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OCEAN SHRIMP REPORT  
1979 SEASON

by

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and  
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TWENTY-THIRD ANNUAL SHRIMP REPORT

MARINE RESOURCES

Administrative Report No. 80-8

April 1980

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ABSTRACT

Statewide Pacific ocean shrimp, *Pandalus jordani*, landings totaled 2,237.7 mt (4,922,857 lb), down 3,745 mt (8,240,386 lb) from the 1978 catch of 5,983.3 mt (13,163,243 lb). The 1979 landings are the lowest since 1976 when 1,545.5 mt (3,400,191 lb) were landed. Area A (Eureka-Crescent City) landings dropped to 1,842.5 mt (4,053,605 lb) from 5,046.3 mt (11,101,895 lb) landed during the previous season. No landings were made in Area B-1 (Fort Bragg). Only 2.0 mt (4,385 lb) were reported caught in Area B-2 (Bodega Bay). Record landings of 393.1 mt (864,867 lb) were made in Area C (Morro Bay-Avila), surpassing the previous record of 90.4 mt (199,000 lb) landed in 1953. In Area A a record 71 vessels, 34 double-rigged and 37 single-rigged, shrimped during the season. Average catch per hour was a low .15 mt (338 lb) and .22 mt (490 lb) for single-rig and double-rig vessels, respectively. In Area C average catch per hour was .23 mt (508 lb) and .42 mt (924 lb) for single-rig and double-rig vessels, respectively. Area A shrimp catches were dominated by 1-year-old shrimp throughout most of the season. The age composition in Area C shifted predominately from 2-year-old shrimp in May and June to predominately 1-year-old shrimp in July, August, October, and November. Area A was closed for one month from July 15 to August 15 because closure criteria of less than .16 mt (350 lb) per hour for two consecutive weeks was met and year class composition exceeded 70% of 1-year-old shrimp. The season was closed October 14 when the catch per hour criterion was exceeded again.

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1/ Marine Resources Administrative Report No. 80-8

2/ Marine Resources Region, 619 2nd St., Eureka, CA 95501

3/ Marine Resources Region, c/o Dept. Parks and Recreation,  
Star Route, Mendocino, CA 95460

4/ Marine Resources Laboratory, 213 B Beach St., Morro Bay, CA 93442

5/ Marine Resources Region, 411 Burgess Drive, Menlo Park, CA 94025

## INTRODUCTION

California's 1979 Pacific ocean shrimp, *Pandalus jordani*, landings totaled 2,237.7 metric tons (4,922,857 lb), down 3,745.6 mt (8,240,386 lb) from the 1978 catch of 5,983.3 mt (13,163,243 lb). The 1979 landings are the lowest since 1976 when 1,545.5 mt (3,400,191 lb) was landed.

Eureka-Crescent City landings dropped to 1,842.5 mt (4,053,605 lb) from 5,046.3 mt (11,101,895 lb) landed in 1978. Shrimp beds off Fort Bragg and Bodega Bay were unproductive. Record landings of 3,931 mt (864,867 lb) were made in the Morro Bay-Avila area surpassing the previous record of 90.4 mt (199,000 lb) landed in 1953.

One-year-old shrimp dominated the catches at Eureka and Crescent City throughout the season with the exception of April. Two-year-old shrimp dominated the catch in Area C during May, June, and September; and 1-year-old shrimp dominated the catches in July, August, October, and November.

Price to the fishermen began at 32¢ per lb in April, increased steadily to an all-time high of 46¢ per lb in mid-August, where it remained until the end of the season.

### AREA A

Area A shrimp landings from the ports of Eureka and Crescent City totaled 1,842.5 mt (4,053,605 lb) for 1979. This is a sharp decline from the 1978 landings of 5,046.3 mt (11,101,895 lb); however, it is still the third best season on record. Shrimpers landed 82.9 mt (182,319 lb) in Crescent City that had been caught in Oregon's areas 19 and 20 (Cape Blanco to the California border).

The season opened on April 16 with the fishermen receiving 32¢ per lb for their shrimp. The price received by the fishermen increased to 35¢ per lb in early May; 38¢ per lb in early June; 42¢ per lb in mid-June, and finally to an all-time high of 46¢ per lb in mid-August where it remained until the season was closed October 14.

A record 71 vessels, 34 double-rigged and 37 single-rigged, shrimped during the season (Table 1). The fishing effort shifted throughout the bed during the season, seldom concentrating exclusively on one area for more than a week. However, two areas fished by some boats every week were NE of the Klamath River and SW of Redding Rock in 45 to 90 fm (Figure 1).

The average catch per hour (CPUE) was quite low throughout the season (Table 1), averaging only 57.6% of the 1978 figures. The CPUE declined to the point that it fell below the established season closure criteria of .16 mt (350 lb) per hour for two consecutive weeks and the year class composition exceeded 70% 1-year-old shrimp, which resulted in the fishery being closed down from July 15 to August 15. Upon reopening the season the CPUE jumped back up to the highest levels since April, but after one week started another decline, which eventually caused the season to be closed two weeks early on October 14.

