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NOAA-TM-NMFS-SWFSC-322

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
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Sharon R. Charter, Richard L. Charter, and H. Geoffrey Moser

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Science Center
8604 La Jolla Shores Drive
La Jolla, California, USA 92037

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**U.S. DEPARTMENT OF COMMERCE**
Donald L. Evans, Secretary
**National Oceanic and Atmospheric Administration**
Scott B. Gudes, Acting Under Secretary for Oceans and Atmosphere
**National Marine Fisheries Service**
William T. Hogarth, Assistant Administrator for Fisheries

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## ABSTRACT

This report provides ichthyoplankton data and associated station and tow data for Manta (surface) tows taken on California Cooperative Oceanic Fisheries Investigations (CalCOFI) cruises in 1986. It is the 5th report in a series that presents surface tow data for all biological-oceanographic CalCOFI surveys from 1977 to the present. A total of 233 net tow stations was occupied during four quarterly cruises over the survey area which extended from Avila Beach to San Diego, California and seaward in a southwesterly direction to a maximum of approximately 330 n. mi. The most seaward station, 90.120, was approximately 400 n. mi. west of Punta Baja, Baja California, Mexico. A total of 215 Manta net tows was taken during 1986. The data for stations on which Manta tows were taken are listed in a series of four tables; the background, methodology, and information necessary for interpretation of the data are presented in an accompanying text. All pertinent station and tow data, including volumes of water filtered are listed in the first table. Another table lists, by station and month, standardized counts of each of the 69 larval fish categories identified from Manta tows taken on the survey. This series of reports makes the CalCOFI ichthyoplankton and station data available to all investigators and serves as a guide to the computer data base.


## INTRODUCTION

This report, the 5th in a series of surface tow data reports, provides ichthyoplankton and associated station and Manta net tow data from California Cooperative Oceanic Fisheries Investigations (CalCOFI) joint biological-oceanographic survey cruises conducted in 1986. This program was initiated in 1949, under the sponsorship of the Marine Research Committee of the State of California, to study the population fluctuations of the Pacific sardine (*Sardinops sagax*) and the environmental factors that may play a role in these fluctuations. CalCOFI is a partnership among the Southwest Fisheries Science Center (SWFSC) of the National Marine Fisheries Service (NMFS), the Scripps Institution of Oceanography (SIO), and the California Department of Fish and Game (CDFG). NMFS and SIO supply ships and personnel to conduct the sea surveys, NMFS processes the plankton samples and analyzes the ichthyoplankton from them. SIO processes and analyzes hydrographic and biological samples and analyzes invertebrate groups from the plankton samples.

The boundaries, station placement, and sampling frequency for the CalCOFI surveys were based on the results of joint biological-oceanographic cruises conducted by NMFS and SIO during 1939–41. Originally, CalCOFI cruises were designed to collect sardine eggs and larvae in oblique net tows and hydrographic data associated with the tows over the entire areal and seasonal spawning range of the species. From 1951 to 1960 the surveys were annual with cruises conducted monthly. The survey area was occupied quarterly during 1961–1965 and in 1966 the surveys became triennial with monthly cruises. Beginning in 1985 annual surveys were resumed, with quarterly cruises occupying only the Southern California Bight region (see Hewitt 1988; Moser et al. 1993, 1994, 2001a for summaries of historical CalCOFI sampling effort). Neuston[1] sampling with the Manta net (Figure 1) was initiated in 1977-78. Station and ichthyoplankton data for oblique tows taken on the 1986 CalCOFI survey are published in Charter et al. (1999). Ahlstrom and Stevens (1976), Gruber et al. (1982) and Doyle (1992a, b) provided initial information

[1]Usage of the term "neuston" for surface-living marine organisms is controversial because it was applied originally to organisms associated with the surface film in freshwater habitats (Naumann 1917). Banse (1975) reviewed in detail the evolution of the usage of this term, a related term, "pleuston", and the various subdivisions of each. Neuston is now used by most workers in referring to the uppermost (upper ~10–20 cm) layer of the sea and to the assemblage of organisms that lives in that zone, either permanently or facultatively (Zaitsev 1970; Hempel and Weikert 1972; Peres 1982; Doyle 1992b). We accept this definition and use it interchangeably with the more general term "surface" (e.g., surface waters, surface zone, surface tow, surface assemblage).

on the distribution and abundance of surface ichthyoplankton in the northeastern Pacific.

Hydrographic and biological data from the 1986 CalCOFI cruises were published by Scripps Institution of Oceanography (Univ. of Calif., SIO 1986a, b, 1987). All available records for Manta tows on the 1986 CalCOFI surveys were verified and edited to produce this data report. The CalCOFI ichthyoplankton data reports make CalCOFI ichthyoplankton and station data available to all investigators and serve as guides to the ichthyoplankton computer data base. They are the basic documents against which changes in the data base can be compared as it is modified to correct errors and update earlier identifications. Citations for previous reports in this series are:

| Survey | Report | Survey | Report |
|---|---|---|---|
| 1977-78 | Moser et al. 2001b | 1984 | Charter et al. 2002 |
| 1980-81 | Ambrose et al. 2002a | 1985 | Ambrose et al. 2002b |

## SAMPLING AREA AND PATTERN

The 1986 CalCOFI survey consisted of four quarterly cruises on which a total of 215 Manta net tows was taken (Table 1; Figures 2 and 3). Two vessels were employed on the survey, the NOAA vessel RV *David Starr Jordan* and the SIO vessel RV *New Horizon*. Dates and numbers of stations sampled with the Manta net in 1986 (Figures 2 and 3) are summarized below:

8602, RV *David Starr Jordan*, 54 stations, 5–19 February;

8605, RV *David Starr Jordan*, 54 stations, 9–21 May;

8609, RV *New Horizon*, 57 stations, 18 September–2 October;

8611, RV *New Horizon*, 50 stations, 11–25 November.

The survey area extended from Avila Beach to San Diego, California and seaward on six survey lines to approximately 120–330 n. mi. (Figures 2 and 3). The most seaward station, 90.0 120.0, was approximately 400 n. mi. west of Punta Baja, Baja California, Mexico. On the 1985 and 1986 CalCOFI surveys, offshore coverage was somewhat different from the standard pattern of subsequent years when lines 76.7 and 80.0 extended to station 100.0, lines 83.3 and 86.7 to station 110.0, and lines 90.0 and 93.3 to station 120.0 (Moser et al. 2001a). In 1986, lines 76.7 and 80.0 extended to station 100.0 on Cruise 8602, to station 120.0 on 8605 and 8609, and to station 90.0 on 8611 (Figures 2 and 3). Lines 83.3 and 86.7 extended seaward to station 70.0 on the first three cruises and to station 110.0 on Cruise 8611. The exception was Cruise 8602 where line 86.7 extended to station 60.0. Lines 90.0 and 93.3 extended to station 120.0 on all cruises (Figures 2 and 3). Offshore coverage of Manta net tows on the survey lines in 1986 varied between cruises because Manta net tows were not taken on all stations (Figures 2 and 3).

## SAMPLING GEAR AND METHODS

Plankton tows were made with a modified version of the Manta net originally designed by Brown and Cheng (1981). It consists of a rectangular mouth 15.5 cm deep and 86 cm wide attached to a frame that supports square lateral extensions covered with plywood and urethane foam (Figure 1). These extensions stabilize the net when it is towed and keep the top of the net at the sea surface. The net is constructed of

0.505 mm nylon mesh. The towing bridle is asymmetrical with one side longer than the other; when the net is towed this bridle arrangement forces the mouth away from the ship at a slight angle. A General Oceanics flowmeter was suspended across the center of the net mouth to measure the amount of water filtered during each tow. At each Manta tow station the tow line from the bridle was attached to the hydrographic wire and then lowered to slightly below the surface of the water before the net was deployed. The net was towed at a ship speed of 1.0–2.0 knots for 15 minutes. Samples were preserved in 5% buffered formalin and returned to the plankton sorting laboratory at the SWFSC at the end of the cruise.

## LABORATORY PROCEDURES

The ichthyoplankton was removed from the invertebrate portion of each sample and bottled separately in 3% buffered formalin. In addition to fish eggs and larvae, some samples contained surface-living juvenile, and occasionally adult, stages of fishes; these were removed and bottled separately in 3% formalin. The volume of water filtered by each net was computed from the flowmeter readings. A "standard haul factor" is used for oblique CalCOFI net tows to calculate the total number of ichthyoplankters of a taxon per unit surface area (Kramer et al 1972; Smith and Richardson 1977; Moser et al. 1993). A requirement for this is the entire depth distribution of the taxon must be encompassed during the tow. The Manta net samples only the upper ~15.5 cm of the water column and most, if not all, ichthyoplankton taxa that inhabit the surface zone have a vertical range > 15.5 cm. Even taxa associated with the immediate surface layer may range deeper than 15.5 cm as a result of diel migratory patterns or vertical mixing (Hempel and Weikert 1972; Doyle 1992b). Calculation of total numbers of eggs or larvae per unit surface area from Manta net samples awaits accurate information on the fine-scale vertical distribution of these organisms in the upper region of the water column. Even if there are few species whose larvae are restricted to the upper 15.5 cm of the water column, the time series of Manta samples provides a useful index of relative abundance for species whose larvae appear in these samples. In this report we express quantities of eggs or larvae in each sample as unadjusted counts or as numbers of eggs or larvae per unit volume of water filtered by the net.

## IDENTIFICATION

Constituent taxa in the samples were identified by the senior author. Early ontogenetic stages of fishes are difficult to identify; most identifications were based on descriptions of ontogenetic series of fishes in published identification guides to early stages of fishes in the northeastern Pacific (Matarese et al. 1989; Moser 1996). Larval specimens that could not be identified with these guides were identified by establishing ontogenetic series on the basis of morphology, meristics, and pigmentation, and then linking these series through overlapping features to known metamorphic, juvenile, or adult stages (Miller and Lea 1972; Eschmeyer et al. 1983; Powles and Markle 1984). Except for damaged specimens, most of the larvae and juvenile/adults taken in the surface tows could be identified to species. A total of 69 larval fish categories (including disintegrated fish larvae) was identified: 60 to species, 7 to genus, and 1 to order.

The following taxonomic categories in Tables 2–4 require special explanation:

*Cyclothone* spp. – small or damaged larvae, almost entirely *C. acclinidens* and/or *C. pseudopallida* lacking diagnostic characters.

Disintegrated fish larvae – larvae that could not be identified because of their poor condition; separated from the "unidentified" category to monitor the general condition of the ichthyoplankton samples through the time series.

*Lampanyctus* spp. – most of the larvae in this category are small (< 5 mm), often poorly preserved, specimens belonging to the subgroup of *Lampanyctus*, characterized by small or absent pectoral fins

in adults, placed by Zahuranec (2000) in the genus *Nannobrachium*; two *Nannobrachium* species, *N. ritteri* (formerly *L. ritteri*) and *N. regale* (formerly *L. regalis*), occur commonly in the present CalCOFI survey pattern; larvae of these species > ~ 5 mm have been identified since 1954; beginning in 1985, larvae of two other species, *N. bristori* and *N. hawaiiensis*, have been identified and included in the CalCOFI data base; in previous data reports these were referred to as *Lampanyctus* "niger" and *Lampanyctus* "no pectorals", respectively (see Moser 1996).

*Parophrys vetulus* – Sakamoto (1984) changed pleuronectid generic designations for some of the species in the CalCOFI area, including *Parophrys vetulus*, which was transferred into *Pleuronectes*; although these changes were incorporated in the lists of Robins et al. (1991) and Eschmeyer (1998) we follow Nelson (1994) in retaining the older nomenclature because Sakamoto's (1984) changes were based on a phenetic study; also, the older names are used in the major identification guides to fishes of our region (Miller and Lea 1972, Eschmeyer et al. 1983, Matarese et al. 1989, and Moser 1996).

*Vinciguerria lucetia* – *V. lucetia*, an eastern tropical Pacific species, is common in the present CalCOFI region whereas the central water mass species *V. poweriae* is rarely encountered; a small percentage of *V. poweriae* larvae may have been included in the *V. lucetia* category because of the difficulty in separating early larvae of the two species.

## SPECIES SUMMARY

Of the five most abundant larvae, northern anchovy (*Engraulis mordax*) ranked first in abundance with 73.6% of the total fish larvae and first in occurrence with larvae collected in 17.6% of the total samples. (Tables 2 and 3). They were over six times more abundant as the second most abundant species, Pacific hake (*Merluccius productus*), which accounted for 11.0% of the total larvae and ranked eleventh in occurrence (1.9% of the total samples). Pacific mackerel (*Scomber japonicus*) was the third most abundant taxon with 4.4% of the total larvae; it ranked fifth in frequency of occurrence (4.9% of the samples). Pacific saury (*Cololabis saira*) ranked fourth in abundance (2.5% of total larvae) and second in occurrence (15.9% of the samples). Pacific sardine (*Sardinops sagax*) ranked fifth in abundance (2.4% of total larvae) and fourth in total occurrences (5.4% of the samples). The next five most abundant taxa were dogtooth lampfish *Ceratoscopelus townsendi* (1.0% of total larvae), California grunion *Leuresthes tenuis* (0.9%), the rockfish genus *Sebastes* (0.8%), Panama lightfish *Vinciguerria lucetia* (0.4%), and mussel blenny *Hypsoblennius jenkinsi* (0.3%). These taxa ranked 10$^{th}$, tied for 14$^{th}$ with two other taxa, 3$^{rd}$, 7$^{th}$, and tied for 6$^{th}$ in frequency of occurrence, respectively. The 10 most abundant taxa comprised 97.3% of all the larvae collected in Manta net tows on CalCOFI cruises in 1986. The remaining 2.7% was distributed among 59 other taxa. Of the ten most abundant taxa, half were coastal pelagic species, two were coastal demersal taxa, two were mesopelagic species, and one was an epipelagic species.

