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U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
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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 1997. It is the 16th report in a series that presents surface tow data for all biological-oceanographic CalCOFI surveys from 1977 to the present. A total of 257 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 251 Manta net tows was taken during 1997. 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 77 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 16th 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 1997. 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 1997 CalCOFI survey are published in Ambrose et al. (1999). Ahlstrom and Stevens (1976), Gruber et al. (1982) and Doyle (1992a, b) provided initial information on the distribution and abundance of surface ichthyoplankton in the northeastern Pacific.

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[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).

Hydrographic and biological data from the 1997 CalCOFI survey were published by the Scripps Institution of Oceanography (Univ. of Calif., SIO 1997, 1999). All available records for Manta tows on the 1997 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 | 1990 | Charter et al. 2002c |
| 1980-81 | Ambrose et al. 2002a | 1991 | Sandknop et al. 2002b |
| 1984 | Charter et al. 2002a | 1992 | Watson et al. 2002b |
| 1985 | Ambrose et al. 2002b | 1993 | Ambrose et al. 2002d |
| 1986 | Charter et al. 2002b | 1994 | Charter et al. 2002d |
| 1987 | Sandknop et al. 2002a | 1995 | Sandknop et al. 2002c |
| 1988 | Watson et al. 2002a | 1996 | Watson et al. 2002c |
| 1989 | Ambrose et al. 2002c | | |

## SAMPLING AREA AND PATTERN

The 1997 CalCOFI survey consisted of four quarterly cruises on which a total of 251 Manta net tows was taken at the 257 standard CalCOFI net tow stations occupied during the survey (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 1997 (Figures 2 and 3) are summarized below:

9702, RV *David Starr Jordan*, 66 stations, January 29–February 14;

9704, RV *New Horizon*, 61 stations, April 2–19;

9707, RV *David Starr Jordan*, 66 stations, July 1–16;

9709, RV *New Horizon*, 58 stations, September 20–October 4.

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. Stations on CalCOFI lines 76.7 and 80.0 extended seaward to station 100.0, stations on lines 83.3 and 86.7 extended seaward to station 110.0, and stations on lines 90.0 and 93.3 extended seaward to station 120.0 on all cruises (Figures 2 and 3). On Cruise 9702, a seventh survey line (75.0), off Morro Bay, California, extended seaward to station 65.0; no Manta tows were taken on this line.

## 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 S. R. Charter and 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 77 larval fish categories was identified: 65 to species, 10 to genus, and 2 to family.

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

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

*Diaphus* spp.–*Diaphus theta* is the dominant *Diaphus* species in the survey area and most, if not all, of the larvae from the Southern California Bight region are this species; the generic category is used because a small proportion of the *Diaphus* larvae captured at the outer margin of the survey pattern may represent other species whose larvae are identical to those of *D. theta*.

*Nannobrachium*–Zahuranec (2000) moved the subgroup of *Lampanyctus* characterized by small or absent pectoral fins in adults to 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 in oblique tow samples 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 for oblique tows; in previous oblique tow data reports these were referred to as *Lampanyctus* "niger" and *Lampanyctus* "no pectorals", respectively (see 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, Pacific sardine (*Sardinops sagax*) ranked first in abundance with 44.0% of the total fish larvae and second in occurrence with larvae collected in 22.7% of the total samples (Tables 2 and 3). They were twice as abundant as the second most abundant species, northern anchovy (*Engraulis mordax*) which had 16.5% of the total larvae and ranked third in occurrence (19.9% of the total samples). The mussel blenny *(Hypsoblennius jenkinsi)* was the third most abundant taxon with 12.7% of the total larvae and tied for fifth in frequency of occurrence (7.6% of the samples). Pacific saury (*Cololabis saira*) ranked fourth in abundance (3.9% of total larvae) and first in total occurrences (25.5% of the samples).The rockfish genus *Sebastes* ranked fifth in abundance (3.3% of total larvae) and fourth in total occurrences (12.0% of the samples). The next five most abundant taxa were jacksmelt *Atherinopsis californiensis* (3.1% of total larvae), California barracuda *Sphyraena argentea* (2.9%), rockpool blenny *Hypsoblennius gilberti* (2.8%), Panama lightfish *Vinciguerria lucetia* (1.5%), and Pacific mackerel *Scomber japonicus* (1.4%). These species ranked tied for 18$^{th}$, tied for 19$^{th}$, tied for 15$^{th}$, 7$^{th}$, and tied for 8$^{th}$ in frequency of occurrence, respectively. The 10 most abundant taxa comprised 92.1% of all the larvae collected in Manta net tows on CalCOFI cruises in 1997. The remaining 7.9% was distributed among 67 other taxa. Of the ten most abundant taxa, three were coastal pelagic taxa, five were coastal demersal taxa, one was a mesopelagic species, and one was epipelagic.

In contrast to the surface collections, among the 140 taxa collected in the oblique tows during the 1997 survey, Pacific hake ranked first in abundance (32.4% of the total), followed by Pacific sardine (18.8%), and Panama lightfish (13.9%). Mussel blenny, Pacific saury and jacksmelt combined abundance in the oblique samples was only 0.1% of the total larvae (Ambrose et al. 1999).

## 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 1997 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 RV *New Horizon* during the 1997 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 RV *New Horizon* during the 1997 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 RV *New Horizon* during the 1997 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.

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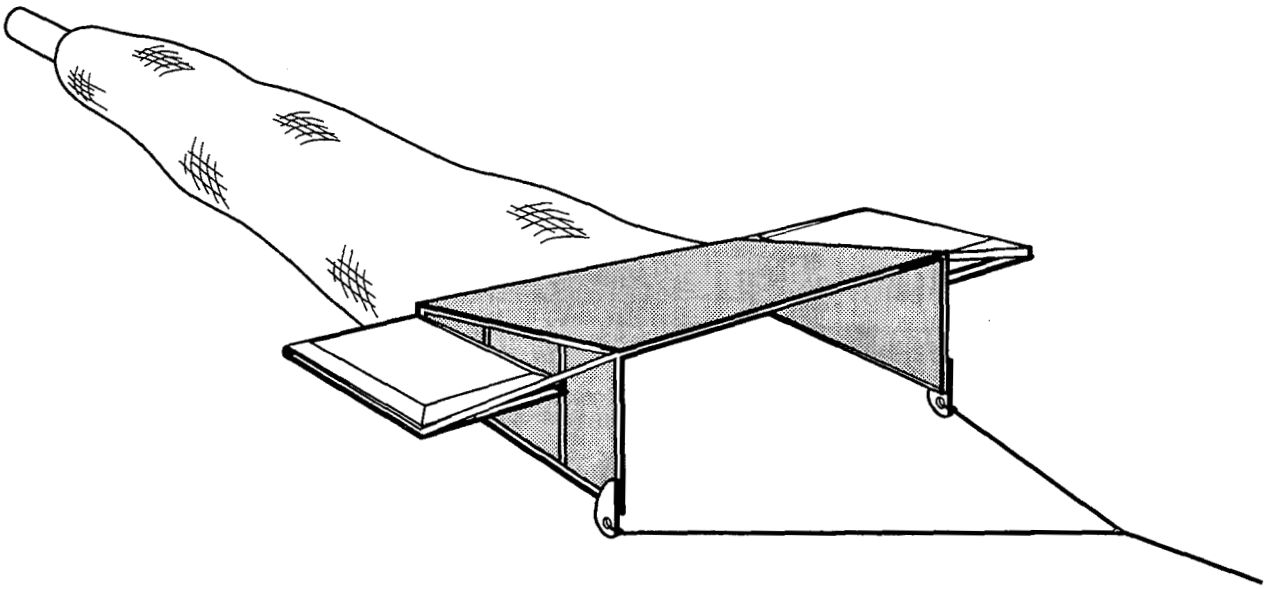

Figure 1. Diagram of the Manta net used on CalCOFI surveys.

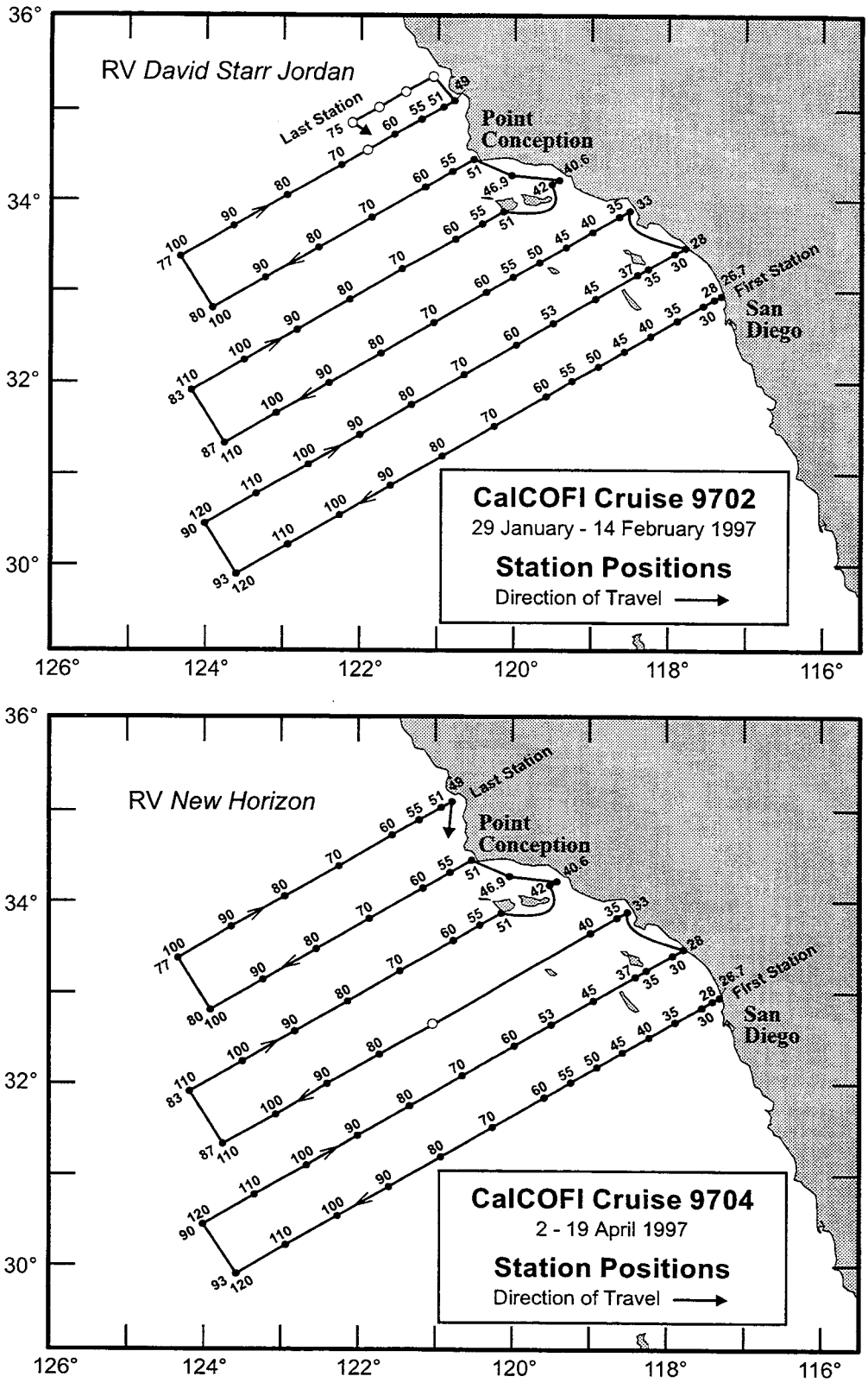


Figure 2. Stations and cruise tracks for CalCOFI cruises 9702 (above) and 9704 (below). Dots indicate stations where Manta and oblique tows were taken; open circles indicate stations where only oblique tows were taken.

