NOAA Technical Memorandum NMFS-NWFSC-114

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

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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

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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

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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

$$W = a \times L^b \tag{5}$$

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 ith 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

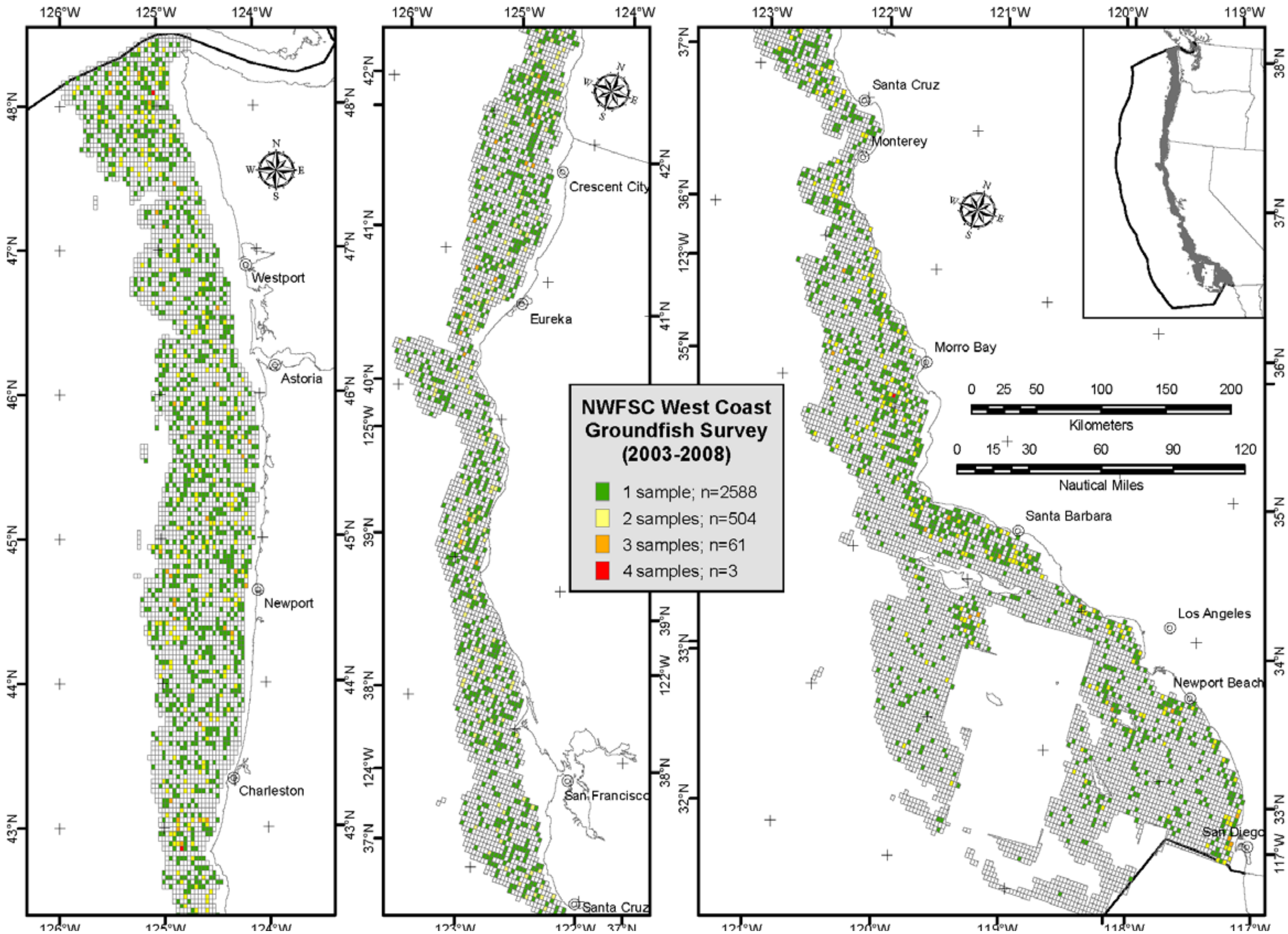

Figure 1. Total survey area and sampling stations during the 2003–2008 surveys. Color of sampling stations or cells is based on the number of times sampled. Green cells have been sampled once, yellow twice, orange three times, and red four times. Neutral cells were not sampled during the time period.

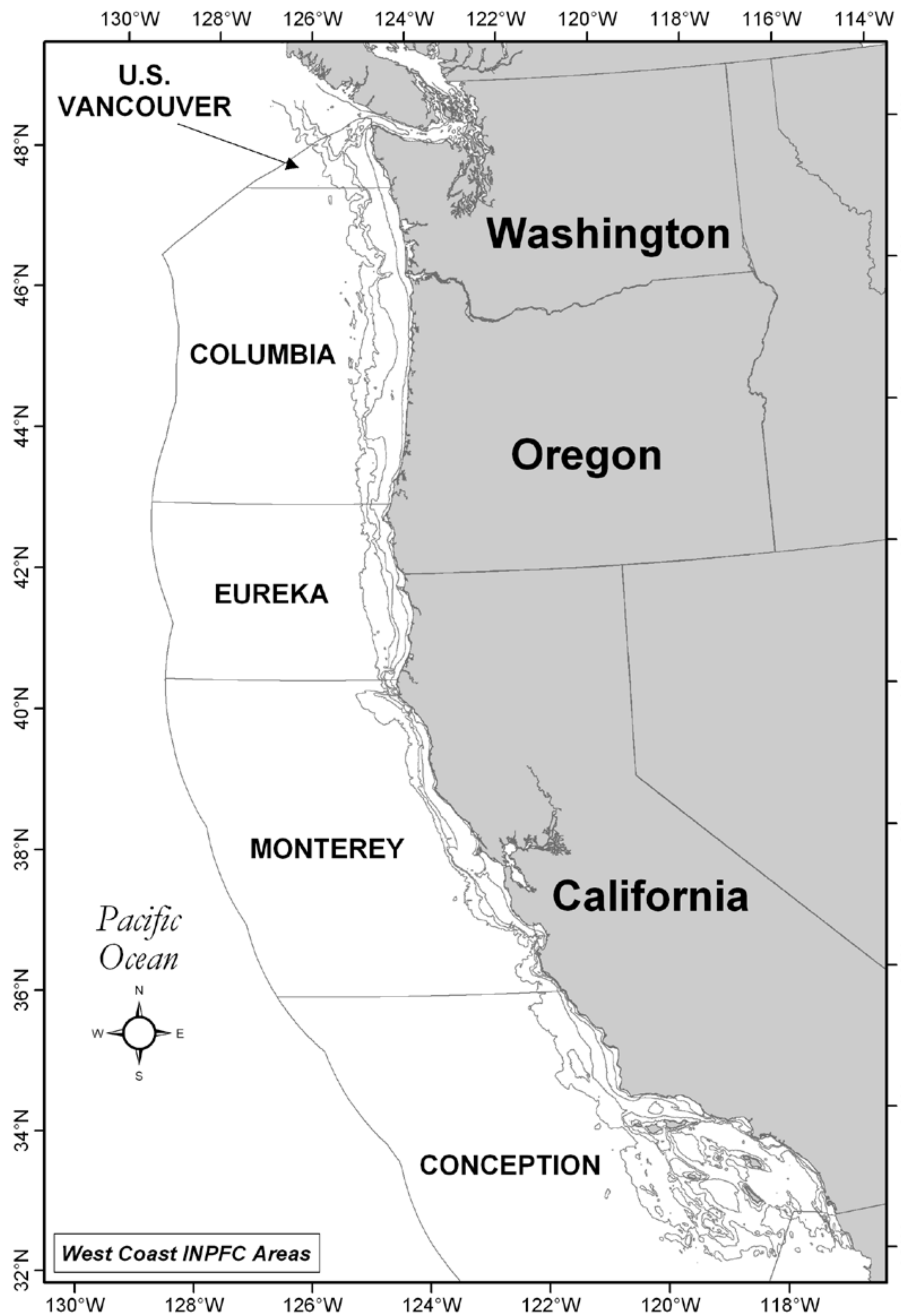

Figure 2. Geographic extent of the surveys subdivided into INPFC areas. Four main survey strata isobaths are shown (55, 183, 549, and 1,280 m).

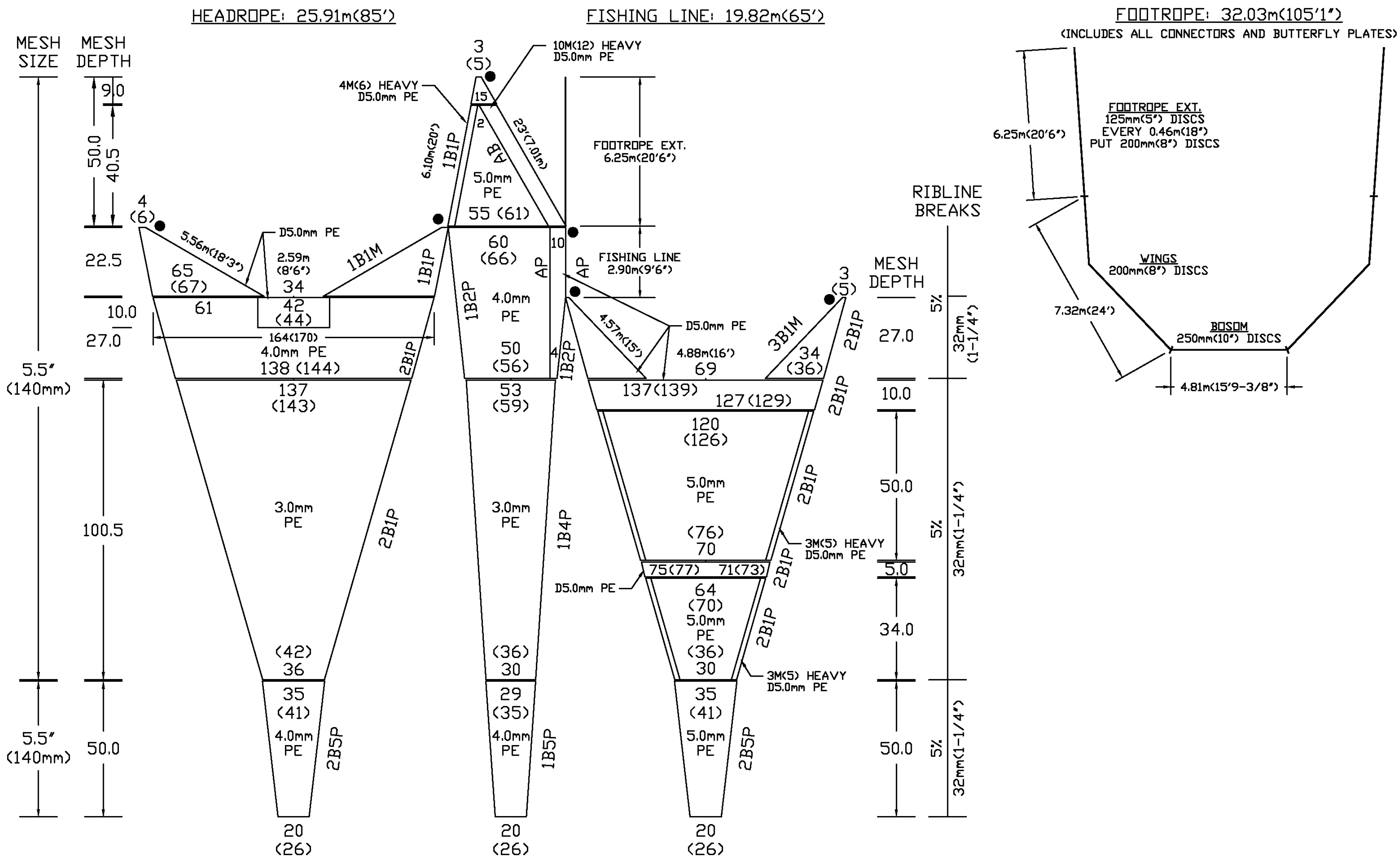

Figure 3. Schematic of Aberdeen-type sampling trawl used during the surveys. Headrope, fishing line, and footrope dimensions are meters (and feet). The depth and width of net sections are measured by mesh count. Each section is composed of 3, 4, and 5 mm polyethylene line where indicated. For further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

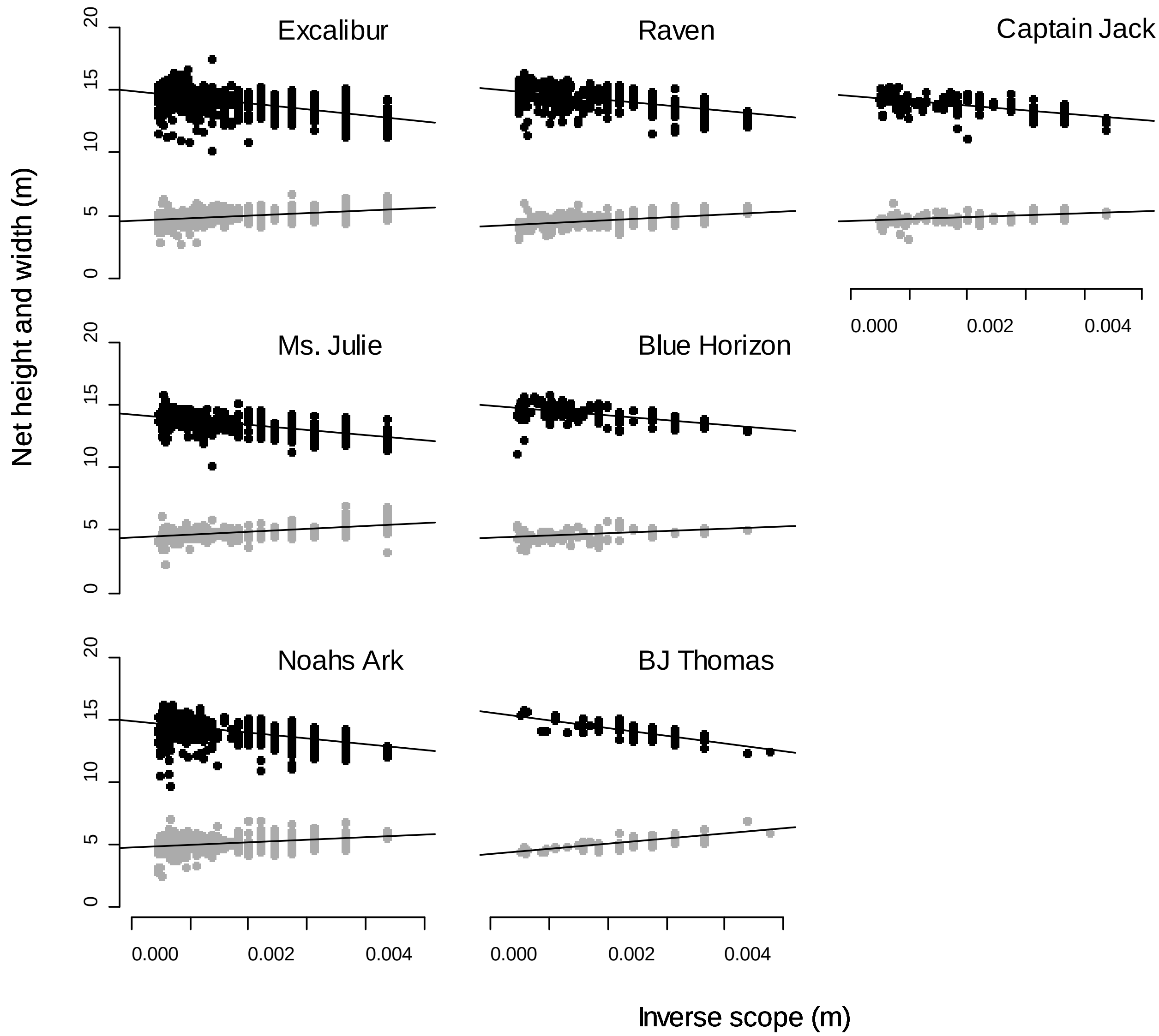

Figure 4. Mean net width and height for trawls conducted as part of the surveys for years 2003–2008. Width (●) and height (●) estimates are grouped by vessel and plotted relative to inverse scope (1/meters). Coefficients and intercepts of linear regressions are reported in Table 12.

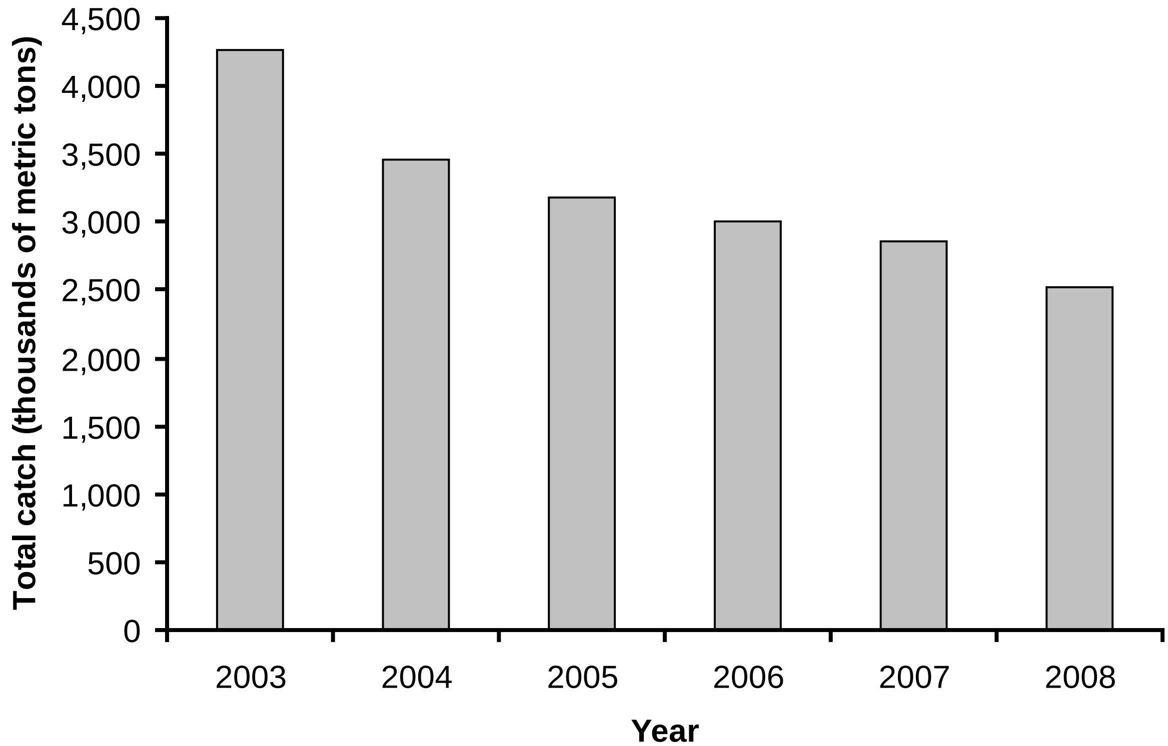

Figure 5. Trends in total catch of 46 FMP species plus grooved tanner crab and giant grenadier in the surveys from 2003 to 2008.

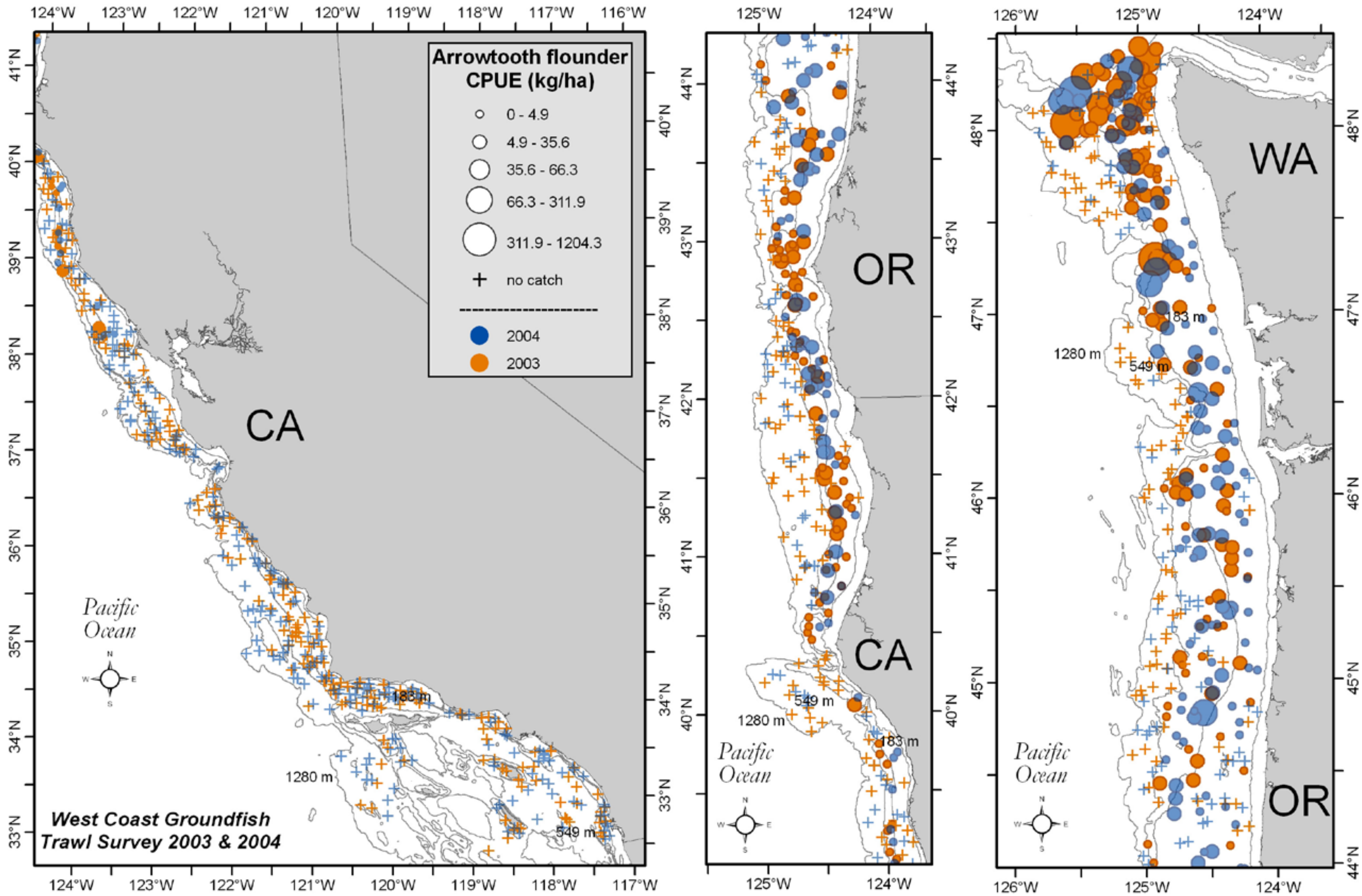

Figure 6. Arrowtooth flounder (*Atheresthes stomias*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between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

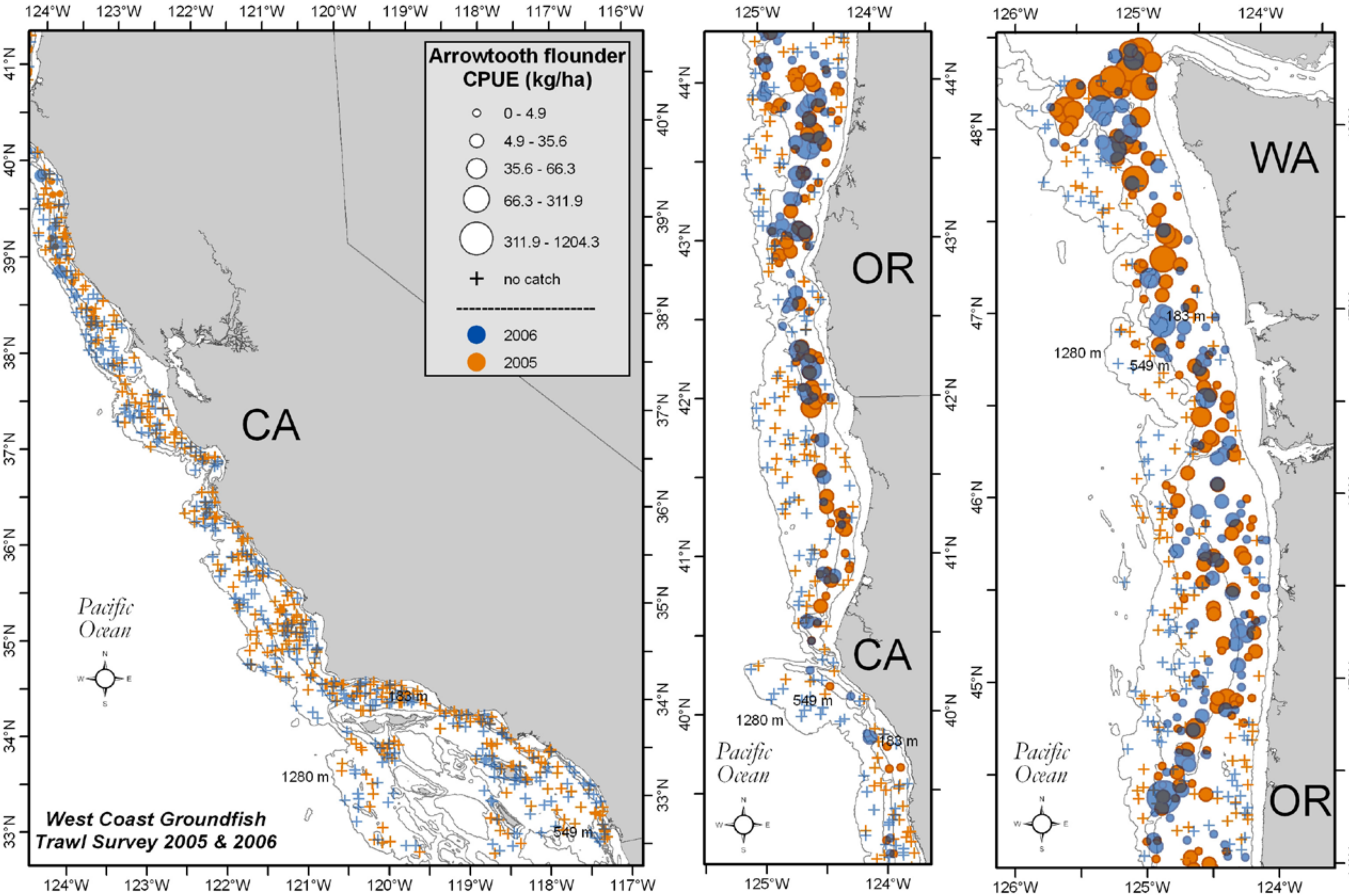

Figure 7. Arrowtooth flounder distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

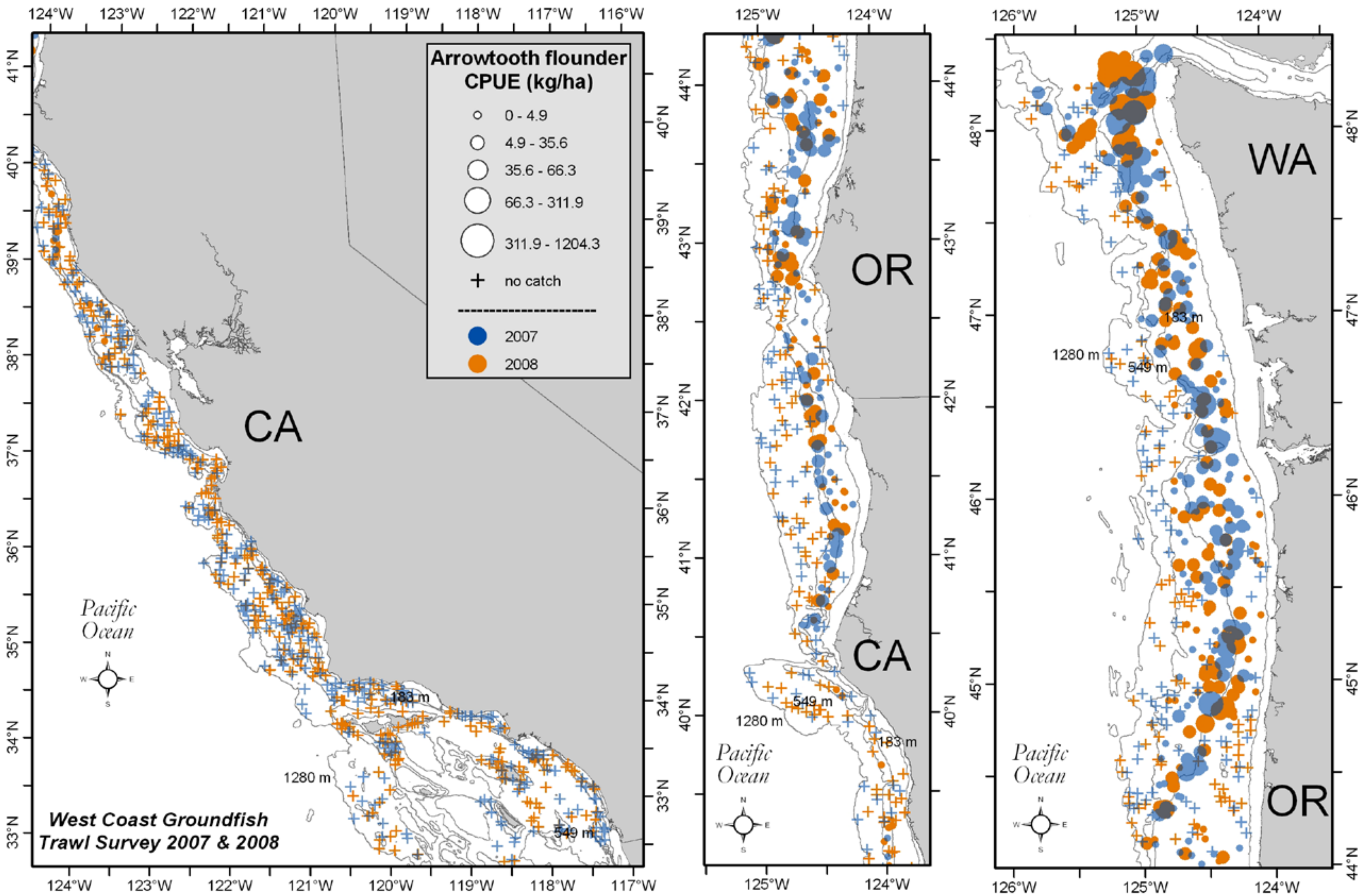

Figure 8. Arrowtooth flounder distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

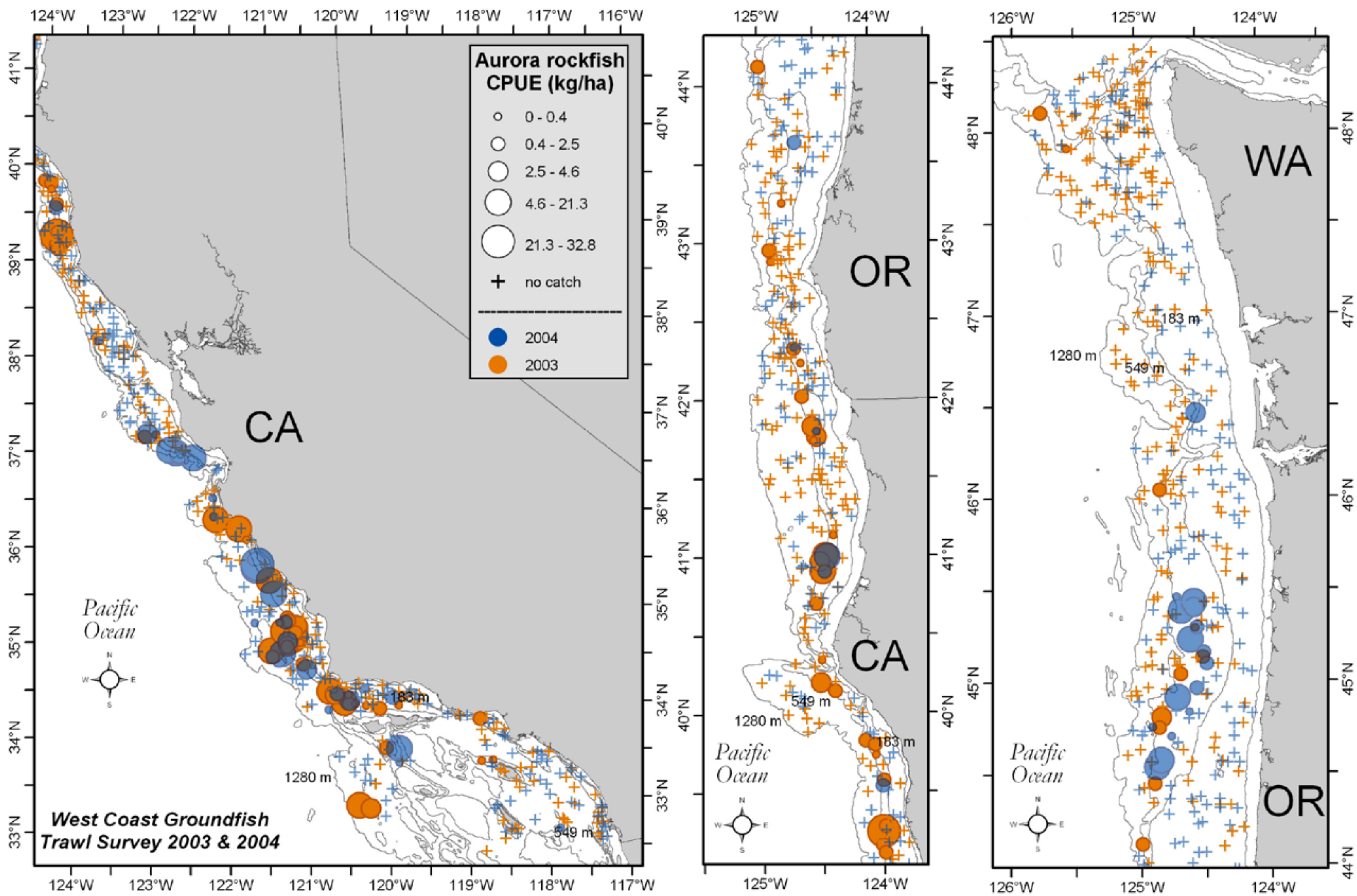

Figure 9. Aurora rockfish (*Sebastes aurora*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2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

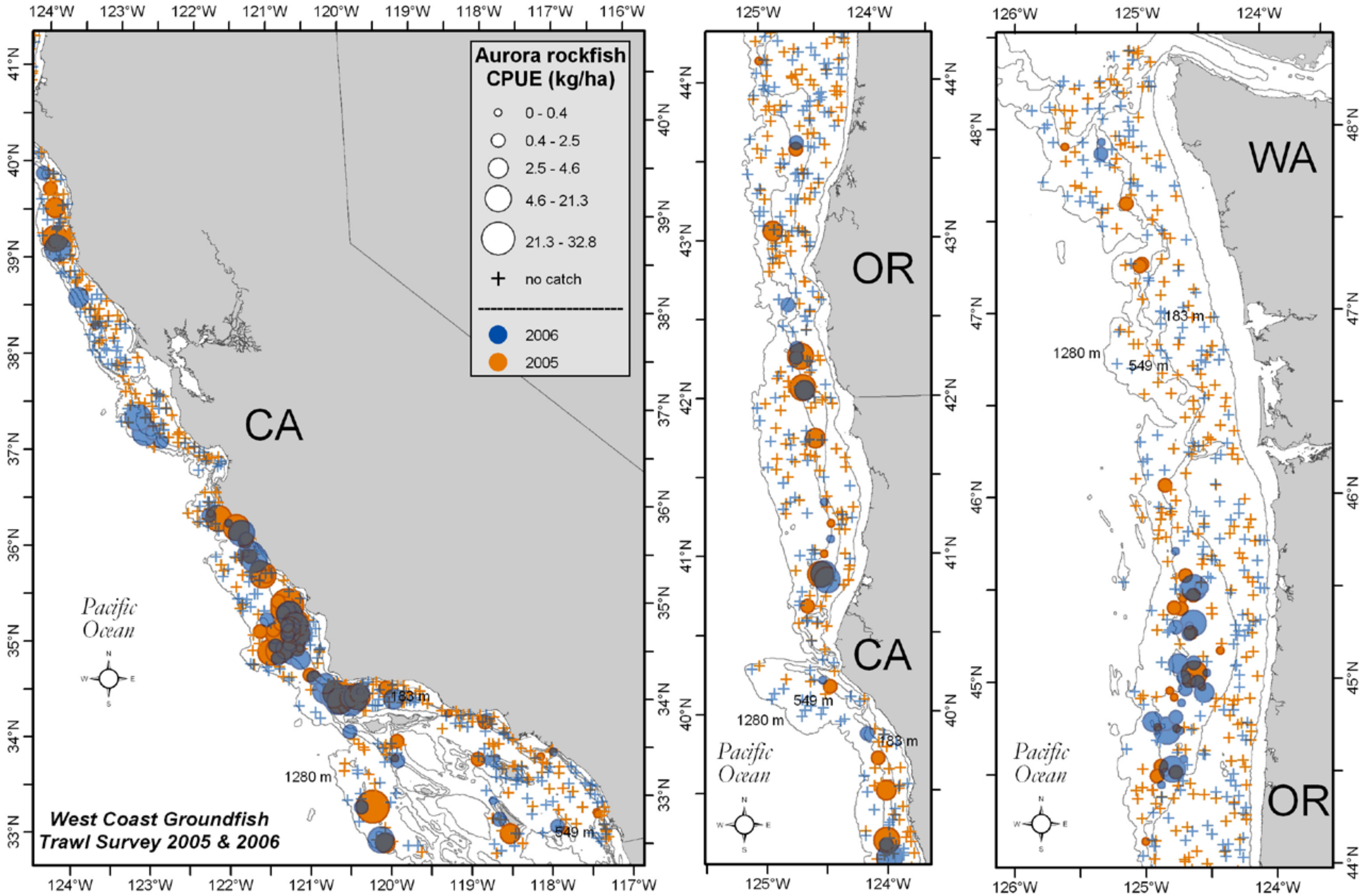

Figure 10. Aurora rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

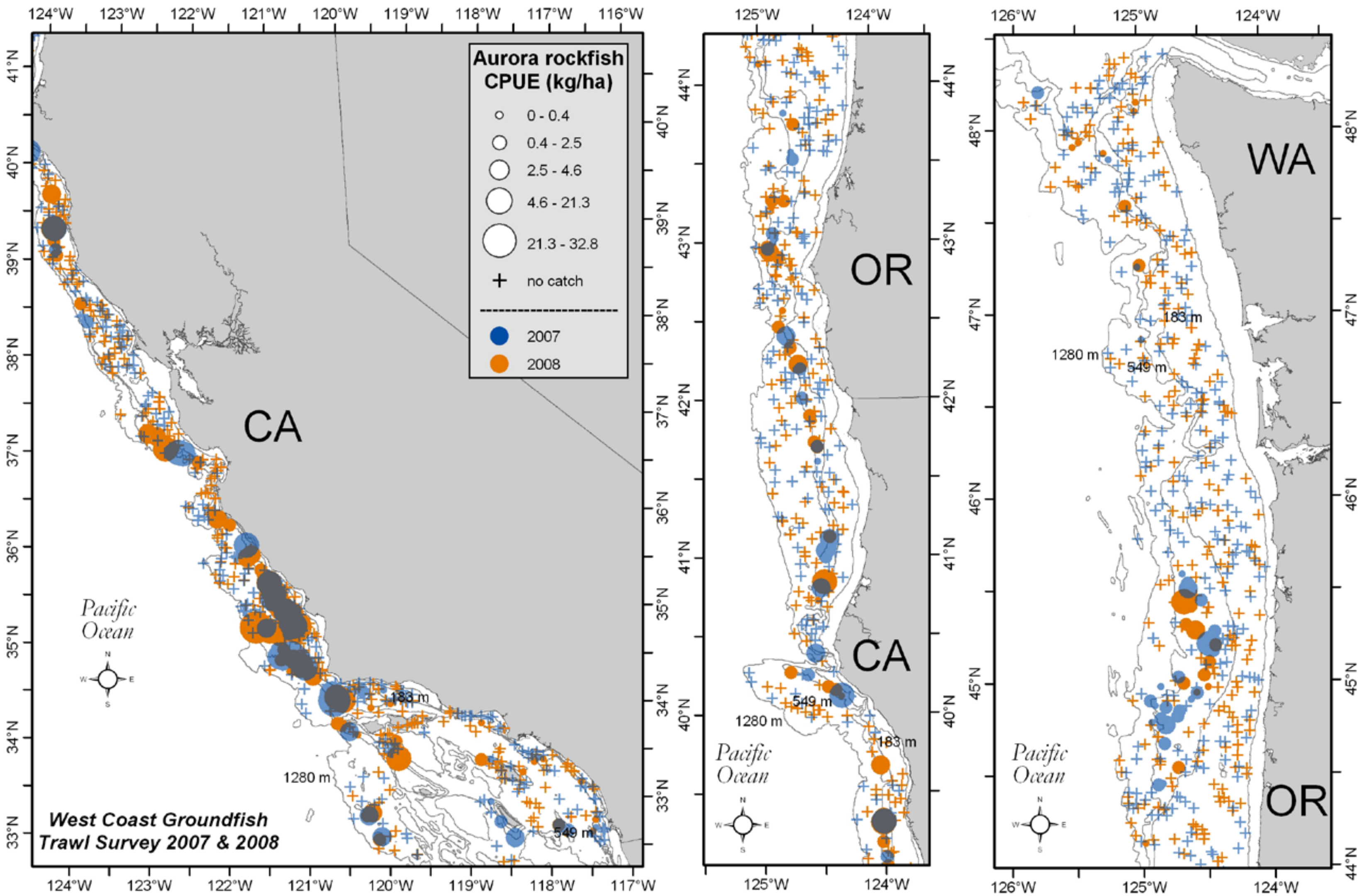

Figure 11. Aurora rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

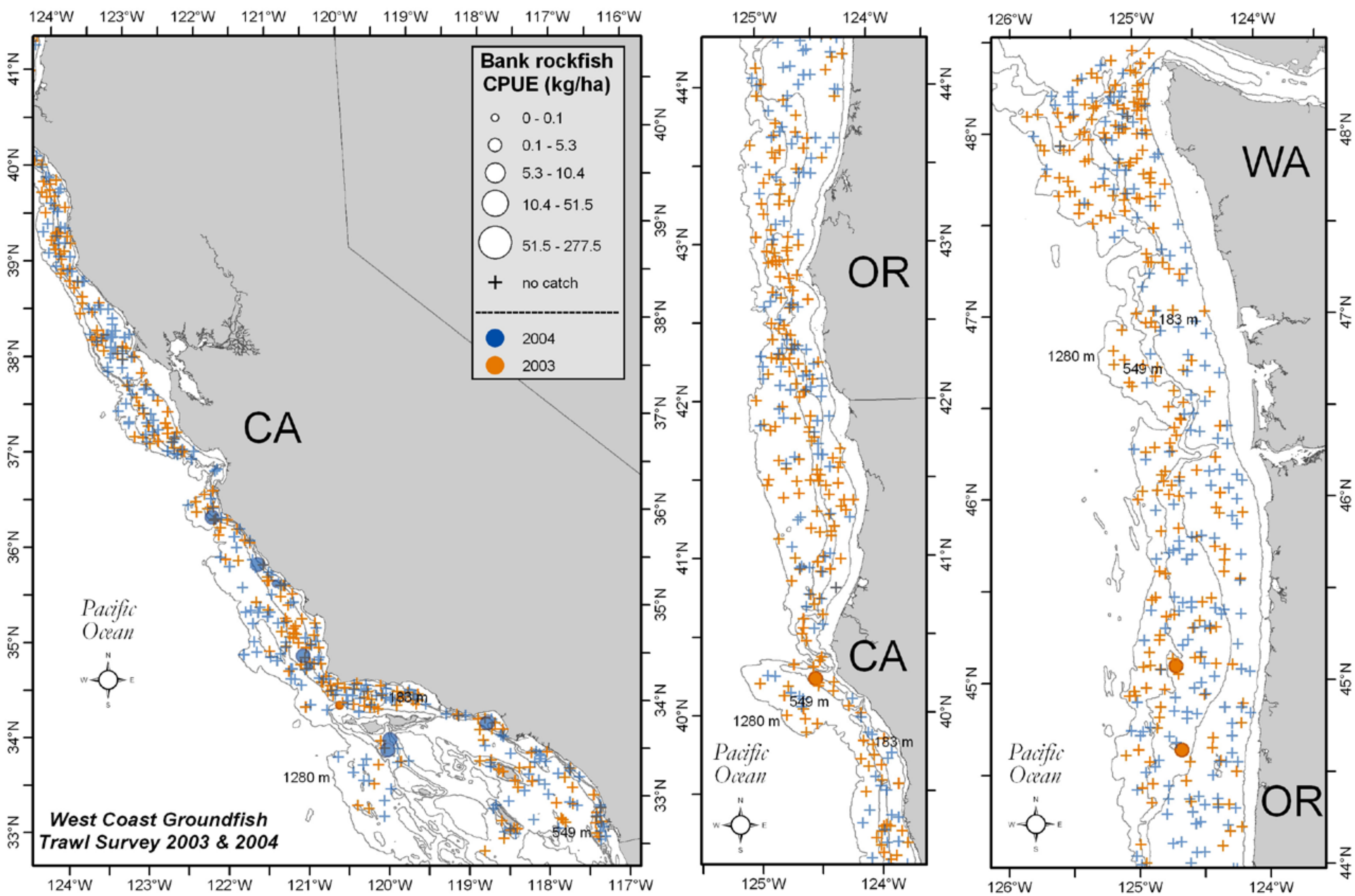

Figure 12. Bank rockfish (*Sebastes rufus*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs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

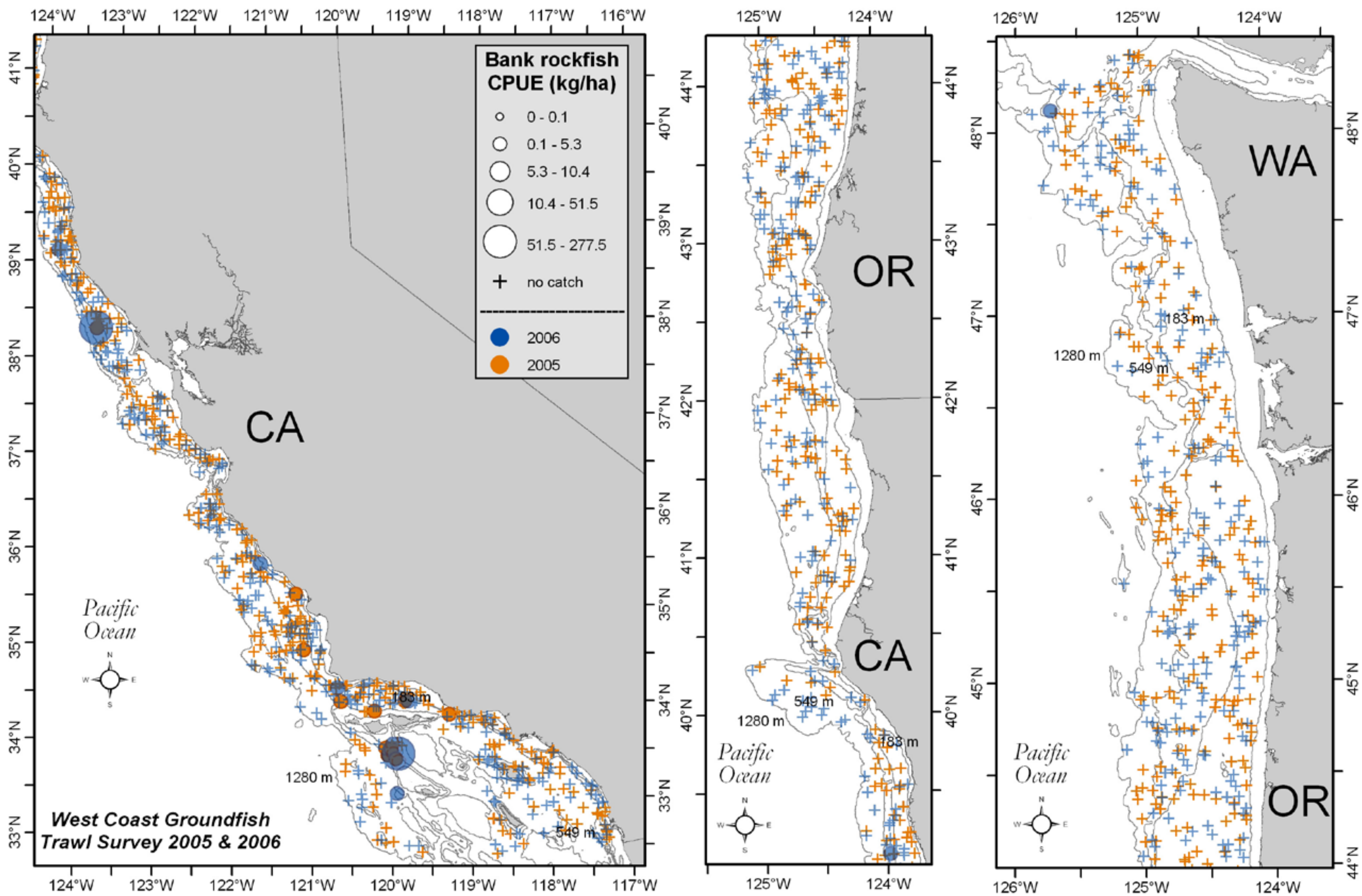

Figure 13. Bank rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

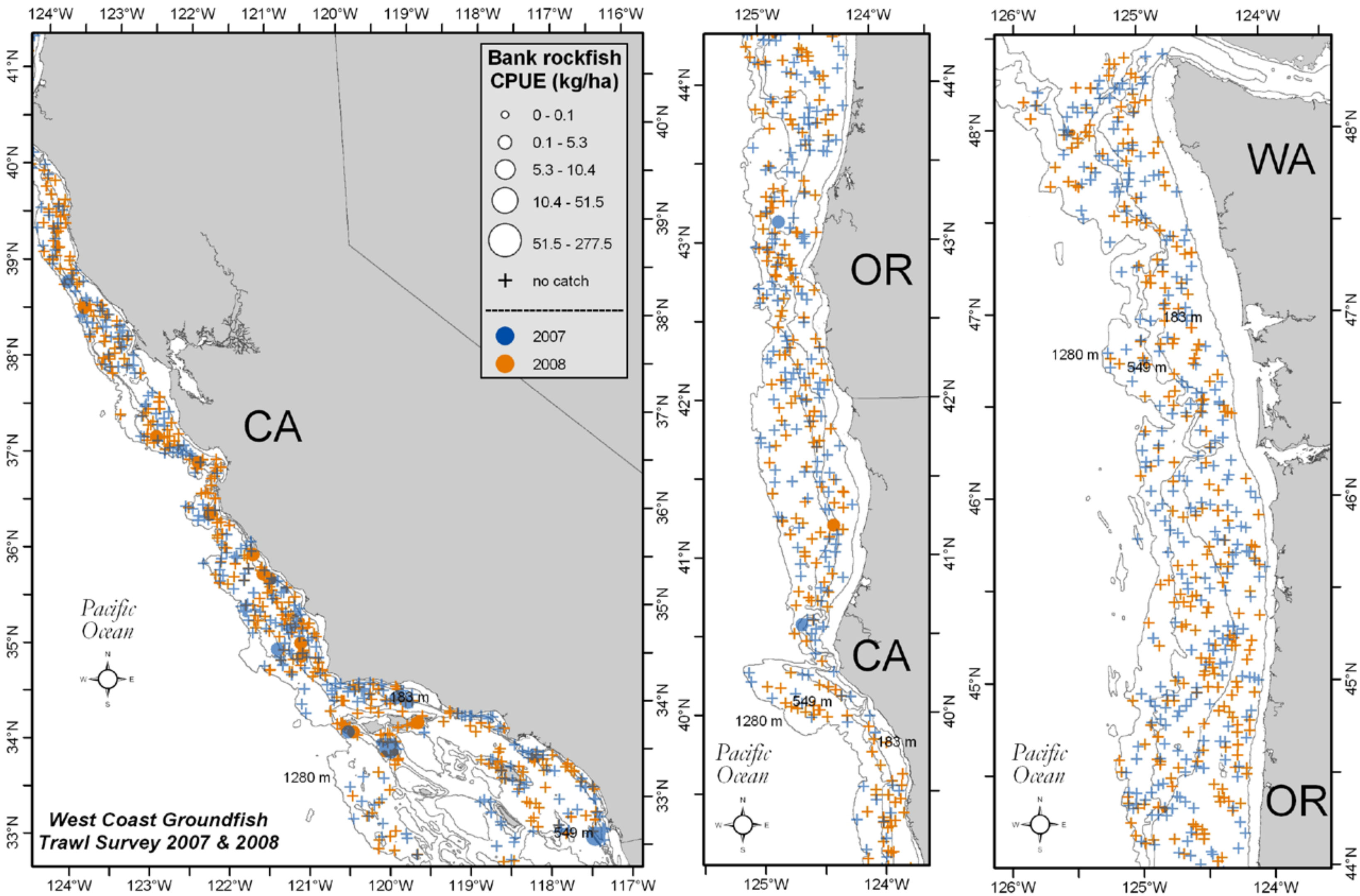

Figure 14. Bank rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

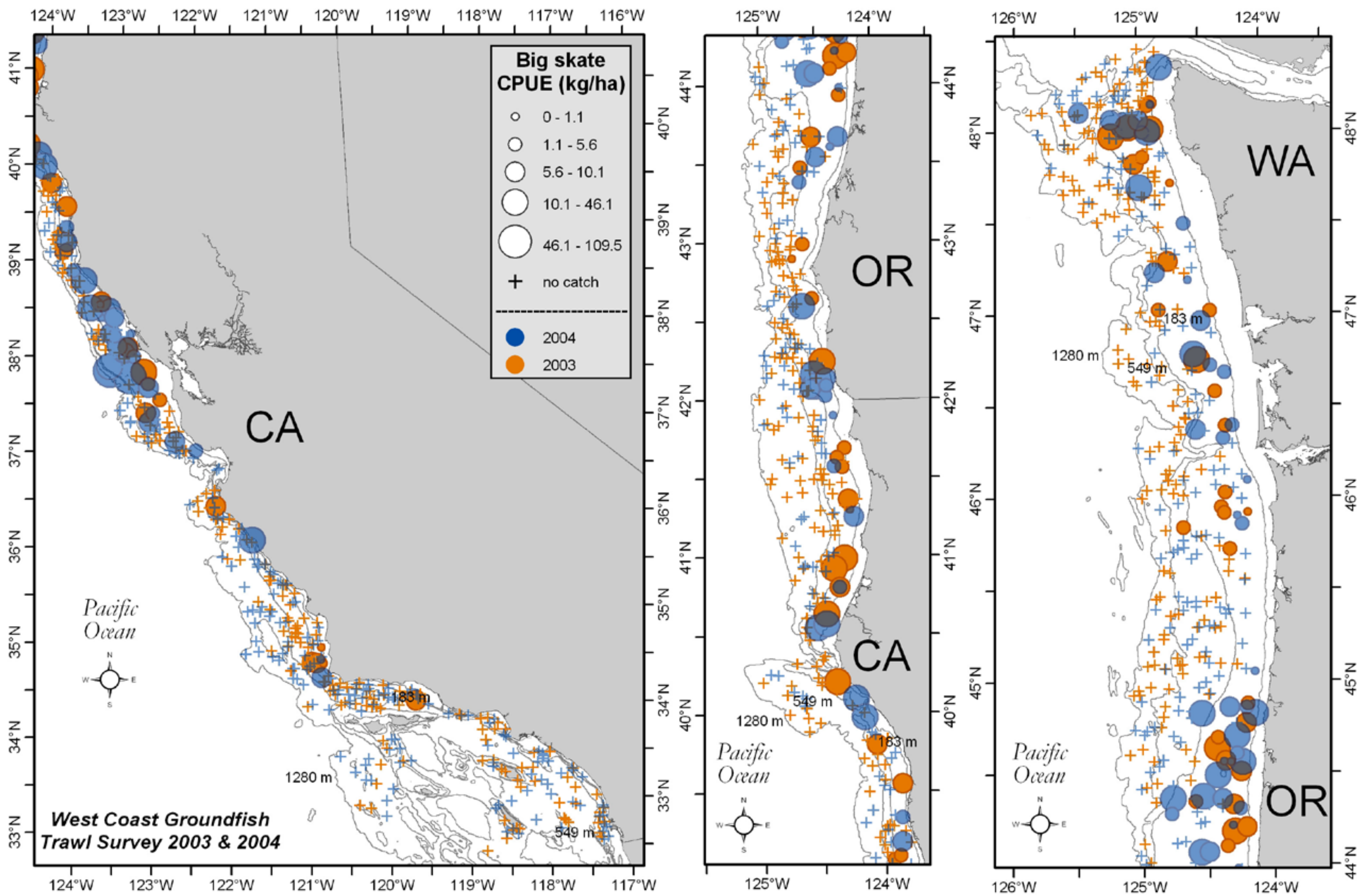

Figure 15. Big skate (*Raja binoculata*) distribution and relative abundance (kg ha–1) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean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

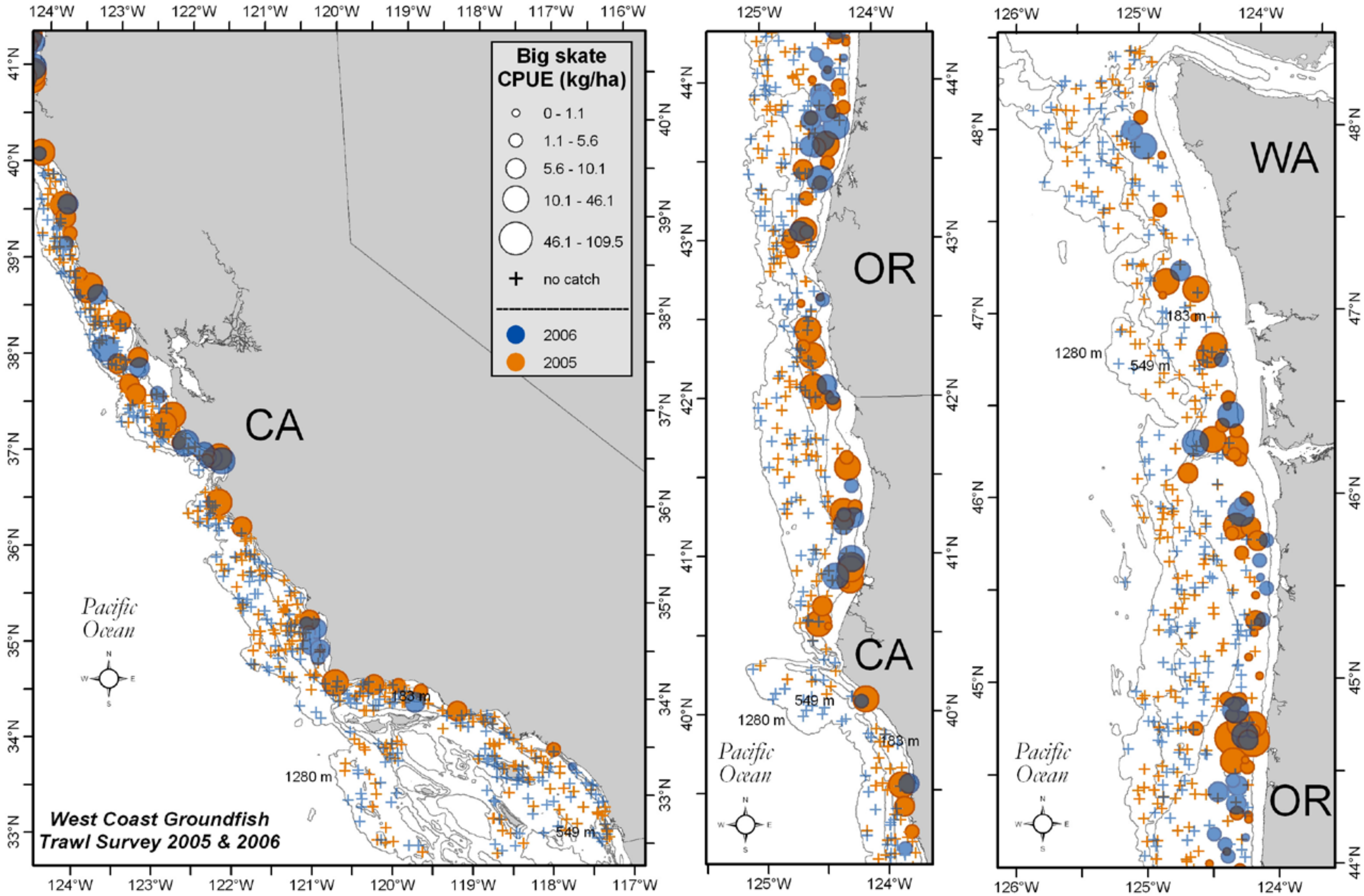

Figure 16. Big skate distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

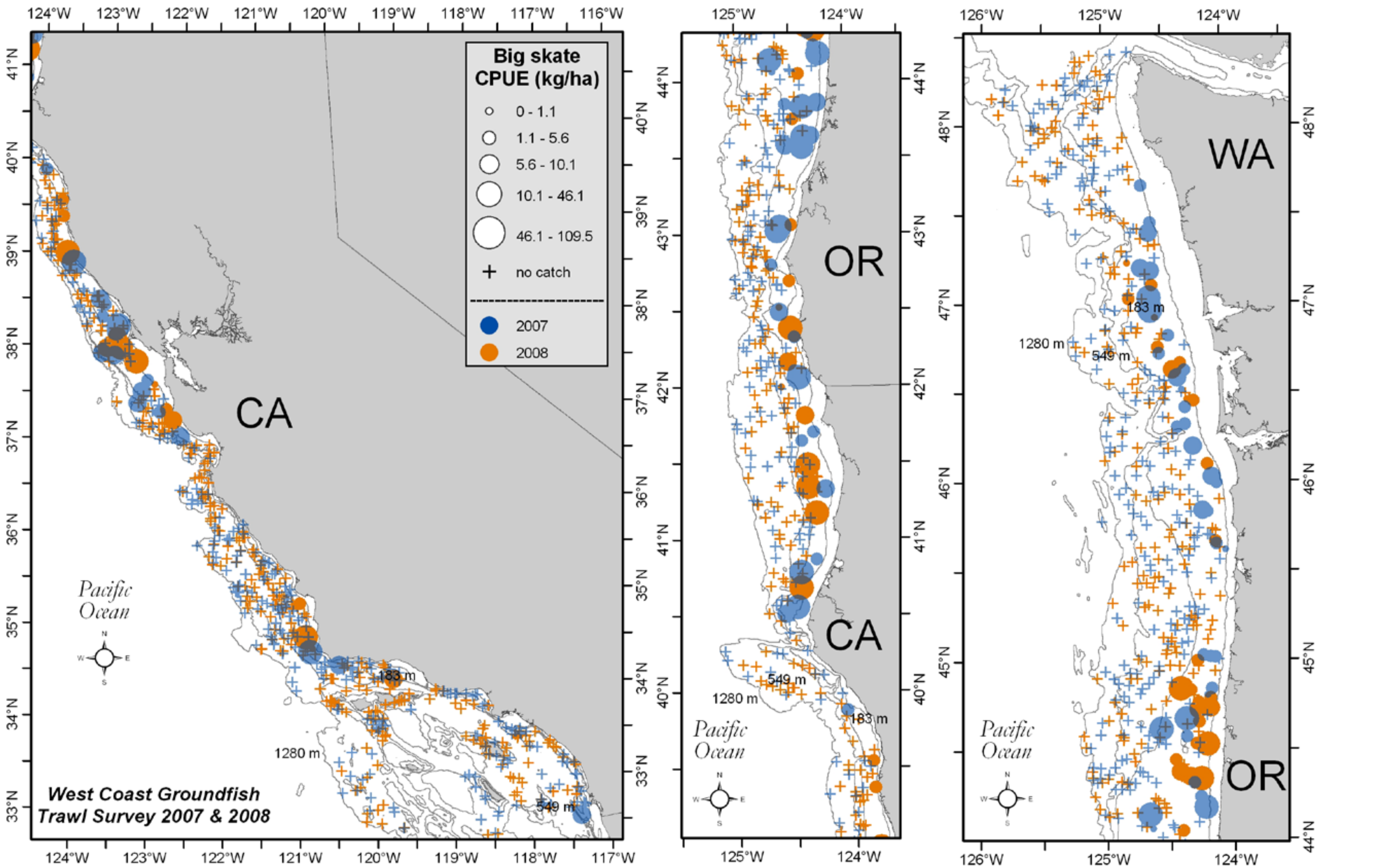

Figure 17. Big skate distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

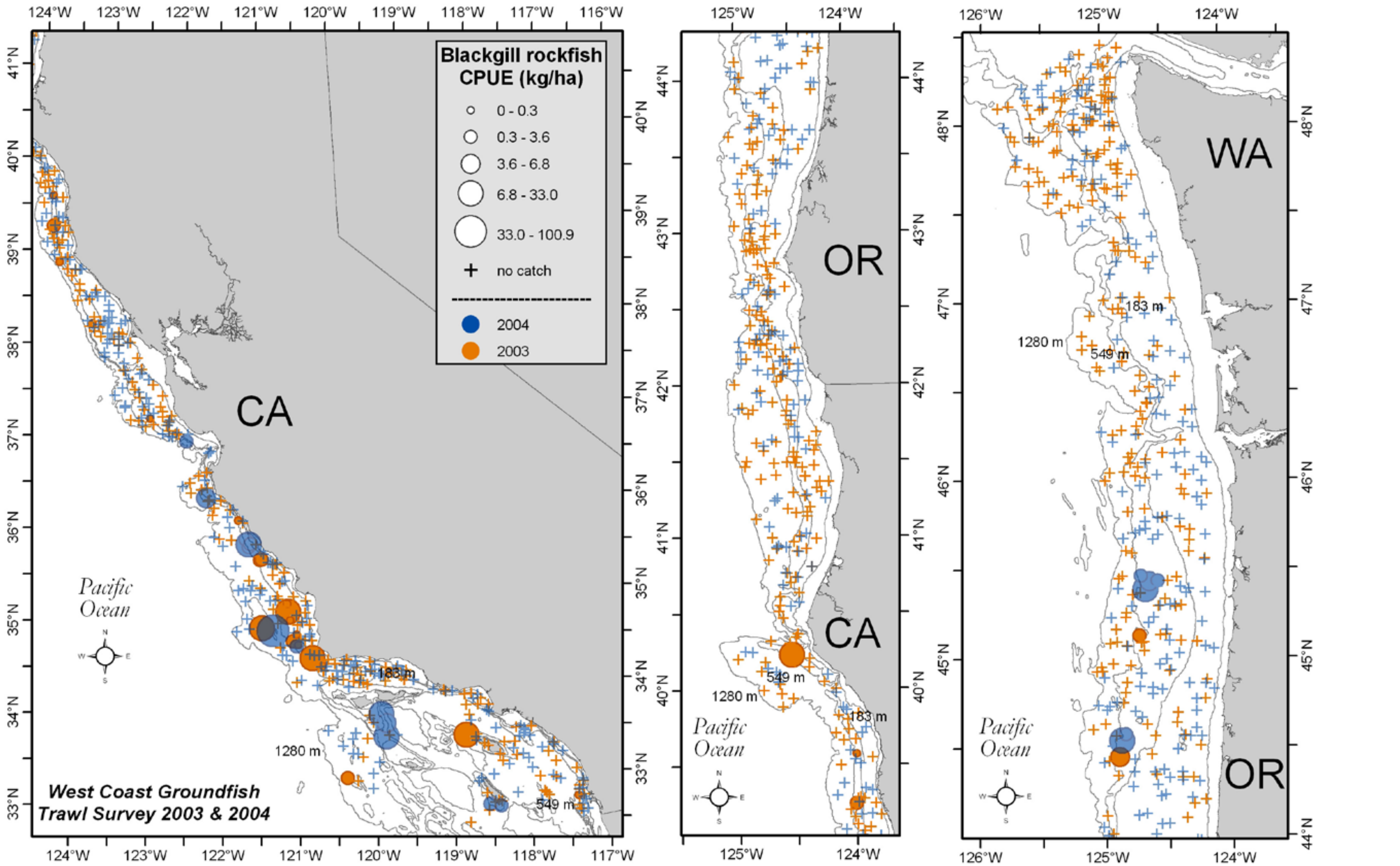

Figure 18. Blackgill rockfish (*Sebastes melanostomus*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between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

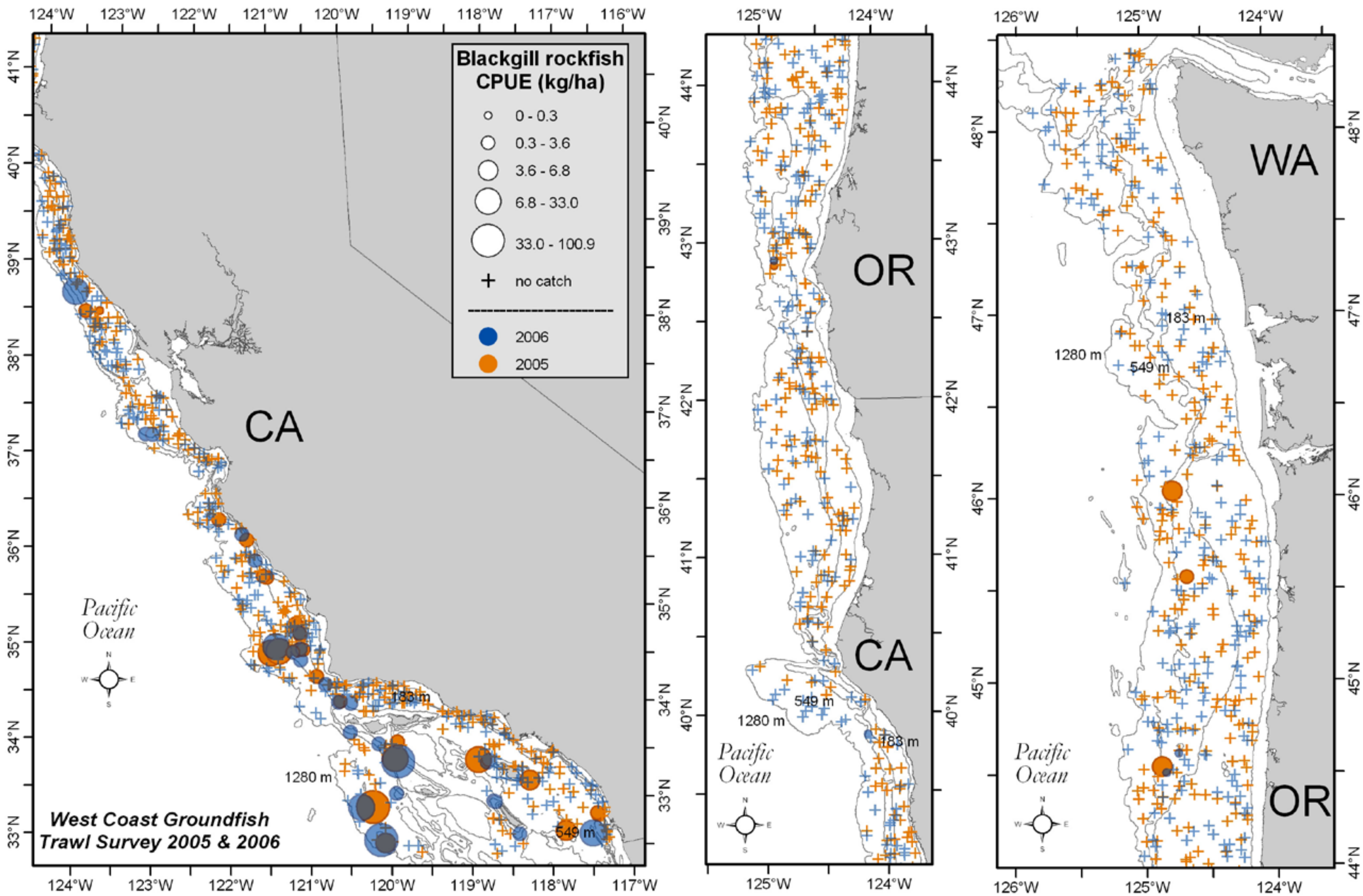

Figure 19. Blackgill rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

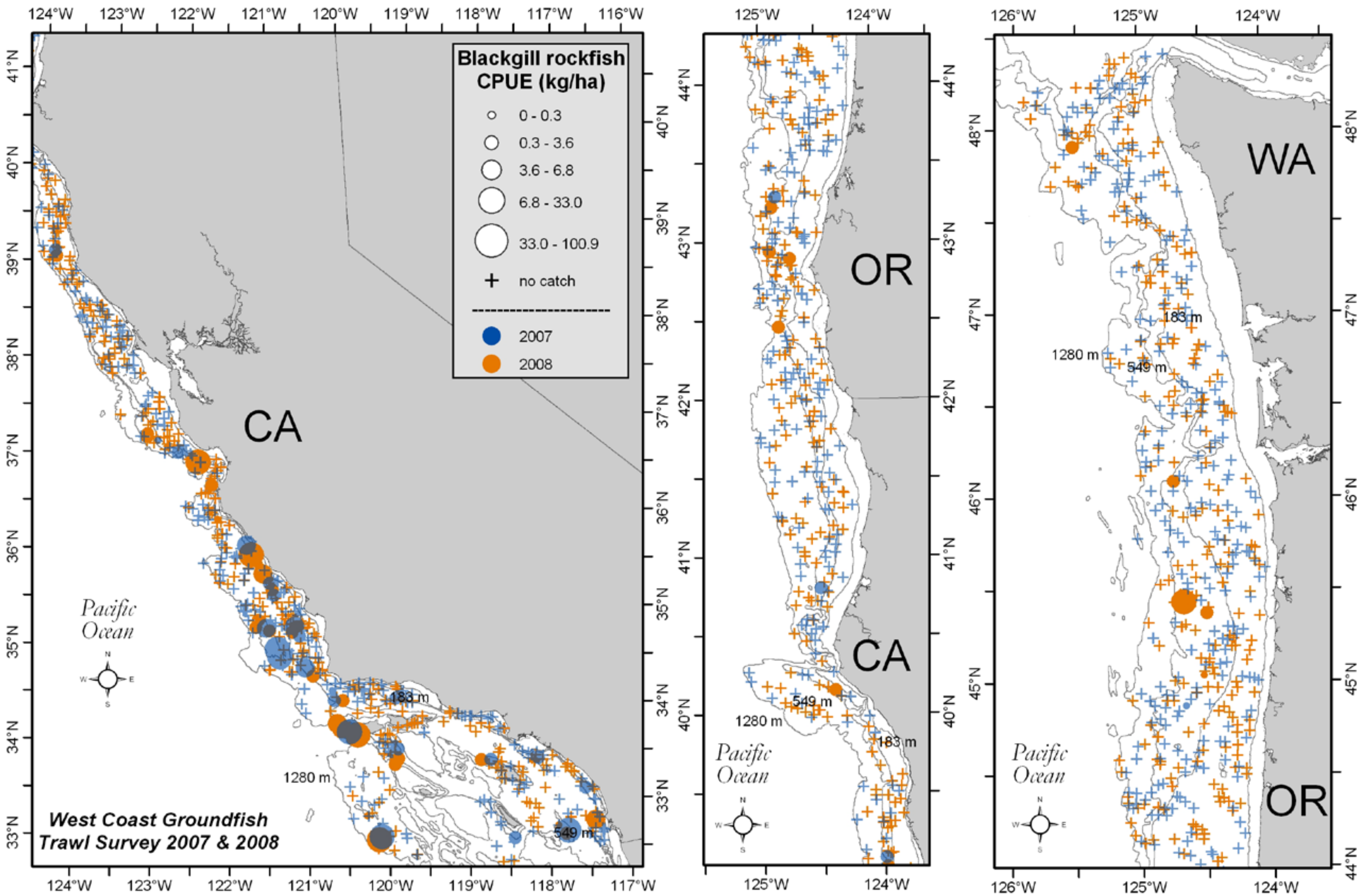

Figure 20. Blackgill rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

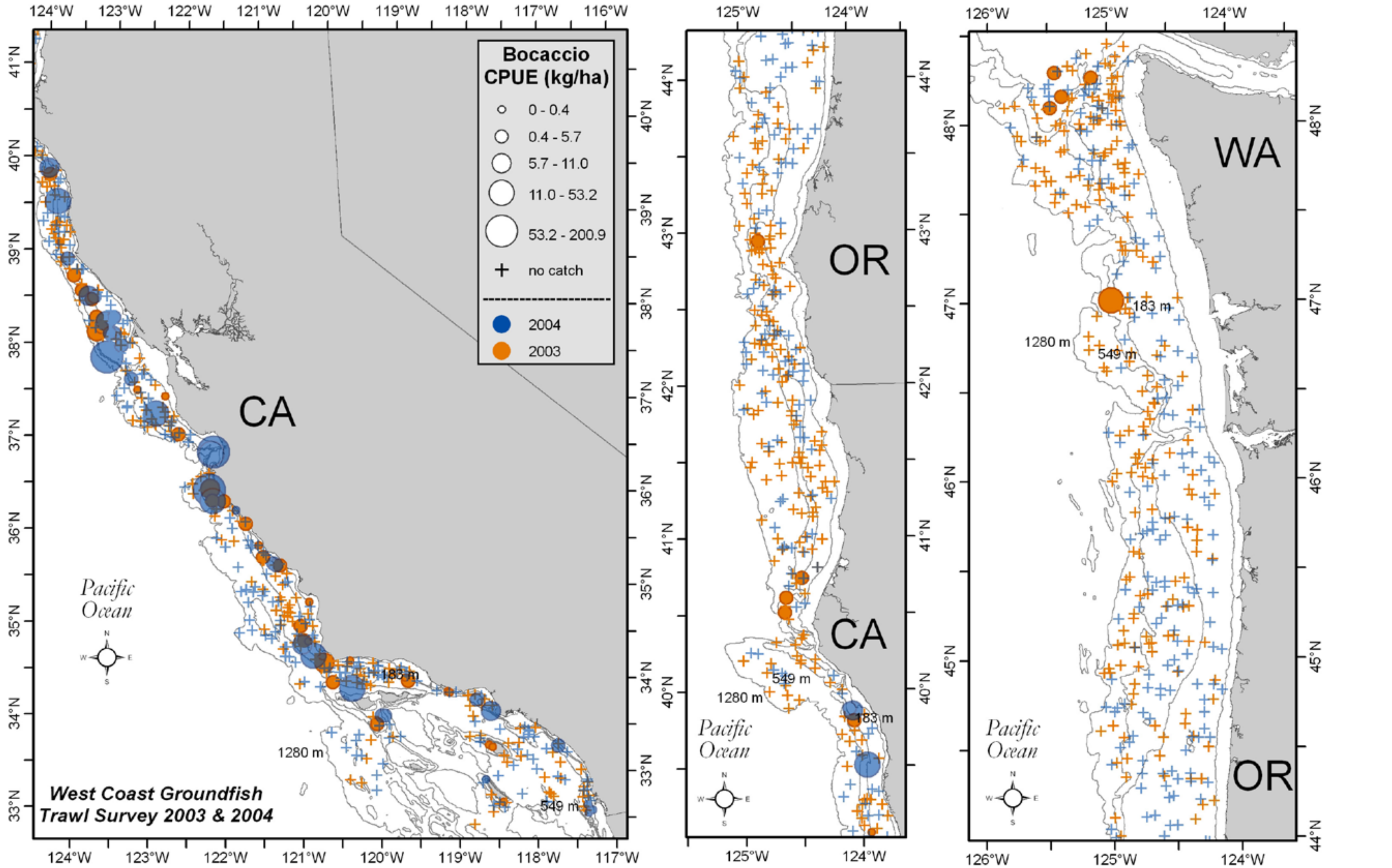

Figure 21. Bocaccio (*Sebastes paucispinis*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs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

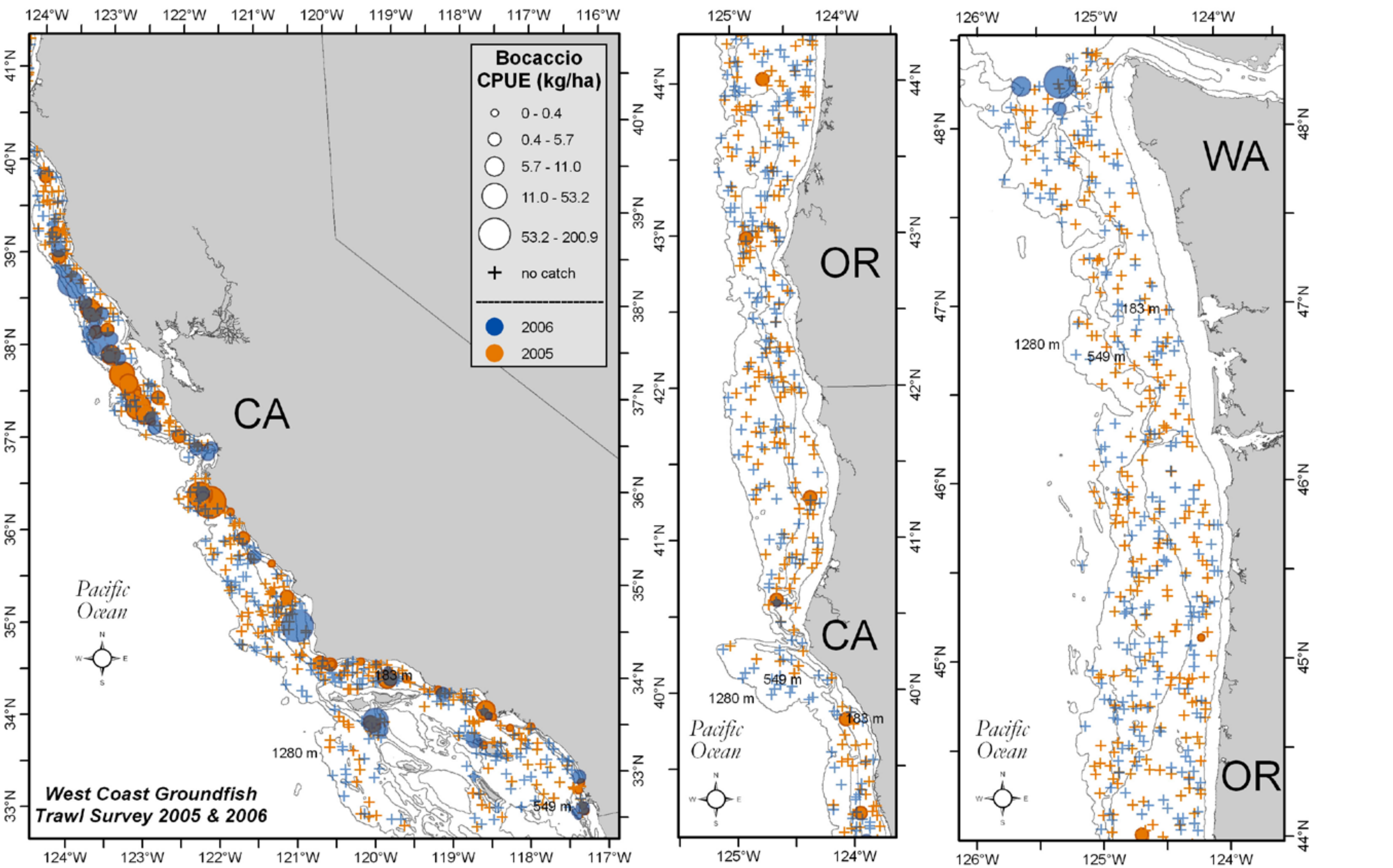

Figure 22. Bocaccio distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2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

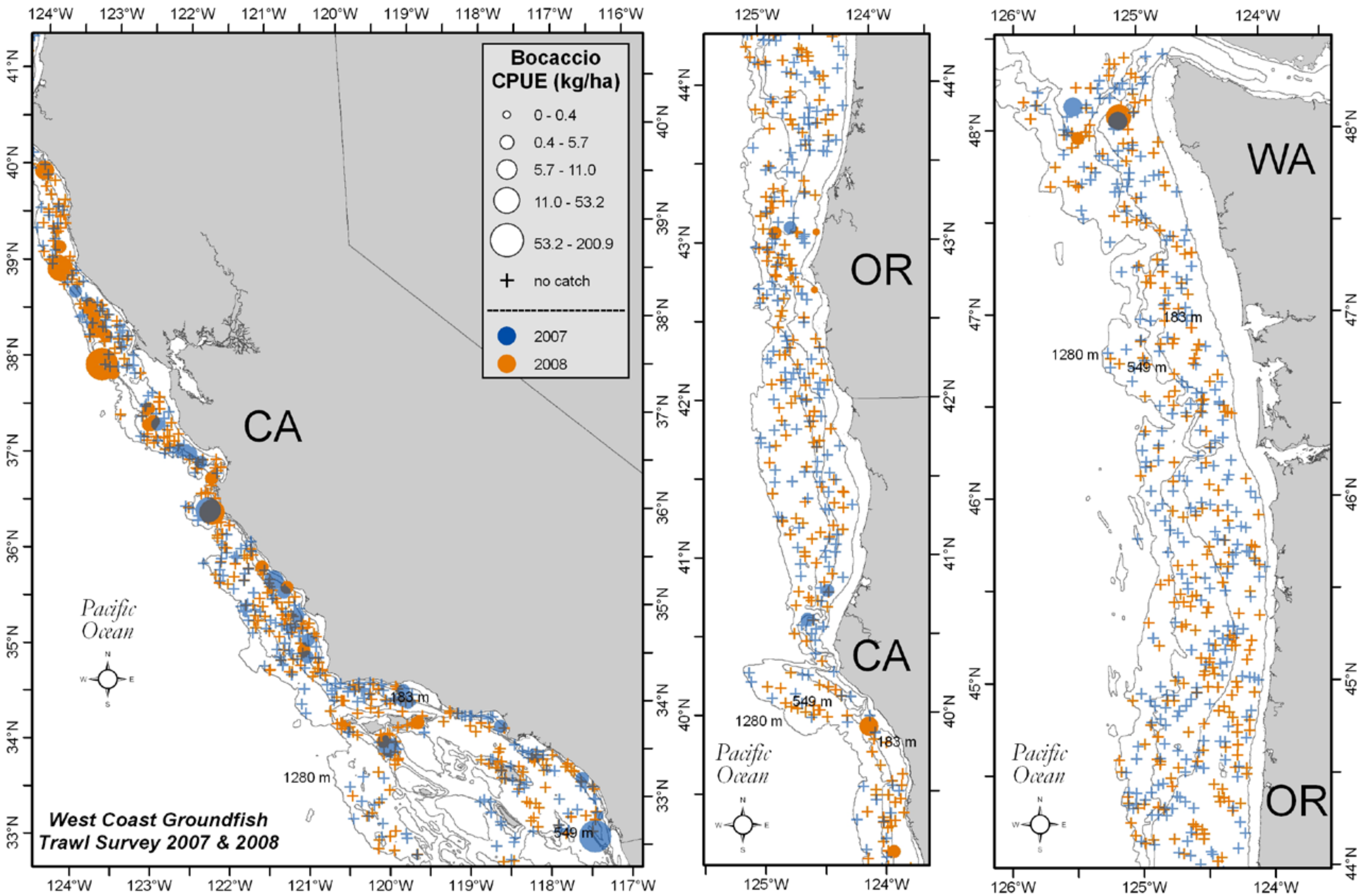

Figure 23. Bocaccio distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2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

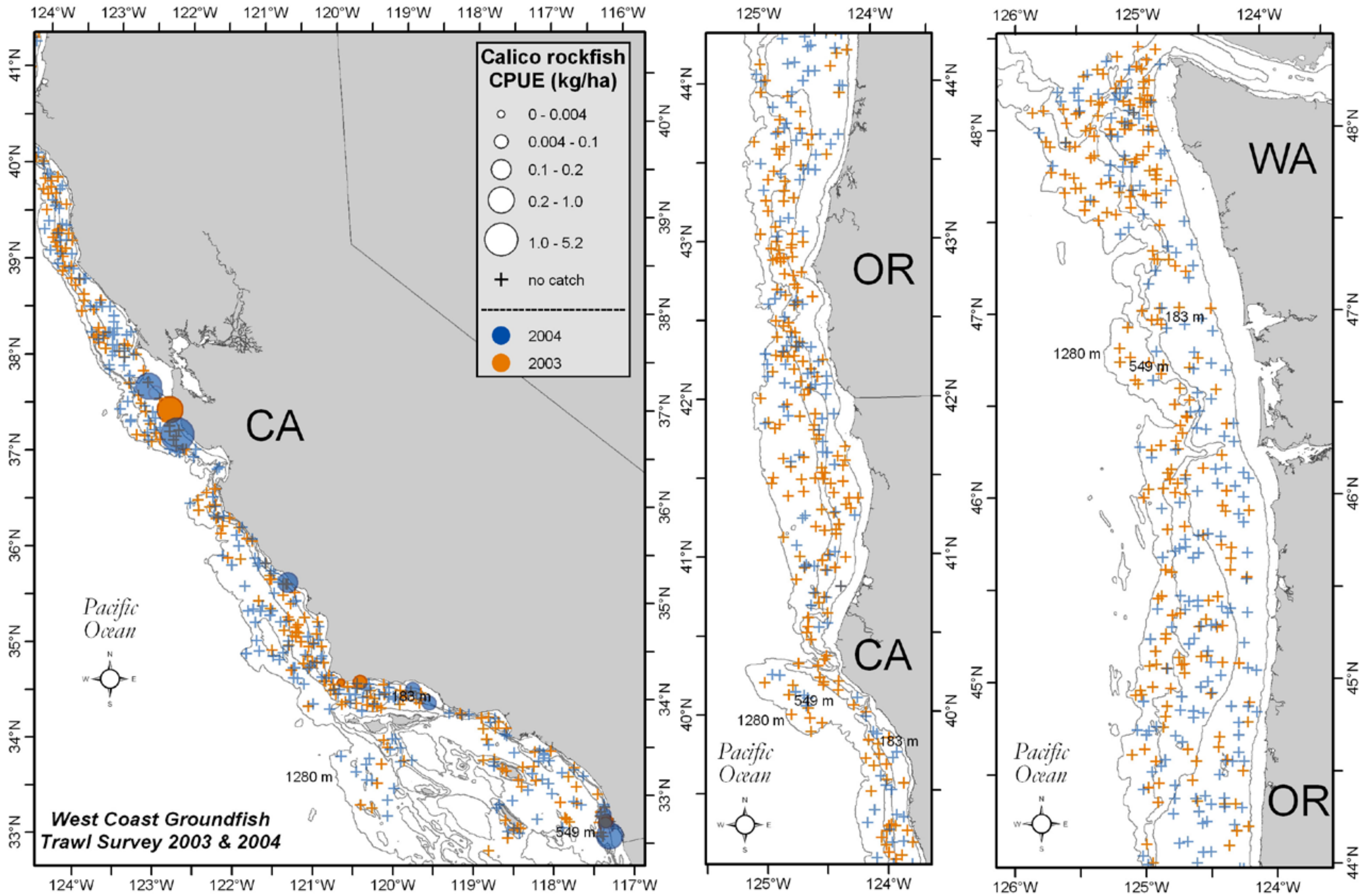

Figure 24. Calico rockfish (*Sebastes dalli*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2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

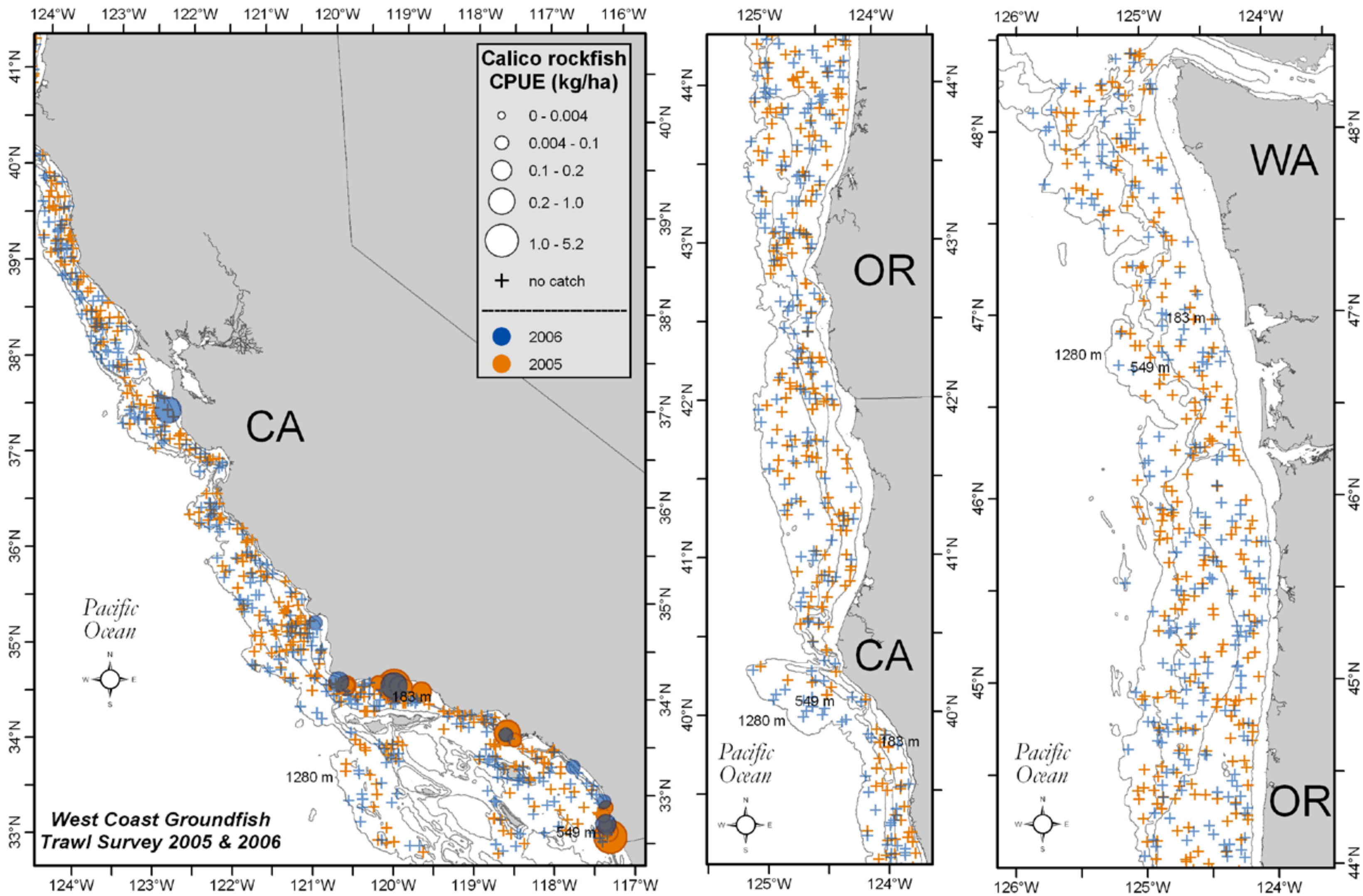

Figure 25. Calico rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

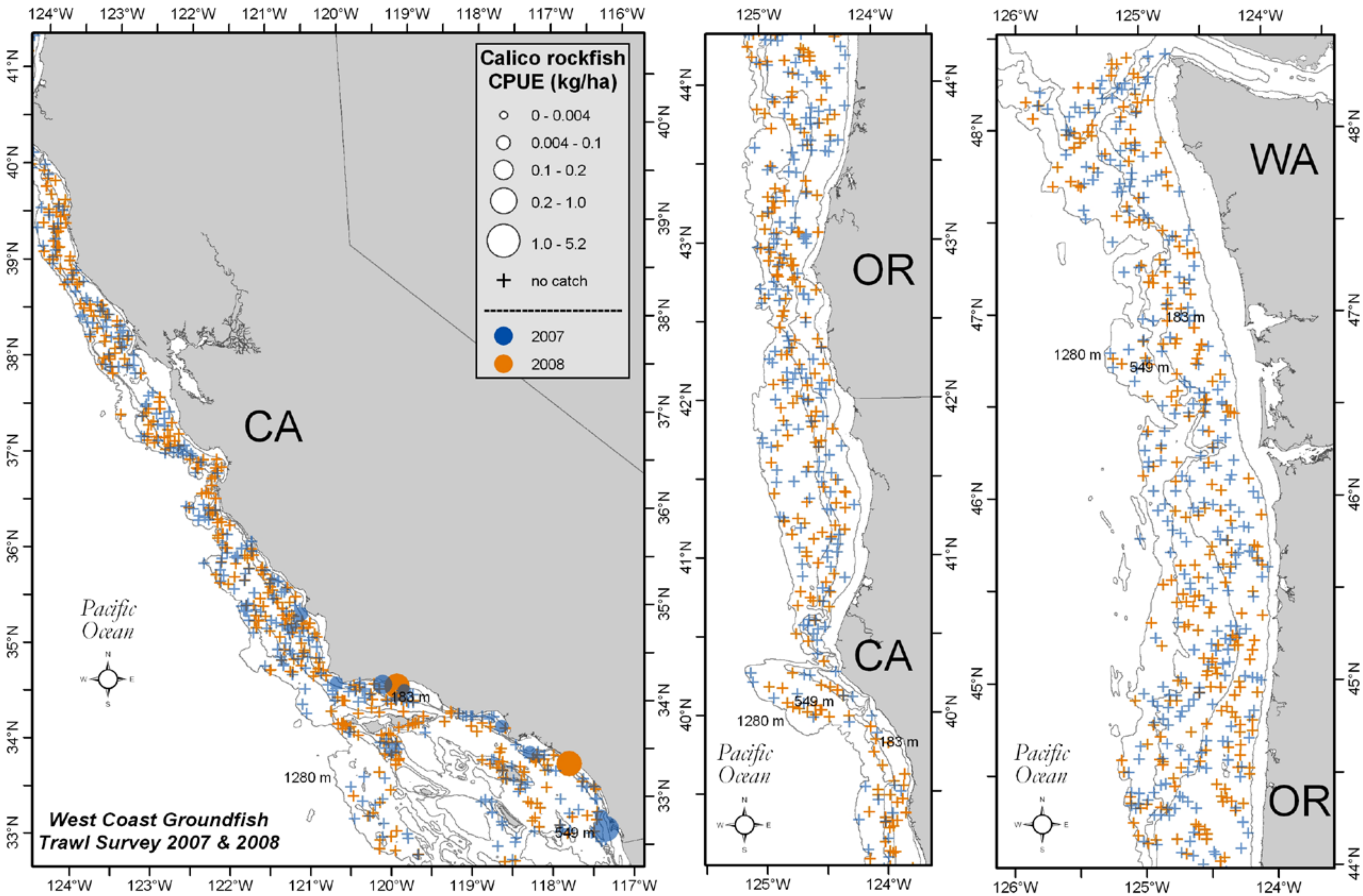

Figure 26. Calico rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

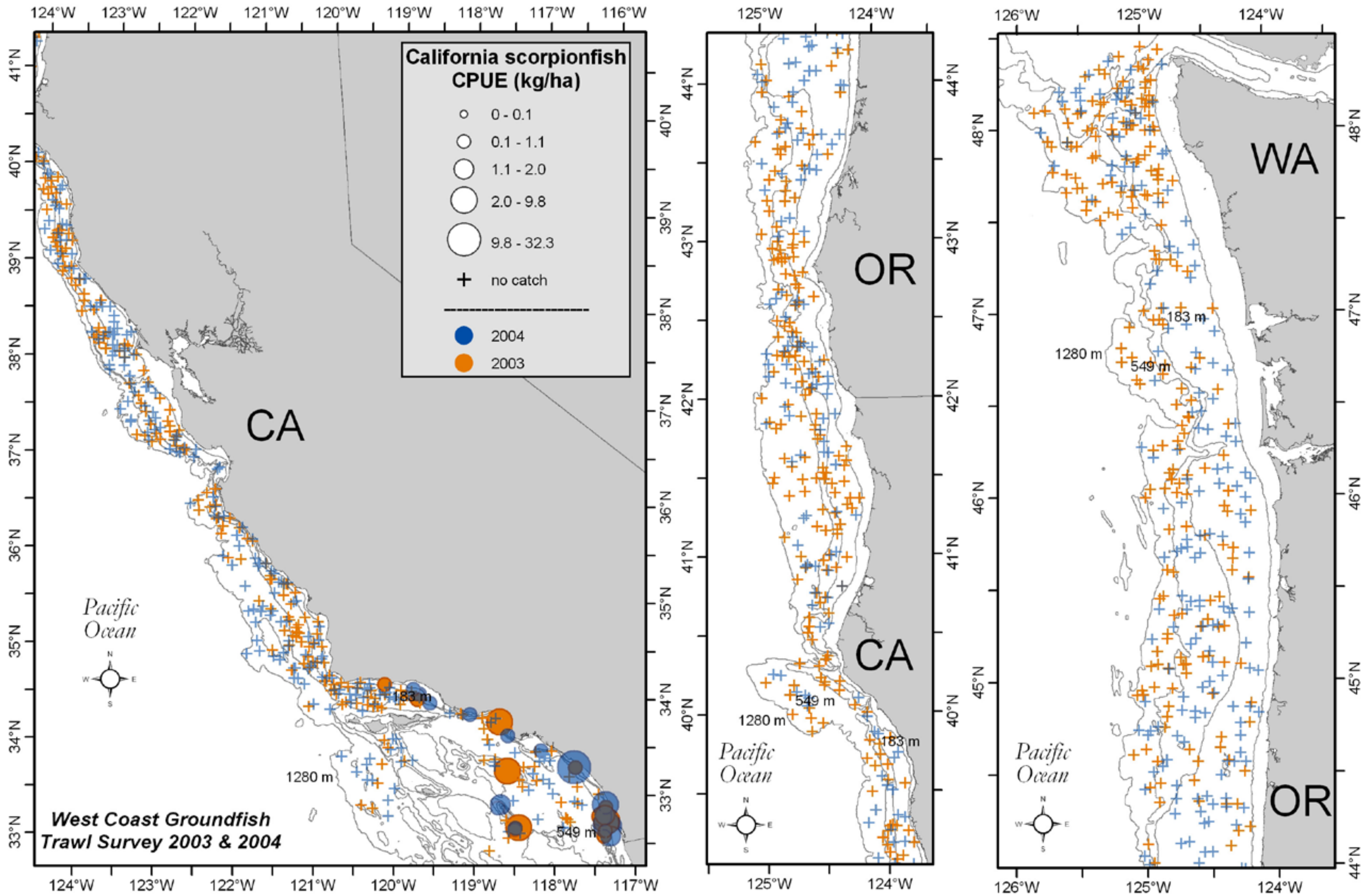

Figure 27. California scorpionfish (*Scorpaena guttata*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between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

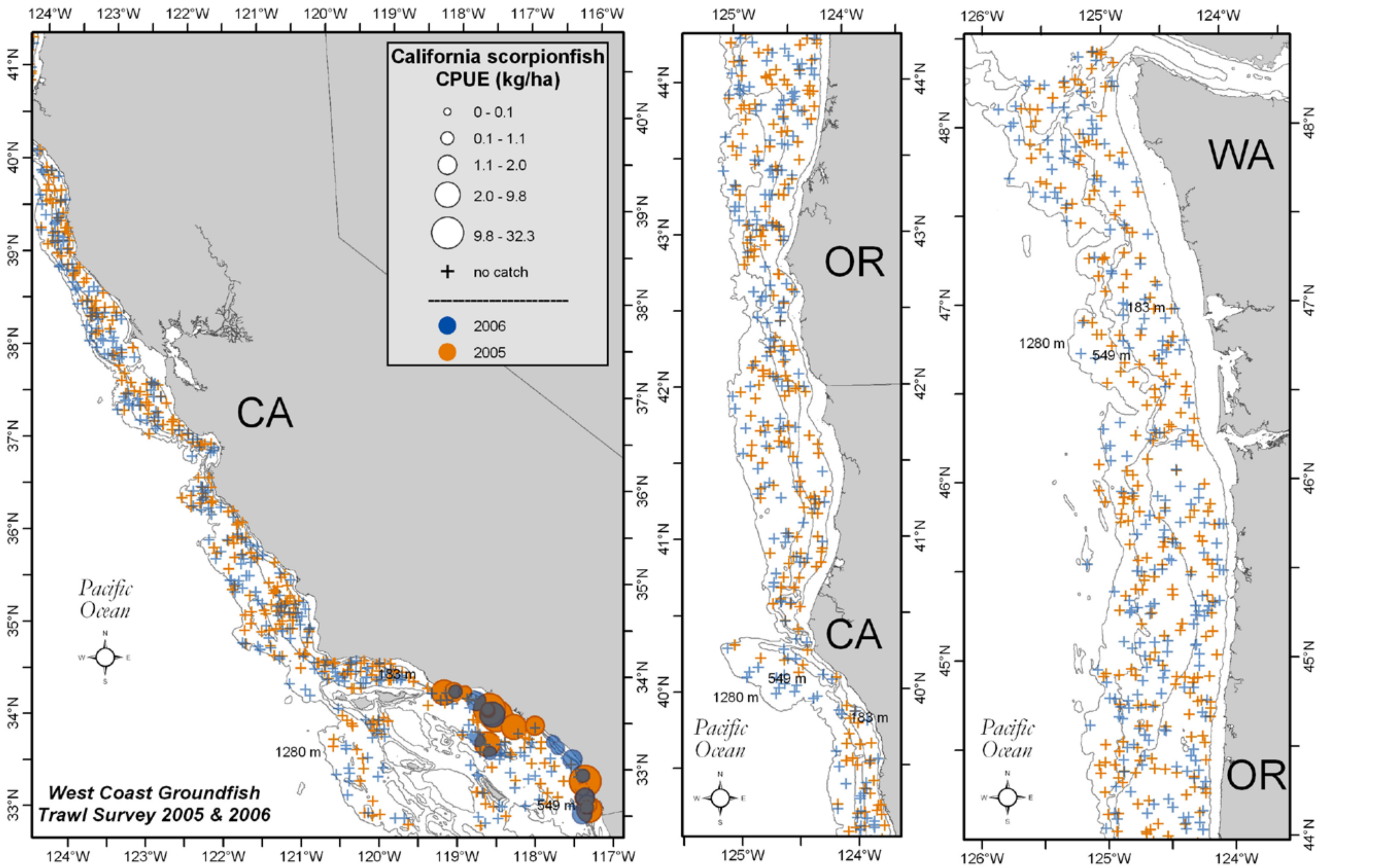

Figure 28. California scorpionfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean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

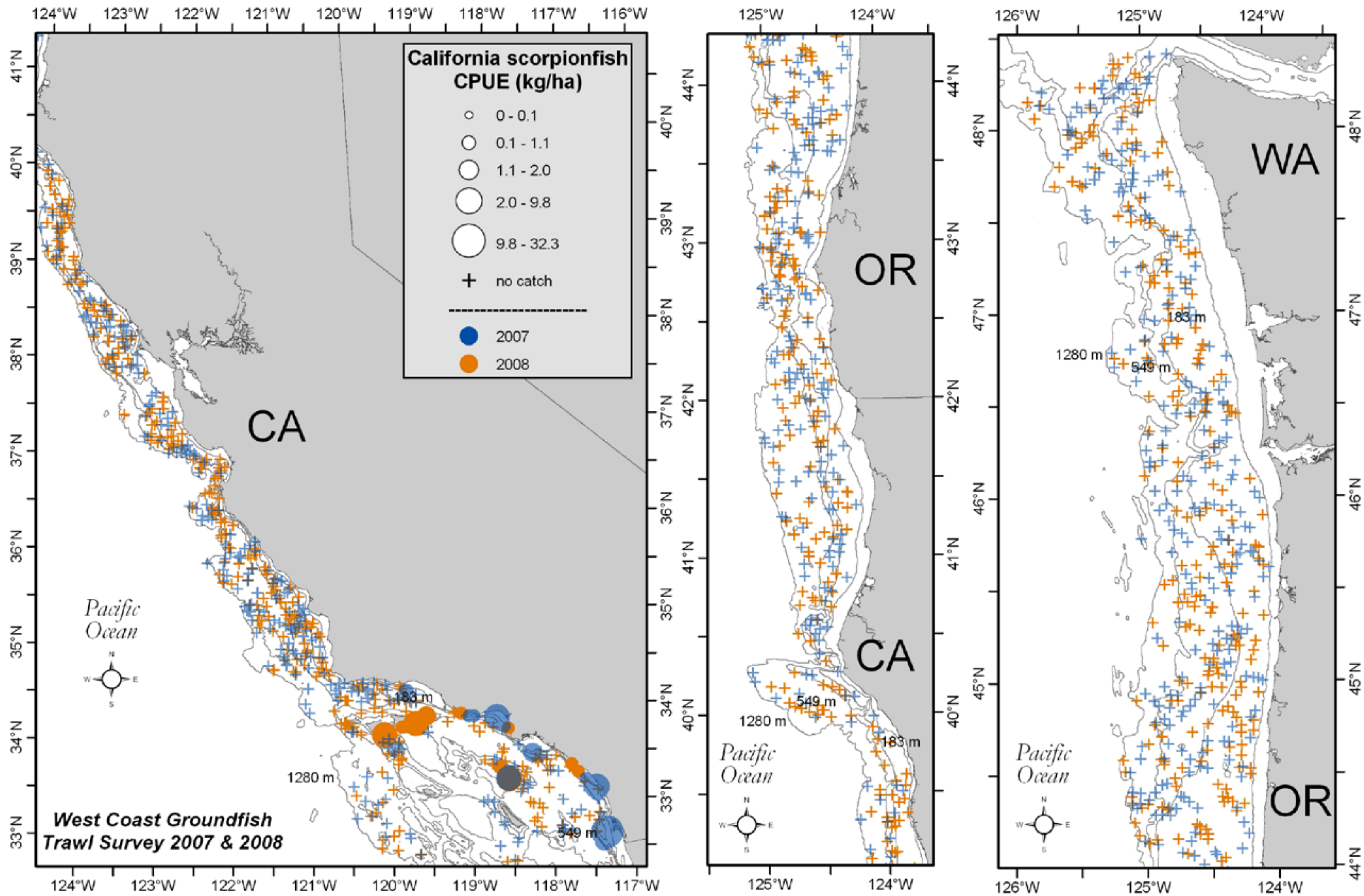

Figure 29. California scorpionfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean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

