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NOAA/NMFS FINAL REPORT TO DOE

Biological/Chemical Survey of Texoma and Capline Sector Salt Dome Brine Disposal Sites Off Louisiana, 1978-1979

A report to the Department of Energy on work conducted under provisions of Interagency Agreement EL-78-I-O-7146 during 1978-1979.

Volume IX
SHRIMP DATA ANALYSIS

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Center
Galveston Laboratory
Galveston, Texas 77550

NOVEMBER 1980

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Biological/Chemical Survey of Texoma and Capline Sector Salt Dome Brine Disposal Sites Off Louisiana, 1978-1979

VOL. IX ANALYSIS OF VARIANCE OF GULF COAST SHRIMP DATA

BY

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A report to the Department of Energy on work conducted under provisions of Interagency Agreement EL-78-I-0-7146 during 1978-1979.

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Volume IX - SHRIMP DATA ANALYSIS

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LIST OF VOLUMES

This Final Report is printed in nine separate volumes:

Volume I - BENTHOS

Work Unit 2.1 Describe Living and Dead Benthic (Macro- and Meio-) Communities

Coastal Ecosystems Management, Inc.

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A. L. Crowe

Volume II - ZOOPLANKTON

Work Unit 2.2 Determine Seasonal Abundance, Distribution and Community Composition of Zooplankton

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Work Unit 2.4 Determine Seasonal Abundance, Distribution and Community Composition of Demersal Finfishes and Macro-crustaceans

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Work Unit 3.1 Describe Surficial Sediments and Suspended Particulate Matter

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Volume VI - HYDROCARBONS

Work Unit 3.2 Determine Hydrocarbon Composition and Concentration in Major Components of the Marine Ecosystem

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Work Unit 3.3 Determine Trace Metal Composition and Concentration in Major Components of the Marine Ecosystem

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Volume VIII - INORGANIC NUTRIENTS

Work Unit 3.4 Determine Seasonal Variations in Inorganic Nutrients Composition and Concentrations in the Water Column

Texas A & M University

J. M. Brooks, Ph.D.

Volume IX - SHRIMP DATA ANALYSIS

Work Unit 5.1 Analysis of Variance of Gulf Coast Shrimp Data

LGL Ecological Research Associates, Inc.

F. J. Margraf, Ph.D.

INTRODUCTION

In compliance with the Energy Policy and Conservation Act of 1975, Title 1, Part B (Public Law 94-163), the Department of Energy (DOE) implemented the Strategic Petroleum Reserve (SPR). The SPR program was implemented in August of 1977 with the goal of storing a minimum of one billion barrels of crude oil by December 22, 1982. After evaluating several physical storage possibilities, DOE determined that storage in commercially developed salt dome cavities through solution-mining processes was the most economically and environmentally advantageous option.

Six areas along the northwestern Gulf of Mexico were to be investigated as potential storage cavern sites. These areas are shown in Figure 1. This project, "Biological/Chemical Survey of Texoma and Capline Sector Salt Dome Brine Disposal Sites Off Louisiana", deals with proposed disposal sites associated with two of the cavern sites, West Hackberry and Weeks Island. The Biological/ Chemical Survey was initiated in April 1978 and was completed in December 1979. Its major products are Final Reports available through the National Technical Information Service (NTIS), Springfield, Virginia; data files available through the Environmental Data and Information Service (EDIS), Washington, D.C., and any research papers that may be written by participating principal investigators and published in scientific or technical journals. Preliminary results were also made available through DOE/NOAA/NMFS project reviews and workshops attended by project participants and various governmental, private and public user groups.

The objectives of the Biological/Chemical Survey were: (1) to describe the biological, physical and chemical components of the marine ecosystem for each disposal site; and (2) to assess, by analysis of Gulf Coast shrimp data, the importance of the Louisiana shrimping grounds in the vicinity of the proposed salt dome brine disposal sites. These objectives were achieved using historical and new data to describe and quantify the biological, chemical, and physical characteristics and the temporal variations of these characteristics in the environments of each proposed disposal site.

The two proposed disposal sites have been extensively examined, using available meteorological, oceanographic, bathymetric and ecological data, in the following two reports:

Environmental Data Service, DOC/NOAA. 1977.

Analysis of Brine Disposal in the Gulf of Mexico, #2 West Hackberry. Report to Federal Energy Administration Strategic Petroleum Reserve Program Salt Dome Storage. Center for Experiment Design and Data Analysis, NOAA, EDS, Marine Assessment Division, Washington, D.C.

Environmental Data Service, DOC/NOAA. 1977.

Analysis of Brine Disposal in the Gulf of Mexico, #3 Capline Sector. Report to Federal Energy Administration Strategic Petroleum Reserve Program Salt Dome Storage. Center for Experiment Design and Data Analysis, NOAA, EDS, Marine Assessment Division, Washington, D.C.

The above reports and other pertinent documents are available from the Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia, 22151.

Proposed locations of the West Hackberry (Texoma Sector) and Weeks Island (Capline Sector) brine disposal sites are shown in Figures 2 and 3, respectively. These sites are subject to change within the same geographic area pending results of baseline surveys presently underway.

The proposed West Hackberry disposal site is located approximately 9.7 km (6 miles) south off the coast from Mud Lake at Latitude 29°40' N and Longitude 93°28' W at a bottom depth of about 9 m (30 feet). Operational requirements and engineering limitations of the proposed brine diffuser at this site are as follows: length - 933.3 m (3070 feet); orientation -normal to coast; number of ports - 52; length between ports - 18 m (59 feet); port diameter - 7.6 cm (3 inches); orientation of port riser - 90° to bottom; and port exit velocity - 7.6 m/sec (25 ft/sec).

The proposed Weeks Island (Capline Sector) disposal site is located approximately 41.8 km (26 miles) off Marsh Island at Latitude 29°04'N and Longitude 91°45' W at a bottom depth of about 9 m (30 feet). Operational requirements and engineering limitations of the proposed brine diffuser at this site are as follows: length - 608 m (2000 feet); orientation -normal to coast; number of ports - 34; orientation to port riser - 90° to bottom, and port exit velocity - 7.6 m/sec (25 ft/sec).

The Biological/Chemical Surveys in the proposed salt dome brine disposal sites described seasonal abundance, distribution and community

composition of major benthic, planktonic, bacterial and demersal finfish and macro-crustacean ecosystem components; the sediments; the hydrocarbons and trace metals composition and concentration in the marine ecosystem; and the seasonal variations in inorganic nutrients composition and concentration of the water column. The sampling scheme used for sample collections around the two sites is shown in Figure 4. A separate data analysis assessed the importance of shrimping grounds in the vicinity of the proposed brine disposal sites in terms of historical data on species composition, marketing size categories and location of commercial shrimp catches within statistical reporting zones off the Louisiana coast.

Information concerning data from this project is available through the Program Data Manager: Mr. Jack Foreman, Environmental Data and Information Service, Page Building No. 2, 3300 Whitehaven Street, N.W., Washington, D.C.

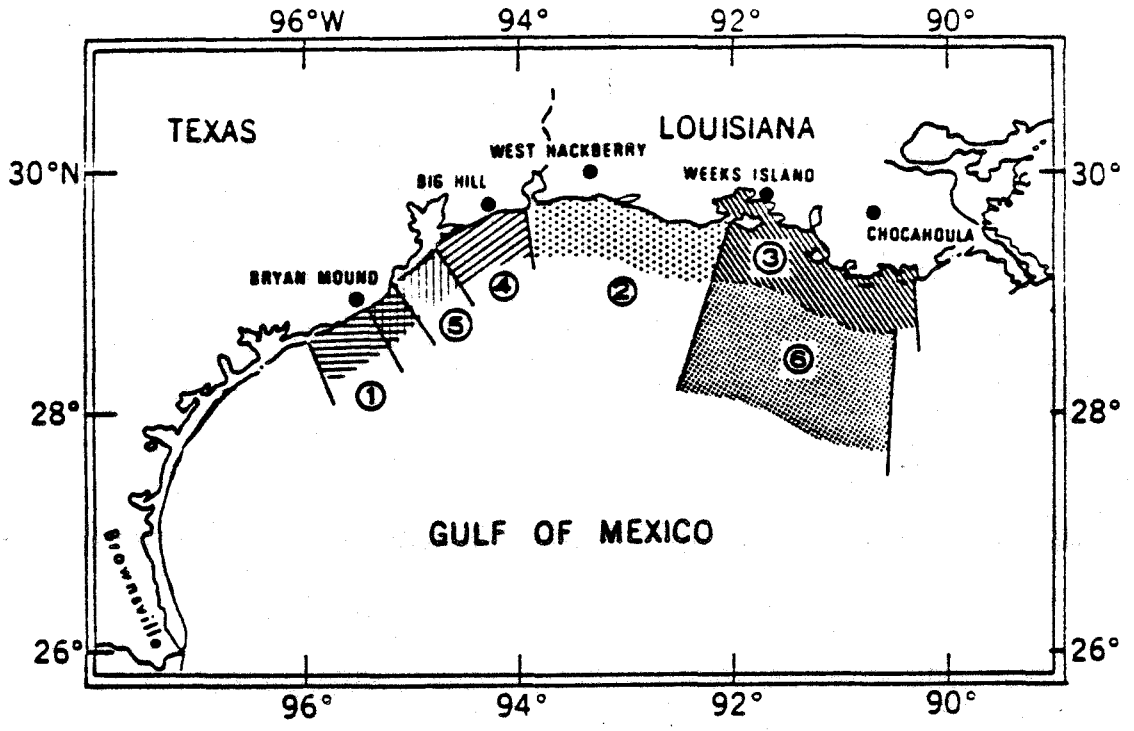

Figure 1. Regions of Study for Brine Disposal Assessment-DOE/NOAA Interagency Agreement (adapted from Environmental Data Service, DOC/NOAA. Analysis of Brine Disposal in the Gulf of Mexico, #2 West Hackberry. 1977.).

1 Texas Coastal Ocean, Colorado River to San Luis Pass (Bryan Mound)

2 Louisiana Coastal Ocean, Sabine Lake to S.W. Pass of Vermilion Bay (West Hackberry)

3 Louisiana Coastal Ocean, S.W. Pass, Vermilion Bay to Timbalier Island (Capline Sector)

4 Texas Coastal Ocean, Port Bolivar to Sabine Pass

5 Texas Coastal Ocean, Freeport Harbor to Galveston South Jetty

6 Louisiana Coastal Ocean, Offshore from Vermilion Bay to Terrebone Bay

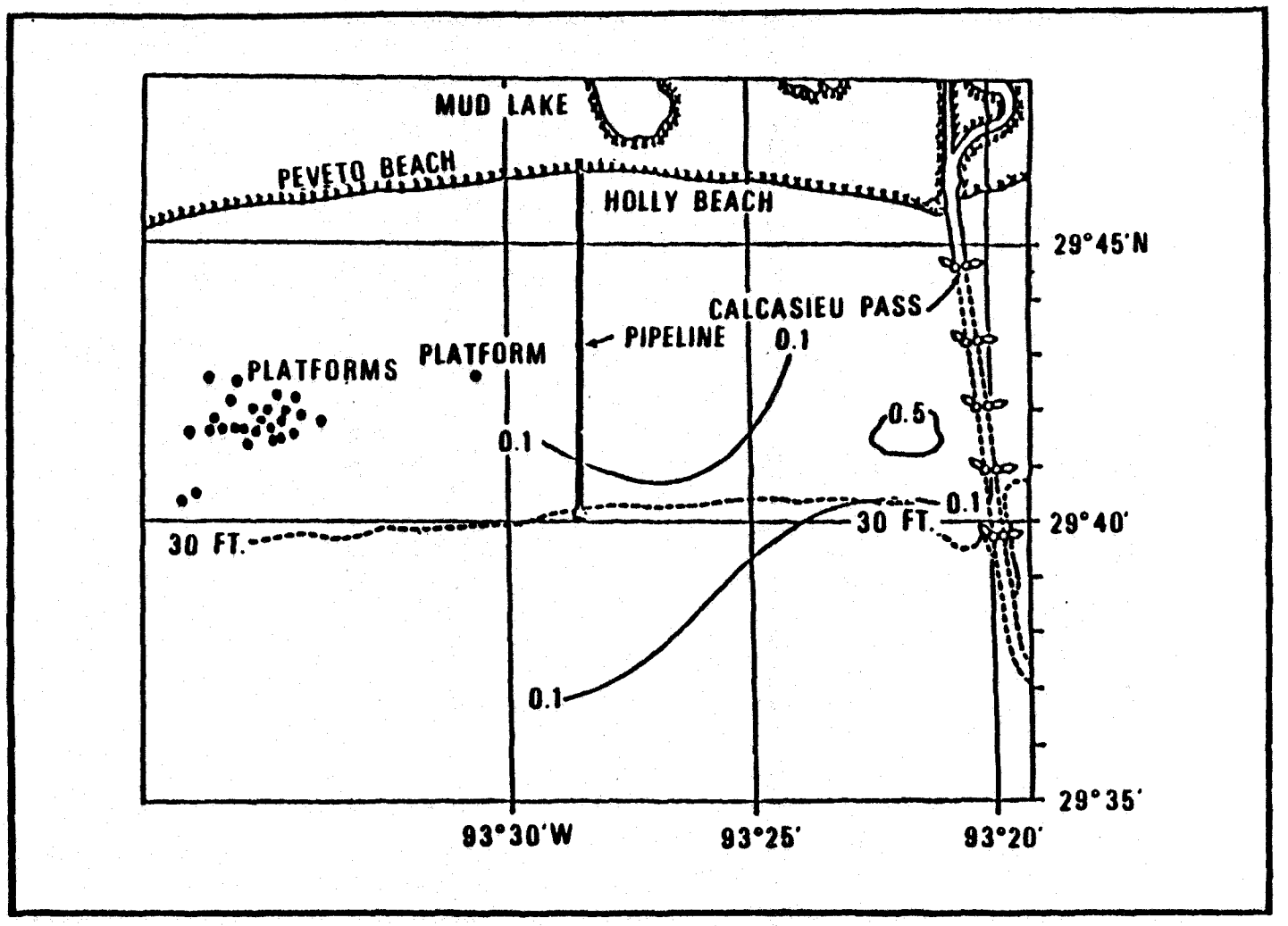

Figure 2. Proposed Texoma brine disposal site.

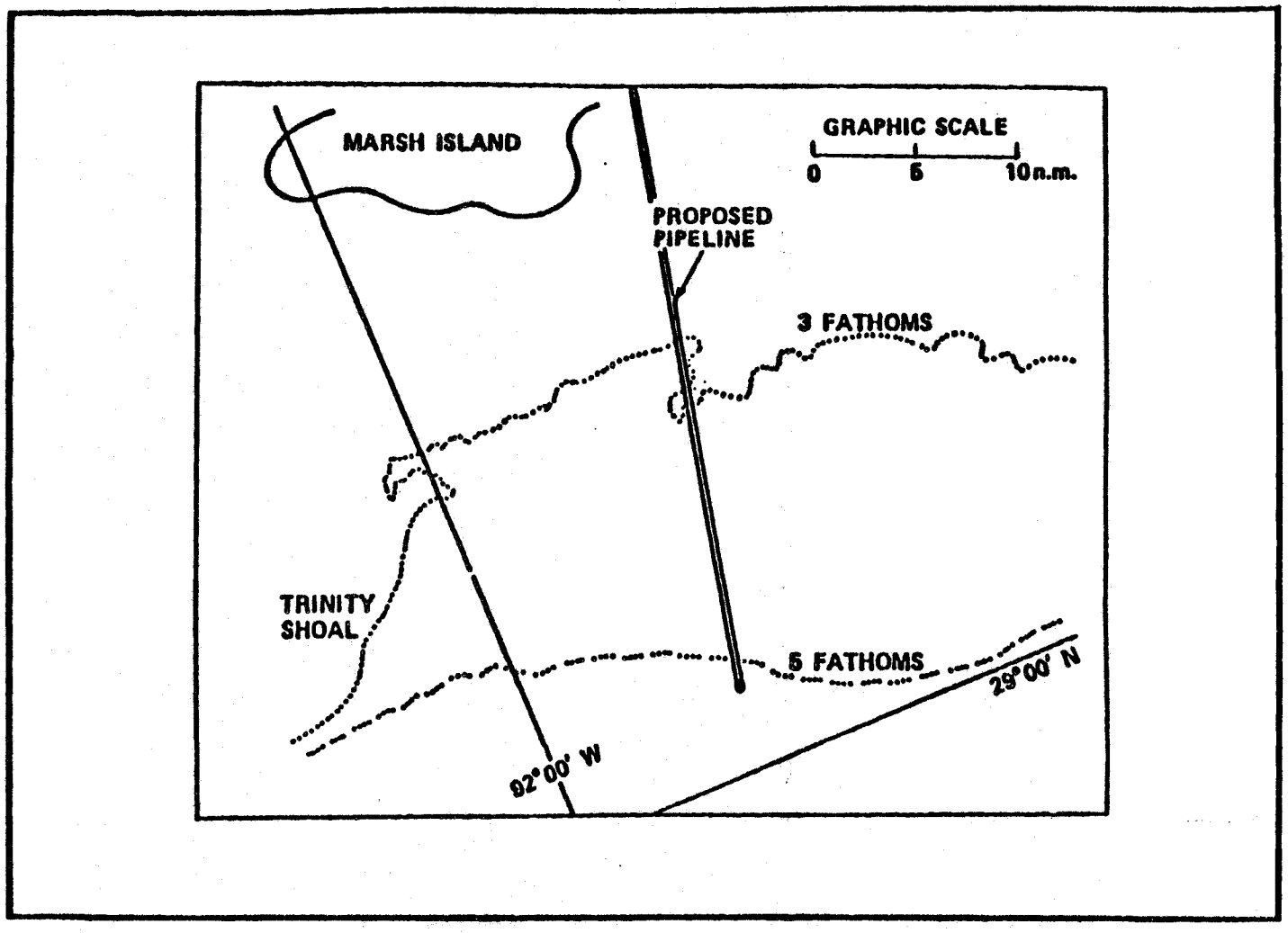

Figure 3. Proposed Capline brine disposal site.

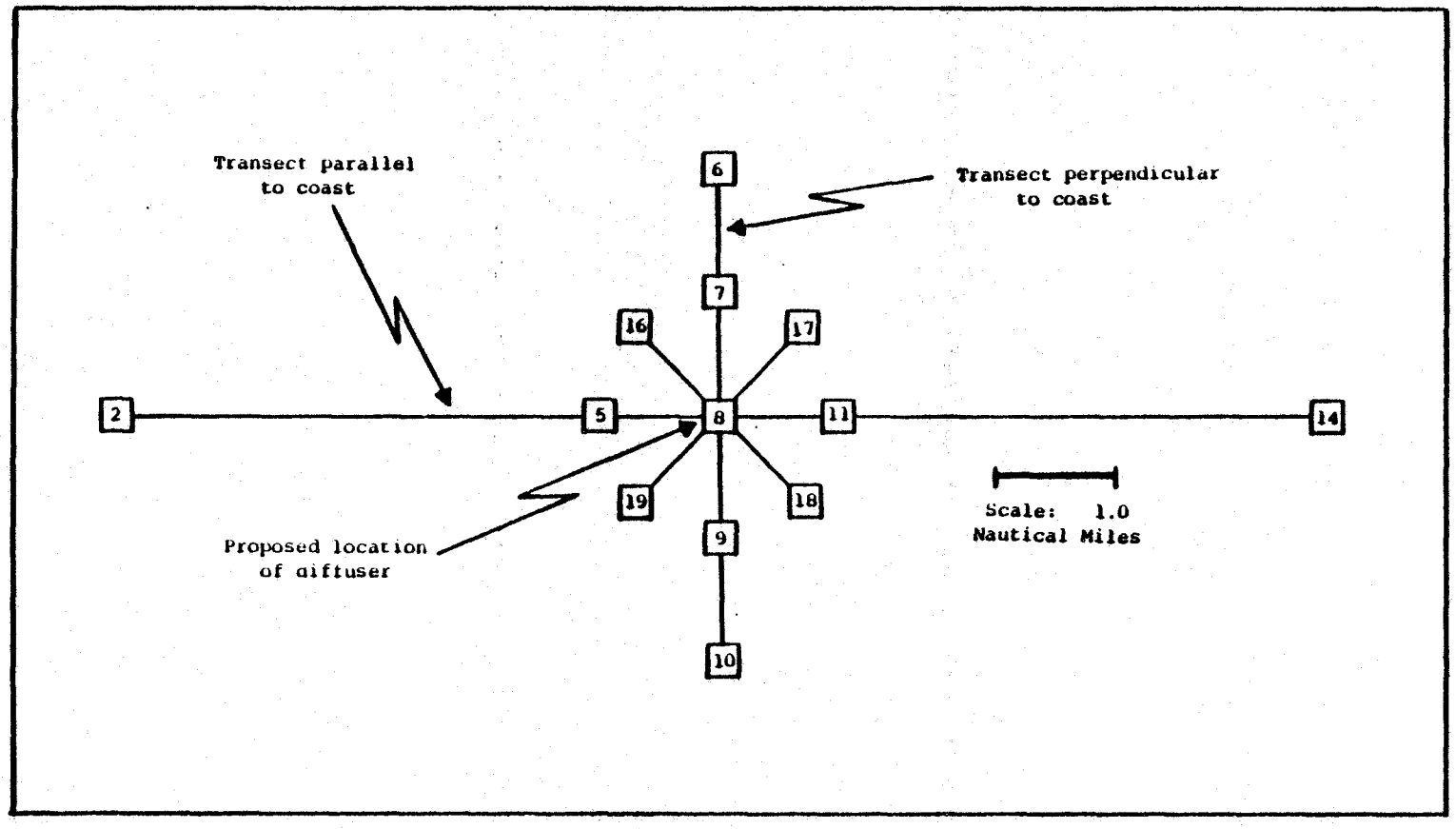

Figure 4. Sampling scheme for proposed salt dome brine disposal sites.

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II. PRINCIPAL INVESTIGATORS' SECTION

WORK UNIT 5.1 - ANALYSIS OF VARIANCE OF GULF COAST SHRIMP DATA

F. J. Margraf, Ph.D.

LGL Ecological Research Associates, Inc.

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ABSTRACT

The analysis of shrimp fishery data using analysis of variance techniques proved to be a useful tool for extracting important factors from a large number of potentially important factors. Transformed and standardized variables provided the best statistical models based upon coefficients of determination and coefficients of variation. The results of detailed examination of the important factors were interpreted to indicate major trends in the shrimp fishery, were related to major aspects of the life history of each species, or indicated the ability of the fishermen to utilize the knowledge of shrimp life history and behavior to locate commercially-exploitable quantities of shrimp.

Based upon the gross level of these analyses, there was no indication that the areas containing the diffuser sites differed radically from the rest of the region. Even though the statistical area-depth intervals containing the diffuser sites exhibited no radical differences in a regional context, the contribution of the smaller area of influence of the diffusers to their respective statistical area-depth interval must be determined. Differences of this type were not addressed by the level of analysis performed for this contract, but will be of major concern in determining the potential impact of brine disposal.

ACKNOWLEDGEMENTS

The long, often arduous, task of producing this lengthy report fell upon the shoulders of Jean Erwin, Alice Doerge, and Kyle Kuberski. I wish to whole-heartedly thank them for their superlative efforts.

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ANALYSIS OF VARIANCE OF GULF COAST SHRIMP DATA

WORK UNIT 5.1

INTRODUCTION

The Gulf of Mexico supports one of the world's most productive shrimp fisheries, providing about 20% of the gross dollar value of the total fishery harvest for the United States (United States Department of Commerce 1977). Because of the potential for impact of brine disposal in the Gulf on this important fishery, the historical importance of the shrimping grounds in the vicinity of the proposed salt dome disposal sites to the shrimp fishery must be determined. The major emphasis of this work unit was to place the diffuser sites in regional perspective with respect to the major sources of variation in historical shrimp fishery data for reported catches within the statistical reporting areas off the Louisiana coast. This work unit represents an initial att mpt at a fishery resource evaluation for the proposed brine disposal sites off Louisiana.

Specifically, the objective of this task was to assess, via analysis of variance, the importance of shrimping grounds in the vicinity of the proposed salt dome brine disposal site in terms of the major sources of variation in historical data on species composition, marketing size categories, and location of reported catches of commercial shrimp within the statistical reporting areas off the Louisiana coast. These analyses should provide a statistical framework for determining the historical importance of shrimping grounds in the vicinity of the proposed salt dome disposal sites and any subsequent effects brine disposal might have on the shrimp fishery.

The concept of using analysis of variance techniques to provide a statistical framework for the examination of historical shrimp fishery data was developed by Dr. C.W. Caillouet, Division Chief, Environmental Research Division, National Marine Fisheries Service, SEFC, Galveston Laboratory. This rather novel concept represents the first attempt

known to this author at a complete statistical analysis of a large regional shrimp fishery data set. Based partly upon preliminary results from this study, a similar statistical analysis has recently been initiated for Texas coast shrimp fishery data as part of a series of environmental impact studies for brine disposal from the Bryan Mound Salt Dome near Freeport, Texas.

The data used in the analyses presented in this report were graciously provided by Dr. Wade Griffin, Department of Agricultural Economics, Texas A&M University, College Station, Texas. Dr. Griffin received his data directly from the NMFS data files in Washington, D.C. These data represent those which are published as part of the fisheries statistics on Gulf coast shrimp data (NMFS Current Fisheries Statistics). The statistical analyses were performed at the Data Processing Center, Texas A&M University using the Analysis of Variance Procedure (PROC ANOVA) of the Statistical Analysis System (SAS). Dr. Rudolf J. Freund, Professor of Statistics, Institute of Statistics, Texas A&M University conducted the analyses, and without his expertise the analysis of such a large data set within cost restraints would have been practically impossible.

METHODS AND MATERIALS

Analysis of variance (ANOVA) in a factorial design was utilized to ass ss the importance of the proposed disposal sites in terms of temporal and spatial variations and shrimp size relationships as they relate to shrimp life cycles, migrations, and spawning grounds. Data for the five statistical areas off the coast of Louisiana from the Mississippi River to the west (numbers 13, 14, 15, 16 and 17) from 1966-1975 were used for analysis (Fig. 1). Although the proposed disposal areas are located in only two of the statistical areas at specific depths, the analyses were performed using all five areas and ten depth intervals because temporal and spatial changes in shrimp harvest in one area may have a large influence on changes in harvest in adjacent areas.

Data were analyzed for 3 species categories (brown shrimp, *Penaeus aztecus*; white shrimp, *P. setiferus*; and all *Penaeus* spp. combined, i.e.,

brown, white and pink shrimp, *P. duorarum*), for 4 marketing size classes (≤ 20, 21-30, 31-50 and ≥ 51 shrimp per pound), for 10 years (1966-1975), for 12 months (January-December), for 5 statistical areas (13-17) and for 10 depth intervals (0-5, 5-10, 10-15, 15-20, 20-25, 25-30, 35-40, 40-45 and 45-50 fathoms). Response variables upon which analysis of variance were performed included: (1) catch (pounds, heads off), C; (2) ln (C+1); (3) effort (nominal days fished), F; (4) ln (F+1); (5) directed effort, E; (6) ln (E+1); (7) catch per nominal days fished, C/F; (8) ln ((C/F)+1); (9) catch per directed effort, C/E; (10) ln ((C/E)+1); (11) catch per unit water surface area with statistical area-depth interval, C/A; (12) ln ((C/A)+1); (13) nominal days fished per unit water surface area, F/A; (14) ln ((F/A)+1); (15) directed effort per unit water surface area, E/A; (16) ln ((E/A)+1); (17) catch per nominal days fished p r unit water surface area, C/F/A; (18) ln ((C/F/A)+1); (19) catch per directed effort per unit water surface area, C/F/A; (20) ln ((C/E/A)+1). The directed effort variable was calculated by Dr. Griffin (Griffin et al. 1977). This parameter was based upon the nominal days fished, adjusted for vessel differences and temporal changes in fishing power, and prorated by species composition of catches toward which the effort was primarily directed. This proration allowed for adjustment of fishing effort based on day-night differences in species composition as related to differences in diel variability of species. All of the shrimp catch and effort data were subjected to editing and verification by Dr. Griffin prior to performance of the statistical analyses. To standardize the data for the varying size of statistical area-depth intervals, the water surface area within each reporting unit was used as calculated by Patella (1975). A response surface diagram illustrating the relationship between the sizes of the reporting units is presented in Fig. 2.

In the treatment of the data, an arbitrary decision was made in regard to the consideration of catch data when no effort was expended. Technically, these could have been considered as missing or null values. However, the insertion of missing values in a complete factorial without replication would have caused a missing cell problem, calling for the use of a general linear model algorithm for performance of the analyses.

This would have been impossible for the size of data set and model used in this study. Instead, zero was arbitrarily chosen to represent the value for catch when no effort was expended, and no distinction is made between this case and the case where catch equals zero but effort does not. Given the nature and economics of the Gulf coast shrimp fishery this decision may be quite logical since, if no effort was expended, it was highly probable that it was because no shrimp were present in commercial quantities. It is customary practice in the Gulf coast shrimp fishery to use "try-nets" to locate commercial quantities of shrimp prior to deployment of larger nets. Try-net effort is not reported in the catch statistics.

There was no residual or error term available for significance testing in the factorial analysis. An approximation of the error term was based upon the mean square for the highest order interaction (Year x Month x Statistical Area x Depth x Size). In addition to the factorial analyses, serial polynomial lack of fit tests were performed on the main effects for years, months, depth intervals, and market size categori s. Polynomial regression analyses were carried through the cubic relationship.