One-year-old shrimp dominated the fishery in percent by number throughout the season and percent by weight every month, except April when 2-year-olds exceeded 1- and 3-year-old shrimp by a small percentage (Table 2). Males were predominately 1-year-olds during the season, and the majority of transitionals were also 1-year-olds. However, during April the vast majority of transitionals were 2-year-olds (Table 3). The

TABLE 1. Area A Monthly Catch and Effort Data, 1979

| Month                     | Pounds landed           | Effort * (hours) | Pounds * per hour          | Vessels         | Trips |
|---------------------------|-------------------------|------------------|----------------------------|-----------------|-------|
| <u>Single-rig vessels</u> |                         |                  |                            |                 |       |
| April                     | 670,647                 | 1,741.7          | 384                        | 80              | 190   |
| May                       | 358,610                 | 978.3            | 265                        | 51              | 86    |
| June                      | 284,704                 | 958.1            | 297                        | 60              | 105   |
| July                      | 56,632                  | 212.4            | 267                        | 13              | 26    |
| August                    | 243,149                 | 703.5            | 346                        | 34              | 67    |
| September                 | 50,372                  | 269.7            | 187                        | 19              | 47    |
| October                   | 22,139                  | 105.8            | 168                        | 7               | 16    |
| Totals                    | 1,686,253<br>766.5 mt   | 4,969.5          | 338 <sup>+</sup><br>.15 mt | 37 <sup>†</sup> | 537   |
| <u>Double-rig vessels</u> |                         |                  |                            |                 |       |
| April                     | 658,738                 | 920.4            | 679                        | 48              | 66    |
| May                       | 343,872                 | 663.9            | 518                        | 32              | 39    |
| June                      | 415,818                 | 1,063.4          | 373                        | 56              | 73    |
| July                      | 138,247                 | 405.9            | 337                        | 18              | 27    |
| August                    | 455,050                 | 779.5            | 581                        | 31              | 49    |
| September                 | 297,933                 | 618.2            | 428                        | 42              | 52    |
| October                   | 57,694                  | 174.9            | 261                        | 12              | 19    |
| Totals                    | 2,367,605<br>1,076.1 mt | 4,626.2          | 490 <sup>+</sup><br>.22 mt | 34 <sup>†</sup> | 325   |
| <u>All vessels</u>        |                         |                  |                            |                 |       |
| Season totals             | 4,053,605<br>1,842.5 mt | 9,595.7          | 411 <sup>+</sup>           | 71 <sup>†</sup> | 862   |

