NOAA Technical Memorandum NMFS

MAY 2002

ICHTHYOPLANKTON AND STATION DATA FOR MANTA (SURFACE) TOWS TAKEN ON CALIFORNIA COOPERATIVE OCEANIC FISHERIES INVESTIGATIONS SURVEY CRUISES IN 1988

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NOAA-TM-NMFS-SWFSC-324

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
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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 1988. It is the seventh report in a series that presents surface tow data for all biological-oceanographic CalCOFI surveys from 1977 to the present. A total of 248 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 245 Manta net tows was taken during 1988. 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 76 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 seventh 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 1988. 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 1988 CalCOFI survey are published in Watson 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 1988 CalCOFI survey were published by Scripps Institution of Oceanography (Univ. of Calif., SIO 1989a, b). All available records for Manta tows on the 1988 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	1985	Ambrose et al. 2002b
1980-81	Ambrose et al. 2002a	1986	Charter et al. 2002b
1984	Charter et al. 2002a	1987	Sandknop et al. 2002

SAMPLING AREA AND PATTERN

The 1988 CalCOFI survey consisted of four quarterly cruises on which a total of 245 Manta net tows was taken at the 248 standard CalCOFI net tow stations occupied on 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 (Figures 2 and 3) are summarized below:

8801, RV *David Starr Jordan*, 62 stations, January 19–February 1;

8805, RV *David Starr Jordan*, 52 stations, April 28–May 11;

8808, RV *New Horizon*, 65 stations, August 9–23;

8810, RV *New Horizon*, 66 stations, October 11–25.

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 90.0 on cruise 8801, to station 70.0 on 8805, and to station 100.0 on 8808 and 8810. Stations on lines 83.3 and 86.7 extended seaward to station 90.0 on 8805 and to station 110.0 on all other cruises. On lines 90.0 and 93.3 stations extended seaward to station 100.0 on cruise 8805 and to station 120.0 on all other cruises (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 76 larval fish categories (including the unidentified and disintegrated categories) was identified: 69 to species, 4 to genus, and 1 to family.

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

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 damaged, 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 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).

Unidentified fish larvae – larvae that were generally in good condition but could not be identified because of their small size or early stage of development.

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 59.7% of the total fish larvae and first in occurrence with larvae collected in 37.1% of the total samples (Tables 2 and 3). They were over six times more abundant than the second most abundant species, Pacific saury (*Cololabis saira*), which accounted for 9.3% of the total larvae and ranked second in occurrence (35.1% of the total samples). Pacific sardine (*Sardinops sagax*) was the third most abundant taxon with 7.4% of the total larvae; it ranked third in frequency of occurrence (20.0% of the samples). Pacific hake (*Merluccius productus*) ranked fourth in abundance (5.7% of total larvae) and eighth in total occurrences (8.2% of the samples). Pacific mackerel (*Scomber japonicus*) ranked fifth in abundance (5.7% of total larvae) and fifth in total occurrences (16.3% of the samples). The next five most abundant taxa were the rockfish genus *Sebastes* (2.5% of total larvae), shortbelly rockfish *S. jordani* (1.3%), mussel blenny *Hypsoblennius jenkinsi* (1.1%), jacksmelt *Atherinopsis californiensis* (1.1%), and blacksmith *Chromis punctipinnis* (0.8%). These species ranked 4th, 13th, 7th, tied for 24th, and ranked 11th in frequency of occurrence, respectively. The ten most abundant taxa comprised 94.6% of all the larvae collected in Manta net tows on CalCOFI cruises in 1988. The remaining 5.4% was distributed among 66 other taxa (including the disintegrated and unidentified categories). Of the ten most abundant taxa, half were coastal demersal taxa, four were coastal pelagic species, and one was epipelagic.

In contrast to the Manta collections, among the 139 larval fish categories collected in the oblique tows during the 1988 survey, Pacific hake was the most abundant (39.7% of the total larvae), although the second-ranked northern anchovy accounted for a respectable 23.4% of the total (Watson et al. 1999). Among the ten most abundant taxa in the Manta collections in 1988, four also were among the ten most abundant in the oblique tows (northern anchovy, Pacific hake, shortbelly rockfish, and *Sebastes* spp.) Two of the five mesopelagic taxa that were ranked among the ten most abundant taxa in the oblique tows did not occur in the Manta samples, another two each accounted for less than 0.1% of total larvae collected in the Manta samples, and the Panama lightfish, ranked 13th in overall abundance in the Manta samples, accounted for 0.5% of the total.

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 1988 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 1988 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 1988 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 1988 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 (8801, 8808, 8810), Ronald Dotson (8801, 8805), William Flerx (8801,8805), and Susan Manion (8808, 8810). The samples were sorted by Lucy Dunn, Jeanne Haddox, 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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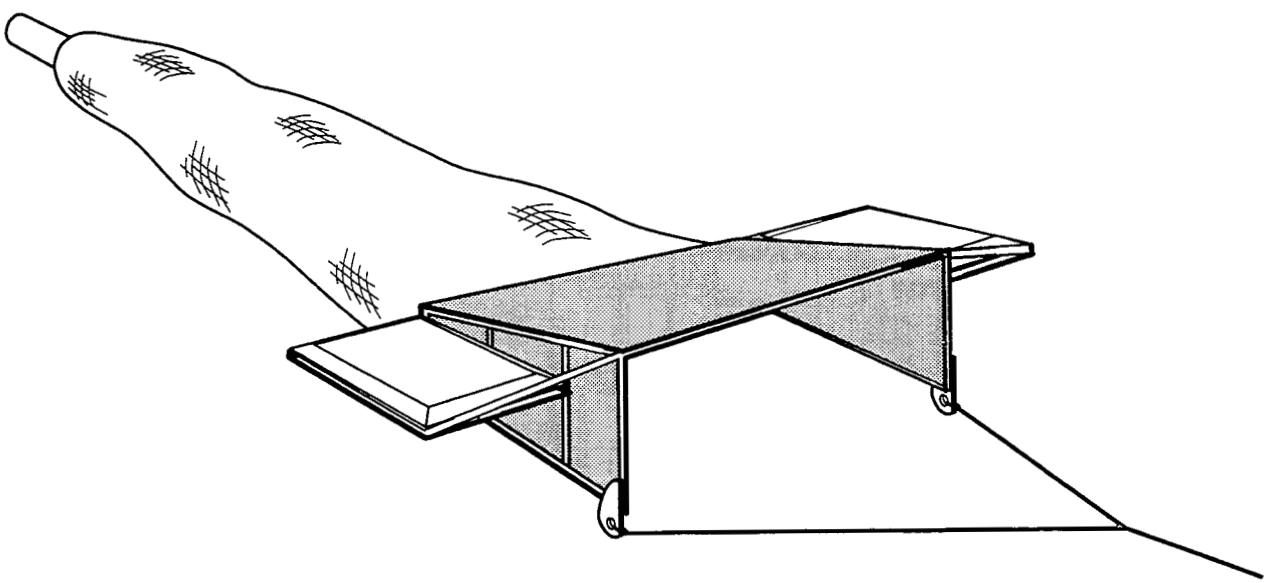

Figure 1. Diagram of the Manta net used on CalCOFI surveys.

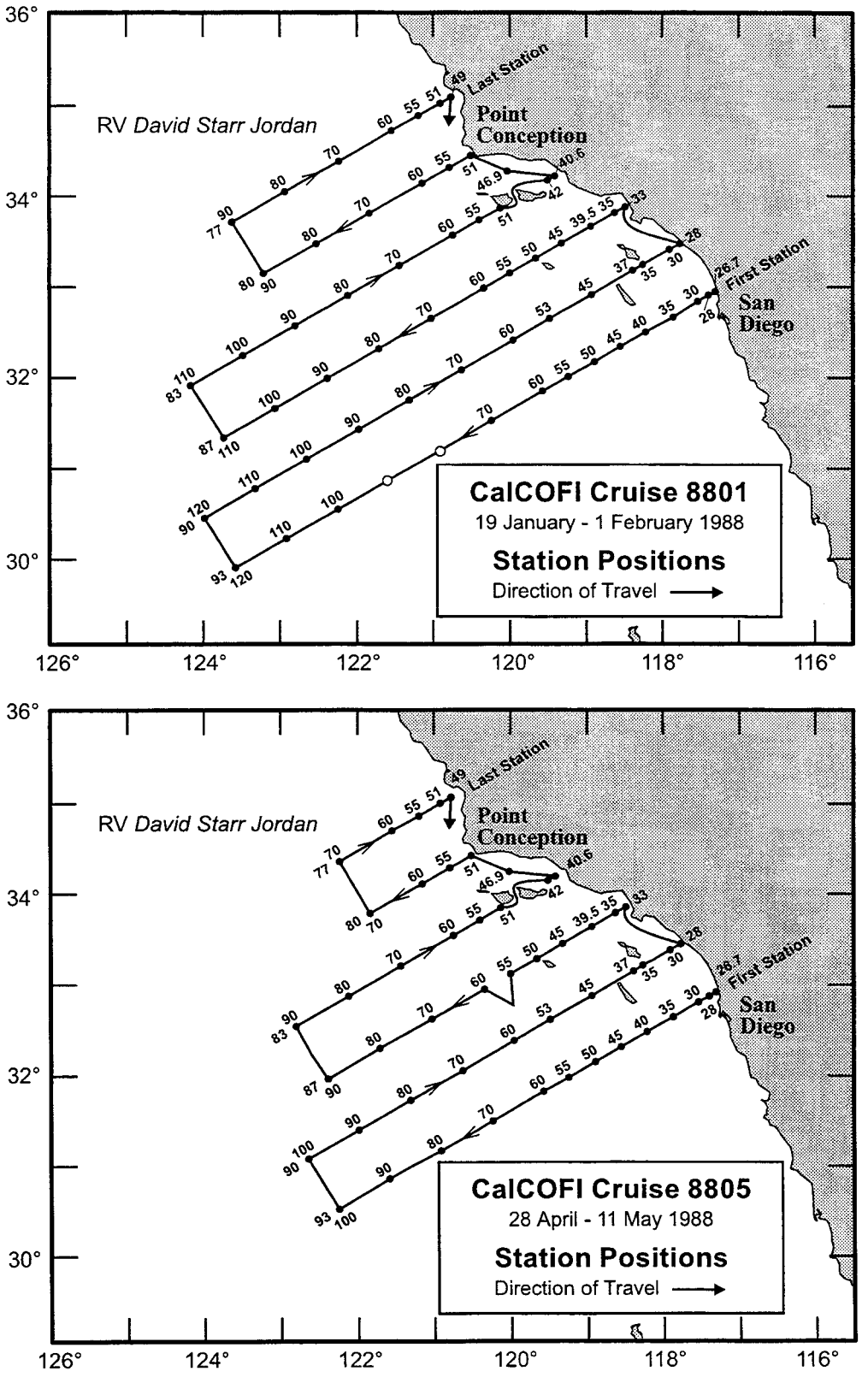

Figure 2. Stations and cruise tracks for CalCOFI cruises 8801 (above) and 8805 (below). Dots indicate stations where Manta and oblique tows were taken; open circles indicate stations where only oblique tows were taken.