In comparison with the surface collections, among the 142 taxa collected in the oblique tows during the 1986 survey, Pacific hake was the most abundant (61.3% of the larvae) and twice as abundant as the second-ranked northern anchovy, which accounted for 25.8% of the total (Charter et al. 1999). The third, fourth, and fifth-ranked species in the Manta collections, Pacific mackerel, Pacific saury, and Pacific sardine ranked 16$^{th}$, 62$^{nd}$, and 9$^{th}$ in oblique tows, respectively. Among the ten most abundant taxa in the oblique tows in 1986, six also were among the ten most abundant in the Manta tows (northern anchovy, Pacific hake, Pacific sardine, dogtooth lampfish, *Sebastes* spp., and Panama lightfish). California grunion, the seventh ranked species in Manta tows, was not taken in oblique tows.

## EXPLANATION OF TABLES

Table 1. This table lists for each tow the pertinent station and tow data, the volume of water filtered, and the total number of fish eggs and larvae for ichthyoplankton stations occupied during the 1986 CalCOFI survey. Cruises are designated by a six character alphanumeric code; the first two digits indicate the year and the second two the month, followed by the ship code, JD (*David Starr Jordan*) or NH (*New Horizon*). Within each cruise the data are listed in order of increasing line and station number (southerly and seaward directions); the order of station occupancy is shown on the station charts (Figures 2 and 3). Stations are designated by two groups of numbers; the first set indicates the line and decimal fraction and the second set indicates the station and decimal fraction. Time is listed as Pacific Standard Time at the start of each tow in 24-hour designation. The values for total fish eggs and larvae are raw counts (unadjusted for volume of water filtered). The listings for station latitude and longitude in this table may differ from values given for the same station in the SIO data reports, reflecting the slight difference in position of the net tow and hydrocast.

Table 2. Pooled occurrences of all larval fish taxa taken in Manta nets on the RV *David Starr Jordan* and the RV *New Horizon* during the 1986 CalCOFI survey. Taxa are listed in rank order.

Table 3. Pooled counts (unadjusted for volume of water filtered) of all larval fish taxa taken in Manta net tows on the the RV *David Starr Jordan* and the RV *New Horizon* during the 1986 CalCOFI survey. Taxa are listed in rank order.

Table 4. Numbers of fish larvae for each taxon taken in Manta net tows on the RV *David Starr Jordan* and the RV *New Horizon* during the 1986 CalCOFI survey. Numbers of larvae are listed as number per 100 $m^3$ of water filtered. Orders and families are listed in phylogenetic sequence (Eschmeyer 1998); other taxa are listed alphabetically.

## ACKNOWLEDGMENTS

The following NMFS personnel were responsible for making the collections at sea: Dimitry Abramenkoff (all cruises), Richard Charter (8605), Ronald Dotson (8602, 8605, 8609), William Flerx (8602, 8605, 8611), Cindy Meyer (8602), Gail Theilacker (8611), and Sachiko Tsuji (8602). The samples were sorted by Lucy Dunn, Mary Farrel, Jeanne Haddox, Alice Lumpkins, and Frances Pocinich. Susan Manion entered the data and Susan Jacobson provided programming assistance. The cooperation and assistance provided by the crews of the CalCOFI research vessels were instrumental in making the collections and observations at sea.

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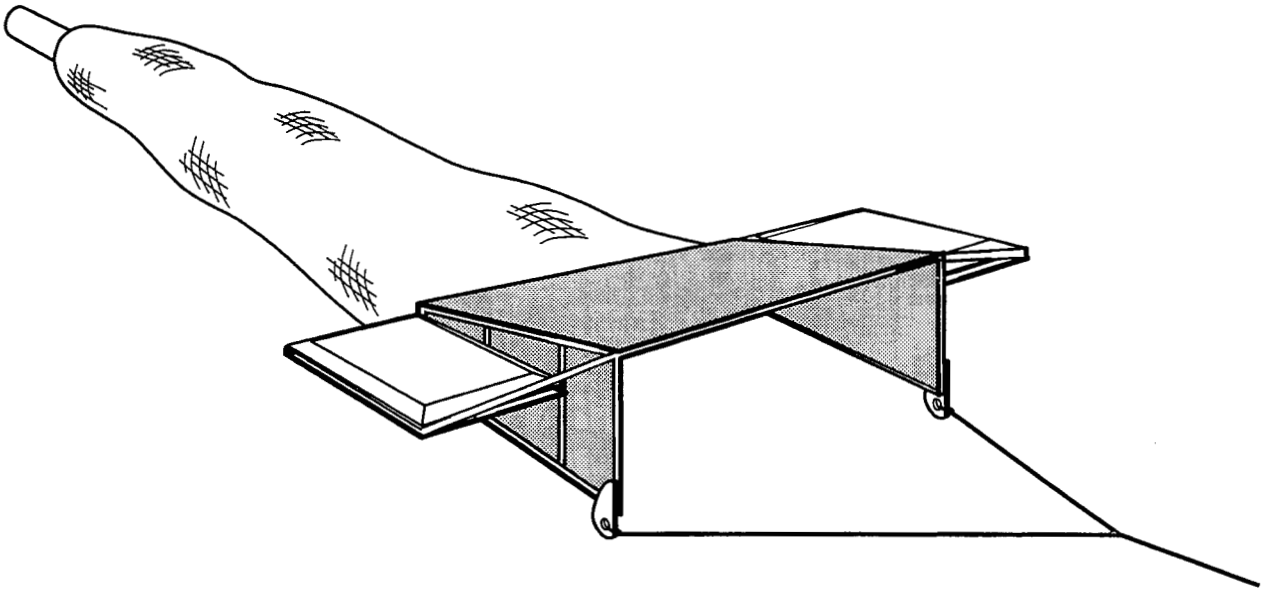

Figure 1. Diagram of the Manta net used on CalCOFI surveys.

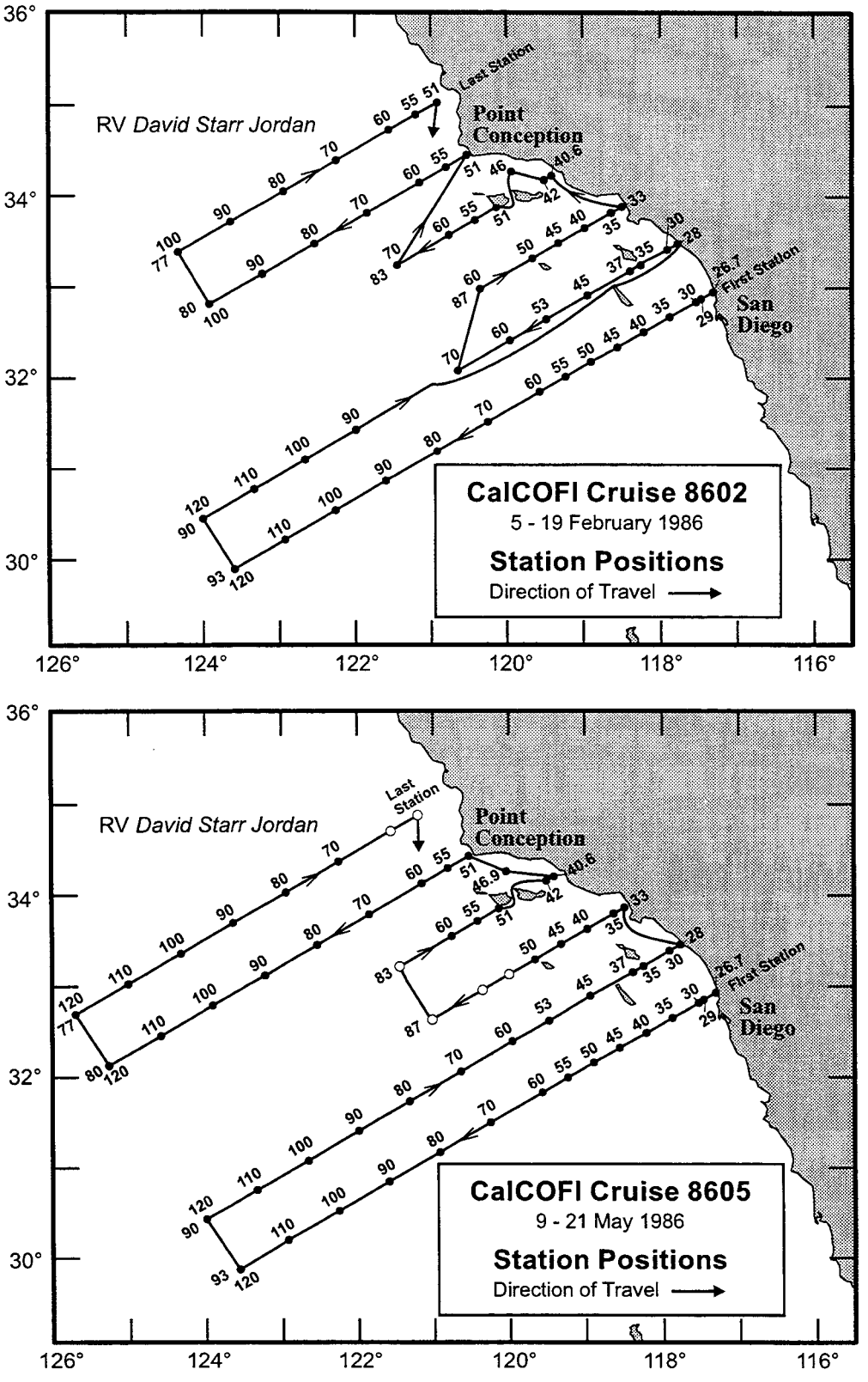


Figure 2. Stations and cruise tracks for CalCOFI cruises 8602 (above) and 8605 (below). Dots indicate stations where Manta and oblique tows were taken; open circles indicate stations where only oblique tows were taken. A Manta tow without an accompanying oblique tow was taken on Cruise 8602 at station 83.3 51.0.

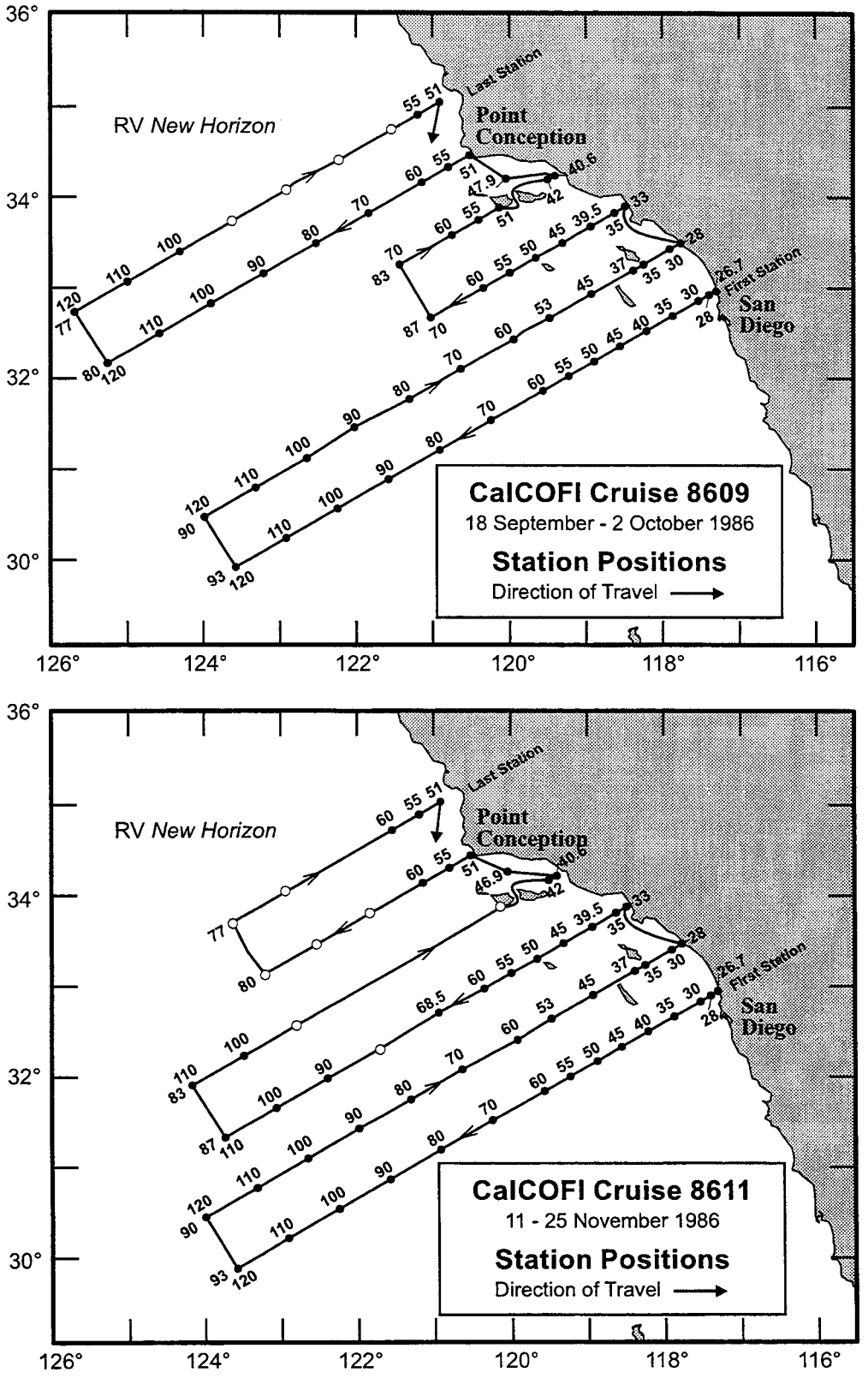


Figure 3. Stations and cruise tracks for CalCOFI cruises 8609 (above) and 8611 (below). Symbols as in Figure 2.