\* Effort and pounds per hour are based upon boat logs

+ Mean

† Total vessels that made landings

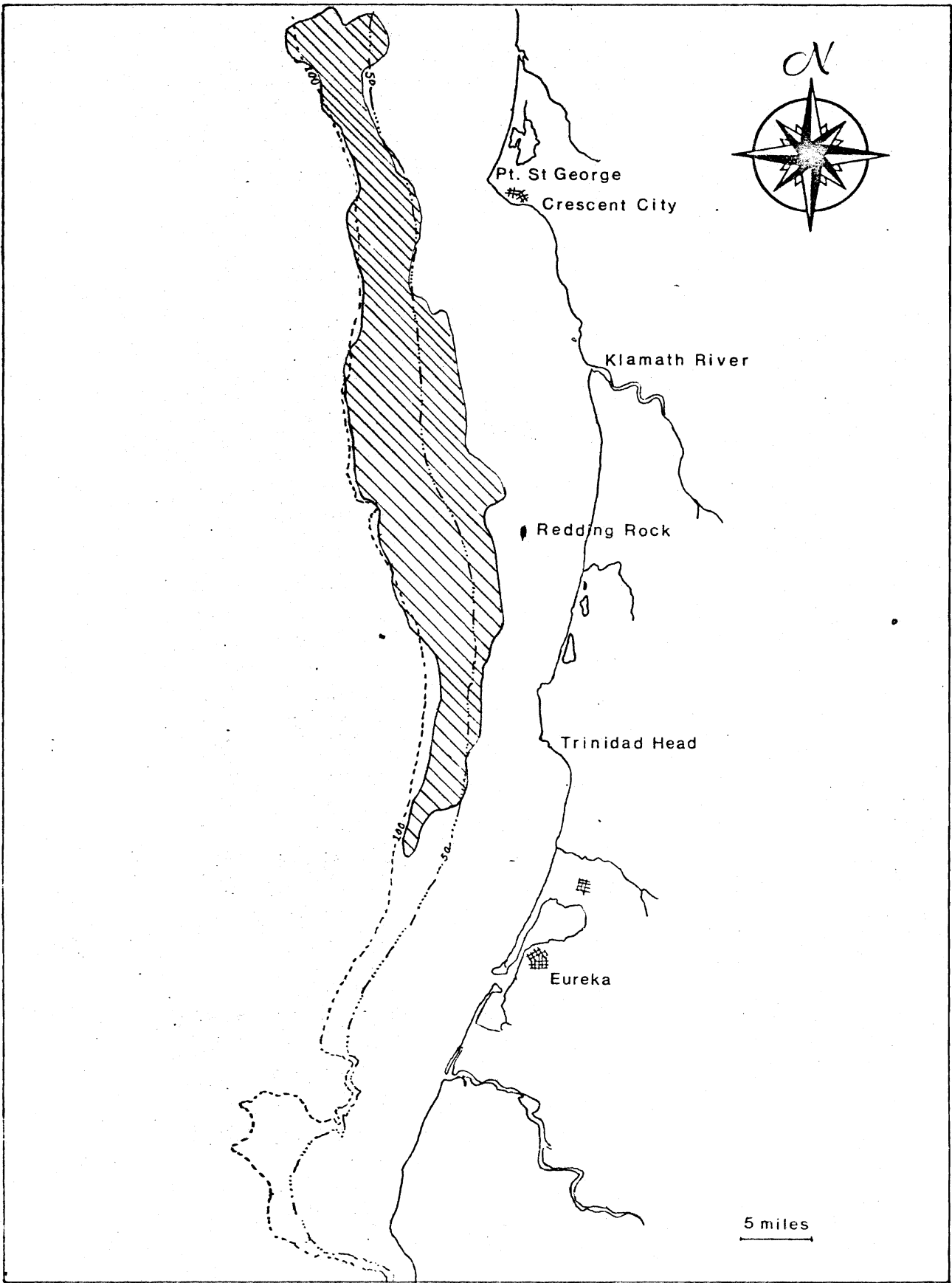


FIGURE 1. Area A Pacific ocean shrimp, *Pandalus jordani*, catch locations, 1979.

TABLE 2. Area A Count Per Pound and Year Class Composition of Shrimp, 1979 Season

| Month     | Count per lb | Age class percent by number |      |      | Age class percent by weight |      |      |
|-----------|--------------|-----------------------------|------|------|-----------------------------|------|------|
|           |              | I                           | II   | III  | I                           | II   | III  |
| April     | 125          | 49.1                        | 34.7 | 16.2 | 26.9                        | 43.0 | 30.1 |
| May       | 171          | 81.2                        | 15.9 | 2.9  | 65.9                        | 27.0 | 7.1  |
| June      | 126          | 65.8                        | 21.9 | 12.3 | 46.6                        | 29.9 | 23.5 |
| July      | 126          | 77.1                        | 13.2 | 9.7  | 63.1                        | 17.8 | 19.1 |
| August    | 110          | 85.2                        | 11.5 | 3.3  | 75.2                        | 17.8 | 7.0  |
| September | 93           | 75.2                        | 22.1 | 2.7  | 63.3                        | 31.6 | 5.1  |
| October   | 92           | 77.1                        | 21.2 | 1.7  | 65.1                        | 31.6 | 3.3  |

TABLE 3. Year Class and Sex Composition of Area A Shrimp by Month, 1979 Season (Percentages)

| Month     | Males |     | Transitionals |      |     | Females |      |      |
|-----------|-------|-----|---------------|------|-----|---------|------|------|
|           | I     | II  | I             | II   | III | I       | II   | III  |
| April     | 44.6  | 1.4 | 4.3           | 21.3 | 0.5 | 0.23    | 12.0 | 15.7 |
| May       | 48.0  | 0.6 | 33.1          | 9.1  | 0.5 | -       | 6.2  | 2.4  |
| June      | 37.7  | 0.9 | 28.1          | 15.2 | -   | -       | 5.8  | 12.3 |
| July      | 35.0  | 0.2 | 40.4          | 9.0  | 0.5 | 1.7     | 3.9  | 9.2  |
| August    | 52.2  | -   | 17.5          | 3.9  | 0.1 | 15.4    | 7.6  | 3.2  |
| September | 41.1  | -   | 20.5          | 4.0  | -   | 13.6    | 18.1 | 2.7  |
| October   | 51.3  | -   | 6.9           | 0.2  | -   | 18.9    | 21.0 | 1.7  |

age composition of female shrimp followed no trend varying from month to month.

The average size of all age classes of shrimp during the 1979 season were very similar to the corresponding age classes during the 1978 season and larger than those caught during the 1977 season (Table 4).

