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# NOAA Technical Memorandum NMFS



**JUNE 1989**

## **ECONOMIC STATUS OF THE WASHINGTON, OREGON AND CALIFORNIA PINK SHRIMP FISHERY IN 1987**

Charles S. Korson



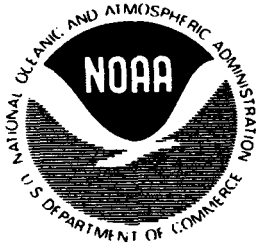
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U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Southwest Region

## NOAA Technical Memorandum NMFS

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Southwest Region  
National Marine Fisheries Service, NOAA  
Terminal Island, California 90731

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### **U.S. DEPARTMENT OF COMMERCE**

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**National Oceanic and Atmospheric Administration**

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**National Marine Fisheries Service**

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## EXECUTIVE SUMMARY

This report reviews the economic status of the 1987 Washington, Oregon, and California pink shrimp fishery. Pink shrimp (Pandalus jordani) are distributed along the entire West Coast, with the center of abundance found off Oregon. The individual states manage the pink shrimp fishery using season, gear, and size regulations. The fishery is exclusively commercial and stocks are exploited by single and double-rig otter trawl vessels that may also fish for groundfish, crab, salmon, and albacore throughout the year.

Data on landings, exvessel values, and fleet size were supplied by state agencies. Statistics are tabulated to summarize changes in economic conditions between 1986 and 1987. General indicators of fleet economic performance are provided using the measure average gross revenue per vessel from West Coast marine fish landings. General conditions in the market sector are reviewed by examining data on the value of domestic processed shrimp products and the quantity of shrimp products imported into U.S. markets.

The West Coast pink shrimp fishery improved for the third consecutive year in 1987, with landings establishing a new record for the third highest coastal catch ever taken. Coastal pink shrimp landings were 68.5 million pounds, up 18 percent from 1986. Landings were higher in Oregon and California, but declined somewhat in Washington. Small-grade shrimp were a problem early in the season; however, the grade of shrimp improved considerably during the course of the season.

Record exvessel values and prices were established in 1987 as well. Landings were valued at \$46.5 million and coastwide exvessel prices averaged \$0.68 per pound. This was 50 percent and 27 percent, respectively, above 1986 figures. Due to substantially higher landings, prices, and exvessel values, shrimp trawl vessels earned substantially greater revenues from West Coast marine fish landings in 1987.

The 1987 market for pink shrimp also took a more favorable turn for domestic processors. Norwegian imports of frozen shrimp dropped substantially and buyers continued to demand West Coast pink shrimp to fill the void in supply. The average wholesale pink shrimp price rose from \$3.30 per pound in 1986 to \$3.80 per pound in 1987. The combination of increased pink shrimp supplies and higher processor prices caused revenues from shrimp production to increase for West Coast shrimp processors in 1987.

ECONOMIC STATUS OF THE WASHINGTON, OREGON  
AND CALIFORNIA PINK SHRIMP FISHERY IN 1987

I. Introduction

This is the second in a series of annual reports on the economic status of the Washington, Oregon, and California (West Coast) pink shrimp fishery. In this year's report, the economic status of the West Coast pink shrimp fishery in 1987 is compared to the 1986 season.

The West Coast pink shrimp population (Pandalus jordani) is thought to be one single stock (Pacific Fishery Management Council (PFMC) 1980). The shrimp stock is divided into 10 subunits according to the physical separation of the shrimp beds, differences in the structure of the population (i.e., age composition), and differential growth rates. In Oregon, the differences in growth characteristics are the primary basis for demarcating statistical areas as logical stock units for the pink shrimp population (Zirges, et al., 1982). The names of the 10 population subunits and their associated Pacific Marine Fisheries Commission (PMFC) statistical areas are shown in Table 1. Although pink shrimp range along the entire West Coast, the stock is generally most abundant off Oregon.

The PFMC originally drafted a coastwide fishery management plan for the pink shrimp fishery in 1980; however, it was never implemented. Instead, the three states adopted most of the recommended Federal regulations to manage pink shrimp as a uniform, coastwide stock. The West Coast pink shrimp fishery is currently managed with a combination of season, gear, and size regulations. The specific management measures are as follows:

1) A coastwide closure from November 1 - March 31, with no provisions for in-season closures.