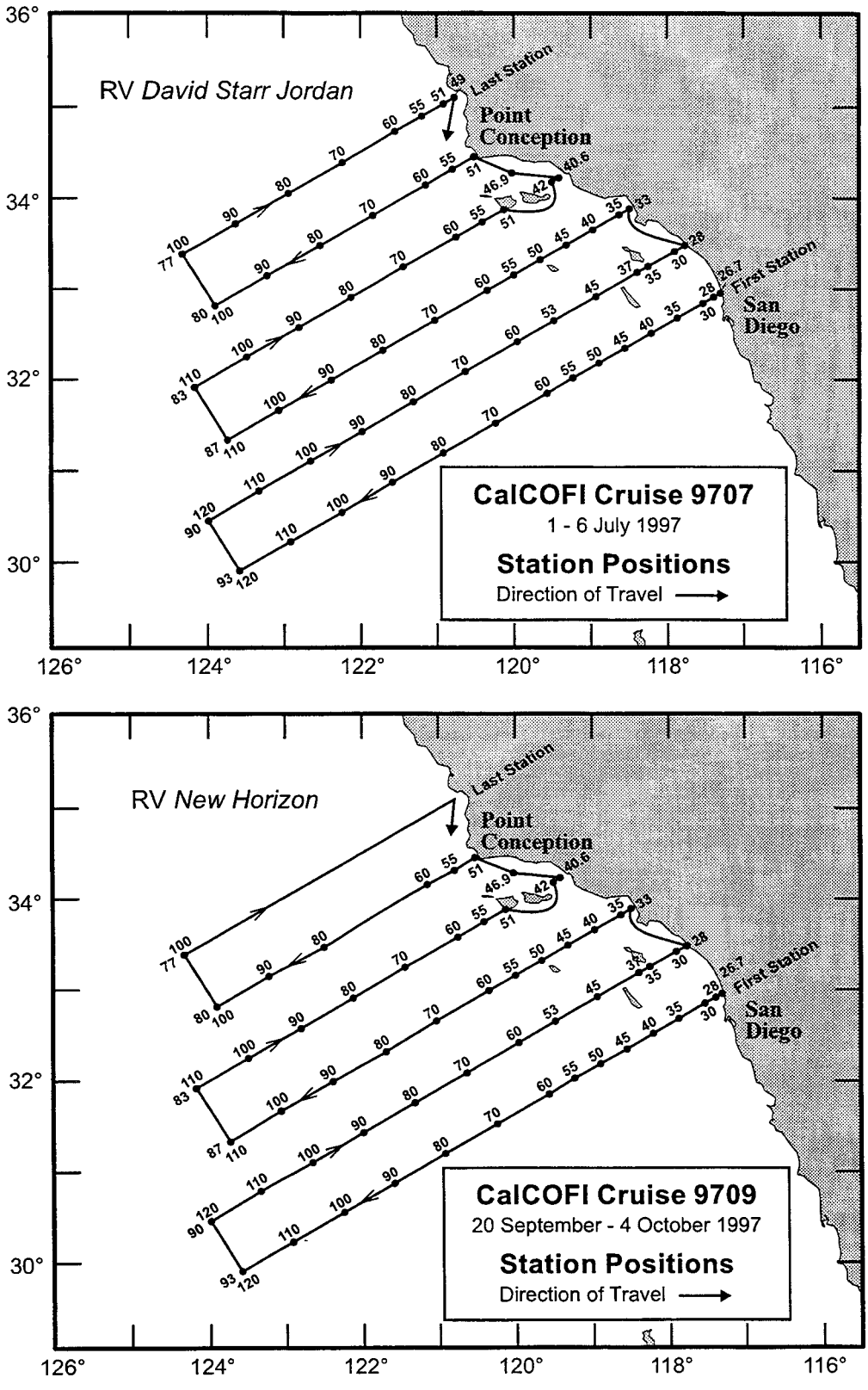


Figure 3. Stations and cruise tracks for CalCOFI cruises 9707 (above) and 9709 (below). Symbols as in Figure 2.

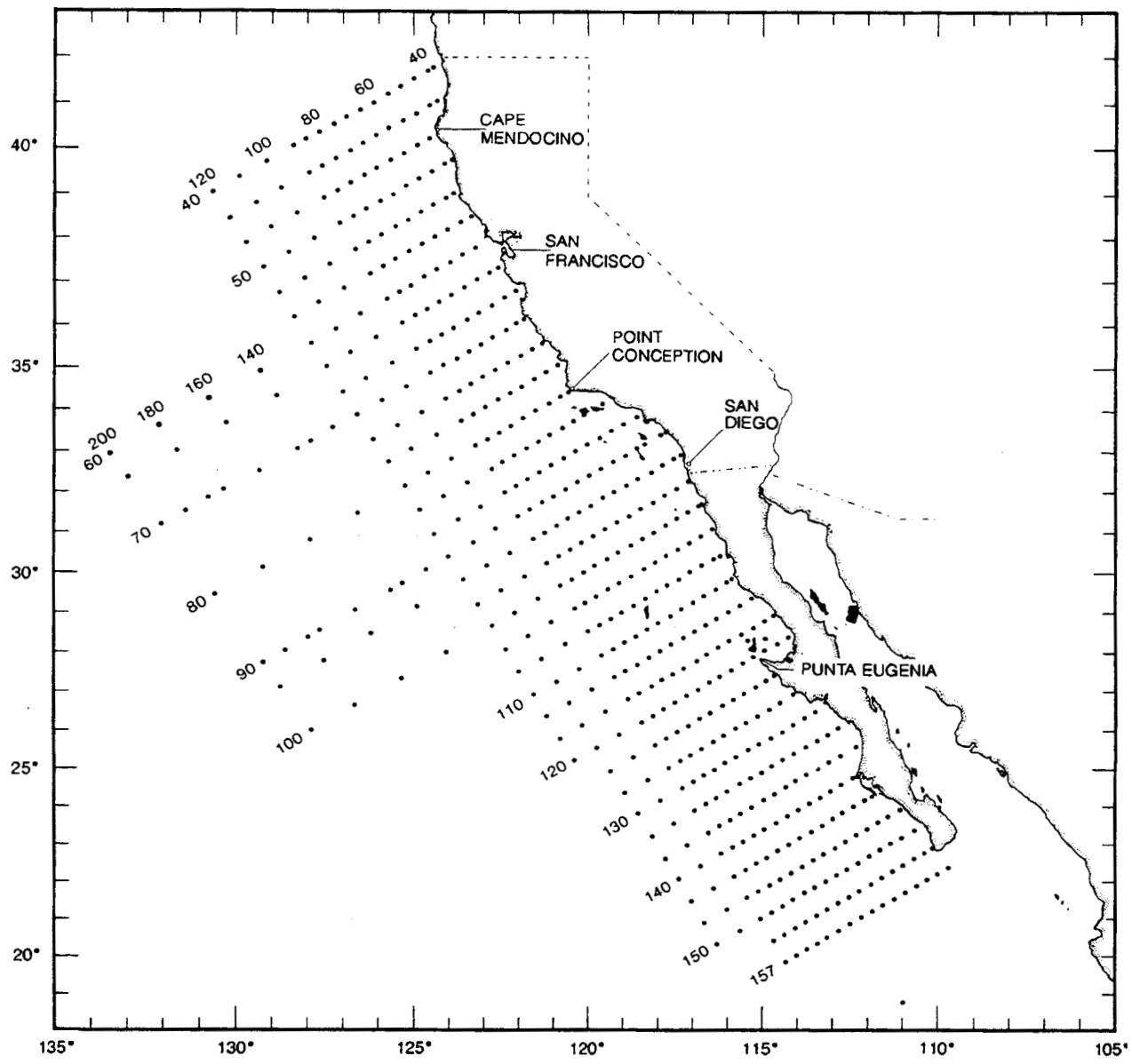


Figure 4. The basic station plan for CalCOFI cruises from 1950 - 1984.

TABLE 1. Station and plankton tow data for Manta tows taken on the 1997 CalCOFI survey. Numbers of fish eggs and larvae are raw counts, unadjusted for volume (cubic meters) of water filtered.

CalCOFI Cruise 9702

| 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 | 49.0 | 35 | 05.3 | 120 | 46.6 | JD | 97 | 02 | 14 | 0505 | 85 | 24 | 287 |
| 76.7 | 51.0 | 35 | 01.3 | 120 | 55.1 | JD | 97 | 02 | 14 | 0251 | 80 | 49 | 1 |
| 76.7 | 55.0 | 34 | 53.3 | 121 | 11.9 | JD | 97 | 02 | 13 | 2334 | 83 | 15 | 6 |
| 76.7 | 60.0 | 34 | 43.3 | 121 | 32.9 | JD | 97 | 02 | 13 | 1925 | 75 | 22 | 12 |
| 76.7 | 70.0 | 34 | 23.3 | 122 | 14.8 | JD | 97 | 02 | 13 | 1115 | 90 | 1 | 5 |
| 76.7 | 80.0 | 34 | 03.3 | 122 | 56.5 | JD | 97 | 02 | 12 | 1220 | 77 | 0 | 10 |
| 76.7 | 90.0 | 33 | 43.3 | 123 | 38.0 | JD | 97 | 02 | 12 | 0521 | 84 | 2 | 4 |
| 76.7 | 100.0 | 33 | 23.3 | 124 | 19.4 | JD | 97 | 02 | 11 | 2322 | 84 | 3 | 3 |
| 80.0 | 51.0 | 34 | 27.0 | 120 | 31.4 | JD | 97 | 02 | 10 | 0655 | 86 | 232 | 529 |
| 80.0 | 55.0 | 34 | 19.0 | 120 | 48.1 | JD | 97 | 02 | 10 | 0916 | 81 | 1 | 58 |
| 80.0 | 60.0 | 34 | 09.0 | 121 | 09.1 | JD | 97 | 02 | 10 | 1516 | 89 | 0 | 10 |
| 80.0 | 70.0 | 33 | 49.0 | 121 | 50.6 | JD | 97 | 02 | 10 | 2113 | 86 | 1 | 1 |
| 80.0 | 80.0 | 33 | 29.0 | 122 | 32.0 | JD | 97 | 02 | 11 | 0301 | 80 | 1 | 8 |
| 80.0 | 90.0 | 33 | 09.0 | 123 | 13.3 | JD | 97 | 02 | 11 | 0812 | 86 | 0 | 3 |
| 80.0 | 100.0 | 32 | 49.0 | 123 | 54.4 | JD | 97 | 02 | 11 | 1640 | 85 | 2 | 2 |
| 81.8 | 46.9 | 34 | 16.5 | 120 | 01.5 | JD | 97 | 02 | 10 | 0254 | 87 | 42 | 589 |
| 83.3 | 40.6 | 34 | 13.5 | 119 | 24.7 | JD | 97 | 02 | 09 | 2219 | 81 | 2 | 194 |
| 83.3 | 42.0 | 34 | 10.7 | 119 | 30.5 | JD | 97 | 02 | 09 | 2025 | 66 | 10 | 2739 |
| 83.3 | 51.0 | 33 | 52.8 | 120 | 08.0 | JD | 97 | 02 | 09 | 1427 | 86 | 26 | 445 |
| 83.3 | 55.0 | 33 | 44.7 | 120 | 24.6 | JD | 97 | 02 | 09 | 1112 | 84 | 10 | 106 |
| 83.3 | 60.0 | 33 | 34.7 | 120 | 45.3 | JD | 97 | 02 | 09 | 0631 | 85 | 2 | 2 |
| 83.3 | 70.0 | 33 | 14.7 | 121 | 26.6 | JD | 97 | 02 | 09 | 0023 | 76 | 0 | 2 |
| 83.3 | 80.0 | 32 | 54.7 | 122 | 07.7 | JD | 97 | 02 | 08 | 1752 | 81 | 0 | 0 |
| 83.3 | 90.0 | 32 | 34.7 | 122 | 48.7 | JD | 97 | 02 | 08 | 0829 | 87 | 0 | 37 |
| 83.3 | 100.0 | 32 | 14.7 | 123 | 29.5 | JD | 97 | 02 | 08 | 0020 | 89 | 0 | 5 |
| 83.3 | 110.0 | 31 | 54.7 | 124 | 10.2 | JD | 97 | 02 | 07 | 1815 | 86 | 2 | 3 |
| 86.7 | 33.0 | 33 | 53.4 | 118 | 29.4 | JD | 97 | 02 | 05 | 0309 | 83 | 31 | 113 |
| 86.7 | 35.0 | 33 | 49.4 | 118 | 37.7 | JD | 97 | 02 | 05 | 0535 | 87 | 56 | 5 |
| 86.7 | 40.0 | 33 | 39.4 | 118 | 58.5 | JD | 97 | 02 | 05 | 0849 | 83 | 12 | 442 |
| 86.7 | 45.0 | 33 | 29.4 | 119 | 19.1 | JD | 97 | 02 | 05 | 1506 | 81 | 8 | 48 |
| 86.7 | 50.0 | 33 | 19.4 | 119 | 39.8 | JD | 97 | 02 | 05 | 1910 | 75 | 86 | 317 |
| 86.7 | 55.0 | 33 | 09.5 | 120 | 00.4 | JD | 97 | 02 | 05 | 2327 | 74 | 18 | 20 |
| 86.7 | 60.0 | 32 | 59.4 | 120 | 21.0 | JD | 97 | 02 | 06 | 0328 | 77 | 0 | 2 |
| 86.7 | 70.0 | 32 | 39.3 | 121 | 02.0 | JD | 97 | 02 | 06 | 0846 | 78 | 1 | 4 |
| 86.7 | 80.0 | 32 | 19.4 | 121 | 42.9 | JD | 97 | 02 | 06 | 1701 | 86 | 0 | 7 |
| 86.7 | 90.0 | 31 | 59.4 | 122 | 23.6 | JD | 97 | 02 | 06 | 2251 | 81 | 0 | 0 |
| 86.7 | 100.0 | 31 | 39.4 | 123 | 04.2 | JD | 97 | 02 | 07 | 0446 | 84 | 0 | 10 |
| 86.7 | 110.0 | 31 | 19.4 | 123 | 44.5 | JD | 97 | 02 | 07 | 1134 | 84 | 0 | 0 |
| 90.0 | 28.0 | 33 | 29.0 | 117 | 46.1 | JD | 97 | 02 | 04 | 2037 | 91 | 12 | 3882 |
| 90.0 | 30.0 | 33 | 25.1 | 117 | 54.3 | JD | 97 | 02 | 04 | 1809 | 88 | 120 | 867 |
| 90.0 | 35.0 | 33 | 15.1 | 118 | 15.0 | JD | 97 | 02 | 04 | 1223 | 82 | 0 | 11 |
| 90.0 | 37.0 | 33 | 11.1 | 118 | 23.3 | JD | 97 | 02 | 04 | 0838 | 86 | 1 | 2 |
| 90.0 | 45.0 | 32 | 55.1 | 118 | 56.1 | JD | 97 | 02 | 04 | 0358 | 86 | 1 | 40 |
| 90.0 | 53.0 | 32 | 39.1 | 119 | 28.9 | JD | 97 | 02 | 03 | 2213 | 85 | 2 | 2 |
| 90.0 | 60.0 | 32 | 25.1 | 119 | 57.6 | JD | 97 | 02 | 03 | 1659 | 85 | 0 | 1 |
| 90.0 | 70.0 | 32 | 05.1 | 120 | 38.3 | JD | 97 | 02 | 03 | 0838 | 81 | 0 | 10 |
| 90.0 | 80.0 | 31 | 45.1 | 121 | 18.9 | JD | 97 | 02 | 03 | 0007 | 81 | 0 | 2 |