TABLE 4. Average Carapace Length (mm) of Area A Shrimp, 1977 and 1978 and 1979 Seasons

| Season<br>(Year Class) | I    |      |      | II   |      |      | III  |      |      |
|------------------------|------|------|------|------|------|------|------|------|------|
|                        | 1977 | 1978 | 1979 | 1977 | 1978 | 1979 | 1977 | 1978 | 1979 |
| April                  | 13.4 | 15.1 | 15.4 | 17.7 | 20.1 | 20.1 | 22.0 | 22.9 | 22.9 |
| May                    | 13.8 | 15.5 | 15.5 | 18.0 | 20.4 | 20.1 | 21.9 | 22.8 | 23.0 |
| June                   | 14.2 | 16.0 | 16.1 | 18.1 | 20.7 | 20.4 | 21.9 | 23.5 | 23.1 |
| July                   | 15.2 | 16.6 | 17.0 | 18.8 | 20.9 | 20.4 | 22.6 | 23.6 | 23.0 |
| August                 | 15.7 | 17.2 | 18.2 | 19.1 | 21.3 | 22.3 | 22.8 | 23.9 | 24.5 |
| September              | 16.3 | 17.6 | 18.6 | 19.5 | 21.9 | 22.5 | 22.8 | 24.5 | 24.9 |
| October                | 16.8 | 18.4 | 18.7 | 20.3 | 22.3 | 23.1 | 23.4 | 24.2 | 25.0 |

#### OUTLOOK

The catch per hour was quite low during most of the season, so 1980 is not expected to be a great season. One-year-old shrimp predominated throughout the season and in 1980 they should contribute substantially to the catch as 2-year-olds. If the carry-over of 1979 year class shrimp is fairly good, the 1980 season should be as good as 1979.



AREA B-1

No commercial quantities of shrimp were found in Area B-1 (Fort Bragg). Daily trawler logs received indicated two vessels made 18 exploratory tows totaling 21 hours on the traditional fishing grounds in 53 to 80 fm during the months of April, May, and July. A total of 60 lb of shrimp were sold. Additionally, three other vessels reportedly made exploratory tows in the area with no success.

AREA B-2

Only one landing of 2.0 mt (4,385 lb) was reported from Area B-2 (Bodega Bay). The shrimp that were landed at Fort Bragg were caught off Fish Mill Cove in 52 to 59 fm during July. Other efforts were made in April, July and October but the shrimp could not be found in commercial quantity. A total of 44 exploratory tows, which encompassed 27 hours, were conducted by six vessels from off Pt. Reyes to Black Point in 34 to 80 fm.

### AREA C

Area C (Morro Bay-Avila) ocean shrimp landings totaled a record 392.4 mt (864,867 lb) for the 1979 season including 6.9 mt (15,188 lb) landed during a two-week extension. The extension, which was granted by the Fish and Game Commission in response to a request by the California Seafood Institute, ended November 19. The previous record was 90.2 mt (199,000 lb) landed in 1953.

A total of 18 vessels participated in the 1979 Area C fishery. All but three had home ports other than Morro Bay or Avila with one vessel from Oregon and one from Texas. Eleven of the vessels were single-rigged including one small beam trawl. The remaining seven vessels were double-rigged including one vessel fishing four nets. Participating vessels made from one to 18 trips. The first landing was made May 7.

The price paid to fishermen rose from 35¢ in May to 46¢ in August, consistent with price increases in Area A. Almost all of the shrimp landed in Area C was trucked to processors in northern California.

Although minimum mesh size in Area C is 1 1/2-inch stretch mesh between the knots, most participating vessels were from northern California ports where minimum mesh size is 1 3/8 inches. Fishermen requested and were granted experimental gear permits in May and early June allowing them to fish with 1 3/8-inch mesh. An endorsement procedure was established in early June to append shrimp permits and allow the use of 1 3/8-inch mesh without the necessity of an experimental gear permit.

Most effort was expended in two general areas (Figure 2). Most shrimp landed in May through September came from Fish and Game Block 633 in 90

