15.36 |
| Grooved tanner crab | 12.86 | Grooved tanner crab | 12.52 | Sablefish | 11.39 |
| Shortspine thornyhead | 6.19 | Shortspine thornyhead | 10.08 | Grooved tanner crab | 8.99 |
| Giant grenadier | 4.59 | Giant grenadier | 7.89 | Giant grenadier | 5.00 |
| Pacific grenadier | 3.86 | Pacific grenadier | 3.87 | Shortspine thornyhead | 4.79 |
| Rex sole | 2.11 | Rex sole | 1.85 | Pacific flatnose | 1.23 |
| Pacific flatnose | 0.48 | Pacific flatnose | 1.73 | Rex sole | 0.79 |
| Longnose skate | 0.38 | Longnose skate | 0.26 | Pacific hake | 0.09 |
| Pacific hake | 0.10 | Pacific hake | 0.03 | Longnose skate | 0.02 |

Table 6. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Monterey INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for chilipepper rockfish, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m; and for canary rockfish, stratum 1 is 54.9–350 m and stratum 3 is defined as 350–1,280.2 m with no stratum 2. These exceptions are noted with an asterisk (*).

| **Stratum 1** | | | | | |
|---|---|---|---|---|---|
| **2003** (number of hauls = 45) | | **2004** (number of hauls = 59) | | **2005** (number of hauls = 78) | |
| Pacific sanddab | 77.44 | Spiny dogfish | 76.38 | Chilipepper rockfish* | 83.35 |
| Chilipepper rockfish* | 71.30 | Chilipepper rockfish* | 40.31 | Pacific hake | 27.42 |
| Spiny dogfish | 60.52 | Pacific sanddab | 24.91 | Shortbelly rockfish | 18.9 |
| Pacific hake | 21.51 | Pacific hake | 18.02 | Spiny dogfish | 13.89 |
| English sole | 12.41 | Shortbelly rockfish | 17.40 | Petrale sole | 12.49 |
| Stripetail rockfish | 5.11 | Lingcod | 12.63 | Pacific sanddab | 11.25 |
| Shortbelly rockfish | 4.98 | English sole | 10.03 | English sole | 9.80 |
| Petrale sole | 4.95 | Longnose skate | 9.47 | Longnose skate | 6.20 |
| Longnose skate | 4.61 | Bocaccio | 8.03 | Dover sole | 5.11 |
| Rex sole | 3.36 | Petrale sole | 7.00 | Stripetail rockfish | 4.24 |
| Greenstriped rockfish | 3.17 | Stripetail rockfish | 6.86 | Lingcod | 3.71 |
| Lingcod | 2.83 | Dover sole | 6.24 | Spotted ratfish | 3.49 |
| Spotted ratfish | 2.20 | Big skate | 6.09 | Rex sole | 3.30 |
| Big skate | 1.81 | Spotted ratfish | 3.62 | Big skate | 2.91 |
| California skate | 1.71 | California skate | 3.52 | Sablefish | 2.29 |
| Sablefish | 1.59 | Sablefish | 3.50 | California skate | 1.90 |
| Yellowtail rockfish | 1.26 | Rex sole | 3.32 | Greenstriped rockfish | 1.21 |
| Dover sole | 1.03 | Greenstriped rockfish | 1.29 | Bocaccio | 0.90 |
| Greenspotted rockfish | 1.01 | Halfbanded rockfish | 1.28 | Widow rockfish | 0.81 |
| Curlfin sole | 0.81 | Greenspotted rockfish | 1.22 | Halfbanded rockfish | 0.76 |
| Canary rockfish* | 0.52 | Yellowtail rockfish | 0.87 | Curlfin sole | 0.53 |
| Bocaccio | 0.44 | Canary rockfish* | 0.77 | Yellowtail rockfish | 0.27 |
| Pacific cod | 0.12 | Curlfin sole | 0.49 | Canary rockfish* | 0.13 |
| Widow rockfish | 0.11 | Squarespot rockfish | 0.29 | Greenspotted rockfish | 0.12 |
| Darkblotched rockfish | 0.09 | Widow rockfish | 0.28 | Darkblotched rockfish | 0.03 |
| Squarespot rockfish | 0.05 | Rosethorn rockfish | 0.04 | Sharpchin rockfish | 0.02 |
| Rosethorn rockfish | 0.01 | Darkblotched rockfish | 0.04 | Rosethorn rockfish | 0.01 |
| Shortspine thornyhead | 0.01 | Calico rockfish | 0.03 | Pygmy rockfish | 0.01 |
| Sharpchin rockfish | 0.01 | Sharpchin rockfish | <0.01 | Splitnose rockfish | <0.01 |
| Calico rockfish | <0.01 | | | Shortspine thornyhead | <0.01 |
| | | | | Blackgill rockfish | <0.01 |

Table 6 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Monterey INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for chilipepper rockfish, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m; and for canary rockfish, stratum 1 is 54.9–350 m and stratum 3 is defined as 350–1,280.2 m with no stratum 2. These exceptions are noted with an asterisk (*).

| **Stratum 1** | | | | | |
|---|---|---|---|---|---|
| **2006** (number of hauls = 61) | | **2007** (number of hauls = 56) | | **2008** (number of hauls = 70) | |
| Chilipepper rockfish* | 57.56 | Pacific hake | 17.56 | Spiny dogfish | 15.54 |
| Spiny dogfish | 27.94 | Chilipepper rockfish* | 12.69 | Pacific sanddab | 11.92 |
| Pacific hake | 10.80 | Pacific sanddab | 7.21 | Pacific hake | 11.50 |
| Longnose skate | 10.59 | Petrale sole | 6.48 | Stripetail rockfish | 11.28 |
| Petrale sole | 8.80 | Spiny dogfish | 5.76 | Chilipepper rockfish* | 5.48 |
| Pacific sanddab | 8.28 | Yellowtail rockfish | 5.65 | Petrale sole | 4.71 |
| Dover sole | 5.94 | Spotted ratfish | 4.96 | Longnose skate | 4.34 |
| Lingcod | 4.54 | Longnose skate | 4.24 | Halfbanded rockfish | 3.79 |
| Stripetail rockfish | 4.45 | Dover sole | 3.35 | Greenstriped rockfish | 3.36 |
| Shortbelly rockfish | 4.44 | English sole | 2.79 | Dover sole | 3.15 |
| English sole | 3.91 | Rex sole | 2.22 | Spotted ratfish | 2.81 |
| Rex sole | 2.92 | Stripetail rockfish | 2.17 | English sole | 2.47 |
| Halfbanded rockfish | 2.83 | Big skate | 1.89 | Squarespot rockfish | 1.56 |
| Big skate | 2.17 | Lingcod | 1.61 | Bocaccio | 1.44 |
| California skate | 1.66 | California skate | 1.48 | Big skate | 1.41 |
| Spotted ratfish | 1.57 | Shortbelly rockfish | 0.90 | Lingcod | 1.20 |
| Canary rockfish* | 1.54 | Sablefish | 0.75 | Rex sole | 1.15 |
| Greenstriped rockfish | 1.41 | Greenstriped rockfish | 0.51 | California skate | 1.02 |
| Sablefish | 0.73 | Bocaccio | 0.48 | Shortbelly rockfish | 0.89 |
| Bocaccio | 0.53 | Canary rockfish* | 0.34 | Greenspotted rockfish | 0.83 |
| Yellowtail rockfish | 0.29 | Darkblotched rockfish | 0.24 | Pygmy rockfish | 0.67 |
| Greenspotted rockfish | 0.23 | Halfbanded rockfish | 0.20 | Sablefish | 0.50 |
| Curlfin sole | 0.19 | Widow rockfish | 0.18 | Yellowtail rockfish | 0.48 |
| Widow rockfish | 0.19 | Curlfin sole | 0.14 | Canary rockfish* | 0.21 |
| Darkblotched rockfish | 0.06 | Greenspotted rockfish | 0.06 | Curlfin sole | 0.17 |
| Squarespot rockfish | 0.04 | Grooved tanner crab | 0.01 | Redstripe rockfish | 0.12 |
| Rosethorn rockfish | 0.03 | Sharpchin rockfish | <0.01 | Rosethorn rockfish | 0.11 |
| Calico rockfish | <0.01 | Rosethorn rockfish | <0.01 | Widow rockfish | 0.09 |
| Sharpchin rockfish | <0.01 | Splitnose rockfish | <0.01 | Sharpchin rockfish | 0.03 |
| Splitnose rockfish | <0.01 | | | Aurora rockfish | 0.01 |
| | | | | Darkblotched rockfish | <0.01 |
| | | | | Splitnose rockfish | <0.01 |

Table 6 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Monterey INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for chilipepper rockfish, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m. These exceptions are noted with an asterisk (*).

| **Stratum 2** | | | | | |
|---|---|---|---|---|---|
| **2003** (number of hauls = 30) | | **2004** (number of hauls = 17) | | **2005** (number of hauls = 21) | |
| Chilipepper rockfish* | 137.71 | Chilipepper rockfish* | 148.16 | Chilipepper rockfish* | 102.64 |
| Shortbelly rockfish | 101.17 | Sablefish | 68.78 | Shortbelly rockfish | 126.41 |
| Dover sole | 79.36 | Splitnose rockfish | 64.72 | Stripetail rockfish | 52.94 |
| Spotted ratfish | 20.78 | Dover sole | 51.64 | Dover sole | 38.45 |
| Splitnose rockfish | 19.51 | Pacific hake | 41.00 | Spiny dogfish | 24.81 |
| Pacific hake | 17.91 | Stripetail rockfish | 40.27 | Pacific hake | 15.85 |
| Rex sole | 15.99 | Shortbelly rockfish | 19.64 | Splitnose rockfish | 12.83 |
| Darkblotched rockfish | 12.47 | Rex sole | 17.46 | Rex sole | 9.61 |
| Stripetail rockfish | 11.31 | Longnose skate | 15.50 | Sablefish | 9.51 |
| Sablefish | 9.90 | Lingcod | 5.77 | Longnose skate | 7.84 |
| Longnose skate | 6.98 | Spiny dogfish | 3.84 | Bocaccio | 6.89 |
| Spiny dogfish | 5.44 | Petrale sole | 3.73 | Petrale sole | 2.90 |
| Shortspine thornyhead | 4.29 | Spotted ratfish | 3.47 | English sole | 2.90 |
| English sole | 4.23 | Darkblotched rockfish | 2.79 | Spotted ratfish | 2.25 |
| Lingcod | 2.57 | Sharpchin rockfish | 2.41 | Lingcod | 2.10 |
| Aurora rockfish | 1.46 | Bocaccio | 2.37 | Shortspine thornyhead | 1.96 |
| Petrale sole | 1.43 | Shortspine thornyhead | 2.18 | Greenstriped rockfish | 1.72 |
| Longspine thornyhead | 0.94 | Aurora rockfish | 1.95 | Darkblotched rockfish | 1.06 |
| Widow rockfish | 0.85 | English sole | 1.82 | Aurora rockfish | 0.94 |
| Bocaccio | 0.72 | Big skate | 1.01 | Longspine thornyhead | 0.56 |
| Blackgill rockfish | 0.42 | Greenstriped rockfish | 0.46 | Pacific sanddab | 0.16 |
| Grooved tanner crab | 0.41 | Greenspotted rockfish | 0.35 | Widow rockfish | 0.13 |
| Big skate | 0.29 | Blackgill rockfish | 0.24 | Blackgill rockfish | 0.10 |
| Redbanded rockfish | 0.25 | Widow rockfish | 0.18 | Redbanded rockfish | 0.09 |
| Rosethorn rockfish | 0.21 | Redbanded rockfish | 0.12 | Rosethorn rockfish | 0.09 |
| Greenstriped rockfish | 0.10 | Pacific sanddab | 0.11 | Grooved tanner crab | 0.07 |
| Giant grenadier | 0.09 | Longspine thornyhead | 0.09 | Bank rockfish | 0.02 |
| Pacific ocean perch | 0.07 | Giant grenadier | 0.05 | Greenspotted rockfish | 0.02 |
| Pacific sanddab | 0.06 | Bank rockfish | 0.02 | Pacific flatnose | 0.02 |
| Bank rockfish | 0.03 | Grooved tanner crab | 0.02 | Giant grenadier | 0.01 |
| Pacific flatnose | 0.02 | Halfbanded rockfish | <0.01 | California skate | <0.01 |
| Greenspotted rockfish | 0.01 | Pacific flatnose | <0.01 | Sharpchin rockfish | <0.01 |
| Sharpchin rockfish | <0.01 | | | | |
| Pygmy rockfish | <0.01 | | | | |

Table 6 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Monterey INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for chilipepper rockfish, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m. These exceptions are noted with an asterisk (*).

| **Stratum 2** | | | | | |
|---|---|---|---|---|---|
| **2006** (number of hauls = 32) | | **2007** (number of hauls = 18) | | **2008** (number of hauls = 32) | |
| Chilipepper rockfish* | 52.14 | Chilipepper rockfish* | 198.46 | Chilipepper rockfish* | 88.47 |
| Dover sole | 41.44 | Dover sole | 72.34 | Dover sole | 47.45 |
| Splitnose rockfish | 24.62 | Splitnose rockfish | 48.40 | Splitnose rockfish | 24.06 |
| Rex sole | 14.23 | Spiny dogfish | 41.35 | Longnose skate | 13.91 |
| Spiny dogfish | 13.70 | Pacific hake | 28.01 | Stripetail rockfish | 11.99 |
| Sablefish | 13.18 | Rex sole | 10.85 | Pacific hake | 11.14 |
| Pacific hake | 13.04 | Stripetail rockfish | 10.16 | Rex sole | 8.49 |
| Stripetail rockfish | 11.50 | Sablefish | 8.71 | Spiny dogfish | 7.64 |
| Longnose skate | 9.77 | Longnose skate | 8.57 | Sablefish | 5.16 |
| Bank rockfish | 8.68 | Darkblotched rockfish | 3.09 | Grooved tanner crab | 4.57 |
| Blackgill rockfish | 3.71 | Shortspine thornyhead | 2.69 | Spotted ratfish | 4.50 |
| Shortspine thornyhead | 3.54 | Spotted ratfish | 2.57 | Shortspine thornyhead | 2.32 |
| Grooved tanner crab | 2.72 | Aurora rockfish | 1.57 | Petrale sole | 1.23 |
| Sharpchin rockfish | 2.71 | Grooved tanner crab | 1.53 | Aurora rockfish | 1.13 |
| Darkblotched rockfish | 2.05 | Longspine thornyhead | 0.63 | Longspine thornyhead | 1.01 |
| Spotted ratfish | 1.80 | Petrale sole | 0.49 | Darkblotched rockfish | 0.90 |
| English sole | 1.72 | Big skate | 0.46 | Bocaccio | 0.88 |
| Lingcod | 1.67 | English sole | 0.40 | Lingcod | 0.85 |
| Aurora rockfish | 1.09 | Greenspotted rockfish | 0.25 | Blackgill rockfish | 0.73 |
| Longspine thornyhead | 0.99 | Blackgill rockfish | 0.23 | English sole | 0.41 |
| Bocaccio | 0.88 | Greenstriped rockfish | 0.21 | Bank rockfish | 0.17 |
| Petrale sole | 0.83 | Lingcod | 0.19 | Widow rockfish | 0.14 |
| Greenspotted rockfish | 0.70 | Sharpchin rockfish | 0.17 | Redbanded rockfish | 0.09 |
| Widow rockfish | 0.56 | Bocaccio | 0.16 | Greenstriped rockfish | 0.08 |
| Rosethorn rockfish | 0.52 | Rosethorn rockfish | 0.05 | Rosethorn rockfish | 0.02 |
| Greenstriped rockfish | 0.51 | Redbanded rockfish | 0.04 | Pacific flatnose | 0.02 |
| Redbanded rockfish | 0.32 | Pacific flatnose | 0.03 | Shortbelly rockfish | 0.01 |
| Pacific flatnose | 0.05 | Pacific grenadier | 0.03 | Greenspotted rockfish | 0.01 |
| Shortbelly rockfish | <0.01 | Bank rockfish | 0.02 | Pacific grenadier | 0.01 |
| California skate | <0.01 | | | Sharpchin rockfish | 0.01 |

Table 6 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Monterey INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m.

| **Stratum 3** | | | | | |
|---|---|---|---|---|---|
| **2003** (number of hauls = 26) | | **2004** (number of hauls = 21) | | **2005** (number of hauls = 20) | |
| Dover sole | 42.52 | Dover sole | 48.51 | Dover sole | 52.5 |
| Pacific grenadier | 32.96 | Longspine thornyhead | 39.11 | Longspine thornyhead | 32.41 |
| Longspine thornyhead | 28.86 | Grooved tanner crab | 11.64 | Grooved tanner crab | 17.78 |
| Grooved tanner crab | 20.39 | Sablefish | 9.93 | Sablefish | 16.71 |
| Sablefish | 16.43 | Shortspine thornyhead | 5.37 | Pacific grenadier | 14.87 |
| Giant grenadier | 12.32 | Pacific grenadier | 2.88 | Shortspine thornyhead | 6.60 |
| Shortspine thornyhead | 7.69 | Giant grenadier | 2.23 | Giant grenadier | 1.62 |
| Pacific flatnose | 1.48 | Longnose skate | 1.38 | Longnose skate | 1.44 |
| Longnose skate | 0.67 | Aurora rockfish | 0.45 | Pacific flatnose | 1.20 |
| Pacific hake | 0.65 | Rex sole | 0.39 | Aurora rockfish | 0.38 |
| Aurora rockfish | 0.49 | Pacific flatnose | 0.23 | Pacific hake | 0.07 |
| Rex sole | 0.37 | Pacific hake | 0.20 | Spiny dogfish | 0.04 |
| California skate | 0.02 | Blackgill rockfish | 0.04 | | |
| | | Spiny dogfish | 0.02 | | |
| **2006** (number of hauls = 37) | | **2007** (number of hauls = 29) | | **2008** (number of hauls = 39) | |
| Dover sole | 28.55 | Dover sole | 33.94 | Dover sole | 44.53 |
| Longspine thornyhead | 27.80 | Longspine thornyhead | 27.28 | Longspine thornyhead | 37.17 |
| Grooved tanner crab | 20.35 | Pacific grenadier | 21.34 | Grooved tanner crab | 15.92 |
| Pacific grenadier | 16.53 | Grooved tanner crab | 15.36 | Pacific grenadier | 14.15 |
| Sablefish | 14.96 | Sablefish | 12.10 | Sablefish | 10.57 |
| Shortspine thornyhead | 6.58 | Shortspine thornyhead | 6.05 | Shortspine thornyhead | 6.79 |
| Giant grenadier | 5.83 | Giant grenadier | 4.48 | Giant grenadier | 3.57 |
| Pacific flatnose | 1.93 | Pacific flatnose | 1.76 | Longnose skate | 0.74 |
| Longnose skate | 0.97 | Rex sole | 0.87 | Pacific flatnose | 0.70 |
| Rex sole | 0.37 | Longnose skate | 0.70 | Pacific hake | 0.14 |
| Aurora rockfish | 0.24 | Aurora rockfish | 0.09 | Rex sole | 0.06 |
| Pacific hake | 0.20 | Pacific hake | 0.07 | Aurora rockfish | 0.05 |
| Blackgill rockfish | 0.04 | | | | |

Table 7. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Conception INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for chilipepper rockfish, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m; and for canary rockfish, stratum 1 is 54.9–350 m and stratum 3 is defined as 350–1,280.2 m with no stratum 2. These exceptions are noted with an asterisk (*).

| **Stratum 1** | | | | | |
|---|---|---|---|---|---|
| **2003** (number of hauls = 52) | | **2004** (number of hauls = 47) | | **2005** (number of hauls = 54) | |
| Pacific sanddab | 14.67 | Halfbanded rockfish | 12.58 | Halfbanded rockfish | 31.99 |
| Spotted ratfish | 2.16 | Spotted ratfish | 5.80 | Spotted ratfish | 15.23 |
| English sole | 1.65 | Pacific sanddab | 5.37 | Pacific sanddab | 7.01 |
| Petrale sole | 0.88 | Spiny dogfish | 1.21 | English sole | 2.68 |
| California skate | 0.79 | English sole | 1.20 | Spiny dogfish | 2.62 |
| Halfbanded rockfish | 0.76 | Stripetail rockfish | 0.94 | Shortbelly rockfish | 2.08 |
| California scorpionfish | 0.64 | California skate | 0.93 | Squarespot rockfish | 1.94 |
| Lingcod | 0.63 | California scorpionfish | 0.92 | Chilipepper rockfish* | 1.85 |
| Spiny dogfish | 0.61 | Pacific hake | 0.87 | California scorpionfish | 1.47 |
| Stripetail rockfish | 0.60 | Lingcod | 0.84 | Canary rockfish* | 1.40 |
| Big skate | 0.56 | Petrale sole | 0.80 | Rosethorn rockfish | 1.25 |
| Sablefish | 0.38 | Bocaccio | 0.77 | Pygmy rockfish | 1.04 |
| Longnose skate | 0.31 | Greenspotted rockfish | 0.68 | Greenspotted rockfish | 0.96 |
| Curlfin sole | 0.27 | Longnose skate | 0.61 | Big skate | 0.89 |
| Bocaccio | 0.24 | Big skate | 0.56 | Stripetail rockfish | 0.80 |
| Greenspotted rockfish | 0.23 | Canary rockfish* | 0.53 | Pacific hake | 0.67 |
| Pacific hake | 0.21 | Widow rockfish | 0.32 | California skate | 0.67 |
| Chilipepper rockfish* | 0.16 | Chilipepper rockfish* | 0.25 | Petrale sole | 0.66 |
| Shortbelly rockfish | 0.13 | Curlfin sole | 0.21 | Lingcod | 0.53 |
| Rex sole | 0.05 | Shortbelly rockfish | 0.16 | Bocaccio | 0.49 |
| Aurora rockfish | 0.03 | Greenstriped rockfish | 0.15 | Yellowtail rockfish | 0.30 |
| Canary rockfish* | 0.03 | Yellowtail rockfish | 0.14 | Widow rockfish | 0.29 |
| Dover sole | 0.03 | Rex sole | 0.13 | Greenstriped rockfish | 0.18 |
| Greenstriped rockfish | 0.01 | Splitnose rockfish | 0.09 | Calico rockfish | 0.16 |
| Rosethorn rockfish | 0.01 | Sablefish | 0.05 | Longnose skate | 0.14 |
| Yellowtail rockfish | 0.01 | Dover sole | 0.05 | Bank rockfish | 0.12 |
| Squarespot rockfish | <0.01 | Rosethorn rockfish | 0.03 | Curlfin sole | 0.09 |
| Calico rockfish | <0.01 | Squarespot rockfish | 0.03 | Dover sole | 0.07 |
| Darkblotched rockfish | <0.01 | Darkblotched rockfish | 0.02 | Sablefish | 0.06 |
| Splitnose rockfish | <0.01 | Calico rockfish | 0.02 | Rex sole | 0.05 |
| | | Bank rockfish | 0.01 | Redbanded rockfish | 0.03 |
| | | | | Splitnose rockfish | <0.01 |
| | | | | Sharpchin rockfish | <0.01 |
| | | | | Flathead sole | <0.01 |

Table 7 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Conception INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for chilipepper rockfish, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m; and for canary rockfish, stratum 1 is 54.9–350 m and stratum 3 is defined as 350–1,280.2 m with no stratum 2. These exceptions are noted with an asterisk (*).