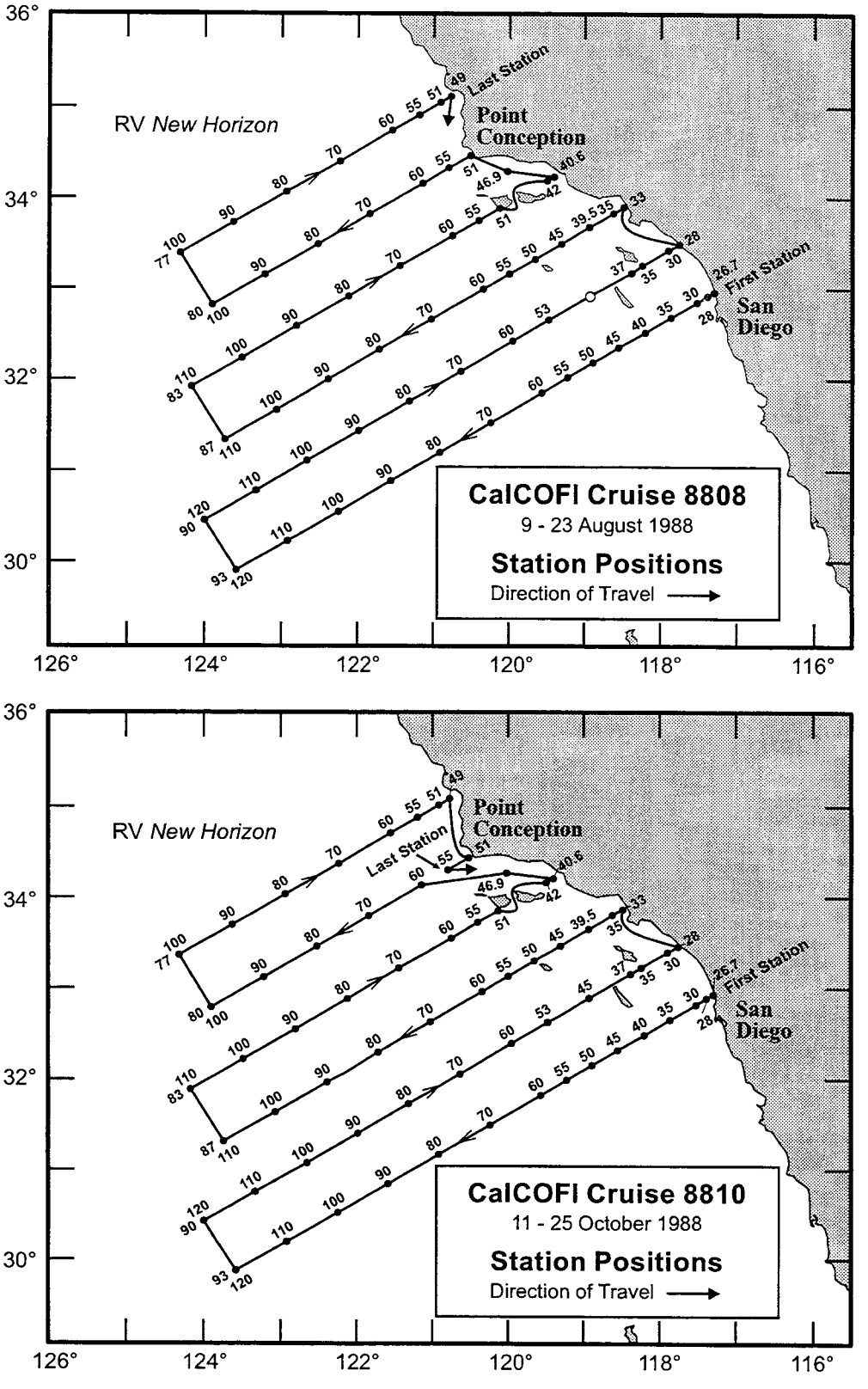

Figure 3. Stations and cruise tracks for CalCOFI cruises 8808 (above) and 8810 (below). Symbols as in Figure 2.

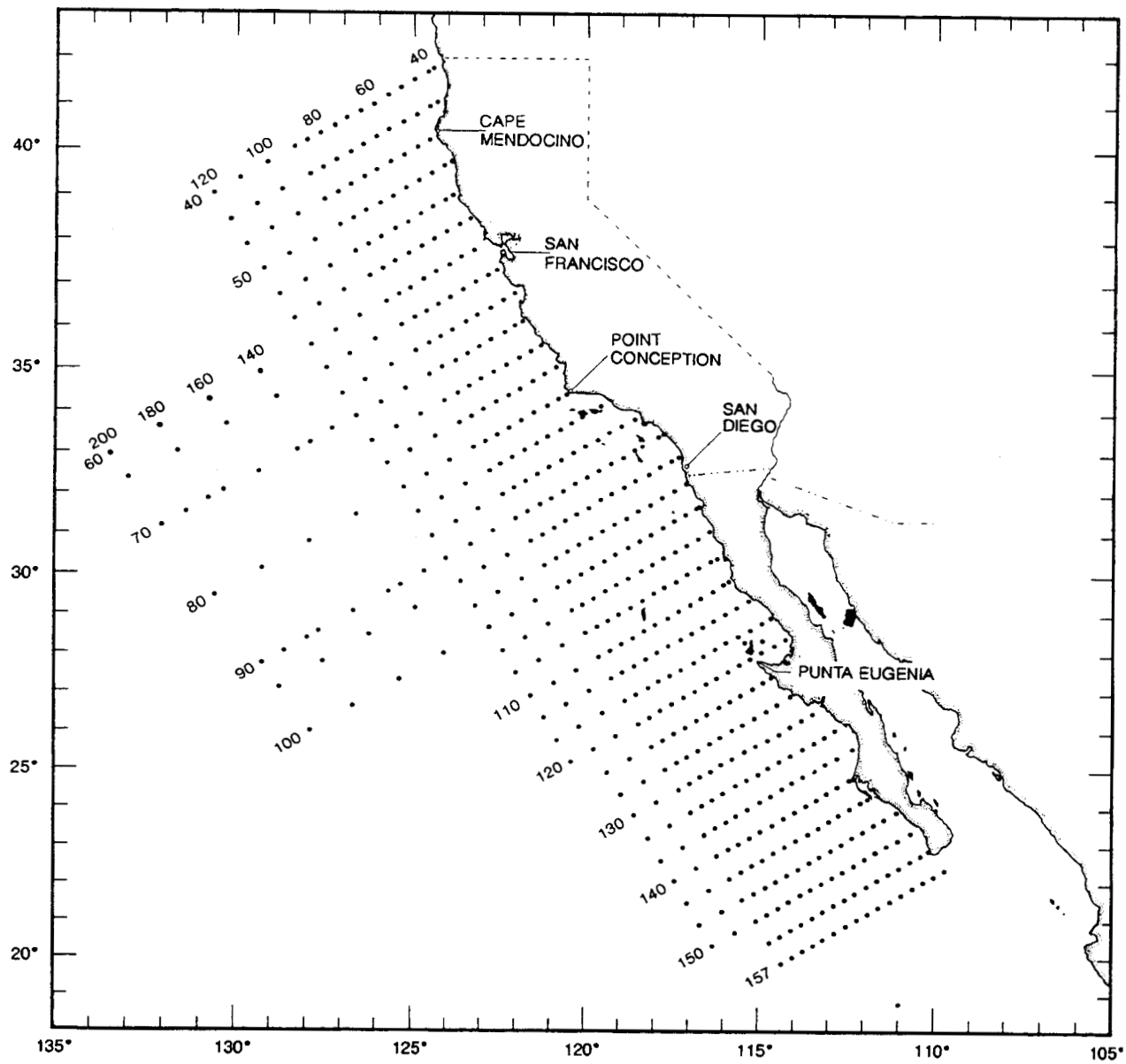

Figure 4. The basic station plan for CalCOFI cruises from 1950 - 1984.

TABLE 1. Station and plankton tow data for Manta tows taken on the 1988 CalCOFI survey. Numbers of fish eggs and larvae are raw counts, unadjusted for volume (cubic meters) of water filtered.

CalCOFI Cruise 8801

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	88	02	01	1413	103	6	106
76.7	51.0	35	01.3	120	55.1	JD	88	02	01	1211	106	23	287
76.7	55.0	34	53.3	121	12.0	JD	88	02	01	0821	102	11	3
76.7	60.0	34	43.3	121	33.0	JD	88	02	01	0448	98	473	30
76.7	70.0	34	23.3	122	14.7	JD	88	01	31	2331	99	4	7
76.7	80.0	34	03.3	122	56.6	JD	88	01	31	1806	108	0	0
76.7	90.0	33	43.3	123	38.0	JD	88	01	31	1255	86	0	2
80.0	51.0	34	27.0	120	31.4	JD	88	01	30	0701	99	43	13
80.0	55.0	34	19.1	120	48.1	JD	88	01	30	0959	93	165	8
80.0	60.0	34	09.0	121	09.0	JD	88	01	30	1422	101	7	21
80.0	70.0	33	49.2	121	50.6	JD	88	01	30	2015	103	2	8
80.0	80.0	33	29.0	122	32.0	JD	88	01	31	0204	96	83	4
80.0	90.0	33	09.1	123	13.3	JD	88	01	31	0711	101	0	2
81.8	46.9	34	16.9	120	02.3	JD	88	01	30	0337	90	362	34
83.3	40.6	34	13.5	119	24.7	JD	88	01	29	2254	99	44	1223
83.3	42.0	34	10.7	119	30.5	JD	88	01	29	2117	94	43	8
83.3	51.0	33	52.6	120	08.1	JD	88	01	29	1525	97	818	0
83.3	55.0	33	44.7	120	24.6	JD	88	01	29	1221	101	2	33
83.3	60.0	33	34.7	120	45.4	JD	88	01	29	0811	115	4	67
83.3	70.0	33	14.6	121	26.6	JD	88	01	29	0235	101	221	171
83.3	80.0	32	54.6	122	07.7	JD	88	01	28	2116	109	239	19
83.3	90.0	32	34.7	122	48.8	JD	88	01	28	1553	106	1	2
83.3	100.0	32	14.7	123	29.5	JD	88	01	28	0933	107	67	4
83.3	110.0	31	54.8	124	10.4	JD	88	01	28	0417	117	3	32
86.7	33.0	33	53.4	118	29.4	JD	88	01	25	1800	81	119	7802
86.7	35.0	33	49.4	118	37.7	JD	88	01	25	2040	108	25	144
86.7	39.5	33	40.4	118	56.5	JD	88	01	26	0010	115	241	767
86.7	45.0	33	29.5	119	19.4	JD	88	01	26	0429	118	35	165
86.7	50.0	33	19.4	119	39.8	JD	88	01	26	0735	124	35	7
86.7	55.0	33	09.4	120	00.2	JD	88	01	26	1450	114	4	6828
86.7	60.0	32	59.4	120	20.9	JD	88	01	26	1831	121	107	10
86.7	70.0	32	39.4	121	02.0	JD	88	01	26	2356	116	7	36
86.7	80.0	32	19.4	121	42.9	JD	88	01	27	0528	123	178	19
86.7	90.0	31	59.4	122	23.6	JD	88	01	27	1058	114	4	32
86.7	100.0	31	39.4	123	04.2	JD	88	01	27	1759	106	44	273
86.7	110.0	31	19.4	123	44.5	JD	88	01	27	2245	109	10	145
90.0	28.0	33	29.0	117	46.1	JD	88	01	25	0828	108	11	1583
90.0	30.0	33	25.1	117	54.5	JD	88	01	25	0619	117	0	0
90.0	35.0	33	15.1	118	15.2	JD	88	01	25	0245	110	121	585
90.0	37.0	33	11.1	118	23.2	JD	88	01	25	0020	113	36	1413
90.0	45.0	32	55.1	118	55.9	JD	88	01	24	1950	115	177	105
90.0	53.0	32	39.3	119	28.6	JD	88	01	24	1525	111	122	28
90.0	60.0	32	25.1	119	57.6	JD	88	01	24	1100	108	0	58
90.0	70.0	32	05.1	120	38.5	JD	88	01	24	0505	113	24	2
90.0	80.0	31	45.1	121	19.0	JD	88	01	23	2233	104	3	4
90.0	90.0	31	24.9	121	59.1	JD	88	01	23	1708	109	3	2
90.0	100.0	31	05.1	122	39.7	JD	88	01	23	1058	104	0	1