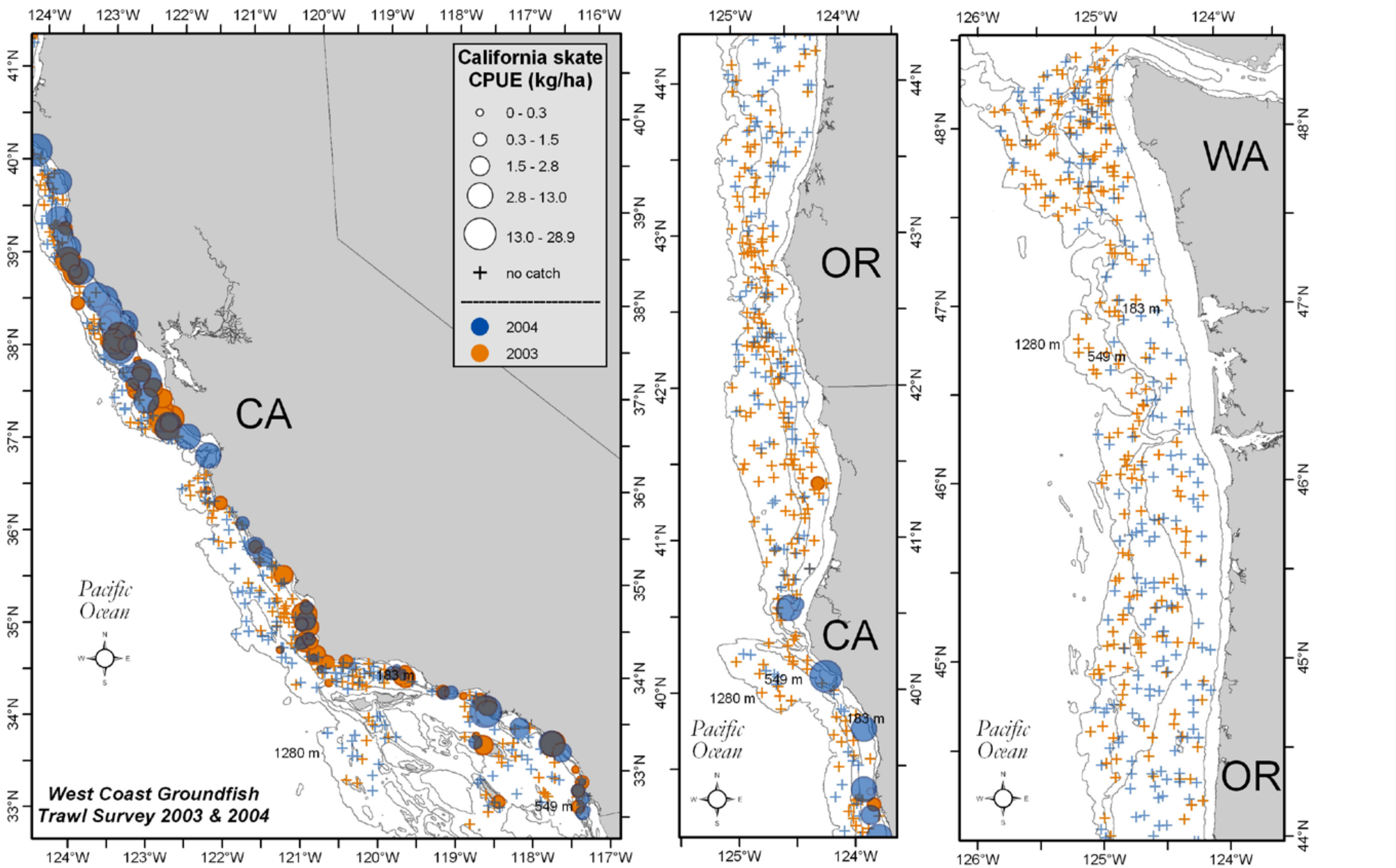

Figure 30. California skate (*Raja inornata*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2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

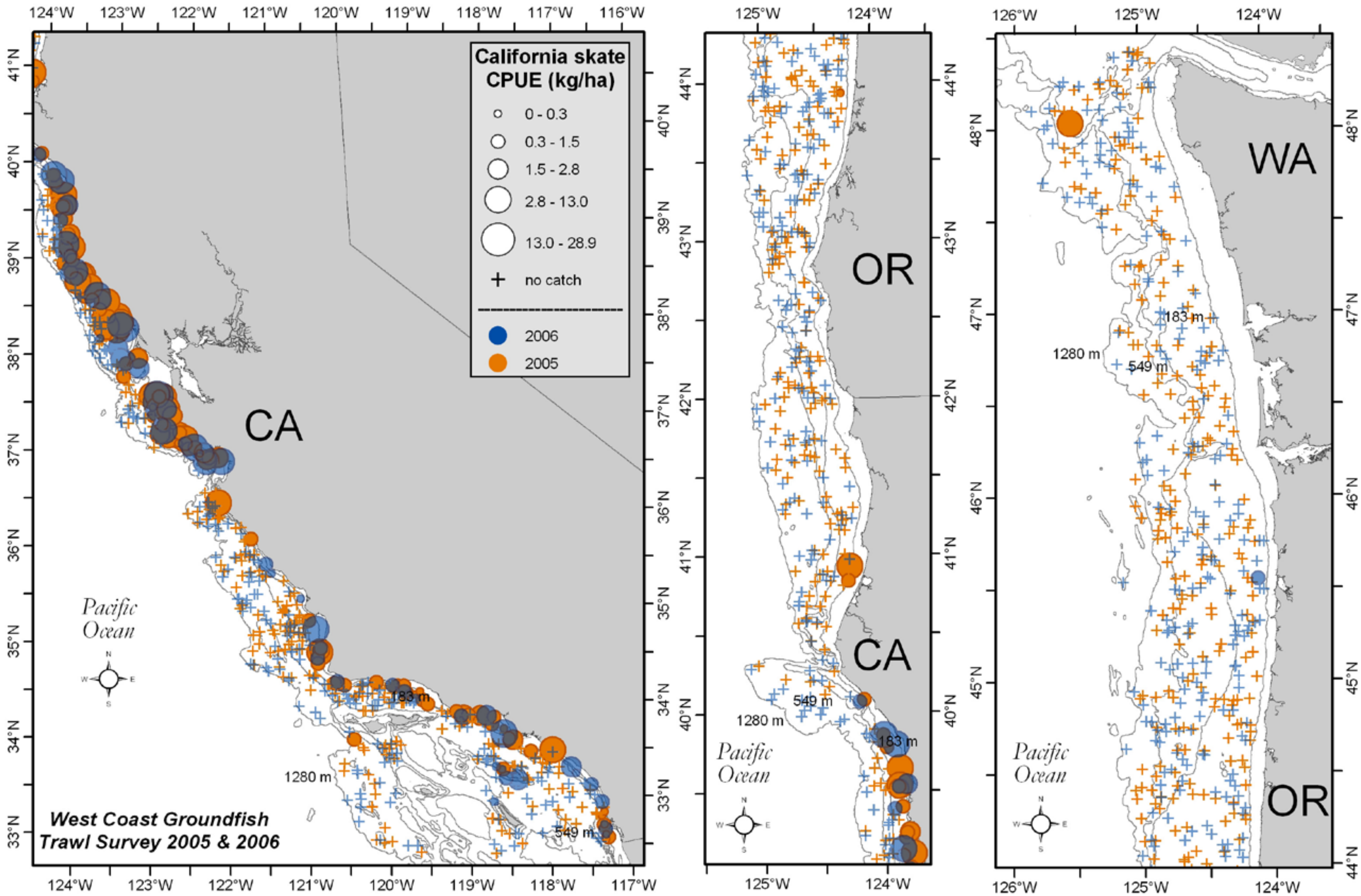

Figure 31. California skate distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

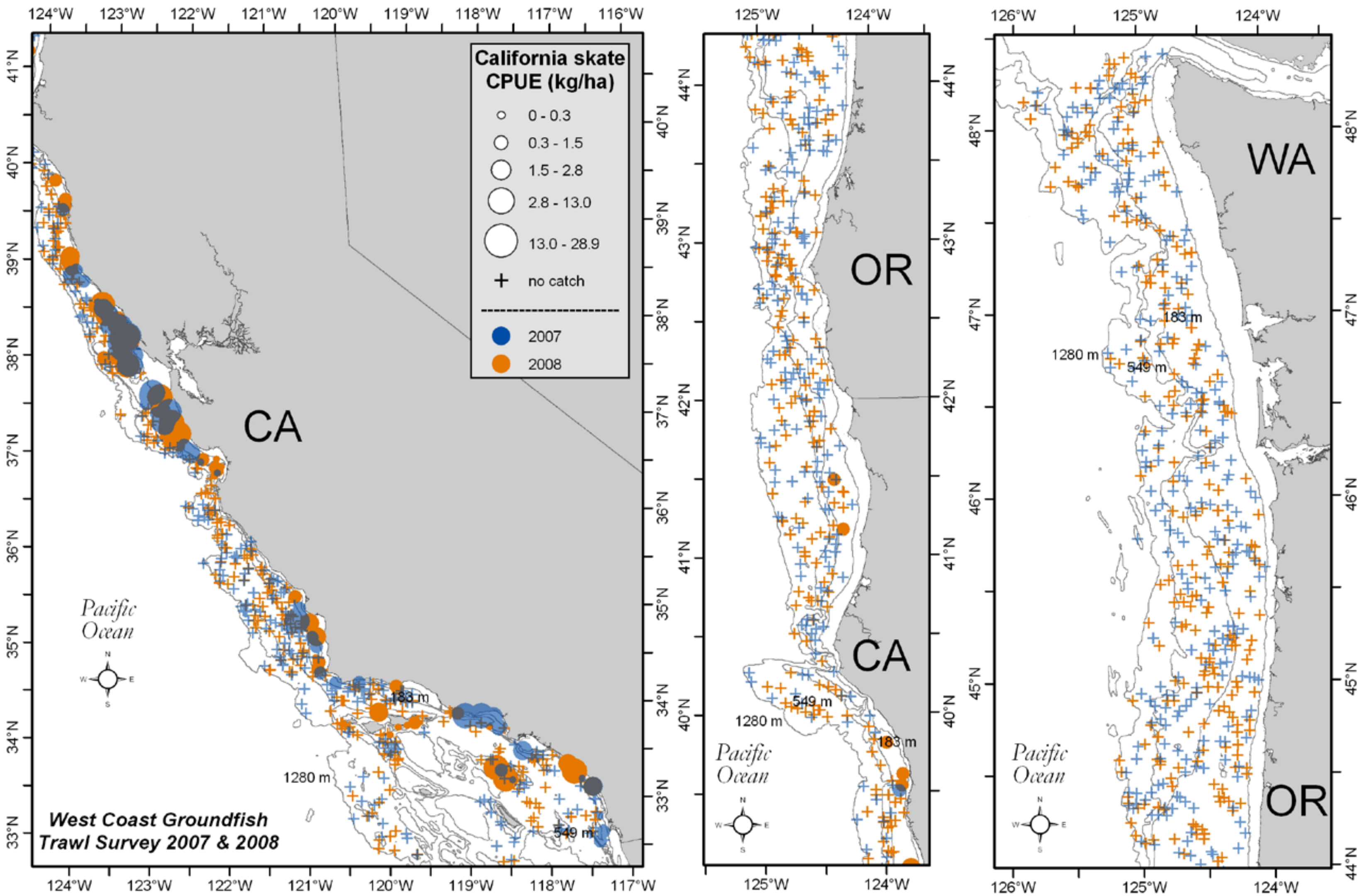

Figure 32. California skate distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

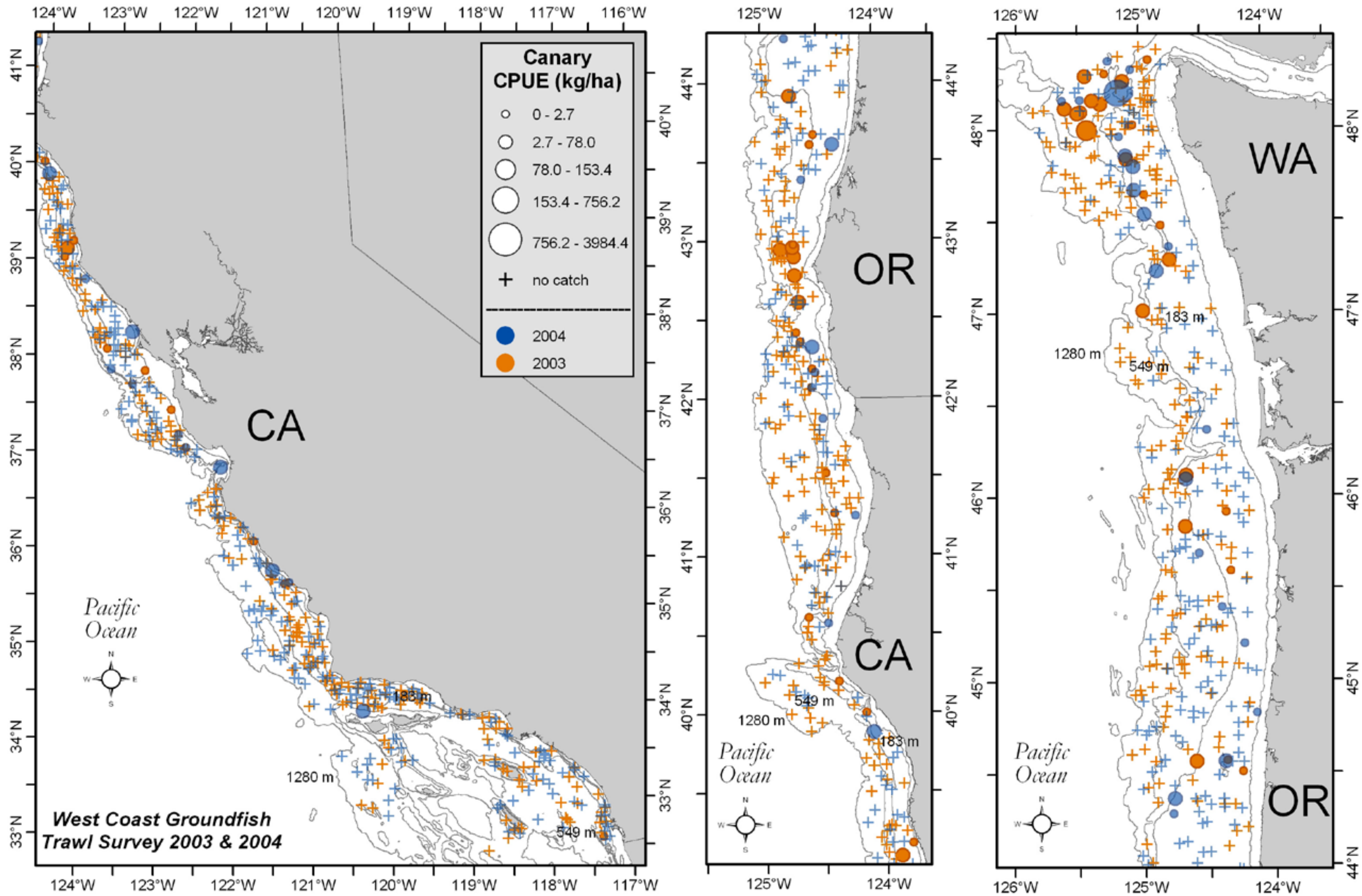

Figure 33. Canary rockfish (*Sebastes pinniger*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and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

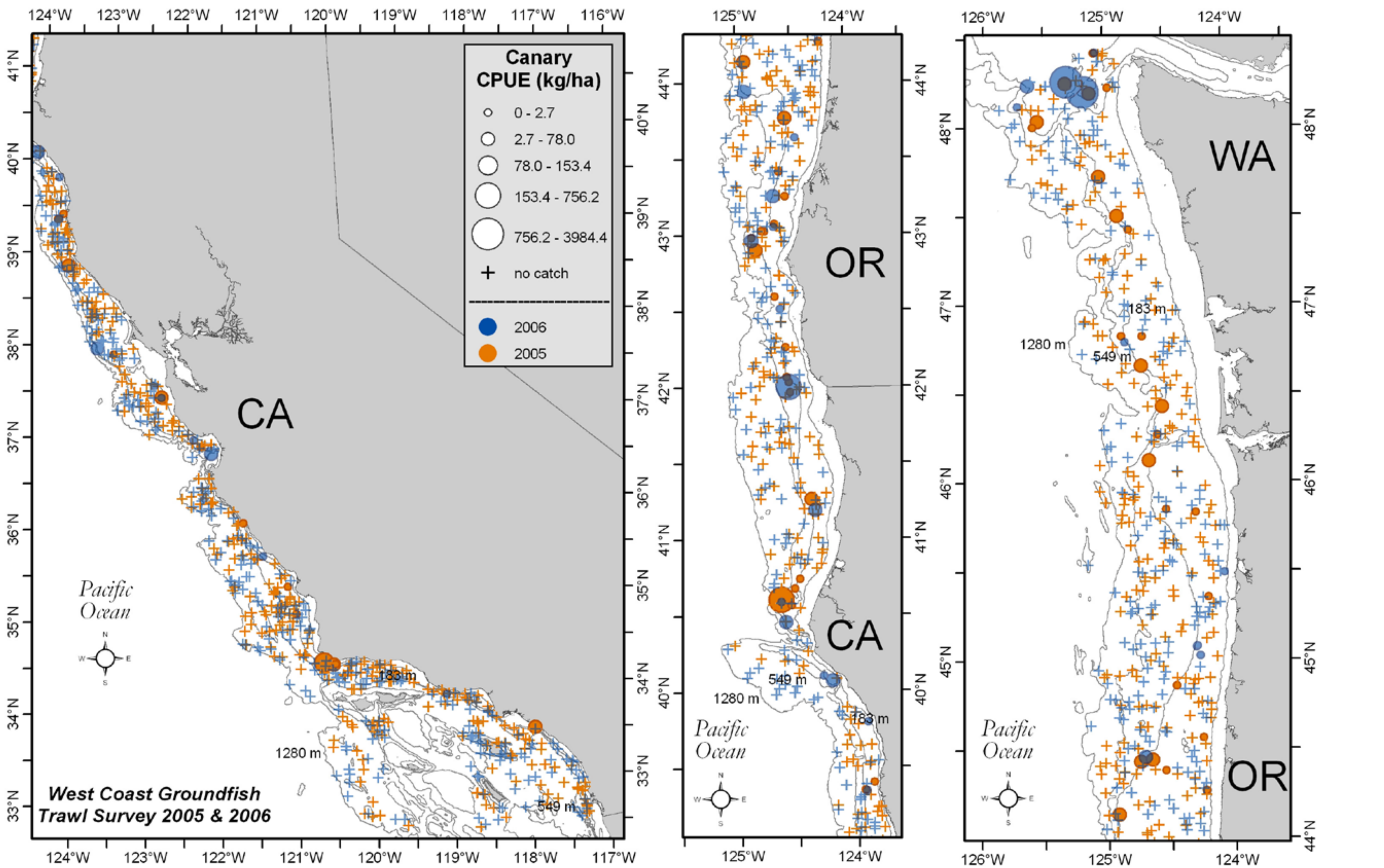

Figure 34. Canary rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

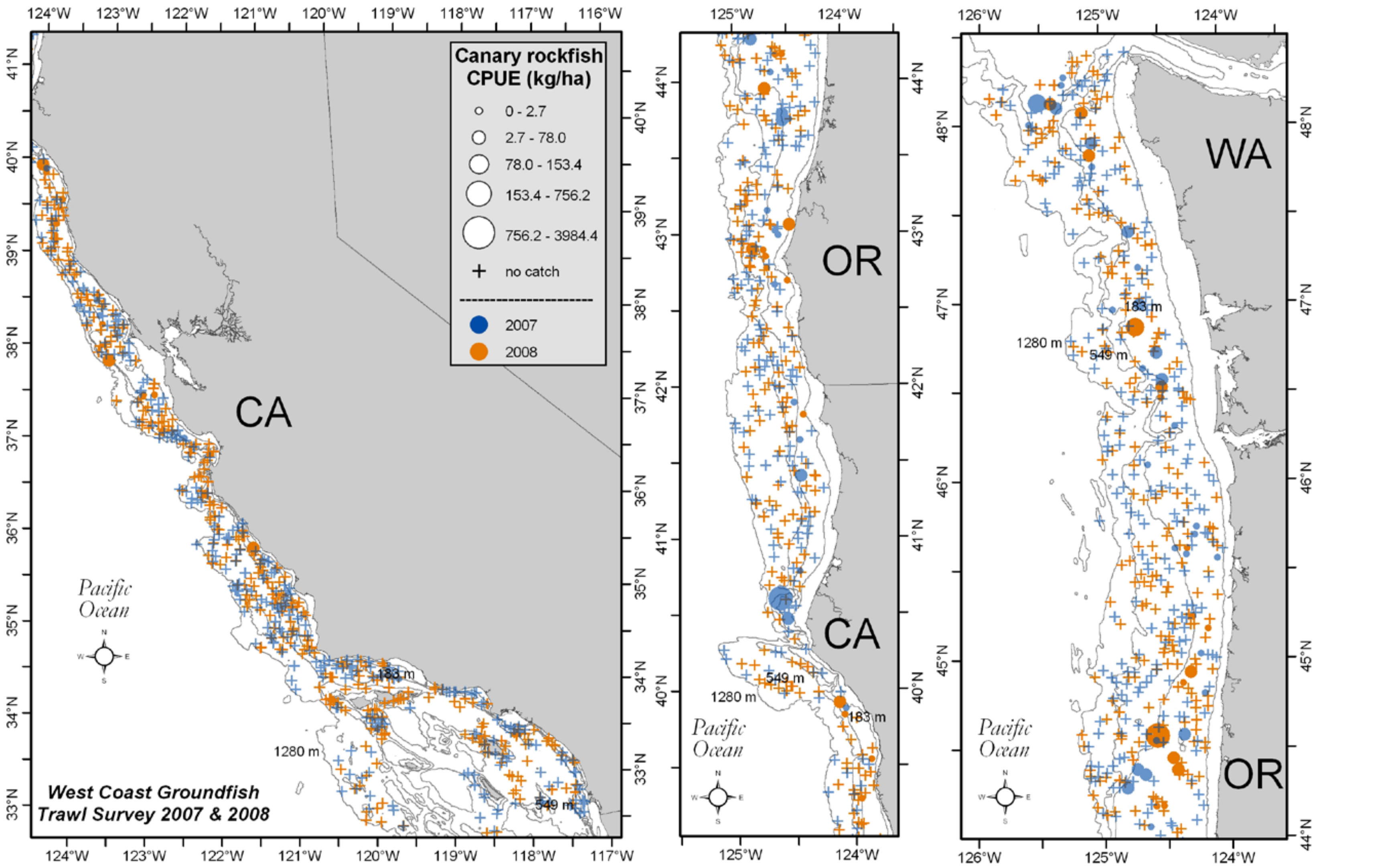

Figure 35. Canary rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

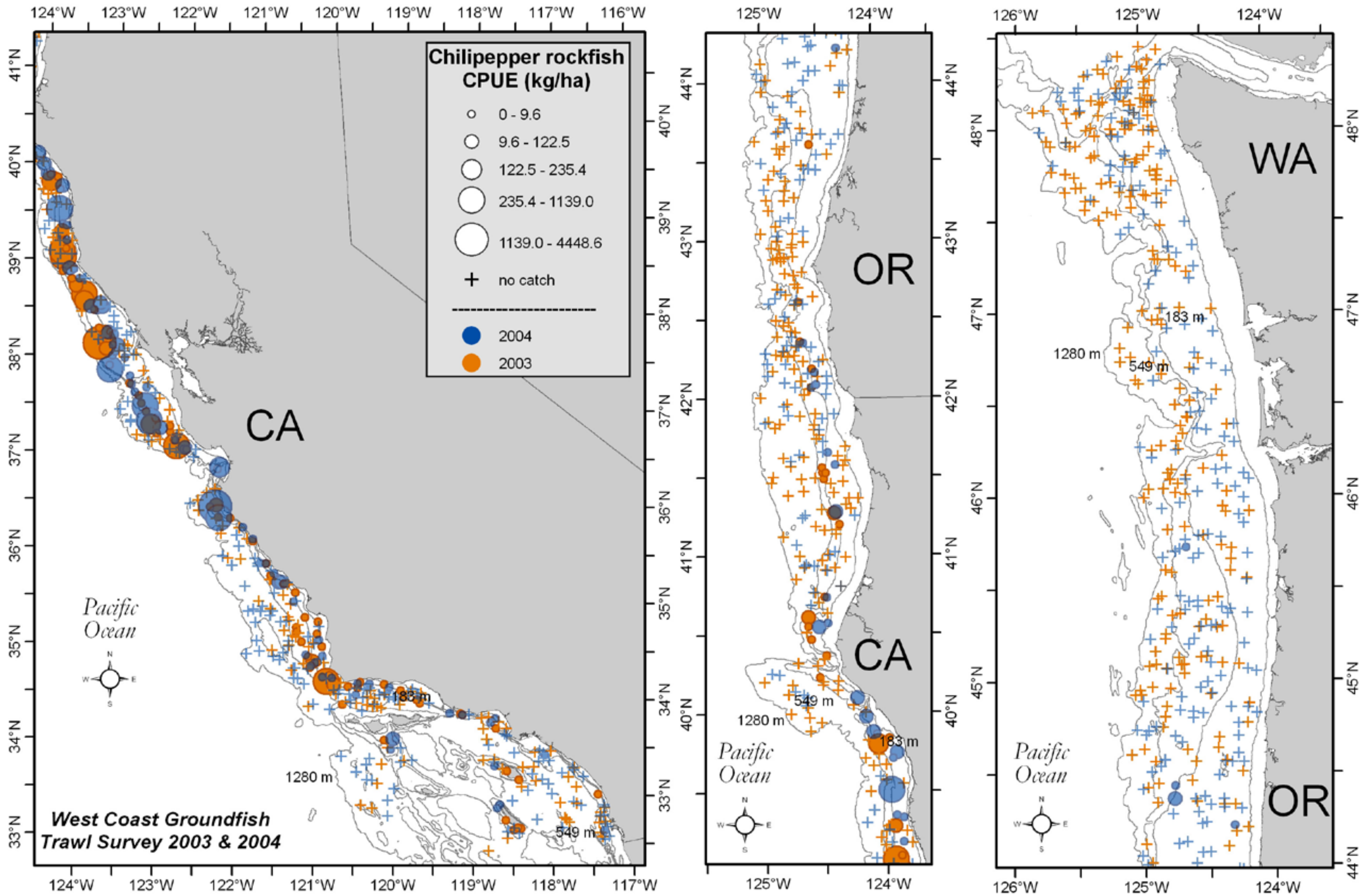

Figure 36. Chilipepper rockfish (*Sebastes goodei*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1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

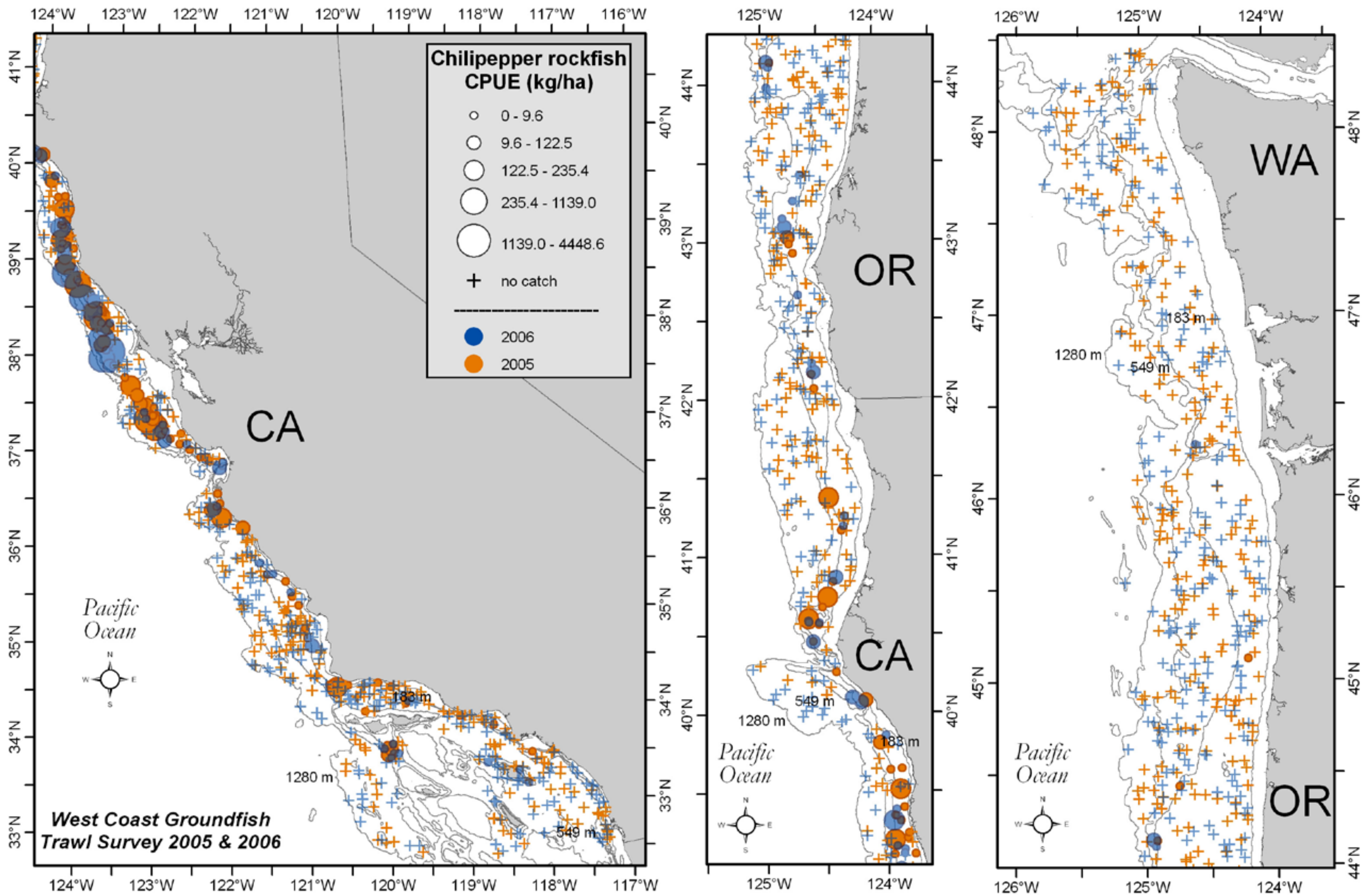

Figure 37. Chilipepper rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

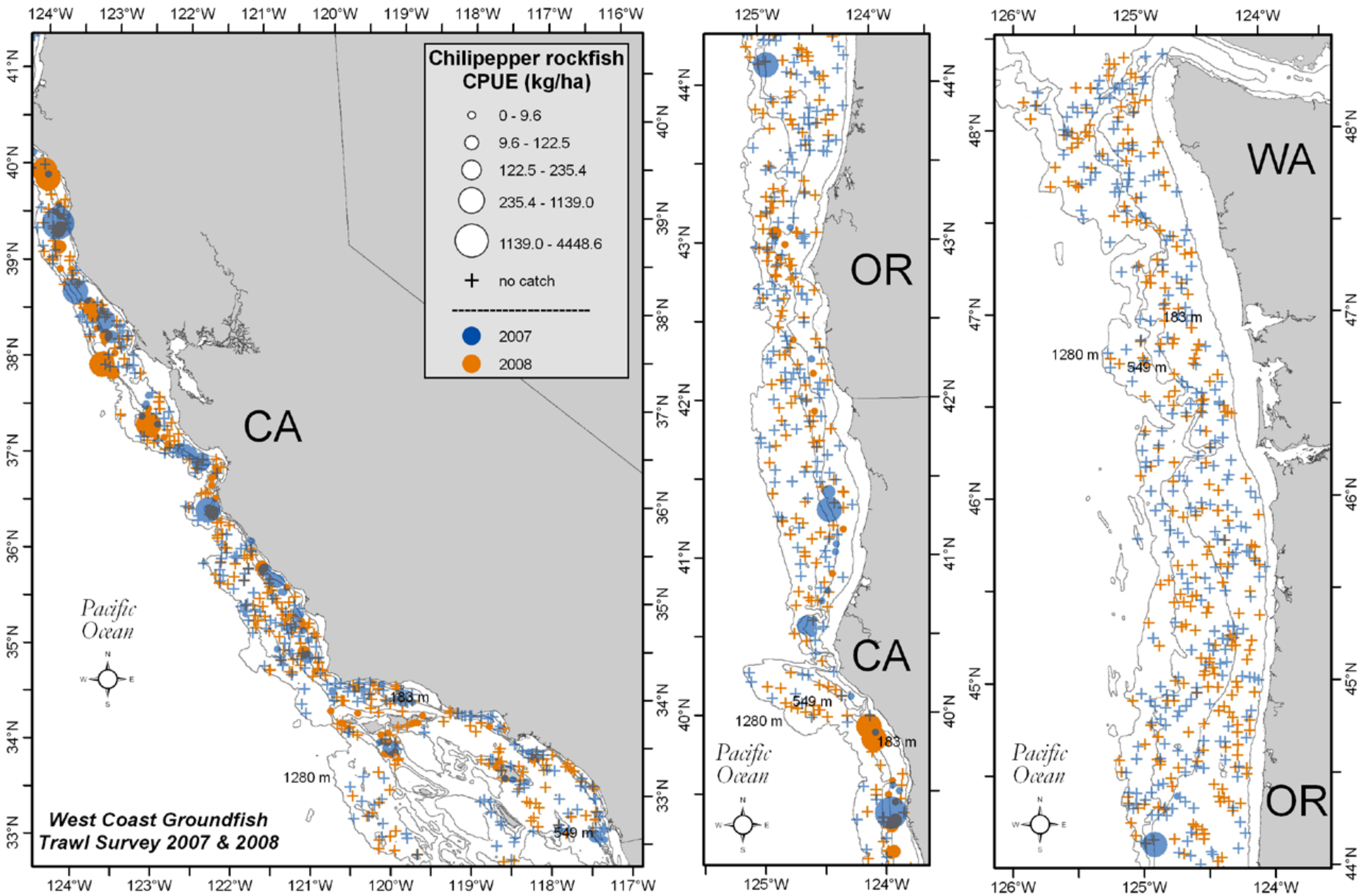

Figure 38. Chilipepper rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

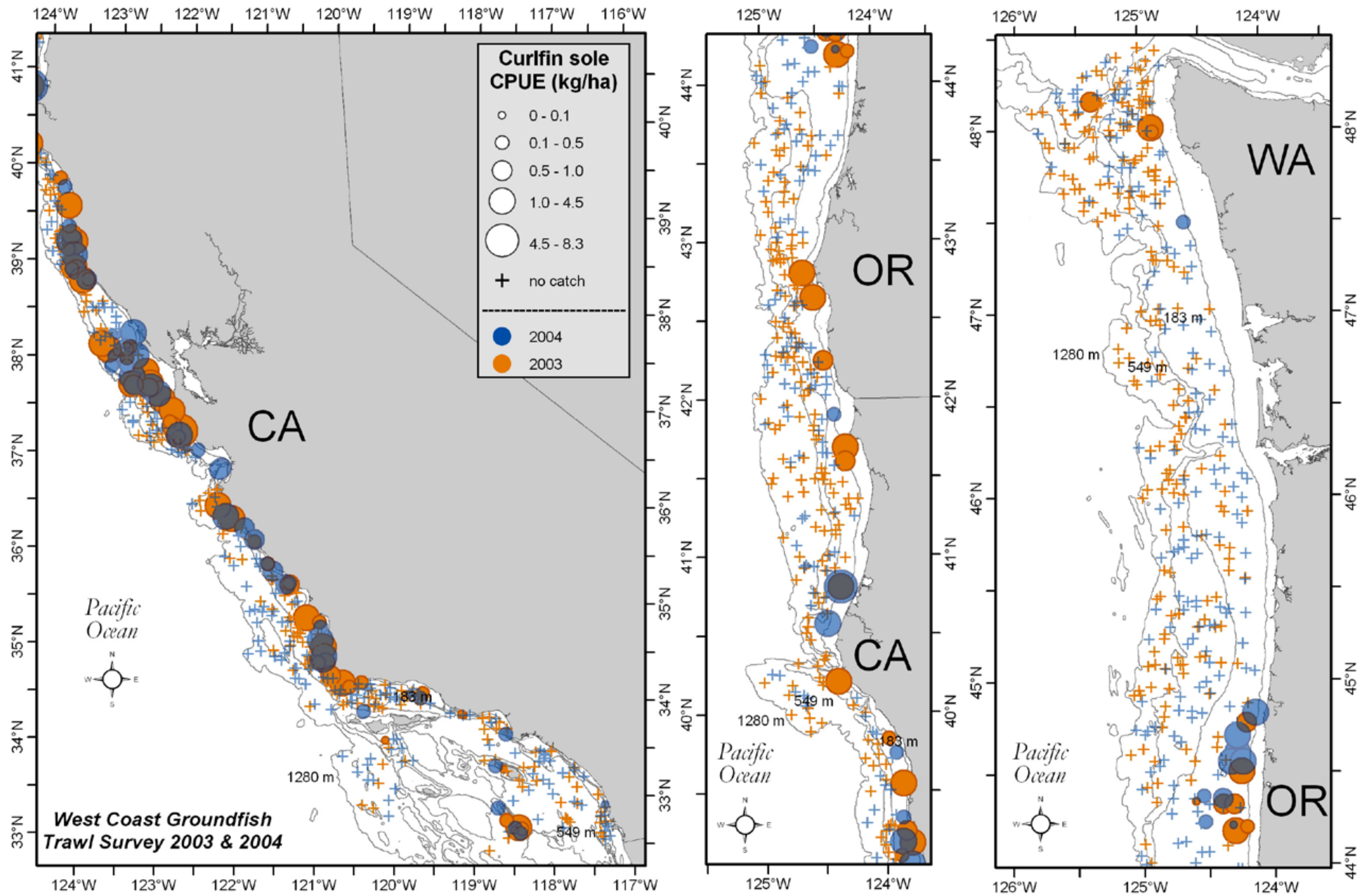

Figure 39. Curlfin sole (*Pleuronichthys decurrens*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1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

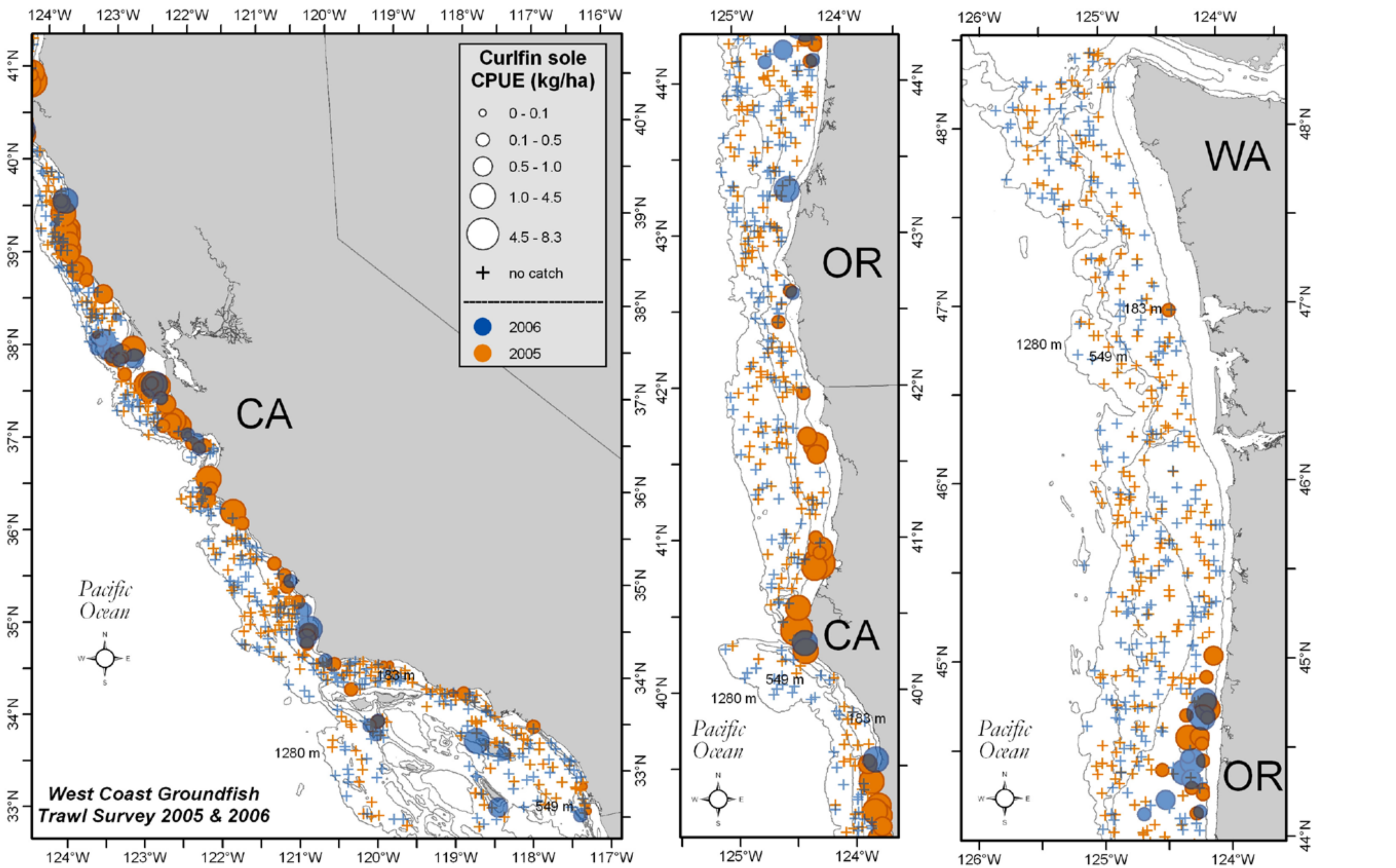

Figure 40. Curlfin sole distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

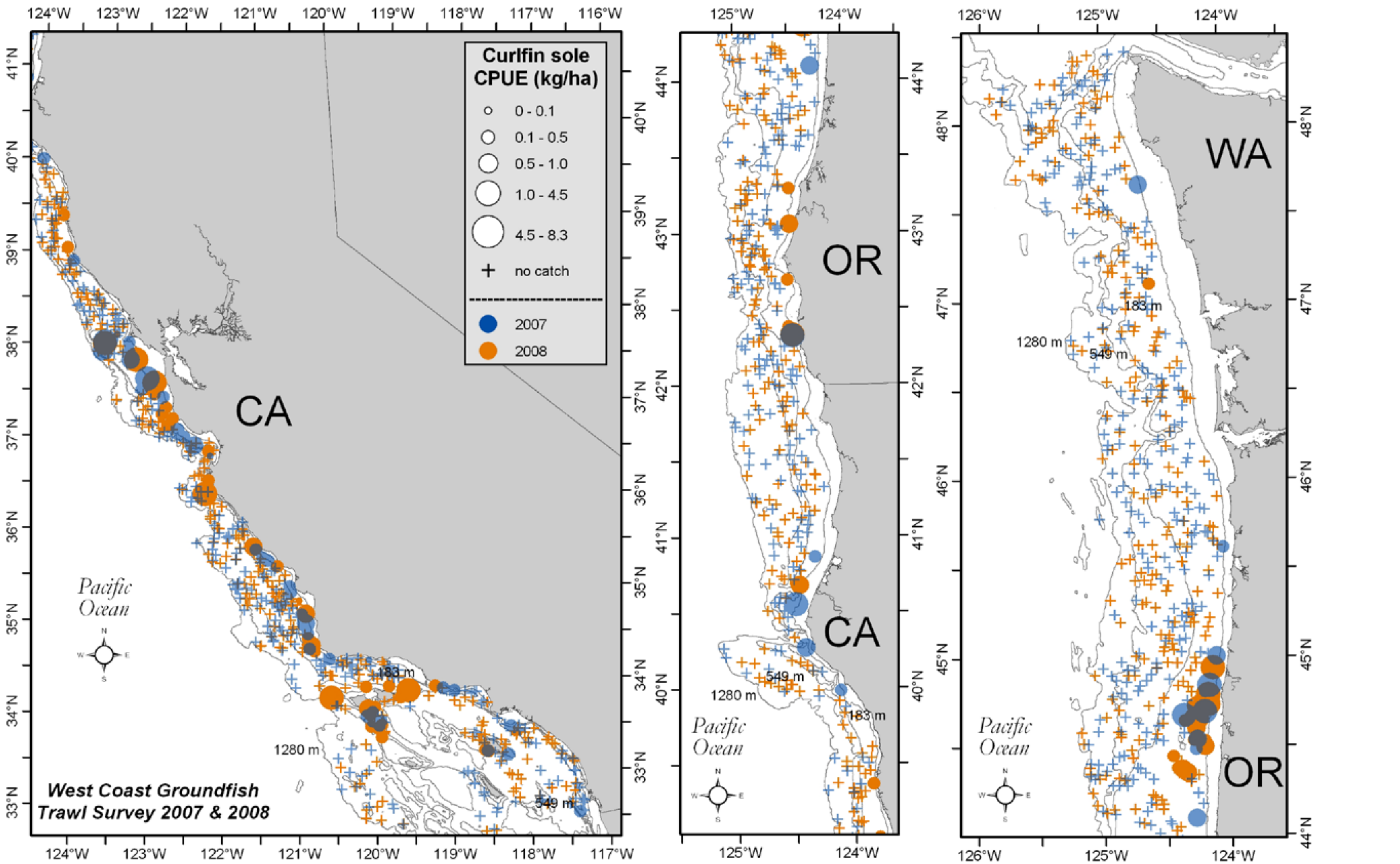

Figure 41. Curlfin sole distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

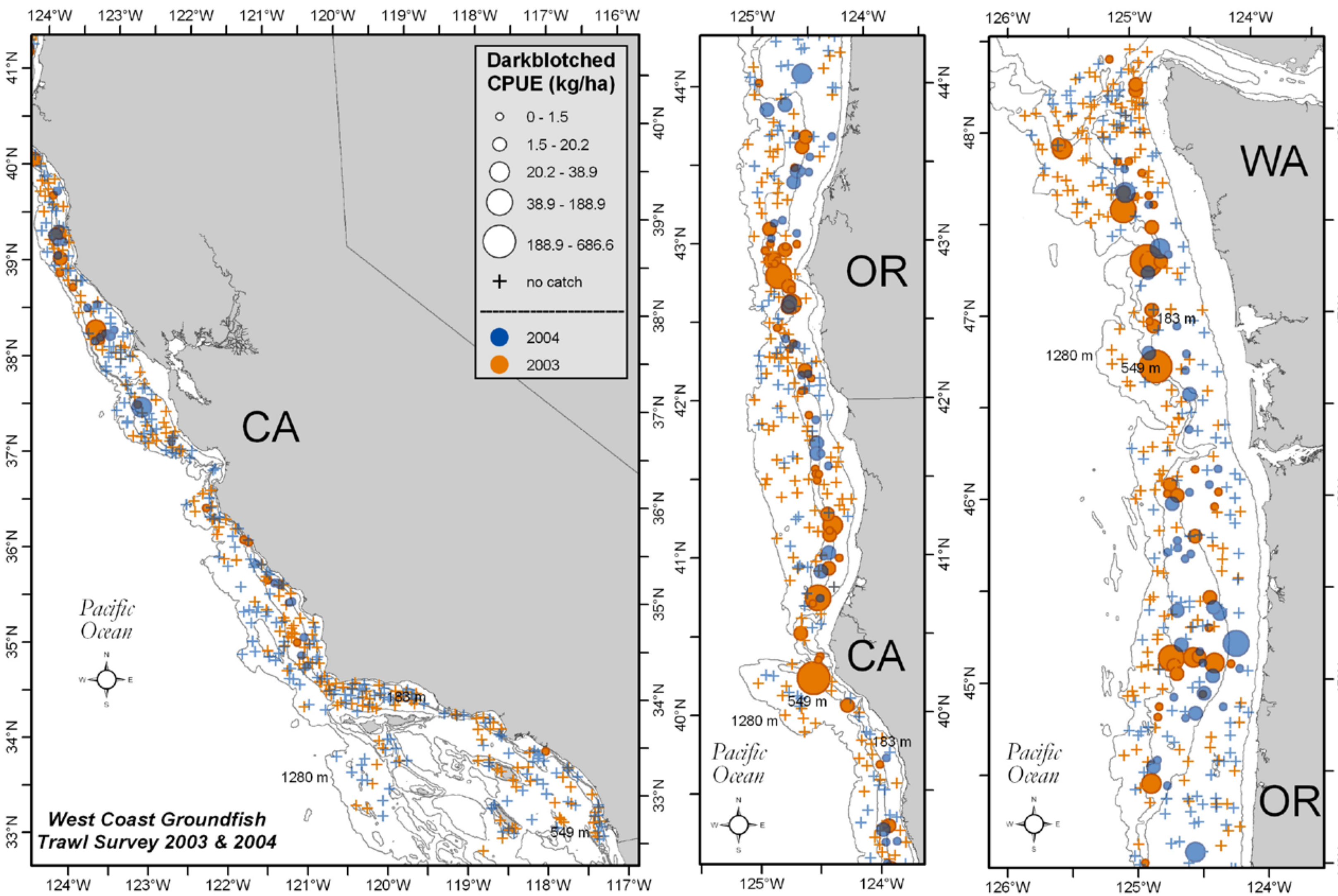

Figure 42. Darkblotched rockfish (*Sebastes crameri*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between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

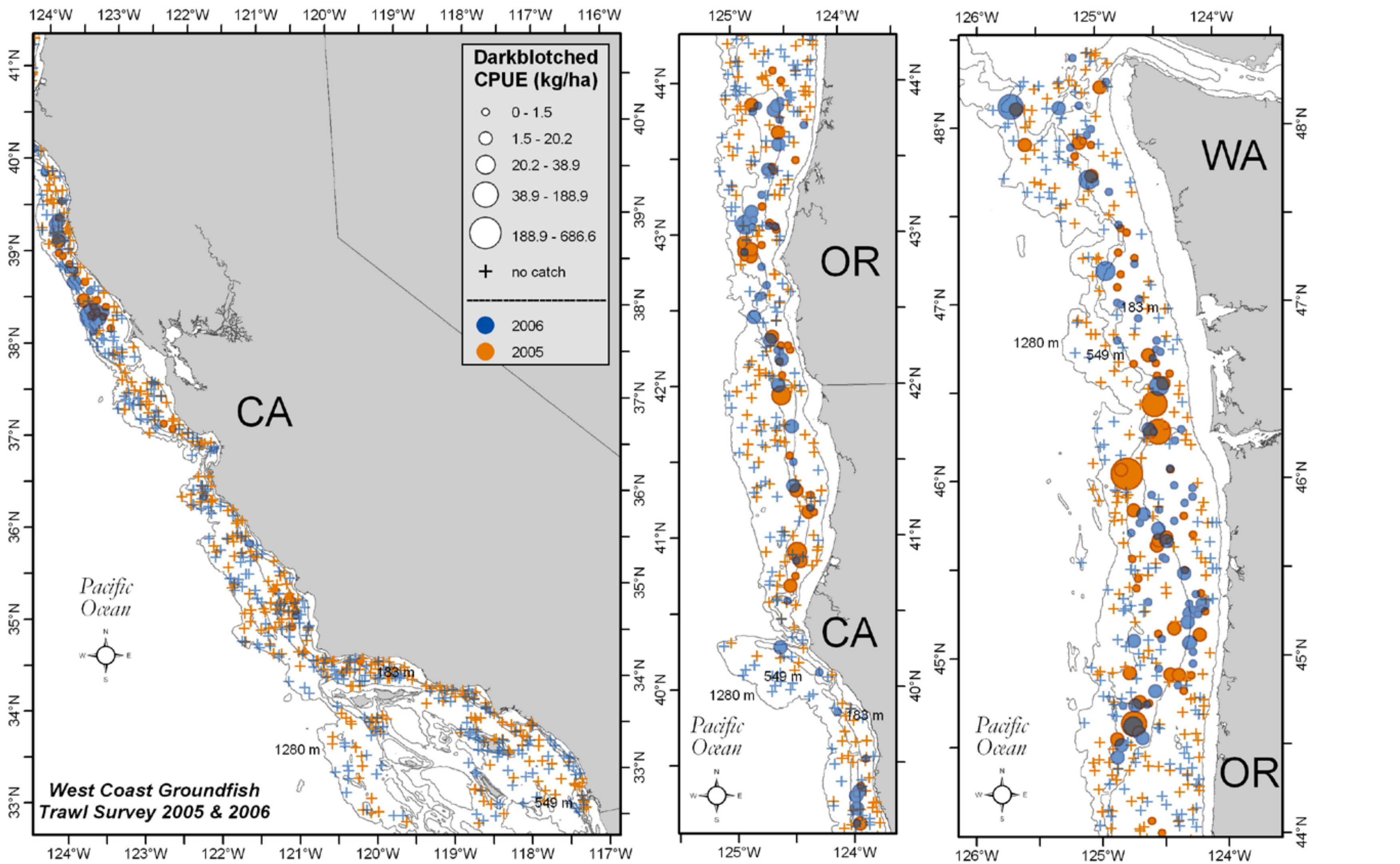

Figure 43. Darkblotched rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

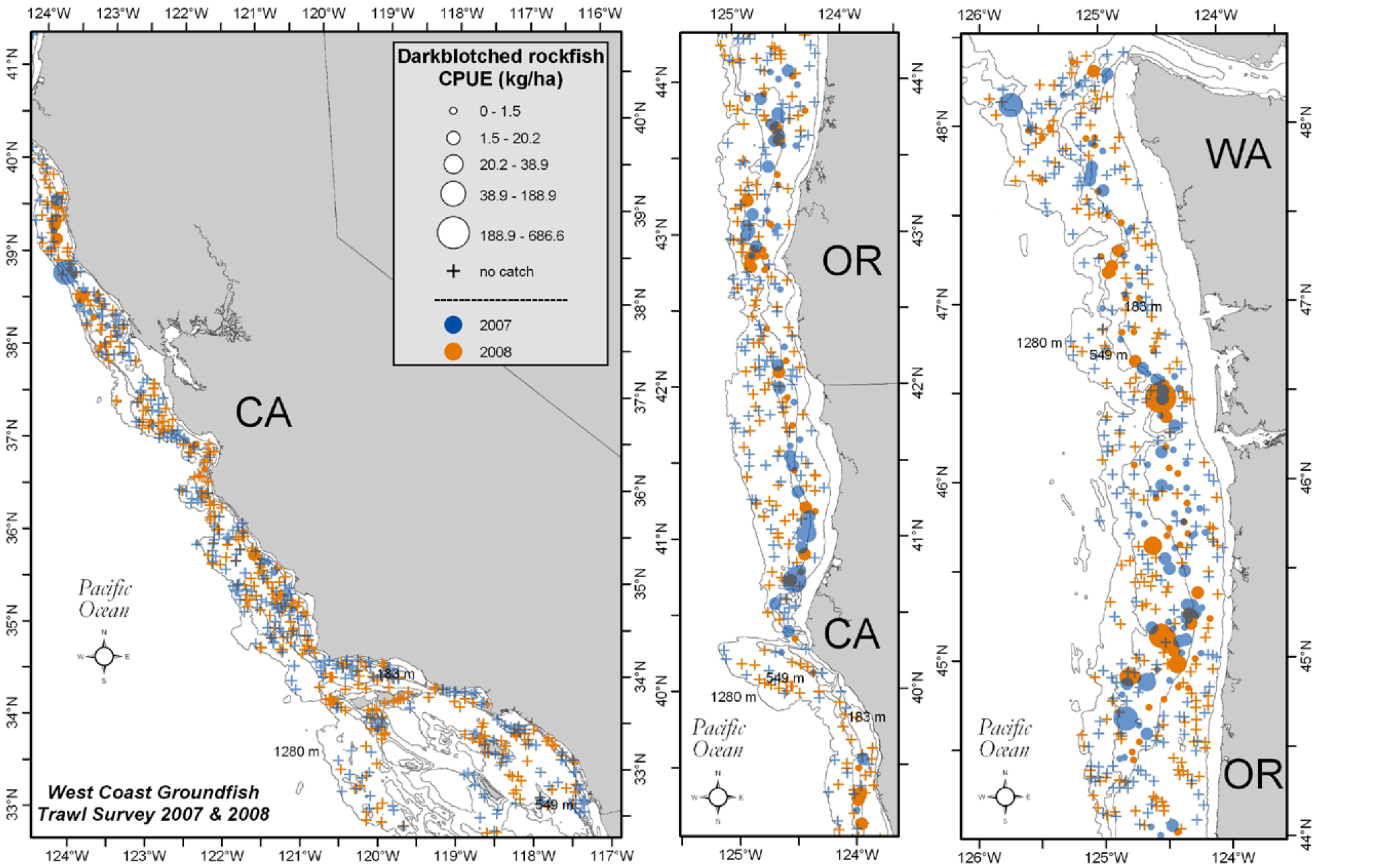

Figure 44. Darkblotched rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

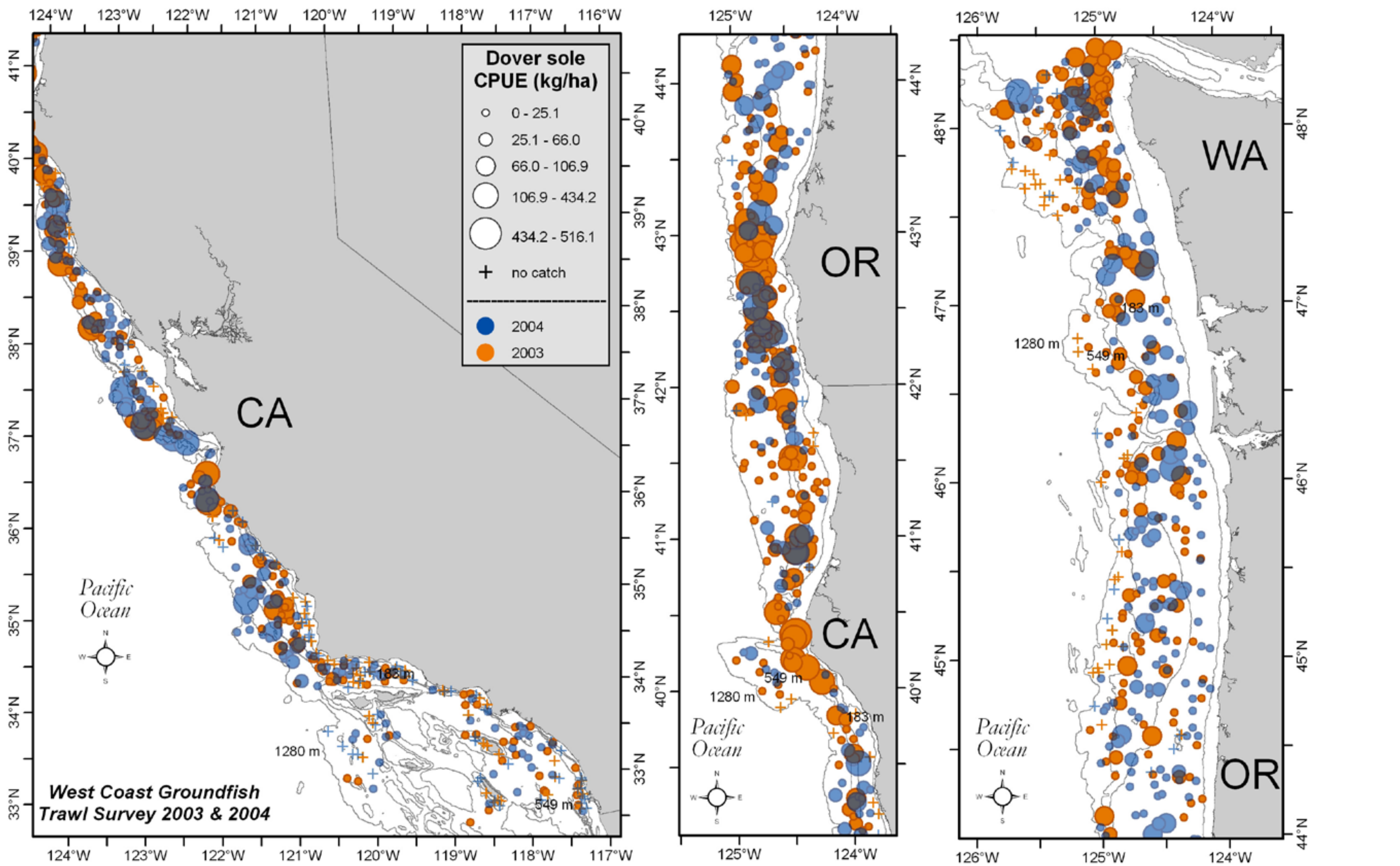

Figure 45. Dover sole distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

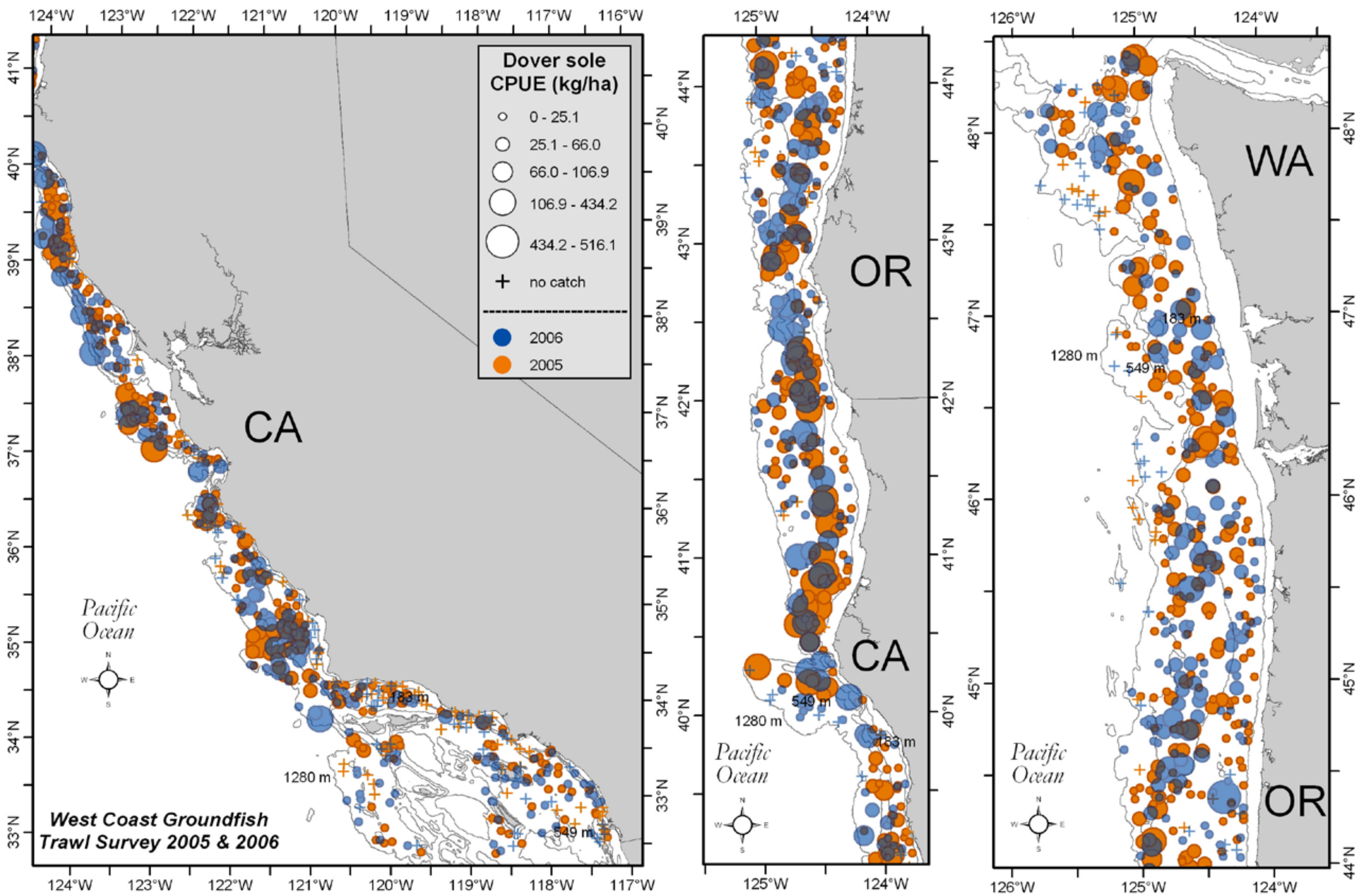

Figure 46. Dover sole distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

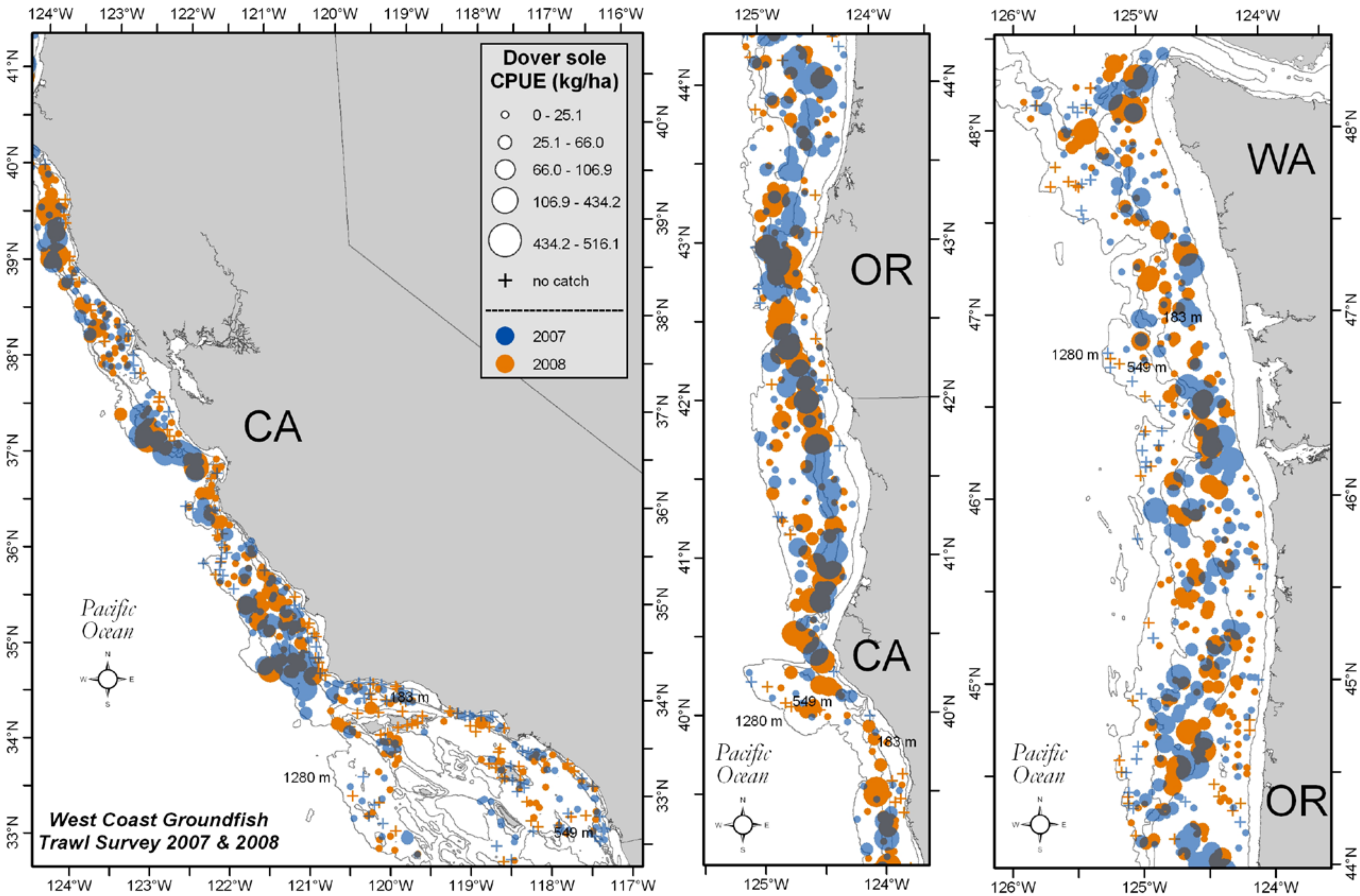

Figure 47. Dover sole distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

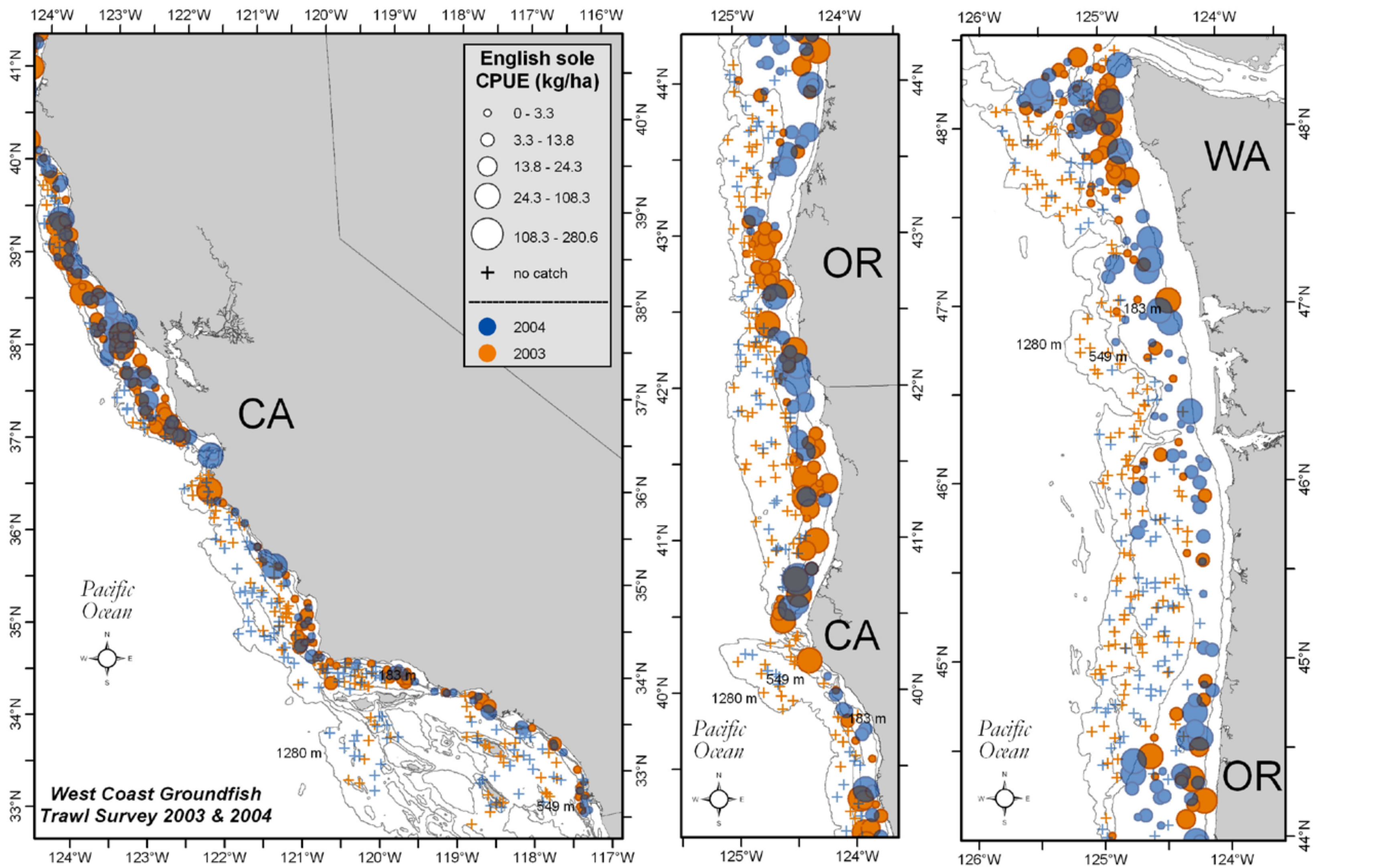

Figure 48. English sole distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

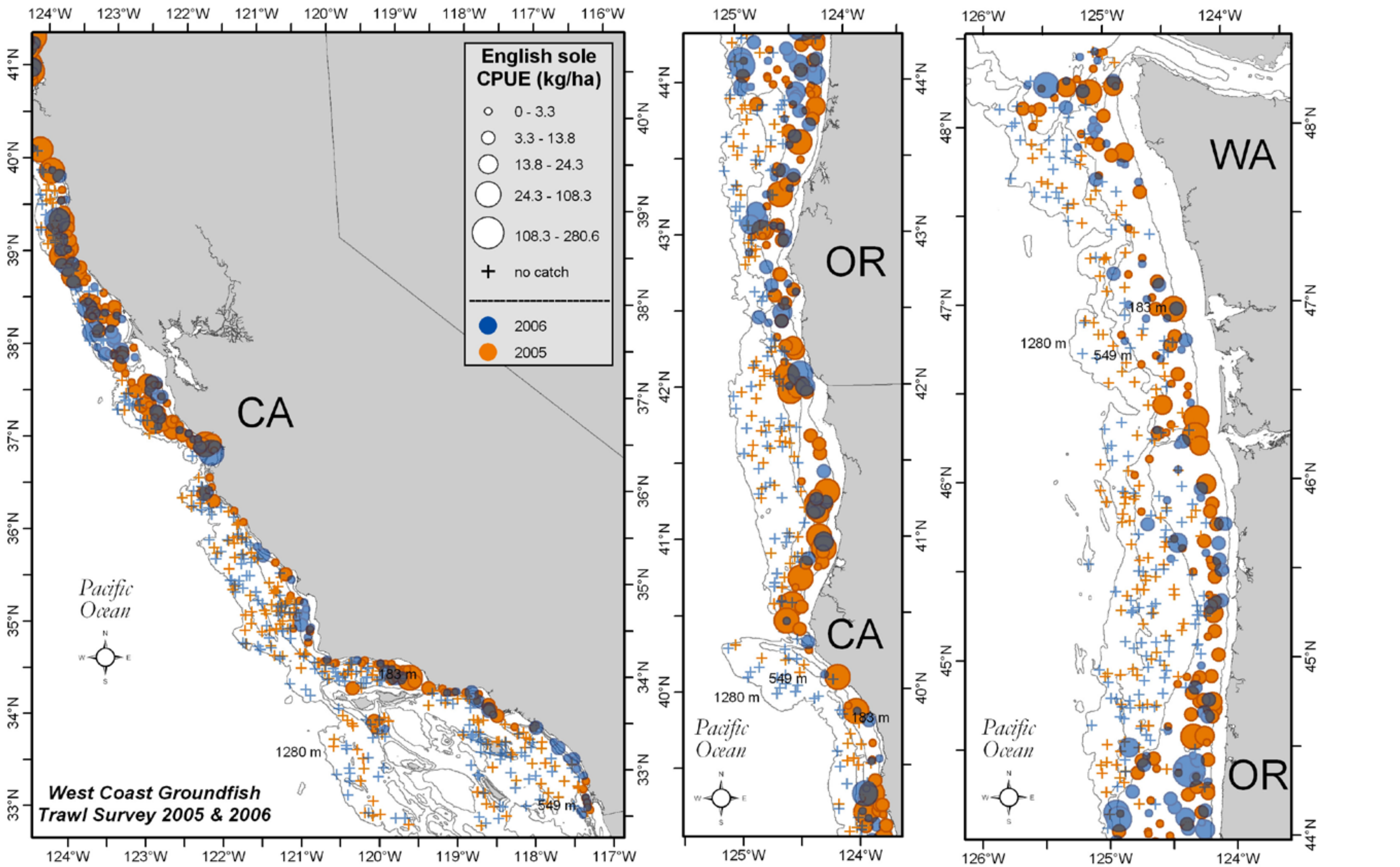

Figure 49. English sole distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

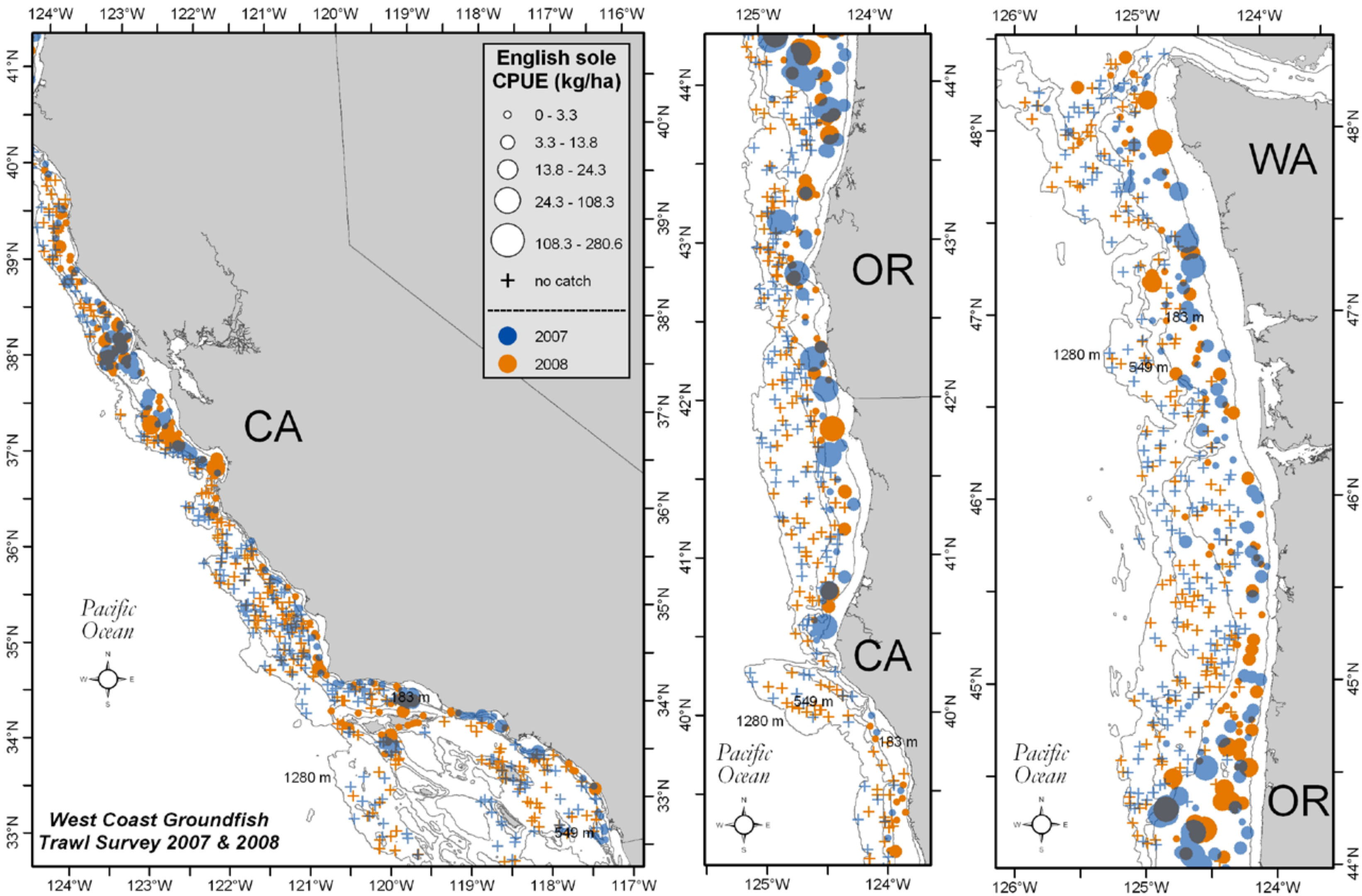

Figure 50. English sole distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

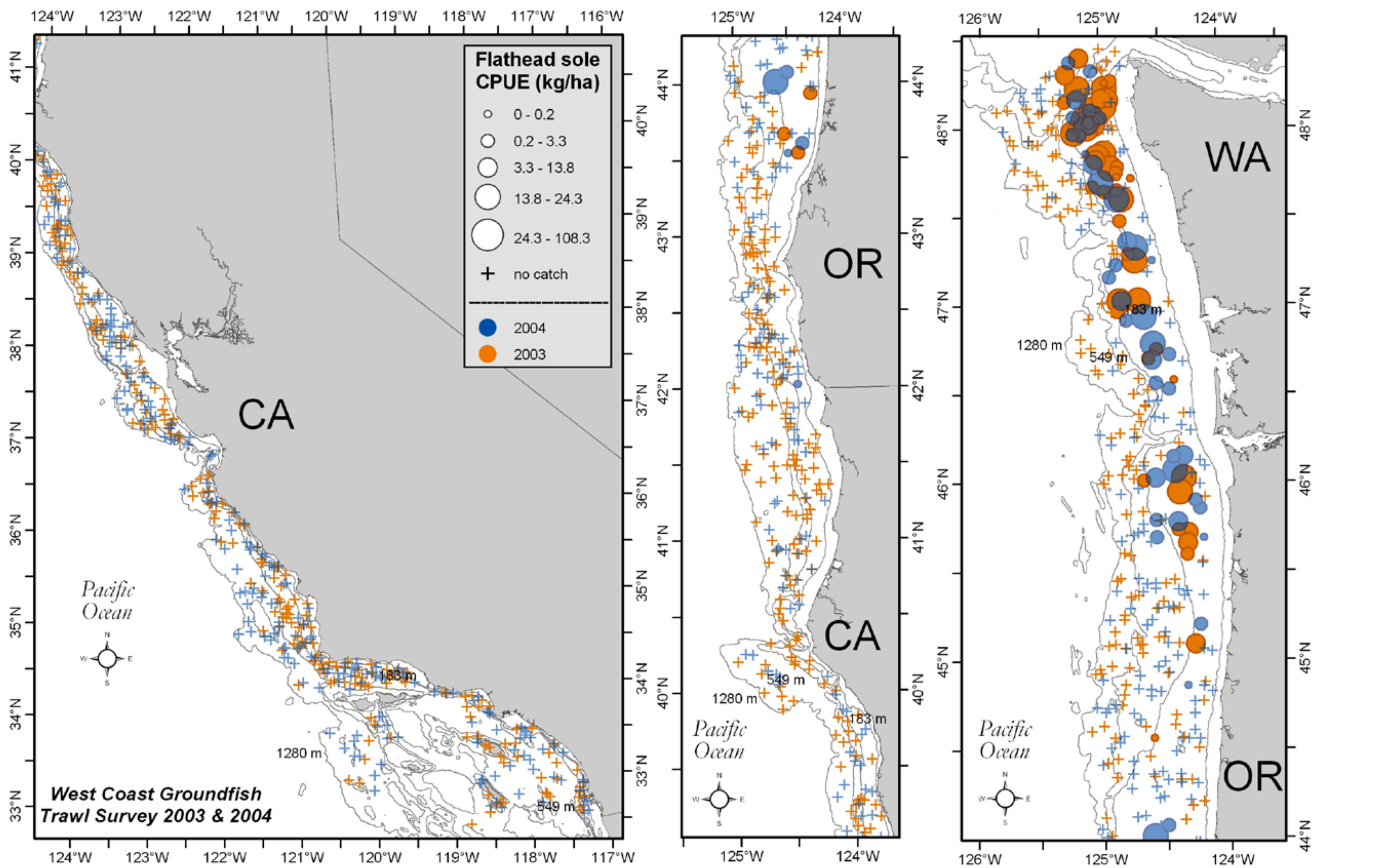

Figure 51. Flathead sole (*Hippoglossoides elassodon*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between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

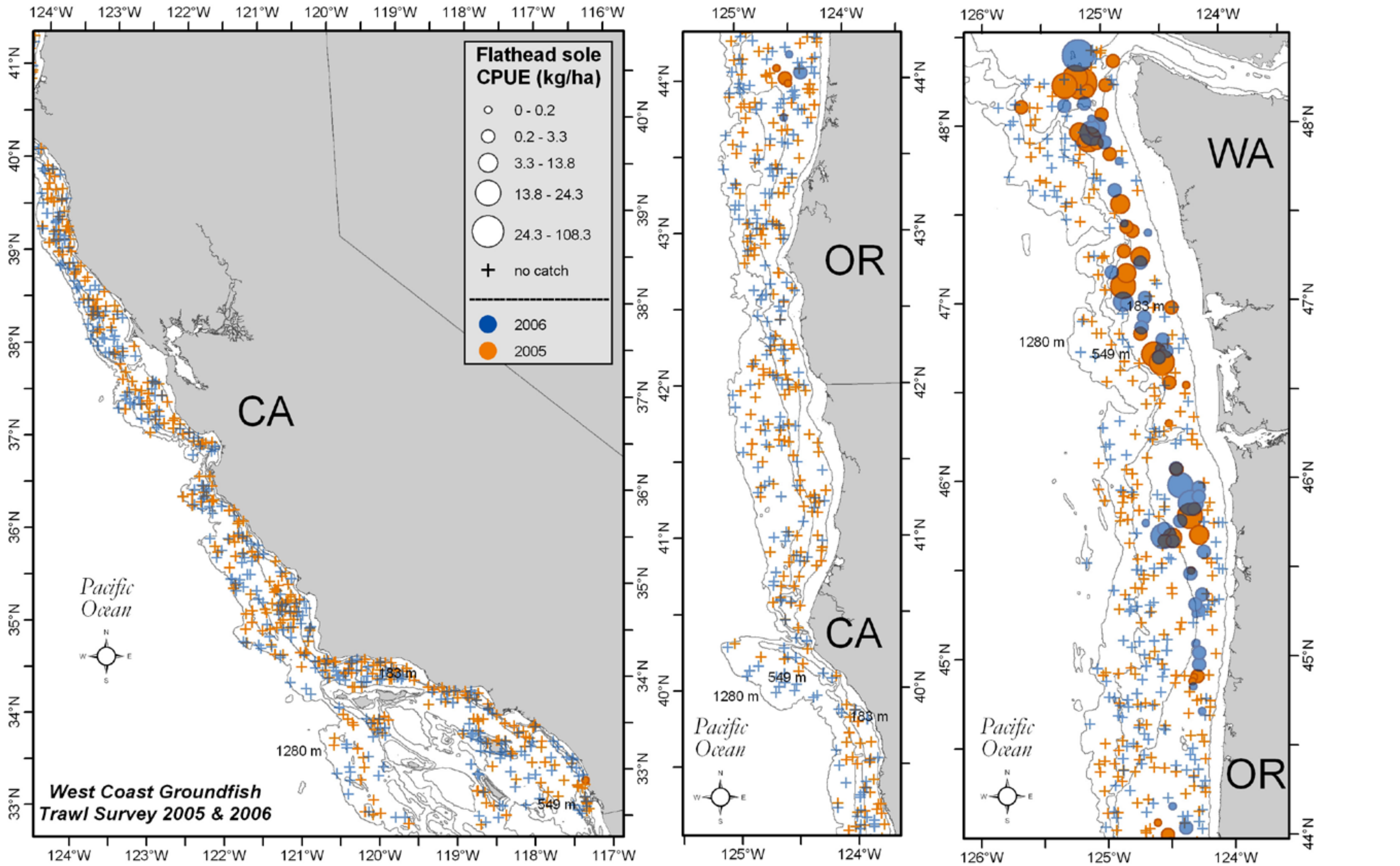

Figure 52. Flathead sole distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

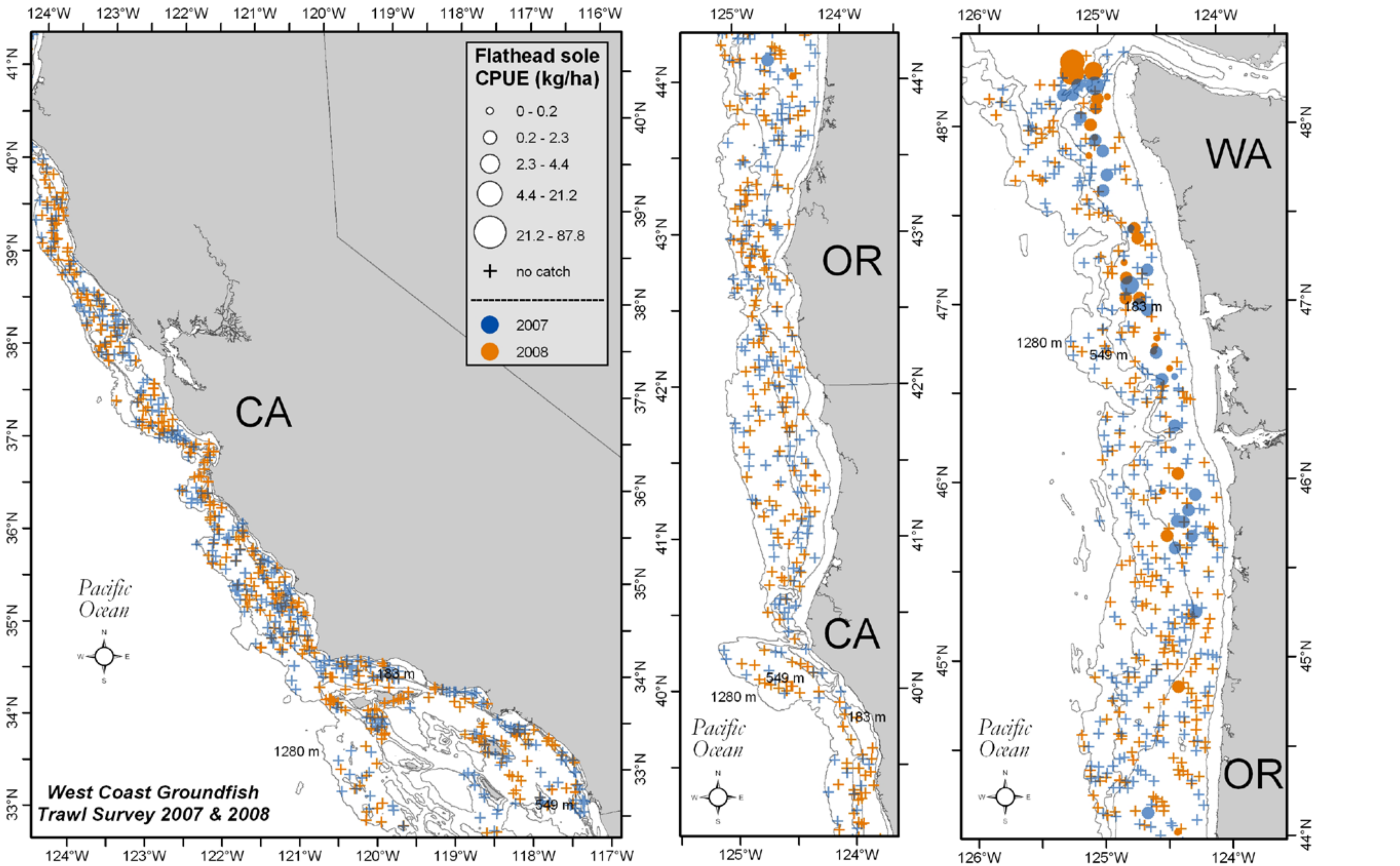

Figure 53. Flathead sole distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

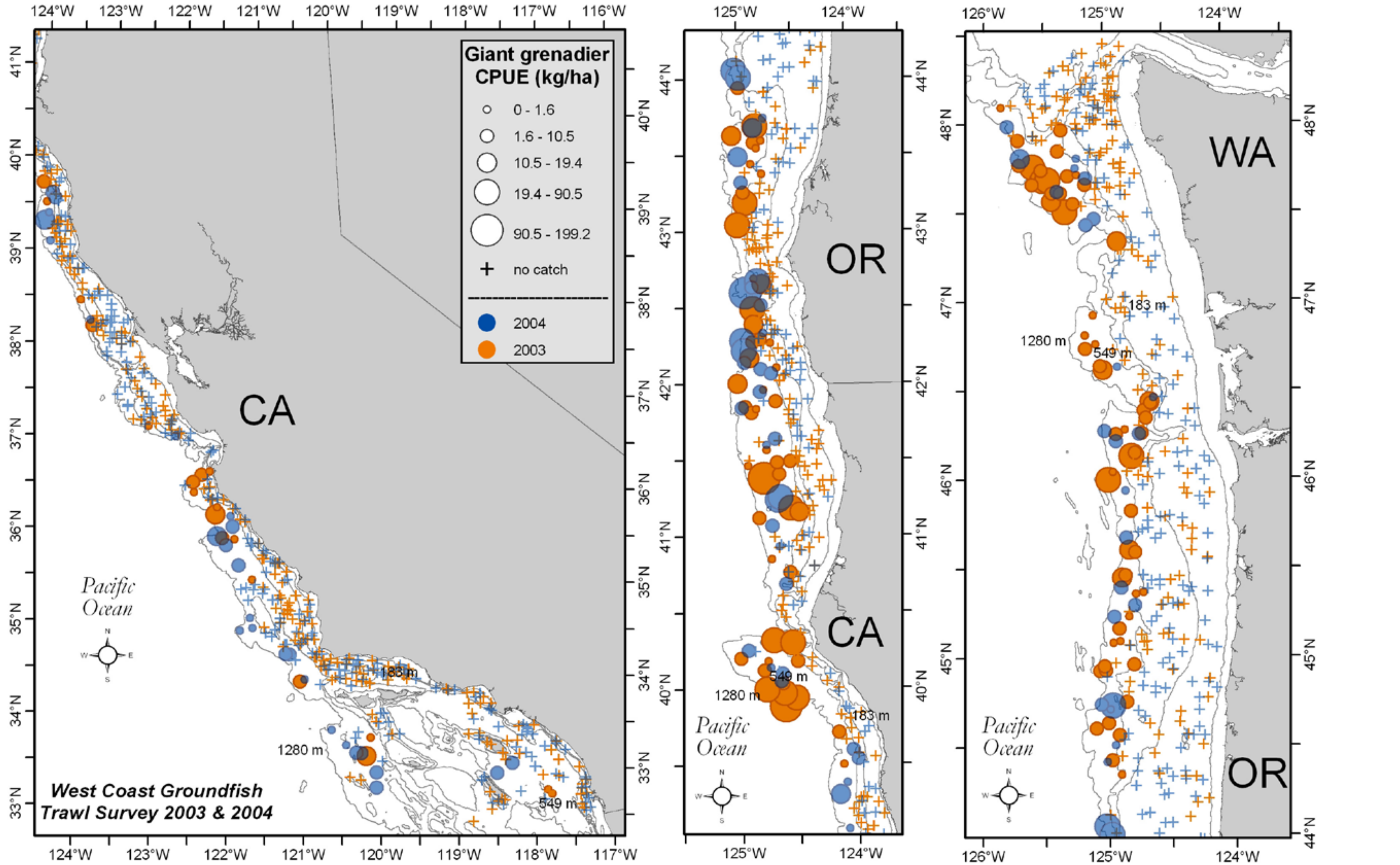

Figure 54. Giant grenadier distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

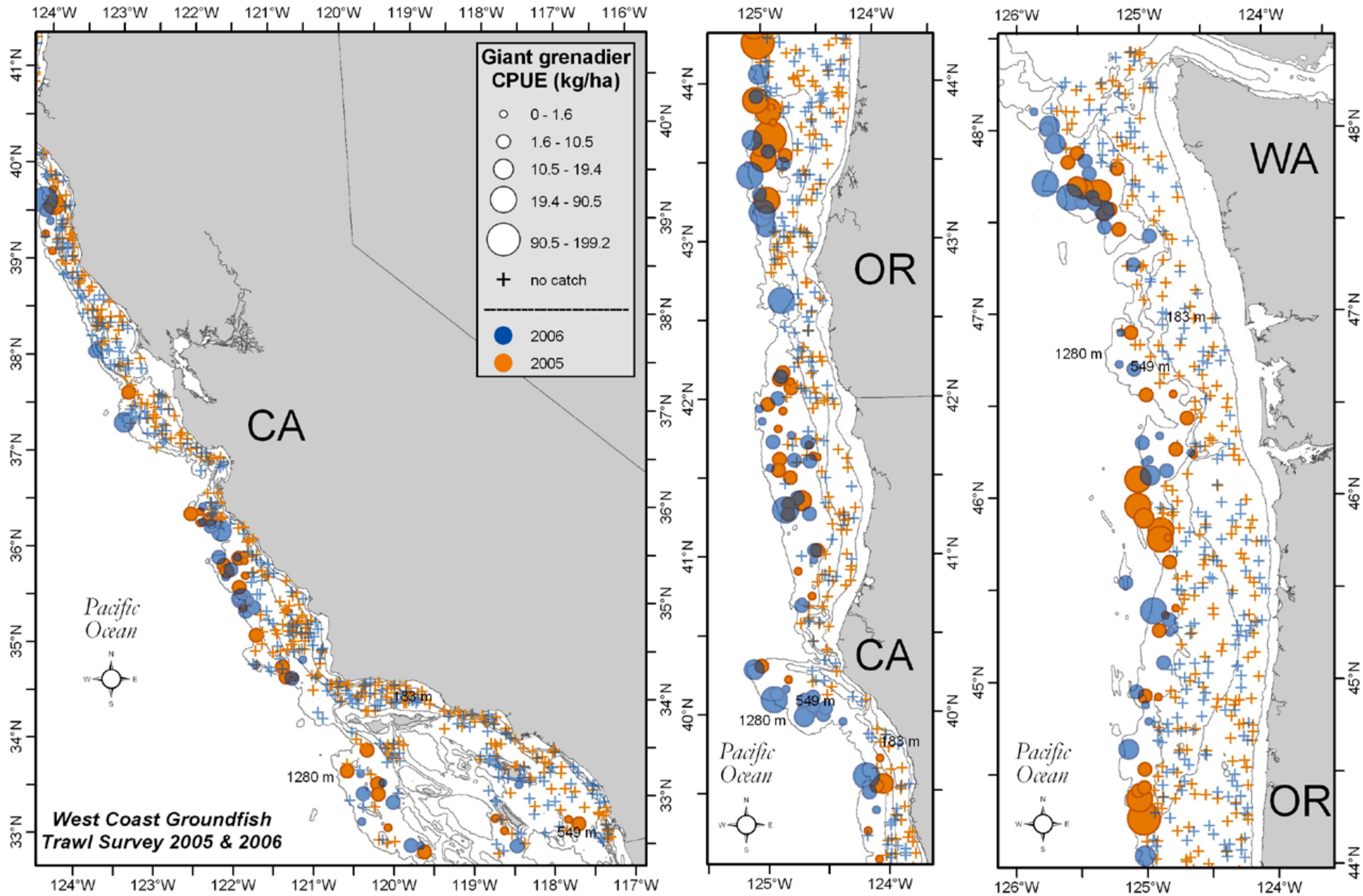

Figure 55. Giant grenadier distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

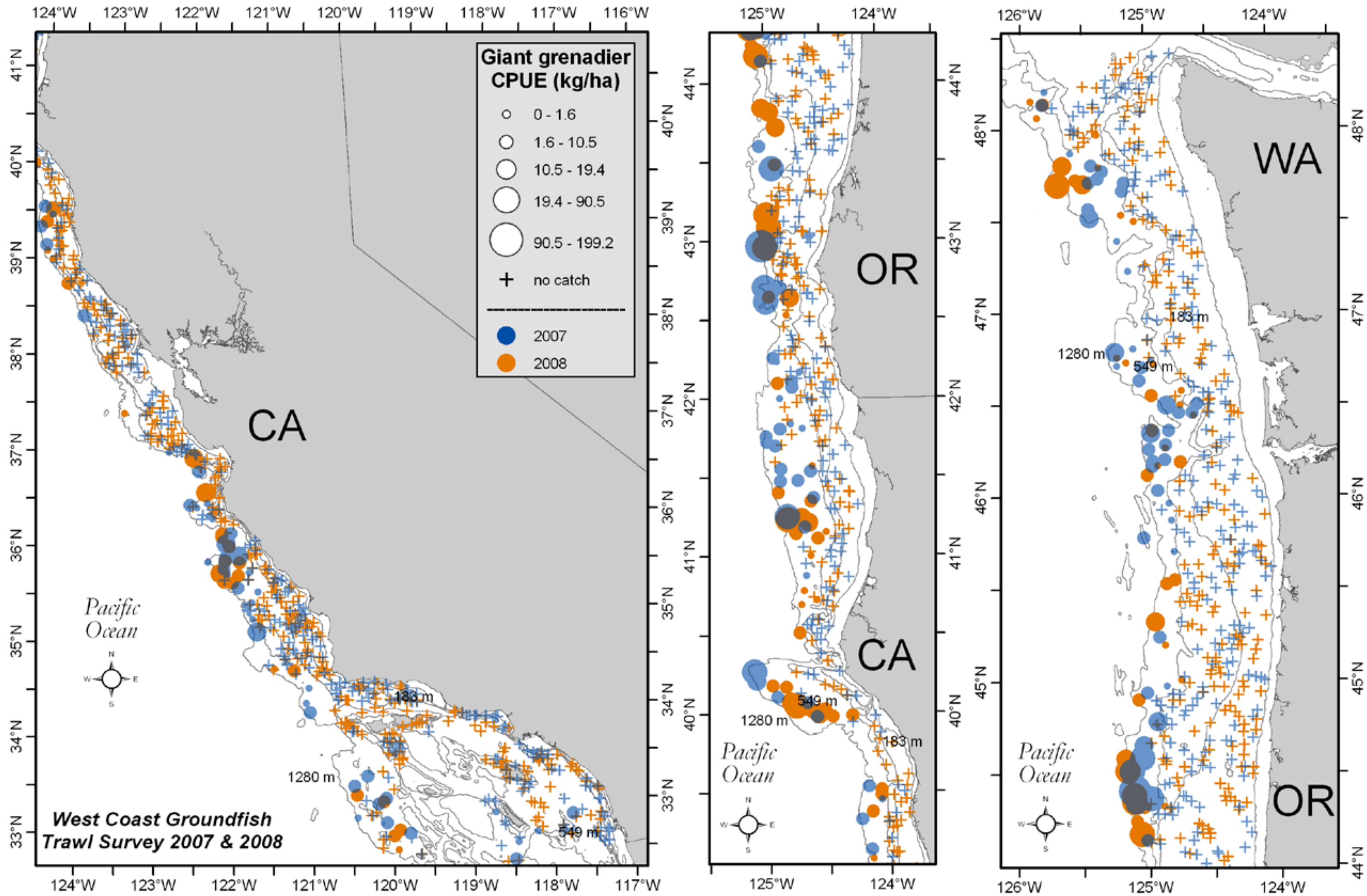

Figure 56. Giant grenadier distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

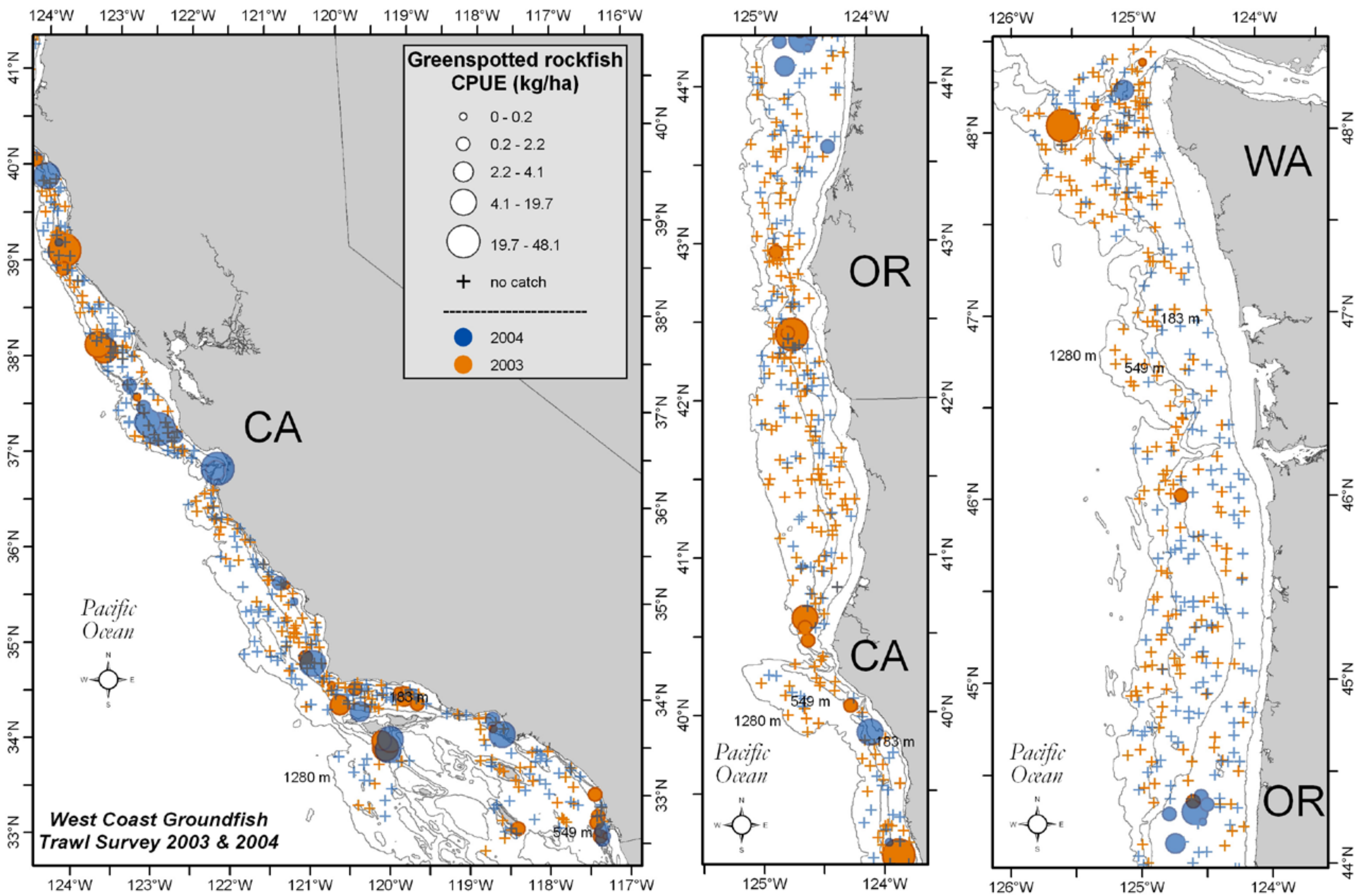

Figure 57. Greenspotted rockfish (*Sebastes chlorostictus*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between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