| **Stratum 1** | | | | | |
|---|---|---|---|---|---|
| **2006** (number of hauls = 48 | | **2007** (number of hauls = 55) | | **2008** (number of hauls = 51) | |
| Pacific sanddab | 14.06 | Halfbanded rockfish | 16.10 | Pacific sanddab | 8.58 |
| Halfbanded rockfish | 7.03 | Pacific sanddab | 10.49 | Spotted ratfish | 5.47 |
| Pacific hake | 4.66 | Spotted ratfish | 7.59 | Halfbanded rockfish | 5.37 |
| English sole | 2.02 | Greenspotted rockfish | 2.54 | Chilipepper rockfish* | 2.18 |
| Bocaccio | 1.60 | Chilipepper rockfish* | 1.46 | English sole | 1.34 |
| Spotted ratfish | 1.52 | Bocaccio | 1.43 | Spiny dogfish | 0.77 |
| Greenspotted rockfish | 1.39 | Shortbelly rockfish | 1.42 | Canary rockfish* | 0.68 |
| Spiny dogfish | 1.37 | English sole | 1.21 | Greenspotted rockfish | 0.68 |
| Stripetail rockfish | 1.30 | Rosethorn rockfish | 1.10 | California skate | 0.66 |
| Shortbelly rockfish | 0.95 | California scorpionfish | 1.05 | Lingcod | 0.65 |
| Petrale sole | 0.88 | Spiny dogfish | 0.99 | Petrale sole | 0.64 |
| Big skate | 0.77 | Greenstriped rockfish | 0.81 | Big skate | 0.38 |
| Longnose skate | 0.66 | Lingcod | 0.75 | Greenstriped rockfish | 0.31 |
| California skate | 0.65 | Petrale sole | 0.63 | Stripetail rockfish | 0.29 |
| Lingcod | 0.63 | Pacific hake | 0.61 | California scorpionfish | 0.24 |
| California scorpionfish | 0.40 | Squarespot rockfish | 0.59 | Curlfin sole | 0.21 |
| Greenstriped rockfish | 0.40 | California skate | 0.55 | Shortbelly rockfish | 0.18 |
| Rosethorn rockfish | 0.37 | Big skate | 0.53 | Longnose skate | 0.16 |
| Rex sole | 0.23 | Longnose skate | 0.43 | Squarespot rockfish | 0.11 |
| Chilipepper rockfish* | 0.19 | Stripetail rockfish | 0.42 | Bocaccio | 0.09 |
| Squarespot rockfish | 0.14 | Pygmy rockfish | 0.24 | Dover sole | 0.08 |
| Curlfin sole | 0.12 | Bank rockfish | 0.19 | Sablefish | 0.05 |
| Dover sole | 0.12 | Rex sole | 0.17 | Rex sole | 0.04 |
| Bank rockfish | 0.05 | Splitnose rockfish | 0.14 | Pacific hake | 0.04 |
| Pygmy rockfish | 0.02 | Dover sole | 0.11 | Calico rockfish | 0.02 |
| Calico rockfish | 0.01 | Curlfin sole | 0.09 | Pygmy rockfish | <0.01 |
| Canary rockfish* | 0.01 | Calico rockfish | 0.02 | Bank rockfish | <0.01 |
| Splitnose rockfish | <0.01 | Sablefish | 0.01 | Rosethorn rockfish | <0.01 |
| Sablefish | <0.01 | Canary rockfish* | 0.01 | Redbanded rockfish | <0.01 |
| | | Darkblotched rockfish | <0.01 | | |

Table 7 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Conception INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for chilipepper rockfish, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m. These exceptions are noted with an asterisk (*).

| **Stratum 2** | | | | | |
|---|---|---|---|---|---|
| **2003** (number of hauls = 54 | | **2004** (number of hauls = 46) | | **2005** (number of hauls = 75) | |
| Chilipepper rockfish* | 17.99 | Splitnose rockfish | 17.21 | Splitnose rockfish | 14.95 |
| Dover sole | 11.05 | Shortbelly rockfish | 16.09 | Dover sole | 14.23 |
| Splitnose rockfish | 10.72 | Dover sole | 13.06 | Shortbelly rockfish | 8.17 |
| Pacific hake | 9.11 | Pacific hake | 13.00 | Sablefish | 7.31 |
| Shortbelly rockfish | 7.19 | Longnose skate | 5.35 | Pacific hake | 6.61 |
| Longnose skate | 6.41 | Sablefish | 4.16 | Longnose skate | 6.48 |
| Rex sole | 4.95 | Rex sole | 4.12 | Chilipepper rockfish* | 6.12 |
| Sablefish | 2.85 | Stripetail rockfish | 3.52 | Rex sole | 5.04 |
| Stripetail rockfish | 2.77 | Lingcod | 3.51 | Shortspine thornyhead | 4.09 |
| Longspine thornyhead | 2.25 | Chilipepper rockfish* | 3.08 | Aurora rockfish | 2.50 |
| Aurora rockfish | 2.07 | Blackgill rockfish | 2.75 | Longspine thornyhead | 2.38 |
| Shortspine thornyhead | 2.06 | Shortspine thornyhead | 2.06 | Blackgill rockfish | 2.08 |
| Spiny dogfish | 2.03 | Aurora rockfish | 1.71 | Stripetail rockfish | 1.67 |
| Spotted ratfish | 1.55 | Pacific sanddab | 1.46 | Spotted ratfish | 1.18 |
| Blackgill rockfish | 0.69 | Spotted ratfish | 1.22 | Rosethorn rockfish | 0.93 |
| Petrale sole | 0.62 | English sole | 1.03 | Spiny dogfish | 0.54 |
| Lingcod | 0.61 | Longspine thornyhead | 0.95 | Lingcod | 0.46 |
| English sole | 0.58 | Petrale sole | 0.90 | Petrale sole | 0.36 |
| Bocaccio | 0.30 | Spiny dogfish | 0.55 | Grooved tanner crab | 0.18 |
| Pacific sanddab | 0.20 | Rosethorn rockfish | 0.32 | Big skate | 0.09 |
| Greenspotted rockfish | 0.18 | Bocaccio | 0.32 | Bank rockfish | 0.06 |
| Greenstriped rockfish | 0.12 | Greenstriped rockfish | 0.21 | Bocaccio | 0.05 |
| Rosethorn rockfish | 0.07 | Greenspotted rockfish | 0.15 | Darkblotched rockfish | 0.02 |
| Redbanded rockfish | 0.03 | Bank rockfish | 0.15 | English sole | 0.01 |
| Darkblotched rockfish | 0.02 | Darkblotched rockfish | 0.07 | Redbanded rockfish | 0.01 |
| California skate | 0.02 | Grooved tanner crab | 0.03 | Greenstriped rockfish | 0.01 |
| California scorpionfish | 0.01 | California skate | 0.02 | Pacific sanddab | 0.01 |
| Curlfin sole | 0.01 | Curlfin sole | 0.02 | Pacific grenadier | 0.01 |
| Grooved tanner crab | 0.01 | Redbanded rockfish | 0.01 | Greenspotted rockfish | 0.01 |
| Halfbanded rockfish | <0.01 | Rougheye rockfish | 0.01 | Widow rockfish | <0.01 |
| Bank rockfish | <0.01 | Widow rockfish | <0.01 | Sharpchin rockfish | <0.01 |
| | | Halfbanded rockfish | <0.01 | | |

Table 7 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Conception INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m; however, for chilipepper rockfish, stratum 1 is 54.9–155 m and stratum 2 is 155–548.6 m. These exceptions are noted with an asterisk (*).

| **Stratum 2** | | | | | |
|---|---|---|---|---|---|
| **2006** (number of hauls = 72 | | **2007** (number of hauls = 85) | | **2008** (number of hauls = 82) | |
| Dover sole | 14.36 | Dover sole | 14.65 | Dover sole | 16.46 |
| Pacific hake | 6.54 | Splitnose rockfish | 11.66 | Splitnose rockfish | 15.67 |
| Longnose skate | 5.81 | Pacific hake | 10.60 | Longnose skate | 14.03 |
| Splitnose rockfish | 4.95 | Longnose skate | 7.16 | Pacific hake | 12.42 |
| Shortbelly rockfish | 4.86 | Chilipepper rockfish* | 4.77 | Shortbelly rockfish | 8.23 |
| Sablefish | 4.61 | Sablefish | 4.68 | Sablefish | 4.91 |
| Shortspine thornyhead | 4.00 | Rex sole | 4.25 | Rex sole | 3.71 |
| Rex sole | 3.11 | Shortspine thornyhead | 3.20 | Shortspine thornyhead | 3.47 |
| Blackgill rockfish | 2.91 | Aurora rockfish | 2.58 | Chilipepper rockfish* | 3.09 |
| Chilipepper rockfish* | 2.58 | Spotted ratfish | 2.17 | Aurora rockfish | 2.85 |
| Aurora rockfish | 2.35 | Longspine thornyhead | 2.07 | Longspine thornyhead | 2.50 |
| Longspine thornyhead | 2.20 | Stripetail rockfish | 1.96 | Spiny dogfish | 2.10 |
| Stripetail rockfish | 2.11 | Blackgill rockfish | 1.43 | Spotted ratfish | 1.82 |
| Spotted ratfish | 1.21 | Shortbelly rockfish | 0.70 | Stripetail rockfish | 1.47 |
| Bank rockfish | 0.95 | Petrale sole | 0.49 | Blackgill rockfish | 1.23 |
| Spiny dogfish | 0.32 | Spiny dogfish | 0.38 | Pacific sanddab | 0.37 |
| English sole | 0.27 | English sole | 0.37 | Halfbanded rockfish | 0.36 |
| Lingcod | 0.23 | Pacific sanddab | 0.26 | Grooved tanner crab | 0.33 |
| Greenstriped rockfish | 0.23 | Bocaccio | 0.21 | English sole | 0.33 |
| Petrale sole | 0.17 | Grooved tanner crab | 0.11 | Petrale sole | 0.19 |
| Grooved tanner crab | 0.13 | Lingcod | 0.11 | Big skate | 0.11 |
| Pacific sanddab | 0.12 | California skate | 0.06 | Lingcod | 0.08 |
| Greenspotted rockfish | 0.09 | Greenstriped rockfish | 0.06 | Bocaccio | 0.07 |
| Big skate | 0.09 | Halfbanded rockfish | 0.03 | Bank rockfish | 0.05 |
| Sharpchin rockfish | 0.05 | Rosethorn rockfish | 0.03 | California skate | 0.03 |
| Rosethorn rockfish | 0.03 | Widow rockfish | 0.03 | Greenstriped rockfish | 0.03 |
| Bocaccio | 0.02 | Redbanded rockfish | 0.02 | Greenspotted rockfish | 0.02 |
| Curlfin sole | 0.01 | Bank rockfish | 0.02 | Darkblotched rockfish | 0.02 |
| Giant grenadier | 0.01 | Greenspotted rockfish | 0.01 | Redbanded rockfish | 0.01 |
| Halfbanded rockfish | 0.01 | Darkblotched rockfish | 0.01 | Rosethorn rockfish | <0.01 |
| Darkblotched rockfish | <0.01 | Curlfin sole | 0.01 | Curlfin sole | <0.01 |
| Pacific grenadier | <0.01 | | | Squarespot rockfish | <0.01 |
| Redbanded rockfish | <0.01 | | | Redstripe rockfish | <0.01 |
| California skate | <0.01 | | | | |
| Rougheye rockfish | <0.01 | | | | |

Table 7 continued. Mean CPUE (kg ha$^{-1}$) of 47 important FMP groundfish species plus grooved tanner crab caught by depth strata in the Conception INPFC area during the 2003–2008 surveys. Stratum 1 typically is 54.9–182.9 m, stratum 2 is 182.9–548.6 m, and stratum 3 is 548.6–1,280.2 m.

| **Stratum 3** | | | | | |
|---|---|---|---|---|---|
| **2003** (number of hauls = 28) | | **2004** (number of hauls = 53) | | **2005** (number of hauls = 72) | |
| Longspine thornyhead | 16.27 | Longspine thornyhead | 19.57 | Longspine thornyhead | 13.51 |
| Dover sole | 10.23 | Dover sole | 13.31 | Dover sole | 13.18 |
| Shortspine thornyhead | 6.89 | Sablefish | 7.67 | Sablefish | 7.53 |
| Sablefish | 4.38 | Shortspine thornyhead | 6.82 | Shortspine thornyhead | 5.54 |
| Giant grenadier | 0.82 | Pacific grenadier | 1.79 | Pacific grenadier | 1.79 |
| Grooved tanner crab | 0.74 | Grooved tanner crab | 1.57 | Grooved tanner crab | 1.73 |
| Pacific grenadier | 0.66 | Giant grenadier | 1.32 | Longnose skate | 0.78 |
| Pacific hake | 0.64 | Longnose skate | 0.49 | Giant grenadier | 0.74 |
| Longnose skate | 0.60 | Pacific flatnose | 0.37 | Pacific flatnose | 0.36 |
| Aurora rockfish | 0.43 | Pacific hake | 0.22 | Aurora rockfish | 0.23 |
| Pacific flatnose | 0.30 | Aurora rockfish | 0.18 | Pacific hake | 0.14 |
| Rex sole | 0.03 | Rex sole | 0.01 | Spotted ratfish | 0.13 |
| California skate | 0.01 | | | Rex sole | 0.01 |
| | | | | California skate | 0.01 |
| **2006** (number of hauls = 70) | | **2007** (number of hauls = 71) | | **2008** (number of hauls = 64) | |
| Longspine thornyhead | 15.65 | Dover sole | 18.86 | Longspine thornyhead | 16.97 |
| Dover sole | 13.66 | Longspine thornyhead | 16.05 | Dover sole | 14.25 |
| Sablefish | 7.24 | Sablefish | 11.44 | Sablefish | 5.82 |
| Pacific grenadier | 6.71 | Shortspine thornyhead | 6.92 | Shortspine thornyhead | 4.61 |
| Shortspine thornyhead | 5.95 | Pacific grenadier | 3.46 | Pacific grenadier | 1.41 |
| Grooved tanner crab | 1.75 | Grooved tanner crab | 1.67 | Grooved tanner crab | 1.30 |
| Giant grenadier | 1.02 | Giant grenadier | 1.64 | Giant grenadier | 0.88 |
| Pacific flatnose | 0.78 | Pacific flatnose | 0.78 | Longnose skate | 0.50 |
| Longnose skate | 0.58 | Longnose skate | 0.35 | Pacific flatnose | 0.36 |
| Pacific hake | 0.14 | Aurora rockfish | 0.12 | Aurora rockfish | 0.33 |
| Aurora rockfish | 0.08 | Pacific hake | 0.08 | Pacific hake | 0.26 |
| Rex sole | 0.06 | Rex sole | 0.07 | Rex sole | 0.01 |
| Spotted ratfish | 0.01 | Spotted ratfish | 0.01 | Blackgill rockfish | <0.01 |
| Blackgill rockfish | <0.01 | | | | |
| Splitnose rockfish | <0.01 | | | | |

Table 8. Number of individual length measurements and age structures collected by species during the surveys from 2003 to 2008. Dorsal spines were collected for spiny dogfish, dorsal finrays for lingcod, and otoliths for all other species.

| Species | Lengths | Ages | Species | Lengths | Ages | Species | Lengths | Ages |
|---|---|---|---|---|---|---|---|---|
| Arrowtooth flounder | 21,138 | 5,466 | Greenblotched r'fish | 308 | 207 | Rosy rockfish | 280 | 103 |
| Aurora rockfish | 9,113 | 3,407 | Greenspotted rockfish | 2,954 | 1,262 | Rougheye rockfish | 814 | 599 |
| Bank rockfish | 571 | 264 | Greenstriped rockfish | 17,678 | 3,809 | Sablefish | 29,690 | 14,562 |
| Big skate | 1,326 | — | Grooved tanner crab | 18,410 | — | Sand sole | 252 | 62 |
| Black rockfish | 1 | 1 | Halfbanded rockfish | 8,286 | 1,519 | Sharpchin rockfish | 7,602 | 1,718 |
| Blackgill rockfish | 2,394 | 1,119 | Honeycomb rockfish | 191 | 95 | Shortbelly rockfish | 10,527 | 2,780 |
| Blue rockfish | 44 | 19 | Kelp greenling | 285 | 126 | Shortraker rockfish | 19 | 16 |
| Bocaccio | 1,458 | 853 | Lingcod | 6,835 | 4,921 | Shortspine thornyhead | 39,094 | 8,270 |
| Bronzespotted rockfish | 1 | 1 | Longnose skate | 19,218 | — | Silvergray rockfish | 153 | 148 |
| Brown rockfish | 165 | 86 | Longspine thornyhead | 60,356 | 5,796 | Soupfin shark | 5 | — |
| Butter sole | 401 | — | Mexican rockfish | 1 | — | Southern rock sole | 954 | — |
| Cabezon | 1 | 1 | Olive rockfish | 3 | 3 | Speckled rockfish | 123 | 42 |
| Calico rockfish | 510 | 330 | Pacific cod | 1,720 | — | Spiny dogfish | 19,474 | 4,636 |
| California scorpionfish | 1,055 | 364 | Pacific flatnose | 7,510 | 270 | Splitnose rockfish | 26,202 | 4,381 |
| California skate | 2,112 | — | Pacific grenadier | 19,238 | 3,857 | Spotted ratfish | 18,063 | — |
| Canary rockfish | 3,690 | 2,047 | Pacific hake | 36,380 | 4,100 | Squarespot rockfish | 1,427 | 365 |
| Chilipepper | 18,044 | 4,388 | Pacific ocean perch | 4,350 | 1,939 | Starry flounder | 166 | 143 |
| Copper rockfish | 242 | 186 | Pacific sanddab | 47,840 | 5,820 | Starry rockfish | 17 | 16 |
| Cowcod | 176 | 176 | Petrale sole | 21,384 | 8,541 | Stripetail rockfish | 22,888 | 2,620 |
| Curlfin sole | 2,646 | 265 | Pink rockfish | 44 | 43 | Swordspine rockfish | 1,642 | 242 |
| Darkblotched rockfish | 11,078 | 4,864 | Pinkrose rockfish | 39 | 29 | Tiger rockfish | 9 | 7 |
| Dover sole | 90,417 | 13,396 | Pygmy rockfish | 1,196 | 306 | Tree rockfish | 1 | 1 |
| English sole | 39,000 | 6,967 | Quillback rockfish | 65 | 43 | Vermilion rockfish | 363 | 205 |
| Flag rockfish | 213 | 129 | Redbanded rockfish | 1,077 | 963 | Widow rockfish | 885 | 349 |
| Flathead sole | 3,348 | — | Redstripe rockfish | 3,031 | 902 | Yelloweye rockfish | 241 | 241 |
| Freckled rockfish | 79 | 44 | Rex sole | 70,145 | 1,571 | Yellowmouth rockfish | 164 | 57 |
| Gopher rockfish | 7 | 3 | Rosethorn rockfish | 7,247 | 2,429 | Yellowtail rockfish | 4,722 | 1,648 |

Table 9. Number of individual length measurements and age structures collected by species by year during the surveys from 2003 to 2008. Dorsal spines were collected for spiny dogfish, dorsal finrays for lingcod, and otoliths for all other species.

| | 2003 | | 2004 | | 2005 | | 2006 | | 2007 | | 2008 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Lengths** | **Ages** | **Lengths** | **Ages** | **Lengths** | **Ages** | **Lengths** | **Ages** | **Lengths** | **Ages** | **Lengths** | **Ages** |
| Arrowtooth flounder | 4,542 | 1,386 | 2,765 | 704 | 3,991 | 867 | 3,036 | 735 | 3,553 | 895 | 3,251 | 879 |
| Aurora rockfish | 1,176 | 575 | 1,087 | 354 | 1,699 | 577 | 1,749 | 609 | 1,694 | 586 | 1,708 | 706 |
| Bank rockfish | 6 | 4 | 106 | 60 | 96 | 50 | 257 | 64 | 75 | 55 | 31 | 31 |
| Big skate | 203 | — | 267 | — | 343 | — | 154 | — | 197 | 0 | 162 | — |
| Black rockfish | — | — | — | — | — | — | — | — | — | — | — | — |
| Blackgill rockfish | 146 | 104 | 449 | 175 | 398 | 191 | 764 | 212 | 298 | 194 | 339 | 243 |
| Blue rockfish | 19 | — | 2 | 2 | 21 | 15 | — | — | — | — | 2 | 2 |
| Bocaccio | 113 | 113 | 493 | 222 | 319 | 196 | 265 | 138 | 157 | 98 | 111 | 86 |
| Bronzespotted rockfish | — | — | — | — | — | — | 1 | 1 | — | — | — | — |
| Brown rockfish | 56 | — | 43 | 43 | 48 | 25 | 13 | 13 | 1 | 1 | 4 | 4 |
| Butter sole | 89 | — | 7 | — | 132 | — | 4 | — | 121 | — | 48 | — |
| Cabezon | — | — | — | — | — | — | — | — | — | — | 1 | 1 |
| Calico rockfish | 12 | — | 84 | 84 | 258 | 119 | 51 | 51 | 55 | 47 | 50 | 29 |
| California scorpionfish | 142 | — | 180 | — | 362 | 147 | 99 | 73 | 217 | 89 | 55 | 55 |
| California skate | 279 | — | 489 | — | 457 | — | 316 | — | 273 | — | 298 | — |
| Canary rockfish | 423 | 278 | 550 | 289 | 622 | 277 | 623 | 247 | 673 | 497 | 799 | 459 |
| Chilipepper | 2,658 | 716 | 3,802 | 855 | 4,102 | 892 | 2,754 | 626 | 2,519 | 596 | 2,209 | 703 |
| Copper rockfish | 29 | — | 76 | 76 | 70 | 43 | 10 | 10 | 13 | 13 | 44 | 44 |
| Cowcod | 13 | 13 | 65 | 65 | 32 | 32 | 25 | 25 | 25 | 25 | 16 | 16 |
| Curlfin sole | 700 | — | 629 | — | 518 | — | 299 | — | 201 | — | 299 | 265 |
| Darkblotched rockfish | 2,375 | 772 | 1,062 | 595 | 1,983 | 804 | 1,925 | 944 | 2,086 | 987 | 1,647 | 762 |
| Dover sole | 23,330 | 3,019 | 17,878 | 2,569 | 18,008 | 2,572 | 13,615 | 2,008 | 11,322 | 2,151 | 6,264 | 1,077 |
| English sole | 8,380 | 1,840 | 8,697 | 994 | 8,780 | 1,332 | 5,529 | 1,001 | 4,088 | 955 | 3,526 | 845 |
| Flag rockfish | 78 | — | 29 | 29 | 17 | 17 | 26 | 26 | 55 | 49 | 8 | 8 |
| Flathead sole | 1,521 | — | 519 | — | 593 | — | 421 | — | 137 | — | 157 | — |
| Freckled rockfish | — | — | — | — | 79 | 44 | — | — | — | — | — | — |
| Gopher rockfish | 3 | — | 1 | — | 1 | 1 | 2 | 2 | — | — | — | — |
| Greenblotched rockfish | 43 | — | 59 | 59 | 30 | 30 | 74 | 40 | 31 | 27 | 71 | 51 |
| Greenspotted rockfish | 424 | — | 567 | 283 | 276 | 153 | 475 | 273 | 655 | 309 | 557 | 244 |
| Greenstriped rockfish | 3,557 | 625 | 2,718 | 541 | 4,008 | 722 | 3,167 | 687 | 2,362 | 665 | 1,866 | 569 |
| Grooved tanner crab | — | — | — | — | 5,441 | — | 5,911 | — | 3,560 | — | 3,498 | — |

Table 9 continued. Number of individual length measurements and age structures collected by species by year during the surveys from 2003 to 2008. Dorsal spines were collected for spiny dogfish, dorsal finrays for lingcod, and otoliths for all other species.