In the following RESULTS AND DISCUSSION section, the results of each statistical analysis are presented in ANOVA Tables. Certain response variables were chosen for more detailed examination, and their results were also presented graphically. The X-Y plots and response surface diagrams were drafted by hand from computer calculated means. These means are also presented tabularly. The means for the various interaction terms not examined in detail graphically were also computer calculated. These values were not reproduced for this report, since they would easily fill several large volumes.

RESULTS AND DISCUSSION

Significance Testing

The relationship between statistical significance and interpretive importance is often obscure. One generally states an hypothesis to be tested and selects some probability level (e.g., P = 0.05) which will signify statistical significance. In the case of analysis of variance, the null hypothesis to be tested is generally implied as no difference can be discerned among the treatments stated in the ANOVA model and is generally tested using the F statistic. The test parameters consist of the mean square for the treatments divided by the mean square for the residual term. However, as the number of values (degrees of freedom) comprising the treatment and residual increases, the magnitude of the value for the F statistic required to indicate significance at a given probability decreases, approaching one (1) as the degrees of freedom approach infinity. Therefore, as the number of degrees of freedom in an analysis become very large, almost any difference (F-value greater than 1) between treatment and residual mean squares will result in statistical significance. The problem thus becomes one of trying to relate statistical significance to, in our application, biological importance. This problem is enhanced by the fact that biological data are often highly variable.

The above problems became vividly apparent in scanning the ANOVA tables and evaluating the probability values for the F-tests (Tables 2-121). Since a detailed analysis of virtually every factor for every response variable is impractical, to say the least, and defeats the purpose of performing the analysis in the first place, another method of establishing importance is warranted for this application. One such method might be to examine the relative magnitudes of the various sums of squares. However, given the large number of degrees of freedom associated with them, some of the high order interactions account for a large proportion of the total sums of squares. Perhaps a more reasonable approach is to examine the relative magnitude of the mean squares, since these values represent, as the term implies, the average variation

associated with each factor. This reduces the effect of a large number of degrees of freedom. Since the F-value is by definition the ratio of the residual mean square to the treatment mean square, an easy way to evaluate mean squares is simply to compare the magnitude of the F-values, with larger F-values having greater importance. It is this rather simple algorithm which was used to determine which factors in the various ANOVAs constituted the most important ones; the ones to be examined in greater detail.

Response Variable Selection

All of the response variables used in the analyses for each species category represent some aspect of the same two variables: catch and effort. Therefore, detailed examination of all of the response variables is unwarranted. Certain of the variables can be considered representative of all those analyzed. Two statistical parameters were utilized to aid in selection of representative variables; these included the coefficient of determination (R^2) and the coefficient of variation (CV). The R^2 of the ANOVA model is the ratio of the model sum of squares to the total sum of squares and, thus, represents the proportion of the total variation explained by the model. The larger the value of R^2, the more of the total variation explained, i.e., the better the model. The CV represents the ratio of the standard deviation to the overall mean and provides a standardized measure of the variability of the response variable. The lower the CV, the less variable (more stable) the data units; and, often, the better the model. Thus, in general terms, given the choice between models, the one with the highest R^2 and the lowest CV should provide the best alternative.

The R^2 and CV values from each of the ANOVAs are presented in Table 1. Two general statements can be made concerning the values in this table: first, the standardized response variables (e.g., catch per effort, catch per effort per water surface area, etc.) are generally more stable (lower CV) than the non-standardized variables (e.g., catch and effort), and second, the transformed variables are generally more stable and the models explain more of the total variation (higher R^2)

than the non-transformed variables. Consider specifically the variables for brown shrimp. The analysis for catch had an R^2 of 0.826 and CV of 295.4, while the log-transformed catch had values of 0.929 and 48.1 respectively. In the case of catch, the log-transformed variable had more of the variation explained by the ANOVA model (higher R^2) and was more stable (lower CV). The analyses for the two effort parameters for brown shrimp are also illustrative. The R^2 and CV values for nominal days fished were 0.636 and 1234.3, respectively, while the values for directed effort were 0.805 and 281.2, respectively. More of the variation was explained and the data units were more stable for the directed effort parameter. It is interesting to note, however, that the difference between the R^2 and CV values for the two log-transformed effort parameters was negligible. Standardizing the catch and effort parameters by the water surface area within each statistical area-depth interval had relatively little stabilizing effect. For instance, catch had R^2 = 0.826 and CV = 295.4, while the values for catch per water surface area were 0.826 and 290.6, respectively. Similarly, directed effort per water surface area had values of 0.826 and 252.0, respectively (compared to R^2 = 0.805 and CV = 281.2 for directed effort).

Because of greater stability (lower CV) and higher proportion of variation explained by the model (higher R^2), log-transformed variables were chosen for detailed examination, and directed effort parameters were chosen over nominal days fished. The specific response parameters chosen were the log-transformed variables for catch [ln (C+1)], directed effort [ln (E+1)], catch per directed effort [ln ((C/E)+1)] and catch per directed effort per unit water surface area [ln ((C/E/A)+1)]. These response variables were chosen for detailed examination based upon their statistical properties and because they were representative of the entire group. It must be remembered, however, that means of log-transformed variables may often exhibit trends different from their non-transformed values. Specifically, when an equal number of observations are drawn from two populations with the same mean but unequal variances, the mean of the log-transformed values will be largest from the population with the smallest variance. As an example, sample population A consists of

two values, 98 and 2, and sample population B consists of 51 and 49. The arithmetic mean of both samples is 50, but the variance of A is greater than B. The antilog of the mean of the log-transformed values for A is 14, while for B it is 50. This must be considered in viewing the results of log-transformed data.

The remainder of this report is based upon the four chosen response variables for each of the three species categories. The variables are considered representative of all of the variables analyzed. The ANOVA and polynomial lack of fit tables are presented for all of the variables (Tables 2-121) along with the means of the main effects for each variable and for the interaction terms examined in detail (Tables 122-150).

Brown Shrimp

The most important factors (largest F-Values) in all of the analyses for the four selected variables for brown shrimp included the main effects for year, month, statistical area, depth interval and market size, and the first order interactions month x depth, month x size, and size x depth (Tables 2-5). The consistency with which each of these factors appeared as the most important contributors is remarkable. The consistency of the interrelationship between the variables is further illustrated by the polynomial lack of fit tests (Tables 6-9). The terms for year were overwhelmingly linear; those for months were overwhelmingly quadratic, as were depth, while the market size terms were markedly linear.

The relationships by year are illustrated in Figs. 3-6. All generally increase in a linear fashion over the 10-year period. The catch and effort variables both show distinct negative quadratic relationships, however, with maxima in 1972. The catch per effort and catch per effort p r area variables are more strictly linear, but 1972 remains a strong year.

The negative quadratic "hump" is quite apparent by month (Fig. 7-10). All four variables show a peak during the warm months (May-October) and are low during the cold months (November-April).

The catch-effort relationships by statistical area are also rather consistent among the four variables (Figs. 11-14). Statistical area 14 is consistently lower than the other areas, while area 13 is consistently higher.

By depth interval, the catch-effort relationships generally resembled a negative quadratic (Figs. 15-18). Peak values generally occurred at mid-depths (10-35 fathoms). Values were low near shore (0-5 fathoms) and far offshore (35-50 fathoms), with the lowest values at 45-50 fathoms.

Although shrimp catch and effort is composed of and directed primarily at the smaller size classes of shrimp (Table 126), the lowest log-transformed values were for the smallest sizes (≥ 51 tails per pound). The three larger sizes had roughly equivalent values (Figs. 19-22). The reversal of actual trends as a result of log-transformation was most evident for size classes.

Month x depth interactions are illustrated in Figs. 23-26. All four variables are relatively constant throughout the 12-month period at depths between 35-50 fathoms. From November through April the greatest values are at mid-depths (25-35 fathoms). From May through October values are greatest closer to shore, with a peak occurring further offshore through the period. This near shore, summer peak represents the recruitment of young shrimp to the fishery as they move out of the inshore nursery areas. It is interesting to note that the summer peak for directed effort precedes the catch, catch per effort, and catch per effort per area summer peaks by almost a month.

Recruitment of young shrimp during summer was also evident in the month x size class interactions (Figs. 27-30). Peak values for smaller shrimp occurred during summer, while those for the larger shrimp remained relatively constant throughout. The greatest values occurred in July and August at sizes of 31-50 tails per pound. The summer peak for effort did not appear to precede the other variables as noted for the month x depth interactions.

The general offshore movement of young and growing shrimp was illustrated by the size x depth interaction (Figs. 31-34). The lines of

equal value have a general slant of highest values for small shrimp near shore and highest for large shrimp farther offshore. Peak values occurred between 15-35 fathoms for the three largest size classes (31-50, 21-30, ≤ 20 tails/pound).

White Shrimp

As noted for brown shrimp, the white shrimp analyses were also relatively consistent in respect to which factors were most important. The most important factors in the analyses for all four variables included year, month, statistical area, depth interval, market size, month x statistical area, statistical area x depth, month x market size, and depth interval x market size (Tables 10-13). The interaction term month x depth interval was also among the most important factors for the analyses of log-transformed catch and directed effort. Statistical area x market size interaction was among the most important factors for the analysis of log-transformed catch per directed effort per water surface area. The polynomial lack of fit analysis also indicated fairly consistent trends in the data for the four selected variables (Tables 14-17). The year and month data were generally best fit by the quadratic, with the exception of directed effort by month which was best fit by the linear term. The depth interval and market size data were all generally linear; but a strong quadratic relationship was also apparent for the depth interval data.

The annual means for the four variables are plotted in Figs. 35-38. The negative quadratic relationship is quite evident in all but the directed effort plot, which is more linear. The years from 1969 to 1975 had relatively constant directed effort (Fig. 36). However, 1969-1972 were peak years for the other three variables, while 1973-75 values were intermediate in magnitude.

The means by month were best fit by a positive quadratic relationship, with exception of directed effort which was more linear. Although directed effort was best fitted by the linear relationship, the positive quadratic relationship was still evident (Fig. 40). The catch and directed effort plots were quite similar in appearance, except that

directed effort was generally more constant. Catch and effort each peaked in fall (October and November) and declined through winter. A second, minor peak occurred in May and declined to the lowest value in July. Catch per directed effort and catch per directed effort per water surface area had generally the same characteristics as those for catch and effort, but without the spring peak.

By statistical area, the variables had a trend similar to that noted for brown shrimp (Figs. 43-46). Values were all lowest for statistical area 14, except for catch per directed effort per water surface area where the value for area 17 was slightly lower than for 14. Values for statistical areas 13, 15, 16 and 17 were similar except as noted for area 17, and because of the relatively small water surface area in statistical area 13, the catch per directed effort per water surface area in statistical area 13 was considerably higher than those for the other areas.

The depth interval relationships are illustrated in Figs. 47-50. Maximum values are near shore (0-15 fathoms) and drop-off sharply at 15-20 fathoms. The values are generally linear, but with a strong quadratic relationship in evidence due to the rapid drop-off in values at 15-20 fathoms.

Peak log-transformed values in market size variables occurred for the largest size class (≤ 20 tails/pound), with the exception of directed effort which had essentially equal values for three largest size classes (Figs. 51-54). Values for the other variables dropped in a near linear fashion, with the lowest values for the smallest size class (≥ 51 tails/pound). As with brown shrimp, this reversal of known trends was an artifact of log transformation.

The importance of the statistical area x month interaction term was basically the result of lower values in statistical areas 13 and 14 during July and August than those in the other areas at that time (Figs. 55-58). Also, the values in area 13 were higher than those of the other areas during October through December. Any reason for this apparent phenomenon remain obscure.

The seasonal dynamics of white shrimp recruitment are apparent in the depth interval x month interaction terms for catch and effort (Figs. 59-60). Catch and effort are relatively constant over the annual cycle from 15-50 fathoms, dropping off rapidly between 15 and 25 fathoms. The main recruitment peak occurs near shore (0-10 fathoms) during the fall, with a minor peak during May. The catch and effort curves both indicate these trends. Apparently, once catch is standardized by effort and effort per surface area, these seasonal dynamics by depth are considerably smoothed, and thus, the depth interval x month interaction term for log-transformed catch per directed effort and catch per directed effort per water surface area were not particularly important contributors to their ANOVA models.

A plot of the statistical area x depth interval interaction term indicated that catch was reduced at all depths in statistical area 14 (Fig. 61). Effort was lowest at area 14 near shore, but relatively constant at all areas farther offshore (Fig. 62). Catch per effort and catch per effort per surface area (Figs. 63-64) were lower at areas 14 and 17 than at areas 13, 15 and 16 at deep depths, were relatively constant at mid-depths of 10-20 fathoms, and were higher at areas 13, 15, 16 and 17 than at area 14 near shore (0-10 fathoms).

Unlike brown shrimp recruitment which was evident as increased catches of small shrimp, the recruitment of white shrimp was not apparent. Instead there was a reduction in values for smallest size shrimp during July with the reduced values for each successively larger size class appearing somewhat later (Figs. 65-68). The previously noted fall peak and minor spring peak in values are present as peaks for 21-30 tails per pound shrimp in the fall and ≤ 20 tails per pound shrimp in the spring.

The movement of progressively larger shrimp farther offshore is evident in Figs. 69-72. The values for smallest shrimp were greatest near shore (0-5 fathoms); those for the largest shrimp were greatest slightly farther offshore (5-10 fathoms). The values for all sizes drop-off rapidly with increasing depth.

Previously noted trends in values by statistical area are further documented by size class for log-transformed catch per directed effort per water surface area (Fig. 73). Low values for area 14 and 17 are

principally related to the larger size classes, but all size classes are at least somewhat reduced in value at these two areas as compared to the other areas.

Penaeus spp.

Since the western Louisiana shrimp fishery is essentially directed at brown and white shrimp, the analyses for all *Penaeus* spp. reflect th combined characteristics of the two species. The most important factors in the analyses included year, month, statistical area, depth interval, market size, month x area, year x depth interval, month x depth interval, statistical area x depth interval, month x market size, and depth interval x market size (Tables 18-21). Because of the combined influence of both species, the polynomial analyses indicated somewhat more complex relationships than those noted for each species (Tables 22-25).

The values for the selected response variables by year for all *Penaeus* spp. combined are best described as linear relationships (Figs. 74-77). The catch and effort variables exhibited strong quadratic relationships. Catch and effort both had distinct peaks in 1972. The lowest values were in 1966-1968. With exception of the peak in 1972, values from 1969 to 1975 were similar. The catch per effort and catch per effort per area variables were more distinctly linear, with values for 1969 to 1975 of similar magnitude.

The values by month were all best described as quadratic, but these complex curves also had strong linear and cubic relationships (Figs. 78-81). Highest values were evident during summer, dropping off through fall, and lowest during winter. Peak values were in August; lowest values were in April.

Values by statistical area were quite similar to those noted for each species separately (Figs. 82-85). For catch, effort, and catch per effort, statistical area 14 had far lower values than the other areas, which had roughly equivalent values. Values for catch per effort per area were highest in area 13 and lowest in area 14; those in areas 15, 16 and 17 were intermediate.

By depth interval, values for the selected variables were highest near shore and lowest further offshore (Figs. 86-89). These relationships were best described as linear. The near shore peak occurred at 5-10 fathoms, dropping off rapidly at 15-20 fathoms. Values from 15-30 fathoms were nearly equivalent throughout the range. Values from 30-50 fathoms dropped off steadily.

Values by market size class were similarly affected by log-transformation as noted for brown and white shrimp (Figs. 90-93). Peak log-transformed values occurred for the two largest size classes (≤ 20 and 21-30 tails/pound). Values for 31-50 tails per pound shrimp were intermediate and those for the smallest shrimp (≥ 51 tails/pound) were lowest.

The importance of the statistical area x month interaction terms was basically the result of low values in area 14 during fall through spring and area 17 during winter, and high values in area 13 during late fall and winter (Figs. 94-97).

Values over the ten-year period by depth interval are illustrated in Figs. 98-101. At depths over 35 fathoms, except for slight overall increases through time, there is little change in annual values over the time period. The majority of the dynamics occur in the mid-depth ranges (20-35 fathoms) and in the near shore depths (0-10 fathoms). This reflects the dominance of brown and white shrimp on the total *Penaeus* spp. fishery statistics.

Recruitment of brown and white shrimp is evident in the importance of the depth interval x month interaction terms (Fig. 102-105). Recruitment of brown shrimp can be seen as increased values during May and June near shore, with values increasing successively farther offshore later in the year, out to 30-35 fathoms during November and December. White shrimp recruitment appears as increased values during October and November near shore (0-10 fathoms).

A plot of the statistical area x depth interval interaction term indicated that values were generally lower at given depth in area 14 than in the other areas (Figs. 106-109). These trends were most evident in the near shore (0-10 fathoms) and mid-depth (20-35 fathoms) ranges. Far offshore (35-50 fathoms) values were relatively constant over the five statistical areas.

The size class x month interaction terms reflected the combined characteristics noted for brown and white shrimp (Figs. 110-113). Greatest values for the smallest shrimp (≥ 51 per pound) occurred during summer, with high values for successively larger size classes occurring later in the fall. Greatest values for the largest shrimp (≤ 20 per pound) occurred during spring.

The recruitment of brown and white shrimp was also illustrated by the size class x depth interval interactions (Figs. 114-117). The smallest size class had greatest values near-shore (0-5 fathoms), dropping off farther offshore. The larger size classes had a bimodal peak: one at 5-10 fathoms representing white shrimp and one at 25-35 fathoms representing brown shrimp.

General Discussion

As was evident above, the most important sources of variation in the ANOVA models were restricted to main effects and certain of the first-order interactions. These results were interpreted to indicate major trends in the fishery or were related to major aspects of the life history of each species. Major sources of variation appeared quite consistently in the analysis for each of the four selected parameters for each species. This can be interpreted to indicate the ability of th shrimp fishermen to exploit their experience and knowledge of shrimp life history and behavior. The process of searching for shrimp using try-nets, as mentioned previously, may be a very important aspect in this regard.

After initiation of the contract for performance of these analyses, considerable interest was expressed in the relationship between directed effort and nominal days fished. An exploratory analysis of these parameters was performed and consisted of determining regression relationships by month for the first (1966) and last (1975) years represented in the data set. These analyses resulted in a set of highly variable relationships. There was no consistent relationship among months or years. The functional relationship between these two parameters was considerably more complex than could be adequately described through regression

analysis. To aid in illustrating the relationship between nominal days fished and directed effort, response surface diagrams by month by year were produced for these variables for brown shrimp (Fig. 118 & 119). Seasonal dynamics, lower effort during winter and higher effort during summer, were apparent for both effort variables. However, directed effort was considerably less variable, especially by year, than nominal days fished. Nominal days fished gives considerably greater weight to the marginal fisherman than does directed effort. Therefore, we felt that the use of Dr. Griffin's directed effort parameter provided considerably more satisfactory results than would the use of the non-standardized effort parameter, nominal days fished; calculation of another measure of directed effort or critical evaluation of Griffin's variable was not within the scope of this contract.

The use of the means of log-transformed data may lead to distortion of the trends exhibited by the non-transformed data. This was most apparent for the market size class variables. This was probably the result of greater variance for the smaller size classes of shrimp than for the large size classes. The catch and effort for small shrimp range from zero to a large peak, while catch and effort for large shrimp is considerably more stable temporally and spacially. The amount of distortion for other treatment means was less dramatic, and these trends were considered to be representative of the non-transformed values. Given the statistical properties of the transformed versus the non-transformed data, the use of log transformation is appropriate; however, the limitations of comparing trends in means of log-transformed data must be remembered.

CONCLUSIONS

The analysis of shrimp fishery data using analysis of variance techniques proved to be a useful tool for extracting important factors from a large number of potentially important factors. Transformed and standardized variables provided the best statistical models based upon coefficients of determination and coefficient of variation. The results of detailed examination of the important factors were interpreted to

indicate major trends in the shrimp fishery, were related to major aspects of the life history of each species, or indicated the ability of the fisherman to utilize the knowledge of shrimp life history and behavior to locate commercially-exploitable quantities of shrimp. Major trends in the shrimp fishery were indicated mainly by the importance of year, statistical area, and market size, as factors in the analyses. Major aspects of the life history of each species were illustrated principally by month, depth, and important interaction terms. Seasonality and depth of catch, recruitment and seasonal movements were apparent from these factors. The ability of the fishermen to exploit knowledge of shrimp life history and behavior pattern was evident in that effort exhibited the same patterns as catch and catch per effort. The practice of searching with try-nets for commercial quantities of shrimp probably has a major impact on this phenomenon.

Based upon the gross level of these analyses, there was no indication that the statistical area-depth intervals containing the diffuser sites differed radically from the adjacent areas. This was apparent from the lack of importance of interaction terms involving statistical area by depth for brown shrimp and examination of catch per effort plots for statistical area by depth for white shrimp and all *Penaeus* spp. combined (Figs. 63-108). The generally low catches noted for Statistical Ar a 14 may be associated with Mississippi River runoff or perhaps with the preponderance of oil and gas production activities in this area.

Even though the statistical area-depth intervals containing the diffuser sites exhibited no radical differences in a regional context, the contribution of the smaller area of influence of the diffusers to their respective statistical area-depth interval must be determined. The question which remains to be asked is 'what is the importance of the relatively small area of influence of the diffuser to the larger reporting block?' That is, 'is the area of influence a "hot spot" and would removal of the area from production produce a significant impact on the fishery?' Questions of this type were not answered by the level of analysis performed for this contract, but will be of major concern in determining the potential impact of brine disposal.

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APPENDIX A

TABLES

Table 1. Coefficient of determination (R^2) and coefficient of variation (CV) from the analysis of variation of the response variables for the three species categories.

Response Variables	Brown Shrimp		White Shrimp		*Penaeus* Shrimp	
	R^2	CV	R^2	CV	R^2	CV
Catch, C	0.826	295.4	0.897	222.8	0.865	179.4
ln (C+1)	0.929	48.1	0.963	47.0	0.945	32.4
Days fished, F	0.636	1234.3	0.664	864.2	0.645	736.7
ln (F+1)	0.927	63.0	0.968	53.3	0.946	40.6
Directed effort, E	0.805	281.2	0.899	199.6	0.846	163.2
ln (E+1)	0.928	62.7	0.968	53.9	0.945	41.0
C/F	0.884	71.0	0.897	96.0	0.898	52.5
ln [(C/F)+1]	0.885	55.1	0.909	66.0	0.903	38.5
C/E	0.881	73.7	0.889	91.8	0.905	51.0
ln [(C/E)+1]	0.884	55.4	0.911	65.5	0.905	38.2
C/A	0.826	290.6	0.864	282.7	0.838	208.9
ln [(C/A)+1]	0.921	48.4	0.949	52.0	0.934	33.7
F/A	0.608	1932.4	0.744	643.3	0.616	1250.8
ln [(F/A)+1]	0.926	54.6	0.958	54.0	0.937	37.4
E/A	0.826	252.0	0.863	251.6	0.836	181.2
ln [(E/A)+1]	0.927	54.5	0.957	54.3	0.936	37.7
C/F/A	0.896	84.3	0.810	172.2	0.902	72.5
ln [(C/F/A)+1]	0.882	44.5	0.896	50.9	0.894	33.9
C/E/A	0.894	83.9	0.811	170.8	0.903	70.6
ln [(C/E/A)+1]	0.881	44.9	0.897	50.8	0.895	33.8

Table 2. Analysis of variance for the log-transformed catch of brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	215321.42662191	-	-
Year (Yr)	9	2014.64019571	153.88	0.0001
Month (Mo)	11	9708.38090783	606.73	0.0001
Yr x Mo	99	3684.54378537	25.59	0.0001
Statistical Area (Ar)	4	1822.32103789	313.19	0.0001
Yr x Ar	36	1283.34738142	24.51	0.0001
Mo x Ar	44	2174.87685222	33.98	0.0001
Yr x Mo x Ar	396	4016.94147903	6.97	0.0001
Depth interval (Di)	9	31631.11405676	2416.08	0.0001
Yr x Di	80	5470.30486918	47.01	0.0001
Mo x Di	99	26638.97910715	184.98	0.0001
Yr x Mo x Di	880	14327.32048661	11.19	0.0001
Ar x Di	36	2172.84499474	41.49	0.0001
Yr x Ar x Di	320	6539.54087355	14.05	0.0001
Mo x Ar x Di	396	4465.64825645	7.75	0.0001
Yr x Mo x Ar x Di	3520	24584.27330112	4.80	0.0001
Market size (Si)	3	8443.31003998	1934.78	0.0001
Yr x Si	27	382.55927364	9.74	0.0001
Mo x Si	33	9671.67213119	201.48	0.0001
Yr x Mo x Si	297	2403.23751671	5.56	0.0001
Ar x Si	12	696.07746417	39.88	0.0001
Yr x Ar x Si	108	548.68333692	3.49	0.0001
Mo x Ar x Si	132	915.91028709	4.77	0.0001
Yr x Mo x Ar x Si	1188	2453.43267690	1.42	0.0001
Di x Si	27	16610.87900461	422.93	0.0001
Yr x Di x Si	240	1854.10256707	5.31	0.0001
Mo x Di x Si	297	4193.84715393	9.71	0.0001
Yr x Mo x Di x Si	2640	5828.35091690	1.52	0.0001
Ar x Di x Si	108	743.13076245	4.73	0.0001
Yr x Ar x Di x Si	960	2239.53875633	1.60	0.0001
Mo x Ar x Di x Si	1188	2440.44776712	1.41	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	15361.16938186		

R^2 for the model = 0.928659

C.V. = 48.1370

Table 3. Analysis of variance for log-transformed directed effort for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	37890.18259986	-	-
Year (Yr)	9	379.80793522	162.66	0.0001
Month (Mo)	11	1237.53381349	433.64	0.0001
Yr x Mo	99	662.46296696	25.79	0.0001
Statistical area (Ar)	4	242.09352771	233.29	0.0001
Yr x Ar	36	330.82724258	35.42	0.0001
Mo x Ar	44	284.62447495	24.93	0.0001
Yr x Mo x Ar	396	645.97451172	6.29	0.0001
Depth interval (Di)	9	3516.35406543	1505.97	0.0001
Yr x Di	80	956.04884234	46.06	0.0001
Mo x Di	99	4021.23917417	156.56	0.0001
Yr x Mo x Di	880	2475.74919503	10.84	0.0001
Ar x Di	36	456.16545543	48.84	0.0001
Yr x Ar x Di	320	1163.51034108	14.01	0.0001
Mo x Ar x Di	396	804.09576379	7.83	0.0001
Yr x Mo x Ar x Di	3520	4123.50133216	4.52	0.0001
Market size (Si)	3	1207.29503269	1551.16	0.0001
Yr x Si	27	114.16685999	16.30	0.0001
Mo x Si	33	2546.22532877	297.41	0.0001
Yr x Mo x Si	297	596.23077565	7.74	0.0001
Ar x Si	12	160.21775649	51.46	0.0001
Yr x Ar x Si	108	142.00541617	5.07	0.0001
Mo x Ar x Si	132	264.99979037	7.74	0.0001
Yr x Mo x Ar x Si	1188	496.17479026	1.61	0.0001
Di x Si	27	3864.51972680	551.69	0.0001
Yr x Di x Si	240	487.80374322	7.83	0.0001
Mo x Di x Si	297	1347.89871081	17.49	0.0001
Yr x Mo x Di x Si	2640	1309.22466497	1.91	0.0001
Ar x Di x Si	108	234.53431090	8.37	0.0001
Yr x Ar x Di x Si	960	522.55977829	2.10	0.0001
Mo x Ar x Di x Si	1188	556.66811906	1.81	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	2739.66915334		

R^2 for the model = 0.927694

C.V. = 62.6927

Table 4. Analysis of variance for log-transformed catch per directed effort for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	111799.82455769	-	-
Year (Yr)	9	920.91906710	83.20	0.0001
Month (Mo)	11	4208.87339718	311.10	0.0001
Yr x Mo	99	1660.47391580	13.64	0.0001
Statistical area (Ar)	4	999.51646510	203.17	0.0001
Yr x Ar	36	438.28431312	9.90	0.0001
Mo x Ar	44	1094.39195281	20.22	0.0001
Yr x Mo x Ar	396	2671.18525380	5.48	0.0001
Depth interval (Di)	9	19932.39521108	1800.70	0.0001
Yr x Di	80	2457.75125447	24.98	0.0001
Mo x Di	99	11807.85902163	96.97	0.0001
Yr x Mo x Di	880	7819.90299087	7.23	0.0001
Ar x Di	36	707.78997724	15.99	0.0001
Yr x Ar x Di	320	3448.92201996	8.76	0.0001
Mo x Ar x Di	396	2548.07886571	5.23	0.0001
Yr x Mo x Ar x Di	3520	16820.81921945	3.89	0.0001
Market size (Si)	3	3192.18978856	865.15	0.0001
Yr x Si	27	102.04287364	3.07	0.0001
Mo x Si	33	1949.29430236	48.03	0.0001
Yr x Mo x Si	297	912.86725643	2.50	0.0001
Ar x Si	12	144.88944699	9.82	0.0001
Yr x Ar x Si	108	245.50081597	1.85	0.0001
Mo x Ar x Si	132	387.28544505	2.39	0.0001
Yr x Mo x Ar x Si	1188	1709.86937856	1.17	0.0001
Di x Si	27	3488.28832995	105.04	0.0001
Yr x Di x Si	240	611.91007501	2.07	0.0001
Mo x Di x Si	297	1085.10460644	2.97	0.0001
Yr x Mo x Di x Si	2640	3957.17506297	1.22	0.0001
Ar x Di x Si	108	221.60264057	1.67	0.0001
Yr x Ar x Di x Si	960	1560.35962045	1.32	0.0001
Mo x Ar x Di x Si	1188	1706.33051442	1.17	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	12987.95147502		