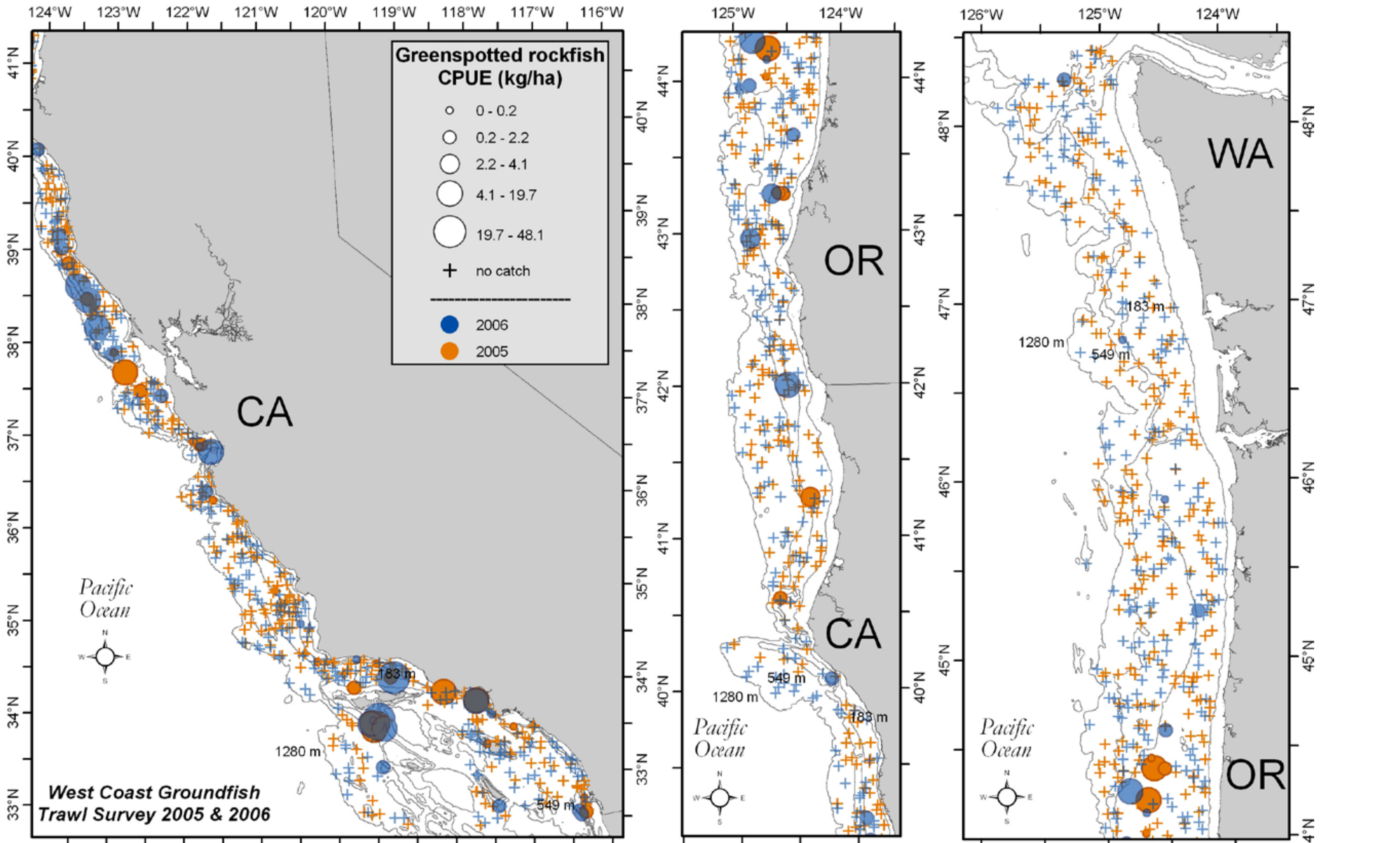

Figure 58. Greenspotted rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

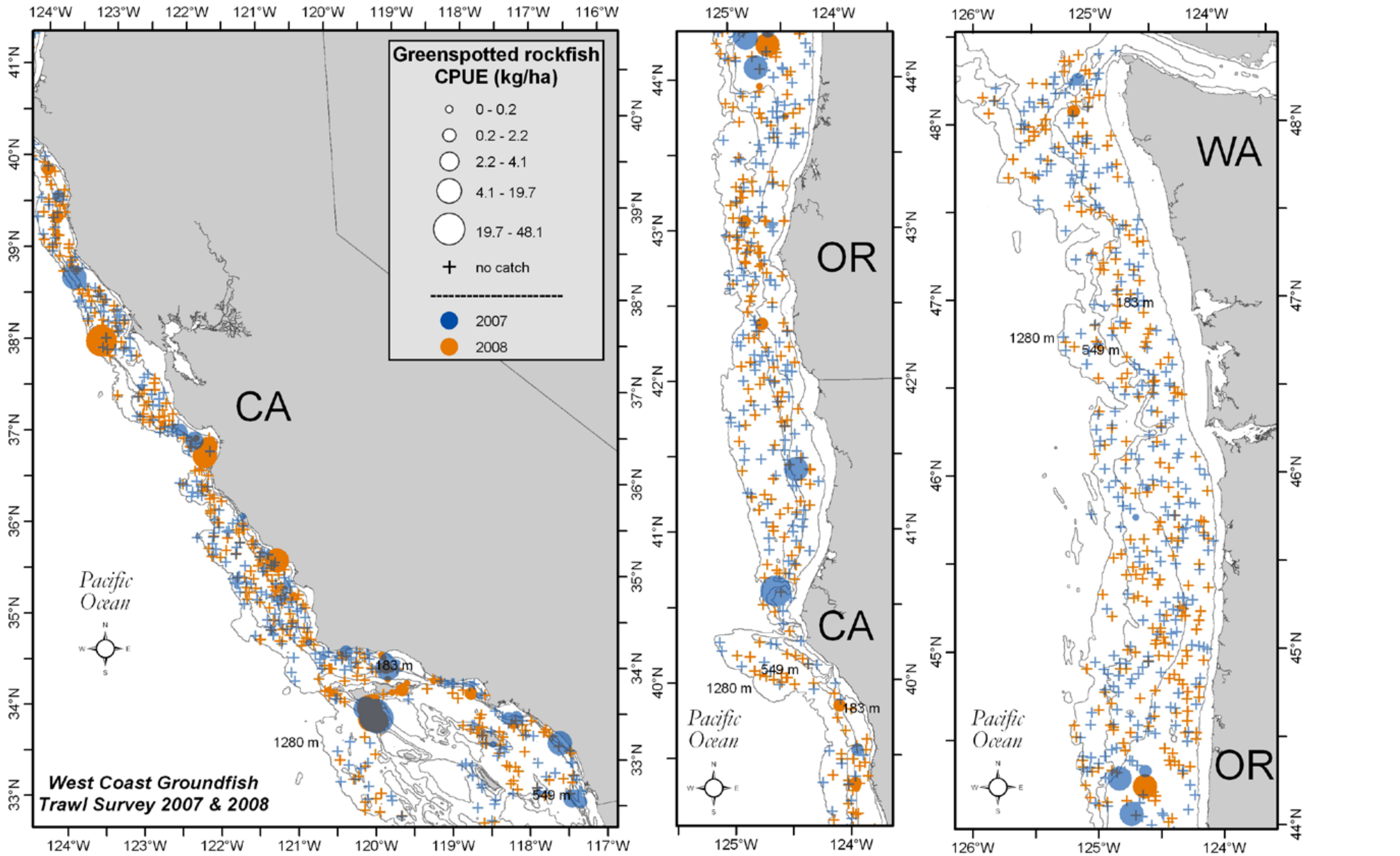

Figure 59. Greenspotted rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

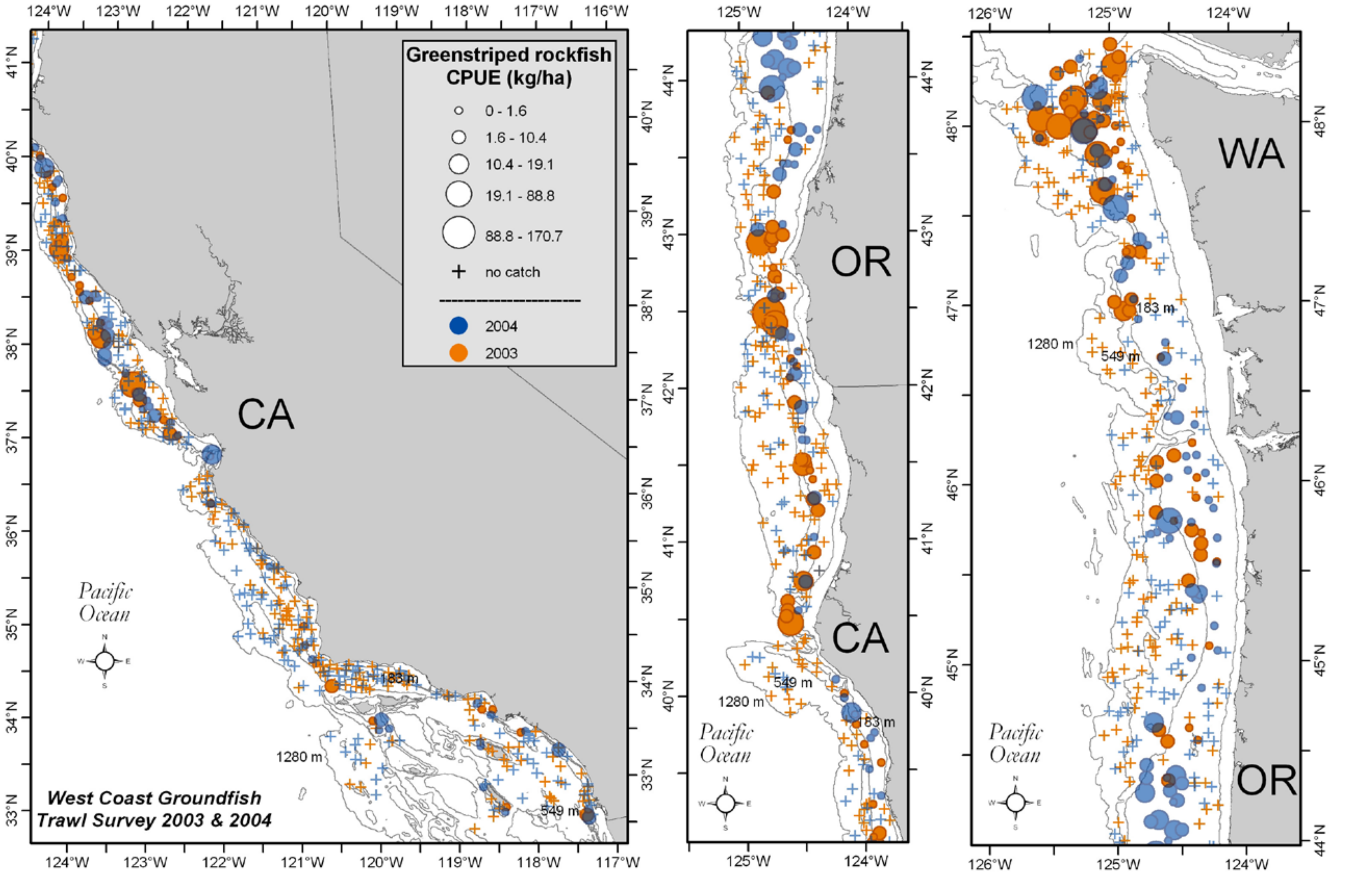

Figure 60. Greenstriped rockfish (*Sebastes elongatus*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between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

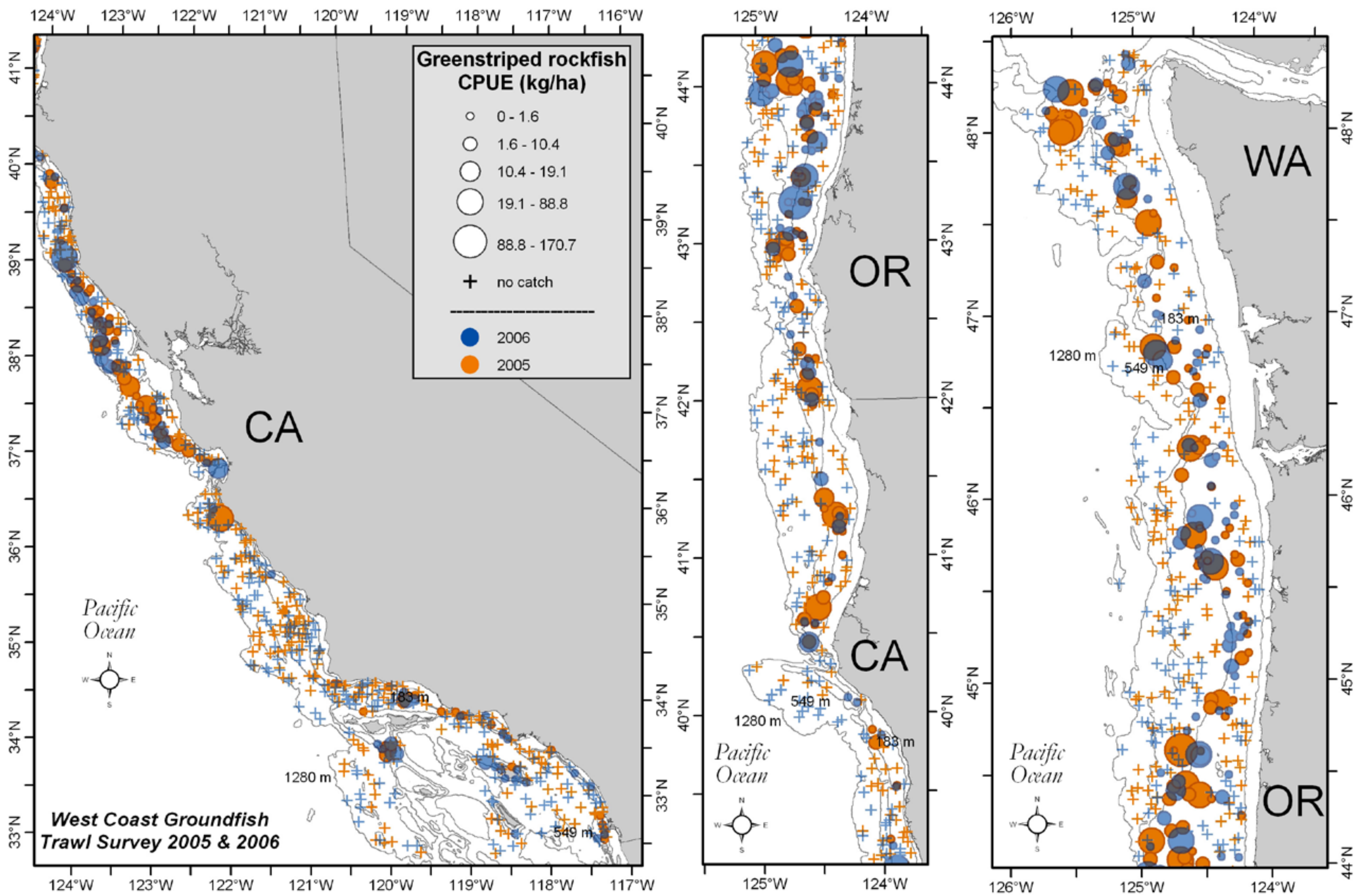

Figure 61. Greenstriped rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

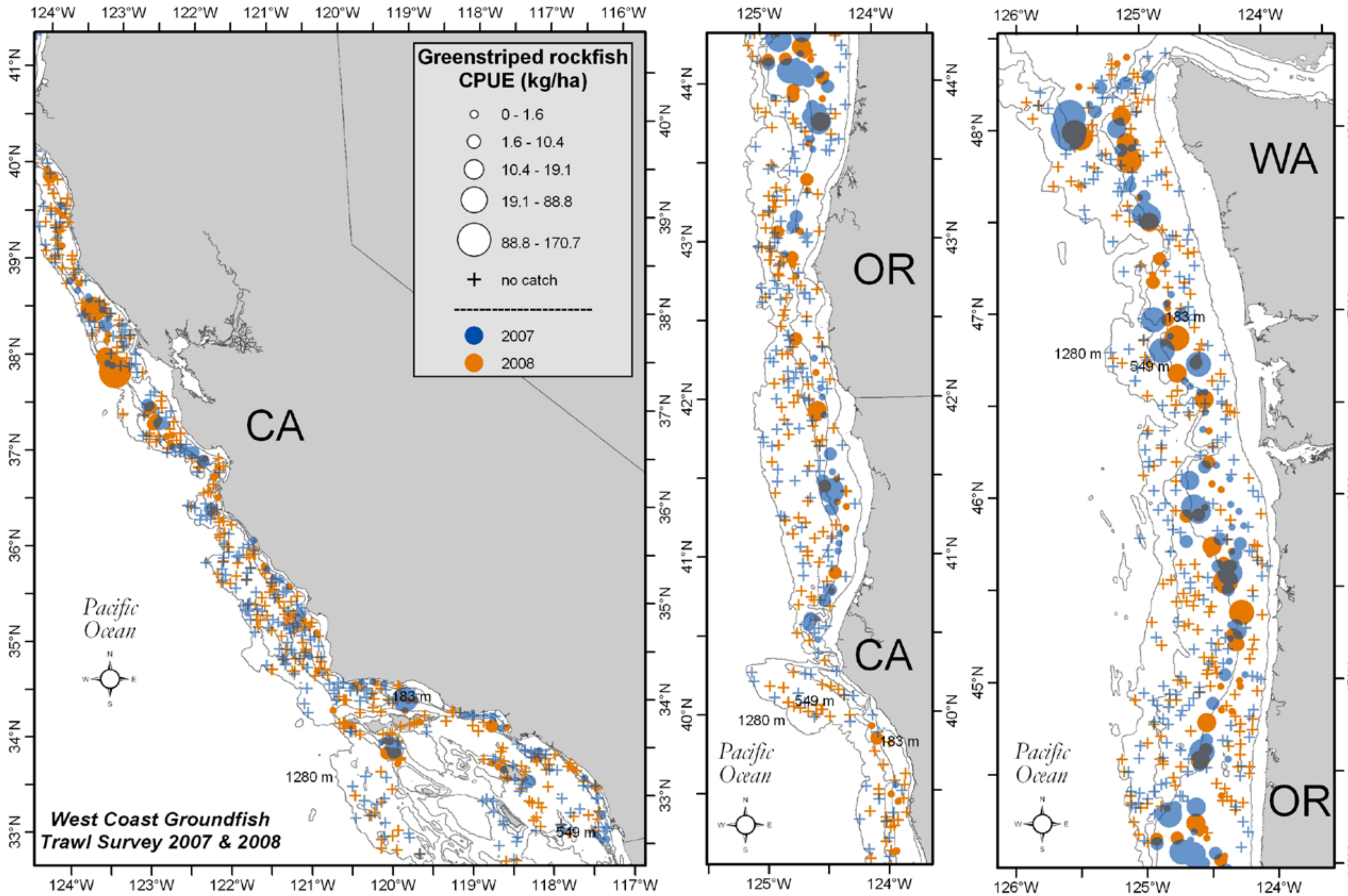

Figure 62. Greenstriped rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

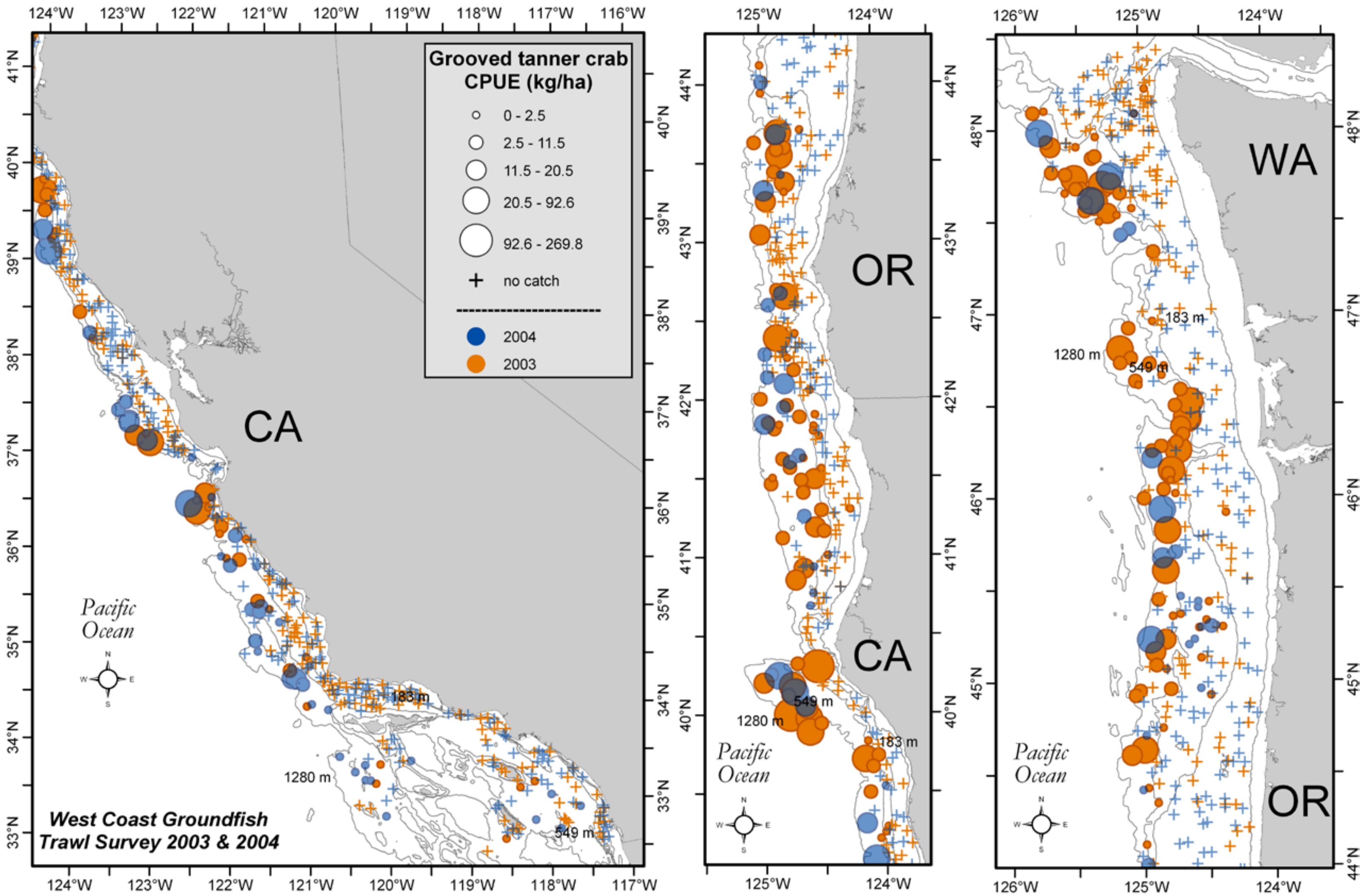

Figure 63. Grooved tanner crab distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

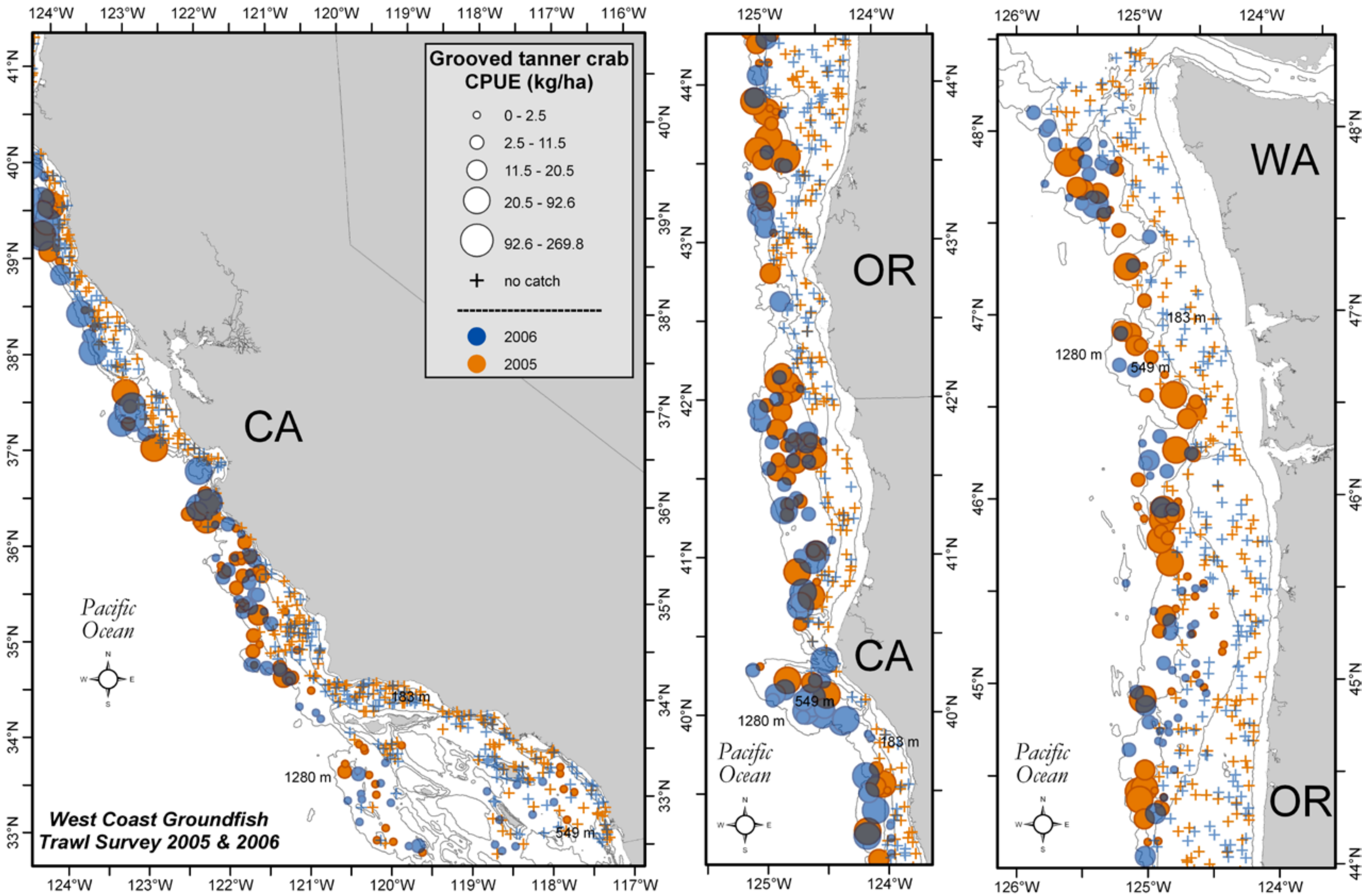

Figure 64. Grooved tanner crab distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

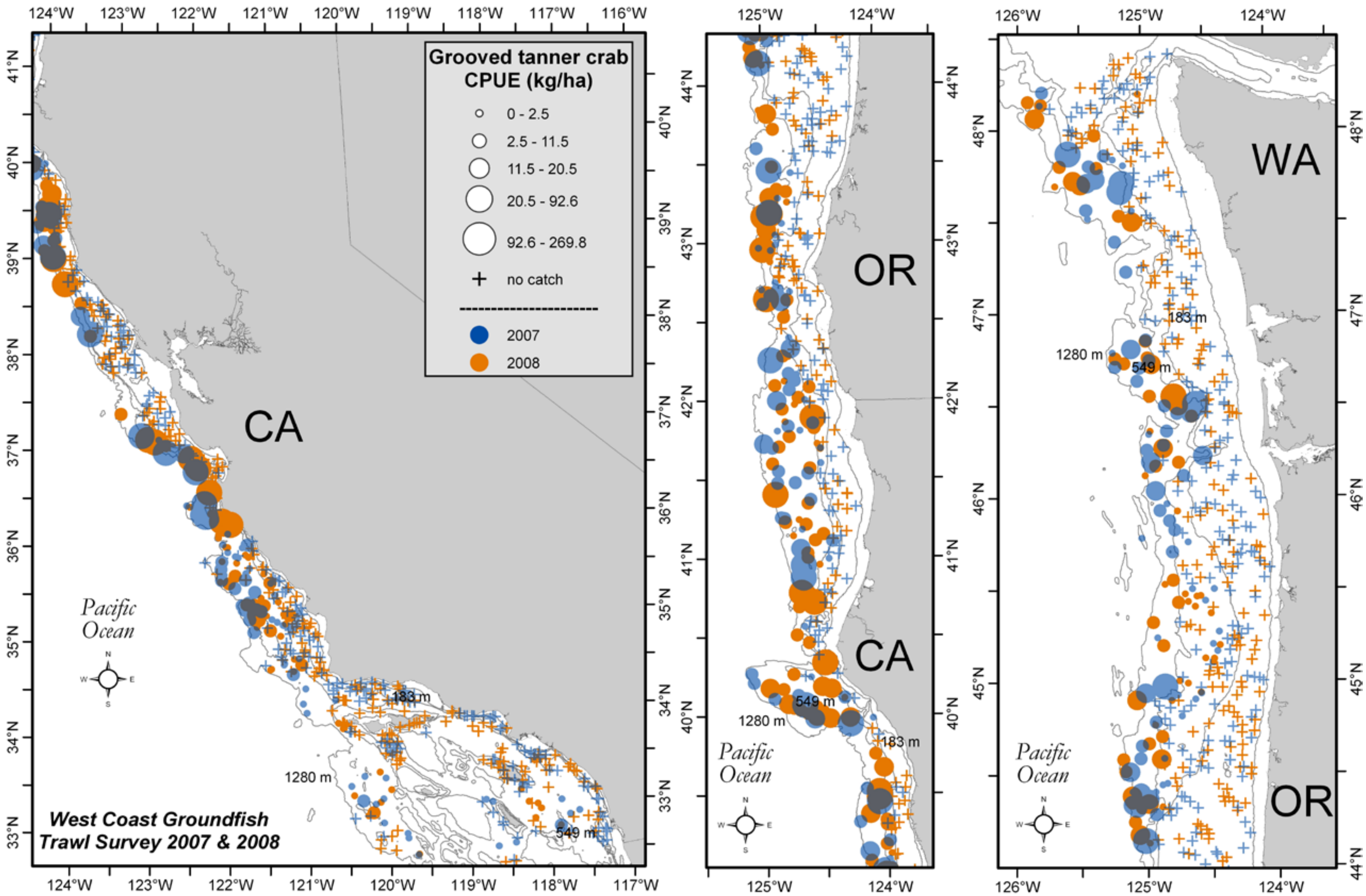

Figure 65. Grooved tanner crab distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

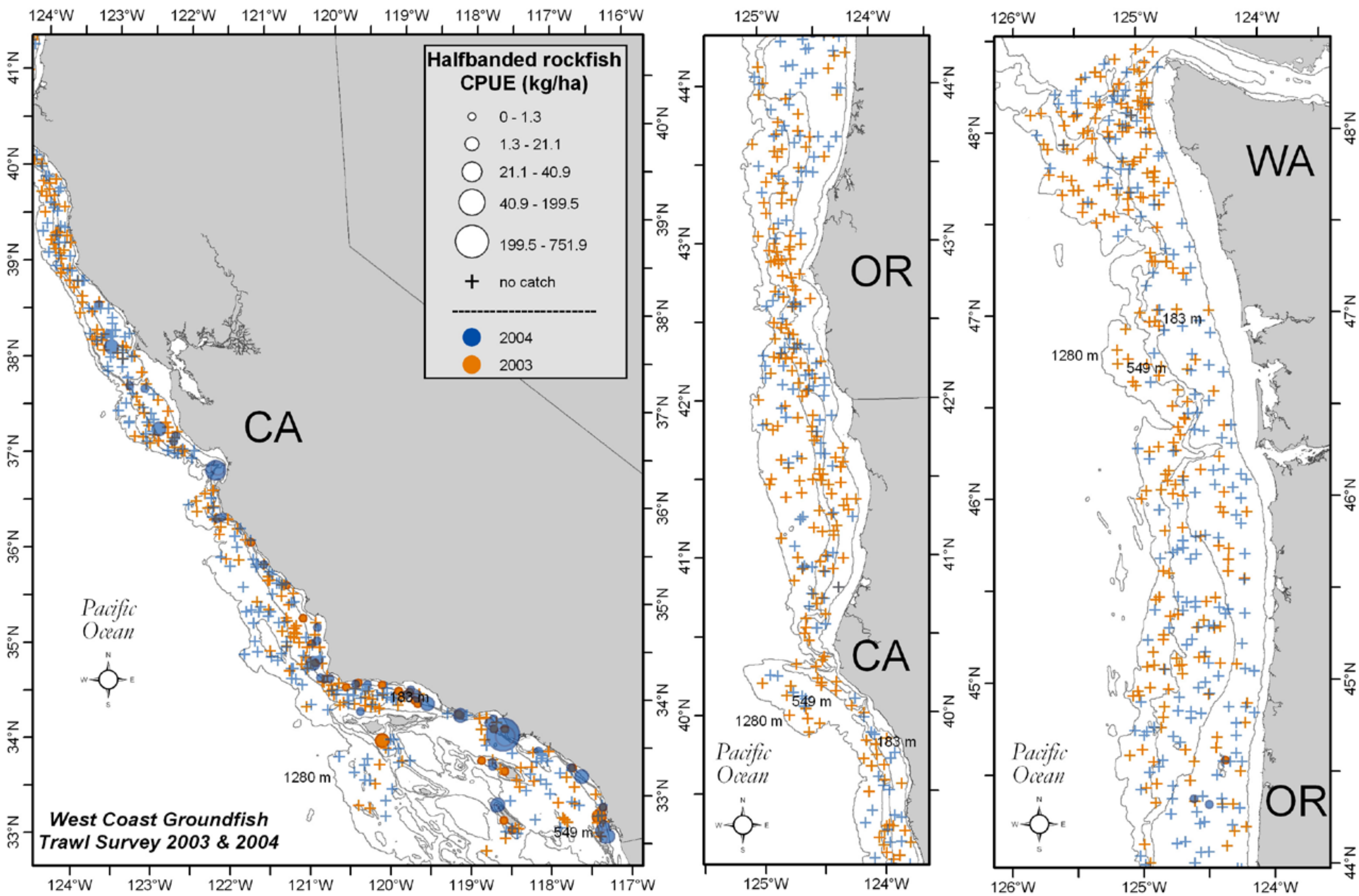

Figure 66. Halfbanded rockfish (*Sebastes semicinctus*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between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

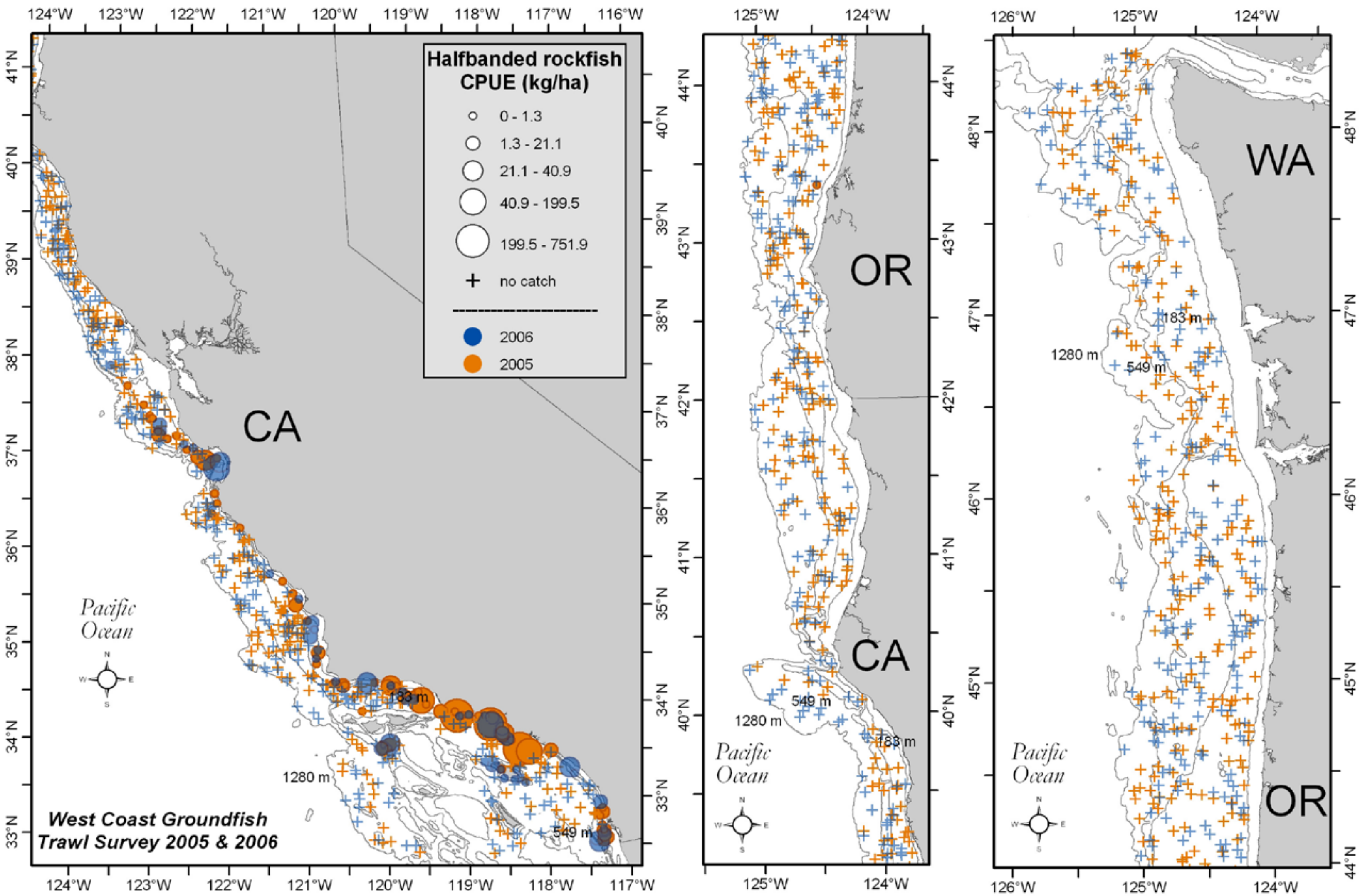

Figure 67. Halfbanded rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

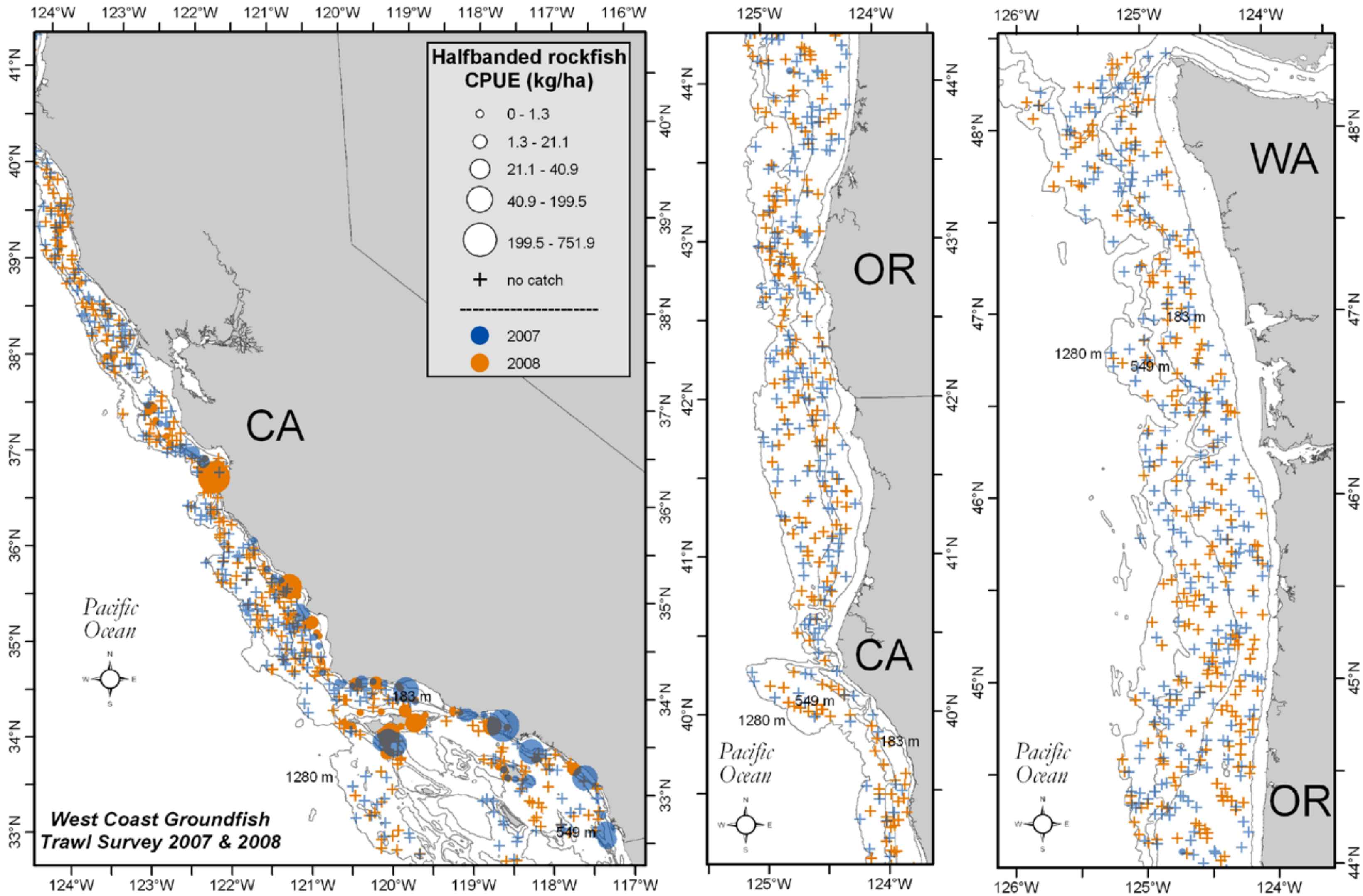

Figure 68. Halfbanded rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

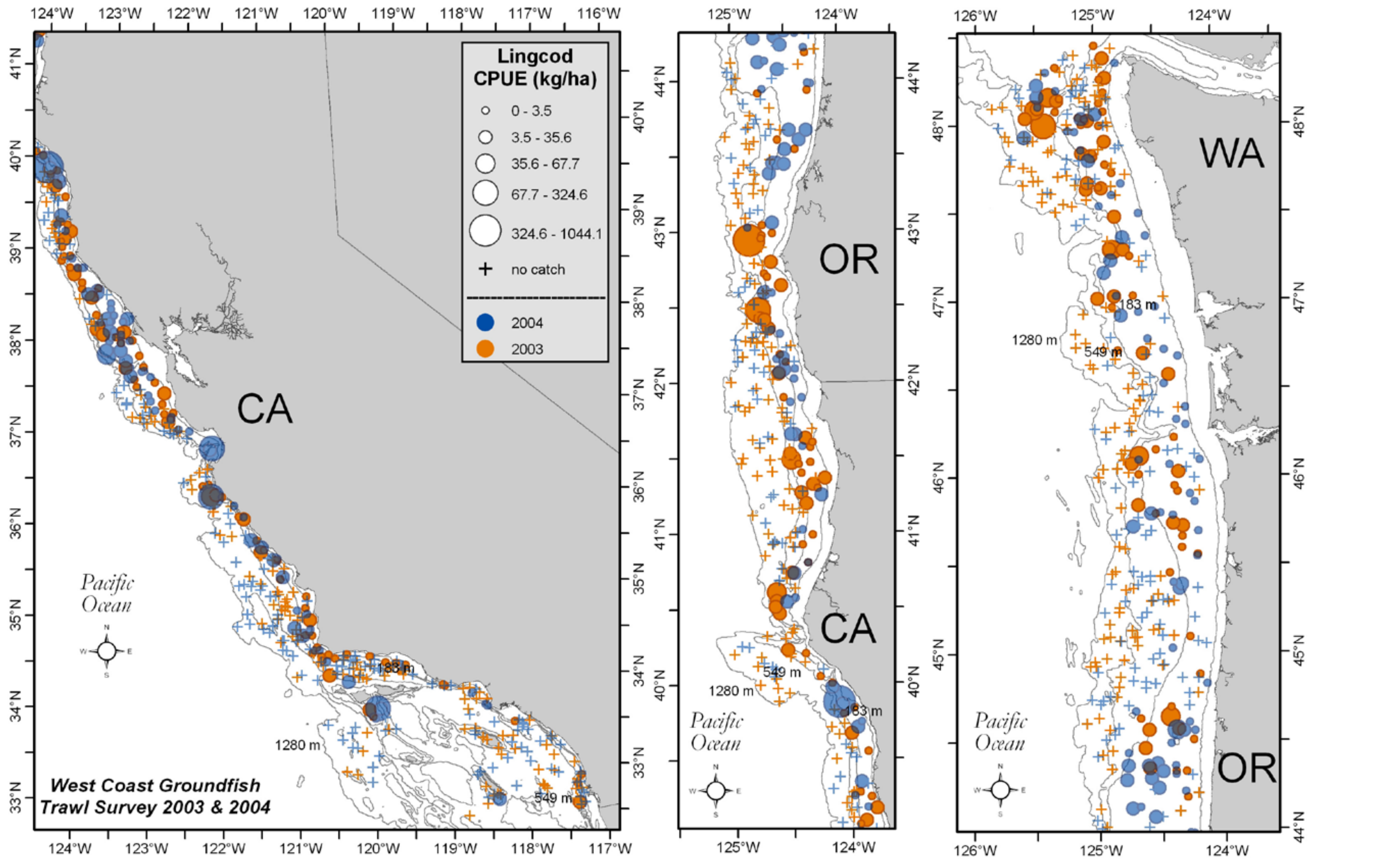

Figure 69. Lingcod distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2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

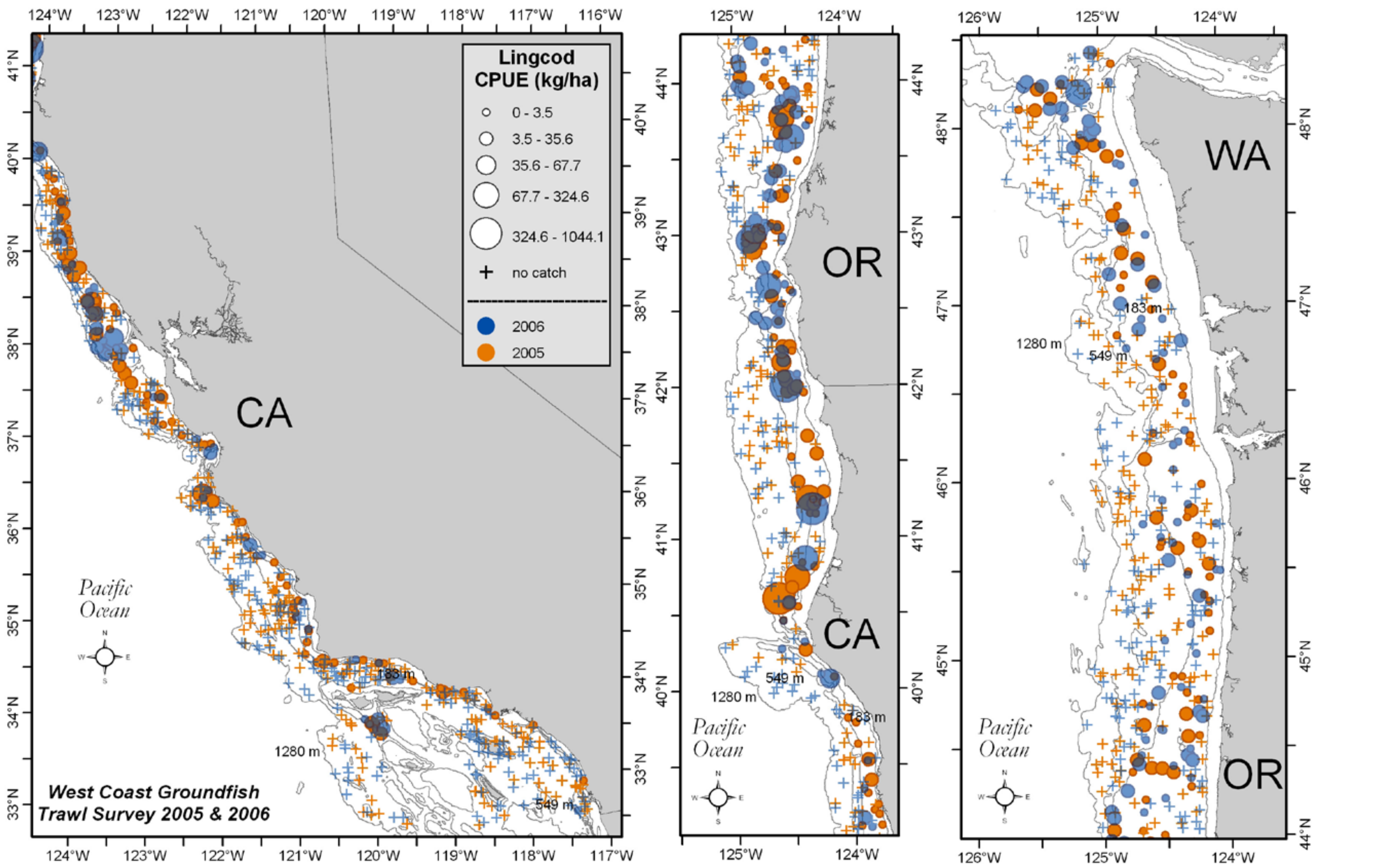

Figure 70. Lingcod distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2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

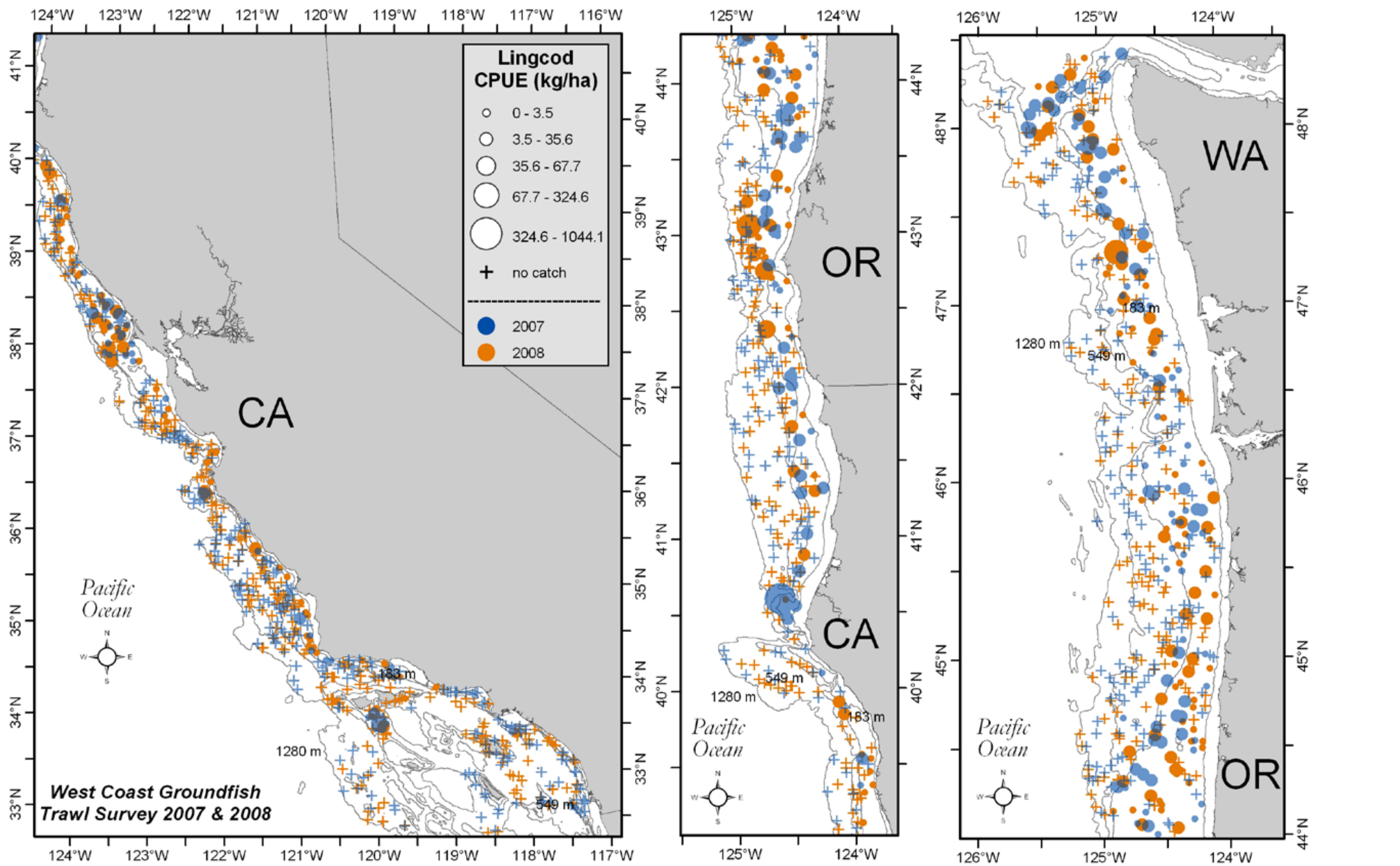

Figure 71. Lingcod distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2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

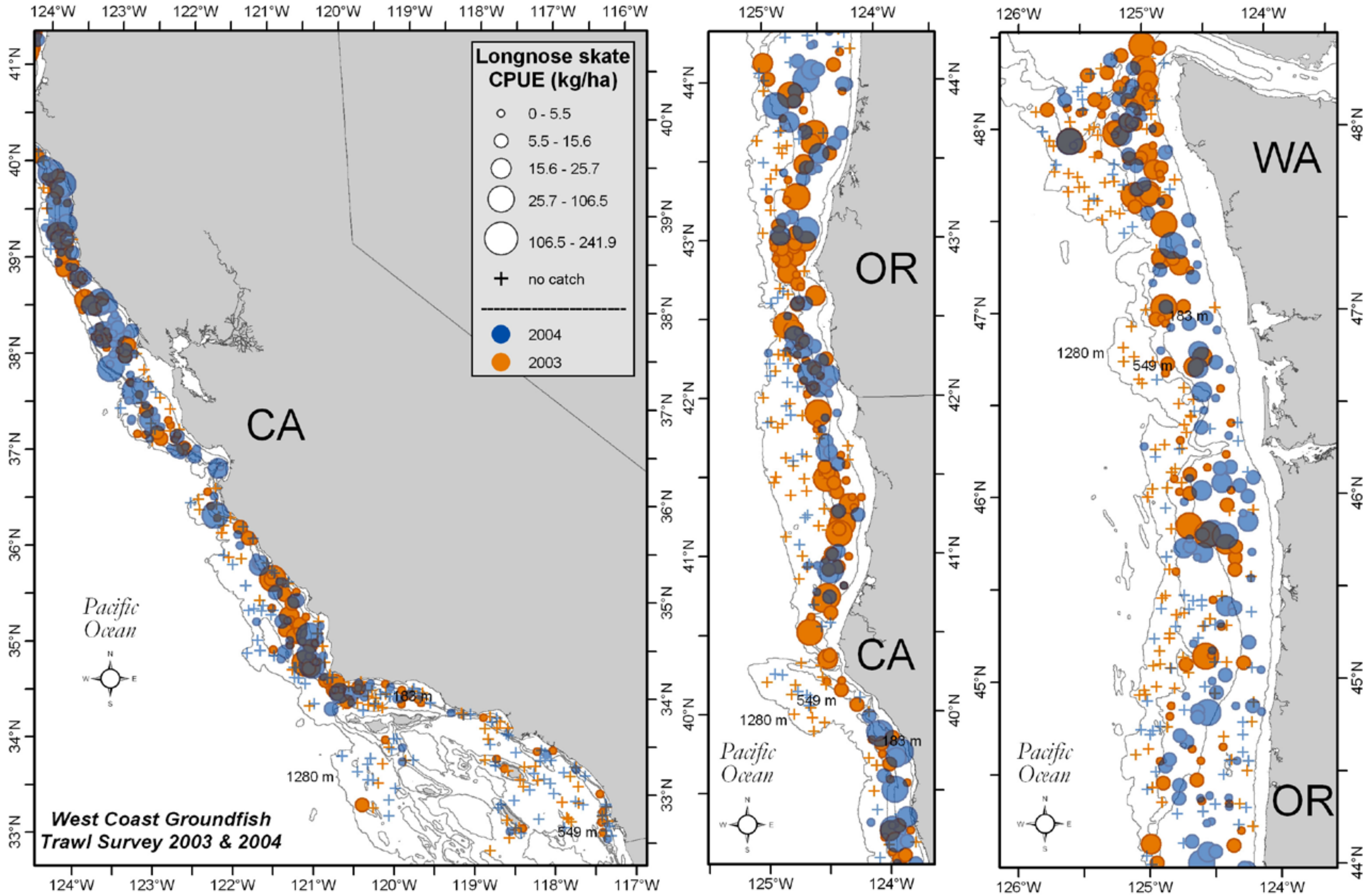

Figure 72. Longnose skate (*Raja rhina*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs >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

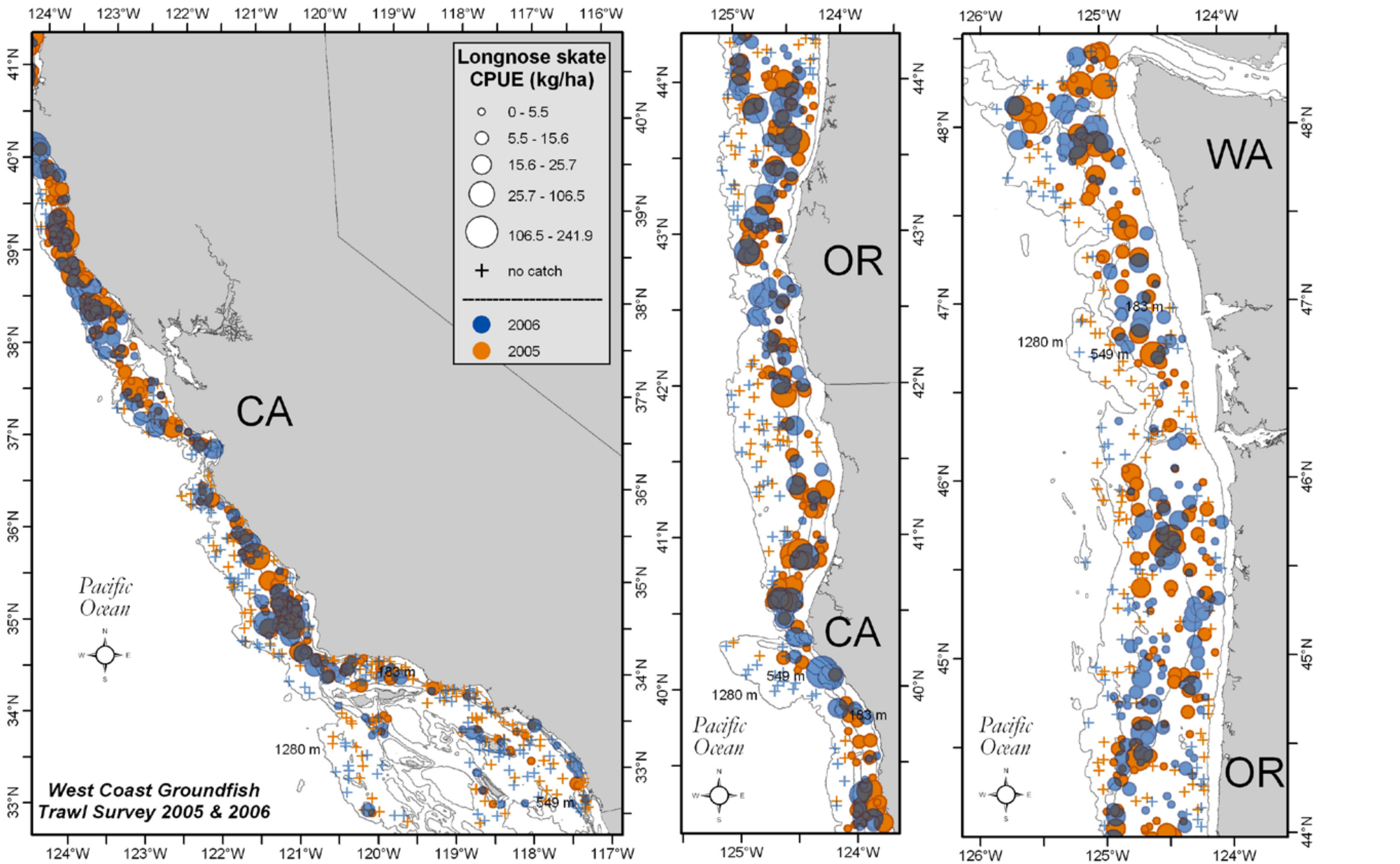

Figure 73. Longnose skate distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

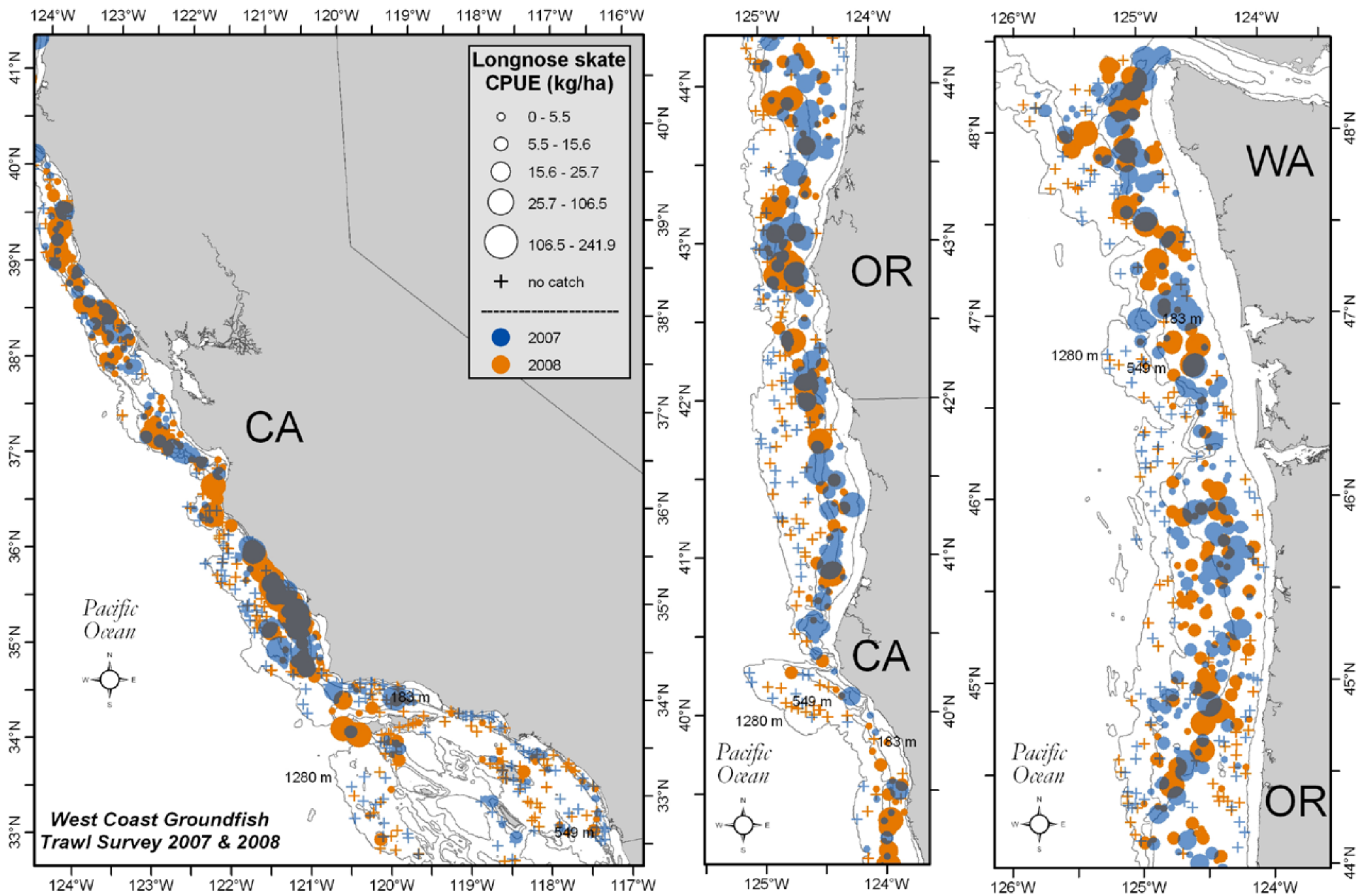

Figure 74. Longnose skate distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

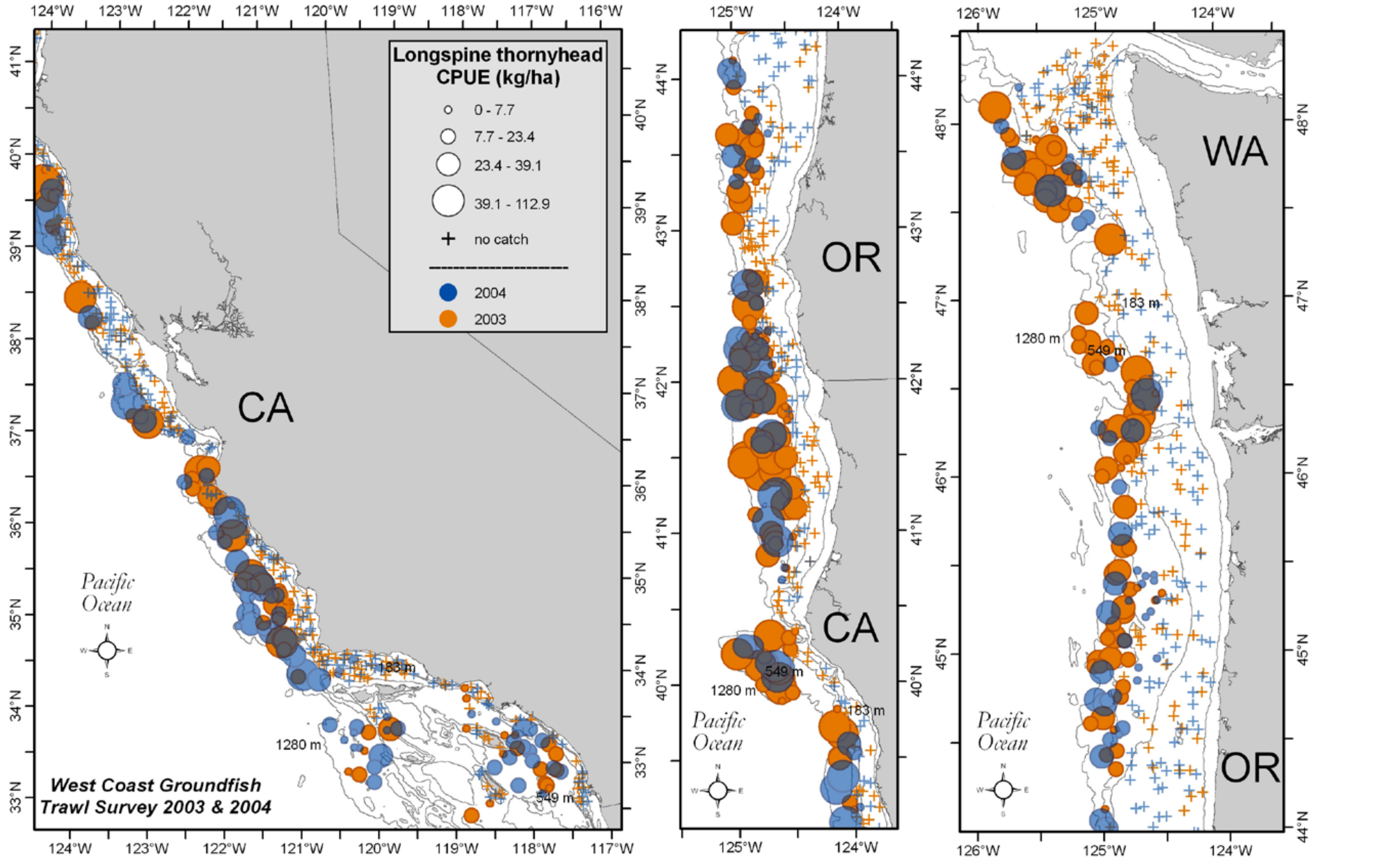

Figure 75. Longspine thornyhead distribution and relative abundance (kg ha–1) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

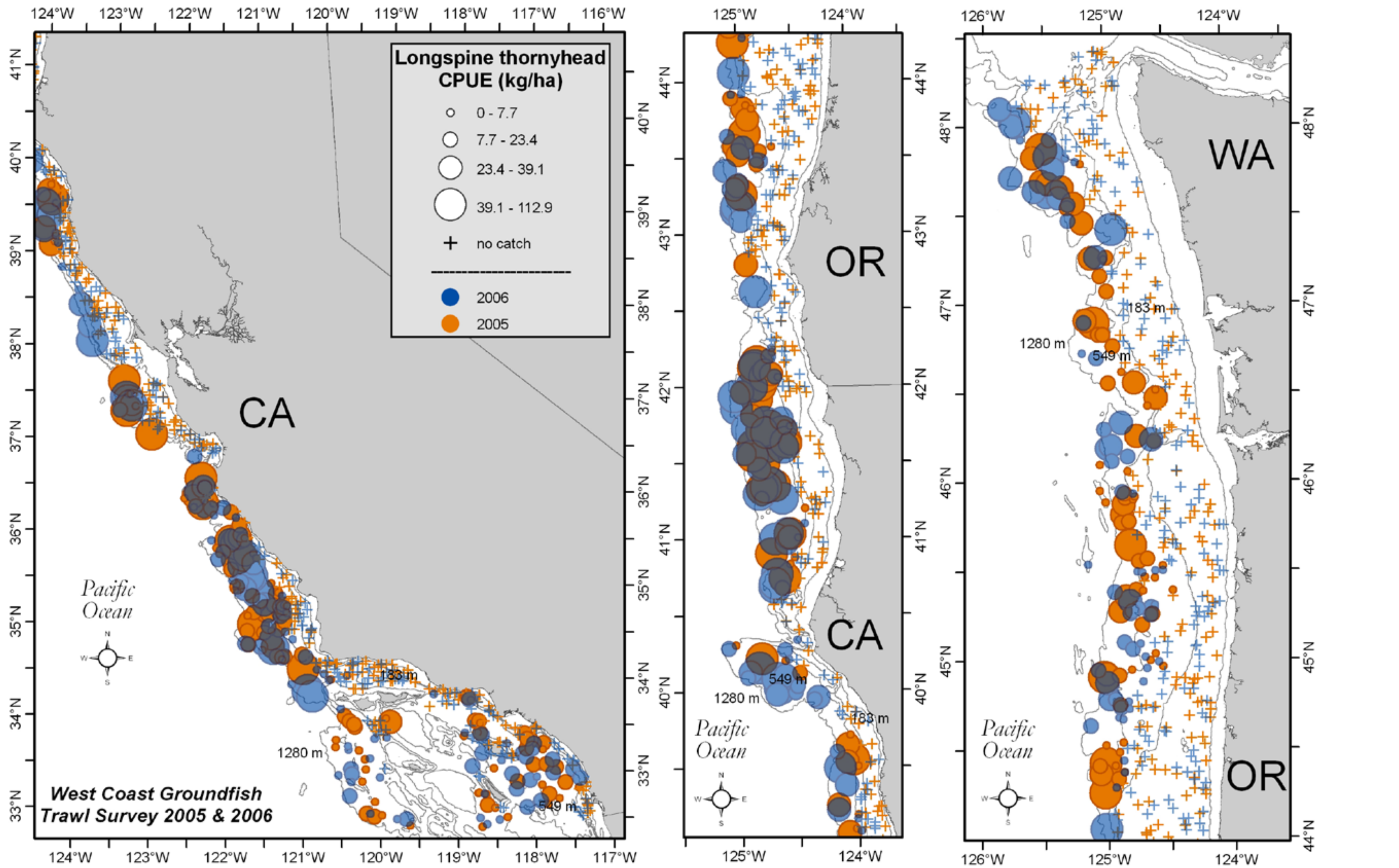

Figure 76. Longspine thornyhead distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

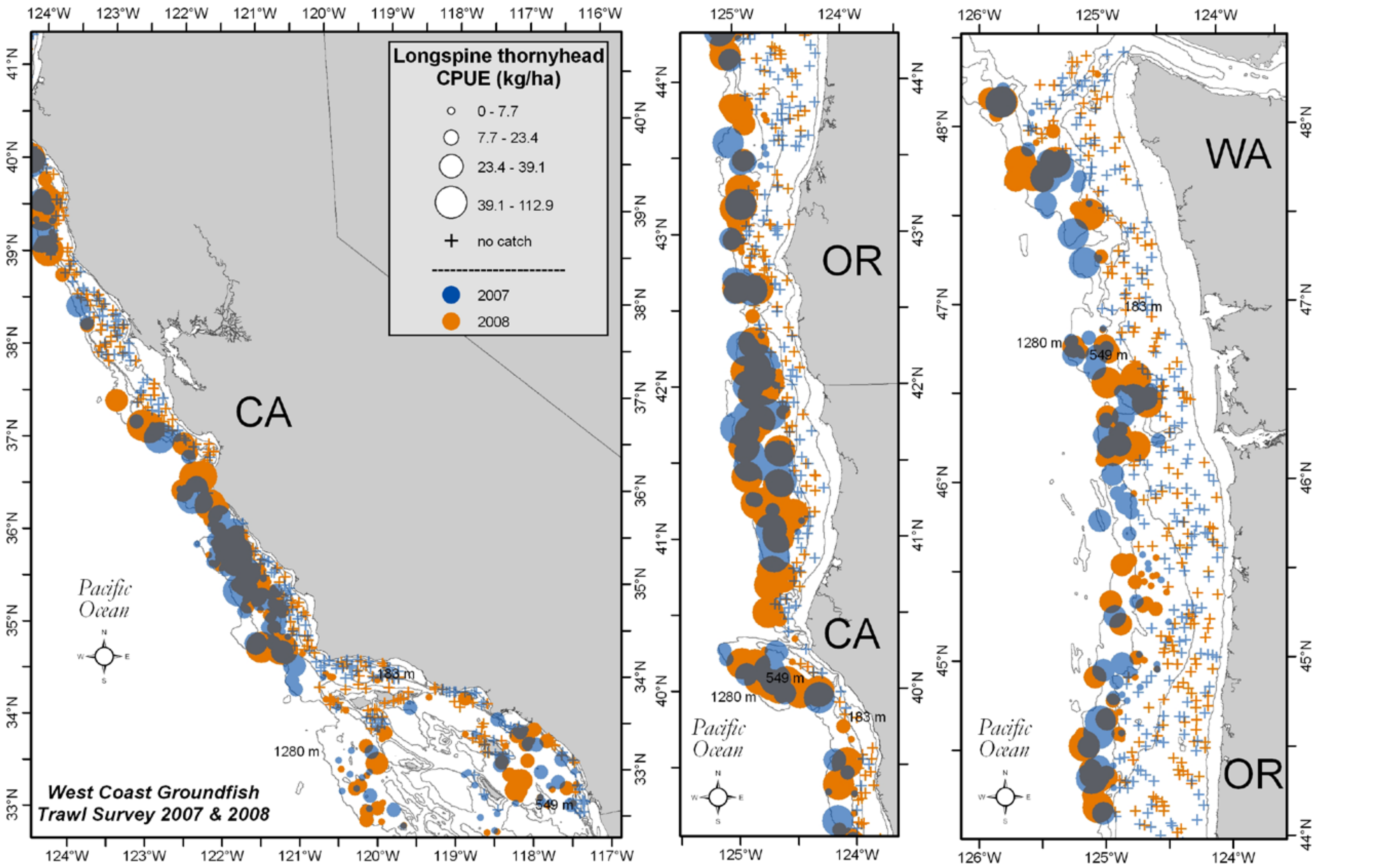

Figure 77. Longspine thornyhead distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

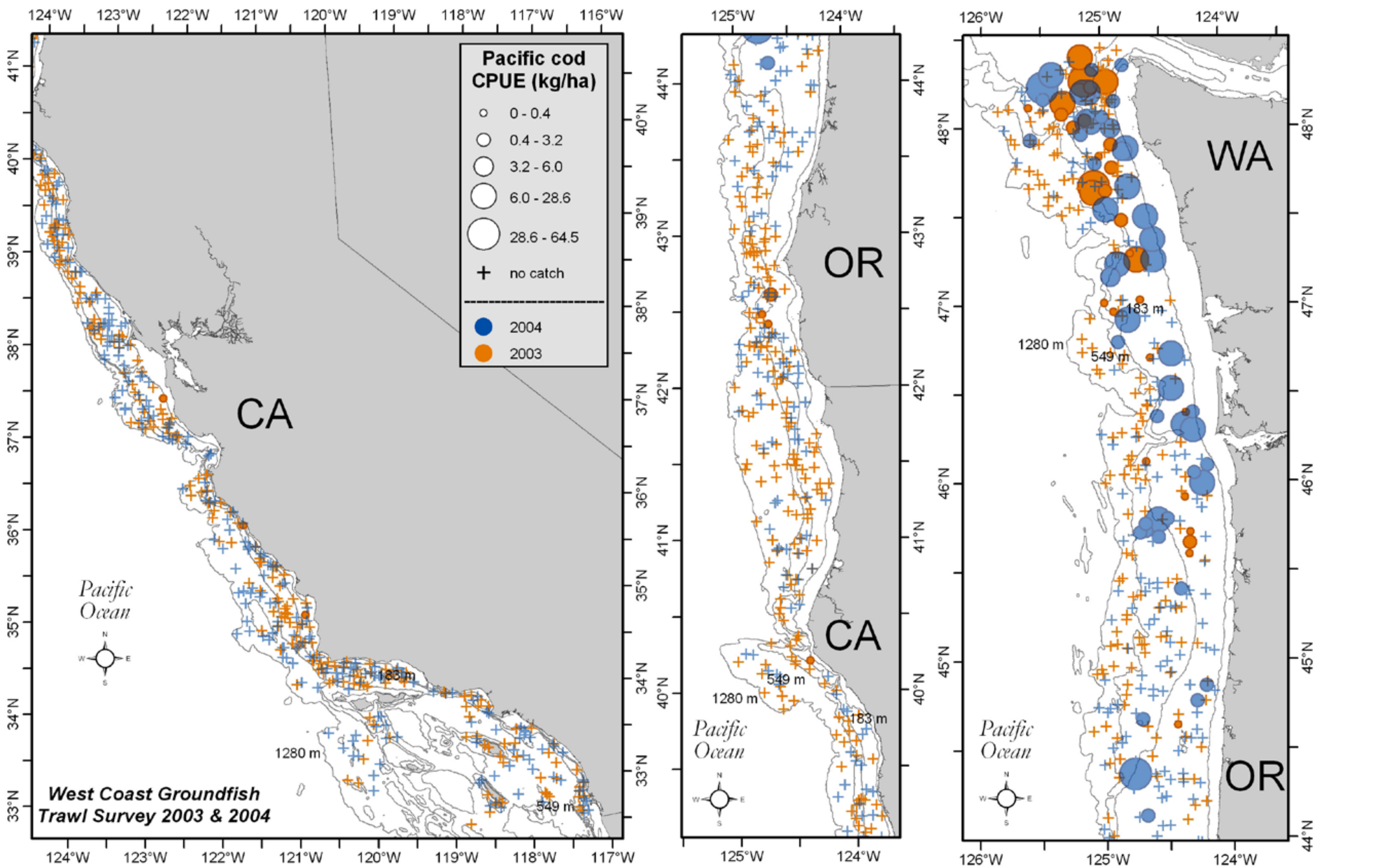

Figure 78. Pacific cod (*Gadus macrocephalus*) distribution and relative abundance (kg ha–1) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs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

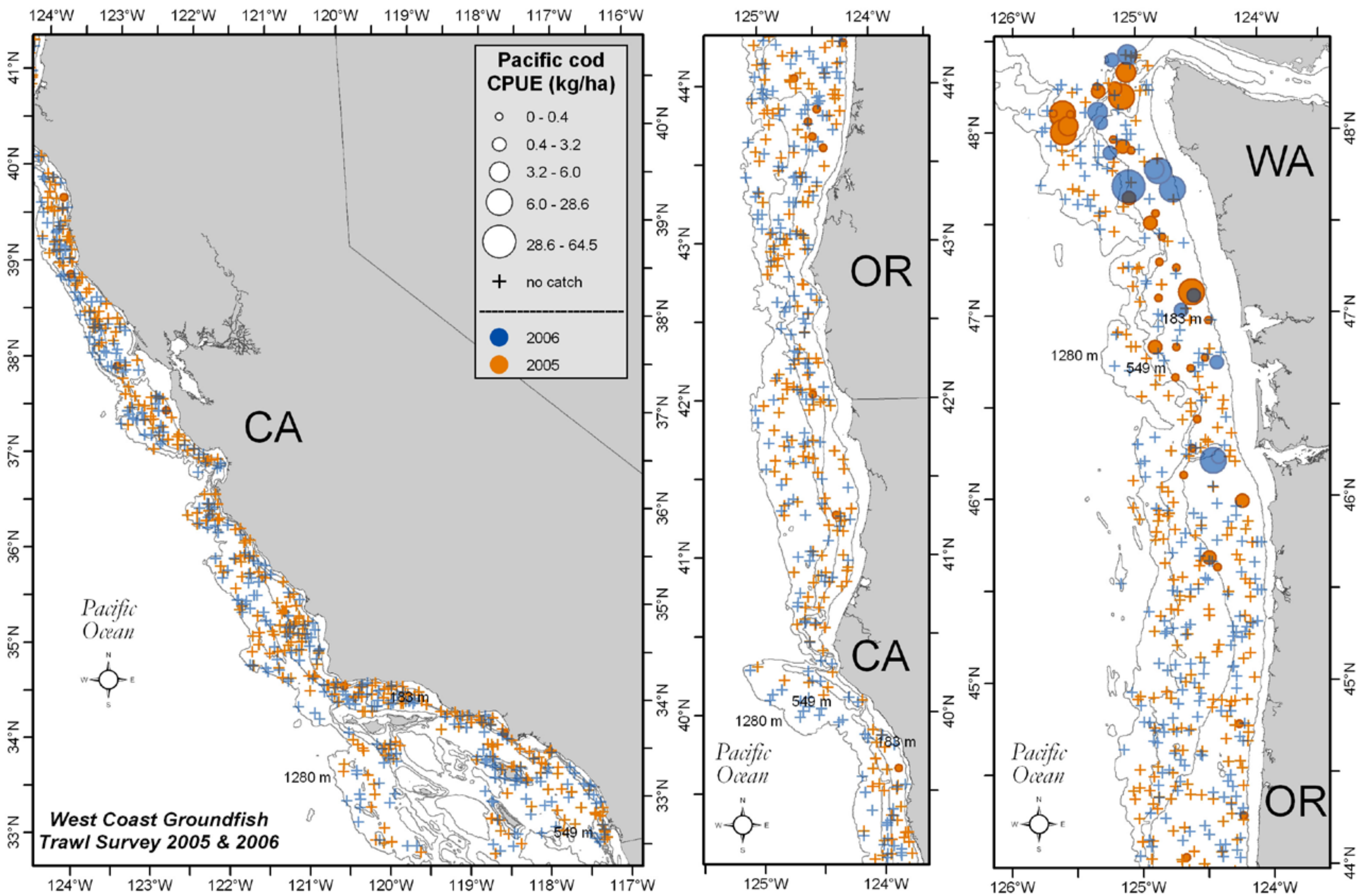

Figure 79. Pacific cod distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

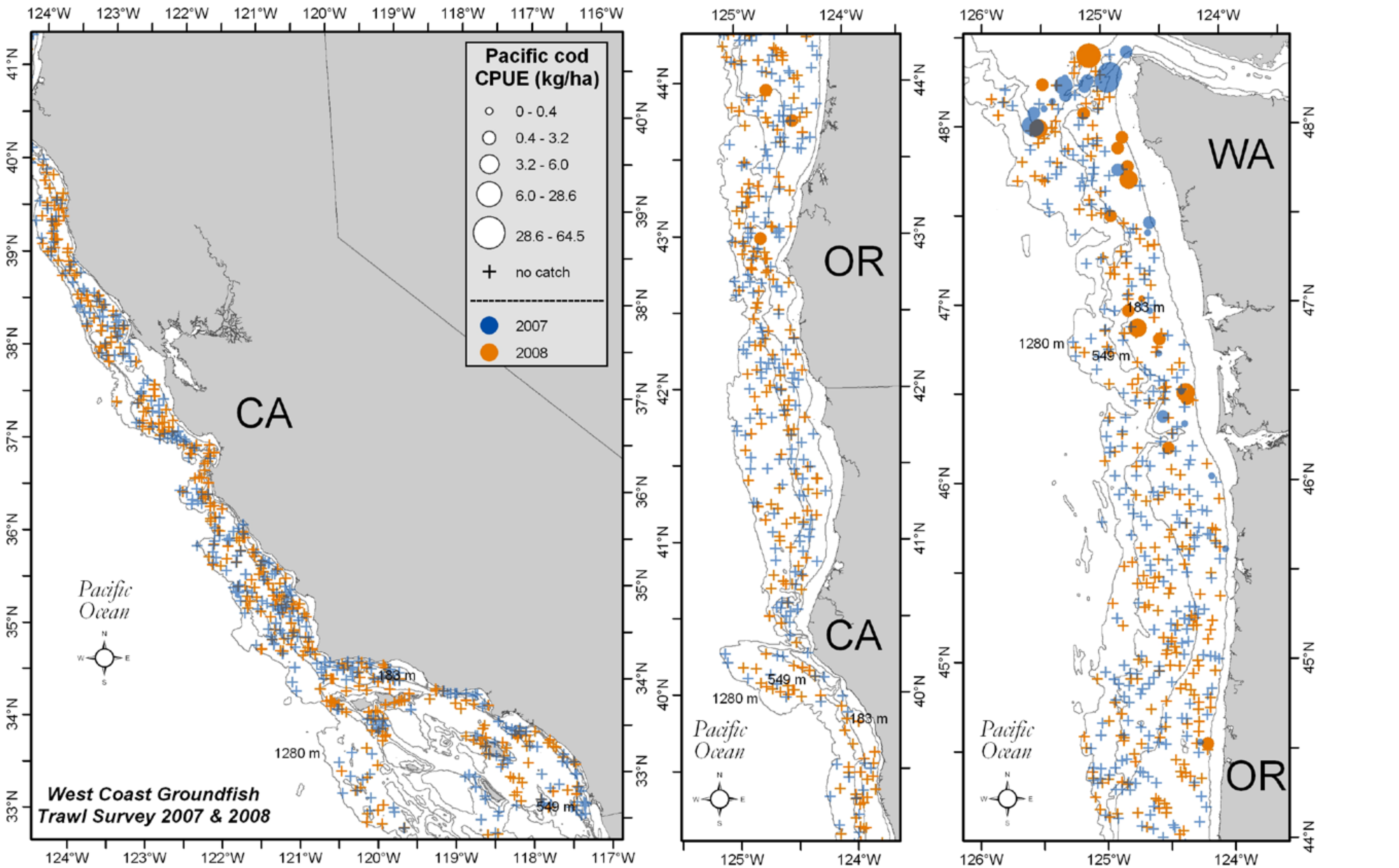

Figure 80. Pacific cod distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

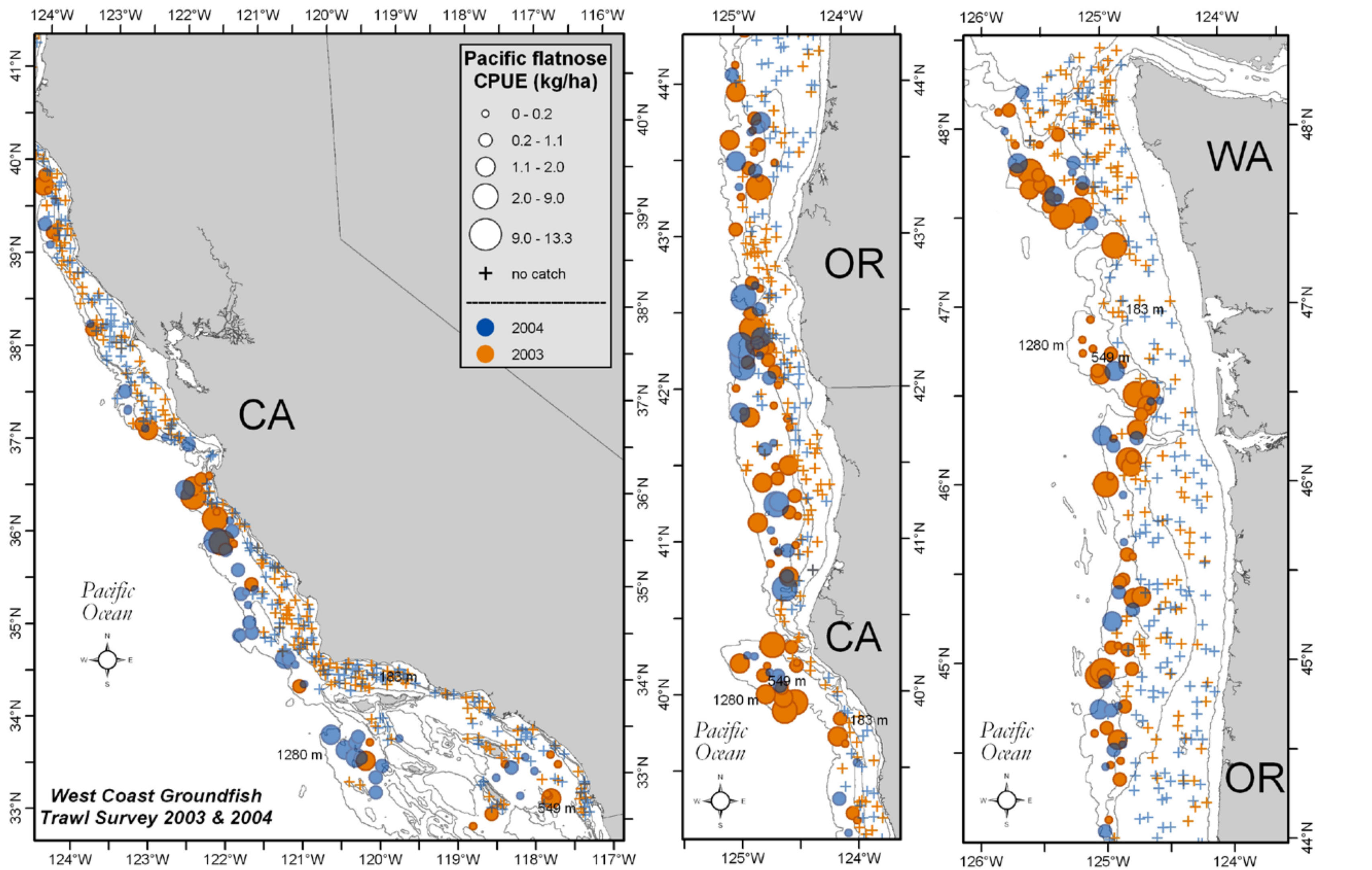

Figure 81. Pacific flatnose (*Antimora microlepis*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1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

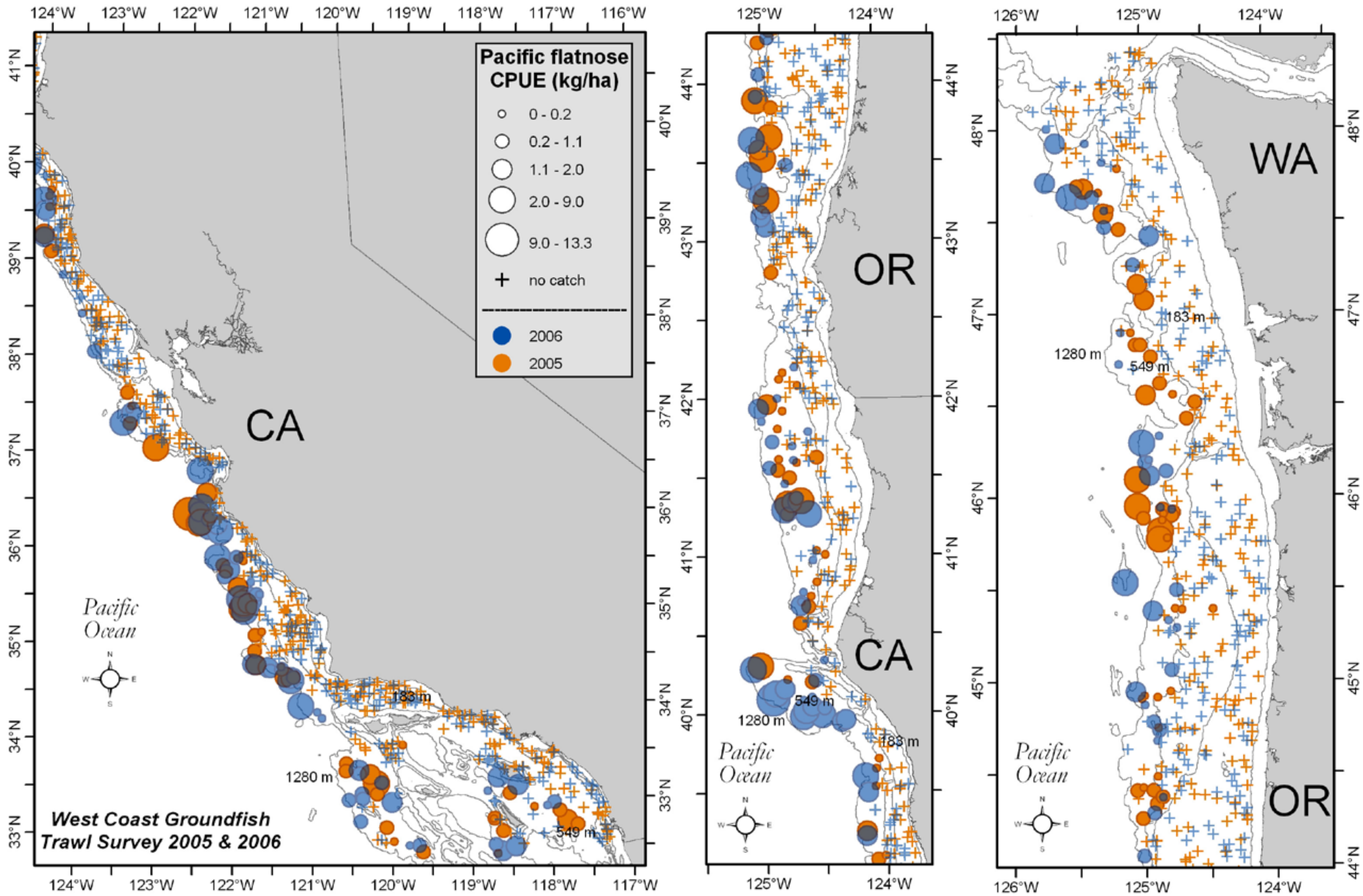

Figure 82. Pacific flatnose distribution and relative abundance (kg ha–1) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

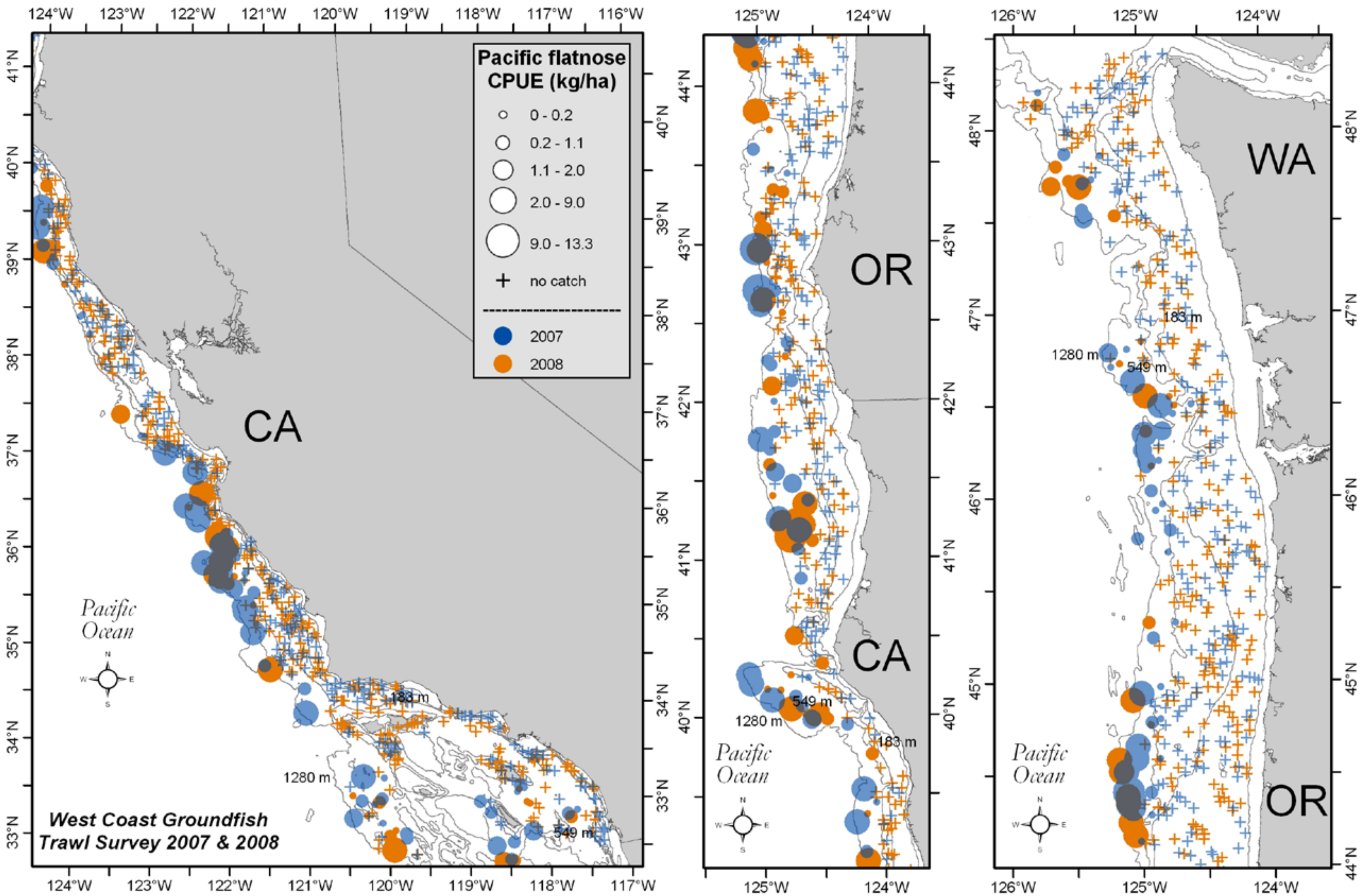

Figure 83. Pacific flatnose distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

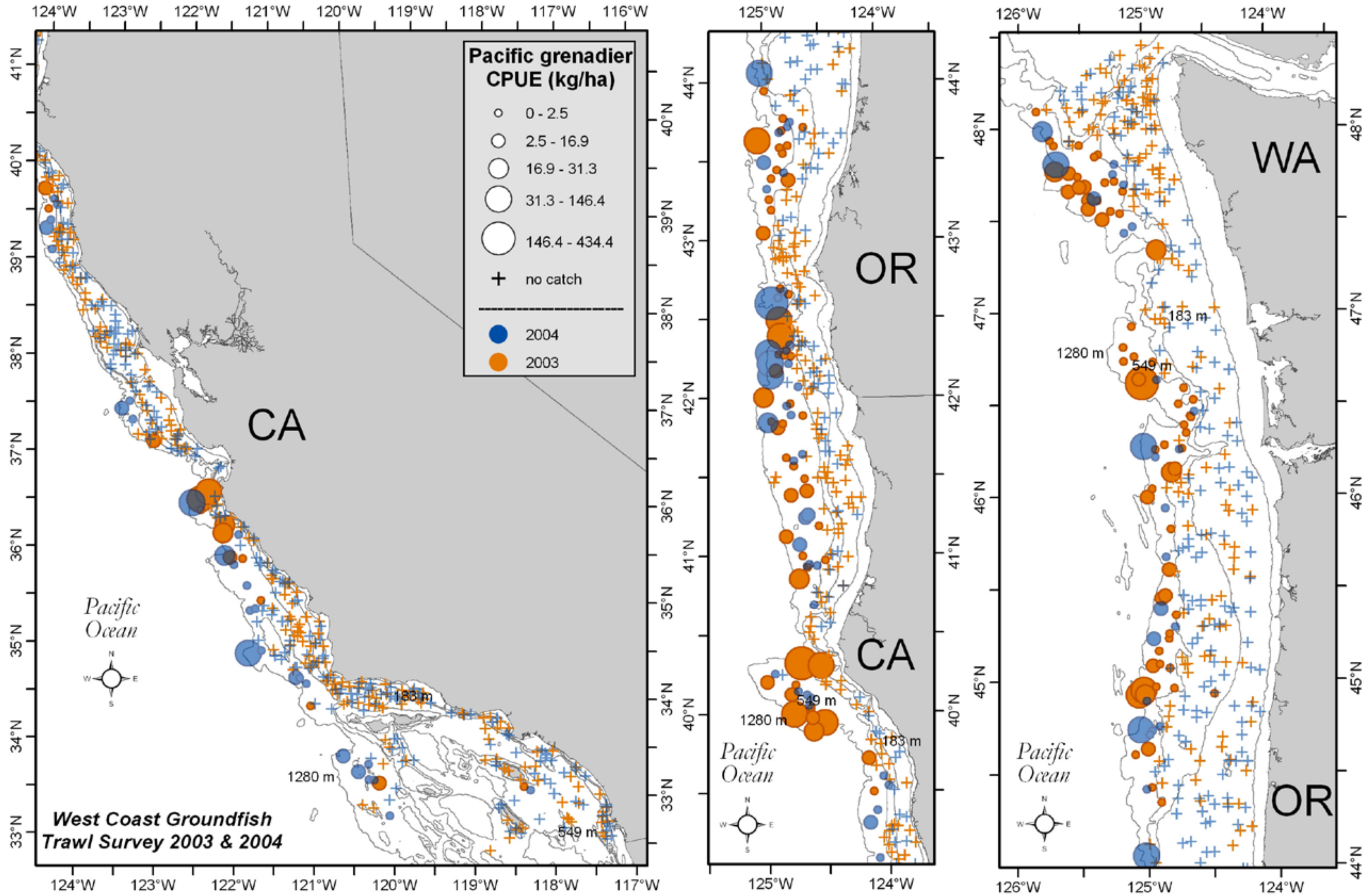

Figure 84. Pacific grenadier distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

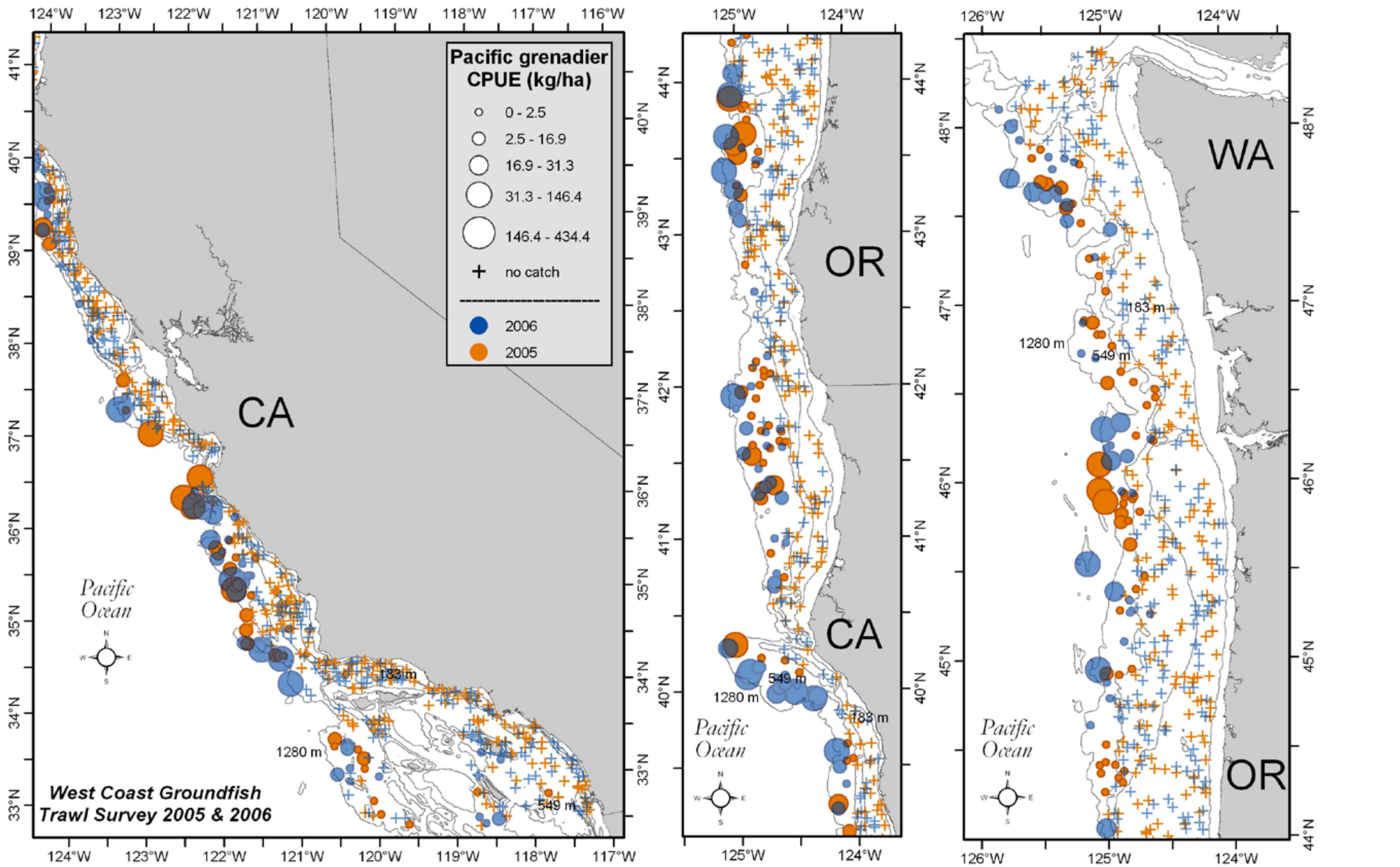

Figure 85. Pacific grenadier distribution and relative abundance (kg ha–1) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

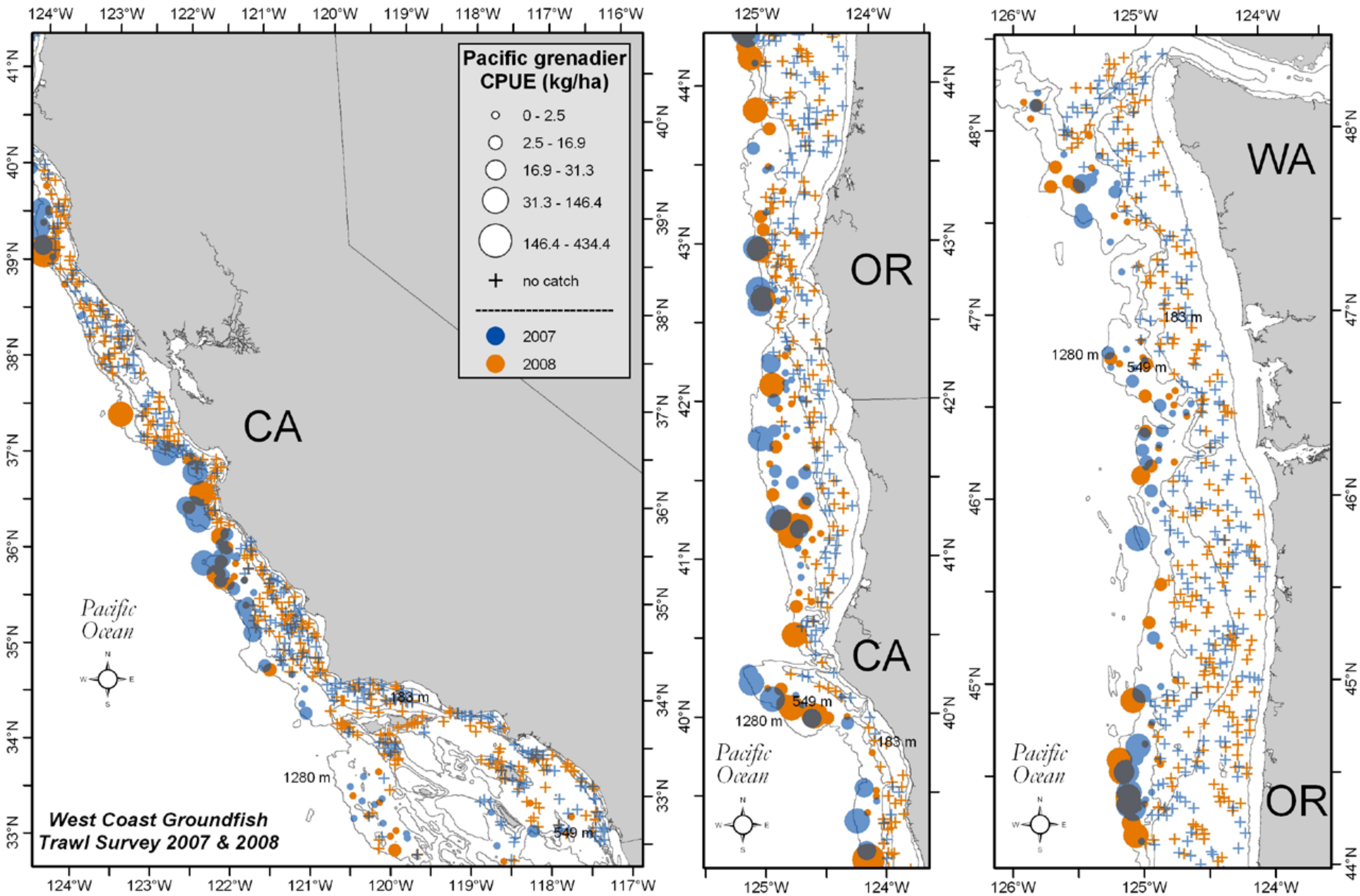

Figure 86. Pacific grenadier distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