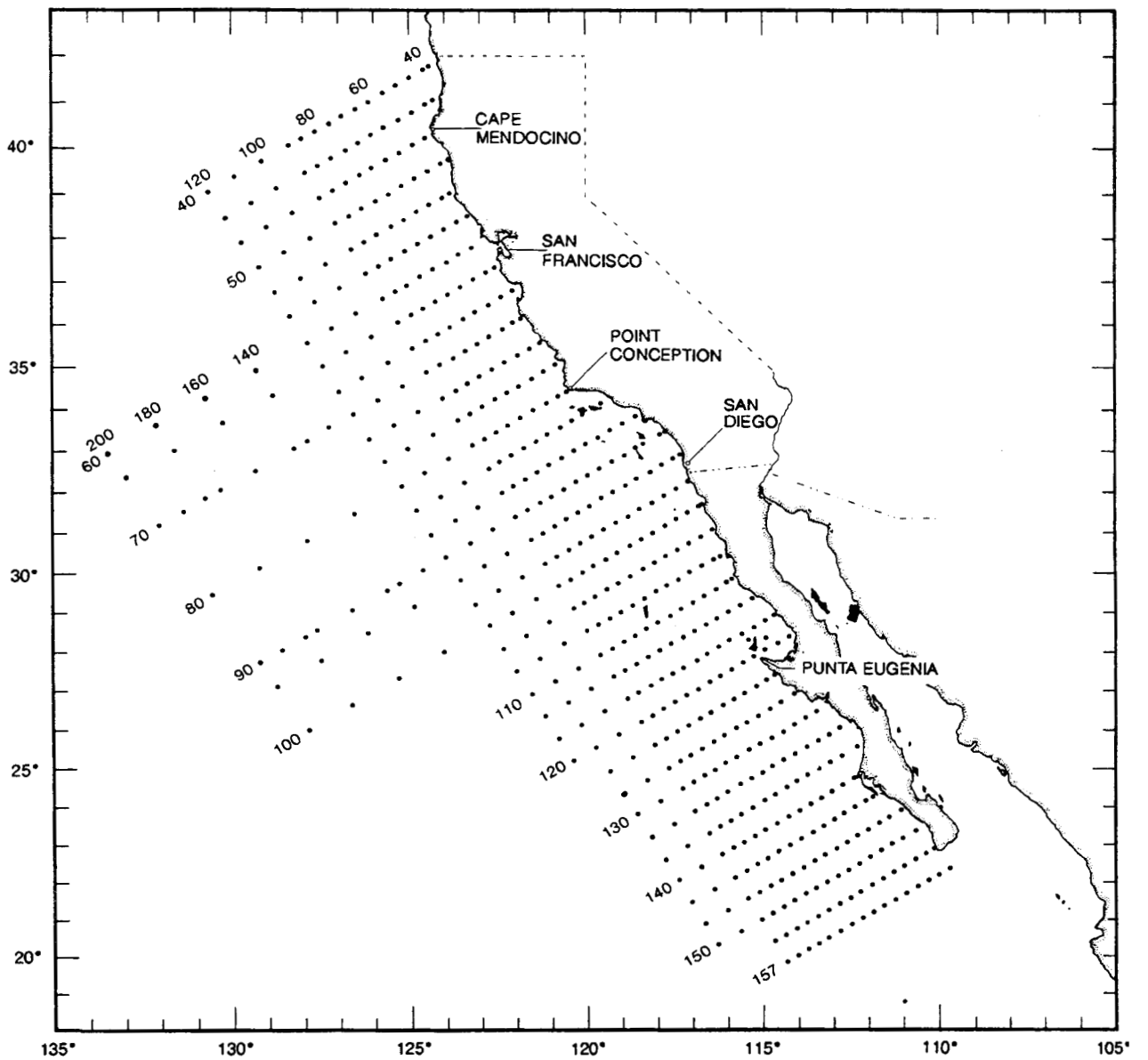


Figure 4. The basic station plan for CalCOFI cruises from 1950 - 1984.

TABLE 1. Station and plankton tow data for Manta tows taken on the 1986 CalCOFI survey. Numbers of fish eggs and larvae are raw counts, unadjusted for volume (cubic meters) of water filtered.

CalCOFI Cruise 8602

| Line | Station | Latitude (N) deg. | min. | Longitude (W) deg. | min. | Ship Code | Tow Date yr. | mo. | day | Time (PST) | Volume Water Strained | Total Larvae | Total Eggs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 | 51.0 | 35 | 01.1 | 120 | 55.1 | JD | 86 | 02 | 19 | 1310 | 104 | 11 | 1 |
| 76.7 | 55.0 | 34 | 53.3 | 121 | 11.9 | JD | 86 | 02 | 19 | 1011 | 102 | 1 | 0 |
| 76.7 | 60.0 | 34 | 43.3 | 121 | 32.9 | JD | 86 | 02 | 19 | 0636 | 81 | 3 | 17 |
| 76.7 | 70.0 | 34 | 23.3 | 122 | 14.8 | JD | 86 | 02 | 19 | 0143 | 90 | 1 | 5 |
| 76.7 | 80.0 | 34 | 03.2 | 122 | 56.5 | JD | 86 | 02 | 18 | 2057 | 100 | 1 | 1 |
| 76.7 | 90.0 | 33 | 43.3 | 123 | 38.0 | JD | 86 | 02 | 18 | 1556 | 91 | 0 | 1 |
| 76.7 | 100.0 | 33 | 23.3 | 124 | 19.4 | JD | 86 | 02 | 18 | 1053 | 98 | 0 | 0 |
| 80.0 | 51.0 | 34 | 27.0 | 120 | 31.4 | JD | 86 | 02 | 17 | 0032 | 107 | 1352 | 483 |
| 80.0 | 55.0 | 34 | 19.0 | 120 | 48.1 | JD | 86 | 02 | 17 | 0327 | 99 | 1449 | 23 |
| 80.0 | 60.0 | 34 | 09.0 | 121 | 08.9 | JD | 86 | 02 | 17 | 0703 | 93 | 25 | 4 |
| 80.0 | 70.0 | 33 | 49.1 | 121 | 50.4 | JD | 86 | 02 | 17 | 1242 | 104 | 1 | 17 |
| 80.0 | 80.0 | 33 | 28.8 | 122 | 32.0 | JD | 86 | 02 | 17 | 1841 | 88 | 0 | 1 |
| 80.0 | 90.0 | 33 | 09.0 | 123 | 13.2 | JD | 86 | 02 | 18 | 0001 | 91 | 1 | 0 |
| 80.0 | 100.0 | 32 | 49.0 | 123 | 54.6 | JD | 86 | 02 | 18 | 0526 | 93 | 277 | 5 |
| 82.0 | 46.0 | 34 | 16.2 | 119 | 56.3 | JD | 86 | 02 | 15 | 2258 | 97 | 207 | 129 |
| 83.3 | 40.6 | 34 | 13.5 | 119 | 24.7 | JD | 86 | 02 | 15 | 1815 | 101 | 104 | 130 |
| 83.3 | 42.0 | 34 | 10.7 | 119 | 30.5 | JD | 86 | 02 | 15 | 1940 | 107 | 31 | 15 |
| 83.3 | 51.0 | 33 | 52.7 | 120 | 08.0 | JD | 86 | 02 | 16 | 0307 | 97 | 553 | 1959 |
| 83.3 | 55.0 | 33 | 44.6 | 120 | 24.7 | JD | 86 | 02 | 16 | 0537 | 96 | 24 | 43 |
| 83.3 | 60.0 | 33 | 34.7 | 120 | 45.3 | JD | 86 | 02 | 16 | 0857 | 104 | 0 | 7 |
| 83.3 | 70.0 | 33 | 14.7 | 121 | 26.6 | JD | 86 | 02 | 16 | 1540 | 106 | 0 | 1 |
| 86.7 | 33.0 | 33 | 53.3 | 118 | 29.5 | JD | 86 | 02 | 15 | 1253 | 92 | 19 | 1239 |
| 86.7 | 35.0 | 33 | 49.4 | 118 | 37.7 | JD | 86 | 02 | 15 | 1103 | 103 | 4 | 2643 |
| 86.7 | 40.0 | 33 | 39.4 | 118 | 58.5 | JD | 86 | 02 | 15 | 0714 | 92 | 252 | 2764 |
| 86.7 | 45.0 | 33 | 29.4 | 119 | 19.1 | JD | 86 | 02 | 15 | 0347 | 89 | 500 | 1064 |
| 86.7 | 50.0 | 33 | 19.4 | 119 | 39.8 | JD | 86 | 02 | 15 | 0048 | 95 | 321 | 9464 |
| 86.7 | 60.0 | 32 | 59.3 | 120 | 21.0 | JD | 86 | 02 | 14 | 1942 | 87 | 2 | 0 |
| 90.0 | 28.0 | 33 | 29.1 | 117 | 46.1 | JD | 86 | 02 | 13 | 0237 | 100 | 13 | 532 |
| 90.0 | 30.0 | 33 | 25.1 | 117 | 54.2 | JD | 86 | 02 | 13 | 0444 | 93 | 81 | 1417 |
| 90.0 | 35.0 | 33 | 15.2 | 118 | 14.9 | JD | 86 | 02 | 13 | 0824 | 90 | 180 | 2241 |
| 90.0 | 37.0 | 33 | 11.1 | 118 | 23.2 | JD | 86 | 02 | 13 | 1120 | 95 | 297 | 811 |
| 90.0 | 45.0 | 32 | 55.1 | 118 | 56.1 | JD | 86 | 02 | 13 | 1615 | 97 | 32 | 2034 |
| 90.0 | 53.0 | 32 | 39.1 | 119 | 28.9 | JD | 86 | 02 | 13 | 2145 | 96 | 236 | 6303 |
| 90.0 | 60.0 | 32 | 25.1 | 119 | 57.5 | JD | 86 | 02 | 14 | 0222 | 99 | 0 | 22 |
| 90.0 | 70.0 | 32 | 05.1 | 120 | 38.3 | JD | 86 | 02 | 14 | 0806 | 100 | 0 | 4 |
| 90.0 | 90.0 | 31 | 25.1 | 121 | 59.5 | JD | 86 | 02 | 10 | 0205 | 113 | 15 | 23 |
| 90.0 | 100.0 | 31 | 05.1 | 122 | 39.7 | JD | 86 | 02 | 09 | 2030 | 104 | 0 | 2 |
| 90.0 | 110.0 | 30 | 45.1 | 123 | 19.9 | JD | 86 | 02 | 09 | 1435 | 96 | 1 | 22 |
| 90.0 | 120.0 | 30 | 25.1 | 124 | 00.0 | JD | 86 | 02 | 09 | 0725 | 91 | 1 | 24 |
| 93.3 | 26.7 | 32 | 57.3 | 117 | 18.3 | JD | 86 | 02 | 05 | 1506 | 102 | 1 | 200 |
| 93.3 | 29.0 | 32 | 52.8 | 117 | 27.7 | JD | 86 | 02 | 05 | 1741 | 100 | 100 | 2002 |
| 93.3 | 30.0 | 32 | 50.8 | 117 | 31.9 | JD | 86 | 02 | 05 | 1945 | 101 | 191 | 1048 |
| 93.3 | 35.0 | 32 | 40.9 | 117 | 52.4 | JD | 86 | 02 | 05 | 2330 | 96 | 91 | 1009 |
| 93.3 | 40.0 | 32 | 30.8 | 118 | 12.8 | JD | 86 | 02 | 06 | 0355 | 92 | 61 | 433 |
| 93.3 | 45.0 | 32 | 20.7 | 118 | 33.2 | JD | 86 | 02 | 06 | 0740 | 90 | 87 | 1316 |
| 93.3 | 50.0 | 32 | 11.0 | 118 | 53.6 | JD | 86 | 02 | 07 | 0510 | 91 | 205 | 1123 |
| 93.3 | 55.0 | 32 | 00.9 | 119 | 13.9 | JD | 86 | 02 | 07 | 0842 | 95 | 59 | 3397 |

TABLE 1. (cont.) CalCOFI Cruise 8602 (cont.)

| Line | Station | Latitude (N) deg. | min. | Longitude (W) deg. | min. | Ship Code | Tow Date yr. | mo. | day | Time (PST) | Volume Water Strained | Total Larvae | Total Eggs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 | 60.0 | 31 | 50.9 | 119 | 34.2 | JD | 86 | 02 | 07 | 1251 | 107 | 0 | 8 |
| 93.3 | 70.0 | 31 | 30.5 | 120 | 14.9 | JD | 86 | 02 | 07 | 1910 | 92 | 18 | 60 |
| 93.3 | 80.0 | 31 | 10.8 | 120 | 55.2 | JD | 86 | 02 | 08 | 0048 | 91 | 4 | 16 |
| 93.3 | 90.0 | 30 | 50.8 | 121 | 35.6 | JD | 86 | 02 | 08 | 0841 | 96 | 0 | 2 |
| 93.3 | 100.0 | 30 | 30.8 | 122 | 15.5 | JD | 86 | 02 | 08 | 1435 | 94 | 0 | 6 |
| 93.3 | 110.0 | 30 | 10.8 | 122 | 55.4 | JD | 86 | 02 | 08 | 2008 | 96 | 6 | 14 |
| 93.3 | 120.0 | 29 | 50.8 | 123 | 35.2 | JD | 86 | 02 | 09 | 0140 | 99 | 10 | 11 |