TABLE 1. (cont.) CalCOFI Cruise 9702 (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 | 90.0 | 31 | 25.1 | 121 | 59.4 | JD | 97 | 02 | 02 | 1720 | 82 | 0 | 0 |
| 90.0 | 100.0 | 31 | 05.1 | 122 | 39.7 | JD | 97 | 02 | 02 | 0829 | 79 | 0 | 1 |
| 90.0 | 110.0 | 30 | 45.1 | 123 | 19.9 | JD | 97 | 02 | 02 | 0030 | 95 | 0 | 0 |
| 90.0 | 120.0 | 30 | 25.1 | 123 | 59.9 | JD | 97 | 02 | 01 | 1832 | 90 | 1 | 7 |
| 93.3 | 26.7 | 32 | 57.2 | 117 | 18.2 | JD | 97 | 01 | 29 | 1148 | 89 | 0 | 133 |
| 93.3 | 28.0 | 32 | 54.8 | 117 | 23.8 | JD | 97 | 01 | 29 | 1400 | 84 | 0 | 0 |
| 93.3 | 30.0 | 32 | 50.8 | 117 | 31.9 | JD | 97 | 01 | 29 | 1647 | 88 | 0 | 0 |
| 93.3 | 35.0 | 32 | 40.8 | 117 | 52.4 | JD | 97 | 01 | 29 | 2042 | 88 | 0 | 0 |
| 93.3 | 40.0 | 32 | 30.8 | 118 | 13.0 | JD | 97 | 01 | 30 | 0028 | 93 | 2 | 7 |
| 93.3 | 45.0 | 32 | 20.8 | 118 | 33.3 | JD | 97 | 01 | 30 | 0433 | 80 | 0 | 30 |
| 93.3 | 50.0 | 32 | 10.7 | 118 | 53.6 | JD | 97 | 01 | 30 | 0838 | 86 | 2 | 54 |
| 93.3 | 55.0 | 32 | 00.9 | 119 | 14.0 | JD | 97 | 01 | 30 | 1442 | 83 | 1 | 24 |
| 93.3 | 60.0 | 31 | 50.8 | 119 | 34.3 | JD | 97 | 01 | 30 | 1843 | 82 | 2 | 0 |
| 93.3 | 70.0 | 31 | 30.8 | 120 | 14.8 | JD | 97 | 01 | 31 | 0113 | 84 | 0 | 5 |
| 93.3 | 80.0 | 31 | 10.8 | 120 | 55.3 | JD | 97 | 01 | 31 | 0831 | 77 | 1 | 0 |
| 93.3 | 90.0 | 30 | 50.8 | 121 | 35.4 | JD | 97 | 01 | 31 | 1657 | 86 | 0 | 2 |
| 93.3 | 100.0 | 30 | 30.8 | 122 | 15.5 | JD | 97 | 01 | 31 | 2308 | 84 | 0 | 0 |
| 93.3 | 110.0 | 30 | 10.8 | 122 | 55.4 | JD | 97 | 02 | 01 | 0500 | 87 | 1 | 15 |
| 93.3 | 120.0 | 29 | 50.8 | 123 | 35.3 | JD | 97 | 02 | 01 | 1138 | 88 | 5 | 13 |

CalCOFI Cruise 9704

| 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 | 49.0 | 35 | 05.2 | 120 | 46.5 | NH | 97 | 04 | 19 | 0603 | 79 | 6 | 2855 |
| 76.7 | 51.0 | 35 | 01.3 | 120 | 55.1 | NH | 97 | 04 | 19 | 0346 | 92 | 321 | 22 |
| 76.7 | 55.0 | 34 | 53.3 | 121 | 11.9 | NH | 97 | 04 | 19 | 0015 | 90 | 121 | 31 |
| 76.7 | 60.0 | 34 | 43.4 | 121 | 33.0 | NH | 97 | 04 | 18 | 2029 | 97 | 554 | 5625 |
| 76.7 | 70.0 | 34 | 23.3 | 122 | 14.8 | NH | 97 | 04 | 18 | 0509 | 80 | 83 | 2467 |
| 76.7 | 80.0 | 34 | 03.3 | 122 | 56.7 | NH | 97 | 04 | 17 | 2233 | 87 | 34 | 418 |
| 76.7 | 90.0 | 33 | 43.6 | 123 | 38.0 | NH | 97 | 04 | 17 | 1635 | 81 | 82 | 2198 |
| 76.7 | 100.0 | 33 | 23.3 | 124 | 19.3 | NH | 97 | 04 | 17 | 0653 | 91 | 12 | 6087 |
| 80.0 | 51.0 | 34 | 27.0 | 120 | 31.4 | NH | 97 | 04 | 15 | 0941 | 92 | 2 | 91 |
| 80.0 | 55.0 | 34 | 19.0 | 120 | 48.0 | NH | 97 | 04 | 15 | 1434 | 94 | 2 | 398 |
| 80.0 | 60.0 | 34 | 09.0 | 121 | 08.9 | NH | 97 | 04 | 15 | 1850 | 79 | 156 | 196 |
| 80.0 | 70.0 | 33 | 49.0 | 121 | 50.5 | NH | 97 | 04 | 16 | 0047 | 84 | 28 | 684 |
| 80.0 | 80.0 | 33 | 29.0 | 122 | 31.9 | NH | 97 | 04 | 16 | 0700 | 71 | 6 | 33 |
| 80.0 | 90.0 | 33 | 09.0 | 123 | 13.3 | NH | 97 | 04 | 16 | 2018 | 85 | 561 | 392 |
| 80.0 | 100.0 | 32 | 48.9 | 123 | 54.4 | NH | 97 | 04 | 17 | 0200 | 81 | 99 | 19 |
| 81.8 | 46.9 | 34 | 16.6 | 120 | 01.6 | NH | 97 | 04 | 15 | 0553 | 85 | 29 | 28 |
| 83.3 | 40.6 | 34 | 13.4 | 119 | 24.6 | NH | 97 | 04 | 15 | 0043 | 81 | 50 | 1512 |
| 83.3 | 42.0 | 34 | 10.7 | 119 | 30.5 | NH | 97 | 04 | 14 | 2242 | 74 | 49 | 14 |
| 83.3 | 51.0 | 33 | 52.6 | 120 | 08.1 | NH | 97 | 04 | 14 | 1517 | 81 | 46 | 834 |
| 83.3 | 55.0 | 33 | 44.7 | 120 | 24.7 | NH | 97 | 04 | 14 | 1145 | 87 | 25 | 4 |
| 83.3 | 60.0 | 33 | 34.6 | 120 | 45.3 | NH | 97 | 04 | 14 | 0707 | 67 | 163 | 113 |
| 83.3 | 70.0 | 33 | 14.8 | 121 | 26.6 | NH | 97 | 04 | 14 | 0024 | 75 | 92 | 13 |
| 83.3 | 80.0 | 32 | 54.7 | 122 | 07.7 | NH | 97 | 04 | 13 | 1739 | 66 | 83 | 122 |
| 83.3 | 90.0 | 32 | 34.7 | 122 | 48.6 | NH | 97 | 04 | 13 | 0843 | 77 | 30 | 895 |
| 83.3 | 100.0 | 32 | 14.5 | 123 | 29.4 | NH | 97 | 04 | 13 | 0237 | 85 | 176 | 1510 |

TABLE 1. (cont.) CalCOFI Cruise 9704 (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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 | 110.0 | 31 | 54.6 | 124 | 10.2 | NH | 97 | 04 | 12 | 2008 | 72 | 30 | 1 |
| 86.7 | 33.0 | 33 | 53.4 | 118 | 29.5 | NH | 97 | 04 | 09 | 0422 | 64 | 26 | 1649 |
| 86.7 | 35.0 | 33 | 49.5 | 118 | 37.6 | NH | 97 | 04 | 09 | 0652 | 79 | 2 | 628 |
| 86.7 | 40.0 | 33 | 39.4 | 118 | 58.4 | NH | 97 | 04 | 09 | 1207 | 89 | 3 | 3 |
| 86.7 | 80.0 | 32 | 19.4 | 121 | 42.7 | NH | 97 | 04 | 11 | 1345 | 77 | 6 | 468 |
| 86.7 | 90.0 | 31 | 59.8 | 122 | 23.6 | NH | 97 | 04 | 11 | 2041 | 18 | 6 | 75 |
| 86.7 | 100.0 | 31 | 38.9 | 123 | 03.4 | NH | 97 | 04 | 12 | 0349 | 76 | 151 | 176 |
| 86.7 | 110.0 | 31 | 19.3 | 123 | 44.5 | NH | 97 | 04 | 12 | 1152 | 80 | 10 | 10 |
| 90.0 | 28.0 | 33 | 29.1 | 117 | 46.0 | NH | 97 | 04 | 08 | 2200 | 86 | 9 | 83 |
| 90.0 | 30.0 | 33 | 25.0 | 117 | 54.3 | NH | 97 | 04 | 08 | 1930 | 90 | 40 | 190 |
| 90.0 | 35.0 | 33 | 15.1 | 118 | 15.1 | NH | 97 | 04 | 08 | 1526 | 84 | 1 | 266 |
| 90.0 | 37.0 | 33 | 11.0 | 118 | 23.2 | NH | 97 | 04 | 08 | 0458 | 70 | 2 | 851 |
| 90.0 | 45.0 | 32 | 55.1 | 118 | 56.1 | NH | 97 | 04 | 07 | 2349 | 69 | 9 | 2 |
| 90.0 | 53.0 | 32 | 39.1 | 119 | 28.9 | NH | 97 | 04 | 07 | 1814 | 70 | 3 | 4 |
| 90.0 | 60.0 | 32 | 25.0 | 119 | 57.6 | NH | 97 | 04 | 07 | 1206 | 74 | 0 | 53 |
| 90.0 | 70.0 | 32 | 05.1 | 120 | 38.3 | NH | 97 | 04 | 07 | 0526 | 65 | 70 | 124 |
| 90.0 | 80.0 | 31 | 45.0 | 121 | 19.0 | NH | 97 | 04 | 06 | 2334 | 66 | 52 | 8 |
| 90.0 | 90.0 | 31 | 25.0 | 121 | 59.5 | NH | 97 | 04 | 06 | 1758 | 84 | 46 | 13 |
| 90.0 | 100.0 | 31 | 05.0 | 122 | 39.6 | NH | 97 | 04 | 06 | 0641 | 79 | 0 | 1 |
| 90.0 | 110.0 | 30 | 45.2 | 123 | 19.9 | NH | 97 | 04 | 06 | 0057 | 86 | 9 | 19 |
| 90.0 | 120.0 | 30 | 25.0 | 123 | 59.9 | NH | 97 | 04 | 05 | 1852 | 80 | 3 | 76 |
| 93.3 | 26.7 | 32 | 57.4 | 117 | 18.4 | NH | 97 | 04 | 02 | 1258 | 75 | 106 | 108 |
| 93.3 | 28.0 | 32 | 54.8 | 117 | 23.7 | NH | 97 | 04 | 02 | 1600 | 100 | 47 | 27 |
| 93.3 | 30.0 | 32 | 50.7 | 117 | 31.8 | NH | 97 | 04 | 02 | 1910 | 85 | 128 | 233 |
| 93.3 | 35.0 | 32 | 40.9 | 117 | 52.3 | NH | 97 | 04 | 02 | 2319 | 83 | 25 | 0 |
| 93.3 | 40.0 | 32 | 30.8 | 118 | 12.8 | NH | 97 | 04 | 03 | 0323 | 77 | 98 | 1 |
| 93.3 | 45.0 | 32 | 20.8 | 118 | 33.5 | NH | 97 | 04 | 03 | 0747 | 91 | 18 | 1 |
| 93.3 | 50.0 | 32 | 10.9 | 118 | 53.4 | NH | 97 | 04 | 03 | 1233 | 86 | 110 | 13 |
| 93.3 | 55.0 | 32 | 00.7 | 119 | 13.6 | NH | 97 | 04 | 03 | 1801 | 80 | 31 | 8 |
| 93.3 | 60.0 | 31 | 50.8 | 119 | 34.3 | NH | 97 | 04 | 03 | 2211 | 86 | 13 | 852 |
| 93.3 | 70.0 | 31 | 30.8 | 120 | 14.8 | NH | 97 | 04 | 04 | 0419 | 83 | 77 | 542 |
| 93.3 | 80.0 | 31 | 10.8 | 120 | 55.1 | NH | 97 | 04 | 04 | 1154 | 84 | 5 | 46 |
| 93.3 | 90.0 | 30 | 50.7 | 121 | 35.4 | NH | 97 | 04 | 04 | 1735 | 81 | 17 | 14 |
| 93.3 | 100.0 | 30 | 30.8 | 122 | 15.7 | NH | 97 | 04 | 04 | 2315 | 82 | 10 | 24 |
| 93.3 | 110.0 | 30 | 10.8 | 122 | 55.7 | NH | 97 | 04 | 05 | 0503 | 78 | 7 | 0 |
| 93.3 | 120.0 | 29 | 51.1 | 123 | 33.9 | NH | 97 | 04 | 05 | 0936 | 96 | 2 | 394 |