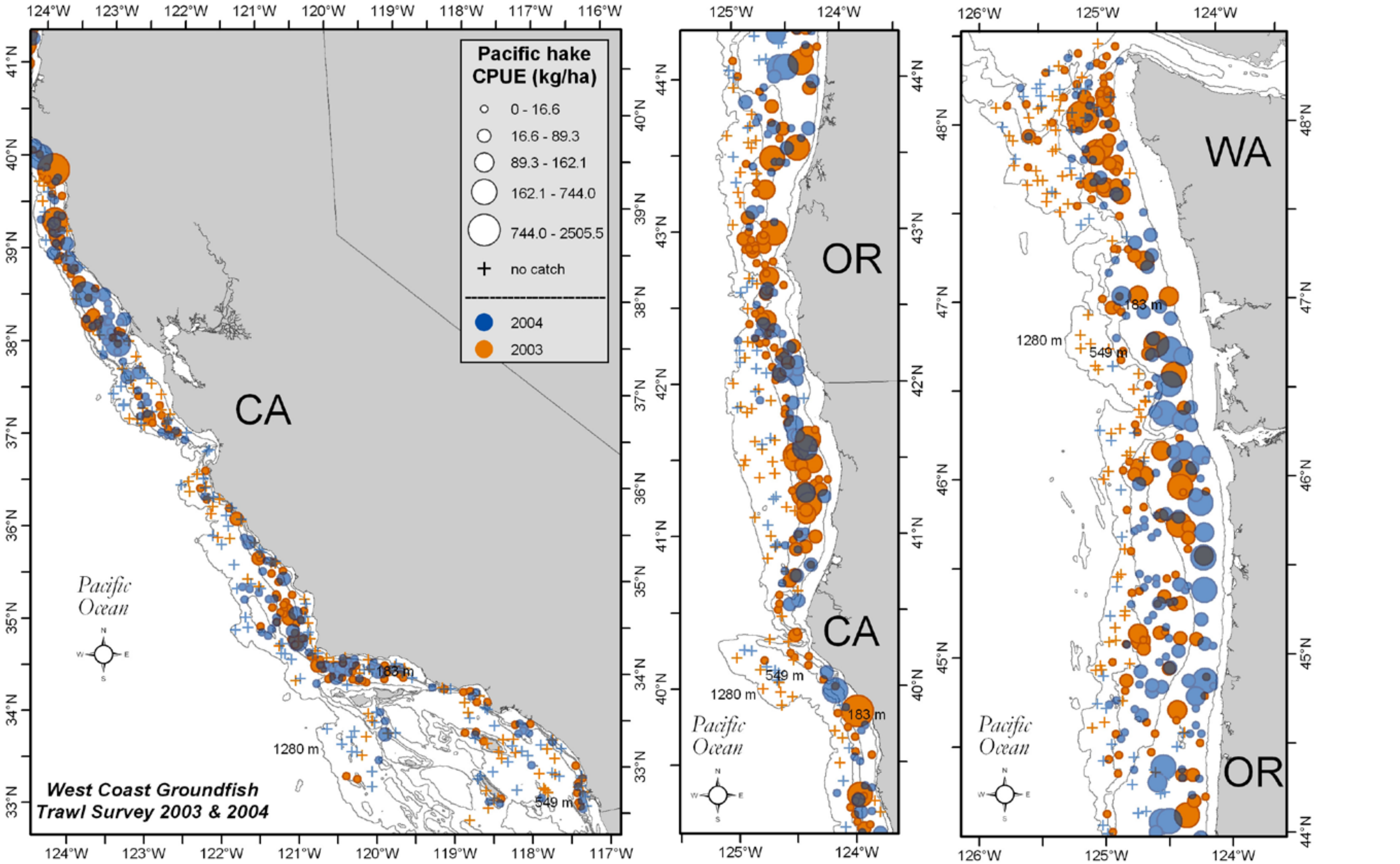

Figure 87. Pacific hake distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

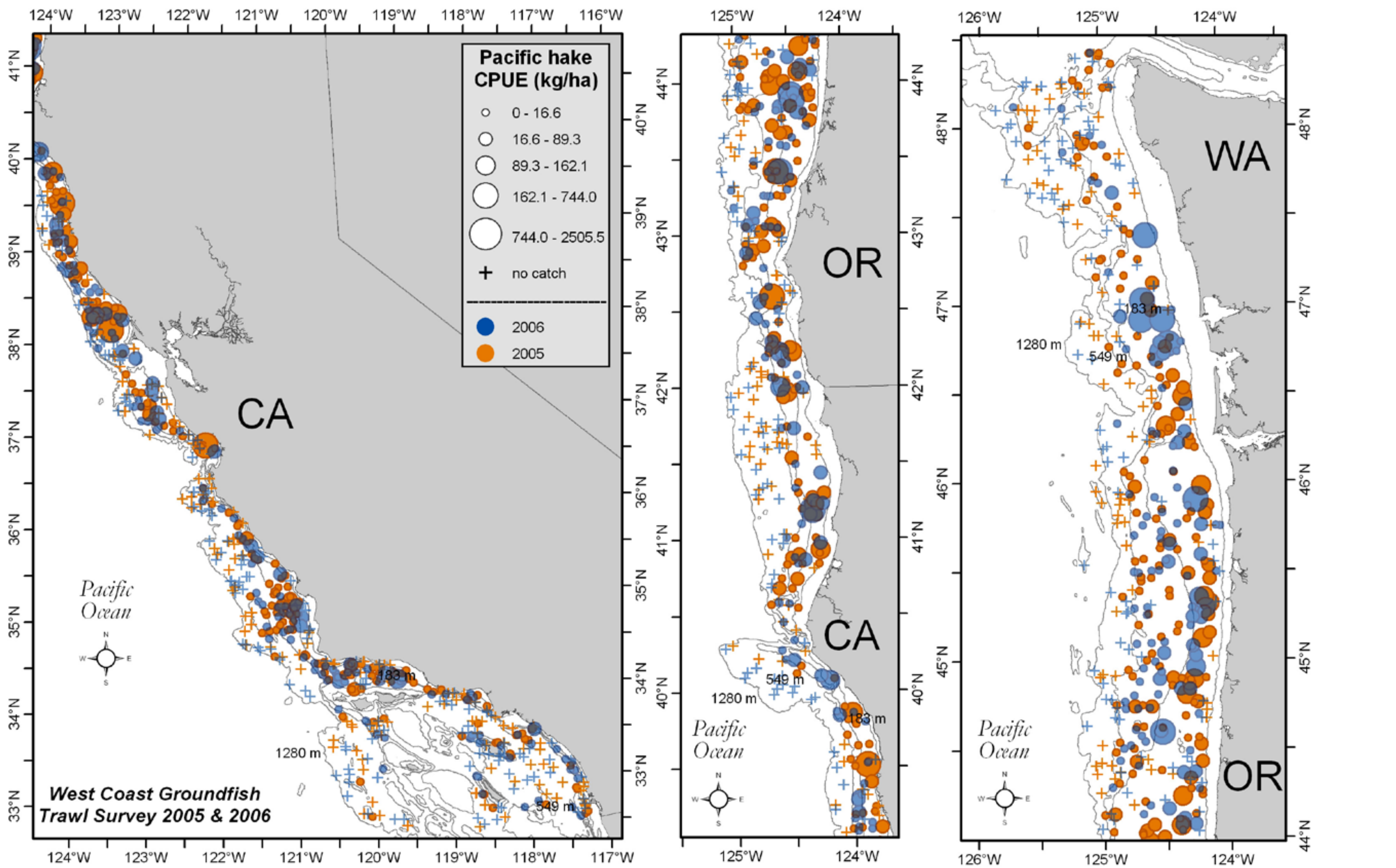

Figure 88. Pacific hake distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

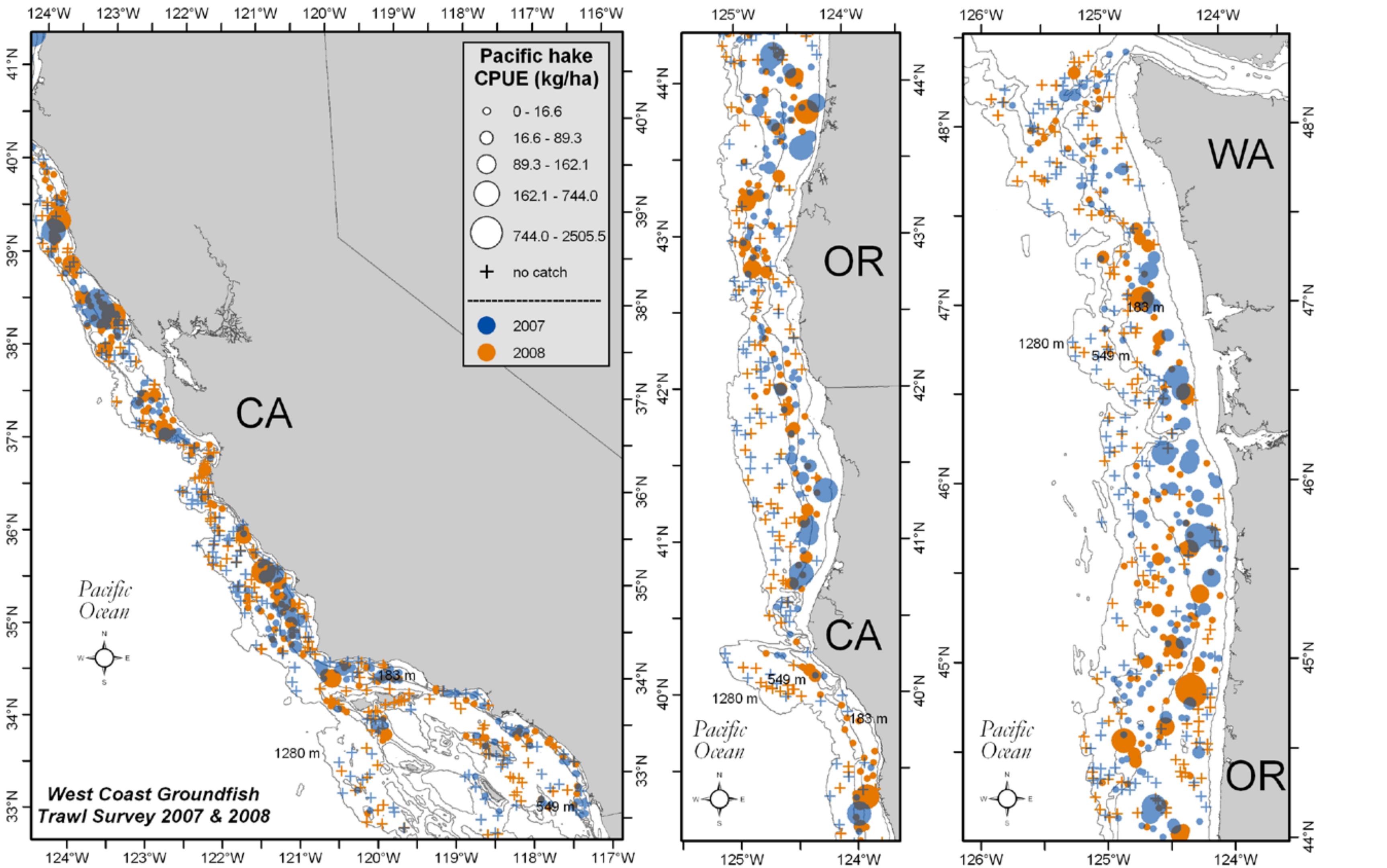

Figure 89. Pacific hake distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

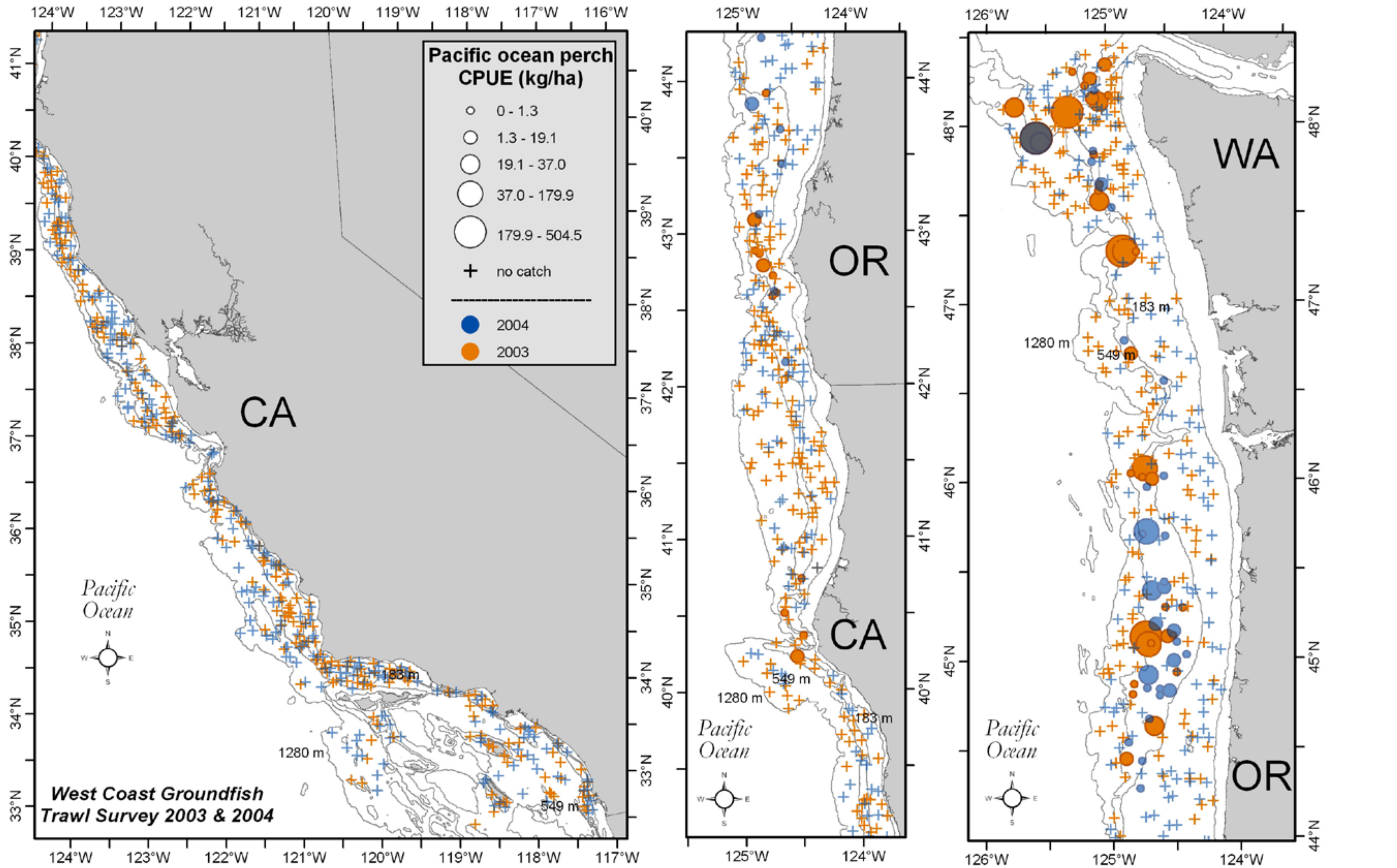

Figure 90. Pacific ocean perch (*Sebastes alutus*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and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

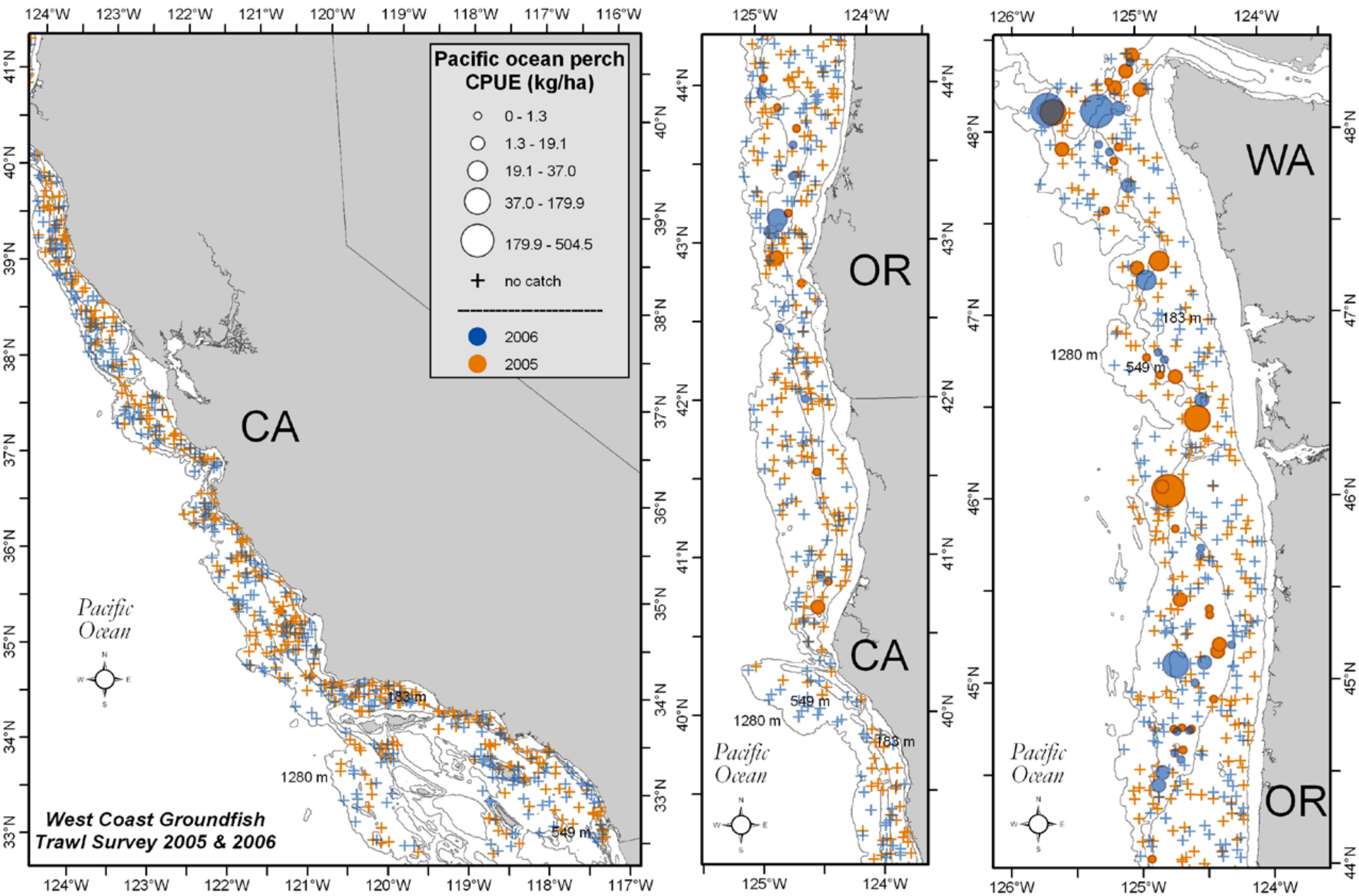

Figure 91. Pacific ocean perch distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

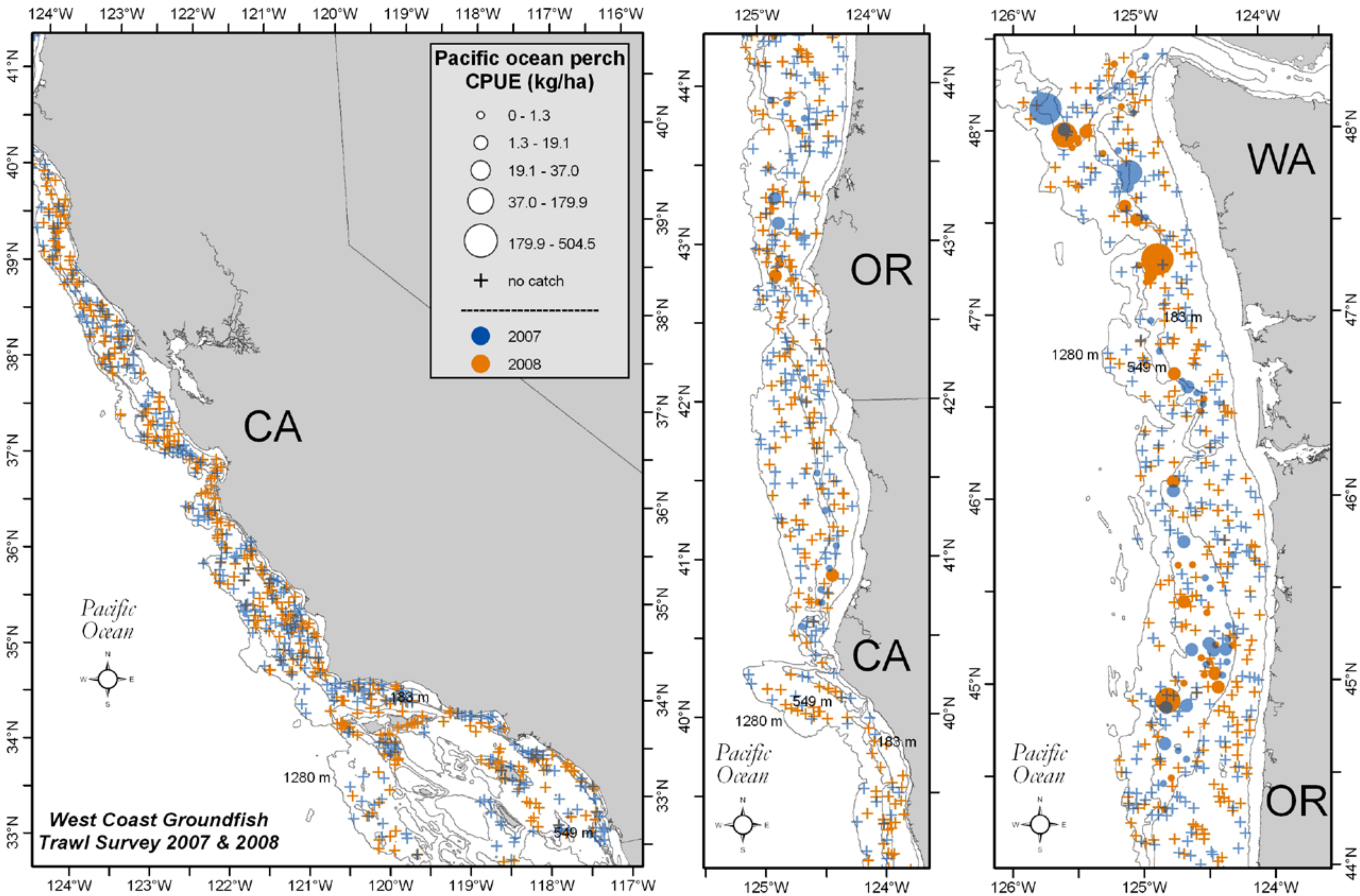

Figure 92. Pacific ocean perch distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

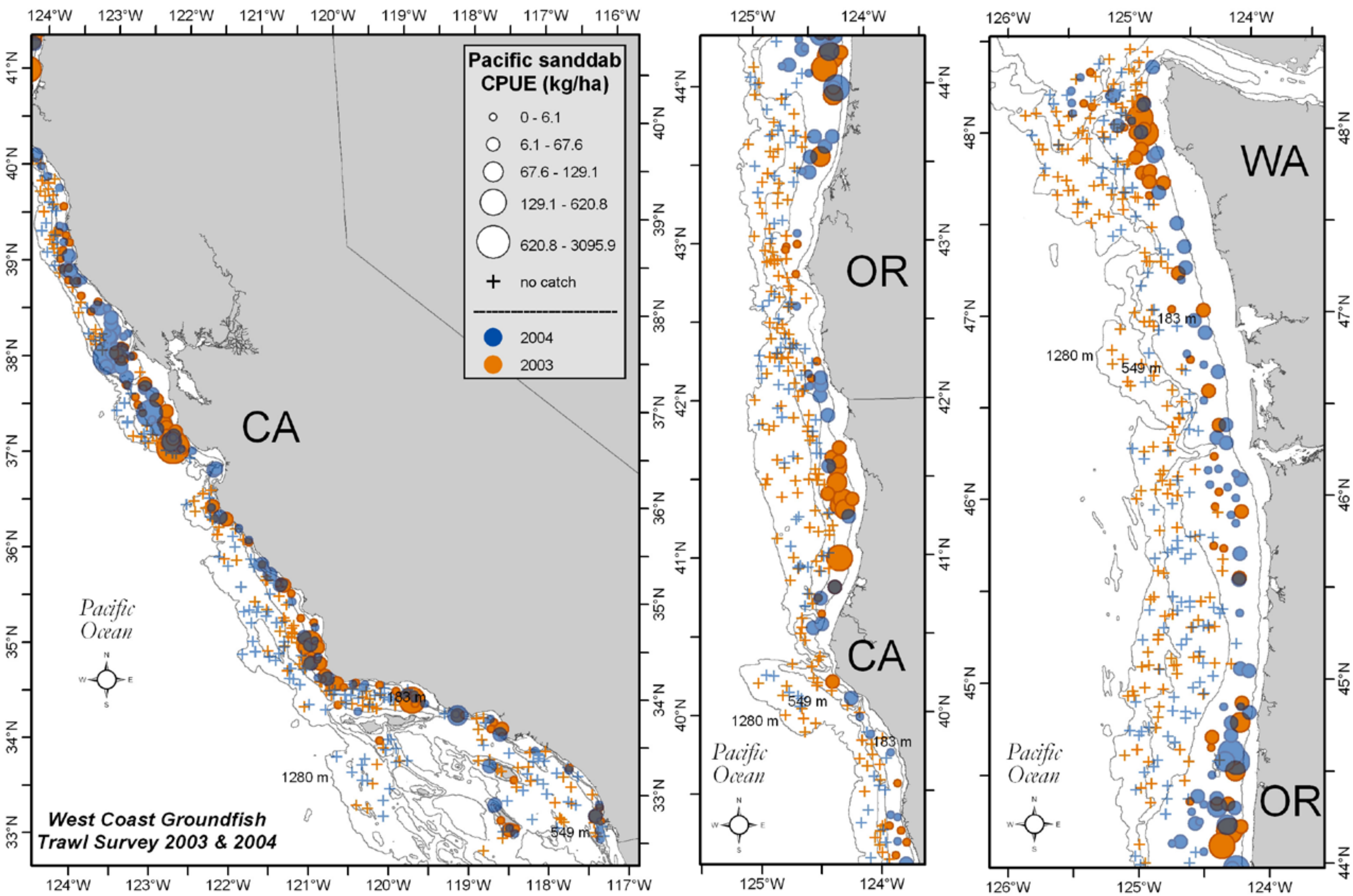

Figure 93. Pacific sanddab distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

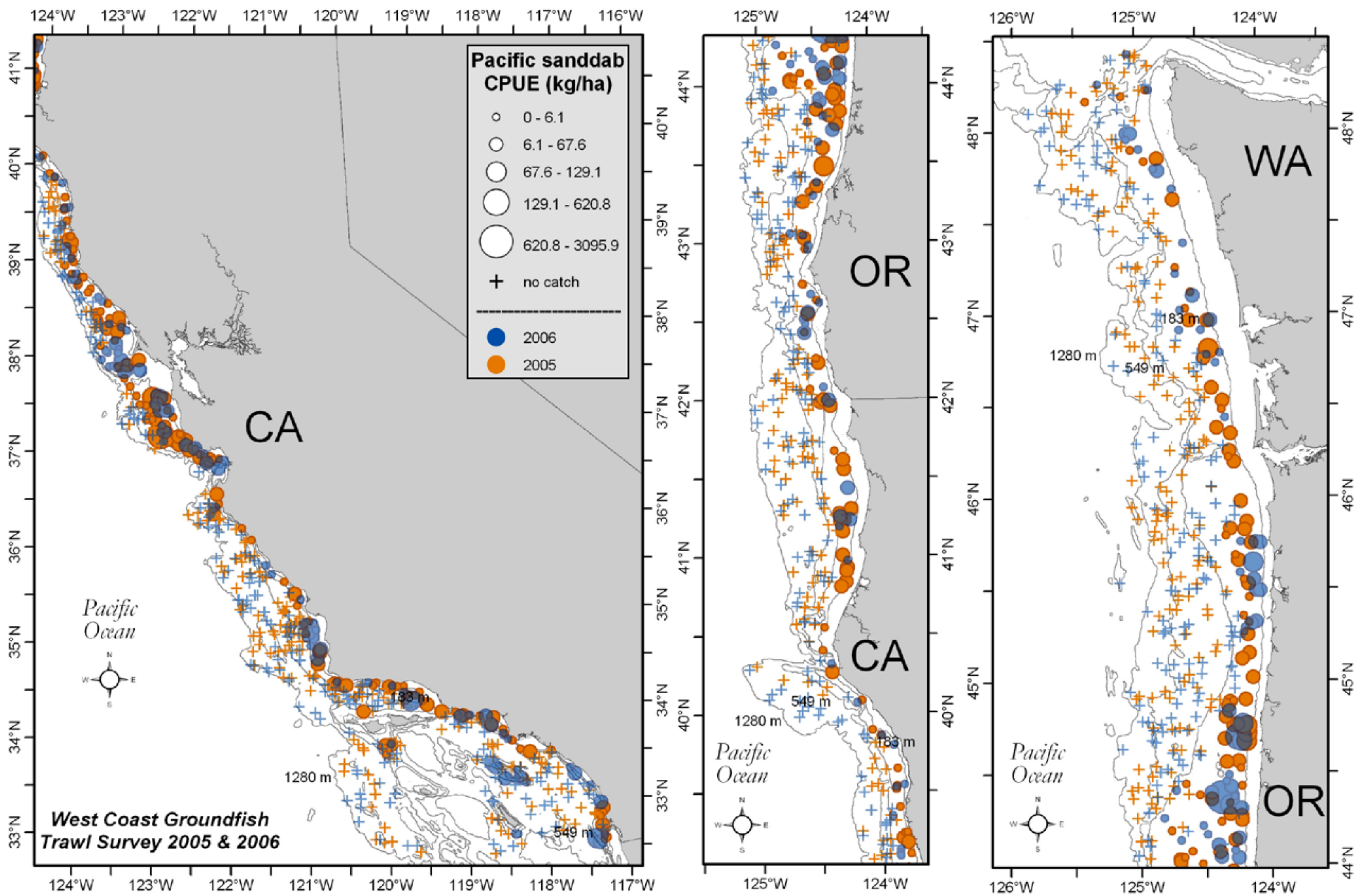

Figure 94. Pacific sanddab distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

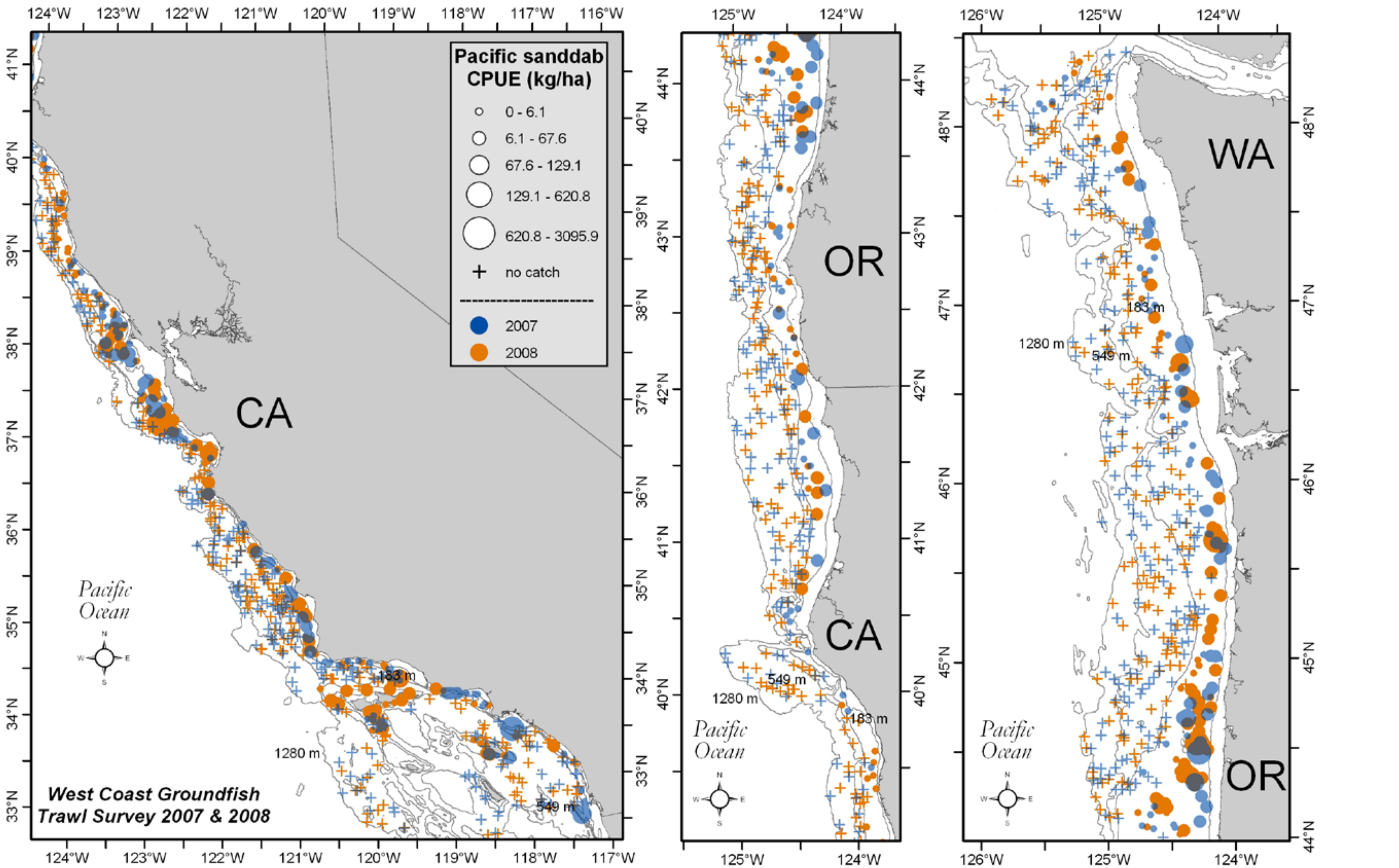

Figure 95. Pacific sanddab distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

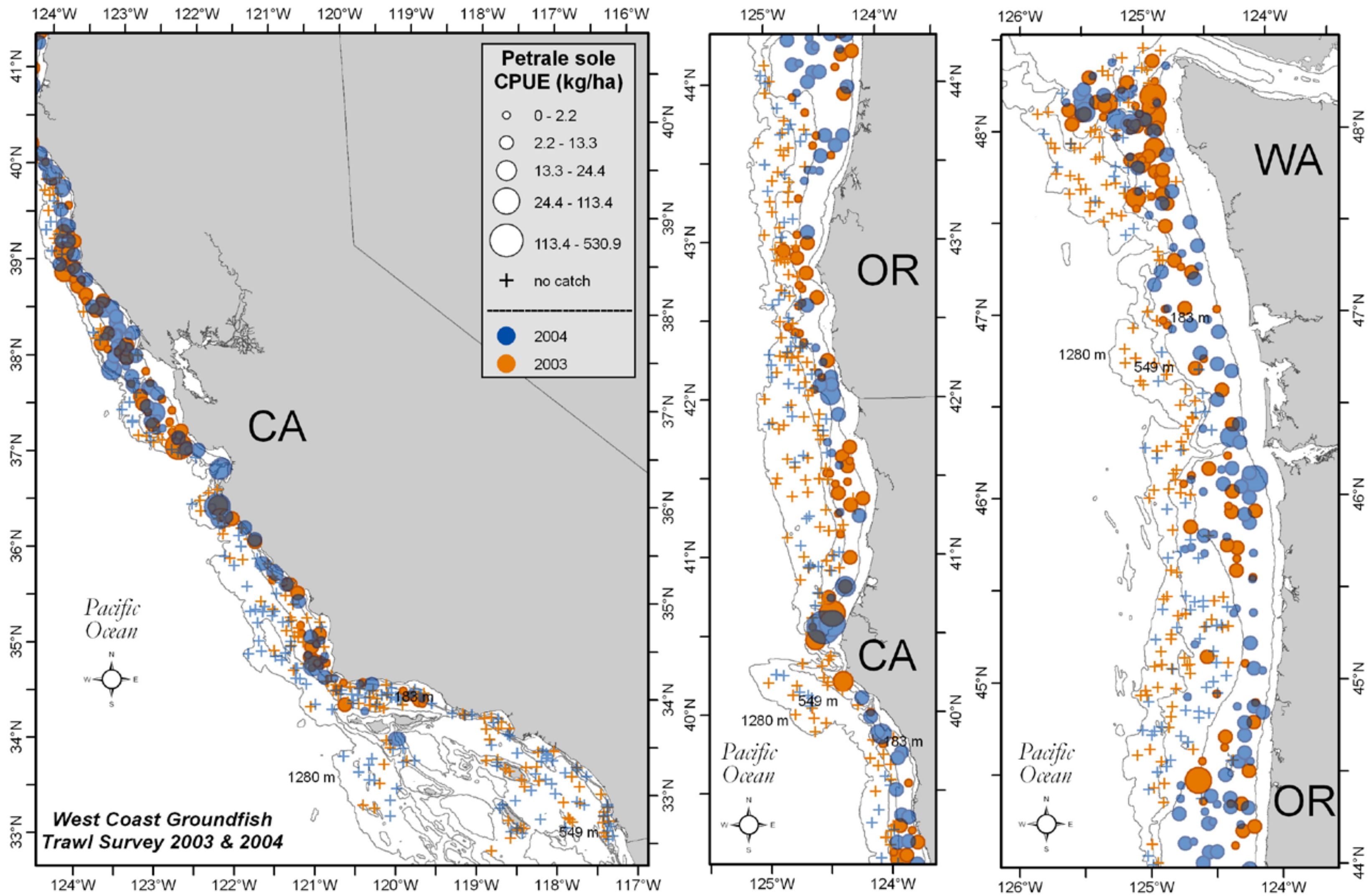

Figure 96. Petrale sole distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

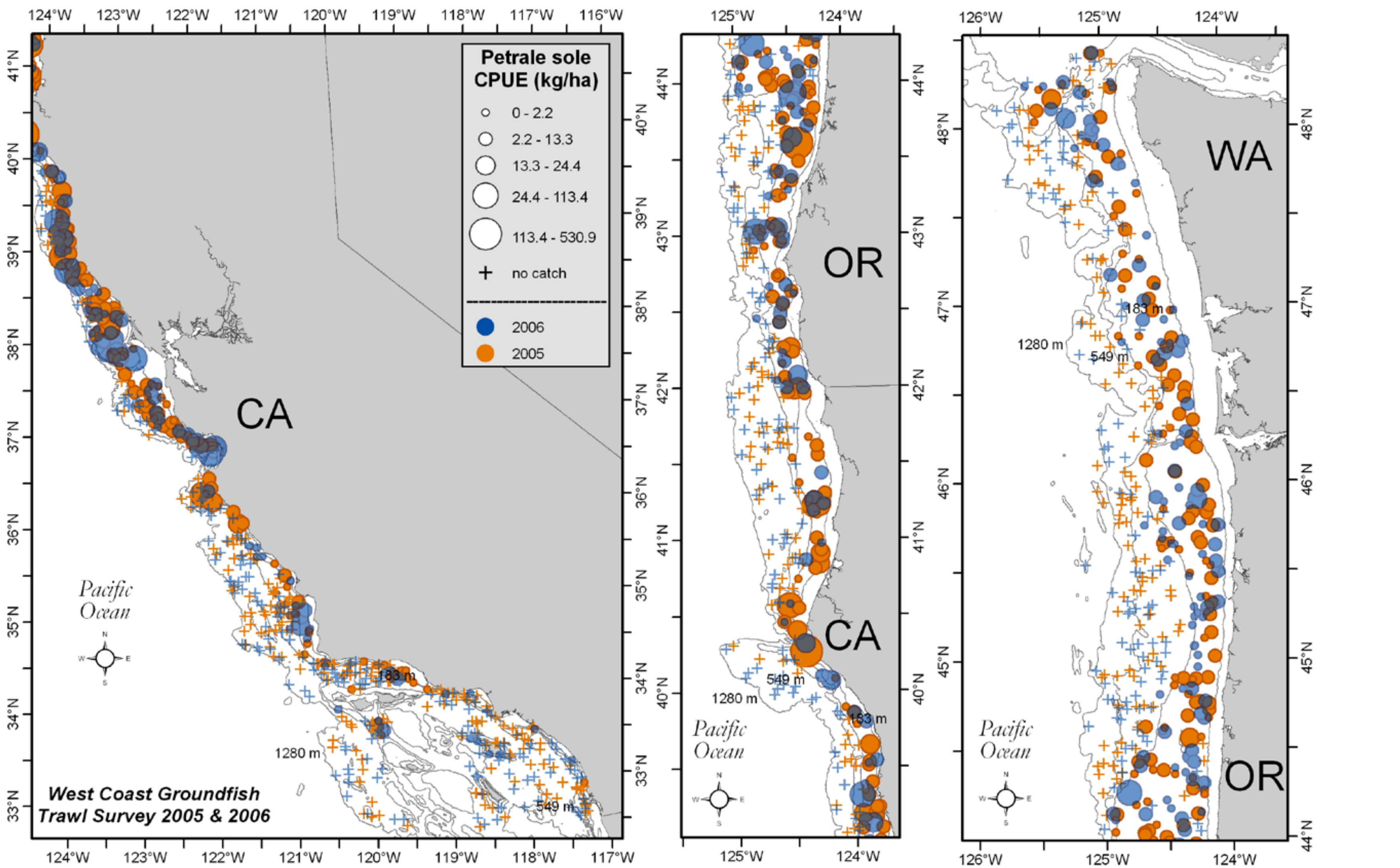

Figure 97. Petrale sole distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

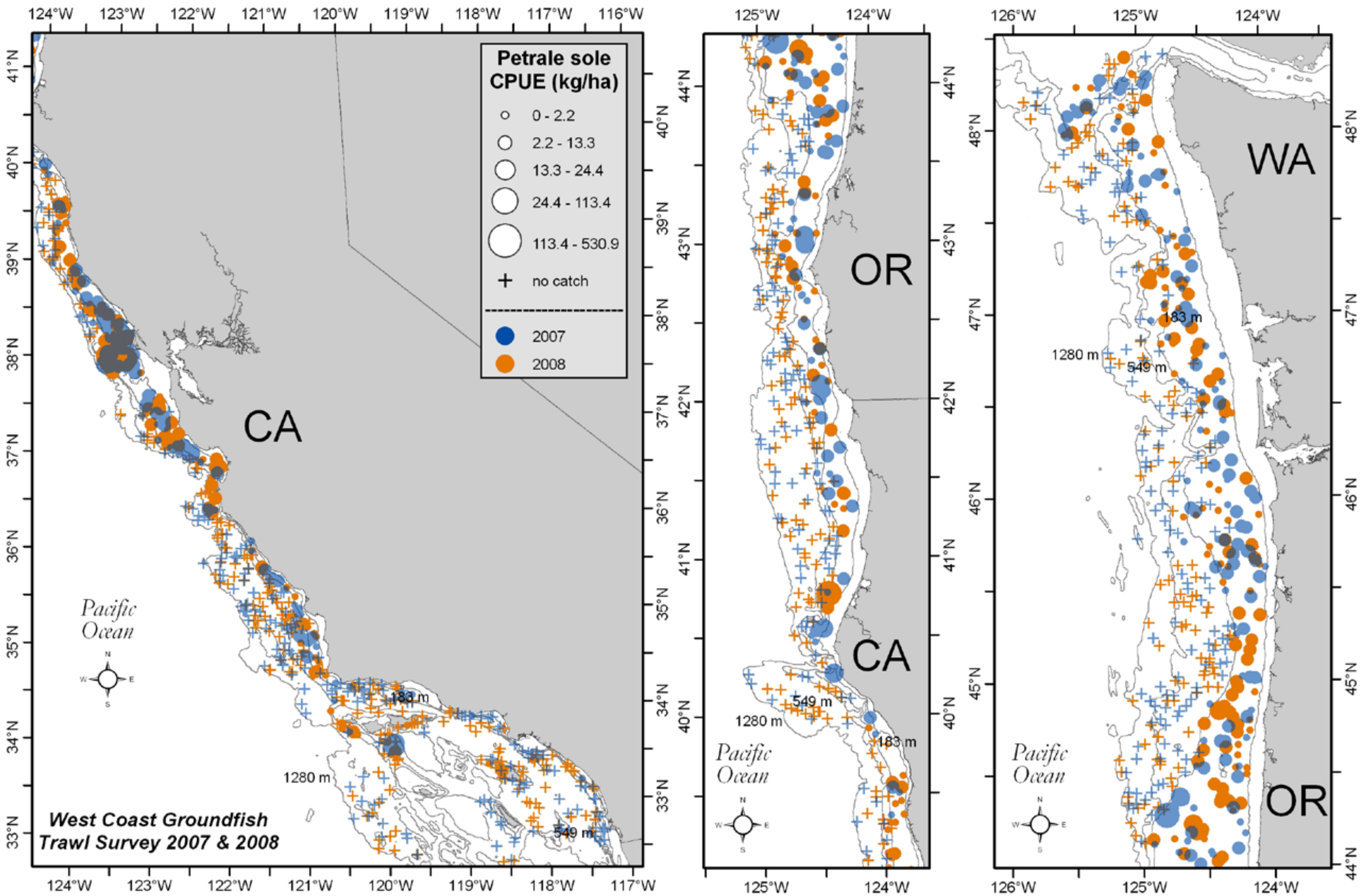

Figure 98. Petrale sole distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

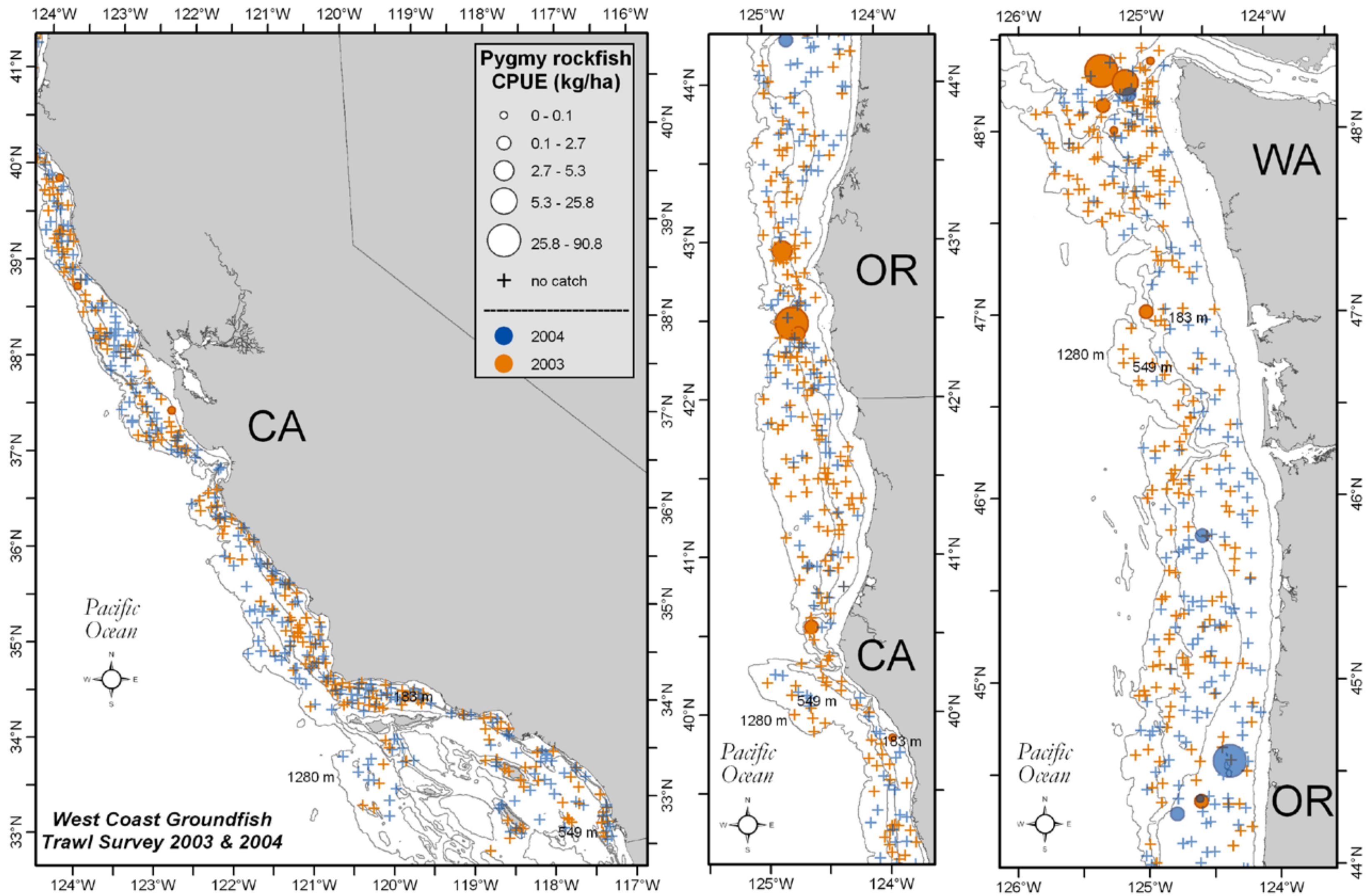

Figure 99. Pygmy rockfish (*Sebastes wilsoni*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2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

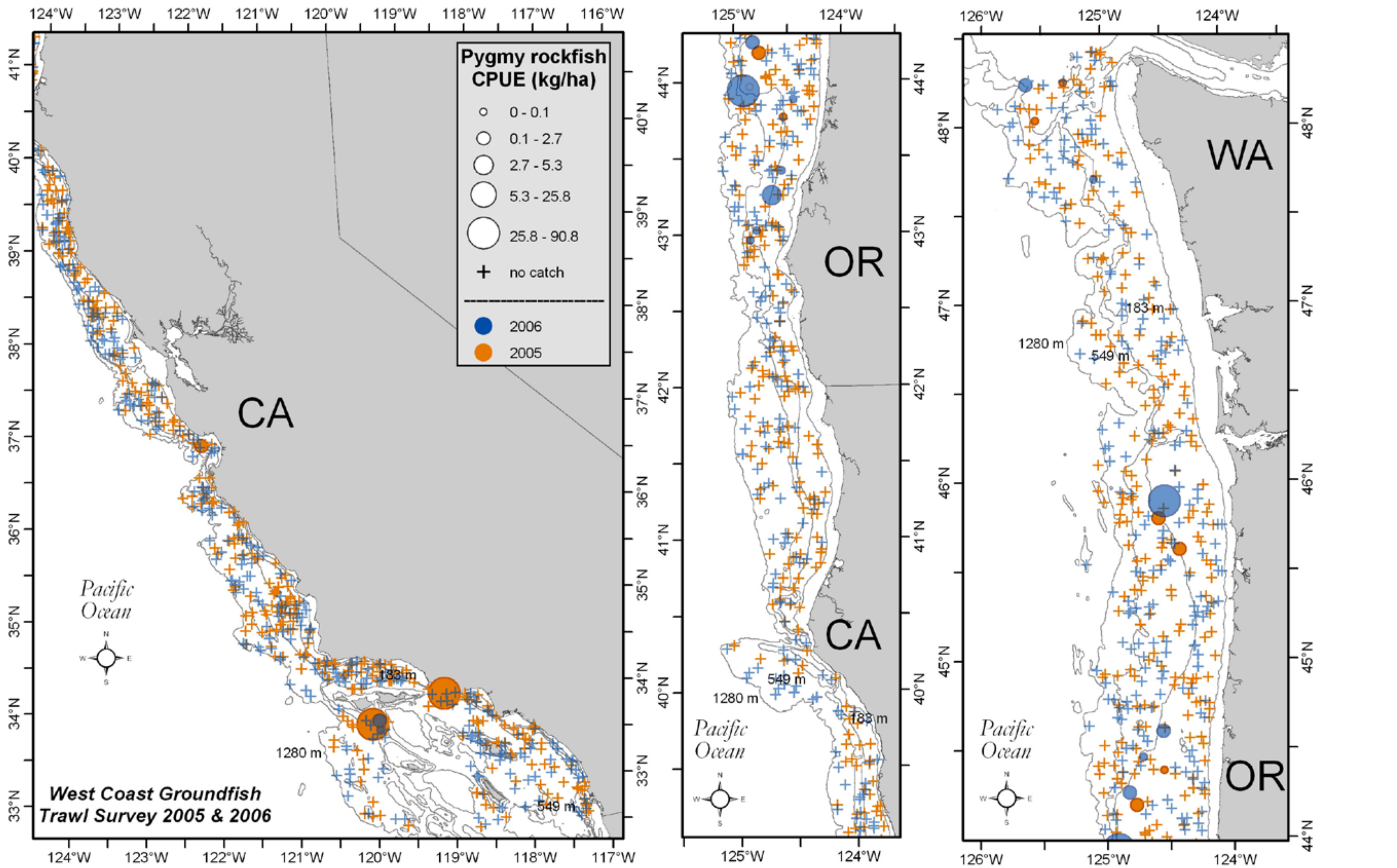

Figure 100. Pygmy rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

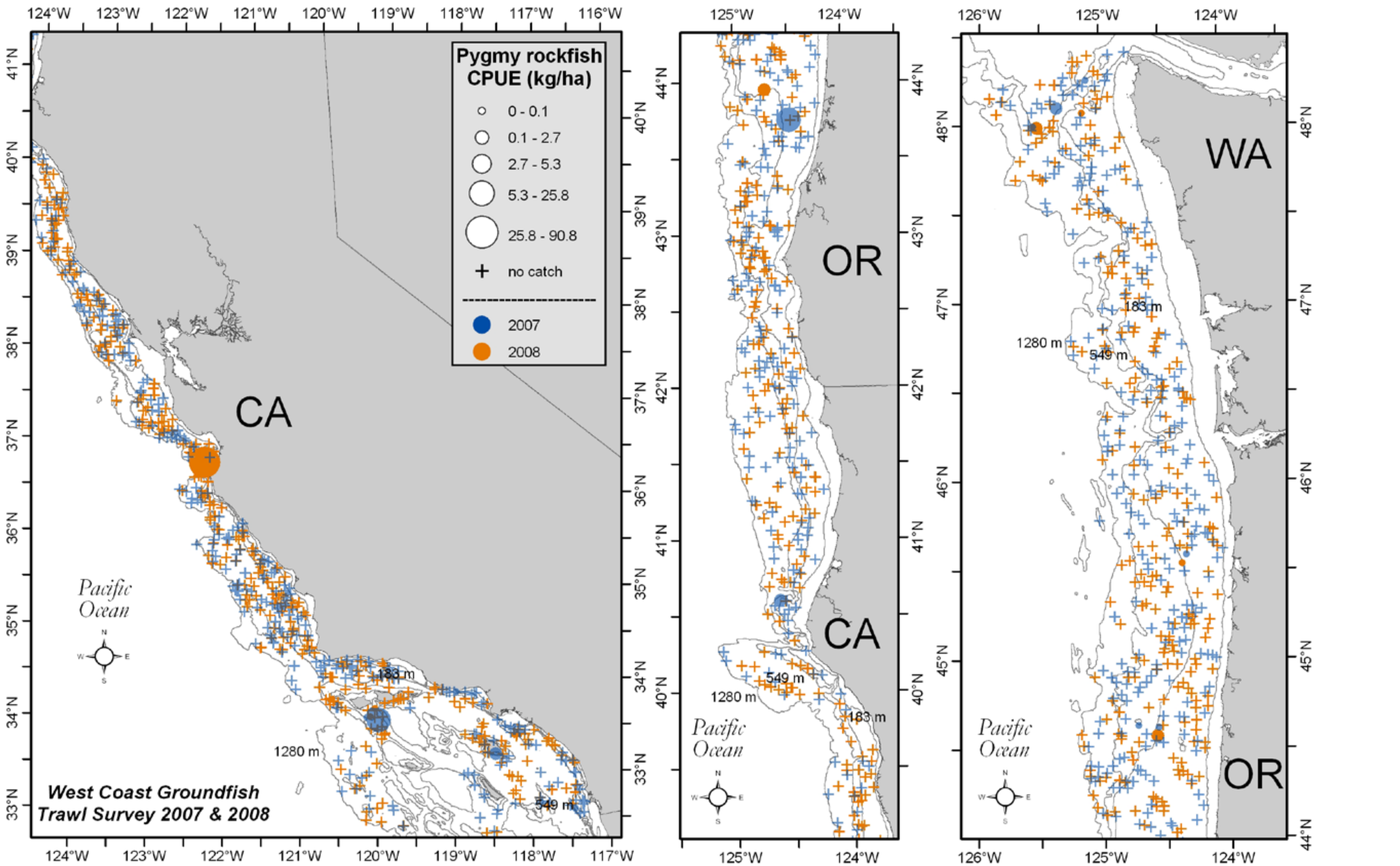

Figure 101. Pygmy rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

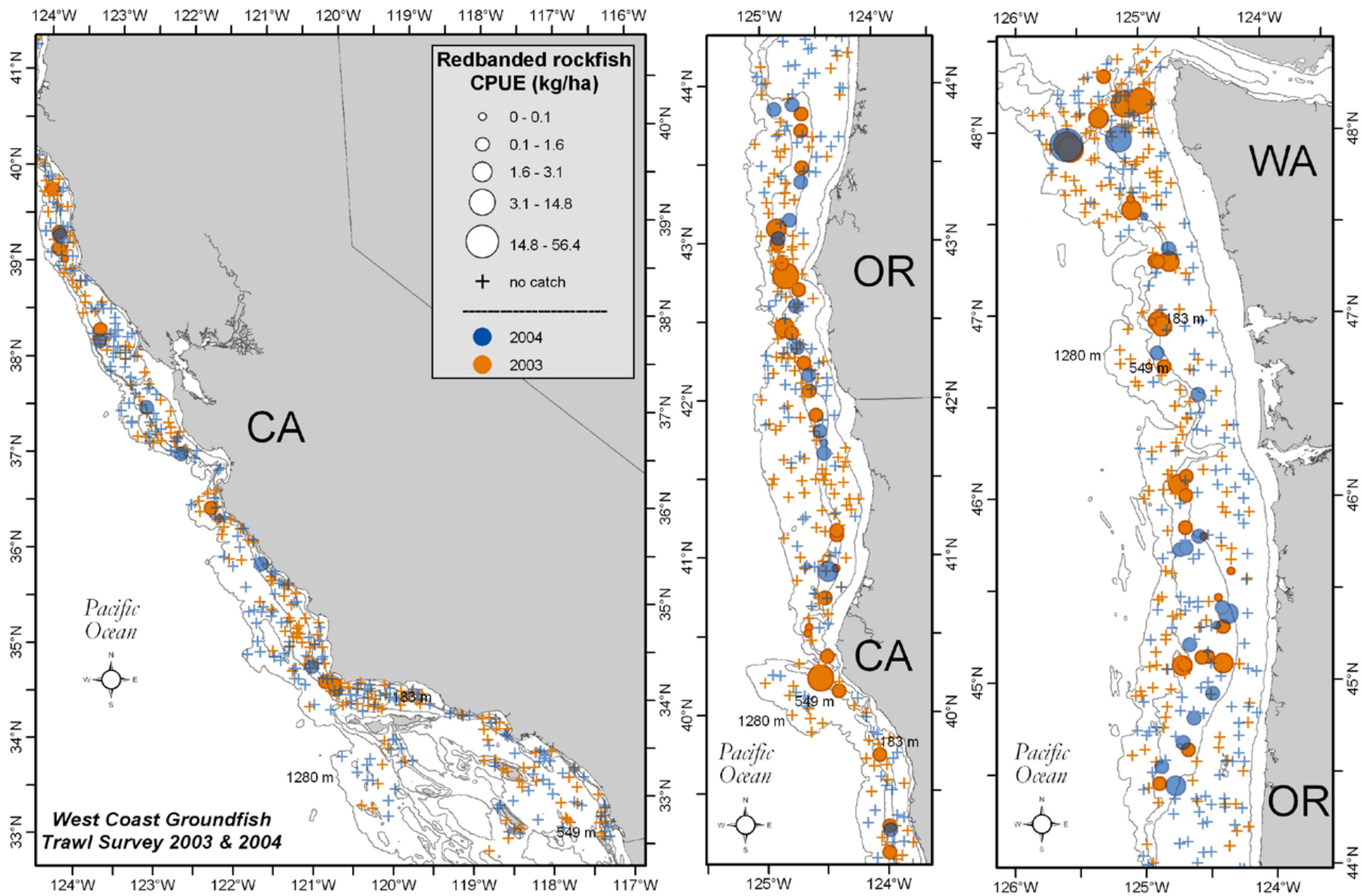

Figure 102. Redbanded rockfish (*Sebastes babcocki*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1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

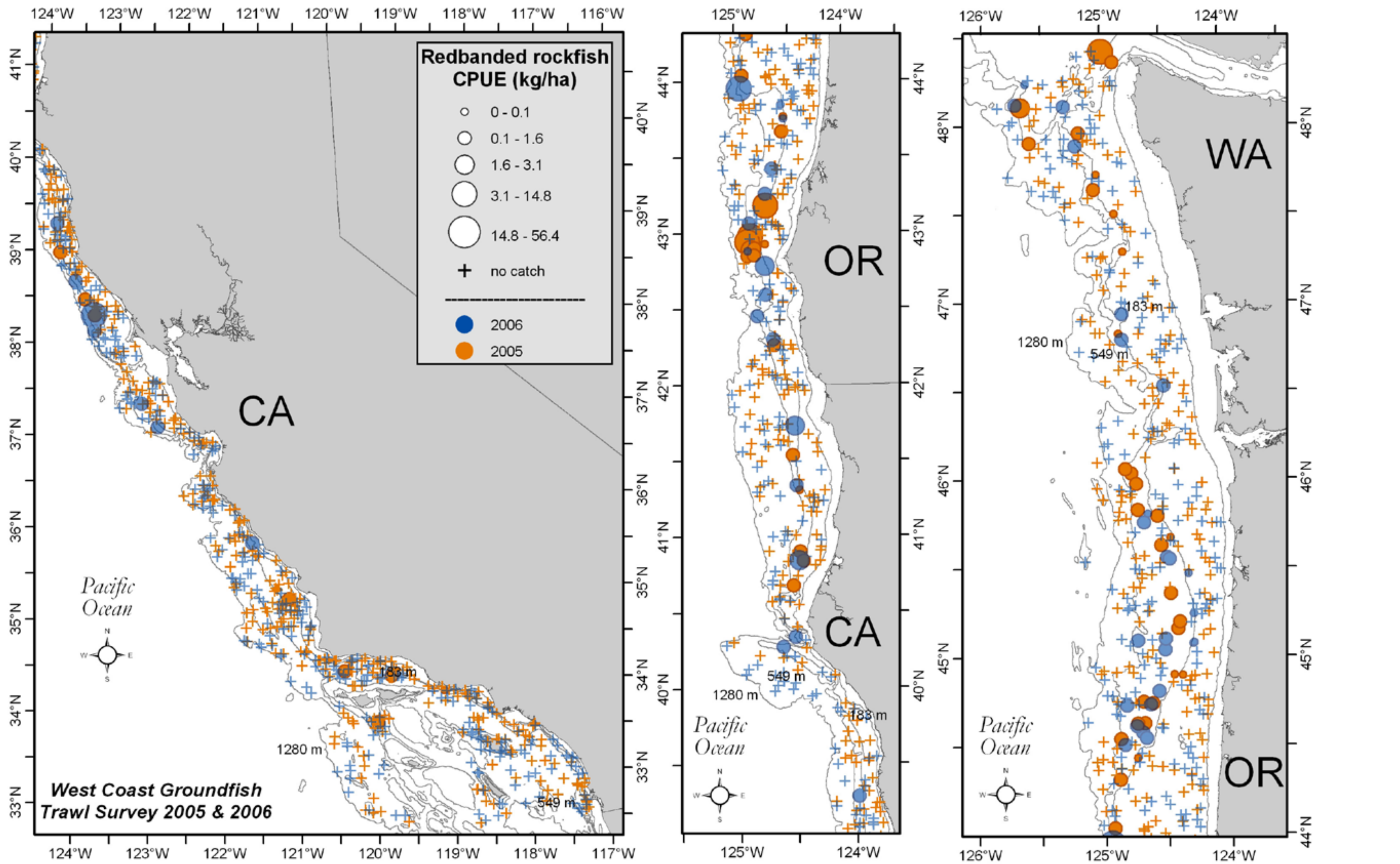

Figure 103. Redbanded rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

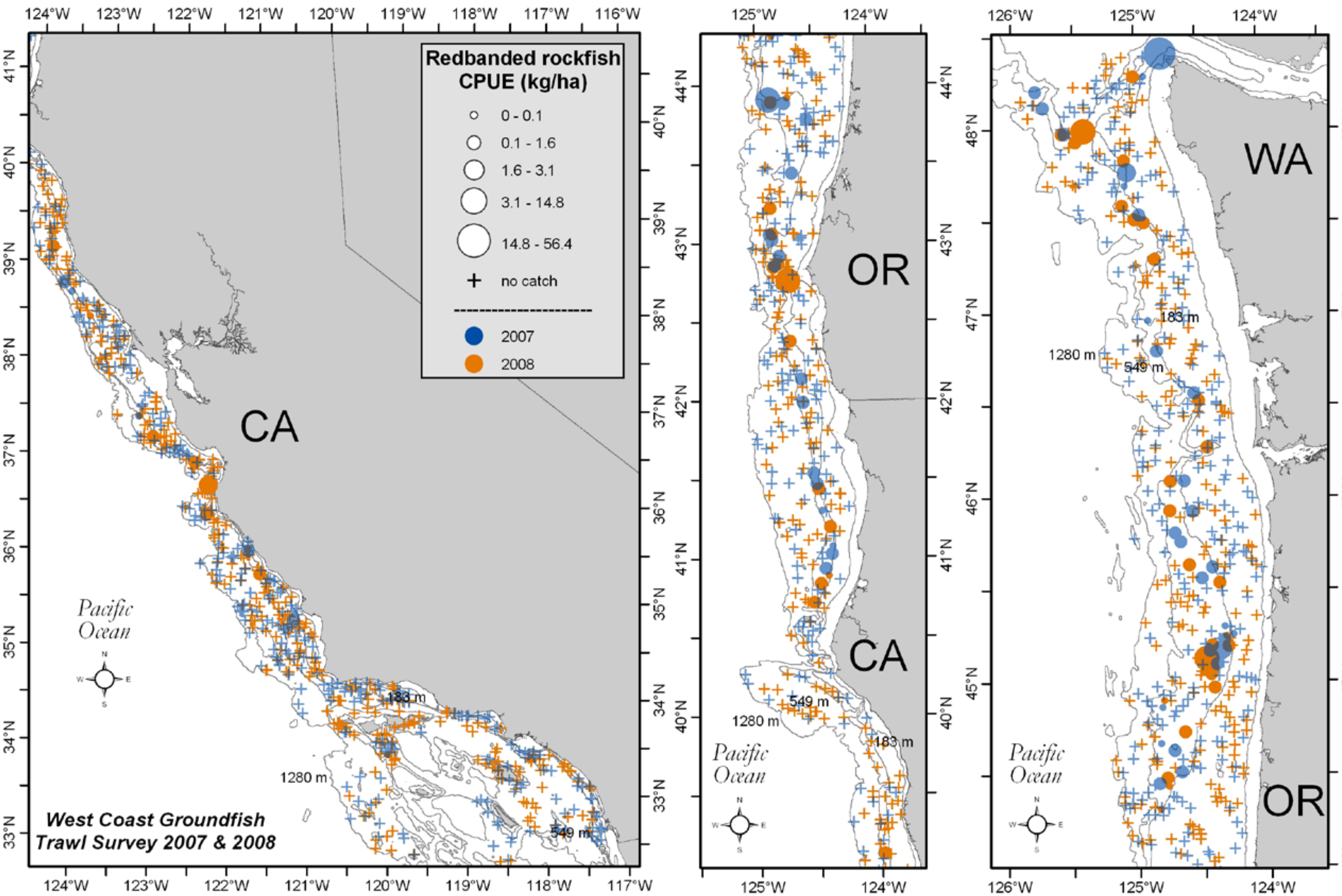

Figure 104. Redbanded rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

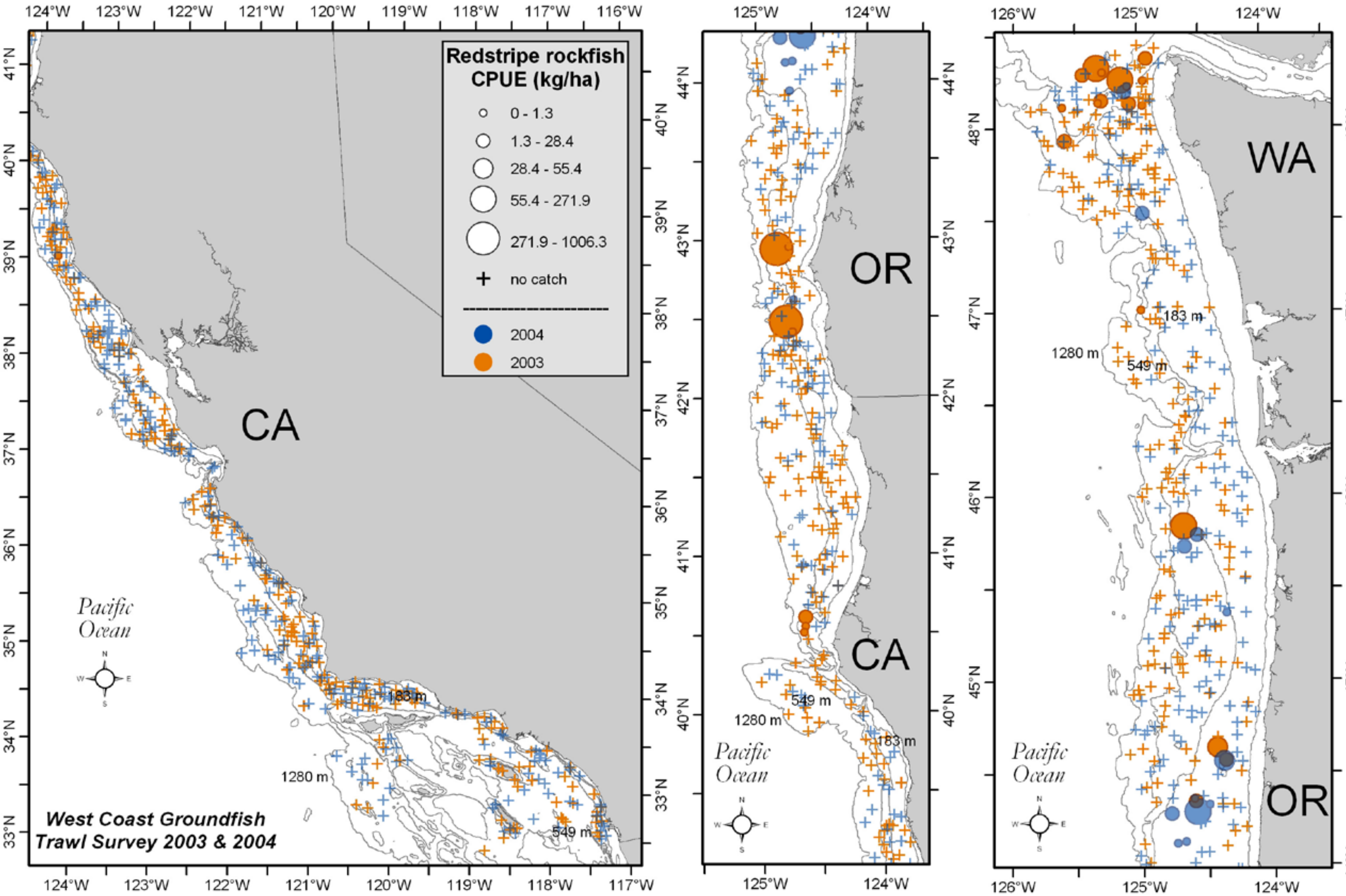

Figure 105. Redstripe rockfish (*Sebastes proriger*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1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

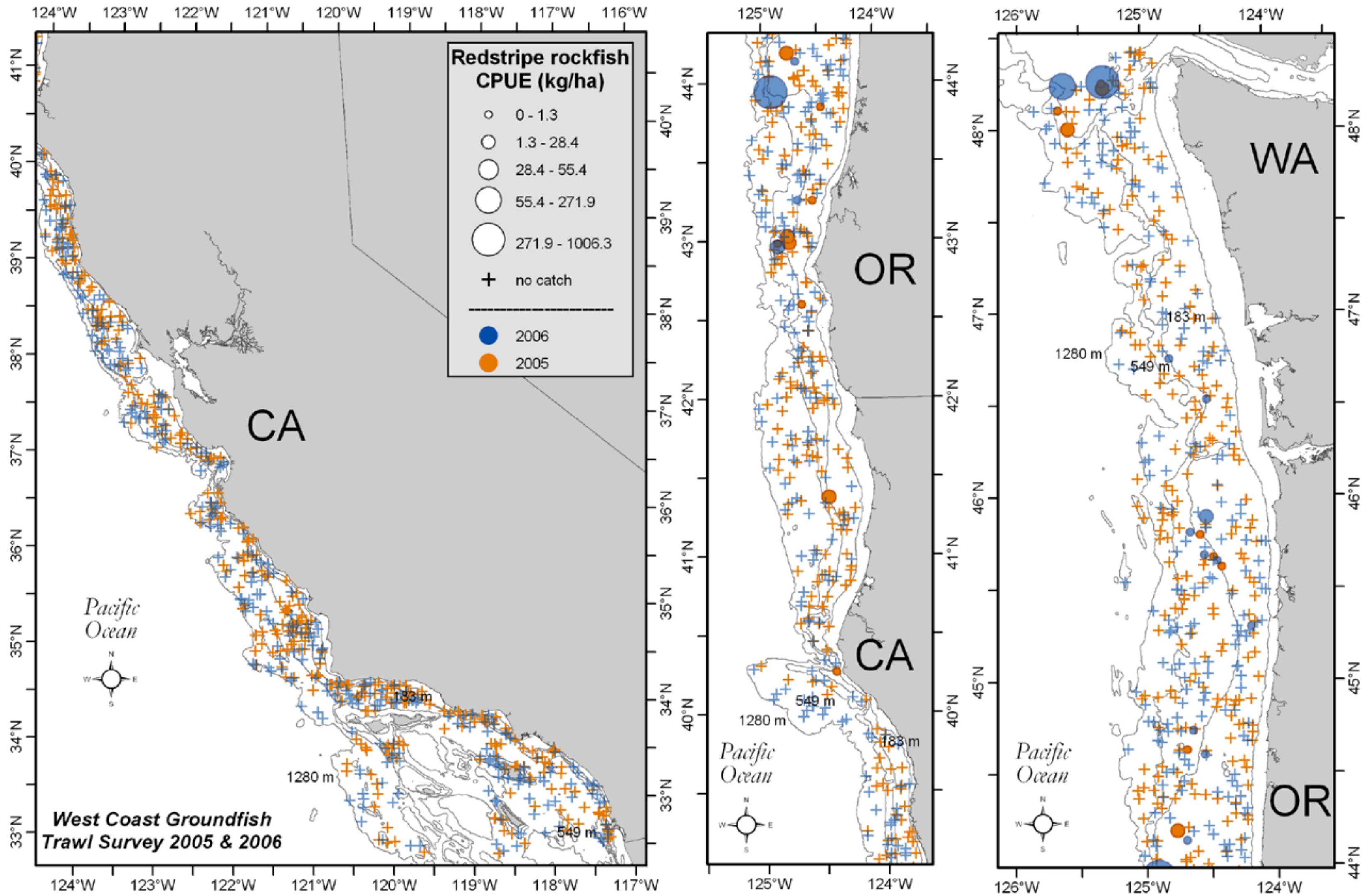

Figure 106. Redstripe rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

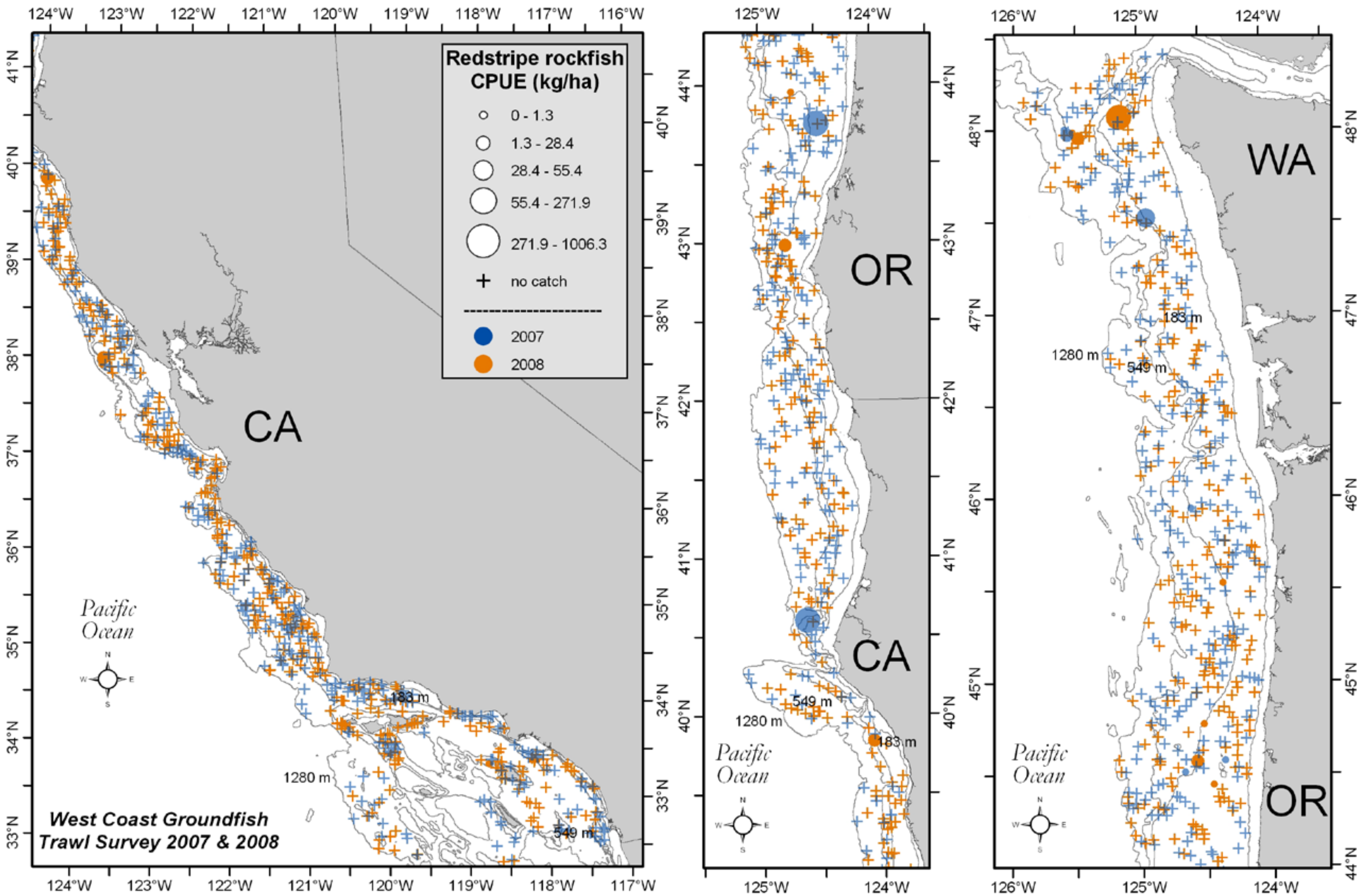

Figure 107. Redstripe rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

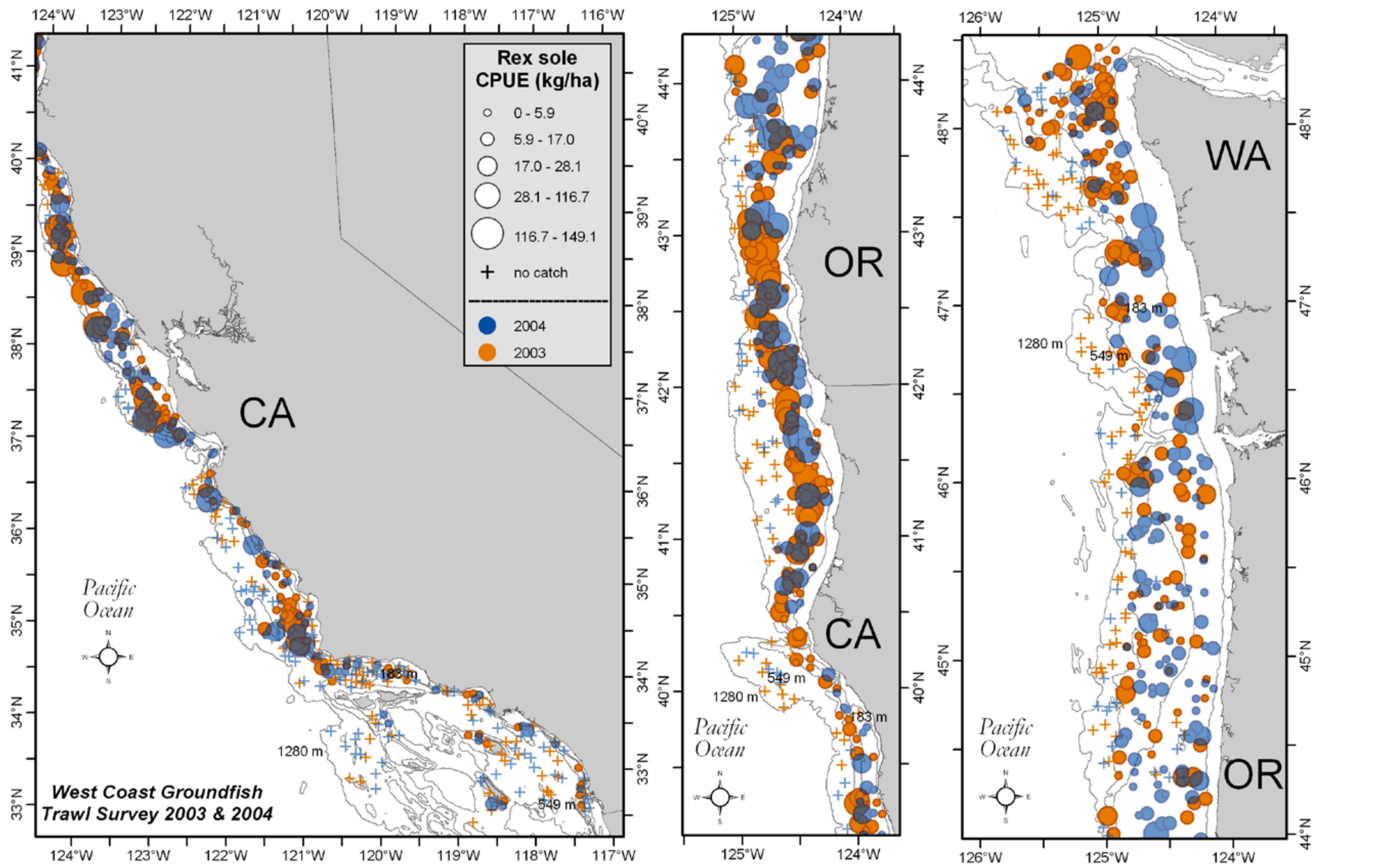

Figure 108. Rex sole distribution and relative abundance (kg ha–1) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between 2 and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

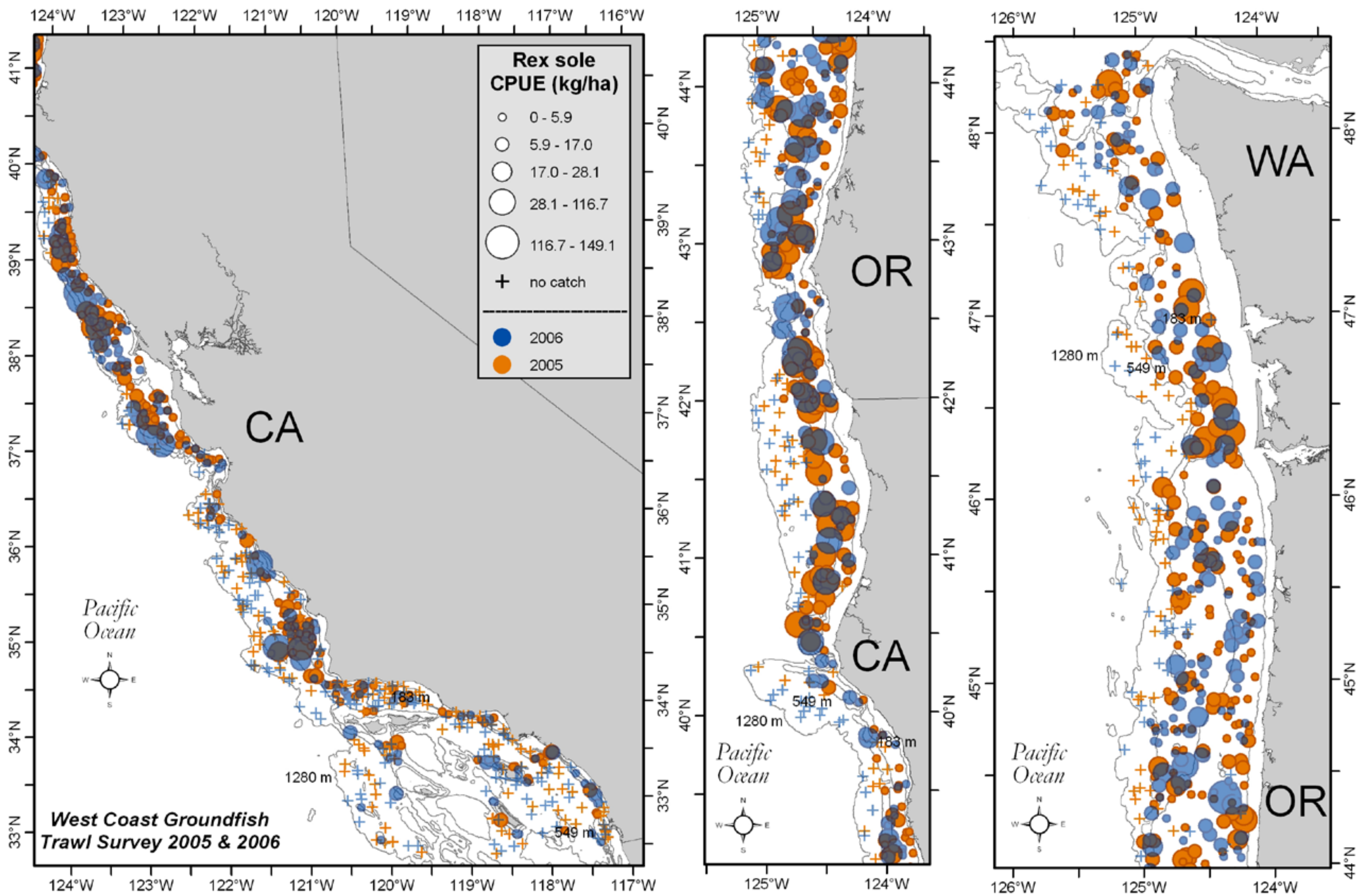

Figure 109. Rex sole distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

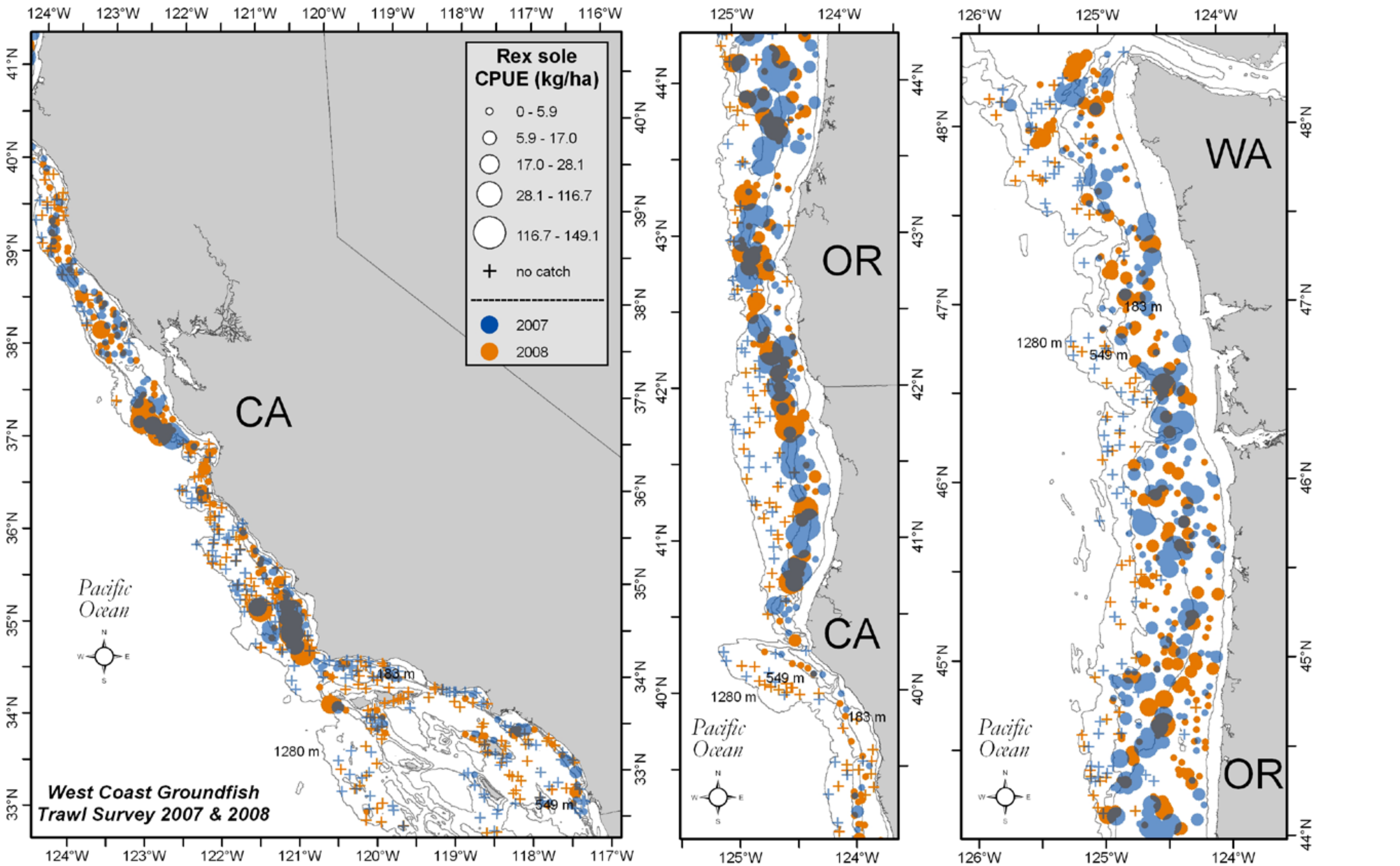

Figure 110. Rex sole distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

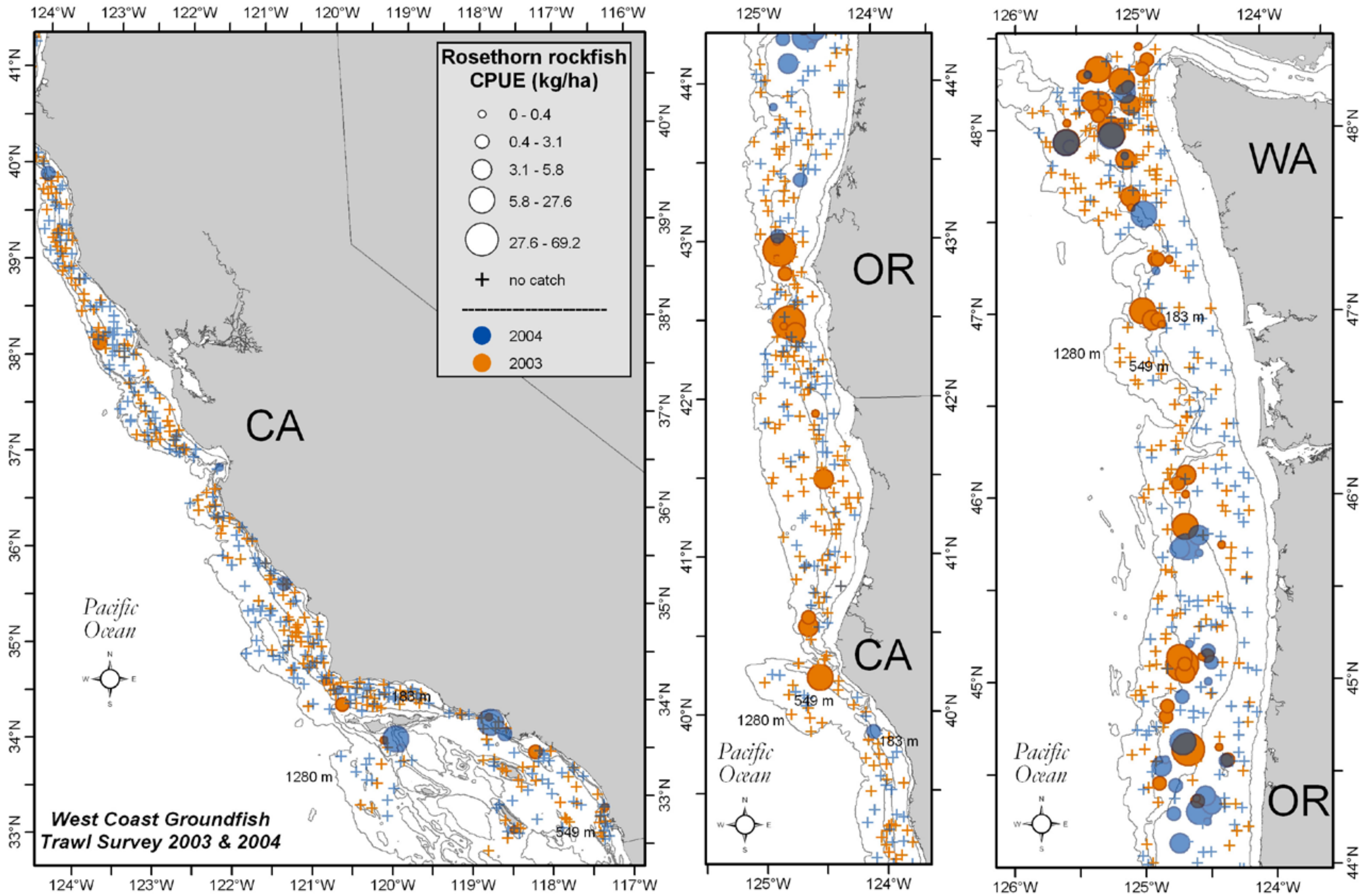

Figure 111. Rosethorn rockfish (*Sebastes helvomaculatus*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between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

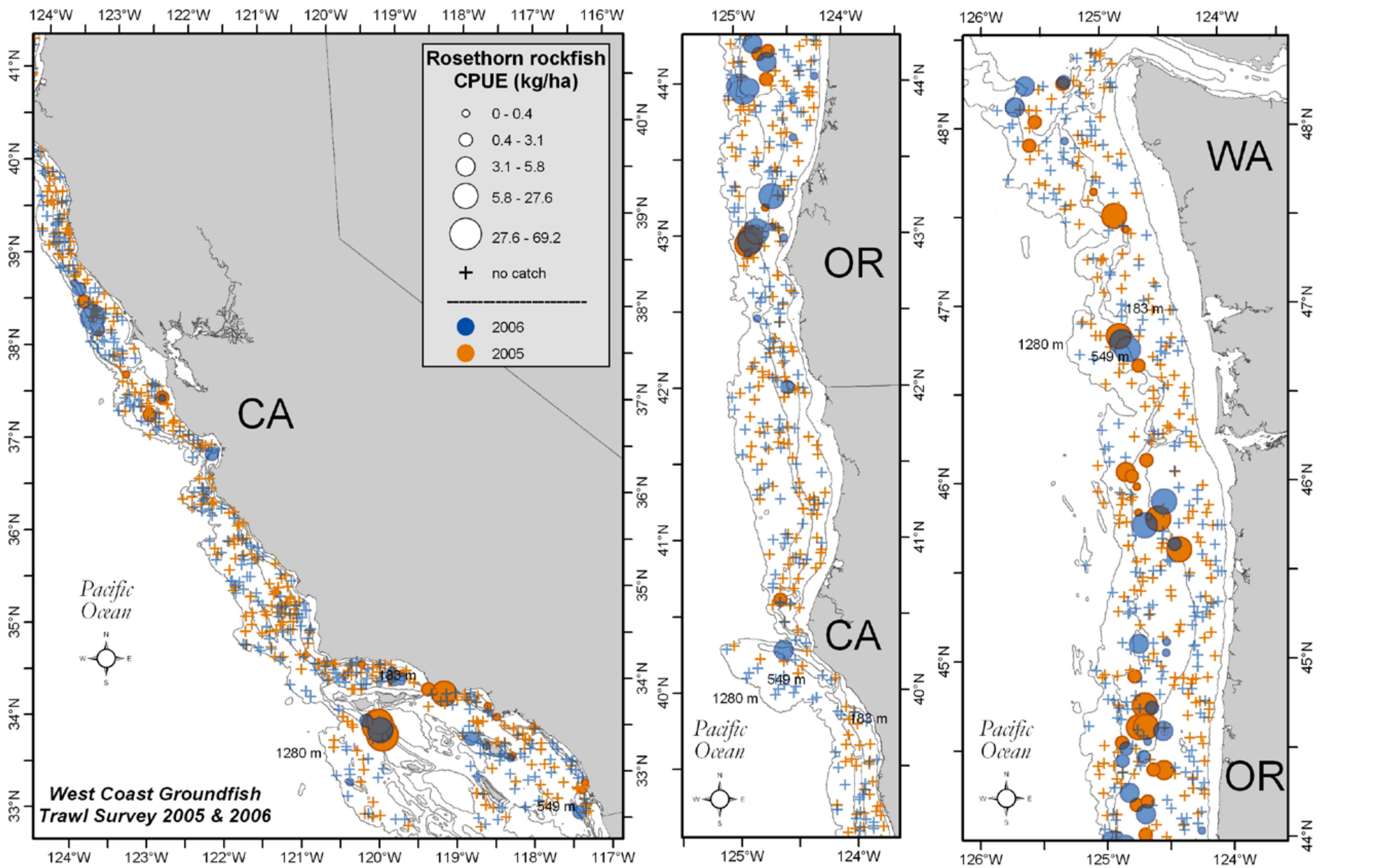

Figure 112. Rosethorn rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

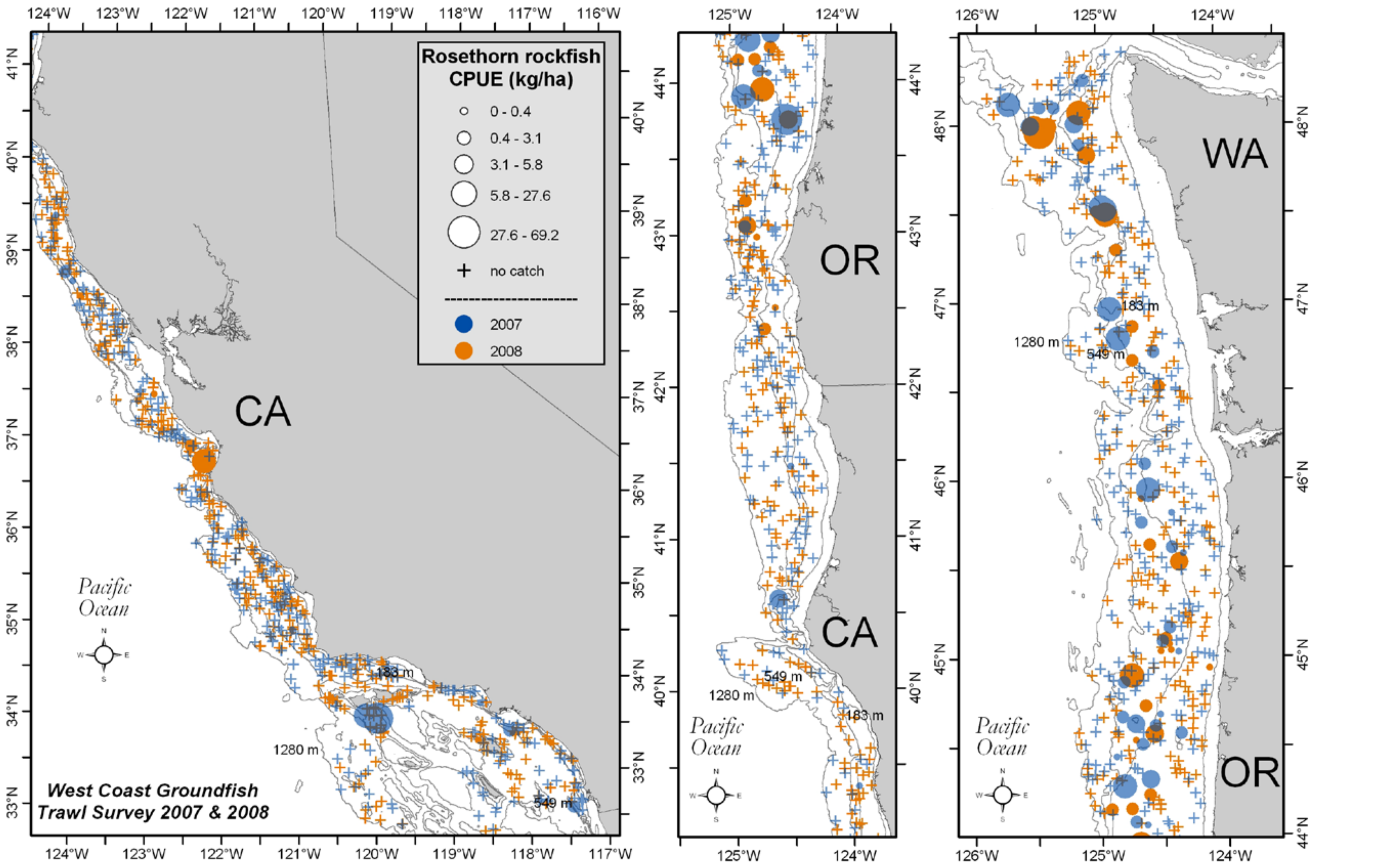

Figure 113. Rosethorn rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

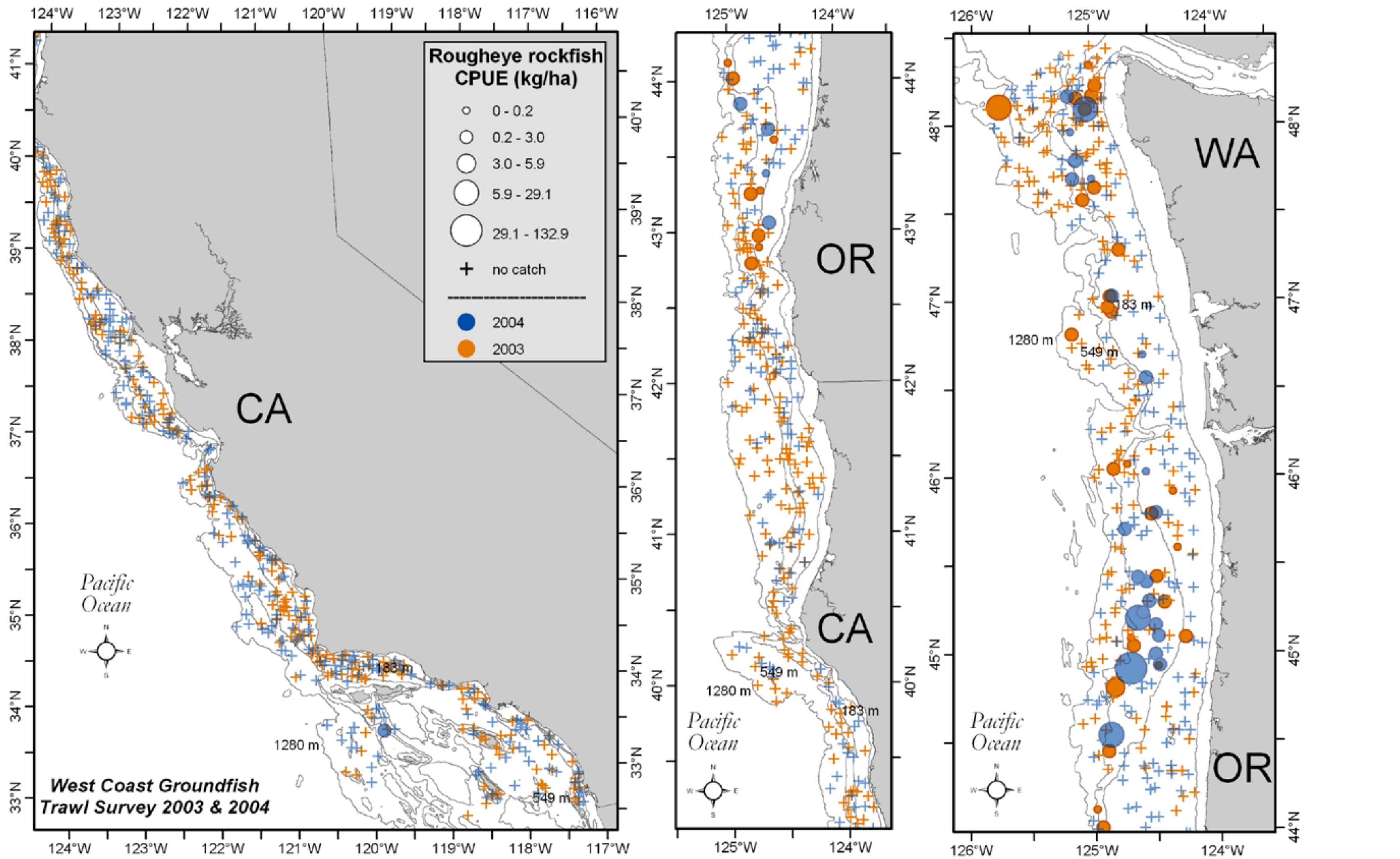

Figure 114. Rougheye rockfish (*Sebastes aleutianus*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between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