R^2 for the model = 0.883829

C.V. = 55.4108

Table 5. Analysis of variance for log-transformed catch per directed effort per unit water surface area for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	211604.56573995	-	-
Year (Yr)	9	2065.03348421	96.54	0.0001
Month (Mo)	11	5316.08699734	203.35	0.0001
Yr x Mo	99	3186.07515354	13.54	0.0001
Statistical area (Ar)	4	5032.32581956	529.36	0.0001
Yr x Ar	36	963.83282395	11.27	0.0001
Mo x Ar	44	1865.42418508	17.84	0.0001
Yr x Mo x Ar	396	4990.20143155	5.30	0.0001
Depth interval (Di)	9	35731.63599881	1670.53	0.0001
Yr x Di	80	4831.23124826	25.41	0.0001
Mo x Di	99	19802.25182254	84.16	0.0001
Yr x Mo x Di	880	14520.01204317	6.94	0.0001
Ar x Di	36	1944.24277176	22.72	0.0001
Yr x Ar x Di	320	6811.10313620	8.96	0.0001
Mo x Ar x Di	396	4950.77901752	5.26	0.0001
Yr x Mo x Ar x Di	3520	31485.23556017	3.76	0.0001
Market size (Si)	3	6947.13803715	974.38	0.0001
Yr x Si	27	253.65140890	3.95	0.0001
Mo x Si	33	4008.87920023	51.12	0.0001
Yr x Mo x Si	297	1812.32316599	2.57	0.0001
Ar x Si	12	429.34003237	15.05	0.0001
Yr x Ar x Si	108	529.54903766	2.06	0.0001
Mo x Ar x Si	132	861.23262332	2.75	0.0001
Yr x Mo x Ar x Si	1188	3389.15664751	1.20	0.0001
Di x Si	27	6943.27814655	108.20	0.0001
Yr x Di x Si	240	1294.03180962	2.27	0.0001
Mo x Di x Si	297	2006.50593577	2.84	0.0001
Yr x Mo x Di x Si	2640	7634.22788466	1.22	0.0001
Ar x Di x Si	108	553.65722753	2.16	0.0001
Yr x Ar x Di x Si	960	3076.01652533	1.35	0.0001
Mo x Ar x Di x Si	1188	3273.26267968	1.16	0.0002
Yr x Mo x Ar x Di x Si (residual)	10560	25096.83388401		

R^2 for the model = 0.881397

C.V. = 44.8682

Table 6. Polynomial lack of fit analysis for the log-transformed catch of brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	2,014.64		
YL	1	1,281.82	1,281.82	881.18**
LOF	8	732.82	91.60	
YQ	1	415.77	415.77	285.82**
LOF	7	317.05	45.29	
YC	1	0.02	0.02	0.01 ns
LOF	6	317.03	52.84	36.32**
Month	11	9,708.38		
ML	1	311.76	311.76	214.32**
LOF	10	9,396.62	939.66	
MQ	1	5,602.78	5,602.78	3,851.12**
LOF	9	3,793.84	421.54	
MC	1	1,125.82	1,125.82	773.94**
LOF	8	2,668.02	333.50	229.26**
Depth	9	31,631.11		
DL	1	5,822.67	5,822.67	4,002.28**
LOF	8	25,808.44	3,226.06	
DQ	1	24,680.70	24,680.70	16,966.69**
LOF	7	1,127.74	161.11	
DC	1	134.05	134.05	92.15**
LOF	6	993.69	165.62	113.86**
Size	3	8,443.31		
SL	1	6,525.29	6,525.29	4,485.80**
LOF	2	1,918.02	959.01	
SQ	1	1,917.26	1,917.26	1,318.02**
SC	1	0.76	0.76	0.52 ns
Residual	10,560	15,361.17	1.45	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 7. Polynomial lack of fit analysis for the log-transformed directed effort for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	379.808		
YL	1	196.441	196.441	757.18**
LOF	8	183.367	22.921	
YQ	1	117.346	117.346	452.31**
LOF	7	66.021	9.432	
YC	1	3.326	3.326	12.82**
LOF	6	62.695	10.449	40.28**
Month	11	1,237.534		
ML	1	1.224	1.224	4.72*
LOF	10	1,236.310	123.631	
MQ	1	686.868	686.868	2,647.52**
LOF	9	549.442	61.049	
MC	1	105.428	105.428	406.37**
LOF	8	444.014	55.502	213.93**
Depth	9	3,516.354		
DL	1	277.732	277.732	1,070.51**
LOF	8	3,238.622	404.828	
DQ	1	3,020.696	3,020.696	11,643.21**
LOF	7	217.926	31.132	
DC	1	4.582	4.582	17.66**
LOF	6	213.344	35.557	137.05**
Size	3	1,207.295		
SL	1	1,035.449	1,035.449	3,991,12**
LOF	2	171.846	85.923	
SQ	1	170.923	170.923	658.82**
SC	1	0.923	0.923	3.56ns
Residual	10,560	2,739.669	0.259	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 8. Polynomial lack of fit analysis for log-transformed catch per directed effort for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	920.919		
YL	1	807.250	807.250	656.34**
LOF	8	113.669	14.209	
YQ	1	37.650	37.650	30.61**
LOF	7	76.019	10.860	
YC	1	0.193	0.193	0.16^{ns}
LOF	6	75.826	12.638	10.28**
Month	11	4,208.873		
ML	1	381.550	381.550	310.22**
LOF	10	3,827.323	382.732	
MQ	1	2,413.770	2,413.770	1,962.54**
LOF	9	1,413.553	157.061	
MC	1	473.229	473.229	384.76**
LOF	8	940.324	117,541	95.57**
Depth	9	19,932.395		
DL	1	6,702.744	6,702.744	5,449.74**
LOF	8	13,229.651	1,653.706	
DQ	1	12,766.287	12,766.287	10,379.77**
LOF	7	463.364	66.195	
DC	1	339.898	339.898	276.36**
LOF	6	123.466	20.578	16.73**
Size	3	3,192.190		
SL	1	2,103.186	2,103.186	1,710.02**
LOF	2	1,089.003	544.502	
SQ	1	1,073.055	1,073.055	872.46**
SC	1	15.948	15.948	12.97**
Residual	10,560	12,987.951	1.230	

ns - not significant, P = 0.05.

** = significant at 0.01.

Table 9. Polynomial lack of fit analysis for log-transformed catch per directed effort per unit water surface area for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	2,065.03		
YL	1	1,750.22	1,750.22	736.44**
LOF	8	314.81	39.35	
YQ	1	108.63	108.63	45.71**
LOF	7	206.18	29.45	
YC	1	0.98	0.98	0.41^{ns}
LOF	6	205.20	34.20	14.39**
Month	11	5,316.09		
ML	1	314.05	314.05	132.14**
LOF	10	5,002.04	500.20	
MQ	1	3,214.99	3,214.99	1,352.77**
LOF	9	1,787.05	198.56	
MC	1	506.33	506.33	213.05**
LOF	8	1,280.72	160.09	67.36**
Depth	9	35,731.64		
DL	1	6,581.61	6,581.61	2,769.35**
LOF	8	29,150.03	3,643.75	
DQ	1	28,139.48	28,139.48	11,840.26**
LOF	7	1,010.55	144.36	
DC	1	137.66	137.66	57.92**
LOF	6	872.89	145.48	61.21**
Size	3	6,947.14		
SL	1	4,848.36	4,848.36	2,040.05**
LOF	2	2,098.77	1,049.39	
SQ	1	2,072.35	2,072.35	871.98**
SC	1	26.42	26.42	11.12**
Residual	10,560	25,096.83	2.38	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 10. Analysis of variance for the log-transformed catch of white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	201424.63652540	-	-
Year (Yr)	9	1315.60509223	205.35	0.0001
Month (Mo)	11	1782.01880104	227.58	0.0001
Yr x Mo	99	842.74951710	11.96	0.0001
Statistical area (Ar)	4	1957.20837040	687.38	0.0001
Yr x Ar	36	630.29683325	24.60	0.0001
Mo x Ar	44	2323.09006692	74.17	0.0001
Yr x Mo x Ar	396	1885.96111551	6.69	0.0001
Depth interval (Di)	9	124864.53691848	19490.13	0.0001
Yr x Di	80	1631.56296766	28.65	0.0001
Mo x Di	99	6558.44182710	93.06	0.0001
Yr x Mo x Di	880	4710.70840393	7.52	0.0001
Ar x Di	36	4852.60527895	189.36	0.0001
Yr x Ar x Di	320	2141.27077198	9.40	0.0001
Mo x Ar x Di	396	3268.46770545	11.59	0.0001
Yr x Mo x Ar x Di	3520	10903.69448730	4.35	0.0001
Market size (Si)	3	1306.11622921	611.62	0.0001
Yr x Si	27	117.47916112	6.11	0.0001
Mo x Si	33	2704.18660942	115.12	0.0001
Yr x Mo x Si	297	688.20370306	3.26	0.0001
Ar x Si	12	210.90580524	24.69	0.0001
Yr x Ar x Si	108	175.49016173	2.28	0.0001
Mo x Ar x Si	132	738.47366000	7.86	0.0001
Yr x Mo x Ar x Si	1188	1168.53700367	1.38	0.0001
Di x Si	27	4786.03113137	249.02	0.0001
Yr x Di x Si	240	514.99155282	3.01	0.0001
Mo x Di x Si	297	5930.12030207	28.05	0.0001
Yr x Mo x Di x Si	2640	2867.62847622	1.53	0.0001
Ar x Di x Si	108	295.21117217	3.84	0.0001
Yr x Ar x Di x Si	960	874.50792555	1.28	0.0001
Mo x Ar x Di x Si	1188	1861.51295675	2.20	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	7517.02251770		

R^2 for the model = 0.962681

C.V. = 46.9588

Table 11. Analysis of variance for log-transformed directed effort for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	42385.09576419	-	-
Year (Yr)	9	191.47546167	165.39	0.0001
Month (Mo)	11	594.45930962	420.12	0.0001
Yr x Mo	99	165.29997941	12.98	0.0001
Statistical area (Ar)	4	540.25962800	1050.00	0.0001
Yr x Ar	36	99.03110157	21.39	0.0001
Mo x Ar	44	402.59930161	71.13	0.0001
Yr x Mo x Ar	396	361.98960703	7.11	0.0001
Depth interval (Di)	9	22588.91709837	19511.95	0.0001
Yr x Di	80	364.02026136	35.37	0.0001
Mo x Di	99	2331.65685422	183.10	0.0001
Yr x Mo x Di	880	999.49544574	8.83	0.0001
Ar x Di	36	1646.73122553	355.61	0.0001
Yr x Ar x Di	320	529.38797704	12.86	0.0001
Mo x Ar x Di	396	887.45033281	17.42	0.0001
Yr x Mo x Ar x Di	3520	2261.57290303	4.99	0.0001
Market size (Si)	3	93.15498405	241.40	0.0001
Yr x Si	27	34.03914495	9.80	0.0001
Mo x Si	33	686.66552617	161.76	0.0001
Yr x Mo x Si	297	165.63689556	4.34	0.0001
Ar x Si	12	25.31449326	16.40	0.0001
Yr x Ar x Si	108	36.43156069	2.62	0.0001
Mo x Ar x Si	132	190.26315312	11.21	0.0001
Yr x Mo x Ar x Si	1188	227.88250649	1.49	0.0001
Di x Si	27	1615.00131205	465.00	0.0001
Yr x Di x Si	240	127.59599314	4.13	0.0001
Mo x Di x Si	297	2169.88460844	56.80	0.0001
Yr x Mo x Di x Si	2640	705.00035309	2.08	0.0001
Ar x Di x Si	108	125.76812875	9.05	0.0001
Yr x Ar x Di x Si	960	198.12882283	1.60	0.0001
Mo x Ar x Di x Si	1188	661.61751045	4.33	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	1358.36428416		

R^2 for the model = 0.967952

C.V. = 53.8571

Table 12. Analysis of variance for log-transformed catch per directed effort for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	90639.38504743	-	-
Year (Yr)	9	902.88929209	130.67	0.0001
Month (Mo)	11	262.84776600	31.12	0.0001
Yr x Mo	99	613.55656437	8.07	0.0001
Statistical area (Ar)	4	660.80771498	215.18	0.0001
Yr x Ar	36	473.11648178	17.12	0.0001
Mo x Ar	44	1113.33194870	32.96	0.0001
Yr x Mo x Ar	396	1304.12684889	4.29	0.0001
Depth interval (Di)	9	48182.67743903	6973.40	0.0001
Yr x Di	80	981.13695237	15.97	0.0001
Mo x Di	99	1216.05009670	16.00	0.0001
Yr x Mo x Di	880	3216.48209298	4.76	0.0001
Ar x Di	36	1072.95298953	38.82	0.0001
Yr x Ar x Di	320	1265.42290605	5.15	0.0001
Mo x Ar x Di	396	1694.08796062	5.57	0.0001
Yr x Mo x Ar x Di	3520	8326.19468749	3.08	0.0001
Market size (Si)	3	1207.19295470	524.14	0.0001
Yr x Si	27	49.37964449	2.38	0.0001
Mo x Si	33	777.43209318	30.69	0.0001
Yr x Mo x Si	297	383.56761899	1.68	0.0001
Ar x Si	12	196.19741400	21.30	0.0001
Yr x Ar x Si	108	132.15883752	1.59	0.0001
Mo x Ar x Si	132	301.12897805	2.97	0.0001
Yr x Mo x Ar x Si	1188	1020.41900894	1.12	0.0041
Di x Si	27	968.69271934	46.73	0.0001
Yr x Di x Si	240	386.76720773	2.10	0.0001
Mo x Di x Si	297	1188.71637494	5.21	0.0001
Yr x Mo x Di x Si	2640	2408.36932442	1.19	0.0001
Ar x Di x Si	108	227.91104728	2.75	0.0001
Yr x Ar x Di x Si	960	822.98204146	1.12	0.0091
Mo x Ar x Di x Si	1188	1175.64255783	1.29	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	8107.14548297		

R^2 for the model = 0.910556

C.V. = 65.5280

Table 13. Analysis of variance for log-transformed catch per directed effort per unit water surface area for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	154917.88051361	-	-
Year (Yr)	9	1517.17749684	111.31	0.0001
Month (Mo)	11	598.89687073	35.95	0.0001
Yr x Mo	99	1104.64058499	7.37	0.0001
Statistical area (Ar)	4	2609.70349459	430.79	0.0001
Yr x Ar	36	998.47460373	18.31	0.0001
Mo x Ar	44	2440.41844386	36.62	0.0001
Yr x Mo x Ar	396	2460.93139698	4.10	0.0001
Depth interval (Di)	9	71812.20882345	5268.52	0.0001
Yr x Di	80	1802.92253999	14.88	0.0001
Mo x Di	99	2091.57220744	13.95	0.0001
Yr x Mo x Di	880	5910.42480494	4.43	0.0001
Ar x Di	36	1934.80388753	35.49	0.0001
Yr x Ar x Di	320	2448.21569299	5.05	0.0001
Mo x Ar x Di	396	3247.25027640	5.41	0.0001
Yr x Mo x Ar x Di	3520	15736.05009257	2.95	0.0001
Market size (Si)	3	2391.85261547	526.44	0.0001
Yr x Si	27	112.56332337	2.75	0.0001
Mo x Si	33	1427.42215299	28.56	0.0001
Yr x Mo x Si	297	749.71213572	1.67	0.0001
Ar x Si	12	628.84767302	34.60	0.0001
Yr x Ar x Si	108	301.07394626	1.84	0.0001
Mo x Ar x Si	132	693.89693568	3.47	0.0001
Yr x Mo x Ar x Si	1188	2049.22543047	1.14	0.0011
Di x Si	27	1745.51044807	42.69	0.0001
Yr x Di x Si	240	739.39029069	2.03	0.0001
Mo x Di x Si	297	2193.42122899	4.88	0.0001
Yr x Mo x Di x Si	2640	4613.50685156	1.15	0.0001
Ar x Di x Si	108	479.09850175	2.93	0.0001
Yr x Ar x Di x Si	960	1652.76723590	1.14	0.0030
Mo x Ar x Di x Si	1188	2432.84513884	1.35	0.0001
Yr x Mo x Ar x Di x Si (residual)	23759	15993.05538783		

R^2 for the model = 0.896764

C.V. = 50.8422

Table 14. Polynomial lack of fit analysis for the log-transformed catch of white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	1,315.61		
YL	1	270.60	270.60	380.14**
LOF	8	1,045.01	130.63	
YQ	1	573.98	573.98	806.33**
LOF	7	471.03	67.29	
YC	1	2.58	2.58	3.62^{ns}
LOF	6	468.45	78.08	109.69**
Month	11	1,782.02		
ML	1	269.13	269.13	378.08**
LOF	10	1,512.89	151.29	
MQ	1	437.38	437.38	614.44**
LOF	9	1,075.51	119.50	
MC	1	0.01	0.01	0.01^{ns}
LOF	8	1,075.50	134.44	188.86**
Depth	9	124,864.54		
DL	1	93,018.85	93,018.85	130,673.95**
LOF	8	31,845.69	3,980.71	
DQ	1	22,191.65	22,191.65	31,175.09**
LOF	7	9,654.04	1,379.15	
DC	1	22.85	22.85	32.10**
LOF	6	9,631.19	1,605.20	2,255.00**
Size	3	1,306.12		
SL	1	1,203.71	1,203.71	1,690.99**
LOF	2	102.41	51.21	
SQ	1	101.85	101.85	143.08**
SC	1	0.56	0.56	0.79^{ns}
Residual	10,560	7,517.02	0.71	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 15. Polynomial lack of fit analysis for log-transformed directed effort for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	191.475		
YL	1	93.919	93.919	730.13**
LOF	8	97.556	12.195	
YQ	1	47.606	47.606	370.09**
LOF	7	49.950	7.136	
YC	1	7.843	7.843	60.97**
LOF	6	42.107	7.018	54.56**
Month	11	594.459		
ML	1	120.968	120.968	940.41**
LOF	10	473.491	47.349	
MQ	1	80.113	80.113	622.80**
LOF	9	393.378	43.709	
MC	1	0.067	0.067	0.52^{ns}
LOF	8	393.311	49.164	382.20**
Depth	9	22,588.917		
DL	1	15,288.768	15,288.768	118,855.74**
LOF	8	7,300.149	912.519	
DQ	1	5,138.209	5,138.209	39,944.73**
LOF	7	2,161.940	308.849	
DC	1	100.778	100.778	783.45**
LOF	6	2,061.162	343.527	2,670.60**
Size	3	93.155		
SL	1	73,998	73.998	575.26**
LOF	2	19.157	9.579	
SQ	1	19.094	19.094	148.44**
SC	1	0.063	0.063	0.49^{ns}
Residual	10,560	1,358.364	0.129	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 16. Polynomial lack of fit analysis for log-transformed catch per directed effort for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	902.889		
YL	1	69.843	69.843	90.97**
LOF	8	833.046	104.131	
YQ	1	401.987	401.987	523.61**
LOF	7	431.059	61.580	
YC	1	0.293	0.293	0.38ns
LOF	6	430.766	71.794	93.52**
Month	11	262.848		
ML	1	0.234	0.234	0.30ns
LOF	10	262.614	26.261	
MQ	1	104.742	104.742	136.43**
LOF	9	157.872	17.541	
MC	1	0.029	0.029	0.04ns
LOF	8	157.843	19.730	25.70**
Depth	9	48,182.677		
DL	1	38,974.301	38,974.301	50,766.16**
LOF	8	9,208.376	1,151.047	
DQ	1	5,307.706	5,307.706	6,913.58**
LOF	7	3,900.670	557.239	
DC	1	76.937	76.937	100.21**
LOF	6	3,823.733	637.289	830.10**
Size	3	1,207.193		
SL	1	1,178.978	1,178.978	1,535.68**
LOF	2	28.216	14.108	
SQ	1	28.144	28.144	36.66**
SC	1	0.072	0.072	0.09ns
Residual	10560	8,107.145	0.768	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 17. Polynomial lack of fit analysis for log-transformed catch per directed effort per unit water surface area for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	1,517.18		
YL	1	185.31	185.31	122.36**
LOF	8	1,331.87	166.48	
YQ	1	776.49	776.49	512.71**
LOF	7	555.38	79.34	
YC	1	0.44	0.44	0.29^{ns}
LOF	6	554.94	92.49	61.07**
Month	11	598.90		
ML	1	5.08	5.08	3.35^{ns}
LOF	10	593.82	59.38	
MQ	1	284.16	284.16	187.63**
LOF	9	309.66	34.41	
MC	1	5.68	5.68	3.75^{ns}
LOF	8	303.98	38.00	25.09**
Depth	9	71,812.21		
DL	1	61,368.41	61,368.41	40,520.74**
LOF	8	10,443.80	1,305.48	
DQ	1	6,882.39	6,882.39	4,544.35**
LOF	7	3,561.41	508.77	
DC	1	79.39	79.39	52.42**
LOF	6	3,482.02	580.34	383.19**
Size	3	2,391.85		
SL	1	2,349.67	2,349.67	1,551.46**
LOF	2	42.18	21.09	
SQ	1	41.84	41.84	27.63**
SC	1	0.34	0.34	0.22^{ns}
Residual	10560	15,993.06	1.57	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 18. Analysis of variance for the log-transformed catch of *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	263026.68690983	-	-
Year (Yr)	9	2595.53616149	208.85	0.0001
Month (Mo)	11	1985.49198836	130.72	0.0001
Yr x Mo	99	2776.18776905	20.31	0.0001
Statistical area (Ar)	4	3531.75681411	639.42	0.0001
Yr x Ar	36	1362.89709996	27.42	0.0001
Mo x Ar	44	3081.44176168	50.72	0.0001
Yr x Mo x Ar	396	4671.25688388	8.54	0.0001
Depth interval (Di)	9	93354.84603006	7511.94	0.0001
Yr x Di	80	5618.41900481	50.86	0.0001
Mo x Di	99	17946.05121904	131.28	0.0001
Yr x Mo x Di	880	14702.45138231	12.10	0.0001
Ar x Di	36	4314.72645514	86.80	0.0001
Yr x Ar x Di	320	6413.50828144	14.51	0.0001
Mo x Ar x Di	396	5108.18796498	9.34	0.0001
Yr x Mo x Ar x Di	3520	24720.70379539	5.09	0.0001
Market size (Si)	3	10110.83727282	2440.75	0.0001
Yr x Si	27	356.69032469	9.57	0.0001
Mo x Si	33	5043.89196421	110.69	0.0001
Yr x Mo x Si	297	1983.16338262	4.84	0.0001
Ar x Si	12	486.19914605	29.34	0.0001
Yr x Ar x Si	108	570.22861976	3.82	0.0001
Mo x Ar x Si	132	1273.05278389	6.98	0.0001
Yr x Mo x Ar x Si	1188	2440.03422265	1.49	0.0001
Di x Si	27	16135.33254299	432.78	0.0001
Yr x Di x Si	240	1781.38379828	5.38	0.0001
Mo x Di x Si	297	4486.17857942	10.94	0.0001
Yr x Mo x Di x Si	2640	5798.70780707	1.59	0.0001
Ar x Di x Si	108	834.89372819	5.60	0.0001
Yr x Ar x Di x Si	960	2112.36390783	1.59	0.0001
Mo x Ar x Di x Si	1188	2848.62354195	1.74	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	14581.64267574		

R^2 for the model = 0.944562

C.V. = 32.3871

Table 19. Analysis of variance for log-tranformed directed effort for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	59694.00396972	-	-
Year (Yr)	9	699.72948578	249.41	0.0001
Month (Mo)	11	323.55905105	94.36	0.0001
Yr x Mo	99	503.85825044	16.33	0.0001
Statistical area (Ar)	4	768.57332838	616.39	0.0001
Yr x Ar	36	411.15565816	36.64	0.0001
Mo x Ar	44	692.21489380	50.47	0.0001
Yr x Mo x Ar	396	924.32716462	7.49	0.0001
Depth interval (Di)	9	17497.75174172	6236.89	0.0001
Yr x Di	60	1131.13615832	45.36	0.0001
Mo x Di	99	4528.95888743	146.75	0.0001
Yr x Mo x Di	880	3062.69883301	11.16	0.0001
Ar x Di	36	1665.64957536	148.43	0.0001
Yr x Ar x Di	320	1419.41752065	14.23	0.0001
Mo x Ar x Di	396	1352.66762518	10.90	0.0001
Yr x Mo x Ar x Di	3520	5438.23011945	4.96	0.0001
Market size (Si)	3	1659.60911266	1774.65	0.0001
Yr x Si	27	121.92116097	14.49	0.0001
Mo x Si	33	1509.41530327	146.73	0.0001
Yr x Mo x Si	297	545.53668045	5.89	0.0001
Ar x Si	12	139.13248290	37.19	0.0001
Yr x Ar x Si	108	141.18067135	4.19	0.0001
Mo x Ar x Si	132	464.23133799	11.28	0.0001
Yr x Mo x Ar x Si	1188	597.35985978	1.61	0.0001
Di x Si	27	4840.10093466	575.07	0.0001
Yr x Di x Si	240	563.09911905	7.53	0.0001
Mo x Di x Si	297	1766.00790838	19.07	0.0001
Yr x Mo x Di x Si	2640	1711.57000315	2.08	0.0001
Ar x Di x Si	108	344.34883665	10.23	0.0001
Yr x Ar x Di x Si	960	596.62376548	1.99	0.0001
Mo x Ar x Di x Si	1188	982.11937686	2.65	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	3291.81852276		

R^2 for the model = 0.944855

C.V. = 40.9537

Table 20. Analysis of variance for log-transformed catch per directed effort for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	103029.90397078	-	-
Year (Yr)	9	658.37717381	78.60	0.0001
Month (Mo)	11	480.93455225	46.98	0.0001
Yr x Mo	99	1295.35809423	14.06	0.0001
Statistical area (Ar)	4	1063.17312711	285.58	0.0001
Yr x Ar	36	352.46412220	10.52	0.0001
Mo x Ar	44	695.31973278	21.86	0.0001
Yr x Mo x Ar	396	2337.68799691	6.34	0.0001
Depth interval (Di)	9	36199.01676395	4321.49	0.0001
Yr x Di	80	2310.54519674	31.03	0.0001
Mo x Di	99	5312.62026215	57.66	0.0001
Yr x Mo x Di	880	6721.12390034	8.21	0.0001
Ar x Di	36	719.08088657	21.46	0.0001
Yr x Ar x Di	320	2883.63694417	9.68	0.0001
Mo x Ar x Di	396	2130.43102477	5.78	0.0001
Yr x Mo x Ar x Di	3520	13566.82484464	4.14	0.0001
Market size (Si)	3	3062.05279924	1096.66	0.0001
Yr x Si	27	80.93351959	3.22	0.0001
Mo x Si	33	1101.05496912	35.85	0.0001
Yr x Mo x Si	297	644.49187196	2.33	0.0001
Ar x Si	12	82.17917246	7.36	0.0001
Yr x Ar x Si	108	260.03237428	2.59	0.0001
Mo x Ar x Si	132	257.08442801	2.09	0.0001
Yr x Mo x Ar x Si	1188	1361.20879912	1.23	0.0001
Di x Si	27	2505.45313324	99.70	0.0001
Yr x Di x Si	240	538.12872575	2.41	0.0001
Mo x Di x Si	297	800.43153753	2.90	0.0001
Yr x Mo x Di x Si	2640	2925.62174775	1.19	0.0001
Ar x Di x Si	108	256.87649117	2.56	0.0001
Yr x Ar x Di x Si	960	1141.76094563	1.28	0.0001
Mo x Ar x Di x Si	1188	1257.55639408	1.14	0.0012
Yr x Mo x Ar x Di x Si (residual)	10560	9828.44243924		

R^2 for the model = 0.904606

C.V. = 38.1891

Table 21. Analysis of variance for log-transformed catch per directed effort per unit water surface area for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	193729.38528951	-	-
Year (Yr)	9	1408.97978987	81.12	0.0001
Month (Mo)	11	363.73743042	17.13	0.0001
Yr x Mo	99	2603.99699746	13.63	0.0001
Statistical area (Ar)	4	6467.90234240	837.89	0.0001
Yr x Ar	36	748.48117291	10.77	0.0001
Mo x Ar	44	1835.68447151	21.62	0.0001
Yr x Mo x Ar	396	4604.04934699	6.02	0.0001
Depth interval (Di)	9	53129.76035396	3058.99	0.0001
Yr x Di	80	4724.63524165	30.60	0.0001
Mo x Di	99	9846.81580422	51.54	0.0001
Yr x Mo x Di	880	13105.52283108	7.72	0.0001
Ar x Di	36	2721.54564495	39.17	0.0001
Yr x Ar x Di	320	5916.69435904	9.58	0.0001
Mo x Ar x Di	396	4227.26909859	5.53	0.0001
Yr x Mo x Ar x Di	3520	26798.45847848	3.95	0.0001
Market size (Si)	3	6803.86624370	1175.21	0.0001
Yr x Si	27	208.54907818	4.00	0.0001
Mo x Si	33	2462.36452720	38.67	0.0001
Yr x Mo x Si	297	1342.65663172	2.34	0.0001
Ar x Si	12	290.21914122	12.53	0.0001
Yr x Ar x Si	108	561.26416878	2.69	0.0001
Mo x Ar x Si	132	613.26822323	2.41	0.0001
Yr x Mo x Ar x Si	1188	2829.03504486	1.23	0.0001
Di x Si	27	5206.46487441	99.92	0.0001
Yr x Di x Si	240	1184.37177865	2.56	0.0001
Mo x Di x Si	297	1741.37272302	3.04	0.0001
Yr x Mo x Di x Si	2640	6097.25810077	1.20	0.0001
Ar x Di x Si	108	555.78196130	2.67	0.0001
Yr x Ar x Di x Si	960	2377.54737622	1.28	0.0001
Mo x Ar x Di x Si	1188	2572.88508963	1.12	0.0033
Yr x Mo x Ar x Di x Si (residual)	10560	20378.94696308		