TABLE 1. (cont.) CalCOFI Cruise 8801 (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	88	01	23	0516	108	7	0
90.0	120.0	30	25.0	123	59.8	JD	88	01	22	2358	103	6	3
93.3	26.7	32	57.2	117	18.3	JD	88	01	19	1545	106	310	844
93.3	28.0	32	54.8	117	23.7	JD	88	01	19	1754	106	439	160
93.3	30.0	32	50.7	117	31.9	JD	88	01	19	2042	118	101	3557
93.3	35.0	32	40.4	117	51.3	JD	88	01	20	0105	109	243	3088
93.3	40.0	32	30.5	118	12.9	JD	88	01	20	0611	119	23	1640
93.3	45.0	32	20.8	118	33.4	JD	88	01	20	1148	120	1	1294
93.3	50.0	32	10.7	118	53.8	JD	88	01	20	1547	111	9	716
93.3	55.0	32	00.7	119	14.0	JD	88	01	20	1931	113	0	7
93.3	60.0	31	50.9	119	34.4	JD	88	01	20	2359	111	6	3
93.3	70.0	31	30.9	120	14.9	JD	88	01	21	0612	108	3	4
93.3	100.0	30	30.9	122	15.5	JD	88	01	22	0506	99	5	0
93.3	110.0	30	10.8	122	55.4	JD	88	01	22	1101	98	0	0
93.3	120.0	29	50.9	123	35.2	JD	88	01	22	1809	106	32	0

CalCOFI Cruise 8805

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	05.0	120	46.9	JD	88	05	11	1426	101	0	7
76.7	51.0	35	01.2	120	55.2	JD	88	05	11	1228	99	1	44
76.7	55.0	34	53.1	121	11.9	JD	88	05	11	0921	97	2	2156
76.7	60.0	34	43.3	121	32.9	JD	88	05	11	0547	88	14	690
76.7	70.0	34	23.2	122	14.8	JD	88	05	11	0010	108	333	42
80.0	51.0	34	27.0	120	31.4	JD	88	05	10	0635	104	2	1
80.0	55.0	34	19.1	120	48.0	JD	88	05	10	0926	103	2	34
80.0	60.0	34	08.6	121	09.2	JD	88	05	10	1308	99	80	153
80.0	70.0	33	49.1	121	50.5	JD	88	05	10	1829	97	29	999
81.8	46.9	34	16.5	120	01.2	JD	88	05	10	0246	98	11	2
83.3	40.6	34	13.5	119	24.7	JD	88	05	09	2209	102	36	74
83.3	42.0	34	10.7	119	30.6	JD	88	05	09	2011	109	17	12
83.3	51.0	33	52.8	120	08.2	JD	88	05	09	1355	90	8	429
83.3	55.0	33	44.6	120	24.7	JD	88	05	09	1057	110	3	96
83.3	60.0	33	34.7	120	45.4	JD	88	05	09	0656	89	2	141
83.3	70.0	33	14.6	121	26.4	JD	88	05	09	0120	96	76	634
83.3	80.0	32	54.7	122	07.7	JD	88	05	08	1950	103	1104	109
83.3	90.0	32	34.5	122	48.8	JD	88	05	08	1415	108	19	72
86.7	33.0	33	53.4	118	29.4	JD	88	05	06	0915	97	0	849
86.7	35.0	33	49.4	118	37.7	JD	88	05	06	1224	106	4	6366
86.7	39.5	33	40.4	118	56.3	JD	88	05	06	1759	91	33	5
86.7	45.0	33	29.4	119	19.1	JD	88	05	06	2304	90	130	1
86.7	50.0	33	19.3	119	39.4	JD	88	05	07	0235	90	171	296
86.7	55.0	33	09.4	120	00.4	JD	88	05	07	0609	96	4	25
86.7	60.0	32	59.2	120	20.9	JD	88	05	07	1455	96	8	626
86.7	70.0	32	39.4	121	02.0	JD	88	05	07	2052	102	58	83
86.7	80.0	32	19.8	121	43.0	JD	88	05	08	0217	97	102	67
86.7	90.0	31	59.4	122	23.7	JD	88	05	08	0757	106	6	216
90.0	28.0	33	29.1	117	46.1	JD	88	05	05	1115	101	8	118

TABLE 1. (cont.) CalCOFI Cruise 8805 (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	30.0	33	25.1	117	54.3	JD	88	05	05	0825	105	6	274
90.0	35.0	33	15.1	118	16.0	JD	88	05	05	0303	104	168	177
90.0	37.0	33	11.1	118	23.2	JD	88	05	05	0028	96	2514	101
90.0	45.0	32	55.0	118	56.2	JD	88	05	04	1915	92	234	9
90.0	53.0	32	39.1	119	29.1	JD	88	05	04	1325	80	0	8
90.0	60.0	32	25.1	119	57.6	JD	88	05	04	0639	85	1	26
90.0	70.0	32	05.0	120	38.4	JD	88	05	03	2207	101	20	223
90.0	80.0	31	45.0	121	18.7	JD	88	05	03	1545	85	4	21
90.0	90.0	31	24.9	121	59.5	JD	88	05	03	0916	89	3	48
90.0	100.0	31	05.2	122	39.0	JD	88	05	03	0253	93	230	5
93.3	26.7	32	57.3	117	18.4	JD	88	04	28	1433	115	26	20
93.3	28.0	32	54.6	117	23.8	JD	88	04	28	1637	103	3	58
93.3	30.0	32	50.8	117	31.9	JD	88	04	28	1912	101	167	1750
93.3	35.0	32	40.7	117	52.1	JD	88	04	28	2325	110	121	72
93.3	40.0	32	31.0	118	12.6	JD	88	04	29	0246	105	90	1415
93.3	45.0	32	20.8	118	33.2	JD	88	04	29	0618	89	21	101
93.3	50.0	32	10.9	118	53.6	JD	88	04	29	0953	101	4	2014
93.3	55.0	32	00.5	119	14.2	JD	88	04	29	1406	94	0	45
93.3	60.0	31	50.9	119	34.3	JD	88	04	29	1752	100	0	1349
93.3	70.0	31	30.9	120	14.7	JD	88	04	30	0005	88	0	50
93.3	80.0	31	10.7	120	55.1	JD	88	05	02	0728	85	1	6
93.3	90.0	30	51.5	121	35.3	JD	88	05	02	1347	93	11	6
93.3	100.0	30	30.8	122	15.5	JD	88	05	02	1952	95	4	63

CalCOFI Cruise 8808

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	46.7	NH	88	08	23	1404	88	0	232
76.7	51.0	35	01.4	120	55.1	NH	88	08	23	1155	87	0	36
76.7	55.0	34	53.3	121	11.8	NH	88	08	23	0820	87	0	6
76.7	60.0	34	43.3	121	33.0	NH	88	08	23	0418	84	18	529
76.7	70.0	34	23.3	122	14.7	NH	88	08	22	2240	100	6	104
76.7	80.0	34	03.3	122	56.5	NH	88	08	22	1725	92	12	14
76.7	90.0	33	43.4	123	37.9	NH	88	08	22	1210	99	0	90
76.7	100.0	33	23.3	124	19.4	NH	88	08	22	0556	90	0	9
80.0	51.0	34	27.0	120	31.4	NH	88	08	20	1821	90	28	3343
80.0	55.0	34	19.0	120	48.2	NH	88	08	20	2119	99	15	67
80.0	60.0	34	09.0	121	09.0	NH	88	08	21	0110	88	5	100
80.0	70.0	33	49.0	121	50.6	NH	88	08	21	0644	51	0	0
80.0	80.0	33	29.0	122	32.0	NH	88	08	21	1252	88	0	16
80.0	90.0	33	09.0	123	13.3	NH	88	08	21	1845	89	0	47
80.0	100.0	32	49.0	123	54.2	NH	88	08	22	0021	93	2	112
81.8	46.9	34	17.0	120	01.9	NH	88	08	20	1452	97	0	6
83.3	40.6	34	13.4	119	25.0	NH	88	08	20	0930	92	33	1411
83.3	42.0	34	10.7	119	30.5	NH	88	08	20	0743	100	106	2542
83.3	51.0	33	52.7	120	08.1	NH	88	08	20	0222	93	250	1324
83.3	55.0	33	44.7	120	24.7	NH	88	08	19	2228	93	245	24
83.3	60.0	33	34.7	120	45.3	NH	88	08	19	1834	89	38	61

TABLE 1. (cont.) CalCOFI Cruise 8808 (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	70.0	33	14.7	121	26.6	NH	88	08	19	1222	83	1	19
83.3	80.0	32	54.6	122	07.7	NH	88	08	19	0539	86	1	11
83.3	90.0	32	34.8	122	48.8	NH	88	08	18	2140	94	0	14
83.3	100.0	32	13.6	123	31.0	NH	88	08	18	1400	75	0	10
83.3	110.0	31	54.7	124	10.2	NH	88	08	18	0635	93	0	551
86.7	33.0	33	53.5	118	29.4	NH	88	08	15	1224	89	8	987
86.7	35.0	33	49.4	118	37.7	NH	88	08	15	1530	95	1	34
86.7	39.5	33	40.4	118	56.5	NH	88	08	15	2120	87	620	351
86.7	45.0	33	29.4	119	19.1	NH	88	08	16	0203	65	115	42
86.7	50.0	33	19.4	119	39.7	NH	88	08	16	0548	79	12	177
86.7	55.0	33	09.4	120	00.5	NH	88	08	16	1043	70	9	61
86.7	60.0	32	59.4	120	21.0	NH	88	08	16	1603	80	75	52
86.7	70.0	32	39.4	121	02.1	NH	88	08	16	2305	87	0	35
86.7	80.0	32	19.5	121	42.9	NH	88	08	17	0531	83	0	13
86.7	90.0	31	59.5	122	23.5	NH	88	08	17	1148	82	0	178
86.7	100.0	31	39.3	123	04.1	NH	88	08	17	1802	89	0	91
86.7	110.0	31	19.3	123	44.3	NH	88	08	18	0002	81	1	102
90.0	28.0	33	29.1	117	46.1	NH	88	08	15	0439	88	25	693
90.0	30.0	33	25.1	117	54.3	NH	88	08	15	0223	88	141	639
90.0	35.0	33	15.1	118	15.0	NH	88	08	14	2007	76	84	221
90.0	37.0	33	31.0	118	23.2	NH	88	08	14	1715	73	0	0
90.0	53.0	32	39.1	119	28.9	NH	88	08	14	0453	83	14	45
90.0	60.0	32	25.0	119	57.7	NH	88	08	13	2328	78	98	60
90.0	70.0	32	05.0	120	38.3	NH	88	08	13	1720	94	0	19
90.0	80.0	31	44.9	121	19.0	NH	88	08	13	1032	99	1	74
90.0	90.0	31	25.2	121	59.3	NH	88	08	13	0450	92	49	103
90.0	100.0	31	05.3	122	40.2	NH	88	08	12	2300	94	4	93
90.0	110.0	30	45.0	123	19.9	NH	88	08	12	1737	91	4	1035
90.0	120.0	30	25.1	123	59.9	NH	88	08	12	1157	89	0	191
93.3	26.7	32	57.4	117	18.3	NH	88	08	09	1245	98	2	704
93.3	28.0	32	54.8	117	23.6	NH	88	08	09	1535	106	10	88
93.3	30.0	32	50.8	117	31.9	NH	88	08	09	1852	101	76	41
93.3	35.0	32	40.8	117	52.5	NH	88	08	09	2242	92	13	84
93.3	40.0	32	30.8	118	12.7	NH	88	08	10	0152	98	38	183
93.3	45.0	32	20.9	118	33.2	NH	88	08	10	0544	94	4	21
93.3	50.0	32	10.9	118	53.7	NH	88	08	10	0946	92	27	210
93.3	55.0	32	00.8	119	13.9	NH	88	08	10	1601	99	3	55
93.3	60.0	31	50.8	119	34.2	NH	88	08	10	2032	103	3	36
93.3	70.0	31	30.8	120	14.8	NH	88	08	11	0149	91	1	203
93.3	80.0	31	10.7	120	55.1	NH	88	08	11	0736	107	1	433
93.3	90.0	30	51.5	121	33.6	NH	88	08	11	1339	96	2	2055
93.3	100.0	30	30.8	122	15.5	NH	88	08	11	1933	94	1	8656
93.3	110.0	30	10.9	122	55.4	NH	88	08	12	0020	91	0	206
93.3	120.0	29	50.8	123	35.2	NH	88	08	12	0556	94	2	332