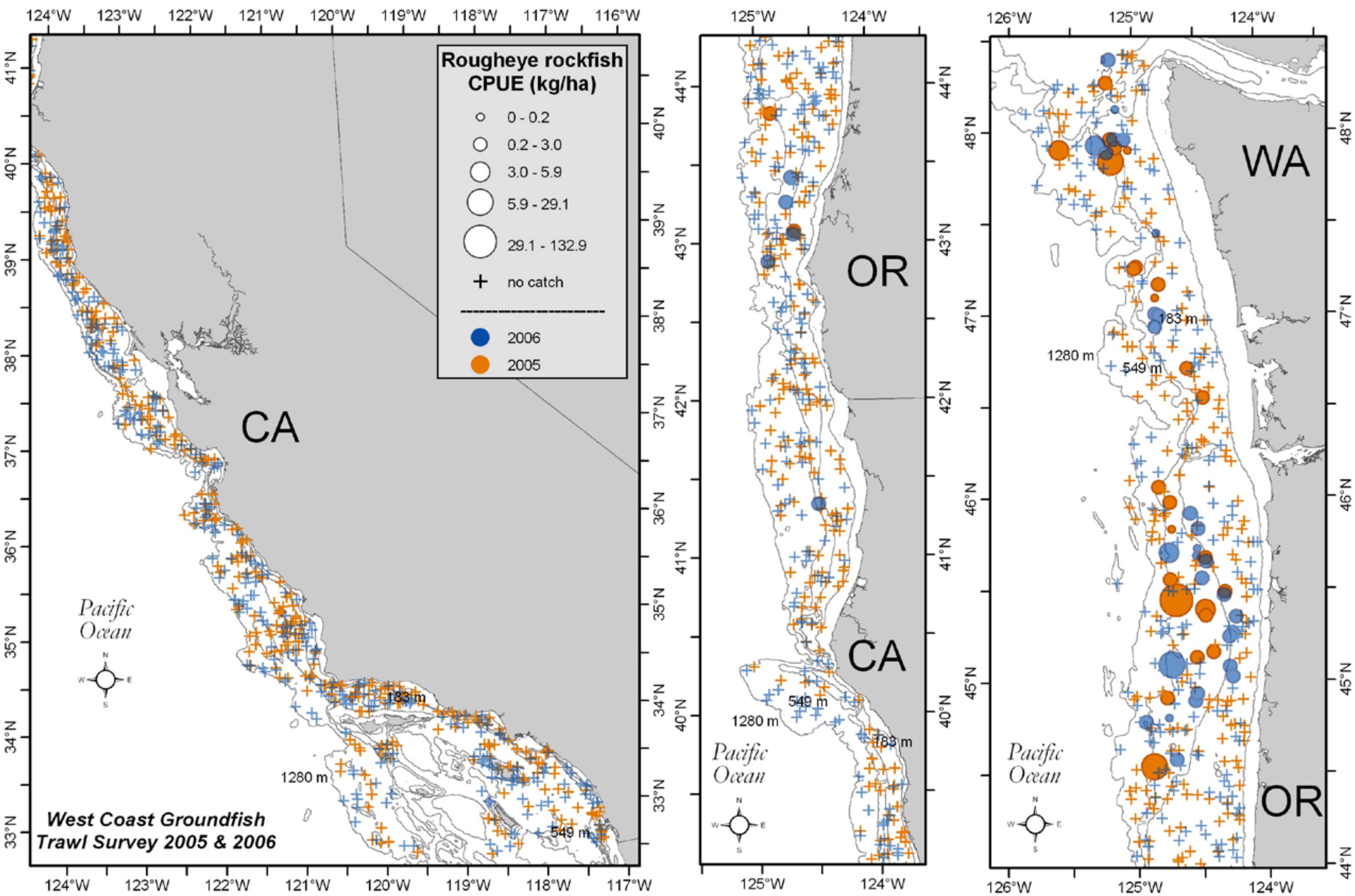

Figure 115. Rougheye rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

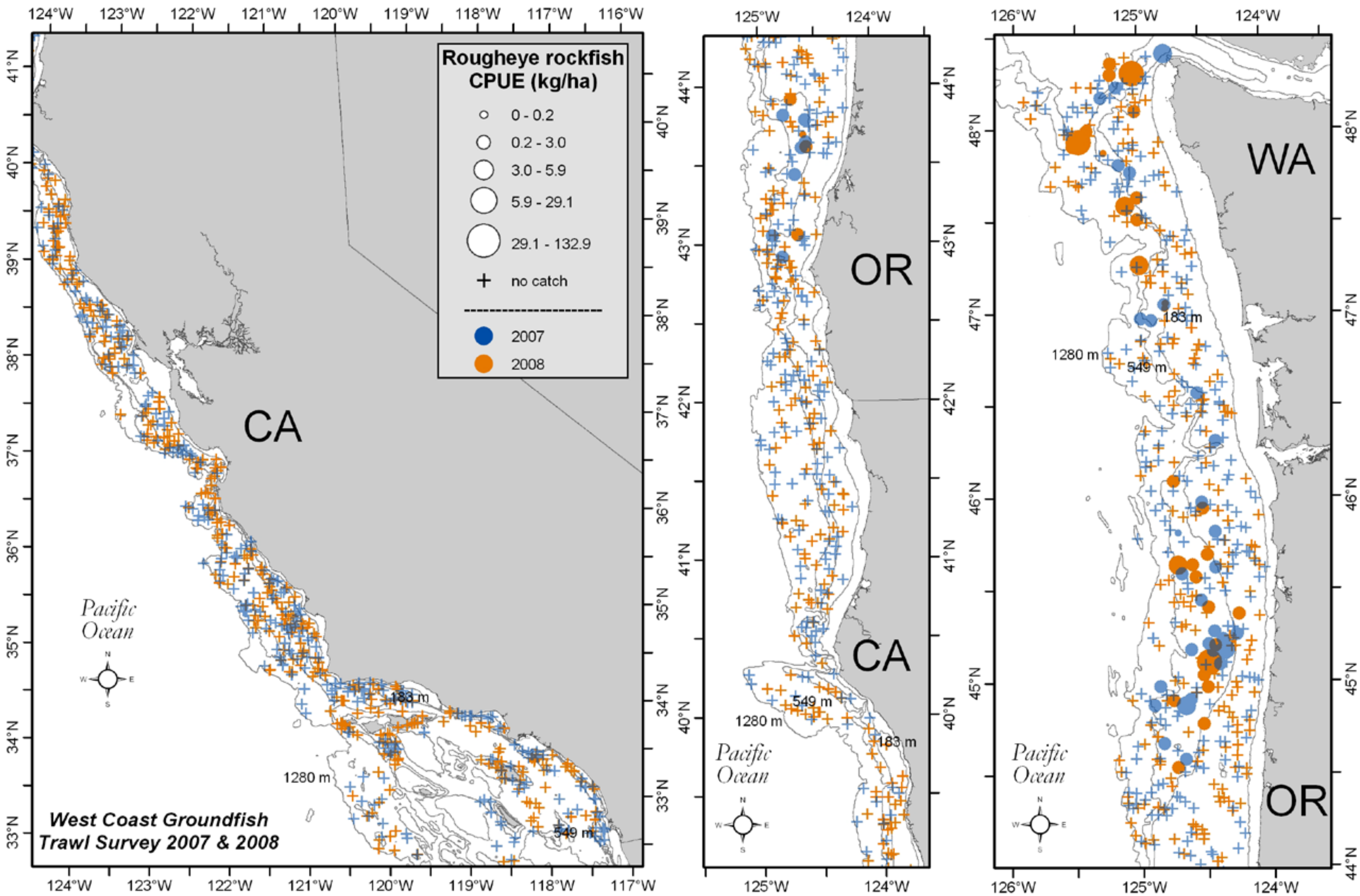

Figure 116. Rougheye rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

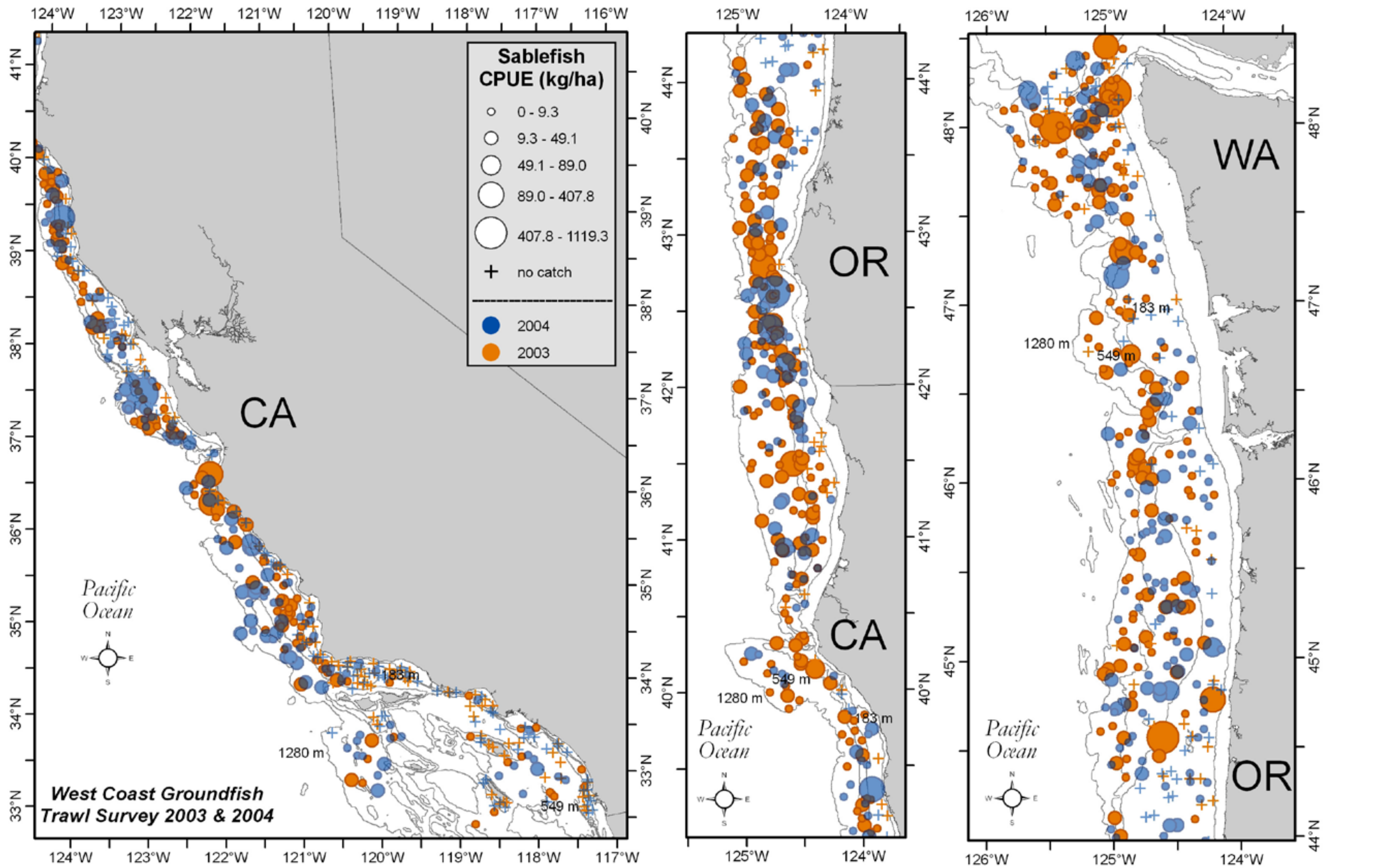

Figure 117. Sablefish distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

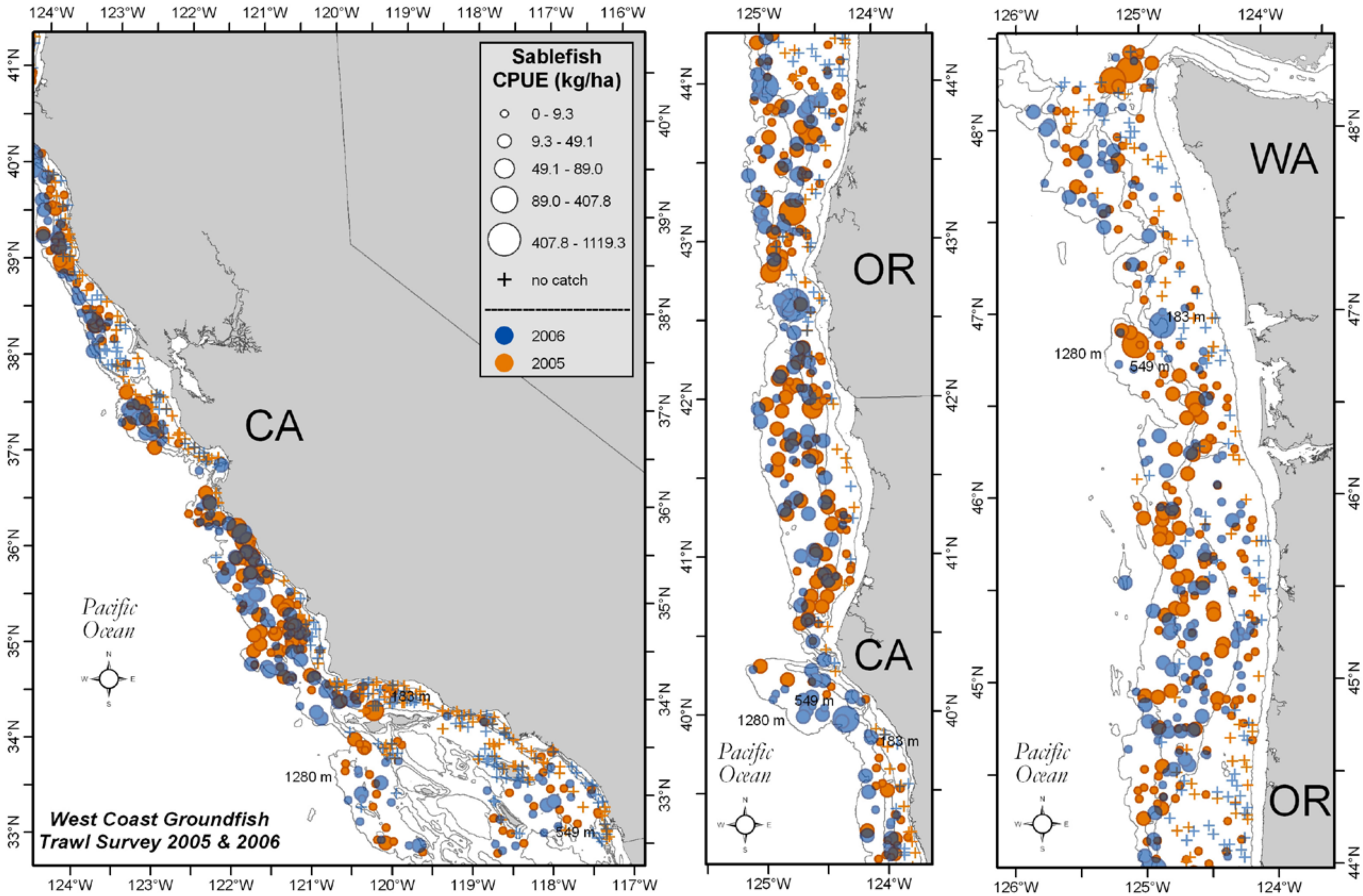

Figure 118. Sablefish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

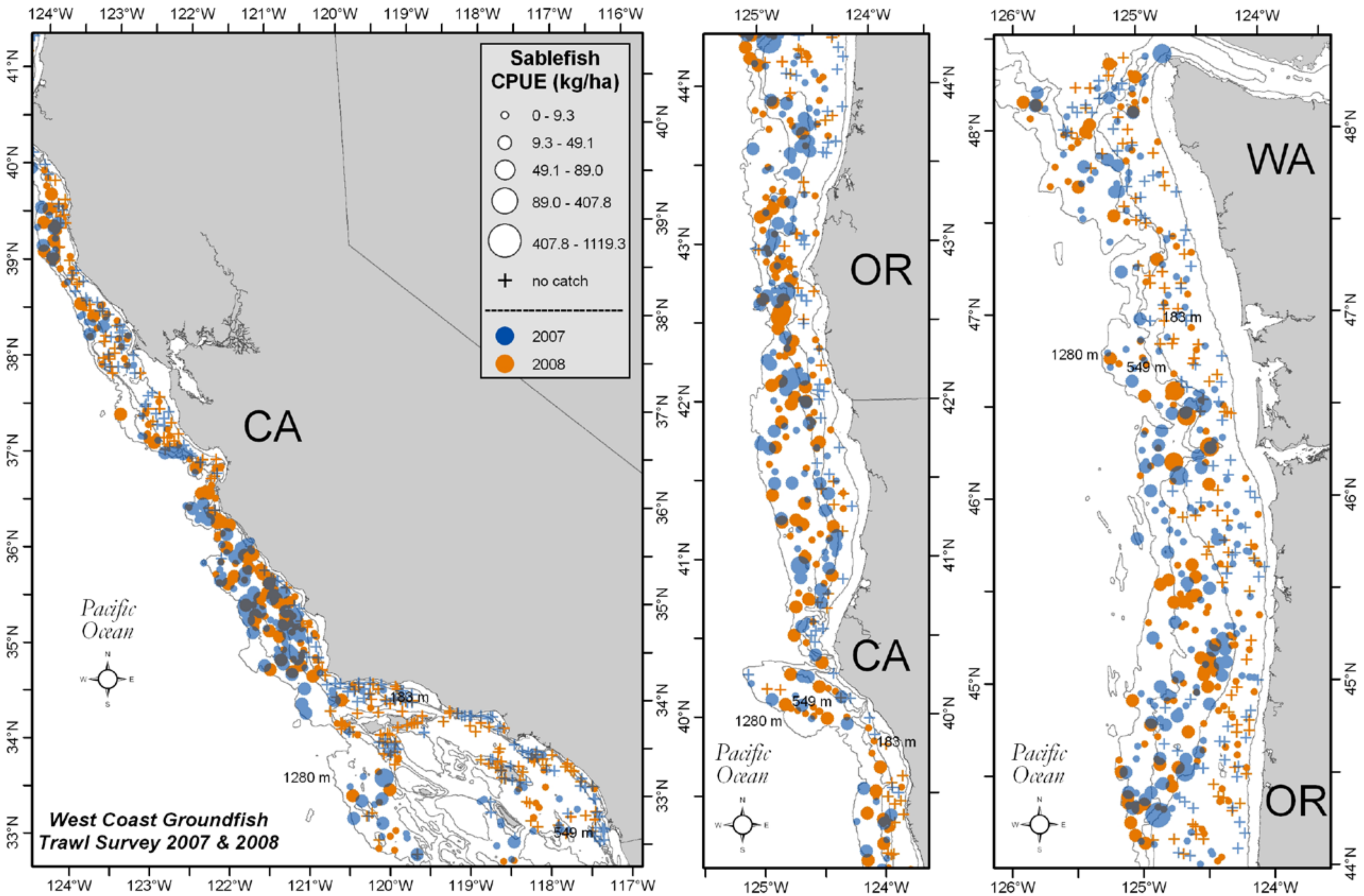

Figure 119. Sablefish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

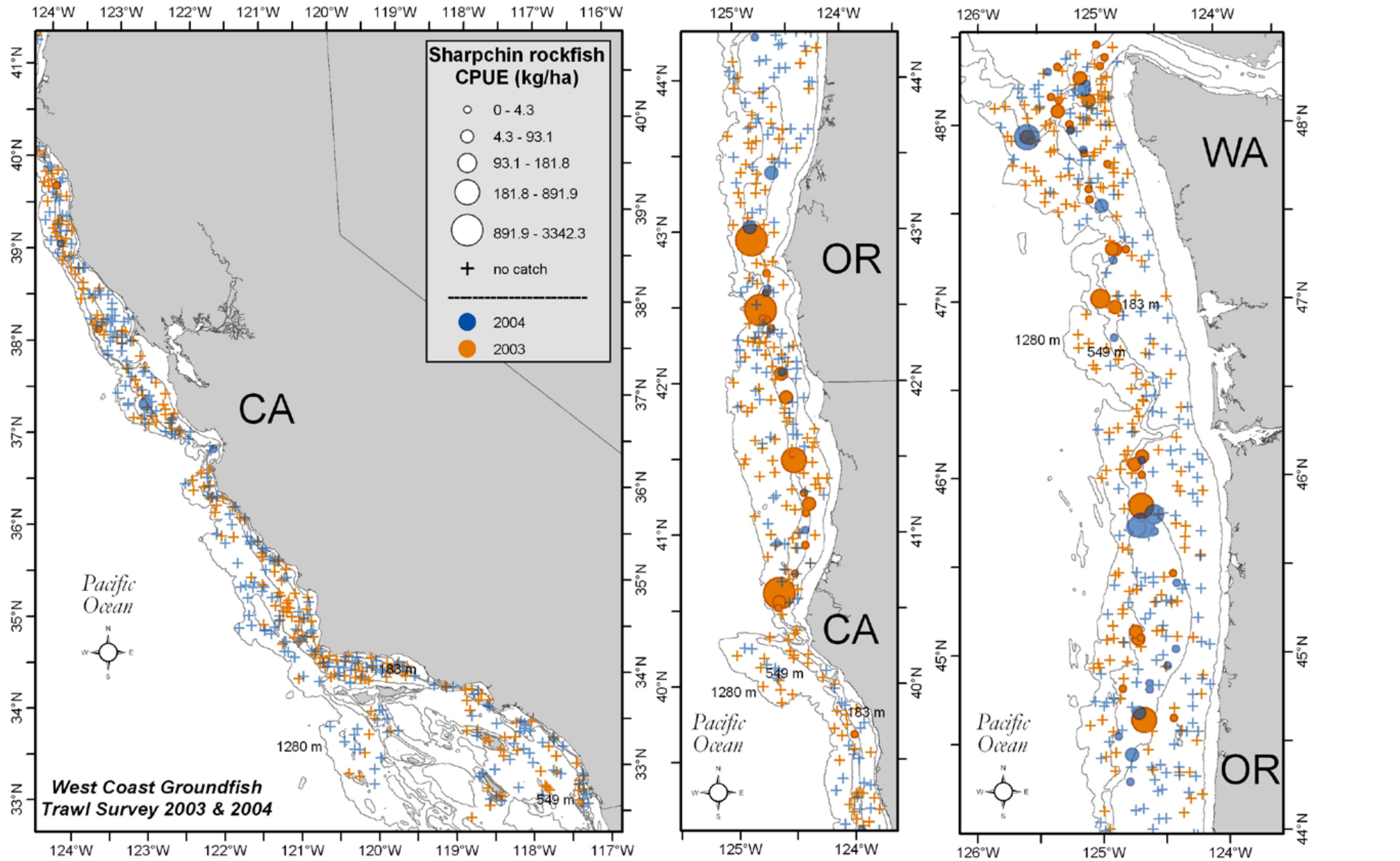

Figure 120. Sharpchin rockfish (*Sebastes zacentrus*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between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

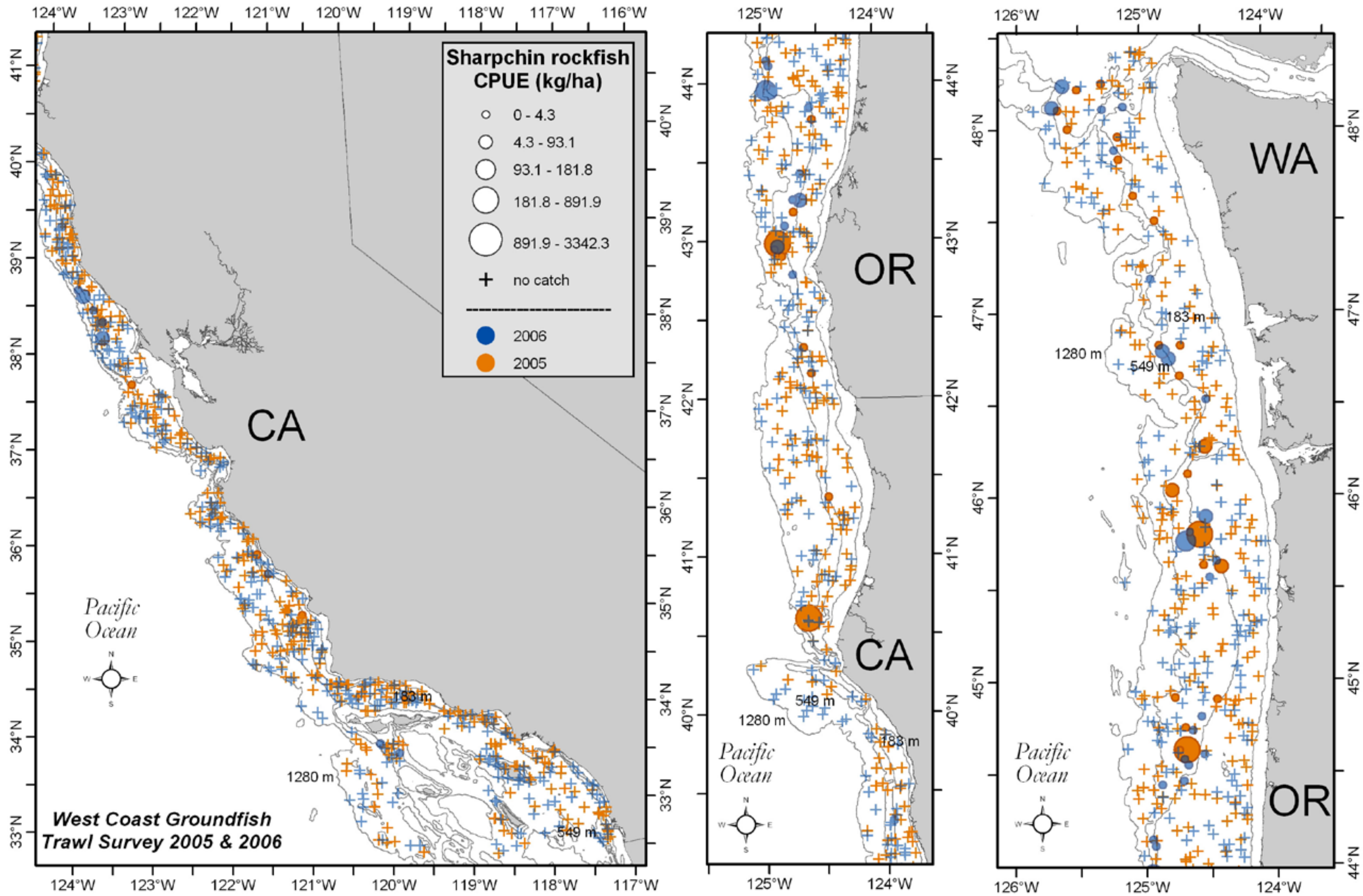

Figure 121. Sharpchin rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

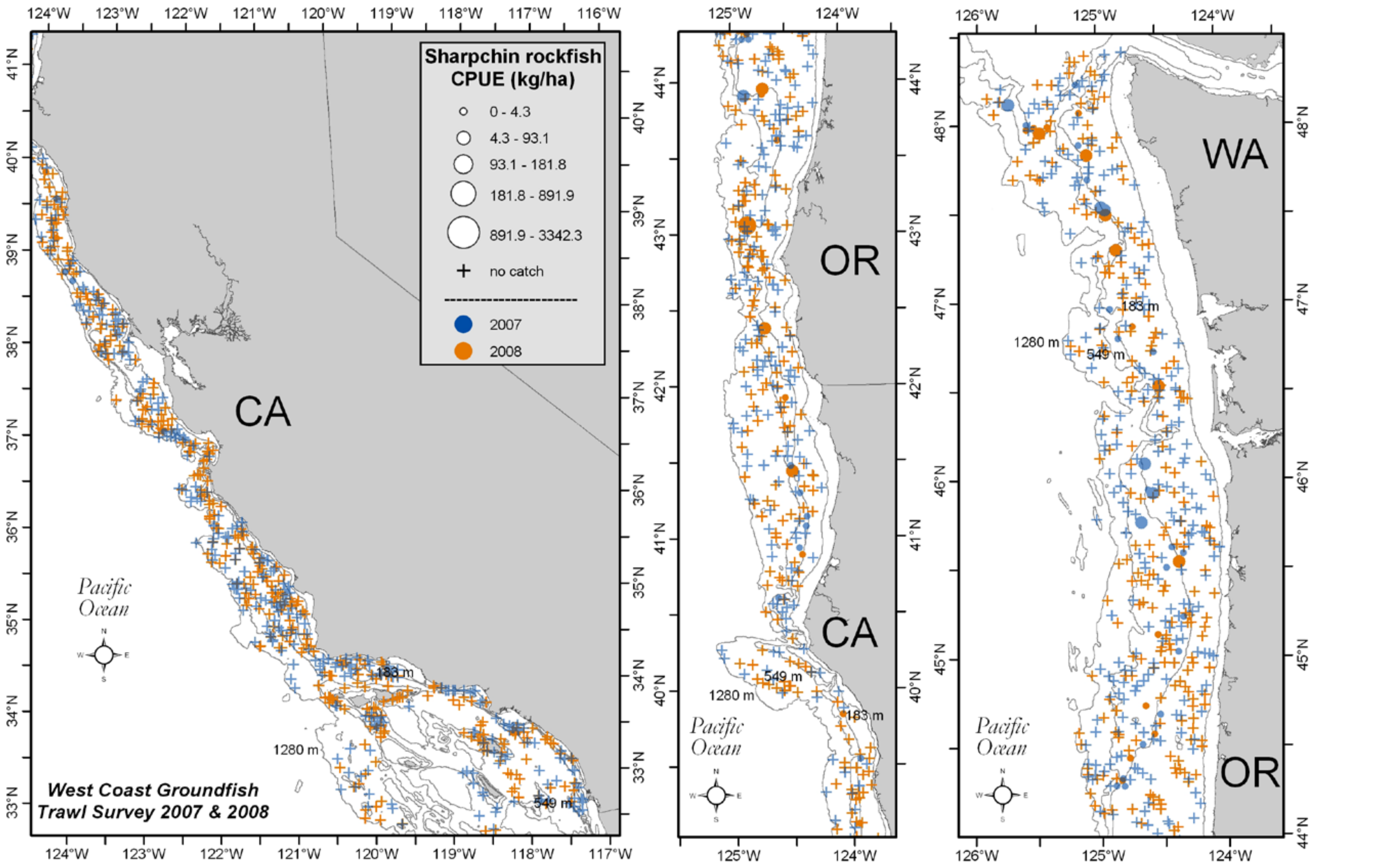

Figure 122. Sharpchin rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

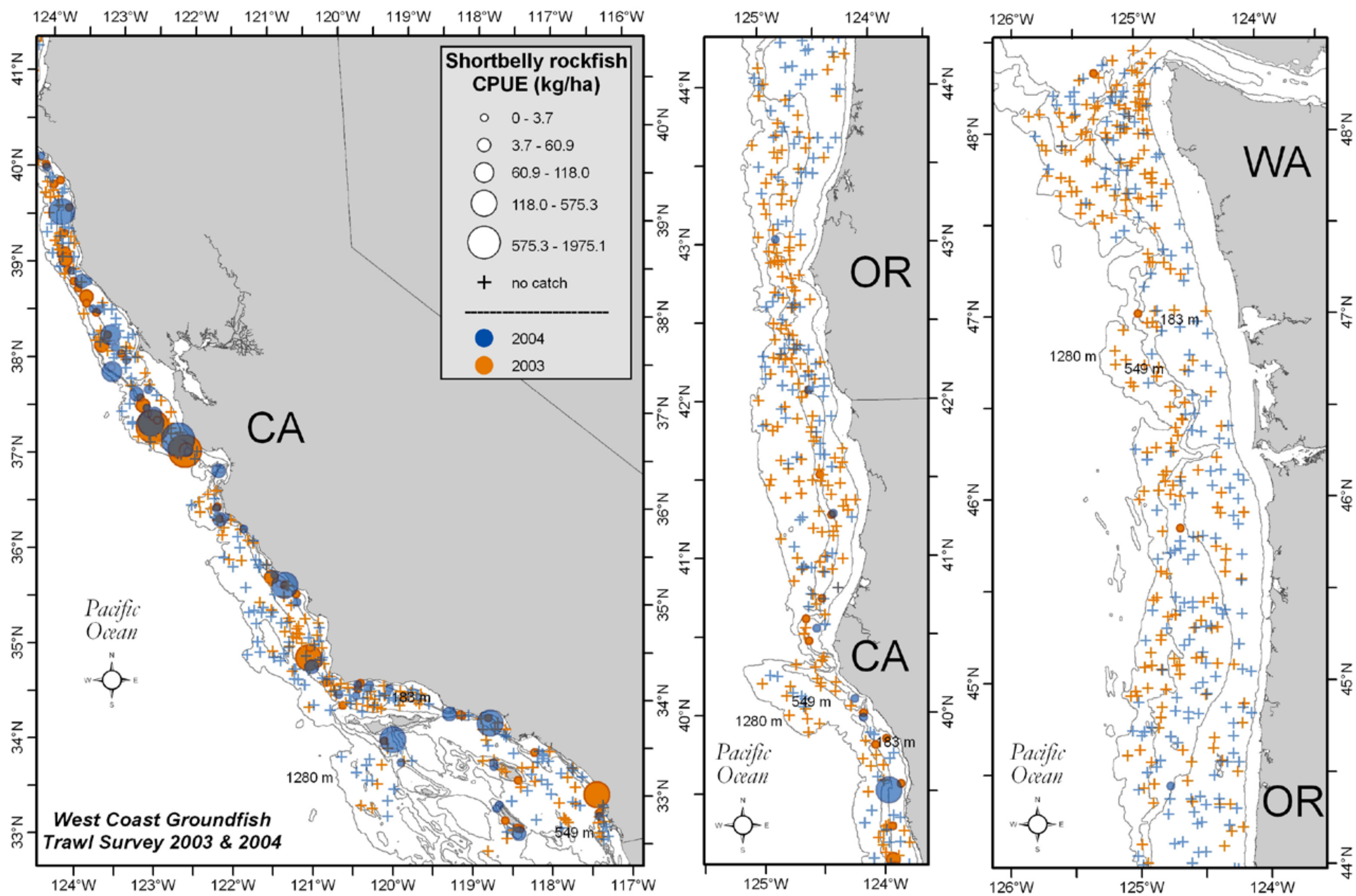

Figure 123. Shortbelly rockfish (*Sebastes jordani*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1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

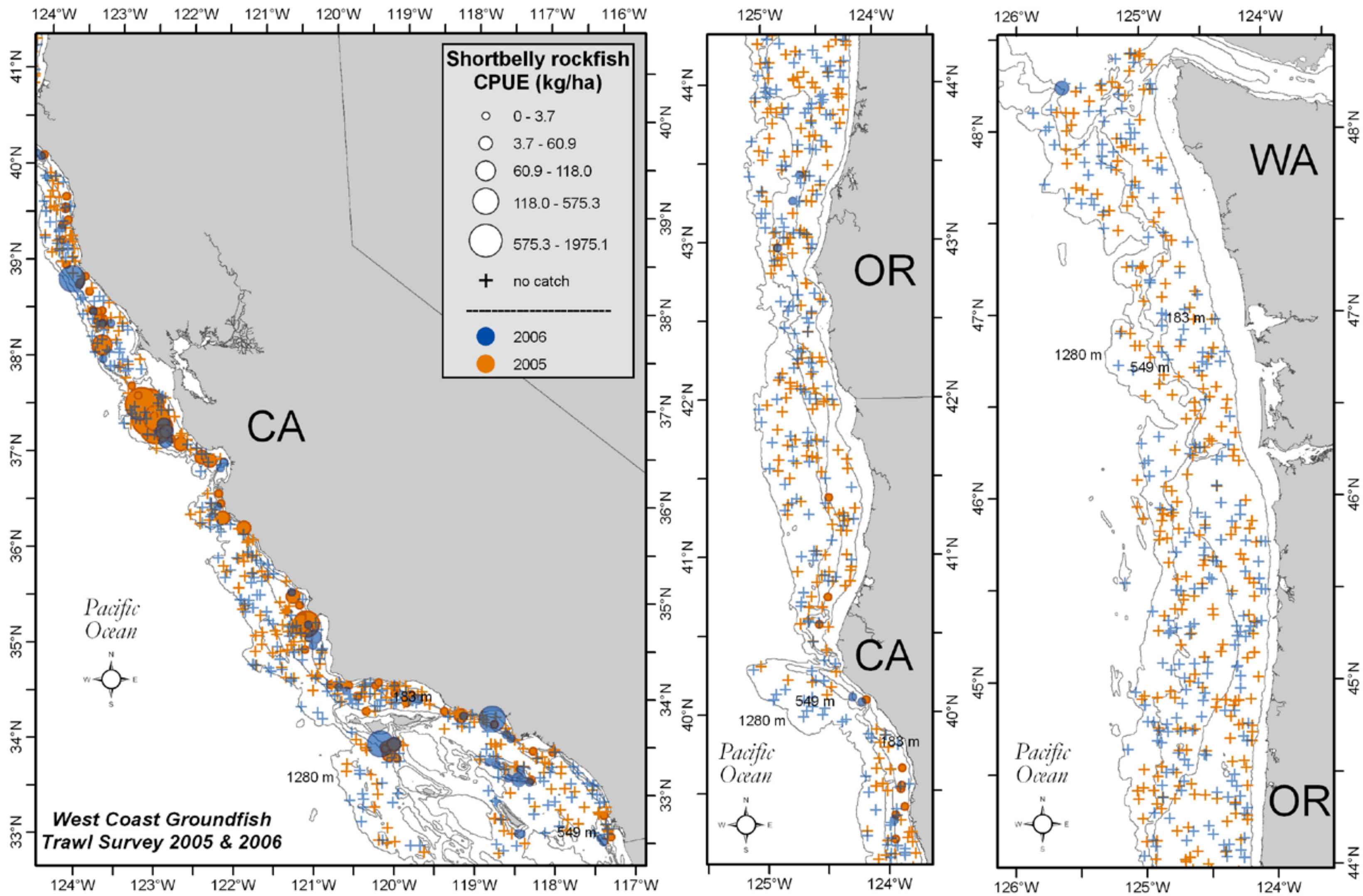

Figure 124. Shortbelly rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

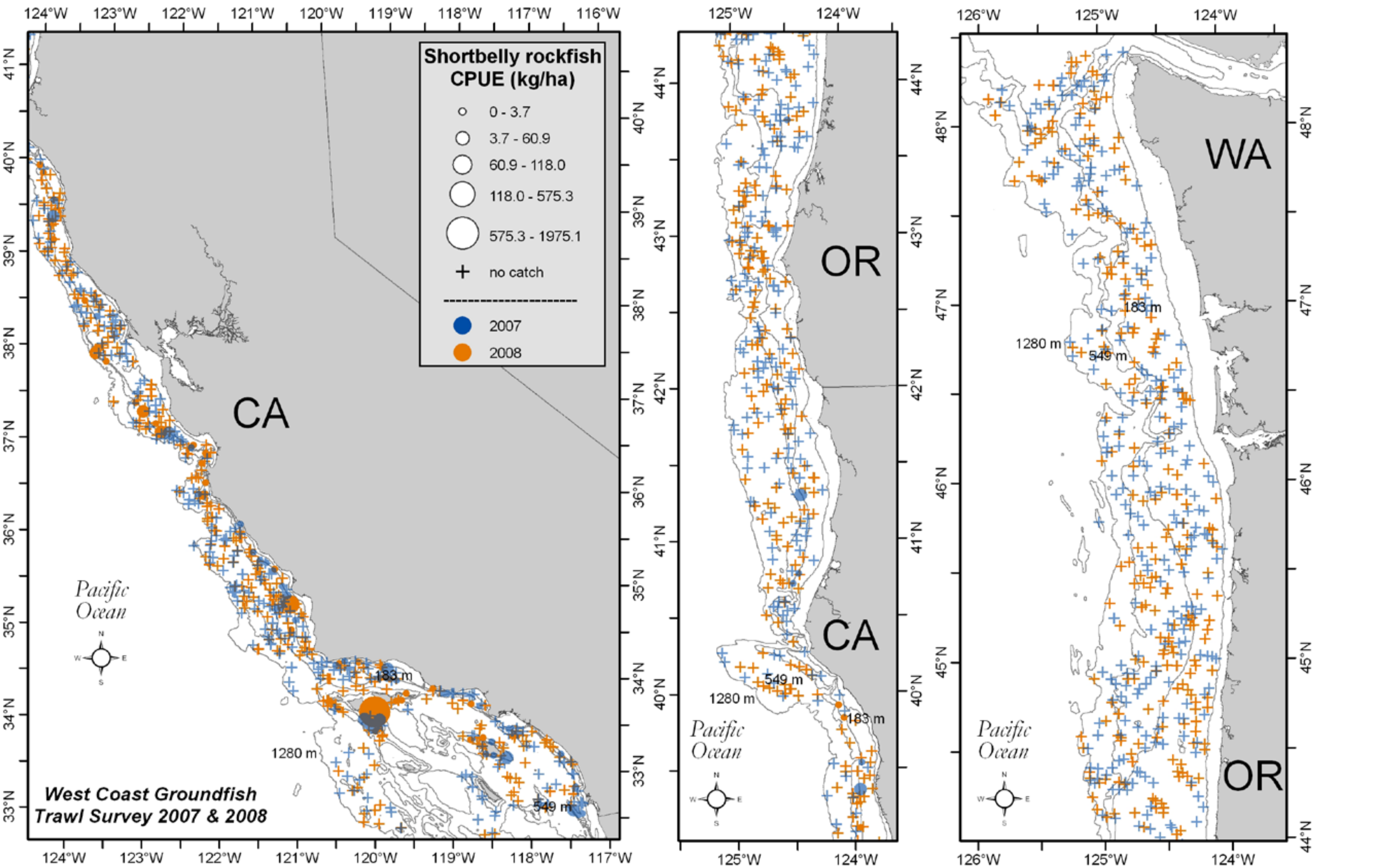

Figure 125. Shortbelly rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

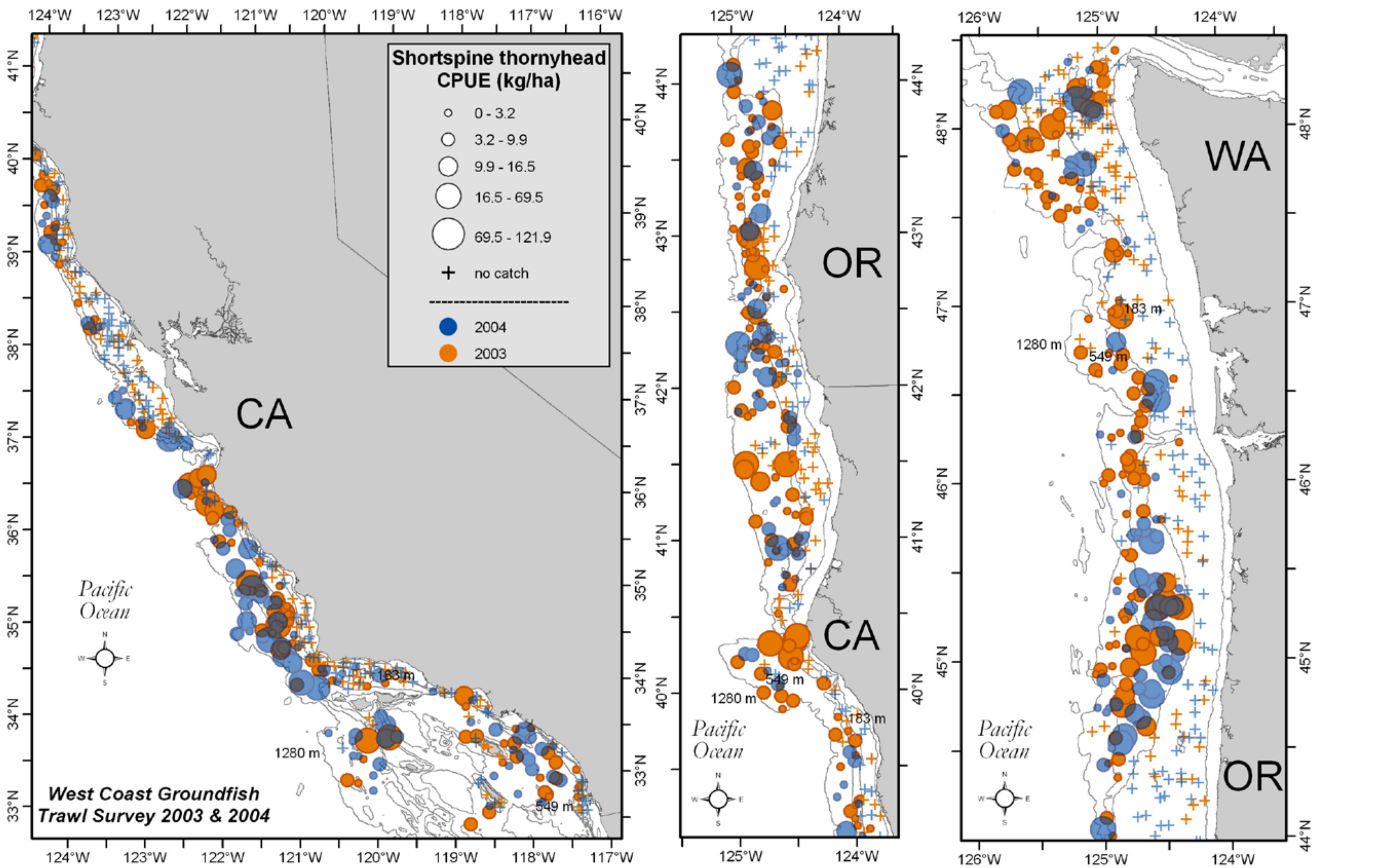

Figure 126. Shortspine thornyhead distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

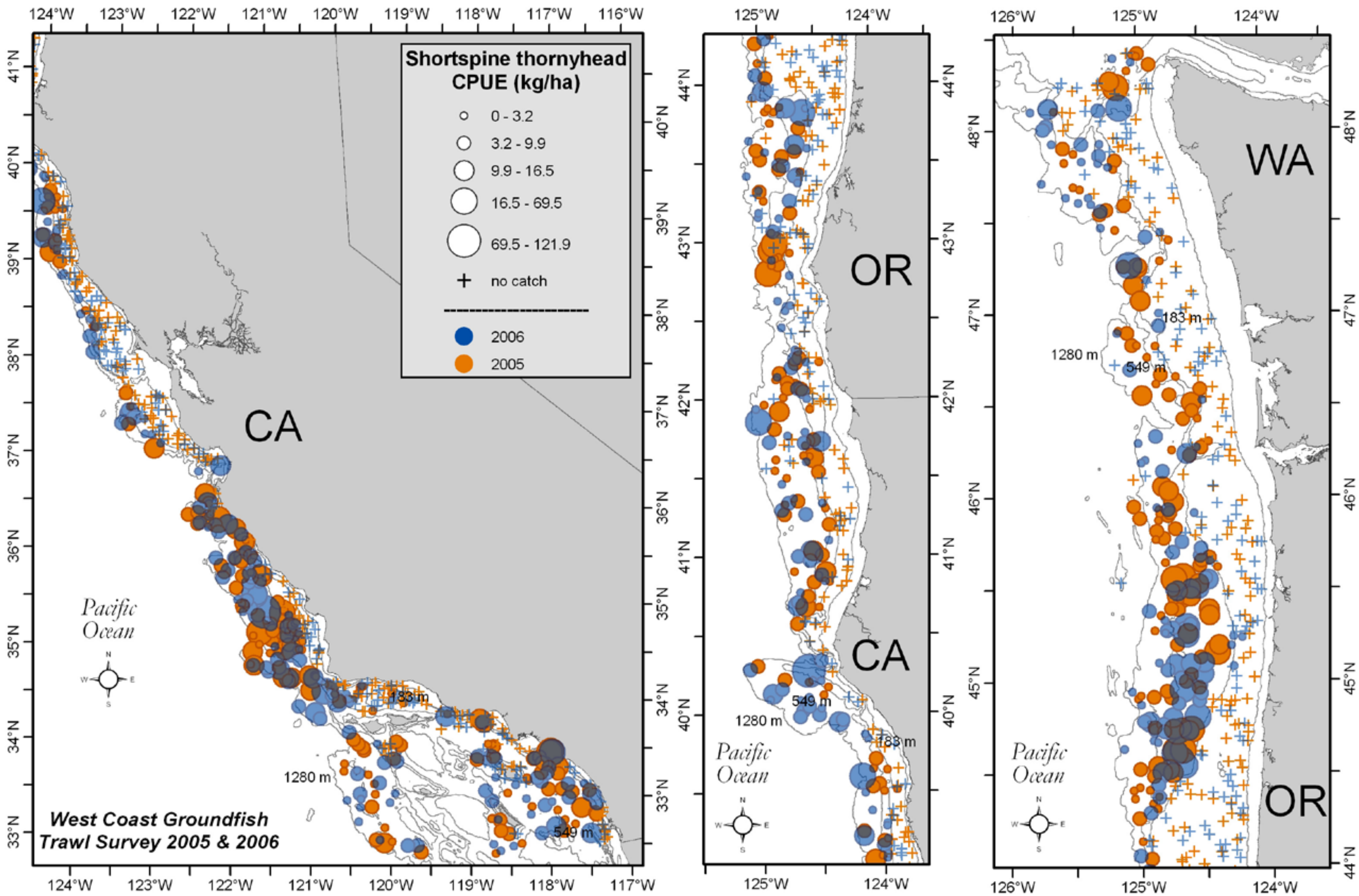

Figure 127. Shortspine thornyhead distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

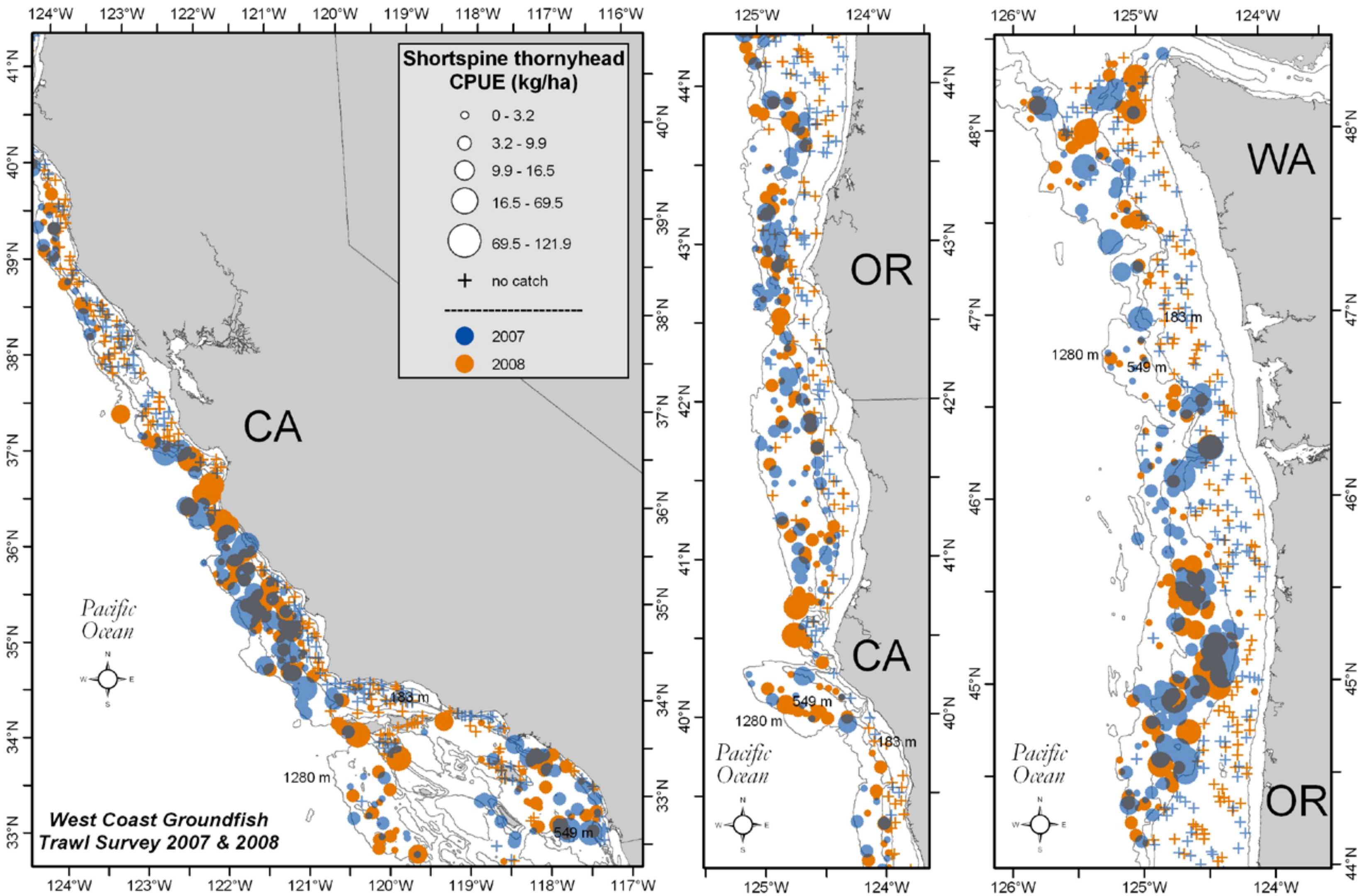

Figure 128. Shortspine thornyhead distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

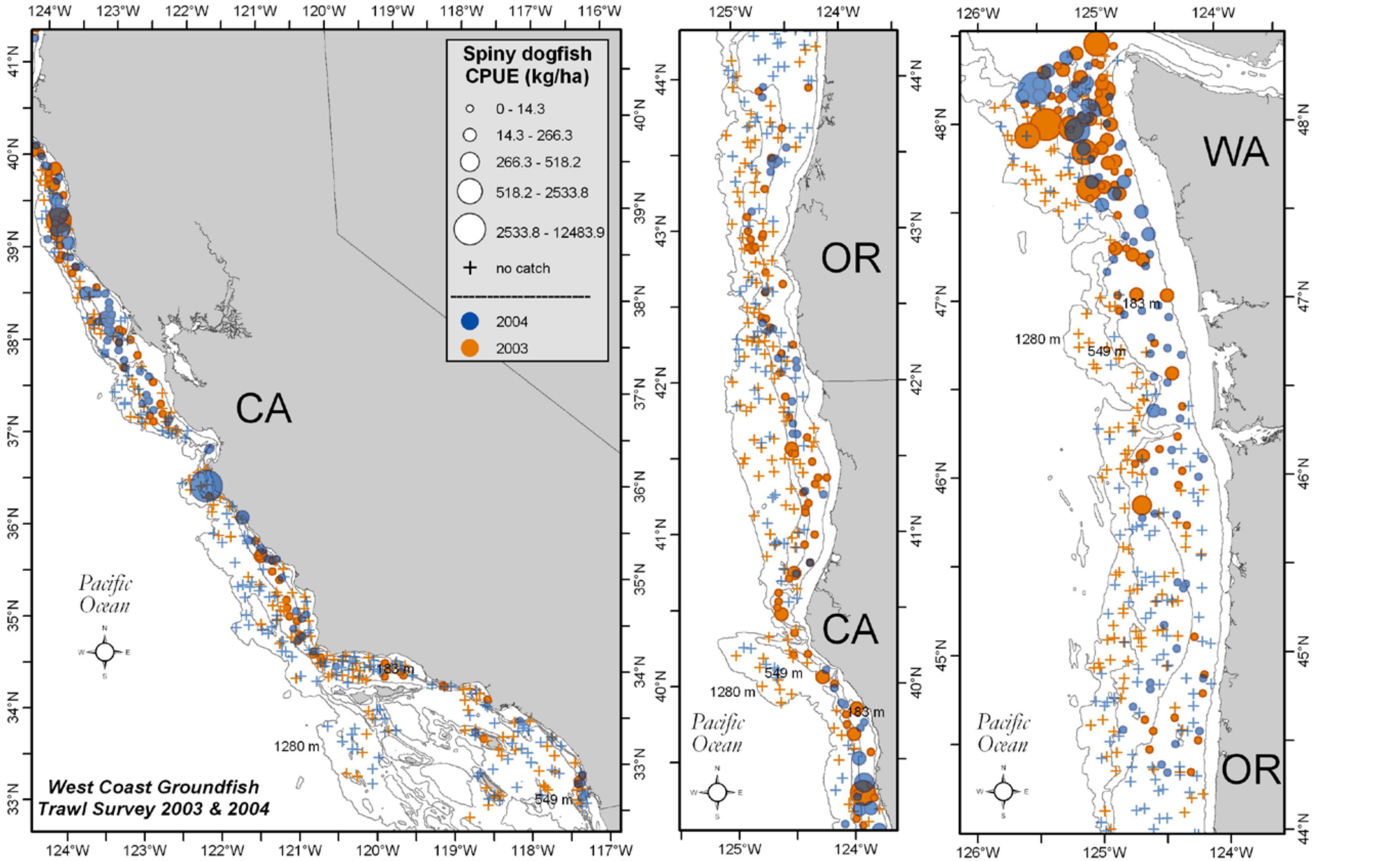

Figure 129. Spiny dogfish distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

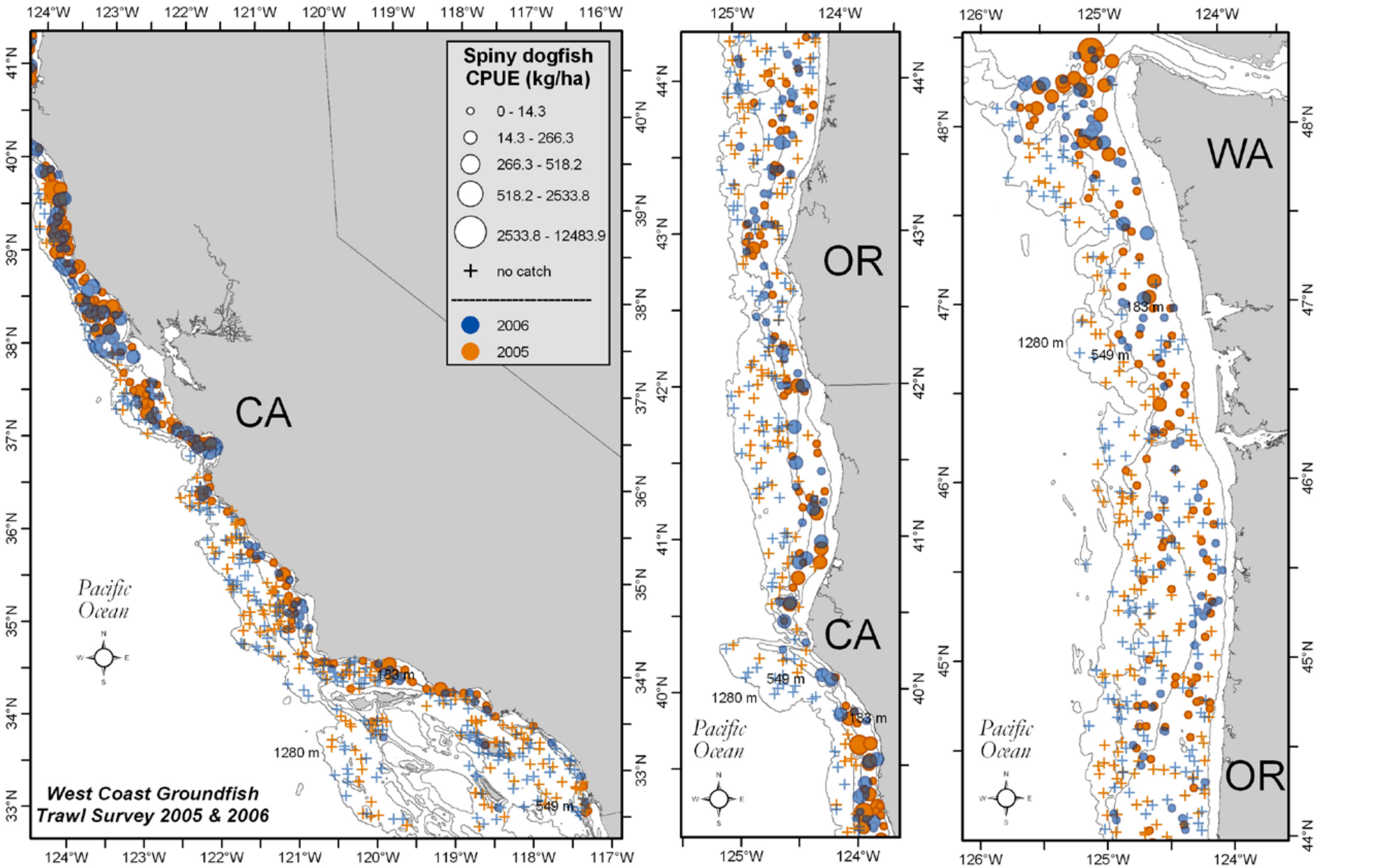

Figure 130. Spiny dogfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

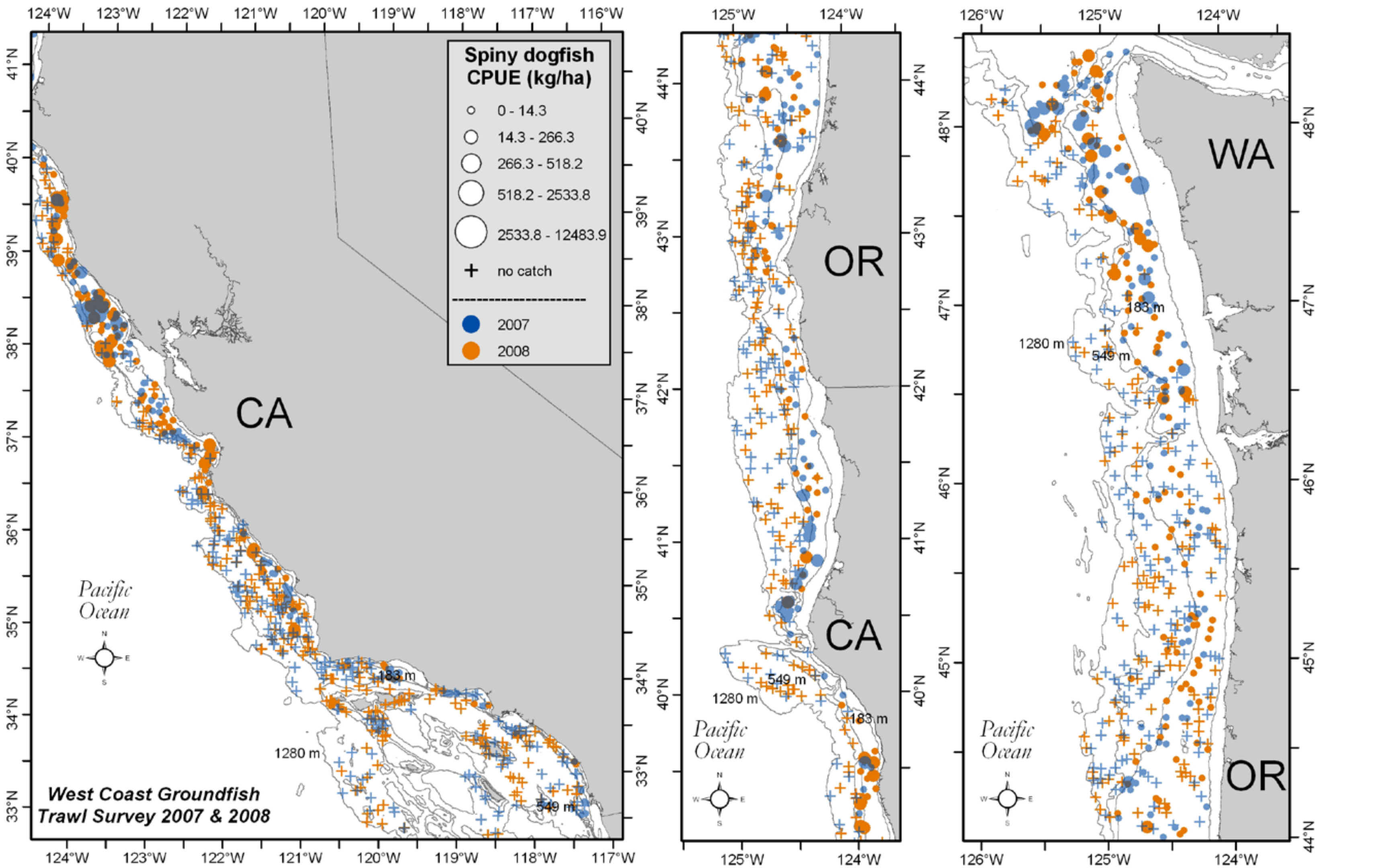

Figure 131. Spiny dogfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

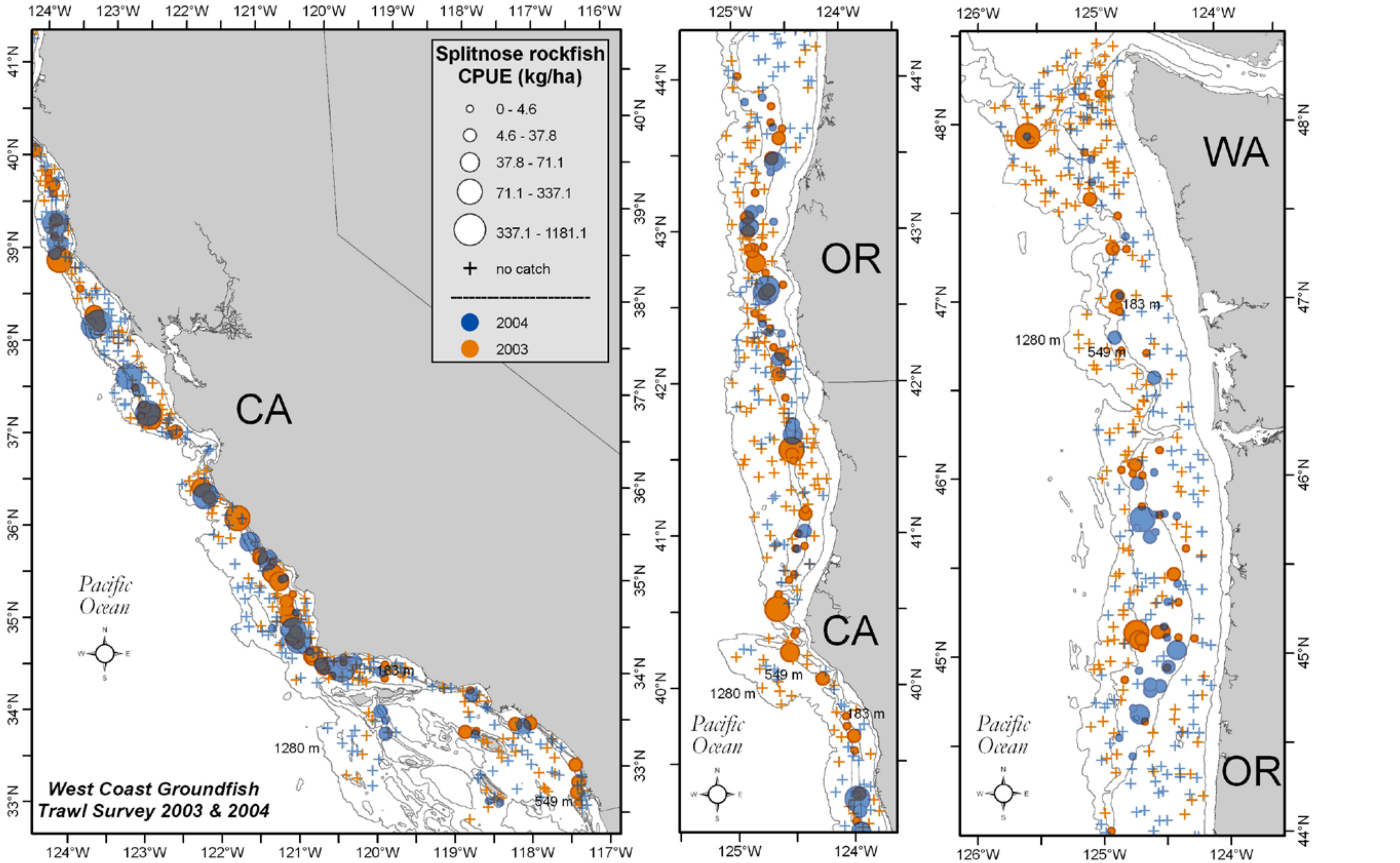

Figure 132. Splitnose rockfish distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

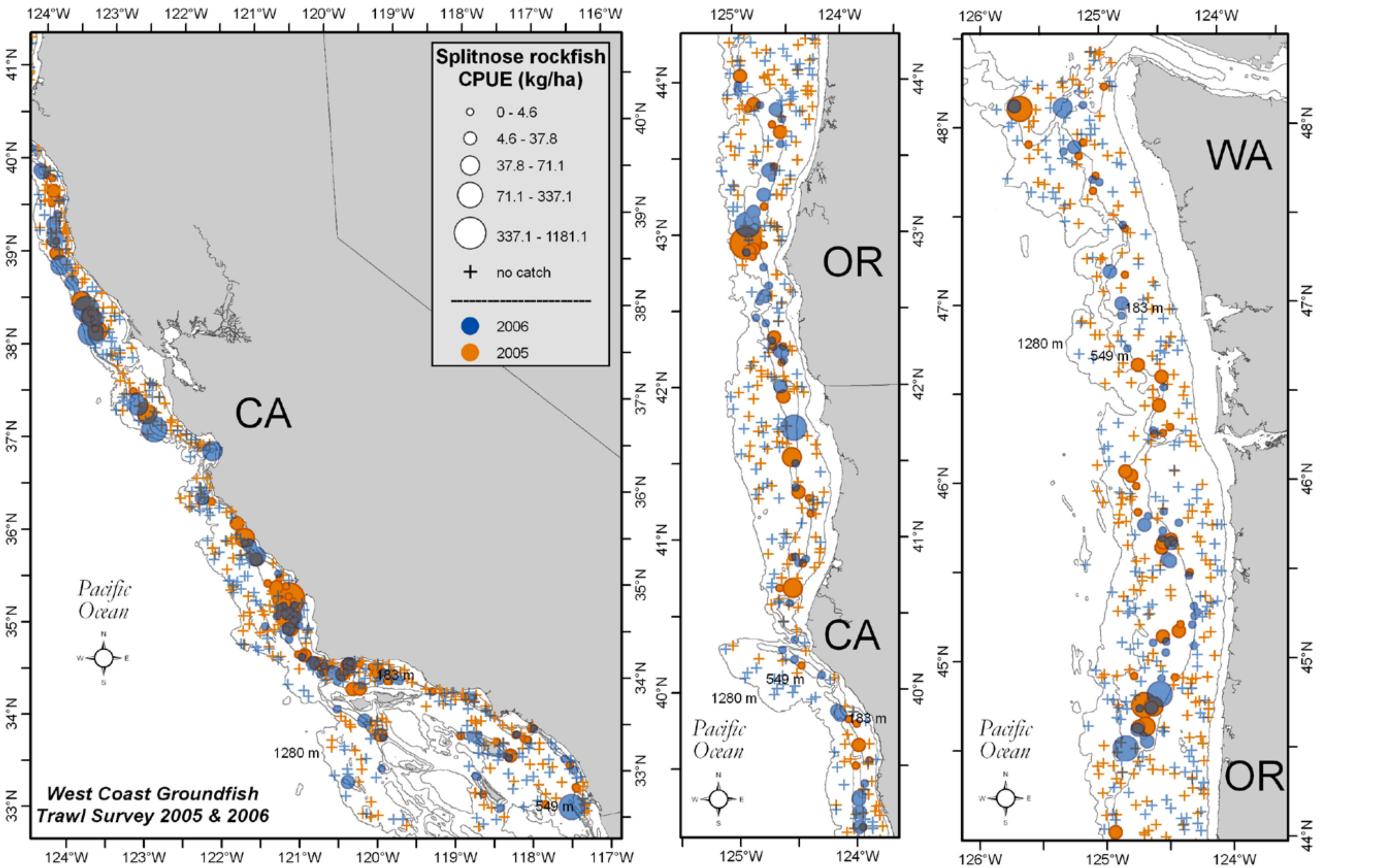

Figure 133. Splitnose rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

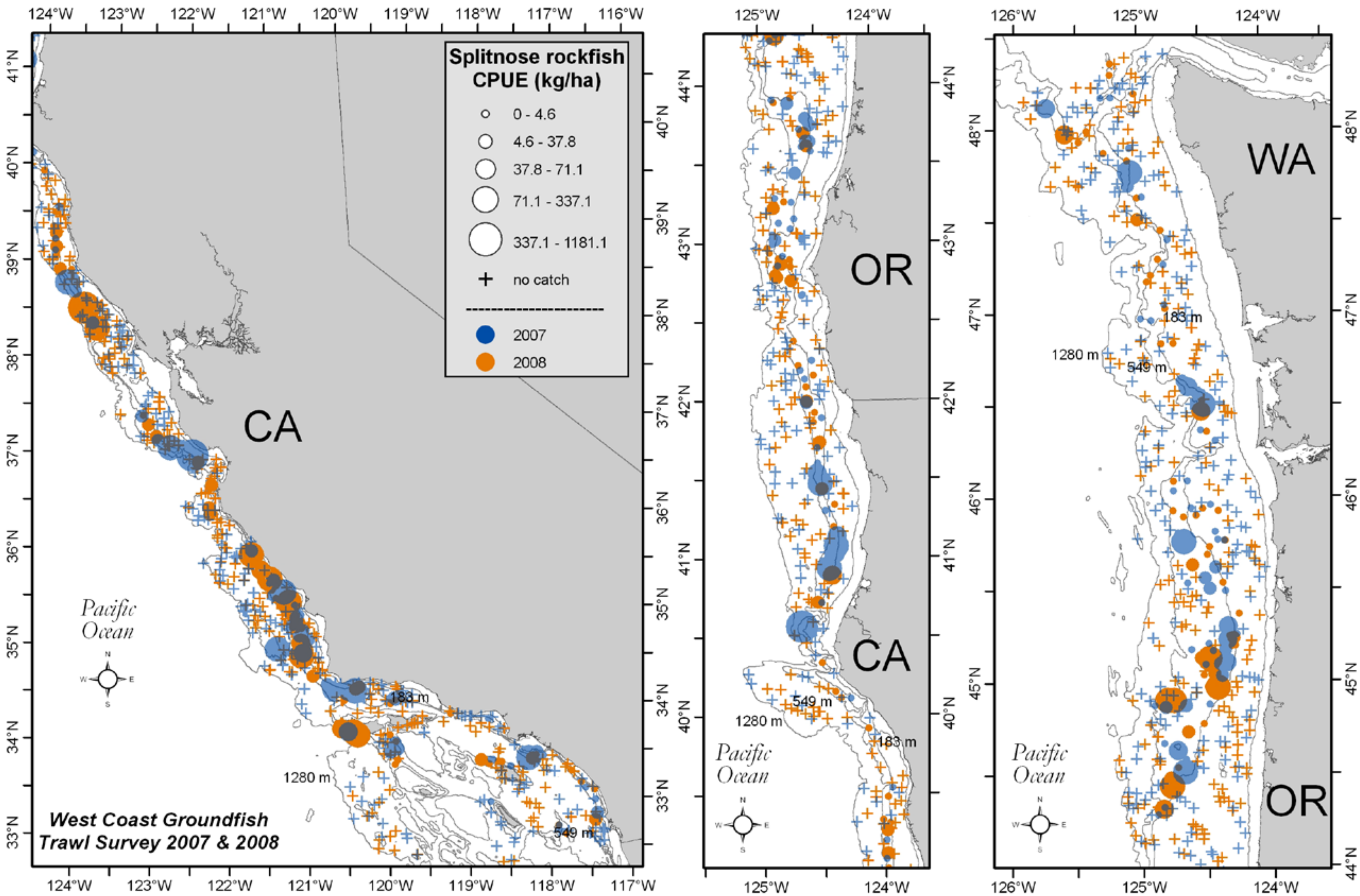

Figure 134. Splitnose rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

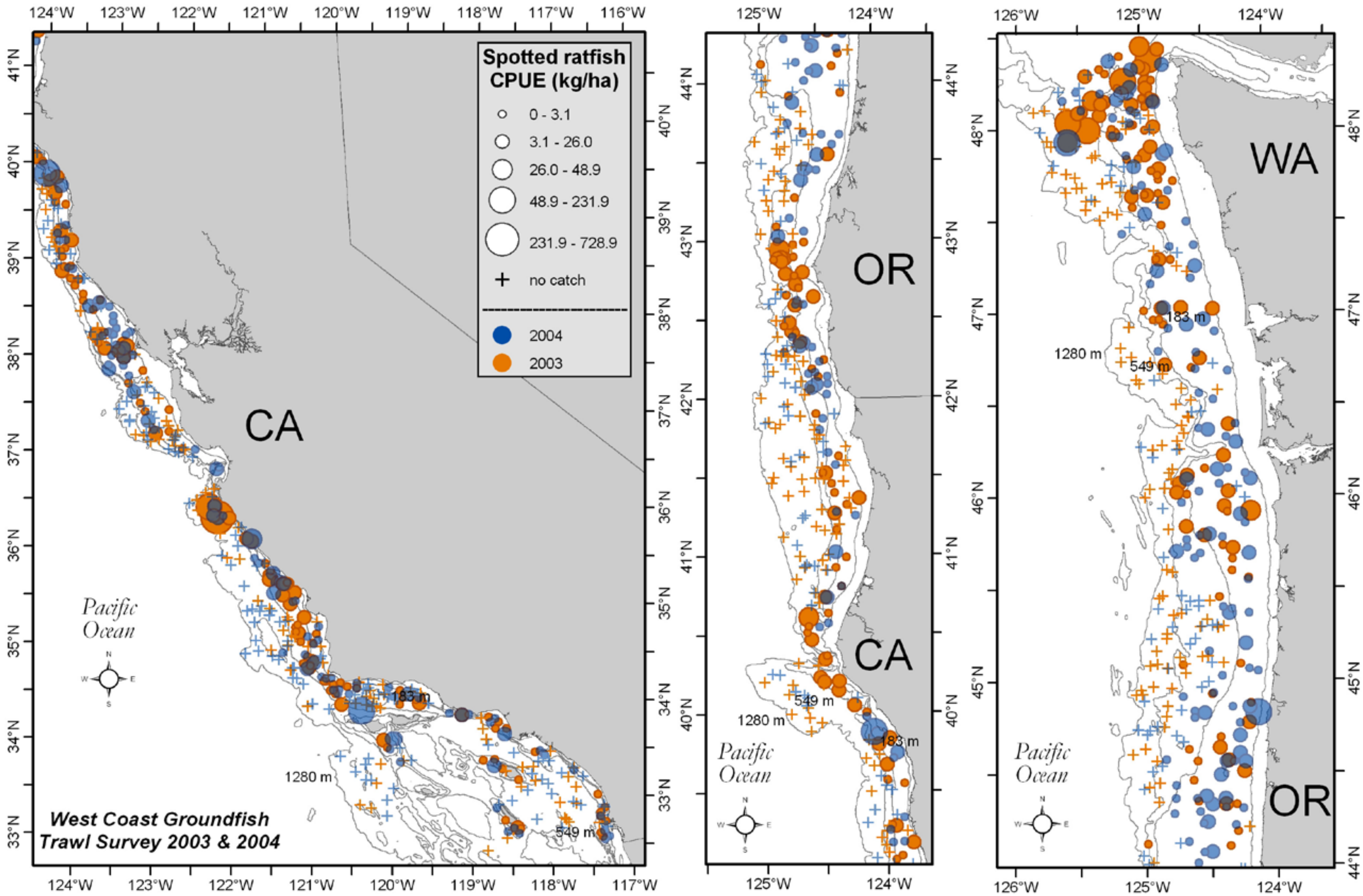

Figure 135. Spotted ratfish distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

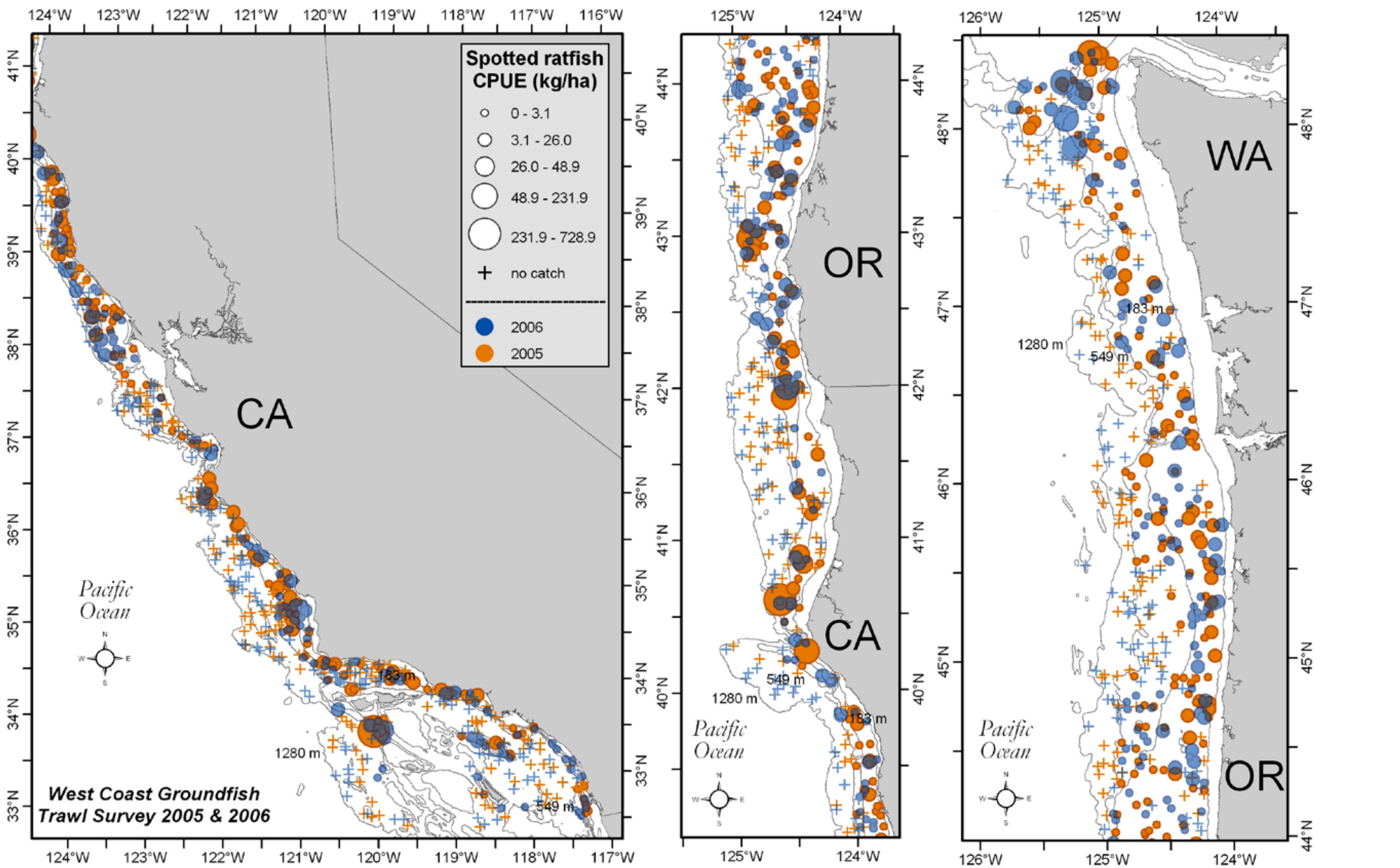

Figure 136. Spotted ratfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

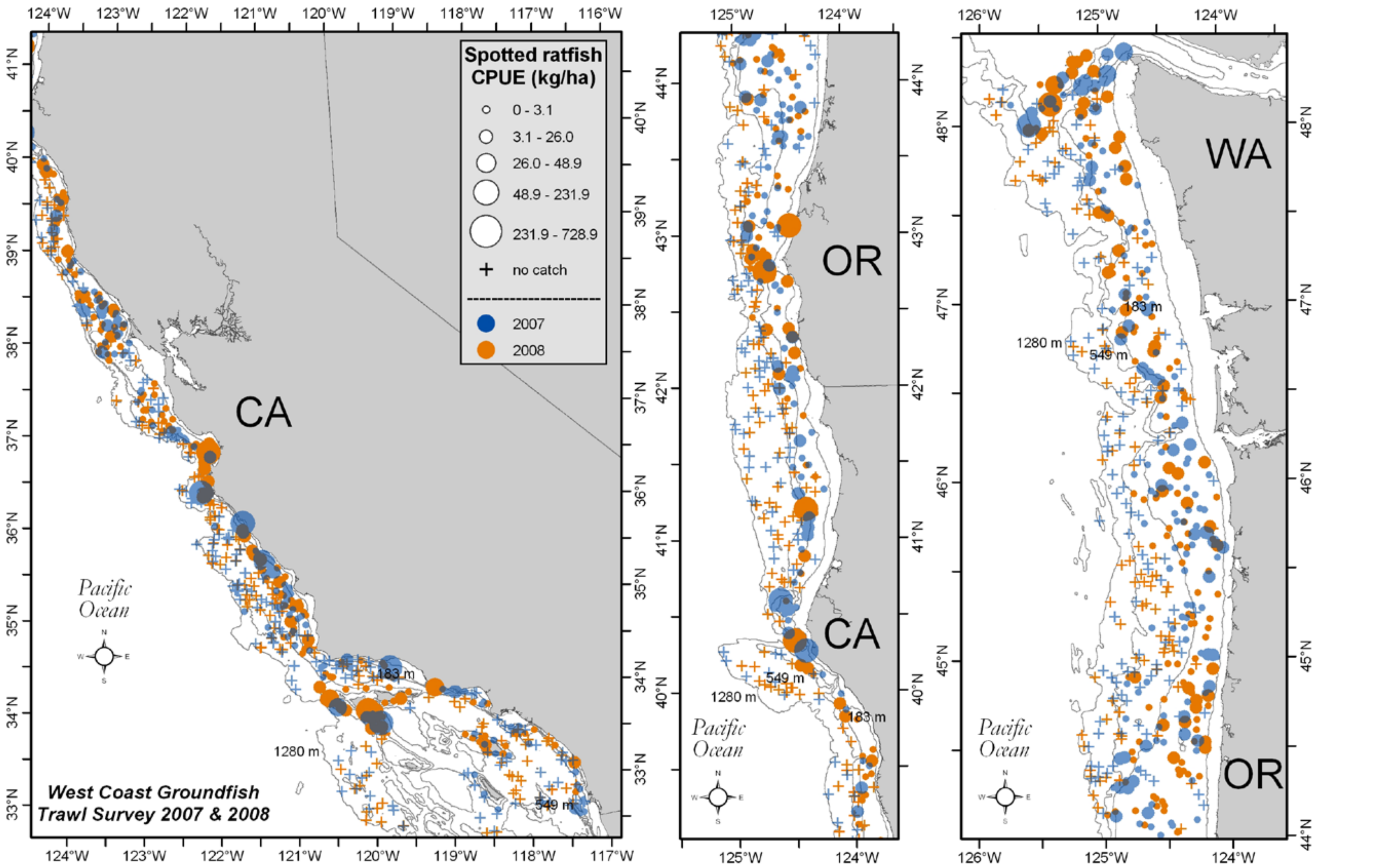

Figure 137. Spotted ratfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

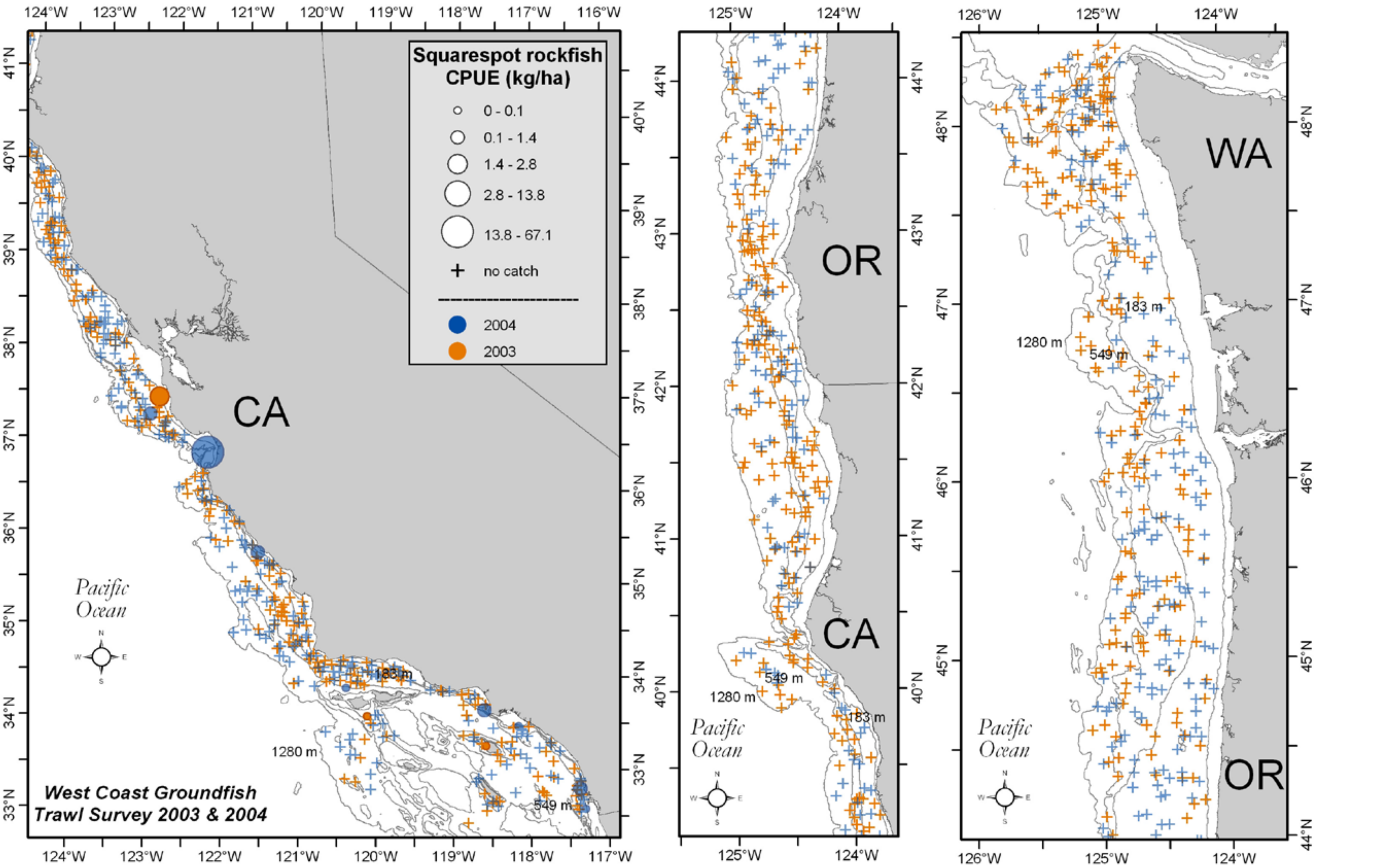

Figure 138. Squarespot rockfish (*Sebastes hopkinsi*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between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

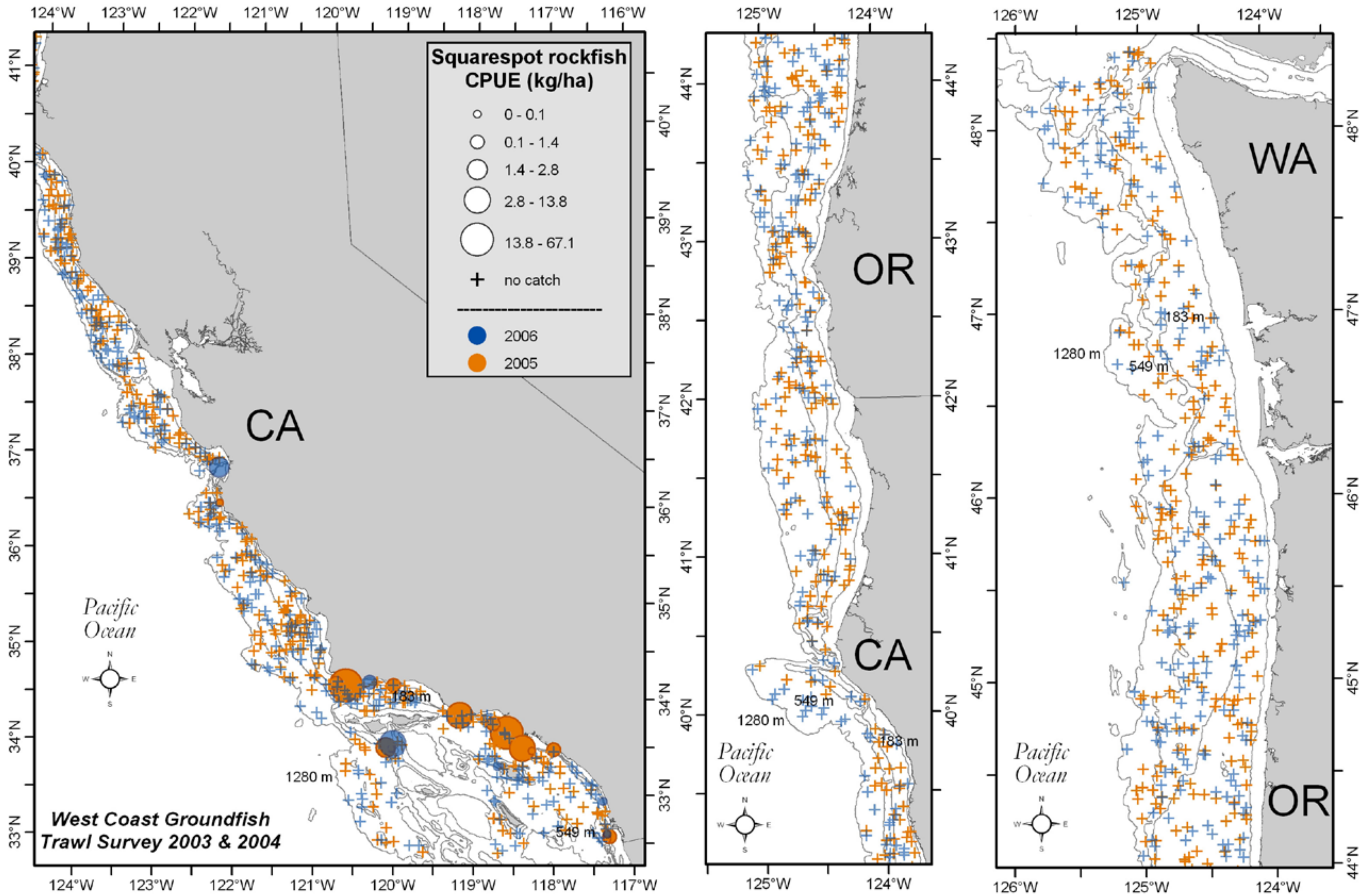

Figure 139. Squarespot rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

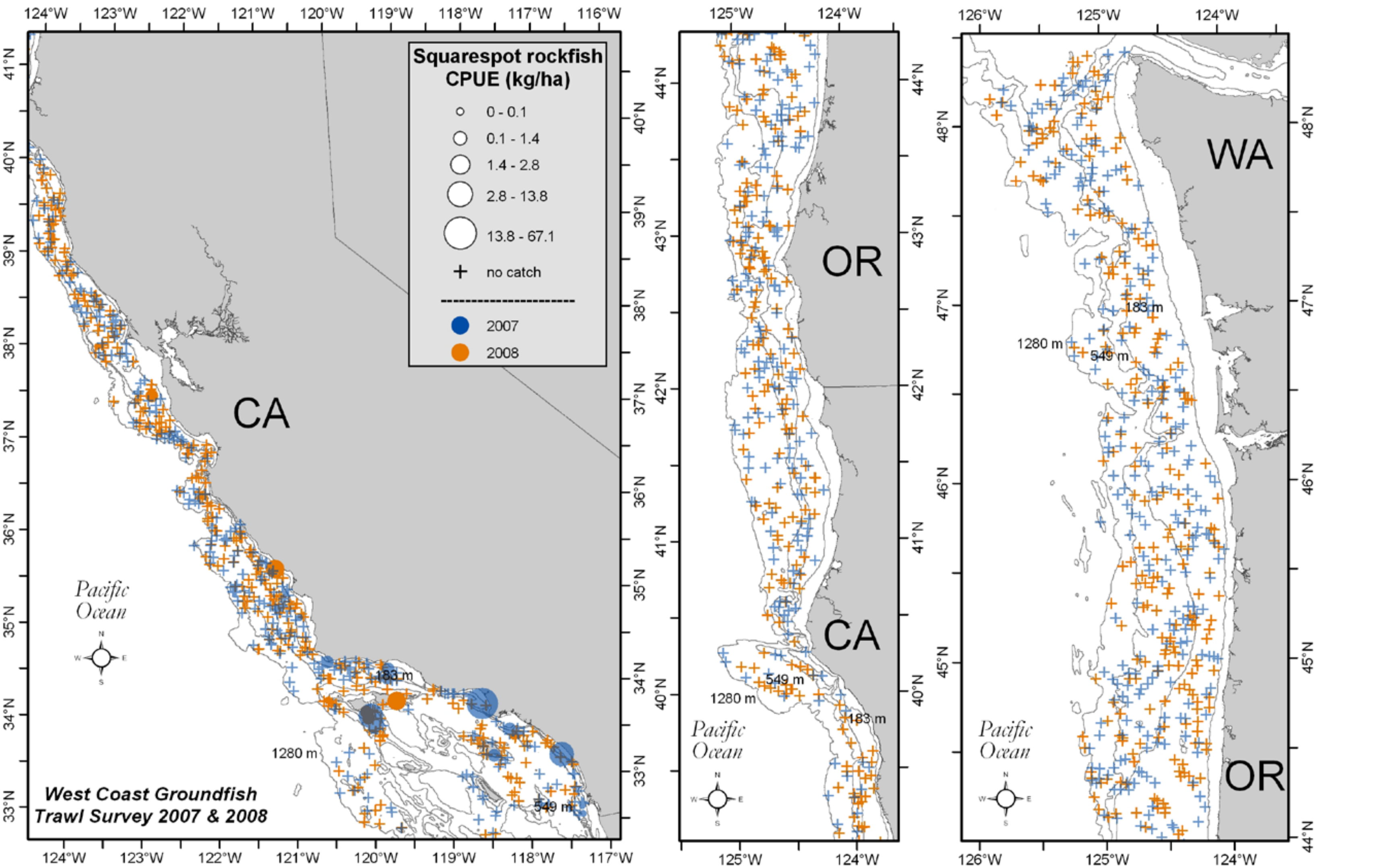

Figure 140. Squarespot rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

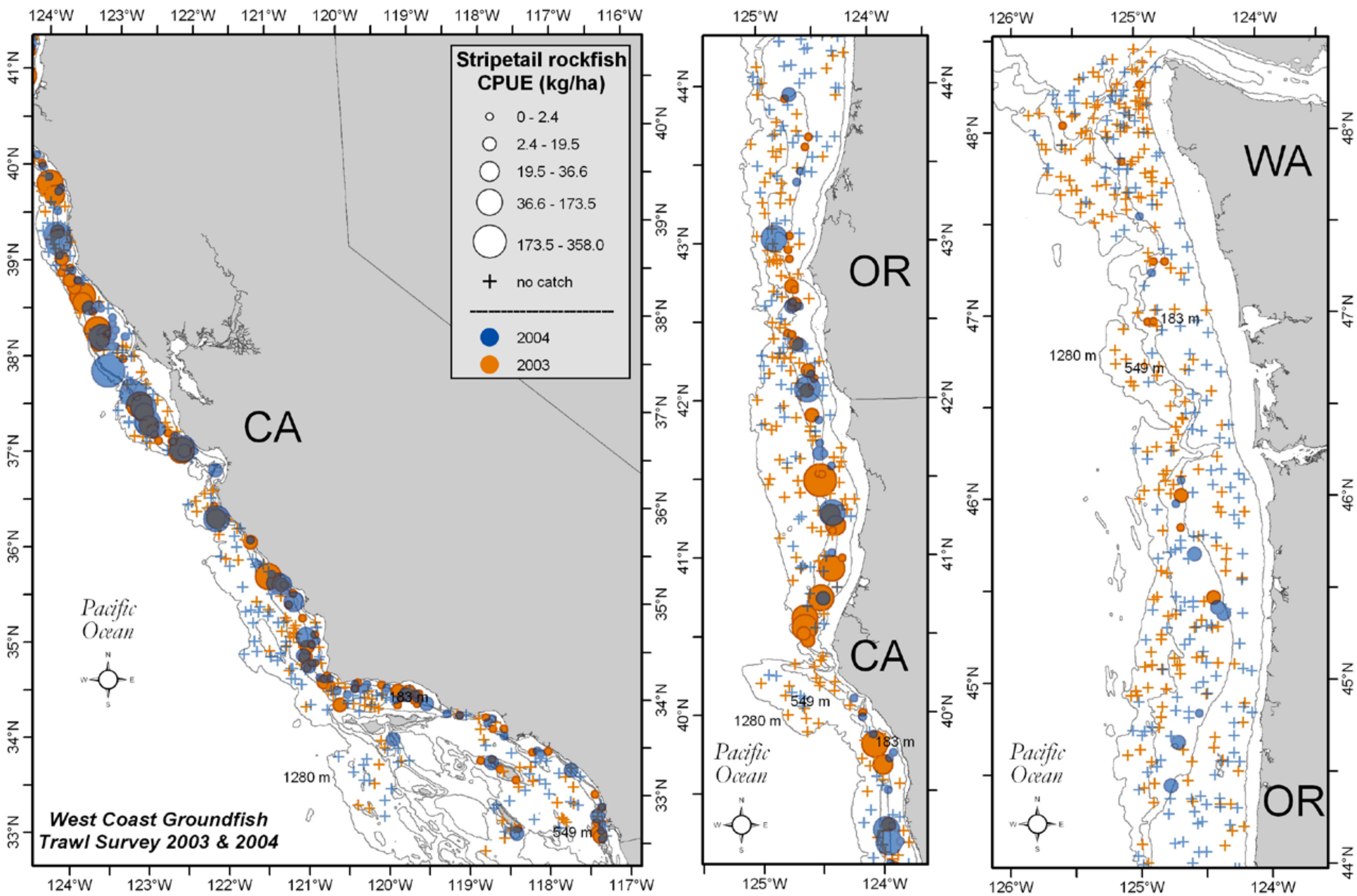

Figure 141. Stripetail rockfish distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

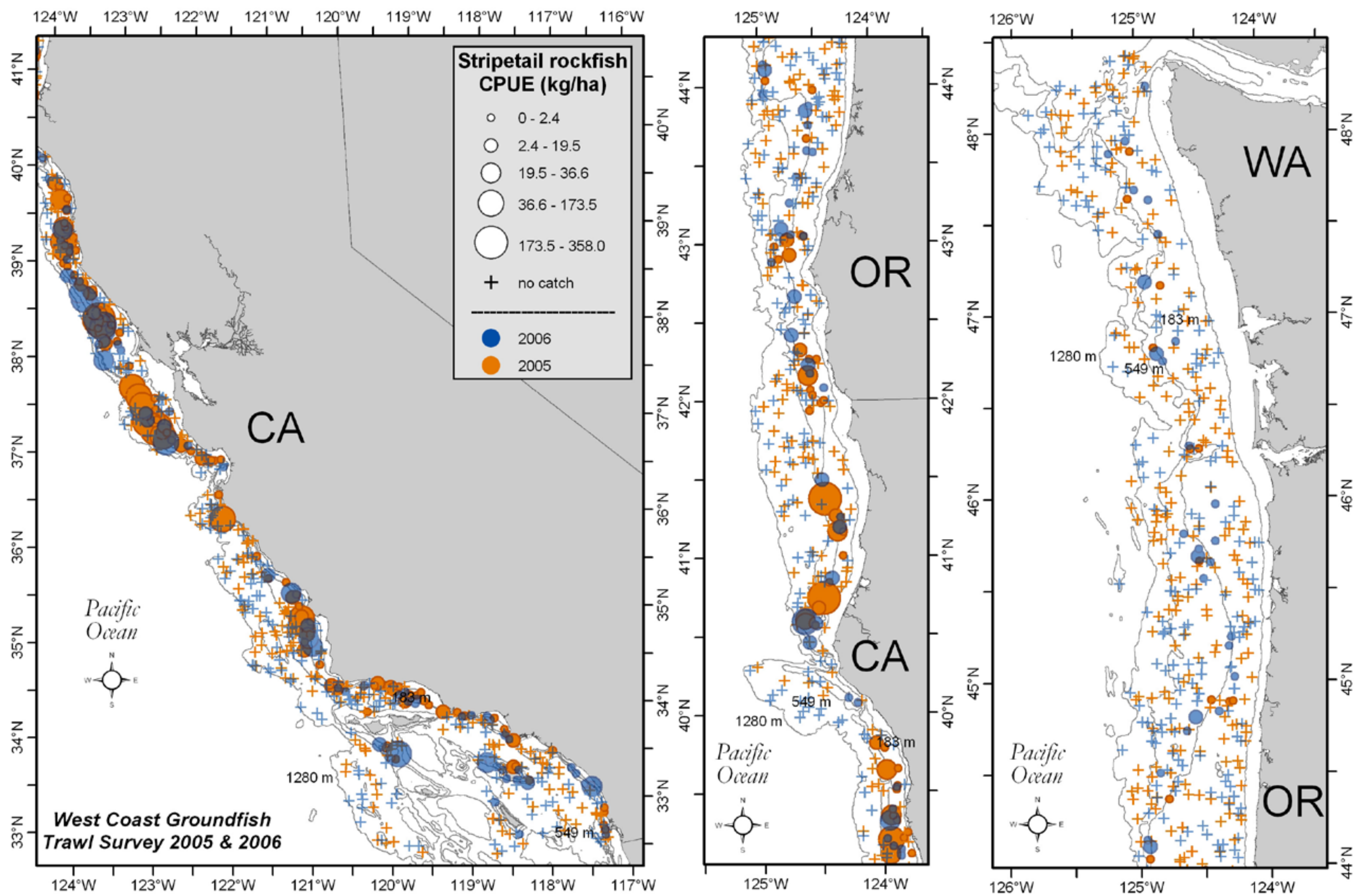

Figure 142. Stripetail rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

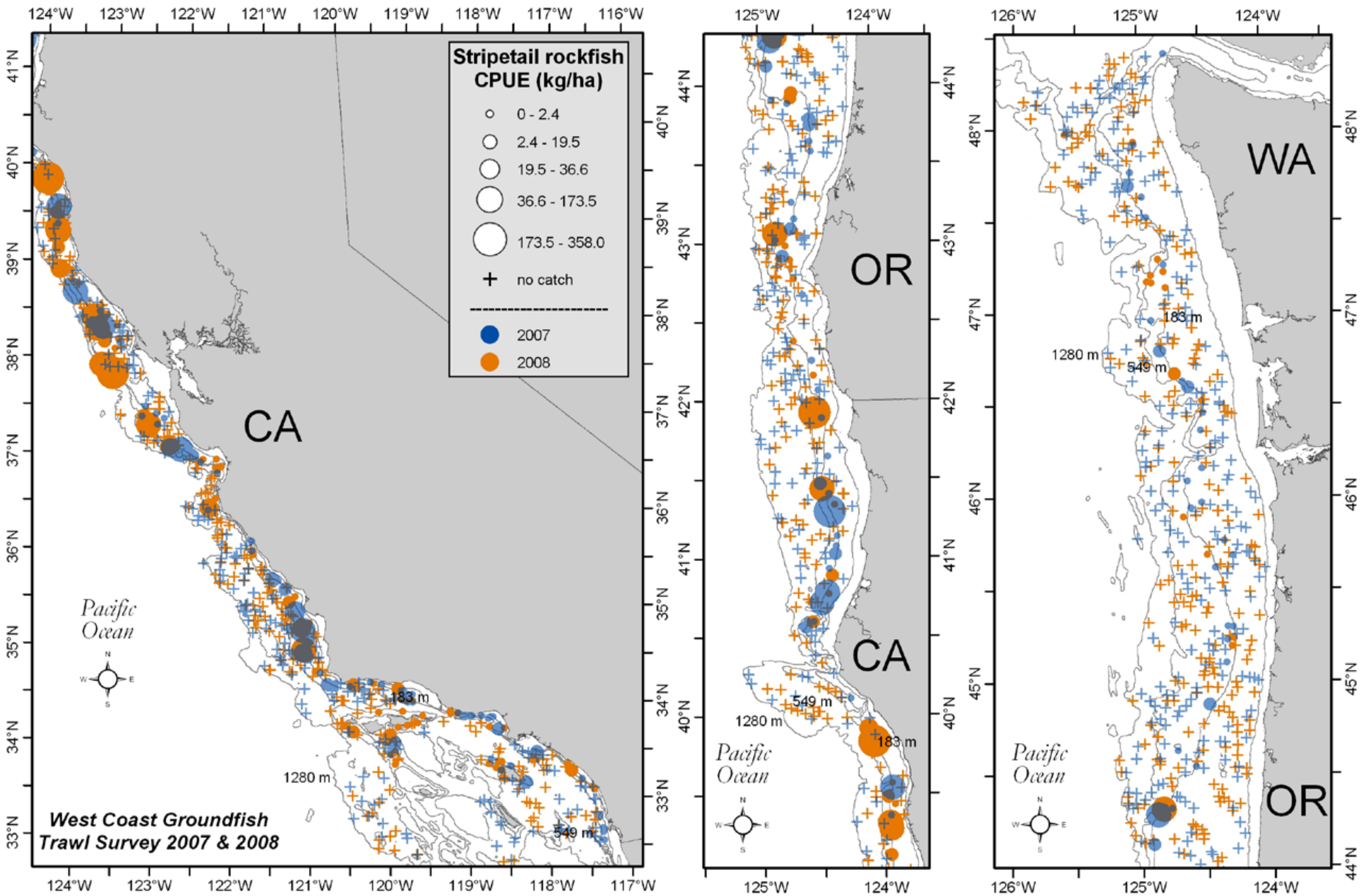

Figure 143. Stripetail rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

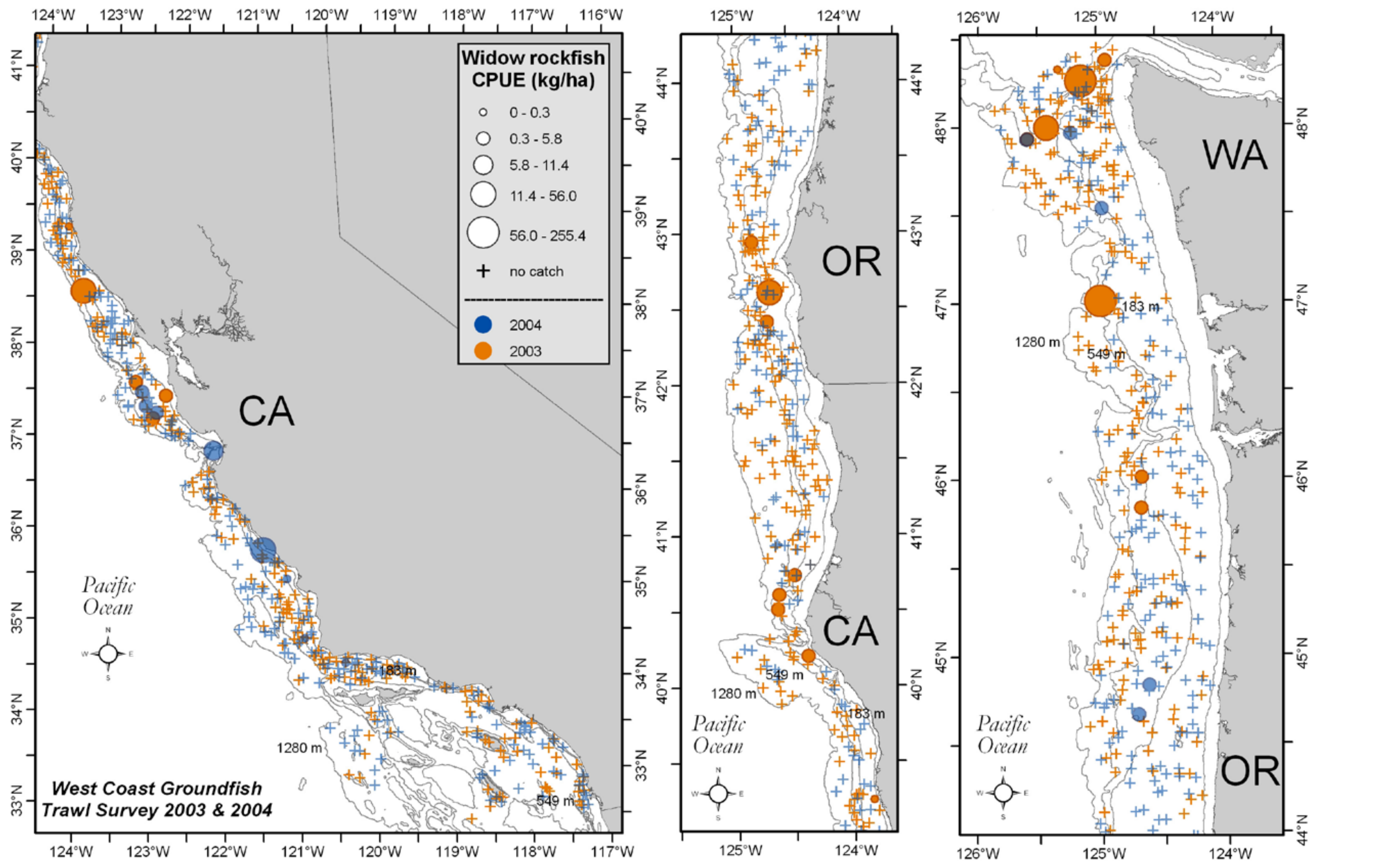

Figure 144. Widow rockfish (*Sebastes entomelas*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and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