CalCOFI Cruise 9707

| 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 | 49.0 | 35 | 05.3 | 120 | 46.6 | JD | 97 | 07 | 16 | 0915 | 87 | 0 | 134 |
| 76.7 | 51.0 | 35 | 01.3 | 120 | 55.1 | JD | 97 | 07 | 16 | 0724 | 75 | 0 | 110 |
| 76.7 | 55.0 | 34 | 53.3 | 121 | 11.9 | JD | 97 | 07 | 16 | 0340 | 80 | 1 | 1 |
| 76.7 | 60.0 | 34 | 43.3 | 121 | 32.9 | JD | 97 | 07 | 15 | 2338 | 80 | 1 | 2 |
| 76.7 | 70.0 | 34 | 23.3 | 122 | 14.8 | JD | 97 | 07 | 15 | 1746 | 85 | 0 | 6 |
| 76.7 | 80.0 | 34 | 03.3 | 122 | 56.5 | JD | 97 | 07 | 15 | 1115 | 86 | 5 | 40 |
| 76.7 | 90.0 | 33 | 43.3 | 123 | 38.0 | JD | 97 | 07 | 15 | 0442 | 84 | 1 | 69 |
| 76.7 | 100.0 | 33 | 23.3 | 124 | 19.4 | JD | 97 | 07 | 14 | 2303 | 93 | 4 | 919 |

TABLE 1. (cont.) CalCOFI Cruise 9707 (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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 | 51.0 | 34 | 27.0 | 120 | 31.4 | JD | 97 | 07 | 13 | 0637 | 87 | 8 | 567 |
| 80.0 | 55.0 | 34 | 19.0 | 120 | 48.1 | JD | 97 | 07 | 13 | 0843 | 94 | 0 | 5 |
| 80.0 | 60.0 | 34 | 09.0 | 121 | 09.0 | JD | 97 | 07 | 13 | 1526 | 100 | 0 | 1 |
| 80.0 | 70.0 | 33 | 49.0 | 121 | 50.7 | JD | 97 | 07 | 13 | 2136 | 98 | 3 | 44 |
| 80.0 | 80.0 | 33 | 29.0 | 122 | 32.0 | JD | 97 | 07 | 14 | 0331 | 91 | 4 | 6 |
| 80.0 | 90.0 | 33 | 09.0 | 123 | 13.4 | JD | 97 | 07 | 14 | 0810 | 93 | 4 | 38 |
| 80.0 | 100.0 | 32 | 49.0 | 123 | 54.4 | JD | 97 | 07 | 14 | 1651 | 92 | 5 | 66 |
| 81.8 | 46.9 | 34 | 16.5 | 120 | 01.5 | JD | 97 | 07 | 13 | 0249 | 88 | 4 | 2 |
| 83.3 | 40.6 | 34 | 13.5 | 119 | 24.7 | JD | 97 | 07 | 12 | 2213 | 93 | 539 | 2167 |
| 83.3 | 42.0 | 34 | 10.7 | 119 | 30.5 | JD | 97 | 07 | 12 | 2027 | 86 | 8 | 160 |
| 83.3 | 51.0 | 33 | 52.7 | 120 | 08.1 | JD | 97 | 07 | 12 | 1425 | 80 | 0 | 42 |
| 83.3 | 55.0 | 33 | 44.7 | 120 | 24.6 | JD | 97 | 07 | 12 | 1052 | 85 | 0 | 0 |
| 83.3 | 60.0 | 33 | 34.7 | 120 | 45.3 | JD | 97 | 07 | 12 | 0552 | 77 | 2 | 0 |
| 83.3 | 70.0 | 33 | 14.7 | 121 | 26.6 | JD | 97 | 07 | 11 | 2341 | 77 | 4 | 0 |
| 83.3 | 80.0 | 32 | 54.7 | 122 | 07.9 | JD | 97 | 07 | 11 | 1737 | 84 | 3 | 15 |
| 83.3 | 90.0 | 32 | 34.7 | 122 | 48.7 | JD | 97 | 07 | 11 | 0801 | 89 | 0 | 53 |
| 83.3 | 100.0 | 32 | 14.7 | 123 | 29.5 | JD | 97 | 07 | 10 | 2358 | 87 | 0 | 473 |
| 83.3 | 110.0 | 31 | 54.7 | 124 | 10.2 | JD | 97 | 07 | 10 | 1740 | 84 | 2 | 363 |
| 86.7 | 33.0 | 33 | 53.2 | 118 | 29.5 | JD | 97 | 07 | 08 | 0130 | 93 | 532 | 6397 |
| 86.7 | 35.0 | 33 | 49.5 | 118 | 37.7 | JD | 97 | 07 | 08 | 0351 | 92 | 209 | 18 |
| 86.7 | 40.0 | 33 | 39.4 | 118 | 58.5 | JD | 97 | 07 | 08 | 0745 | 95 | 0 | 6 |
| 86.7 | 45.0 | 33 | 29.4 | 119 | 19.1 | JD | 97 | 07 | 08 | 1223 | 87 | 0 | 0 |
| 86.7 | 50.0 | 33 | 19.5 | 119 | 39.8 | JD | 97 | 07 | 08 | 1618 | 85 | 2 | 86 |
| 86.7 | 55.0 | 33 | 09.4 | 120 | 00.4 | JD | 97 | 07 | 08 | 2003 | 84 | 3 | 1 |
| 86.7 | 60.0 | 32 | 59.4 | 120 | 21.0 | JD | 97 | 07 | 08 | 2356 | 86 | 1 | 3 |
| 86.7 | 70.0 | 32 | 39.3 | 121 | 02.1 | JD | 97 | 07 | 09 | 0529 | 73 | 0 | 3 |
| 86.7 | 80.0 | 32 | 19.4 | 121 | 42.9 | JD | 97 | 07 | 09 | 1212 | 74 | 1 | 16 |
| 86.7 | 90.0 | 31 | 59.4 | 122 | 23.6 | JD | 97 | 07 | 09 | 1901 | 90 | 17 | 965 |
| 86.7 | 100.0 | 31 | 39.4 | 123 | 04.2 | JD | 97 | 07 | 10 | 0058 | 84 | 12 | 82 |
| 86.7 | 110.0 | 31 | 19.4 | 123 | 44.7 | JD | 97 | 07 | 10 | 0815 | 86 | 1 | 995 |
| 90.0 | 28.0 | 33 | 29.0 | 117 | 46.1 | JD | 97 | 07 | 07 | 1914 | 89 | 82 | 61 |
| 90.0 | 30.0 | 33 | 24.9 | 117 | 54.2 | JD | 97 | 07 | 07 | 1544 | 91 | 4 | 21 |
| 90.0 | 35.0 | 33 | 15.2 | 118 | 14.9 | JD | 97 | 07 | 07 | 1142 | 88 | 0 | 0 |
| 90.0 | 37.0 | 33 | 11.2 | 118 | 23.5 | JD | 97 | 07 | 07 | 0813 | 94 | 5 | 17 |
| 90.0 | 45.0 | 32 | 55.1 | 118 | 56.1 | JD | 97 | 07 | 07 | 0245 | 89 | 0 | 0 |
| 90.0 | 53.0 | 32 | 39.1 | 119 | 28.9 | JD | 97 | 07 | 06 | 2118 | 86 | 0 | 5 |
| 90.0 | 60.0 | 32 | 25.1 | 119 | 57.6 | JD | 97 | 07 | 06 | 1630 | 84 | 0 | 2 |
| 90.0 | 70.0 | 32 | 05.1 | 120 | 38.2 | JD | 97 | 07 | 06 | 0806 | 79 | 0 | 54 |
| 90.0 | 80.0 | 31 | 45.1 | 121 | 18.9 | JD | 97 | 07 | 06 | 0015 | 85 | 109 | 4 |
| 90.0 | 90.0 | 31 | 25.1 | 121 | 59.3 | JD | 97 | 07 | 05 | 1756 | 85 | 0 | 16 |
| 90.0 | 100.0 | 31 | 05.2 | 122 | 39.7 | JD | 97 | 07 | 05 | 0802 | 83 | 1 | 555 |
| 90.0 | 110.0 | 30 | 45.1 | 123 | 19.9 | JD | 97 | 07 | 05 | 0139 | 85 | 15 | 136 |
| 90.0 | 120.0 | 30 | 25.1 | 123 | 59.7 | JD | 97 | 07 | 04 | 1922 | 77 | 17 | 251 |
| 93.3 | 26.7 | 32 | 57.3 | 117 | 18.2 | JD | 97 | 07 | 01 | 1117 | 93 | 1 | 2 |
| 93.3 | 28.0 | 32 | 54.8 | 117 | 23.7 | JD | 97 | 07 | 01 | 1354 | 97 | 0 | 1 |
| 93.3 | 30.0 | 32 | 50.8 | 117 | 31.9 | JD | 97 | 07 | 01 | 1642 | 92 | 1 | 1 |
| 93.3 | 35.0 | 32 | 40.8 | 117 | 52.4 | JD | 97 | 07 | 01 | 2141 | 89 | 2 | 0 |
| 93.3 | 40.0 | 32 | 30.8 | 118 | 12.8 | JD | 97 | 07 | 02 | 0141 | 84 | 0 | 1 |
| 93.3 | 45.0 | 32 | 20.8 | 118 | 33.3 | JD | 97 | 07 | 02 | 0530 | 89 | 0 | 2 |

TABLE 1. (cont.) CalCOFI Cruise 9707 (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 | 50.0 | 32 | 10.8 | 118 | 53.6 | JD | 97 | 07 | 02 | 0819 | 82 | 0 | 0 |
| 93.3 | 55.0 | 32 | 00.8 | 119 | 13.9 | JD | 97 | 07 | 02 | 1530 | 82 | 0 | 0 |
| 93.3 | 60.0 | 31 | 50.8 | 119 | 34.3 | JD | 97 | 07 | 02 | 1945 | 91 | 1 | 23 |
| 93.3 | 70.0 | 31 | 30.8 | 120 | 14.8 | JD | 97 | 07 | 03 | 0207 | 87 | 1 | 156 |
| 93.3 | 80.0 | 31 | 10.8 | 120 | 55.2 | JD | 97 | 07 | 03 | 0810 | 82 | 0 | 260 |
| 93.3 | 90.0 | 30 | 50.8 | 121 | 35.4 | JD | 97 | 07 | 03 | 1715 | 77 | 1 | 85 |
| 93.3 | 100.0 | 30 | 30.8 | 122 | 15.5 | JD | 97 | 07 | 03 | 2355 | 82 | 11 | 462 |
| 93.3 | 110.0 | 30 | 10.9 | 122 | 55.3 | JD | 97 | 07 | 04 | 0552 | 77 | 5 | 16 |
| 93.3 | 120.0 | 29 | 50.9 | 123 | 35.2 | JD | 97 | 07 | 04 | 1251 | 82 | 0 | 91 |