2) Maximum mesh size in the cod-end with no cod-end liners permitted in California (1 3/8 inch between knots) and Washington (1 1/2 inch including one knot). There are no mesh size measures in Oregon.

3) Maximum average count of 160 shrimp per pound.

The West Coast shrimp stock is exploited primarily by commercial double-rig and single-rig otter trawl vessels. In recent years some vessels began to experiment with beam and midwater trawls to catch pink shrimp. For the most part, trawl vessels are multi-species, multi-purpose fishing operations; when not fishing for shrimp they may fish for groundfish, crab, salmon or albacore. All pink shrimp caught by West Coast trawl vessels are delivered to shore-based processing plants. There is no joint venture, foreign, or recreational fishery for pink shrimp.

## II. Overview of the 1987 Season

The West Coast pink shrimp catch was significantly higher in 1987. Shrimp landings totaled 68.5 million pounds, up 18 percent from the 58 million pounds landed during the 1986 season (Table 2). This is the third consecutive year that landings have increased dramatically, following the depressed coastwide catch of only 9.9 million pounds taken in 1984. The 1987 landed catch exceeded the ten-year average (42.9 million pounds) by 60 percent and was the third highest coastal catch ever recorded, previously established in 1986.

Despite the coastwide success, pink shrimp landings did not increase in all three states. California and Oregon had noticeably higher landings, while landings were somewhat lower in Washington (Table 2). The totals for California and Oregon were up by 18 percent and 32 percent, respectively. California's catch total was the highest since 1978 and Oregon's was the third highest in the state's history.

Due to the combined effects of higher landings and exvessel prices, the exvessel value of pink shrimp rose 50.1 percent to \$46.5 million in 1987 (Table 2). This was a new record high, breaking the previous record set in 1986. After adjusting for inflation, where the base year is 1986 = 1.00, the exvessel value of shrimp was \$45.4 million, or 47 percent higher than in 1986. The exvessel price opened at \$0.65 per pound, considerably higher than the \$0.45 per pound paid in April of 1986. Despite a severe pinhead problem and poor grade early in the season, exvessel prices continued to move upward, reflecting an increase in demand for the West Coast shrimp product. Oregon reported prices as high as \$0.85 per pound in July; however, the demand for shrimp decreased unexpectedly in August, when processors limited landings because of higher than normal inventories (ODFW 1987). Consequently, Oregon landings were reduced to the lowest monthly catch for the season and exvessel prices fell to \$0.60 per pound (ODFW 1987). For the balance of the season, coastwide exvessel prices stabilized in the \$0.60-0.70 range. The average coastwide exvessel price per pound was \$0.679 in 1987, still 27 percent above the average of \$0.533 per pound paid in 1986.

In general, the size of shrimp improved during the course of the season in most areas, following the problem with small-grade shrimp in catches early in the season, particularly in Oregon. However, in spite of normal growth and an increase in the percentage of two-year-old shrimp in catches (ODFW 1987), all of the subunit areas from Coos Bay northward yielded smaller shrimp than in 1986, according to market sample data provided by the states (Table 3). The subunit areas from southern Oregon and northern California waters produced shrimp that were generally larger in size than the shrimp caught in these areas in 1986. The trend toward larger shrimp in southern waters off California is thought to be due to warmer water temperatures which stimulate shrimp growth (P. Collier, CDFG 1987, pers. comm.).

### III. Harvesting Sector

This section reviews factors affecting the economic performance of the West Coast pink shrimp trawl fleet. Previous economic status reports have reported average vessel revenue from pink shrimp landings as an indicator of vessel economic performance. However, it is now possible to determine the value of all West Coast and Puget Sound shoreside and joint venture landings for the pink shrimp trawl fleet, using the Pacific Coast Fishery Information Network research database (RDB). Since this value represents a larger share of the fleet's range of economic activities than solely pink shrimp, it is a more complete and preferred indicator of economic performance, and will be used rather than the average per vessel value of pink shrimp landings.