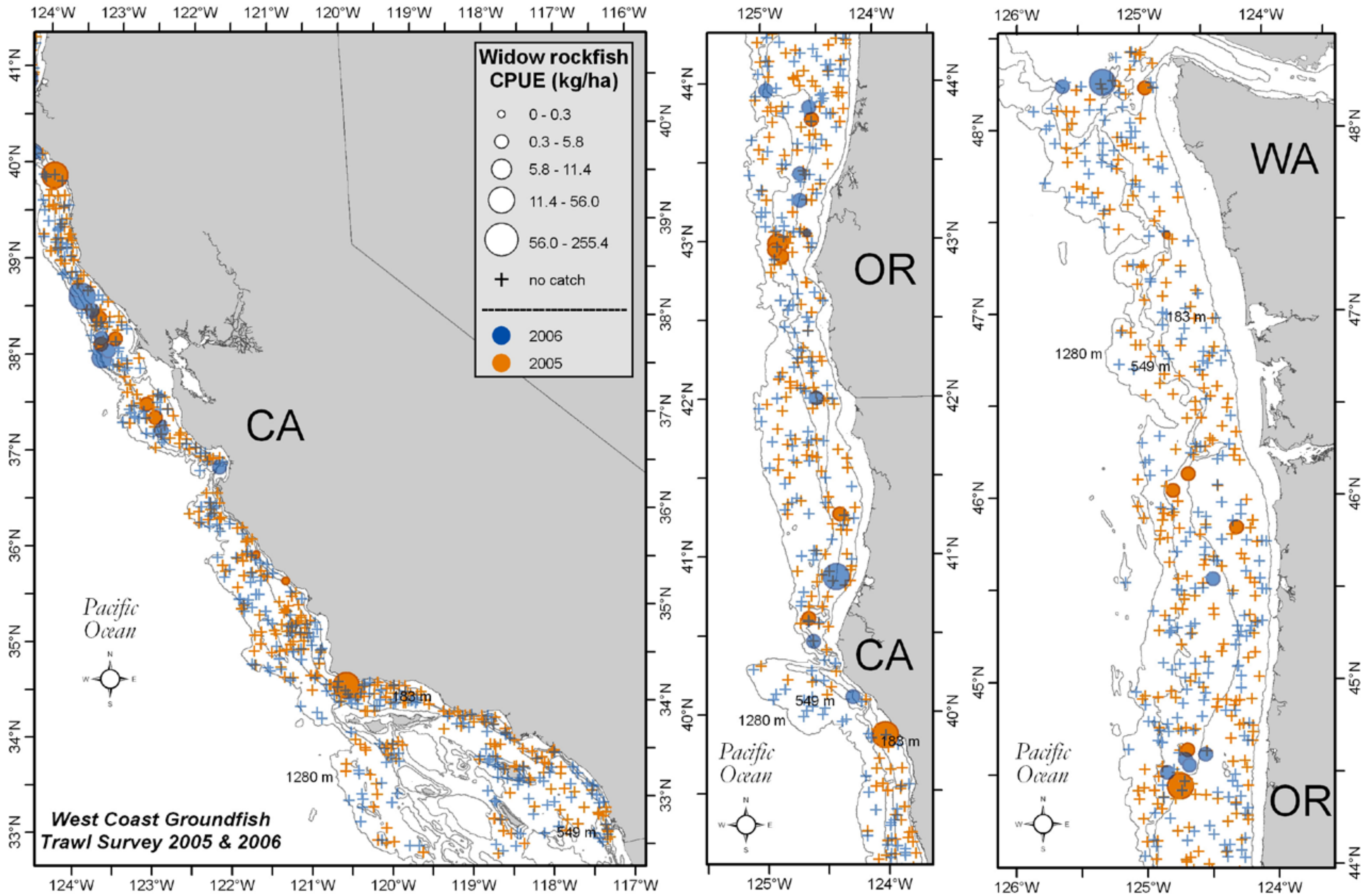

Figure 145. Widow rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

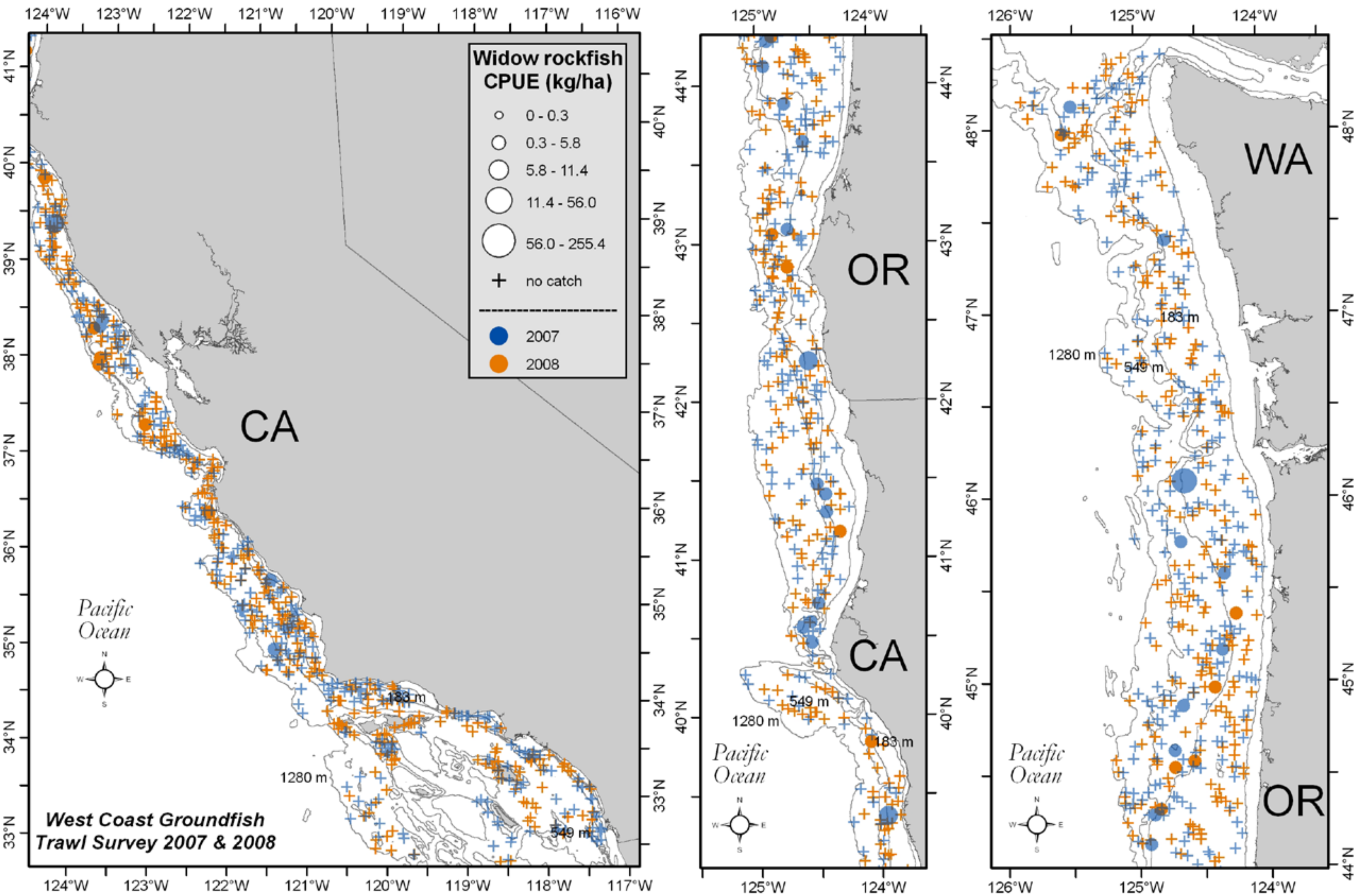

Figure 146. Widow rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE, between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

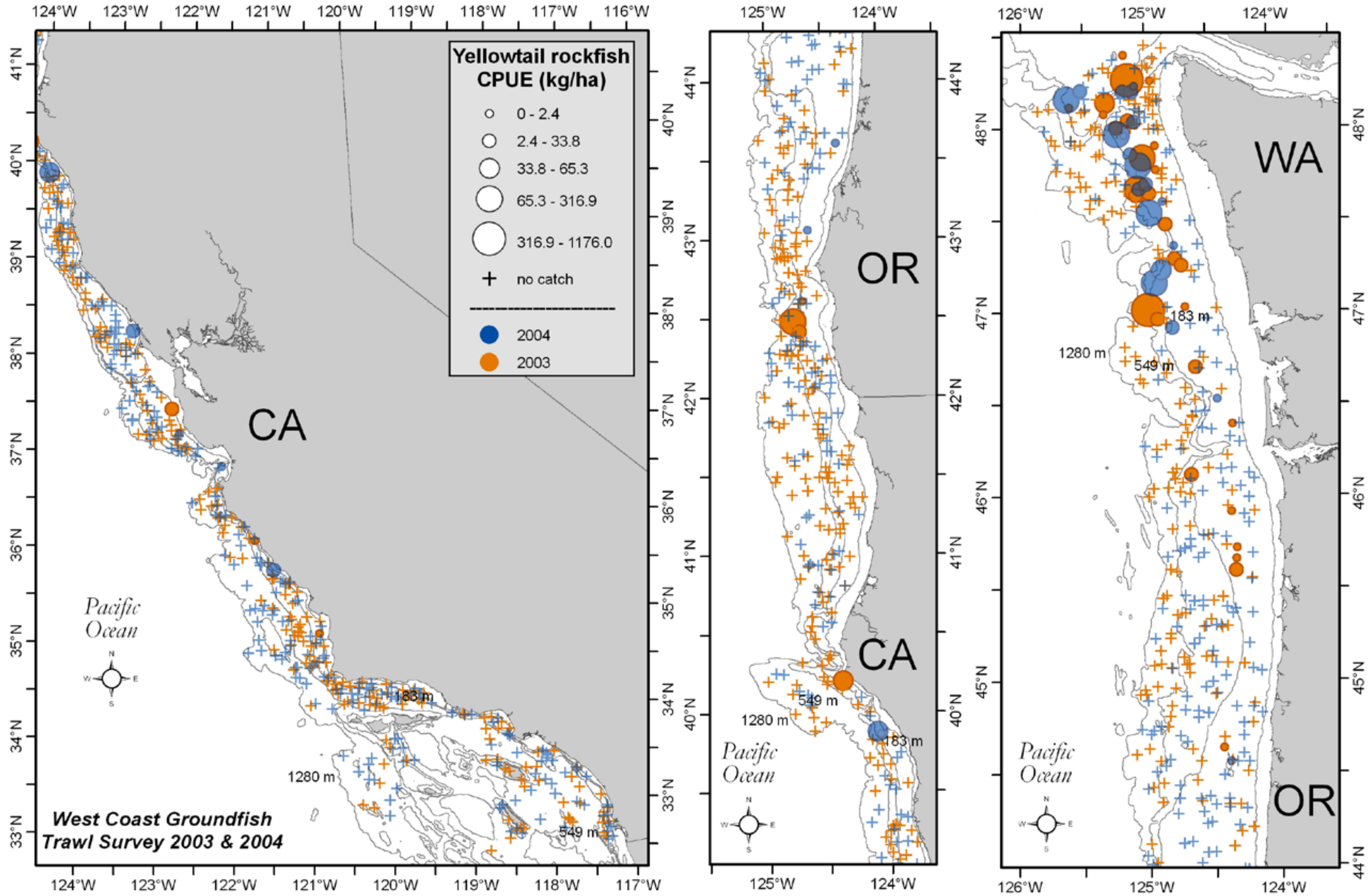

Figure 147. Yellowtail rockfish (*Sebastes flavidus*) distribution and relative abundance (kg ha^{-1}) from the 2003 and 2004 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between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

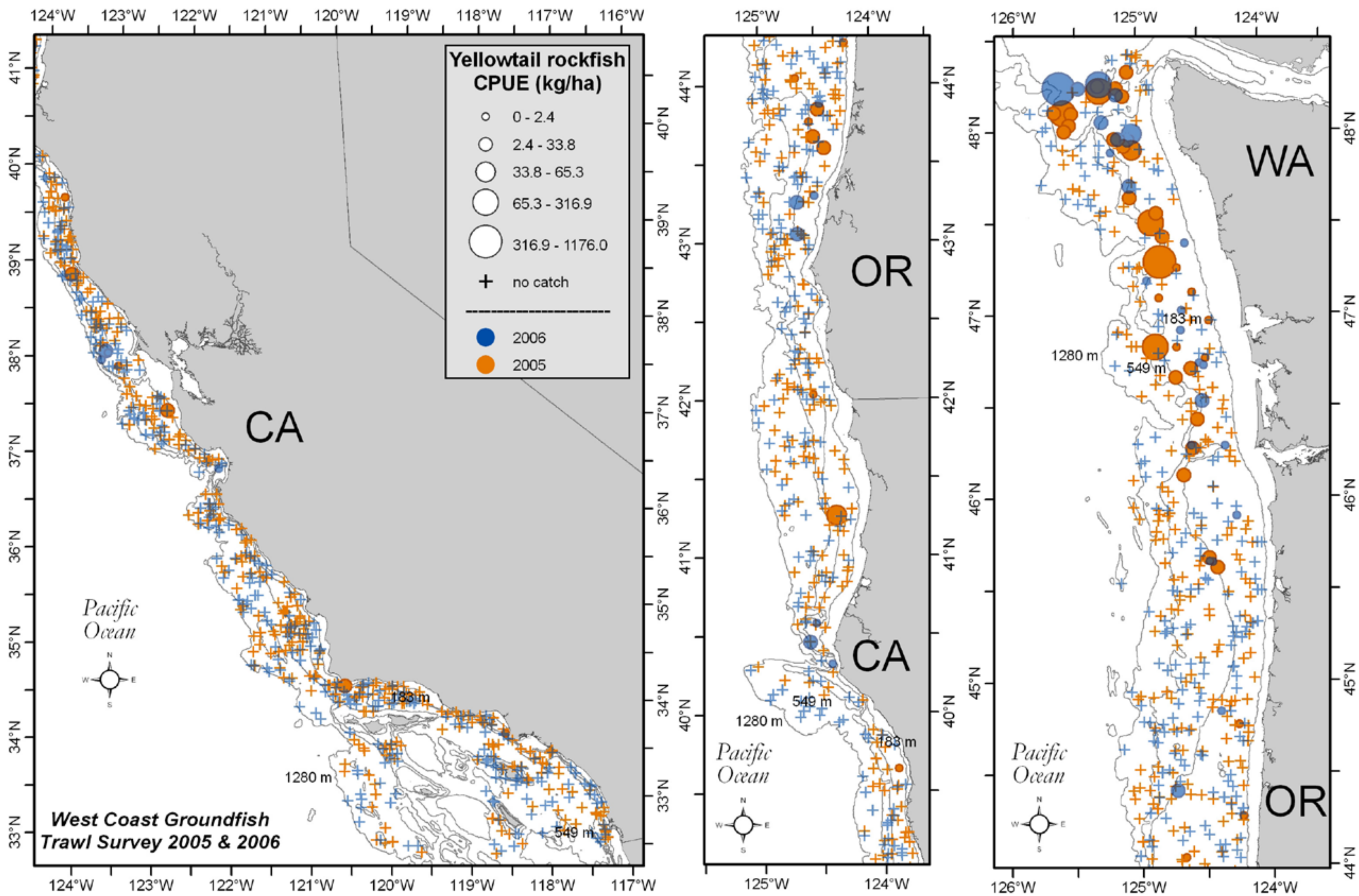

Figure 148. Yellowtail rockfish distribution and relative abundance (kg ha^{-1}) from the 2005 and 2006 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

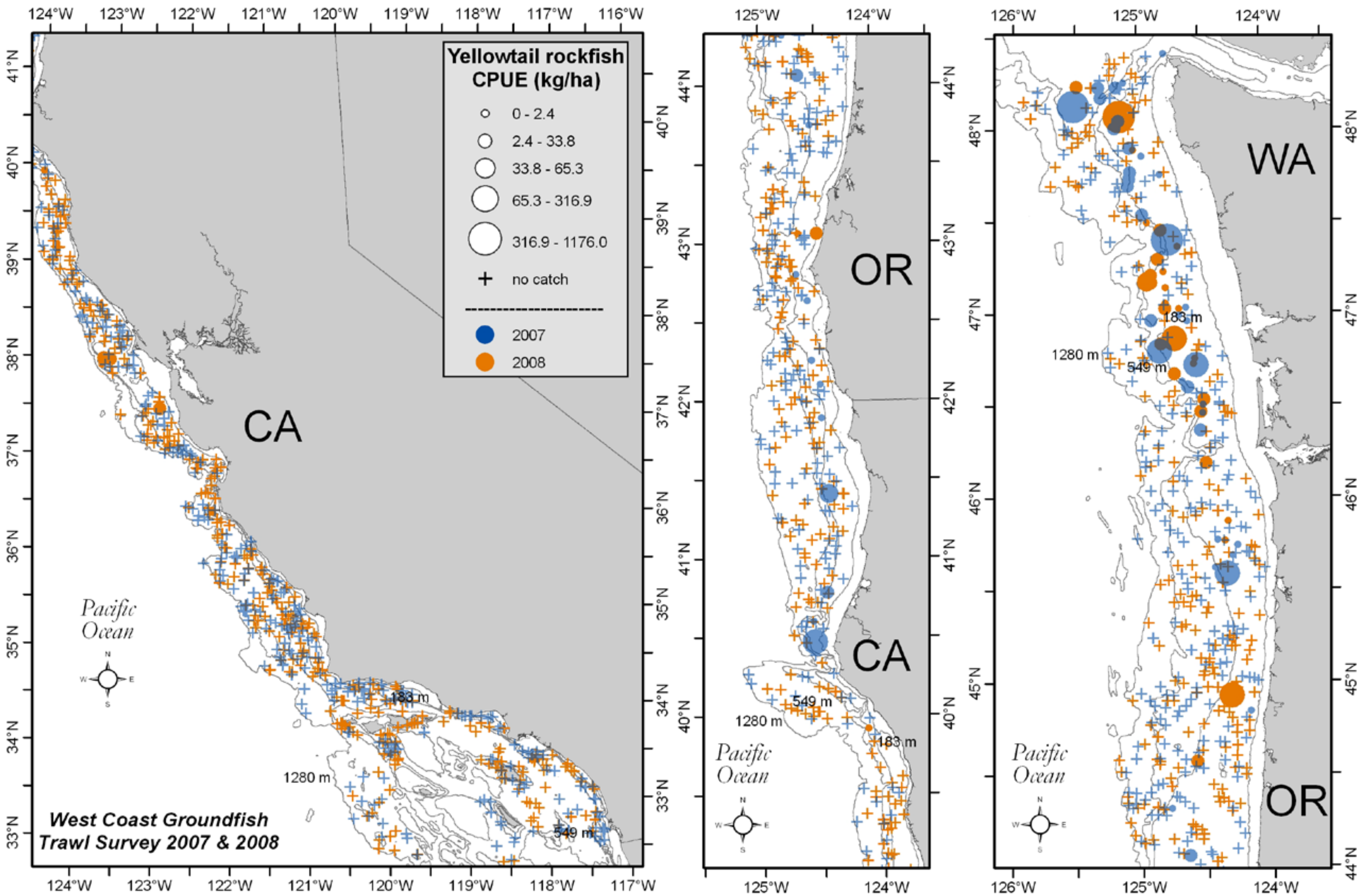

Figure 149. Yellowtail rockfish distribution and relative abundance (kg ha^{-1}) from the 2007 and 2008 surveys. The five ranges of relative abundance are categorized from top to bottom in the legend as follows: > 0 but ≤ mean CPUE, > mean CPUE but ≤ 1 SD from the mean, between 1 and 2 SDs > mean CPUE,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

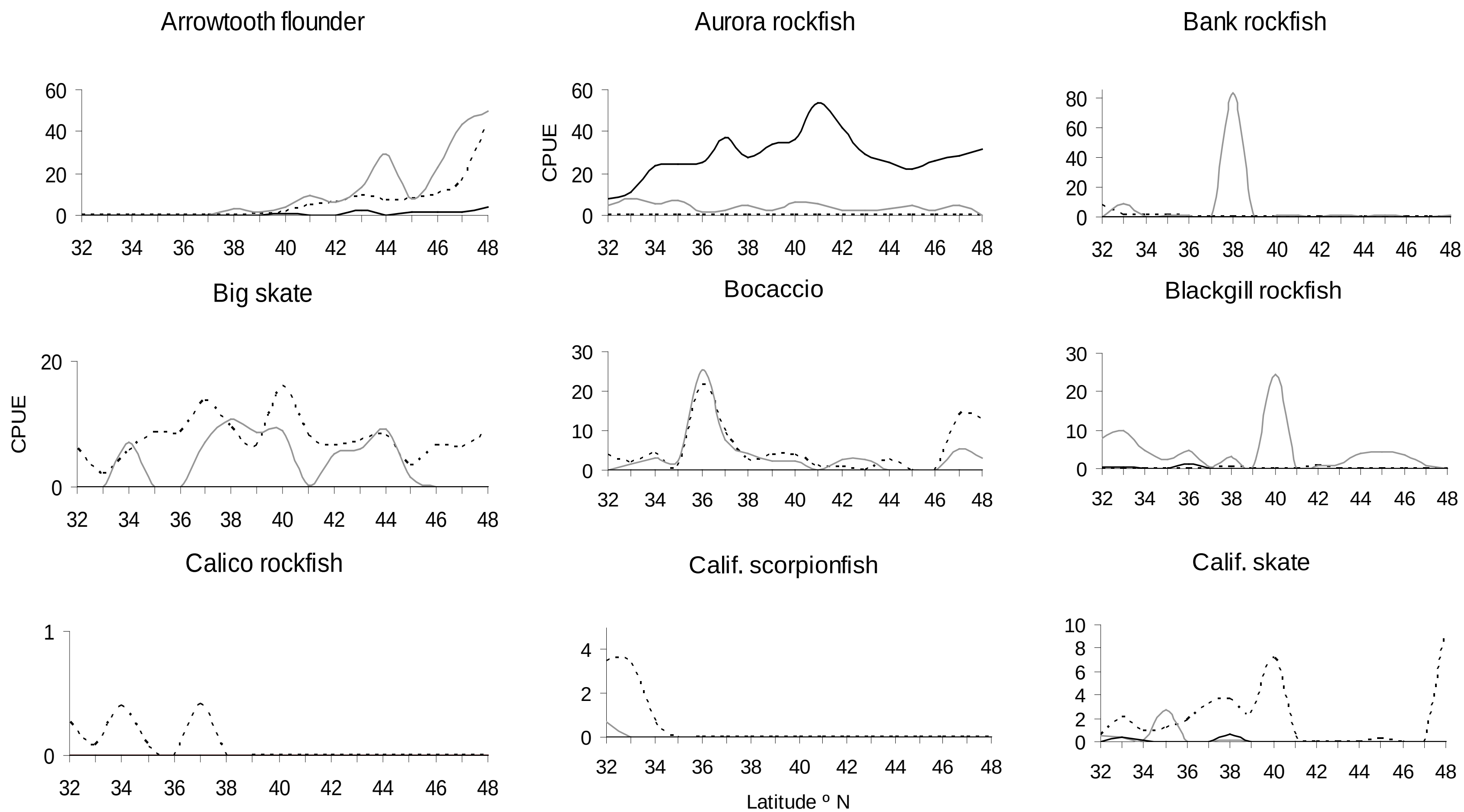

Figure 150. Species specific CPUE (kg ha^{-1}) by latitude for survey years 2003–2008 for 9 of 46 FMP species. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

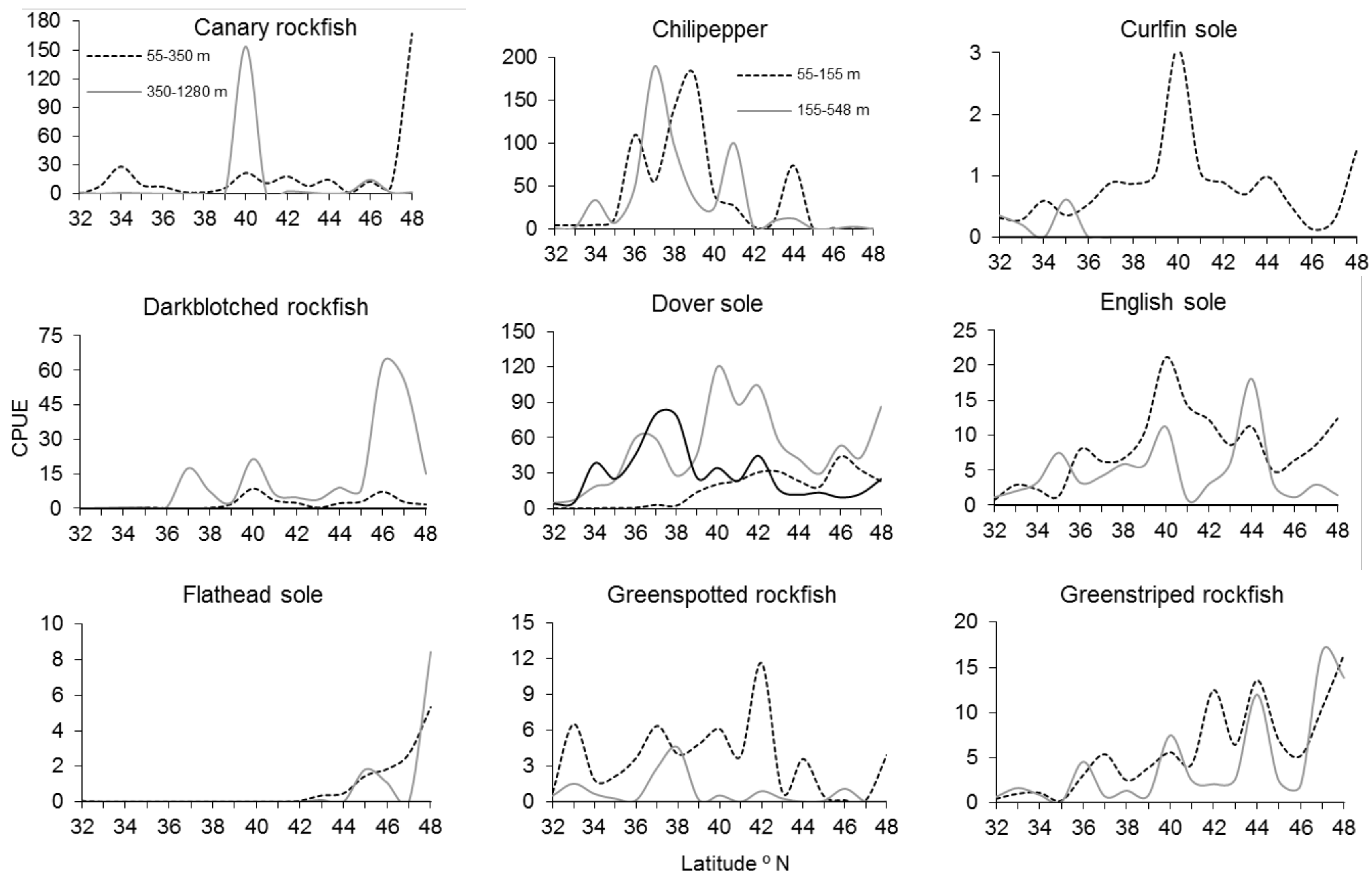

Figure 151. Species specific CPUE (kg ha–1) by latitude for survey years 2003–2008 for 9 of 46 FMP species. Except for canary rockfish and chilipepper, indicated above, the dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

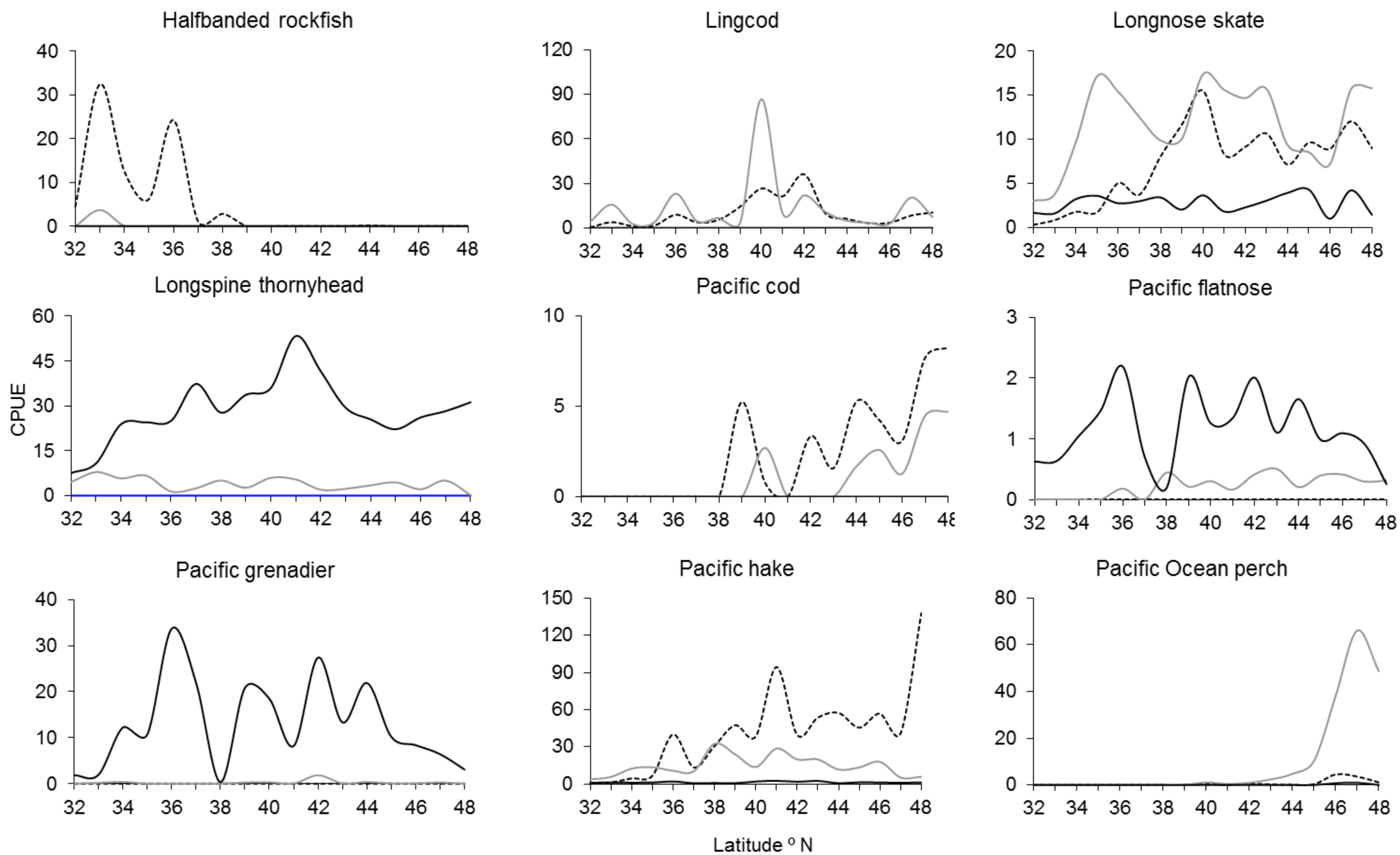

Figure 152. Species specific CPUE (kg ha–1) by latitude for survey years 2003–2008 for 9 of 46 FMP species. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

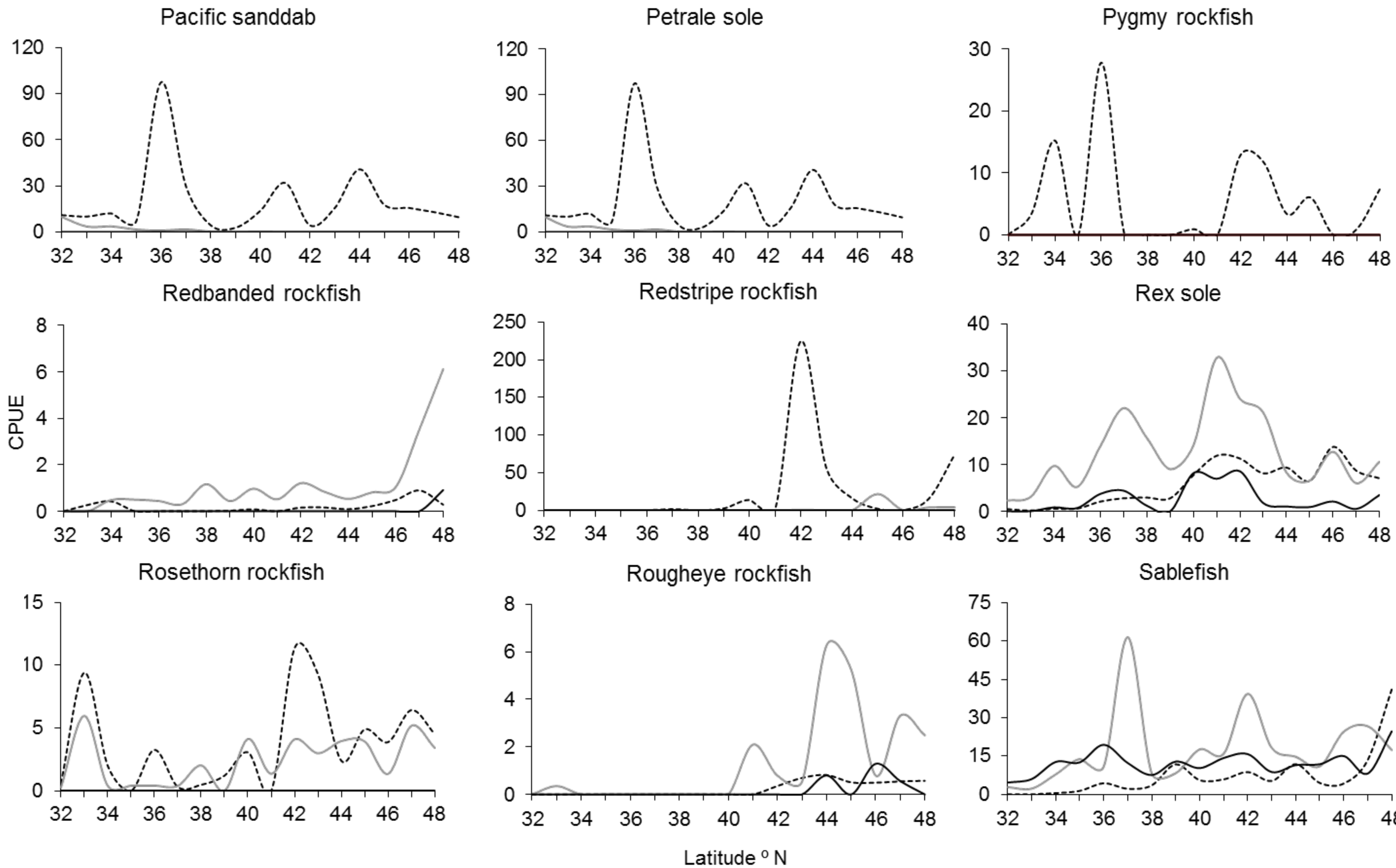

Figure 153. Species specific CPUE (kg ha^{-1}) by latitude for survey years 2003–2008 for 9 of 46 FMP species. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

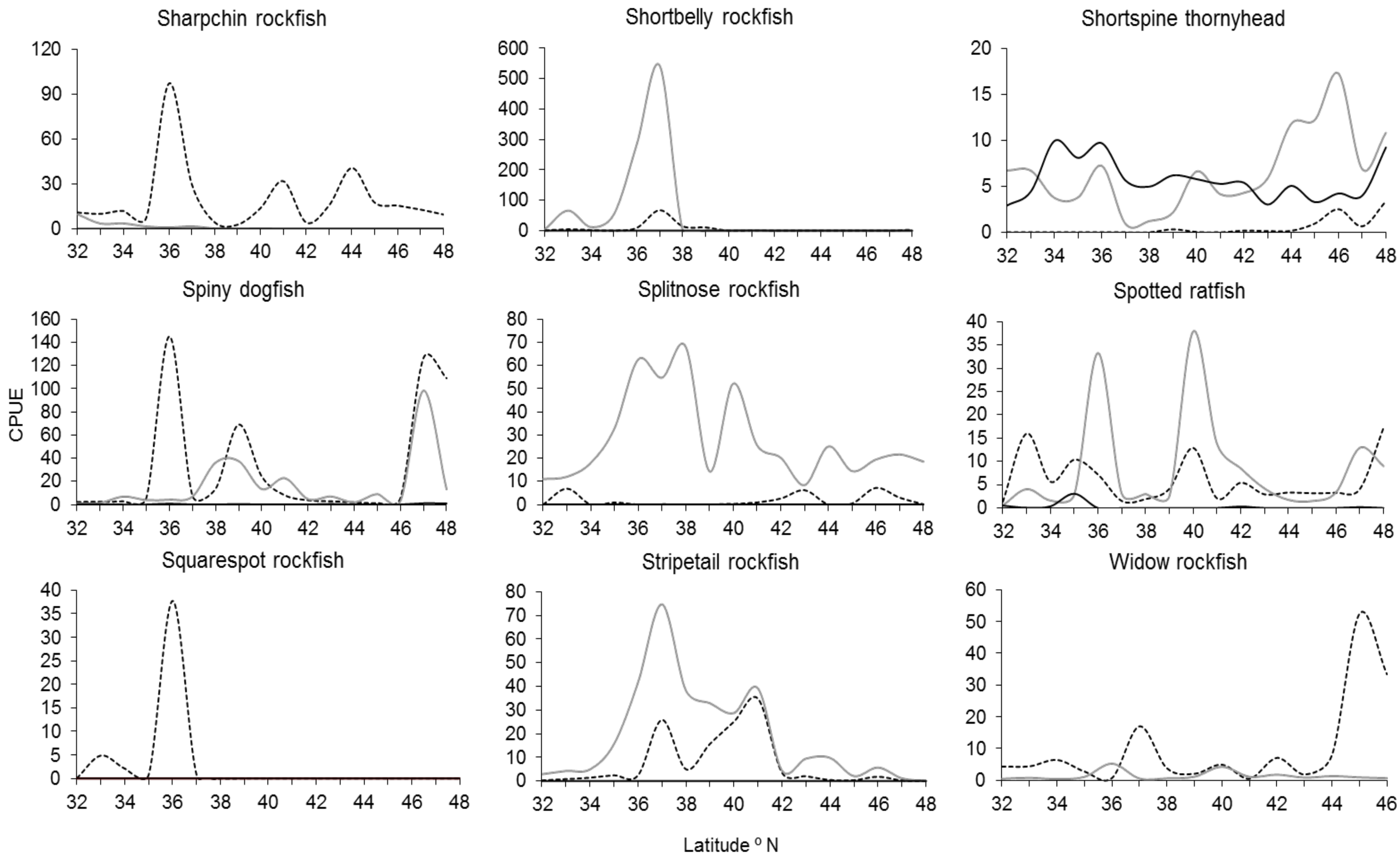

Figure 154. Species specific CPUE (kg ha–1) by latitude for survey years 2003–2008 for 9 of 46 FMP species. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

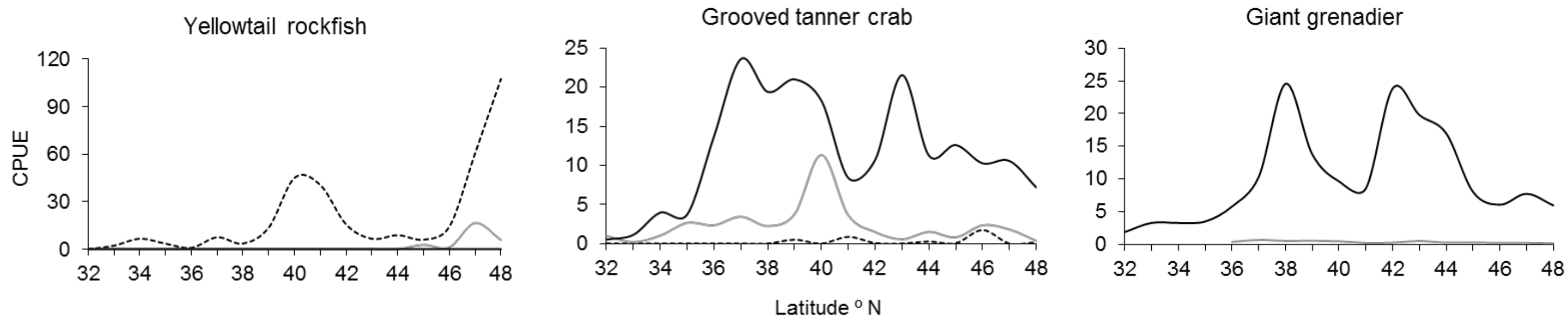

Figure 155. Species specific CPUE (kg ha^{-1}) by latitude for survey years 2003–2008 for 1 of 46 FMP species plus grooved tanner crab and giant grenadier. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

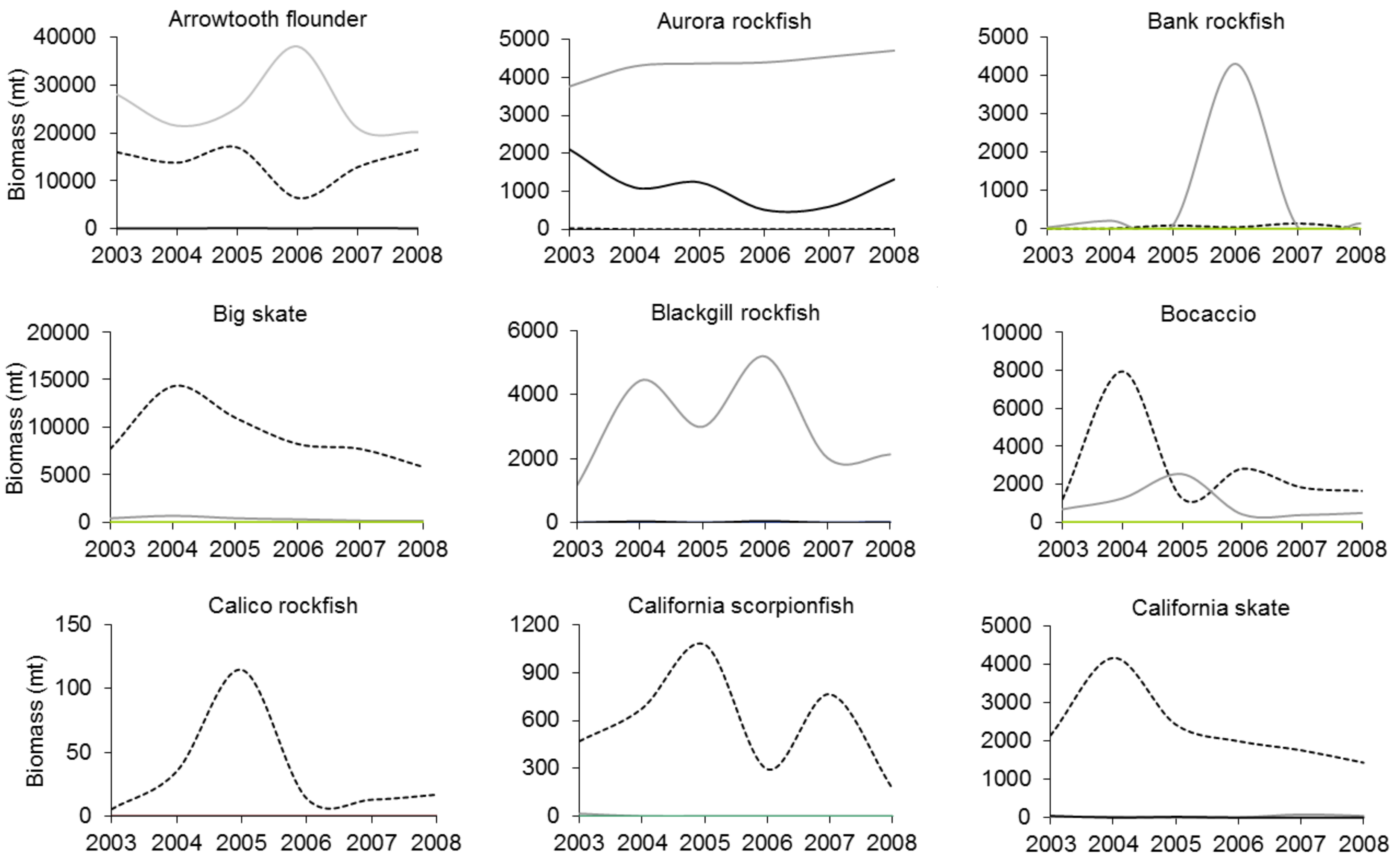

Figure 156. Species specific biomass (mt) by year for 9 of 46 FMP species. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

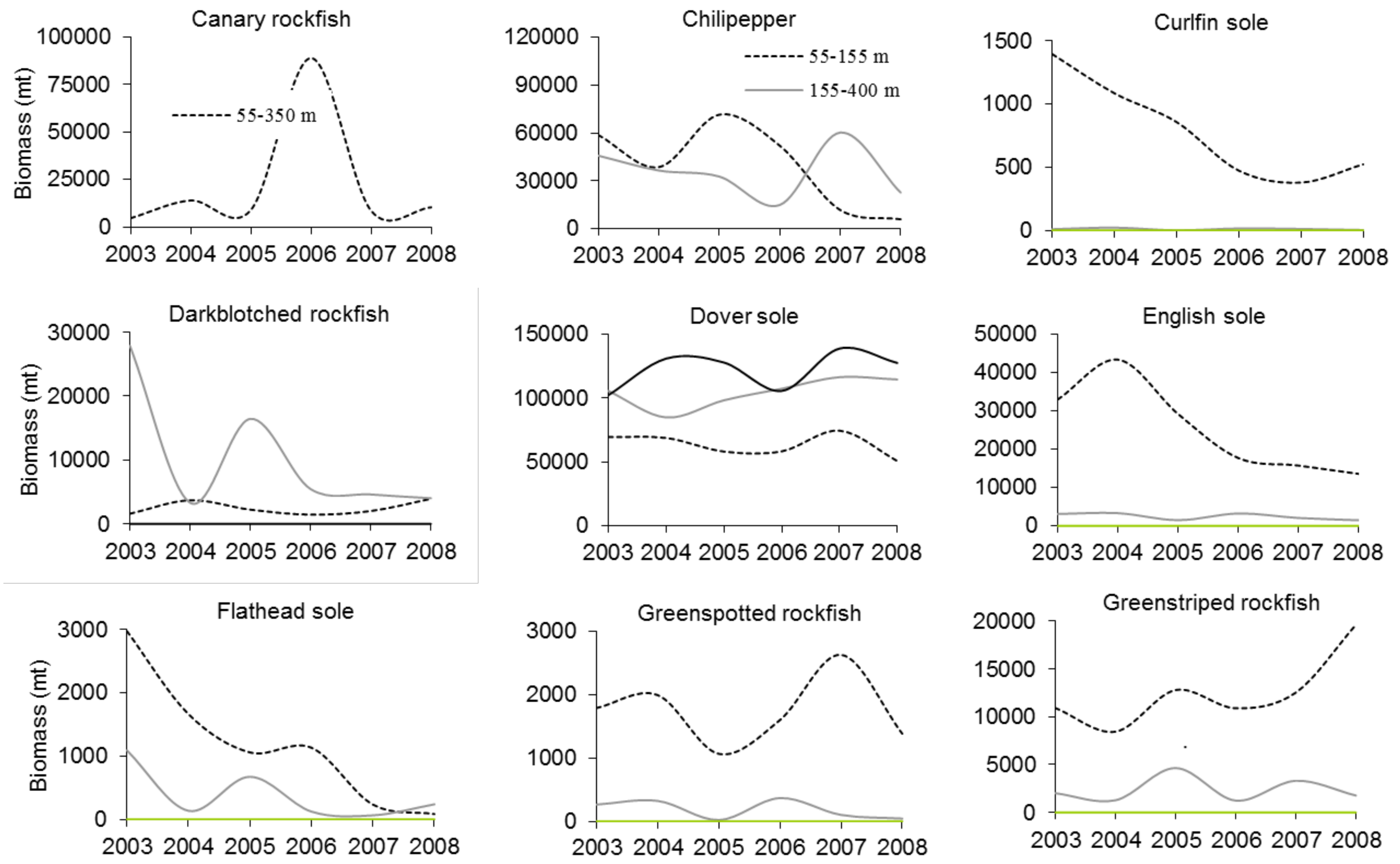

Figure 157. Species specific biomass (mt) by year for 9 of 46 FMP species. Except for canary rockfish and chilipepper, indicated above, the dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

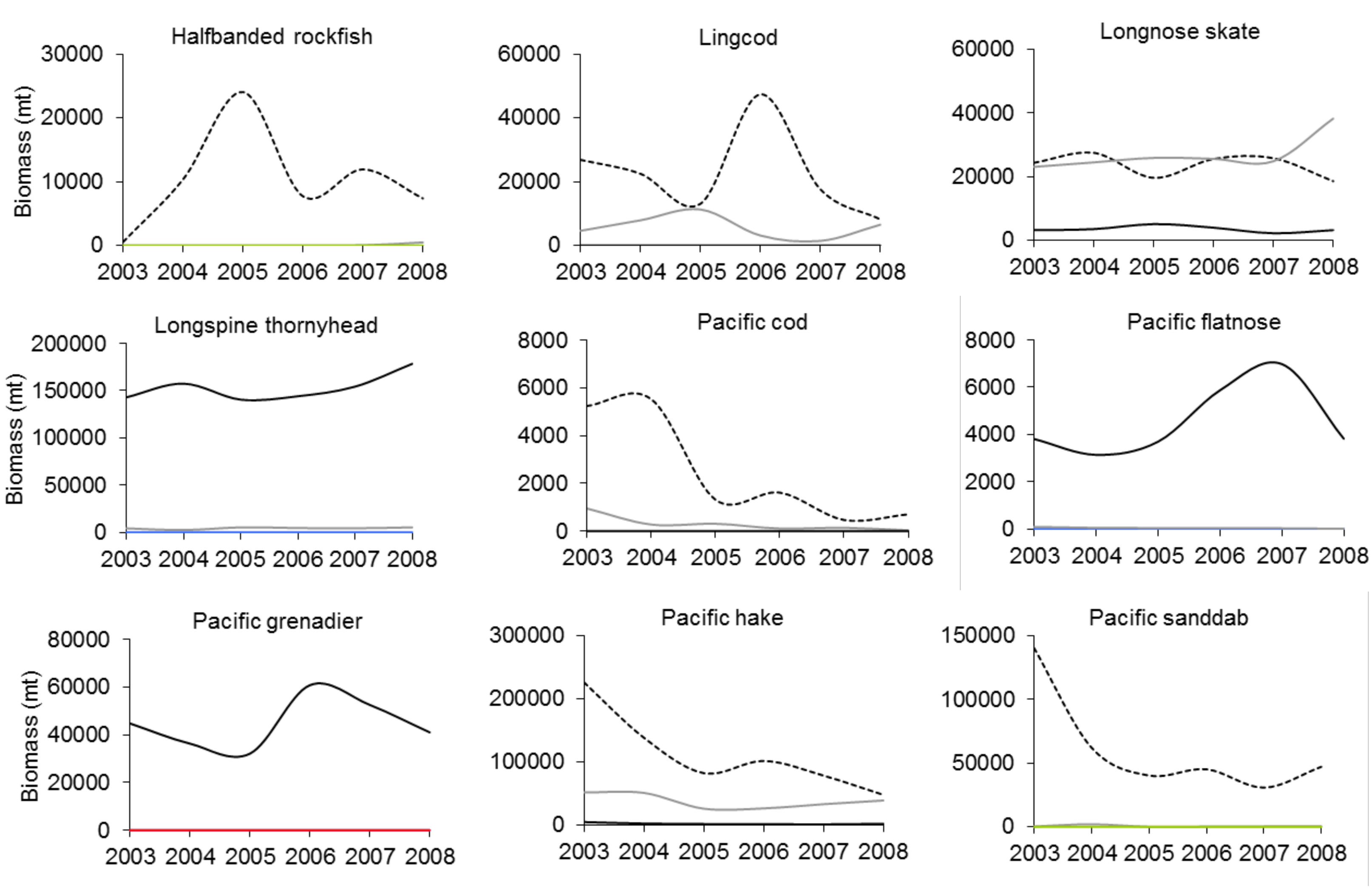

Figure 158. Species specific biomass (mt) by year for 9 of 46 FMP species. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

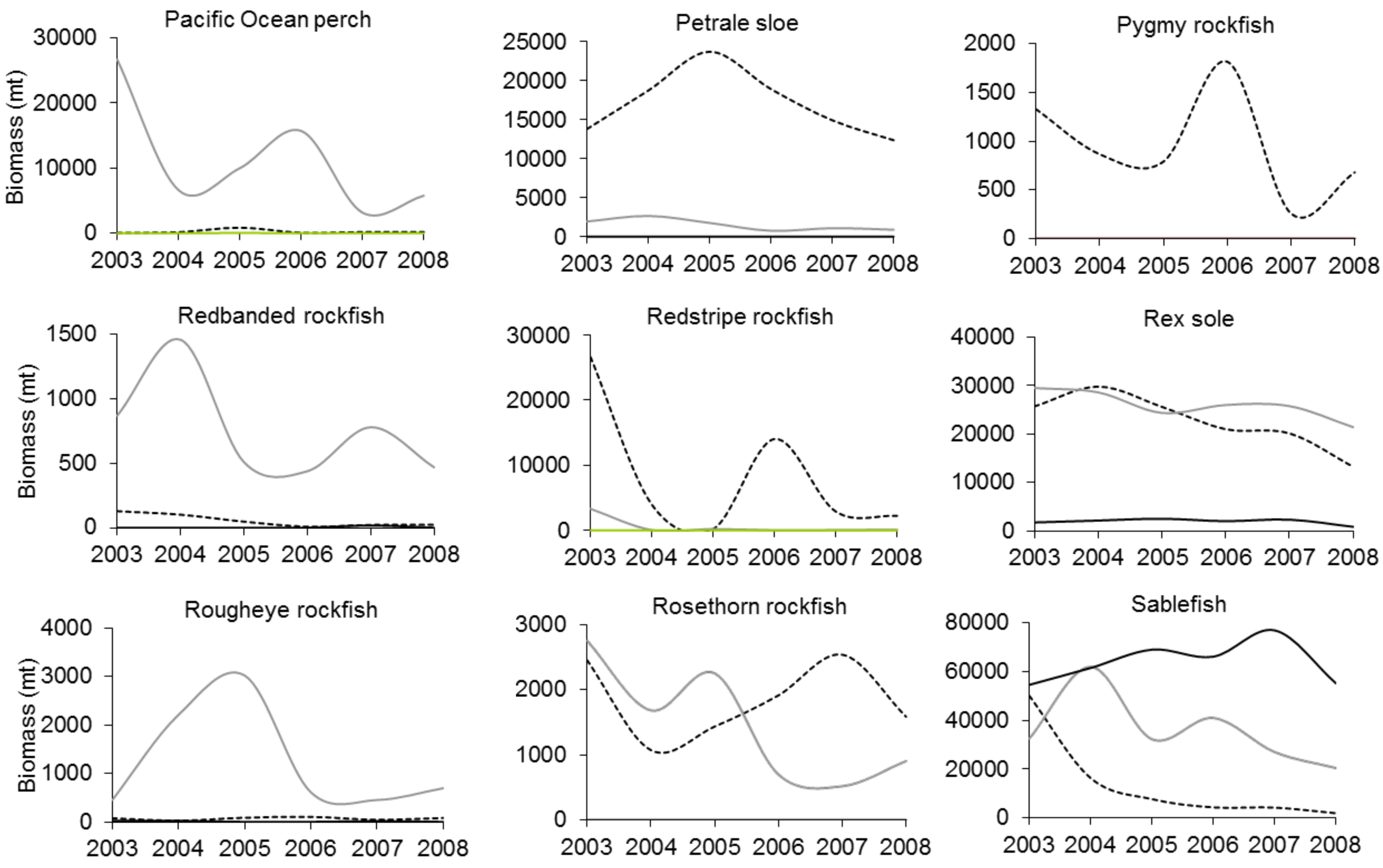

Figure 159. Species specific biomass (mt) by year for 9 of 46 FMP species. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

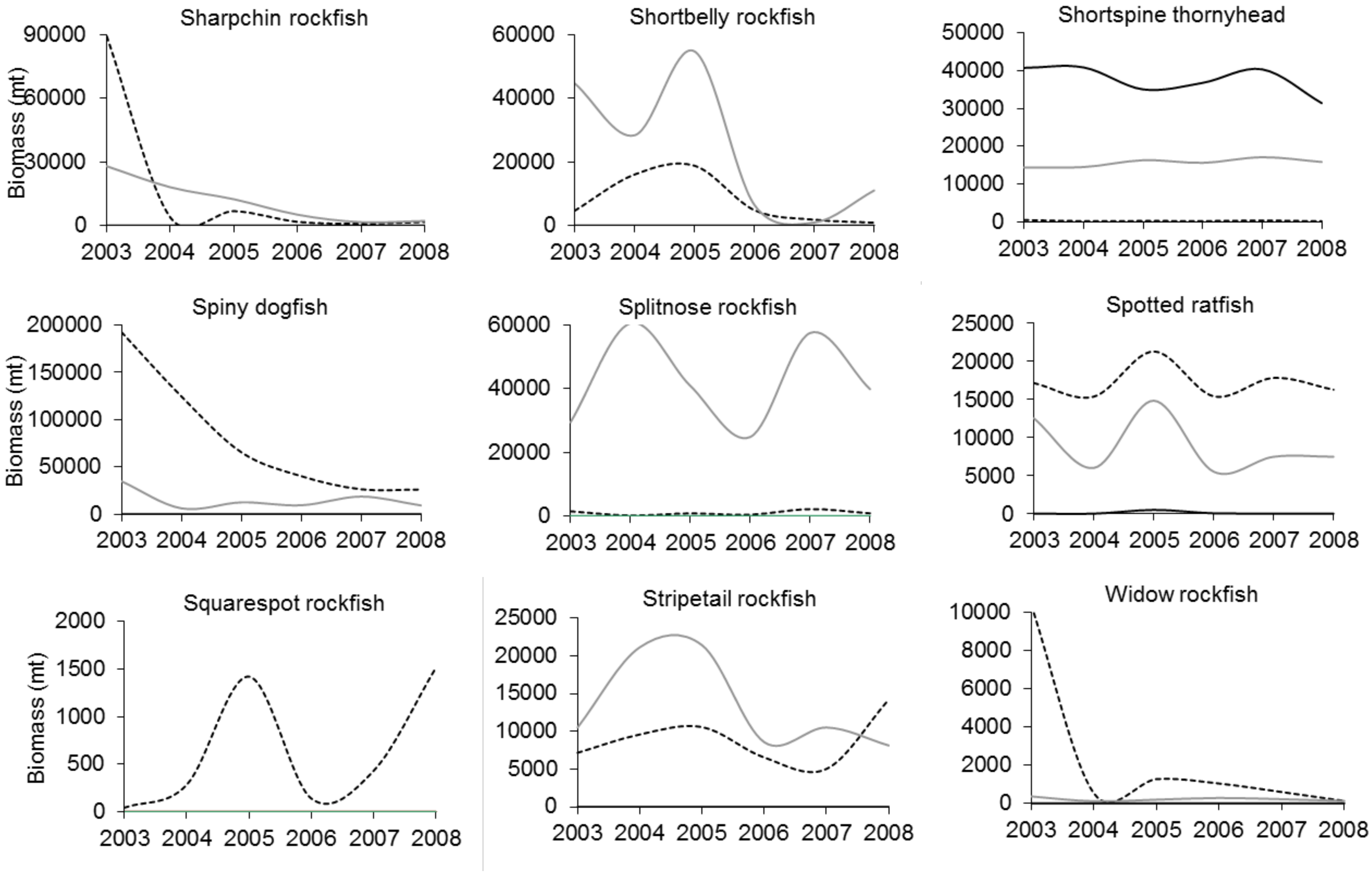

Figure 160. Species specific biomass (mt) by year for 9 of 46 FMP species. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

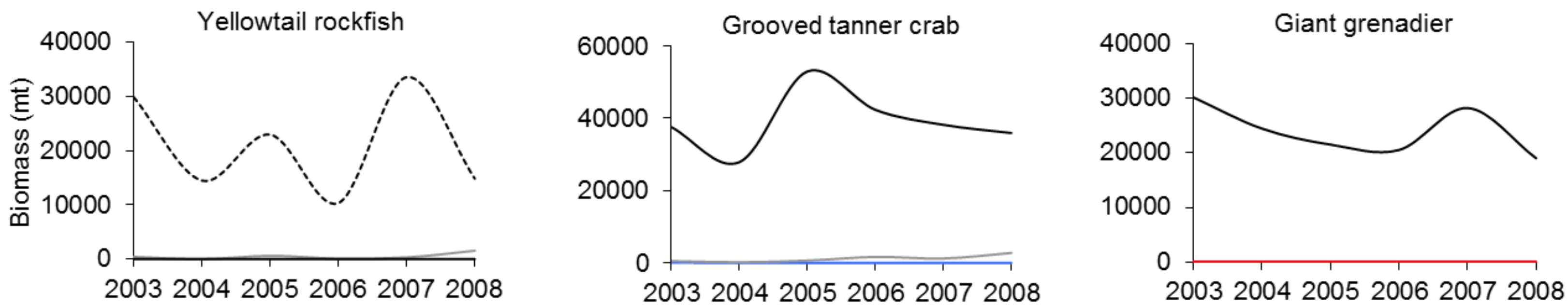

Figure 161. Species specific biomass (mt) by year for 1 of 46 FMP species plus grooved tanner crab and giant grenadier. The dashed line is stratum 1, 55–183 m; the gray line is stratum 2, 184–549 m; and the black line is stratum 3, 550–1,280 m.

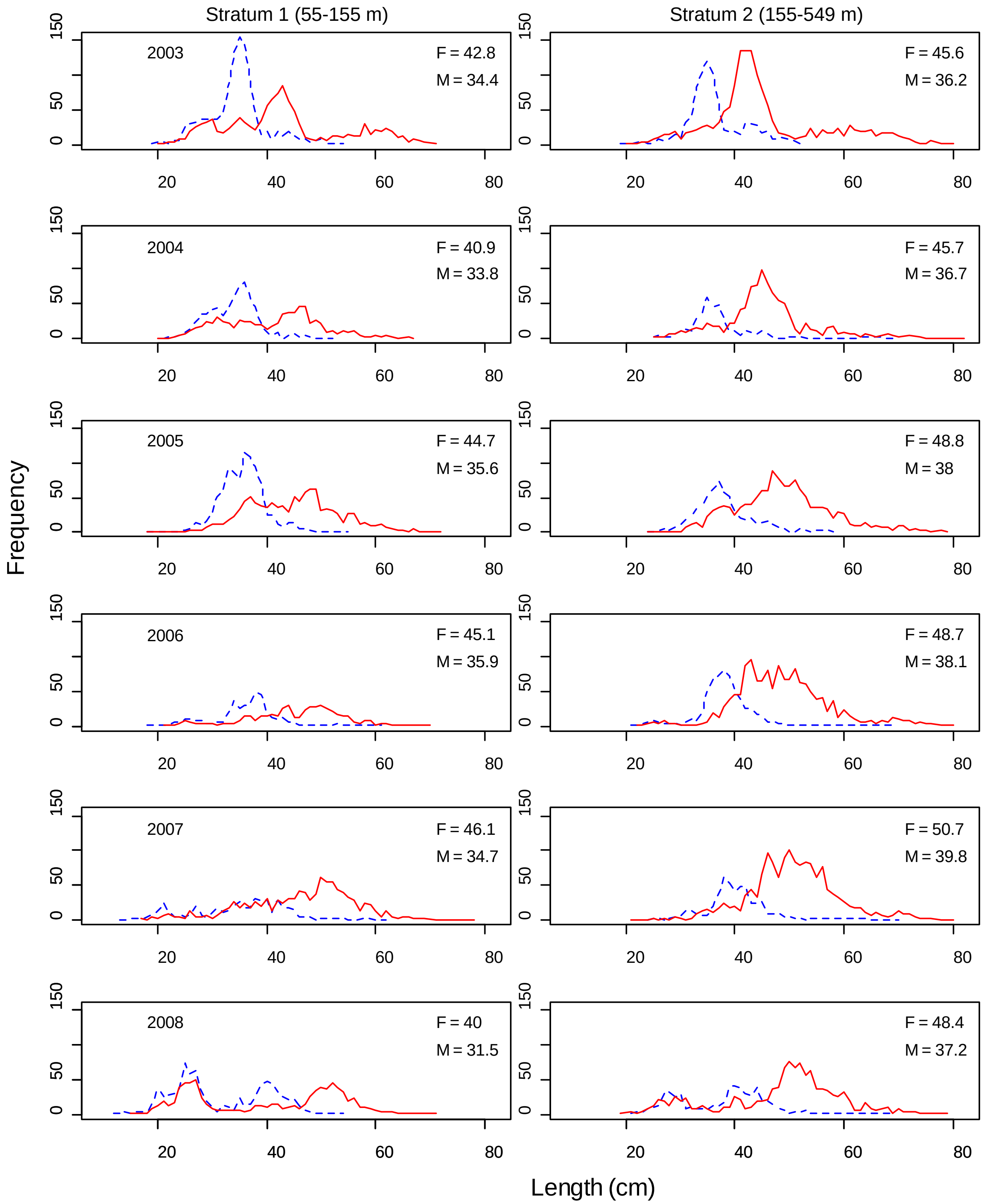

Figure 162. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for arrowtooth flounder from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

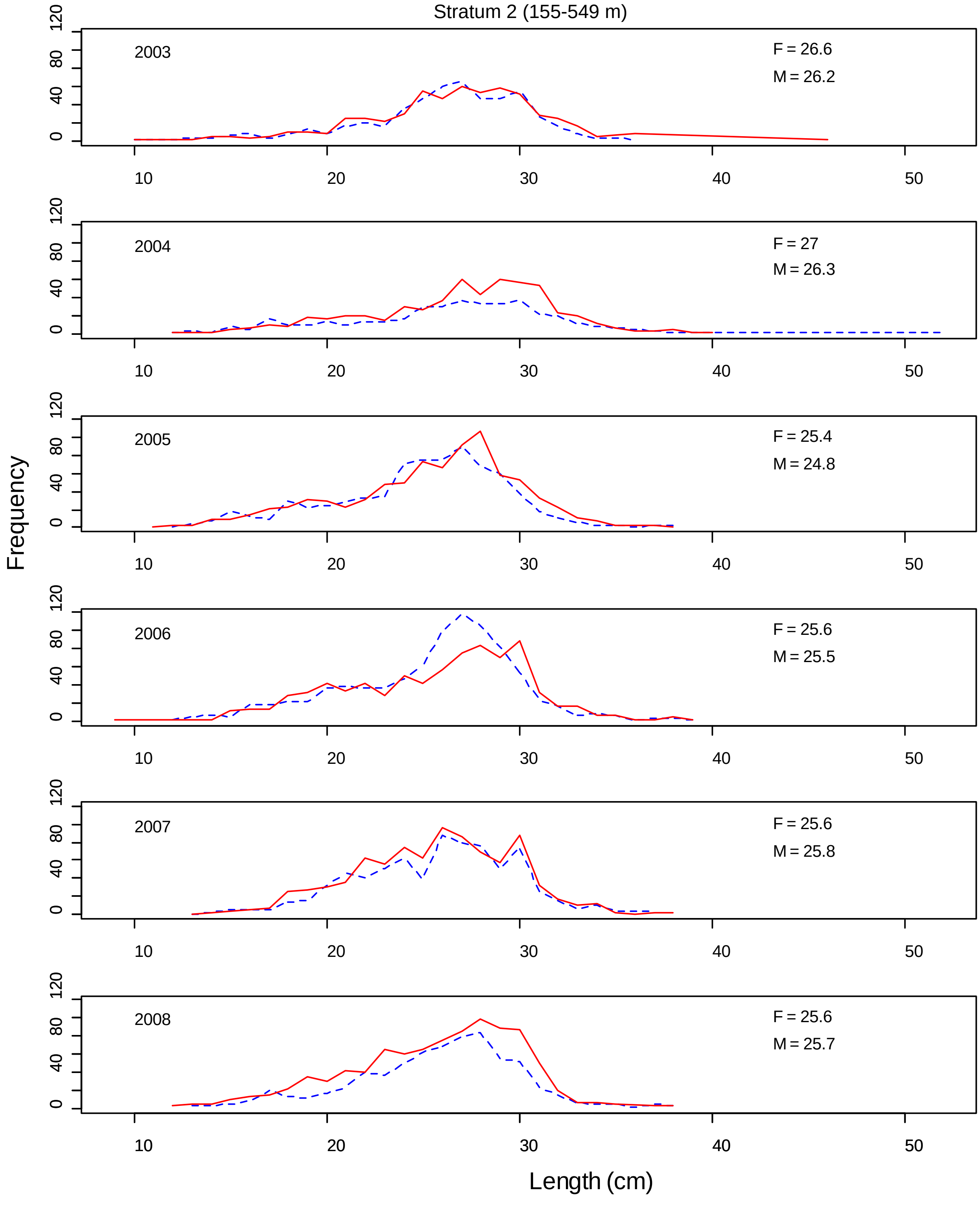

Figure 163. Frequency of lengths by gender in stratum 2 for aurora rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

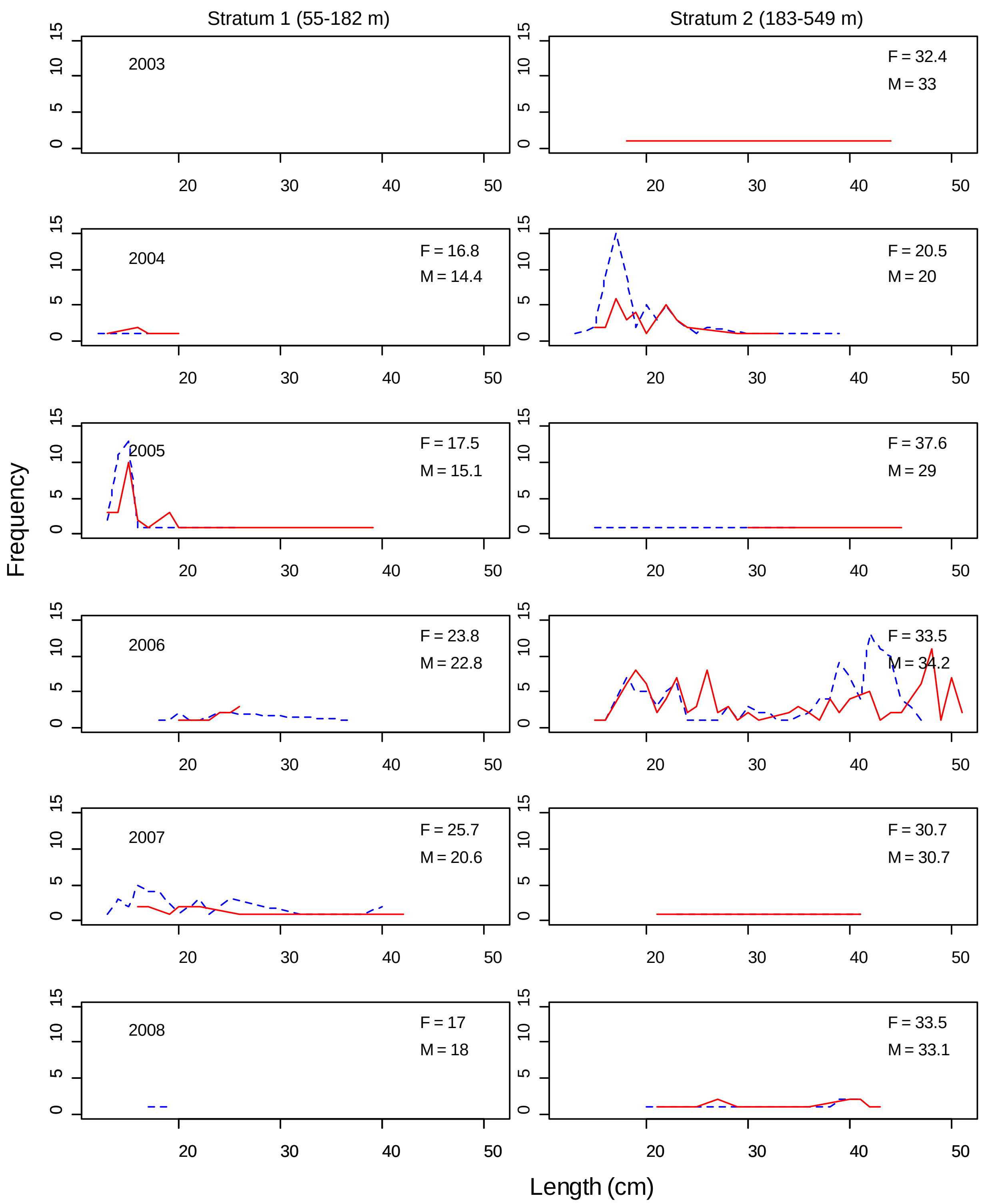

Figure 164. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for bank rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

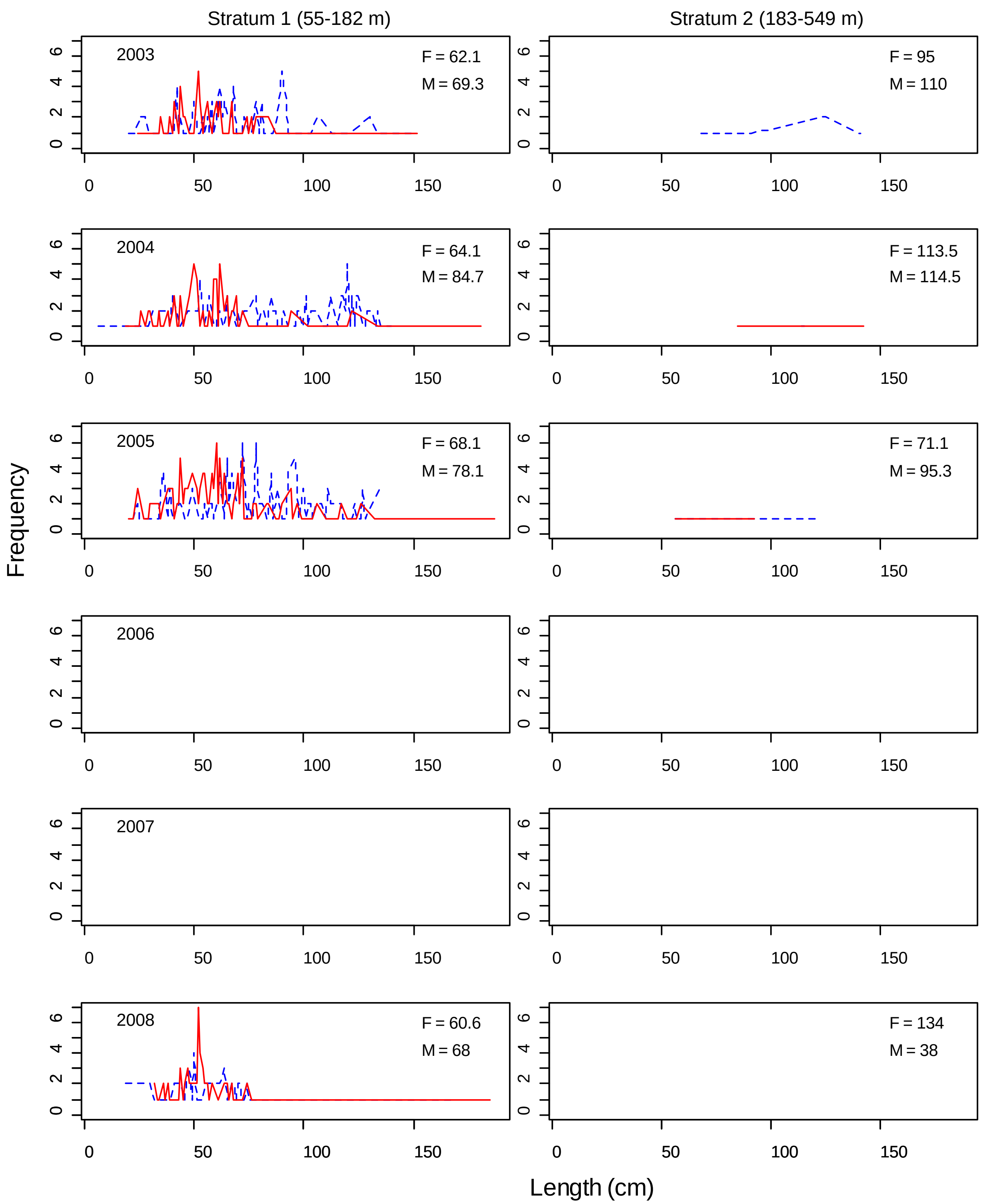

Figure 165. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for big skate from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

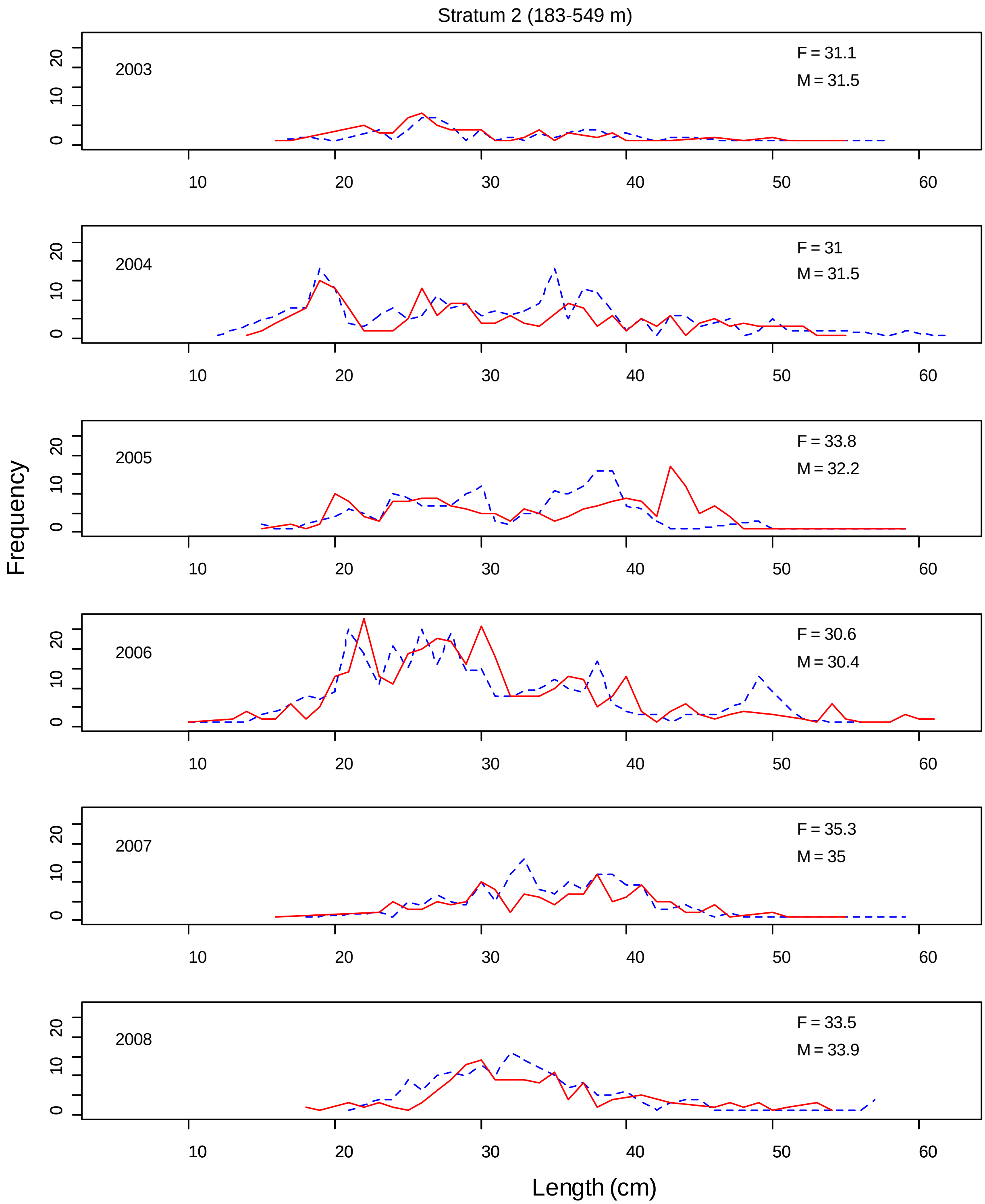

Figure 166. Frequency of lengths by gender in stratum 2 for blackgill rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

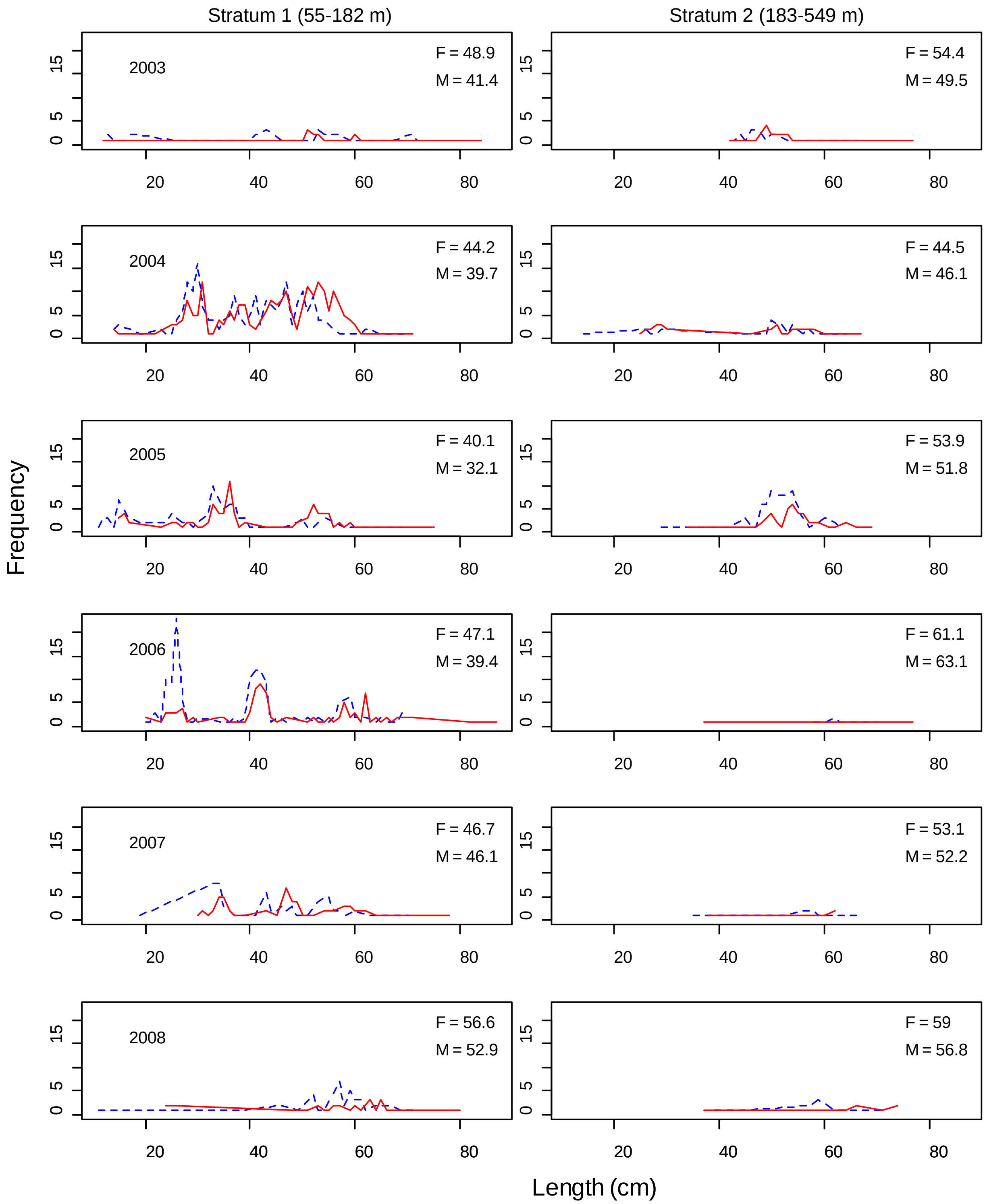

Figure 167. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for bocaccio from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

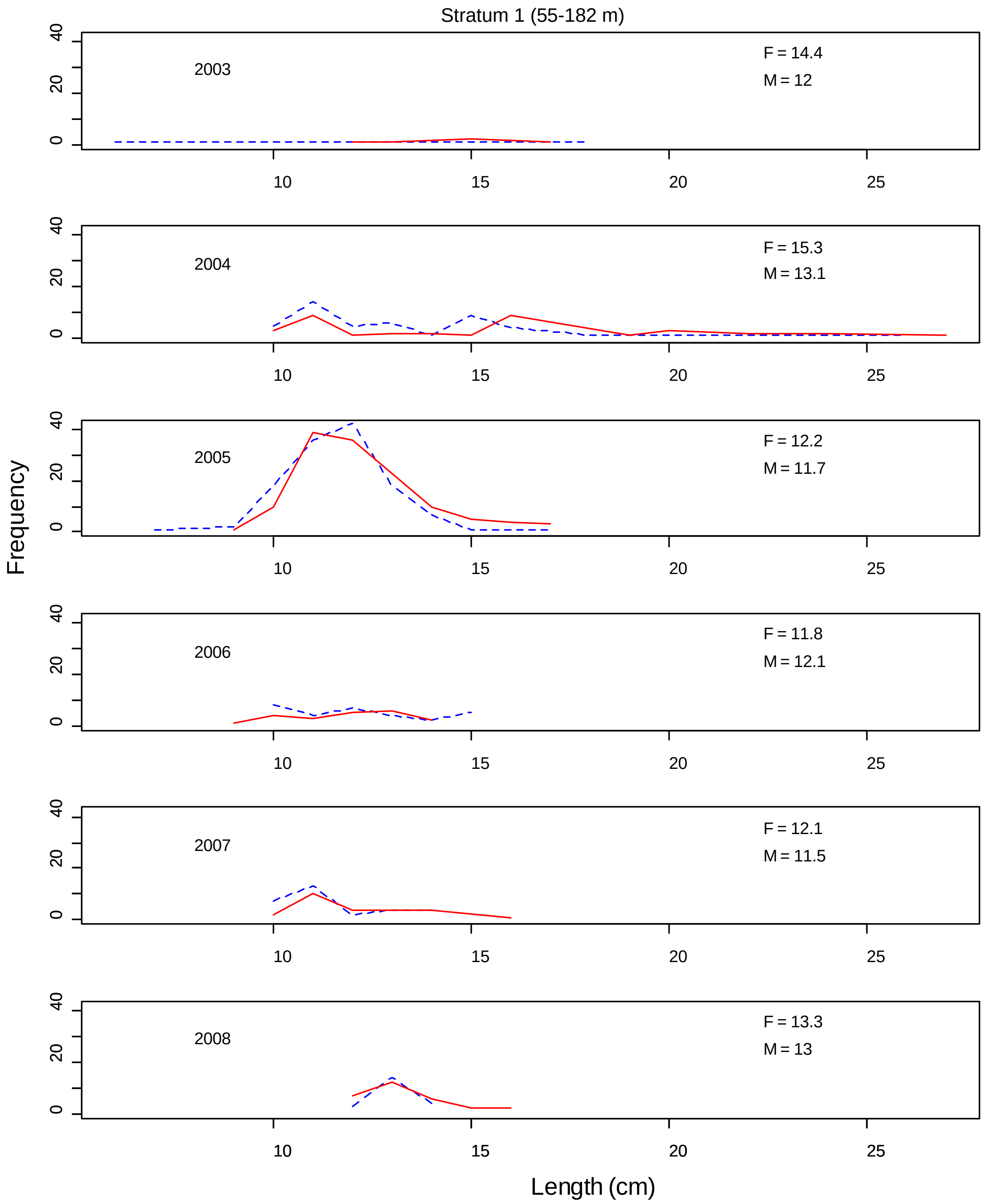

Figure 168. Frequency of lengths by gender in stratum 1 for calico rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

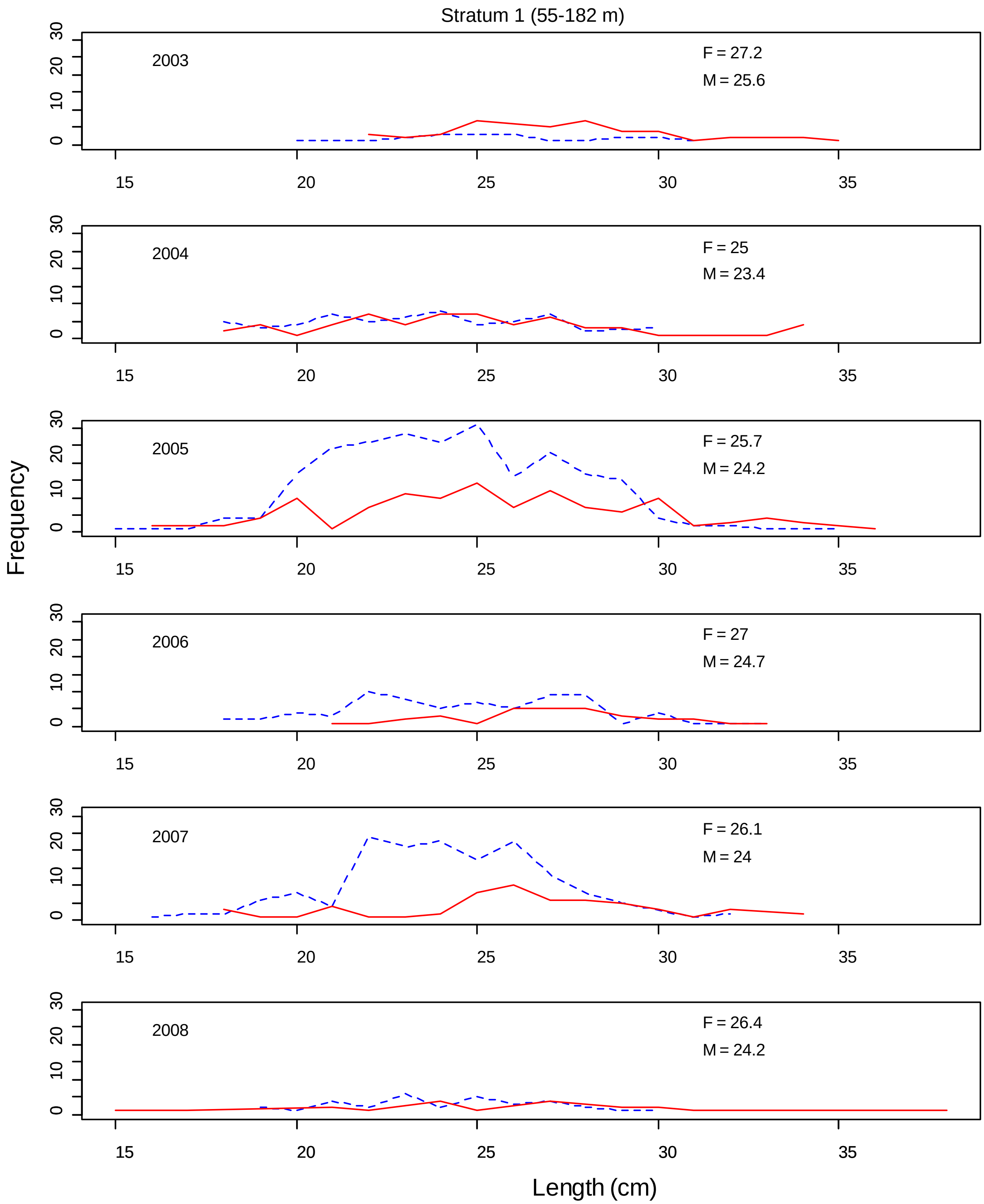

Figure 169. Frequency of lengths by gender in stratum 1 for California scorpionfish from the 2003−2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

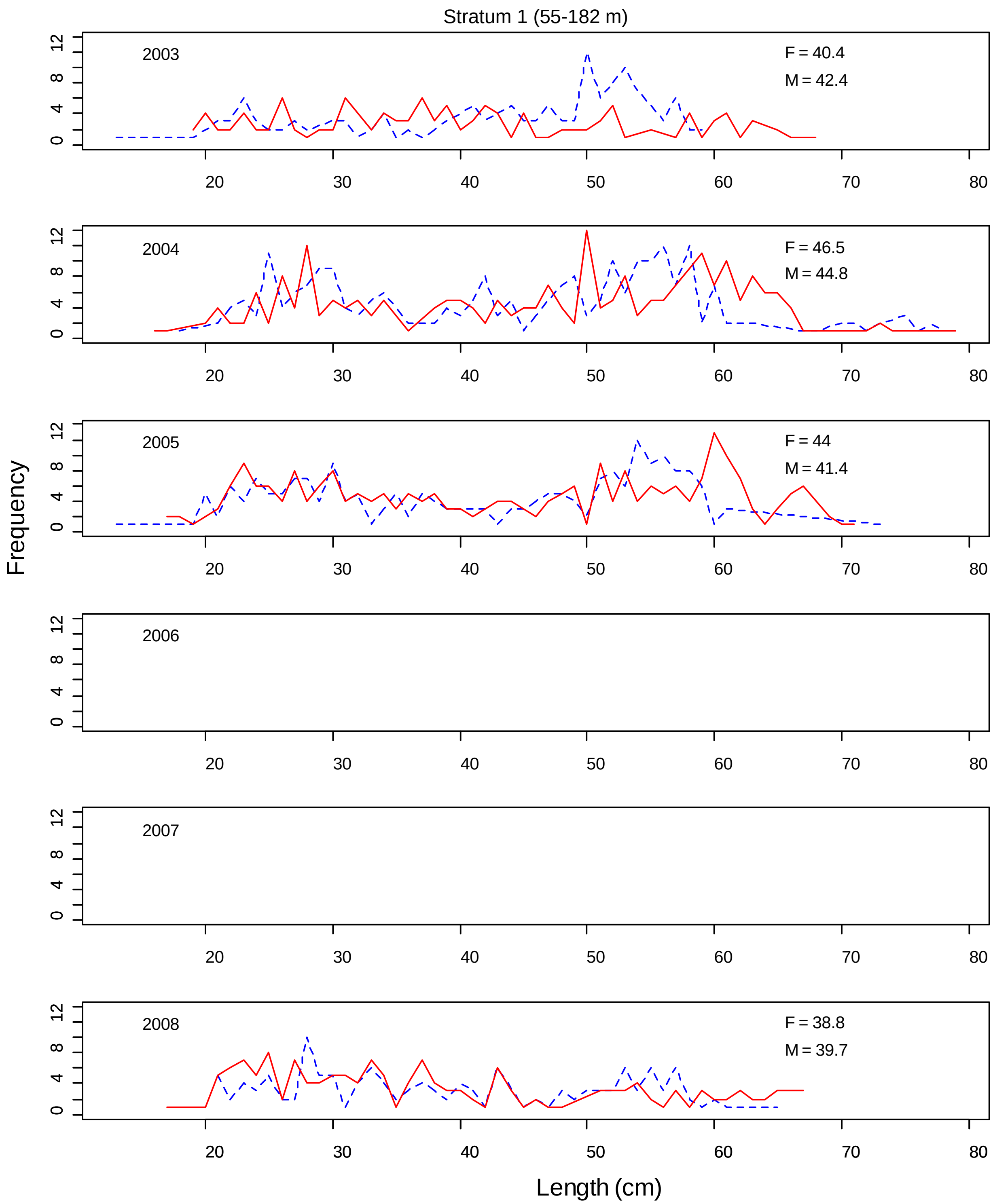

Figure 170. Frequency of lengths by gender in stratum 1 for California skate from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

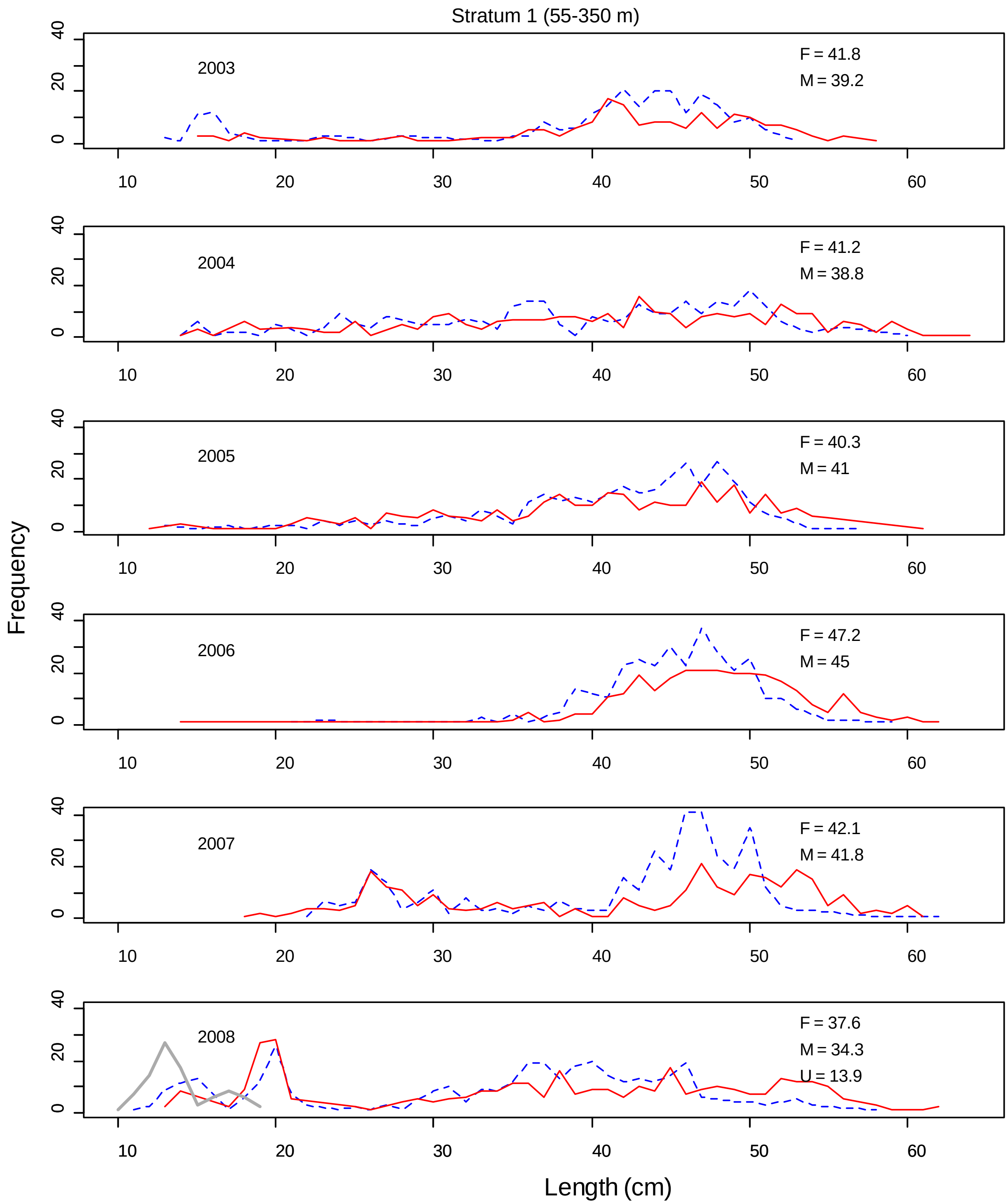

Figure 171. Frequency of lengths by gender in stratum 1 for canary rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U [unknown])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

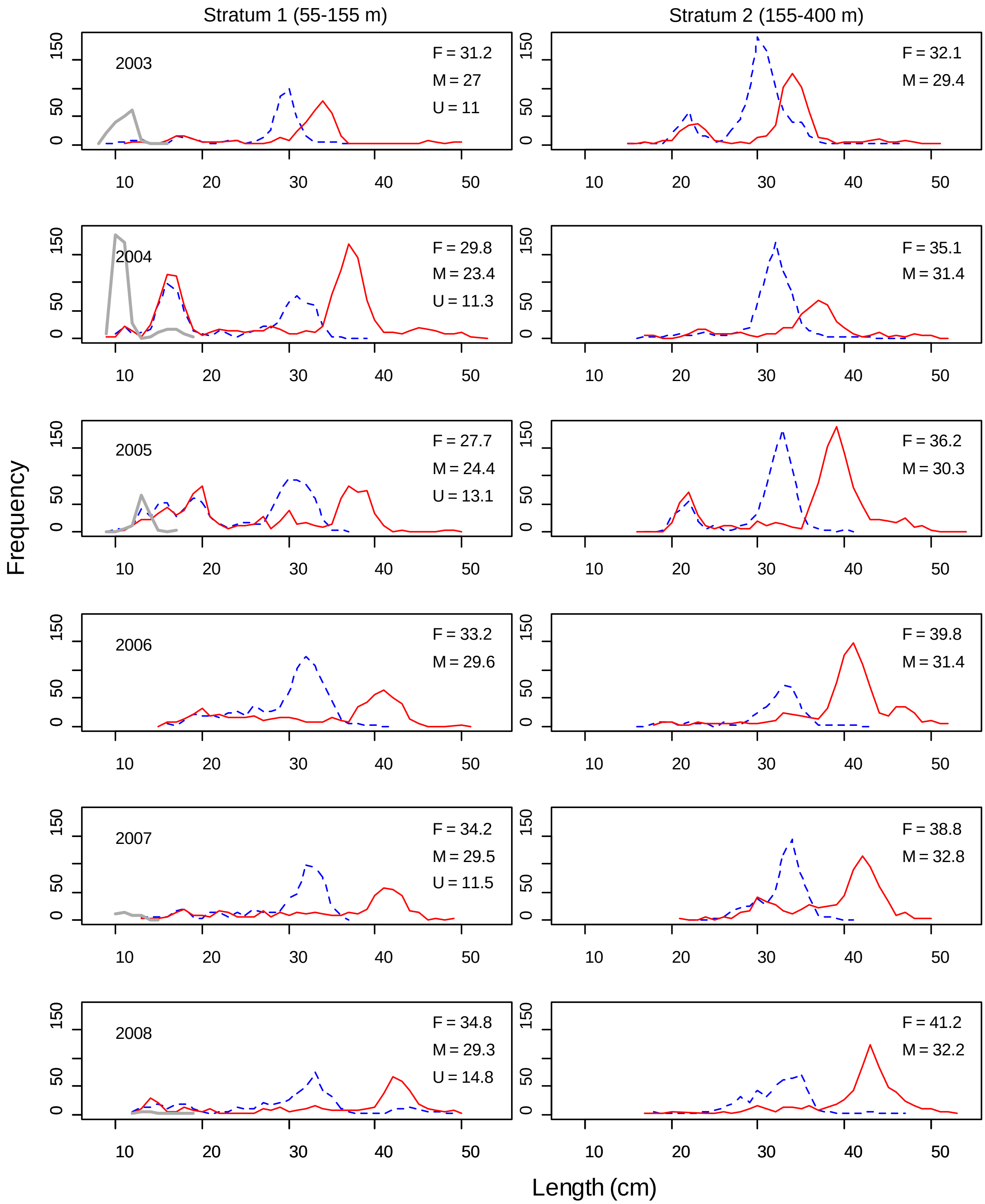

Figure 172. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for chilipepper rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each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

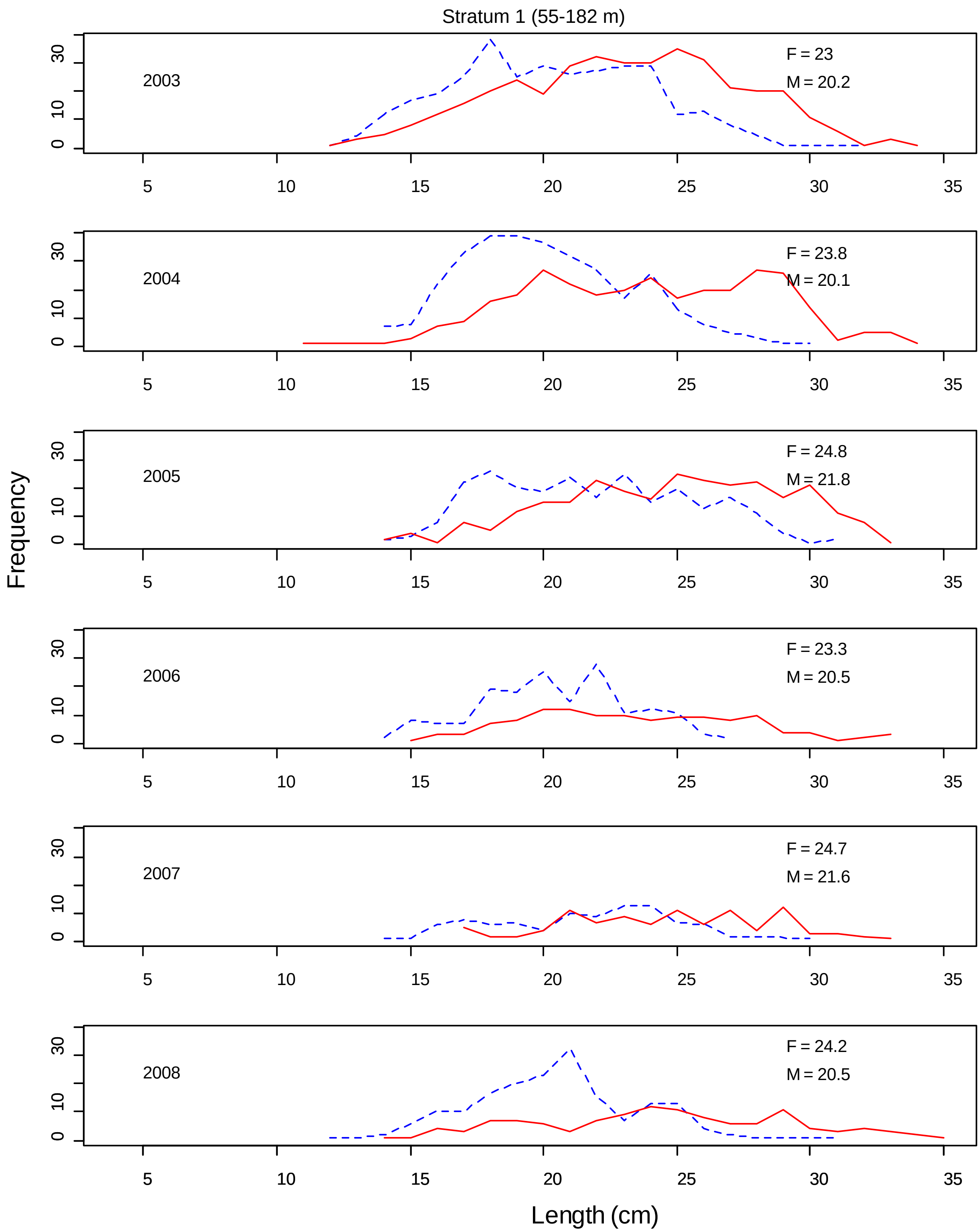

Figure 173. Frequency of lengths by gender in stratum 1 for curlfin sole from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

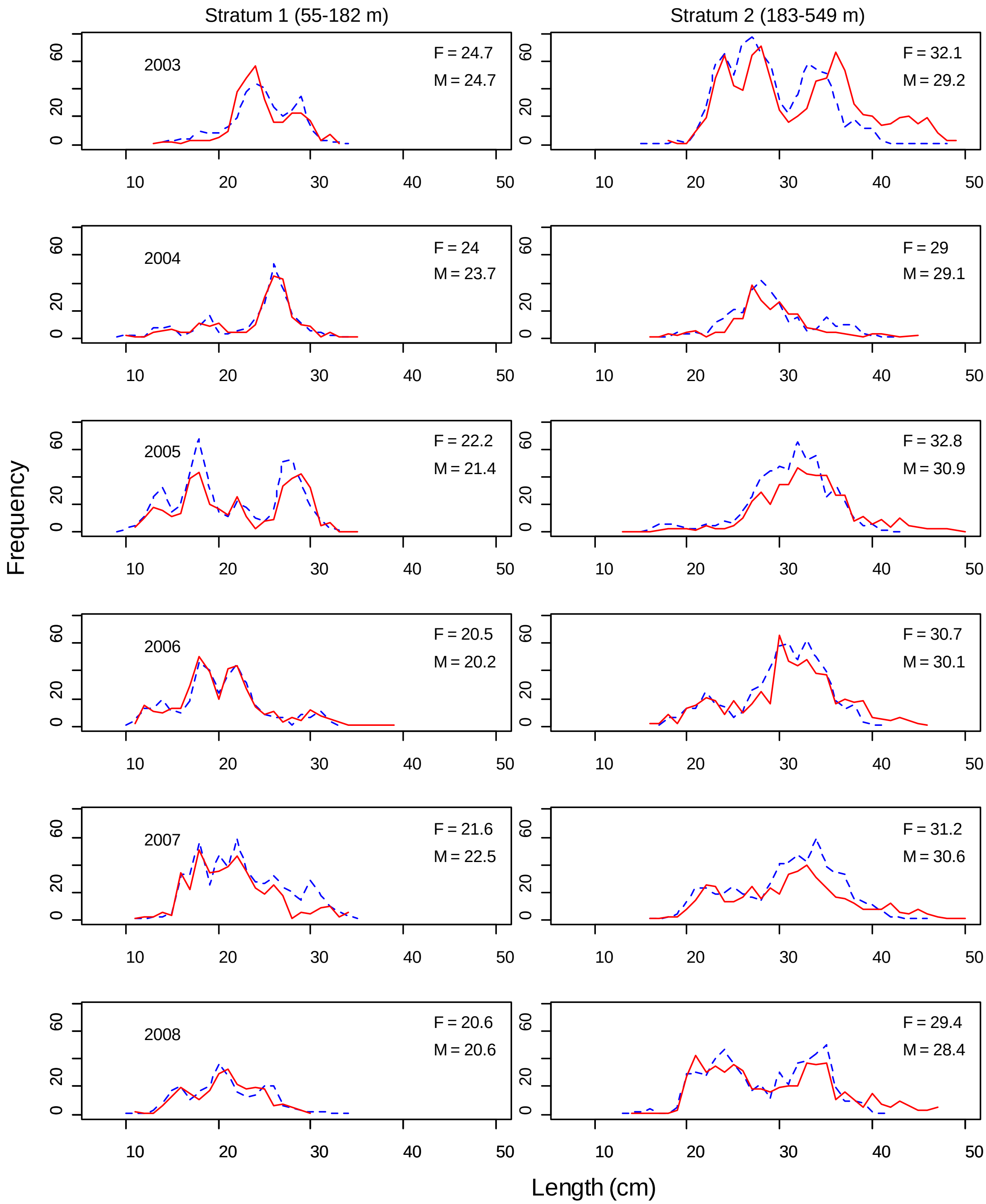

Figure 174. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for darkblotched rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