CalCOFI Cruise 9709

| 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 | 100.0 | 33 | 23.1 | 124 | 19.2 | NH | 97 | 10 | 04 | 0800 | 73 | 1 | 6 |
| 80.0 | 51.0 | 34 | 26.9 | 120 | 31.6 | NH | 97 | 10 | 02 | 0501 | 77 | 113 | 66 |
| 80.0 | 55.0 | 34 | 18.3 | 120 | 47.6 | NH | 97 | 10 | 02 | 0811 | 74 | 1 | 3 |
| 80.0 | 60.0 | 34 | 09.1 | 121 | 08.9 | NH | 97 | 10 | 02 | 1533 | 86 | 4 | 0 |
| 80.0 | 80.0 | 33 | 28.3 | 122 | 30.5 | NH | 97 | 10 | 03 | 0816 | 68 | 3 | 14 |
| 80.0 | 90.0 | 33 | 08.9 | 123 | 13.3 | NH | 97 | 10 | 03 | 1806 | 82 | 4 | 19 |
| 80.0 | 100.0 | 32 | 48.8 | 123 | 54.5 | NH | 97 | 10 | 04 | 0116 | 75 | 0 | 3 |
| 81.8 | 46.9 | 34 | 16.5 | 120 | 01.8 | NH | 97 | 10 | 02 | 0110 | 83 | 10 | 5 |
| 83.3 | 40.6 | 34 | 13.6 | 119 | 24.9 | NH | 97 | 10 | 01 | 2018 | 99 | 58 | 1501 |
| 83.3 | 42.0 | 34 | 10.6 | 119 | 30.5 | NH | 97 | 10 | 01 | 1613 | 72 | 1 | 0 |
| 83.3 | 51.0 | 33 | 52.7 | 120 | 08.0 | NH | 97 | 10 | 01 | 0809 | 72 | 0 | 43 |
| 83.3 | 55.0 | 33 | 44.7 | 120 | 24.8 | NH | 97 | 10 | 01 | 0415 | 66 | 3 | 2 |
| 83.3 | 60.0 | 33 | 34.7 | 120 | 45.2 | NH | 97 | 09 | 30 | 2358 | 52 | 1 | 11 |
| 83.3 | 70.0 | 33 | 14.7 | 121 | 26.7 | NH | 97 | 09 | 30 | 1645 | 86 | 0 | 64 |
| 83.3 | 80.0 | 32 | 54.7 | 122 | 07.7 | NH | 97 | 09 | 30 | 0845 | 88 | 1 | 178 |
| 83.3 | 90.0 | 32 | 34.7 | 122 | 48.4 | NH | 97 | 09 | 30 | 0343 | 84 | 1 | 50 |
| 83.3 | 100.0 | 32 | 14.7 | 123 | 29.5 | NH | 97 | 09 | 29 | 2150 | 86 | 5 | 3509 |
| 83.3 | 110.0 | 31 | 54.7 | 124 | 10.2 | NH | 97 | 09 | 29 | 1558 | 90 | 1 | 45 |
| 86.7 | 33.0 | 33 | 53.4 | 118 | 29.5 | NH | 97 | 09 | 26 | 2112 | 82 | 9 | 742 |
| 86.7 | 35.0 | 33 | 49.3 | 118 | 37.7 | NH | 97 | 09 | 26 | 2336 | 83 | 16 | 0 |
| 86.7 | 40.0 | 33 | 39.4 | 118 | 58.4 | NH | 97 | 09 | 27 | 0321 | 75 | 0 | 172 |
| 86.7 | 45.0 | 33 | 29.4 | 119 | 18.9 | NH | 97 | 09 | 27 | 0724 | 85 | 0 | 117 |
| 86.7 | 50.0 | 33 | 19.4 | 119 | 39.8 | NH | 97 | 09 | 27 | 1111 | 70 | 0 | 21 |
| 86.7 | 55.0 | 33 | 09.4 | 120 | 00.3 | NH | 97 | 09 | 27 | 1622 | 82 | 0 | 2 |
| 86.7 | 60.0 | 32 | 59.5 | 120 | 21.1 | NH | 97 | 09 | 27 | 2027 | 64 | 2 | 1 |
| 86.7 | 70.0 | 32 | 39.4 | 121 | 02.0 | NH | 97 | 09 | 28 | 0257 | 65 | 1 | 20 |
| 86.7 | 80.0 | 32 | 19.0 | 121 | 41.8 | NH | 97 | 09 | 28 | 0843 | 82 | 1 | 0 |
| 86.7 | 90.0 | 31 | 59.3 | 122 | 23.6 | NH | 97 | 09 | 28 | 1751 | 82 | 0 | 12 |
| 86.7 | 100.0 | 31 | 39.5 | 123 | 04.1 | NH | 97 | 09 | 29 | 0129 | 69 | 3 | 2 |
| 86.7 | 110.0 | 31 | 18.7 | 123 | 43.9 | NH | 97 | 09 | 29 | 0800 | 93 | 1 | 217 |
| 90.0 | 28.0 | 33 | 28.8 | 117 | 46.1 | NH | 97 | 09 | 26 | 1448 | 104 | 2 | 314 |
| 90.0 | 30.0 | 33 | 25.1 | 117 | 54.3 | NH | 97 | 09 | 26 | 1208 | 94 | 0 | 6 |
| 90.0 | 35.0 | 33 | 15.0 | 118 | 15.0 | NH | 97 | 09 | 26 | 0734 | 85 | 0 | 2 |
| 90.0 | 37.0 | 33 | 11.1 | 118 | 23.5 | NH | 97 | 09 | 26 | 0443 | 88 | 28 | 20 |
| 90.0 | 45.0 | 32 | 55.1 | 118 | 56.2 | NH | 97 | 09 | 25 | 2305 | 57 | 1 | 0 |

TABLE 1. (cont.) CalCOFI Cruise 9709 (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 | 53.0 | 32 | 39.0 | 119 | 28.9 | NH | 97 | 09 | 25 | 1736 | 80 | 1 | 1 |
| 90.0 | 60.0 | 32 | 25.1 | 119 | 57.6 | NH | 97 | 09 | 25 | 1055 | 89 | 1 | 0 |
| 90.0 | 70.0 | 32 | 04.9 | 120 | 38.4 | NH | 97 | 09 | 25 | 0439 | 84 | 3 | 5 |
| 90.0 | 80.0 | 31 | 45.0 | 121 | 18.9 | NH | 97 | 09 | 24 | 2225 | 72 | 1 | 5 |
| 90.0 | 90.0 | 31 | 24.9 | 121 | 59.5 | NH | 97 | 09 | 24 | 1620 | 87 | 1 | 54 |
| 90.0 | 100.0 | 31 | 04.6 | 122 | 39.8 | NH | 97 | 09 | 24 | 0802 | 58 | 0 | 40 |
| 90.0 | 110.0 | 30 | 45.1 | 123 | 20.2 | NH | 97 | 09 | 24 | 0110 | 78 | 1 | 5 |
| 90.0 | 120.0 | 30 | 24.8 | 123 | 59.7 | NH | 97 | 09 | 23 | 1851 | 87 | 3 | 78 |
| 93.3 | 26.7 | 32 | 57.4 | 117 | 18.3 | NH | 97 | 09 | 20 | 1139 | 90 | 0 | 2132 |
| 93.3 | 28.0 | 32 | 54.8 | 117 | 23.3 | NH | 97 | 09 | 20 | 1510 | 89 | 0 | 1 |
| 93.3 | 30.0 | 32 | 50.9 | 117 | 31.6 | NH | 97 | 09 | 20 | 1804 | 78 | 8 | 0 |
| 93.3 | 35.0 | 32 | 40.8 | 117 | 52.4 | NH | 97 | 09 | 20 | 2205 | 89 | 3 | 316 |
| 93.3 | 40.0 | 32 | 30.9 | 118 | 12.4 | NH | 97 | 09 | 21 | 0150 | 84 | 3 | 0 |
| 93.3 | 45.0 | 32 | 20.8 | 118 | 33.1 | NH | 97 | 09 | 21 | 0601 | 77 | 0 | 2 |
| 93.3 | 50.0 | 32 | 10.8 | 118 | 53.6 | NH | 97 | 09 | 21 | 1049 | 83 | 0 | 0 |
| 93.3 | 55.0 | 32 | 01.1 | 119 | 13.9 | NH | 97 | 09 | 21 | 1503 | 85 | 3 | 22 |
| 93.3 | 60.0 | 31 | 50.8 | 119 | 34.1 | NH | 97 | 09 | 21 | 1918 | 80 | 2 | 2 |
| 93.3 | 70.0 | 31 | 30.8 | 120 | 14.6 | NH | 97 | 09 | 22 | 0112 | 79 | 3 | 13 |
| 93.3 | 80.0 | 31 | 10.6 | 120 | 55.2 | NH | 97 | 09 | 22 | 0804 | 71 | 4 | 8 |
| 93.3 | 90.0 | 30 | 50.4 | 121 | 35.3 | NH | 97 | 09 | 22 | 1655 | 85 | 3 | 9 |
| 93.3 | 100.0 | 30 | 30.8 | 122 | 15.5 | NH | 97 | 09 | 22 | 2256 | 88 | 23 | 7 |
| 93.3 | 110.0 | 30 | 10.6 | 122 | 55.2 | NH | 97 | 09 | 23 | 0458 | 72 | 13 | 54 |
| 93.3 | 120.0 | 29 | 50.6 | 123 | 35.3 | NH | 97 | 09 | 23 | 1137 | 81 | 0 | 51 |

TABLE 2. Pooled occurrences of fish larvae taken in Manta tows on the 1997 CalCOFI survey.

| Rank | Taxon | Occurrences |
|---|---|---|
| 1 | *Cololabis saira* | 64 |
| 2 | *Sardinops sagax* | 57 |
| 3 | *Engraulis mordax* | 50 |
| 4 | *Sebastes* spp. | 30 |
| 5 | *Scorpaenichthys marmoratus* | 18 |
| 5 | *Hypsoblennius jenkinsi* | 18 |
| 7 | *Vinciguerria lucetia* | 16 |
| 8 | *Scomber japonicus* | 13 |
| 8 | *Atherinopsis californiensis* | 13 |
| 10 | *Cheilopogon heterurus* | 12 |
| 11 | *Trachurus symmetricus* | 11 |
| 12 | *Tetragonurus cuvieri* | 9 |
| 13 | *Ceratoscopelus townsendi* | 8 |
| 13 | *Chromis punctipinnis* | 8 |
| 15 | *Hypsoblennius gilberti* | 7 |
| 15 | *Lampanyctus* spp. | 7 |
| 17 | *Medialuna californiensis* | 6 |
| 17 | *Merluccius productus* | 6 |
| 19 | *Sebastes diploproa* | 5 |
| 19 | *Sphyraena argentea* | 5 |
| 19 | *Lampadena urophaos* | 5 |
| 22 | *Paralabrax* spp. | 4 |
| 22 | *Coryphopterus nicholsii* | 4 |
| 22 | *Triphoturus mexicanus* | 4 |
| 22 | *Xenistius californiensis* | 4 |
| 22 | *Sebastes jordani* | 4 |
| 22 | *Hexagrammos decagrammus* | 4 |
| 28 | *Pleuronichthys coenosus* | 3 |
| 29 | *Fodiator acutus* | 2 |
| 29 | *Diaphus* spp. | 2 |
| 29 | *Stenobrachius leucopsarus* | 2 |
| 29 | *Oxylebius pictus* | 2 |
| 29 | *Leuresthes tenuis* | 2 |
| 29 | *Aristostomias scintillans* | 2 |
| 29 | Myctophidae | 2 |
| 29 | *Girella nigricans* | 2 |
| 29 | *Ophiodon elongatus* | 2 |
| 29 | *Hypsoblennius* spp. | 2 |
| 29 | *Hypsoblennius gentilis* | 2 |
| 29 | *Oxyjulis californica* | 2 |
| 29 | *Citharichthys sordidus* | 2 |
| 29 | *Paralichthys californicus* | 2 |
| 29 | *Anisotremus davidsoni* | 2 |
| 29 | *Seriola lalandi* | 2 |
| 45 | *Bathylagus ochotensis* | 1 |
| 45 | *Neoclinus blanchardi* | 1 |
| 45 | *Hypsopsetta guttulata* | 1 |
| 45 | *Neoclinus stephensae* | 1 |
| 45 | *Argentina sialis* | 1 |

TABLE 2. (cont.)

| Rank | Taxon | Occurrences |
|---|---|---|
| 45 | *Tactostoma macropus* | 1 |
| 45 | *Icosteus aenigmaticus* | 1 |
| 45 | *Cyclothone* spp. | 1 |
| 45 | *Scopelosaurus* spp. | 1 |
| 45 | *Nannobrachium hawaiiensis* | 1 |
| 45 | *Leuroglossus stilbius* | 1 |
| 45 | *Cryptotrema corallinum* | 1 |
| 45 | *Stomias atriventer* | 1 |
| 45 | *Bolinichthys longipes* | 1 |
| 45 | *Halichoeres semicinctus* | 1 |
| 45 | Cottidae | 1 |
| 45 | *Coryphaena hippurus* | 1 |
| 45 | *Brama japonica* | 1 |
| 45 | *Sebastes goodei* | 1 |
| 45 | *Atractoscion nobilis* | 1 |
| 45 | *Genyonemus lineatus* | 1 |
| 45 | *Cheilopogon pinnatibarbatus* | 1 |
| 45 | *Nannobrachium ritteri* | 1 |
| 45 | *Hypsypops rubicundus* | 1 |
| 45 | *Nannobrachium regale* | 1 |
| 45 | *Gigantactis* spp. | 1 |
| 45 | *Brosmophycis marginata* | 1 |
| 45 | *Ophidion scrippsae* | 1 |
| 45 | *Semicossyphus pulcher* | 1 |
| 45 | *Protomyctophum crockeri* | 1 |
| 45 | *Neoclinus* spp. | 1 |
| 45 | *Sebastes paucispinis* | 1 |
| 45 | *Cheilopogon* spp. | 1 |
| | Total | 460 |

TABLE 3. Pooled raw counts of fish larvae taken in Manta tows on the 1997 CalCOFI survey.

| Rank | Taxon | Count |
|---|---|---|
| 1 | *Sardinops sagax* | 2977 |
| 2 | *Engraulis mordax* | 1114 |
| 3 | *Hypsoblennius jenkinsi* | 856 |
| 4 | *Cololabis saira* | 262 |
| 5 | *Sebastes* spp. | 225 |
| 6 | *Atherinopsis californiensis* | 207 |
| 7 | *Sphyraena argentea* | 196 |
| 8 | *Hypsoblennius gilberti* | 189 |
| 9 | *Vinciguerria lucetia* | 102 |
| 10 | *Scomber japonicus* | 98 |
| 11 | *Scorpaenichthys marmoratus* | 82 |
| 12 | *Hypsypops rubicundus* | 59 |
| 13 | *Trachurus symmetricus* | 41 |
| 14 | *Xenistius californiensis* | 24 |
| 15 | *Cheilopogon heterurus* | 23 |
| 16 | *Ophiodon elongatus* | 22 |
| 17 | *Chromis punctipinnis* | 21 |
| 18 | *Ceratoscopelus townsendi* | 20 |
| 18 | *Merluccius productus* | 20 |
| 20 | *Stomias atriventer* | 16 |
| 20 | *Sebastes jordani* | 16 |
| 22 | *Hexagrammos decagrammus* | 14 |
| 23 | *Tetragonurus cuvieri* | 12 |
| 23 | *Paralabrax* spp. | 12 |
| 23 | *Medialuna californiensis* | 12 |
| 26 | *Lampanyctus* spp. | 9 |
| 27 | *Hypsoblennius gentilis* | 8 |
| 27 | *Hypsoblennius* spp. | 8 |
| 29 | *Triphoturus mexicanus* | 7 |
| 29 | *Coryphopterus nicholsii* | 7 |
| 29 | *Leuroglossus stilbius* | 7 |
| 29 | *Stenobrachius leucopsarus* | 7 |
| 33 | *Lampadena urophaos* | 6 |
| 33 | *Pleuronichthys coenosus* | 6 |
| 33 | *Sebastes diploproa* | 6 |
| 36 | *Anisotremus davidsoni* | 5 |
| 36 | *Neoclinus* spp. | 5 |
| 38 | *Leuresthes tenuis* | 4 |
| 38 | *Oxylebius pictus* | 4 |
| 38 | *Paralichthys californicus* | 4 |
| 41 | *Ophidion scrippsae* | 3 |
| 41 | *Bathylagus ochotensis* | 3 |
| 41 | *Diaphus* spp. | 3 |
| 41 | *Aristostomias scintillans* | 3 |
| 41 | *Girella nigricans* | 3 |
| 46 | *Fodiator acutus* | 2 |
| 46 | *Nannobrachium ritteri* | 2 |
| 46 | *Cheilopogon pinnatibarbatus* | 2 |
| 46 | *Seriola lalandi* | 2 |