Effort was up significantly in the pink shrimp fishery due to the entry of several trawlers that did not fish shrimp in 1986. The pink shrimp trawl fleet, defined as those vessels landing pink shrimp at least once with shrimp trawl gear, increased from 216 trawlers landing in 1986 to 243 vessels in 1987. This fleet expansion was distributed entirely across intermediate (50-69 feet) and large (greater than 69 feet) vessel size classes (Table 4). Many of the trawl vessels that left the fishery because of low shrimp catches in 1984-85 have re-entered to capitalize on the resurgence in shrimp abundance and exvessel prices.

Of those trawlers landing pink shrimp, 34 percent landed in more than one coastal state during 1987, compared to 38 percent in 1986 (Table 4). This decrease in multi-state activity may reflect the presence of more abundant concentrations of shrimp on beds in close proximity to a vessel's offloading port, thereby eliminating the need to travel long distances. A total of 83 trawl vessels made multi-state landings in 1987, of which the majority were based in Oregon.

To assess the economic performance of the pink shrimp trawl fleet, the list of vessels comprising the pink shrimp trawl fleet in 1986-1987, as provided by state fishery agencies, was matched against the identification numbers of vessels in the RDB. This resulted in matches for 210 and 239 pink shrimp trawl vessels in 1986 and 1987, respectively. After adjusting for inflation, pink shrimp trawlers earned an average of \$286,700 per vessel from all West Coast marine fish landings, compared to \$243,400 per vessel in 1986 (Table 5). This is an 18 percent increase in average gross revenues per vessel from all West Coast fishing activities. As expected, the principal species for this fleet is pink shrimp<sup>1</sup>, with groundfish being the second most important species group. Dungeness crab is an important alternate fishery, generating the largest share of revenue for nine pink shrimp trawl vessels in 1986 and 1987. Within each principal species

<sup>1</sup> Principal species is defined as that species which accounts for more of a vessel's gross revenue than any other species.

group, average vessel gross fishing revenue was up in 1987. Thus, with landings and exvessel prices higher for pink shrimp and major complementary fisheries, the economic status of the West Coast pink shrimp trawl fleet improved considerably in 1987, using average total gross fishing revenue as an indicator of performance.

The economic performance of the shrimp trawl fleet was examined by vessel size class to analyze the variation in the magnitude of gross revenue in more detail. With the exception of the largest vessel size class (over 70 feet), all major components of the fleet had higher average gross revenue from West Coast marine fish landings, after adjusting for inflation (Table 6). The largest increase in average adjusted gross revenue occurred for 61-70 foot trawlers. The decline in average revenue for the largest size class should be interpreted with caution, since revenues derived from fishing activities in Alaska are not a component of the RDB and large trawlers have the capacity to fish in Alaskan waters.

A frequency distribution of total gross revenues from all marine fish landings and landings of exclusively pink shrimp is presented for the shrimp trawl fleet in Tables 7 and 8. Compared to 1986, a larger percentage of the fleet had total gross revenues and pink shrimp landings concentrated toward the highest end of the distribution in 1987, (i.e. over \$400,000 in total gross revenue and over 200 metric tons of pink shrimp landings).

#### IV. Processing and Market Sector

The National Marine Fisheries Service annually surveys processing plants on the West Coast (including Puget Sound) to determine the quantity and wholesale value of processed fish products and employment in the fish processing sector. The results of this survey provide data to compute wholesale prices received by West Coast processors for shrimp products by product form. Individual quick frozen (IQF) shrimp is now the dominant product form produced by the West Coast seafood processing sector. This contrasts with the more traditional fresh and vacuum packed tins which were the major shrimp products produced in the early 1980's. However, this changed in the mid-1980's as U.S. production shifted to IQF shrimp in response to the success of IQF shrimp imported from Norway (Korson 1986, 1988). Therefore, the wholesale price of IQF shrimp derived from the survey of West Coast processors is taken as an index of the wholesale price of pink shrimp as a whole.

In 1987 IQF pink shrimp produced in all West Coast plants averaged \$3.80 per pound wholesale, with a price range of \$3.00-4.50 per pound. This compares to the average wholesale IQF shrimp price of \$3.30 and range of \$2.10-4.60 per pound received



by processors in 1986. Consequently, with pink shrimp supplies and processor prices higher, revenue from shrimp production undoubtedly increased for West Coast shrimp processors.