| | 2003 | | 2004 | | 2005 | | 2006 | | 2007 | | 2008 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Lengths** | **Ages** | **Lengths** | **Ages** | **Lengths** | **Ages** | **Lengths** | **Ages** | **Lengths** | **Ages** | **Lengths** | **Ages** |
| Halfbanded rockfish | — | — | 1,693 | 439 | 2,749 | 418 | 1,549 | 220 | 1,213 | 234 | 1,082 | 208 |
| Honeycomb rockfish | 1 | — | 16 | 16 | 91 | 33 | 14 | 14 | 68 | 31 | 1 | 1 |
| Kelp greenling | 61 | — | 97 | — | 46 | 45 | 23 | 23 | 39 | 39 | 19 | 19 |
| Lingcod | 1,381 | 931 | 1,436 | 907 | 1,182 | 944 | 1,022 | 721 | 650 | 557 | 1,164 | 861 |
| Longnose skate | 2,673 | — | 2,644 | — | 3,328 | — | 3,323 | — | 3,867 | — | 3,383 | — |
| Longspine thornyhead | 15,595 | 970 | 11,703 | 772 | 13,975 | 1,149 | 9,180 | 946 | 6,249 | 962 | 3,654 | 997 |
| Mexican rockfish | — | — | 1 | — | — | — | — | — | — | — | — | — |
| Olive rockfish | — | — | 1 | 1 | 2 | 2 | — | — | — | — | — | — |
| Pacific cod | 785 | — | 304 | — | 199 | — | 166 | — | 177 | — | 89 | — |
| Pacific flatnose | 1,973 | — | — | — | 1,206 | — | 1,743 | — | 1,689 | 270 | 899 | — |
| Pacific grenadier | 4,463 | 1,141 | 2,048 | 350 | 2,643 | 548 | 4,334 | 599 | 3,157 | 641 | 2,593 | 578 |
| Pacific hake | 5,947 | 1,714 | 3,893 | — | 9,140 | — | 7,372 | — | 5,465 | 1,233 | 4,563 | 1,153 |
| Pacific ocean perch | 1,426 | 434 | 565 | 219 | 533 | 264 | 659 | 255 | 628 | 439 | 539 | 328 |
| Pacific sanddab | 9,690 | 838 | 11,935 | 1,565 | 10,957 | 1,122 | 6,130 | 744 | 4,559 | 768 | 4,569 | 783 |
| Petrale sole | 2,868 | 1,631 | 3,509 | 1,973 | 4,732 | 1,919 | 3,745 | 986 | 3,461 | 995 | 3,069 | 1,037 |
| Pink rockfish | 1 | — | — | — | — | — | 22 | 22 | 21 | 21 | — | — |
| Pinkrose rockfish | — | — | — | — | — | — | 12 | 12 | 27 | 17 | — | — |
| Pygmy rockfish | — | — | 171 | 46 | 196 | 53 | 405 | 81 | 248 | 77 | 176 | 49 |
| Quillback rockfish | 3 | — | — | — | 2 | 2 | 3 | 3 | 20 | 16 | 37 | 22 |
| Redbanded rockfish | 272 | 179 | 158 | 144 | 171 | 171 | 152 | 145 | 178 | 178 | 146 | 146 |
| Redstripe rockfish | 1,068 | 246 | 527 | 179 | 240 | 113 | 507 | 131 | 356 | 102 | 333 | 131 |
| Rex sole | 11,047 | — | 14,388 | — | 16,173 | — | 11,641 | — | 9,646 | 805 | 7,250 | 766 |
| Rosethorn rockfish | 1,604 | 382 | 1,003 | 353 | 931 | 325 | 1,578 | 496 | 1,320 | 507 | 811 | 366 |
| Rosy rockfish | — | — | 3 | 3 | 14 | 14 | — | — | 41 | 16 | 222 | 70 |
| Rougheye rockfish | 112 | 56 | 115 | 78 | 259 | 140 | 99 | 97 | 108 | 107 | 121 | 121 |
| Sablefish | 5,938 | 2,402 | 4,671 | 2,204 | 5,721 | 2,946 | 4,904 | 2,696 | 4,477 | 2,123 | 3,979 | 2,191 |
| Sand sole | 81 | — | 29 | — | 31 | — | 12 | — | 37 | — | 62 | 62 |
| Sharpchin rockfish | 2,355 | 553 | 1,176 | 199 | 890 | 158 | 1,283 | 239 | 975 | 204 | 923 | 365 |
| Shortbelly rockfish | 2,133 | 638 | 2,920 | 479 | 2,154 | 572 | 1,445 | 387 | 1,034 | 376 | 841 | 328 |
| Shortraker rockfish | 3 | — | 8 | 8 | 8 | 8 | — | — | — | — | — | — |
| Shortspine thornyhead | 7,712 | 1,269 | 6,766 | 1,719 | 8,152 | 1,415 | 6,240 | 1,261 | 5,506 | 1,298 | 4,718 | 1,308 |
| Silvergray rockfish | 34 | 34 | 19 | 19 | 51 | 46 | 7 | 7 | 22 | 22 | 20 | 20 |

Table 9 continued. Number of individual length measurements and age structures collected by species by year during the surveys from 2003 to 2008. Dorsal spines were collected for spiny dogfish, dorsal finrays for lingcod, and otoliths for all other species.

| | 2003 | | 2004 | | 2005 | | 2006 | | 2007 | | 2008 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Lengths** | **Ages** | **Lengths** | **Ages** | **Lengths** | **Ages** | **Lengths** | **Ages** | **Lengths** | **Ages** | **Lengths** | **Ages** |
| Soupfin shark | 1 | — | — | — | 3 | — | — | — | — | — | 1 | — |
| Southern rock sole | 25 | — | 174 | — | 165 | — | 168 | — | 175 | — | 247 | — |
| Speckled rockfish | — | — | — | — | — | — | 17 | 17 | 106 | 25 | — | — |
| Spiny dogfish | 3,847 | 679 | 2,616 | 582 | 3,727 | 931 | 3,903 | 789 | 2,479 | 763 | 2,902 | 892 |
| Splitnose rockfish | 6,633 | 1,068 | 5,229 | 437 | 4,467 | 543 | 3,592 | 619 | 3,363 | 884 | 2,918 | 830 |
| Spotted ratfish | 4,871 | — | — | — | 3,736 | — | 3,293 | — | 3,524 | — | 2,639 | — |
| Squarespot rockfish | 30 | — | 166 | 26 | 416 | 117 | 152 | 49 | 424 | 93 | 239 | 80 |
| Starry flounder | 6 | — | 51 | 45 | 54 | 43 | 7 | 7 | 25 | 25 | 23 | 23 |
| Starry rockfish | 1 | — | 3 | 3 | 4 | 4 | 1 | 1 | 6 | 6 | 2 | 2 |
| Stripetail rockfish | 5,945 | — | 4,852 | 499 | 4,647 | 591 | 3,330 | 538 | 2,302 | 555 | 1,812 | 437 |
| Swordspine rockfish | — | — | 305 | 49 | 51 | — | 524 | 55 | 453 | 74 | 309 | 64 |
| Tiger rockfish | 2 | — | — | — | — | — | 3 | 3 | 4 | 4 | — | — |
| Tree rockfish | — | — | — | — | 1 | 1 | — | — | — | — | — | — |
| Vermilion rockfish | 63 | — | 20 | 19 | 58 | 37 | 27 | 27 | 121 | 57 | 74 | 65 |
| Widow rockfish | 216 | 10 | 182 | 58 | 197 | 83 | 172 | 89 | 92 | 83 | 26 | 26 |
| Yelloweye rockfish | 68 | 68 | 21 | 21 | 40 | 40 | 43 | 43 | 26 | 26 | 43 | 43 |
| Yellowmouth rockfish | 141 | 34 | — | — | 23 | 23 | — | — | — | — | — | — |
| Yellowtail rockfish | 849 | 275 | 703 | 203 | 1,134 | 365 | 388 | 171 | 958 | 279 | 690 | 355 |

Table 10. Number of length measurements collected by stratum for FMP species during the surveys from 2003 to 2008.

| Species | Stratum 1 (55–183 m) | Stratum 2 (184–549 m) | Stratum 3 (550–1,280 m) | All strata (55–1,280 m) |
|---|---|---|---|---|
| Arrowtooth flounder | 13,988 | 7,118 | 32 | 21,138 |
| Aurora rockfish | 6 | 8,606 | 501 | 9,113 |
| Bank rockfish | 185 | 386 | — | 571 |
| Big skate | 1,297 | 29 | — | 1,326 |
| Black rockfish | 1 | — | — | 1 |
| Blackgill rockfish | 2 | 2,387 | 5 | 2,394 |
| Blue rockfish | 44 | — | — | 44 |
| Bocaccio | 1,160 | 298 | — | 1,458 |
| Bronzespotted rockfish | — | 1 | — | 1 |
| Brown rockfish | 165 | — | — | 165 |
| Butter sole | 401 | — | — | 401 |
| Cabezon | 1 | — | — | 1 |
| Calico rockfish | 510 | — | — | 510 |
| California scorpionfish | 1,052 | 3 | — | 1,055 |
| California skate | 2,088 | 22 | 2 | 2,112 |
| Canary rockfish | 3,511 | 179 | — | 3,690 |
| Chilipepper | 13,619 | 4,425 | — | 18,044 |
| Copper rockfish | 240 | 2 | — | 242 |
| Cowcod | 100 | 76 | — | 176 |
| Curlfin sole | 2,618 | 28 | — | 2,646 |
| Darkblotched rockfish | 4,419 | 6,659 | — | 11,078 |
| Dover sole | 34,399 | 38,491 | 17,527 | 90,417 |
| English sole | 35,723 | 3,277 | — | 39,000 |
| Flag rockfish | 188 | 25 | — | 213 |
| Flathead sole | 2,730 | 618 | — | 3,348 |
| Freckled rockfish | 79 | — | — | 79 |
| Gopher rockfish | 7 | — | — | 7 |
| Greenblotched rockfish | 103 | 205 | — | 308 |
| Greenspotted rockfish | 2,692 | 262 | — | 2,954 |
| Greenstriped rockfish | 14,230 | 3,448 | — | 17,678 |
| Halfbanded rockfish | 8,114 | 172 | — | 8,286 |
| Honeycomb rockfish | 190 | 1 | — | 191 |
| Kelp greenling | 285 | — | — | 285 |
| Lingcod | 5,792 | 1,043 | — | 6,835 |
| Longnose skate | 9,038 | 9,689 | 491 | 19,218 |
| Longspine thornyhead | 1 | 9,707 | 50,648 | 60,356 |
| Mexican rockfish | — | 1 | — | 1 |
| Olive rockfish | 3 | — | — | 3 |
| Pacific cod | 1,532 | 188 | — | 1,720 |
| Pacific flatnose | — | 170 | 7,340 | 7,510 |
| Pacific grenadier | — | 102 | 19,136 | 19,238 |
| Pacific hake | 18,111 | 17,748 | 521 | 36,380 |
| Pacific ocean perch | 554 | 3,792 | 4 | 4,350 |
| Pacific sanddab | 47,061 | 779 | — | 47,840 |
| Petrale sole | 20,257 | 1,127 | — | 21,384 |
| Pink rockfish | 15 | 29 | — | 44 |

Table 10 continued. Number of length measurements collected by stratum for FMP species during the surveys from 2003 to 2008.

| Species | Stratum 1 (55–183 m) | Stratum 2 (184–549 m) | Stratum 3 (550–1,280 m) | All strata (55–1,280 m) |
|---|---|---|---|---|
| Pinkrose rockfish | — | 39 | — | 39 |
| Pygmy rockfish | 1,195 | 1 | — | 1,196 |
| Quillback rockfish | 65 | — | — | 65 |
| Redbanded rockfish | 111 | 965 | 1 | 1,077 |
| Redstripe rockfish | 2,730 | 301 | — | 3,031 |
| Rex sole | 40,739 | 27,849 | 1,557 | 70,145 |
| Rosethorn rockfish | 4,013 | 3,234 | — | 7,247 |
| Rosy rockfish | 275 | 5 | — | 280 |
| Rougheye rockfish | 220 | 591 | 3 | 814 |
| Sablefish | 5,424 | 11,527 | 12,739 | 29,690 |
| Sand sole | 252 | — | — | 252 |
| Sharpchin rockfish | 3,418 | 4,184 | — | 7,602 |
| Shortbelly rockfish | 7,077 | 3,450 | — | 10,527 |
| Shortraker rockfish | — | 13 | 6 | 19 |
| Shortspine thornyhead | 507 | 27,812 | 10,775 | 39,094 |
| Silvergray rockfish | 58 | 95 | — | 153 |
| Soupfin shark | 5 | — | — | 5 |
| Southern rock sole | 942 | 12 | — | 954 |
| Speckled rockfish | 123 | — | — | 123 |
| Spiny dogfish | 14,709 | 4,760 | 5 | 19,474 |
| Splitnose rockfish | 2,565 | 23,636 | 1 | 26,202 |
| Spotted ratfish | 11,726 | 6,299 | 38 | 18,063 |
| Squarespot rockfish | 1,426 | 1 | — | 1,427 |
| Starry flounder | 166 | — | — | 166 |
| Starry rockfish | 17 | — | — | 17 |
| Stripetail rockfish | 12,425 | 10,463 | — | 22,888 |
| Swordspine rockfish | 1,343 | 299 | — | 1,642 |
| Tiger rockfish | 9 | — | — | 9 |
| Tree rockfish | 1 | — | — | 1 |
| Vermilion rockfish | 357 | 6 | — | 363 |
| Widow rockfish | 744 | 141 | — | 885 |
| Yelloweye rockfish | 198 | 43 | — | 241 |
| Yellowmouth rockfish | 7 | 157 | — | 164 |
| Yellowtail rockfish | 4,455 | 267 | — | 4,722 |

Table 11. Weight-length relationships by year for the 2003–2008 surveys using a nonlinear least squares fit for the equation: Weight = a × Length$^b$ (weight in kg; length in cm).

| Species and year | Weight-length coeffcients a | b | $r^2$ | Number | Species and year | Weight-length coeffcients a | b | $r^2$ | Number |
|---|---|---|---|---|---|---|---|---|---|
| Arrowtooth flounder | | | | | Blackgill rockfish | | | | |
| 2003 | 2.19E-06 | 3.39 | 0.98 | 921 | 2003 | 1.63E-05 | 2.99 | 0.98 | 118 |
| 2004 | 2.44E-06 | 3.36 | 0.98 | 567 | 2004 | 9.32E-06 | 3.14 | 0.99 | 182 |
| 2005 | 3.78E-06 | 3.24 | 0.98 | 875 | 2005 | 1.57E-05 | 3.00 | 0.99 | 181 |
| 2006 | 4.38E-06 | 3.20 | 0.98 | 739 | 2006 | 1.19E-05 | 3.07 | 0.99 | 223 |
| 2007 | 5.99E-06 | 3.11 | 0.98 | 905 | 2007 | 1.49E-05 | 3.00 | 0.97 | 189 |
| 2008 | 6.25E-06 | 3.10 | 0.99 | 895 | 2008 | 1.28E-05 | 3.05 | 0.99 | 299 |
| Aurora rockfish | | | | | Bocaccio | | | | |
| 2003 | 9.67E-06 | 3.15 | 0.96 | 533 | 2003 | 6.66E-06 | 3.15 | 0.99 | 120 |
| 2004 | 8.49E-06 | 3.19 | 0.98 | 365 | 2004 | 5.96E-06 | 3.17 | 0.99 | 226 |
| 2005 | 9.23E-06 | 3.16 | 0.98 | 574 | 2005 | 8.39E-06 | 3.09 | 0.99 | 208 |
| 2006 | 1.05E-05 | 3.11 | 0.97 | 602 | 2006 | 7.94E-06 | 3.09 | 0.99 | 160 |
| 2007 | 1.06E-05 | 3.11 | 0.97 | 575 | 2007 | 6.16E-06 | 3.16 | 0.99 | 98 |
| 2008 | 9.31E-06 | 3.16 | 0.97 | 745 | 2008 | 1.04E-05 | 3.03 | 1.00 | 86 |
| Bank rockfish | | | | | Canary rockfish | | | | |
| 2004 | 6.76E-06 | 3.22 | 0.97 | 77 | 2003 | 8.45E-06 | 3.18 | 0.99 | 264 |
| 2005 | 9.11E-06 | 3.13 | 0.97 | 50 | 2004 | 8.97E-06 | 3.17 | 0.99 | 291 |
| 2006 | 6.74E-06 | 3.21 | 0.99 | 70 | 2005 | 1.03E-05 | 3.14 | 0.99 | 278 |
| 2007 | 7.21E-06 | 3.21 | 0.98 | 54 | 2006 | 1.27E-05 | 3.08 | 0.98 | 272 |
| 2008 | 6.03E-06 | 3.25 | 0.99 | 33 | 2007 | 1.06E-05 | 3.11 | 0.99 | 502 |
| | | | | | 2008 | 1.26E-05 | 3.07 | 0.99 | 470 |
| Chilipepper | | | | | Dover sole | | | | |
| 2003 | 6.01E-06 | 3.23 | 0.97 | 693 | 2003 | 2.24E-06 | 3.41 | 0.97 | 2,989 |
| 2004 | 6.09E-06 | 3.23 | 0.99 | 856 | 2004 | 2.40E-06 | 3.39 | 0.97 | 2,368 |
| 2005 | 9.02E-06 | 3.12 | 0.99 | 898 | 2005 | 2.76E-06 | 3.36 | 0.98 | 2,588 |
| 2006 | 8.34E-06 | 3.14 | 0.99 | 643 | 2006 | 2.34E-06 | 3.39 | 0.97 | 2,242 |
| 2007 | 8.78E-06 | 3.13 | 0.99 | 607 | 2007 | 2.49E-06 | 3.38 | 0.97 | 2,193 |
| 2008 | 9.91E-06 | 3.09 | 0.99 | 685 | 2008 | 3.18E-06 | 3.31 | 0.98 | 1,092 |

Table 11 continued. Weight-length relationships by year for the 2003–2008 surveys using a nonlinear least squares fit for the equation: Weight = a × Length$^b$ (weight in kg; length in cm).

| Species and year | Weight-length coeffcients a | b | $r^2$ | Number | Species and year | Weight-length coeffcients a | b | $r^2$ | Number |
|---|---|---|---|---|---|---|---|---|---|
| Cowcod | | | | | English sole | | | | |
| 2003 | 8.16E-06 | 3.19 | 0.99 | 13 | 2003 | 7.04E-06 | 3.07 | 0.95 | 1,863 |
| 2004 | 6.68E-06 | 3.26 | 0.99 | 70 | 2004 | 7.28E-06 | 3.06 | 0.95 | 940 |
| 2005 | 8.37E-06 | 3.19 | 0.99 | 32 | 2005 | 1.01E-05 | 2.96 | 0.96 | 1,363 |
| 2006 | 5.19E-06 | 3.30 | 0.98 | 25 | 2006 | 9.11E-06 | 2.98 | 0.97 | 1,017 |
| 2007 | 9.63E-06 | 3.12 | 0.99 | 25 | 2007 | 8.14E-06 | 3.02 | 0.96 | 1,008 |
| 2008 | 8.34E-06 | 3.17 | 0.99 | 18 | 2008 | 8.68E-06 | 3.01 | 0.96 | 856 |
| Darkblotched rockfish | | | | | Greenstriped rockfish | | | | |
| 2003 | 9.50E-06 | 3.18 | 0.97 | 679 | 2003 | 6.38E-06 | 3.20 | 0.94 | 383 |
| 2004 | 1.22E-05 | 3.11 | 0.98 | 565 | 2004 | 6.34E-06 | 3.21 | 0.97 | 484 |
| 2005 | 1.16E-05 | 3.12 | 0.99 | 799 | 2005 | 1.09E-05 | 3.06 | 0.97 | 735 |
| 2006 | 1.17E-05 | 3.11 | 0.98 | 944 | 2006 | 8.35E-06 | 3.13 | 0.97 | 707 |
| 2007 | 1.04E-05 | 3.14 | 0.98 | 983 | 2007 | 7.76E-06 | 3.15 | 0.97 | 584 |
| 2008 | 1.36E-05 | 3.07 | 0.99 | 814 | 2008 | 1.05E-05 | 3.06 | 0.97 | 561 |
| Lingcod | | | | | Pacific hake | | | | |
| 2003 | 1.84E-06 | 3.39 | 0.99 | 866 | 2003 | 8.24E-06 | 2.93 | 0.97 | 1,152 |
| 2004 | 1.92E-06 | 3.39 | 0.99 | 860 | 2005 | 5.90E-06 | 3.02 | 0.98 | 416 |
| 2005 | 2.44E-06 | 3.32 | 0.99 | 970 | 2007 | 4.52E-06 | 3.08 | 0.99 | 1,816 |
| 2006 | 2.41E-06 | 3.32 | 0.99 | 743 | 2008 | 5.16E-06 | 3.06 | 0.99 | 1,227 |
| 2007 | 3.17E-06 | 3.25 | 0.99 | 559 | | | | | |
| 2008 | 3.00E-06 | 3.26 | 0.99 | 897 | | | | | |
| Longspine thornyhead | | | | | Pacific ocean perch | | | | |
| 2003 | 1.04E-05 | 3.03 | 0.89 | 956 | 2003 | 5.44E-06 | 3.28 | 0.97 | 368 |
| 2004 | 1.90E-05 | 2.84 | 0.94 | 792 | 2004 | 1.71E-05 | 2.94 | 0.98 | 163 |
| 2005 | 1.75E-05 | 2.88 | 0.95 | 1,145 | 2005 | 1.19E-05 | 3.05 | 0.98 | 264 |
| 2006 | 1.23E-05 | 2.97 | 0.96 | 954 | 2006 | 7.66E-06 | 3.18 | 0.99 | 230 |
| 2007 | 4.53E-06 | 3.30 | 0.94 | 943 | 2007 | 9.97E-06 | 3.10 | 0.99 | 467 |
| 2008 | 4.96E-06 | 3.28 | 0.96 | 1,009 | 2008 | 9.67E-06 | 3.10 | 0.99 | 381 |

Table 11 continued. Weight-length relationships by year for the 2003–2008 surveys using a nonlinear least squares fit for the equation: Weight = a × Length$^b$ (weight in kg; length in cm).

| Species and year | Weight-length coeffcients a | b | $r^2$ | Number | Species and year | Weight-length coeffcients a | b | $r^2$ | Number |
|---|---|---|---|---|---|---|---|---|---|
| Pacific grenadier | | | | | Pacific sanddab | | | | |
| 2003 | 0.00030 | 2.61 | 0.92 | 836 | 2003 | 4.71E-06 | 3.23 | 0.92 | 872 |
| 2004 | 0.00025 | 2.69 | 0.96 | 380 | 2004 | 5.34E-06 | 3.19 | 0.92 | 1,512 |
| 2005 | 0.00024 | 2.73 | 0.96 | 545 | 2005 | 9.39E-06 | 3.01 | 0.94 | 1,145 |
| 2006 | 0.00018 | 2.82 | 0.97 | 603 | 2006 | 4.54E-06 | 3.23 | 0.94 | 856 |
| 2007 | 0.00014 | 2.90 | 0.97 | 640 | 2007 | 5.38E-06 | 3.19 | 0.95 | 818 |
| 2008 | 0.00019 | 2.81 | 0.97 | 569 | 2008 | 4.54E-06 | 3.25 | 0.94 | 794 |
| Petrale sole | | | | | Rex sole | | | | |
| 2003 | 1.60E-06 | 3.55 | 0.97 | 1,583 | 2006 | 2.33E-06 | 3.28 | 0.92 | 1,699 |
| 2004 | 1.87E-06 | 3.50 | 0.97 | 1,821 | 2007 | 2.66E-06 | 3.24 | 0.93 | 823 |
| 2005 | 2.49E-06 | 3.42 | 0.98 | 1,970 | 2008 | 2.88E-06 | 3.23 | 0.94 | 773 |
| 2006 | 2.14E-06 | 3.45 | 0.98 | 1,079 | | | | | |
| 2007 | 2.29E-06 | 3.44 | 0.98 | 1,043 | | | | | |
| 2008 | 3.18E-06 | 3.35 | 0.98 | 1,047 | | | | | |
| Redbanded rockfish | | | | | Rosethorn rockfish | | | | |
| 2003 | 7.88E-06 | 3.22 | 0.99 | 189 | 2003 | 4.21E-06 | 3.38 | 0.96 | 425 |
| 2004 | 4.65E-06 | 3.38 | 0.99 | 128 | 2004 | 8.73E-06 | 3.14 | 0.92 | 315 |
| 2005 | 7.26E-06 | 3.24 | 0.99 | 173 | 2005 | 1.51E-05 | 2.97 | 0.95 | 323 |
| 2006 | 9.42E-06 | 3.15 | 0.99 | 144 | 2006 | 6.21E-06 | 3.24 | 0.96 | 511 |
| 2007 | 9.19E-06 | 3.16 | 0.99 | 169 | 2007 | 8.16E-06 | 3.15 | 0.96 | 502 |
| 2008 | 1.15E-05 | 3.10 | 0.99 | 149 | 2008 | 1.01E-05 | 3.10 | 0.96 | 386 |
| Redstripe rockfish | | | | | Rougheye rockfish | | | | |
| 2003 | 8.75E-06 | 3.10 | 0.98 | 201 | 2003 | 7.09E-06 | 3.22 | 0.99 | 52 |
| 2004 | 1.61E-05 | 2.94 | 0.96 | 167 | 2004 | 4.52E-06 | 3.31 | 0.99 | 63 |
| 2005 | 4.07E-06 | 3.35 | 0.98 | 113 | 2005 | 1.01E-05 | 3.11 | 0.99 | 140 |
| 2006 | 3.38E-06 | 3.41 | 0.98 | 136 | 2006 | 1.09E-05 | 3.09 | 0.99 | 82 |
| 2007 | 5.86E-06 | 3.23 | 0.95 | 96 | 2007 | 7.12E-06 | 3.20 | 0.99 | 104 |
| 2008 | 2.30E-05 | 2.83 | 0.99 | 156 | 2008 | 1.00E-05 | 3.12 | 0.98 | 129 |