CalCOFI Cruise 8605

| Line | Station | Latitude (N) deg. | min. | Longitude (W) deg. | min. | Ship Code | Tow Date yr. | mo. | day | Time (PST) | Volume Water Strained | Total Larvae | Total Eggs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 | 70.0 | 34 | 23.3 | 122 | 14.9 | JD | 86 | 05 | 21 | 0252 | 89 | 1 | 98 |
| 76.7 | 80.0 | 34 | 03.3 | 122 | 56.5 | JD | 86 | 05 | 20 | 2150 | 102 | 7 | 103 |
| 76.7 | 90.0 | 33 | 43.3 | 123 | 38.0 | JD | 86 | 05 | 20 | 1555 | 97 | 0 | 12 |
| 76.7 | 100.0 | 33 | 23.3 | 124 | 19.4 | JD | 86 | 05 | 20 | 0837 | 97 | 0 | 4 |
| 76.7 | 110.0 | 33 | 03.4 | 125 | 00.5 | JD | 86 | 05 | 20 | 0310 | 97 | 1 | 10 |
| 76.7 | 120.0 | 32 | 43.3 | 125 | 41.6 | JD | 86 | 05 | 19 | 2139 | 97 | 5 | 6 |
| 80.0 | 51.0 | 34 | 27.0 | 120 | 31.4 | JD | 86 | 05 | 17 | 1855 | 89 | 4 | 700 |
| 80.0 | 55.0 | 34 | 19.0 | 120 | 48.2 | JD | 86 | 05 | 17 | 2257 | 97 | 2 | 109 |
| 80.0 | 60.0 | 34 | 09.0 | 121 | 09.0 | JD | 86 | 05 | 18 | 0225 | 96 | 20 | 713 |
| 80.0 | 70.0 | 33 | 49.0 | 121 | 50.6 | JD | 86 | 05 | 18 | 0905 | 96 | 1 | 426 |
| 80.0 | 80.0 | 33 | 29.0 | 122 | 32.0 | JD | 86 | 05 | 18 | 1625 | 96 | 0 | 18 |
| 80.0 | 90.0 | 33 | 09.0 | 123 | 13.3 | JD | 86 | 05 | 18 | 2158 | 97 | 1 | 4 |
| 80.0 | 100.0 | 32 | 49.0 | 123 | 54.4 | JD | 86 | 05 | 19 | 0330 | 97 | 0 | 6 |
| 80.0 | 110.0 | 32 | 29.0 | 124 | 35.3 | JD | 86 | 05 | 19 | 0850 | 101 | 0 | 3 |
| 80.0 | 120.0 | 32 | 09.0 | 125 | 16.1 | JD | 86 | 05 | 19 | 1610 | 99 | 1 | 45 |
| 81.7 | 46.9 | 34 | 17.0 | 120 | 02.1 | JD | 86 | 05 | 17 | 1505 | 106 | 8 | 45 |
| 83.3 | 40.6 | 34 | 13.5 | 119 | 24.7 | JD | 86 | 05 | 17 | 0940 | 114 | 2 | 8632 |
| 83.3 | 42.0 | 34 | 10.7 | 119 | 30.5 | JD | 86 | 05 | 17 | 0710 | 83 | 30 | 142 |
| 83.3 | 51.0 | 33 | 52.7 | 120 | 08.0 | JD | 86 | 05 | 17 | 0200 | 99 | 372 | 1156 |
| 83.3 | 55.0 | 33 | 44.7 | 120 | 24.7 | JD | 86 | 05 | 16 | 2255 | 93 | 13 | 4 |
| 83.3 | 60.0 | 33 | 34.7 | 120 | 45.4 | JD | 86 | 05 | 16 | 1910 | 92 | 19 | 43 |
| 86.7 | 33.0 | 33 | 53.4 | 118 | 29.4 | JD | 86 | 05 | 15 | 0325 | 101 | 613 | 7 |
| 86.7 | 35.0 | 33 | 49.4 | 118 | 37.7 | JD | 86 | 05 | 15 | 0527 | 102 | 38 | 7 |
| 86.7 | 40.0 | 33 | 39.3 | 118 | 58.5 | JD | 86 | 05 | 15 | 0855 | 104 | 4 | 200 |
| 86.7 | 45.0 | 33 | 29.4 | 119 | 19.1 | JD | 86 | 05 | 15 | 1313 | 92 | 3 | 432 |
| 86.7 | 50.0 | 33 | 19.4 | 119 | 39.8 | JD | 86 | 05 | 15 | 1635 | 101 | 19 | 616 |
| 90.0 | 28.0 | 33 | 29.1 | 117 | 46.1 | JD | 86 | 05 | 14 | 2146 | 94 | 156 | 1538 |
| 90.0 | 30.0 | 33 | 25.1 | 117 | 54.4 | JD | 86 | 05 | 14 | 1803 | 107 | 505 | 325 |
| 90.0 | 35.0 | 33 | 15.1 | 118 | 15.0 | JD | 86 | 05 | 14 | 1432 | 106 | 1 | 22 |
| 90.0 | 37.0 | 33 | 11.2 | 118 | 23.1 | JD | 86 | 05 | 14 | 1206 | 93 | 14 | 75 |
| 90.0 | 45.0 | 32 | 55.2 | 118 | 56.0 | JD | 86 | 05 | 14 | 0715 | 103 | 8 | 456 |
| 90.0 | 53.0 | 32 | 39.0 | 119 | 28.9 | JD | 86 | 05 | 14 | 0245 | 95 | 15 | 309 |
| 90.0 | 60.0 | 32 | 25.1 | 119 | 57.7 | JD | 86 | 05 | 13 | 2222 | 92 | 124 | 38 |
| 90.0 | 70.0 | 32 | 05.1 | 120 | 38.3 | JD | 86 | 05 | 13 | 1648 | 110 | 2 | 24 |
| 90.0 | 80.0 | 31 | 45.1 | 121 | 19.1 | JD | 86 | 05 | 13 | 1035 | 90 | 0 | 9 |
| 90.0 | 90.0 | 31 | 25.1 | 121 | 59.4 | JD | 86 | 05 | 13 | 0505 | 103 | 15 | 106 |
| 90.0 | 100.0 | 31 | 05.1 | 122 | 39.5 | JD | 86 | 05 | 12 | 2326 | 98 | 27 | 59 |

TABLE 1. (cont.) CalCOFI Cruise 8605 (cont.)

| Line | Station | Latitude (N) deg. | min. | Longitude (W) deg. | min. | Ship Code | Tow Date yr. | mo. | day | Time (PST) | Volume Water Strained | Total Larvae | Total Eggs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 | 110.0 | 30 | 45.1 | 123 | 19.9 | JD | 86 | 05 | 12 | 1741 | 106 | 4 | 91 |
| 90.0 | 120.0 | 30 | 25.1 | 123 | 59.9 | JD | 86 | 05 | 12 | 1141 | 92 | 3 | 120 |
| 93.3 | 26.7 | 32 | 57.4 | 117 | 18.3 | JD | 86 | 05 | 09 | 1535 | 86 | 4 | 58 |
| 93.3 | 29.0 | 32 | 52.8 | 117 | 27.8 | JD | 86 | 05 | 09 | 1803 | 94 | 15 | 74 |
| 93.3 | 30.0 | 32 | 50.8 | 117 | 31.9 | JD | 86 | 05 | 09 | 2018 | 96 | 544 | 340 |
| 93.3 | 35.0 | 32 | 40.8 | 117 | 52.4 | JD | 86 | 05 | 10 | 0009 | 102 | 3642 | 25 |
| 93.3 | 40.0 | 32 | 30.8 | 118 | 12.9 | JD | 86 | 05 | 10 | 0351 | 106 | 258 | 775 |
| 93.3 | 45.0 | 32 | 20.8 | 118 | 33.3 | JD | 86 | 05 | 10 | 0739 | 90 | 4 | 937 |
| 93.3 | 50.0 | 32 | 10.8 | 118 | 53.6 | JD | 86 | 05 | 10 | 1130 | 99 | 0 | 374 |
| 93.3 | 55.0 | 32 | 00.8 | 119 | 14.0 | JD | 86 | 05 | 10 | 1512 | 107 | 1 | 231 |
| 93.3 | 60.0 | 31 | 50.8 | 119 | 34.2 | JD | 86 | 05 | 10 | 1907 | 74 | 18 | 392 |
| 93.3 | 70.0 | 31 | 30.8 | 120 | 14.9 | JD | 86 | 05 | 11 | 0035 | 101 | 20 | 33 |
| 93.3 | 80.0 | 31 | 10.7 | 120 | 55.3 | JD | 86 | 05 | 11 | 0610 | 98 | 4 | 17 |
| 93.3 | 90.0 | 30 | 50.8 | 121 | 35.4 | JD | 86 | 05 | 11 | 1220 | 87 | 0 | 56 |
| 93.3 | 100.0 | 30 | 30.9 | 122 | 15.4 | JD | 86 | 05 | 11 | 1800 | 107 | 0 | 160 |
| 93.3 | 110.0 | 30 | 10.8 | 122 | 55.7 | JD | 86 | 05 | 11 | 2347 | 85 | 8 | 59 |
| 93.3 | 120.0 | 29 | 50.4 | 123 | 33.4 | JD | 86 | 05 | 12 | 0520 | 104 | 21 | 5 |

CalCOFI Cruise 8609

| Line | Station | Latitude (N) deg. | min. | Longitude (W) deg. | min. | Ship Code | Tow Date yr. | mo. | day | Time (PST) | Volume Water Strained | Total Larvae | Total Eggs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 | 51.0 | 35 | 01.4 | 120 | 54.9 | NH | 86 | 10 | 02 | 0915 | 98 | 0 | 531 |
| 76.7 | 55.0 | 34 | 53.3 | 121 | 12.0 | NH | 86 | 10 | 02 | 0428 | 70 | 2 | 4 |
| 76.7 | 100.0 | 33 | 23.4 | 124 | 19.3 | NH | 86 | 09 | 30 | 1937 | 96 | 2 | 0 |
| 76.7 | 110.0 | 33 | 03.3 | 125 | 00.5 | NH | 86 | 09 | 30 | 1406 | 82 | 3 | 3 |
| 76.7 | 120.0 | 32 | 43.3 | 125 | 41.6 | NH | 86 | 09 | 30 | 0652 | 79 | 16 | 0 |
| 80.0 | 51.0 | 34 | 26.9 | 120 | 31.4 | NH | 86 | 09 | 27 | 2048 | 78 | 4 | 18 |
| 80.0 | 55.0 | 34 | 19.0 | 120 | 48.0 | NH | 86 | 09 | 28 | 0024 | 118 | 1 | 5 |
| 80.0 | 60.0 | 34 | 09.0 | 121 | 09.0 | NH | 86 | 09 | 28 | 0354 | 79 | 6 | 5 |
| 80.0 | 70.0 | 33 | 49.0 | 121 | 50.7 | NH | 86 | 09 | 28 | 1727 | 101 | 1 | 15 |
| 80.0 | 80.0 | 33 | 28.9 | 122 | 32.0 | NH | 86 | 09 | 28 | 2341 | 88 | 15 | 11 |
| 80.0 | 90.0 | 33 | 08.9 | 123 | 13.4 | NH | 86 | 09 | 29 | 0532 | 82 | 1 | 12 |
| 80.0 | 100.0 | 32 | 48.9 | 123 | 54.5 | NH | 86 | 09 | 29 | 1213 | 78 | 3 | 7 |
| 80.0 | 110.0 | 32 | 29.0 | 124 | 35.4 | NH | 86 | 09 | 29 | 1824 | 98 | 146 | 0 |
| 80.0 | 120.0 | 32 | 09.0 | 125 | 16.1 | NH | 86 | 09 | 30 | 0035 | 76 | 12 | 0 |
| 82.1 | 47.9 | 34 | 11.5 | 120 | 03.4 | NH | 86 | 09 | 27 | 1600 | 86 | 2 | 12 |
| 83.3 | 40.6 | 34 | 13.5 | 119 | 24.8 | NH | 86 | 09 | 27 | 0929 | 73 | 1 | 2027 |
| 83.3 | 42.0 | 34 | 10.7 | 119 | 30.5 | NH | 86 | 09 | 27 | 0714 | 82 | 3 | 142 |
| 83.3 | 51.0 | 33 | 52.6 | 120 | 08.2 | NH | 86 | 09 | 27 | 0042 | 78 | 65 | 332 |
| 83.3 | 55.0 | 33 | 44.7 | 120 | 24.5 | NH | 86 | 09 | 26 | 2116 | 74 | 1 | 2 |
| 83.3 | 60.0 | 33 | 34.6 | 120 | 45.2 | NH | 86 | 09 | 26 | 1652 | 123 | 5 | 20 |
| 83.3 | 70.0 | 33 | 14.7 | 121 | 26.5 | NH | 86 | 09 | 26 | 1002 | 62 | 0 | 34 |
| 86.7 | 33.0 | 33 | 53.5 | 118 | 29.4 | NH | 86 | 09 | 24 | 2122 | 90 | 18 | 186 |
| 86.7 | 35.0 | 33 | 49.3 | 118 | 37.8 | NH | 86 | 09 | 25 | 0035 | 89 | 30 | 7 |
| 86.7 | 39.5 | 33 | 40.4 | 118 | 56.4 | NH | 86 | 09 | 25 | 0629 | 82 | 2 | 17 |
| 86.7 | 45.0 | 33 | 29.3 | 119 | 18.9 | NH | 86 | 09 | 25 | 1159 | 81 | 3 | 1 |
| 86.7 | 50.0 | 33 | 19.5 | 119 | 39.9 | NH | 86 | 09 | 25 | 1519 | 63 | 7 | 54 |
| 86.7 | 55.0 | 33 | 09.4 | 120 | 00.3 | NH | 86 | 09 | 25 | 1858 | 72 | 7 | 1 |

TABLE 1. (cont.) CalCOFI Cruise 8609 (cont.)