TABLE 1. (cont.) CalCOFI Cruise 8810

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	NH	88	10	25	1203	91	1	280
76.7	51.0	35	01.3	120	55.2	NH	88	10	25	0935	89	0	463
76.7	55.0	34	53.3	121	12.0	NH	88	10	25	0626	80	0	199
76.7	60.0	34	43.1	121	33.3	NH	88	10	25	0200	88	0	57
76.7	70.0	34	23.3	122	14.8	NH	88	10	24	2003	88	5	2
76.7	80.0	34	03.3	122	56.6	NH	88	10	24	1432	89	3	57
76.7	90.0	33	43.2	123	38.0	NH	88	10	24	0805	80	2	2
76.7	100.0	33	23.5	124	19.3	NH	88	10	24	0231	81	12	6
80.0	51.0	34	27.0	120	31.6	NH	88	10	25	1735	88	49	181
80.0	55.0	34	19.0	120	48.1	NH	88	10	25	2040	78	30	2
80.0	60.0	34	09.1	121	09.0	NH	88	10	22	1925	87	1	21
80.0	70.0	33	49.1	121	50.6	NH	88	10	23	0022	75	2	1
80.0	80.0	33	29.0	122	32.0	NH	88	10	23	0536	87	19	5
80.0	90.0	33	08.9	123	13.3	NH	88	10	23	1131	83	0	7
80.0	100.0	32	49.0	123	54.5	NH	88	10	23	2055	75	3	1
81.8	46.9	34	17.1	120	01.8	NH	88	10	22	1143	88	2	2634
83.3	40.6	34	13.5	119	24.8	NH	88	10	22	0700	88	13	1579
83.3	42.0	34	10.7	119	30.5	NH	88	10	22	0440	86	101	99
83.3	51.0	33	52.5	120	08.4	NH	88	10	21	2320	79	11	315
83.3	55.0	33	44.9	120	24.6	NH	88	10	21	1940	81	51	17
83.3	60.0	33	34.5	120	45.3	NH	88	10	21	1535	84	0	7
83.3	70.0	33	14.7	121	26.6	NH	88	10	21	0851	94	2	545
83.3	80.0	32	54.6	122	07.7	NH	88	10	21	0314	91	20	10
83.3	90.0	32	34.5	122	48.8	NH	88	10	20	2150	81	1	3
83.3	100.0	32	14.9	123	29.3	NH	88	10	20	1550	78	1	4
83.3	110.0	31	54.6	124	10.2	NH	88	10	20	0742	78	0	3
86.7	33.0	33	53.4	118	29.4	NH	88	10	17	1650	91	5	233
86.7	35.0	33	49.8	118	37.6	NH	88	10	17	1947	90	24	64
86.7	39.5	33	40.5	118	56.4	NH	88	10	18	0159	88	10	182
86.7	45.0	33	29.5	119	19.1	NH	88	10	18	0647	87	3	339
86.7	50.0	33	19.5	119	39.8	NH	88	10	18	1003	85	8	14
86.7	55.0	33	09.6	120	00.3	NH	88	10	18	1610	93	15	23
86.7	60.0	32	59.4	120	21.0	NH	88	10	18	1955	86	117	24
86.7	70.0	32	39.5	121	01.9	NH	88	10	19	0144	88	24	21
86.7	80.0	32	19.4	121	42.9	NH	88	10	19	0706	89	0	2
86.7	90.0	31	59.4	122	23.5	NH	88	10	19	1340	81	1	4
86.7	100.0	31	39.4	123	04.2	NH	88	10	19	2010	81	8	1
86.7	110.0	31	19.6	123	44.7	NH	88	10	20	0134	83	5	4
90.0	28.0	33	29.1	117	46.1	NH	88	10	17	0734	90	4	143
90.0	30.0	33	25.1	117	54.3	NH	88	10	17	0525	87	14	18
90.0	35.0	33	15.1	118	15.1	NH	88	10	17	0019	90	61	1472
90.0	37.0	33	11.0	118	23.3	NH	88	10	16	2210	88	73	6937
90.0	45.0	32	55.1	118	56.1	NH	88	10	16	1709	90	20	0
90.0	53.0	32	39.2	119	28.9	NH	88	10	16	0901	83	1	1
90.0	60.0	32	25.3	119	57.6	NH	88	10	16	0404	98	4	3
90.0	70.0	32	05.0	120	38.3	NH	88	10	15	2250	78	3	2
90.0	80.0	31	44.9	121	18.9	NH	88	10	15	1650	89	5	2
90.0	90.0	31	25.0	121	59.4	NH	88	10	15	1037	83	1	6
90.0	100.0	31	05.1	122	39.7	NH	88	10	15	0414	80	13	5

TABLE 1. (cont.) CalCOFI Cruise 8810 (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	20.0	NH	88	10	14	2200	79	17	0
90.0	120.0	30	25.0	123	59.9	NH	88	10	14	1605	83	0	9
93.3	26.7	32	57.4	117	18.4	NH	88	10	11	1205	99	10	42
93.3	28.0	32	54.8	117	23.7	NH	88	10	11	1455	91	3	1
93.3	30.0	32	50.8	117	31.9	NH	88	10	11	1814	93	89	8
93.3	35.0	32	40.8	117	52.4	NH	88	10	11	2215	85	0	8
93.3	40.0	32	30.7	118	12.8	NH	88	10	12	0128	77	3	0
93.3	45.0	32	20.8	118	33.2	NH	88	10	12	0558	80	1	59
93.3	50.0	32	10.8	118	53.5	NH	88	10	12	1016	87	0	123
93.3	55.0	32	00.8	119	14.0	NH	88	10	12	1500	84	0	0
93.3	60.0	31	50.8	119	34.3	NH	88	10	12	1901	87	3	4
93.3	70.0	31	30.8	120	14.8	NH	88	10	13	0003	89	24	6
93.3	80.0	31	10.8	120	55.2	NH	88	10	13	0550	92	0	4
93.3	90.0	30	50.7	121	35.4	NH	88	10	13	1245	98	0	107
93.3	100.0	30	30.8	122	15.4	NH	88	10	13	1813	83	12	17
93.3	110.0	30	10.7	122	55.4	NH	88	10	13	2300	90	11	0
93.3	120.0	29	50.9	123	35.1	NH	88	10	14	0514	91	8	260

TABLE 2. Pooled occurrences of fish larvae taken in Manta tows on the 1988 CalCOFI survey.

Rank	Taxon	Occurrences
1	*Engraulis mordax*	91
2	*Cololabis saira*	86
3	*Sardinops sagax*	49
4	*Sebastes* spp.	40
5	*Scomber japonicus*	27
6	*Scorpaenichthys marmoratus*	24
7	*Hypsoblennius jenkinsi*	23
8	*Merluccius productus*	20
9	*Sebastes diploproa*	19
10	*Oxyjulis californica*	18
11	*Chromis punctipinnis*	17
12	*Vinciguerria lucetia*	15
13	*Sebastes jordani*	14
14	*Ceratoscopelus townsendi*	12
15	*Medialuna californiensis*	11
16	*Trachurus symmetricus*	10
16	*Triphoturus mexicanus*	10
18	*Sphyraena argentea*	9
18	*Tetragonurus cuvieri*	9
20	*Girella nigricans*	8
21	*Pleuronichthys coenosus*	7
21	*Paralabrax* spp.	7
21	*Citharichthys sordidus*	7
24	*Atherinopsis californiensis*	6
24	*Stenobrachius leucopsarus*	6
26	*Leuresthes tenuis*	5
26	*Cheilopogon* spp.	5
28	*Cyclothone signata*	4
28	Disintegrated fish larvae	4
28	*Pleuronichthys verticalis*	4
28	*Oxylebius pictus*	4
28	*Hippoglossina stomata*	4
28	*Citharichthys stigmaeus*	4
28	*Icichthys lockingtoni*	4
28	*Halichoeres semicinctus*	4
28	*Hypsoblennius gilberti*	4
28	*Diogenichthys atlanticus*	4
38	*Pleuronichthys decurrens*	3
38	*Bathylagus ochotensis*	3
38	*Lampadena urophaos*	3
38	*Nannobrachium ritteri*	3
42	*Sebastes paucispinis*	2
42	*Sebastes aurora*	2
42	*Neoclinus stephensae*	2
45	*Aristostomias scintillans*	1
45	*Ruscarius creaseri*	1
45	*Tarletonbeania crenularis*	1
45	*Symbolophorus californiensis*	1
45	*Leuroglossus stilbius*	1

TABLE 2. (cont.)

Rank	Taxon	Occurrences
45	*Stomias atriventer*	1
45	*Idiacanthus antrostomus*	1
45	*Lampanyctus* spp.	1
45	*Nannobrachium regale*	1
45	*Bathylagus wesethi*	1
45	*Myctophum nitidulum*	1
45	*Genyonemus lineatus*	1
45	*Pleuronichthys ritteri*	1
45	*Peprilus simillimus*	1
45	*Typhlogobius californiensis*	1
45	*Lythrypnus dalli*	1
45	*Coryphopterus nicholsii*	1
45	*Icosteus aenigmaticus*	1
45	*Hypsoblennius gentilis*	1
45	*Neoclinus blanchardi*	1
45	*Hexagrammos lagocephalus*	1
45	*Hypsypops rubicundus*	1
45	*Cheilopogon pinnatibarbatus*	1
45	Sciaenidae	1
45	*Xenistius californiensis*	1
45	*Seriola lalandi*	1
45	Unidentified fish larvae	1
45	*Ophiodon elongatus*	1
45	*Hexagrammos decagrammus*	1
45	*Sebastes goodei*	1
45	*Hirundichthys marginatus*	1
45	*Chiasmodon niger*	1
	Total	645

TABLE 3. Pooled raw counts of fish larvae taken in Manta tows on the 1988 CalCOFI survey.

Rank	Taxon	Count
1	*Engraulis mordax*	8446
2	*Cololabis saira*	1314
3	*Sardinops sagax*	1045
4	*Merluccius productus*	807
5	*Scomber japonicus*	803
6	*Sebastes* spp.	351
7	*Sebastes jordani*	182
8	*Hypsoblennius jenkinsi*	162
9	*Atherinopsis californiensis*	161
10	*Chromis punctipinnis*	107
11	*Scorpaenichthys marmoratus*	105
12	*Ceratoscopelus townsendi*	92
13	*Vinciguerria lucetia*	73
14	*Paralabrax* spp.	66
15	*Medialuna californiensis*	40
16	*Oxyjulis californica*	39
17	*Sebastes diploproa*	36
18	*Sphyraena argentea*	34
19	*Trachurus symmetricus*	27
20	*Cheilopogon* spp.	23
21	*Hexagrammos decagrammus*	20
22	*Tetragonurus cuvieri*	15
23	*Girella nigricans*	14
24	*Pleuronichthys coenosus*	12
24	*Triphoturus mexicanus*	12
24	*Bathylagus ochotensis*	12
24	*Halichoeres semicinctus*	12
28	*Citharichthys sordidus*	9
28	*Stenobrachius leucopsarus*	9
30	*Genyonemus lineatus*	8
31	*Hypsoblennius gilberti*	7
31	*Pleuronichthys verticalis*	7
33	*Leuresthes tenuis*	6
34	*Icichthys lockingtoni*	5
34	*Cyclothone signata*	5
34	Disintegrated fish larvae	5
37	*Citharichthys stigmaeus*	4
37	*Diogenichthys atlanticus*	4
37	*Oxylebius pictus*	4
37	*Hippoglossina stomata*	4
41	*Pleuronichthys decurrens*	3
41	*Nannobrachium ritteri*	3
41	*Lampadena urophaos*	3
41	*Hexagrammos lagocephalus*	3
41	*Sebastes aurora*	3
46	*Ophiodon elongatus*	2
46	*Neoclinus stephensae*	2
46	*Sebastes paucispinis*	2
49	*Stomias atriventer*	1

TABLE 3. (cont.)