Table 11 continued. Weight-length relationships by year for the 2003–2008 surveys using a nonlinear least squares fit for the equation: Weight = a × Length$^b$ (weight in kg; length in cm).

| Species and year | Weight-length coeffcients a | b | $r^2$ | Number | Species and year | Weight-length coeffcients a | b | $r^2$ | Number |
|---|---|---|---|---|---|---|---|---|---|
| Sablefish | | | | | Shortspine thornyhead | | | | |
| 2003 | 5.30E-06 | 3.15 | 0.93 | 2,367 | 2003 | 4.79E-06 | 3.26 | 0.98 | 1,249 |
| 2004 | 3.02E-06 | 3.30 | 0.98 | 2,080 | 2004 | 5.35E-06 | 3.23 | 0.99 | 1,673 |
| 2005 | 3.12E-06 | 3.29 | 0.98 | 2,963 | 2005 | 6.17E-06 | 3.19 | 0.99 | 1,425 |
| 2006 | 3.50E-06 | 3.26 | 0.97 | 2,702 | 2006 | 6.98E-06 | 3.14 | 0.98 | 1,272 |
| 2007 | 4.08E-06 | 3.22 | 0.96 | 2,131 | 2007 | 4.68E-06 | 3.26 | 0.99 | 1,293 |
| 2008 | 4.54E-06 | 3.20 | 0.99 | 2,224 | 2008 | 4.73E-06 | 3.27 | 0.99 | 1,337 |
| Sharpchin rockfish | | | | | Silvergray rockfish | | | | |
| 2003 | 1.18E-05 | 3.05 | 0.90 | 506 | 2003 | 6.76E-06 | 3.18 | 0.99 | 32 |
| 2004 | 1.67E-05 | 2.94 | 0.94 | 168 | 2004 | 2.09E-05 | 2.89 | 0.96 | 19 |
| 2005 | 8.19E-06 | 3.16 | 0.97 | 157 | 2005 | 4.39E-05 | 2.70 | 0.84 | 46 |
| 2006 | 8.53E-06 | 3.14 | 0.96 | 252 | 2006 | 4.79E-06 | 3.27 | 0.98 | 7 |
| 2007 | 8.42E-06 | 3.15 | 0.95 | 218 | 2007 | 1.12E-05 | 3.04 | 0.99 | 22 |
| 2008 | 9.98E-06 | 3.10 | 0.95 | 387 | 2008 | 6.12E-06 | 3.18 | 0.92 | 28 |
| Shortbelly rockfish | | | | | Spiny dogfish | | | | |
| 2003 | 1.82E-06 | 3.55 | 0.89 | 540 | 2003 | 2.50E-06 | 3.11 | 0.98 | 689 |
| 2004 | 4.57E-06 | 3.27 | 0.92 | 477 | 2004 | 2.87E-06 | 3.08 | 0.99 | 490 |
| 2005 | 7.30E-06 | 3.13 | 0.95 | 585 | 2005 | 3.83E-06 | 3.02 | 0.98 | 953 |
| 2006 | 3.33E-06 | 3.38 | 0.93 | 384 | 2006 | 3.33E-06 | 3.05 | 0.98 | 818 |
| 2007 | 8.17E-06 | 3.09 | 0.93 | 331 | 2007 | 2.90E-06 | 3.09 | 0.98 | 788 |
| 2008 | 3.18E-06 | 3.40 | 0.96 | 343 | 2008 | 3.50E-06 | 3.04 | 0.98 | 901 |
| Splitnose rockfish | | | | | Yellowmouth rockfish | | | | |
| 2003 | 1.05E-05 | 3.13 | 0.93 | 888 | 2003 | 5.72E-06 | 3.27 | 0.99 | 33 |
| 2004 | 1.95E-05 | 2.93 | 0.96 | 415 | 2005 | 7.83E-06 | 3.20 | 0.99 | 23 |
| 2005 | 2.57E-05 | 2.85 | 0.96 | 543 | | | | | |
| 2006 | 2.42E-05 | 2.86 | 0.97 | 632 | | | | | |
| 2007 | 1.77E-05 | 2.97 | 0.97 | 778 | | | | | |
| 2008 | 1.71E-05 | 2.98 | 0.97 | 825 | | | | | |

Table 11 continued. Weight-length relationships by year for the 2003–2008 surveys using a nonlinear least squares fit for the equation: Weight = a × Length$^b$ (weight in kg; length in cm).

| Species and year | Weight-length coeffcients a | b | $r^2$ | Number | Species and year | Weight-length coeffcients a | b | $r^2$ | Number |
|---|---|---|---|---|---|---|---|---|---|
| Widow rockfish | | | | | Yellowtail rockfish | | | | |
| 2003 | 5.16E-06 | 3.29 | 0.93 | 12 | 2003 | 8.95E-06 | 3.14 | 0.99 | 218 |
| 2004 | 4.01E-06 | 3.37 | 0.99 | 62 | 2004 | 8.29E-06 | 3.16 | 0.99 | 171 |
| 2005 | 6.03E-06 | 3.24 | 0.99 | 83 | 2005 | 9.56E-06 | 3.13 | 0.99 | 381 |
| 2006 | 2.29E-05 | 2.88 | 0.98 | 87 | 2006 | 2.07E-05 | 2.92 | 0.95 | 192 |
| 2007 | 7.56E-05 | 2.56 | 0.89 | 81 | 2007 | 2.53E-05 | 2.86 | 0.94 | 276 |
| 2008 | 5.59E-06 | 3.27 | 0.99 | 32 | 2008 | 1.87E-05 | 2.94 | 0.98 | 387 |
| Yelloweye rockfish | | | | | | | | | |
| 2003 | 6.56E-06 | 3.26 | 0.98 | 73 | | | | | |
| 2004 | 3.87E-06 | 3.42 | 0.99 | 18 | | | | | |
| 2005 | 1.04E-05 | 3.15 | 0.99 | 40 | | | | | |
| 2006 | 5.93E-06 | 3.29 | 0.98 | 45 | | | | | |
| 2007 | 3.48E-06 | 3.44 | 0.99 | 24 | | | | | |
| 2008 | 6.43E-06 | 3.28 | 0.98 | 46 | | | | | |

Table 12. Coefficients for linear regressions describing net width and height as a function of inverse scope for each fishing vessel, all years combined. Net Width = $B_w + ax$ where $x$ is inverse scope. Net Height = $B_h + ax$ where $x$ is inverse scope.

| Vessel | $B_w$ | $a$ | $B_h$ | $a$ |
|---|---|---|---|---|
| FV *Excalibur* | –474.22 | 14.86 | 4.59 | 188.58 |
| FV *Ms. Julie* | –404.34 | 14.21 | 4.43 | 215.15 |
| FV *Noah's Ark* | –463.32 | 14.84 | 4.73 | 226.25 |
| FV *Raven* | –445.52 | 15.09 | 4.21 | 229.45 |
| FV *Blue Horizon* | –392.01 | 14.97 | 4.36 | 179.83 |
| FV *B.J. Thomas* | –623.04 | 15.56 | 4.30 | 396.28 |
| FV *Captain Jack* | –404.32 | 14.59 | 4.49 | 159.15 |

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# Appendix A: Primary and Alternative Station Selection for the Survey Cell Pool

The survey pool of cells were picked to be:

1. Within U.S. waters.
2. On the Pacific Ocean only, no straits or inlets.
3. Between 30 and 700 fathoms (fm) deep.
4. Only within the natural fathom contours, that is, seamounts outside the 700 fm contour line were not included. In the California Bight, a small extremely western seamount was excluded, but all other larger areas less than or equal to 700 fm were included.
5. Outside the Cowcod Exclusion Area.
6. Outside the 3-mile limit of the Channel Island Marine Protected Area.
7. Only those cells with greater than 50% of the cell area within the political and geographical borders defined above.

For stratum apportionment, each cell needs a unique INPFC area and depth designation. For area, cells spanning more than one area were assigned the INPFC area that was greater by surface area. Note that cells below the classic Conception area boundary of 32°30′N and above the U.S.-Mexico exclusive economic zone are assigned the Conception Area designation.

Likewise, each cell was given a single classifying depth designation from the following list:

- <30 fm
- 30–100 fm
- 100–300 fm
- 300–700 fm
- 700–1,000 fm
- >1,000 fm

Cells spanning two depth zones were assigned the one with the greatest surface area. Cells spanning three depth zones were assigned the one with the largest area, regardless of whether it was greater than 50% of the total. However, cells on any border still need to first qualify using item 7 above. For example, if a cell has 25% of its area greater than 1,000 m, 35% of its area 700–1,000 m, and 40% of its area 300–700 m, then the cell would not be included in the pool. For even though the 300–700 depth stratum is the largest, 60% of the area is outside of

700 fm. Note that in this example, if a new survey includes the 700–1,000 fm depth strata, then the majority of the cell would be within the survey boundaries (75%), but the majority depth strata would be the 300–700 strata. So adding the 700–1,000 strata transforms a previously unselected cell to a 300–700 cell in the new survey. The percent of cells that span three depth strata, but have no depth strata greater than 50%, is two-tenths of 1% of the survey pool of cells.

## Primary Station Selection

For 2003, 720 cells (one tow per cell) were apportioned to the strata by multiplying 720 times the strata proportions found above. Rounding to the nearest whole number caused the grand total to miss the mark, so unary adjustments were made to the strata numbers to obtain a grand total of 720. The primary stations were then picked from the survey cell pool by strata, using a pseudorandom number generator. These 720 selected primary station cells were assigned a vessel number of 1–4, using a simple sequence (1,2,3,4, 1,2,3,4, …)

## Alternative Station Selection

For each primary station, two alternative stations were chosen as follows.

By strata, a secondary random selection of the nonprimary cells was performed. Using a great circle distance measurement, the closest site of the available alternative site pool was matched to a primary site within a stratum. These were then removed from the secondary pool for that stratum and the process was repeated for the second alternative site. This was done for each of the strata, in turn. The number of cells selected for this secondary pick is set greater than the first and hence more densely distributed geographically than the primary cells. This density was selected by strata to achieve a good balance between travel distance between sites (distance from primary to first alternative and first alternative to second alternative) and to ensure to a 20–30% chance that the alternative sites would not be positioned directly adjacent to the primary site.

Where nearby alternative sites are at a premium, such as in the shallow Conception Area, a few alternative sites are more than 20 nautical miles away from their primary station. In the event this proves to be a problem, the following rule was developed: If the primary station is deemed untrawlable and the secondary station is greater than 2 hours “out of your way” (in the wrong direction, that is, in relation to your next primary station), then it is at the field party chief’s discretion to postpone or skip that secondary station.

## Search Times

All sites, whether primary or alternative, will be searched for a towable location for up to a maximum of 1 hour each. If no towable location is found after 3 hours, then the vessel will move on to the next primary location on its list.

# Appendix B: Species Frequency of Occurrence, Depth Range, and Latitudinal Range

Appendix B consists of two tables. Table B-1 lists frequency of occurrence, depth range, and latitudinal range for fish species and Table B-2 lists them for invertebrates.

Table B-1. Frequency of occurrence, depth range, and latitudinal range for fish species, grouped by family (or higher taxonomic classification), encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degrees) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| **Myxinidae** | | | | | | |
| Myxinidae | Hagfish unident. | 357 | 32.1 | 48.1 | 60 | 1,297 |
| *Eptatretus* sp. | | 1 | 47.6 | 47.6 | 986 | 986 |
| *E. deani* | Black hagfish | 332 | 32.3 | 48.3 | 52 | 1,271 |
| *E. stouti* | Pacific hagfish | 128 | 32.6 | 48.2 | 66 | 1,155 |
| **Petromyzontidae** | Lamprey unident. | 3 | 34.3 | 47.6 | 99 | 920 |
| *Lampetra tridentata* | Pacific lamprey | 3 | 41.2 | 44.5 | 171 | 308 |
| **Hexanchiformes** | | | | | | |
| *Hexanchus griseus* | Sixgill shark | 11 | 33.6 | 45.7 | 79 | 406 |
| **Squalidae** | Dogfish sharks | 1 | 33.6 | 33.6 | 1,188 | 1,188 |
| *Squalus acanthias* | Spiny dogfish | 1,386 | 32.6 | 48.5 | 36 | 1,143 |
| *Somniosus pacificus* | Pacific sleeper shark | 17 | 33.0 | 47.3 | 463 | 1,166 |
| **Scyliorhinidae** | | | | | | |
| Scyliorhinidae | Cat shark unident. | 11 | 33.4 | 44.8 | 335 | 1,209 |
| *Apristurus brunneus* | Brown cat shark | 1,333 | 32.1 | 48.3 | 82 | 1,241 |
| *A. brunneus* egg case | Cat shark egg case | 77 | 32.7 | 48.2 | 74 | 1,147 |
| *A. kampae* | Longnose cat shark | 78 | 32.2 | 47.6 | 230 | 1,268 |
| *A.* sp. | | 2 | 34.3 | 34.3 | 512 | 571 |
| *Cephaloscyllium ventriosum* | Swell shark | 21 | 33.0 | 34.7 | 59 | 117 |
| *Parmaturus xaniurus* | Filetail cat shark | 363 | 32.7 | 37.3 | 113 | 1,224 |
| **Triakididae** | Smoothhounds | 40 | 32.6 | 38.1 | 52 | 208 |
| *Galeorhinus galeus* | Soupfin shark | 10 | 33.7 | 41.5 | 69 | 175 |
| *Mustelus californicus* | Gray smoothhound | 27 | 32.7 | 38.8 | 27 | 247 |
| *M. henlei* | Brown smoothhound | 52 | 32.6 | 38.4 | 35 | 243 |
| **Carcharhinidae** | | | | | | |
| *Prionace glauca* | Blue shark | 1 | 40.6 | 40.6 | 173 | 173 |
| **Squatinidae** | | | | | | |
| *Squatina californica* | Pacific angel shark | 20 | 32.8 | 35.1 | 27 | 184 |
| **Dalatiidae** | | | | | | |
| *Centroscyllium nigrum* | Combtooth dogfish | 15 | 32.6 | 33.2 | 871 | 1,212 |

Table B-1 continued. Frequency of occurrence, depth range, and latitudinal range for fish species, grouped by family (or higher taxonomic classification), encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degrees) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| **Rhinobatidae** | Guitarfishes | 2 | 34.3 | 34.3 | 85 | 174 |
| *Rhionbatos productus* | Shovelnose guitarfish | 1 | 34.0 | 34.0 | 27 | 27 |
| *Zapteryx exasperata* | Banded guitarfish | 1 | 33.8 | 33.8 | 60 | 60 |
| **Rajidae unident.** | | 2 | 33.8 | 48.4 | 313 | 648 |
| *Bathyraja abyssicola* | Deepsea skate | 19 | 32.3 | 47.5 | 780 | 1,428 |
| *B. aleutica* | Aleutian skate | 12 | 36.2 | 47.3 | 206 | 1,241 |
| *B. kincaidii* | Bering skate | 1,258 | 32.4 | 48.5 | 52 | 1,173 |
| *B. kincaidii* egg case | Bering skate egg case | 1 | 44.9 | 44.9 | 1,007 | 1,007 |
| *Bathyraja* sp. | | 17 | 32.6 | 47.7 | 209 | 1,206 |
| *Bathyraja* sp. egg case | | 6 | 44.9 | 47.7 | 69 | 1,011 |
| *Bathyraja trachura* | Roughtail skate | 500 | 32.2 | 48.2 | 107 | 1,428 |
| *Bathyraja trachura* egg case | Roughtail skate egg case | 2 | 42.6 | 46.0 | 1,186 | 1,243 |
| *Raja binoculata* | Big skate | 489 | 32.6 | 48.4 | 36 | 302 |
| *R. binoculata* egg case | Big skate egg case | 66 | 34.1 | 48.2 | 54 | 1,169 |
| *R. inornata* | California skate | 432 | 32.6 | 48.0 | 24 | 792 |
| *R. rhina* | Longnose skate | 2,239 | 32.4 | 48.5 | 43 | 1,162 |
| *R. sp.* egg case | Raja sp. egg case | 46 | 34.3 | 48.3 | 59 | 1,011 |
| *R. stellulata* | Starry skate | 77 | 33.3 | 48.1 | 54 | 982 |
| Rajiformes egg case | Skate egg case unident. | 306 | 32.6 | 48.5 | 35 | 1,214 |
| **Torpedinidae** | Electric rays | 8 | 33.5 | 38.1 | 69 | 379 |
| *Torpedo californica* | Pacific electric ray | 237 | 32.6 | 48.4 | 27 | 1,079 |
| **Dasyatidae** | Whiptail Stingrays | 1 | 34.6 | 34.6 | 59 | 59 |
| **Myliobatidae** | Eagle rays | 2 | 32.8 | 39.1 | 359 | 488 |
| *Myliobatis californicus* | Bat ray | 25 | 32.6 | 34.4 | 27 | 176 |
| **Chimaeridae** | | | | | | |
| *Hydrolagus colliei* | Spotted ratfish | 1,983 | 32.6 | 48.5 | 44 | 1,241 |
| **Nettastomatidae** | Duckbilled eels | 1 | 32.7 | 32.7 | 1,096 | 1,096 |
| *Facciolella gilbertii* | Dogface witch-eel | 11 | 32.7 | 34.4 | 371 | 507 |
| *Venefica* sp. | Whipsnout eels | 5 | 32.7 | 46.3 | 916 | 1,148 |
| **Acipenseridae** | | | | | | |

Table B-1 continued. Frequency of occurrence, depth range, and latitudinal range for fish species, grouped by family (or higher taxonomic classification), encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degrees) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *Acipenser medirostris* | Green sturgeon | 1 | 44.7 | 44.7 | 53 | 53 |
| **Anguilliformes** | Eel unident. | 1 | 34.6 | 34.6 | 743 | 743 |
| **Nemichthyidae** | Snipe eel unident. | 10 | 32.7 | 35.8 | 196 | 972 |
| *Avocettina infans* | Blackline snipe eel | 46 | 32.4 | 47.9 | 71 | 1,186 |
| *Nemichthys larseni* | Pale snipe eel | 7 | 32.9 | 47.4 | 366 | 935 |
| *N. scolopaceus* | Slender snipe eel | 13 | 32.7 | 33.9 | 482 | 1,241 |
| **Serrivomeridae** | Sawtooth eels | 23 | 32.3 | 40.6 | 290 | 1,246 |
| *Serrivomer jesperseni* | Crossthroat snipe eel | 2 | 36.1 | 36.2 | 1,139 | 1,173 |
| *S. sector* | Sawtooth eel | 21 | 32.7 | 47.7 | 516 | 1,206 |
| **Saccopharyngidae** | Whiptail gulpers | 5 | 32.6 | 33.2 | 1,075 | 1,160 |
| **Clupeidae** | | | | | | |
| *Alosa sapidissima* | American shad | 418 | 34.0 | 48.4 | 52 | 440 |
| *Clupea pallasi* | Pacific herring | 281 | 34.7 | 48.4 | 47 | 723 |
| *Sardinops sagax* | Pacific sardine | 82 | 32.8 | 48.4 | 35 | 982 |
| **Salmonidae** | | | | | | |
| *Oncorhynchus kisutch* | Coho salmon | 2 | 38.3 | 38.5 | 89 | 101 |
| *O. tshawytscha* | Chinook salmon | 52 | 34.9 | 48.3 | 58 | 171 |
| **Osmeridae** | Smelt unident. | 37 | 34.2 | 48.3 | 57 | 579 |
| *Allosmerus elongatus* | Whitebait smelt | 60 | 34.4 | 47.9 | 53 | 170 |
| *Hypomesus pretiosus* | Surf smelt | 1 | 41.5 | 41.5 | 113 | 113 |
| *Osmerus mordax* | Rainbow smelt | 6 | 45.8 | 48.4 | 61 | 156 |
| *Spirinchus starksi* | Night smelt | 21 | 34.0 | 48.1 | 53 | 594 |
| *S. thaleichthys* | Longfin smelt | 6 | 33.9 | 46.6 | 55 | 64 |
| *Thaleichthys pacificus* | Eulachon | 165 | 34.0 | 48.4 | 51 | 374 |
| **Engraulidae** | Anchovies | 14 | 33.4 | 46.1 | 53 | 276 |
| *Engraulis mordax* | Northern anchovy | 166 | 32.7 | 47.8 | 35 | 806 |
| **Argentinidae** | Argentine unident. | 7 | 32.6 | 42.1 | 96 | 847 |
| *Nansenia candida* | Bluethroat argentine | 4 | 40.1 | 48.0 | 437 | 968 |
| *Argentina sialis* | Pacific argentine | 127 | 32.6 | 42.6 | 60 | 907 |
| **Bathylagidae** | Deepsea smelt unident. | 657 | 32.2 | 48.2 | 247 | 1,341 |

Table B-1 continued. Frequency of occurrence, depth range, and latitudinal range for fish species, grouped by family (or higher taxonomic classification), encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degrees) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *Bathylagus milleri* | Robust blacksmelt | 14 | 32.9 | 46.9 | 562 | 1,215 |
| *B. pacificus* | Pacific blacksmelt | 5 | 33.3 | 46.5 | 867 | 1,215 |
| *B.* sp. | Blacksmelt unident. | 84 | 32.6 | 48.0 | 562 | 1,428 |
| *Leuroglossus schmidti* | Northern smoothtongue | 18 | 33.3 | 42.1 | 397 | 898 |
| *Leuroglossus* sp. | | 5 | 33.4 | 35.2 | 399 | 554 |
| *L. stilbius* | California smoothtongue | 91 | 32.5 | 43.4 | 390 | 1,174 |
| **Opisthoproctidae** | Spookfish unident. | 5 | 32.4 | 41.7 | 431 | 885 |
| *Bathylychnops exilis* | Javelin spookfish | 1 | 32.7 | 32.7 | 452 | 452 |
| *Macropinna microstoma* | Barreleye | 22 | 32.6 | 47.7 | 279 | 1,201 |
| **Gonostomatidae** | Bristlemouth unident. | 13 | 32.4 | 47.9 | 566 | 1,186 |
| *Gonostoma* sp. | | 1 | 36.7 | 36.7 | 805 | 805 |
| **Sternoptychidae** | Hatchetfish unident. | 21 | 32.6 | 43.3 | 185 | 1,148 |
| *Argyropelecus affinis* | Slender hatchetfish | 64 | 32.1 | 43.6 | 303 | 1,212 |
| *A. lychnus* | Tropical hatchetfish | 1 | 33.0 | 33.0 | 968 | 968 |
| *A.* sp. | | 20 | 32.6 | 43.8 | 190 | 1,205 |
| *Sternoptyx diaphana* | Longspine hatchetfish | 20 | 32.5 | 41.7 | 328 | 1,230 |
| *S.* sp. | | 10 | 32.9 | 47.6 | 543 | 1,079 |
| **Stomiiformes** | Dragonfish unident. | 1 | 33.2 | 33.2 | 893 | 893 |
| **Stomiidae** | Barbled dragonfishes | 5 | 32.7 | 47.6 | 83 | 1,184 |
| *Stomias atriventer* | Blackbelly dragonfish | 92 | 32.6 | 48.0 | 177 | 1,241 |
| **Chauliodontidae** | Viperfish unident. | 20 | 32.9 | 47.9 | 207 | 1,197 |
| *Chauliodus macouni* | Pacific viperfish | 454 | 32.5 | 48.2 | 106 | 1,297 |
| **Astronesthidae** | | | | | | |
| *Borostomias panamensis* | Panama snaggletooth | 4 | 32.6 | 37.1 | 666 | 1,098 |
| **Malacosteidae** | Loosejaw unident. | 1 | 32.9 | 32.9 | 1,096 | 1,096 |
| *Aristostomias scintillans* | Shining loosejaw | 53 | 32.1 | 47.9 | 176 | 1,237 |
| *Idiacanthus antrostomus* | Pacific blackdragon | 56 | 32.5 | 46.1 | 311 | 1,240 |
| **Melanostomiidae** | Scaleless dragonfish unident. | 6 | 32.7 | 47.7 | 307 | 763 |
| *Bathophilus flemingi* | Highfin dragonfish | 1 | 38.4 | 38.4 | 603 | 603 |
| *Tactostoma macropus* | Longfin dragonfish | 301 | 32.8 | 48.2 | 156 | 1,341 |