| Line | Station | Latitude (N) deg. | min. | Longitude (W) deg. | min. | Ship Code | Tow Date yr. | mo. | day | Time (PST) | Volume Water Strained | Total Larvae | Total Eggs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 | 60.0 | 32 | 59.4 | 120 | 21.0 | NH | 86 | 09 | 25 | 2223 | 50 | 7 | 11 |
| 86.7 | 70.0 | 32 | 39.5 | 121 | 01.9 | NH | 86 | 09 | 26 | 0335 | 88 | 13 | 3 |
| 90.0 | 28.0 | 33 | 29.1 | 117 | 46.1 | NH | 86 | 09 | 24 | 1545 | 77 | 1 | 7 |
| 90.0 | 30.0 | 33 | 25.1 | 117 | 54.4 | NH | 86 | 09 | 24 | 1312 | 79 | 0 | 33 |
| 90.0 | 35.0 | 33 | 15.1 | 118 | 14.9 | NH | 86 | 09 | 24 | 0554 | 92 | 19 | 97 |
| 90.0 | 37.0 | 33 | 11.2 | 118 | 23.1 | NH | 86 | 09 | 24 | 0228 | 95 | 14 | 8 |
| 90.0 | 45.0 | 32 | 55.2 | 118 | 56.1 | NH | 86 | 09 | 23 | 2110 | 90 | 3 | 1 |
| 90.0 | 53.0 | 32 | 39.1 | 119 | 29.0 | NH | 86 | 09 | 23 | 1455 | 123 | 2 | 43 |
| 90.0 | 60.0 | 32 | 25.0 | 119 | 57.4 | NH | 86 | 09 | 23 | 0855 | 89 | 1 | 9 |
| 90.0 | 70.0 | 32 | 05.2 | 120 | 38.3 | NH | 86 | 09 | 23 | 0255 | 88 | 6 | 9 |
| 90.0 | 80.0 | 31 | 45.0 | 121 | 18.7 | NH | 86 | 09 | 22 | 2031 | 94 | 18 | 10 |
| 90.0 | 90.0 | 31 | 26.3 | 122 | 01.9 | NH | 86 | 09 | 22 | 1145 | 61 | 3 | 1 |
| 90.0 | 100.0 | 31 | 05.1 | 122 | 39.6 | NH | 86 | 09 | 22 | 0407 | 79 | 19 | 10 |
| 90.0 | 110.0 | 30 | 45.2 | 123 | 19.8 | NH | 86 | 09 | 21 | 2142 | 91 | 49 | 0 |
| 90.0 | 120.0 | 30 | 25.1 | 123 | 59.8 | NH | 86 | 09 | 21 | 1533 | 84 | 2 | 0 |
| 93.3 | 26.7 | 32 | 57.1 | 117 | 18.2 | NH | 86 | 09 | 18 | 1404 | 95 | 2 | 60 |
| 93.3 | 28.0 | 32 | 54.8 | 117 | 23.8 | NH | 86 | 09 | 18 | 1653 | 82 | 4 | 26 |
| 93.3 | 30.0 | 32 | 50.7 | 117 | 32.1 | NH | 86 | 09 | 18 | 1946 | 85 | 12 | 124 |
| 93.3 | 35.0 | 32 | 40.7 | 117 | 52.5 | NH | 86 | 09 | 18 | 2342 | 51 | 6 | 85 |
| 93.3 | 40.0 | 32 | 30.8 | 118 | 12.8 | NH | 86 | 09 | 19 | 0347 | 72 | 1 | 2 |
| 93.3 | 45.0 | 32 | 20.6 | 118 | 33.5 | NH | 86 | 09 | 19 | 0835 | 78 | 0 | 1 |
| 93.3 | 50.0 | 32 | 10.4 | 118 | 54.1 | NH | 86 | 09 | 19 | 1316 | 88 | 2 | 3 |
| 93.3 | 55.0 | 32 | 00.7 | 119 | 14.1 | NH | 86 | 09 | 19 | 1707 | 77 | 2 | 7 |
| 93.3 | 60.0 | 31 | 50.6 | 119 | 34.3 | NH | 86 | 09 | 19 | 2048 | 95 | 3 | 7 |
| 93.3 | 70.0 | 31 | 30.8 | 120 | 14.8 | NH | 86 | 09 | 20 | 0224 | 76 | 6 | 14 |
| 93.3 | 80.0 | 31 | 10.8 | 120 | 55.1 | NH | 86 | 09 | 20 | 0825 | 92 | 2 | 3 |
| 93.3 | 90.0 | 30 | 50.8 | 121 | 35.4 | NH | 86 | 09 | 20 | 1525 | 83 | 2 | 10 |
| 93.3 | 100.0 | 30 | 31.0 | 122 | 15.3 | NH | 86 | 09 | 20 | 2054 | 85 | 20 | 155 |
| 93.3 | 110.0 | 30 | 10.8 | 122 | 55.4 | NH | 86 | 09 | 21 | 0230 | 86 | 19 | 43 |
| 93.3 | 120.0 | 29 | 50.8 | 123 | 35.2 | NH | 86 | 09 | 21 | 0759 | 77 | 3 | 4 |

CalCOFI Cruise 8611

| Line | Station | Latitude (N) deg. | min. | Longitude (W) deg. | min. | Ship Code | Tow Date yr. | mo. | day | Time (PST) | Volume Water Strained | Total Larvae | Total Eggs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 | 51.0 | 35 | 01.4 | 120 | 54.9 | NH | 86 | 11 | 25 | 1656 | 84 | 41 | 3 |
| 76.7 | 55.0 | 34 | 53.3 | 121 | 11.9 | NH | 86 | 11 | 25 | 1414 | 79 | 1 | 2 |
| 76.7 | 60.0 | 34 | 43.4 | 121 | 32.9 | NH | 86 | 11 | 25 | 1022 | 52 | 0 | 8 |
| 80.0 | 51.0 | 34 | 27.1 | 120 | 31.4 | NH | 86 | 11 | 23 | 0451 | 91 | 21 | 252 |
| 80.0 | 55.0 | 34 | 18.9 | 120 | 48.1 | NH | 86 | 11 | 23 | 0837 | 62 | 4 | 18 |
| 80.0 | 60.0 | 34 | 08.9 | 121 | 09.0 | NH | 86 | 11 | 23 | 1313 | 100 | 2 | 8 |
| 81.8 | 46.9 | 34 | 16.4 | 120 | 02.9 | NH | 86 | 11 | 23 | 0112 | 59 | 0 | 21 |
| 83.3 | 40.6 | 34 | 13.7 | 119 | 24.5 | NH | 86 | 11 | 22 | 1828 | 82 | 5 | 79 |
| 83.3 | 42.0 | 34 | 10.8 | 119 | 30.5 | NH | 86 | 11 | 22 | 1621 | 78 | 2 | 47 |
| 83.3 | 100.0 | 32 | 14.7 | 123 | 29.6 | NH | 86 | 11 | 21 | 0001 | 73 | 0 | 6 |
| 83.3 | 110.0 | 31 | 54.7 | 124 | 10.2 | NH | 86 | 11 | 20 | 1812 | 101 | 0 | 0 |
| 86.6 | 68.5 | 32 | 43.1 | 120 | 56.8 | NH | 86 | 11 | 19 | 1121 | 87 | 0 | 6 |
| 86.7 | 33.0 | 33 | 53.4 | 118 | 29.4 | NH | 86 | 11 | 18 | 0311 | 118 | 11 | 189 |
| 86.7 | 35.0 | 33 | 49.4 | 118 | 37.7 | NH | 86 | 11 | 18 | 0625 | 102 | 4 | 0 |

TABLE 1. (cont.) CalCOFI Cruise 8611 (cont.)

| Line | Station | Latitude (N) deg. | min. | Longitude (W) deg. | min. | Ship Code | Tow Date yr. | mo. | day | Time (PST) | Volume Water Strained | Total Larvae | Total Eggs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 | 39.5 | 33 | 40.4 | 118 | 56.4 | NH | 86 | 11 | 18 | 1309 | 93 | 1 | 21 |
| 86.7 | 45.0 | 33 | 29.4 | 119 | 19.2 | NH | 86 | 11 | 18 | 1803 | 95 | 18 | 77 |
| 86.7 | 50.0 | 33 | 19.1 | 119 | 39.6 | NH | 86 | 11 | 18 | 2155 | 78 | 10 | 42 |
| 86.7 | 55.0 | 33 | 09.4 | 120 | 00.3 | NH | 86 | 11 | 19 | 0144 | 104 | 1 | 0 |
| 86.7 | 60.0 | 32 | 59.4 | 120 | 21.2 | NH | 86 | 11 | 19 | 0515 | 76 | 1 | 1 |
| 86.7 | 90.0 | 31 | 59.3 | 122 | 23.9 | NH | 86 | 11 | 20 | 0020 | 87 | 0 | 2 |
| 86.7 | 100.0 | 31 | 39.4 | 123 | 04.2 | NH | 86 | 11 | 20 | 0550 | 103 | 4 | 0 |
| 86.7 | 110.0 | 31 | 19.3 | 123 | 44.6 | NH | 86 | 11 | 20 | 1227 | 82 | 1 | 3 |
| 90.0 | 28.0 | 33 | 29.1 | 117 | 46.3 | NH | 86 | 11 | 17 | 2131 | 67 | 1 | 6 |
| 90.0 | 30.0 | 33 | 25.2 | 117 | 54.3 | NH | 86 | 11 | 17 | 1916 | 81 | 0 | 0 |
| 90.0 | 35.0 | 33 | 15.2 | 118 | 15.0 | NH | 86 | 11 | 17 | 1117 | 85 | 0 | 1 |
| 90.0 | 37.0 | 33 | 11.1 | 118 | 23.2 | NH | 86 | 11 | 17 | 0830 | 77 | 2 | 136 |
| 90.0 | 45.0 | 32 | 55.1 | 118 | 56.1 | NH | 86 | 11 | 17 | 0342 | 72 | 1 | 40 |
| 90.0 | 53.0 | 32 | 39.1 | 119 | 28.9 | NH | 86 | 11 | 16 | 2247 | 92 | 6 | 0 |
| 90.0 | 60.0 | 32 | 25.2 | 119 | 55.5 | NH | 86 | 11 | 16 | 1752 | 69 | 1 | 1 |
| 90.0 | 70.0 | 32 | 05.2 | 120 | 38.4 | NH | 86 | 11 | 16 | 1205 | 90 | 6 | 4 |
| 90.0 | 80.0 | 31 | 45.1 | 121 | 18.9 | NH | 86 | 11 | 16 | 0550 | 86 | 12 | 2 |
| 90.0 | 90.0 | 31 | 25.1 | 121 | 59.4 | NH | 86 | 11 | 16 | 0029 | 47 | 0 | 0 |
| 90.0 | 100.0 | 31 | 05.1 | 122 | 39.7 | NH | 86 | 11 | 15 | 1820 | 85 | 7 | 1 |
| 90.0 | 110.0 | 30 | 45.2 | 123 | 19.9 | NH | 86 | 11 | 15 | 1243 | 82 | 2 | 2 |
| 90.0 | 120.0 | 30 | 25.2 | 124 | 00.0 | NH | 86 | 11 | 15 | 0605 | 79 | 10 | 0 |
| 93.3 | 26.7 | 32 | 57.7 | 117 | 18.4 | NH | 86 | 11 | 11 | 1205 | 66 | 0 | 35 |
| 93.3 | 28.0 | 32 | 54.8 | 117 | 23.8 | NH | 86 | 11 | 11 | 1422 | 78 | 0 | 688 |
| 93.3 | 30.0 | 32 | 50.7 | 117 | 31.8 | NH | 86 | 11 | 11 | 1657 | 93 | 6 | 90 |
| 93.3 | 35.0 | 32 | 40.8 | 117 | 52.4 | NH | 86 | 11 | 11 | 2118 | 80 | 5 | 3 |
| 93.3 | 40.0 | 32 | 30.9 | 118 | 12.8 | NH | 86 | 11 | 12 | 0126 | 67 | 5 | 1 |
| 93.3 | 45.0 | 32 | 20.7 | 118 | 33.3 | NH | 86 | 11 | 12 | 0445 | 70 | 0 | 1 |
| 93.3 | 50.0 | 32 | 11.0 | 118 | 52.8 | NH | 86 | 11 | 12 | 0730 | 82 | 3 | 2 |
| 93.3 | 55.0 | 32 | 00.6 | 119 | 14.0 | NH | 86 | 11 | 12 | 1257 | 82 | 2 | 3 |
| 93.3 | 60.0 | 31 | 50.7 | 119 | 34.3 | NH | 86 | 11 | 13 | 1303 | 78 | 2 | 1 |
| 93.3 | 70.0 | 31 | 30.8 | 120 | 14.9 | NH | 86 | 11 | 13 | 1822 | 81 | 2 | 7 |
| 93.3 | 80.0 | 31 | 10.9 | 120 | 55.3 | NH | 86 | 11 | 13 | 2356 | 81 | 0 | 7 |
| 93.3 | 90.0 | 30 | 50.7 | 121 | 35.4 | NH | 86 | 11 | 14 | 0511 | 75 | 3 | 17 |
| 93.3 | 100.0 | 30 | 30.8 | 122 | 15.2 | NH | 86 | 11 | 14 | 0936 | 71 | 0 | 0 |
| 93.3 | 110.0 | 30 | 10.8 | 122 | 55.3 | NH | 86 | 11 | 14 | 1828 | 82 | 5 | 1 |
| 93.3 | 120.0 | 29 | 50.1 | 123 | 35.7 | NH | 86 | 11 | 15 | 0015 | 93 | 14 | 2 |

TABLE 2. Pooled occurrences of fish larvae taken in Manta tows on the 1986 CalCOFI survey.