West Coast pink shrimp competes in the market with Alaskan pink shrimp and with IQF shrimp imported from Norway. The supply of West Coast pink shrimp was significantly higher in 1987, due to an over 10 million pound or 18 percent increase in pink shrimp landings. The Alaskan pink shrimp supply remained inconsequential for the fifth consecutive year; landings totaled a mere 2.0 million pounds in 1987, compared to 4.7 million pounds landed in 1986. Similarly, Norwegian imports of IQF shrimp (identified as peeled, other fresh and frozen) have become less of a factor in the U.S. market during recent years. This is due to a decline in shrimp abundance in Norway and fall in the U.S. dollar relative to the kroner. The total quantity of Norwegian IQF shrimp imported into all U.S. ports of entry was only 4.04 million pounds, down 15 percent from 1986 (4.76 million pounds) and 74 percent below the level of imports in 1985 (15.86 million pounds) (U.S. Dept. of Commerce 1986, 1987). These imports were valued at \$17.5 million (\$3.67 per pound) and \$19.2 million (\$4.76 per pound) in 1986 and 1987, respectively. Out of the total supply from Norway, only 178,400 pounds entered West Coast customs districts in 1987, compared to 300,000 pounds in 1986 and 8.7 million pounds imported just two years ago. If it is assumed that 1) Norwegian imports passing through West Coast ports are distributed into western shrimp markets, and 2) West Coast and Alaskan IQF pink shrimp is not exported from the region, then the total supply of IQF pink shrimp increased in West Coast markets due to higher pink shrimp landings in Washington, Oregon, and California.

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Table 1 - Statistical subunits for the West Coast pink shrimp population.

| <u>Subunit Name</u>        | <u>State</u> | <u>PMFC Data Series Statistical Area</u> |
|----------------------------|--------------|--|
| Destruction Island         | Washington   | 72                                       |
| Grays Harbor               | Washington   | 74                                       |
| Willapa                    | Washington   | 75                                       |
| Northern Oregon            | Oregon       | 82, 84                                   |
| Coos Bay                   | Oregon       | 86                                       |
| Port Orford                | Oregon       | Northern 25 nautical miles of 88         |
| Southern OR to Northern CA | -            | Southern 25 nautical miles of 88 plus 92 |
| Fort Bragg                 | California   | 94                                       |
| Bodega Bay                 | California   | 96                                       |
| Morro Bay                  | California   | 98                                       |

Source - Draft fishery management plan for the pink shrimp fishery off Washington, Oregon and California, Pacific Fishery Management Council.

Table 2 - Poundage (1000 lbs) and exvessel value (1,000 dollars) of pink shrimp landings in California, Oregon, and Washington from 1977-1987.

| Year               | California |       | Oregon |        | Washington |        | Total  |        |
|--------------------|------------|-------|--------|--------|------------|--------|--------|--------|
|                    | Lbs        | \$    | Lbs    | \$     | Lbs        | \$     | Lbs    | \$     |
| 1977               | 15,871     | 3,609 | 48,580 | 11,200 | 11,803     | 2,602  | 76,254 | 17,411 |
| 1978               | 13,887     | 3,654 | 56,666 | 14,903 | 12,262     | 2,967  | 82,815 | 21,524 |
| 1979               | 5,183      | 1,998 | 29,587 | 11,340 | 12,253     | 4,492  | 47,023 | 17,830 |
| 1980               | 3,814      | 2,152 | 30,152 | 16,684 | 12,661     | 6,736  | 46,427 | 25,572 |
| 1981               | 4,164      | 2,127 | 25,924 | 13,043 | 10,041     | 4,920  | 40,129 | 20,090 |
| 1982               | 4,544      | 2,364 | 18,462 | 9,289  | 4,999      | 2,586  | 28,005 | 14,239 |
| 1983               | 1,030      | 881   | 6,547  | 4,656  | 5,704      | 4,346  | 13,381 | 9,883  |
| 1984               | 1,629      | 758   | 4,844  | 2,148  | 3,415      | 1,566  | 9,888  | 4,472  |
| 1985               | 3,331      | 1,171 | 14,855 | 5,241  | 9,122      | 3,203  | 27,308 | 9,615  |
| 1986               | 6,758      | 3,616 | 33,884 | 18,105 | 17,446     | 9,259  | 58,088 | 30,980 |
| 1977-86<br>Average | 6,031      | 2,233 | 26,950 | 10,661 | 9,971      | 4,268  | 42,932 | 17,616 |
| 1987               | 7,945      | 5,615 | 44,595 | 30,275 | 15,914     | 10,621 | 68,454 | 46,511 |

Source -

State fishery agencies, final published data.