TABLE 3. (cont.)

| Rank | Taxon | Count |
|---|---|---|
| 46 | Myctophidae | 2 |
| 46 | *Semicossyphus pulcher* | 2 |
| 46 | *Sebastes paucispinis* | 2 |
| 46 | *Cyclothone* spp. | 2 |
| 46 | *Neoclinus blanchardi* | 2 |
| 46 | *Citharichthys sordidus* | 2 |
| 46 | *Oxyjulis californica* | 2 |
| 57 | *Tactostoma macropus* | 1 |
| 57 | *Cheilopogon* spp. | 1 |
| 57 | *Argentina sialis* | 1 |
| 57 | *Atractoscion nobilis* | 1 |
| 57 | *Hypsopsetta guttulata* | 1 |
| 57 | *Brosmophycis marginata* | 1 |
| 57 | *Neoclinus stephensae* | 1 |
| 57 | *Cryptotrema corallinum* | 1 |
| 57 | Cottidae | 1 |
| 57 | *Sebastes goodei* | 1 |
| 57 | *Brama japonica* | 1 |
| 57 | *Genyonemus lineatus* | 1 |
| 57 | *Scopelosaurus* spp. | 1 |
| 57 | *Gigantactis* spp. | 1 |
| 57 | *Coryphaena hippurus* | 1 |
| 57 | *Icosteus aenigmaticus* | 1 |
| 57 | *Protomyctophum crockeri* | 1 |
| 57 | *Nannobrachium hawaiiensis* | 1 |
| 57 | *Nannobrachium regale* | 1 |
| 57 | *Bolinichthys longipes* | 1 |
| 57 | *Halichoeres semicinctus* | 1 |
| | Total | 6771 |

TABLE 4. Numbers of fish larvae taken in Manta net tows on the 1997 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 | 49.0 | - | 0.0 | - | 3.2 | - | - | 0.0 | - | - | - | - | - |
| 76.7 | 51.0 | - | 0.0 | - | 123.4 | - | - | 0.0 | - | - | - | - | - |
| 76.7 | 55.0 | - | 0.0 | - | 48.3 | - | - | 0.0 | - | - | - | - | - |
| 76.7 | 60.0 | - | 0.0 | - | 510.5 | - | - | 0.0 | - | - | - | - | - |
| 76.7 | 70.0 | - | 0.0 | - | 60.3 | - | - | 0.0 | - | - | - | - | - |
| 76.7 | 80.0 | - | 0.0 | - | 15.6 | - | - | 0.0 | - | - | - | - | - |
| 76.7 | 90.0 | - | 0.0 | - | 65.0 | - | - | 0.0 | - | - | - | - | - |
| 76.7 | 100.0 | - | 0.0 | - | 7.3 | - | - | 0.0 | - | - | 0.0 | - | - |
| 80.0 | 51.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 0.8 | - | - |
| 80.0 | 60.0 | - | 0.0 | - | 121.8 | - | - | 0.0 | - | - | 0.0 | - | - |
| 80.0 | 70.0 | - | 0.0 | - | 23.6 | - | - | 2.9 | - | - | - | - | - |
| 80.0 | 80.0 | - | 0.0 | - | 0.7 | - | - | 1.8 | - | - | 0.0 | - | - |
| 80.0 | 90.0 | - | 0.0 | - | 443.6 | - | - | 0.0 | - | - | 0.0 | - | - |
| 80.0 | 100.0 | - | 0.0 | - | 50.1 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 | 40.6 | - | 0.0 | - | 2.4 | - | - | 0.0 | - | - | 26.8 | - | - |
| 83.3 | 51.0 | - | 0.9 | - | 3.2 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 | 55.0 | - | 0.0 | - | 9.5 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 | 60.0 | - | 0.0 | - | 57.2 | - | - | 0.0 | - | 0.0 | - | - | - |
| 83.3 | 70.0 | - | 0.0 | - | 68.9 | - | - | 0.0 | - | 0.0 | - | - | - |
| 83.3 | 80.0 | - | 0.0 | - | 50.2 | - | - | 0.0 | - | 0.0 | - | - | - |
| 83.3 | 90.0 | - | 0.0 | - | 14.7 | - | - | 0.0 | - | 0.0 | - | - | - |
| 83.3 | 100.0 | - | 0.0 | - | 129.6 | - | - | 0.0 | - | 0.0 | - | - | - |
| 83.3 | 110.0 | - | 0.0 | - | 12.3 | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 | 33.0 | - | 0.0 | - | 0.0 | - | - | 3.7 | - | 0.0 | - | - | - |
| 86.7 | 35.0 | - | 38.3 | - | 0.0 | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 | 50.0 | - | 0.8 | - | - | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 | 55.0 | - | 0.0 | - | - | - | - | 2.5 | - | 0.0 | - | - | - |
| 86.7 | 60.0 | - | 0.0 | - | - | - | - | 0.9 | - | 0.0 | - | - | - |
| 86.7 | 80.0 | - | 0.0 | - | 3.8 | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 | 90.0 | - | 0.0 | - | 1.1 | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 | 100.0 | - | 0.0 | - | 110.1 | - | - | 0.0 | - | 0.0 | - | - | - |

TABLE 4. (cont.)

*Sardinops sagax* (cont.)

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 110.0 | - | 0.0 | - | 2.4 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 30.0 | - | 0.0 | - | 5.4 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 35.0 | - | 0.0 | - | 0.8 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 37.0 | - | 0.0 | - | 0.7 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 45.0 | - | 0.0 | - | 4.1 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 70.0 | - | 0.0 | - | 42.3 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 80.0 | - | 0.0 | - | 30.8 | - | - | 89.8 | - | 0.0 | - | - | - |
| 90.0 90.0 | - | 0.0 | - | 21.1 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 28.0 | 0.0 | - | - | 1.0 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 30.0 | 0.0 | - | - | 0.8 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 35.0 | 0.0 | - | - | 20.7 | - | - | 0.9 | - | 0.0 | - | - | - |
| 93.3 40.0 | 0.0 | - | - | 70.9 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 45.0 | 0.0 | - | - | 0.9 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 50.0 | 0.0 | - | - | 88.9 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 55.0 | 0.0 | - | - | 22.4 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 60.0 | 0.0 | - | - | 7.8 | - | - | 0.9 | - | 0.0 | - | - | - |
| 93.3 70.0 | 0.0 | - | - | 58.9 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 80.0 | 0.0 | - | - | 2.5 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 90.0 | 0.0 | - | - | 2.4 | - | - | 0.0 | - | 0.0 | - | - | - |

*Engraulis mordax*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 51.0 | - | 0.0 | - | 150.1 | - | - | 0.0 | - | - | - | - | - |
| 76.7 55.0 | - | 7.5 | - | 6.3 | - | - | 0.0 | - | - | - | - | - |
| 76.7 60.0 | - | 13.4 | - | 23.2 | - | - | 0.0 | - | - | - | - | - |
| 76.7 80.0 | - | 0.0 | - | 1.7 | - | - | 0.0 | - | - | - | - | - |
| 80.0 51.0 | - | 191.5 | - | 0.0 | - | - | 6.1 | - | - | 53.8 | - | - |
| 80.0 55.0 | - | 0.0 | - | 1.9 | - | - | 0.0 | - | - | 0.0 | - | - |
| 80.0 60.0 | - | 0.0 | - | 0.8 | - | - | 0.0 | - | - | 0.0 | - | - |
| 80.0 80.0 | - | 0.0 | - | 0.0 | - | - | 0.9 | - | - | 0.0 | - | - |
| 80.0 90.0 | - | 0.0 | - | 0.8 | - | - | 0.0 | - | - | 0.0 | - | - |
| 81.8 46.9 | - | 22.6 | - | 12.7 | - | - | 1.8 | - | - | 0.0 | - | - |
| 83.3 40.6 | - | 0.0 | - | 21.1 | - | - | 0.9 | - | - | 13.9 | - | - |
| 83.3 42.0 | - | 4.6 | - | 29.0 | - | - | 0.9 | - | - | 0.0 | - | - |
| 83.3 51.0 | - | 9.5 | - | 4.8 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 55.0 | - | 1.7 | - | 10.4 | - | - | 0.0 | - | - | 0.0 | - | - |

TABLE 4. (cont.)

***Engraulis mordax*** (cont.)

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 60.0 | - | 0.0 | - | 49.9 | - | - | 0.0 | - | 0.5 | - | - | - |
| 83.3 70.0 | - | 0.0 | - | 0.0 | - | - | 0.8 | - | 0.0 | - | - | - |
| 86.7 33.0 | - | 2.5 | - | 3.8 | - | - | 4.6 | - | 3.3 | - | - | - |
| 86.7 35.0 | - | 4.4 | - | 0.8 | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 40.0 | - | 7.5 | - | 0.9 | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 45.0 | - | 6.5 | - | - | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 50.0 | - | 3.0 | - | - | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 55.0 | - | 2.2 | - | - | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 28.0 | - | 0.0 | - | 4.3 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 30.0 | - | 105.7 | - | 29.7 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 45.0 | - | 0.0 | - | 1.4 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 53.0 | - | 1.7 | - | 0.0 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 30.0 | 0.0 | - | - | 107.3 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 50.0 | 0.0 | - | - | 1.7 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 55.0 | 0.0 | - | - | 2.4 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 60.0 | 0.0 | - | - | 1.7 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 110.0 | - | 0.0 | - | 0.8 | - | - | 0.0 | - | 0.0 | - | - | - |

***Argentina sialis***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 55.0 | - | 0.0 | - | 0.9 | - | - | 0.0 | - | - | - | - | - |

***Bathylagus ochotensis***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 53.0 | - | 0.0 | - | 2.1 | - | - | 0.0 | - | 0.0 | - | - | - |

***Leuroglossus stilbius***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 50.0 | - | 5.3 | - | - | - | - | 0.0 | - | 0.0 | - | - | - |

***Cyclothone* spp.**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 100.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 1.8 | - | - | - |

***Vinciguerria lucetia***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 60.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 3.4 | - | - |
| 80.0 80.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 1.4 | - | - |

TABLE 4. (cont.)

*Vinciguerria lucetia* (cont.)

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 70.0 | - | 0.0 | - | - | - | - | 0.0 | - | 0.6 | - | - | - |
| 86.7 90.0 | - | 0.0 | - | 0.0 | - | - | 15.3 | - | 0.0 | - | - | - |
| 86.7 100.0 | - | 0.0 | - | 0.0 | - | - | 9.3 | - | 0.0 | - | - | - |
| 90.0 110.0 | - | 0.0 | - | 0.0 | - | - | 10.2 | - | 0.0 | - | - | - |
| 90.0 120.0 | - | 0.0 | - | 0.0 | - | - | 3.9 | - | 0.0 | - | - | - |
| 93.3 40.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 2.5 | - | - | - |
| 93.3 60.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 0.8 | - | - | - |
| 93.3 70.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 1.6 | - | - | - |
| 93.3 80.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 1.4 | - | - | - |
| 93.3 90.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 0.8 | - | - | - |
| 93.3 100.0 | 0.0 | - | - | 0.0 | - | - | 9.0 | - | 17.5 | - | - | - |
| 93.3 110.0 | - | 0.0 | - | 0.0 | - | - | 3.1 | - | 4.3 | - | - | - |

*Stomias atriventer*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 45.0 | 0.0 | - | - | 14.5 | - | - | 0.0 | - | 0.0 | - | - | - |

*Tactostoma macropus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 100.0 | - | 0.0 | - | 0.0 | - | - | 0.8 | - | 0.0 | - | - | - |

*Aristostomias scintillans*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 100.0 | - | 1.7 | - | 0.0 | - | - | 0.9 | - | - | 0.0 | - | - |

*Scopelosaurus* spp.

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

**Myctophidae**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 40.6 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 1.0 | - | - |
| 83.3 42.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 0.7 | - | - |

*Bolinichthys longipes*

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

TABLE 4. (cont.)