R^2 for the model = 0.894807

C.V. = 33.8102

Table 22. Polynomial lack of fit analysis for the log-transformed catch of *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	2,595.54		
YL	1	1,215.27	1,215.27	880.10**
LOF	8	1,380.27	172.53	
YQ	1	781.99	781.99	566.32**
LOF	7	598.28	85.47	
YC	1	0.70	0.70	0.51^{ns}
LOF	6	597.58	99.60	72.13**
Month	11	1,985.49		
ML	1	501.88	501.88	363.46**
LOF	10	1,483.61	148.36	
MQ	1	704.74	704.74	510.37**
LOF	9	778.87	86.54	
MC	1	416.50	416.50	301.63**
LOF	8	362.37	45.30	32.81**
Depth	9	93,354.85		
DL	1	87,469.17	87,469.17	63,345.02**
LOF	8	5,885.68	735.71	
DQ	1	210.58	210.58	152.50**
LOF	7	5,675.10	810.73	
DC	1	575.65	575.65	416.88**
LOF	6	5,099.45	849.91	615.50**
Size	3	10,110.84		
SL	1	8,441.25	8,441.25	6,113.14**
LOF	2	1,669.58	834.80	
SQ	1	1,669.44	1,669.44	1,209.01**
SC	1	0.14	0.14	0.10^{ns}
Residual	10560	14,581.64	1.38	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 23. Polynomial lack of fit analysis for the log-transformed directed effort for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	699.729		
YL	1	370.806	370.806	1,189.53**
LOF	8	328.923	41.115	
YQ	1	207.032	207.032	664.15**
LOF	7	121.891	17.413	
YC	1	8.373	8.373	26.86**
LOF	6	113.518	18.920	20.69**
Month	11	323.560		
ML	1	61.928	61.928	198.66**
LOF	10	261.632	26.163	
MQ	1	133.154	133.154	427.15**
LOF	9	128.478	14.275	
MC	1	53.055	53.055	170.20**
LOF	8	75.423	9.428	30.24**
Depth	9	17,497.752		
DL	1	15,542.955	15,542.955	49,861.07**
LOF	8	1,954.797	244.350	
DQ	1	212.816	212.816	682.70**
LOF	7	1,741.981	248.854	
DC	1	308.946	308.946	991.08**
LOF	6	1,433.035	238.839	766.18**
Size	3	1,659.609		
SL	1	1,442.506	1,442.506	4,627.49**
LOF	2	217.103	108.552	
SQ	1	214.569	214.569	688.33**
SC	1	2.534	2.534	8.13**
Residual	10560	3,291.819	0.312	

** = significant at P = 0.01.

Table 24. Polynomial lack of fit analysis for the log-transformed catch per directed effort for *Penaeus* sp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	658.377		
YL	1	387.015	387.015	415.82**
LOF	8	271.362	33.920	
YQ	1	78.443	78.443	84.28**
LOF	7	192.919	27.560	
YC	1	1.065	1.065	1.14^{ns}
LOF	6	191.854	31.976	34.36**
Month	11	480.935		
ML	1	117.928	117.928	126.71**
LOF	10	363.007	36.301	
MQ	1	127.271	127.271	136.74**
LOF	9	235.736	26.193	
MC	1	91.448	91.448	98.25**
LOF	8	144.288	18.036	19.38**
Depth	9	36,199.017		
DL	1	33,778.627	33,778.627	36,292.86**
LOF	8	2,420.390	302.549	
DQ	1	1,794.756	1,794.756	1,928.34**
LOF	7	625.634	89.376	
DC	1	50.645	50.645	54.42**
LOF	6	574.989	95.832	102.97**
Size	3	3,062.053		
SL	1	2,402.681	2,402.681	2,581.52**
LOF	2	659.371	329.686	
SQ	1	646.826	646.826	694.97**
SC	1	12.545	12.545	13.48**
Residual	10560	9,828.442	0.931	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 25. Polynomial lack of fit analysis for log-transformed catch per directed effort per unit water surface area for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	1,408.98		
YL	1	934.72	934.72	484.35**
LOF	8	474.26	59.28	
YQ	1	204.77	204.77	106.11**
LOF	7	269.49	38.50	
YC	1	14.02	14.02	7.26**
LOF	6	255.47	42.58	22.06**
Month	11	363.74		
ML	1	43.64	43.64	22.61**
LOF	10	320.10	32.01	
MQ	1	104.33	104.33	54.06**
LOF	9	215.77	23.97	
MC	1	52.27	52.27	27.09**
LOF	8	163.50	20.44	10.59**
Depth	9	53,129.76		
DL	1	45,163.90	45,163.90	23,403.11**
LOF	8	7,965.86	995.73	
DQ	1	6,043.69	6,043.69	3,131.73**
LOF	7	1,922.17	274.60	
DC	1	436.66	436.66	226.27**
LOF	6	1,485.51	247.59	128.30
Size	3	6,803.87		
SL	1	5,472.13	5,472.13	2,835.56**
LOF	2	1,331.74	665.87	
SQ	1	1,311.69	1,311.69	679.69**
SC	1	20.05	20.05	10.39**
Residual	10560	20,378.95	1.93	

** = significant at P = 0.01.

Table 26. Analysis of variance for the catch of brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	160330714218.221400	-	-
Year (Yr)	9	312915929.561273	13.14	0.0001
Month (Mo)	11	3344498971.927751	114.92	0.0001
Yr x Mo	99	1837922228.427703	7.02	0.0001
Statistical Area (Ar)	4	317548400.062019	30.01	0.0001
Yr x Ar	36	438105550.007311	4.60	0.0001
Mo x Ar	44	531667442.537731	4.57	0.0001
Yr x Mo x Ar	396	1457901977.042496	1.39	0.0001
Depth interval (Di)	9	2181608289.238861	91.62	0.0001
Yr x Di	80	1579287877.946722	7.46	0.0001
Mo x Di	99	10367598490.922595	39.58	0.0001
Yr x Mo x Di	880	8210512080.079352	3.53	0.0001
Ar x Di	36	1414402331.994691	14.85	0.0001
Yr x Ar x Di	320	3057050997.284340	3.61	0.0001
Mo x Ar x Di	396	5799382788.124476	5.54	0.0001
Yr x Mo x Ar x Di	3520	15014303289.473952	1.61	0.0001
Market size (si)	3	155978800.059481	19.65	0.0001
Yr x Si	27	358044884.506047	5.01	0.0001
Mo x Si	33	6805884334.766382	77.95	0.0001
Yr x Mo x Si	297	2561125941.685726	3.26	0.0001
Ar x Si	12	425527869.413714	13.40	0.0001
Yr x Ar x Si	108	624968163.919017	2.19	0.0001
Mo x Ar x Si	132	2192341794.356116	6.28	0.0001
Yr x Mo x Ar x Si	1188	3366941550.304812	1.07	0.0531
Di x Si	27	9083036196.293605	127.15	0.0001
Yr x Di x Si	240	2042846665.386214	3.22	0.0001
Mo x Di x Si	297	16793603469.621562	21.37	0.0001
Yr x Mo x Di x Si	2640	12855367200.037218	1.84	0.0001
Ar x Di x Si	108	2581909694.823267	9.04	0.0001
Yr x Ar x Di x Si	960	5096397121.655513	2.01	0.0001
Mo x Ar x Di x Si	1188	11582491134.410836	3.69	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	27939042752.350692		

R^2 for the model = 0.825741

C.V. = 295.4228

Table 27. Analysis of variance for the nominal days fished for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	473883115.21167520	-	-
Year (Yr)	9	296394.84081090	2.02	0.0336
Month (Mo)	11	1050184.33151458	5.84	0.0001
Yr x Mo	99	2856102.72647878	1.77	0.0001
Statistical area (Ar)	4	193034.74752120	2.95	0.0189
Yr x Ar	36	908903.45102050	1.54	0.0197
Mo x Ar	44	958481.63385712	1.33	0.0693
Yr x Mo x Ar	396	7928525.71388102	1.23	0.0018
Depth interval (Di)	9	1297435.37028597	8.82	0.0001
Yr x Di	80	3613152.79675909	2.76	0.0001
Mo x Di	99	6491311.05899258	4.01	0.0001
Yr x Mo x Di	880	25682833.59539866	1.79	0.0001
Ar x Di	36	1388112.41068954	2.36	0.0001
Yr x Ar x Di	320	8192285.16323257	1.57	0.0001
Mo x Ar x Di	396	8492974.45753378	1.31	0.0001
Yr x Mo x Ar x Di	3520	72918272.09063944	1.27	0.0001
Market size (Si)	3	215516.99334779	4.40	0.0045
Yr x Si	27	589630.04320369	1.34	0.1138
Mo x Si	33	3186881.74704421	5.91	0.0001
Yr x Mo x Si	297	6819136.51546903	1.40	0.0001
Ar x Si	12	412289.20276564	2.10	0.0139
Yr x Ar x Si	108	1815505.59709833	1.03	0.4007
Mo x Ar x Si	132	2543163.85703100	1.18	0.0800
Yr x Mo x Ar x Si	1188	18986814.26523634	0.98	0.6927
Di x Si	27	4728474.21084910	10.72	0.0001
Yr x Di x Si	240	5945166.62648536	1.52	0.0001
Mo x Di x Si	297	13534663.49636825	2.79	0.0001
Yr x Mo x Di x Si	2640	60287253.59903338	1.40	0.0001
Ar x Si	108	3424351.01807231	1.94	0.0001
Yr x Ar x Di x Si	960	15002075.93509414	0.96	0.8215
Mo x Ar x Di x Si	1188	21537284.65109273	1.11	0.0073
Yr x Mo x Ar x Di x Si (residual)	10560	172586903.06486827		

R^2 for the model = 0.635803

C.V. = 1234.2910

Table 28. Analysis of variance for log-transformed nominal days fished for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	41005.72559786	-	-
Year (Yr)	9	311.23822788	121.54	0.0001
Month (Mo)	11	1456.61987290	465.39	0.0001
Yr x Mo	99	708.74553257	25.16	0.0001
Statistical area (Ar)	4	284.85049100	250.28	0.0001
Yr x Ar	36	338.74444890	33.07	0.0001
Mo x Ar	44	328.94535276	26.27	0.0001
Yr x Mo x Ar	396	716.08234250	6.36	0.0001
Depth interval (Di)	9	3546.81017571	1385.02	0.0001
Yr x Di	80	995.54394875	43.74	0.0001
Mo x Di	99	4487.05575430	159.29	0.0001
Yr x Mo x Di	880	2681.75555023	10.71	0.0001
Ar x Di	36	443.09649151	43.26	0.0001
Yr x Ar x Di	320	1254.10144934	13.77	0.0001
Mo x Ar x Di	396	872.49502476	7.74	0.0001
Yr x Mo x Ar x Di	2530	4512.13931531	4.51	0.0001
Market size (Si)	3	1169.04150936	1369.53	0.0001
Yr x Si	27	111.93397179	14.57	0.0001
Mo x Si	33	2789.87150846	297.12	0.0001
Yr x Mo x Si	297	639.35926066	7.57	0.0001
Ar x Si	12	174.94299713	51.24	0.0001
Yr x Ar x Si	108	149.14762228	4.85	0.0001
Mo x Ar x Si	132	292.19532979	7.78	0.0001
Yr x Mo x Ar x Si	1188	543.49684726	1.61	0.0001
Di x Si	27	4257.58418841	554.19	0.0001
Yr x Di x Si	240	488.13537865	7.15	0.0001
Mo x Di x Si	297	1601.08038402	18.95	0.0001
Yr x Mo x Di x Si	2640	1424.25818419	1.90	0.0001
Ar x Di x Si	108	244.68549602	7.96	0.0001
Yr x Ar x Di x Si	960	560.61056986	2.05	0.0001
Mo x Ar x Di x Si	1188	616.45191613	1.82	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	3004.70645543		

R^2 for the model = 0.926725

C.V. = 62.9577

Table 29. Analysis of variance for directed effort for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	22028806.52460751	-	-
Year (Yr)	9	44841.74147315	12.23	0.0001
Month (Mo)	11	273767.47592733	61.11	0.0001
Yr x Mo	99	239013.78770326	5.93	0.0001
Statistical area (Ar)	4	23911.29468059	14.68	0.0001
Yr x Ar	36	89731.50307256	6.12	0.0001
Mo x Ar	44	60676.86634167	3.39	0.0001
Yr x Mo x Ar	**396**	**388227.76758148**	**2.41**	**0.0001**
Depth interval (Di)	9	269626.62157814	73.56	0.0001
Yr x Di	80	241658.26334865	7.42	0.0001
Mo x Di	99	1238955.25588970	30.73	0.0001
Yr x Mo x Di	880	1287471.66630169	3.59	0.0001
Ar x Si	36	157575.61255243	10.75	0.0001
Yr x Ar x Di	320	516197.28828023	3.96	0.0001
Mo x Ar x Di	396	497837.58387852	3.09	0.0001
Yr x Mo x Ar x Di	3520	3279747.34978223	2.29	0.0001
Market size (Si)	3	14725.67407514	12.05	0.0001
Yr x Si	27	47913.97469319	4.36	0.0001
Mo x Si	**33**	**894235.11256847**	**66.53**	**0.0001**
Yr x Mo x Si	297	342415.57900556	2.83	0.0001
Ar x Si	12	51542.91074082	10.55	0.0001
Yr x Ar x Si	108	106059.75711389	2.41	0.0001
Mo x Ar x Si	132	202311.31975977	3.76	0.0001
Yr x Mo x Ar x Si	1188	574361.70774105	1.19	0.0001
Di x Si	27	1151477.82123347	104.71	0.0001
Yr x Di x Si	240	306739.48005360	3.14	0.0001
Mo x Di x Si	297	1745769.95139163	14.43	0.0001
Yr x Mo x Di x Si	2640	1825148.19057368	1.70	0.0001
Ar x Di x Si	108	237294.93046912	5.39	0.0001
Yr x Ar x Di x Si	960	642370.63767691	1.64	0.0001
Mo x Ar x Di x Si	1188	976312.62874451	2.02	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	4300886.77037507		

R^2 for the model = 0.804761

C.V. = 281.1646

Table 30. Analysis of variance for catch per nominal days fished for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	56494226.54554296	-	-
Year (Yr)	9	527956.65602187	94.62	0.0001
Month (Mo)	11	3819822.27315212	560.12	0.0001
Yr x Mo	99	1036052.08426405	16.88	0.0001
Statistical area (Ar)	4	265771.74371825	107.17	0.0001
Yr x Ar	36	212156.95382414	9.51	0.0001
Mo x Ar	44	355636.45828833	13.04	0.0001
Yr x Mo x Ar	396	1697916.94269789	6.92	0.0001
Depth interval (Di)	9	7397494.42424932	1325.78	0.0001
Yr x Di	80	1887200.19916098	38.05	0.0001
Mo x Di	99	6060715.52336925	98.75	0.0001
Yr x Mo x Di	880	5399613.68558817	9.90	0.0001
Ar x Di	36	455491.34763812	20.41	0.0001
Yr x Ar x Di	320	1764763.58628615	8.90	0.0001
Mo x Ar x Di	396	1689396.48782670	6.88	0.0001
Yr x Mo x Ar x Di	3520	10030035.68413674	4.60	0.0001
Market size (Si)	3	660394.21202106	355.07	0.0001
Yr x Si	27	52117.03237295	3.11	0.0001
Mo x Si	33	286640.42318190	14.01	0.0001
Yr x Mo x Si	297	332775.08777479	1.81	0.0001
Ar x Si	12	45460.59778083	6.11	0.0001
Yr x Ar x Si	108	98828.97258731	1.48	0.0010
Mo x Ar x Si	132	136831.70847594	1.67	0.0001
Yr x Mo x Ar x Si	1188	842610.22906522	1.14	0.0007
Di x Si	27	707092.10038316	42.24	0.0001
Yr x Di x Si	240	262719.07825590	1.77	0.0001
Mo x Di x Si	297	302113.80575959	1.64	0.0001
Yr x Mo x Di x Si	2640	1898918.76237221	1.16	0.0001
Ar x Di x Si	108	90287.84919674	1.35	0.0096
Yr x Ar x Di x Si	960	819256.22782855	1.38	0.0001
Mo x Ar x Di x Si	1188	811265.41869276	1.10	0.0115
Yr x Mo x Ar x Di x Si (residual)	10560	6546890.98957197		

R^2 for the model = 0.884114

C.V. = 70.9602

Table 31. Analysis of variance for log-transformed catch per nominal days fished for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	106596.20292946	-	-
Year (Yr)	9	1086.94433451	103.84	0.0001
Month (Mo)	11	3766.67787091	294.41	0.0001
Yr x Mo	99	1561.12432787	13.56	0.0001
Statistical area (Ar)	4	913.72595238	196.40	0.0001
Yr x Ar	36	407.72079242	9.74	0.0001
Mo x Ar	44	1017.05474818	19.87	0.0001
Yr x Mo x Ar	396	2514.95685234	5.46	0.0001
Depth interval (Di)	9	19485.46897262	1861.47	0.0001
Yr x Di	80	2454.86698152	26.38	0.0001
Mo x Di	99	10901.98207882	94.68	0.0001
Yr x Mo x Di	880	7508.01939987	7.34	0.0001
Ar x Di	36	751.64869437	17.95	0.0001
Yr x Ar x Di	320	3390.23679734	9.11	0.0001
Mo x Ar x Di	396	2441.41673155	5.30	0.0001
Yr x Mo x Ar x Di	3520	16258.55730735	3.97	0.0001
Market size (Si)	3	3205.37308491	918.64	0.0001
Yr x Si	27	108.58293818	3.46	0.0001
Mo x Si	33	1745.36990641	45.47	0.0001
Yr x Mo x Si	297	833.63741999	2.41	0.0001
Ar x Si	12	137.02337360	9.82	0.0001
Yr x Ar x Si	108	237.78367950	1.89	0.0001
Mo x Ar x Si	132	349.07745287	2.27	0.0001
Yr x Mo x Ar x Si	1188	1608.02585536	1.16	0.0002
Di x Si	27	3073.84092674	97.88	0.0001
Yr x Di x Si	240	590.18141232	2.11	0.0001
Mo x Di x Si	297	879.93872879	2.55	0.0001
Yr x Mo x Di x Si	2640	3735.55077885	1.22	0.0001
Ar x Di x Si	108	222.91232538	1.77	0.0001
Yr x Ar x Di x Si	960	1525.17036429	1.37	0.0001
Mo x Ar x Di x Si	1188	1601.12333162	1.16	0.0002
Yr x Mo x Ar x Di x Si (residual)	10560	12282.20950863		

R^2 for the model = 0.884778

C.V. = 55.0717

Table 32. Analysis of variance for catch per directed effort for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	73693648.15659018	-	-
Year (Yr)	9	466107.91264326	62.18	0.0001
Month (Mo)	11	5297312.39191294	578.20	0.0001
Yr x Mo	99	1322607.61483100	16.04	0.0001
Statistical area (Ar)	4	330671.16963216	99.25	0.0001
Yr x Ar	36	285747.17331377	9.53	0.0001
Mo x Ar	44	479620.09616386	13.09	0.0001
Yr x Mo x Ar	396	2153417.35599621	6.53	0.0001
Depth interval (Di)	9	9225467.83469893	1230.72	0.0001
Yr x Di	80	2135219.19523681	32.05	0.0001
Mo x Di	99	8605122.47308326	104.36	0.0001
Yr x Mo x Di	880	7016458.61934656	9.57	0.0001
Ar x Di	36	397506.95733748	13.26	0.0001
Yr x Ar x Di	320	2061605.47462111	7.74	0.0001
Mo x Ar x Di	396	2310705.29892125	7.01	0.0001
Yr x Mo x Ar x Di	3520	12360188.72897757	4.22	0.0001
Market size (Si)	3	673165.93385448	269.41	0.0001
Yr x Si	27	48975.16450343	2.18	0.0004
Mo x Si	33	481251.59216828	17.51	0.0001
Yr x Mo x Si	297	464285.80107746	1.88	0.0001
Ar x Si	12	53411.73309675	5.34	0.0001
Yr x Ar x Si	108	123598.99452895	1.37	0.0063
Mo x Ar x Si	132	220574.54299337	2.01	0.0001
Yr x Mo x Ar x Si	1188	1138077.46624470	1.15	0.0005
Di x Si	27	1230925.67656275	54.74	0.0001
Yr x Di x Si	240	384141.84622600	1.92	0.0001
Mo x Di x Si	297	713858.70644496	2.89	0.0001
Yr x Mo x Di x Si	2640	2607040.50326851	1.19	0.0001
Ar x Di x Si	108	96554.28483324	1.07	0.2848
Yr x Ar x Di x Si	960	970076.12274848	1.21	0.0001
Mo x Ar x Di x Si	1188	1244677.14496774	1.26	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	8795274.34635493		

R^2 for the model = 0.880651

C.V. = 73.6727

Table 33. Analysis of variance for catch per unit water surface area for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	24338536067173.0110	-	-
Year (Yr)	9	26773352875.5439	7.43	0.0001
Month (Mo)	11	232418576769.4453	52.80	0.0001
Yr x Mo	99	188879534787.4890	4.77	0.0001
Statistical area (Ar)	4	865988842700.7724	540.98	0.0001
Yr x Ar	36	94197140636.8389	6.54	0.0001
Mo x Ar	44	204013853298.6315	11.59	0.0001
Yr x Mo x Ar	396	274168337658.4656	1.73	0.0001
Depth interval (Di)	9	244510260671.5176	67.89	0.0001
Yr x Di	80	263674489724.2983	8.24	0.0001
Mo x Di	99	1043558522099.4665	26.34	0.0001
Yr x Mo x Di	880	1180387387557.2033	3.35	0.0001
Ar x Di	36	336474055270.6262	23.35	0.0001
Yr x Ar x Di	320	567535863200.4565	4.43	0.0001
Mo x Ar x Di	396	1300603024491.5598	8.21	0.0001
Yr x Mo x Ar x Di	3520	2807794588663.6884	1.99	0.0001
Statistical size (Si)	3	14525590532.0073	12.10	0.0001
Yr x Si	27	54852174175.1074	5.08	0.0001
Mo x Si	33	865559815704.8020	65.54	0.0001
Yr x Mo x Si	297	277033897576.0488	2.33	0.0001
Ar x Si	12	65914845428.9548	13.73	0.0001
Yr x Ar x Si	108	85469590547.4009	1.98	0.0001
Mo x Ar x Si	132	965653718688.8728	18.28	0.0001
Yr x Mo x Ar x Si	1188	513377111640.6281	1.08	0.0356
Di x Si	27	945655118310.9643	87.52	0.0001
Yr x Di x Si	240	267726213135.7407	2.79	0.0001
Mo x Di x Si	297	1362059266755.4257	11.46	0.0001
Yr x Mo x Di x Si	2640	1484788856766.4543	1.41	0.0001
Ar x Di x Si	108	911853373888.1263	21.10	0.0001
Yr x Ar x Di x Si	960	752014564896.6725	1.96	0.0001
Mo x Ar x Di x Si	1188	1915008454078.2685	4.03	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	4226065644441.3359		

R^2 for the model = 0.826363

C.V. = 290.6236

Table 34. Analysis of variance for log-transformed catch per unit water surface area for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	399196.93393650	-	-
Year (Yr)	9	4255.64430822	158.28	0.0001
Month (Mo)	11	13392.71240799	407.55	0.0001
Yr x Mo	99	6651.83923407	22.49	0.0001
Statistical area (Ar)	4	7519.61125679	629.28	0.0001
Yr x Ar	36	2401.25149448	22.33	0.0001
Mo x Ar	44	3809.74039835	28.98	0.0001
Yr x Mo x Ar	396	7951.57426742	6.72	0.0001
Depth interval (Di)	9	63262.41843188	2352.94	0.0001
Yr x Di	80	10351.41862356	43.31	0.0001
Mo x Di	99	44619.32667387	150.87	0.0001
Yr x Mo x Di	880	26915.72225132	10.24	0.0001
Ar x Di	36	4187.51885855	38.94	0.0001
Yr x Ar x Di	320	12852.21358323	13.44	0.0001
Mo x Ar x Di	396	8393.56317266	7.10	0.0001
Yr x Mo x Ar x Di	3520	48474.58033144	4.61	0.0001
Market size (Si)	3	16731.54677100	1866.90	0.0001
Yr x Si	27	673.53409123	8.35	0.0001
Mo x Si	33	15236.11880700	154.55	0.0001
Yr x Mo x Si	297	4093.24560214	4.61	0.0001
Ar x Si	12	1308.30055856	36.49	0.0001
Yr x Ar x Si	108	1022.56000892	3.17	0.0001
Mo x Ar x Si	132	1680.35552219	4.26	0.0001
Yr x Mo x Ar x Si	1188	4858.63152935	1.37	0.0001
Di x Si	27	26415.49726038	327.49	0.0001
Yr x Di x Si	240	3246.24860680	4.53	0.0001
Mo x Di x Si	297	5948.18969796	6.70	0.0001
Yr x Mo x Di x Si	2640	11062.91570982	1.40	0.0001
Ar x Di x Si	108	1329.76164990	4.12	0.0001
Yr x Ar x Di x Si	960	4322.28599325	1.51	0.0001
Mo x Ar x Di x Si	1188	4681.67652911	1.32	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	31546.93030506		

R^2 for the model = 0.920974

C.V. = 48.4310

Table 35. Analysis of variance for nominal days fished per unit water surface area for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	186047978027.583800	-	-
Year (Yr)	9	110117551.661310	1.77	0.0678
Month (Mo)	11	144943009.314440	1.91	0.0336
Yr x Mo	99	968878391.648232	1.42	0.0042
Statistical area (Ar)	4	422826004.500294	15.31	0.0001
Yr x Ar	36	483178007.189200	1.94	0.0006
Mo x Ar	44	441581801.330318	1.45	0.0267
Yr x Mo x Ar	396	3697342331.861733	1.35	0.0001
Depth interval (Di)	9	155062928.952154	2.49	0.0077
Yr x Di	80	1240383053.598671	2.24	0.0001
Mo x Di	99	1316339319.816841	1.93	0.0001
Yr x Mo x Di	880	8930077962.874945	1.47	0.0001
Ar x Di	36	506889809.373965	2.04	0.0002
Yr x Ar x Di	320	4596865252.976653	2.08	0.0001
Mo x Ar x Di	396	4056582125.125447	1.48	0.0001
Yr x Mo x Ar x Di	3520	34328780106.006138	1.41	0.0001
Market size (Si)	3	9582413.745507	0.46	0.7125
Yr x Si	27	186576870.254717	1.00	0.4632
Mo x Si	33	560224810.907131	2.46	0.0001
Yr x Mo x Si	297	2065346790.900283	1.01	0.4568
Ar x Si	12	58894038.128494	0.71	0.7426
Yr x Ar x Si	108	740741810.650039	0.99	0.5024
Mo x Ar x Si	132	1240154747.101561	1.36	0.0040
Yr x Mo x Ar x Si	1188	7958123666.831819	0.97	0.7554
Di x Si	27	517438532.114088	2.77	0.0001
Yr x Di x Si	240	1667352007.761256	1.01	0.4629
Mo x Di x Si	297	2425497951.454556	1.18	0.0181
Yr x Mo x Di x Si	2640	18662382758.539720	1.02	0.2225
Ar x Di x Si	108	967162390.345891	1.30	0.0214
Yr x Ar x Di x Si	960	6387851377.316766	0.96	0.7776
Mo x Ar x Di x Si	1188	8267411552.650135	1.01	0.4259
Yr x Mo x Ar x Di x Si (residual)	10560	72933388642.651560		

R^2 for the model = 0.607980

C.V. = 1932.3952

Table 36. Analysis of variance for log-transformed nominal days fished per unit water surface area for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	124756.35408871	-	-
Year (Yr)	9	1221.47430265	155.58	0.0001
Month (Mo)	11	3180.45623484	331.45	0.0001
Yr x Mo	99	2120.59245176	24.56	0.0001
Statistical area (Ar)	4	3567.11374902	1022.31	0.0001
Yr x Ar	36	983.64828927	31.32	0.0001
Mo x Ar	44	1011.26294239	26.35	0.0001
Yr x Mo x Ar	396	2352.65349358	6.81	0.0001
Depth interval (Di)	9	15275.15813747	1945.67	0.0001
Yr x Di	80	3157.98296270	45.25	0.0001
Mo x Di	99	12117.68201478	140.32	0.0001
Yr x Mo x Di	880	8040.80958648	10.47	0.0001
Ar x Di	36	1664.64698276	53.01	0.0001
Yr x Ar x Di	320	4009.70392659	14.36	0.0001
Mo x Ar x Di	396	2616.70749465	7.58	0.0001
Yr x Mo x Ar x Di	3520	14027.94349688	4.57	0.0001
Market size (si)	3	5303.39494019	2026.55	0.0001
Yr x Si	27	306.30168804	13.01	0.0001
Mo x Si	33	0710.69285788	233.12	0.0001
Yr x Mo x Si	297	1607.38733631	6.20	0.0001
Ar x Si	12	620.17211281	59.25	0.0001
Yr x Ar x Si	108	400.98511380	4.26	0.0001
Mo x Ar x Si	132	789.01226302	6.85	0.0001
Yr x Mo x Ar x Si	1188	1599.09175008	1.54	0.0001
Di x Si	27	11117.72554830	472.04	0.0001
Yr x Di x Si	240	1351.49564413	6.46	0.0001
Mo x Di x Si	297	2932.53836043	11.32	0.0001
Yr x Mo x Di x Si	2640	3761.64391981	1.63	0.0001
Ar x Di x Si	108	672.88142088	7.14	0.0001
Yr x Ar x Di x Si	960	1458.51966325	1.74	0.0001
Mo x Ar x Di x Si	1188	1564.99606774	1.51	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	9211.67931622		