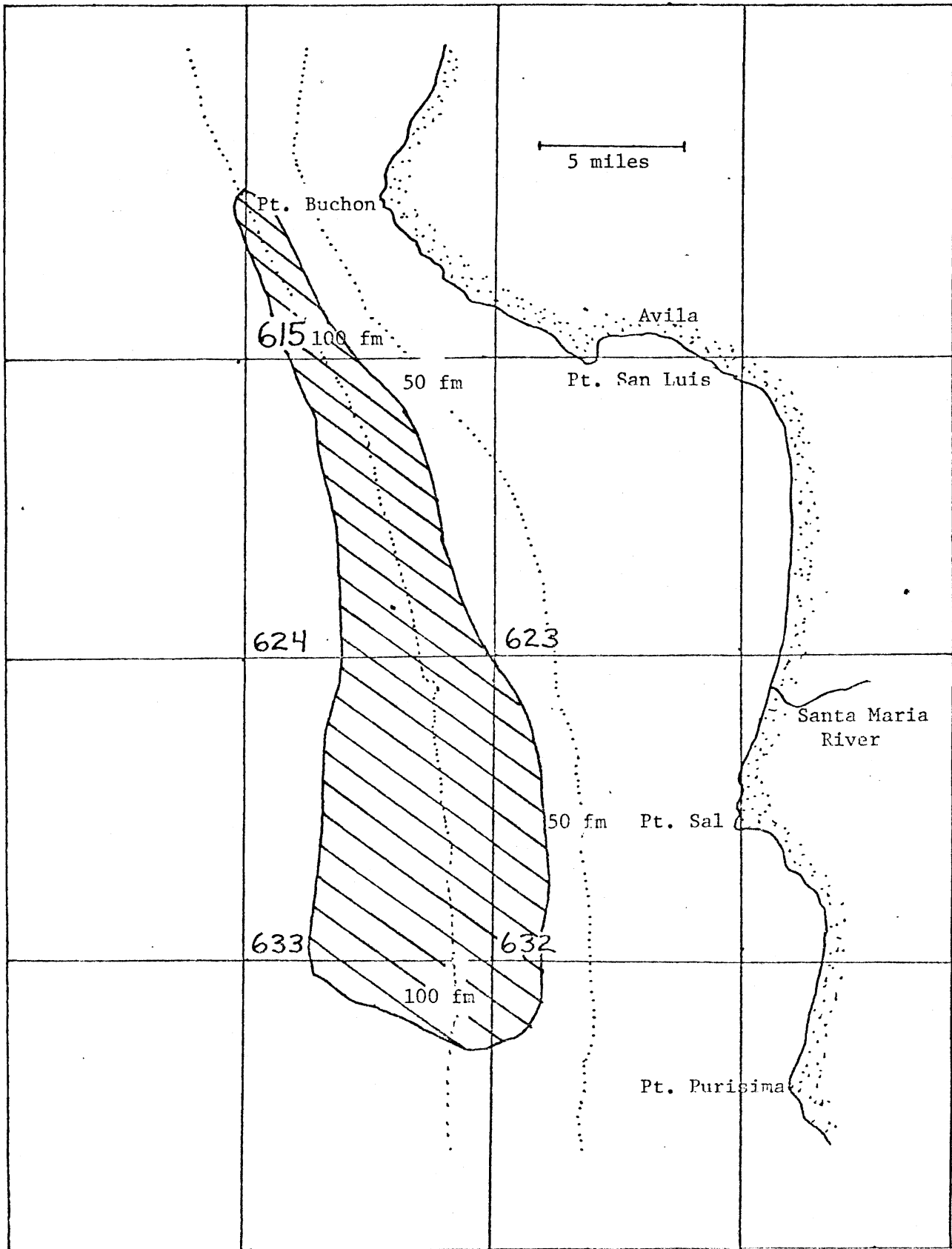


FIGURE 2. Area C ocean shrimp catch location, 1979 season.

to 120 fm off Point Sal. Effort shifted north in early October through the end of the extension in November to off Point San Luis and off Point Buchon in 92 to 105 fm.

Average catch per hour for all reporting vessels was .34 mt (743 lb). Single-rigged vessels averaged 231 kg (508 lb) per hour while double-rigged vessels averaged 420 kg (924 lb) per hour (Table 5). The highest average catch per hour for any month of the season was 977 kg (2,150 lb) by a single rigged vessel in June (one trip). The highest catch per hour for a single trip was recorded by a double-rigged vessel in July at 1,428 kg (3,142 lb).

Logs were submitted for 90 (75%) of a total of 120 trips. One single-rigged vessel landed small quantities of ocean shrimp caught incidental to spot prawn fishing. His catch and effort data were not included in the above catch averages because his target species was spot prawn.

The age composition of the catch shifted from predominately 2-year-old shrimp in May and June to predominately 1-year-old shrimp in July, August, October, and November (Table 6). There was a resurgence of 2-year-old shrimp in September, possibly a result of low fishing effort and consequently limited exploration which prevailed toward season's end. In October, the percentage of 1-year-old shrimp, at 75.2% by number, exceeded the 70% criterion for emergency closure of the fishery; but no action was taken to close the fishery due to the extremely low fishing effort and the rapidly approaching regular season closure. The percentage of 1-year-old shrimp dropped during the second half of October and was 51.5% for the 2-week extension in November.

Average count per lb ranged from 60 (in September) to 88 (in October) with an overall average of 77 for the season (Table 6). Average count