***Ceratoscopelus townsendi***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 90.0 | - | 0.8 | - | 0.0 | - | - | 0.8 | - | - | - | - | - |
| 80.0 80.0 | - | 0.0 | - | 0.7 | - | - | 0.0 | - | - | 0.0 | - | - |
| 80.0 90.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 1.6 | - | - |
| 83.3 42.0 | - | 0.0 | - | 0.0 | - | - | 0.9 | - | - | 0.0 | - | - |
| 83.3 80.0 | - | 0.0 | - | 0.0 | - | - | 0.8 | - | 0.0 | - | - | - |
| 90.0 120.0 | - | 0.0 | - | 0.0 | - | - | 9.3 | - | 0.0 | - | - | - |
| 93.3 100.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 0.9 | - | - | - |

***Diaphus* spp.**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 70.0 | - | 0.0 | - | 0.0 | - | - | 1.5 | - | 0.0 | - | - | - |
| 90.0 90.0 | - | 0.0 | - | 0.8 | - | - | 0.0 | - | 0.0 | - | - | - |

***Lampadena urophaos***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 90.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 1.6 | - | - |
| 86.7 100.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 0.7 | - | - | - |
| 90.0 90.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 0.9 | - | - | - |
| 90.0 120.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 0.9 | - | - | - |
| 93.3 30.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 0.8 | - | - | - |

***Lampanyctus* spp.**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 90.0 | - | 0.8 | - | 0.0 | - | - | 0.0 | - | - | - | - | - |
| 76.7 100.0 | - | 0.8 | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 80.0 | - | 0.0 | - | 0.0 | - | - | 0.8 | - | 0.0 | - | - | - |
| 86.7 50.0 | - | 0.8 | - | - | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 80.0 | - | 0.0 | - | 0.0 | - | - | 2.5 | - | 0.0 | - | - | - |
| 90.0 110.0 | - | 0.0 | - | 0.0 | - | - | 0.8 | - | 0.0 | - | - | - |
| 93.3 90.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 0.8 | - | - | - |

***Nannobrachium hawaiiensis***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 70.0 | 0.0 | - | - | 0.8 | - | - | 0.0 | - | 0.0 | - | - | - |

TABLE 4. (cont.)

*Nannobrachium regale*

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

*Nannobrachium ritteri*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 100.0 | - | 1.7 | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - |

*Stenobrachius leucopsarus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 49.0 | - | 1.7 | - | 0.0 | - | - | 0.0 | - | - | - | - | - |
| 86.7 50.0 | - | 3.8 | - | - | - | - | 0.0 | - | 0.0 | - | - | - |

*Triphoturus mexicanus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 100.0 | - | 0.0 | - | 0.0 | - | - | 0.9 | - | - | 0.0 | - | - |
| 90.0 110.0 | - | 0.0 | - | 0.0 | - | - | 1.7 | - | 0.0 | - | - | - |
| 93.3 30.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 2.3 | - | - | - |
| 93.3 90.0 | 0.0 | - | - | 0.8 | - | - | 0.0 | - | 0.0 | - | - | - |

*Protomyctophum crockeri*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 120.0 | - | 0.9 | - | 0.0 | - | - | 0.0 | - | 0.0 | - | - | - |

*Merluccius productus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 51.0 | - | 11.9 | - | 0.9 | - | - | 0.0 | - | - | - | - | - |
| 76.7 55.0 | - | 0.8 | - | 0.0 | - | - | 0.0 | - | - | - | - | - |
| 81.8 46.9 | - | 0.9 | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 51.0 | - | 0.9 | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - |
| 86.7 50.0 | - | 0.8 | - | - | - | - | 0.0 | - | 0.0 | - | - | - |

*Ophidion scrippsae*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 28.0 | - | 0.0 | - | 0.0 | - | - | 2.7 | - | 0.0 | - | - | - |

*Brosmophycis marginata*

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

TABLE 4. (cont.)

*Gigantactis* spp.

| Station | | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93.3 | 80.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 0.7 | - | - | - |

*Atherinopsis californiensis*

| 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 | - | - |
| 81.8 | 46.9 | - | 1.7 | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 | 40.6 | - | 1.6 | - | 14.6 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 | 42.0 | - | 1.3 | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 | 51.0 | - | 1.7 | - | 8.9 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 | 55.0 | - | 0.8 | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - |
| 86.7 | 33.0 | - | 3.3 | - | 2.5 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 | 28.0 | - | 7.3 | - | 0.0 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 | 26.7 | 0.0 | - | - | 79.2 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 | 28.0 | 0.0 | - | - | 46.2 | - | - | 0.0 | - | 0.0 | - | - | - |

*Leuresthes tenuis*

| Station | | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 | 40.6 | - | 0.0 | - | 0.0 | - | - | 2.8 | - | - | 0.0 | - | - |
| 90.0 | 28.0 | - | 0.0 | - | 0.9 | - | - | 0.0 | - | 0.0 | - | - | - |

*Cololabis saira*

| Station | | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 | 51.0 | - | 0.8 | - | 0.0 | - | - | 0.0 | - | - | - | - | - |
| 76.7 | 70.0 | - | 0.9 | - | 2.4 | - | - | 0.0 | - | - | - | - | - |
| 76.7 | 80.0 | - | 0.0 | - | 11.3 | - | - | 4.3 | - | - | - | - | - |
| 76.7 | 90.0 | - | 0.0 | - | 1.6 | - | - | 0.0 | - | - | - | - | - |
| 76.7 | 100.0 | - | 0.0 | - | 1.8 | - | - | 3.7 | - | - | 0.0 | - | - |
| 80.0 | 70.0 | - | 0.9 | - | 0.0 | - | - | 0.0 | - | - | - | - | - |
| 80.0 | 80.0 | - | 0.8 | - | 2.8 | - | - | 0.9 | - | - | 0.7 | - | - |
| 80.0 | 90.0 | - | 0.0 | - | 22.0 | - | - | 0.9 | - | - | 0.0 | - | - |
| 80.0 | 100.0 | - | 0.0 | - | 20.2 | - | - | 0.0 | - | - | 0.0 | - | - |
| 81.8 | 46.9 | - | 0.9 | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 | 40.6 | - | 0.0 | - | 0.0 | - | - | 0.9 | - | - | 0.0 | - | - |
| 83.3 | 80.0 | - | 0.0 | - | 2.0 | - | - | 0.0 | - | 0.9 | - | - | - |
| 83.3 | 90.0 | - | 0.0 | - | 2.3 | - | - | 0.0 | - | 0.8 | - | - | - |
| 83.3 | 100.0 | - | 0.0 | - | 18.6 | - | - | 0.0 | - | 3.4 | - | - | - |

TABLE 4. (cont.)

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

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 110.0 | - | 1.7 | - | 9.4 | - | - | 0.0 | - | 0.9 | - | - | - |
| 86.7 35.0 | - | 3.5 | - | 0.0 | - | - | 0.9 | - | 0.0 | - | - | - |
| 86.7 40.0 | - | 0.0 | - | 0.9 | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 55.0 | - | 0.7 | - | - | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 70.0 | - | 0.8 | - | - | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 80.0 | - | 0.0 | - | 0.8 | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 100.0 | - | 0.0 | - | 3.8 | - | - | 0.0 | - | 1.4 | - | - | - |
| 86.7 110.0 | - | 0.0 | - | 5.6 | - | - | 0.0 | - | 0.9 | - | - | - |
| 90.0 28.0 | - | 0.0 | - | 1.7 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 37.0 | - | 0.0 | - | 0.7 | - | - | 0.0 | - | 0.9 | - | - | - |
| 90.0 70.0 | - | 0.0 | - | 2.0 | - | - | 0.0 | - | 0.8 | - | - | - |
| 90.0 80.0 | - | 0.0 | - | 1.3 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 90.0 | - | 0.0 | - | 10.1 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 110.0 | - | 0.0 | - | 7.7 | - | - | 0.0 | - | 0.8 | - | - | - |
| 90.0 120.0 | - | 0.0 | - | 2.4 | - | - | 0.0 | - | 1.7 | - | - | - |
| 93.3 40.0 | 1.9 | - | - | 0.0 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 45.0 | 0.0 | - | - | 0.9 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 55.0 | 0.8 | - | - | 0.0 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 60.0 | 1.6 | - | - | 1.7 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 70.0 | 0.0 | - | - | 2.5 | - | - | 0.9 | - | 0.0 | - | - | - |
| 93.3 80.0 | 0.8 | - | - | 1.7 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 90.0 | 0.0 | - | - | 10.6 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 100.0 | 0.0 | - | - | 8.2 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 110.0 | - | 0.9 | - | 3.9 | - | - | 0.0 | - | 5.1 | - | - | - |
| 93.3 120.0 | - | 4.4 | - | 1.9 | - | - | 0.0 | - | 0.0 | - | - | - |

***Cheilopogon* spp.**

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

***Cheilopogon heterurus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 35.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 0.8 | - | - | - |
| 86.7 80.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 0.8 | - | - | - |
| 90.0 37.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 6.1 | - | - | - |
| 90.0 45.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 0.6 | - | - | - |

TABLE 4. (cont.)

***Cheilopogon heterurus*** (cont.)

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 53.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 0.8 | - | - | - |
| 90.0 60.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 0.9 | - | - | - |
| 90.0 70.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 0.8 | - | - | - |
| 93.3 30.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 3.1 | - | - | - |
| 93.3 35.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 1.8 | - | - | - |
| 93.3 55.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 1.7 | - | - | - |
| 93.3 60.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 0.8 | - | - | - |
| 93.3 80.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 0.7 | - | - | - |

***Cheilopogon pinnatibarbatus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 37.0 | - | 0.0 | - | 0.0 | - | - | 1.9 | - | 0.0 | - | - | - |

***Fodiator acutus***

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

***Sebastes* spp.**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 49.0 | - | 0.0 | - | 0.8 | - | - | 0.0 | - | - | - | - | - |
| 76.7 51.0 | - | 0.0 | - | 17.5 | - | - | 0.0 | - | - | - | - | - |
| 76.7 55.0 | - | 3.3 | - | 39.4 | - | - | 0.0 | - | - | - | - | - |
| 76.7 60.0 | - | 2.2 | - | 1.0 | - | - | 0.0 | - | - | - | - | - |
| 76.7 70.0 | - | 0.0 | - | 3.2 | - | - | 0.0 | - | - | - | - | - |
| 80.0 51.0 | - | 3.4 | - | 0.9 | - | - | 0.0 | - | - | 0.0 | - | - |
| 80.0 55.0 | - | 0.8 | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - |
| 81.8 46.9 | - | 0.0 | - | 11.0 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 42.0 | - | 0.0 | - | 5.9 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 51.0 | - | 3.5 | - | 16.2 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 55.0 | - | 2.5 | - | 0.9 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 60.0 | - | 0.8 | - | 0.7 | - | - | 0.8 | - | 0.0 | - | - | - |
| 86.7 33.0 | - | 0.8 | - | 0.0 | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 40.0 | - | 2.5 | - | 0.9 | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 50.0 | - | 45.8 | - | - | - | - | 1.7 | - | 0.0 | - | - | - |
| 86.7 55.0 | - | 8.1 | - | - | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 30.0 | - | 0.0 | - | 0.0 | - | - | 3.6 | - | 0.0 | - | - | - |

TABLE 4. (cont.)

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

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 45.0 | - | 0.9 | - | 0.0 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 30.0 | 0.0 | - | - | 0.0 | - | - | 0.9 | - | 0.0 | - | - | - |
| 93.3 50.0 | 1.7 | - | - | 3.4 | - | - | 0.0 | - | 0.0 | - | - | - |

***Sebastes diploproa***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 49.0 | - | 0.0 | - | 0.8 | - | - | 0.0 | - | - | - | - | - |
| 76.7 51.0 | - | 0.0 | - | 0.9 | - | - | 0.0 | - | - | - | - | - |
| 83.3 55.0 | - | 1.7 | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 60.0 | - | 0.0 | - | 0.0 | - | - | 0.8 | - | 0.0 | - | - | - |
| 90.0 90.0 | - | 0.0 | - | 0.8 | - | - | 0.0 | - | 0.0 | - | - | - |

***Sebastes goodei***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 55.0 | - | 0.8 | - | 0.0 | - | - | 0.0 | - | - | - | - | - |

***Sebastes jordani***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 51.0 | - | 0.0 | - | 0.9 | - | - | 0.0 | - | - | - | - | - |
| 76.7 55.0 | - | 0.0 | - | 7.2 | - | - | 0.0 | - | - | - | - | - |
| 83.3 51.0 | - | 5.2 | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - |
| 90.0 37.0 | - | 0.9 | - | 0.0 | - | - | 0.0 | - | 0.0 | - | - | - |

***Sebastes paucispinis***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 50.0 | - | 1.5 | - | - | - | - | 0.0 | - | 0.0 | - | - | - |

***Oxylebius pictus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 51.0 | - | 0.8 | - | 0.0 | - | - | 0.0 | - | - | - | - | - |
| 76.7 55.0 | - | 0.0 | - | 2.7 | - | - | 0.0 | - | - | - | - | - |

***Hexagrammos decagrammus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 51.0 | - | 8.0 | - | 0.0 | - | - | 0.0 | - | - | - | - | - |
| 81.8 46.9 | - | 1.7 | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 51.0 | - | 0.9 | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 55.0 | - | 0.8 | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - |

TABLE 4. (cont.)