R^2 for the model = 0.926163

C.V. = 54.5523

Table 37. Analysis of variance for directed effort per unit water surface area for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	3405478890.29855990	-	-
Year (Yr)	9	13203005.98967191	26.14	0.0001
Month (Mo)	11	15406703.60505592	24.96	0.0001
Yr x Mo	99	25836806.30668345	4.65	0.0001
Statistical area (Ar)	4	129277014.53125354	575.99	0.0001
Yr x Ar	36	37080652.23190734	18.36	0.0001
Mo x Ar	44	12116977.29337091	4.91	0.0001
Yr x Mo x Ar	396	40348341.49601609	1.82	0.0001
Depth interval (Di)	9	59215816.90725585	117.26	0.0001
Yr x Di	80	50271600.89154568	11.20	0.0001
Mo x Di	99	126275161.16826040	22.73	0.0001
Yr x Mo x Di	880	161734678.43724803	3.28	0.0001
Ar x Di	36	67744886.84849366	33.54	0.0001
Yr x Ar x Di	320	107323919.77995130	5.98	0.0001
Mo x Ar x Di	396	133442786.06560207	6.01	0.0001
Yr x Mo x Ar x Di	3520	399606149.50269162	2.02	0.0001
Market size (Si)	3	19522979.97850595	115.98	0.0001
Yr x Si	27	14489103.18386034	9.56	0.0001
Mo x Si	33	131988072.23008292	71.28	0.0001
Yr x Mo x Si	297	44654445.52666500	2.68	0.0001
Ar x Si	12	11603657.38750841	17.23	0.0001
Yr x Ar x Si	108	23695397.29056074	3.91	0.0001
Mo x Ar x Si	132	111582454.10938752	15.07	0.0001
Yr x Mo x Ar x Si	1188	85438259.05935804	1.28	0.0001
Di x Si	27	146466871.26013090	96.68	0.0001
Yr x Di x Si	240	60529840.95113729	4.49	0.0001
Mo x Di x Si	297	144189246.14144931	8.65	0.0001
Yr x Mo x Di x Si	2640	214926048.01739032	1.45	0.0001
Ar x Di x Si	108	118300733.86459477	19.52	0.0001
Yr x Ar x Di x Si	960	129273792.99992166	2.40	0.0001
Mo x Ar x Di x Si	1188	177401333.27583441	2.66	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	592532153.96716510		

R^2 for the model = 0.826006

C.V. = 251.9837

Table 38. Analysis of variance for log-transformed directed effort per unit water surface area for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	119632.92113779	-	-
Year (Yr)	9	1398.83715459	187.93	0.0001
Month (Mo)	11	2815.56749732	309.50	0.0001
Yr x Mo	99	2035.33964307	24.86	0.0001
Statistical area (Ar)	4	3393.35856485	1025.77	0.0001
Yr x Ar	36	957.21723478	32.15	0.0001
Mo x Ar	44	918.04511623	25.23	0.0001
Yr x Mo x Ar	396	2199.08345428	6.71	0.0001
Depth interval (Di)	9	15372.71975855	2065.33	0.0001
Yr x Di	80	3105.22907066	46.93	0.0001
Mo x Di	99	11259.14819251	137.52	0.0001
Yr x Mo x Di	880	7665.26034225	10.53	0.0001
Ar x Di	36	1724.53565647	57.92	0.0001
Yr x Ar x Di	320	3847.76986680	14.54	0.0001
Mo x Ar x Di	396	2484.15999500	7.59	0.0001
Yr x Mo x Ar x Di	3520	13354.28730760	4.59	0.0001
Market size (Si)	3	5358.27646955	2159.66	0.0001
Yr x Si	27	314.72326799	14.09	0.0001
Mo x Si	33	6343.24456160	232.42	0.0001
Yr x Mo x Si	297	1533.78320785	6.24	0.0001
Ar x Si	12	592.93058284	59.75	0.0001
Yr x Ar x Si	108	392.22704160	4.39	0.0001
Mo x Ar x Si	132	747.20986289	6.94	0.0001
Yr x Mo x Ar x Si	1188	1505.44164829	1.53	0.0001
Di x Si	27	10497.36770755	470.11	0.0001
Yr x Di x Si	240	1344.90958490	6.78	0.0001
Mo x Di x Si	297	2628.73320789	10.70	0.0001
Yr x Mo x Di x Si	2640	3574.24065880	1.64	0.0001
Ar x Di x Si	108	662.60732064	7.42	0.0001
Yr x Ar x Di x Si	960	1395.40759159	1.76	0.0001
Mo x Ar x Di x Si	1188	1477.88488001	1.50	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	8733.37468884		

R^2 for the model = 0.926999

C.V. = 54.5133

Table 39. Analysis of variance for catch per nominal days fished per unit water surface area for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	13389322027.1345950	-	-
Year (Yr)	9	63292559.6233473	53.18	0.0001
Month (Mo)	11	254591385.3444924	175.02	0.0001
Yr x Mo	99	156522306.6796551	11.96	0.0001
Statistical area (Ar)	4	2524341114.4608154	4772.21	0.0001
Yr x Ar	36	66957309.7160683	14.06	0.0001
Mo x Ar	44	161696762.9472847	27.78	0.0001
Yr x Mo x Ar	396	356065107.9278660	6.80	0.0001
Depth interval (Di)	9	877004657.1143522	736.87	0.0001
Yr x Di	80	231572863.0724220	21.89	0.0001
Mo x Di	99	671998286.6005725	51.33	0.0001
Yr x Mo x Di	880	799273138.3225364	6.87	0.0001
Ar x Di	36	772752865.4227676	162.32	0.0001
Yr x Ar x Di	320	367698110.8889408	8.69	0.0001
Mo x Ar x Di	396	615033021.7547197	11.74	0.0001
Yr x Mo x Ar x Di	3520	2196817398.0353269	4.72	0.0001
Market size (Si)	3	177023646.1858654	446.21	0.0001
Yr x Si	27	11559502.0060158	3.24	0.0001
Mo x Si	33	60465505.5543785	13.86	0.0001
Yr x Mo x Si	297	81888207.2433615	2.08	0.0001
Ar x Si	12	112027997.9648666	70.60	0.0001
Yr x Ar x Si	108	38829483.3044100	2.72	0.0001
Mo x Ar x Si	132	63716425.0977459	3.65	0.0001
Yr x Mo x Ar x Si	1188	218567271.2531528	1.39	0.0001
Di x Si	27	151481910.3630333	42.43	0.0001
Yr x Di x Si	240	54300451.1196947	1.71	0.0001
Mo x Di x Si	297	54852343.1943274	1.40	0.0001
Yr x Mo x Di x Si	2640	390627063.9049606	1.12	0.0001
Ar x Di x Si	108	106021600.3806200	7.42	0.0001
Yr x Ar x Di x Si	960	184884738.9977379	1.46	0.0001
Mo x Ar x Di x Si	1188	170986304.4533281	1.09	0.0233
Yr x Mo x Ar x Di x Si (residual)	10560	1396472688.1999397		

R^2 for the model = 0.895703

C.V. = 84.2604

Table 40. Analysis of variance for log-transformed catch per unit nominal days fished per unit water surface area for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	204814.87809884	-	-
Year (Yr)	9	2309.13827178	112.31	0.0001
Month (Mo)	11	4814.25094583	191.59	0.0001
Yr x Mo	99	3042.43726755	13.45	0.0001
Statistical area (Ar)	4	4799.29460044	525.22	0.0001
Yr x Ar	36	907.77832837	11.04	0.0001
Mo x Ar	44	1741.62892398	17.33	0.0001
Yr x Mo x Ar	396	4779.11598163	5.28	0.0001
Depth interval (Di)	9	35369.65766638	1720.34	0.0001
Yr x Di	80	4817.57704002	26.36	0.0001
Mo x Di	99	18638.62690901	82.41	0.0001
Yr x Mo x Di	880	14094.58511500	7.01	0.0001
Ar x Di	36	2055.23277297	24.99	0.0001
Yr x Ar x Di	320	6725.66119554	9.20	0.0001
Mo x Ar x Di	396	4816.75736432	5.32	0.0001
Yr x Mo x Ar x Di	3520	30719.62641430	3.82	0.0001
Market size (Si)	3	6976.44286510	1017.98	0.0001
Yr x Si	27	263.48659890	4.27	0.0001
Mo x Si	33	3708.73301269	49.20	0.0001
Yr x Mo x Si	297	1695.01395391	2.50	0.0001
Ar x Si	12	420.15596918	15.33	0.0001
Yr x Ar x Si	108	521.75540346	2.11	0.0001
Mo x Ar x Si	132	800.23604644	2.65	0.0001
Yr x Mo x Ar x Si	1188	3242.45037526	1.19	0.0001
Di x Si	27	6351.69856302	102.98	0.0001
Yr x Di x Si	240	1265.39806715	2.31	0.0001
Mo x Di x Si	297	1744.68033002	2.57	0.0001
Yr x Mo x Di x Si	2640	7343.54619607	1.22	0.0001
Ar x Di x Si	108	561.55892381	2.28	0.0001
Yr x Ar x Di x Si	960	3030.41435433	1.38	0.0001
Mo x Ar x Di x Si	1188	3134.55827680	1.16	0.0003
Yr x Mo x Ar x Di x Si (residual)	10560	24123.38036556		

R^2 for the model = 0.882219

C.V. = 44.5428

Table 41. Analysis of variance for catch per directed effort per unit water surface area for brown shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	15539425134.0605170	-	-
Year (Yr)	9	51952331.8725100	37.10	0.0001
Month (Mo)	11	332646155.8078871	194.37	0.0001
Yr x Mo	99	178538223.9463615	11.59	0.0001
Statistical area (Ar)	4	2979032533.6716537	4786.83	0.0001
Yr x Ar	36	90351534.5027685	16.13	0.0001
Mo x Ar	44	203799385.2812395	29.77	0.0001
Yr x Mo x Ar	396	430783549.2062397	6.99	0.0001
Depth interval (Di)	9	875279443.2338380	625.08	0.0001
Yr x Di	80	254964116.2490129	20.48	0.0001
Mo x Di	99	856121994.1676073	55.58	0.0001
Yr x Mo x Di	880	933020590.7986497	6.81	0.0001
Ar x Di	36	763907925.7635583	136.39	0.0001
Yr x Ar x Di	320	426149325.1866522	8.56	0.0001
Mo x Ar x Di	396	764151778.9631900	12.40	0.0001
Yr x Mo x Ar x Di	3520	2486955617.4615001	4.54	0.0001
Market size (Si)	3	183903580.2165642	394.00	0.0001
Yr x Si	27	12587574.5299673	3.00	0.0001
Mo x Si	33	84070741.5660353	16.37	0.0001
Yr x Mo x Si	297	102439522.0343475	2.22	0.0001
Ar x Si	12	121081005.5235968	64.85	0.0001
Yr x Ar x Si	108	41544477.3778801	2.47	0.0001
Mo x Ar x Si	132	87872443.2709589	4.28	0.0001
Yr x Mo x Ar x Si	1188	269745820.4721107	1.46	0.0001
Di x Si	27	199523255.0028267	47.50	0.0001
Yr x Di x Si	240	66039961.7742586	1.77	0.0001
Mo x Di x Si	297	78160174.2340918	1.69	0.0001
Yr x Mo x Di x Si	2640	466022638.7412748	1.13	0.0001
Ar x Di x Si	108	121673062.8999767	7.24	0.0001
Yr x Ar x Di x Si	960	214408025.1946325	1.44	0.0001
Mo x Ar x Di x Si	1188	219721137.9886255	1.19	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	1642977207.1207008		

R^2 for the model = 0.894270

C.V. = 83.8514

Table 42. Analysis of variance for the catch of white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	190262121298.656320	-	-
Year (Yr)	9	441575273.771869	26.55	0.0001
Month (Mo)	11	4471840147.081742	219.95	0.0001
Yr x Mo	99	1029848488.453856	5.63	0.0001
Statistical area (Ar)	4	1619994877.543883	219.13	0.0001
Yr x Ar	36	394356111.912539	5.93	0.0001
Mo x Ar	44	1302305677.877596	16.01	0.0001
Yr x Mo x Ar	396	1419179740.383913	1.94	0.0001
Depth interval (Di)	9	29560056569.269748	1777.06	0.0001
Yr x Di	80	1750185896.746033	11.84	0.0001
Mo x Di	99	17713688919.822107	96.81	0.0001
Yr x Mo x Di	880	5344180240.464290	3.29	0.0001
Ar x Di	36	6854062415.232051	103.01	0.0001
Yr x Ar x Di	320	2711102834.709133	4.58	0.0001
Mo x Ar x Di	396	6248078633.546722	8.54	0.0001
Yr x Mo x Ar x Di	3520	11425343349.468992	1.76	0.0001
Market size (Si)	3	446865475.161607	80.59	0.0001
Yr x Si	27	288754272.572530	5.79	0.0001
Mo x Si	33	3772550255.210975	61.85	0.0001
Yr x Mo x Si	297	1135202171.027540	2.07	0.0001
Ar x Si	12	178596288.572084	8.05	0.0001
Yr x Ar x Si	108	386248818.099323	1.94	0.0001
Mo x Ar x Si	132	1285337817.242736	5.27	0.0001
Yr x Mo x Ar x Si	1188	2326532012.694366	1.06	0.0871
Di x Si	27	13419396831.295809	268.91	0.0001
Yr x Di x Si	240	1912141059.604285	4.31	0.0001
Mo x Di x Si	297	26727084217.522330	48.69	0.0001
Yr x Mo x Di x Si	2640	7567424179.448957	1.55	0.0001
Ar x Di x Si	108	3712141933.215428	18.60	0.0001
Yr x Ar x Di x Si	960	3661024422.838456	2.06	0.0001
Mo x Ar x Di x Si	1188	11639538211.452281	5.30	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	19517484156.413284		

R^2 for the model = 0.897418

C.V. = 222.8181

Table 43. Analysis of variance for the nominal days fished for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	350594702.80031985	-	-
Year (Yr)	9	216032.04026074	2.15	0.0222
Month (Mo)	11	1674672.91774936	13.66	0.0001
Yr x Mo	99	1378521.96816357	1.25	0.0478
Statistical area (Ar)	4	739325.47819992	16.59	0.0001
Yr x Ar	36	760206.09605653	1.90	0.0010
Mo x Ar	44	1215050.03894961	2.48	0.0001
Yr x Mo x Ar	396	5483798.83192580	1.24	0.0009
Depth interval (Di)	9	12593223.71586672	125.59	0.0001
Yr x Di	80	1359891.78473799	1.53	0.0018
Mo x Di	99	8449281.40228122	7.66	0.0001
Yr x Mo x Di	880	12523940.04777865	1.28	0.0001
Ar x Di	36	3709585.90641978	9.25	0.0001
Yr x Ar x Di	320	6598852.11117776	1.85	0.0001
Mo x Ar x Di	396	9325976.65129877	2.11	0.0001
Yr x Mo x Ar x Di	3520	48959096.06537825	1.25	0.0001
Market size (Si)	3	267005.45760924	7.99	0.0001
Yr x Si	27	419907.92903054	1.40	0.0831
Mo x Si	33	2232767.65859018	6.07	0.0001
Yr x Mo x Si	297	3221781.32470234	0.97	0.6155
Ar x Si	12	263833.94625940	1.97	0.0226
Yr x Ar x Si	108	1477106.93548401	1.23	0.0554
Mo x Ar x Si	132	2394958.94427351	1.63	0.0001
Yr x Mo x Ar x Si	1188	13087909.49299597	0.99	0.5981
Di x Si	27	6173929.76093104	20.52	0.0001
Yr x Di x Si	240	3869195.11240237	1.45	0.0001
Mo x Di x Si	297	17452391.81929315	5.27	0.0001
Yr x Mo x Di x Si	2640	28693923.52567898	0.98	0.7873
Ar x Di x Si	108	3550560.23655844	2.95	0.0001
Yr x Ar x Di x Si	960	13313595.18517015	1.24	0.0001
Mo x Ar x Di x Si	1188	21533190.79457789	1.63	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	117655189.61051798		

R^2 for the model = 0.664413

C.V. = 864.1998

Table 44. Analysis of variance for log-transformed nominal days fished for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	45659.71920439	-	-
Year (Yr)	9	170.53664812	138.30	0.0001
Month (Mo)	11	621.08242087	412.11	0.0001
Yr x Mo	99	180.41749516	13.30	0.0001
Statistical area (Ar)	4	568.00287053	1036.46	0.0001
Yr x Ar	36	100.10268439	20.30	0.0001
Mo x Ar	44	431.14575143	71.52	0.0001
Yr x Mo x Ar	396	385.66530818	7.11	0.0001
Depth interval (Di)	9	24645.57618335	19987.43	0.0001
Yr x Di	80	333.60219213	30.44	0.0001
Mo x Di	99	2450.87237152	180.69	0.0001
Yr x Mo x Di	880	1083.22473587	8.98	0.0001
Ar x Di	36	1698.39769155	344.35	0.0001
Yr x Ar x Di	320	602.88230532	13.75	0.0001
Mo x Ar x Di	396	956.59509997	17.63	0.0001
Yr x Mo x Ar x Di	3520	2401.83302908	4.98	0.0001
Market size (Si)	3	94.05686207	228.84	0.0001
Yr x Si	27	34.60350599	9.35	0.0001
Mo x Si	33	738.73881678	163.39	0.0001
Yr x Mo x Si	297	176.59224238	4.34	0.0001
Ar x Si	12	26.37619841	16.04	0.0001
Yr x Ar x Si	108	39.90310126	2.70	0.0001
Mo x Ar x Si	132	205.27533297	11.35	0.0001
Yr x Mo x Ar x Si	1188	242.57268698	1.49	0.0001
Di x Si	27	1741.35631700	470.74	0.0001
Yr x Di x Si	240	129.34571891	3.93	0.0001
Mo x Di x Si	297	2351.43004022	57.79	0.0001
Yr x Mo x Di x Si	2640	753.82957975	2.08	0.0001
Ar x Di x Si	108	125.21305266	8.46	0.0001
Yr x Ar x Di x Si	960	215.58644167	1.64	0.0001
Mo x Ar x Di x Si	1188	708.11909936	4.35	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	1446.78342052		

R^2 for the model = 0.968314

C.V. = 53.2976

Table 45. Analysis of variance for directed effort for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	37334226.73646945	-	-
Year (Yr)	9	82698.10077465	25.68	0.0001
Month (Mo)	11	751957.56378298	191.07	0.0001
Yr x Mo	99	210339.07726414	5.94	0.0001
Statistical area (Ar)	4	387405.56667031	270.70	0.0001
Yr x Ar	36	103945.46441489	8.07	0.0001
Mo x Ar	44	254437.18731901	16.16	0.0001
Yr x Mo x Ar	396	422913.77591565	2.98	0.0001
Depth interval (Di)	9	6780514.43208269	2105.74	0.0001
Yr x Di	80	304471.20813327	10.64	0.0001
Mo x Di	99	2976132.66081045	84.02	0.0001
Yr x Mo x Di	880	1327098.50544284	4.22	0.0001
Ar x Di	36	1573032.48343552	122.13	0.0001
Yr x Ar x Di	320	658771.52102099	5.75	0.0001
Mo x Ar x Di	396	1368413.15253564	9.66	0.0001
Yr x Mo x Ar x Di	3520	3260904.62139674	2.59	0.0001
Market size (Si)	3	35532.17432943	33.10	0.0001
Yr x Si	27	60689.57508920	6.28	0.0001
Mo x Si	33	632416.62713417	53.56	0.0001
Yr x Mo x Si	297	213539.06140150	2.01	0.0001
Ar x Si	12	17532.09676092	4.08	0.0001
Yr x Ar x Si	108	79913.33124911	2.07	0.0001
Mo x Ar x Si	132	234256.00519846	4.96	0.0001
Yr x Mo x Ar x Si	1188	457485.83197816	1.08	0.0420
Di x Si	27	2172733.19147492	224.92	0.0001
Yr x Di x Si	240	451211.22314690	5.25	0.0001
Mo x Di x Si	297	4035412.44400844	37.98	0.0001
Yr x Mo x Di x Si	2640	1492075.33023921	1.58	0.0001
Ar x Di x Si	108	540996.10892353	14.00	0.0001
Yr x Ar x Di x Si	960	733876.23694466	2.14	0.0001
Mo x Ar x Di x Si	1188	1935381.80360473	4.55	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	3778142.37398636		

R^2 for the model = 0.898802

C.V. = 199.5979

Table 46. Analysis of variance for catch per nominal days fished for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	32664996.49904206	-	-
Year (Yr)	9	654959.69575972	194.01	0.0001
Month (Mo)	11	219321.39128144	53.32	0.0001
Yr x Mo	99	454735.67146494	12.28	0.0001
Statistical area (Ar)	4	126127.61620394	84.32	0.0001
Yr x Ar	36	210391.14721194	15.63	0.0001
Mo x Ar	44	268042.60295101	16.29	0.0001
Yr x Mo x Ar	396	813982.09814694	5.50	0.0001
Depth interval (Di)	9	10360139.48452011	3078.41	0.0001
Yr x Di	80	694405.62464112	23.21	0.0001
Mo x Di	99	789508.95949442	21.33	0.0001
Yr x Mo x Di	880	2232080.00316622	6.78	0.0001
Ar x Di	36	423456.14563430	31.46	0.0001
Yr x Ar x Di	320	720878.80913230	6.02	0.0001
Mo x Ar x Di	396	948192.84088102	6.40	0.0001
Yr x Mo x Ar x Di	3520	5497525.78303924	4.18	0.0001
Market size (Si)	3	316438.43175507	282.08	0.0001
Yr x Si	27	31974.39459233	3.17	0.0001
Mo x Si	33	212562.30430851	17.23	0.0001
Yr x Mo x Si	297	165009.53838442	1.49	0.0001
Ar x Si	12	57339.41671175	12.76	0.0001
Yr x Ar x Si	108	87103.98606735	2.16	0.0001
Mo x Ar x Si	132	99187.22314586	2.01	0.0001
Yr x Mo x Ar x Si	1188	491557.54448883	1.11	0.0086
Di x Si	27	239177.34364537	23.69	0.0001
Yr x Di x Si	240	150991.81476974	1.68	0.0001
Mo x Di x Si	297	304168.91040199	2.74	0.0001
Yr x Mo x Di x Si	2640	1146369.56753887	1.16	0.0001
Ar x Di x Si	108	72055.96871530	1.78	0.0001
Yr x Ar x Di x Si	960	383662.15638122	1.07	0.0775
Mo x Ar x Di x Si	1188	544871.56465925	1.23	o.0001
Yr x Mo x Ar x Di x Si (residual)	10560	3948758.45994699		

R^2 for the model = 0.879113

C.V. = 96.0150

Table 47. Analysis of variance for log-transformed catch per nominal days fished for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	85846.83758399	-	-
Year (Yr)	9	941.71946744	142.11	0.0001
Month (Mo)	11	242.30022977	29.92	0.0001
Yr x Mo	99	592.13020808	8.12	0.0001
Statistical area (Ar)	4	622.62169643	211.41	0.0001
Yr x Ar	36	454.90854504	17.16	0.0001
Mo x Ar	44	1068.67085711	32.99	0.0001
Yr x Mo x Ar	396	1253.38180158	4.30	0.0001
Depth interval (Di)	9	44905.92323003	6776.69	0.0001
Yr x Di	80	1009.18449977	17.13	0.0001
Mo x Di	99	1161.91827951	15.94	0.0001
Yr x Mo x Di	880	3098.52603893	4.78	0.0001
Ar x Di	36	1046.56840428	39.48	0.0001
Yr x Ar x Di	320	1209.91223848	5.14	0.0001
Mo x Ar x Di	396	1613.34492230	5.53	0.0001
Yr x Mo x Ar x Di	3520	8079.54167627	3.12	0.0001
Market size (Si)	3	1184.18336547	536.11	0.0001
Yr x Si	27	49.64672529	2.50	0.0001
Mo x Si	33	736.61549028	30.32	0.0001
Yr x Mo x Si	297	364.37267988	1.67	0.0001
Ar x Si	12	191.61756608	21.69	0.0001
Yr x Ar x Si	108	130.04671683	1.64	0.0001
Mo x Ar x Si	132	283.89603828	2.92	0.0001
Yr x Mo x Ar x Si	1188	981.44793686	1.12	0.0033
Di x Si	27	903.05208361	45.43	0.0001
Yr x Di x Si	240	381.38719833	2.16	0.0001
Mo x Di x Si	297	1125.25665646	5.15	0.0001
Yr x Mo x Di x Si	2640	2307.90176091	1.19	0.0001
Ar x Di x Si	108	216.59763278	2.72	0.0001
Yr x Ar x Di x Si	960	785.44308668	1.11	0.0120
Mo x Ar x Di x Si	1188	1129.58920576	1.29	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	7775.13134547		

R^2 for the model = 0.909430

C.V. = 65.9847

Table 48. Analysis of variance for catch per directed effort for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	20788026.78706868	-	-
Year (Yr)	9	712718.02867549	184.49	0.0001
Month (Mo)	11	322804.23323501	68.36	0.0001
Yr x Mo	99	524458.83551288	12.34	0.0001
Statistical area (Ar)	4	158088.45911871	92.07	0.0001
Yr x Ar	36	303825.89994814	19.66	0.0001
Mo x Ar	44	331843.31376136	17.57	0.0001
Yr x Mo x Ar	396	1063820.16712809	6.26	0.0001
Depth interval (Di)	9	13762387.11107138	3562.36	0.0001
Yr x Di	80	822816.18903414	23.96	0.0001
Mo x Di	99	1113409.63066989	26.20	0.0001
Yr x Mo x Di	880	2529740.40738978	6.70	0.0001
Ar x Di	36	610037.85884265	39.48	0.0001
Yr x Ar x Di	320	895029.98559779	6.52	0.0001
Mo x Ar x Di	396	1190369.79573920	7.00	0.0001
Yr x Mo x Ar x Di	3520	6777526.03198574	4.49	0.0001
Market size (Si)	3	346789.00994191	269.30	0.0001
Yr x Si	27	32603.77105844	2.81	0.0001
Mo x Si	33	265930.94553922	18.77	0.0001
Yr x Mo x Si	297	185439.30391537	1.45	0.0001
Ar x Si	12	73348.85341632	14.24	0.0001
Yr x Ar x Si	108	113168.37093803	2.44	0.0001
Mo x Ar x Si	132	123103.62515102	2.17	0.0001
Yr x Mo x Ar x Si	1188	559035.52691747	1.10	0.0154
Di x Si	27	315527.53292349	27.22	0.0001
Yr x Di x Si	240	170863.72221428	1.66	0.0001
Mo x Di x Si	297	386677.15948721	3.03	0.0001
Yr x Mo x Di x Si	2640	1336041.73552144	1.18	0.0001
Ar x Di x Si	108	82500.59500978	1.78	0.0001
Yr x Ar x Di x Si	960	474752.43844407	1.15	0.0012
Mo x Ar x Di x Si	1188	670461.25005056	1.31	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	4532906.99892984		

R^2 for the model = 0.888867

C.V. = 91.8067

Table 49. Analysis of variance for catch per unit water surface area for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	9090404554160.30300	-	-
Year (Yr)	9	18180801020.23979	17.25	0.0001
Month (Mo)	11	226187569548.88731	175.56	0.0001
Yr x Mo	99	50360880260.19287	4.34	0.0001
Statistical area (Ar)	4	90686973674.57975	193.56	0.0001
Yr x Ar	36	21842096429.28360	5.18	0.0001
Mo x Ar	44	171715945628.00742	33.32	0.0001
Yr x Mo x Ar	396	97735844030.74928	2.11	0.0001
Depth interval (Di)	9	1022486289770.32100	969.96	0.0001
Yr x Di	80	72067586274.07346	7.69	0.0001
Mo x Di	99	757001634927.15450	65.28	0.0001
Yr x Mo x Di	880	280464849742.83323	2.72	0.0001
Ar x Di	36	249157271183.88772	59.09	0.0001
Yr x Ar x Di	320	155704181095.01026	4.15	0.0001
Mo x Ar x Di	396	518739201355.03210	11.18	0.0001
Yr x Mo x Ar x Di	3520	871068164799.25220	2.11	0.0001
Market size (Si)	3	20949024953.14021	59.62	0.0001
Yr x Si	27	15270014886.06161	4.83	0.0001
Mo x Si	33	144761878188.73840	37.45	0.0001
Yr x Mo x Si	297	56789596101.50960	1.63	0.0001
Ar x Si	12	14545901170.51471	10.35	0.0001
Yr x Ar x Si	108	26281185091.45320	2.08	0.0001
Mo x Ar x Si	132	72023612967.48916	4.66	0.0001
Yr x Mo x Ar x Si	1188	165943245754.95411	1.19	0.0001
Di x Si	27	510713215237.51260	161.49	0.0001
Yr x Di x Si	240	83790911981.33243	2.98	0.0001
Mo x Di x Si	297	1054756848440.92920	30.32	0.0001
Yr x Mo x Di x Si	2640	369113400334.12690	1.19	0.0001
Ar x Di x Si	108	84232034038.29946	6.66	0.0001
Yr x Ar x Di x Si	960	196434250611.11292	1.75	0.0001
Mo x Ar x Di x Si	1188	434527220398.93143	3.12	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	1236872924274.69530		