Table 3 - West Coast pink shrimp market sample summaries<sup>1</sup>, 1986-1987.

| <u>Subunit Area</u>         | <u>Average Count per Pound</u> |             |             |             |             |             |
|-----------------------------|--------------------------------|-------------|-------------|-------------|-------------|-------------|
|                             | Washington                     |             | Oregon      |             | California  |             |
|                             | <u>1987</u>                    | <u>1986</u> | <u>1987</u> | <u>1986</u> | <u>1987</u> | <u>1986</u> |
| Destruction Island          | 154.4                          | 119.7       | 143.2       | 145.9       | -           | -           |
| Grays Harbor                | 131.6                          | 115.3       | 129.4       | 114.2       | -           | -           |
| Willapa                     | 125.0                          | 110.9       | -           | -           | -           | -           |
| Northern Oregon             | -                              | -           | 137.1       | 90.2        | -           | -           |
| Coos Bay                    | -                              | -           | 116.3       | 110.5       | -           | -           |
| Port Orford                 | -                              | -           | -           | -           | -           | -           |
| Southern, OR<br>Northern CA | -                              | -           | 110.2       | 115.8       | 119.4       | 123.7       |
| Fort Bragg                  | -                              | -           | -           | -           | 109.2       | -           |
| Morro Bay                   | -                              | -           | -           | -           | 66.7        | N/A         |

1/ Count-per-pound is a weighted annual average computed from state agency monthly market samples.

Source - State fishery agencies.

Table 4 - West Coast pink shrimp trawl fleet characteristics, 1985-1987.

|                             | <u>1985</u> | <u>1986</u> | <u>1987</u> |
|-----------------------------|-------------|-------------|-------------|
| Number Landing              | 118         | 216         | 243         |
| Size Distribution (Feet)    |             |             |             |
| Under 30                    | 0           | 0           | 0           |
| 30 - 39                     | 5           | 9           | 8           |
| 40 - 49                     | 27          | 52          | 50          |
| 50 - 59                     | 25          | 53          | 62          |
| 60 - 69                     | 49          | 76          | 88          |
| 70 - 79                     | 11          | 24          | 30          |
| 80 and over                 | 1           | 2           | 5           |
| Average Length (Ft)         |             |             |             |
| Average Length (Ft)         | 57.7        | 57.4        | 58.6        |
| Average Gross Tons          | 69.0        | 69.1        | 72.1        |
| Average Net Tons            | 46.9        | 47.7        | 49.3        |
| Average Horsepower          | 292.6       | 293.4       | 302.5       |
| Number Home Based per State |             |             |             |
| California                  | 24          | 47          | 56          |
| Oregon                      | 67          | 135         | 138         |
| Washington                  | 27          | 34          | 49          |
| Number Landing Out-of-State | 47          | 82          | 83          |

Source - State fishery agencies.

Table 5 - Average gross revenues from all West Coast landings of marine fish for pink shrimp trawl vessels by principal species group, 1986-1987.

| <u>Principal Species</u> | <u>Average Gross Revenues (\$)</u> |                | <u>Number of Vessels</u> |                  |
|--------------------------|------------------------------------|----------------|--------------------------|------------------|
|                          | <u>1986</u>                        | <u>1987</u>    | <u>1986</u>              | <u>1987</u>      |
| Pink Shrimp              | 239,856                            | 293,545        | 157                      | 187              |
| Sole, Flatfish, Halibut  | 159,237                            | 188,923        | 17                       | 18               |
| Rockfish                 | 266,822                            | 282,883        | 8                        | 13               |
| Pacific Whiting          | 539,267                            | 690,402        | 12                       | 6                |
| Dungeness Crab           | 137,655                            | 146,106        | 9                        | 9                |
| Other                    | <u>85,643</u>                      | <u>163,203</u> | <u>5</u>                 | <u>5</u>         |
| All Species              | 243,415                            | 286,742        | 210                      | 238 <sup>1</sup> |