Rank	Taxon	Count
49	*Leuroglossus stilbius*	1
49	*Cheilopogon pinnatibarbatus*	1
49	*Idiacanthus antrostomus*	1
49	*Hirundichthys marginatus*	1
49	*Aristostomias scintillans*	1
49	*Pleuronichthys ritteri*	1
49	*Bathylagus wesethi*	1
49	*Peprilus simillimus*	1
49	*Sebastes goodei*	1
49	*Ruscarius creaseri*	1
49	*Coryphopterus nicholsii*	1
49	*Lythrypnus dalli*	1
49	*Hypsypops rubicundus*	1
49	*Typhlogobius californiensis*	1
49	Sciaenidae	1
49	*Symbolophorus californiensis*	1
49	Unidentified fish larvae	1
49	*Nannobrachium regale*	1
49	*Seriola lalandi*	1
49	*Neoclinus blanchardi*	1
49	*Xenistius californiensis*	1
49	*Hypsoblennius gentilis*	1
49	*Tarletonbeania crenularis*	1
49	*Icosteus aenigmaticus*	1
49	*Myctophum nitidulum*	1
49	*Lampanyctus* spp.	1
49	*Chiasmodon niger*	1
	Total	14136

TABLE 4. Numbers of fish larvae taken in Manta net tows on the 1988 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	60.0	-	0.0	-	-	0.0	-	-	5.9	-	0.0	-	-
80.0	51.0	0.0	-	-	-	0.0	-	-	10.8	-	4.4	-	-
80.0	55.0	0.0	-	-	-	0.0	-	-	1.0	-	3.9	-	-
80.0	80.0	0.0	-	-	-	-	-	-	0.0	-	12.2	-	-
83.3	40.6	0.0	-	-	-	1.0	-	-	25.6	-	0.9	-	-
83.3	42.0	0.0	-	-	-	0.0	-	-	64.2	-	0.0	-	-
83.3	51.0	0.0	-	-	-	3.6	-	-	116.1	-	0.0	-	-
83.3	55.0	0.0	-	-	-	0.0	-	-	23.2	-	20.3	-	-
83.3	60.0	0.0	-	-	-	0.0	-	-	26.7	-	0.0	-	-
83.3	70.0	0.0	-	-	-	4.8	-	-	0.0	-	0.9	-	-
83.3	80.0	0.0	-	-	-	432.2	-	-	0.0	-	9.1	-	-
86.7	33.0	0.0	-	-	-	0.0	-	-	2.7	-	1.8	-	-
86.7	39.5	0.0	-	-	-	13.7	-	-	1.7	-	0.0	-	-
86.7	45.0	0.0	-	-	-	0.9	-	-	1.9	-	0.9	-	-
86.7	50.0	0.0	-	-	-	0.0	-	-	4.7	-	0.0	-	-
86.7	55.0	0.0	-	-	-	0.0	-	-	2.1	-	0.0	-	-
86.7	60.0	2.4	-	-	-	1.0	-	-	47.3	-	35.1	-	-
86.7	70.0	0.0	-	-	-	1.0	-	-	0.0	-	17.6	-	-
86.7	80.0	11.1	-	-	-	0.0	-	-	0.0	-	0.0	-	-
90.0	28.0	0.0	-	-	-	0.0	-	-	12.4	-	0.0	-	-
90.0	30.0	0.0	-	-	-	1.0	-	-	25.4	-	0.0	-	-
90.0	35.0	0.0	-	-	-	7.3	-	-	0.0	-	0.0	-	-
90.0	37.0	0.0	-	-	-	2.9	-	-	0.0	-	0.0	-	-
90.0	45.0	0.0	-	-	-	0.9	-	-	-	-	0.0	-	-
90.0	70.0	24.8	-	-	-	2.0	-	-	0.0	-	0.0	-	-
93.3	26.7	2.1	-	-	2.3	-	-	-	0.0	-	5.0	-	-
93.3	28.0	0.0	-	-	2.1	-	-	-	0.0	-	0.0	-	-
93.3	40.0	0.0	-	-	0.0	-	-	-	2.0	-	0.0	-	-
93.3	50.0	0.0	-	-	0.0	-	-	-	0.9	-	0.0	-	-

TABLE 4. (cont.)

Station		*Engraulis mordax*											
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7	49.0	-	1.0	-	-	0.0	-	-	0.0	-	0.0	-	-
76.7	60.0	-	19.6	-	-	0.0	-	-	5.1	-	0.0	-	-
80.0	51.0	16.7	-	-	-	2.1	-	-	0.9	-	16.8	-	-
80.0	55.0	0.0	-	-	-	0.0	-	-	9.9	-	14.0	-	-
80.0	60.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
80.0	70.0	1.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-
81.8	46.9	166.7	-	-	-	10.8	-	-	0.0	-	0.0	-	-
83.3	40.6	5.9	-	-	-	34.6	-	-	0.0	-	7.9	-	-
83.3	42.0	10.3	-	-	-	14.2	-	-	0.0	-	83.9	-	-
83.3	51.0	674.3	-	-	-	0.0	-	-	101.3	-	7.9	-	-
83.3	55.0	0.0	-	-	-	0.0	-	-	163.3	-	17.1	-	-
83.3	60.0	2.3	-	-	-	0.0	-	-	3.6	-	0.0	-	-
83.3	70.0	216.0	-	-	-	4.8	-	-	0.0	-	0.0	-	-
83.3	80.0	242.9	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7	33.0	7.3	-	-	-	0.0	-	-	0.0	-	0.9	-	-
86.7	35.0	26.0	-	-	-	1.1	-	-	0.0	-	3.6	-	-
86.7	39.5	268.4	-	-	-	9.1	-	-	316.5	-	8.8	-	-
86.7	45.0	31.9	-	-	-	106.7	-	-	61.9	-	0.0	-	-
86.7	50.0	23.5	-	-	-	138.3	-	-	1.6	-	0.0	-	-
86.7	60.0	118.3	-	-	-	0.0	-	-	4.8	-	62.4	-	-
86.7	70.0	5.8	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7	80.0	206.8	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7	110.0	2.2	-	-	-	-	-	-	0.0	-	0.0	-	-
90.0	28.0	6.5	-	-	-	0.0	-	-	0.9	-	2.7	-	-
90.0	30.0	0.0	-	-	-	2.1	-	-	33.3	-	0.0	-	-
90.0	35.0	130.9	-	-	-	155.3	-	-	43.8	-	27.8	-	-
90.0	37.0	40.8	-	-	-	2379.2	-	-	0.0	-	63.9	-	-
90.0	45.0	120.6	-	-	-	189.9	-	-	-	-	0.0	-	-
90.0	53.0	80.2	-	-	-	0.0	-	-	3.3	-	0.0	-	-
90.0	60.0	0.0	-	-	-	0.0	-	-	67.4	-	0.0	-	-
90.0	70.0	2.3	-	-	-	0.0	-	-	0.0	-	0.0	-	-
90.0	90.0	1.1	-	-	-	0.0	-	-	0.0	-	0.0	-	-
93.3	26.7	295.5	-	-	25.4	-	-	-	0.0	-	0.0	-	-
93.3	28.0	459.4	-	-	0.0	-	-	-	10.6	-	0.9	-	-

TABLE 4. (cont.)

Engraulis mordax (cont.)

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
93.3 30.0	112.2	-	-	160.6	-	-	-	76.8	-	63.9	-	-
93.3 35.0	264.0	-	-	106.3	-	-	-	9.2	-	0.0	-	-
93.3 40.0	21.5	-	-	93.5	-	-	-	22.6	-	1.5	-	-
93.3 45.0	0.0	-	-	2.7	-	-	-	0.9	-	0.0	-	-
93.3 50.0	6.7	-	-	0.0	-	-	-	2.8	-	0.0	-	-
93.3 70.0	0.0	-	-	0.0	-	-	-	0.9	-	0.0	-	-
93.3 90.0	-	-	-	-	0.0	-	-	1.9	-	0.0	-	-

Bathylagus ochotensis

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 60.0	-	9.8	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7 50.0	0.0	-	-	-	0.9	-	-	0.0	-	0.0	-	-
93.3 100.0	1.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-

Bathylagus wesethi

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
83.3 100.0	0.0	-	-	-	-	-	-	0.0	-	0.8	-	-

Leuroglossus stilbius

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

Cyclothone signata

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
80.0 70.0	0.0	-	-	-	0.0	-	-	0.0	-	0.8	-	-
90.0 90.0	0.0	-	-	-	0.9	-	-	0.0	-	0.0	-	-
90.0 110.0	2.2	-	-	-	-	-	-	0.0	-	0.0	-	-
93.3 100.0	1.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-

Vinciguerria lucetia

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 100.0	-	-	-	-	-	-	-	0.0	-	2.4	-	-
83.3 90.0	0.0	-	-	-	0.0	-	-	0.0	-	0.8	-	-
86.7 110.0	0.0	-	-	-	-	-	-	0.0	-	2.5	-	-
90.0 35.0	0.0	-	-	-	0.0	-	-	0.0	-	0.9	-	-
90.0 60.0	0.0	-	-	-	0.0	-	-	0.0	-	1.0	-	-
90.0 70.0	0.0	-	-	-	0.0	-	-	0.0	-	2.3	-	-

TABLE 4. (cont.)

Vinciguerria lucetia (cont.)

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
90.0 80.0	0.0	-	-	-	0.0	-	-	0.0	-	2.7	-	-
90.0 90.0	0.0	-	-	-	0.0	-	-	2.8	-	0.0	-	-
90.0 100.0	0.0	-	-	-	0.0	-	-	3.8	-	8.0	-	-
90.0 110.0	0.0	-	-	-	-	-	-	0.0	-	10.2	-	-
93.3 60.0	0.0	-	-	0.0	-	-	-	0.0	-	1.7	-	-
93.3 70.0	0.0	-	-	0.0	-	-	-	0.0	-	18.8	-	-
93.3 110.0	0.0	-	-	-	-	-	-	0.0	-	3.6	-	-
93.3 120.0	0.0	-	-	-	-	-	-	0.9	-	0.0	-	-

Stomias atriventer

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
86.7 80.0	0.0	-	-	-	1.0	-	-	0.0	-	0.0	-	-

Aristostomias scintillans

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
90.0 120.0	1.0	-	-	-	-	-	-	0.0	-	0.0	-	-

Idiacanthus antrostomus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
86.7 110.0	1.1	-	-	-	-	-	-	0.0	-	0.0	-	-

Ceratoscopelus townsendi

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
86.7 100.0	1.1	-	-	-	-	-	-	0.0	-	0.0	-	-
90.0 60.0	0.0	-	-	-	0.9	-	-	0.0	-	0.0	-	-
90.0 80.0	0.0	-	-	-	0.0	-	-	1.0	-	0.0	-	-
90.0 90.0	1.1	-	-	-	0.0	-	-	40.4	-	0.0	-	-
90.0 100.0	0.0	-	-	-	0.0	-	-	0.0	-	1.6	-	-
90.0 110.0	0.0	-	-	-	-	-	-	0.9	-	0.0	-	-
93.3 100.0	0.0	-	-	-	0.9	-	-	0.0	-	2.5	-	-
93.3 110.0	0.0	-	-	-	-	-	-	0.0	-	1.8	-	-
93.3 120.0	32.9	-	-	-	-	-	-	0.0	-	3.6	-	-

Lampadena urophaos

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
86.7 33.0	0.0	-	-	-	0.0	-	-	0.0	-	0.9	-	-
93.3 110.0	0.0	-	-	-	-	-	-	0.0	-	0.9	-	-

TABLE 4. (cont.)

Lampadena urophaos (cont.)