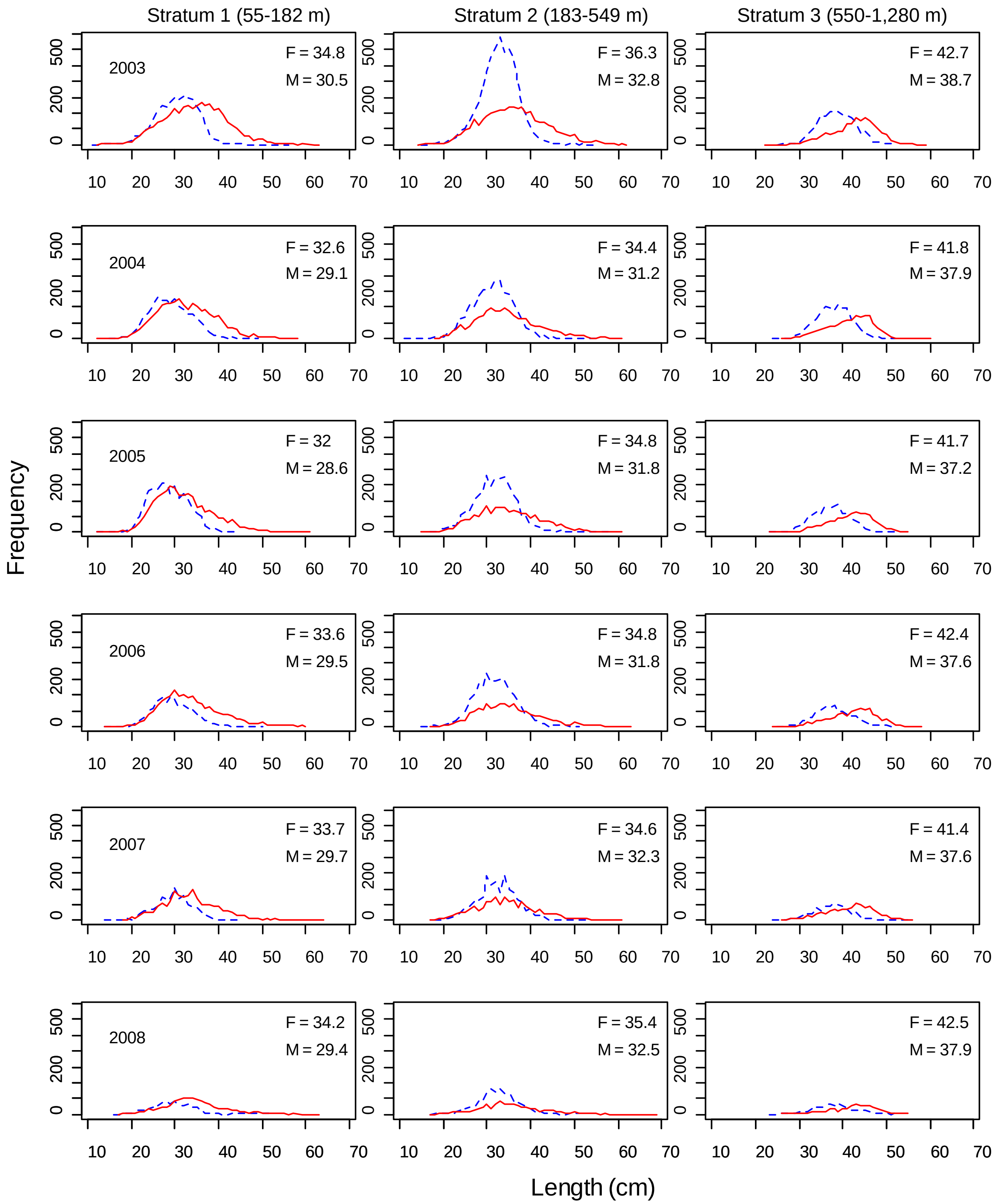

Figure 175. Frequency of lengths by gender in stratum 1 (left column), stratum 2 (middle column), and stratum 3 (right column) for Dover sole from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in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

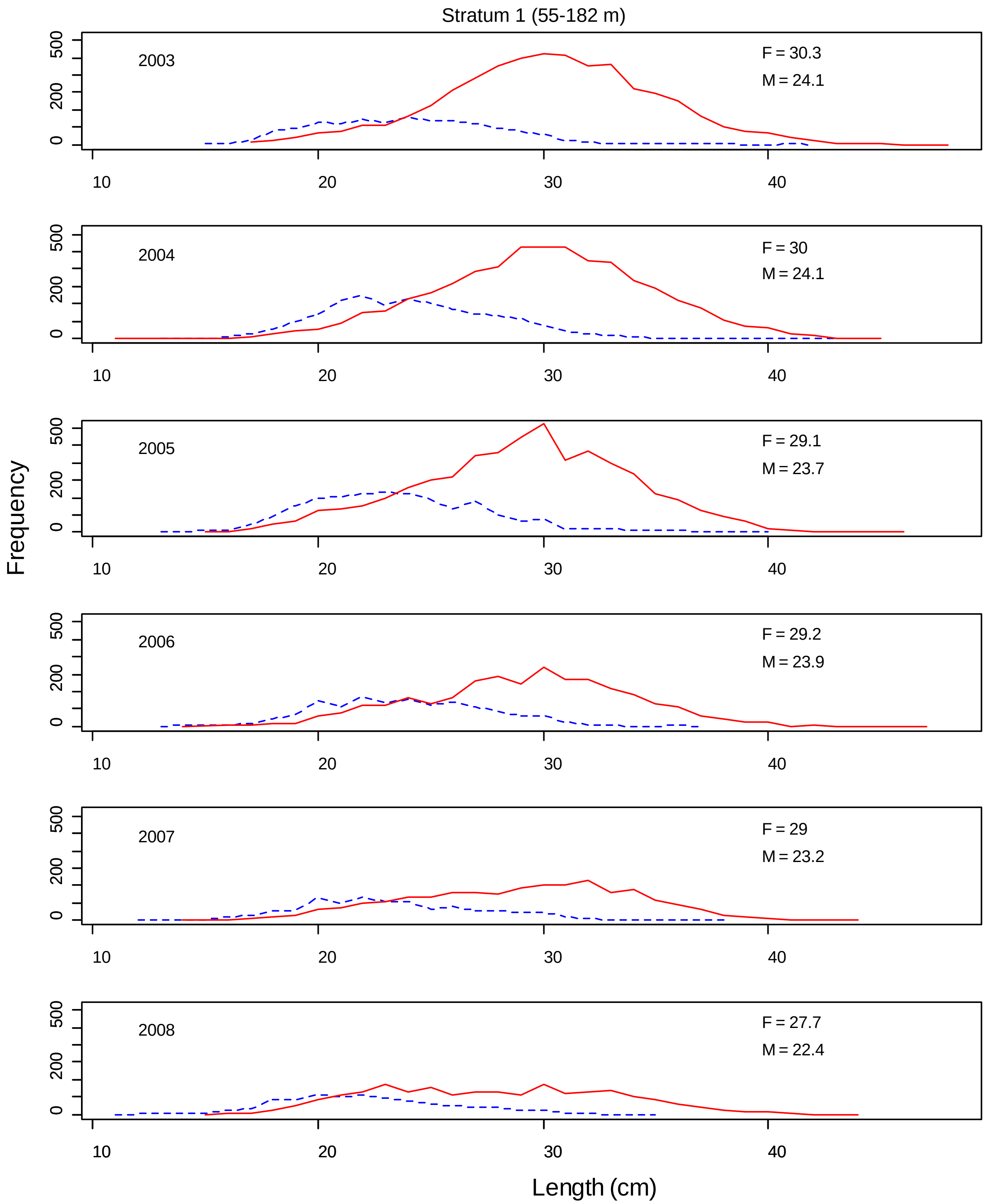

Figure 176. Frequency of lengths by gender in stratum 1 for English sole from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

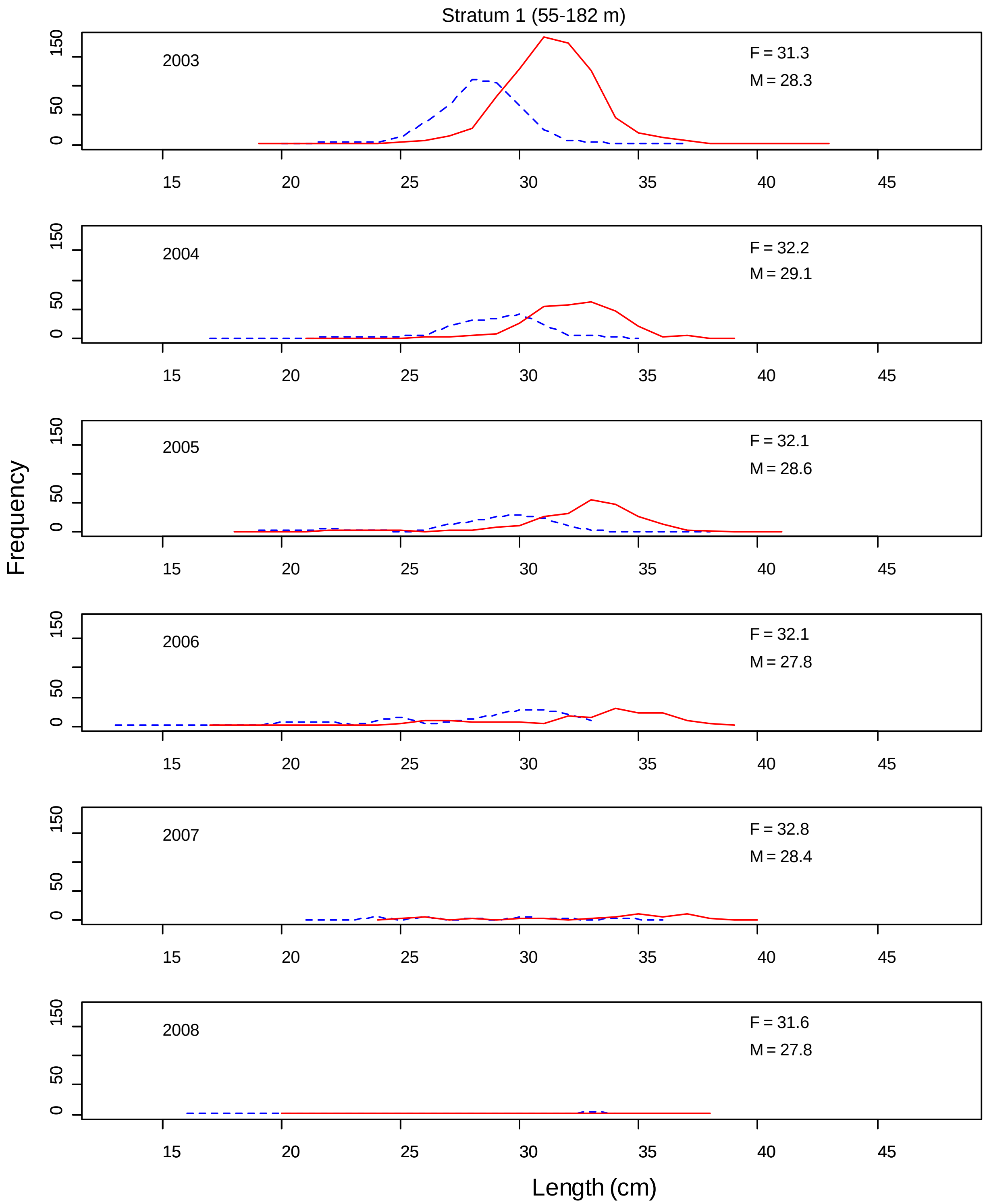

Figure 177. Frequency of lengths by gender in stratum 1 for flathead sole from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

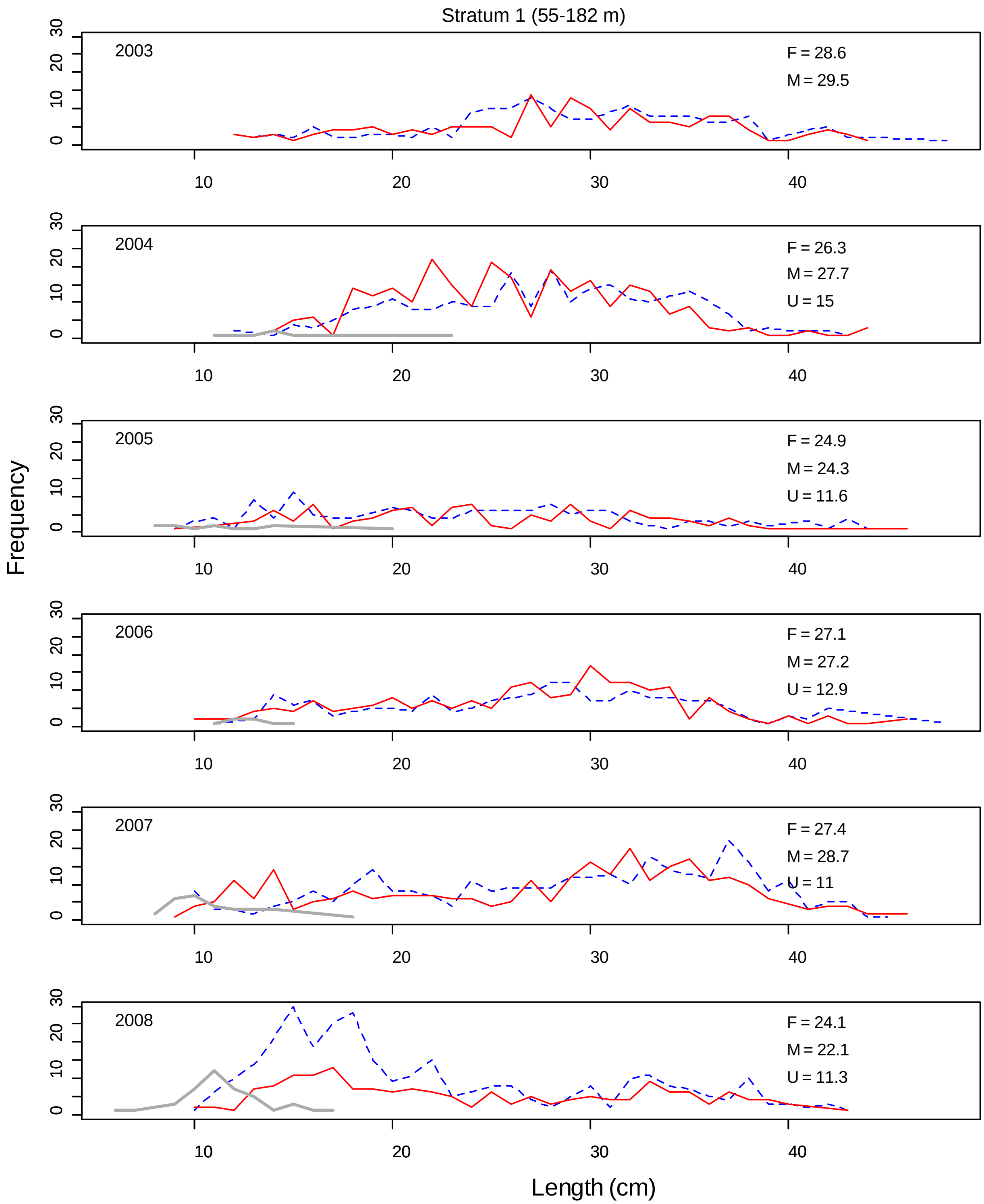

Figure 178. Frequency of lengths by gender in stratum 1 for greenspotted rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is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

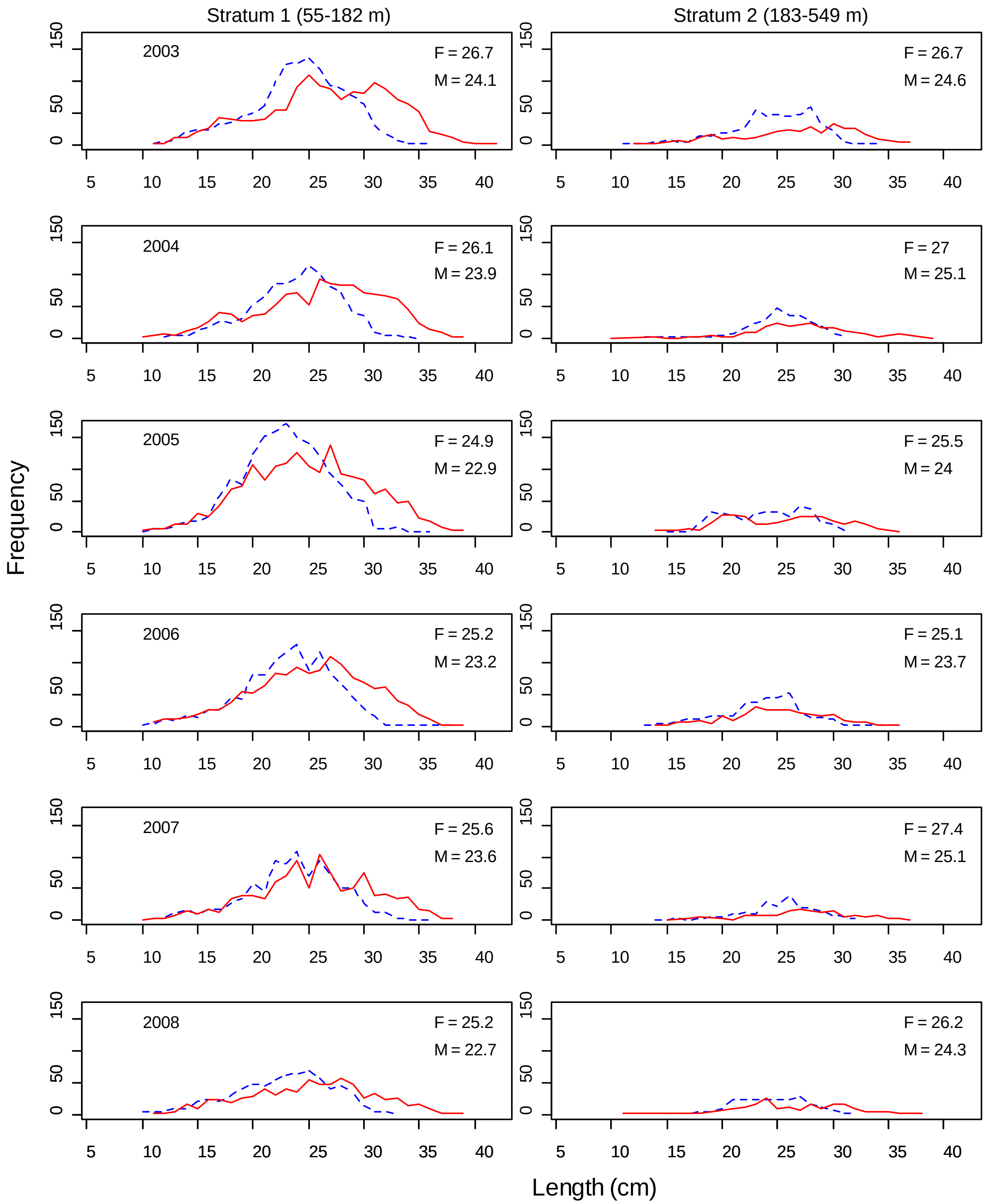

Figure 179. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for greenstriped rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

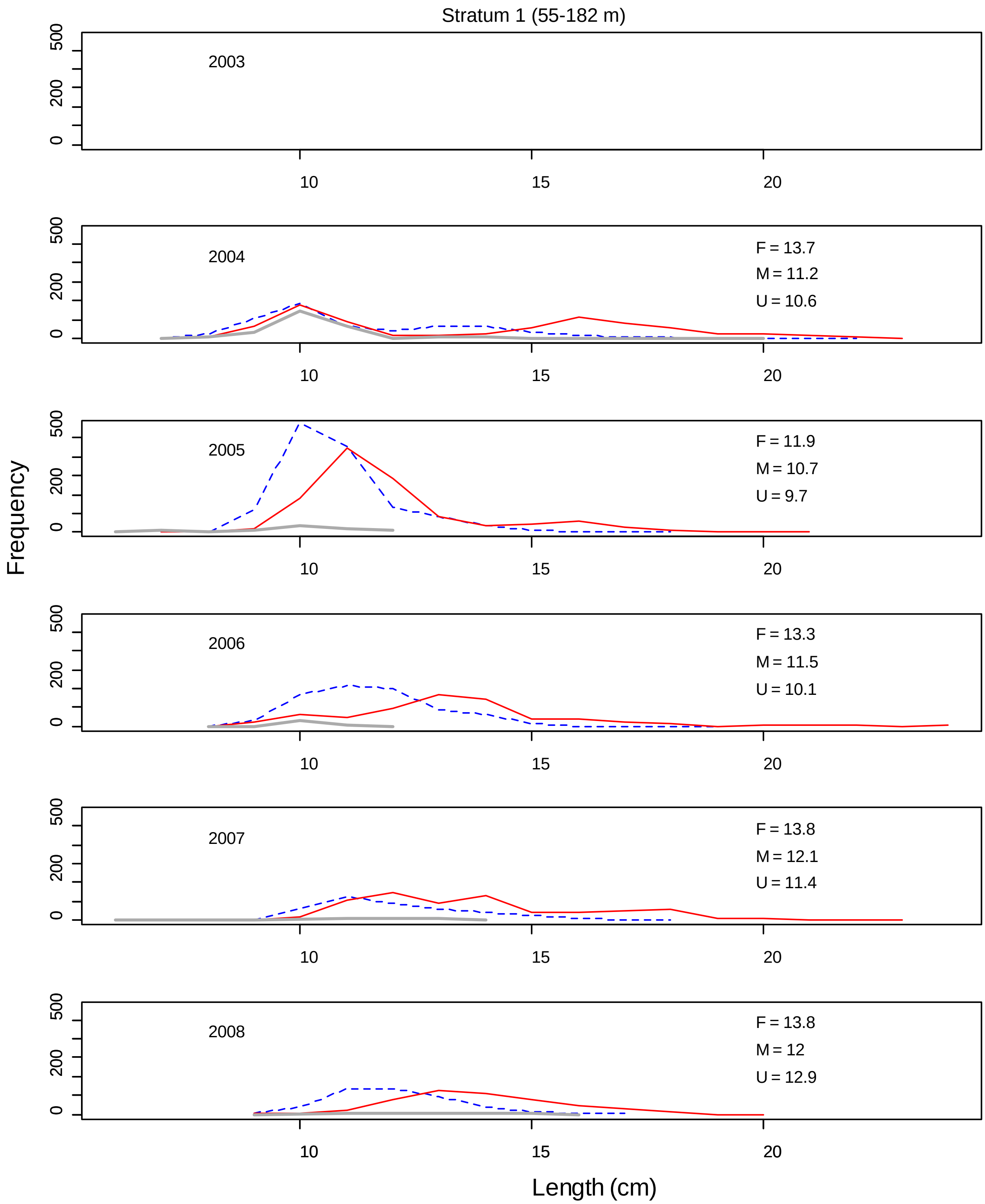

Figure 180. Frequency of lengths by gender in stratum 1 for halfbanded rockfish from the 2003–2008 surveys. Females are represented by a solid line; males by a dashed line; and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed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

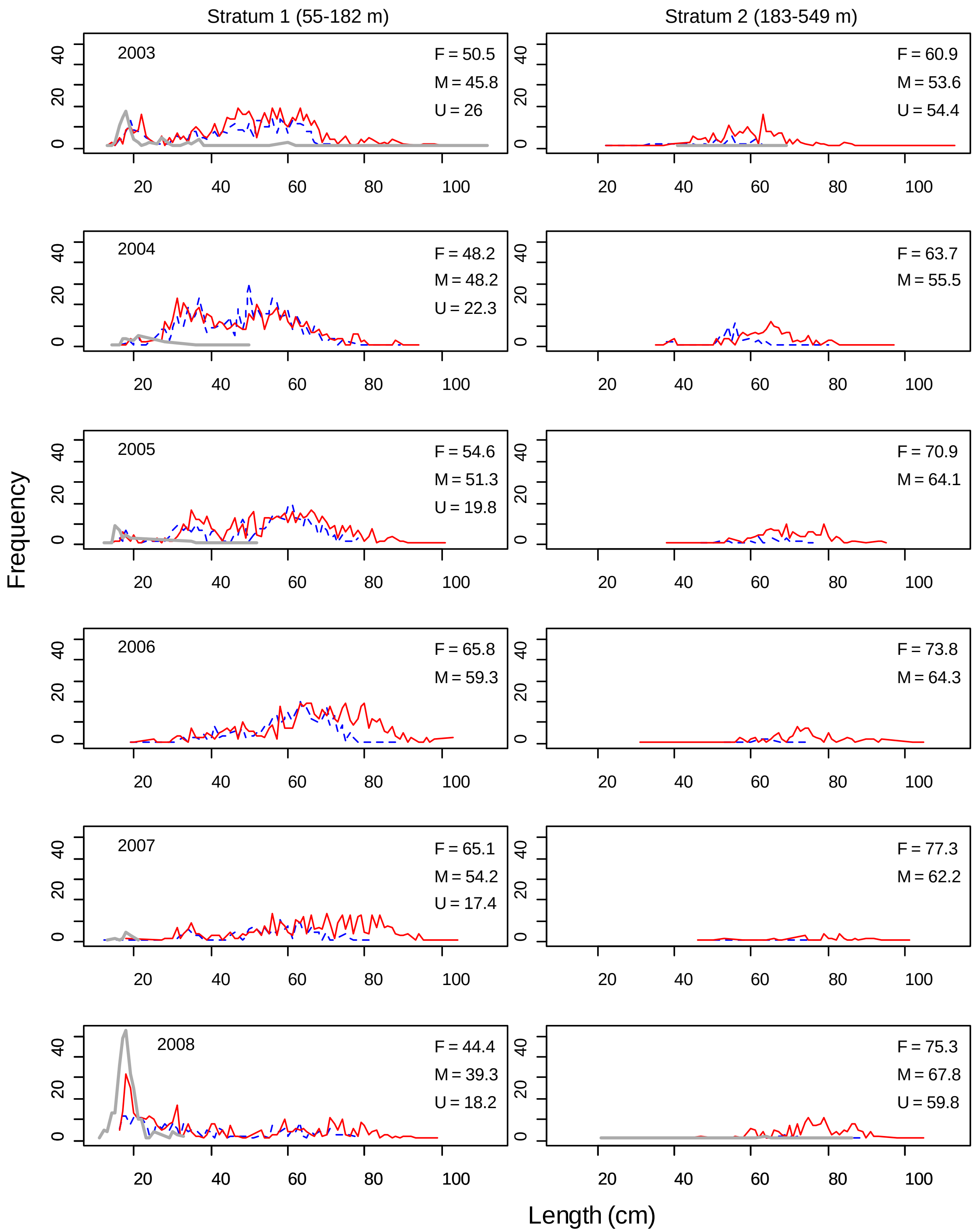

Figure 181. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for lingcod from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification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

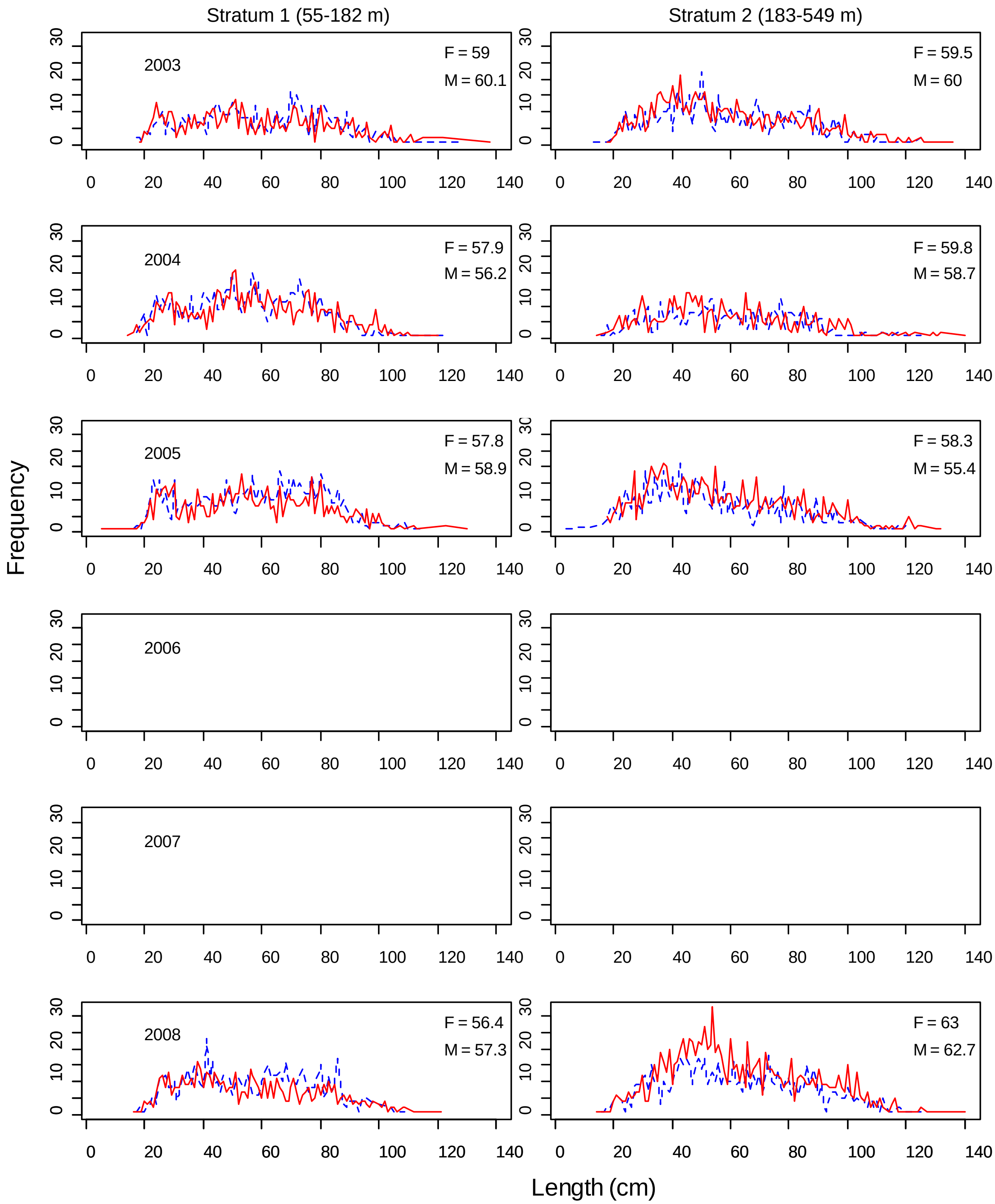

Figure 182. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for longnose skate from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

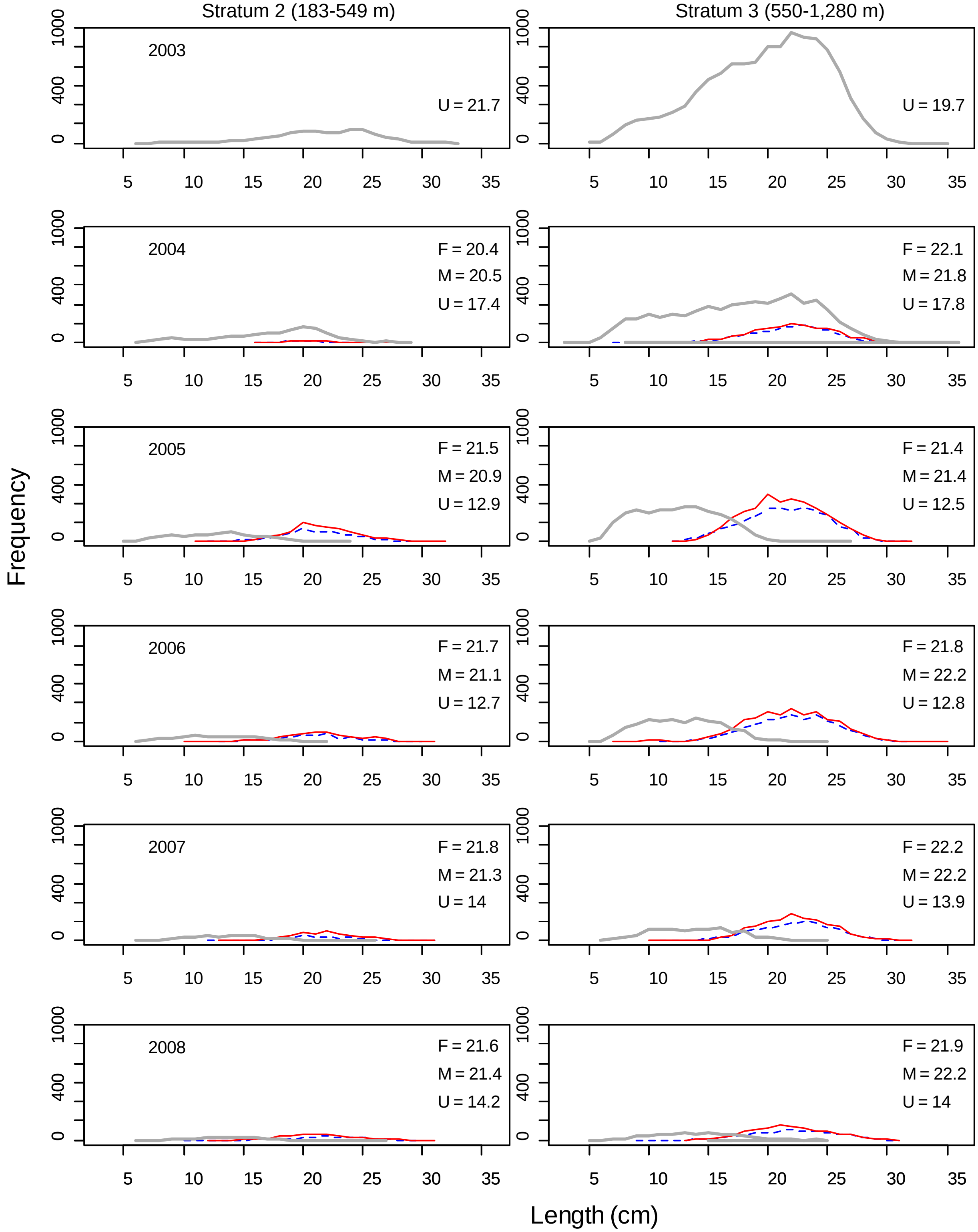

Figure 183. Frequency of lengths by gender in stratum 2 (left column) and stratum 3 (right column) for longspine thornyhead from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each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

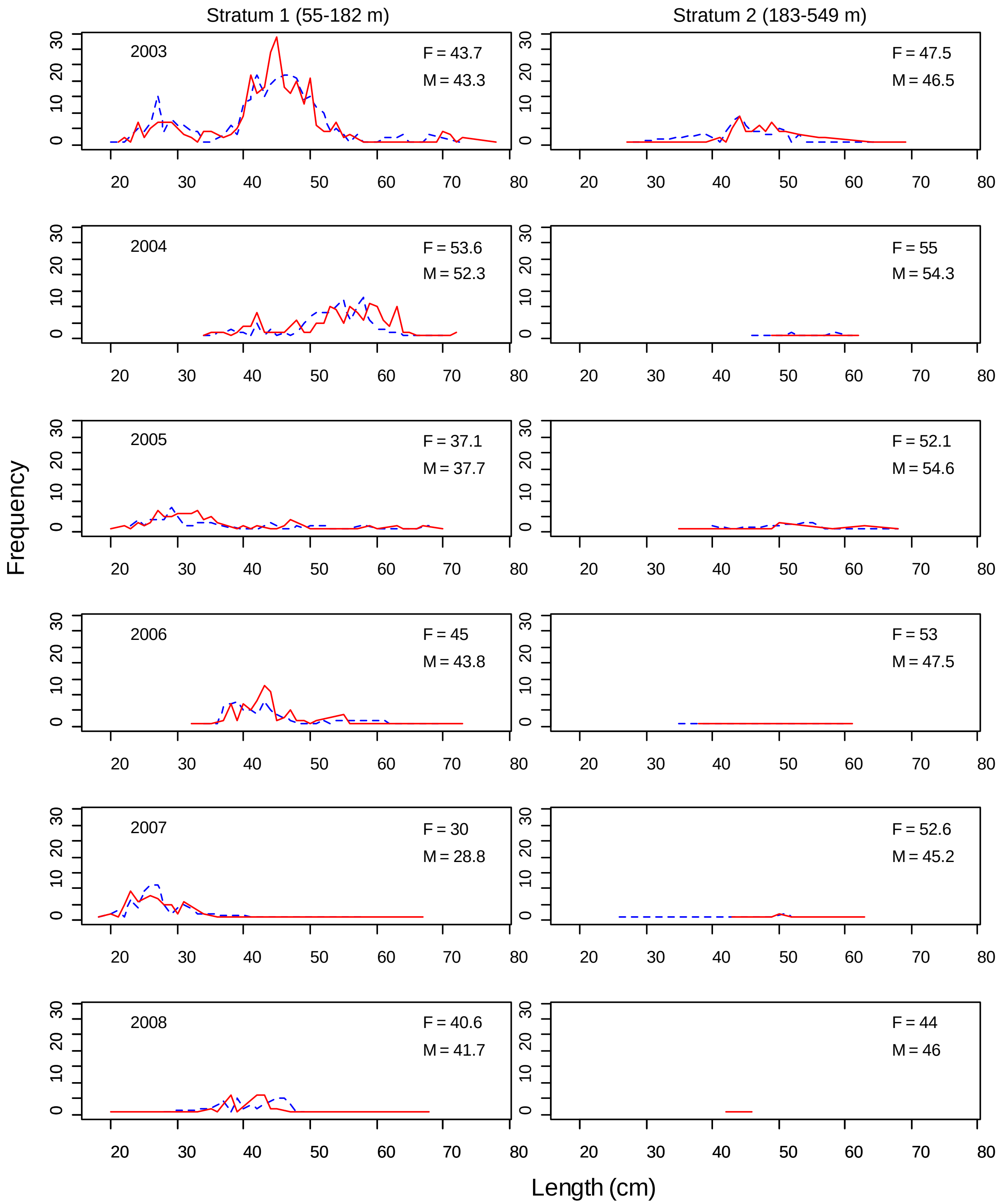

Figure 184. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for Pacific cod from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

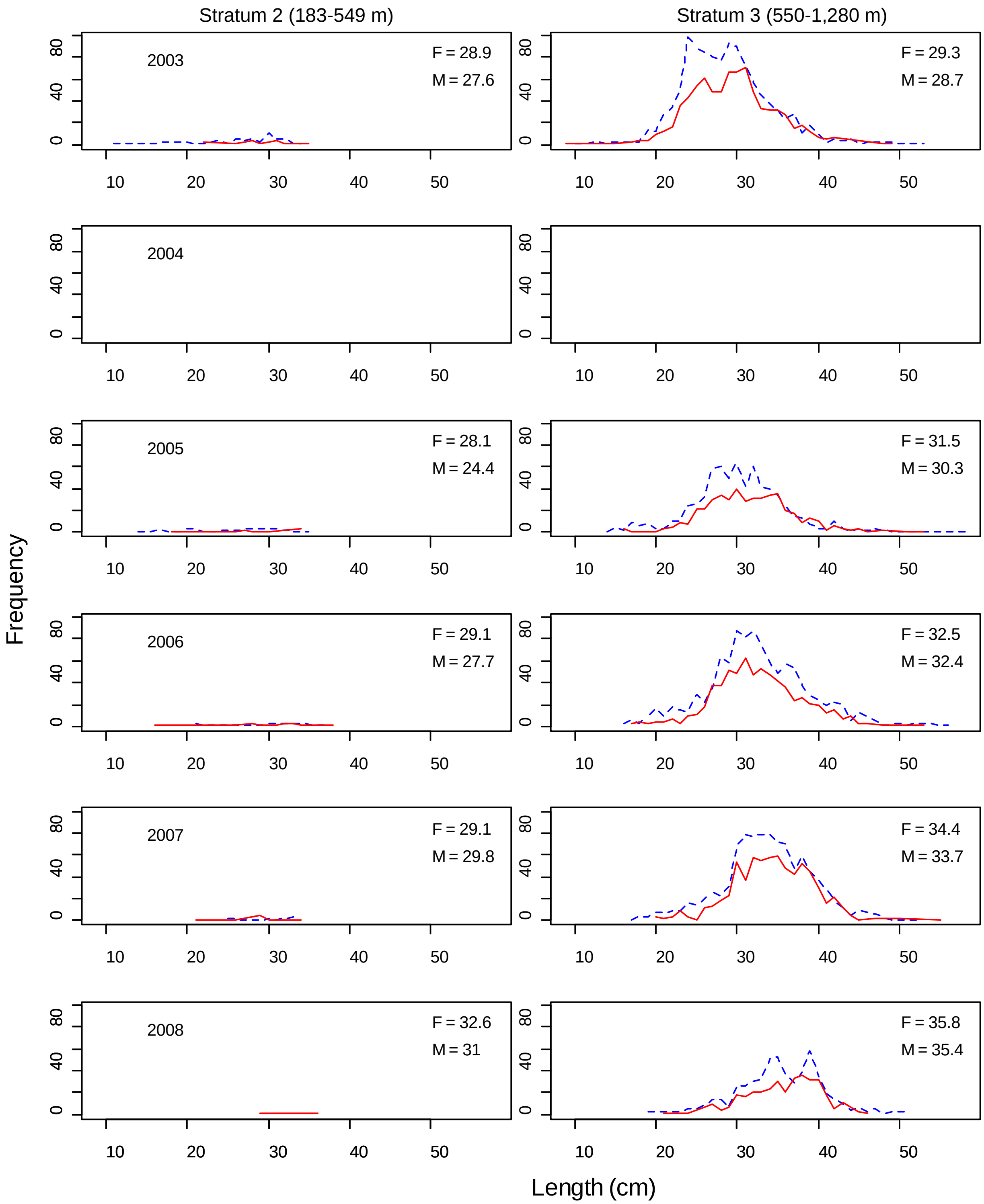

Figure 185. Frequency of lengths by gender in stratum 2 (left column) and stratum 3 (right column) for Pacific flatnose from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

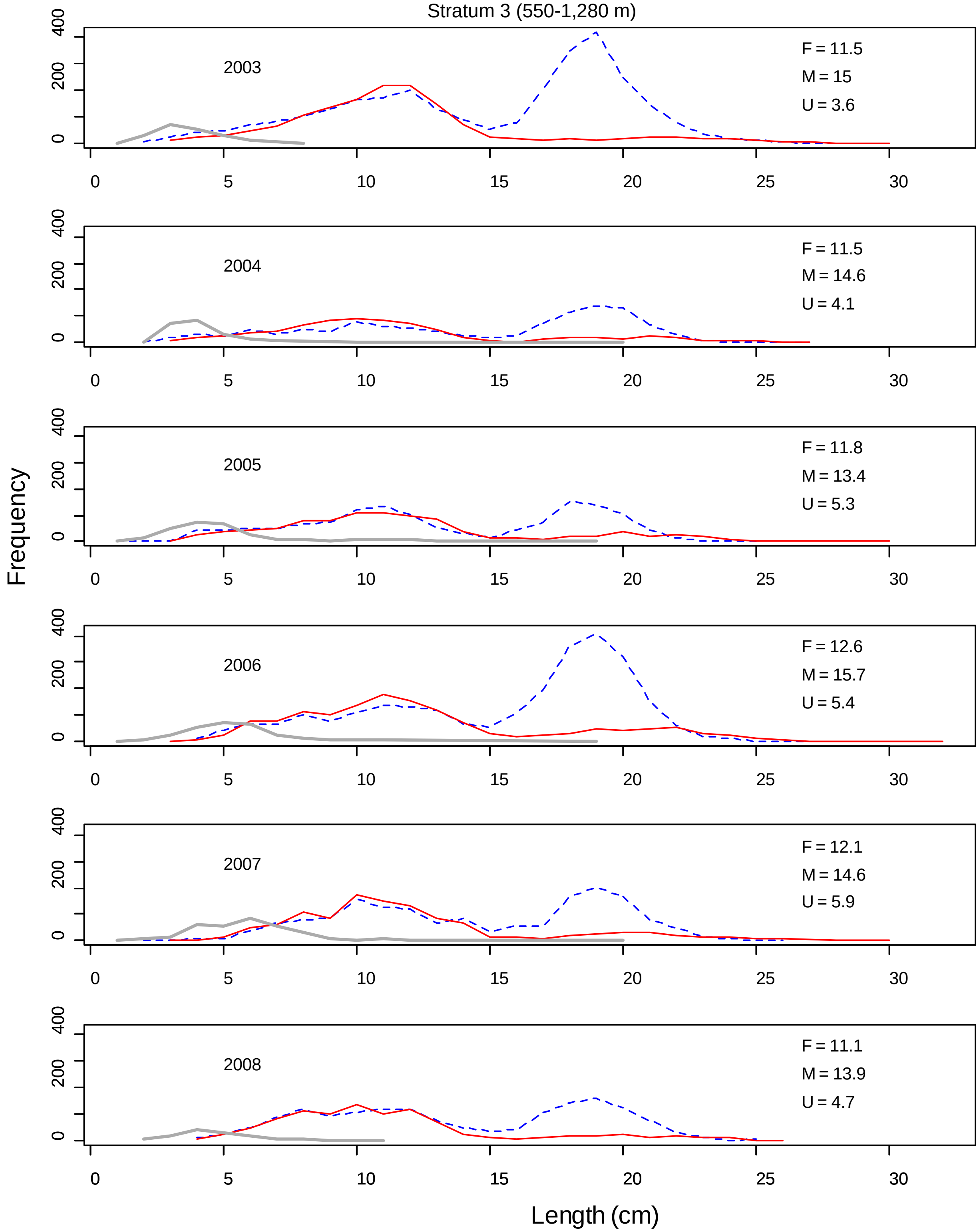

Figure 186. Frequency of lengths by gender in stratum 3 for Pacific grenadier from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed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

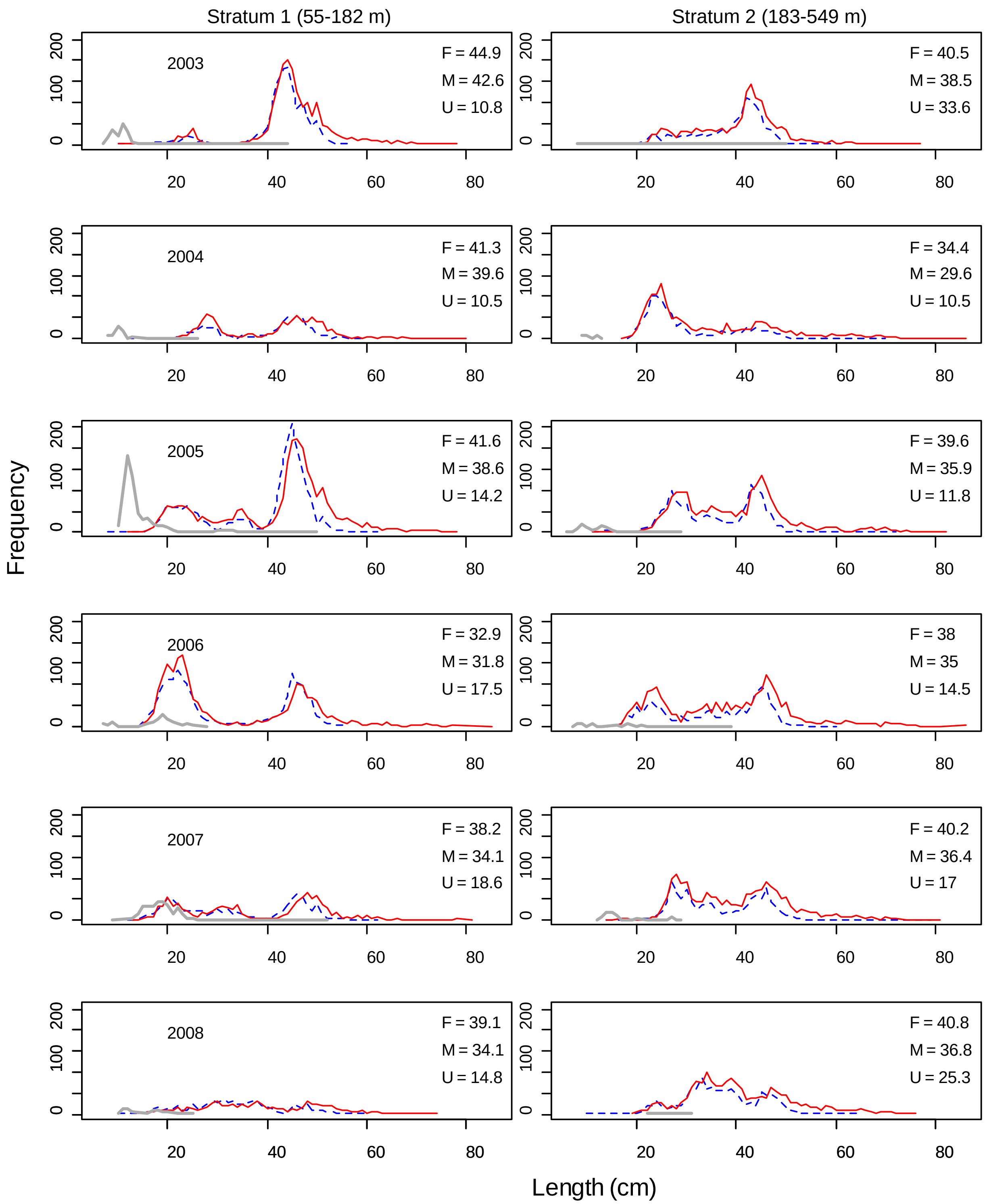

Figure 187. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for Pacific hake from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender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

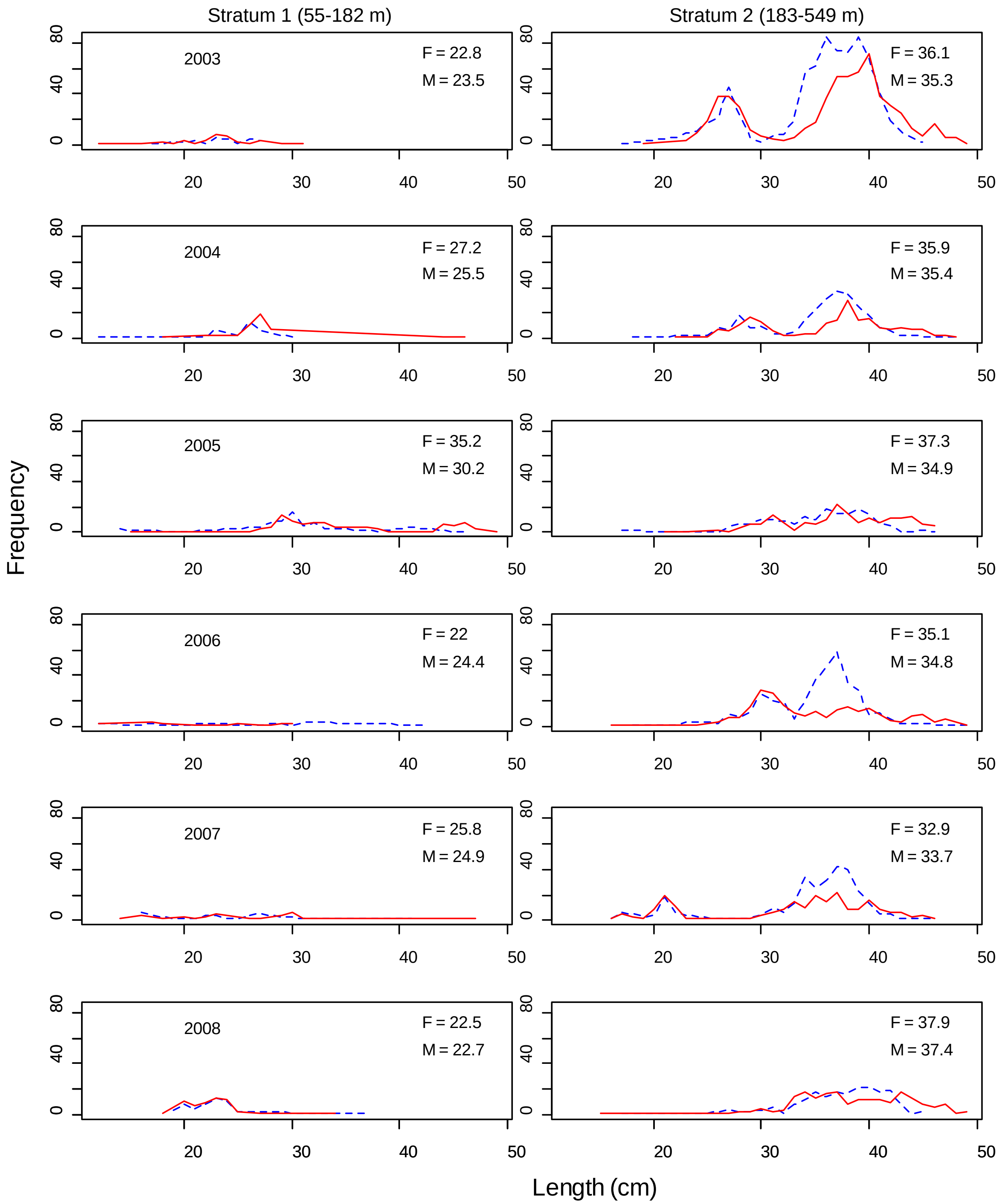

Figure 188. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for Pacific ocean perch from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

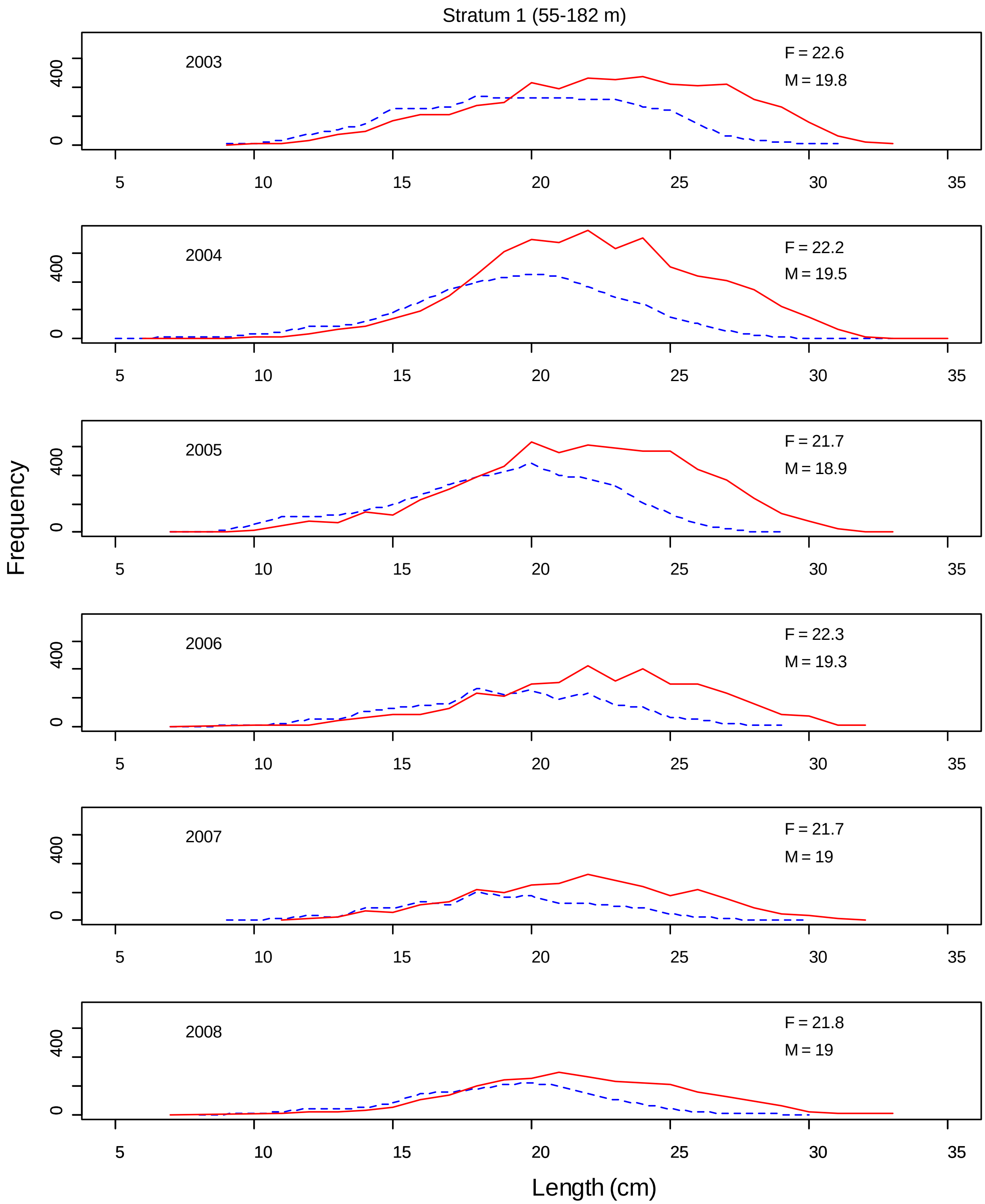

Figure 189. Frequency of lengths by gender in stratum 1 for Pacific sanddab from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

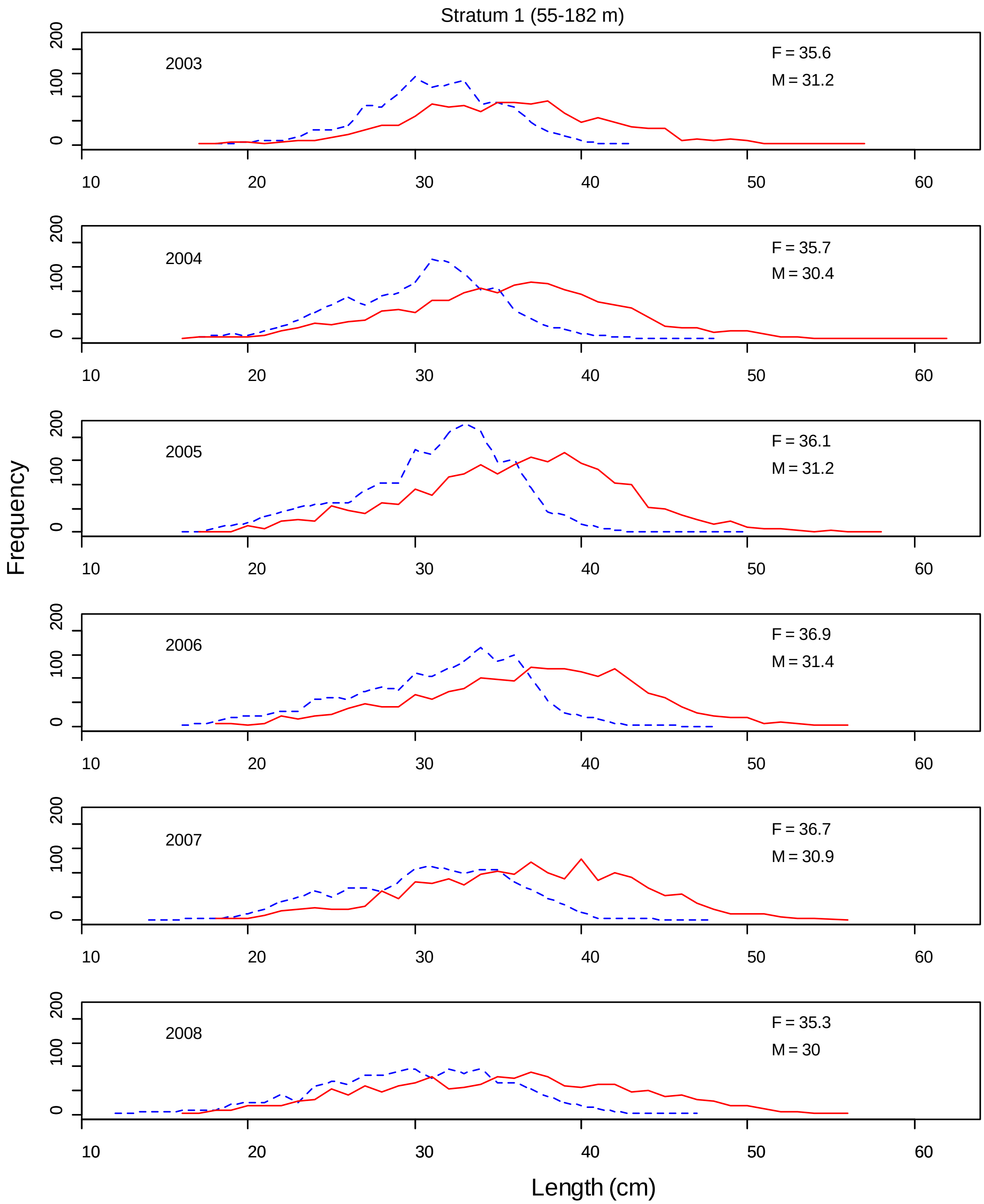

Figure 190. Frequency of lengths by gender in stratum 1 for petrale sole from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

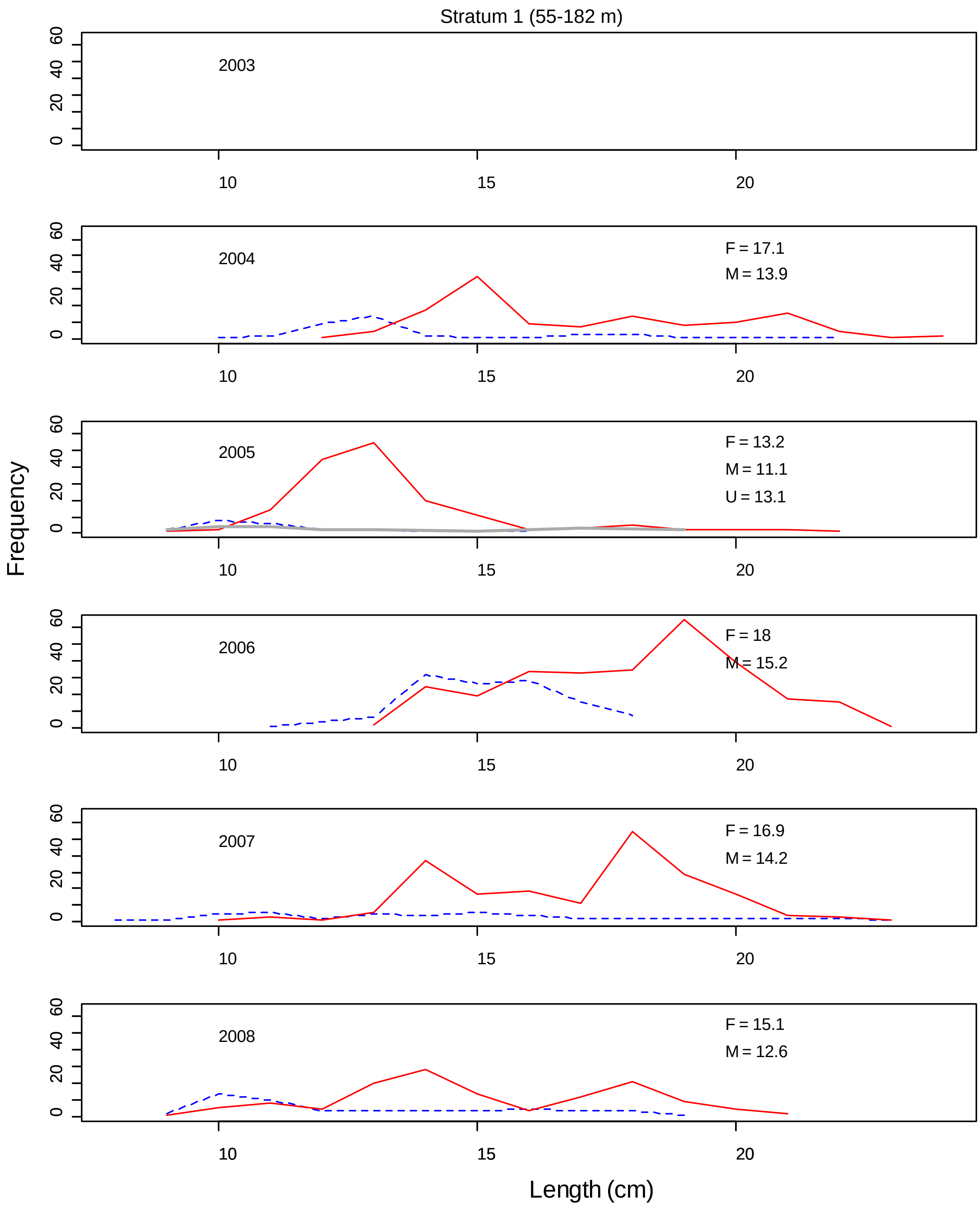

Figure 191. Frequency of lengths by gender in stratum 1 for pygmy rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed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

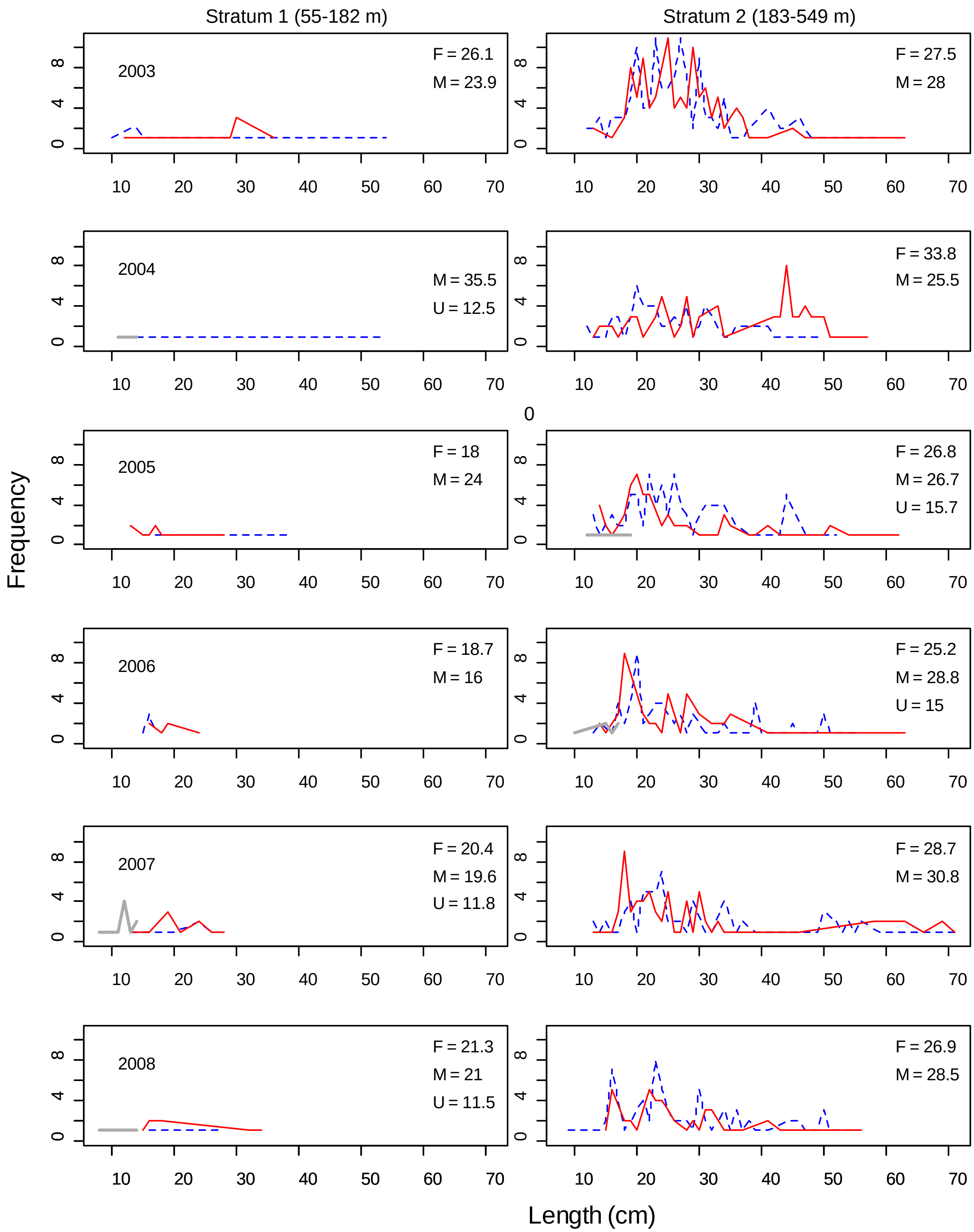

Figure 192. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for redbanded rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each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

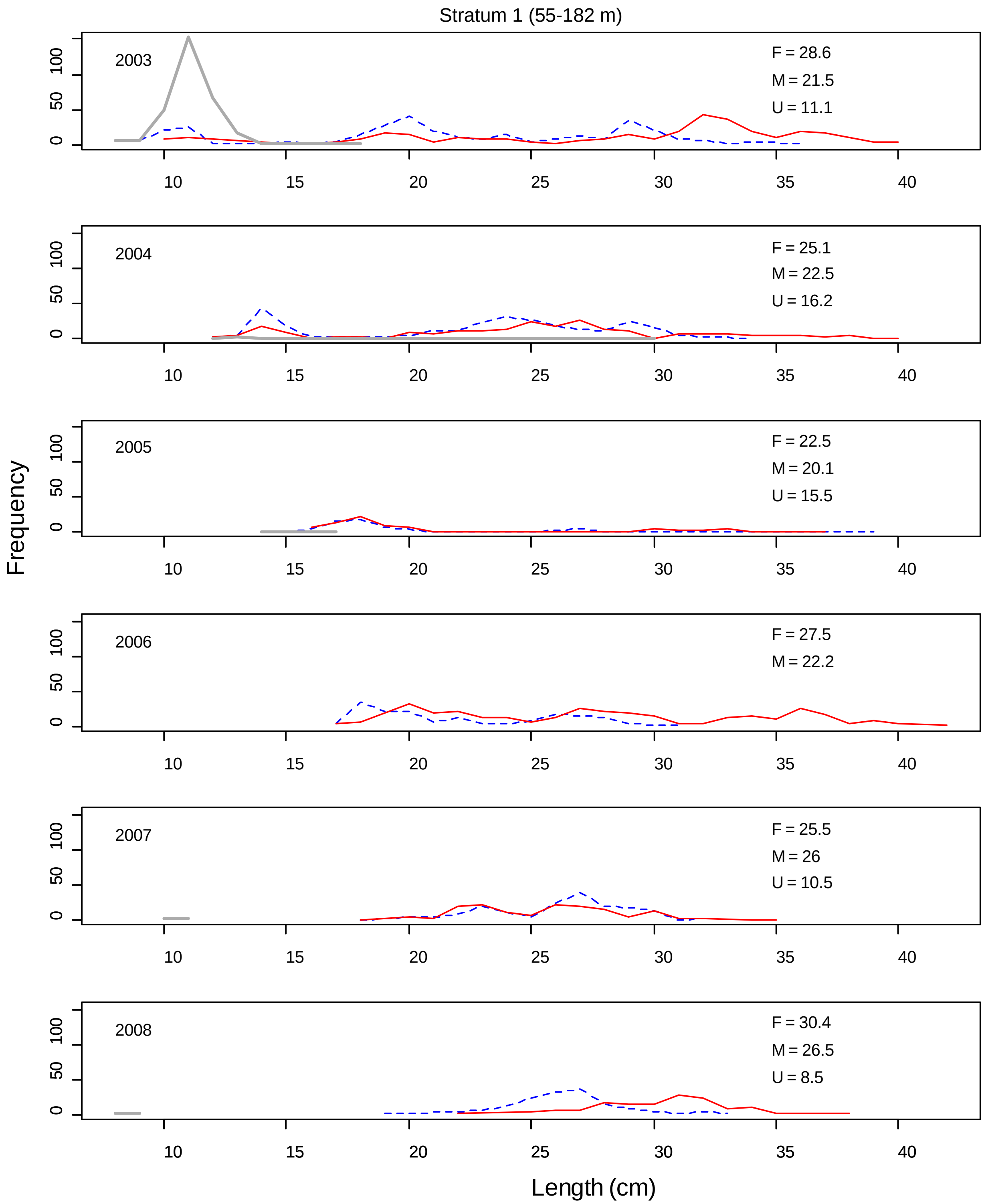

Figure 193. Frequency of lengths by gender in stratum 1 for redstripe rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed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

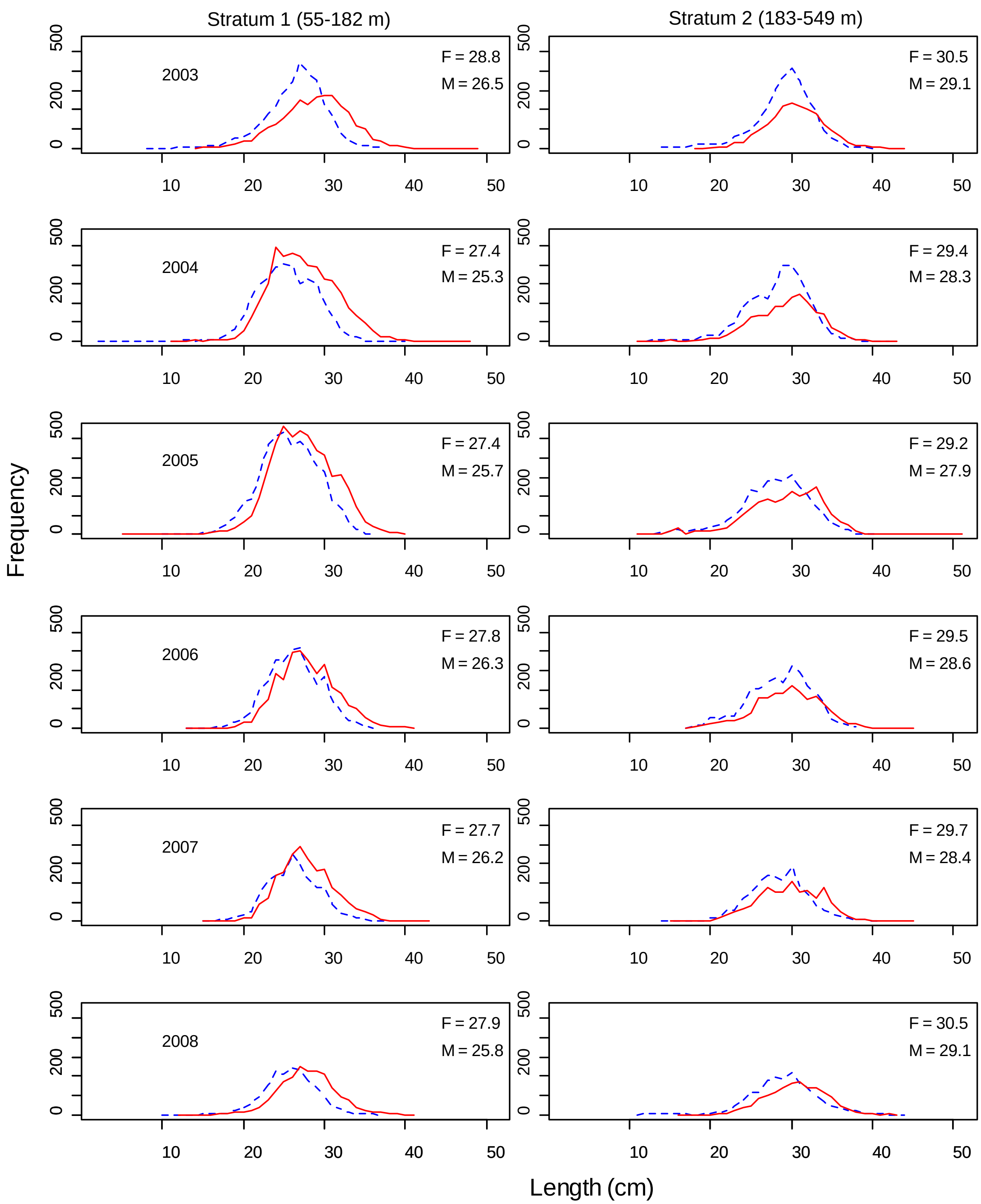

Figure 194. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for rex sole from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

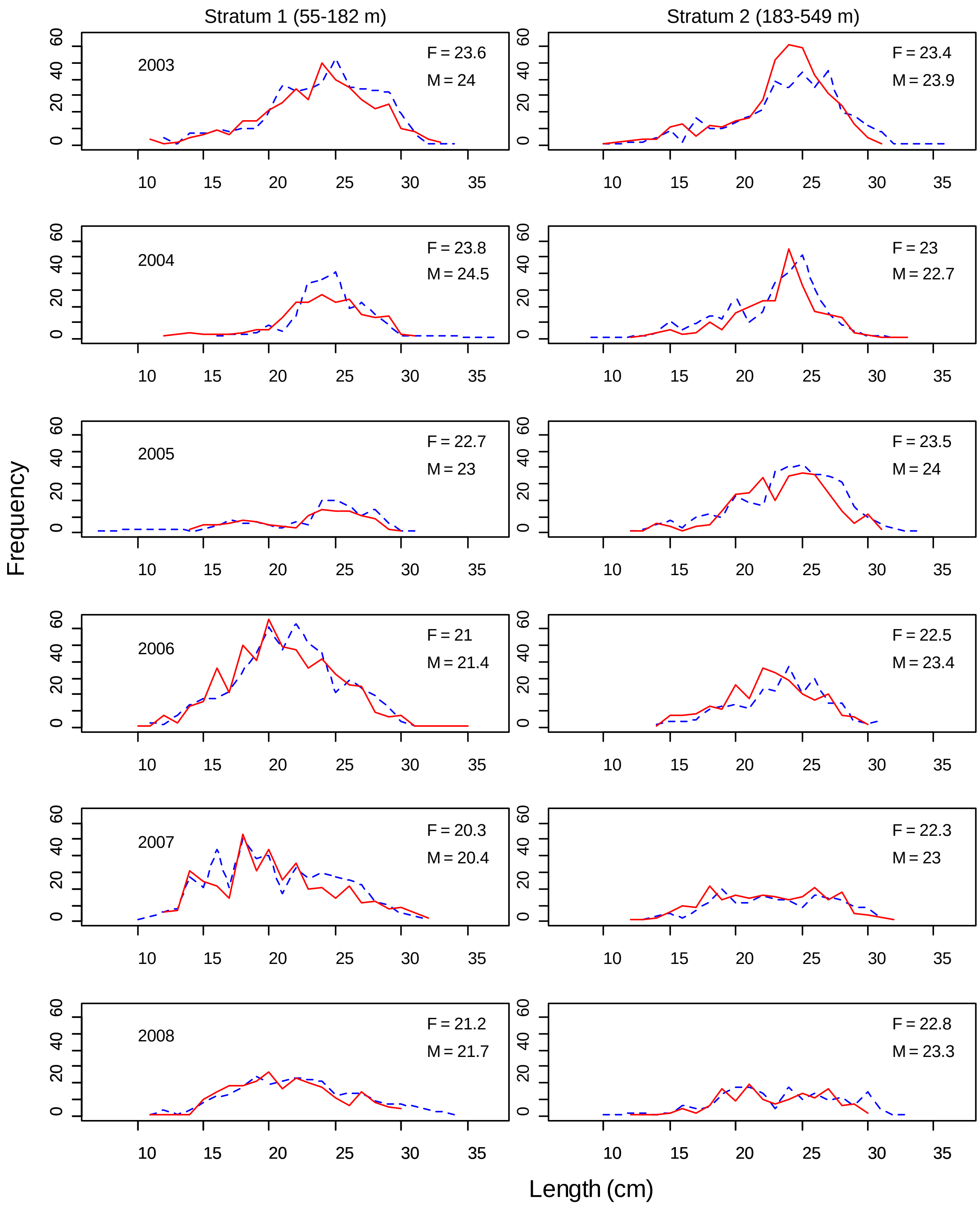

Figure 195. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for rosethorn rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

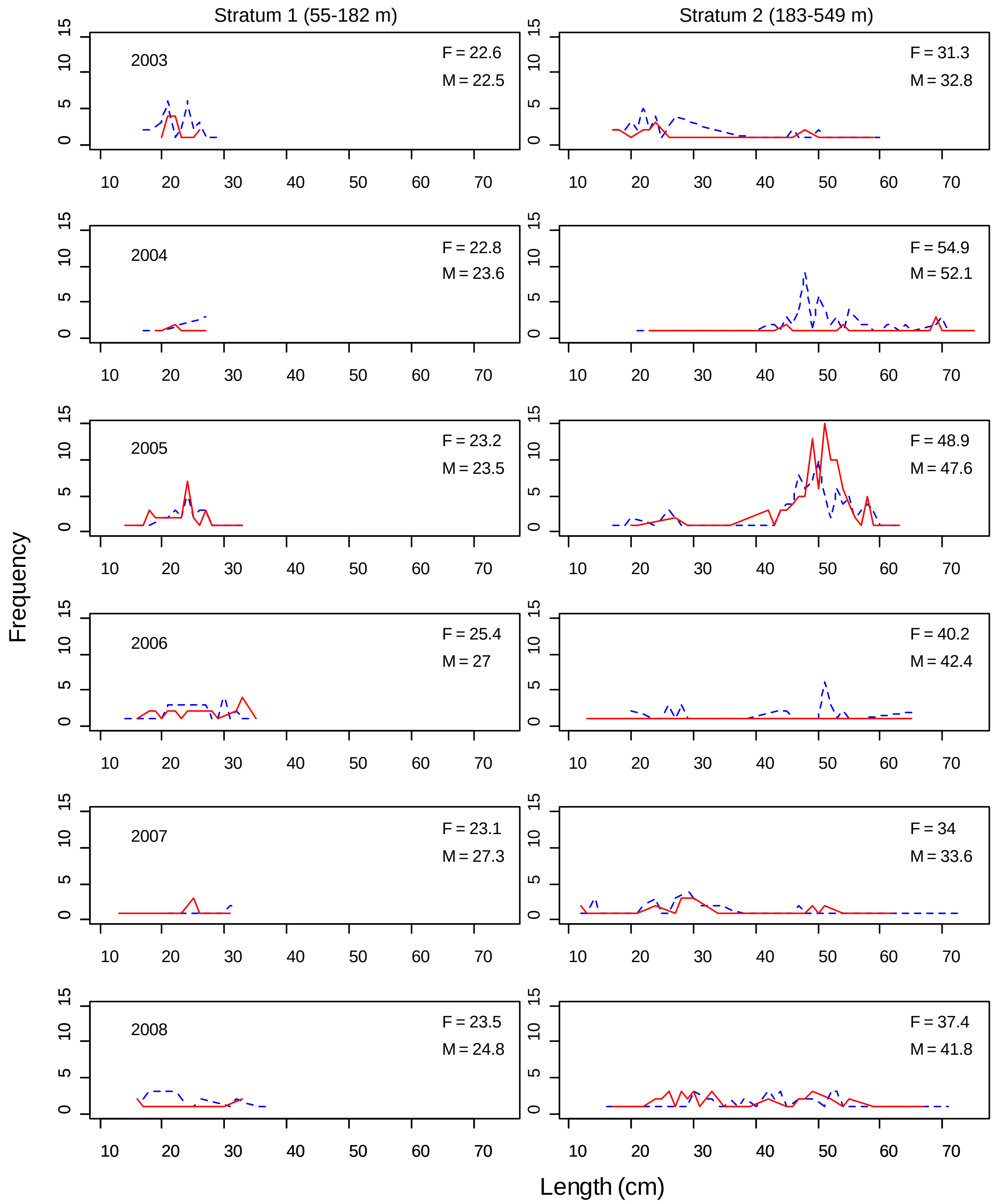

Figure 196. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for rougheye rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

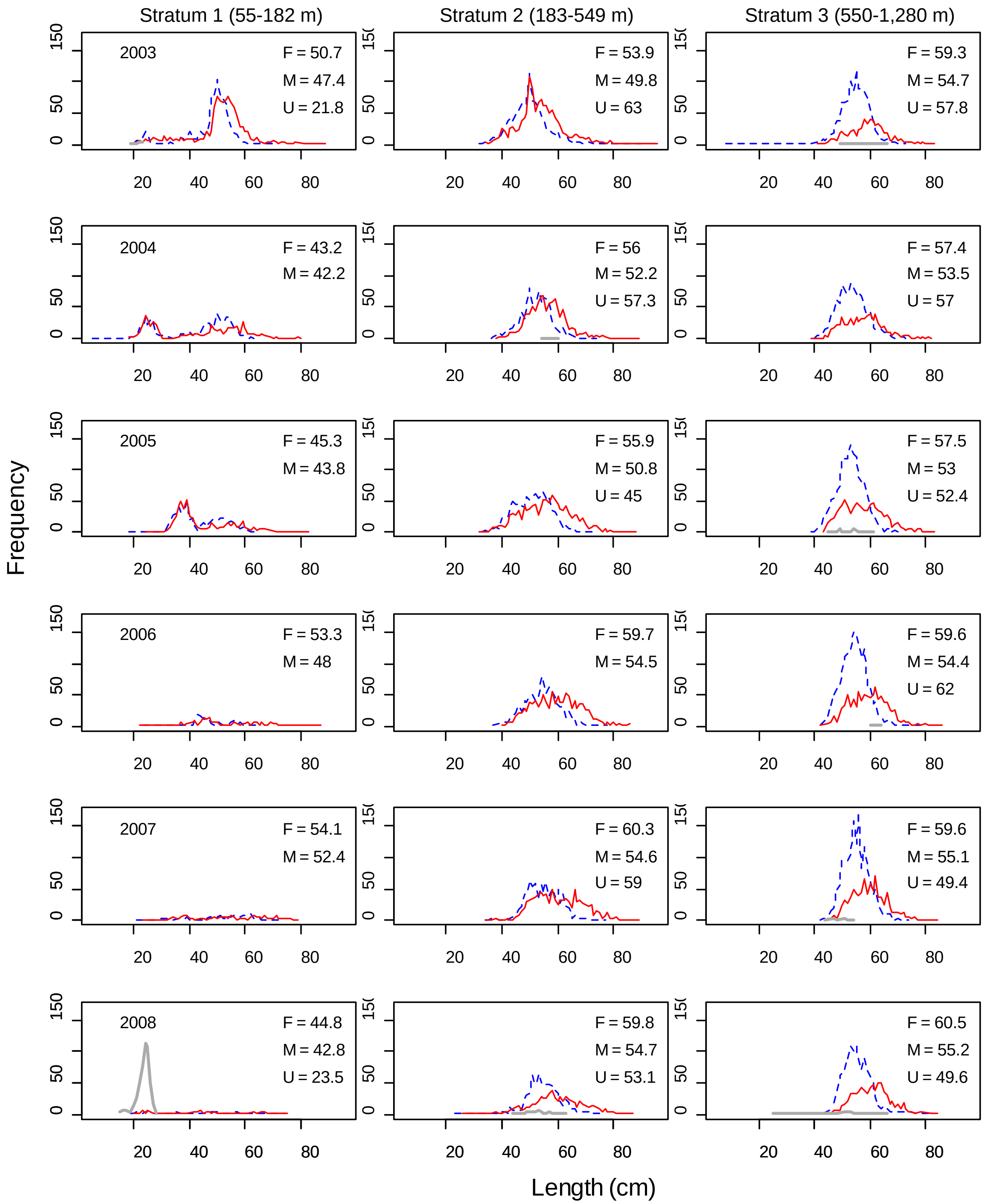

Figure 197. Frequency of lengths by gender in stratum 1 (left column), stratum 2 (middle column), and stratum 3 (right column) for sablefish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line.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

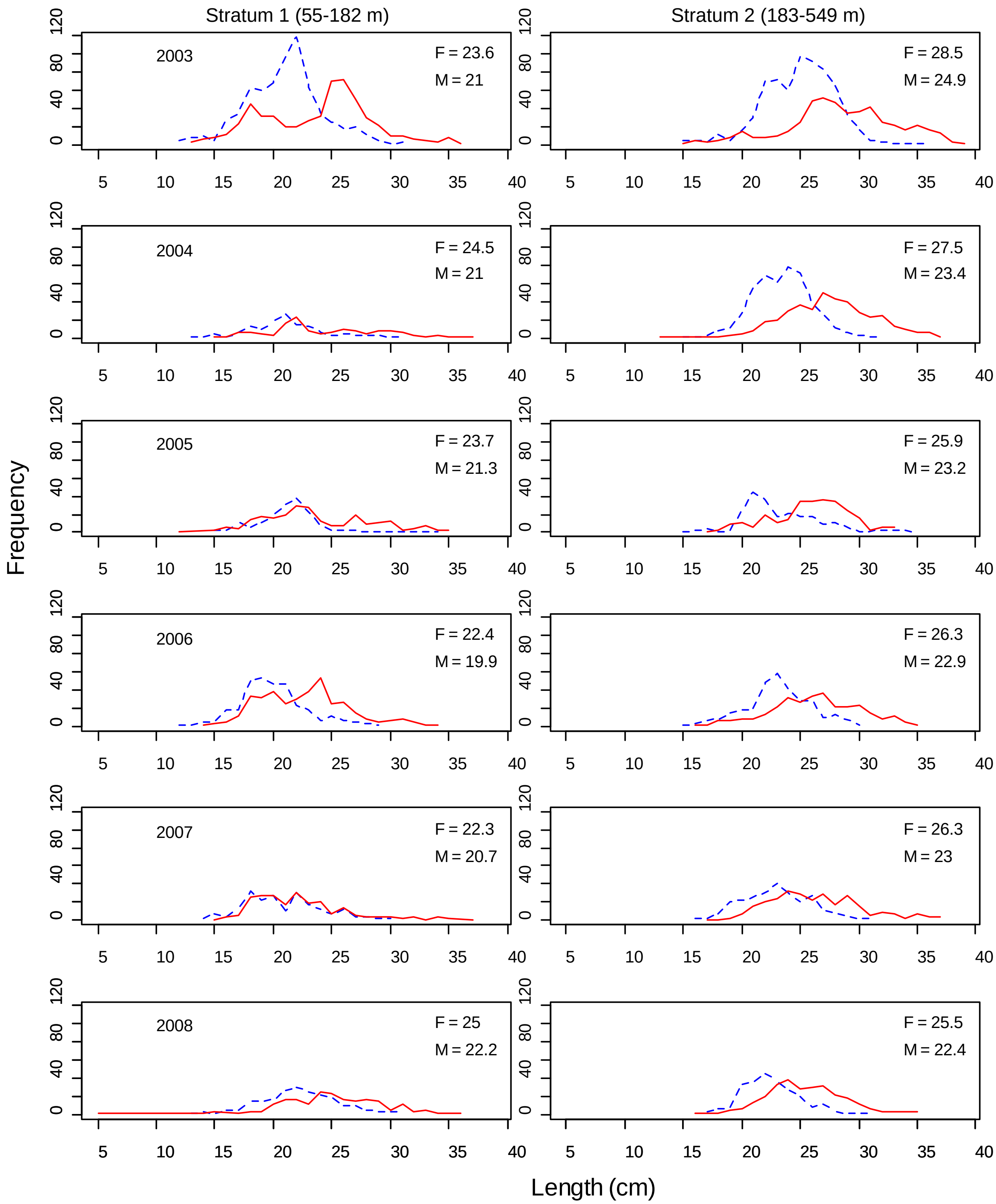

Figure 198. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for sharpchin rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

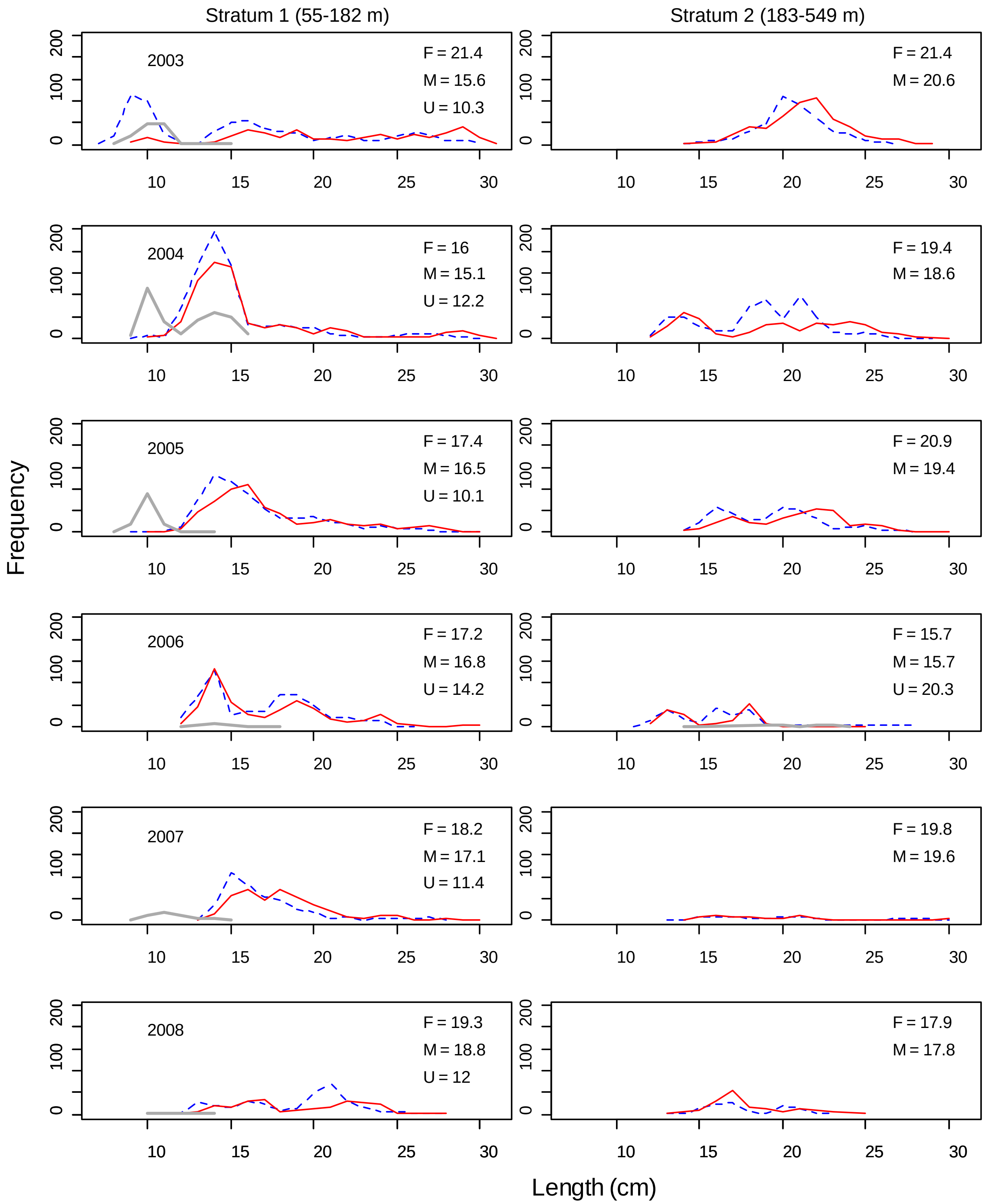

Figure 199. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for shortbelly rockfish from the 2003–2008 surveys. F emales are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each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

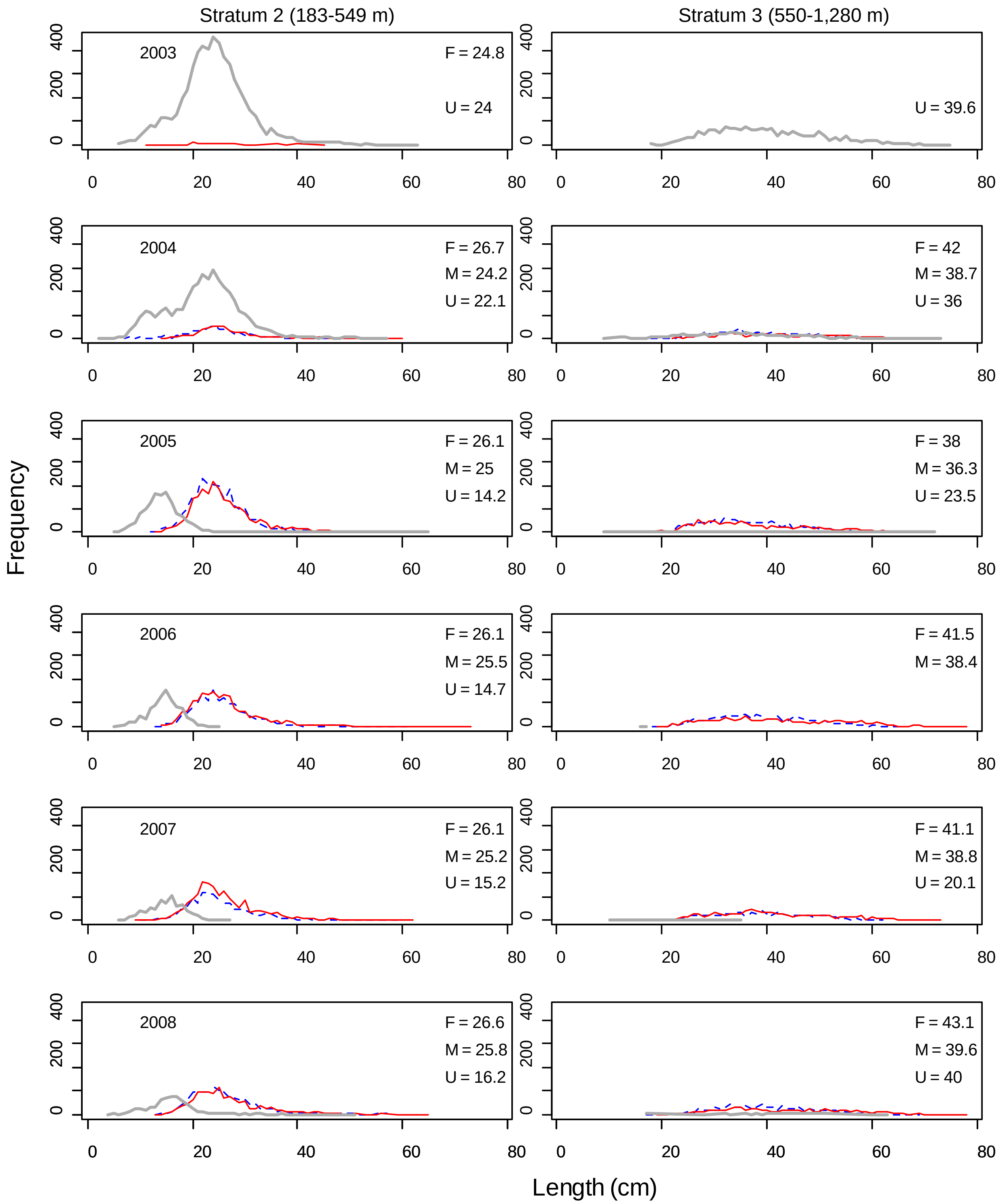

Figure 200. Frequency of lengths by gender in stratum 2 (left column) and stratum 3 (right column) for shortspine thornyhead from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for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

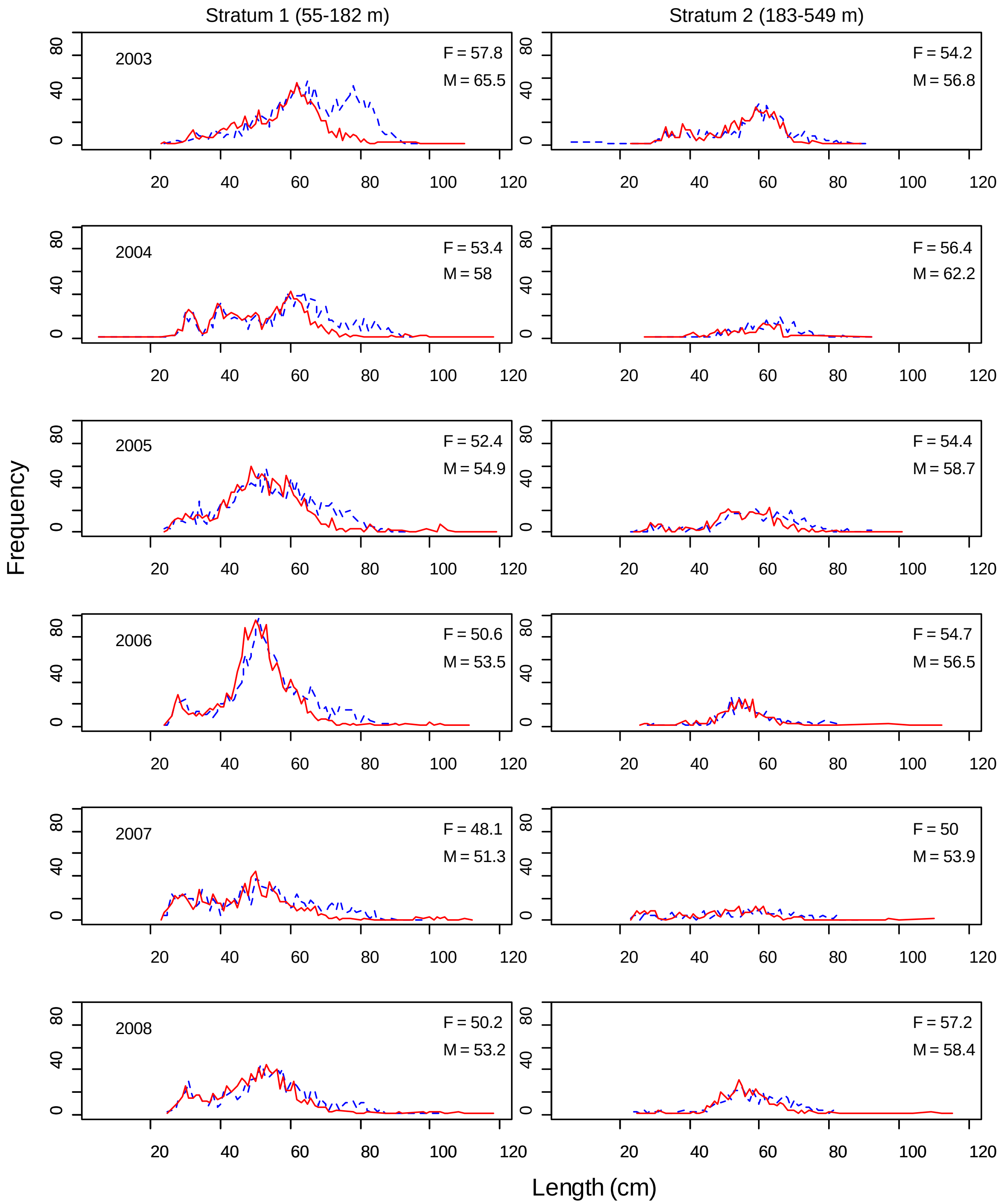

Figure 201. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for spiny dogfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

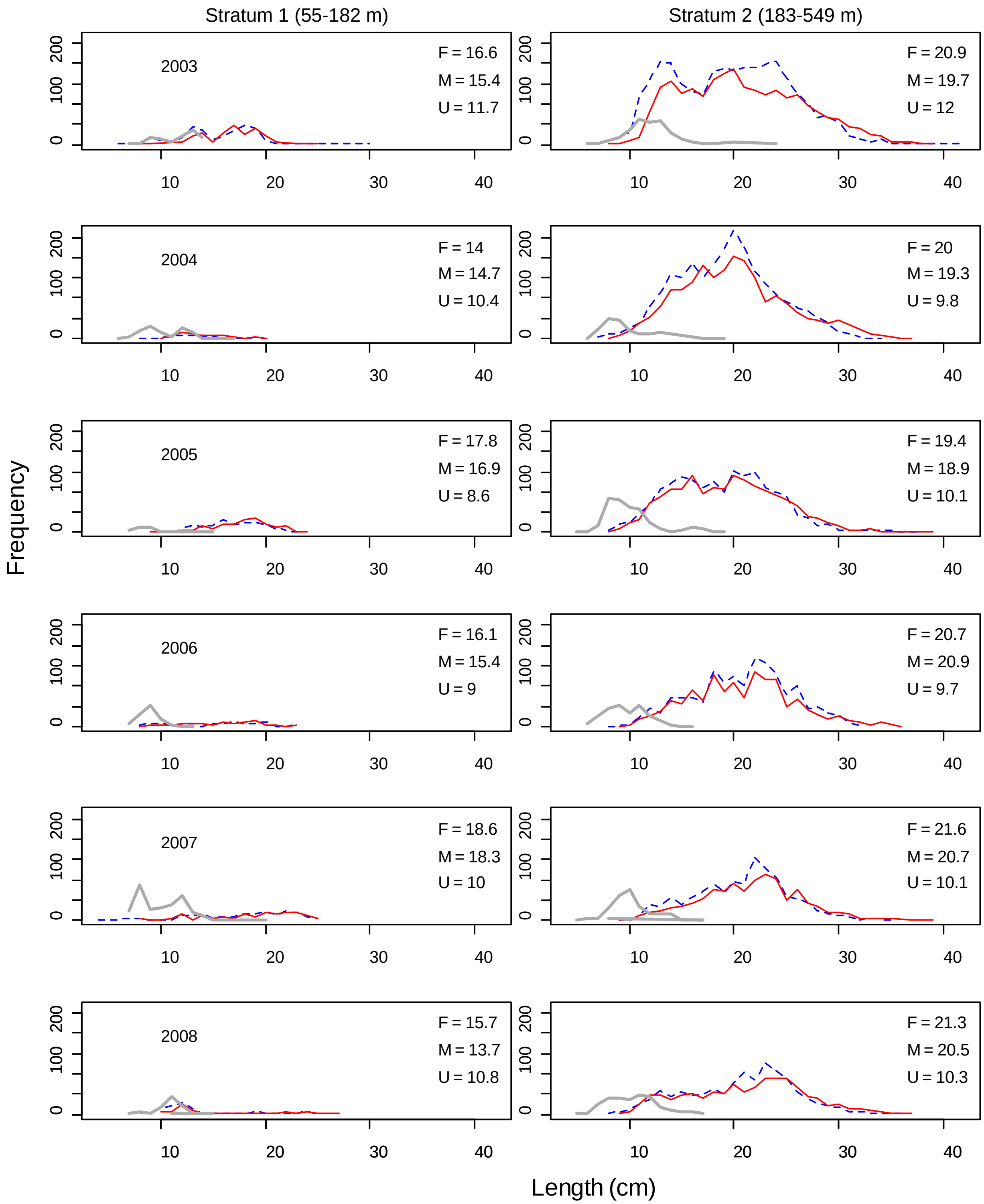

Figure 202. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for splitnose rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each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

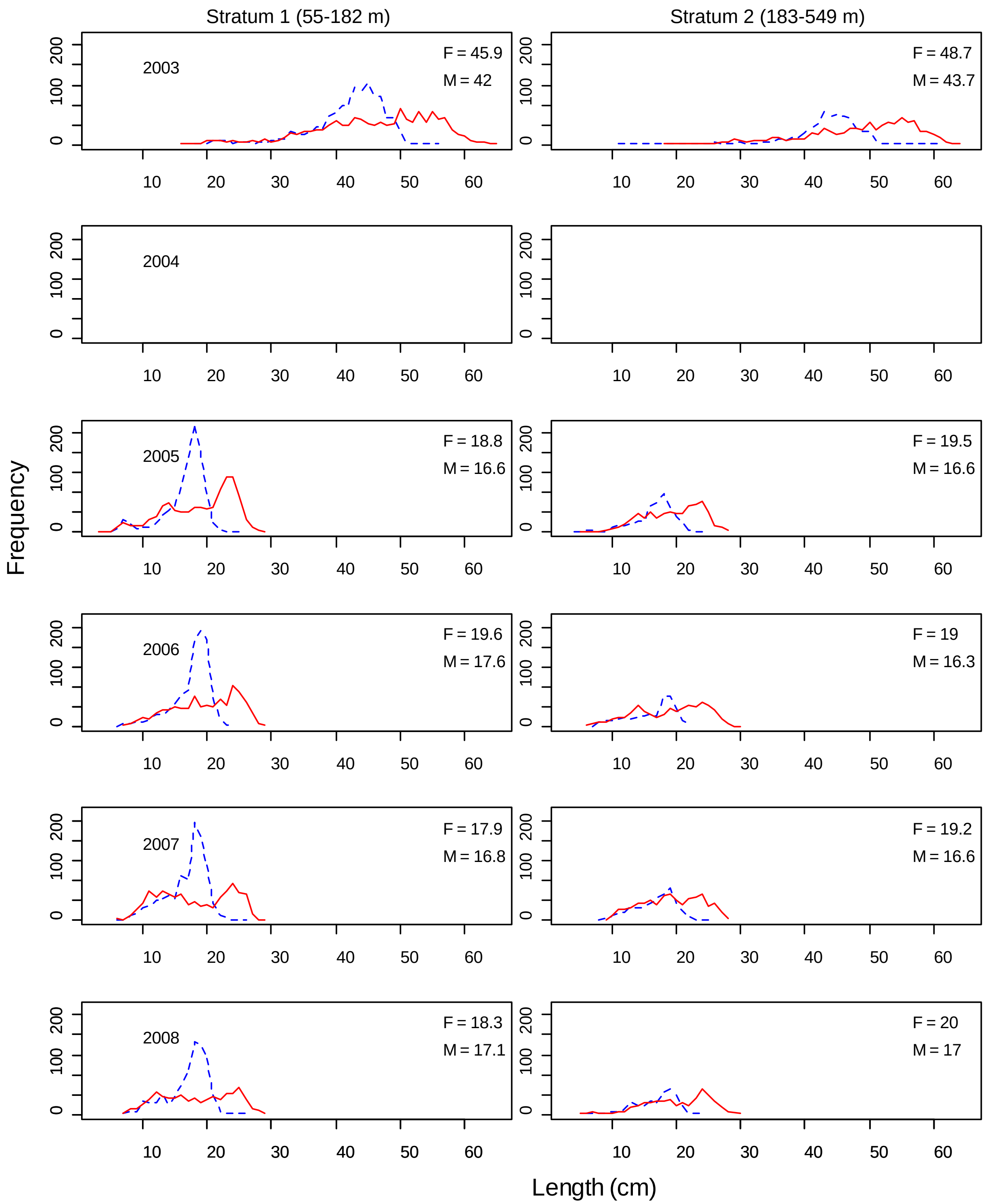

Figure 203. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for spotted ratfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