TABLE 5. Area C Monthly Catch and Effort, 1979

| Month                     | Pounds<br>Landed    | Effort *<br>(hours) | Pounds *<br>per hour       | Vessels         | Trips |
|---------------------------|---------------------|---------------------|----------------------------|-----------------|-------|
| <u>Single-rig vessels</u> |                     |                     |                            |                 |       |
| May                       | 13,457              | 19.25               | 699                        | 2               | 4     |
| June                      | 2,150               | 1.00                | 2,150                      | 1               | 1     |
| July                      | 34,438              | 87.25               | 394                        | 5               | 10    |
| August                    | 51,014              | 102.62              | 497                        | 2               | 5     |
| September                 | 65,231              | 112.43              | 580                        | 2               | 9     |
| October                   | 38,762              | 67.75               | 572                        | 1               | 3     |
| November                  | 8,660               | 30.00               | 289                        | 3               | 11    |
| Totals                    | 213,712             | 420.30              | 508 <sup>+</sup><br>.23 mt | 10 <sup>‡</sup> | 43    |
| <u>Double-rig vessels</u> |                     |                     |                            |                 |       |
| May                       | 85,023              | 80.62               | 1,055                      | 2               | 7     |
| June                      | 111,062             | 86.70               | 1,281                      | 2               | 6     |
| July                      | 168,240             | 151.25              | 1,112                      | 3               | 11    |
| August                    | 24,387              | 32.27               | 756                        | 1               | 3     |
| September                 | 31,441              | 64.10               | 491                        | 3               | 5     |
| October                   | 77,606              | 122.93              | 631                        | 4               | 8     |
| November                  | 6,385               | 7.50                | 1,419                      | 1               | 1     |
| Totals                    | 504,144<br>229.2 mt | 545.37              | 924 <sup>+</sup><br>.42 mt | 7 <sup>‡</sup>  | 41    |
| <u>All Vessels</u>        |                     |                     |                            |                 |       |
| Season Totals             | 717,856<br>326.3 mt | 965.67              | 743 <sup>*</sup><br>.34 mt | 17 <sup>‡</sup> | 84    |

\* Effort and pounds per hour are based upon boat logs

+ Mean

‡ Total vessels that made landings

TABLE 6. Area C Count per Pound and Age Class Composition of Shrimp, 1979 Season

| Month       | Count per lb | Age class<br>Percent by number |      |      |      | Age class<br>Percent by weight |      |      |      |
|-------------|--------------|--------------------------------|------|------|------|--------------------------------|------|------|------|
|             |              | 0                              | I    | II   | III  | 0                              | I    | II   | III  |
| April       | —            | No Effort                      |      |      |      | —                              |      |      |      |
| May         | 63           | -                              | 15.4 | 50.2 | 34.4 | -                              | 5.9  | 46.1 | 48.0 |
| June        | 71           | -                              | 25.7 | 51.3 | 23.0 | -                              | 12.8 | 51.9 | 35.4 |
| July        | 87           | -                              | 53.5 | 36.6 | 9.9  | -                              | 36.0 | 45.9 | 18.1 |
| August      | 75           | -                              | 49.9 | 34.5 | 15.6 | -                              | 27.9 | 42.9 | 29.2 |
| September   | 60           | -                              | 33.1 | 48.1 | 18.9 | -                              | 18.9 | 52.5 | 28.6 |
| October     | 88           | -                              | 75.2 | 21.3 | 3.5  | -                              | 62.2 | 30.3 | 7.5  |
| November*   | 72           | -                              | 51.5 | 42.1 | 6.4  | -                              | 35.8 | 53.0 | 11.1 |
| Season Mean | 77           |                                | 42.5 | 40.8 | 16.7 |                                |      |      |      |

\* Season Extension, November 3-19.

TABLE 7. Year Class and Sex Composition of Area C Shrimp by Month, 1979 Season (Percentages)

| Month     | Males |     |     | Transitionals |      |     | Females |      |      |
|-----------|-------|-----|-----|---------------|------|-----|---------|------|------|
|           | I     | II  | III | I             | II   | III | I       | II   | III  |
| April     | —     |     |     | No Effort     |      |     | —       |      |      |
| May       | 4.4   | 1.2 | 0.4 | 8.7           | 25.6 | 1.8 | 2.4     | 23.4 | 32.2 |
| June      | 9.7   | 0.6 | -   | 10.2          | 24.4 | 1.2 | 5.8     | 26.3 | 21.8 |
| July      | 26.2  | 0.4 | -   | 14.2          | 16.6 | 1.4 | 13.1    | 19.6 | 8.5  |
| August    | 39.0  | 0.8 | -   | 7.7           | 22.9 | 1.3 | 3.2     | 10.8 | 14.3 |
| September | 19.4  | 0.2 | -   | 5.5           | 11.5 | 2.4 | 8.1     | 36.4 | 16.5 |
| October   | 49.2  | 0.6 | 0.1 | 9.5           | 5.7  | 0.1 | 16.4    | 15.0 | 3.3  |
| November* | 37.2  | 0.9 | -   | 1.6           | 2.5  | 0.4 | 12.7    | 38.7 | 6.0  |

\* Area C season extension, November 3-19

per lb for individual samples ranged from 40 to 133.

Two and 3-year-old females dominated samples in May and June. Dominance shifted to 1 and 2-year-old transitionals and 1-year-old males in July and August and finally to 1-year-old males and 2-year-old females for the remainder of the season (Table 7).