| Rank | Taxon | Occurrences |
|---|---|---|
| 1 | *Engraulis mordax* | 82 |
| 2 | *Cololabis saira* | 74 |
| 3 | *Sebastes* spp. | 37 |
| 4 | *Sardinops sagax* | 25 |
| 5 | *Scomber japonicus* | 23 |
| 6 | *Scorpaenichthys marmoratus* | 19 |
| 6 | *Hypsoblennius jenkinsi* | 19 |
| 7 | *Vinciguerria lucetia* | 15 |
| 8 | *Trachurus symmetricus* | 14 |
| 10 | *Ceratoscopelus townsendi* | 10 |
| 11 | *Merluccius productus* | 9 |
| 12 | *Stenobrachius leucopsarus* | 7 |
| 12 | *Hypsoblennius gilberti* | 7 |
| 14 | *Oxyjulis californica* | 6 |
| 14 | *Cyclothone* spp. | 6 |
| 14 | *Leuresthes tenuis* | 6 |
| 17 | *Chromis punctipinnis* | 5 |
| 17 | *Sebastes aurora* | 5 |
| 17 | *Genyonemus lineatus* | 5 |
| 17 | *Icichthys lockingtoni* | 5 |
| 21 | *Cheilopogon pinnatibarbatus* | 4 |
| 21 | *Triphoturus mexicanus* | 4 |
| 21 | *Cheilopogon heterurus* | 4 |
| 21 | *Pleuronichthys coenosus* | 4 |
| 21 | *Atherinopsis californiensis* | 4 |
| 21 | *Oneirodes* spp. | 4 |
| 21 | *Sphyraena argentea* | 4 |
| 28 | *Aristostomias scintillans* | 3 |
| 28 | *Cyclothone signata* | 3 |
| 28 | *Citharichthys sordidus* | 3 |
| 28 | *Medialuna californiensis* | 3 |
| 28 | *Neoclinus stephensae* | 3 |
| 33 | *Sebastes diploproa* | 2 |
| 33 | *Pleuronichthys verticalis* | 2 |
| 33 | *Hypsopsetta guttulata* | 2 |
| 33 | *Myctophum nitidulum* | 2 |
| 33 | *Tetragonurus cuvieri* | 2 |
| 33 | *Synodus lucioceps* | 2 |
| 33 | *Ophiodon elongatus* | 2 |
| 33 | *Lampanyctus* spp. | 2 |
| 41 | *Stomias atriventer* | 1 |
| 41 | *Bathophilus flemingi* | 1 |
| 41 | *Nannobrachium ritteri* | 1 |
| 41 | *Oxylebius pictus* | 1 |
| 41 | Stomiiformes | 1 |
| 41 | *Protomyctophum crockeri* | 1 |
| 41 | *Lampadena urophaos* | 1 |
| 41 | *Sternoptyx* spp. | 1 |
| 41 | *Brama japonica* | 1 |

TABLE 2. (cont.)

| Rank | Taxon | Occurrences |
|---|---|---|
| 41 | *Pleuronichthys ritteri* | 1 |
| 41 | *Pleuronichthys decurrens* | 1 |
| 41 | *Parophrys vetulus* | 1 |
| 41 | *Paralichthys californicus* | 1 |
| 41 | *Hippoglossina stomata* | 1 |
| 41 | *Sarda chiliensis* | 1 |
| 41 | *Rathbunella alleni* | 1 |
| 41 | *Mugil cephalus* | 1 |
| 41 | *Sebastes jordani* | 1 |
| 41 | *Atractoscion nobilis* | 1 |
| 41 | *Tarletonbeania crenularis* | 1 |
| 41 | *Paralabrax* spp. | 1 |
| 41 | *Odontopyxis trispinosa* | 1 |
| 41 | *Clinocottus analis* | 1 |
| 41 | *Hexagrammos decagrammus* | 1 |
| 41 | Disintegrated fish larvae | 1 |
| 41 | *Sebastes paucispinis* | 1 |
| 41 | *Hirundichthys* spp. | 1 |
| 41 | *Atherinops affinis* | 1 |
| 41 | *Girella nigricans* | 1 |
| | Total | 467 |

TABLE 3. Pooled raw counts of fish larvae taken in Manta tows on the 1986 CalCOFI survey.

| Rank | Taxon | Count |
|---|---|---|
| 1 | *Engraulis mordax* | 10471 |
| 2 | *Merluccius productus* | 1565 |
| 3 | *Scomber japonicus* | 627 |
| 4 | *Cololabis saira* | 352 |
| 5 | *Sardinops sagax* | 341 |
| 6 | *Ceratoscopelus townsendi* | 143 |
| 7 | *Leuresthes tenuis* | 122 |
| 8 | *Sebastes* spp. | 116 |
| 9 | *Vinciguerria lucetia* | 63 |
| 10 | *Hypsoblennius jenkinsi* | 45 |
| 10 | *Scorpaenichthys marmoratus* | 45 |
| 12 | *Atherinopsis californiensis* | 43 |
| 13 | *Cheilopogon pinnatibarbatus* | 41 |
| 14 | *Stenobrachius leucopsarus* | 37 |
| 15 | *Trachurus symmetricus* | 32 |
| 16 | *Cyclothone signata* | 13 |
| 17 | *Hypsoblennius gilberti* | 12 |
| 18 | *Genyonemus lineatus* | 11 |
| 18 | *Chromis punctipinnis* | 11 |
| 20 | *Oxyjulis californica* | 10 |
| 21 | *Cheilopogon heterurus* | 9 |
| 22 | *Sphyraena argentea* | 8 |
| 22 | *Cyclothone* spp. | 8 |
| 24 | *Pleuronichthys coenosus* | 6 |
| 24 | *Neoclinus stephensae* | 6 |
| 26 | *Sebastes diploproa* | 5 |
| 26 | *Sebastes aurora* | 5 |
| 26 | *Aristostomias scintillans* | 5 |
| 26 | *Triphoturus mexicanus* | 5 |
| 26 | *Icichthys lockingtoni* | 5 |
| 26 | *Ophiodon elongatus* | 5 |
| 32 | *Citharichthys sordidus* | 4 |
| 32 | *Oneirodes* spp. | 4 |
| 34 | *Medialuna californiensis* | 3 |
| 34 | *Pleuronichthys verticalis* | 3 |
| 36 | *Hypsopsetta guttulata* | 2 |
| 36 | *Lampadena urophaos* | 2 |
| 36 | *Nannobrachium ritteri* | 2 |
| 36 | *Lampanyctus* spp. | 2 |
| 36 | *Myctophum nitidulum* | 2 |
| 36 | *Synodus lucioceps* | 2 |
| 36 | *Tetragonurus cuvieri* | 2 |
| 36 | *Atractoscion nobilis* | 2 |
| 36 | *Stomias atriventer* | 2 |
| 45 | *Bathophilus flemingi* | 1 |
| 45 | *Atherinops affinis* | 1 |
| 45 | Stomiiformes | 1 |
| 45 | *Sternoptyx* spp. | 1 |
| 45 | *Hirundichthys* spp. | 1 |

TABLE 3. (cont.)

| Rank | Taxon | Count |
|---|---|---|
| 45 | *Hexagrammos decagrammus* | 1 |
| 45 | *Pleuronichthys ritteri* | 1 |
| 45 | *Pleuronichthys decurrens* | 1 |
| 45 | *Parophrys vetulus* | 1 |
| 45 | *Paralichthys californicus* | 1 |
| 45 | *Hippoglossina stomata* | 1 |
| 45 | *Rathbunella alleni* | 1 |
| 45 | *Odontopyxis trispinosa* | 1 |
| 45 | *Brama japonica* | 1 |
| 45 | *Oxylebius pictus* | 1 |
| 45 | *Protomyctophum crockeri* | 1 |
| 45 | *Sebastes paucispinis* | 1 |
| 45 | *Sebastes jordani* | 1 |
| 45 | *Girella nigricans* | 1 |
| 45 | *Mugil cephalus* | 1 |
| 45 | *Sarda chiliensis* | 1 |
| 45 | Disintegrated fish larvae | 1 |
| 45 | *Paralabrax* spp. | 1 |
| 45 | *Tarletonbeania crenularis* | 1 |
| 45 | *Clinocottus analis* | 1 |
| | Total | 14224 |

TABLE 4. Numbers of fish larvae taken in Manta net tows on the 1986 CalCOFI survey, listed by taxon, station, and month. Numbers of larvae are expressed as larvae per 100 cubic meters of water filtered. Unoccupied stations are indicated by a dash.

***Sardinops sagax***

| Station | | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 | 51.0 | - | 0.0 | - | - | - | - | - | - | - | 0.0 | 1.7 | - |
| 80.0 | 51.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.8 | - | 0.9 | - |
| 82.1 | 47.9 | - | - | - | - | - | - | - | - | 0.9 | - | - | - |
| 83.3 | 51.0 | - | 0.0 | - | - | 4.0 | - | - | - | 0.8 | - | - | - |
| 83.3 | 60.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | - | - |
| 86.7 | 33.0 | - | 0.0 | - | - | 255.8 | - | - | - | 3.6 | - | 1.2 | - |
| 86.7 | 35.0 | - | 1.0 | - | - | 3.1 | - | - | - | 4.5 | - | 0.0 | - |
| 86.7 | 70.0 | - | - | - | - | - | - | - | - | 0.9 | - | - | - |
| 90.0 | 28.0 | - | 0.0 | - | - | 6.6 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 | 30.0 | - | 0.0 | - | - | 20.2 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 | 35.0 | - | 0.0 | - | - | 0.0 | - | - | - | 16.6 | - | 0.0 | - |
| 90.0 | 53.0 | - | 0.0 | - | - | 5.7 | - | - | - | 1.2 | - | 0.0 | - |
| 90.0 | 60.0 | - | 0.0 | - | - | 5.5 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 | 26.7 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 | 28.0 | - | - | - | - | - | - | - | - | 0.8 | - | 0.0 | - |
| 93.3 | 30.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.9 | - | 0.0 | - |
| 93.3 | 35.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.5 | - | 0.0 | - |

***Engraulis mordax***

| Station | | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 | 51.0 | - | 1.0 | - | - | - | - | - | - | - | 0.0 | 15.1 | - |
| 76.7 | 55.0 | - | 0.0 | - | - | - | - | - | - | - | 0.7 | 0.0 | - |
| 80.0 | 51.0 | - | 1443.7 | - | - | 1.8 | - | - | - | 0.0 | - | 2.7 | - |
| 80.0 | 55.0 | - | 195.8 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 80.0 | 60.0 | - | 0.0 | - | - | 19.3 | - | - | - | 0.0 | - | 0.0 | - |
| 80.0 | 90.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | - | - |
| 81.7 | 46.9 | - | - | - | - | 1.1 | - | - | - | - | - | - | - |
| 82.0 | 46.0 | - | 162.6 | - | - | - | - | - | - | - | - | - | - |
| 83.3 | 40.6 | - | 102.7 | - | - | 1.1 | - | - | - | 0.7 | - | 0.8 | - |
| 83.3 | 42.0 | - | 32.1 | - | - | 1.7 | - | - | - | 1.6 | - | 0.0 | - |
| 83.3 | 51.0 | - | 523.9 | - | - | 251.7 | - | - | - | 48.4 | - | - | - |

TABLE 4. (cont.)

*Engraulis mordax* (cont.)

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 55.0 | - | 23.0 | - | - | 5.6 | - | - | - | 0.0 | - | - | - |
| 83.3 60.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | - | - |
| 86.7 33.0 | - | 12.9 | - | - | 334.6 | - | - | - | 6.3 | - | 0.0 | - |
| 86.7 35.0 | - | 2.1 | - | - | 0.0 | - | - | - | 4.5 | - | 0.0 | - |
| 86.7 39.5 | - | - | - | - | - | - | - | - | 0.8 | - | 0.0 | - |
| 86.7 40.0 | - | 229.8 | - | - | 0.0 | - | - | - | - | - | - | - |
| 86.7 45.0 | - | 440.7 | - | - | 1.8 | - | - | - | 0.0 | - | 15.2 | - |
| 86.7 50.0 | - | 294.8 | - | - | 5.1 | - | - | - | 1.3 | - | 5.4 | - |
| 86.7 55.0 | - | - | - | - | - | - | - | - | 1.4 | - | 0.0 | - |
| 86.7 70.0 | - | - | - | - | - | - | - | - | 2.6 | - | - | - |
| 90.0 28.0 | - | 10.0 | - | - | 112.9 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 30.0 | - | 74.5 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 35.0 | - | 159.7 | - | - | 1.1 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 37.0 | - | 280.9 | - | - | 10.2 | - | - | - | 2.9 | - | 0.0 | - |
| 90.0 45.0 | - | 31.2 | - | - | 3.1 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 53.0 | - | 227.5 | - | - | 1.0 | - | - | - | 1.2 | - | 3.7 | - |
| 90.0 60.0 | - | 0.0 | - | - | 94.9 | - | - | - | 0.0 | - | 0.7 | - |
| 90.0 70.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.9 | - | 0.0 | - |
| 90.0 90.0 | - | 1.1 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 110.0 | - | 1.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 26.7 | - | 1.0 | - | - | 1.7 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 28.0 | - | - | - | - | - | - | - | - | 0.8 | - | 0.0 | - |
| 93.3 29.0 | - | 99.4 | - | - | 3.8 | - | - | - | - | - | - | - |
| 93.3 30.0 | - | 190.7 | - | - | 475.2 | - | - | - | 0.9 | - | 0.9 | - |
| 93.3 35.0 | - | 86.8 | - | - | 3675.9 | - | - | - | 1.0 | - | 0.0 | - |
| 93.3 40.0 | - | 56.2 | - | - | 210.5 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 45.0 | - | 78.5 | - | - | 2.7 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 50.0 | - | 180.7 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 55.0 | - | 56.3 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 60.0 | - | 0.0 | - | - | 8.2 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 70.0 | - | 11.1 | - | - | 15.1 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 80.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 120.0 | - | 0.0 | - | - | 5.2 | - | - | - | 0.0 | - | 0.0 | - |

TABLE 4. (cont.)