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
93.3 120.0	0.0	-	-	-	-	-	-	0.9	-	0.0	-	-

Lampanyctus spp.

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
93.3 40.0	1.2	-	-	0.0	-	-	-	0.0	-	0.0	-	-

Nannobrachium regale

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
93.3 120.0	1.1	-	-	-	-	-	-	0.0	-	0.0	-	-

Nannobrachium ritteri

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
80.0 55.0	0.9	-	-	-	0.0	-	-	0.0	-	0.0	-	-
83.3 90.0	1.1	-	-	-	0.0	-	-	0.0	-	0.0	-	-
93.3 70.0	1.1	-	-	0.0	-	-	-	0.0	-	0.0	-	-

Stenobrachius leucopsarus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 60.0	-	2.9	-	-	0.0	-	-	0.0	-	0.0	-	-
80.0 70.0	0.0	-	-	-	1.0	-	-	0.0	-	0.0	-	-
83.3 55.0	1.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-
90.0 30.0	0.0	-	-	-	1.0	-	-	0.0	-	0.0	-	-
93.3 26.7	2.1	-	-	0.0	-	-	-	0.0	-	0.0	-	-
93.3 28.0	0.0	-	-	1.0	-	-	-	0.0	-	0.0	-	-

Triphoturus mexicanus

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	-	-
80.0 55.0	0.0	-	-	-	0.0	-	-	0.0	-	0.8	-	-
83.3 40.6	0.0	-	-	-	0.0	-	-	0.0	-	0.9	-	-
86.7 39.5	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
86.7 55.0	0.0	-	-	-	0.0	-	-	0.0	-	0.9	-	-
86.7 60.0	0.0	-	-	-	0.0	-	-	0.8	-	0.0	-	-
90.0 35.0	0.0	-	-	-	0.0	-	-	0.8	-	0.0	-	-
90.0 80.0	1.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-
93.3 45.0	0.0	-	-	0.0	-	-	-	0.9	-	0.0	-	-
93.3 50.0	0.0	-	-	0.0	-	-	-	2.8	-	0.0	-	-

TABLE 4. (cont.)

Diogenichthys atlanticus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
90.0 45.0	0.0	-	-	-	0.9	-	-	-	-	0.0	-	-
90.0 110.0	1.1	-	-	-	-	-	-	0.0	-	0.0	-	-
93.3 70.0	1.1	-	-	0.0	-	-	-	0.0	-	0.0	-	-
93.3 100.0	1.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-

Myctophum nitidulum

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
93.3 70.0	1.1	-	-	0.0	-	-	-	0.0	-	0.0	-	-

Symbolophorus californiensis

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
93.3 40.0	1.2	-	-	0.0	-	-	-	0.0	-	0.0	-	-

Tarletonbeania crenularis

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
86.7 60.0	0.0	-	-	-	1.0	-	-	0.0	-	0.0	-	-

Merluccius productus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 60.0	-	423.8	-	-	0.0	-	-	0.0	-	0.0	-	-
76.7 70.0	3.9	-	-	-	0.0	-	-	0.0	-	0.0	-	-
80.0 55.0	153.0	-	-	-	0.0	-	-	1.0	-	0.0	-	-
80.0 60.0	3.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-
80.0 80.0	80.0	-	-	-	-	-	-	0.0	-	0.0	-	-
81.8 46.9	0.9	-	-	-	0.0	-	-	0.0	-	0.9	-	-
83.3 60.0	1.2	-	-	-	0.0	-	-	0.0	-	0.0	-	-
83.3 70.0	1.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-
83.3 80.0	10.9	-	-	-	0.0	-	-	0.0	-	0.0	-	-
83.3 100.0	71.8	-	-	-	-	-	-	0.0	-	0.0	-	-
86.7 45.0	4.7	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7 50.0	1.2	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7 70.0	1.2	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7 90.0	3.4	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7 100.0	25.5	-	-	-	-	-	-	0.0	-	0.0	-	-
86.7 110.0	3.3	-	-	-	-	-	-	0.0	-	0.0	-	-
90.0 28.0	1.1	-	-	-	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.
90.0 80.0	2.1	-	-	-	0.0	-	-	0.0	-	0.0	-	-

Atherinopsis californiensis

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
83.3 40.6	34.5	-	-	-	0.0	-	-	0.0	-	0.0	-	-
83.3 42.0	0.0	-	-	-	1.1	-	-	0.0	-	0.0	-	-
86.7 33.0	84.8	-	-	-	0.0	-	-	0.0	-	0.0	-	-
90.0 28.0	1.1	-	-	-	0.0	-	-	0.0	-	0.0	-	-
93.3 26.7	19.1	-	-	0.0	-	-	-	0.0	-	0.0	-	-
93.3 30.0	1.2	-	-	0.0	-	-	-	0.0	-	0.0	-	-

Leuresthes tenuis

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
83.3 55.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
86.7 35.0	0.0	-	-	-	1.1	-	-	0.0	-	0.0	-	-
90.0 30.0	0.0	-	-	-	2.1	-	-	0.0	-	0.0	-	-
90.0 37.0	0.0	-	-	-	1.0	-	-	0.0	-	0.0	-	-
93.3 26.7	0.0	-	-	1.2	-	-	-	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	-	-	1.0	-	-	0.0	-	0.0	-	-
76.7 55.0	-	0.0	-	-	1.9	-	-	0.0	-	0.0	-	-
76.7 60.0	-	0.0	-	-	8.8	-	-	2.5	-	0.0	-	-
76.7 70.0	0.0	-	-	-	358.1	-	-	3.0	-	4.4	-	-
76.7 80.0	0.0	-	-	-	-	-	-	10.1	-	2.7	-	-
76.7 90.0	0.0	-	-	-	-	-	-	0.0	-	1.6	-	-
76.7 100.0	-	-	-	-	-	-	-	0.0	-	6.5	-	-
80.0 55.0	0.0	-	-	-	2.1	-	-	0.0	-	0.8	-	-
80.0 60.0	0.0	-	-	-	79.5	-	-	3.5	-	0.9	-	-
80.0 70.0	0.0	-	-	-	27.0	-	-	0.0	-	0.8	-	-
80.0 80.0	0.0	-	-	-	-	-	-	0.0	-	4.4	-	-
80.0 100.0	-	-	-	-	-	-	-	1.9	-	2.2	-	-
83.3 42.0	0.0	-	-	-	1.1	-	-	0.0	-	0.0	-	-
83.3 55.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
83.3 60.0	0.0	-	-	-	0.9	-	-	0.0	-	0.0	-	-
83.3 70.0	0.0	-	-	-	50.6	-	-	0.8	-	0.0	-	-

TABLE 4. (cont.)

Cololabis saira (cont.)

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
83.3 80.0	0.0	-	-	-	156.4	-	-	0.9	-	9.1	-	-
83.3 90.0	0.0	-	-	-	20.5	-	-	0.0	-	0.0	-	-
83.3 110.0	3.5	-	-	-	-	-	-	0.0	-	0.0	-	-
86.7 35.0	0.0	-	-	-	1.1	-	-	0.0	-	0.0	-	-
86.7 39.5	1.1	-	-	-	7.3	-	-	0.0	-	0.0	-	-
86.7 50.0	0.0	-	-	-	1.8	-	-	0.8	-	0.0	-	-
86.7 55.0	0.0	-	-	-	2.9	-	-	0.0	-	0.0	-	-
86.7 60.0	0.0	-	-	-	3.8	-	-	0.0	-	0.9	-	-
86.7 70.0	1.2	-	-	-	17.3	-	-	0.0	-	3.5	-	-
86.7 80.0	0.0	-	-	-	97.7	-	-	0.0	-	0.0	-	-
86.7 90.0	1.1	-	-	-	6.4	-	-	0.0	-	0.0	-	-
86.7 100.0	15.9	-	-	-	-	-	-	0.0	-	6.5	-	-
86.7 110.0	3.3	-	-	-	-	-	-	0.8	-	1.7	-	-
90.0 28.0	0.0	-	-	-	8.1	-	-	0.0	-	0.0	-	-
90.0 35.0	0.0	-	-	-	1.0	-	-	0.0	-	0.0	-	-
90.0 37.0	0.0	-	-	-	31.8	-	-	0.0	-	0.0	-	-
90.0 53.0	0.0	-	-	-	0.0	-	-	0.0	-	0.8	-	-
90.0 60.0	0.0	-	-	-	0.0	-	-	4.7	-	2.0	-	-
90.0 70.0	0.0	-	-	-	14.1	-	-	0.0	-	0.0	-	-
90.0 80.0	0.0	-	-	-	3.4	-	-	0.0	-	0.0	-	-
90.0 90.0	0.0	-	-	-	1.8	-	-	1.8	-	0.0	-	-
90.0 100.0	0.0	-	-	-	212.3	-	-	0.0	-	0.8	-	-
90.0 110.0	4.3	-	-	-	-	-	-	0.9	-	3.2	-	-
90.0 120.0	5.2	-	-	-	-	-	-	0.0	-	0.0	-	-
93.3 28.0	0.0	-	-	0.0	-	-	-	0.0	-	0.9	-	-
93.3 30.0	1.2	-	-	2.0	-	-	-	0.0	-	0.0	-	-
93.3 35.0	1.1	-	-	21.9	-	-	-	0.0	-	0.0	-	-
93.3 50.0	3.3	-	-	0.0	-	-	-	1.8	-	0.0	-	-
93.3 60.0	5.6	-	-	0.0	-	-	-	2.1	-	0.9	-	-
93.3 70.0	0.0	-	-	0.0	-	-	-	0.0	-	2.7	-	-
93.3 80.0	-	-	-	-	0.8	-	-	1.1	-	0.0	-	-
93.3 90.0	-	-	-	-	10.2	-	-	0.0	-	0.0	-	-
93.3 100.0	1.0	-	-	-	1.9	-	-	0.9	-	3.3	-	-
93.3 110.0	0.0	-	-	-	-	-	-	0.0	-	3.6	-	-
93.3 120.0	0.0	-	-	-	-	-	-	0.0	-	2.7	-	-

TABLE 4. (cont.)

***Cheilopogon* spp.**

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
83.3 51.0	0.0	-	-	-	0.0	-	-	1.9	-	0.0	-	-
86.7 55.0	0.0	-	-	-	0.0	-	-	0.7	-	0.0	-	-
93.3 26.7	0.0	-	-	0.0	-	-	-	1.0	-	0.0	-	-
93.3 40.0	0.0	-	-	0.0	-	-	-	10.8	-	0.0	-	-
93.3 50.0	0.0	-	-	0.0	-	-	-	7.4	-	0.0	-	-

Cheilopogon pinnatibarbatus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
86.7 45.0	0.0	-	-	-	0.0	-	-	0.6	-	0.0	-	-

Hirundichthys marginatus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
93.3 40.0	0.0	-	-	0.0	-	-	-	1.0	-	0.0	-	-

***Sebastes* spp.**

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 49.0	-	0.0	-	-	0.0	-	-	0.0	-	0.9	-	-
76.7 51.0	-	3.2	-	-	0.0	-	-	0.0	-	0.0	-	-
76.7 55.0	-	11.2	-	-	0.0	-	-	0.0	-	0.0	-	-
76.7 60.0	-	3.9	-	-	0.0	-	-	0.0	-	0.0	-	-
80.0 51.0	16.7	-	-	-	0.0	-	-	0.9	-	5.3	-	-
80.0 55.0	0.0	-	-	-	0.0	-	-	0.0	-	0.8	-	-
80.0 60.0	2.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-
80.0 70.0	1.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-
81.8 46.9	117.4	-	-	-	0.0	-	-	0.0	-	0.9	-	-
83.3 42.0	10.3	-	-	-	2.2	-	-	0.0	-	0.0	-	-
83.3 51.0	25.3	-	-	-	1.8	-	-	0.9	-	0.0	-	-
83.3 55.0	0.0	-	-	-	3.3	-	-	0.0	-	0.0	-	-
83.3 80.0	4.4	-	-	-	3.1	-	-	0.0	-	0.0	-	-
86.7 33.0	3.2	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7 35.0	0.0	-	-	-	1.1	-	-	0.0	-	0.0	-	-
86.7 45.0	0.0	-	-	-	3.6	-	-	0.0	-	0.0	-	-
86.7 50.0	3.7	-	-	-	12.7	-	-	0.0	-	1.7	-	-
86.7 60.0	4.8	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7 100.0	2.1	-	-	-	-	-	-	0.0	-	0.0	-	-
90.0 28.0	1.1	-	-	-	0.0	-	-	0.0	-	0.0	-	-

TABLE 4. (cont.)