1/ One missing observation

Table 6 - Average gross revenues<sup>1</sup> from all West Coast landings of marine fish for pink shrimp trawl vessels by length class, 1986-1987.

| <u>Size Class (feet)</u> | <u>Average Gross Revenues (\$)</u> |             | <u>Number of Vessels</u> |             |
|--------------------------|------------------------------------|-------------|--------------------------|-------------|
|                          | <u>1986</u>                        | <u>1987</u> | <u>1986</u>              | <u>1987</u> |
| Under 40                 | 74,854                             | 103,962     | 11                       | 10          |
| 41 - 50                  | 175,787                            | 199,883     | 64                       | 68          |
| 51 - 60                  | 236,730                            | 273,362     | 43                       | 49          |
| 61 - 70                  | 298,269                            | 368,814     | 74                       | 84          |
| Over 70                  | 377,332                            | 342,141     | 18                       | 27          |

1/ Values converted to 1986 dollars.



Table 7 - Distribution of total gross revenue, adjusted for inflation, from all West Coast landings of marine fish for vessels comprising the pink shrimp fleet, 1986-1987.

| Value (\$)<br>(1,000 dollars) | 1987           |             | 1986           |            |
|-------------------------------|----------------|-------------|----------------|------------|
|                               | No.<br>Vessels | %           | No.<br>Vessels | %          |
| Under 20                      | 4              | 1.6         | 1              | 0.5        |
| 20 - 40                       | 6              | 2.5         | 9              | 4.3        |
| 40 - 60                       | 5              | 2.1         | 4              | 1.9        |
| 60 - 80                       | 10             | 4.2         | 11             | 5.2        |
| 80 - 100                      | 8              | 3.3         | 18             | 8.6        |
| 100 - 120                     | 13             | 5.4         | 16             | 7.6        |
| 120 - 150                     | 17             | 7.1         | 16             | 7.6        |
| 150 - 200                     | 31             | 13.0        | 23             | 11.0       |
| 200 - 250                     | 32             | 13.4        | 17             | 8.1        |
| 250 - 300                     | 13             | 5.4         | 20             | 9.5        |
| 300 - 350                     | 17             | 7.1         | 30             | 14.3       |
| 350 - 400                     | 14             | 5.9         | 15             | 7.1        |
| 400 - 500                     | 37             | 15.5        | 16             | 7.6        |
| Over 500                      | <u>32</u>      | <u>13.4</u> | <u>14</u>      | <u>6.7</u> |
|                               | 239            | 100.0       | 210            | 100.0      |

Table 8 - Frequency distribution of pink shrimp landings (metric tons) for vessels comprising the pink shrimp trawl fleet, 1986-1987.

| <u>Metric tons</u> | <u>1987</u>        |             | <u>1986</u>        |             |
|--------------------|--------------------|-------------|--------------------|-------------|
|                    | <u>No. Vessels</u> | <u>%</u>    | <u>No. Vessels</u> | <u>%</u>    |
| 0 - 5              | 17                 | 8.1         | 21                 | 8.8         |
| 5 - 10             | 9                  | 4.3         | 9                  | 3.8         |
| 10 - 20            | 11                 | 5.2         | 12                 | 5.0         |
| 20 - 30            | 13                 | 6.2         | 20                 | 8.4         |
| 30 - 40            | 6                  | 2.9         | 12                 | 5.0         |
| 40 - 50            | 13                 | 6.2         | 7                  | 2.9         |
| 50 - 75            | 24                 | 11.4        | 14                 | 5.9         |
| 75 - 100           | 13                 | 6.2         | 26                 | 10.9        |
| 100 - 125          | 13                 | 6.2         | 20                 | 8.4         |
| 125 - 150          | 11                 | 5.2         | 13                 | 5.4         |
| 150 - 200          | 23                 | 11.0        | 16                 | 6.7         |
| 200 - 250          | 27                 | 12.9        | 26                 | 10.9        |
| Over 250           | <u>30</u>          | <u>14.3</u> | <u>43</u>          | <u>18.0</u> |
|                    | 210                | 100.0       | 239                | 100.0       |