Table B-1 continued. Frequency of occurrence, depth range, and latitudinal range for fish species, grouped by family (or higher taxonomic classification), encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degrees) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| **Alepocephalidae** | Slickhead unident. | 2 | 35.3 | 45.0 | 867 | 1,196 |
| *Alepocephalus tenebrosus* | California slickhead | 846 | 32.2 | 48.2 | 477 | 1,279 |
| *Bajacalifornia burragei* | Sharpchin slickhead | 12 | 32.6 | 40.0 | 805 | 1,169 |
| *B. erimoensis* | | 2 | 33.0 | 33.0 | 814 | 1,212 |
| *Talismania bifurcata* | Threadfin slickhead | 242 | 32.3 | 48.1 | 601 | 1,341 |
| **Platytroctidae** | Tubeshoulder unident. | 7 | 32.7 | 40.1 | 885 | 1,029 |
| *Maulisia mauli* | | 7 | 32.8 | 47.7 | 723 | 1,172 |
| *Maulisia* sp. | | 1 | 35.3 | 35.3 | 934 | 934 |
| *Sagamichthys abei* | Shining tubeshoulder | 30 | 32.3 | 47.6 | 381 | 1,197 |
| **Synodontidae** | Lizardfish unident. | 4 | 32.7 | 34.3 | 79 | 85 |
| *Synodus lucioceps* | California lizardfish | 61 | 32.6 | 35.5 | 24 | 122 |
| **Alepisauridae** | | | | | | |
| *Alepisaurus ferox* | Longnose lancetfish | 1 | 32.8 | 32.8 | 1,041 | 1,041 |
| **Scopelarchidae** | | | | | | |
| *Benthalbella dentata* | Northern pearleye | 7 | 35.8 | 47.8 | 710 | 1,205 |
| **Paralepididae** | | | | | | |
| *Arctozenus risso* | Ribbon barracudina | 5 | 32.9 | 47.8 | 589 | 1,102 |
| *Lestidiops ringens* | Slender barracudina | 5 | 33.4 | 44.9 | 71 | 805 |
| *Magnisudis atlantica* | Duckbill barracudina | 4 | 40.2 | 47.6 | 520 | 808 |
| **Scopelosauridae** | | | | | | |
| *Scopelosaurus harryi* | Scaly paperbone | 1 | 37.1 | 37.1 | 667 | 667 |
| **Myctophidae** | Lanternfish unident. | 729 | 32.3 | 48.2 | 86 | 1,268 |
| *Diaphus theta* | California headlightfish | 91 | 32.3 | 48.4 | 157 | 1,215 |
| *D.* sp. | | 1 | 35.6 | 35.6 | 1,002 | 1,002 |
| *Lampanyctus ritteri* | Broadfin lanternfish | 9 | 35.2 | 47.9 | 397 | 903 |
| *L.* sp. | | 523 | 32.4 | 48.4 | 115 | 1,428 |
| *Stenobrachius leucopsarus* | Northern lampfish | 33 | 32.4 | 46.4 | 386 | 1,297 |
| *Symbolophorus californiensis* | California lanternfish | 15 | 33.3 | 47.7 | 490 | 1,197 |
| *Tarletonbeania crenularis* | Blue lanternfish | 30 | 34.5 | 47.7 | 119 | 1,095 |
| *T.* sp. | | 9 | 34.7 | 47.7 | 151 | 1,068 |

Table B-1 continued. Frequency of occurrence, depth range, and latitudinal range for fish species, grouped by family (or higher taxonomic classification), encountered during the 2003–2008 surveys (unident. = unidentified, YOY = young of year).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degrees) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| **Neoscopelidae** | Blackchin unident. | 1 | 45.9 | 45.9 | 1,132 | 1,132 |
| *Scopelengys tristis* | Blackchin | 6 | 32.6 | 42.0 | 723 | 972 |
| **Gadidae** | | | | | | |
| *Gadus macrocephalus* | Pacific cod | 216 | 39.2 | 48.5 | 53 | 285 |
| *Microgadus proximus* | Pacific tomcod | 133 | 35.1 | 48.4 | 53 | 117 |
| *Theragra chalcogramma* | Walleye pollock | 23 | 47.1 | 48.5 | 73 | 270 |
| **Merlucciidae** | | | | | | |
| *Merluccius productus* | Pacific hake | 2,180 | 32.1 | 48.4 | 52 | 1,213 |
| *M. productus* YOY | Pacific hake YOY | 103 | 32.9 | 47.6 | 66 | 1,015 |
| **Moridae** | Codlings unident. | 2 | 32.7 | 47.3 | 498 | 713 |
| *Antimora microlepis* | Pacific flatnose | 783 | 32.2 | 48.2 | 262 | 1,428 |
| *Halargyreus johnsoni* | Slender codling | 2 | 41.8 | 43.5 | 753 | 1,130 |
| *Physiculus rastrelliger* | Hundred fathom mora | 33 | 32.7 | 35.1 | 142 | 498 |
| **Melanonidae** | | | | | | |
| *Melanonus zugmayeri* | Arrowtail | 9 | 32.7 | 42.0 | 766 | 1,124 |
| **Macrouridae** | Grenadier unident. | 2 | 34.4 | 46.1 | 388 | 565 |
| *Albatrossia pectoralis* | Giant grenadier | 685 | 32.3 | 48.2 | 443 | 1,428 |
| *Coelorinchus scaphopsis* | Shoulderspot grenadier | 2 | 34.5 | 36.3 | 166 | 343 |
| *Coryphaenoides acrolepis* | Pacific grenadier | 797 | 32.2 | 48.2 | 313 | 1,428 |
| *C. cinereus* | Popeye grenadier | 52 | 33.4 | 48.1 | 395 | 1,297 |
| *C. filifer* | Filamented grenadier | 2 | 40.0 | 40.5 | 1,064 | 1,196 |
| *Nezumia liolepis* | Smooth grenadier | 172 | 32.1 | 46.2 | 390 | 1,246 |
| *N. stelgidolepis* | California grenadier | 200 | 32.1 | 45.0 | 377 | 1,201 |
| **Ophidiidae** | Cusk-eel unident. | 1 | 48.4 | 48.4 | 117 | 117 |
| *Chilara taylori* | Spotted cusk-eel | 121 | 32.8 | 47.9 | 27 | 366 |
| *Dicrolene filamentosa* | Threadfin cusk-eel | 2 | 32.9 | 37.1 | 879 | 1,096 |
| *Lamprogrammus niger* | Paperbone cusk-eel | 10 | 32.6 | 33.7 | 876 | 1,184 |
| **Bythitidae** | | | | | | |
| *Brosmophycis marginata* | Red brotula | 2 | 32.6 | 41.2 | 138 | 190 |
| *Cataetyx rubrirostris* | Rubynose brotula | 40 | 32.7 | 41.8 | 322 | 874 |

Table B-1 continued. Frequency of occurrence, depth range, and latitudinal range for fish species, grouped by family (or higher taxonomic classification), encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degrees) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *C.* sp. | | 1 | 34.3 | 34.3 | 402 | 402 |
| **Zoarcidae** | Eelpout unident. | 9 | 32.7 | 45.9 | 104 | 1,132 |
| *Bothrocara brunneum* | Twoline eelpout | 700 | 32.2 | 48.2 | 450 | 1,428 |
| *B. molle* | Soft eelpout | 6 | 34.5 | 46.6 | 803 | 1,341 |
| *Lycenchelys camchatica* | Kamchatka eelpout | 25 | 35.0 | 47.7 | 524 | 1,238 |
| *L. crotalinus* | Snakehead eelpout | 601 | 32.7 | 48.2 | 219 | 1,297 |
| *Lycodapus dermatinus* | Looseskin eelpout | 1 | 41.0 | 41.0 | 646 | 646 |
| *L. endemoscotus* | Deepwater eelpout | 29 | 34.3 | 47.8 | 386 | 1,197 |
| *L. fierasfer* | Blackmouth eelpout | 16 | 32.7 | 46.6 | 743 | 1,200 |
| *L. mandibularis* | Pallid eelpout | 24 | 32.6 | 48.1 | 399 | 1,173 |
| *L.* sp. | | 5 | 33.2 | 39.0 | 371 | 1,111 |
| *Lycodema barbatum* | Bearded eelpout | 3 | 34.2 | 40.6 | 144 | 290 |
| *Lycodes brevipes* | Shortfin eelpout | 1 | 41.5 | 41.5 | 171 | 171 |
| *L. cortezianus* | Bigfin eelpout | 1,086 | 32.7 | 48.2 | 57 | 1,162 |
| *L. diapterus* | Black eelpout | 686 | 32.6 | 48.3 | 82 | 1,162 |
| *L. pacificus* | Blackbelly eelpout | 664 | 32.6 | 48.4 | 52 | 729 |
| *L. palearis* | Wattled eelpout | 2 | 47.6 | 47.9 | 111 | 187 |
| *Maynea californica* | Persimmon eelpout | 2 | 34.3 | 34.4 | 70 | 349 |
| *Melanostigma pammelas* | Midwater eelpout | 3 | 33.9 | 41.0 | 713 | 806 |
| **Batrachoididae** | Midshipmen | 1 | 35.2 | 35.2 | 252 | 252 |
| *Porichthys notatus* | Plainfin midshipman | 500 | 32.7 | 47.8 | 24 | 464 |
| **Oneirodidae** | Dreamer unident. | 16 | 32.8 | 45.4 | 691 | 1,188 |
| *Oneirodes thompsoni* | | 1 | 32.4 | 32.4 | 1,040 | 1,040 |
| *Oneirodes* sp. | | 12 | 32.6 | 47.8 | 528 | 1,268 |
| **Chaenophryne longiceps** | | 1 | 45.7 | 45.7 | 84 | 84 |
| *Chaenophryne draco* | Smooth dreamer | 6 | 32.9 | 47.3 | 766 | 1,186 |
| **Melanocetidae** | | | | | | |
| *Melanocetus johnsonii* | Common blackdevil | 2 | 34.5 | 45.2 | 503 | 797 |
| **Ceratiidae** | | | | | | |
| *Cryptopsaras couesii* | Triplewart sea devil | 1 | 33.4 | 33.4 | 844 | 844 |

Table B-1 continued. Frequency of occurrence, depth range, and latitudinal range for fish species, grouped by family (or higher taxonomic classification), encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degrees) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| **Gigantactinidae** | | | | | | |
| *Gigantactis vanhoeffeni* | Whipnose | 1 | 32.6 | 32.6 | 1,056 | 1,056 |
| **Trachipteridae** | | | | | | |
| *Trachipterus altivelis* | King-of-the-salmon | 6 | 32.7 | 45.3 | 158 | 1,214 |
| **Melamphaidae** | Bigscale unident. | 9 | 32.3 | 41.7 | 489 | 1,124 |
| *Melamphaes lugubris* | Highsnout bigscale | 23 | 32.6 | 45.8 | 741 | 1,214 |
| *Poromitra crassiceps* | Crested bigscale | 131 | 32.5 | 47.9 | 126 | 1,428 |
| **Anoplogastridae** | Fangtooths | 3 | 33.2 | 43.0 | 848 | 1,049 |
| *Anoplogaster cornuta* | Fangtooth | 83 | 32.4 | 48.2 | 641 | 1,246 |
| **Scorpaenidae** | Scorpionfish/rockfish unident. | 3 | 33.0 | 34.0 | 27 | 117 |
| *Scorpaena guttata* | California scorpionfish | 98 | 32.6 | 34.4 | 24 | 190 |
| *Sebastolobus alascanus* | Shortspine thornyhead | 1,989 | 32.1 | 48.4 | 67 | 1,341 |
| *S. altivelis* | Longspine thornyhead | 1,426 | 32.1 | 48.3 | 163 | 1,428 |
| *Sebastes aleutianus* | Rougheye rockfish | 200 | 32.7 | 48.4 | 125 | 798 |
| *S. alutus* | Pacific ocean perch | 250 | 40.2 | 48.4 | 87 | 715 |
| *S. auriculatus* | Brown rockfish | 33 | 32.8 | 41.7 | 58 | 94 |
| *S. aurora* | Aurora rockfish | 530 | 32.1 | 48.2 | 129 | 814 |
| *S. babcocki* | Redbanded rockfish | 316 | 33.7 | 48.4 | 71 | 550 |
| *S. borealis* | Shortraker rockfish | 9 | 44.5 | 48.2 | 301 | 555 |
| *S. brevispinis* | Silvergray rockfish | 38 | 37.4 | 48.2 | 66 | 283 |
| *S. carnatus* | Gopher rockfish | 5 | 32.7 | 35.5 | 58 | 76 |
| *S. caurinus* | Copper rockfish | 46 | 32.8 | 40.5 | 36 | 408 |
| *S. chlorostictus* | Greenspotted rockfish | 245 | 32.6 | 48.4 | 65 | 320 |
| *S. constellatus* | Starry rockfish | 14 | 32.6 | 38.0 | 62 | 141 |
| *S. crameri* | Darkblotched rockfish | 686 | 33.6 | 48.4 | 84 | 538 |
| *S. dalli* | Calico rockfish | 57 | 32.6 | 37.6 | 52 | 146 |
| *S. diploproa* | Splitnose rockfish | 844 | 32.3 | 48.4 | 68 | 559 |
| *S. elongatus* | Greenstriped rockfish | 992 | 32.6 | 48.5 | 64 | 447 |
| *S. emphaeus* | Puget Sound rockfish | 7 | 34.4 | 48.0 | 36 | 173 |
| *S. ensifer* | Swordspine Rockfish | 26 | 32.6 | 34.2 | 106 | 308 |

Table B-1 continued. Frequency of occurrence, depth range, and latitudinal range for fish species, grouped by family (or higher taxonomic classification), encountered during the 2003–2008 surveys.

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degrees) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *S. entomelas* | Widow rockfish | 135 | 34.4 | 48.4 | 64 | 399 |
| *S. eos* | Pink rockfish | 20 | 33.2 | 37.2 | 83 | 344 |
| *S. flavidus* | Yellowtail rockfish | 248 | 33.8 | 48.4 | 36 | 231 |
| *S. gilli* | Bronzespotted rockfish | 1 | 32.7 | 32.7 | 382 | 382 |
| *S. goodei* | Chilipepper | 509 | 32.6 | 47.5 | 36 | 464 |
| *S. helvomaculatus* | Rosethorn rockfish | 329 | 32.6 | 48.5 | 65 | 447 |
| *S. hopkinsi* | Squarespot rockfish | 67 | 32.6 | 38.0 | 52 | 169 |
| *S. jordani* | Shortbelly rockfish | 328 | 32.6 | 48.3 | 26 | 406 |
| *S. lentiginosus* | Freckled rockfish | 8 | 32.6 | 33.8 | 60 | 103 |
| *S. levis* | Cowcod | 87 | 32.6 | 42.3 | 74 | 308 |
| *S. macdonaldi* | Mexican rockfish | 1 | 33.9 | 33.9 | 269 | 269 |
| *S. maliger* | Quillback rockfish | 12 | 40.5 | 48.3 | 61 | 125 |
| *S. melanops* | Black rockfish | 2 | 37.4 | 40.8 | 70 | 71 |
| *S. melanostictus* | Blackspotted rockfish | 5 | 44.4 | 45.7 | 367 | 408 |
| *S. melanostomus* | Blackgill rockfish | 195 | 32.3 | 47.9 | 133 | 595 |
| *S. miniatus* | Vermilion rockfish | 57 | 32.6 | 38.0 | 58 | 478 |
| *S. mystinus* | Blue rockfish | 5 | 34.4 | 37.4 | 64 | 132 |
| *S. nigrocinctus* | Tiger rockfish | 6 | 38.2 | 48.3 | 114 | 178 |
| *S. ovalis* | Speckled rockfish | 6 | 32.6 | 33.9 | 106 | 151 |
| *S. paucispinis* | Bocaccio | 233 | 32.6 | 48.3 | 56 | 326 |
| *S. pinniger* | Canary rockfish | 283 | 32.6 | 48.4 | 54 | 260 |
| *S. proriger* | Redstripe rockfish | 105 | 33.5 | 48.4 | 66 | 271 |
| *S. reedi* | Yellowmouth rockfish | 7 | 43.0 | 48.3 | 114 | 313 |
| *S. rosaceus* | Rosy rockfish | 20 | 32.7 | 43.0 | 60 | 328 |
| *S. rosenblatti* | Greenblotched rockfish | 69 | 32.6 | 38.3 | 63 | 413 |
| *S. ruberrimus* | Yelloweye rockfish | 90 | 36.7 | 48.4 | 66 | 250 |
| *S. rubrivinctus* | Flag rockfish | 63 | 32.6 | 36.9 | 55 | 431 |
| *S. rufus* | Bank rockfish | 73 | 32.6 | 48.1 | 108 | 499 |
| *S. saxicola* | Stripetail rockfish | 801 | 32.3 | 48.4 | 36 | 436 |
| *S. semicinctus* | Halfbanded rockfish | 312 | 32.6 | 44.6 | 52 | 395 |

Table B-1 continued. Frequency of occurrence, depth range, and latitudinal range for fish species, grouped by family (or higher taxonomic classification), encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degrees) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *S. serranoides* | Olive rockfish | 2 | 37.4 | 37.7 | 103 | 134 |
| *S. serriceps* | Tree rockfish | 1 | 33.8 | 33.8 | 60 | 60 |
| *S. simulator* | Pinkrose rockfish | 3 | 33.8 | 34.2 | 205 | 325 |
| *S. umbrosus* | Honeycomb rockfish | 12 | 32.6 | 34.4 | 52 | 241 |
| *S. wilsoni* | Pygmy rockfish | 81 | 32.6 | 48.4 | 64 | 268 |
| *S. zacentrus* | Sharpchin rockfish | 236 | 33.7 | 48.5 | 86 | 404 |
| *S.* sp. | Rockfish unident. | 33 | 32.7 | 48.1 | 54 | 512 |
| *S.* sp. | Rockfish unident. | 3 | 33.3 | 43.9 | 114 | 240 |
| **Triglidae** | | | | | | |
| *Prionotus stephanophrys* | Lumptail sea robin | 13 | 32.9 | 33.8 | 52 | 184 |
| *Bellator xenisma* | Splitnose Searobin | 1 | 33.4 | 33.4 | 66 | 66 |
| *Anoplopoma fimbria* | Sablefish | 2,549 | 32.1 | 48.5 | 26 | 1,428 |
| **Hexagrammidae** | | | | | | |
| *Ophiodon elongatus* | Lingcod | 1,170 | 32.6 | 48.5 | 26 | 410 |
| *Hexagrammos lagocephalus* | Rock greenling | 1 | 34.0 | 34.0 | 27 | 27 |
| *H. decagrammus* | Kelp greenling | 59 | 34.4 | 48.4 | 60 | 149 |
| **Zaniolepididae** | | | | | | |
| *Zaniolepis latipinnis* | Longspine combfish | 363 | 32.6 | 45.6 | 26 | 288 |
| *Z. frenata* | Shortspine combfish | 144 | 32.6 | 38.2 | 59 | 411 |
| **Cottidae** | Sculpin unident. | 15 | 33.3 | 48.1 | 73 | 1,015 |
| *Bolinia euryptera* | Broadfin sculpin | 1 | 33.8 | 33.8 | 126 | 126 |
| *Chitonotus pugetensis* | Roughback sculpin | 30 | 32.9 | 45.6 | 56 | 240 |
| *Clinocottus acuticeps* | Sharpnose sculpin | 6 | 33.3 | 44.5 | 61 | 96 |
| *Dasycottus setiger* | Spinyhead sculpin | 2 | 37.8 | 48.4 | 58 | 169 |
| *Enophrys bison* | Buffalo sculpin | 8 | 33.3 | 48.2 | 56 | 194 |
| *E. taurina* | Bull sculpin | 28 | 33.9 | 37.9 | 58 | 95 |
| *Hemilepidotus hemilepidotus* | Red Irish lord | 10 | 42.4 | 48.4 | 70 | 151 |
| *H. spinosus* | Brown Irish lord | 5 | 38.2 | 48.3 | 63 | 126 |
| *H.* sp. | Irish lord | 2 | 37.4 | 45.7 | 65 | 122 |
| *Icelinus burchami* | Dusky sculpin | 11 | 33.5 | 48.0 | 61 | 435 |

Table B-1 continued. Frequency of occurrence, depth range, and latitudinal range for fish species, grouped by family (or higher taxonomic classification), encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degrees) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *I. filamentosus* | Threadfin sculpin | 347 | 32.9 | 48.5 | 54 | 482 |
| *I. fimbriatus* | Fringed sculpin | 23 | 32.5 | 46.0 | 90 | 1,158 |
| *I. tenuis* | Spotfin sculpin | 5 | 33.3 | 48.0 | 67 | 165 |
| *I.* sp. | Sculpin unident. | 5 | 32.7 | 42.5 | 75 | 382 |
| *Jordania zonope* | Longfin sculpin | 3 | 33.7 | 44.3 | 121 | 497 |
| *Leptocottus armatus* | Pacific staghorn sculpin | 61 | 33.4 | 48.2 | 47 | 335 |
| *Malacocottus kincaidi* | Blackfin sculpin | 8 | 45.1 | 47.9 | 293 | 437 |
| *Nautichthys oculofasciatus* | Sailfin sculpin | 2 | 37.8 | 44.4 | 58 | 88 |
| *Paricelinus hopliticus* | Thornback sculpin | 1 | 33.3 | 33.3 | 234 | 234 |
| *Psychrolutes phrictus* | Blob sculpin | 14 | 39.1 | 47.8 | 988 | 1,341 |
| *Radulinus asprellus* | Slim sculpin | 57 | 33.3 | 48.0 | 62 | 380 |
| *R. taylori* | Spinynose sculpin | 1 | 38.6 | 38.6 | 212 | 212 |
| *Rhamphocottus richardsoni* | Grunt sculpin | 5 | 33.7 | 43.1 | 61 | 150 |
| *Scorpaenichthys marmoratus* | Cabezon | 2 | 34.0 | 43.1 | 27 | 61 |
| *Triglops macellus* | Roughspine sculpin | 3 | 48.2 | 48.4 | 113 | 117 |
| *Zesticelus profundorum* | Flabby sculpin | 7 | 34.2 | 47.7 | 941 | 1,186 |
| **Agonidae** | Poacher unident. | 9 | 32.7 | 48.3 | 70 | 302 |
| *Agonopsis vulsa* | Northern spearnose poacher | 19 | 34.4 | 48.2 | 61 | 260 |
| *Bathyagonus nigripinnis* | Blackfin poacher | 221 | 35.2 | 48.3 | 116 | 1,008 |
| *B. pentacanthus* | Bigeye poacher | 55 | 32.7 | 48.3 | 53 | 611 |
| *Chesnonia verrucosa* | Warty poacher | 14 | 37.9 | 47.9 | 53 | 89 |
| *Odontopyxis trispinosa* | Pygmy poacher | 1 | 34.4 | 34.4 | 70 | 70 |
| *Podothecus acipenserinus* | Sturgeon poacher | 2 | 48.1 | 48.2 | 65 | 88 |
| *Xeneretmus latifrons* | Blacktip poacher | 114 | 32.7 | 48.2 | 83 | 1,064 |
| *X. leiops* | Smootheye poacher | 7 | 34.8 | 48.0 | 149 | 399 |
| **Liparidinae** | Snailfish unident. | 19 | 32.6 | 47.9 | 63 | 1,240 |
| *Careproctus colletti* | Alaska snailfish | 2 | 35.6 | 42.5 | 331 | 946 |
| *C. cypselurus* | Blackfin snailfish | 113 | 33.4 | 47.8 | 317 | 1,341 |
| *C. gilberti* | Smalldisk snailfish | 38 | 34.8 | 44.9 | 248 | 672 |
| *C. melanurus* | Blacktail snailfish | 770 | 32.3 | 48.2 | 163 | 1,215 |

Table B-1 continued. Frequency of occurrence, depth range, and latitudinal range for fish species, grouped by family (or higher taxonomic classification), encountered during the 2003–2008 surveys.