R^2 for the model = 0.863936

C.V. = 282.7426

Table 50. Analysis of variance for log-transformed catch per unit water surface area for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	320500.08109528	-	-
Year (Yr)	9	2539.09331141	180.49	0.0001
Month (Mo)	11	2567.52943319	149.33	0.0001
Yr x Mo	99	1547.19194790	10.00	0.0001
Statistical area (Ar)	4	4143.67825280	662.73	0.0001
Yr x Ar	36	1415.89958116	25.16	0.0001
Mo x Ar	44	4820.94311220	70.10	0.0001
Yr x Mo x Ar	396	3700.91013646	5.98	0.0001
Depth interval (Di)	9	190861.39975767	13567.10	0.0001
Yr x Di	80	2934.58635136	23.47	0.0001
Mo x Di	99	9082.71949004	58.69	0.0001
Yr x Mo x Di	880	8914.71246964	6.48	0.0001
Ar x Di	36	5172.37905960	91.92	0.0001
Yr x Ar x Di	320	3974.55451768	7.95	0.0001
Mo x Ar x Di	396	5756.42755775	9.30	0.0001
Yr x Mo x Ar x Di	3520	21601.15836600	3.93	0.0001
Market size	3	3108.04135599	662.79	0.0001
Yr x Si	27	213.81825652	5.07	0.0001
Mo x Si	33	4307.67742405	83.51	0.0001
Yr x Mo x Si	297	1277.87700664	2.75	0.0001
Ar x Si	12	749.94943934	39.98	0.0001
Yr x Ar x Si	108	398.28871328	2.36	0.0001
Mo x Ar x Si	132	1372.45195654	6.65	0.0001
Yr x Mo x Ar x Si	1188	2446.35612419	1.32	0.0001
Di x Si	27	6736.55028960	159.62	0.0001
Yr x Di x Si	240	993.16723646	2.65	0.0001
Mo x Di x Si	297	8255.30526418	17.78	0.0001
Yr x Mo x Di x Si	2640	5527.30907614	1.34	0.0001
Ar x Di x Si	108	508.20194204	3.01	0.0001
Yr x Ar x Di x Si	960	1832.00898490	1.22	0.0001
Mo x Ar x Di x Si	1188	3233.49306084	1.74	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	16506.40161970		

R^2 for the model = 0.949444

C.V. = 51.9501

Table 51. Analysis of variance for nominal days fished per unit water surface area for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	10323982527.2839300	-	-
Year (Yr)	9	5339295.3492508	2.37	0.0114
Month (Mo)	11	73368289.3278918	26.65	0.0001
Yr x Mo	99	58425614.1939515	2.36	0.0001
Statistical area (Ar)	4	51912714.6526018	51.86	0.0001
Yr x Ar	36	27962829.9563271	3.10	0.0001
Mo x Ar	**44**	**73501354.1651946**	**6.67**	**0.0001**
Yr x Mo x Ar	396	235750998.6551857	2.36	0.0001
Depth interval (Di)	9	471807016.5051435	209.46	0.0001
Yr x Di	80	55058013.9834063	2.75	0.0001
Mo x Di	99	323158615.2966144	13.04	0.0001
Yr x Mo x Di	880	515809951.2479844	2.34	0.0001
Ar x Di	36	153420207.4538272	17.03	0.0001
Yr x Ar x Di	320	305971559.7711033	3.82	0.0001
Mo x Ar x Di	396	357716305.6513112	3.61	0.0001
Yr x Mo x Ar x Di	3520	2227698422.2949609	2.53	0.0001
Market size (Si)	3	9542722.0179475	12.71	0.0001
Yr x Si	27	7706605.1825322	1.14	0.2798
Mo x Si	35	75555841.9524821	9.15	0.0001
Yr x Mo x Si	297	67450821.1775701	0.91	0.8694
Ar x Si	12	6278549.2307199	2.09	0.0145
Yr x Ar x Si	108	29376408.9050067	1.09	0.2541
Mo x Ar x Si	132	57525033.7519922	1.74	0.0001
Yr x Mo x Ar x Si	1188	291365302.1863636	0.98	0.6756
Di x Si	27	205244163.4357691	30.37	0.0001
Yr x Di x Si	240	74954332.3228141	1.25	0.0060
Mo x Di x Si	297	573995051.0330876	7.72	0.0001
Yr x Mo x Di x Si	2640	608963627.5419470	0.92	0.9956
Ar x Di x Si	108	46512539.1246283	1.72	0.0001
Yr x Ar x Di x Si	960	273068387.5676571	1.14	0.0030
Mo x Ar x Di x Si	1188	416624370.5567419	1.40	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	2642917582.1919250		

R^2 for the model = 0.744002

C.V. = 643.3483

Table 52. Analysis of variance for log-transformed nominal days fished per unit water surface area for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	100580.45911359	-	-
Year (Yr)	9	560.33321546	155.09	0.0001
Month (Mo)	11	1231.54545784	278.90	0.0001
Yr x Mo	99	440.99704482	11.10	0.0001
Statistical area (Ar)	4	1627.78255780	1013.74	0.0001
Yr x Ar	36	358.38520455	24.80	0.0001
Mo x Ar	44	1558.29045013	88.22	0.0001
Yr x Mo x Ar	396	1067.17547874	6.71	0.0001
Depth interval (Di)	9	54177.92700586	14995.79	0.0001
Yr x Di	80	807.76749259	25.15	0.0001
Mo x Di	99	4273.55346046	107.53	0.0001
Yr x Mo x Di	880	2695.29262439	7.63	0.0001
Ar x Di	36	2427.24274891	167.96	0.0001
Yr x Ar x Di	320	1433.48126456	11.16	0.0001
Mo x Ar x Di	396	2107.90198682	13.26	0.0001
Yr x Mo x Ar x Di	3520	6280.36319107	4.44	0.0001
Market size (Si)	3	551.11649535	457.63	0.0001
Yr x Si	27	63.41239054	7.70	0.0001
Mo x Si	33	1577.93313745	119.11	0.0001
Yr x Mo x Si	297	429.65110920	3.60	0.0001
Ar x Si	12	195.67504802	40.62	0.0001
Yr x Ar x Si	108	123.23242021	2.84	0.0001
Mo x Ar x Si	132	528.33072307	9.97	0.0001
Yr x Mo x Ar x Si	1188	713.39984775	1.50	0.0001
Di x Si	27	3051.49152647	281.54	0.0001
Yr x Di x Si	240	286.35719871	2.97	0.0001
Mo x Di x Si	297	4052.25010274	33.99	0.0001
Yr x Mo x Di x Si	2640	1701.00589061	1.61	0.0001
Ar x Di x Si	108	187.49078240	4.32	0.0001
Yr x Ar x Di x Si	960	532.14638749	1.38	0.0001
Mo x Ar x Di x Si	1188	1259.81818652	2.64	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	4239.10868305		

R^2 for the model = 0.957845

C.V. = 53.9501

Table 53. Analysis of variance for directed effort per unit water surface area for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	1694330682.63995830	-	-
Year (Yr)	9	2719006.76100702	13.75	0.0001
Month (Mo)	11	36343890.21629405	150.35	0.0001
Yr x Mo	99	7179740.24293103	3.30	0.0001
Statistical area (Ar)	4	21056684.02938708	239.56	0.0001
Yr x Ar	36	4385607.84277274	5.54	0.0001
Mo x Ar	44	33466675.06588729	34.61	0.0001
Yr x Mo x Ar	396	20738067.13143243	2.38	0.0001
Depth interval (Di)	9	224866536.89952263	1137.00	0.0001
Yr x Di	80	9905776.54187088	5.63	0.0001
Mo x Di	99	120680149.70377203	55.47	0.0001
Yr x Mo x Di	880	57955866.64059913	3.00	0.0001
Ar x Di	36	52941868.92248180	66.92	0.0001
Yr x Ar x Di	320	35134353.71173055	5.00	0.0001
Mo x Ar x Di	396	96847560.66111619	11.13	0.0001
Yr x Mo x Ar x Di	3520	201852530.32944010	2.61	0.0001
Market size (Si)	3	1868209.50662268	28.34	0.0001
Yr x Si	27	2378011.63766710	4.01	0.0001
Mo x Si	33	24451749.79447343	33.72	0.0001
Yr x Mo x Si	297	9205960.30459110	1.41	0.0001
Ar x Si	12	2730668.63281643	10.36	0.0001
Yr x Ar x Si	108	4097280.76598683	1.73	0.0001
Mo x Ar x Si	132	14713800.18464302	5.07	0.0001
Yr x Mo x Ar x Si	1188	28379450.85856370	1.09	0.0249
Di x Si	27	82883042.31831374	139.69	0.0001
Yr x Di x Si	240	15702513.63390353	2.98	0.0001
Mo x Di x Si	297	157782566.02852397	24.18	0.0001
Yr x Mo x Di x Si	2640	66605641.74447693	1.15	0.0001
Ar x Di x Si	108	14401121.02124468	6.07	0.0001
Yr x Ar x Di x Si	960	35151570.23411426	1.67	0.0001
Mo x Ar x Di x Si	1188	75852426.29014672	2.91	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	232052354.98362588		

R^2 for the model = 0.863042

C.V. = 251.6173

Table 54. Analysis of variance for log-transformed directed effort per unit water surface area for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	95296.17370102	-	-
Year (Yr)	9	604.09246570	175.00	0.0001
Month (Mo)	11	1198.26356161	284.00	0.0001
Yr x Mo	99	413.89945479	10.90	0.0001
Statistical area (Ar)	4	1548.95462672	1009.59	0.0001
Yr x Ar	36	361.09669417	26.15	0.0001
Mo x Ar	44	1501.46597019	88.97	0.0001
Yr x Mo x Ar	396	1025.47754193	6.75	0.0001
Depth interval (Di)	9	50750.56605079	14701.55	0.0001
Yr x Di	80	841.51922766	27.42	0.0001
Mo x Di	99	4139.91054192	109.02	0.0001
Yr x Mo x Di	880	2553.47397488	7.57	0.0001
Ar x Di	36	2374.30540302	171.95	0.0001
Yr x Ar x Di	320	1311.41633209	10.68	0.0001
Mo x Ar x Di	396	1998.53243193	13.16	0.0001
Yr x Mo x Ar x Di	3520	6048.25081164	4.48	0.0001
Market size (Si)	3	539.81892768	469.13	0.0001
Yr x Si	27	83.65893447	8.08	0.0001
Mo x Si	33	1504.28542641	118.85	0.0001
Yr x Mo x Si	297	411.29722369	3.61	0.0001
Ar x Si	12	191.51842781	41.61	0.0001
Yr x Ar x Si	108	117.92382685	2.85	0.0001
Mo x Ar x Si	132	505.84073519	9.99	0.0001
Yr x Mo x Ar x Si	1188	683.37069377	1.50	0.0001
Di x Si	27	2899.62051245	279.99	0.0001
Yr x Di x Si	240	279.88133790	3.04	0.0001
Mo x Di x Si	297	3839.56895532	33.70	0.0001
Yr x Mo x Di x Si	2640	1624.59120547	1.60	0.0001
Ar x Di x Si	108	185.76891684	4.48	0.0001
Yr x Ar x Di x Si	960	506.81500449	1.38	0.0001
Mo x Ar x Di x Si	1188	1200.57678170	2.63	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	4050.41170195		

R^2 for the model = 0.957497

C.V. = 54.3201

Table 55. Analysis of variance for catch per nominal days fished per unit water surface area for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	5879982703.11975600	-	-
Year (Yr)	9	43853199.32845956	45.95	0.0001
Month (Mo)	11	37115960.08071578	31.82	0.0001
Yr x Mo	99	50508088.26762008	4.81	0.0001
Statistical area (Ar)	4	518028711.64352230	1221.21	0.0001
Yr x Ar	36	49802324.21662968	13.05	0.0001
Mo x Ar	44	112112190.29428547	24.03	0.0001
Yr x Mo x Ar	396	147211801.46472829	3.51	0.0001
Depth interval (Di)	9	469580551.40798150	492.00	0.0001
Yr x Di	80	73740481.92166543	8.69	0.0001
Mo x Di	99	61709817.45146286	5.88	0.0001
Yr x Mo x Di	880	315820199.33262449	3.38	0.0001
Ar x Di	36	322077815.95268195	84.36	0.0001
Yr x Ar x Di	320	177162389.05677253	5.22	0.0001
Mo x Ar x Di	396	189255631.71682310	4.51	0.0001
Yr x Mo x Ar x Di	3520	1020929435.56273070	2.73	0.0001
Market size (Si)	3	66215145.06102633	208.13	0.0001
Yr x Si	27	10273305.40764481	3.59	0.0001
Mo x Si	33	34972396.72532731	9.99	0.0001
Yr x Mo x Si	297	42262608.16719949	1.34	0.0001
Ar x Si	12	78729694.71542632	61.87	0.0001
Yr x Ar x Si	108	44886876.47221243	3.92	0.0001
Mo x Ar x Si	132	50598778.79735338	3.61	0.0001
Yr x Mo x Ar x Si	1188	152926021.40716403	1.21	0.0001
Di x Si	27	37761876.43641353	13.19	0.0001
Yr x Di x Si	240	28137677.98930228	1.11	0.1285
Mo x Di x Si	297	52548154.24726778	1.67	0.0001
Yr x Mo x Di x Si	2640	294730320.60714435	1.05	0.0460
Ar x Di x Si	108	43549031.37060100	3.80	0.0001
Yr x Ar x Di x Si	960	97904278.33204889	0.96	0.7887
Mo x Ar x Di x Si	1188	135711162.34496587	1.08	0.0403
Yr x Mo x Ar x Di x Si (residual)	10560	1119865777.33995720		

R^2 for the model = 0.809546

C.V. = 172.1939

Table 56. Analysis of variance for log-transformed catch per unit nominal days fished per unit water surface area for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	148640.22806623	-	-
Year (Yr)	9	1577.07919376	119.25	0.0001
Month (Mo)	11	564.40389884	34.92	0.0001
Yr x Mo	99	1075.51597161	7.39	0.0001
Statistical area (Ar)	4	2523.34574926	429.29	0.0001
Yr x Ar	36	983.11182112	18.58	0.0001
Mo x Ar	44	2374.90698311	36.73	0.0001
Yr x Mo x Ar	396	2392.13345293	4.11	0.0001
Depth interval (Di)	9	67700.74948016	5118.95	0.0001
Yr x Di	80	1844.37163933	15.69	0.0001
Mo x Di	99	2021.96535870	13.90	0.0001
Yr x Mo x Di	880	5728.83468586	4.43	0.0001
Ar x Di	36	1890.95211042	35.74	0.0001
Yr x Ar x Di	320	2362.99817050	5.03	0.0001
Mo x Ar x Di	396	3126.53631404	5.37	0.0001
Yr x Mo x Ar x Di	3520	15402.59279787	2.98	0.0001
Market size (Si)	3	2361.18076134	535.60	0.0001
Yr x Di	27	113.02004898	2.85	0.0001
Mo x Si	33	1373.19449477	28.32	0.0001
Yr x Mo x Di	297	721.49073012	1.65	0.0001
Ar x Si	12	622.25027079	35.29	0.0001
Yr x Ar x Si	108	299.16526122	1.89	0.0001
Mo x Ar x Si	132	666.60049539	3.44	0.0001
Yr x Mo x Ar x Si	1188	1994.97472928	1.14	0.0008
Di x Si	27	1655.14016786	41.72	0.0001
Yr x Di x Si	240	732.35407748	2.08	0.0001
Mo x Di x Si	297	2106.06167814	4.83	0.0001
Yr x Mo x Di x Si	2640	4475.44991438	1.15	0.0001
Ar x Di x Si	108	459.17948430	2.89	0.0001
Yr x Ar x Di x Si	960	1602.19021694	1.14	0.0032
Mo x Ar x Di x Si	1188	2370.54252525	1.36	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	15517.93558246		

R^2 for the model = 0.895601

C.V. = 50.8576

Table 57. Analysis of variance for catch per directed effort per unit water surface area for white shrimp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	7242929818.53573300	-	-
Year (Yr)	9	40209061.74892133	34.52	0.0001
Month (Mo)	11	52311106.58306664	36.75	0.0001
Yr x Mo	99	57442325.63837516	4.48	0.0001
Statistical area (Ar)	4	634998910.32639440	1226.76	0.0001
Yr x Ar	36	67661115.97537493	14.52	0.0001
Mo x Ar	44	140712269.62158656	24.71	0.0001
Yr x Mo x Ar	396	177636138.39872461	3.47	0.0001
Depth interval (Di)	9	627166002.32468650	538.50	0.0001
Yr x Di	80	90567616.62361419	8.75	0.0001
Mo x Di	99	83588247.04453754	6.52	0.0001
Yr x Mo x Di	880	370917948.35577052	3.26	0.0001
Ar x Di	36	395703704.83459186	84.94	0.0001
Yr x Ar x Di	320	237082865.09956091	5.73	0.0001
Mo x Ar x Di	396	222464064.87799531	4.34	0.0001
Yr x Mo x Ar x Di	3520	1242268874.70387190	2.73	0.0001
Market size (Si)	3	74692233.50392645	192.40	0.0001
Yr x Si	27	13558602.37951660	3.88	0.0001
Mo x Si	33	43487347.65216947	10.18	0.0001
Yr x Mo x Si	297	50628035.12319558	1.32	0.0002
Ar x Si	12	95061633.04442280	61.22	0.0001
Yr x Ar x Si	108	63185560.16765618	4.52	0.0001
Mo x Ar x Si	132	62791844.89881688	3.68	0.0001
Yr x Mo x Ar x Si	1188	187035687.21392142	1.22	0.0001
Di x Si	27	47569254.90075230	13.61	0.0001
Yr x Si x Si	240	33439092.46377665	1.08	0.2007
Mo x Di x Si	297	63999032.34531003	1.67	0.0001
Yr x Mo x Di x Si	2640	359030969.71574139	1.05	0.0517
Ar x Di x Si	108	51460352.02325755	3.68	0.0001
Yr x Ar x Di x Si	960	125889353.08030980	1.01	0.3851
Mo x Ar x Di x Si	1188	163847724.79650878	1.07	0.0673
Yr x Mo x Ar x Di x Si (residual)	10560	1366522843.06938550		

R^2 for the model = 0.811330

C.V. = 170.7980

Table 58. Analysis of variance for the catch of *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	340299661201.941250	-	-
Year (Yr)	9	1004321946.436899	25.74	0.0001
Month (Mo)	11	4726308471.774375	99.10	0.0001
Yr x Mo	99	2494719568.083736	5.81	0.0001
Statistical area (Ar)	4	1097764045.108433	63.30	0.0001
Yr x Ar	36	754498129.515841	4.83	0.0001
Mo x Ar	44	1608546705.742444	8.43	0.0001
Yr x Mo x Ar	396	2994832442.037433	1.74	0.0001
Depth interval (Di)	9	39240069670.159501	1005.65	0.0001
Yr x Di	80	3351089412.940756	9.66	0.0001
Mo x Di	99	23115009784.366966	53.85	0.0001
Yr x Mo x Di	880	14016093833.836564	3.67	0.0001
Ar x Di	36	10127534957.805889	64.89	0.0001
Yr x Ar x Di	320	5993773475.952497	4.32	0.0001
Mo x Ar x Di	396	10407635643.060755	6.06	0.0001
Yr x Mo x Ar x Di	3520	27965663276.234270	1.83	0.0001
Market size (Si)	3	985317388.992939	75.76	0.0001
Yr x Si	27	479485011.230464	4.10	0.0001
Mo x Si	33	6708031344.147363	46.89	0.0001
Yr x Mo x Si	297	3446683950.177830	2.68	0.0001
Ar x Si	12	768212795.558375	14.77	0.0001
Yr x Ar x Si	108	1106013604.866535	2.36	0.0001
Mo x Ar x Si	132	3604550719.025335	6.30	0.0001
Yr x Mo x Ar x Si	1188	5578650880.015849	1.08	0.0303
Di x Si	27	37513471591.634852	320.47	0.0001
Yr x Di x Si	240	3065886090.289168	2.95	0.0001
Mo x Di x Si	297	24457944501.214301	18.99	0.0001
Yr x Mo x Di x Si	2640	20555195406.420424	1.80	0.0001
Ar x Di x Si	108	8679340314.423027	18.54	0.0001
Yr x Ar x Di x Si	960	8763607652.058293	2.11	0.0001
Mo x Ar x Di x Si	1188	19906543879.344746	3.86	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	294516796492.485549		

R^2 for the model = 0.865463

C.V. = 179.3856

Table 59. Analysis of variance for nominal days fished for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	821297902.15593610	-	-
Year (Yr)	9	651380.74111263	2.62	0.0052
Month (Mo)	11	1486732.91002906	4.89	0.0001
Yr x Mo	99	4006742.75489376	1.46	0.0019
Statistical area (Ar)	4	972082.93037673	8.79	0.0001
Yr x Ar	36	1287064.31147468	1.29	0.1125
Mo x Ar	44	1962562.91149837	1.61	0.0062
Yr x Mo x Ar	396	13520982.74005744	1.23	0.0012
Depth interval (Di)	9	19360116.15273806	77.80	0.0001
Yr x Di	80	5858853.18299267	2.65	0.0001
Mo x Di	99	12627540.04618821	4.61	0.0001
Yr x Mo x Di	880	37424515.75916288	1.54	0.0001
Ar x Di	36	7619191.02692204	7.65	0.0001
Yr x Ar x Di	320	13475642.87486371	1.52	0.0001
Mo x Ar x Di	396	15781886.31548509	1.44	0.0001
Yr x Mo x Ar x Di	3520	123397421.55681732	1.27	0.0001
Market size (Si)	3	930047.40154192	11.21	0.0001
Yr x Si	27	704065.60727436	0.94	0.5487
Mo x Si	33	3522256.20299422	3.86	0.0001
Yr x Mo x Si	297	10016347.01889059	1.22	0.0064
Ar x Si	12	1139389.31816901	3.43	0.0001
Yr x Ar x Si	108	3145264.66952895	1.05	0.3344
Mo x Ar x Si	132	4644111.27224563	1.27	0.0195
Yr x Mo x Ar x Si	1188	32363327.65371726	0.99	0.6293
Di x Si	27	19461207.78780942	26.07	0.0001
Yr x Di x Si	240	8219216.44102592	1.24	0.0076
Mo x Di x Si	297	21163782.44443980	2.58	0.0001
Yr x Mo x Di x Si	2640	88786065.41305408	1.22	0.0001
Ar x Di x Si	108	12092759.72419990	4.05	0.0001
Yr x Ar x Di x Si	960	26794796.69647954	1.01	0.4161
Mo x Ar x Di x Si	1188	36915648.16512406	1.12	0.0030
Yr x Mo x Ar x Di x Si (residual)	10560	291966900.12482923		

R^2 for the model = 0.644505

C.V. = 736.6715

Table 60. Analysis of variance for log-transformed nominal days fished for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	64201.96078223	-	-
Year (Yr)	9	569.40396903	191.77	0.0001
Month (Mo)	11	375.21574614	103.39	0.0001
Yr x Mo	99	532.26344960	16.30	0.0001
Statistical area (Ar)	4	837.49530159	634.63	0.0001
Yr x Ar	36	435.24411626	36.65	0.0001
Mo x Ar	44	747.71081237	51.51	0.0001
Yr x Mo x Ar	396	984.27485194	7.53	0.0001
Depth interval (Di)	9	19706.55025448	6636.92	0.0001
Yr x Di	80	1170.14996155	44.34	0.0001
Mo x Di	99	4750.99924745	145.46	0.0001
Yr x Mo x Di	880	3244.56059282	11.18	0.0001
Ar x Di	36	1663.10098644	140.03	0.0001
Yr x Ar x Di	320	1535.93444569	14.55	0.0001
Mo x Ar x Di	396	1423.86444608	10.90	0.0001
Yr x Mo x Ar x Di	3520	5797.36262304	4.99	0.0001
Market size (Si)	3	1610.55405879	1627.24	0.0001
Yr x Si	27	115.89169890	13.01	0.0001
Mo x Si	33	1625.13392423	149.27	0.0001
Yr x Mo x Si	297	580.95595142	5.93	0.0001
Ar x Si	12	149.34915112	37.72	0.0001
Yr x Ar x Si	108	147.96317425	4.15	0.0001
Mo x Ar x Si	132	498.94301222	11.46	0.0001
Yr x Mo x Ar x Si	1188	631.79647474	1.61	0.0001
Di x Si	27	5418.75189569	608.32	0.0001
Yr x Di x Si	240	555.87904318	7.02	0.0001
Mo x Di x Si	297	1790.28512794	18.27	0.0001
Yr x Mo x Di x Si	2640	1794.51034892	2.06	0.0001
Ar x Di x Si	108	356.25055882	10.00	0.0001
Yr x Ar x Di x Si	960	632.09737697	2.00	0.0001
Mo x Ar x Di x Si	1188	1035.56978112	2.64	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	3483.89839946		

R^2 for the model =0.945735

C.V. = 40.5856

Table 61. Analysis of variance for total directed effort for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	57176921.20273463	-	-
Year (Yr)	9	220751.22248109	33.22	0.0001
Month (Mo)	11	468501.15679090	57.69	0.0001
Yr x Mo	99	333355.84350052	4.56	0.0001
Statistical area (Ar)	4	328117.67652755	111.10	0.0001
Yr x Ar	36	191184.55261435	7.19	0.0001
Mo x Ar	44	269974.24695385	8.31	0.0001
Yr x Mo x Ar	396	826949.99889401	2.83	0.0001
Depth interval (Di)	9	7491920.09908860	1127.48	0.0001
Yr x Di	80	529623.91041056	8.97	0.0001
Mo x Di	99	3782918.58682276	51.76	0.0001
Yr x Mo x Di	880	2619743.08144870	4.03	0.0001
Ar x Di	36	2035966.82939114	76.60	0.0001
Yr x Ar x Di	320	1379119.02147773	5.84	0.0001
Mo x Ar x Di	396	1605230.89709672	5.49	0.0001
Yr x Mo x Ar x Di	3520	6380906.77435103	2.46	0.0001
Market size (Si)	3	8177.35510951	3.69	0.0114
Yr x Si	27	76344.86259795	3.83	0.0001
Mo x Si	33	975520.62939783	40.04	0.0001
Yr x Mo x Si	297	529709.44845209	2.42	0.0001
Ar x Si	12	80122.56885757	9.04	0.0001
Yr x Ar x Si	108	216597.74169059	2.72	0.0001
Mo x Ar x Si	132	462843.02155485	4.75	0.0001
Yr x Mo x Ar x Si	1188	995535.41023193	1.14	0.0014
Di x Si	27	5130370.43445127	257.36	0.0001
Yr x Di x Si	240	809166.56532113	4.57	0.0001
Mo x Di x Si	297	3291329.26687011	15.01	0.0001
Yr x Mo x Di x Si	2640	3157022.65912701	1.62	0.0001
Ar x Di x Si	108	1079056.88743311	13.53	0.0001
Yr x Ar x Di x Si	960	1518651.73910019	2.14	0.0001
Mo x Ar x Di x Si	1188	2585779.52308543	2.95	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	7796528.19160457		

R^2 for the model = 0.863642

C.V. = 163.1521

Table 62. Analysis of variance for catch per nominal days fished for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	45582966.16280929	-	-
Year (Yr)	9	582384.68908440	147.40	0.0001
Month (Mo)	11	1938985.87842114	401.51	0.0001
Yr x Mo	99	854591.78931217	19.66	0.0001
Statistical area (Ar)	4	283403.25775209	161.38	0.0001
Yr x Ar	36	152650.37468762	9.66	0.0001
Mo x Ar	44	239129.29695553	12.90	0.0001
Yr x Mo x Ar	396	1389365.71836333	7.99	0.0001
Depth interval (Di)	9	9834438.59468026	2488.99	0.0001
Yr x Di	80	1391907.40539794	39.63	0.0001
Mo x Di	99	3272078.42538878	75.28	0.0001
Yr x Mo x Di	880	3875418.96696338	10.03	0.0001
Ar x Di	36	399464.80940763	25.28	0.0001
Yr x Ar x Di	320	1284947.24788522	9.15	0.0001
Mo x Ar x Di	396	1385997.54661453	7.97	0.0001
Yr x Mo x Ar x Di	3520	8395013.81912309	5.43	0.0001
Market size (Si)	3	476858.92093943	362.06	0.0001
Yr x Si	27	36291.05777090	3.06	0.0001
Mo x Si	33	263551.11671690	18.19	0.0001
Yr x Mo x Si	297	271078.23729642	2.08	0.0001
Ar x Si	12	33030.26352508	6.27	0.0001
Yr x Ar x Si	108	102092.17963819	2.15	0.0001
Mo x Ar x Si	132	79052.09380218	1.36	0.0037
Yr x Mo x Ar x Si	1188	616539.65936267	1.18	0.0001
Di x Si	27	605945.00435415	51.12	0.0001
Yr x Di x Si	240	230819.71917736	2.19	0.0001
Mo x Di x Si	297	330566.31798429	2.54	0.0001
Yr x Mo x Di x Si	2640	1417347.95429841	1.22	0.0001
Ar x Di x Si	108	80821.27534173	1.70	0.0001
Yr x Ar x Di x Si	960	502360.75405162	1.19	0.0001
Mo x Ar x Di x Si	1188	610787.70802925	1.17	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	4636046.08048362		