**Stomiiformes**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 51.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.8 | - | 0.0 | - |

***Cyclothone* spp.**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 110.0 | - | - | - | - | 0.0 | - | - | - | 1.0 | - | - | - |
| 86.7 60.0 | - | 0.9 | - | - | - | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 60.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 90.0 | - | 3.4 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 120.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

***Cyclothone signata***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 90.0 | - | 5.7 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 110.0 | - | 4.8 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 120.0 | - | 3.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

***Sternoptyx* spp.**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 120.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |

***Vinciguerria lucetia***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 110.0 | - | - | - | - | 0.0 | - | - | - | 0.8 | - | - | - |
| 80.0 110.0 | - | - | - | - | 0.0 | - | - | - | 2.0 | - | - | - |
| 90.0 53.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 60.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 90.0 | - | 1.1 | - | - | 6.2 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 100.0 | - | 0.0 | - | - | 25.6 | - | - | - | 1.6 | - | 0.0 | - |
| 90.0 120.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.8 | - |
| 93.3 70.0 | - | 0.0 | - | - | 0.0 | - | - | - | 2.3 | - | 0.0 | - |
| 93.3 80.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 100.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.8 | - | 0.0 | - |
| 93.3 110.0 | - | 0.0 | - | - | 5.1 | - | - | - | 0.9 | - | 0.0 | - |
| 93.3 120.0 | - | 0.0 | - | - | 10.4 | - | - | - | 0.0 | - | 0.0 | - |

TABLE 4. (cont.)

***Stomias atriventer***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 120.0 | - | 2.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

***Bathophilus flemingi***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 110.0 | - | - | - | - | 0.0 | - | - | - | 1.0 | - | - | - |

***Aristostomias scintillans***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 70.0 | - | 0.0 | - | - | 1.1 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 90.0 | - | 0.0 | - | - | 3.1 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 80.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |

***Synodus lucioceps***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 51.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.9 | - |
| 86.7 35.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.9 | - | 0.0 | - |

***Ceratoscopelus townsendi***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 110.0 | - | - | - | - | 0.0 | - | - | - | 121.1 | - | - | - |
| 90.0 90.0 | - | 0.0 | - | - | 4.1 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 100.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.8 | - | 0.0 | - |
| 90.0 110.0 | - | 0.0 | - | - | 2.1 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 120.0 | - | 0.0 | - | - | 1.8 | - | - | - | 0.0 | - | 0.8 | - |
| 93.3 80.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 110.0 | - | 0.0 | - | - | 1.7 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 120.0 | - | 0.0 | - | - | 5.2 | - | - | - | 0.0 | - | 0.0 | - |

***Lampadena urophaos***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 120.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 1.6 | - |

***Lampanyctus* spp.**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 110.0 | - | - | - | - | 0.0 | - | - | - | 1.0 | - | - | - |
| 80.0 120.0 | - | - | - | - | 1.0 | - | - | - | 0.0 | - | - | - |

TABLE 4. (cont.)

*Nannobrachium ritteri*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 90.0 | - | 2.3 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

*Stenobrachius leucopsarus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 51.0 | - | 1.0 | - | - | - | - | - | - | - | 0.0 | 0.0 | - |
| 76.7 100.0 | - | 0.0 | - | - | 0.0 | - | - | - | 1.0 | - | - | - |
| 83.3 40.6 | - | 0.0 | - | - | 1.1 | - | - | - | 0.0 | - | 0.0 | - |
| 83.3 51.0 | - | 2.9 | - | - | 0.0 | - | - | - | 0.0 | - | - | - |
| 86.7 35.0 | - | 0.0 | - | - | 29.6 | - | - | - | 0.0 | - | 0.0 | - |
| 86.7 50.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 30.0 | - | 0.0 | - | - | 1.1 | - | - | - | 0.0 | - | 0.0 | - |

*Triphoturus mexicanus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 45.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.9 | - | 0.0 | - |
| 90.0 70.0 | - | 0.0 | - | - | 1.1 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 110.0 | - | 0.0 | - | - | 2.1 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 29.0 | - | 0.0 | - | - | 0.9 | - | - | - | - | - | - | - |

*Myctophum nitidulum*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 110.0 | - | 1.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 120.0 | - | 1.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

*Protomyctophum crockeri*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 80.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

*Tarletonbeania crenularis*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 110.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.9 | - | 0.0 | - |

*Merluccius productus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 60.0 | - | 2.4 | - | - | - | - | - | - | - | - | 0.0 | - |
| 76.7 80.0 | - | 1.0 | - | - | 0.0 | - | - | - | - | - | - | - |
| 80.0 55.0 | - | 1244.5 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

TABLE 4. (cont.)

***Merluccius productus*** (cont.)

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 60.0 | - | 23.2 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 80.0 70.0 | - | 1.0 | - | - | 0.0 | - | - | - | 0.0 | - | - | - |
| 80.0 100.0 | - | 257.5 | - | - | 0.0 | - | - | - | 0.0 | - | - | - |
| 83.3 51.0 | - | 2.9 | - | - | 0.0 | - | - | - | 0.0 | - | - | - |
| 86.7 40.0 | - | 0.9 | - | - | 0.0 | - | - | - | - | - | - | - |
| 93.3 50.0 | - | 2.7 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

***Oneirodes* spp.**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 110.0 | - | - | - | - | 0.0 | - | - | - | 1.0 | - | - | - |
| 90.0 100.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.8 | - | 0.0 | - |
| 90.0 120.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.8 | - | 0.0 | - |
| 93.3 110.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.9 | - | 0.0 | - |

***Atherinops affinis***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 42.0 | - | 0.0 | - | - | 0.8 | - | - | - | 0.0 | - | 0.0 | - |

***Atherinopsis californiensis***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 51.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.9 | - |
| 82.0 46.0 | - | 33.9 | - | - | - | - | - | - | - | - | - | - |
| 86.7 33.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 7.1 | - |
| 90.0 28.0 | - | 1.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

***Leuresthes tenuis***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 81.7 46.9 | - | - | - | - | 1.1 | - | - | - | - | - | - | - |
| 83.3 51.0 | - | 0.0 | - | - | 98.1 | - | - | - | 0.0 | - | - | - |
| 86.7 33.0 | - | 0.0 | - | - | 10.1 | - | - | - | 0.0 | - | 0.0 | - |
| 86.7 35.0 | - | 0.0 | - | - | 2.0 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 28.0 | - | 0.0 | - | - | 8.5 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 30.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |

***Cololabis saira***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 51.0 | - | 0.0 | - | - | - | - | - | - | - | 0.0 | 1.7 | - |

TABLE 4. (cont.)

| Station | | *Cololabis saira* (cont.) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
| 76.7 | 55.0 | - | 0.0 | - | - | - | - | - | - | - | 0.7 | 0.0 | - |
| 76.7 | 70.0 | - | 0.9 | - | - | 0.0 | - | - | - | - | - | - | - |
| 76.7 | 80.0 | - | 0.0 | - | - | 1.0 | - | - | - | - | - | - | - |
| 76.7 | 100.0 | - | 0.0 | - | - | 0.0 | - | - | - | 1.0 | - | - | - |
| 76.7 | 110.0 | - | - | - | - | 1.0 | - | - | - | 0.8 | - | - | - |
| 76.7 | 120.0 | - | - | - | - | 1.9 | - | - | - | 12.7 | - | - | - |
| 80.0 | 55.0 | - | 0.0 | - | - | 0.0 | - | - | - | 1.2 | - | 0.6 | - |
| 80.0 | 60.0 | - | 0.0 | - | - | 0.0 | - | - | - | 4.7 | - | 1.0 | - |
| 80.0 | 70.0 | - | 0.0 | - | - | 0.0 | - | - | - | 1.0 | - | - | - |
| 80.0 | 80.0 | - | 0.0 | - | - | 0.0 | - | - | - | 13.2 | - | - | - |
| 80.0 | 90.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.8 | - | - | - |
| 80.0 | 100.0 | - | 0.9 | - | - | 0.0 | - | - | - | 2.3 | - | - | - |
| 80.0 | 110.0 | - | - | - | - | 0.0 | - | - | - | 15.6 | - | - | - |
| 80.0 | 120.0 | - | - | - | - | 0.0 | - | - | - | 9.1 | - | - | - |
| 83.3 | 40.6 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 2.4 | - |
| 83.3 | 60.0 | - | 0.0 | - | - | 0.0 | - | - | - | 4.9 | - | - | - |
| 86.7 | 33.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 1.2 | - |
| 86.7 | 35.0 | - | 0.0 | - | - | 2.0 | - | - | - | 0.0 | - | 4.1 | - |
| 86.7 | 45.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 1.9 | - |
| 86.7 | 50.0 | - | 0.0 | - | - | 0.0 | - | - | - | 1.3 | - | 0.0 | - |
| 86.7 | 55.0 | - | - | - | - | - | - | - | - | 2.9 | - | 1.0 | - |
| 86.7 | 60.0 | - | 0.0 | - | - | - | - | - | - | 3.5 | - | 0.8 | - |
| 86.7 | 70.0 | - | - | - | - | - | - | - | - | 3.5 | - | - | - |
| 86.7 | 100.0 | - | - | - | - | - | - | - | - | - | - | 4.1 | - |
| 86.7 | 110.0 | - | - | - | - | - | - | - | - | - | - | 0.8 | - |
| 90.0 | 28.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.8 | - | 0.0 | - |
| 90.0 | 37.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.8 | - |
| 90.0 | 45.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.9 | - | 0.7 | - |
| 90.0 | 53.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 1.8 | - |
| 90.0 | 60.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.9 | - | 0.0 | - |
| 90.0 | 70.0 | - | 0.0 | - | - | 0.0 | - | - | - | 3.5 | - | 5.4 | - |
| 90.0 | 80.0 | - | - | - | - | 0.0 | - | - | - | 16.9 | - | 10.3 | - |
| 90.0 | 90.0 | - | 3.4 | - | - | 0.0 | - | - | - | 1.8 | - | 0.0 | - |
| 90.0 | 100.0 | - | 0.0 | - | - | 0.0 | - | - | - | 11.0 | - | 5.9 | - |
| 90.0 | 110.0 | - | 0.0 | - | - | 0.0 | - | - | - | 43.8 | - | 1.6 | - |

TABLE 4. (cont.)

***Cololabis saira*** (cont.)

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 120.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.8 | - | 4.7 | - |
| 93.3 29.0 | - | 1.0 | - | - | 0.0 | - | - | - | - | - | - | - |
| 93.3 30.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 35.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 4.0 | - |
| 93.3 40.0 | - | 0.0 | - | - | 2.1 | - | - | - | 0.7 | - | 3.3 | - |
| 93.3 50.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | 2.5 | - |
| 93.3 55.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 1.6 | - |
| 93.3 60.0 | - | 0.0 | - | - | 0.0 | - | - | - | 1.9 | - | 0.8 | - |
| 93.3 70.0 | - | 0.0 | - | - | 0.0 | - | - | - | 2.3 | - | 1.6 | - |
| 93.3 80.0 | - | 0.0 | - | - | 0.0 | - | - | - | 1.8 | - | 0.0 | - |
| 93.3 90.0 | - | 0.0 | - | - | 0.0 | - | - | - | 1.7 | - | 2.2 | - |
| 93.3 100.0 | - | 0.0 | - | - | 0.0 | - | - | - | 16.1 | - | 0.0 | - |
| 93.3 110.0 | - | 0.0 | - | - | 0.0 | - | - | - | 14.6 | - | 4.1 | - |
| 93.3 120.0 | - | 3.0 | - | - | 0.0 | - | - | - | 2.3 | - | 13.1 | - |

***Cheilopogon heterurus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 45.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.8 | - | 0.0 | - |
| 93.3 26.7 | - | 0.0 | - | - | 0.0 | - | - | - | 1.9 | - | 0.0 | - |
| 93.3 30.0 | - | 0.0 | - | - | 0.0 | - | - | - | 4.3 | - | 0.0 | - |
| 93.3 50.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.9 | - | 0.0 | - |

***Cheilopogon pinnatibarbatus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 33.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.9 | - | 0.0 | - |
| 90.0 37.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.8 | - |
| 93.3 40.0 | - | 0.0 | - | - | 40.2 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 45.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | 0.0 | - |

***Hirundichthys* spp.**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 100.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.8 | - | 0.0 | - |

***Sebastes* spp.**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 51.0 | - | 9.4 | - | - | - | - | - | - | - | 0.0 | 5.9 | - |
| 76.7 55.0 | - | 1.0 | - | - | - | - | - | - | - | 0.0 | 0.0 | - |

TABLE 4. (cont.)

***Sebastes* spp.** (cont.)

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 51.0 | - | 2.1 | - | - | 0.9 | - | - | - | 0.0 | - | 0.0 | - |
| 80.0 55.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |
| 81.7 46.9 | - | - | - | - | 6.4 | - | - | - | - | - | - | - |
| 83.3 40.6 | - | 1.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 83.3 42.0 | - | 0.0 | - | - | 20.7 | - | - | - | 0.0 | - | 0.8 | - |
| 83.3 51.0 | - | 0.0 | - | - | 3.0 | - | - | - | 0.8 | - | - | - |
| 83.3 55.0 | - | 0.0 | - | - | 5.6 | - | - | - | 0.0 | - | - | - |
| 86.7 33.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 86.7 35.0 | - | 1.0 | - | - | 1.0 | - | - | - | 2.7 | - | 0.0 | - |
| 86.7 39.5 | - | - | - | - | - | - | - | - | 0.8 | - | 0.9 | - |
| 86.7 40.0 | - | 1.8 | - | - | 0.0 | - | - | - | - | - | - | - |
| 86.7 45.0 | - | 3.6 | - | - | 0.0 | - | - | - | 0.8 | - | 0.0 | - |
| 86.7 50.0 | - | 8.5 | - | - | 13.2 | - | - | - | 0.0 | - | 1.6 | - |
| 86.7 60.0 | - | 0.9 | - | - | - | - | - | - | 0.0 | - | 0.0 | - |
| 86.7 70.0 | - | - | - | - | - | - | - | - | 0.9 | - | - | - |
| 90.0 30.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 35.0 | - | 1.8 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 37.0 | - | 0.9 | - | - | 0.9 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 60.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 26.7 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 30.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 35.0 | - | 1.0 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 50.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

***Sebastes aurora***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 70.0 | - | 0.0 | - | - | 0.9 | - | - | - | - | - | - | - |
| 76.7 80.0 | - | 0.0 | - | - | 1.0 | - | - | - | - | - | - | - |
| 80.0 55.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |
| 83.3 42.0 | - | 1.1 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 83.3 60.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | - | - |

***Sebastes diploproa***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 51.0 | - | 0.0 | - | - | - | - | - | - | - | 0.0 | 3.4 | - |

TABLE 4. (cont.)