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degrees) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *C.* sp. | | 7 | 32.5 | 47.8 | 737 | 1,115 |
| *Elassodiscus caudatus* | Humpback snailfish | 19 | 36.8 | 47.8 | 399 | 879 |
| *E. tremebundus* | Blacklip snailfish | 1 | 33.4 | 33.4 | 611 | 611 |
| *Liparidae* n. gen. (Orr) | Hardhead snailfish | 1 | 33.9 | 33.9 | 1,224 | 1,224 |
| *Liparis fucensis* | Slipskin snailfish | 1 | 42.1 | 42.1 | 77 | 77 |
| *L. pulchellus* | Showy snailfish | 1 | 41.8 | 41.8 | 88 | 88 |
| *Nectoliparis pelagicus* | Tadpole snailfish | 1 | 39.2 | 39.2 | 476 | 476 |
| *Paraliparis cephalus* | Swellhead snailfish | 77 | 32.6 | 47.8 | 504 | 1,285 |
| *P. dactylosus* | Red snailfish | 48 | 32.6 | 47.6 | 422 | 1,162 |
| *P. pectoralis* | Broadfin snailfish | 14 | 32.6 | 47.7 | 893 | 1,241 |
| *P. rosaceus* | Rosy snailfish | 8 | 32.4 | 46.2 | 972 | 1,215 |
| *P.* sp. | | 2 | 32.9 | 35.6 | 302 | 1,029 |
| *Rhinoliparis attenuatus* | Slim snailfish | 6 | 32.8 | 40.8 | 546 | 1,139 |
| *R. barbulifer* | Longnose snailfish | 13 | 32.6 | 40.1 | 795 | 1,184 |
| *R.* sp. | | 2 | 32.7 | 35.3 | 867 | 961 |
| **Percichthyidae** | | | | | | |
| *Howella sherborni* | Sherborn's pelagic bass | 1 | 45.1 | 45.1 | 331 | 331 |
| **Chiasmodontidae** | Swallowers | 3 | 32.9 | 33.2 | 848 | 933 |
| *Chiasmodon niger* | Black swallower | 24 | 32.8 | 42.3 | 379 | 1,241 |
| *Kali indica* | Shortnose swallower | 1 | 32.9 | 32.9 | 1,028 | 1,028 |
| *K. normani* | Needletooth swallower | 1 | 33.4 | 33.4 | 1,178 | 1,178 |
| **Caristiidae** | | | | | | |
| *Caristius macropus* | Manefish | 3 | 32.4 | 42.1 | 365 | 1,086 |
| **Serranidae** | | | | | | |
| *Paralabrax nebulifer* | Barred sand bass | 26 | 32.7 | 34.4 | 24 | 101 |
| **Carangidae** | | | | | | |
| *Trachurus symmetricus* | Jack mackerel | 90 | 32.7 | 46.9 | 27 | 981 |
| **Sciaenidae** | Croakers | 5 | 32.7 | 34.6 | 62 | 107 |
| *Genyonemus lineatus* | White croaker | 268 | 32.6 | 41.4 | 27 | 132 |
| *Seriphus politus* | Queenfish | 4 | 32.7 | 33.4 | 35 | 81 |

Table B-1 continued. Frequency of occurrence, depth range, and latitudinal range for fish species, grouped by family (or higher taxonomic classification), encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degrees) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| **Embiotocidae** | Surfperch unident. | 7 | 33.3 | 36.1 | 31 | 119 |
| *Amphistichus argenteus* | Barred surfperch | 2 | 34.4 | 37.1 | 53 | 80 |
| *A. rhodoterus* | Redtail surfperch | 2 | 34.0 | 39.2 | 60 | 73 |
| *Cymatogaster aggregata* | Shiner perch | 161 | 32.6 | 47.2 | 26 | 114 |
| *Damalichthys vacca* | Pile perch | 4 | 32.8 | 37.1 | 60 | 86 |
| *Embiotoca lateralis* | Striped surfperch | 2 | 34.3 | 34.3 | 63 | 64 |
| *Hyperprosopon anale* | Spotfin surfperch | 23 | 34.0 | 37.6 | 36 | 80 |
| *Phanerodon atripes* | Sharpnose surfperch | 1 | 34.0 | 34.0 | 83 | 83 |
| *P. furcatus* | White surfperch | 5 | 33.9 | 38.0 | 62 | 86 |
| *Rhacochilus toxotes* | Rubberlip surfperch | 2 | 32.9 | 34.4 | 52 | 80 |
| *Zalembius rosaceus* | Pink sea perch | 507 | 32.6 | 39.9 | 26 | 276 |
| **Sphyraenidae** | | | | | | |
| *Sphyraena argentea* | California barracuda | 1 | 33.3 | 33.3 | 35 | 35 |
| **Bathymasteridae** | | | | | | |
| *Ronquilus jordani* | Northern ronquil | 16 | 38.7 | 48.4 | 61 | 191 |
| **Uranoscopidae** | | | | | | |
| *Kathetostoma averruncus* | Smooth stargazer | 16 | 32.6 | 34.3 | 59 | 225 |
| **Stichaeidae** | | | | | | |
| *Poroclinus rothrocki* | Whitebarred prickleback | 7 | 43.0 | 48.2 | 88 | 171 |
| **Cryptacanthodidae** | | | | | | |
| *Lyconectes aleutensis* | Dwarf wrymouth | 1 | 43.8 | 43.8 | 109 | 109 |
| *Cryptacanthodes giganteus* | Giant wrymouth | 8 | 45.8 | 48.2 | 107 | 309 |
| **Tetragonuridae** | | | | | | |
| *Tetragonurus cuvieri* | Smalleye squaretail | 1 | 37.1 | 37.1 | 491 | 491 |
| **Anarhichadidae** | | | | | | |
| *Anarrhichthys ocellatus* | Wolf-eel | 24 | 32.7 | 48.1 | 36 | 145 |
| **Ammodytidae** | | | | | | |
| *Ammodytes hexapterus* | Pacific sand lance | 2 | 42.8 | 44.4 | 64 | 83 |
| **Trichiuridae** | | | | | | |
| *Aphanopus carbo* | Black scabbardfish | 3 | 32.1 | 44.3 | 578 | 669 |

Table B-1 continued. Frequency of occurrence, depth range, and latitudinal range for fish species, grouped by family (or higher taxonomic classification), encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degrees) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *Lepidopus xantusi* | Scabbardfish | 20 | 32.7 | 41.0 | 163 | 1,080 |
| **Scombridae** | | | | | | |
| *Scomber japonicus* | Chub mackerel | 38 | 32.6 | 47.6 | 60 | 752 |
| **Stromateidae** | Butterfishes | 3 | 33.6 | 34.3 | 78 | 109 |
| *Peprilus simillimus* | Pacific butterfish | 242 | 32.6 | 47.4 | 26 | 550 |
| **Centrolophidae** | | | | | | |
| *Icichthys lockingtoni* | Medusafish | 9 | 34.3 | 46.5 | 65 | 775 |
| **Icosteidae** | Ragfish unident. | 1 | 32.8 | 32.8 | 1,201 | 1,201 |
| *Icosteus aenigmaticus* | Ragfish | 3 | 39.4 | 46.8 | 598 | 713 |
| **Pleuronectiformes** | Flatfish unident. | 1 | 34.0 | 34.0 | 78 | 78 |
| *Pleuronectiformes* larvae | Flatfish larvae | 1 | 45.0 | 45.0 | 1,196 | 1,196 |
| **Bothidae unident.** | Lefteye flounder unident. | 2 | 44.3 | 47.9 | 63 | 463 |
| *Citharichthys sordidus* | Pacific sanddab | 1,213 | 32.6 | 48.4 | 24 | 451 |
| *C. stigmaeus* | Speckled sanddab | 2 | 33.3 | 44.8 | 35 | 65 |
| *C. xanthostigma* | Longfin sanddab | 42 | 32.6 | 34.7 | 26 | 125 |
| *C.* sp. | Sanddab unident. | 3 | 35.0 | 37.8 | 58 | 135 |
| *Hippoglossina stomata* | Bigmouth sole | 174 | 32.6 | 35.5 | 24 | 478 |
| *Paralichthys californicus* | California halibut | 47 | 32.7 | 42.1 | 24 | 317 |
| *Xystreurys liolepis* | Fantail sole | 25 | 32.7 | 34.8 | 24 | 104 |
| **Pleuronectidae** | | | | | | |
| *Atheresthes stomias* | Arrowtooth flounder | 1,261 | 37.8 | 48.5 | 52 | 1,111 |
| *Embassichthys bathybius* | Deepsea sole | 877 | 32.4 | 48.2 | 276 | 1,428 |
| *Eopsetta jordani* | Petrale sole | 1,543 | 32.9 | 48.4 | 36 | 538 |
| *Glyptocephalus zachirus* | Rex sole | 2,406 | 32.3 | 48.5 | 47 | 937 |
| *G. zachirus* larvae | Rex sole larvae | 1 | 45.4 | 45.4 | 433 | 433 |
| *Hippoglossoides elassodon* | Flathead sole | 244 | 42.0 | 48.4 | 62 | 374 |
| *Hippoglossus stenolepis* | Pacific halibut | 300 | 37.8 | 48.4 | 53 | 492 |
| *Isopsetta isolepis* | Butter sole | 44 | 40.2 | 47.9 | 47 | 178 |
| *Lepidopsetta bilineata* | Southern rock sole | 179 | 32.7 | 48.4 | 47 | 236 |
| *Lepidopsetta* sp. | Rock sole unident. | 16 | 36.8 | 48.2 | 36 | 141 |

Table B-1 continued. Frequency of occurrence, depth range, and latitudinal range for fish species, grouped by family (or higher taxonomic classification), encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degrees) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *Lyopsetta exilis* | Slender sole | 1,929 | 32.3 | 48.5 | 52 | 680 |
| *Microstomus pacificus* | Dover sole | 3,214 | 32.3 | 48.5 | 52 | 1,246 |
| *Parophrys vetulus* | English sole | 1,541 | 32.6 | 48.5 | 24 | 480 |
| *Platichthys stellatus* | Starry flounder | 43 | 36.8 | 44.8 | 36 | 95 |
| *Pleuronichthys decurrens* | Curlfin sole | 401 | 32.6 | 48.2 | 26 | 380 |
| *P. ritteri* | Spotted turbot | 23 | 32.8 | 37.7 | 26 | 219 |
| *P. verticalis* | Hornyhead turbot | 155 | 32.6 | 38.1 | 24 | 496 |
| *Psettichthys melanostictus* | Sand sole | 50 | 36.3 | 48.4 | 36 | 110 |
| **Cynoglossidae** | Tonguefish unident. | 1 | 36.9 | 36.9 | 60 | 60 |
| *Symphurus atricauda* | California tonguefish | 5 | 34.0 | 34.4 | 70 | 110 |
| **Molidae** | | | | | | |
| *Mola mola* | Ocean sunfish | 1 | 37.0 | 37.0 | 125 | 125 |