A comparison of mean carapace lengths of 1-, 2-, and 3-year-old shrimp by month of the season from Areas A and C indicates that Area C shrimp were consistently larger than their Area A counterparts of any given age during any given month except August (Figure 3). In August, the average carapace length for Area C 1-year-old shrimp was actually 0.51 mm less than the average length of corresponding Area A shrimp. It appears that Area C shrimp had a slower growth rate during the comparison period (May through October) which may be a result of the unexploited state of the Area C stock(s), environmental factors, or a combination of the two.

Large variations in age composition of the 1979 Area C catch (Figure 4) are indicative of the highly varied level of effort expended and the consequent unexplored condition of the stock(s). The level of effort expended in Area C in 1979 was, to a great degree, dependent on the condition of the Area A and B fisheries. When the Area A fishery reopened in mid-August, the most productive vessels returned to their Area A home ports and did not return to Area C until the Area A fishery again declined in September. In short, effort was too inconsistent to provide good information on the Area C stock(s).

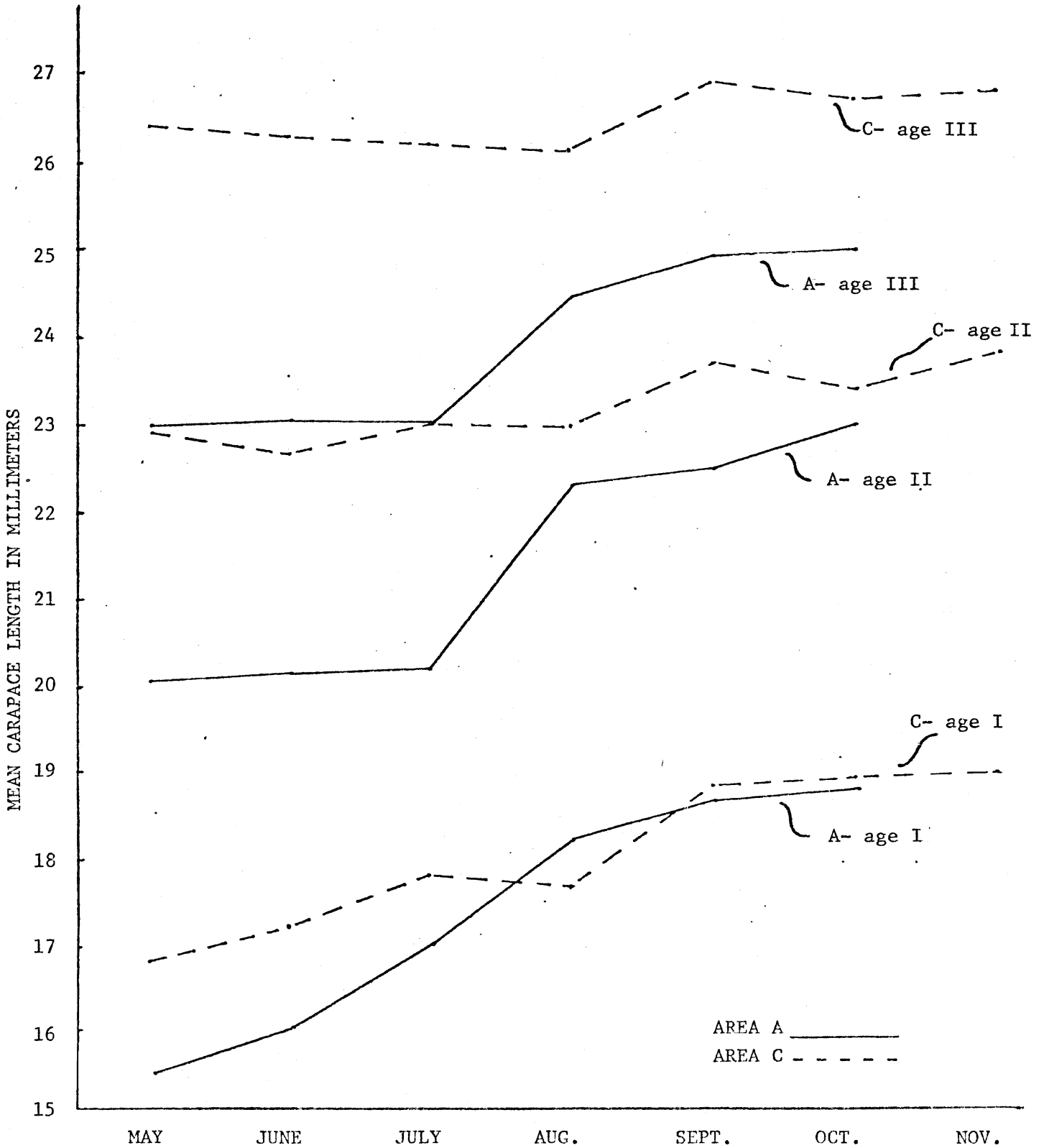


FIGURE 3. Comparisons of mean carapace lengths of 1-, 2-, and 3-year-old ocean shrimp from Areas A and C by month of 1979 season.

\* Area C extension, November 3 through 19.