R^2 for the model = 0.898294

C.V. = 52.4563

Table 63. Analysis of variance for log-transformed catch per nominal total days fished for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	98250.10577335	-	-
Year (Yr)	9	840.89361529	103.67	0.0001
Month (Mo)	11	427.63101798	43.14	0.0001
Yr x Mo	99	1264.85302476	14.18	0.0001
Statistical area (Ar)	4	980.62056623	272.02	0.0001
Yr x Ar	36	320.70292290	9.88	0.0001
Mo x Ar	44	845.44786510	21.32	0.0001
Yr x Mo x Ar	396	2230.69011929	6.25	0.0001
Depth interval (Di)	9	33378.33267078	4115.09	0.0001
Yr x Di	80	2296.44287580	31.85	0.0001
Mo x Di	99	5118.37297745	57.37	0.0001
Yr x Mo x Di	880	6526.49613448	8.23	0.0001
Ar x Di	36	757.45431896	23.35	0.0001
Yr x Ar x Di	320	2832.47409991	9.82	0.0001
Mo x Ar x Di	396	2082.25155609	5.83	0.0001
Yr x Mo x Ar x Di	3520	13179.21451546	4.15	0.0001
Market size (Si)	3	3102.48225774	1147.48	0.0001
Yr x Si	27	87.91267719	3.61	0.0001
Mo x Si	33	1004.86864865	33.79	0.0001
Yr x Mo x Si	297	592.39866642	2.21	0.0001
Ar x Si	12	81.80568872	7.56	0.0001
Yr x Ar x Si	108	253.83568314	2.61	0.0001
Mo x Ar x Si	132	235.75894684	1.98	0.0001
Yr x Mo x Ar x Si	1188	1310.90268892	1.22	0.0001
Di x Si	27	2239.10989292	92.02	0.0001
Yr x Di x Si	240	526.59853578	2.43	0.0001
Mo x Di x Si	297	810.95257678	3.03	0.0001
Yr x Mo x Di x Si	2640	2828.22627818	1.19	0.0001
Ar x Di x Si	108	247.19230793	2.54	0.0001
Yr x Ar x Di x Si	960	1104.02766952	1.28	0.0001
Mo x Ar x Di x Si	1188	1225.00358433	1.14	0.0007
Yr x Mo x Ar x Di x Si (residual)	10560	9517.15138980		

R^2 for the model = 0.903133

C.V. = 38.5344

Table 64. Analysis of variance for catch per directed effort for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	57225022.48036084	-	-
Year (Yr)	9	650924.62595103	141.39	0.0001
Month (Mo)	11	2479436.10355344	440.66	0.0001
Yr x Mo	99	957592.62643887	18.91	0.0001
Statistical area (Ar)	4	368007.42450733	179.86	0.0001
Yr x Ar	36	207734.15463769	11.28	0.0001
Mo x Ar	44	324344.56733938	14.41	0.0001
Yr x Mo x Ar	396	1747151.55649559	8.63	0.0001
Depth interval (Di)	9	13745691.33077981	2985.86	0.0001
Yr x Di	80	1566980.97749854	38.29	0.0001
Mo x Di	99	3945870.07419311	77.92	0.0001
Yr x Mo x Di	880	4580642.85300272	10.18	0.0001
Ar x Di	36	462010.18294025	25.09	0.0001
Yr x Ar x Di	320	1436850.16307978	8.78	0.0001
Mo x Ar x Di	396	1769364.26595046	8.74	0.0001
Yr x Mo x Ar x Di	3520	10178838.52160864	5.65	0.0001
Market size (Si)	3	402041.02657358	272.00	0.0001
Yr x Si	27	34064.40243213	2.47	0.0001
Mo x Si	33	425722.00256176	25.22	0.0001
Yr x Mo x Si	297	388827.84866748	2.56	0.0001
Ar x Si	12	32746.28230805	5.33	0.0001
Yr x Ar x Si	108	120625.25733085	2.18	0.0001
Mo x Ar x Si	132	118247.11257510	1.75	0.0001
Yr x Mo x Ar x Si	1188	744244.04399712	1.22	0.0001
Di x Si	27	1007321.71872706	72.94	0.0001
Yr x Di x Si	240	306503.54162788	2.50	0.0001
Mo x Di x Si	297	525248.48418789	3.46	0.0001
Yr x Mo x Di x Si	2640	1797578.41241040	1.33	0.0001
Ar x Di x Si	108	85240.43835010	1.54	0.0003
Yr x Ar x Di x Si	960	627487.78658833	1.28	0.0001
Mo x Ar x Di x Si	1188	786129.61295413	1.29	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	5401555.08109236		

R^2 for the model = 0.905609

C.V. = 50.9603

Table 65. Analysis of variance for catch per unit water surface area for *Penaeus* sp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	32640899098904.8510	-	-
Year (Yr)	9	43540791028.3628	9.66	0.0001
Month (Mo)	11	276657566456.3333	50.21	0.0001
Yr x Mo	99	202259794860.0332	4.08	0.0001
Statistical area (Ar)	4	1451050607654.4479	724.26	0.0001
Yr x Ar	36	86869749765.9504	4.82	0.0001
Mo x Ar	44	324180862049.1379	14.71	0.0001
Yr x Mo x Ar	396	348170486722.4065	1.76	0.0001
Depth interval (Di)	9	1216261210925.6615	289.81	0.0001
Yr x Di	80	370021230992.0378	9.23	0.0001
Mo x Di	99	1484636972167.6149	29.94	0.0001
Yr x Mo x Di	880	1479641572639.3535	3.36	0.0001
Ar x Di	36	547856970864.1909	30.38	0.0001
Yr x Ar x Di	320	840356745037.9694	5.24	0.0001
Mo x Ar x Di	398	1446777686564.5278	7.29	0.0001
Yr x Mo x Ar x Di	3520	3767865008179.0526	2.14	0.0001
Market size (Si)	3	13434417647.9607	8.94	0.0001
Yr x Si	27	63467901152.2417	4.69	0.0001
Mo x Si	33	846180042831.3310	51.19	0.0001
Yr x Mo x Si	297	315696046917.4419	2.12	0.0001
Ar x Si	12	96516293649.4036	16.06	0.0001
Yr x Ar x Si	108	112696596967.7075	2.08	0.0001
Mo x Ar x Si	132	1084734662423.5805	16.41	0.0001
Yr x Mo x Ar x Si	1188	663013219322.2739	1.11	0.0054
Di x Si	27	2324084528244.2048	171.85	0.0001
Yr x Di x Si	240	349800892048.5508	2.91	0.0001
Mo x Di x Si	297	1431880430805.6669	9.63	0.0001
Yr x Mo x Di x Si	2640	1852564969643.9211	1.40	0.0001
Ar x Di x Si	108	1228982019434.2226	22.72	0.0001
Yr x Ar x Di x Si	960	1025666882042.0185	2.13	0.0001
Mo x Ar x Di x Si	1188	2056816987005.2028	3.46	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	5289215952842.0540		

R^2 for the model = 0.837957

C.V. = 208.9429

Table 66. Analysis of variance for log-transformed catch per unit water surface area for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	439673.58123371	-	-
Year (Yr)	9	4600.53085712	185.17	0.0001
Month (Mo)	11	1824.50995612	60.08	0.0001
Yr x Mo	99	5279.16441847	19.32	0.0001
Statistical area (Ar)	4	10752.09609316	973.74	0.0001
Yr x Ar	36	2290.30448130	23.05	0.0001
Mo x Ar	44	5376.20492551	44.26	0.0001
Yr x Mo x Ar	396	6891.65815901	8.13	0.0001
Depth interval (Di)	9	136920.15472970	5511.07	0.0001
Yr x Di	80	10468.18289418	47.40	0.0001
Mo x Di	99	26584.82652132	104.60	0.0001
Yr x Mo x Di	880	26993.91845580	11.11	0.0001
Ar x Di	36	6028.82285802	60.67	0.0001
Yr x Ar x Di	320	12299.19524073	13.92	0.0001
Mo x Ar x Di	396	8741.08161696	8.00	0.0001
Yr x Mo x Ar x Di	3520	47116.40076574	4.85	0.0001
Market size (Si)	3	19139.12718549	2311.06	0.0001
Yr x Si	27	612.86295417	8.22	0.0001
Mo x Si	33	8393.45651428	92.14	0.0001
Yr x Mo x Si	297	3322.93045987	4.05	0.0001
Ar x Si	12	877.41899360	26.49	0.0001
Yr x Ar x Si	108	1079.35690221	3.62	0.0001
Mo x Ar x Si	132	2047.67469790	5.62	0.0001
Yr x Mo x Ar x Si	1188	4660.32626301	1.42	0.0001
Di x Si	27	24129.98604717	323.75	0.0001
Yr x Di x Si	240	3070.30823187	4.63	0.0001
Mo x Di x Si	297	6592.33923604	8.04	0.0001
Yr x Mo x Di x Si	2640	10391.29743604	1.43	0.0001
Ar x Di x Si	108	1380.57509991	4.63	0.0001
Yr x Ar x Di x Si	960	3905.16981815	1.47	0.0001
Mo x Ar x Di x Si	1188	4752.71431749	1.45	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	29150.98510340		

R^2 for the model = 0.933699

C.V. = 33.6699

Table 67. Analysis of variance for nominal days fished per unit water surface area for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	196498350643.738280	-	-
Year (Yr)	9	120369739.363377	1.87	0.0512
Month (Mo)	11	115125654.824405	1.46	0.1368
Yr x Mo	99	1007488996.542522	1.42	0.0038
Statistical area (Ar)	4	753288702.438016	26.34	0.0001
Yr x Ar	36	470888941.309091	1.83	0.0018
Mo x Ar	44	460585682.208366	1.46	0.0242
Yr x Mo x Ar	396	3920251897.730989	1.38	0.0001
Depth interval (Di)	9	722380979.290055	11.23	0.0001
Yr x Di	80	1413038151.138619	2.47	0.0001
Mo x Di	99	1527719934.226206	2.16	0.0001
Yr x Mo x Di	880	9377248594.144617	1.49	0.0001
Ar x Di	36	719019078.233095	2.79	0.0001
Yr x Ar x Di	320	4999138228.460317	2.19	0.0001
Mo x Ar x Di	396	4287984741.809653	1.51	0.0001
Yr x Mo x Ar x Di	3520	36676134341.339415	1.46	0.0001
Market size (Si)	3	33509675.620496	1.56	0.1945
Yr x Si	27	165629607.184843	0.86	0.6761
Mo x Si	33	556019308.467773	2.36	0.0001
Yr x Mo x Si	297	2148052099.064198	1.01	0.4337
Ar x Si	12	90220506.550439	1.05	0.3973
Yr x Ar x Si	108	755076240.264383	0.98	0.5466
Mo x Ar x Si	132	1343340848.935389	1.42	0.0011
Yr x Mo x Ar x Si	1188	8282054115.929513	0.98	0.7143
Di x Si	27	1018112801.079461	5.27	0.0001
Yr x Di x Si	240	1705397816.780199	0.99	0.5141
Mo x Di x Si	297	2659421573.571457	1.25	0.0023
Yr x Mo x Di x Si	2640	19274488882.392105	1.02	0.2440
Ar x Di x Si	108	1038971167.235056	1.35	0.0101
Yr x Ar x Di x Si	960	6775619494.347691	0.90	0.6001
Mo x Ar x Di x Si	1188	8594309343.032227	1.01	0.3865
Yr x Mo x Ar x Di x Si (residual)	10560	75487463500.224390		

R^2 for the model = 0.615837

C.V. = 1250.7734

Table 68. Analysis of variance for log-transformed nominal days fished per unit water surface area for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	152439.29035560	-	-
Year (Yr)	9	1635.44364158	200.20	0.0001
Month (Mo)	11	495.42561761	49.62	0.0001
Yr x Mo	99	1690.31107257	18.81	0.0001
Statistical area (Ar)	4	5460.83225358	1504.08	0.0001
Yr x Ar	36	1071.42777739	32.79	0.0001
Mo x Ar	44	2044.55296330	51.19	0.0001
Yr x Mo x Ar	396	2922.69314920	8.13	0.0001
Depth interval (Di)	9	36115.36322143	4665.83	0.0001
Yr x Di	80	3399.54843270	46.82	0.0001
Mo x Di	99	10417.53523338	115.93	0.0001
Yr x Mo x Di	880	8830.33393176	11.06	0.0001
Ar x Di	36	3073.47097457	94.06	0.0001
Yr x Ar x Di	320	4345.36842271	14.96	0.0001
Mo x Ar x Di	396	3179.55378745	8.85	0.0001
Yr x Mo x Ar x Di	3520	15580.75666906	4.88	0.0001
Market size (Si)	3	6583.41693731	2417.70	0.0001
Yr x Si	27	297.46069238	12.14	0.0001
Mo x Si	33	3923.68522162	130.99	0.0001
Yr x Mo x Si	297	3191.98717618	5.16	0.0001
Ar x Si	12	463.87455338	42.59	0.0001
Yr x Ar x Si	108	400.96834679	4.09	0.0001
Mo x Ar x Si	132	1160.57515487	9.69	0.0001
Yr x Mo x Ar x Si	1188	1683.23160084	1.56	0.0001
Di x Si	27	11597.82273053	473.24	0.0001
Yr x Di x Si	240	1373.53134445	6.31	0.0001
Mo x Di x Si	297	3405.93504511	12.63	0.0001
Yr x Mo x Di x Si	2640	4116.26867766	1.72	0.0001
Ar x Di x Si	108	735.18665234	7.50	0.0001
Yr x Ar x Di x Si	960	1497.03815347	1.72	0.0001
Mo x Ar x Di x Si	1188	1960.68354946	1.82	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	9585.00737091		

R^2 for the model = 0.937122

C.V. = 37.4330

Table 69. Analysis of variance for directed effort per unit water surface area for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	4934950034.82675300	-	-
Year (Yr)	9	22805160.72455370	33.00	0.0001
Month (Mo)	11	14899584.56884301	17.64	0.0001
Yr x Mo	99	24427554.05432093	3.21	0.0001
Statistical area (Ar)	4	243674143.56470549	793.44	0.0001
Yr x Ar	36	37522792.69020778	13.58	0.0001
Mo x Ar	44	39314663.54996771	11.64	0.0001
Yr x Mo x Ar	396	58763463.09174484	1.93	0.0001
Depth interval (Di)	9	198350714.15710848	287.05	0.0001
Yr x Di	80	57624610.27911543	9.38	0.0001
Mo x Di	99	225874832.71271687	29.72	0.0001
Yr x Mo x Di	880	223235969.15235322	3.30	0.0001
Ar x Di	36	89811476.72493815	32.49	0.0001
Yr x Ar x Di	320	160861897.20604443	6.55	0.0001
Mo x Ar x Di	396	178482680.71961915	5.87	0.0001
Yr x Mo x Ar x Di	3520	610698949.26804140	2.26	0.0001
Market size (Si)	3	10475076.08902854	45.48	0.0001
Yr x Si	27	13974186.73732495	6.74	0.0001
Mo x Si	33	140202417.01780652	55.34	0.0001
Yr x Mo x Si	297	51618811.78140443	2.26	0.0001
Ar x Si	12	13513760.87867641	14.67	0.0001
Yr x Ar x Si	108	30342285.09551048	3.66	0.0001
Mo x Ar x Si	132	145245954.04632377	14.33	0.0001
Yr x Mo x Ar x Si	1188	109773891.15844911	1.20	0.0001
Di x Si	27	333377253.61333090	160.82	0.0001
Yr x Di x Si	240	81872324.52026146	4.44	0.0001
Mo x Di x Si	297	178301148.82862573	7.82	0.0001
Yr x Mo x Di x Si	2640	279730286.53258501	1.38	0.0001
Ar x Di x Si	108	161038300.82877016	19.42	0.0001
Yr x Ar x Di x Si	960	171879044.81360906	2.33	0.0001
Mo x Ar x Di x Si	1188	216482163.65258127	2.37	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	810774636.76818500		

R^2 for the model = 0.835708

C.V. = 181.1989

Table 70. Analysis of variance for log-transformed directed effort per unit water surface area for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	145973.55407691	-	-
Year (Yr)	9	1918.75529794	242.69	0.0001
Month (Mo)	11	439.08090723	45.44	0.0001
Yr x Mo	99	1628.23301103	18.72	0.0001
Statistical area (Ar)	4	5232.92806543	1489.23	0.0001
Yr x Ar	36	1017.85191577	32.19	0.0001
Mo x Ar	44	1955.27645050	50.59	0.0001
Yr x Mo x Ar	396	2803.14421714	8.06	0.0001
Depth interval (Di)	9	34961.87456832	4422.10	0.0001
Yr x Di	80	3346.29020719	47.62	0.0001
Mo x Di	99	10106.93721566	116.21	0.0001
Yr x Mo x Di	880	8538.32871771	11.05	0.0001
Ar x Di	36	3112.56748064	98.42	0.0001
Yr x Ar x Di	320	4160.34319233	14.80	0.0001
Mo x Ar x Di	396	3075.39903692	8.84	0.0001
Yr x Mo x Ar x Di	3520	15054.53235101	4.87	0.0001
Market size (Si)	3	6661.07151158	2527.55	0.0001
Yr x Si	27	310.69058641	13.10	0.0001
Mo x Si	33	3749.45003699	128.34	0.0001
Yr x Mo x Si	297	1330.94645355	5.10	0.0001
Ar x Si	12	450.86667687	42.77	0.0001
Yr x Ar x Si	108	390.26042691	4.11	0.0001
Mo x Ar x Si	132	1116.70771284	9.63	0.0001
Yr x Mo x Ar x Si	1188	1623.34559242	1.56	0.0001
Di x Si	27	10832.20883256	456.70	0.0001
Yr x Di x Si	240	1383.55712659	6.56	0.0001
Mo x Di x Si	297	3418.77446053	13.10	0.0001
Yr x Mo x Di x Si	2640	4001.71076800	1.73	0.0001
Ar x Di x Si	108	721.42485749	7.60	0.0001
Yr x Ar x Di x Si	960	1449.54224455	1.72	0.0001
Mo x Ar x Di x Si	1188	1904.88291505	1.83	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	9276.57113977		

R^2 for the model = 0.936450

C.V. = 37.7151

Table 71. Analysis of variance for catch per nominal days fished per unit water surface area for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	12644306270.0207380	-	-
Year (Yr)	9	53480642.8334169	50.63	0.0001
Month (Mo)	11	183871668.3780050	142.43	0.0001
Yr x Mo	99	143934842.2196131	12.39	0.0001
Statistical area (Ar)	4	2918761014.7695466	6217.49	0.0001
Yr x Ar	36	56526966.6579456	13.38	0.0001
Mo x Ar	44	147972323.0282812	28.66	0.0001
Yr x Mo x Ar	396	333148823.7991009	7.17	0.0001
Depth interval (Di)	9	750392570.4530487	710.43	0.0001
Yr x Di	80	236770921.0388222	25.22	0.0001
Mo x Di	99	510927045.9437932	43.97	0.0001
Yr x Mo x Di	880	734917227.1000738	7.12	0.0001
Ar x Di	36	797788536.3460454	188.83	0.0001
Yr x Ar x Di	320	319817509.5348196	8.52	0.0001
Mo x Ar x Di	396	521889947.4579553	11.23	0.0001
Yr x Mo x Ar x Di	3520	2028494261.0459060	4.91	0.0001
Market size (Si)	3	152570904.8356857	433.34	0.0001
Yr x Si	27	8582105.9953470	2.71	0.0001
Mo x Si	33	50842760.1019831	13.13	0.0001
Yr x Mo x Si	297	70920600.8785791	2.03	0.0001
Ar x Si	12	90164414.2857895	64.02	0.0001
Yr x Ar x Si	108	43155698.8753061	3.40	0.0001
Mo x Ar x Si	132	43858008.8661108	2.83	0.0001
Yr x Mo x Ar x Si	1188	191856010.9376316	1.38	0.0001
Di x Si	27	142415785.5288153	44.94	0.0001
Yr x Di x Si	240	53590690.6253643	1.90	0.0001
Mo x Di x Si	297	57586355.6635303	1.65	0.0001
Yr x Mo x Di x Si	2640	347888071.8518353	1.12	0.0001
Ar x Di x Si	108	95786609.4259596	7.56	0.0001
Yr x Ar x Di x Si	960	156117760.5736790	1.39	0.0001
Mo x Ar x Di x Si	1188	160944335.5378237	1.15	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	1239331854.4309244		

R^2 for the model = 0.901985

C.V. = 72.5350

Table 72. Analysis of variance for log-transformed catch per unit nominal days fished per unit water surface area for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	187565.28891989	-	-
Year (Yr)	9	1692.07847264	99.70	0.0001
Month (Mo)	11	317.69363139	15.32	0.0001
Yr x Mo	99	2555.61820736	13.69	0.0001
Statistical area (Ar)	4	6246.99436362	828.23	0.0001
Yr x Ar	36	695.15874964	10.24	0.0001
Mo x Ar	44	1752.46619361	21.12	0.0001
Yr x Mo x Ar	396	4458.17082897	5.97	0.0001
Depth interval (Di)	9	49919.07159588	2941.45	0.0001
Yr x Di	80	4694.00825625	31.12	0.0001
Mo x Di	99	9566.94291368	51.25	0.0001
Yr x Mo x Di	880	12827.27365092	7.73	0.0001
Ar x Di	36	2753.67879718	40.56	0.0001
Yr x Ar x Di	320	5815.52524587	9.64	0.0001
Mo x Ar x Di	396	4153.43859345	5.56	0.0001
Yr x Mo x Ar x Di	3520	26261.85869839	3.96	0.0001
Market size (Si)	3	6865.67503356	1213.67	0.0001
Yr x Si	27	219.39048047	4.31	0.0001
Mo x Si	33	2314.76659439	37.20	0.0001
Yr x Mo x Si	297	1264.54476040	2.26	0.0001
Ar x Si	12	294.97778759	13.04	0.0001
Yr x Ar x Si	108	555.03307282	2.73	0.0001
Mo x Ar x Si	132	576.50352442	2.32	0.0001
Yr x Mo x Ar x Si	1188	2754.31302261	1.23	0.0001
Di x Si	27	4825.04872454	94.77	0.0001
Yr x Di x Si	240	1166.39207323	2.58	0.0001
Mo x Di x Si	297	1762.03774269	3.15	0.0001
Yr x Mo x Di x Si	2640	5948.13265156	1.19	0.0001
Ar x Di x Si	108	539.05942137	2.65	0.0001
Yr x Ar x Di x Si	960	2327.29767567	1.29	0.0001
Mo x Ar x Di x Si	1188	2529.60524892	1.13	0.0021
Yr x Mo x Ar x Di x Si (residual)	10560	19912.53290679		

R^2 for the model = 0.893837

C.V. = 33.9447

Table 73. Analysis of variance for catch per directed effort per unit water surface area for *Penaeus* spp.

	D.F.	Sum of Squares	F Value	Pr > F
Total	23759	14418863352.4609810	-	-
Year (Yr)	9	54286429.4952173	45.70	0.0001
Month (Mo)	11	224105091.4534912	154.34	0.0001
Yr x Mo	99	153485045.9112654	11.75	0.0001
Statistical area (Ar)	4	3422119018.1272239	6481.25	0.0001
Yr x Ar	36	78877075.4133568	16.60	0.0001
Mo x Ar	44	178792103.9538612	30.78	0.0001
Yr x Mo x Ar	396	392479106.4736862	7.51	0.0001
Depth interval (Di)	9	867679932.6740102	730.37	0.0001
Yr x Di	80	244176798.1471949	23.12	0.0001
Mo x Di	99	580260548.2460155	44.40	0.0001
Yr x Mo x Di	880	813025329.0624790	7.00	0.0001
Ar x Di	36	877549048.7224998	184.67	0.0001
Yr x Ar x Di	320	350687514.7504196	8.30	0.0001
Mo x Ar x Di	396	596489435.9388113	11.41	0.0001
Yr x Mo x Ar x Di	3520	2238601118.2501430	4.82	0.0001
Market size (Si)	3	147531530.9441833	372.55	0.0001
Yr x Si	27	9599033.9380159	2.69	0.0001
Mo x Si	33	71076977.2247181	16.32	0.0001
Yr x Mo x Si	297	90440088.2899446	2.31	0.0001
Ar x Si	12	91040125.1638165	57.47	0.0001
Yr x Ar x Si	108	47828767.0510759	3.35	0.0001
Mo x Ar x Si	132	64619949.6766357	3.71	0.0001
Yr x Mo x Ar x Si	1188	227758379.5039644	1.45	0.0001
Di x Si	27	188877749.2210522	53.00	0.0001
Yr x Di x Si	240	59264602.1119394	1.87	0.0001
Mo x Di x Si	297	73527835.5638628	1.88	0.0001
Yr x Mo x Di x Si	2640	398840781.0519257	1.14	0.0001
Ar x Di x Si	108	114281721.4001961	8.02	0.0001
Yr x Ar x Di x Si	960	174549527.4572744	1.38	0.0001
Mo x Ar x Di x Si	1188	193085961.6392841	1.23	0.0001
Yr x Mo x Ar x Di x Si (residual)	10560	1393926725.6034164		

R^2 for the model = 0.903326

C.V. = 70.5625

Table 74. Polynomial lack of fit analysis for the catch of brown shrimp.

	d.f.	Sum of Squares	Mean Square	F Value
Year	9	312,915,929		
YL	1	49,693,407	49,693,407	18.78**
LOF	8	263,322,522	32,902,815	
YQ	1	109,737,120	109,737,120	41.48**
LOF	7	153,485,402	21,926,486	
YC	1	2,163,967	2,163,967	0.82^{ns}
LOF	6	151,321,435	25,220,240	9.53**
Month	11	3,344,498,971		
ML	1	51,136,704	51,136,704	19.33**
LOF	10	3,293,363,267	329,336,327	
MQ	1	1,704,495,306	1,704,495,306	644.24**
LOF	9	1,588,867,961	176,540,880	
MC	1	230,062,038	230,062,038	86.96**
LOF	8	1,358,805,923	169,850,740	64.20**
Depth	9	2,181,608,289		
DL	1	1,539,556,760	1,539,556,760	581.90**
LOF	8	642,051,529	80,256,438	
DQ	1	132,172,260	132,172,260	49.96**
LOF	7	509,879,269	72,839,886	
DC	1	41,640,916	41,640,916	15.74**
LOF	6	468,238,353	78,039,717	29.50**
Size	3	155,978,800		
SL	1	141,747,470	141,747,470	53.58**
LOF	2	14,231,330	7,115,665	
SQ	1	3,529,090	3,529,090	1.33^{ns}
SC	1	10,702,240	10,702,240	4.05*
Residual	10,560	27,939,042,752	2,645,743	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 75. Polynomial lack of fit analysis for nominal days fished for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	296,394.84		
YL	1	9,188.37	9,188.37	0.56^{ns}
LOF	8	287,206.47	35,900.81	
YQ	1	73,876.90	73,876.90	4.52*
LOF	7	213,329.57	30,475.65	
YC	1	1,144.74	1,144.74	0.07^{ns}
LOF	6	212,184.83	35,364.14	2.16*
Month	11	1,050,184.33		
ML	1	4,757.96	4,757.96	0.29^{ns}
LOF	10	1,045,426.37	104,542.64	
MQ	1	634,502.34	634,502.34	38.82**
LOF	9	410,924.03	45,658.23	
MC	1	4,604.14	4,604.14	0.28^{ns}
LOF	8	406,319.89	50,789.99	3.11**
Depth	9	1,297,435.37		
DL	1	743,534.21	743,534.21	45.49**
LOF	8	553,901.16	69,237.65	
DQ	1	9,566.13	9,566.13	0.59^{ns}
LOF	7	544,335.03	77,762.15	
DC	1	144,445.20	144,445.20	8.84**
LOF	6	399,889.83	66,648.31	4.08**
Size	3	215,516.99		
SL	1	126,188.91	126,188.91	7.72**
LOF	2	89,328.08	44,664.04	
SQ	1	83,359.55	83,359.55	5.10**
SC	1	5,968.53	5,968.53	0.37^{ns}
Residual	10,560	172,586,903.06	16,343.46	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 76. Polynomial lack of fit analysis for log-transformed nominal days fished for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	311.238		
YL	1	146.604	146.604	515.24**
LOF	8	164.634	20.579	
YQ	1	98.548	98.548	346.35**
LOF	7	66.086	9.441	
YC	1	4.421	4.421	15.54**
LOF	6	61.665	10.278	36.12**
Month	11	1,456.620		
ML	1	0.162	0.162	0.57ns
LOF	10	1,456.458	145.646	
MQ	1	829.510	829.510	2,915.30**
LOF	9	626.948	69.661	
MC	1	127.085	127.085	446.64**
LOF	8	499.863	62.483	219.60**
Depth	9	3,546.810		
DL	1	440.194	440.194	1,547.06**
LOF	8	3,106.616	388.327	
DQ	1	2,863.478	2,863.478	10,063.65**
LOF	7	243.138	34.734	
DC	1	9.062	9.062	31.85**
LOF	6	234.076	39.013	137.11**
Size	3	1,169.042		
SL	1	989.177	989.177	3,476.45**
LOF	2	179.865	89.933	
SQ	1	178.958	178.958	628.95**
SC	1	0.907	0.907	3.19ns
Residual	10,560	3,004.706	0.285	

ns - not significant, P = 0.05.