Table B-2. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| Invertebrata | Invertebrate unident. | 62 | 32.3 | 48.2 | 59 | 1,241 |
| Invertebrata | Invertebrate eggs unident. | 3 | 32.4 | 40.5 | 53 | 1,064 |
| **Annelida** (phylum) | Worm unident. | 52 | 32.8 | 48.1 | 71 | 1,238 |
| *Annelid* spp. | Tube worm unident. | 7 | 32.6 | 48.4 | 121 | 1,169 |
| **Polychaeta** (class) | Polychaete worm unident. | 37 | 32.6 | 48.4 | 68 | 1,239 |
| *Aphroditidae* | | 131 | 32.8 | 48.4 | 95 | 1,201 |
| *Aphrodita* sp. | Sea mouse unident. | 313 | 32.7 | 48.4 | 58 | 1,428 |
| *Nereis* sp. | | 1 | 46.6 | 46.6 | 1,002 | 1,002 |
| **Polynoidae** (family) | Scale worm unident. | 1 | 44.9 | 44.9 | 302 | 302 |
| **Arthropoda** (phylum) | | | | | | |
| **Isopoda** (order) | Sea cockroaches unident. | 94 | 32.9 | 48.3 | 48 | 1,253 |
| *Anuropsus bathypelagica* | Giant isopod | 1 | 43.1 | 43.1 | 233 | 233 |
| **Pycnogonida** (class) | Sea spiders | 4 | 33.2 | 47.6 | 451 | 1,141 |
| **Crustacea** (sub-phylum) | Crustacean unident. | 1 | 39.3 | 39.3 | 596 | 596 |
| **Malacostraca** (class) | | | | | | |
| **Decapoda** (order) | | | | | | |
| *Sicyonia ingentis* | Razor-back prawn | 130 | 32.6 | 42.7 | 55 | 1,127 |
| Malacostraca | Shrimp unident. | 34 | 32.6 | 47.8 | 24 | 1,105 |
| Eualus sp. | Eualid unident. | 30 | 32.6 | 48.1 | 239 | 1,239 |
| *Eualus macrophthalmus* | Big eyed eualid | 212 | 33.0 | 48.2 | 301 | 1,285 |
| *E. biunguis* | Deepsea eualid | 18 | 34.8 | 47.8 | 391 | 1,341 |
| *Notostomus japonicus* | Japanese spinyridge | 11 | 33.0 | 48.2 | 210 | 1,201 |
| Acanthephyra sp. | | 1 | 33.1 | 33.1 | 1,186 | 1,186 |
| *Acanthephyra curtirostris* | Peaked shrimp | 36 | 32.6 | 47.9 | 382 | 1,241 |
| *Nematocarcinus* sp. | Red sword shrimps | 1 | 35.8 | 35.8 | 900 | 900 |
| *Hemisquilla californiensis* | Mantis shrimp | 15 | 32.6 | 34.0 | 27 | 86 |
| **Sergestidae** (family) | Sergestid shrimp unident. | 4 | 33.5 | 45.1 | 431 | 1,010 |
| *Sergestes* sp. | | 88 | 32.9 | 48.1 | 118 | 1,184 |
| *Sergestes similis* | Pacific sergestid | 137 | 32.7 | 47.9 | 129 | 1,140 |
| **Euphausiacea** | Deep sea red shrimps | 3 | 34.3 | 39.6 | 92 | 498 |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| **Mysidacea** | Crested red mysids | 22 | 32.6 | 47.5 | 524 | 1,186 |
| *Neognathophausia* sp. | Red mysids | 38 | 32.3 | 41.6 | 483 | 1,230 |
| *Neognathophausia gigas* | | 19 | 32.4 | 43.7 | 756 | 1,206 |
| *N. ingens* | Giant red mysid | 106 | 32.5 | 46.1 | 564 | 1,271 |
| *Neognathophausia* sp. A | | 1 | 47.7 | 47.7 | 991 | 991 |
| **Pandalidae** (family) | Pandalid shrimp unident. | 7 | 33.2 | 48.1 | 108 | 1,109 |
| *Pandalus* sp. | | 5 | 34.5 | 44.1 | 79 | 787 |
| *P. danae* | Dock shrimp | 2 | 43.1 | 44.3 | 61 | 73 |
| *P. jordani* | Ocean shrimp | 578 | 32.7 | 48.4 | 67 | 1,056 |
| *P. tridens* | Yellowleg pandalid | 4 | 42.9 | 47.5 | 250 | 340 |
| *P. platyceros* | Spot prawn | 249 | 32.7 | 48.4 | 70 | 397 |
| *P. hypsinotus* | Coonstriped shrimp | 8 | 37.1 | 47.9 | 53 | 259 |
| *Pandalopsis dispar* | Sidestripe shrimp | 63 | 32.9 | 48.4 | 147 | 1,214 |
| *P. ampla* | Smooth shrimp | 184 | 32.2 | 48.0 | 230 | 1,341 |
| **Crangonidae** (family) | Crangonid shrimp unident. | 1 | 42.5 | 42.5 | 96 | 96 |
| *Crangon* sp. | | 93 | 34.2 | 48.4 | 62 | 676 |
| *Crangon alba* | Stout crangon | 1 | 35.3 | 35.3 | 77 | 77 |
| *C. communis* | Twospine crangon | 42 | 34.4 | 47.8 | 53 | 215 |
| *C. dalli* | Ridged crangon | 5 | 34.2 | 41.5 | 76 | 204 |
| *C. septemspinosa* | Sand shrimp | 10 | 34.4 | 47.9 | 63 | 156 |
| **Pasiphaeidae** (family) | Pasiphaeid shrimp unident. | 5 | 33.4 | 41.5 | 451 | 854 |
| *Pasiphaea pacifica* | Glass shrimp | 531 | 32.7 | 48.4 | 84 | 1,156 |
| *P. tarda* | Crimson pasiphaeid | 485 | 32.1 | 47.9 | 181 | 1,341 |
| **Brachyura** | Crab unident. | 19 | 32.6 | 36.3 | 24 | 343 |
| *Moloha faxoni* | Pacific carrier crab | 9 | 32.6 | 33.8 | 112 | 151 |
| **Cancridae** (family) | Rock crabs | 1 | 32.7 | 32.7 | 83 | 83 |
| *Cancer* sp. | Cancer crab unident. | 13 | 33.0 | 38.5 | 24 | 455 |
| *Cancer branneri* | Furrowed rock crab | 2 | 39.4 | 43.2 | 54 | 68 |
| *C. anthonyi* | Yellow rock crab | 75 | 32.6 | 38.7 | 27 | 451 |
| *C. magister* | Dungeness crab | 1,189 | 34.5 | 48.3 | 36 | 835 |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *C. productus* | Red rock crab | 127 | 32.8 | 39.0 | 31 | 437 |
| *C. gracilis* | Graceful cancer crab | 30 | 34.0 | 47.9 | 26 | 97 |
| **Calappidae** (family) | Box crab | 14 | 33.7 | 48.2 | 66 | 287 |
| *Platymera gaudichaudii* | Shame faced crab | 263 | 32.6 | 44.5 | 24 | 480 |
| **Majidae** (family) | Spider crab unident. | 1 | 34.8 | 34.8 | 48 | 48 |
| *Oregonia gracilis* | Graceful decorator crab | 4 | 33.3 | 44.5 | 67 | 101 |
| *Macroregonia macrochira* | Long-armed spider crab | 2 | 32.6 | 32.8 | 151 | 630 |
| *Loxorhynchus crispatus* | Masking crab | 21 | 32.8 | 44.3 | 35 | 464 |
| *L. grandis* | Sheep crab | 25 | 32.7 | 35.0 | 27 | 514 |
| *Chorilia longipes* | Long horned decorator crab | 309 | 32.3 | 48.4 | 35 | 1,230 |
| *Chionoecetes* sp. | Tanner crab unident. | 64 | 33.6 | 48.2 | 280 | 1,197 |
| *C. tanneri* | Grooved tanner crab | 1,122 | 32.6 | 48.2 | 64 | 1,428 |
| *C. bairdi* | Baird's tanner crab | 25 | 33.0 | 48.4 | 124 | 1,142 |
| *C. angulatus* | Triangle tanner crab | 5 | 44.9 | 47.7 | 421 | 1,428 |
| *Hyas lyratus* | Pacific lyre crab | 7 | 43.2 | 48.4 | 73 | 777 |
| **Paguridae** | Hermit crab unident. | 385 | 32.4 | 48.4 | 61 | 1,268 |
| *Paguristes turgidus* | Hermit crab | 38 | 32.8 | 48.2 | 77 | 968 |
| *Pagurus* sp. | | 29 | 32.7 | 47.6 | 99 | 1,186 |
| *Pagurus aleuticus* | Aleutian hermit crab | 2 | 41.7 | 41.7 | 254 | 273 |
| *P. confragosus* | Knobbyhand hermit crab | 1 | 41.7 | 41.7 | 254 | 254 |
| *P. rathbuni* | Longfinger hermit crab | 2 | 42.3 | 47.2 | 180 | 385 |
| *P. tanneri* | Tanners hermit crab | 10 | 33.5 | 48.4 | 168 | 1,184 |
| *P. capillatus* | Hairy hermit crab | 5 | 41.2 | 48.0 | 108 | 185 |
| **Lithodidae unident.** | Stone crab unident. | 2 | 33.3 | 34.0 | 455 | 823 |
| *Lopholithodes* sp. | Box crab unident. | 10 | 37.0 | 48.3 | 64 | 206 |
| *Lopholithodes foraminatus* | Brown box crab | 220 | 32.7 | 48.4 | 67 | 519 |
| *Acantholithodes hispidus* | Fuzzy crab | 24 | 33.8 | 48.4 | 86 | 502 |
| *Lithodes* sp. | | 1 | 33.9 | 33.9 | 1,224 | 1,224 |
| *Lithodes couesi* | Scarlet king crab | 210 | 32.1 | 48.1 | 492 | 1,246 |
| *L. aequispina* | Golden king crab | 1 | 34.4 | 34.4 | 301 | 301 |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *Rhinolithodes wosnessenskii* | Rhinoceros crab | 1 | 37.2 | 37.2 | 112 | 112 |
| *Paralithodes* sp. | | 2 | 35.0 | 45.5 | 255 | 267 |
| *Paralithodes californiensis* | California king crab | 116 | 32.6 | 38.3 | 82 | 1,098 |
| *P. rathbuni* | Spiny king crab | 76 | 32.6 | 38.7 | 86 | 1,184 |
| *Paralomis* sp. | | 9 | 32.8 | 33.5 | 846 | 1,246 |
| *Paralomis verrilli* | Vermillion crab | 1 | 34.0 | 34.0 | 496 | 496 |
| *P. manningi* | Deep-sea spider crab | 3 | 33.2 | 45.9 | 1,101 | 1,200 |
| *P. multispina* | Hair crab | 168 | 32.2 | 47.8 | 149 | 1,341 |
| *Neolithodes diomedeae* | Spiky king crab | 18 | 32.6 | 38.3 | 302 | 1,229 |
| *Glyptolithodes cristatipes* | | 37 | 32.7 | 34.0 | 269 | 588 |
| *Pugettia* sp. | Kelp crab | 2 | 33.3 | 44.3 | 130 | 184 |
| *Pugettia richii* | Cryptic kelp crab | 8 | 33.2 | 44.2 | 92 | 147 |
| **Galatheidae** (family) | | 16 | 33.1 | 48.2 | 133 | 1,188 |
| Galatheoidea | Squat lobsters and pinch bugs | 4 | 35.6 | 47.5 | 1,035 | 1,241 |
| *Janetogalathea californiensis* | California pinch bug | 2 | 33.2 | 33.5 | 379 | 876 |
| *Munidopsis* sp. | Thorny pinch bugs | 28 | 32.6 | 47.4 | 105 | 1,201 |
| *Munidopsis* sp. A | Thorny pinch bugs sp. A | 6 | 32.3 | 33.2 | 972 | 1,157 |
| *Chirostylus* sp. | Spiny pinch bugs | 5 | 33.5 | 47.8 | 344 | 1,170 |
| *Munida hispida* | Deep water squat lobster | 26 | 32.1 | 36.2 | 147 | 1,230 |
| *M. quadrispina* | Pinch bug | 60 | 32.5 | 48.3 | 78 | 1,215 |
| *Panulirus interruptus* | California spiny lobster | 1 | 34.0 | 34.0 | 27 | 27 |
| *Polycheles sculptus* | Deep-sea lobster | 68 | 32.2 | 46.0 | 251 | 1,264 |
| *Pleuroncodes planipes* | Pelagic red crab | 2 | 34.2 | 34.2 | 179 | 312 |
| *Calocarides* sp. | Deep-sea shrimps | 25 | 33.9 | 47.5 | 324 | 1,170 |
| *Callianassa* sp. | Ghost shrimp | 6 | 34.3 | 47.9 | 454 | 1,095 |
| *Callianassa californiensis* | Bay ghost shrimp | 1 | 44.3 | 44.3 | 69 | 69 |
| *Munidopsis quadrata* | Pale rough pinch | 4 | 33.4 | 44.6 | 729 | 1,166 |
| *M. hystrix* | | 3 | 33.0 | 33.7 | 756 | 826 |
| **Thoracica** (order) | | | | | | |
| *Thoracica* | Barnacle unident. | 3 | 36.1 | 47.5 | 60 | 633 |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *Lepas* sp. | | 1 | 35.6 | 35.6 | 1,002 | 1,002 |
| **Brachiopoda** (phylum) | | | | | | |
| *Thetys vagina* | Rabbit-eared salp | 21 | 32.9 | 48.2 | 52 | 1,181 |
| *Styela rustica* | Sea potato | 126 | 32.7 | 48.3 | 59 | 1,224 |
| **Cnidaria** (phylum) | | | | | | |
| **Anthozoa** (class) | | | | | | |
| Scleractinia unident. | Stony coral unident. | 7 | 33.4 | 48.2 | 242 | 1,115 |
| *Coenocyathus bowersi* | Colonial cup coral | 1 | 32.9 | 32.9 | 74 | 74 |
| *Polymyces cf montereyensis* | Cup coral | 10 | 32.7 | 44.6 | 78 | 421 |
| *Caryophyllia alaskensis* | Alaska cup coral | 1 | 32.6 | 32.6 | 72 | 72 |
| **Alcyonacea** (order) | Soft coral unident. | 28 | 32.5 | 47.9 | 60 | 1,215 |
| *Alcyonaria* unident. | Octocoral unident. | 3 | 32.8 | 45.1 | 419 | 915 |
| *Anthomastus ritteri* | Mushroom coral | 63 | 32.6 | 47.9 | 293 | 1,107 |
| *Anthomastus* sp. | | 29 | 32.6 | 46.9 | 347 | 1,094 |
| *Anthomastus* sp. A | Red anthomastus | 1 | 33.7 | 33.7 | 447 | 447 |
| *Halocynthia* sp. | Sea peach unident. | 3 | 36.8 | 46.8 | 36 | 181 |
| **Actinaria** (order) | | | | | | |
| Actiniaria | Purple striated anemone | 207 | 33.3 | 47.8 | 189 | 1,176 |
| Actiniaria | Red striated anemone | 179 | 32.3 | 48.3 | 59 | 1,235 |
| Actiniaria | Sea anemone unident. | 678 | 32.5 | 48.4 | 36 | 1,341 |
| **Actinostolidae** | | 146 | 32.4 | 47.8 | 53 | 1,259 |
| *Actinostola* sp. | | 37 | 32.6 | 48.3 | 70 | 1,235 |
| *Sicyonis* spp. | Orange actinistolids | 89 | 33.0 | 47.8 | 138 | 1,238 |
| **Hormathiidae** (family) | Hormathiid anemones unident. | 410 | 32.3 | 48.2 | 64 | 1,271 |
| Hormathiid sp. A | Pink hormathiid anemones | 4 | 32.9 | 47.7 | 858 | 1,034 |
| *Actinauge verrilli* | Reticulated anemone | 359 | 32.4 | 48.2 | 131 | 1,428 |
| *Actinernus* spp. | Lava anemones | 82 | 32.4 | 47.7 | 352 | 1,259 |
| *Actinoscyphia* sp. | Sea whip anemones | 49 | 32.6 | 47.7 | 63 | 1,268 |
| *Anthopleura xanthogrammica* | Green anemone | 37 | 37.5 | 47.9 | 60 | 176 |
| *Corallimorphus* sp. | Club tipped anemones | 48 | 32.7 | 48.2 | 331 | 1,205 |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *Liponema brevicornis* | Pom pom anemone | 814 | 32.2 | 48.2 | 83 | 1,428 |
| *Metridium farcimen* | Giant anemone | 1,068 | 32.6 | 48.4 | 53 | 1,153 |
| *M. senile* | Colonial plumose sea anemone | 2 | 42.4 | 47.9 | 64 | 304 |
| *Metridium* sp. | | 8 | 32.6 | 44.0 | 64 | 380 |
| *Oractis diomedeae* | Grape anemone | 5 | 43.5 | 47.6 | 484 | 969 |
| *Paractinostola faeculenta* | Rough anemone | 1,308 | 32.3 | 48.2 | 89 | 1,428 |
| *Stomphia coccinea* | Swimming anemone | 115 | 32.7 | 48.4 | 63 | 1,240 |
| *Stomphia* sp. | | 34 | 33.5 | 48.3 | 66 | 1,157 |
| *Urticina columbiana* | Columbian anemone | 30 | 33.6 | 47.8 | 59 | 147 |
| *U. crassicornis* | Painted anemone | 101 | 33.5 | 48.3 | 56 | 581 |
| *Urticina* sp. | | 90 | 33.8 | 48.4 | 53 | 521 |
| **Gorgonacea** (order) | Gorgonian coral unident. | 42 | 32.6 | 47.0 | 52 | 1,184 |
| *Amphilaphis* sp. | | 1 | 33.8 | 33.8 | 114 | 114 |
| *Antipatharia* | Black coral | 64 | 33.2 | 48.1 | 103 | 1,285 |
| *Antipathes* sp. | | 26 | 33.7 | 46.6 | 82 | 1,162 |
| *Bathypathes* sp. | Quill black corals | 20 | 32.8 | 47.8 | 136 | 1,243 |
| *Calcigorgia* sp. | | 1 | 47.9 | 47.9 | 604 | 604 |
| *Callogorgia kinoshitae* | Golden coral | 19 | 33.3 | 48.1 | 114 | 1,152 |
| *Callogorgia* sp. | | 4 | 32.1 | 33.7 | 129 | 820 |
| *Chrysopathes* sp. | | 18 | 33.1 | 47.8 | 93 | 1,235 |
| *Euplexaura marki* | Red licorice coral | 4 | 42.8 | 48.2 | 181 | 398 |
| *Isidella* sp. | Articulated bamboo corals | 9 | 33.1 | 44.8 | 84 | 1,092 |
| *Keratoisis* sp. | Forked bamboo corals | 3 | 40.3 | 47.5 | 1,063 | 1,285 |
| *Lillipathes* sp. | Long stemmed black corals | 12 | 43.4 | 47.6 | 449 | 1,243 |
| *Lophogorgia chilensis* | Red gorgonian | 4 | 32.8 | 47.1 | 73 | 710 |
| *Paragorgia pacifica* | | 11 | 34.2 | 48.3 | 122 | 1,166 |
| *Paragorgia* sp. | Peppermint corals | 8 | 33.2 | 47.6 | 185 | 1,092 |
| *Pennatulacea* | Sea pen unident. | 132 | 32.6 | 48.1 | 61 | 1,264 |
| *Swiftia pacifica* | | 5 | 32.4 | 46.7 | 78 | 1,186 |
| *S. simplex* | | 28 | 32.6 | 48.0 | 52 | 1,206 |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *Swiftia* sp. | Red sea fans | 51 | 32.6 | 47.7 | 52 | 1,184 |
| **Pennatulacea** (order) | | | | | | |
| **Virgulariidae** (family) | Sea whip unident. | 175 | 32.7 | 48.2 | 59 | 1,325 |
| *Virgularia* sp. | Smoothstem sea whip | 1 | 42.1 | 42.1 | 96 | 96 |
| *Anthoptilum grandiflorum* | Fleshy sea pen | 293 | 32.6 | 48.2 | 80 | 1,241 |
| *Anthoptilum murrayi* | Murray's sea pen | 22 | 32.6 | 47.7 | 345 | 1,239 |
| *Distichoptilum gracile* | Deep-sea sea whip | 17 | 32.6 | 47.6 | 80 | 1,229 |
| *Halipteris californica* | | 66 | 36.7 | 48.3 | 84 | 1,237 |
| *Halipteris* sp. | | 29 | 33.6 | 47.9 | 81 | 922 |
| *Pennatula phosphorea* | Branched sea pen | 3 | 34.2 | 48.0 | 465 | 1,179 |
| *P. phosphorea californica* | Deep-sea sea pen | 4 | 34.2 | 47.7 | 418 | 982 |
| *Ptilosarcus gurneyi* | Orange sea pen | 66 | 33.9 | 47.0 | 47 | 798 |
| *Stylatula gracile* | Slender sea whip | 146 | 33.0 | 47.9 | 64 | 1,243 |
| *Stylatula* sp. | Slender sea whips | 68 | 32.7 | 47.8 | 63 | 1,173 |
| *Umbellula* sp. | Flower sea pens | 99 | 32.7 | 48.1 | 441 | 1,428 |
| **Hydrozoa** (class) | | | | | | |
| *Stylasterina* unident. | Hydrocoral unident. | 2 | 33.5 | 35.1 | 344 | 544 |
| *Stylaster* sp. | | 1 | 44.4 | 44.4 | 102 | 102 |
| *Stylaster alaskanus* | | 1 | 46.1 | 46.1 | 172 | 172 |
| *S. californicus* | California hydrocoral | 2 | 34.0 | 34.0 | 68 | 94 |
| *Distichopora* sp. | | 1 | 32.9 | 32.9 | 1,140 | 1,140 |
| **Scyphozoa** (class) | Jellyfish unident. | 754 | 32.6 | 48.3 | 26 | 1,428 |
| *Chrysaora* sp. | Chrysaora jellyfish | 101 | 32.6 | 48.1 | 52 | 1,235 |
| *Periphylla* sp. | | 2 | 40.2 | 44.7 | 583 | 1,214 |
| *Chrysaora fuscens* | Sea nettle | 49 | 36.4 | 47.9 | 47 | 728 |
| *Periphylla periphylla* | Purple cone jelly | 274 | 32.6 | 48.2 | 317 | 1,268 |
| *Chrysaora melanaster* | Sunrise jelly | 31 | 37.1 | 48.0 | 53 | 918 |
| *Phacellophora camtschatica* | Egg-yolk jellyfish | 165 | 32.7 | 48.4 | 59 | 1,184 |
| *Aequorea* sp. | | 8 | 35.1 | 46.9 | 82 | 1,130 |
| *Phacellophora* sp. | | 1 | 43.2 | 43.2 | 54 | 54 |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *Atolla* sp. | Wheel jellies | 275 | 32.1 | 48.2 | 64 | 1,428 |
| *Aurelia* sp. | Moon jellies | 105 | 34.0 | 47.3 | 47 | 1,228 |
| *Aurelia labiata* | | 122 | 34.1 | 47.9 | 53 | 1,162 |
| *Pelagia colorata* | Purple striped jellyfish | 9 | 32.9 | 36.9 | 52 | 464 |
| *Cyanea capillata* | Lion's mane | 3 | 48.1 | 48.2 | 129 | 248 |
| **Ctenophora** (phylum) | Comb jelly unident. | 14 | 33.9 | 48.2 | 60 | 1,132 |
| *Beroe* sp. | | 1 | 42.6 | 42.6 | 1,235 | 1,235 |
| **Echinodermata** (phylum) | | | | | | |
| **Asteroidea** (class) | | | | | | |
| Asteroidea unident. | Sea star unident. | 493 | 32.6 | 48.5 | 26 | 1,341 |
| **Forcipulatida** (order) | | | | | | |
| *Ampheraster marianus* | Pink star | 180 | 32.7 | 48.1 | 143 | 1,185 |
| *Ampheraster* sp. | | 10 | 37.1 | 47.5 | 607 | 998 |
| *Anteliaster* sp. | Soft stars | 25 | 32.7 | 45.6 | 123 | 1,188 |
| *Asterias* sp. | | 1 | 45.6 | 45.6 | 115 | 115 |
| *Astrometis sertulifera* | Fragile rainbow star | 1 | 36.8 | 36.8 | 94 | 94 |
| *Brisingella exilis* | Lacy-armed star | 88 | 32.6 | 47.9 | 420 | 1,240 |
| *Brisingella* sp. | | 19 | 33.5 | 45.3 | 344 | 1,148 |
| *Myxoderma platyacanthum* | Red star | 556 | 32.1 | 47.9 | 84 | 1,241 |
| *M. sacculatum* | Snakehead star | 152 | 32.2 | 47.7 | 154 | 1,297 |
| *Orthasterias koehleri* | Rainbow star | 34 | 33.3 | 48.4 | 60 | 981 |
| *Orthasterias* sp. | | 8 | 41.2 | 47.5 | 60 | 181 |
| *Pedicellaster magister* | Majestic sea star | 4 | 41.0 | 47.2 | 171 | 688 |
| *Pedicellaster* sp. | | 4 | 42.3 | 45.7 | 253 | 957 |
| *Pisaster brevispinus* | Short-spined pink star | 267 | 33.4 | 48.3 | 24 | 723 |
| *P. ochraceus* | | 11 | 43.5 | 48.1 | 53 | 155 |
| *Pisaster* sp. | | 3 | 43.8 | 44.2 | 60 | 312 |
| *Pycnopodia helianthoides* | Sunflower star | 504 | 33.9 | 48.4 | 48 | 1,169 |
| *Rathbunaster californicus* | Deep-sea sunflower star | 569 | 32.3 | 48.4 | 53 | 995 |
| *Sclerasterias heteropaes* | False rainbow star | 4 | 34.0 | 39.8 | 87 | 139 |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys.

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *Stylasterias forreri* | Fish-eating star | 392 | 32.7 | 48.4 | 53 | 1,214 |
| *Stylasterias* sp. | | 2 | 34.9 | 35.7 | 74 | 499 |
| *Zoroaster ophiurus* | | 2 | 41.5 | 43.8 | 968 | 1,019 |
| *Z. evermanni* | Slender star | 452 | 32.6 | 48.2 | 97 | 1,428 |
| Zoroasteridae | | 1 | 41.8 | 41.8 | 484 | 484 |
| **Paxillosida** (order) | | | | | | |
| *Astropecten armatus* | Spiny sand star | 21 | 33.7 | 43.0 | 69 | 832 |
| *A. californicus* | California sand star | 92 | 32.6 | 44.5 | 53 | 960 |
| *A. ornatissimus* | Ornate sand star | 11 | 32.6 | 38.5 | 61 | 881 |
| *Cheiraster dawsoni* | Fragile star | 44 | 38.9 | 47.9 | 72 | 1,012 |
| *Ctenodiscus crispatus* | Mud star | 62 | 33.2 | 48.3 | 163 | 1,271 |
| *Ctenodiscus* sp. | | 5 | 33.0 | 45.2 | 295 | 1,179 |
| *Dipsacaster borealis* | Northern sand star | 7 | 33.0 | 45.7 | 408 | 1,166 |
| *D. eximius* | Broad sand star | 221 | 32.5 | 47.5 | 64 | 1,246 |
| *Dipsacaster* sp. | | 14 | 33.1 | 41.9 | 60 | 1,145 |
| *Leptychaster arcticus* | Arctic sand star | 2 | 44.7 | 48.1 | 133 | 383 |
| *L. pacificus* | Pacific sand star | 4 | 38.7 | 48.0 | 273 | 991 |
| *Leptychaster* sp. | | 2 | 43.3 | 44.9 | 448 | 451 |
| *Luidia asthenosoma* | Pretty mud star | 2 | 42.8 | 45.3 | 164 | 173 |
| *L. foliolata* | Flat mud star | 1,553 | 32.6 | 48.4 | 47 | 1,125 |
| *Luidia* sp. | | 3 | 32.9 | 34.4 | 65 | 507 |
| *Nearchaster aciculosus* | Deep-sea fragile star | 398 | 32.6 | 48.2 | 168 | 1,428 |
| *N. pedicellaris* | | 1 | 35.8 | 35.8 | 1,241 | 1,241 |
| *Nearchaster* sp. | | 26 | 32.6 | 47.6 | 391 | 1,229 |
| *Thrissacanthias penicillatus* | Carpet star | 926 | 32.6 | 48.2 | 60 | 1,428 |
| **Spinulosida** (order) | | | | | | |
| *Asthenactis fisheri* | Slimy deep sea sun star | 3 | 33.2 | 46.3 | 1,148 | 1,184 |
| *Crossaster borealis* | Grooved sun star | 605 | 32.6 | 48.4 | 79 | 1,428 |
| *C. papposus* | Rose star | 70 | 33.6 | 48.4 | 66 | 618 |
| *Crossaster* sp. | | 2 | 33.2 | 47.3 | 432 | 1,089 |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys.