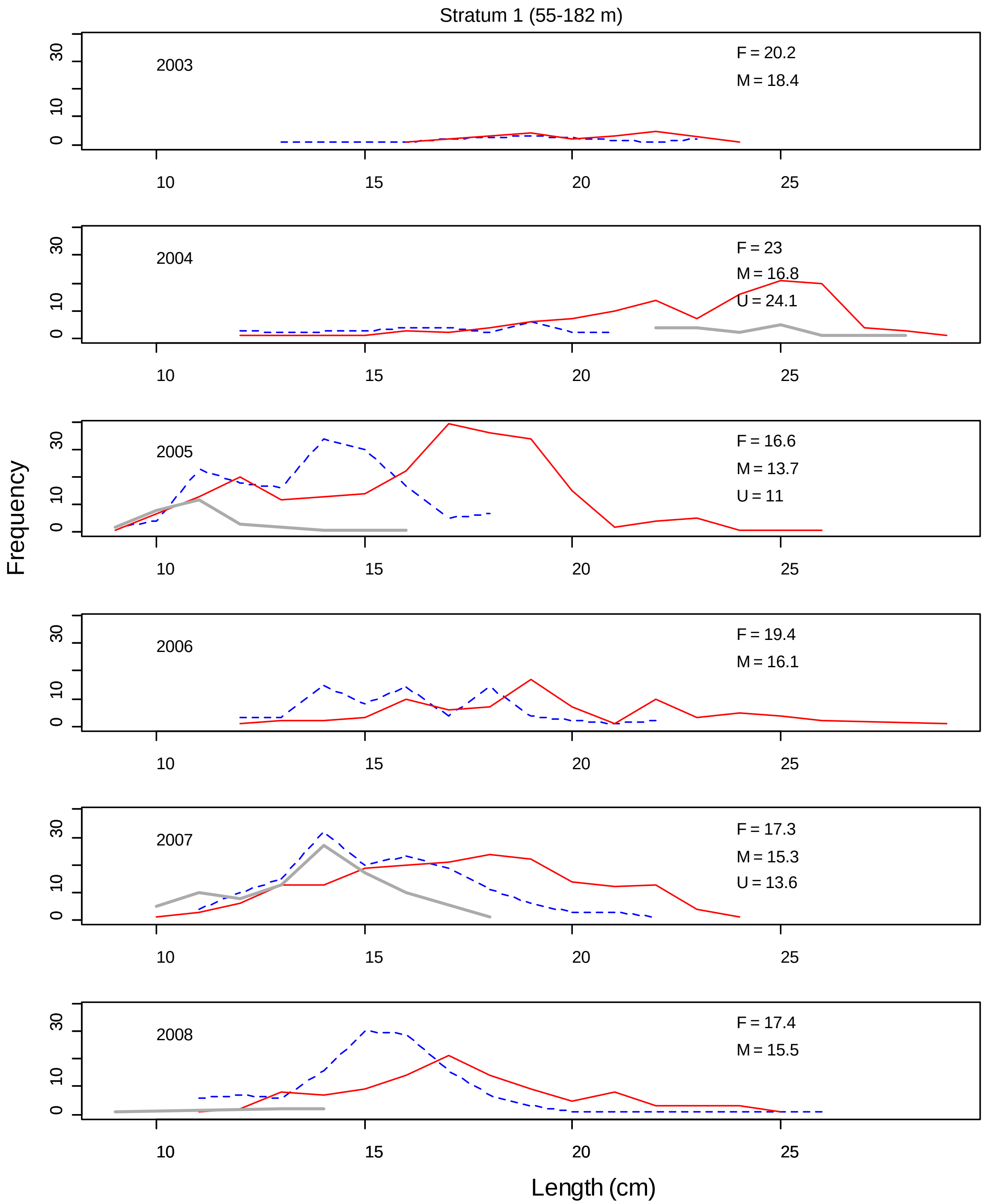

Figure 204. Frequency of lengths by gender in stratum 1 for squarespot rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each gender classification (F, M, and U) is displayed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

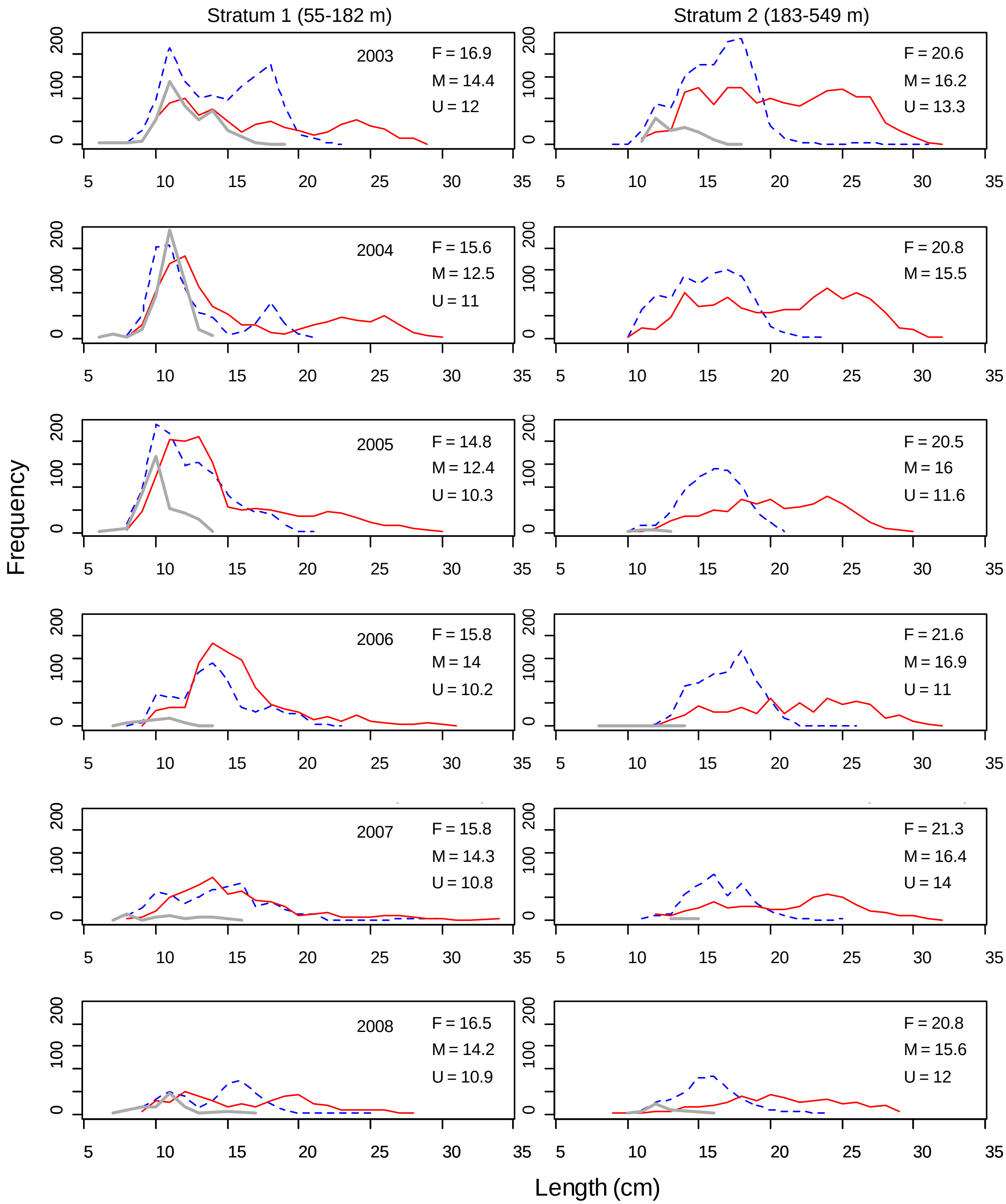

Figure 205. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for stripetail rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line. Mean length for each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

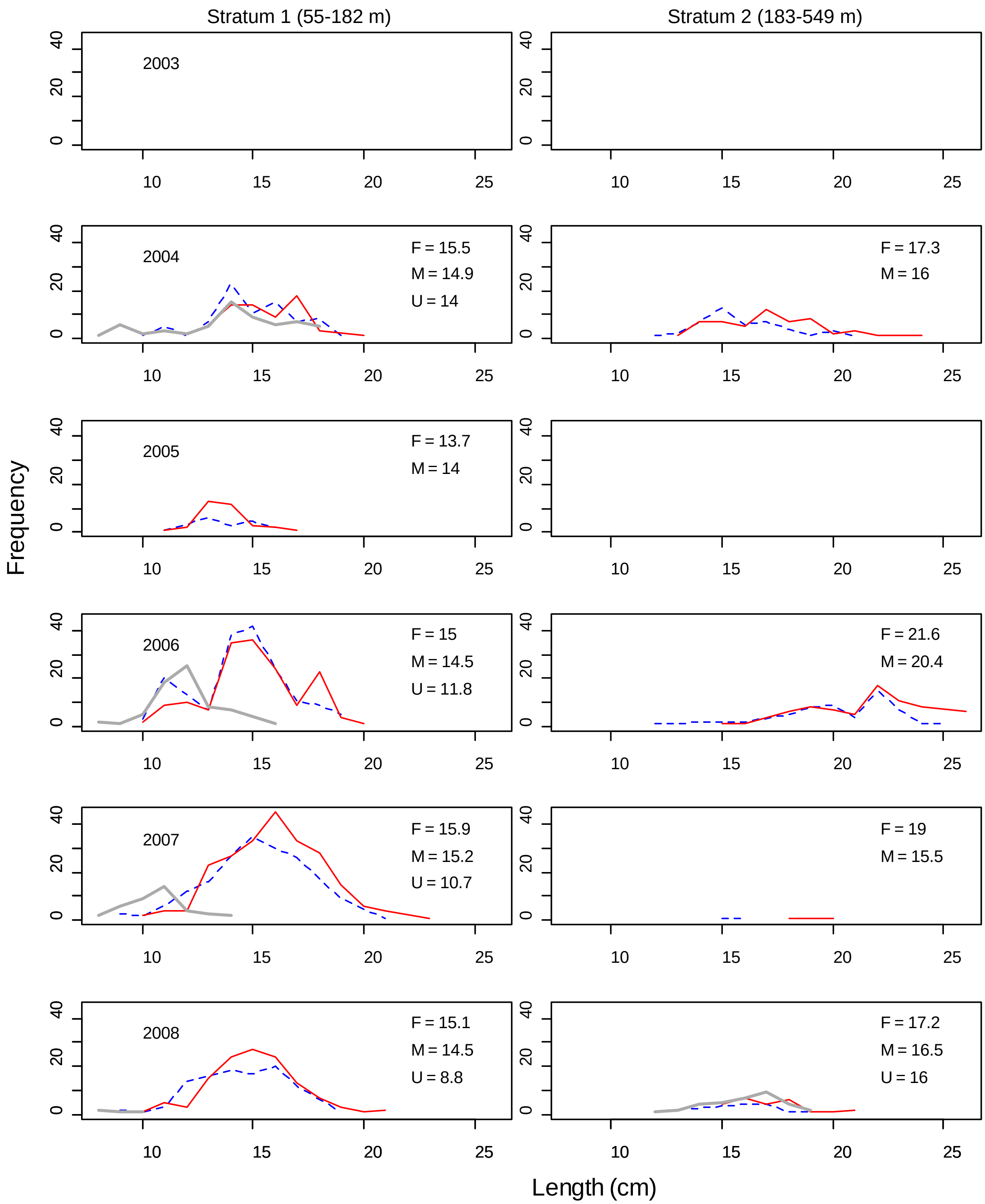

Figure 206. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for swordspine rockfish (*Sebastes ensifer*) from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line, and individuals without gender determination by a thick gray line.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

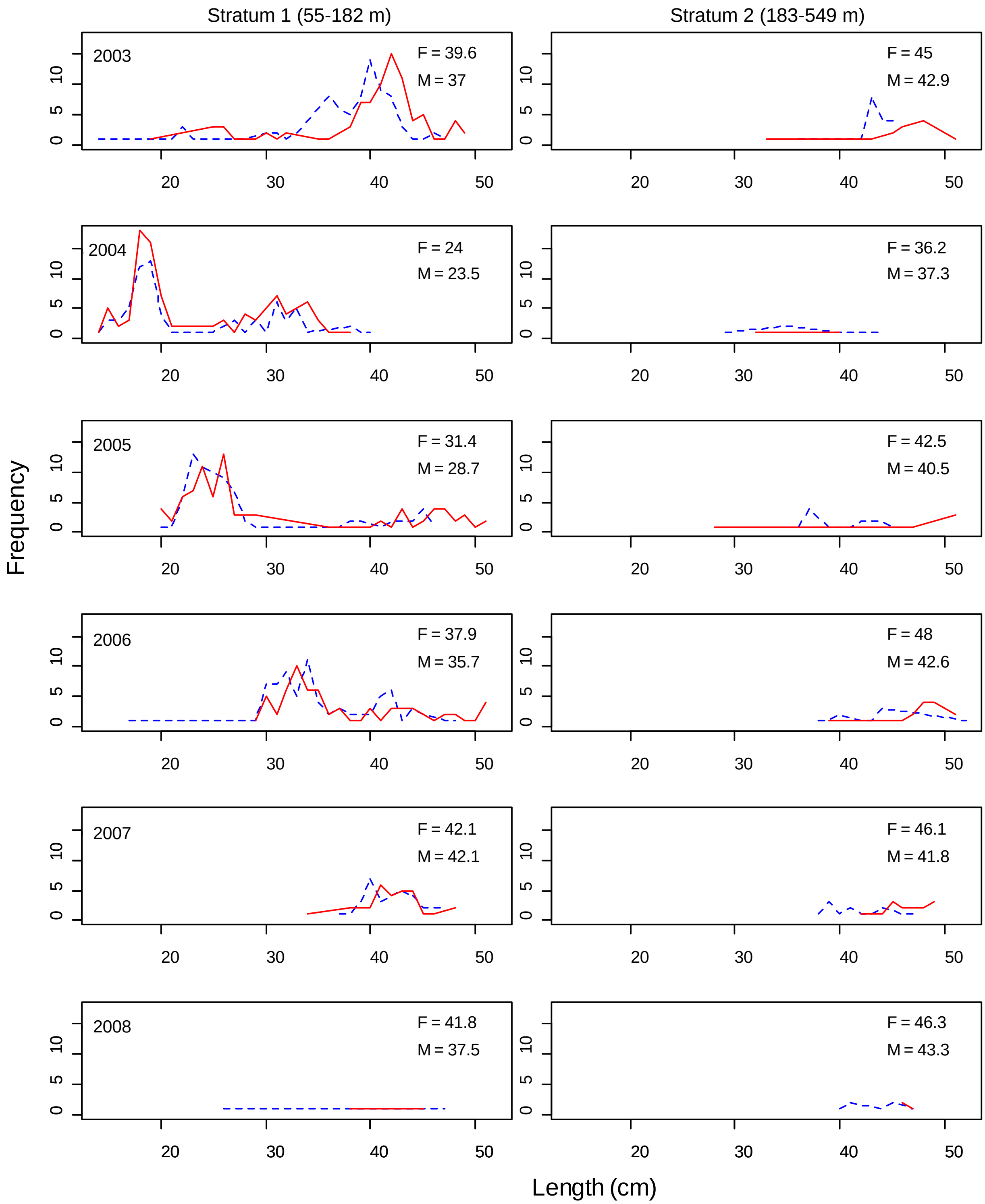

Figure 207. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for widow rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

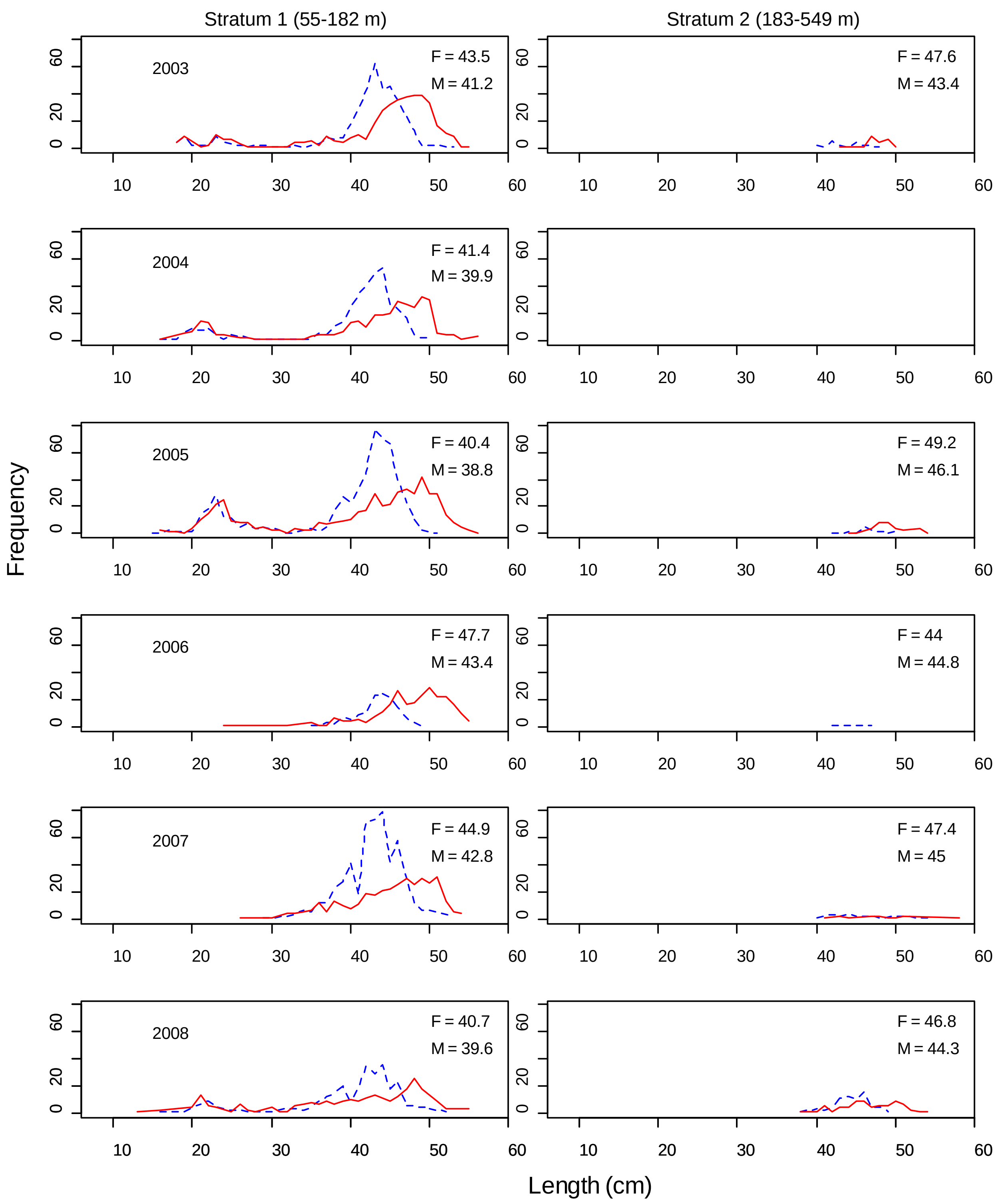

Figure 208. Frequency of lengths by gender in stratum 1 (left column) and stratum 2 (right column) for yellowtail rockfish from the 2003–2008 surveys. Females are represented by a solid line, males by a dashed line. Mean length for each gender classification (F, M) is displayed in each panel.

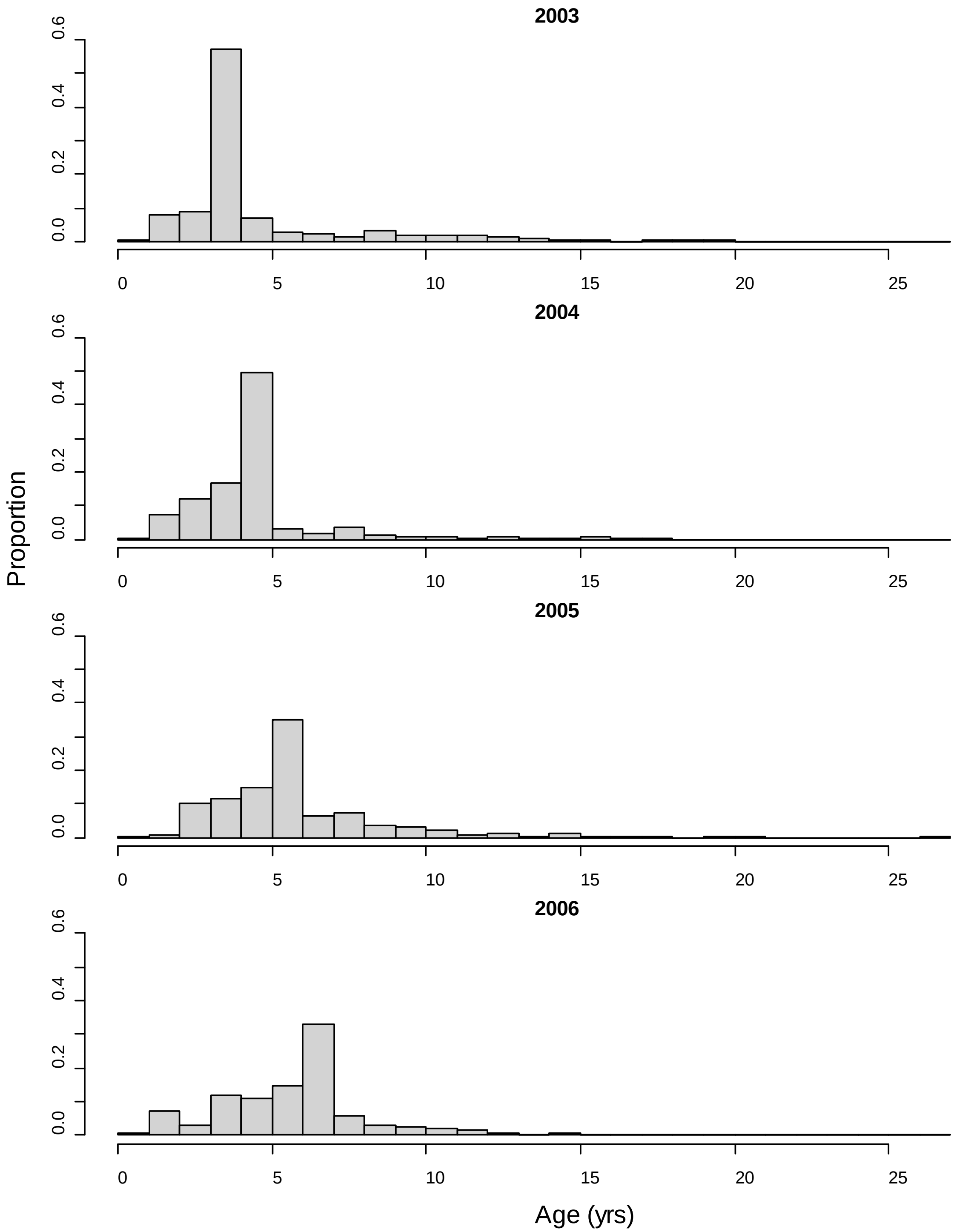

Figure 209. Age distribution for arrowtooth flounder sampled during the surveys from 2003 to 2006.

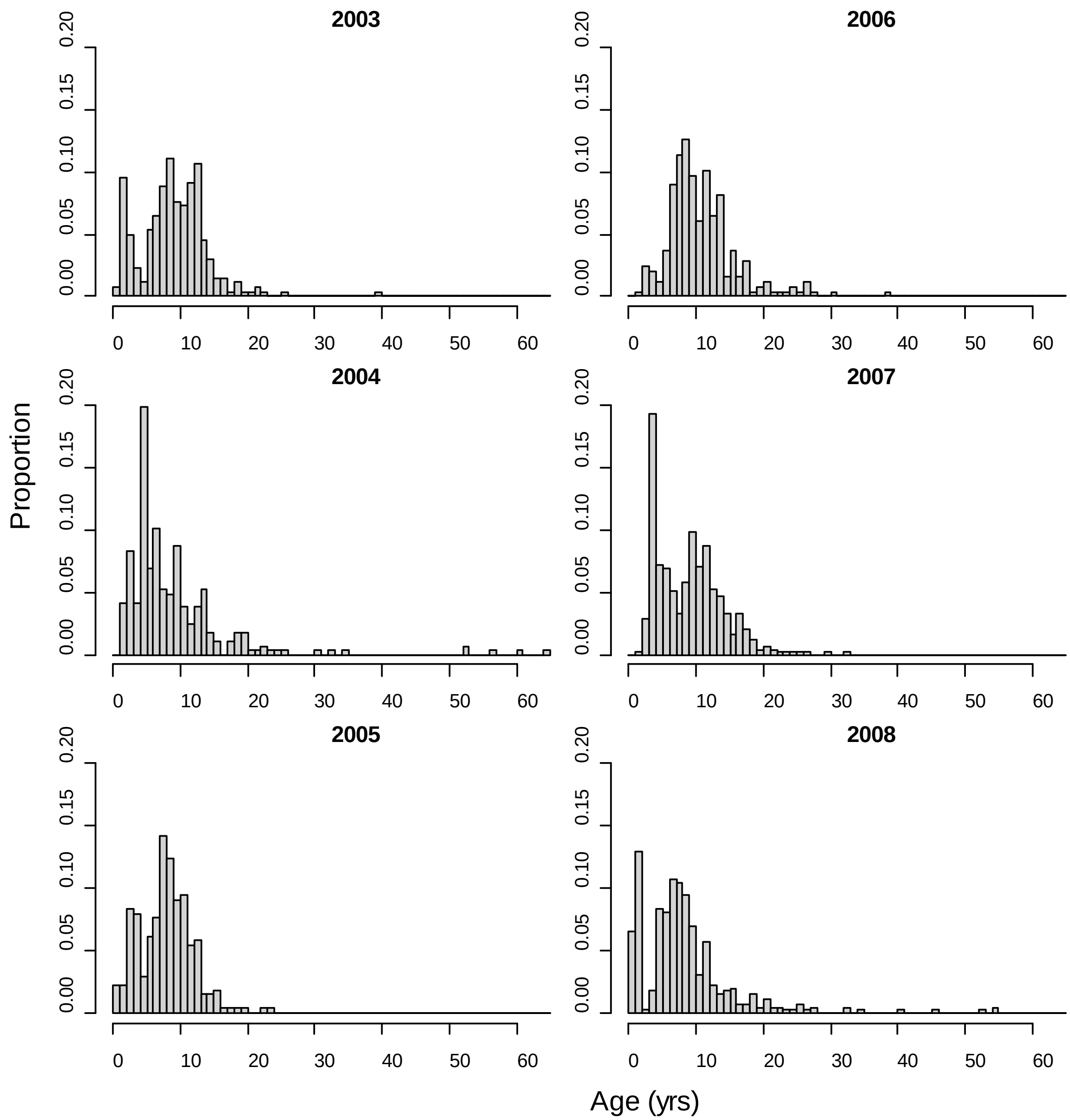

Figure 210. Age distribution for canary rockfish sampled during the surveys from 2003 to 2008.

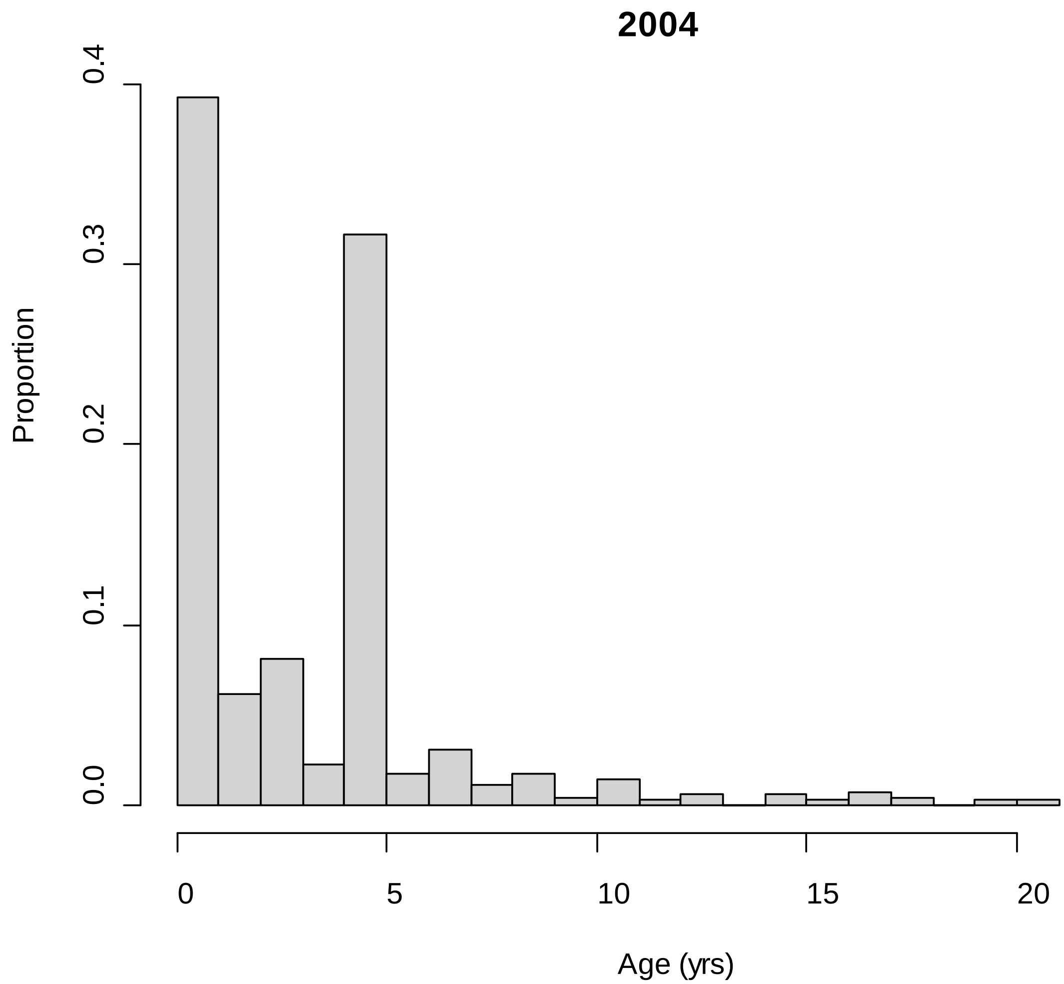

Figure 211. Age distribution for chilipepper rockfish sampled during the 2004 survey.

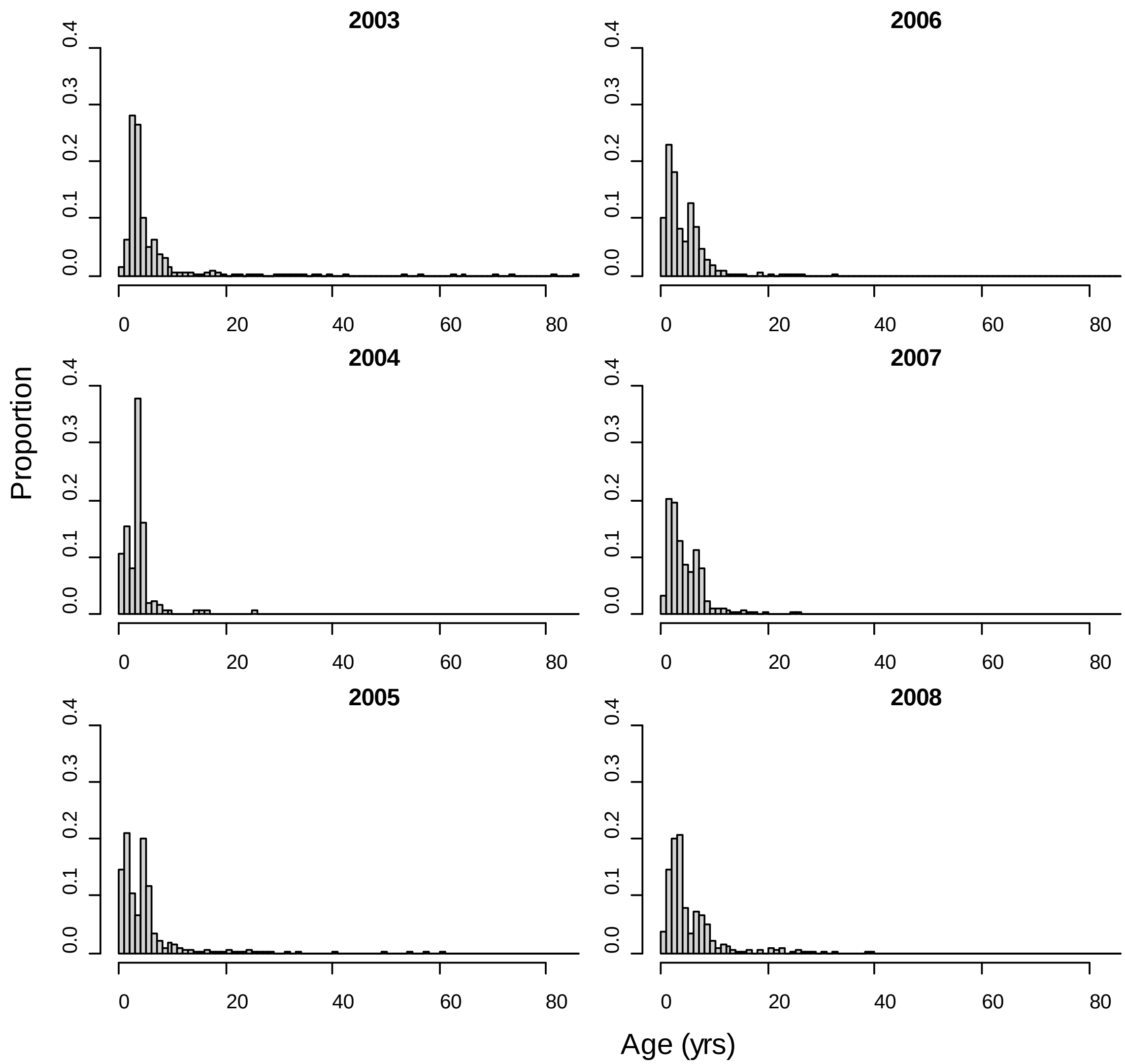

Figure 212. Age distribution for darkblotched rockfish sampled during the surveys from 2003 to 2008.

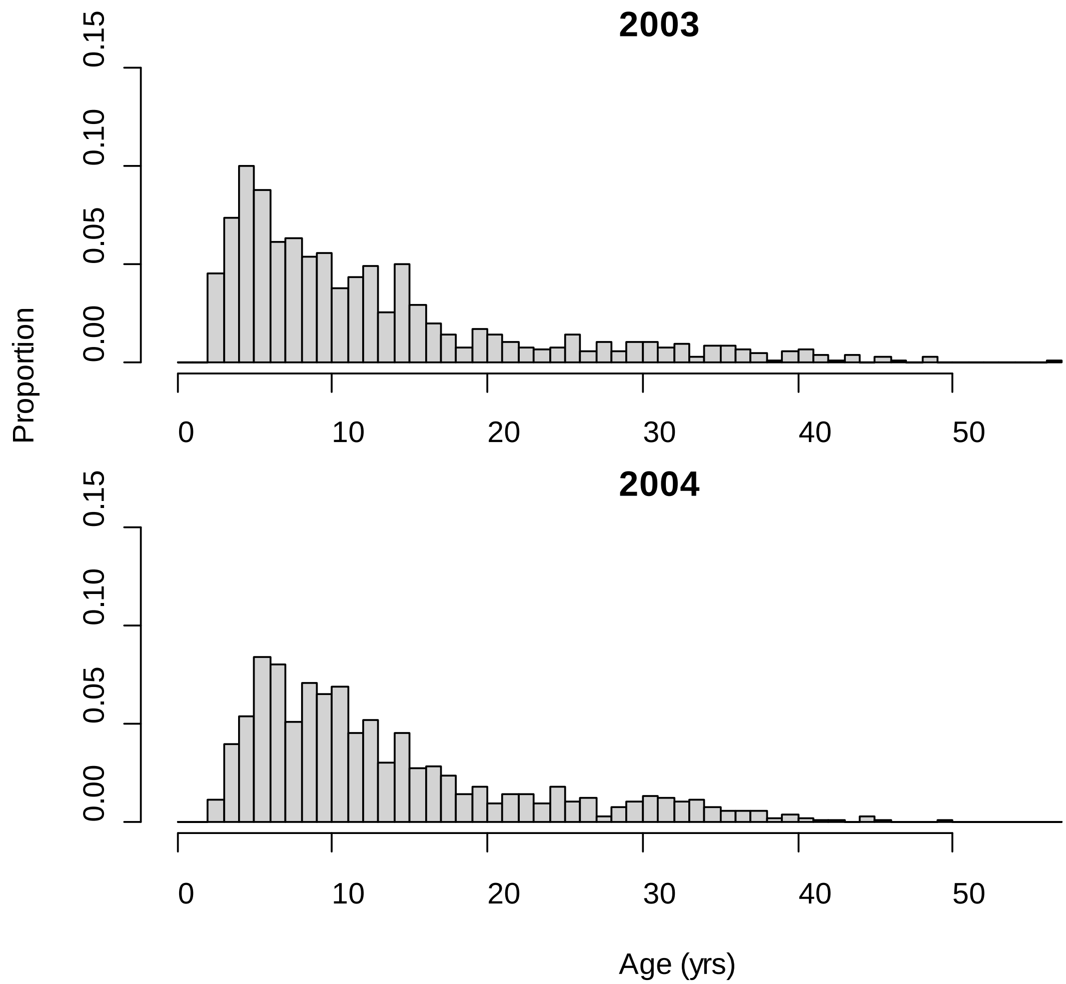

Figure 213. Age distribution for Dover sole sampled during the surveys from 2003 to 2004.

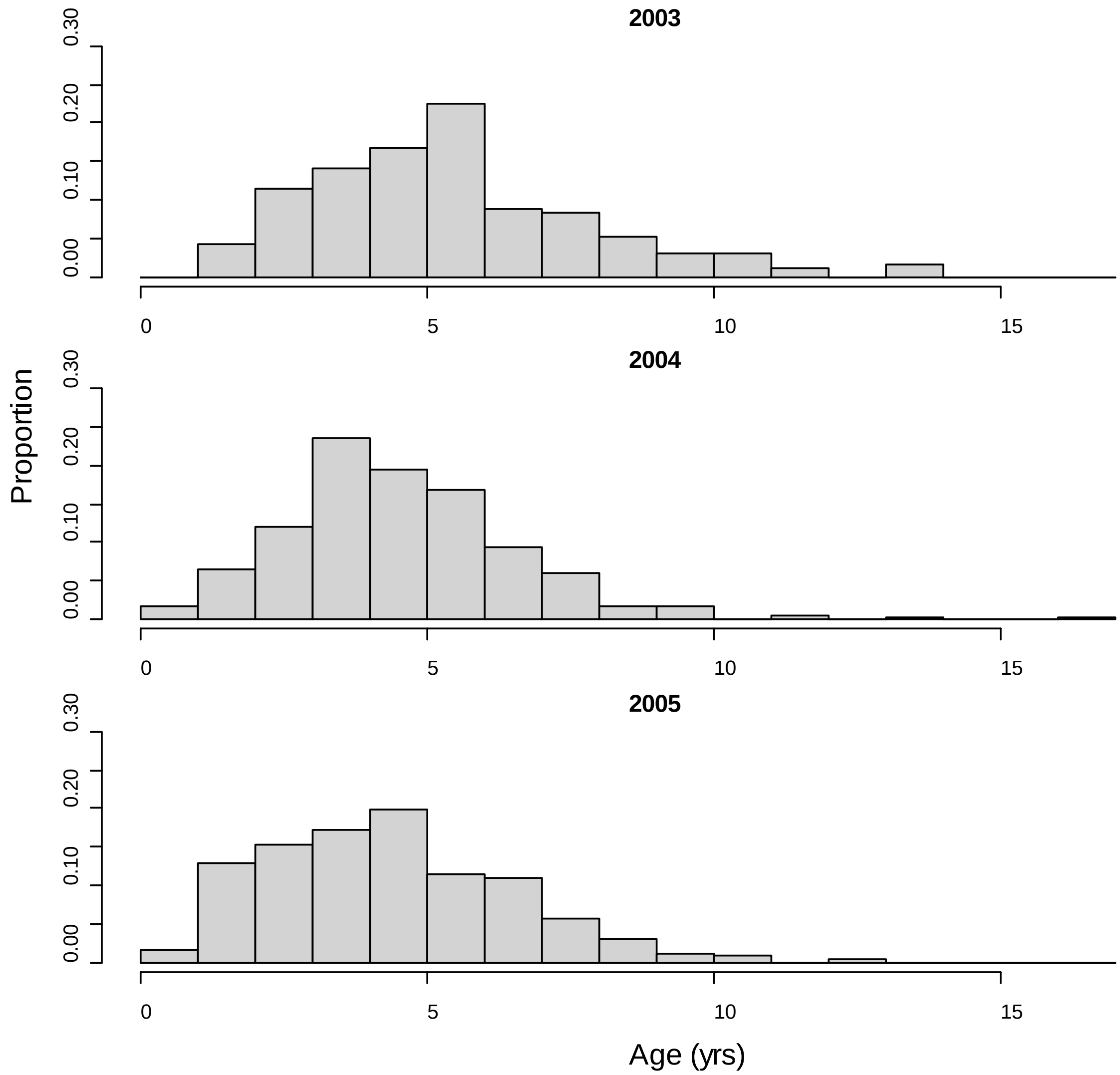

Figure 214. Age distribution for English sole sampled during the surveys from 2003 to 2005.

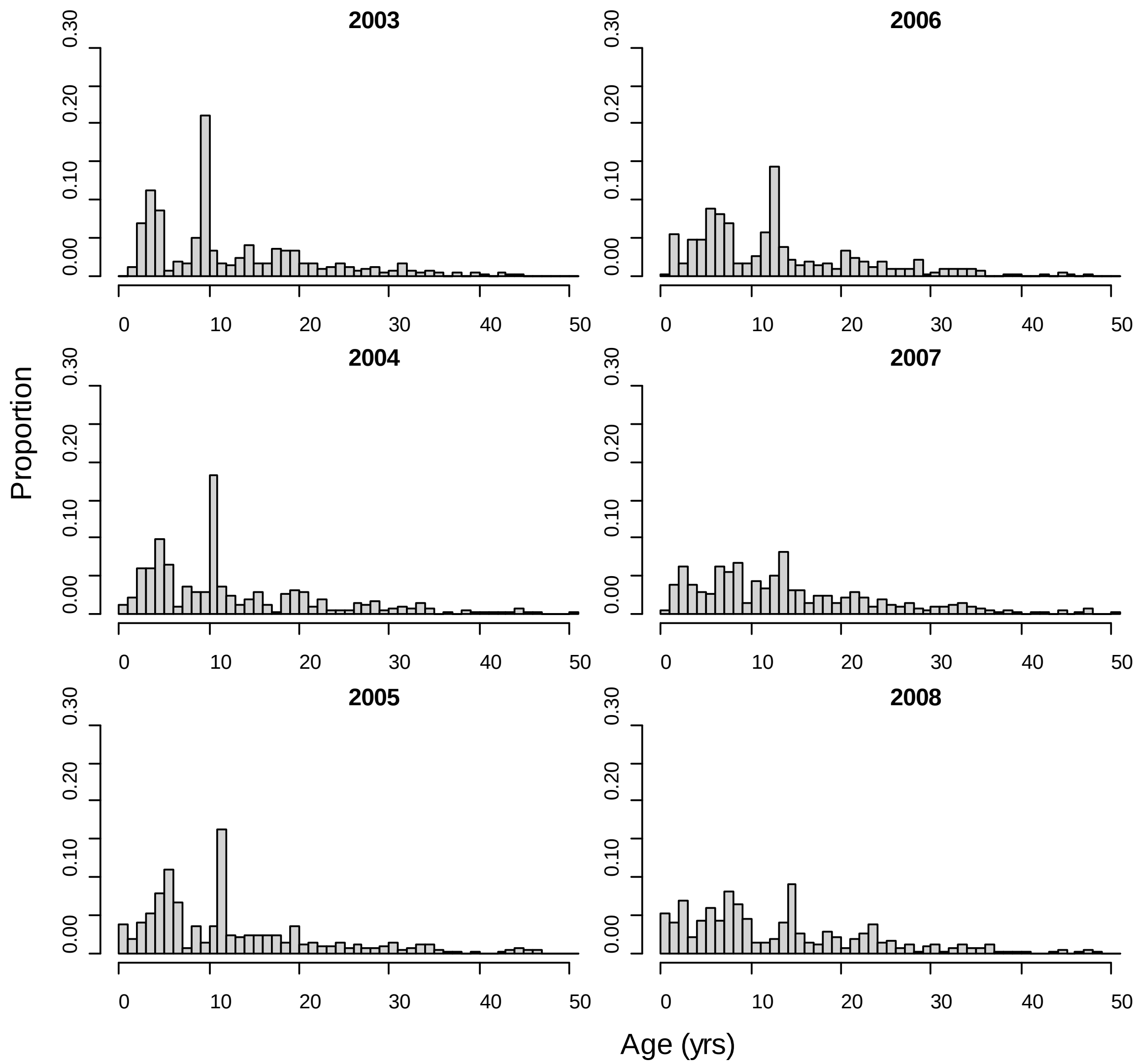

Figure 215. Age distribution for greenstriped rockfish sampled during the surveys from 2003 to 2008.

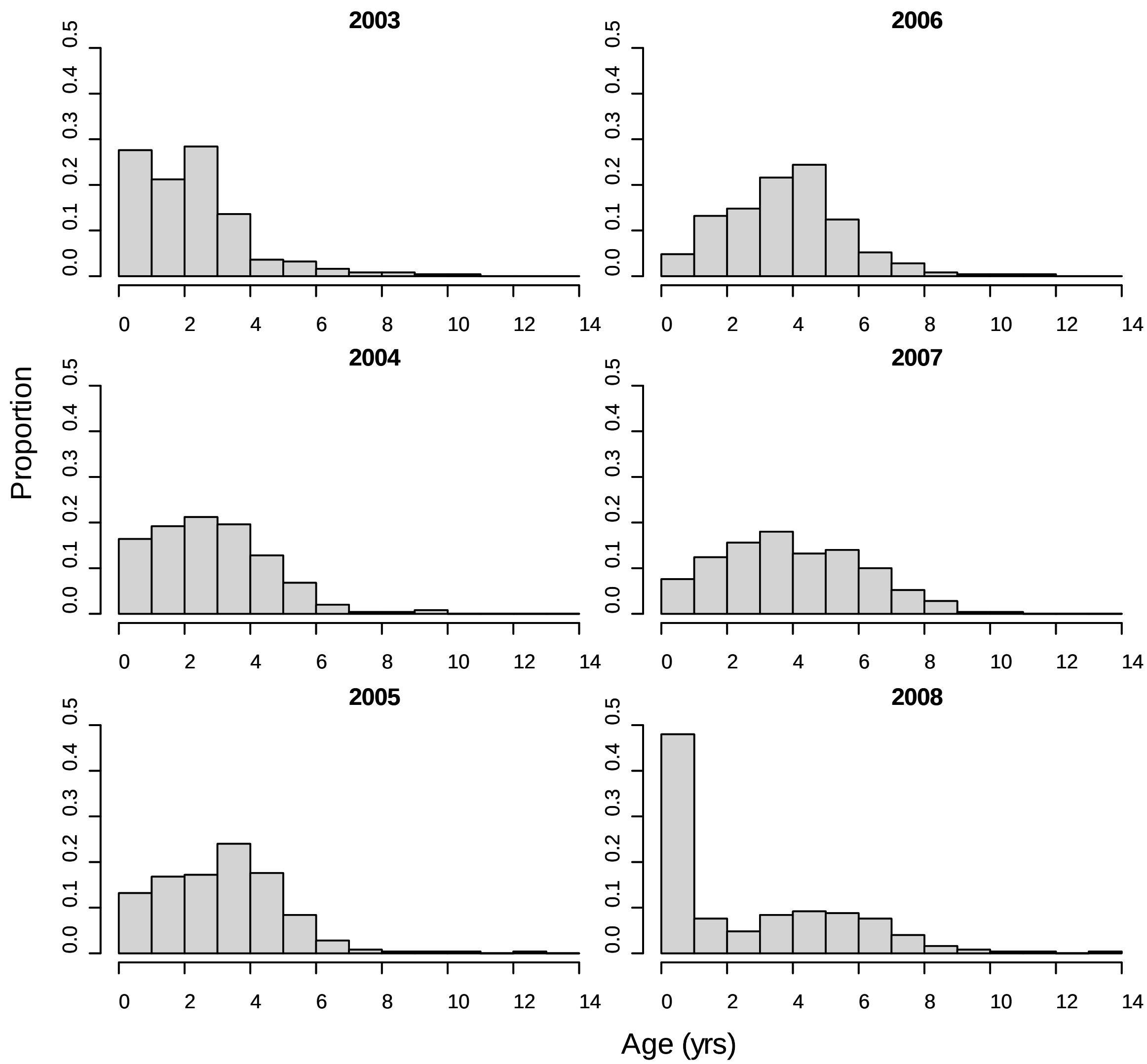

Figure 216. Age distribution for lingcod sampled during the surveys from 2003 to 2008.

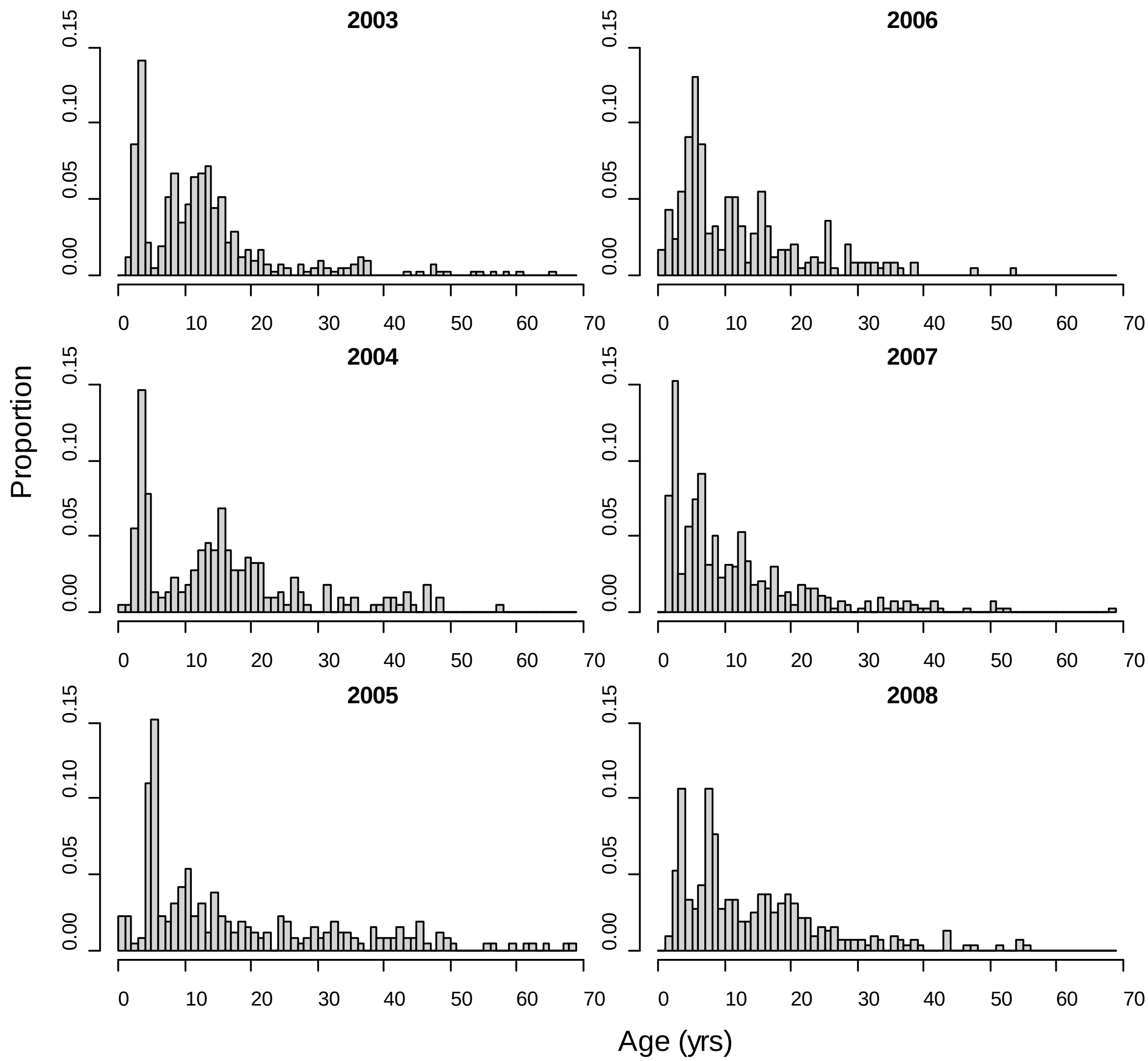

Figure 217. Age distribution for Pacific ocean perch sampled during the surveys from 2003 to 2008.

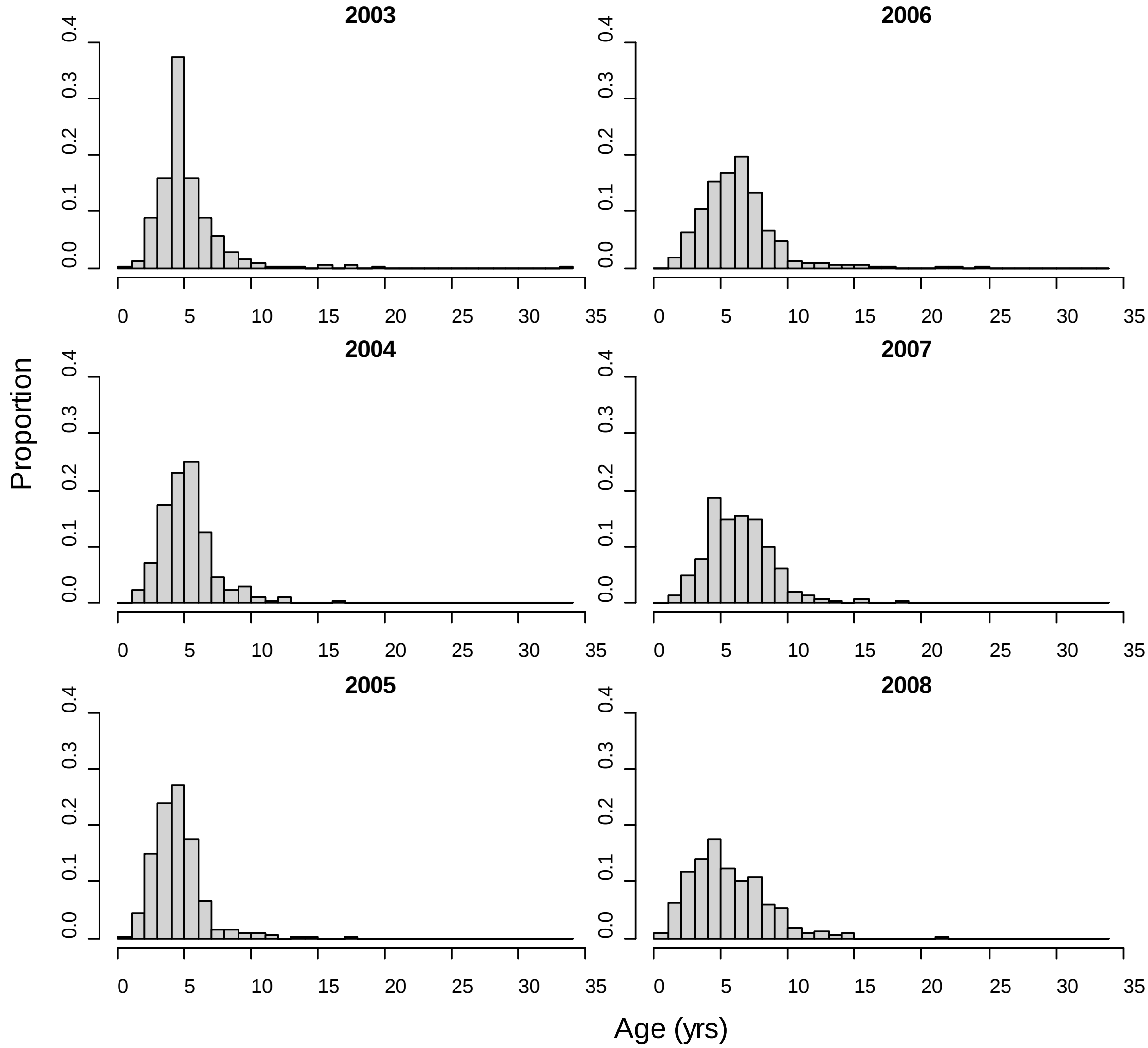

Figure 218. Age distribution for petrale sole sampled during the surveys from 2003 to 2008.

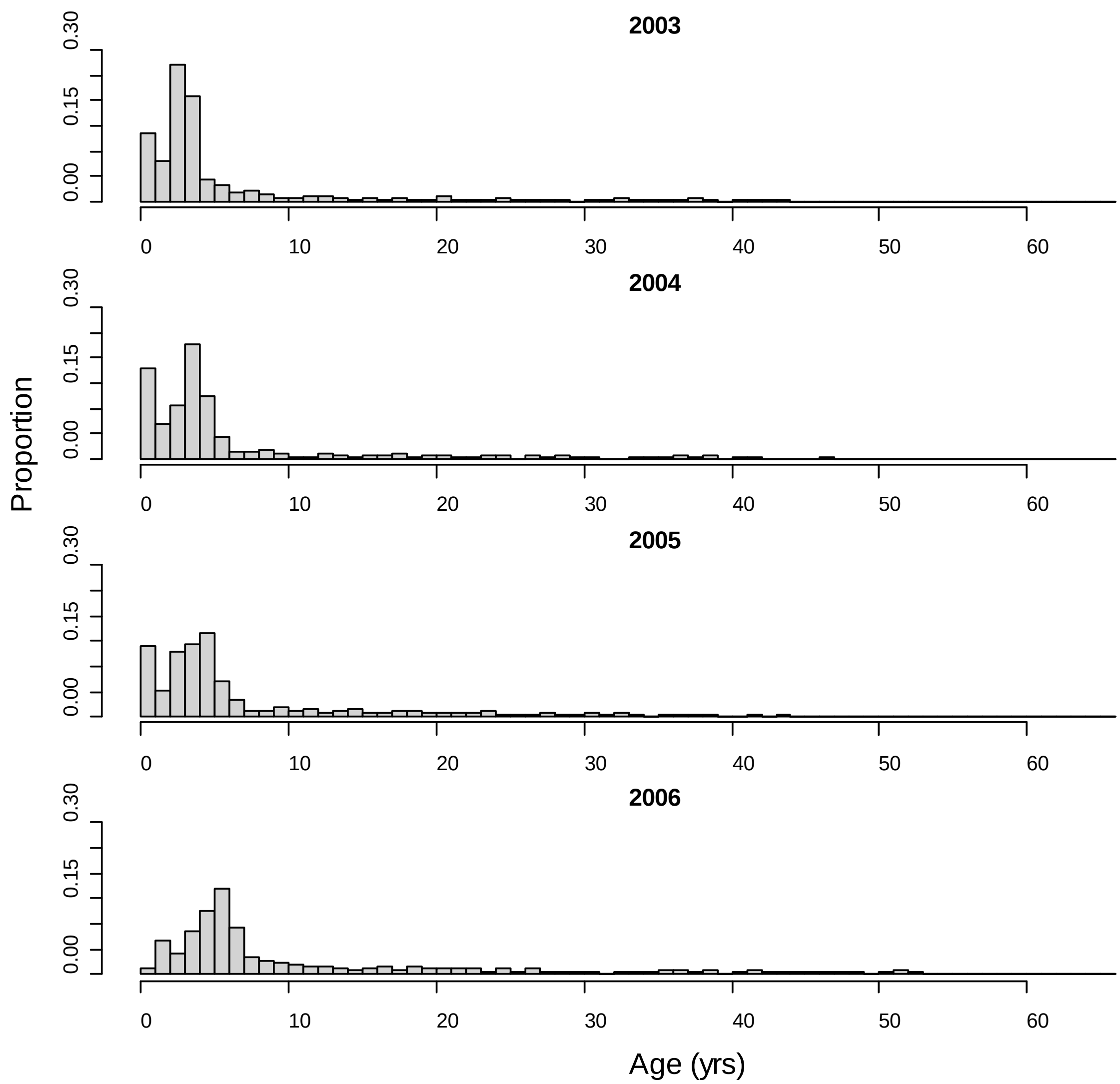

Figure 219. Age distribution for sablefish sampled during the surveys from 2003 to 2006.

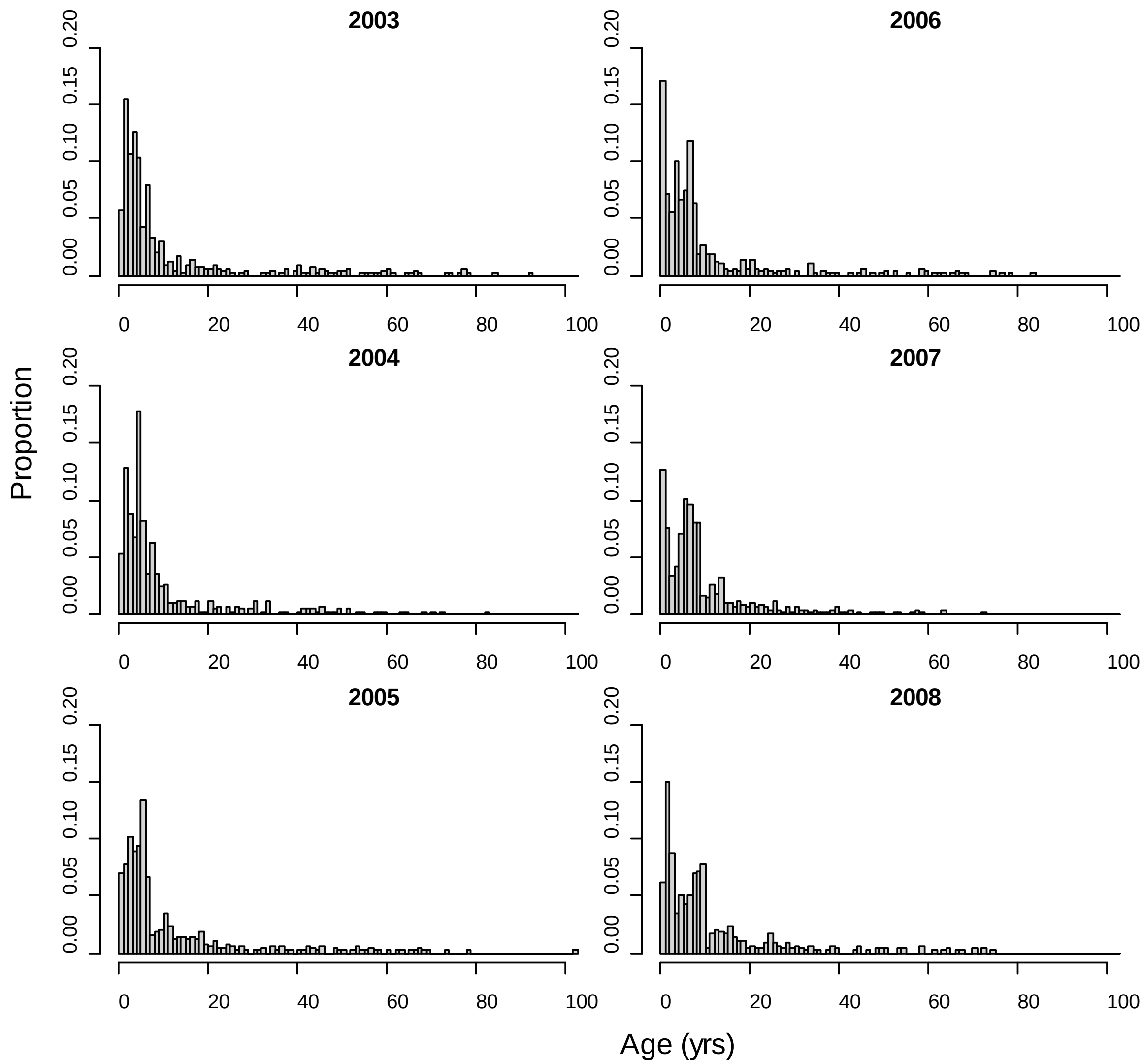

Figure 220. Age distribution for splitnose rockfish sampled during the surveys from 2003 to 2008.

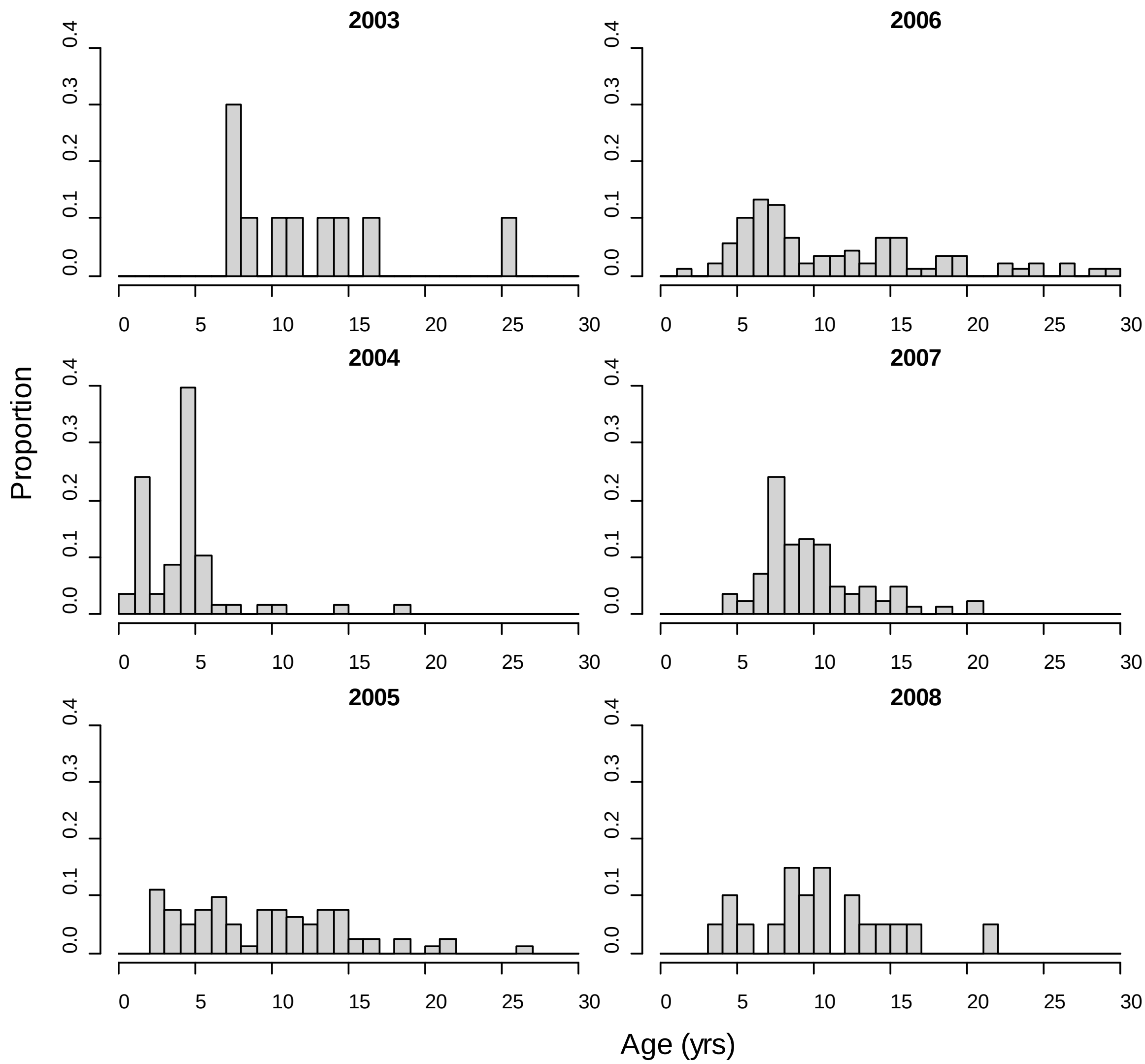

Figure 221. Age distribution for widow rockfish sampled during the surveys from 2003 to 2008.

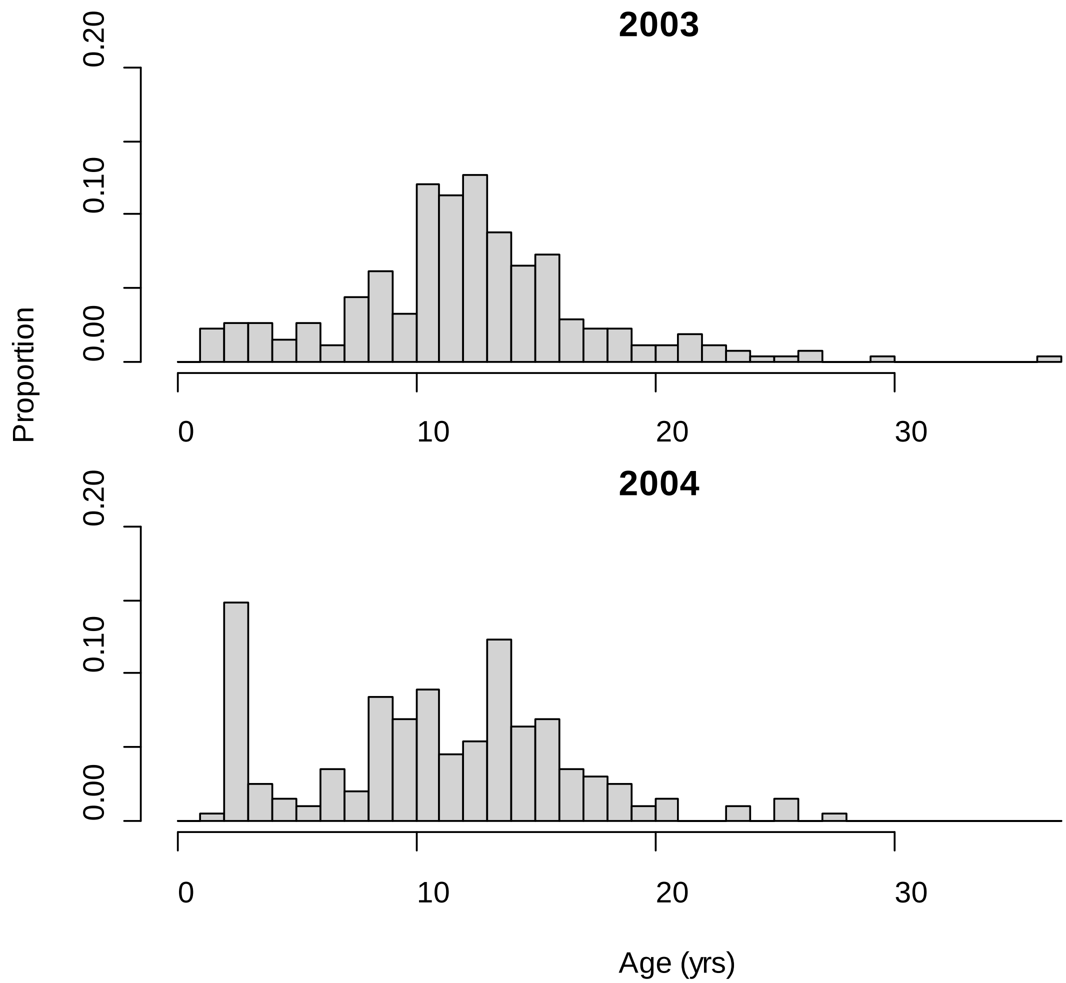

Figure 222. Age distribution for yellowtail rockfish sampled during the 2003 and 2004 surveys.

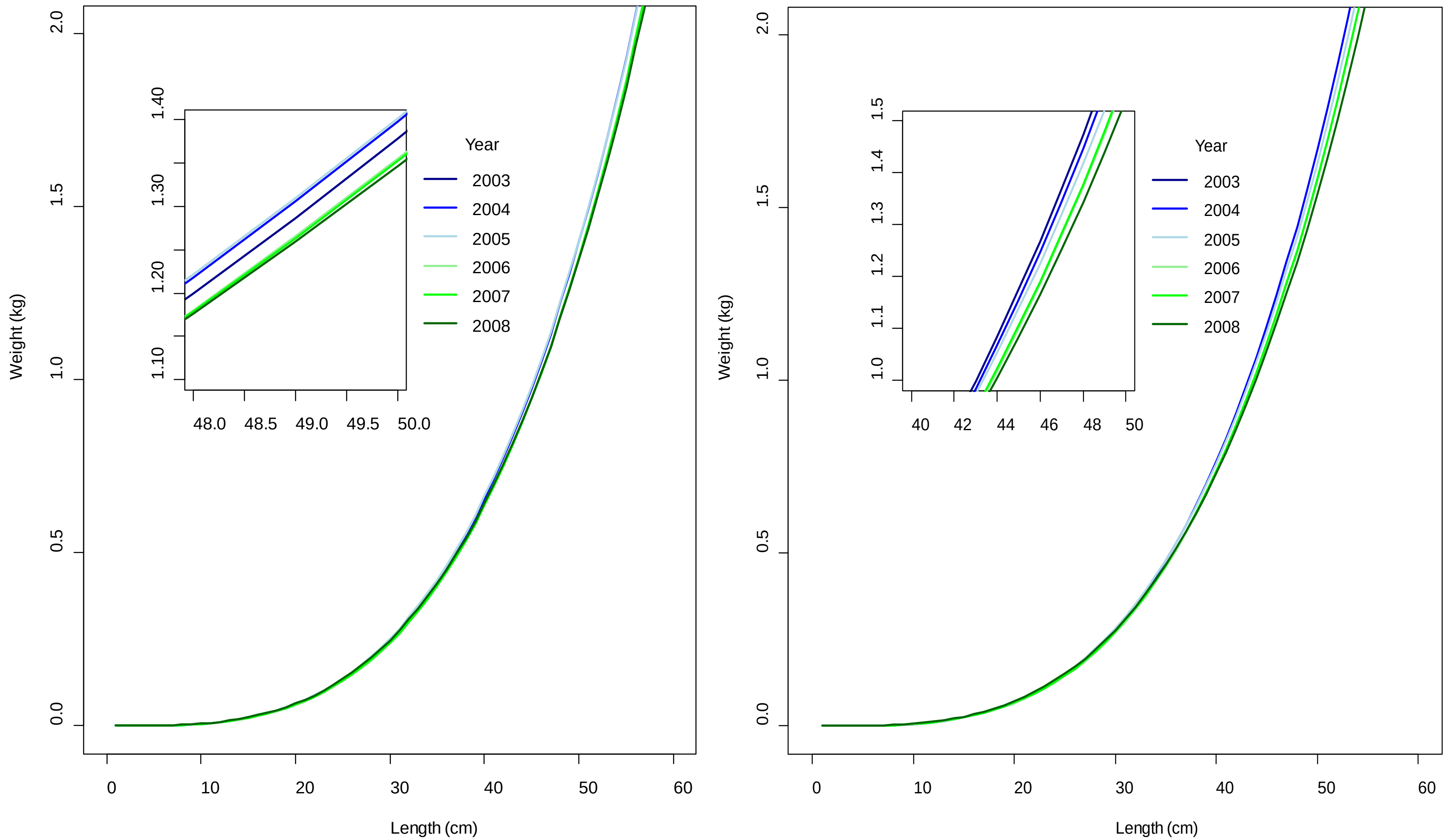

Figure 223. Weight-length relationship observed for Dover sole (left) and petrale sole (right) during the surveys from 2003 to 2008. Inset shows an enlarged view of a subsection of the graph.

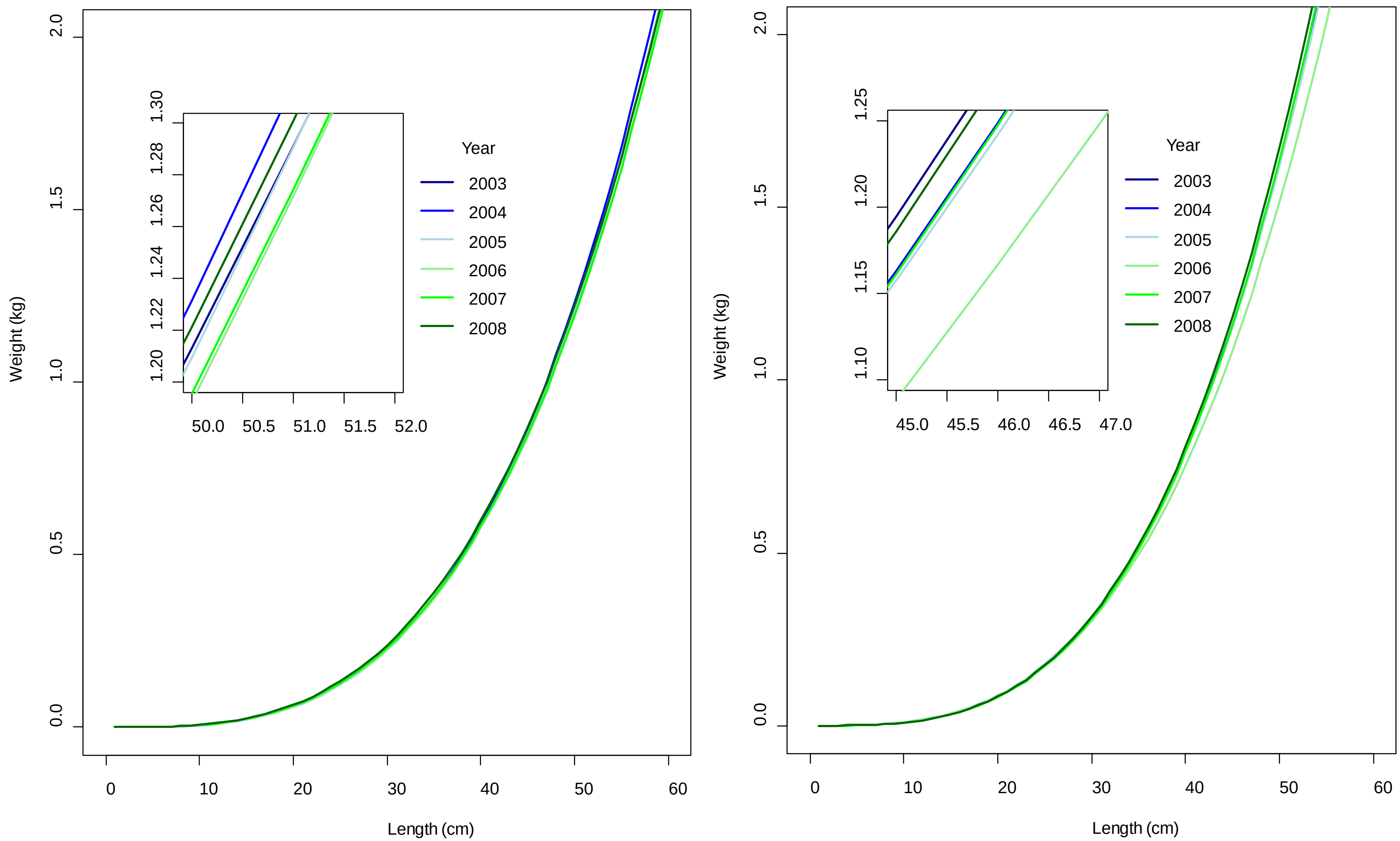

Figure 224. Weight-length relationship observed for sablefish (left) and shortspine thornyhead (right) during the surveys from 2003 to 2008. Inset shows an enlarged view of a subsection of the graph.

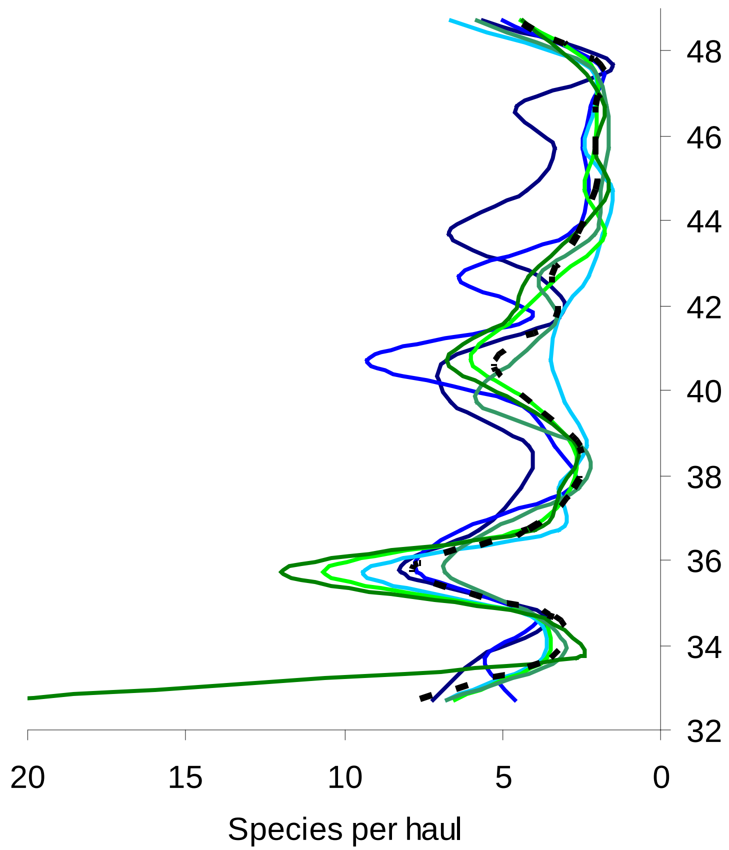

Figure 225. Species richness per tow and per year by latitude for stratum 1 (55–183 m) in the surveys from 2003 to 2008.

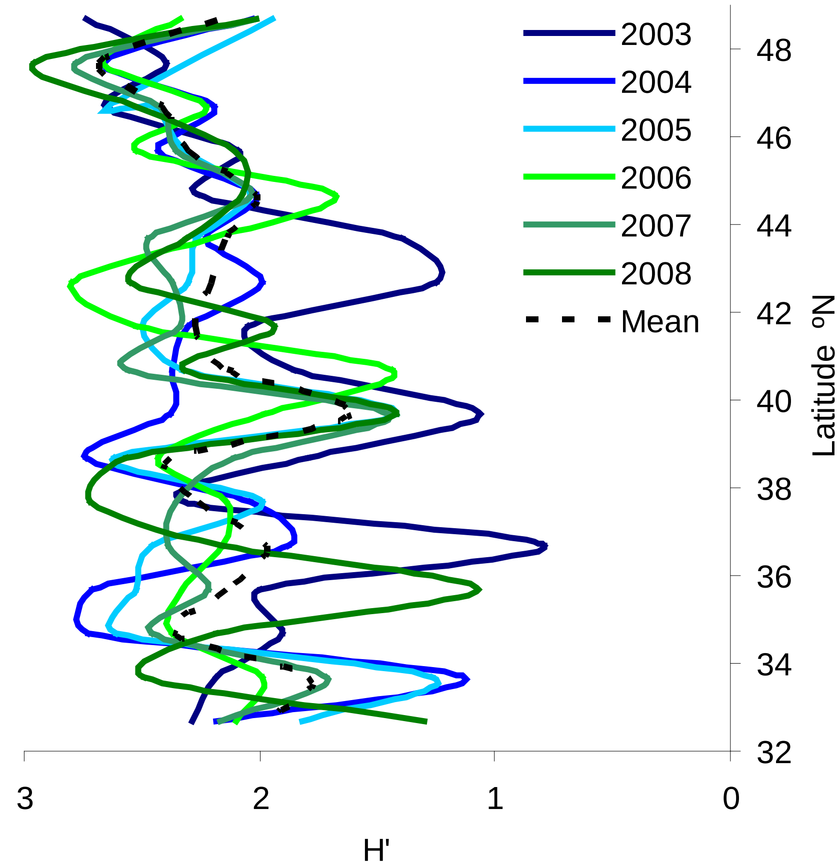

Figure 226. Species diversity by latitude for stratum 1 (55–183 m) in the surveys from 2003 to 2008. The Shannon-Weaver diversity values are based on fish species encountered within each depth strata in 1° intervals of latitude.

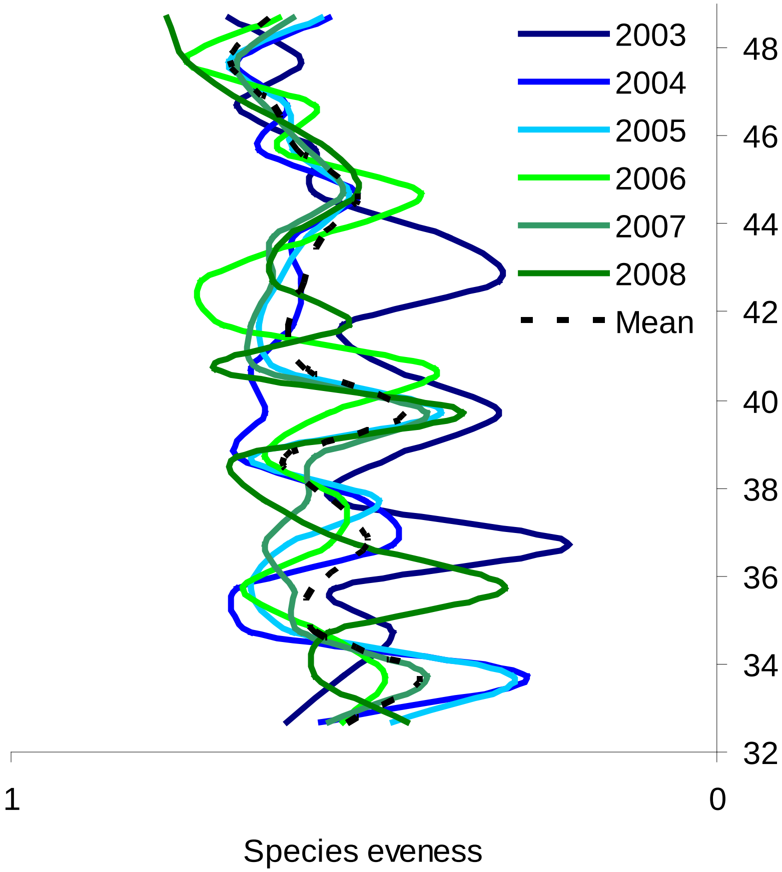

Figure 227. Species eveness by latitude for stratum 1 (55–183 m) in the surveys from 2003 to 2008. The eveness values are based on fish species encountered within each depth strata in 1° intervals of latitude.

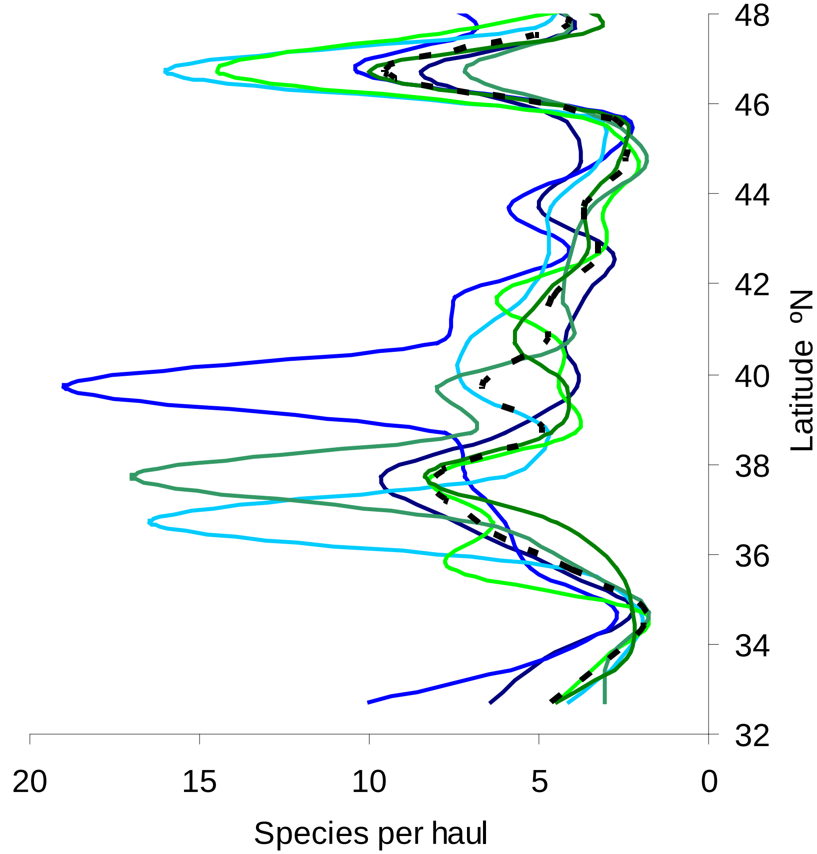

Figure 228. Species richness per tow and per year by latitude for stratum 2 (184–549 m) in the surveys from 2003 to 2008.

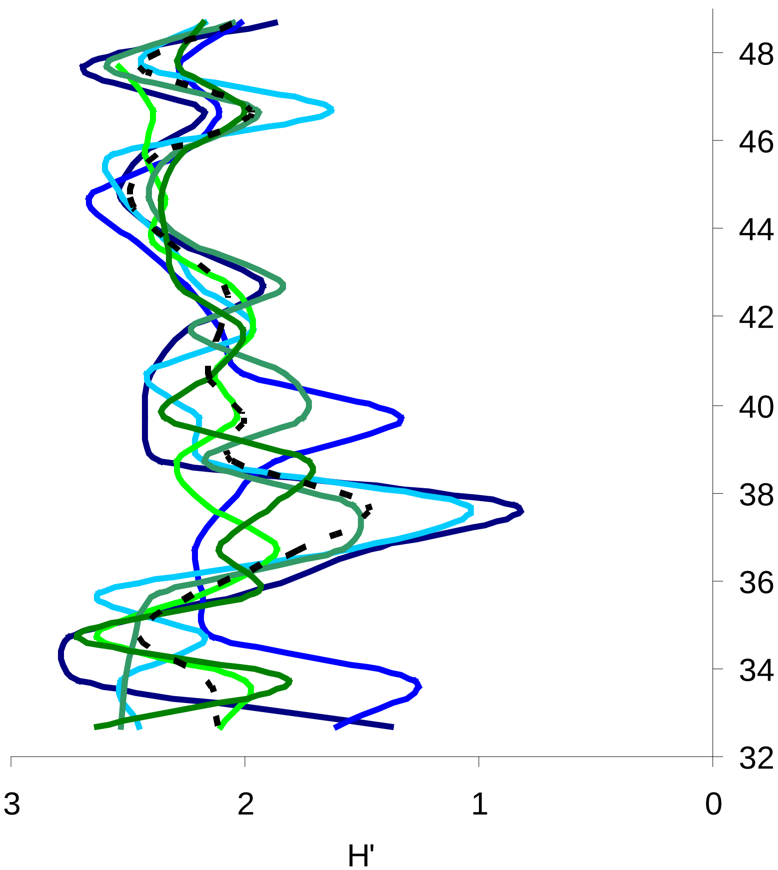

Figure 229. Species diversity by latitude for stratum 2 (184–549 m) in the surveys from 2003 to 2008. The Shannon-Weaver diversity values are based on fish species encountered within each depth strata in 1° intervals of latitude.

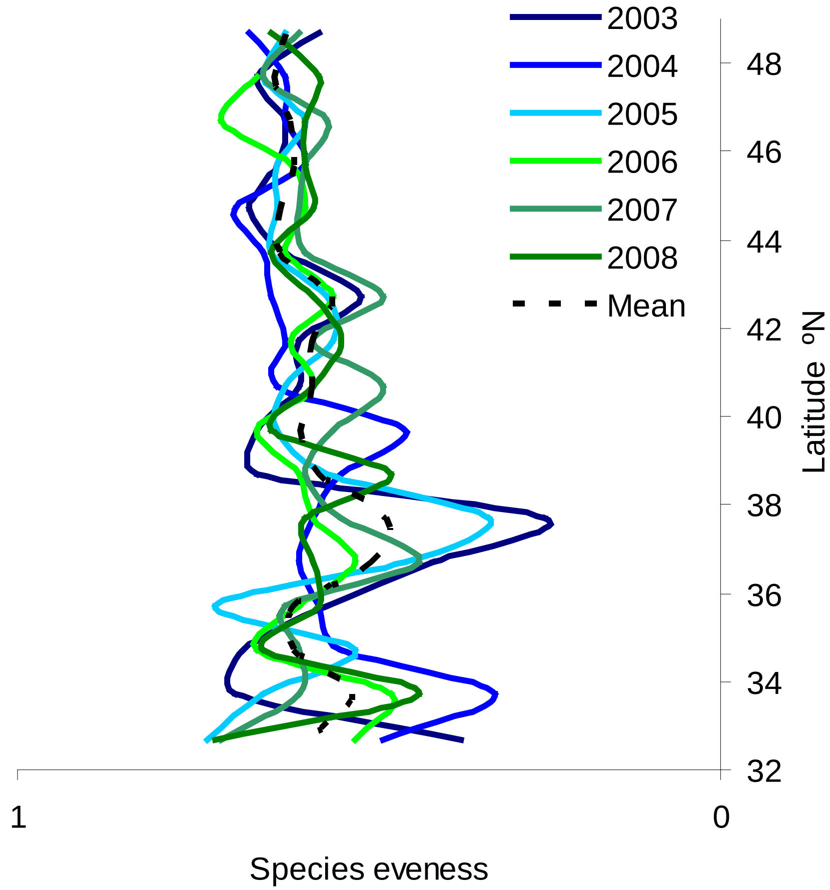

Figure 230. Species eveness by latitude for stratum 2 (184–549 m) in the surveys from 2003 to 2008. The eveness values are based on fish species encountered within each depth strata in 1° intervals of latitude.

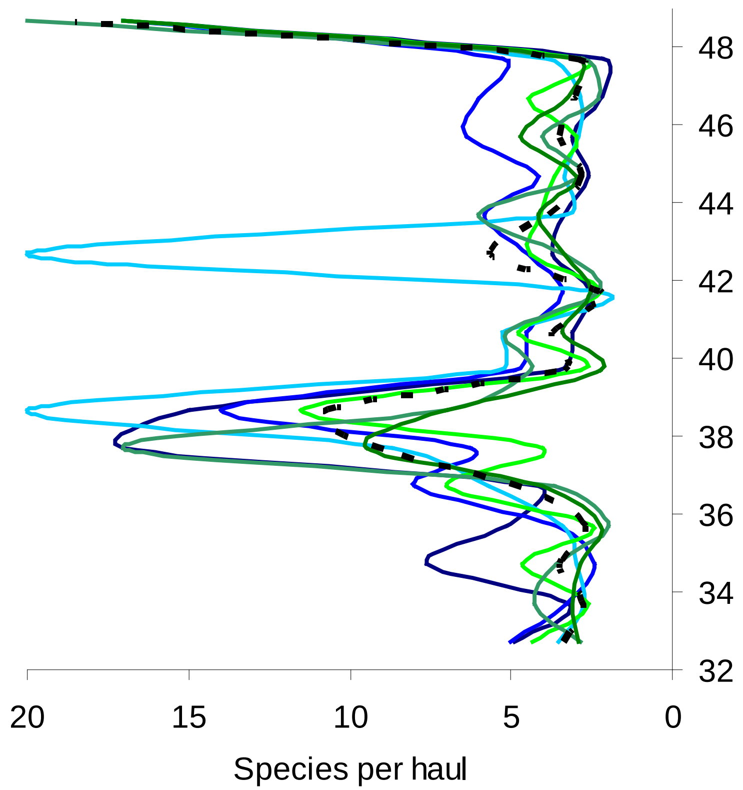

Figure 231. Species richness per tow and per year by latitude for stratum 3 (550–1,280 m) in the surveys from 2003 to 2008.

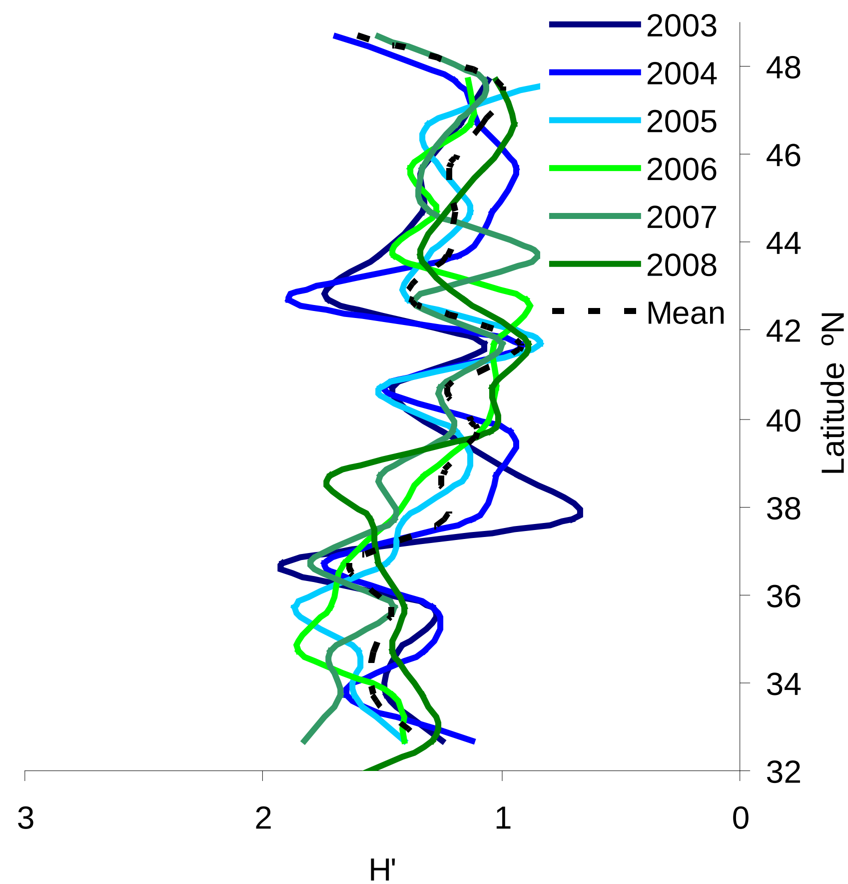

Figure 232. Species diversity by latitude for stratum 3 (550–1,280 m) in the surveys from 2003 to 2008. The Shannon-Weaver diversity values are based on fish species encountered within each depth strata in 1° intervals of latitude.

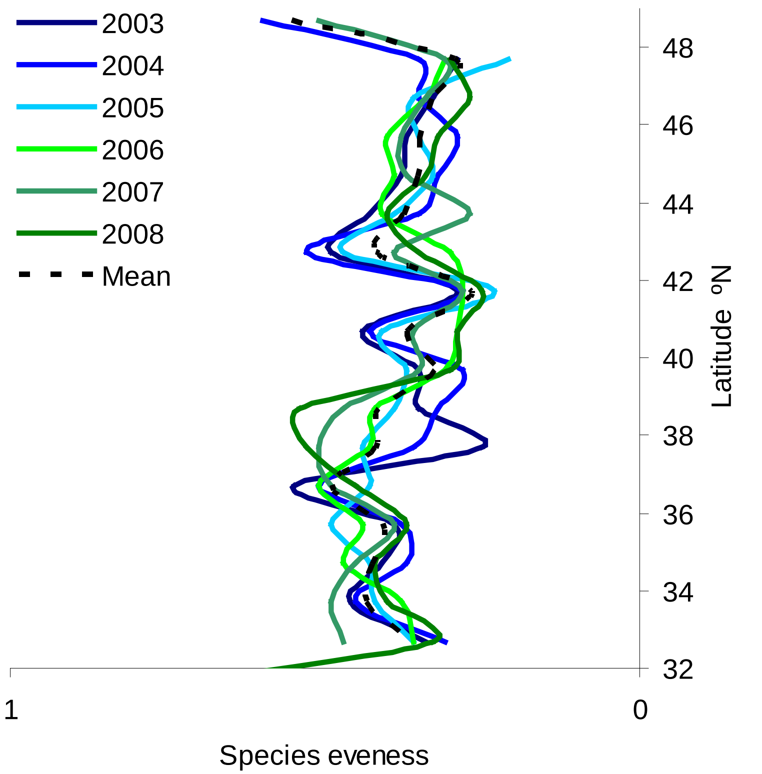

Figure 233. Species eveness by latitude for stratum 3 (550–1,280 m) in the surveys from 2003 to 2008. The eveness values are based on fish species encountered within each depth strata in 1° intervals of latitude.

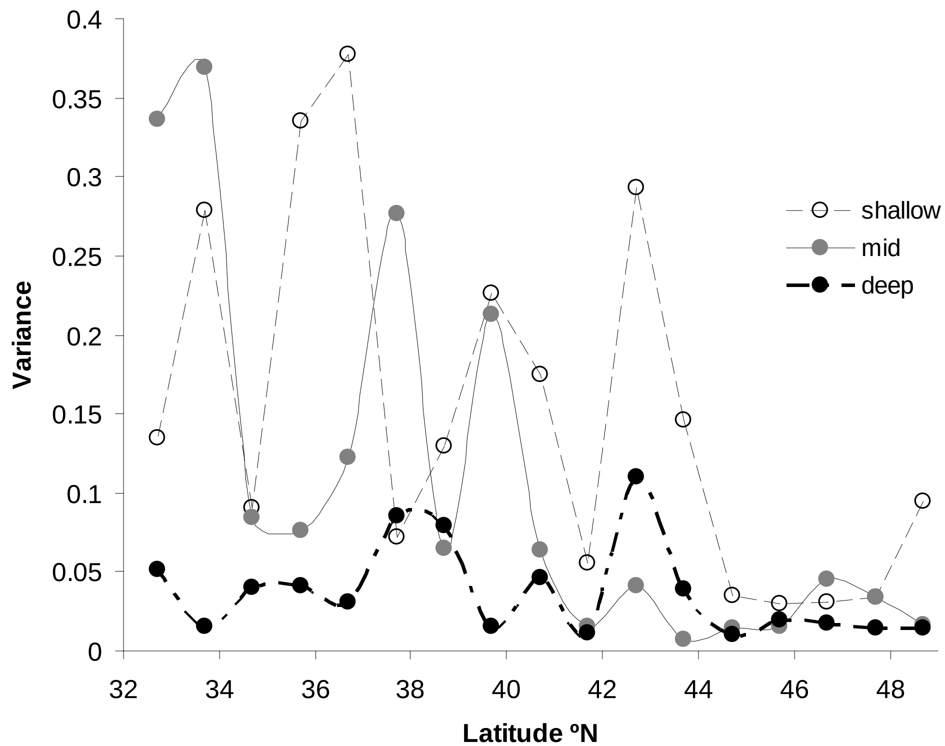

Figure 234. Patterns of variance of H′ in relation to latitude for each depth stratum for all survey years combined. Variance of H′ and latitude are plotted for each 1° latitude bin.

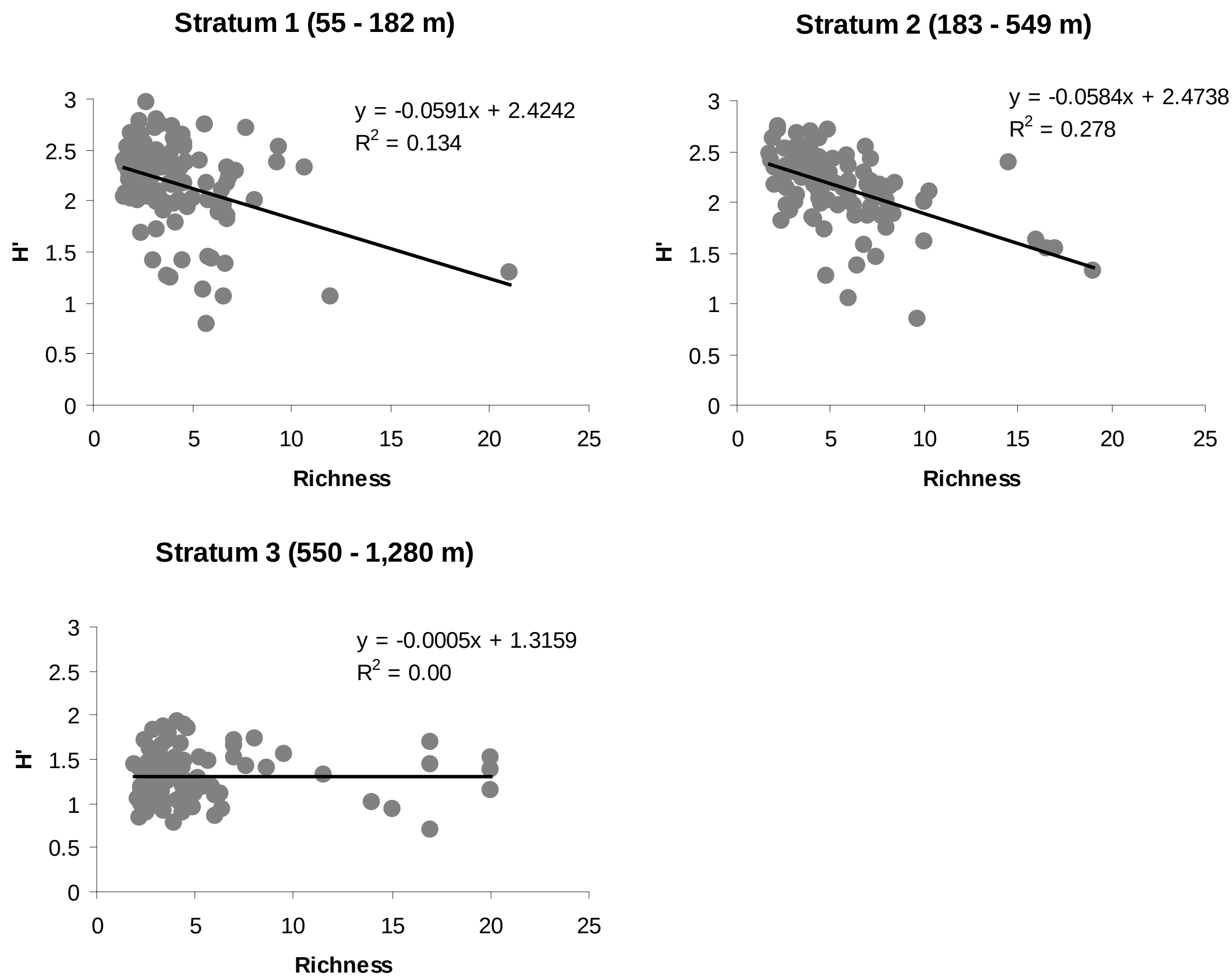

Figure 235. Relationship between species richness and diversity. Richness and diversity values are plotted for each 1° latitude bin in each year of the 2003–2008 surveys.

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 = $B_0 + a\text{x}1 + b\text{x}2$ 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

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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				

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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	Weight-length coeffcients				Species and	Weight-length coeffcients			
year	a	b	r^2	Number	year	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 = $a \times \text{Length}^b$ (weight in kg; length in cm).

Species and year	Weight-length coeffcients			Number	Species and year	Weight-length coeffcients			Number
	a	b	r^2			a	b	r^2	
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	Weight-length coeffcients				Species and	Weight-length coeffcients			
year	a	b	r^2	Number	year	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) South	Latitude (decimal degree) North	Depth (m) Min.	Depth (m) 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) South	Latitude (decimal degree) North	Depth (m) Min.	Depth (m) 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) South	Latitude (decimal degree) North	Depth (m) Min.	Depth (m) 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) South	Latitude (decimal degree) North	Depth (m) Min.	Depth (m) 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) South	Latitude (decimal degree) North	Depth (m) Min.	Depth (m) 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) South	Latitude (decimal degree) North	Depth (m) Min.	Depth (m) 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) South	Latitude (decimal degree) North	Depth (m) Min.	Depth (m) 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) South	Latitude (decimal degree) North	Depth (m) Min.	Depth (m) 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) South	Latitude (decimal degree) North	Depth (m) Min.	Depth (m) 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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