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

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
90.0 35.0	0.0	-	-	-	2.1	-	-	0.0	-	0.0	-	-
90.0 37.0	0.0	-	-	-	1.0	-	-	0.0	-	0.0	-	-
90.0 45.0	18.4	-	-	-	16.6	-	-	-	-	0.0	-	-
90.0 53.0	37.9	-	-	-	0.0	-	-	0.0	-	0.0	-	-
93.3 26.7	8.5	-	-	0.0	-	-	-	0.0	-	0.0	-	-
93.3 28.0	1.1	-	-	0.0	-	-	-	0.0	-	0.0	-	-
93.3 30.0	0.0	-	-	1.0	-	-	-	0.0	-	0.0	-	-
93.3 40.0	2.4	-	-	1.1	-	-	-	0.0	-	0.0	-	-
93.3 45.0	1.2	-	-	0.0	-	-	-	0.0	-	0.0	-	-

Sebastes aurora

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
90.0 45.0	2.3	-	-	-	0.9	-	-	-	-	0.0	-	-

Sebastes diploproa

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 70.0	0.0	-	-	-	1.1	-	-	0.0	-	0.0	-	-
76.7 80.0	0.0	-	-	-	-	-	-	0.9	-	0.0	-	-
80.0 51.0	1.0	-	-	-	0.0	-	-	1.8	-	0.0	-	-
83.3 55.0	0.0	-	-	-	0.0	-	-	10.2	-	2.4	-	-
83.3 70.0	1.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7 50.0	1.2	-	-	-	0.9	-	-	0.0	-	1.7	-	-
86.7 55.0	1.1	-	-	-	0.0	-	-	0.7	-	1.9	-	-
86.7 60.0	1.2	-	-	-	1.0	-	-	0.0	-	0.0	-	-
86.7 100.0	1.1	-	-	-	-	-	-	0.0	-	0.0	-	-
90.0 45.0	2.3	-	-	-	0.0	-	-	-	-	0.0	-	-
90.0 53.0	1.1	-	-	-	0.0	-	-	1.7	-	0.0	-	-

Sebastes goodei

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
86.7 50.0	1.2	-	-	-	0.0	-	-	0.0	-	0.0	-	-

Sebastes jordani

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 49.0	-	4.1	-	-	0.0	-	-	0.0	-	0.0	-	-
76.7 60.0	-	1.0	-	-	0.0	-	-	0.0	-	0.0	-	-
80.0 51.0	5.9	-	-	-	0.0	-	-	0.0	-	0.0	-	-

TABLE 4. (cont.)

Sebastes jordani (cont.)

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
81.8 46.9	25.1	-	-	-	0.0	-	-	0.0	-	0.0	-	-
83.3 40.6	2.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-
83.3 42.0	15.9	-	-	-	0.0	-	-	0.0	-	0.0	-	-
83.3 51.0	93.4	-	-	-	0.9	-	-	0.0	-	0.0	-	-
86.7 39.5	1.1	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7 45.0	0.0	-	-	-	0.9	-	-	0.0	-	0.0	-	-
86.7 50.0	9.9	-	-	-	0.0	-	-	0.0	-	1.7	-	-
90.0 28.0	1.1	-	-	-	0.0	-	-	0.0	-	0.0	-	-
90.0 53.0	15.6	-	-	-	0.0	-	-	0.0	-	0.0	-	-

Sebastes paucispinis

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
80.0 51.0	1.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-
90.0 28.0	1.1	-	-	-	0.0	-	-	0.0	-	0.0	-	-

Oxylebius pictus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
83.3 70.0	1.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-
83.3 80.0	0.0	-	-	-	1.0	-	-	0.0	-	0.0	-	-
86.7 45.0	1.2	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7 80.0	1.2	-	-	-	0.0	-	-	0.0	-	0.0	-	-

Hexagrammos decagrammus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 51.0	-	21.3	-	-	0.0	-	-	0.0	-	0.0	-	-

Hexagrammos lagocephalus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
86.7 55.0	3.4	-	-	-	0.0	-	-	0.0	-	0.0	-	-

Ophiodon elongatus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
83.3 51.0	1.9	-	-	-	0.0	-	-	0.0	-	0.0	-	-

Ruscarius creaseri

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
81.8 46.9	0.9	-	-	-	0.0	-	-	0.0	-	0.0	-	-

TABLE 4. (cont.)

Scorpaenichthys marmoratus

Station		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7	49.0	-	1.0	-	-	0.0	-	-	0.0	-	0.0	-	-
76.7	60.0	-	1.0	-	-	0.0	-	-	0.0	-	0.0	-	-
80.0	51.0	0.0	-	-	-	0.0	-	-	0.0	-	2.6	-	-
81.8	46.9	12.5	-	-	-	0.0	-	-	0.0	-	0.0	-	-
83.3	40.6	1.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-
83.3	42.0	1.9	-	-	-	0.0	-	-	0.0	-	0.0	-	-
83.3	51.0	1.0	-	-	-	0.0	-	-	0.0	-	0.8	-	-
83.3	60.0	1.2	-	-	-	0.0	-	-	0.0	-	0.0	-	-
83.3	70.0	5.1	-	-	-	0.0	-	-	0.0	-	0.0	-	-
83.3	80.0	2.2	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7	33.0	0.8	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7	35.0	1.1	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7	39.5	4.6	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7	45.0	3.5	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7	50.0	2.5	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7	60.0	2.4	-	-	-	0.0	-	-	0.0	-	0.0	-	-
86.7	100.0	1.1	-	-	-	-	-	-	0.0	-	0.0	-	-
90.0	35.0	1.1	-	-	-	0.0	-	-	0.0	-	0.0	-	-
90.0	45.0	58.6	-	-	-	0.0	-	-	-	-	0.0	-	-
93.3	28.0	1.1	-	-	0.0	-	-	-	0.0	-	0.0	-	-
93.3	30.0	4.7	-	-	0.0	-	-	-	0.0	-	0.0	-	-
93.3	40.0	1.2	-	-	0.0	-	-	-	0.0	-	0.0	-	-
93.3	60.0	1.1	-	-	0.0	-	-	-	0.0	-	0.0	-	-

***Paralabrax* spp.**

Station		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
83.3	51.0	0.0	-	-	-	0.0	-	-	2.8	-	0.0	-	-
83.3	55.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
86.7	39.5	0.0	-	-	-	0.0	-	-	46.0	-	0.0	-	-
90.0	30.0	0.0	-	-	-	0.0	-	-	2.6	-	0.0	-	-
90.0	35.0	0.0	-	-	-	0.0	-	-	2.3	-	0.0	-	-
90.0	60.0	0.0	-	-	-	0.0	-	-	1.6	-	0.0	-	-
93.3	26.7	0.0	-	-	0.0	-	-	-	0.0	-	1.0	-	-

TABLE 4. (cont.)

Seriola lalandi

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
83.3 55.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-

Trachurus symmetricus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 60.0	-	0.0	-	-	1.8	-	-	0.0	-	0.0	-	-
80.0 51.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
83.3 70.0	0.0	-	-	-	1.0	-	-	0.0	-	0.0	-	-
86.7 55.0	0.0	-	-	-	1.0	-	-	0.0	-	0.0	-	-
86.7 70.0	0.0	-	-	-	16.2	-	-	0.0	-	0.0	-	-
90.0 35.0	0.0	-	-	-	2.1	-	-	0.0	-	0.0	-	-
90.0 100.0	0.0	-	-	-	0.9	-	-	0.0	-	0.0	-	-
93.3 55.0	0.0	-	-	0.0	-	-	-	1.0	-	0.0	-	-
93.3 60.0	0.0	-	-	0.0	-	-	-	1.0	-	0.0	-	-
93.3 100.0	0.0	-	-	-	0.9	-	-	0.0	-	0.0	-	-

Xenistius californiensis

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
86.7 39.5	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-

Sciaenidae

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
90.0 35.0	0.0	-	-	-	0.0	-	-	0.8	-	0.0	-	-

Genyonemus lineatus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
80.0 51.0	0.0	-	-	-	0.0	-	-	0.0	-	7.1	-	-

Girella nigricans

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
80.0 51.0	0.0	-	-	-	0.0	-	-	3.6	-	0.0	-	-
83.3 42.0	0.0	-	-	-	0.0	-	-	2.0	-	0.0	-	-
83.3 55.0	0.0	-	-	-	0.0	-	-	1.9	-	0.0	-	-
86.7 39.5	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
86.7 45.0	0.0	-	-	-	0.0	-	-	0.6	-	0.0	-	-
86.7 55.0	0.0	-	-	-	0.0	-	-	0.0	-	0.9	-	-
90.0 35.0	0.0	-	-	-	1.0	-	-	0.0	-	0.0	-	-
93.3 35.0	0.0	-	-	0.0	-	-	-	1.8	-	0.0	-	-

TABLE 4. (cont.)

Medialuna californiensis

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
83.3 40.6	0.0	-	-	-	0.0	-	-	0.0	-	0.9	-	-
83.3 55.0	0.0	-	-	-	0.0	-	-	0.0	-	0.8	-	-
86.7 39.5	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
86.7 45.0	0.0	-	-	-	0.0	-	-	1.3	-	0.9	-	-
86.7 50.0	0.0	-	-	-	0.0	-	-	0.8	-	0.0	-	-
86.7 55.0	0.0	-	-	-	0.0	-	-	0.0	-	2.8	-	-
90.0 45.0	0.0	-	-	-	0.0	-	-	-	-	18.0	-	-
90.0 53.0	0.0	-	-	-	0.0	-	-	0.8	-	0.0	-	-
93.3 45.0	0.0	-	-	0.0	-	-	-	0.0	-	0.8	-	-
93.3 50.0	0.0	-	-	0.0	-	-	-	7.4	-	0.0	-	-

Chromis punctipinnis

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	-	-
83.3 42.0	0.0	-	-	-	0.0	-	-	10.0	-	0.9	-	-
83.3 51.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
83.3 55.0	0.0	-	-	-	0.0	-	-	17.6	-	0.0	-	-
86.7 33.0	0.0	-	-	-	0.0	-	-	3.6	-	0.0	-	-
86.7 39.5	0.0	-	-	-	0.0	-	-	8.7	-	0.0	-	-
86.7 45.0	0.0	-	-	-	0.0	-	-	3.9	-	0.0	-	-
86.7 60.0	0.0	-	-	-	0.0	-	-	1.6	-	1.7	-	-
90.0 30.0	0.0	-	-	-	0.0	-	-	34.2	-	0.0	-	-
90.0 45.0	0.0	-	-	-	6.5	-	-	-	-	0.0	-	-
90.0 53.0	0.0	-	-	-	0.0	-	-	0.8	-	0.0	-	-
90.0 60.0	0.0	-	-	-	0.0	-	-	0.0	-	1.0	-	-
93.3 40.0	0.0	-	-	0.0	-	-	-	1.0	-	0.0	-	-
93.3 45.0	0.0	-	-	0.0	-	-	-	0.9	-	0.0	-	-
93.3 50.0	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	-	-	0.9	-	0.0	-	-

Halichoeres semicinctus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
86.7 39.5	0.0	-	-	-	0.0	-	-	6.9	-	0.0	-	-

TABLE 4. (cont.)

Halichoeres semicinctus (cont.)