***Ophiodon elongatus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 49.0 | - | 17.0 | - | 0.0 | - | - | 0.0 | - | - | - | - | - |
| 80.0 51.0 | - | 1.7 | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - |

**Cottidae**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 51.0 | - | 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 49.0 | - | 1.7 | - | 0.0 | - | - | 0.0 | - | - | - | - | - |
| 76.7 51.0 | - | 17.5 | - | 1.8 | - | - | 0.0 | - | - | - | - | - |
| 76.7 55.0 | - | 0.0 | - | 1.8 | - | - | 0.0 | - | - | - | - | - |
| 76.7 70.0 | - | 0.0 | - | 0.8 | - | - | 0.0 | - | - | - | - | - |
| 80.0 51.0 | - | 0.9 | - | 0.0 | - | - | 0.0 | - | - | 0.8 | - | - |
| 81.8 46.9 | - | 8.7 | - | 0.8 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 51.0 | - | 0.0 | - | 4.0 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 55.0 | - | 0.0 | - | 0.9 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 60.0 | - | 0.0 | - | 0.7 | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 33.0 | - | 19.0 | - | 0.0 | - | - | 0.9 | - | 0.0 | - | - | - |
| 86.7 35.0 | - | 2.6 | - | 0.0 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 28.0 | - | 3.7 | - | 0.9 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 45.0 | - | 0.0 | - | 0.7 | - | - | 0.0 | - | 0.0 | - | - | - |

***Paralabrax* spp.**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 40.6 | - | 0.0 | - | 0.0 | - | - | 5.6 | - | - | 2.0 | - | - |
| 86.7 33.0 | - | 0.0 | - | 0.0 | - | - | 2.8 | - | 0.0 | - | - | - |
| 90.0 28.0 | - | 0.0 | - | 0.0 | - | - | 0.9 | - | 0.0 | - | - | - |

***Seriola lalandi***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 33.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 0.8 | - | - | - |
| 86.7 35.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 0.8 | - | - | - |

***Trachurus symmetricus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 80.0 | - | 0.0 | - | 0.9 | - | - | 0.0 | - | - | - | - | - |

TABLE 4. (cont.)

*Trachurus symmetricus* (cont.)

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 100.0 | - | 0.0 | - | 1.8 | - | - | 0.0 | - | - | 0.0 | - | - |
| 80.0 90.0 | - | 0.0 | - | 6.8 | - | - | 0.0 | - | - | 0.0 | - | - |
| 80.0 100.0 | - | 0.0 | - | 8.1 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 80.0 | - | 0.0 | - | 2.6 | - | - | 0.0 | - | 0.0 | - | - | - |
| 83.3 90.0 | - | 0.0 | - | 6.2 | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 100.0 | - | 0.0 | - | 0.8 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 80.0 | - | 0.0 | - | 1.3 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 90.0 | - | 0.0 | - | 2.5 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 70.0 | 0.0 | - | - | 0.8 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 110.0 | - | 0.0 | - | 0.8 | - | - | 0.0 | - | 0.0 | - | - | - |

*Coryphaena hippurus*

| 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 | - | - | - |

*Brama japonica*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 100.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 0.7 | - | - |

*Anisotremus davidsoni*

| 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 28.0 | - | 0.0 | - | 0.0 | - | - | 3.6 | - | 0.0 | - | - | - |

*Xenistius californiensis*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 51.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 2.3 | - | - |
| 83.3 40.6 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 1.0 | - | - |
| 86.7 33.0 | - | 0.0 | - | 0.0 | - | - | 12.1 | - | 0.0 | - | - | - |
| 90.0 28.0 | - | 0.0 | - | 0.0 | - | - | 6.2 | - | 0.0 | - | - | - |

*Atractoscion nobilis*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 40.6 | - | 0.0 | - | 0.0 | - | - | 0.9 | - | - | 0.0 | - | - |

*Genyonemus lineatus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 55.0 | - | 0.8 | - | 0.0 | - | - | 0.0 | - | - | 0.0 | - | - |

TABLE 4. (cont.)

***Girella nigricans***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 51.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 1.5 | - | - |
| 86.7 33.0 | - | 0.0 | - | 0.0 | - | - | 0.9 | - | 0.0 | - | - | - |

***Medialuna californiensis***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 90.0 | - | 0.0 | - | 0.0 | - | - | 2.8 | - | - | 0.0 | - | - |
| 83.3 55.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 2.0 | - | - |
| 90.0 37.0 | - | 0.0 | - | 0.0 | - | - | 2.8 | - | 0.9 | - | - | - |
| 90.0 70.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 0.8 | - | - | - |
| 90.0 80.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 0.7 | - | - | - |

***Chromis punctipinnis***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 81.8 46.9 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 0.8 | - | - |
| 83.3 40.6 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 3.0 | - | - |
| 86.7 33.0 | - | 0.0 | - | 0.0 | - | - | 1.9 | - | 0.8 | - | - | - |
| 86.7 35.0 | - | 0.0 | - | 0.0 | - | - | 3.7 | - | 6.7 | - | - | - |
| 90.0 37.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 0.9 | - | - | - |
| 93.3 35.0 | 0.0 | - | - | 0.0 | - | - | 0.9 | - | 0.0 | - | - | - |

***Hypsypops rubicundus***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 28.0 | - | 0.0 | - | 0.0 | - | - | 52.6 | - | 0.0 | - | - | - |

***Halichoeres semicinctus***

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

***Oxyjulis californica***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 42.0 | - | 0.0 | - | 0.0 | - | - | 0.9 | - | - | 0.0 | - | - |
| 86.7 33.0 | - | 0.0 | - | 0.0 | - | - | 0.9 | - | 0.0 | - | - | - |

***Semicossyphus pulcher***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86.7 60.0 | - | 0.0 | - | - | - | - | 0.0 | - | 1.3 | - | - | - |

TABLE 4. (cont.)

***Cryptotrema corallinum***

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

***Neoclinus* spp.**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 40.6 | - | 0.0 | - | 0.0 | - | - | 4.7 | - | - | 0.0 | - | - |

***Neoclinus blanchardi***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 40.6 | - | 0.0 | - | 0.0 | - | - | 1.9 | - | - | 0.0 | - | - |

***Neoclinus stephensae***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 40.6 | - | 0.0 | - | 0.8 | - | - | 0.0 | - | - | 0.0 | - | - |

***Hypsoblennius* spp.**

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 51.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 5.4 | - | - |
| 80.0 55.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 0.7 | - | - |

***Hypsoblennius gentilis***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 51.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 5.4 | - | - |
| 90.0 37.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 0.9 | - | - | - |

***Hypsoblennius gilberti***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 81.8 46.9 | - | 0.0 | - | 0.0 | - | - | 1.8 | - | - | 0.0 | - | - |
| 83.3 40.6 | - | 0.0 | - | 0.0 | - | - | 154.1 | - | - | 0.0 | - | - |
| 86.7 33.0 | - | 0.0 | - | 3.8 | - | - | 10.2 | - | 0.0 | - | - | - |
| 86.7 35.0 | - | 0.0 | - | 0.8 | - | - | 2.8 | - | 0.0 | - | - | - |
| 90.0 30.0 | - | 0.0 | - | 0.9 | - | - | 0.0 | - | 0.0 | - | - | - |

***Hypsoblennius jenkinsi***

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 55.0 | - | 0.0 | - | 0.0 | - | - | 0.8 | - | - | - | - | - |
| 80.0 51.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 15.4 | - | - |
| 81.8 46.9 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 7.5 | - | - |
| 83.3 40.6 | - | 0.0 | - | 0.0 | - | - | 328.8 | - | - | 5.0 | - | - |

TABLE 4. (cont.)

*Hypsoblennius jenkinsi* (cont.)

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 42.0 | - | 0.7 | - | 0.0 | - | - | 3.5 | - | - | 0.0 | - | - |
| 83.3 100.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 0.9 | - | - | - |
| 86.7 33.0 | - | 0.0 | - | 6.4 | - | - | 211.8 | - | 0.8 | - | - | - |
| 86.7 35.0 | - | 0.0 | - | 0.0 | - | - | 184.8 | - | 1.7 | - | - | - |
| 86.7 80.0 | - | 0.0 | - | 0.0 | - | - | 0.7 | - | 0.0 | - | - | - |
| 90.0 28.0 | - | 0.0 | - | 0.0 | - | - | 1.8 | - | 0.0 | - | - | - |
| 90.0 37.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 14.9 | - | - | - |
| 93.3 26.7 | 0.0 | - | - | 0.0 | - | - | 0.9 | - | 0.0 | - | - | - |
| 93.3 35.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 0.9 | - | - | - |

*Icosteus aenigmaticus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 60.0 | - | 0.8 | - | 0.0 | - | - | 0.0 | - | 0.0 | - | - | - |

*Coryphopterus nicholsii*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 42.0 | - | 0.0 | - | 0.0 | - | - | 0.9 | - | - | 0.0 | - | - |
| 83.3 70.0 | - | 0.0 | - | 0.0 | - | - | 0.8 | - | 0.0 | - | - | - |
| 86.7 50.0 | - | 2.3 | - | - | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 55.0 | - | 1.5 | - | - | - | - | 0.0 | - | 0.0 | - | - | - |

*Sphyraena argentea*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 40.6 | - | 0.0 | - | 0.0 | - | - | 0.9 | - | - | 3.0 | - | - |
| 86.7 33.0 | - | 0.0 | - | 0.0 | - | - | 176.5 | - | 0.0 | - | - | - |
| 86.7 35.0 | - | 0.0 | - | 0.0 | - | - | 0.9 | - | 0.0 | - | - | - |
| 90.0 28.0 | - | 0.0 | - | 0.0 | - | - | 0.9 | - | 0.0 | - | - | - |

*Scomber japonicus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 51.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | - | 0.8 | - | - |
| 80.0 90.0 | - | 0.0 | - | 0.8 | - | - | 0.0 | - | - | 0.0 | - | - |
| 80.0 100.0 | - | 0.0 | - | 0.8 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 100.0 | - | 0.0 | - | 0.8 | - | - | 0.0 | - | 0.0 | - | - | - |
| 86.7 33.0 | - | 0.0 | - | 0.0 | - | - | 66.0 | - | 1.6 | - | - | - |
| 86.7 35.0 | - | 0.0 | - | 0.0 | - | - | 0.0 | - | 3.3 | - | - | - |

TABLE 4. (cont.)

*Scomber japonicus* (cont.)

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90.0 28.0 | - | 0.0 | - | 0.0 | - | - | 2.7 | - | 0.0 | - | - | - |
| 90.0 70.0 | - | 0.0 | - | 1.3 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 80.0 | - | 0.0 | - | 0.7 | - | - | 0.0 | - | 0.0 | - | - | - |
| 90.0 90.0 | - | 0.0 | - | 3.4 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 40.0 | 0.0 | - | - | 4.6 | - | - | 0.0 | - | 0.0 | - | - | - |
| 93.3 70.0 | 0.0 | - | - | 0.8 | - | - | 0.0 | - | 0.0 | - | - | - |

*Tetragonurus cuvieri*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80.0 100.0 | - | 0.0 | - | 0.8 | - | - | 2.7 | - | - | 0.0 | - | - |
| 83.3 80.0 | - | 0.0 | - | 0.0 | - | - | 0.8 | - | 0.0 | - | - | - |
| 83.3 110.0 | - | 0.0 | - | 0.0 | - | - | 1.7 | - | 0.0 | - | - | - |
| 86.7 110.0 | - | 0.0 | - | 0.0 | - | - | 0.9 | - | 0.0 | - | - | - |
| 90.0 100.0 | - | 0.0 | - | 0.0 | - | - | 0.8 | - | 0.0 | - | - | - |
| 93.3 55.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 0.8 | - | - | - |
| 93.3 70.0 | 0.0 | - | - | 0.0 | - | - | 0.0 | - | 0.8 | - | - | - |
| 93.3 110.0 | - | 0.0 | - | 0.0 | - | - | 0.8 | - | 0.0 | - | - | - |

*Citharichthys sordidus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 60.0 | - | 0.7 | - | 0.0 | - | - | 0.0 | - | - | - | - | - |
| 86.7 55.0 | - | 0.7 | - | - | - | - | 0.0 | - | 0.0 | - | - | - |

*Paralichthys californicus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83.3 40.6 | - | 0.0 | - | 0.0 | - | - | 1.9 | - | - | 2.0 | - | - |

*Hypsopsetta guttulata*

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

*Pleuronichthys coenosus*

| Station | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.7 55.0 | - | 0.0 | - | 1.8 | - | - | 0.0 | - | - | - | - | - |
| 83.3 40.6 | - | 0.0 | - | 1.6 | - | - | 0.0 | - | - | 0.0 | - | - |
| 83.3 42.0 | - | 0.0 | - | 1.5 | - | - | 0.0 | - | - | 0.0 | - | - |

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(May 2002)

324 Ichthyoplankton and station data for Manta (surface) tows taken on California Cooperative Oceanic Fisheries Investigations Survey Cruises in 1988.
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E.M. SANDKNOP, R.L. CHARTER, H.G. MOSER
(May 2002)

328 Ichthyoplankton and station data for Manta (surface) tows taken on California Cooperative Oceanic Fisheries Investigations Survey Cruises in 1992.
W. WATSON, R.L. CHARTER, H.G. MOSER
(May 2002)

329 Ichthyoplankton and station data for Manta (surface) tows taken on California Cooperative Oceanic Fisheries Investigations Survey Cruises in 1993.
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330 Ichthyoplankton and station data for Manta (surface) tows taken on California Cooperative Oceanic Fisheries Investigations Survey Cruises in 1994.
S.R. CHARTER, R.L. CHARTER, H.G. MOSER
(May 2002)

331 Ichthyoplankton and station data for Manta (surface) tows taken on California Cooperative Oceanic Fisheries Investigations Survey Cruises in 1995.
E.M. SANDKNOP, R.L. CHARTER, H.G. MOSER
(May 2002)

332 Ichthyoplankton and station data for Manta (surface) tows taken on California Cooperative Oceanic Fisheries Investigations Survey Cruises in 1996.
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