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *Diplopteraster multipes* | Pincushion sea star | 105 | 32.6 | 48.2 | 192 | 1,241 |
| *Diplopteraster* sp. | Pincushion star | 3 | 40.2 | 46.8 | 95 | 906 |
| *Henricia aspera* | Smooth henricia | 6 | 33.4 | 45.8 | 129 | 699 |
| *H. clarki* | Serpent-arm henricia | 9 | 32.7 | 47.6 | 280 | 1,246 |
| *H. leviuscula* | Blood star | 10 | 32.6 | 46.9 | 72 | 182 |
| *Henricia* sp. | | 63 | 32.6 | 48.3 | 67 | 1,230 |
| *Heterozonias alternatus* | Pink sun star | 845 | 32.2 | 48.2 | 89 | 1,428 |
| *Lophaster furcilliger* | Pink crested star | 86 | 32.6 | 48.0 | 92 | 1,428 |
| *Lophaster* sp. | | 9 | 32.9 | 40.2 | 489 | 1,229 |
| *L. vexator* | Crested star | 18 | 33.4 | 47.6 | 73 | 1,184 |
| *Peribolaster biserialis* | | 1 | 34.8 | 34.8 | 477 | 477 |
| *Poraniopsis flexilis* | Flexible thorny star | 24 | 32.6 | 48.2 | 67 | 1,157 |
| *P. inflata* | Thorny star | 117 | 32.6 | 48.4 | 70 | 1,259 |
| *Pteraster jordani* | Jordans slime star | 198 | 32.1 | 48.2 | 235 | 1,428 |
| *P. militaris* | Wrinkled slime star | 58 | 32.8 | 48.3 | 92 | 1,239 |
| *Pteraster* sp. | | 68 | 32.6 | 48.3 | 72 | 1,271 |
| *Pteraster* sp. cf. *temnochiton* | | 1 | 35.1 | 35.1 | 546 | 546 |
| *P. tesselatus* | Slimy cushion star | 35 | 33.6 | 48.4 | 61 | 1,148 |
| *P. trigonodon* | Triangle-toothed cushion star | 13 | 32.7 | 45.5 | 395 | 1,230 |
| *Solaster dawsoni* | Morning sun star | 10 | 43.2 | 48.4 | 54 | 433 |
| *S. endeca* | Northern sun star | 3 | 44.4 | 48.3 | 98 | 346 |
| *S. exiguus* | Deep-sea sunstar | 61 | 32.7 | 47.9 | 255 | 1,279 |
| *S. paxillatus* | Evening sun sea star | 5 | 48.1 | 48.3 | 100 | 166 |
| *Solaster* sp. | Orange sun stars | 65 | 32.7 | 48.4 | 60 | 1,241 |
| *S. stimpsoni* | Striped sun star | 8 | 43.1 | 48.2 | 61 | 235 |
| **Valvatida** (order) | | | | | | |
| *Asterina miniata* | Bat star | 19 | 32.7 | 38.2 | 58 | 755 |
| *Ceramaster arcticus* | Arctic bat sea star | 2 | 36.2 | 43.2 | 722 | 1,166 |
| *C. leptoceramus* | California cookie star | 81 | 32.7 | 48.0 | 53 | 1,188 |
| *C. patagonicus* | Orange cookie star | 9 | 33.3 | 36.8 | 201 | 756 |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *Ceramaster* sp. | | 43 | 32.8 | 48.0 | 130 | 1,208 |
| *Cryptopeltaster lepidonotus* | Grainy star | 66 | 32.4 | 48.3 | 72 | 1,201 |
| *Dermasterias imbricata* | Leather star | 52 | 34.7 | 48.4 | 53 | 173 |
| *Hippasteria californica* | Deep-sea spiny star | 536 | 32.4 | 48.4 | 55 | 1,428 |
| *Hippasteria* sp. | | 50 | 32.1 | 48.2 | 60 | 1,197 |
| *H. spinosa* | Spiny star | 436 | 32.6 | 48.4 | 54 | 1,214 |
| *Mediaster aequalis* | Equal armed star | 376 | 32.6 | 48.4 | 54 | 1,279 |
| *Mediaster* sp. | | 42 | 34.0 | 48.4 | 66 | 604 |
| *M.r tenellus* | Pale equal armed star | 18 | 32.7 | 47.6 | 186 | 1,163 |
| *Pseudarchaster alascensis* | Alaskan pseudarchaster | 64 | 33.1 | 47.9 | 69 | 1,148 |
| *P. dissonus* | Deep-sea pseudarchaster | 11 | 34.9 | 45.7 | 70 | 1,268 |
| *P. parelii* | Scarlet sea star | 31 | 33.5 | 48.1 | 95 | 520 |
| *P. pusillus* | Little pseudarchaster | 13 | 34.2 | 45.3 | 133 | 700 |
| *Pseudarchaster* sp. | | 90 | 32.6 | 48.4 | 61 | 1,243 |
| **Crinoidea** (class) | Crinoid unident. | 29 | 32.6 | 48.0 | 86 | 1,238 |
| *Florometra serratissima* | Feather star | 45 | 32.6 | 48.3 | 72 | 1,184 |
| *Florometra* sp. | | 15 | 33.5 | 47.7 | 97 | 1,104 |
| *Psathyrometra fragilis* | Fragile crinoid | 2 | 32.6 | 40.3 | 559 | 769 |
| **Echinoidea** (class) | Sea urchins/sand dollars unident. | 33 | 32.4 | 48.3 | 100 | 1,158 |
| *Allocentrotus fragilis* | Fragile red sea urchin | 1,271 | 32.3 | 48.4 | 61 | 1,224 |
| *Allocentrotus* sp. | | 5 | 33.6 | 45.2 | 328 | 795 |
| *Brisaster latifrons* | Mud urchin | 1,041 | 32.6 | 48.4 | 72 | 1,268 |
| *Brisaster* sp. | | 148 | 32.9 | 48.3 | 85 | 1,224 |
| *B. townsendi* | Giant mud urchin | 31 | 33.3 | 48.1 | 122 | 1,013 |
| *Brissopsis pacifica* | Oval sea biscuit | 126 | 32.6 | 39.1 | 76 | 937 |
| *Echinacea* unident. | | 258 | 32.7 | 48.5 | 63 | 1,157 |
| *Lytechinus anamesus* | White urchin | 30 | 32.6 | 48.4 | 60 | 248 |
| *Spatangoida* | Heart sea urchin unident. | 60 | 32.3 | 48.2 | 113 | 972 |
| *Spatangus californicus* | Giant sea biscuit | 109 | 32.6 | 39.1 | 73 | 498 |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *Strongylocentrotus droebachiensis* | Green sea urchin | 8 | 32.6 | 48.4 | 91 | 370 |
| *S. echinoides* | | 1 | 34.2 | 34.2 | 115 | 115 |
| *S. franciscanus* | Red sea urchin | 10 | 32.7 | 34.4 | 70 | 163 |
| *S. pallidus* | Crowned sea urchin | 24 | 32.7 | 48.4 | 62 | 346 |
| *Strongylocentrotus* sp. | | 8 | 32.6 | 48.4 | 76 | 211 |
| *Brisaster* spp. | Brisaster spp/*brissopsis pacifica* unident. | 45 | 32.7 | 36.2 | 155 | 1,048 |
| | Crushed urchin | 141 | 32.6 | 48.4 | 100 | 999 |
| **Holothuroidea** (class) | | | | | | |
| *Holothuroidea* unident. | Sea cucumber unident. | 224 | 32.6 | 48.5 | 35 | 1,285 |
| *Cucumaria* sp. | | 3 | 34.4 | 48.4 | 227 | 503 |
| *Dromalia alexandri* | Pineapple benthic siphonophore | 278 | 32.3 | 36.9 | 90 | 916 |
| *Molpadia intermedia* | Purple sea potato | 193 | 32.8 | 48.4 | 60 | 1,271 |
| *Molpadia* sp. | | 1 | 33.2 | 33.2 | 1,241 | 1,241 |
| *Paelopatides confundus* | Deep sea swimming sea cucumber | 4 | 32.2 | 39.3 | 1,086 | 1,188 |
| *Pannychia moseleyi* | Sloppy cucumber | 281 | 32.4 | 48.2 | 145 | 1,268 |
| *Parastichopus californicus* | California cucumber | 277 | 32.6 | 48.4 | 43 | 1,178 |
| *P. leukothele* | Giant soft cucumber | 566 | 32.6 | 48.4 | 54 | 1,241 |
| *P. parvimensis* | Warty sea cucucumber | 15 | 32.7 | 34.5 | 259 | 1,028 |
| *Parastichopus* sp. | | 9 | 32.6 | 48.3 | 77 | 1,205 |
| *Pseudostichopus mollis* | Sandy sea cucumber | 261 | 32.3 | 48.2 | 95 | 1,268 |
| *Pseudostichopus* sp. | | 1 | 47.8 | 47.8 | 397 | 397 |
| *Psolidae* | | 1 | 33.2 | 33.2 | 879 | 879 |
| *Psolus fabricii* | Brownscaled sea cucumber | 1 | 36.4 | 36.4 | 1,050 | 1,050 |
| *P. squamatus* | White-scaled cucumber | 137 | 32.3 | 48.1 | 235 | 1,197 |
| *Scotoplanes* spp. | Sea pigs | 146 | 32.2 | 48.1 | 589 | 1,428 |
| **Synallactidae** (family) | Deep sea papillose sea cucumbers | 47 | 32.1 | 34.5 | 72 | 1,246 |
| *Synallactes challengeri* | | 7 | 32.8 | 33.6 | 200 | 1,188 |
| **Ophiuroidea** (class) | | | | | | |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| Ophiuroida unident. | Ophuiroid unident. | 69 | 32.7 | 48.4 | 35 | 1,279 |
| *Amphiophiura* sp. | Southern armored brittle stars | 26 | 32.7 | 47.6 | 820 | 1,428 |
| *Amphiura diomedeae* | Tan brittle star | 9 | 32.9 | 48.1 | 727 | 1,271 |
| *Amphiuridae* unident. | | 2 | 33.0 | 46.9 | 968 | 1,111 |
| *Asteronyx longifissus* | Long-slit serpent star | 88 | 32.5 | 47.8 | 132 | 1,241 |
| *A. loveni* | Giant serpent star | 121 | 33.0 | 47.9 | 71 | 1,271 |
| *Asteronyx* sp. | | 56 | 32.6 | 47.8 | 76 | 1,238 |
| *Gorgonocephalus eucnemis* | Basket star | 234 | 32.6 | 48.4 | 54 | 1,206 |
| *Ophiacantha diplasia* | Lacy brittle star | 22 | 32.7 | 45.6 | 123 | 910 |
| *O. enneactis* | | 1 | 45.2 | 45.2 | 371 | 371 |
| *Ophiacantha* sp. | | 43 | 32.6 | 46.4 | 68 | 1,297 |
| *Ophiomusium jolliensis* | Red brittle star | 45 | 32.6 | 47.9 | 215 | 1,200 |
| *O. lymani* | Lymans brittle star | 9 | 32.6 | 46.0 | 547 | 1,243 |
| *Ophiopholis aculeata* | Ubiquitous brittle star | 1 | 47.7 | 47.7 | 1,095 | 1,095 |
| *O. longispina* | Longspined brittle star | 8 | 33.8 | 45.4 | 114 | 948 |
| *Ophiopholis* sp. | | 52 | 32.7 | 48.4 | 85 | 998 |
| *Ophiopthalmus normani* | Rosy brittle star | 6 | 32.9 | 46.2 | 1,098 | 1,157 |
| *Ophioscolex corynetes* | Blob disc serpent star | 5 | 43.5 | 45.5 | 449 | 594 |
| *Ophioscolex* sp. | | 2 | 45.4 | 45.4 | 408 | 467 |
| *Ophiura sarsi* | Notched brittle star | 176 | 34.7 | 48.4 | 64 | 923 |
| *Ophiura* sp. | | 32 | 32.7 | 47.8 | 61 | 1,160 |
| *Ophiurida* | Brittlestars unident. | 55 | 32.7 | 48.2 | 70 | 1,246 |
| *Stegophiura ponderosa* | Giant armored brittle star | 106 | 32.8 | 47.9 | 322 | 1,241 |
| | | | | | | |
| **Aplacophora** (class) | Aplacophora unident. | 16 | 34.2 | 48.1 | 74 | 1,186 |
| *Alexandromenia agassizi* | Sponge dwelling aplacophoran | 2 | 32.9 | 33.0 | 347 | 395 |
| *Neomenia* sp. | Solenogasters | 81 | 32.7 | 48.3 | 69 | 1,264 |
| **Bivalvia** (class) | | | | | | |
| *Acesta sphoni* | Sphons giant file clam | 10 | 32.7 | 33.8 | 493 | 1,114 |
| *Acharax johnsoni* | | 6 | 42.1 | 48.1 | 449 | 1,143 |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| Bivalvia (empty shells) | Empty bivalve shells | 1 | 33.4 | 33.4 | 491 | 491 |
| Bivalvia unident. | Bivalve unident. | 48 | 33.0 | 48.2 | 66 | 1,224 |
| *Calyptogena pacifica* | Cold seep clam | 3 | 32.6 | 46.5 | 458 | 1,271 |
| *Chlamys hastata hericia* | | 2 | 36.5 | 44.5 | 72 | 97 |
| *C. rubida* | Reddish scallop | 1 | 32.8 | 32.8 | 59 | 59 |
| *Cyclopecten davidsoni* | Salmon glass-scallop | 1 | 45.0 | 45.0 | 743 | 743 |
| *Delectopecten vancouverensis* | Glass scallop | 67 | 32.7 | 47.8 | 95 | 1,271 |
| Gastropod eggs | Snail eggs | 94 | 32.6 | 47.9 | 60 | 1,235 |
| *Halicardia perplicata* | Deep-sea heart clam | 2 | 33.0 | 44.5 | 968 | 1,129 |
| **Mytilidae** (family) | Mussel unident. | 2 | 33.6 | 46.3 | 216 | 1,056 |
| *Panopea abrupta* | Pacific geoduck | 3 | 37.1 | 42.6 | 58 | 80 |
| *Parvamussium alaskense* | Alaska glass-scallop | 12 | 33.0 | 47.8 | 611 | 1,197 |
| *Patinopecten caurinus* | Weather vane scallop | 13 | 40.9 | 47.4 | 72 | 141 |
| Pectinid unident. | Scallop unident. | 5 | 33.2 | 48.1 | 70 | 1,154 |
| *Solemya* sp. | Awning clam | 1 | 46.3 | 46.3 | 957 | 957 |
| *Teredinidae* | Shipworm unident. | 1 | 32.7 | 32.7 | 76 | 76 |
| *Tochuina tetraquetra* | Giant orange tochui | 2 | 34.0 | 43.0 | 95 | 235 |
| *Tritonia* sp. | | 6 | 33.7 | 45.9 | 129 | 1,094 |
| *Vesicomya pacifica* | Cold seep clam | 9 | 33.9 | 48.1 | 505 | 1,224 |
| *Yoldia scissurata* | Crisscrossed yoldia | 1 | 43.7 | 43.7 | 103 | 103 |
| *Yoldia* sp. | | 3 | 34.4 | 46.5 | 820 | 885 |
| **Cephalopoda** (class) | | | | | | |
| *Abraliopsis felis* | | 2 | 47.2 | 47.5 | 174 | 562 |
| *Benthoctopus leioderma* | Smooth octopus unident. | 15 | 33.9 | 48.4 | 98 | 1,197 |
| *Benthoctopus* spp. | | 379 | 32.2 | 48.4 | 70 | 1,428 |
| *Berryteuthis magister* | Magistrate armhook squid | 21 | 32.7 | 48.4 | 163 | 1,127 |
| *Cephalopoda* unident. | Cephalopod unident. | 1 | 47.5 | 47.5 | 903 | 903 |
| *Chiroteuthis calyx* | | 32 | 33.5 | 47.8 | 104 | 1,155 |
| *Cranchia scabra* | Sandpaper squid | 7 | 34.0 | 40.1 | 455 | 1,105 |
| *Cranchiidae* | Glass squids | 10 | 32.1 | 47.7 | 443 | 1,032 |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *Dosidicus gigas* | Rojo diablo humboldt squid | 126 | 32.3 | 47.4 | 66 | 1,153 |
| *Enteroctopus dofleini* | Giant pacific octopus | 153 | 32.8 | 48.4 | 35 | 734 |
| *Galiteuthis phyllura* | Arrow squid | 11 | 33.5 | 47.8 | 176 | 1,235 |
| *Gonatopsis borealis* | North Pacific armhook squid | 77 | 32.7 | 48.0 | 156 | 1,235 |
| *Gonatopsis* sp. | | 1 | 37.0 | 37.0 | 737 | 737 |
| *Gonatus onyx* | Clawed armhook squid | 203 | 32.4 | 48.0 | 58 | 1,228 |
| *Gonatus* sp. | | 18 | 32.7 | 47.9 | 138 | 1,063 |
| *Graneledone boreopacifica* | Ghost octopus | 20 | 32.7 | 47.5 | 1,040 | 1,285 |
| *Graneledone* sp. | Deep-sea octopus unident. | 10 | 32.6 | 47.8 | 1,125 | 1,428 |
| *Grimpoteuthis albatrossi* | Albatross' flapjack | 1 | 47.6 | 47.6 | 1,076 | 1,076 |
| *Histioteuthis heteropsis* | Jewel squid | 171 | 32.7 | 47.8 | 102 | 1,201 |
| *H. hoylei* | Long armed jewel squid | 15 | 35.6 | 47.7 | 387 | 1,098 |
| *Histioteuthis* sp. | Jewel squids | 3 | 32.8 | 33.5 | 493 | 1,184 |
| *Japetella diaphana* | Yellow ringed octopus | 67 | 32.6 | 48.1 | 461 | 1,285 |
| *Loligo opalescens* | California market squid | 706 | 32.6 | 48.2 | 26 | 888 |
| *Moroteuthis robusta* | Big squid | 18 | 34.3 | 47.3 | 273 | 700 |
| Octopodidae | Octopus unident. | 41 | 32.6 | 48.4 | 43 | 1,285 |
| *Octopoteuthis deletron* | Octopus squid | 513 | 32.6 | 48.2 | 273 | 1,297 |
| *Octopus californicus* | North Pacific bigeye octopus | 175 | 32.6 | 47.0 | 64 | 754 |
| *O. rubescens* | Red octopus | 40 | 32.7 | 47.8 | 47 | 516 |
| *Octopus* sp. | | 15 | 32.8 | 48.4 | 59 | 1,251 |
| *Onychoteuthidae* | | 1 | 32.6 | 32.6 | 897 | 897 |
| *Onychoteuthis borealijaponicus* | Boreal clubhook squid | 3 | 34.5 | 41.5 | 380 | 948 |
| *Opisthoteuthis californiana* | Flapjack devilfish | 313 | 32.8 | 48.2 | 60 | 1,241 |
| *Rossia pacifica* | Bobtail squid | 304 | 32.8 | 48.3 | 56 | 1,151 |
| *Taonius pavo* | Cone squid | 46 | 34.2 | 47.7 | 75 | 1,251 |
| *Teuthida* | Squid unident. | 40 | 32.6 | 48.1 | 84 | 1,237 |
| *Teuthida* eggs | Squid eggs unident. | 1 | 33.4 | 33.4 | 1,206 | 1,206 |
| *Vampyroteuthis infernalis* | Vampire squid | 238 | 32.4 | 48.2 | 94 | 1,297 |
| **Gastropoda** (class) | | | | | | |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| **Heteropoda** (order) | | 38 | 32.3 | 47.7 | 68 | 1,243 |
| *Carinaria cristata* | | 11 | 33.2 | 47.6 | 86 | 1,184 |
| | Heteropod/pteropod unident. | 7 | 32.7 | 46.7 | 73 | 1,193 |
| *Aforia goodei* | Goode's aforia | 3 | 33.2 | 46.7 | 947 | 1,271 |
| *Anisodoris nobilis* | Pacific sea lemon | 22 | 32.7 | 48.4 | 61 | 564 |
| *Antiplanes perversa* | Lefthanded turrid | 6 | 39.5 | 45.0 | 84 | 1,049 |
| *Antiplanes* sp. A | Green lefthanded turrids | 1 | 43.5 | 43.5 | 554 | 554 |
| *Archidoris odhneri* | White night doris | 3 | 44.3 | 45.8 | 98 | 180 |
| *Armina californica* | Striped tongue nudibranch | 17 | 41.8 | 48.4 | 53 | 211 |
| *Bathybembix bairdii* | Green top snail | 599 | 32.1 | 48.2 | 285 | 1,246 |
| *Boreotrophon* spp. | | 1 | 45.3 | 45.3 | 384 | 384 |
| Buccinum sp. eggs | | 1 | 45.3 | 45.3 | 384 | 384 |
| *Buccinum* spp. | | 35 | 33.2 | 47.7 | 366 | 1,144 |
| *Buccinum strigillatum* | Striated whelk | 24 | 33.0 | 47.6 | 276 | 1,215 |
| *B. viridum* | Turban whelk | 59 | 34.5 | 48.0 | 355 | 1,297 |
| *Bulbus fragilis* | Fragile moonsnail | 91 | 32.6 | 48.4 | 67 | 337 |
| *Calinaticina oldroydii* | Oldroyd's moonsnail | 98 | 33.3 | 48.2 | 60 | 419 |
| *Calliostoma platinum* | Silvery top snail | 4 | 34.4 | 45.1 | 341 | 828 |
| *Colus aphelus* | Oblique whelk | 10 | 35.1 | 47.4 | 371 | 1,169 |
| *C. georgianus* | Georgias whelk | 4 | 34.4 | 48.0 | 820 | 1,008 |
| *Colus* spp. | | 45 | 33.3 | 47.9 | 218 | 1,238 |
| *C. trophius* | Ribbed whelk | 3 | 34.4 | 47.7 | 805 | 982 |
| *Cryptonatica russa* | Rusty moonsnail | 4 | 34.4 | 46.2 | 550 | 1,210 |
| Dorididae | Dorid nudibranch unident. | 19 | 32.7 | 47.7 | 67 | 1,088 |
| *Euspira lewisii* | Moon snail | 22 | 33.8 | 47.9 | 79 | 347 |
| *Exilioidea rectirostris* | Spindle shell | 2 | 35.2 | 43.1 | 496 | 1,048 |
| *Fusitriton oregonensis* | Oregon triton | 82 | 40.3 | 48.4 | 91 | 785 |
| Gastropod unident. | Snail unident. | 232 | 32.7 | 48.4 | 48 | 1,325 |
| Gastropoda (empty shells) | Empty gastropod shells | 3 | 34.6 | 43.8 | 204 | 1,176 |
| *Lepeta* sp. | Deep-sea limpets unident. | 1 | 44.6 | 44.6 | 70 | 70 |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| *Megasurcula* spp. | | 1 | 39.0 | 39.0 | 125 | 125 |
| *Megasurcula stearnsiana* | Stearns' turrid | 1 | 34.4 | 34.4 | 86 | 86 |
| *Natica* sp. | | 1 | 46.2 | 46.2 | 1,125 | 1,125 |
| *Neptunea amianta* | Deep-sea whelk | 416 | 32.6 | 48.2 | 102 | 1,279 |
| *N. eulimata* | | 1 | 44.1 | 44.1 | 446 | 446 |
| *N. humboldtiana* | Humboldt whelk | 17 | 39.1 | 48.0 | 307 | 1,008 |
| *N. ithia* | Slender whelk | 2 | 40.5 | 46.0 | 114 | 359 |
| *N. phoenicia* | Phoenicean whelk | 2 | 46.9 | 47.7 | 521 | 1,068 |
| *N. pribiloffensis* | Pribilof whelk | 8 | 39.1 | 47.0 | 333 | 1,193 |
| *N. smirnia* | Chocolate whelk | 3 | 45.5 | 48.2 | 90 | 1,152 |
| *N.* sp. | | 459 | 32.3 | 48.2 | 134 | 1,241 |
| *N. stilesi* | Stile's whelk | 2 | 42.3 | 45.7 | 253 | 280 |
| *N. tabulata* | Tabled whelk | 4 | 33.1 | 46.0 | 93 | 850 |
| Nudibranchia unident. | Nudibranch unident. | 254 | 32.6 | 48.4 | 26 | 1,325 |
| *Philine bakeri* | Ocean won ton | 79 | 32.3 | 38.5 | 77 | 531 |
| *Pleurobranchaea californica* | California sea slug | 499 | 32.6 | 44.8 | 55 | 1,209 |
| *Plicifusus (formerly Colus)* sp. | | 2 | 37.4 | 42.2 | 734 | 969 |
| *Plicifusus griseus* | Gray whelk | 16 | 33.0 | 48.0 | 689 | 1,011 |
| *Polinices* sp. | | 2 | 38.0 | 38.0 | 60 | 62 |
| *Puncturella rothi* | Keyhole limpet | 4 | 34.0 | 48.4 | 66 | 211 |
| *Solariella nuda* | Naked solarelle | 5 | 36.2 | 42.3 | 467 | 906 |
| *Solariella* sp. | | 1 | 33.4 | 33.4 | 960 | 960 |
| *Tritonia diomedea* | Rosy tritonia | 915 | 32.4 | 48.1 | 55 | 1,279 |
| | Nudibranch sp.a | 22 | 33.3 | 48.3 | 65 | 1,056 |
| **Polyplacophora** | | | | | | |
| Polyplacophora unident. | Chiton unident. | 2 | 34.4 | 48.1 | 70 | 1,152 |
| **Brachiopoda** (phylum) | | | | | | |
| Brachiopod unident. | Lampshells unident. | 43 | 32.8 | 47.7 | 85 | 1,170 |
| *Laqueus californianus* | California lamp shell | 12 | 33.4 | 45.8 | 91 | 504 |
| *Terebratalia transversa* | Common brachiopod | 9 | 40.6 | 46.8 | 109 | 449 |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| Taxonomic group and scientific name | Common name | Frequency of occurrence (no. hauls) | Latitude (decimal degree) | | Depth (m) | |
|---|---|---|---|---|---|---|
| | | | South | North | Min. | Max. |
| **Nematoda** | | | | | | |
| Nematoda | Nematode worm unident. | 18 | 32.6 | 47.7 | 65 | 1,188 |
| **Platyhelminthes** | | | | | | |
| Platyhelminthes | Flatworm unident. | 1 | 45.0 | 45.0 | 143 | 143 |
| **Porifera** | Sponge unident. | 797 | 32.1 | 48.5 | 59 | 1,285 |
| *Acanthascus* sp. | Chimney sponges | 16 | 32.6 | 47.3 | 123 | 1,088 |
| *Aphrocallistes vastus* | Clay pipe sponge | 311 | 32.6 | 48.4 | 77 | 1,268 |
| *Chonelasma calyx* | Goblet sponge | 8 | 32.7 | 47.6 | 275 | 1,024 |
| *Farrea convolulus* | Crusty tube sponge | 8 | 32.9 | 47.7 | 307 | 1,083 |
| *Hexactinellida* | Glass sponge unident. | 18 | 33.2 | 48.0 | 114 | 1,097 |
| *Hyalonema* sp. | Fiber optic sponges | 117 | 32.3 | 48.0 | 35 | 1,285 |
| *Leucandra heathi* | Spiny vase sponge | 13 | 32.6 | 47.7 | 133 | 1,239 |
| *Mycale* sp. | | 1 | 34.8 | 34.8 | 477 | 477 |
| *Polymastia pachymastia* | Black-orange spud sponge | 1 | 45.7 | 45.7 | 112 | 112 |
| *Rhabdocalyptus* sp. | Cloud sponges | 42 | 32.7 | 47.9 | 129 | 1,125 |
| *Staurocalyptus* sp. | Spiny vase sponges unident. | 53 | 32.6 | 48.2 | 122 | 1,184 |
| *Suberites ficus* | Hermit sponge | 2 | 32.7 | 33.8 | 87 | 130 |
| *Suberites* sp. | Deep sea free living sponges | 5 | 32.6 | 34.4 | 121 | 395 |
| *Tethya* sp. | Ball sponge | 11 | 32.6 | 45.1 | 66 | 826 |
| | Vase sponge | 43 | 32.6 | 48.0 | 70 | 1,147 |
| | White claypipe sponge | 5 | 33.5 | 48.2 | 130 | 1,193 |
| | Soft green sponge | 4 | 46.8 | 48.2 | 285 | 1,197 |
| | Mushroom sponge | 2 | 35.3 | 46.3 | 528 | 889 |
| | Firm yellow green sponge | 1 | 32.6 | 32.6 | 133 | 133 |
| **Sipuncula** (phylum) | Peanut worm unident. | 18 | 33.1 | 47.4 | 59 | 1,193 |
| Gymnolaemata | Bryozoan unident. | 1 | 33.3 | 33.3 | 846 | 846 |
| *Cellepora ventricosa* | Coral bryozoan | 1 | 47.5 | 47.5 | 819 | 819 |
| **Sipuncula** | | | | | | |
| Tunicata | Tunicate unident. | 62 | 32.8 | 47.7 | 52 | 1,246 |
| **Urochordata** | | | | | | |

Table B-2 continued. Frequency of occurrence, depth range, and latitudinal range for invertebrates (grouped by taxonomic classification) encountered during the 2003–2008 surveys (unident. = unidentified).

| **Taxonomic group and scientific name** | **Common name** | **Frequency of occurrence (no. hauls)** | **Latitude (decimal degree)** | | **Depth (m)** | |
|---|---|---|---|---|---|---|
| | | | **South** | **North** | **Min.** | **Max.** |
| Thaliacea unident. | Salps unident. | 878 | 32.3 | 48.4 | 53 | 1,268 |
| *Pyrosoma atlanticum* | Sea tongue | 7 | 33.5 | 36.2 | 87 | 1,154 |
| *Halocynthia igaboja* | Spiny tunicate | 28 | 34.2 | 47.5 | 67 | 947 |
| *H. aurantium* | Sea peach | 2 | 32.9 | 33.2 | 882 | 1,157 |
| *Cnemidocarpa finsmarkiensis* | Solitary heart tunicate | 1 | 33.2 | 33.2 | 882 | 882 |
| *Halocynthia hispidus* | Hairy tunicate | 1 | 34.1 | 34.1 | 95 | 95 |
| *Molgula griffithsii* | Sea grape | 53 | 32.9 | 48.2 | 69 | 1,239 |

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**113** **Ford, M.J. (ed.). 2011.** Status review update for Pacific salmon and steelhead listed under the Endangered Species Act: Pacific Northwest. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-113, 281 p. NTIS number pending.

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**111** **Leonard, J., and P. Watson. 2011.** Description of the input-output model for Pacific Coast fisheries. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-111, 64 p. NTIS number PB2011-113405.

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