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
86.7 45.0	0.0	-	-	-	0.0	-	-	1.3	-	0.0	-	-
90.0 35.0	0.0	-	-	-	0.0	-	-	0.8	-	0.0	-	-
90.0 60.0	0.0	-	-	-	0.0	-	-	0.8	-	0.0	-	-

Oxyjulis californica

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 60.0	-	0.0	-	-	0.9	-	-	0.0	-	0.0	-	-
80.0 51.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
80.0 55.0	0.0	-	-	-	0.0	-	-	0.0	-	0.8	-	-
83.3 40.6	0.0	-	-	-	0.0	-	-	0.0	-	0.9	-	-
83.3 42.0	0.0	-	-	-	0.0	-	-	4.0	-	0.0	-	-
83.3 60.0	0.0	-	-	-	0.0	-	-	3.6	-	0.0	-	-
86.7 33.0	0.0	-	-	-	0.0	-	-	0.9	-	0.9	-	-
86.7 35.0	0.0	-	-	-	0.0	-	-	1.0	-	0.0	-	-
86.7 50.0	0.0	-	-	-	0.0	-	-	0.0	-	1.7	-	-
86.7 55.0	0.0	-	-	-	0.0	-	-	1.4	-	4.7	-	-
86.7 60.0	0.0	-	-	-	0.0	-	-	2.4	-	0.0	-	-
90.0 53.0	0.0	-	-	-	0.0	-	-	4.2	-	0.0	-	-
90.0 60.0	0.0	-	-	-	0.0	-	-	2.4	-	0.0	-	-
93.3 45.0	0.0	-	-	0.0	-	-	-	0.9	-	0.0	-	-
93.3 50.0	0.0	-	-	0.0	-	-	-	0.9	-	0.0	-	-
93.3 55.0	0.0	-	-	0.0	-	-	-	2.0	-	0.0	-	-

Chiasmodon niger

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
93.3 100.0	1.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-

Neoclinus blanchardi

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
90.0 35.0	1.1	-	-	-	0.0	-	-	0.0	-	0.0	-	-

Neoclinus stephensae

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
83.3 51.0	0.0	-	-	-	0.9	-	-	0.0	-	0.0	-	-
83.3 55.0	0.0	-	-	-	0.0	-	-	0.0	-	0.8	-	-

TABLE 4. (cont.)

Hypsoblennius gentilis

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
90.0 45.0	1.1	-	-	-	0.0	-	-	-	-	0.0	-	-

Hypsoblennius gilberti

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
83.3 42.0	0.0	-	-	-	0.0	-	-	2.0	-	0.9	-	-
83.3 51.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
90.0 30.0	0.0	-	-	-	0.0	-	-	2.6	-	0.0	-	-

Hypsoblennius jenkinsi

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 60.0	-	0.0	-	-	0.0	-	-	0.8	-	0.0	-	-
76.7 70.0	0.0	-	-	-	0.0	-	-	2.0	-	0.0	-	-
80.0 51.0	0.0	-	-	-	0.0	-	-	1.8	-	2.6	-	-
83.3 42.0	0.0	-	-	-	0.0	-	-	1.0	-	0.0	-	-
83.3 51.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
83.3 55.0	0.0	-	-	-	0.0	-	-	1.9	-	0.0	-	-
86.7 35.0	0.0	-	-	-	0.0	-	-	0.0	-	17.2	-	-
86.7 39.5	1.1	-	-	-	0.0	-	-	27.7	-	0.0	-	-
86.7 45.0	0.0	-	-	-	0.0	-	-	0.6	-	0.0	-	-
90.0 28.0	0.0	-	-	-	0.0	-	-	8.0	-	0.9	-	-
90.0 30.0	0.0	-	-	-	0.0	-	-	12.3	-	12.2	-	-
90.0 35.0	0.0	-	-	-	0.0	-	-	3.8	-	26.0	-	-
90.0 53.0	0.0	-	-	-	0.0	-	-	0.8	-	0.0	-	-
93.3 26.7	1.1	-	-	0.0	-	-	-	0.0	-	2.0	-	-
93.3 28.0	0.0	-	-	0.0	-	-	-	0.0	-	0.9	-	-
93.3 30.0	0.0	-	-	0.0	-	-	-	0.0	-	17.6	-	-
93.3 40.0	0.0	-	-	0.0	-	-	-	0.0	-	0.8	-	-

Icosteus aenigmaticus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 70.0	0.0	-	-	-	1.1	-	-	0.0	-	0.0	-	-

Coryphopterus nicholsii

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

TABLE 4. (cont.)

Lythrypnus dalli

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	-	-

Typhlogobius californiensis

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

Sphyraena argentea

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	-	-
80.0 55.0	0.0	-	-	-	0.0	-	-	3.0	-	0.0	-	-
83.3 40.6	0.0	-	-	-	0.0	-	-	2.7	-	0.0	-	-
83.3 42.0	0.0	-	-	-	0.0	-	-	13.0	-	0.0	-	-
83.3 51.0	0.0	-	-	-	0.0	-	-	2.8	-	0.0	-	-
83.3 55.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
86.7 55.0	0.0	-	-	-	0.0	-	-	0.7	-	0.0	-	-
90.0 30.0	0.0	-	-	-	0.0	-	-	5.3	-	0.0	-	-
90.0 35.0	0.0	-	-	-	0.0	-	-	2.3	-	0.0	-	-

Scomber japonicus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 60.0	-	0.0	-	-	0.9	-	-	0.0	-	0.0	-	-
80.0 51.0	0.0	-	-	-	0.0	-	-	2.7	-	0.0	-	-
83.3 40.6	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
83.3 42.0	0.0	-	-	-	0.0	-	-	8.0	-	0.0	-	-
83.3 51.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
83.3 55.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
83.3 70.0	0.0	-	-	-	11.5	-	-	0.0	-	0.0	-	-
83.3 80.0	0.0	-	-	-	542.3	-	-	0.0	-	0.0	-	-
86.7 39.5	0.0	-	-	-	0.0	-	-	126.6	-	0.0	-	-
86.7 45.0	0.0	-	-	-	2.7	-	-	1.9	-	0.0	-	-
86.7 50.0	0.0	-	-	-	0.0	-	-	1.6	-	0.0	-	-
86.7 55.0	0.0	-	-	-	0.0	-	-	0.7	-	0.0	-	-
86.7 60.0	0.0	-	-	-	1.0	-	-	3.2	-	0.0	-	-
86.7 70.0	0.0	-	-	-	24.4	-	-	0.0	-	0.0	-	-
90.0 30.0	0.0	-	-	-	0.0	-	-	7.9	-	0.0	-	-
90.0 35.0	0.0	-	-	-	4.2	-	-	9.1	-	0.0	-	-

TABLE 4. (cont.)

Scomber japonicus (cont.)

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
90.0 37.0	0.0	-	-	-	5.8	-	-	0.0	-	0.0	-	-
90.0 70.0	0.0	-	-	-	4.0	-	-	0.0	-	0.0	-	-
93.3 26.7	0.0	-	-	1.2	-	-	-	1.0	-	2.0	-	-
93.3 30.0	0.0	-	-	4.0	-	-	-	0.0	-	0.0	-	-
93.3 45.0	0.0	-	-	16.1	-	-	-	0.0	-	0.0	-	-
93.3 50.0	0.0	-	-	4.0	-	-	-	0.0	-	0.0	-	-

Icichthys lockingtoni

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
80.0 51.0	1.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-
80.0 60.0	2.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-
83.3 60.0	0.0	-	-	-	0.9	-	-	0.0	-	0.0	-	-
86.7 55.0	0.0	-	-	-	0.0	-	-	0.0	-	0.9	-	-

Tetragonurus cuvieri

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 100.0	-	-	-	-	-	-	-	0.0	-	0.8	-	-
86.7 90.0	0.0	-	-	-	0.0	-	-	0.0	-	0.8	-	-
90.0 80.0	0.0	-	-	-	0.0	-	-	0.0	-	1.8	-	-
90.0 90.0	1.1	-	-	-	0.0	-	-	0.0	-	0.8	-	-
90.0 110.0	0.0	-	-	-	-	-	-	1.8	-	0.0	-	-
93.3 35.0	0.0	-	-	0.0	-	-	-	0.9	-	0.0	-	-
93.3 100.0	0.0	-	-	-	0.0	-	-	0.0	-	4.2	-	-
93.3 120.0	0.0	-	-	-	-	-	-	0.0	-	0.9	-	-

Peprilus simillimus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
90.0 35.0	0.0	-	-	-	1.0	-	-	0.0	-	0.0	-	-

Citharichthys sordidus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 60.0	-	1.0	-	-	0.0	-	-	0.0	-	0.0	-	-
80.0 55.0	0.0	-	-	-	0.0	-	-	0.0	-	1.6	-	-
83.3 42.0	0.0	-	-	-	0.0	-	-	0.0	-	0.9	-	-
83.3 51.0	0.0	-	-	-	0.0	-	-	1.9	-	0.0	-	-
83.3 55.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
83.3 80.0	1.1	-	-	-	0.0	-	-	0.0	-	0.0	-	-

TABLE 4. (cont.)

Citharichthys sordidus (cont.)

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

Citharichthys stigmaeus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 70.0	0.0	-	-	-	0.0	-	-	1.0	-	0.0	-	-
80.0 51.0	0.0	-	-	-	0.0	-	-	0.0	-	0.9	-	-
83.3 70.0	0.0	-	-	-	0.0	-	-	0.0	-	0.9	-	-
86.7 45.0	0.0	-	-	-	0.0	-	-	0.0	-	0.9	-	-

Hippoglossina stomata

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	-	-
80.0 55.0	0.0	-	-	-	0.0	-	-	0.0	-	0.8	-	-
83.3 55.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
93.3 28.0	1.1	-	-	0.0	-	-	-	0.0	-	0.0	-	-

Pleuronichthys coenosus

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
83.3 80.0	0.0	-	-	-	1.0	-	-	0.0	-	0.0	-	-
86.7 35.0	0.0	-	-	-	0.0	-	-	0.0	-	0.9	-	-
86.7 55.0	0.0	-	-	-	0.0	-	-	0.0	-	1.9	-	-
90.0 35.0	0.0	-	-	-	1.0	-	-	0.0	-	0.0	-	-
90.0 37.0	0.0	-	-	-	1.9	-	-	0.0	-	0.0	-	-
93.3 30.0	0.0	-	-	1.0	-	-	-	0.0	-	0.0	-	-
93.3 35.0	0.0	-	-	4.4	-	-	-	0.0	-	0.0	-	-

Pleuronichthys decurrens

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
83.3 55.0	1.0	-	-	-	0.0	-	-	0.0	-	0.0	-	-
90.0 53.0	1.1	-	-	-	0.0	-	-	0.0	-	0.0	-	-
93.3 30.0	0.0	-	-	0.0	-	-	-	0.0	-	0.9	-	-

Pleuronichthys ritteri

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
83.3 51.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-

TABLE 4. (cont.)

Pleuronichthys verticalis

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
76.7 60.0	-	0.0	-	-	0.0	-	-	0.8	-	0.0	-	-
80.0 51.0	0.0	-	-	-	0.0	-	-	0.0	-	0.9	-	-
83.3 42.0	1.9	-	-	-	0.0	-	-	0.0	-	0.0	-	-
93.3 28.0	3.2	-	-	0.0	-	-	-	0.0	-	0.0	-	-

Disintegrated fish larvae

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
81.8 46.9	0.9	-	-	-	0.0	-	-	0.0	-	0.0	-	-
83.3 42.0	0.0	-	-	-	0.0	-	-	2.0	-	0.0	-	-
83.3 55.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-
86.7 110.0	1.1	-	-	-	-	-	-	0.0	-	0.0	-	-

Unidentified fish larvae

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
83.3 55.0	0.0	-	-	-	0.0	-	-	0.9	-	0.0	-	-

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ALPHABETICAL INDEX TO TABLE 4

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