***Sebastes diploproa*** (cont.)

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 51.0 | - | 0.0 | - | - | - | - | - | - | - | 0.0 | 3.4 | - |

***Sebastes jordani***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 51.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | - | - |

***Sebastes paucispinis***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 51.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | 0.0 | - |

***Oxylebius pictus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 51.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | - | - |

***Hexagrammos decagrammus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 50.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

***Ophiodon elongatus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 51.0 | - | 1.1 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 83.3 51.0 | - | 3.9 | - | - | 0.0 | - | - | - | 0.0 | - | - | - |

***Clinocottus analis***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 33.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

***Scorpaenichthys marmoratus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 51.0 | - | 0.0 | - | - | - | - | - | - | - | 0.0 | 5.0 | - |
| 76.7 55.0 | - | 0.0 | - | - | - | - | - | - | - | 0.0 | 0.8 | - |
| 80.0 51.0 | - | 1.1 | - | - | 0.0 | - | - | - | 0.8 | - | 12.7 | - |
| 80.0 55.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 1.2 | - |
| 80.0 60.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 1.0 | - |
| 82.0 46.0 | - | 1.9 | - | - | - | - | - | - | - | - | - | - |
| 83.3 40.6 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.8 | - |
| 83.3 51.0 | - | 3.9 | - | - | 4.0 | - | - | - | 0.0 | - | - | - |

TABLE 4. (cont.)

***Scorpaenichthys marmoratus*** (cont.)

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 33.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | 1.2 | - |
| 86.7 45.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 86.7 50.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.8 | - |
| 93.3 29.0 | - | 0.0 | - | - | 0.9 | - | - | - | - | - | - | - |
| 93.3 30.0 | - | 1.0 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 50.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

***Odontopyxis trispinosa***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 82.0 46.0 | - | 1.0 | - | - | - | - | - | - | - | - | - | - |

***Paralabrax* spp.**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 37.0 | - | 0.0 | - | - | 0.0 | - | - | - | 1.0 | - | 0.0 | - |

***Trachurus symmetricus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 80.0 | - | 0.0 | - | - | 5.1 | - | - | - | - | - | - | - |
| 76.7 120.0 | - | - | - | - | 2.9 | - | - | - | 0.0 | - | - | - |
| 83.3 60.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | - | - |
| 86.7 70.0 | - | - | - | - | - | - | - | - | 0.9 | - | - | - |
| 90.0 30.0 | - | 0.0 | - | - | 1.1 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 45.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 53.0 | - | 0.0 | - | - | 3.8 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 60.0 | - | 0.0 | - | - | 2.8 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 90.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 29.0 | - | 0.0 | - | - | 0.9 | - | - | - | - | - | - | - |
| 93.3 60.0 | - | 0.0 | - | - | 0.7 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 70.0 | - | 5.5 | - | - | 2.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 80.0 | - | 0.0 | - | - | 2.0 | - | - | - | 0.0 | - | 0.0 | - |

***Brama japonica***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 120.0 | - | 1.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

TABLE 4. (cont.)

***Atractoscion nobilis***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 28.0 | - | 0.0 | - | - | 1.9 | - | - | - | 0.0 | - | 0.0 | - |

***Genyonemus lineatus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 40.6 | - | 1.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 86.7 33.0 | - | 2.8 | - | - | 0.0 | - | - | - | 0.0 | - | 2.4 | - |
| 90.0 28.0 | - | 0.0 | - | - | 3.8 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 35.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

***Girella nigricans***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 30.0 | - | 0.0 | - | - | 1.1 | - | - | - | 0.0 | - | 0.0 | - |

***Medialuna californiensis***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 45.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.8 | - | 0.0 | - |
| 93.3 50.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.9 | - | 0.0 | - |
| 93.3 55.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.8 | - | 0.0 | - |

***Mugil cephalus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 60.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.8 | - |

***Chromis punctipinnis***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 82.1 47.9 | - | - | - | - | - | - | - | - | 0.9 | - | - | - |
| 83.3 42.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.8 | - | 0.0 | - |
| 90.0 37.0 | - | 0.0 | - | - | 0.0 | - | - | - | 5.7 | - | 0.0 | - |
| 93.3 28.0 | - | - | - | - | - | - | - | - | 0.8 | - | 0.0 | - |
| 93.3 35.0 | - | 0.0 | - | - | 0.0 | - | - | - | 1.0 | - | 0.0 | - |

***Oxyjulis californica***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 60.0 | - | 0.0 | - | - | 0.0 | - | - | - | 1.2 | - | - | - |
| 86.7 35.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.9 | - | 0.0 | - |
| 86.7 70.0 | - | - | - | - | - | - | - | - | 0.9 | - | - | - |
| 90.0 30.0 | - | 0.0 | - | - | 5.3 | - | - | - | 0.0 | - | 0.0 | - |

TABLE 4. (cont.)

***Oxyjulis californica*** (cont.)

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 37.0 | - | 0.0 | - | - | 0.0 | - | - | - | 1.0 | - | 0.0 | - |
| 93.3 55.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.8 | - | 0.0 | - |

***Rathbunella alleni***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 45.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

***Neoclinus stephensae***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 42.0 | - | 0.0 | - | - | 1.7 | - | - | - | 0.0 | - | 0.0 | - |
| 83.3 51.0 | - | 0.0 | - | - | 2.0 | - | - | - | 0.0 | - | - | - |
| 86.7 50.0 | - | 0.0 | - | - | 0.0 | - | - | - | 1.3 | - | 0.0 | - |

***Hypsoblennius gilberti***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 51.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.8 | - | 0.0 | - |
| 83.3 55.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.7 | - | - | - |
| 86.7 33.0 | - | 0.0 | - | - | 4.0 | - | - | - | 0.0 | - | 0.0 | - |
| 86.7 50.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.6 | - | 0.0 | - |
| 90.0 28.0 | - | 0.0 | - | - | 1.9 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 70.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.9 | - | 0.0 | - |
| 93.3 30.0 | - | 0.0 | - | - | 1.9 | - | - | - | 0.0 | - | 0.0 | - |

***Hypsoblennius jenkinsi***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 51.0 | - | 0.0 | - | - | - | - | - | - | - | 0.0 | 0.8 | - |
| 80.0 51.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.9 | - |
| 83.3 42.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.8 | - |
| 86.7 33.0 | - | 0.0 | - | - | 0.0 | - | - | - | 5.4 | - | 0.0 | - |
| 86.7 35.0 | - | 0.0 | - | - | 0.0 | - | - | - | 8.0 | - | 0.0 | - |
| 86.7 70.0 | - | - | - | - | - | - | - | - | 1.8 | - | - | - |
| 90.0 28.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | 0.7 | - |
| 90.0 30.0 | - | 0.0 | - | - | 1.1 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 35.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.9 | - | 0.0 | - |
| 90.0 37.0 | - | 0.0 | - | - | 0.0 | - | - | - | 2.9 | - | 0.0 | - |
| 90.0 45.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.9 | - | 0.0 | - |

TABLE 4. (cont.)

*Hypsoblennius jenkinsi* (cont.)

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 28.0 | - | - | - | - | - | - | - | - | 0.8 | - | 0.0 | - |
| 93.3 30.0 | - | 0.0 | - | - | 6.7 | - | - | - | 1.7 | - | 3.7 | - |
| 93.3 35.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.5 | - | 0.0 | - |
| 93.3 40.0 | - | 0.0 | - | - | 1.1 | - | - | - | 0.0 | - | 0.0 | - |

*Sphyraena argentea*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 28.0 | - | 0.0 | - | - | 2.8 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 30.0 | - | 0.0 | - | - | 2.9 | - | - | - | 0.9 | - | 0.0 | - |
| 93.3 35.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |

*Sarda chiliensis*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 35.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | 0.0 | - |

*Scomber japonicus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 55.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | - | - |
| 83.3 60.0 | - | 0.0 | - | - | 12.8 | - | - | - | 0.0 | - | - | - |
| 86.7 33.0 | - | 0.0 | - | - | 14.2 | - | - | - | 0.0 | - | 0.0 | - |
| 86.7 35.0 | - | 0.0 | - | - | 1.0 | - | - | - | 5.4 | - | 0.0 | - |
| 86.7 40.0 | - | 0.0 | - | - | 4.2 | - | - | - | - | - | - | - |
| 86.7 45.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | 0.0 | - |
| 86.7 55.0 | - | - | - | - | - | - | - | - | 0.7 | - | 0.0 | - |
| 90.0 28.0 | - | 0.0 | - | - | 4.7 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 30.0 | - | 0.0 | - | - | 506.9 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 37.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 45.0 | - | 0.0 | - | - | 4.1 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 53.0 | - | 0.0 | - | - | 2.9 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 60.0 | - | 0.0 | - | - | 7.4 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 120.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 29.0 | - | 0.0 | - | - | 5.6 | - | - | - | - | - | - | - |
| 93.3 30.0 | - | 0.0 | - | - | 31.7 | - | - | - | 0.9 | - | 0.0 | - |
| 93.3 35.0 | - | 0.0 | - | - | 20.3 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 40.0 | - | 0.0 | - | - | 18.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 55.0 | - | 0.0 | - | - | 1.1 | - | - | - | 0.0 | - | 0.0 | - |

TABLE 4. (cont.)

*Scomber japonicus* (cont.)

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 60.0 | - | 0.0 | - | - | 4.4 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 70.0 | - | 0.0 | - | - | 3.0 | - | - | - | 0.0 | - | 0.0 | - |

*Icichthys lockingtoni*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 70.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | - | - |
| 80.0 90.0 | - | 0.0 | - | - | 1.0 | - | - | - | 0.0 | - | - | - |
| 83.3 60.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | - | - |
| 90.0 37.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | 0.0 | - |
| 90.0 60.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | 0.0 | - |

*Tetragonurus cuvieri*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 110.0 | - | - | - | - | 0.0 | - | - | - | 0.8 | - | - | - |
| 93.3 60.0 | - | 0.0 | - | - | 0.0 | - | - | - | 1.0 | - | 0.0 | - |

*Citharichthys sordidus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 51.0 | - | 0.0 | - | - | - | - | - | - | - | 0.0 | 0.8 | - |
| 83.3 51.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.8 | - | - | - |
| 93.3 29.0 | - | 0.0 | - | - | 1.9 | - | - | - | - | - | - | - |

*Hippoglossina stomata*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 30.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.9 | - | 0.0 | - |

*Paralichthys californicus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 28.0 | - | 0.0 | - | - | 0.9 | - | - | - | 0.0 | - | 0.0 | - |

*Hypsopsetta guttulata*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 55.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.6 | - |
| 93.3 30.0 | - | 0.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.9 | - |

*Parophrys vetulus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 30.0 | - | 1.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

TABLE 4. (cont.)

***Pleuronichthys coenosus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 82.0 46.0 | - | 1.0 | - | - | - | - | - | - | - | - | - | - |
| 83.3 51.0 | - | 0.0 | - | - | 3.0 | - | - | - | 0.0 | - | - | - |
| 90.0 28.0 | - | 1.0 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |
| 93.3 40.0 | - | 0.0 | - | - | 1.1 | - | - | - | 0.0 | - | 0.0 | - |

***Pleuronichthys decurrens***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 30.0 | - | 0.0 | - | - | 1.1 | - | - | - | 0.0 | - | 0.0 | - |

***Pleuronichthys ritteri***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 45.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

***Pleuronichthys verticalis***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 28.0 | - | 1.0 | - | - | 1.9 | - | - | - | 0.0 | - | 0.0 | - |

**Disintegrated fish larvae**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 80.0 | - | 0.9 | - | - | 0.0 | - | - | - | 0.0 | - | 0.0 | - |

PHYLOGENETIC INDEX TO TABLE 4

ALPHABETICAL INDEX TO TABLE 4

# RECENT TECHNICAL MEMORANDUMS

Copies of this and other NOAA Technical Memorandums are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22167. Paper copies vary in price. Microfiche copies cost $9.00. Recent issues of NOAA Technical Memorandums from the NMFS Southwest Fisheries Science Center are listed below:

NOAA-TM-NMFS-SWFSC-312 Ichthyoplankton and station data for California Cooperative Oceanic Fisheries Investigations survey cruises in 2000.
W. WATSON, R.L. CHARTER, and H.G. MOSER
(September 2001)

313 Ichthyoplankton and station data for Manta (surface) tows taken on California Cooperative Oceanic Fisheries Investigations Survey Cruises in 1977 and 1978.
H.G. MOSER, R.L. CHARTER, D.A. AMBROSE, and E.M. SANDKNOP
(September 2001)

314 AMLR 2000/2001 field season report: Objectives, accomplishments, and tentative conclusions.
J.D. LIPSKY, Editor
(September 2001)

315 The physical oceanography off the central California coast during May-June, 1999: A summary of CTD data from pelagic juvenile rockfish surveys.
K.M. SAKUMA, F.B. SCHWING, M.H. PICKETT, D. ROBERTS, and S. RALSTON
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316 Monthly mean coastal upwelling indices, west coast of South America 1981 to 1999: Trends and Relationships.
J.G NORTON, F.B. SCHWING, M.H. PICKETT, D.M. HUSBY, and C.S. MOORE
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317 U.S. Pacific marine mammal stock assessments: 2001
J.V. CARRETTA, J. BARLOW, K.A. FORNEY, M.M. MUTO, and J. BAKER
(December 2001)

318 The physical oceanography off the central California coast during May-June, 2000: A summary of CTD data from pelagic juvenile rockfish surveys.
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