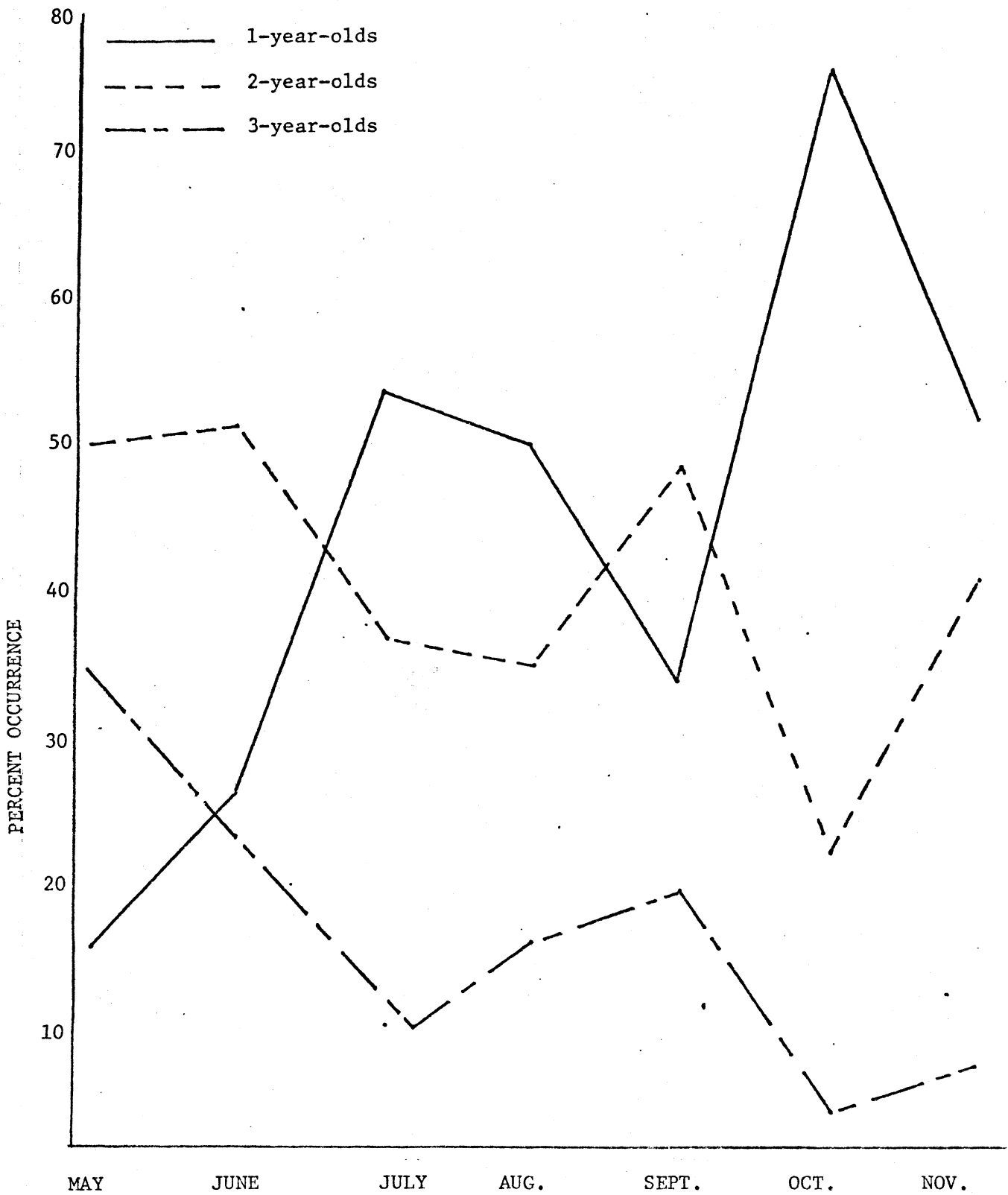


FIGURE 4. Percent occurrence of 1-, 2-, and 3-year-old shrimp in 1979 Area C landings by month.

OUTLOOK

The success of the 1980 Area C shrimp season will depend in part on conditions in Areas A and B where most of California's shrimp fishermen are home ported. If a successful season occurs in those areas, effort in Area C may again be insufficient to provide good information on the extent of the Area C stock(s). Several boats from Area A have already come down to Morro Bay and the fishermen involved have expressed an intention to fish Area C in 1980.

Based on the facts that (1) Area C shrimp are larger than Area A shrimp; (2) the fishery in Area C is relatively unexplored, undeveloped, and undefined; and (3) the potential for conflict with Area C prawn fishermen who must use 1-1/2 inch mesh, we have recommended that the current minimum mesh size of 1-1/2 inches inside the knots be retained and that no permits for smaller mesh be issued for the 1980 season. Continued monitoring of the Area C fishery may indicate that the 1-1/2 inch mesh size may be too small to provide adequate escapement of 1-year-olds and a larger mesh size may be necessary.