Table 77. Polynomial lack of fit analysis for directed effort for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	44,841.7		
YL	1	4,782.5	4,782.5	11.74**
LOF	8	40,059.2	5,007.4	
YQ	1	32,013.0	32,013.0	78.60**
LOF	7	8,046.2	1,149.5	
YC	1	405.0	405.0	0.99^{ns}
LOF	6	7,641.2	1,273.5	3.13**
Month	11	273,767.5		
ML	1	4,610.5	4,610.5	11.32**
LOF	10	269,157.0	26,915.7	
MQ	1	137,566.0	137,566.0	337.77**
LOF	9	131,591.0	14,621.2	
MC	1	9,302.1	9,302.1	22.84**
LOF	8	122,288.9	15,286.1	37.53**
Depth	9	269,626.6		
DL	1	83,415.1	83,415.1	204.81**
LOF	8	186,211.5	23,276.4	
DQ	1	73,685.2	73,685.2	180.92**
LOF	7	112,526.3	16,075.2	
DC	1	40,500.6	40,500.6	99.44**
LOF	6	72,025.7	12,004.3	29.47**
Size	3	14,725.7		
SL	1	13,881.9	13,881.9	34.08**
LOF	2	843.7	421.9	
SQ	1	409.6	409.6	1.01^{ns}
SC	1	434.1	434.1	1.07^{ns}
Residual	10,560	4,300,886.8	407.3	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 78. Polynomial lack of fit analysis for catch per nominal days fished for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	527,957		
YL	1	14,147	14,147	22.82**
LOF	8	513,810	64,226	
YQ	1	67,879	67,879	109.49**
LOF	7	445,931	63,704	
YC	1	112,285	112,285	181.11**
LOF	6	333,646	55,608	89.69**
Month	11	3,819,822		
ML	1	1,145,737	1,145,737	1,848.05**
LOF	10	2,674,085	267,409	
MQ	1	1,309,145	1,309,145	2,111.62**
LOF	9	1,364,940	151,660	
MC	1	618,339	618,339	997.37**
LOF	8	746,601	93,325	105.53**
Depth	9	7,397,494		
DL	1	4,021,777	4,021,777	6,487.04**
LOF	8	3,375,717	421,965	
DQ	1	2,627,819	2,627,819	4,238.62**
LOF	7	747,898	106,843	
DC	1	355,059	355,059	572.70**
LOF	6	392,839	65,473	105.61**
Size	3	660,394		
SL	1	342,903	342,903	553.10**
LOF	2	317,491	158,746	
SQ	1	312,481	312,481	504.03**
SC	1	5,010	5,010	8.08**
Residual	10,560	6,546,891	620	

** = significant at P = 0.01.

Table 79. Polynomial lack of fit analysis for log-transformed catch per nominal days fished for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	1,086.94		
YL	1	941.38	941.38	809.38**
LOF	8	145.56	18.20	
YQ	1	60.81	60.81	52.28**
LOF	7	84.75	12.11	
YC	1	0.00	0.00	0.00ns
LOF	6	84.75	14.13	12.15**
Month	11	3,766.68		
ML	1	351.00	351.00	301.78**
LOF	10	3,415.68	341.57	
MQ	1	2,132.49	2,132.49	1,833.47**
LOF	9	1,283.19	142.58	
MC	1	427.40	427.40	367.47**
LOF	8	855.79	106.97	91.97**
Depth	9	19,485.47		
DL	1	5,900.38	5,900.38	5,073.03**
LOF	8	13,585.09	1,698.14	
DQ	1	13,060.41	13,060.41	11,229.08**
LOF	7	524.68	74.95	
DC	1	367.18	367.18	315.69**
LOF	6	157.50	26.25	
Size	3	3,205.37		
SL	1	2,157.59	2,157.59	1,855.05**
LOF	2	1,047.79	523.89	
SQ	1	1,032.23	1,032.23	887.49**
SC	1	15.56	15.56	13.39**
Residual	10,560	12,282.21	1.16	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 80. Polynomial lack of fit analysis for catch per directed effort for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	466,108		
YL	1	9,283	9,283	11.15**
LOF	8	456,825	57,103	
YQ	1	18,173	18,173	21.82**
LOF	7	438,652	62,665	
YC	1	90,892	90,892	109.13**
LOF	6	347,760	57,960	69.59**
Month	11	5,297,312		
ML	1	1,396,120	1,396,120	1,676.24**
LOF	10	3,901,192	390,119	
MQ	1	2,069,818	2,069,818	2,485.12**
LOF	9	1,831,374	203,486	
MC	1	784,699	784,699	942.14**
LOF	8	1,046,675	130,834	157.09**
Depth	9	9,225,468		
DL	1	6,672,304	6,672,304	8,011.07**
LOF	8	2,553,164	319,146	
DQ	1	1,902,785	1,902,785	2,284.57**
LOF	7	650,379	92,911	
DC	1	251,856	251,856	302.39**
LOF	6	398,523	66,421	79.75**
Size	3	673,166		
SL	1	278,049	278,049	333.84**
LOF	2	395,117	197,559	
SQ	1	390,346	390,346	468.67**
SC	1	4,771	4,771	5.73*
Residual	10,560	8,795,274	833	

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 81. Polynomial lack of fit analysis for catch per unit water surface area for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	26,773,353		
YL	1	3,416	3,416	0.01^{ns}
LOF	8	26,769,937	3,346,242	
YQ	1	2,255,815	2,255,815	5.64*
LOF	7	24,514,122	3,502,017	
YC	1	8,045,735	8,045,735	20.10**
LOF	6	16,468,387	2,744,731	6.86**
Month	11	232,418,577		
ML	1	9,546,004	9,546,004	23.85**
LOF	10	222,872,573	22,287,257	
MQ	1	99,002,385	99,002,385	247.38**
LOF	9	123,870,188	13,763,354	
MC	1	33,500,613	33,500,613	83.71**
LOF	8	90,369,575	11,296,197	28.23**
Depth	9	244,510,261		
DL	1	24,407,228	24,407,228	60.99**
LOF	8	220,103,033	27,512,879	
DQ	1	107,478,023	107,478,023	268.56**
LOF	7	112,625,010	16,089,287	
DC	1	45,112,594	45,112,594	112.73**
LOF	6	67,512,416	11,252,069	28.12**
Size	3	14,525,591		
SL	1	3,392,057	3,392,057	8.48**
LOF	2	11,133,534	5,566,767	
SQ	1	10,912,241	10,912,241	27.27**
SC	1	221,293	221,293	0.55^{ns}
Residual	10,560	4,266,065,644	400,196	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 82. Polynomial lack of fit analysis for log-transformed catch per unit water surface area for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	4,256.64		
YL	1	3,141.55	3,141.55	1,051.60**
LOF	8	1,115.09	139.39	
YQ	1	575.39	575.39	192.61**
LOF	7	539.70	77.10	
YC	1	2.71	2.71	0.91^{ns}
LOF	6	536.99	89.50	29.96**
Month	11	13,392.71		
ML	1	287.13	287.13	96.11**
LOF	10	13,105.58	1,310.56	
MQ	1	8,108.78	8,108.78	2,714.33**
LOF	9	4,996.80	555.20	
MC	1	1,210.28	1,310.28	438.60**
LOF	8	3,686.52	460.82	154,25**
Depth	9	63,262.42		
DL	1	7,955.60	7,955.60	2,663.05**
LOF	8	55,306.82	6,913.35	
DQ	1	53,108.37	53,108.37	17,777.46**
LOF	7	2,198.45	314.06	
DC	1	49.56	49.56	16.90**
LOF	6	2,148.89	358.15	119.89**
Size	3	16,731.55		
SL	1	12,914.09	12,914.09	4,322.85**
LOF	2	3,817.46	1,908.73	
SQ	1	3,811.80	3,811.80	1,275.96**
SC	1	5.66	5.66	1.89^{ns}
Residual	10,560	31,546.93	2.99	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 83. Polynomial lack of fit analysis for nominal days fished per unit water surface area for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	110,118		
YL	1	2,149	2,149	0.31^{ns}
LOF	8	107,969	13,496	
YQ	1	19,049	19,049	2.76^{ns}
LOF	7	88,920	12,703	
YC	1	9,575	9,575	1.39^{ns}
LOF	6	79,345	13,224	1.91^{ns}
Month	11	144,943		
ML	1	21	21	0.00^{ns}
LOF	10	144,922	14,492	
MQ	1	56,839	56,839	8.23**
LOF	9	88,083	9,787	
MC	1	4,596	4,596	0.67^{ns}
LOF	8	83,487	10,436	1.51^{ns}
Depth	9	155,063		
DL	1	26,857	26,857	3.89*
LOF	8	128,206	16,026	
DQ	1	15,328	15,328	2.22^{ns}
LOF	7	112,878	16,125	
DC	1	5,960	5,690	0.82^{ns}
LOF	6	107,188	17,864	2.59*
Size	3	9,582		
SL	1	2,012	2,012	0.29^{ns}
LOF	2	7,570	3,785	
SQ	1	5,597	5,597	0.81^{ns}
SC	1	1,973	1,973	0.29^{ns}
Residual	10,560	72,933,389	6,907	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 84. Polynomial lack of fit analysis for log-transformed nominal days fished per unit water surface area for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	1,221.47		
YL	1	815.15	815.15	934.46**
LOF	8	406.32	50.79	
YQ	1	183.88	183.88	210.79**
LOF	7	222.44	31.78	
YC	1	18.63	18.63	21.36**
LOF	6	203.81	33.97	38.94**
Month	11	3,180.46		
ML	1	3.12	3.12	3.58^{ns}
LOF	10	3,177.34	317.73	
MQ	1	1,895.06	1,895.06	2,172.44**
LOF	9	1,282.28	142.48	
MC	1	236.62	236.62	271.25**
LOF	8	1,045.66	130.71	149.84**
Depth	9	15,275.16		
DL	1	614.86	614.86	704.86**
LOF	8	14,660.30	1,832.54	
DQ	1	13,633.58	13,663.58	15,663.53**
LOF	7	996.72	142.39	
DC	1	88.76	88.76	101.75**
LOF	6	907.96	151.33	173.48**
Size	3	5,303.39		
SL	1	4,381.01	4,381.01	5,022.26**
LOF	2	922.38	461.19	
SQ	1	921.20	921.20	1,056.04**
LOF	1	1.18	1.18	1.35^{ns}
Residual	10,560	9,211.68	0.87	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 85. Polynomial lack of fit analysis for directed effort per unit water surface area for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	13,203		
YL	1	5,458	5,458	97.27**
LOF	8	7,745	968	
YQ	1	419	419	7.47**
LOF	7	7,326	1,047	
YC	1	3,186	3,186	56.78**
LOF	6	4,140	690	12.30**
Month	11	15,407		
ML	1	1,271	1,271	22.65**
LOF	10	14,136	1,414	
MQ	1	4,336	4,336	77.28**
LOF	9	9,800	1,089	
MC	1	640	640	11.41**
LOF	8	9,160	1,145	20.41**
Depth	9	59,216		
DL	1	535	535	9.53**
LOF	8	58,681	7,335	
DQ	1	30,126	30,126	536.90**
LOF	7	28,555	4,079	
DC	1	20,510	20,510	365.53**
LOF	6	8,045	1,341	23.90**
Size	3	19,523		
SL	1	19,115	19,115	340.66**
LOF	2	407	204	
SQ	1	216	216	3.85*
SC	1	191	191	3.40ns
Residual	10,560	592,532	56	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 86. Polynomial lack of fit analysis for log-transformed directed effort per unit water surface area for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	1,398.84		
YL	1	1,035.48	1,035.48	1,252.06**
LOF	8	363.36	45.42	
YQ	1	161.00	161.00	194.67**
LOF	7	202.36	28.91	
YC	1	44.11	44.11	53.34**
LOF	6	158.25	26.38	31.90**
Month	11	2,815.57		
ML	1	6.91	6.91	8.36**
LOF	10	2,808.66	280.87	
MQ	1	1,647.14	1,647.14	1.991.65**
LOF	9	1,161.52	129.06	
MC	1	203.15	203.15	245.64**
LOF	8	958.37	119.80	144.86**
Depth	9	15,372.72		
DL	1	522.84	522.84	632.19**
LOF	8	14,849.88	1,856.24	
DQ	1	14,073.21	14,073.21	17,016.69**
LOF	7	776.67	110.95	
DC	1	71.67	71.67	86.66**
LOF	6	705.00	117.50	142.08**
Size	3	5,358.28		
SL	1	4,463.87	4,463.87	5,397.51**
LOF	2	894.41	447.21	
SQ	1	893.14	893.14	1,079.94**
SC	1	1.27	1.27	1.54^{ns}
Residual	10,560	8,733.37	0.83	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 87. Polynomial lack of fit analysis for catch per nominal days fished per unit water surface area for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	63,293		
YL	1	8,066	8,066	60.99**
LOF	8	55,227	6,903	
YQ	1	5,900	5,900	44.62**
LOF	7	49,327	7,047	
YC	1	512	512	3.87*
LOF	6	48,815	8,136	61.52**
Month	11	254,591		
ML	1	109,829	109,829	830.52**
LOF	10	144,762	14,476	
MQ	1	42,844	42,844	323.98**
LOF	9	101,918	11,324	
MC	1	52,738	52,738	398.80**
LOF	8	49,180	6,148	46.49**
Depth	9	877,005		
DL	1	28,298	28,298	213.99**
LOF	8	848,707	106,088	
DQ	1	830,257	830,257	6,278.33**
LOF	7	18,450	2,636	
DC	1	2,568	2,568	19.42**
LOF	6	15,882	2,647	20.02**
Size	3	177,024		
SL	1	119,788	119,788	905.83**
LOF	2	57,237	28,618	
SQ	1	56,877	56,877	430.10**
SC	1	360	360	2.72^{ns}
Residual	10,560	1,396,473	132	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 88. Polynomial lack of fit analysis for log-transformed catch per nominal days fished per unit water surface area for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	2,309.14		
YL	1	2,132.99	2,132.99	933.72**
LOF	8	176.15	22.02	
YQ	1	76.30	76.30	33.40**
LOF	7	99.85	14.26	
YC	1	8.31	8.31	3.64^{ns}
LOF	6	91.54	15.26	6.68**
Month	11	4,814.25		
ML	1	286.71	286.71	125.51**
LOF	10	4,527.54	452.75	
MQ	1	2,889.82	2,889.82	1,265.02**
LOF	9	1,637.72	181.97	
MC	1	454.64	454.64	199.02**
LOF	8	1,183.08	147.89	64.74**
Depth	9	35,369.66		
DL	1	6,472.50	6,472.50	2,833.33**
LOF	8	28,897.16	3,612.15	
DQ	1	28,426.08	28,426.08	12,443.51**
LOF	7	471.08	67.30	
DC	1	155.02	155.02	67.86**
LOF	6	316.06	52.68	23.06**
Size	3	6,976.44		
SL	1	4,934.11	4,934.11	2,159.90**
LOF	2	2,042.33	1,021.17	
SQ	1	2,015.87	2,015.87	822.45**
SC	1	26.46	26.46	11.58**
Residual	10,560	24,123.38	2.28	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 89. Polynomial lack of fit analysis for catch per directed effort per unit water surface area for brown shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	51,952		
YL	1	1	1	0.01^{ns}
LOF	8	51,951	6,494	
YQ	1	1,945	1,945	41.74**
LOF	7	50,006	7,144	
YC	7	226	226	1.71^{ns}
LOF	6	49,780	8,297	53.33**
Month	11	332,646		
ML	1	134,466	134,466	864.26**
LOF	10	198,180	19,818	
MQ	1	72,495	72,495	465.95**
LOF	9	125,685	13,965	
MC	1	65,397	65,397	420.33**
LOF	8	60,288	7,536	48.44**
Depth	9	875,279		
DL	1	74,681	74,681	180.00**
LOF	8	800,598	100,075	
DQ	1	755,740	755,740	4,857.41**
LOF	7	44,858	6,408	
DC	1	7,384	7,384	47.46**
LOF	6	37,474	6,246	40.15**
Size	3	183,904		
SL	1	115,953	115,953	745.27**
LOF	2	67,950	33,976	
SQ	1	67,621	67,621	434.62**
SC	1	329	329	2.11^{ns}
Residual	10,560	1,642,977	156	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 90. Polynomial lack of fit analysis for the catch of white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	441,575		
YL	1	1,905	1,905	1.03^{ns}
LOF	8	439,670	54,959	
YQ	1	193,439	193,439	104.66**
LOF	7	246,231	35,176	
YC	1	10,955	10,955	5.93*
LOF	6	235,276	39,213	21.22**
Month	11	4,471,840		
ML	1	1,923,190	1,923,190	1,040.55**
LOF	10	2,548,650	254,865	
MQ	1	755,195	755,195	408.60**
LOF	9	1,793,455	199,273	
MC	1	138,119	138,119	74.73**
LOF	8	1,655,336	206,917	111.95**
Depth	9	29,560,057		
DL	1	16,402,582	16,402,582	8,874.67**
LOF	8	13,157,475	1,644,684	
DQ	1	9,872,880	9,872,880	5,341.75**
LOF	7	3,284,595	469,228	
DC	1	2,119,932	2,119,932	1,147.00**
LOF	6	1,164,663	194,110	105.02**
Size	3	446,865		
SL	1	360,574	360,574	195.09**
LOF	2	86,292	43,146	
SQ	1	29,885	29,885	16.17**
SC	1	56,407	56,407	30.52**
Residual	10,560	19,517,484	1,848	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 91. Polynomial lack of fit analysis for nominal days fished for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	216,032		
YL	1	31,147	31,147	2.80^{ns}
LOF	8	184,885	23,111	
YQ	1	48,844	48,844	4.38*
LOF	7	136,041	19,434	
YC	1	57,658	57,658	5.18*
LOF	6	78,383	13,064	
Month	11	1,674,673		
ML	1	739,589	739,589	66.38**
LOF	10	935,084	93,508	
MQ	1	179,937	179,937	16.15**
LOF	9	755,147	83,905	
MC	1	26,887	26,887	2.41^{ns}
LOF	8	728,260	91,033	8.17**
Depth	9	12,593,224		
DL	1	6,774,631	6,774,631	608.05**
LOF	8	5,818,593	727,324	
DQ	1	4,368,893	4,368,893	392.12**
LOF	7	1,449,700	207,100	
DC	1	1,224,324	1,224,324	109.89**
LOF	6	225,376	37,563	3.37^{ns}
Size	3	267,005		
SL	1	204,925	204,925	18.39**
LOF	2	62,080	31,040	
SQ	1	28,586	28,586	2.57^{ns}
SC	1	33,494	33,494	3.01^{ns}
Residual	10,560	117,655,190	11,142	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 92. Polynomial lack of fit analysis for log-transformed nominal days fished for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	170.537		
YL	1	76.043	76.043	555.03**
LOF	8	94.494	11.812	
YQ	1	46.913	46.913	342.42**
LOF	7	47.581	6.797	
YC	1	9.382	9.382	68.48**
LOF	6	38.199	6.367	46.47**
Month	11	621.082		
ML	1	129.599	129.599	945.94**
LOF	10	491.483	49.148	
MQ	1	90.277	90.277	658.93**
LOF	9	401.206	44.578	
MC	1	0.020	0.020	0.15^{ns}
LOF	8	401.186	50.148	366.03**
Depth	9	24,645.576		
DL	1	16,723.294	16,723.294	122.062.48**
LOF	8	7,922.282	990.285	
DQ	1	5,755.234	5,755.234	42,007.17**
LOF	7	2,167.048	309.578	
DC	1	147.088	147.088	1,073.59**
LOF	6	2,019.960	336.660	2,457.26**
Size	3	94.057		
SL	1	73.747	73.747	538.28**
LOF	2	20.309	10.155	
SQ	1	20.246	20.246	147.77**
SC	1	0.063	0.063	0.46^{ns}
Residual	10,560	1,446.783	0.137	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 93. Polynomial lack of fit analysis for directed effort for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	82,698.1		
YL	1	39,606.3	39,606.3	110.70**
LOF	8	43,091.8	5,386.5	
YQ	1	19,151.9	19,151.9	53.53**
LOF	7	23,939.9	3,420.0	
YC	1	12,291.1	12,291.1	34.35**
LOF	6	11,648.8	1,941.5	5.43**
Month	11	751,957.6		
ML	1	289,676.9	289,676.9	809.65**
LOF	10	462,280.7	46,228.1	
MQ	1	63,724.3	63,724.3	178.11**
LOF	9	398,556.4	44,284.0	
MC	1	9,354.1	9,354.1	26.14**
LOF	8	389,202.3	48,650.3	135.98
Depth	9	6,780.514.4		
DL	1	3,872,306.1	3,872,306.1	10,823.19**
LOF	8	2,908,208.3	363,526.0	
DQ	1	2,166,362.9	2,166,362.9	6,055.04**
LOF	7	741,845.4	105,977.9	
DC	1	387,712.8	387,712.8	1,083.67**
LOF	6	354,132.6	59,022.1	164.97**
Size	3	35,532.2		
SL	1	28,644.9	28,644.9	80.06**
LOF	2	6,887.3	3,443.7	
SQ	1	708.5	708.5	1.98^{ns}
SC	1	6,178.8	6,178.8	17.27**
Residual	10,560	3,778,142.4	357.8	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 94. Polynomial lack of fit analysis for catch per nominal days fished for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	654,960		
YL	1	2,741	2,741	7.33**
LOF	8	652,219	81,527	
YQ	1	295,322	295,322	789.77**
LOF	7	356,897	50,985	
YC	1	27,805	27,805	74.36**
LOF	6	329,092	54,849	146.68**
Month	11	219,321		
ML	1	104,097	104,097	278.38**
LOF	10	115,224	11,522	
MQ	1	57,266	57,266	153.14**
LOF	9	57,958	6,440	
MC	1	32,480	32,480	86.86**
LOF	8	25,478	3,185	8.52**
Depth	9	10,360,139		
DL	1	8,610,788	8,610,788	23,027.47**
LOF	8	1,749,351	218,669	
DQ	1	1,064,282	1,064,282	2,846.17**
LOF	7	685,069	97,867	
DC	1	16,347	16,347	43.72**
LOF	6	668,722	111,454	298.06**
Size	3	316,438		
SL	1	312,623	312,623	836.03**
LOF	2	3,815	1,908	
SQ	1	3,759	3,759	10.05**
SC	1	56	56	0.15^{ns}
Residual	10,560	3,948,758	374	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 95. Polynomial lack of fit analysis for log-transformed catch per nominal days fished for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	941.719		
YL	1	91.210	91,210	123.88**
LOF	8	850.509	106.314	
YQ	1	409.694	409.694	556.44**
LOF	7	440.815	62.974	
YC	1	1.170	1.170	1.59^{ns}
LOF	6	439.645	73.274	99.52**
Month	11	242.300		
ML	1	0.102	0.102	0.14^{ns}
LOF	10	242.198	24.220	
MQ	1	90.700	90.700	123.19**
LOF	9	151.498	16.833	
MC	1	0.070	0.070	0.10^{ns}
LOF	8	151.428	18.929	25.71**
Depth	9	44,905.923		
DL	1	36,317.758	36,317.758	49,325.42**
LOF	8	8,588.165	1,073.521	
DQ	1	4,646.458	4,646.458	6,310.71**
LOF	7	3,941.707	563.101	
DC	1	123.991	123.991	168.40**
LOF	6	3,817.716	636.286	864.19**
Size	3	1,184.183		
SL	1	1,158.814	1,158.814	1,573.87**
LOF	2	25.369	12.685	
SQ	1	25.330	25.330	34.40**
SC	1	0.039	0.039	0.05^{ns}
Residual	10,560	7,775.131	0.736	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 96. Polynomial lack of fit analysis for catch per directed effort for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	712,718		
YL	1	24,329	24,329	56.68**
LOF	8	688,389	86,049	
YQ	1	276,621	276,621	644.42**
LOF	7	411,768	58,824	
YC	1	15,572	15,572	36.28**
LOF	6	396,196	66,033	153.83**
Month	11	322,804		
ML	1	144,350	144,350	336.28**
LOF	10	178,454	17,845	
MQ	1	105,254	105,254	245.20**
LOF	9	73,200	8,133	
MC	1	44,723	44,723	104.19**
LOF	8	28,477	3,560	8.29**
Depth	9	13,762,387		
DL	1	11,345,198	11,345,198	26,430.12**
LOF	8	2,417,189	302,149	
DQ	1	1,720,522	1,720,522	4,008.18**
LOF	7	696,667	99,524	
DC	1	206	206	0.48^{ns}
LOF	6	696,461	116,077	270.42**
Size	3	346,789		
SL	1	341,631	341,631	795.87**
LOF	2	5,158	2,579	
SQ	1	4,965	4,965	11.57**
SC	1	193	193	0.45^{ns}
Residual	10,560	4,532,907	429	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 97. Polynomial lack of fit analysis for catch per unit water surface area for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	18,180,801		
YL	1	220,013	220,013	1.88^{ns}
LOF	8	17,960,788	2,245,099	
YQ	1	7,813,798	7,813,798	66.71**
LOF	7	10,146,990	1,449,570	
YC	1	118,134	118,134	1.01^{ns}
LOF	6	10,028,856	1,671,476	14.27**
Month	11	226,187,570		
ML	1	96,704,240	96,704,240	825.63**
LOF	10	129,483,330	12,948,333	
MQ	1	52,740,963	52,740,963	450.28**
LOF	9	76,742,367	8,526,930	
MC	1	5,310,518	5,310,518	45.34**
LOF	8	71,431,849	8,928,981	76.23**
Depth	9	1,022,486,290		
DL	1	604,309,615	604,309,615	5,159.39**
LOF	8	418,176,675	52,272,084	
DQ	1	335,836,825	335,836,825	2,867.26**
LOF	7	82,339,850	11,762,836	
DC	1	68,477,039	68,477,039	584.63**
LOF	6	13,862,811	2,310,469	19.73**
Size	3	20,949,025		
SL	1	17,527,381	17,527,381	149.64**
LOF	2	3,421,645	1,710,822	
SQ	1	1,444,950	1,444,950	12.34**
SC	1	1,976,695	1,976,695	16.88**
Residual	10560	1,236,872,924	117,128	

ns = not significant, P = 0.05.

Table 98. Polynomial lack of fit analysis for log-transformed catch per unit water surface area for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	2,539.09		
YL	1	605.72	605.72	387.51**
LOF	8	1,933.37	241.67	
YQ	1	1,113.02	1,113.02	712.06**
LOF	7	820.35	117.19	
YC	1	11.24	11.24	7.19**
LOF	6	809.11	134.85	86.27**
Month	11	2,567.53		
ML	1	171.33	171.33	109.61**
LOF	10	2,396.20	239.62	
MQ	1	838.09	838.09	536.17**
LOF	9	1,558.11	173.12	
MC	1	8.78	8.78	5.62*
LOF	8	1,549.33	193.67	123.90**
Depth	9	190,861.40		
DL	1	149,292.78	149,292.78	95,510.32**
LOF	8	41,568.62	5,196.08	
DQ	1	29,535.80	29,535.80	18,895.58**
LOF	7	12,032.82	1,718.97	
DC	1	8.80	8.80	5.63*
LOF	6	12,024.02	2,004.00	1,282.06**
Size	3	3,108.04		
SL	1	2,955.66	2,955.66	1,890.89**
LOF	2	152.38	76.19	
SQ	1	152.12	152.12	97.32**
SC	1	0.26	0.26	0.17^{ns}
Residual	10560	16,506.40	1.56	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 99. Polynomial lack of fit analysis for nominal days fished per unit water surface area for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	5,339,295		
YL	1	13,216	13,216	0.05^{ns}
LOF	8	5,326,079	665,760	
YQ	1	637,934	637,934	2.55^{ns}
LOF	7	4,688,145	669,735	
YC	1	312,792	312,792	1.25^{ns}
LOF	6	4,375,350	729,225	2.91**
Month	11	73,368,289		
ML	1	33,396,939	33,396,939	133.44**
LOF	10	39,971,350	3,997,135	
MQ	1	13,229,645	13,229,645	52.86**
LOF	9	26,741,705	2,971,301	
MC	1	2,391,620	2,391,620	9.56**
LOF	8	24,350,085	3,043,761	12.16**
Depth	9	471,807,017		
DL	1	259,844,384	259,844,384	1,038.23**
LOF	8	211,962,633	26,495,329	
DQ	1	160,779,637	160,779,637	642.41**
LOF	7	51,182,996	7,311,857	
DC	1	46,235,312	46,235,312	184.74**
LOF	6	4,947,684	824,614	3.29**
Size	3	9,542,722		
SL	1	7,718,782	7,718,782	30.84**
LOF	2	1,823,940	911,970	
SQ	1	465,861	465,861	1.86^{ns}
SC	1	1,358,079	1,358,079	5.43*
Residual	10560	2,642,917,582	350,276	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 100. Polynomial lack of fit analysis for log-transformed nominal days fished per unit water surface area for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	560.333		
YL	1	252.576	252.576	629.19**
LOF	8	307.757	38.470	
YQ	1	168.638	168.638	420.09**
LOF	7	139.119	19.874	
YC	1	29.690	29.690	73.96**
LOF	6	109.429	18.238	45.43**
Month	11	1,231.545		
ML	1	119.419	119.419	297.48**
LOF	10	1,112.126	111.213	
MQ	1	338.728	338.728	843.80**
LOF	9	773.398	85.933	
MC	1	6.531	6.531	16.27**
LOF	8	766.867	98.858	246.26**
Depth	9	54,177.927		
DL	1	40,211.557	40,211.557	100,170.59**
LOF	8	13,966.370	1,745.796	
DQ	1	10,580.492	10,580.492	26,356.95**
LOF	7	3,385.878	483.697	
DC	1	139.681	139.681	347.96**
LOF	6	3,246.197	541.033	1,347.76**
Size	3	551.116		
SL	1	502.858	502.858	1,252.66**
LOF	2	48.259	24.129	
SQ	1	48.119	48.119	119.87**
SC	1	0.140	0.140	0.35ns
Residual	10560	4,239.109	0.401	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 101. Polynomial lack of fit analysis for directed effort per unit water surface area for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	2,719,007		
YL	1	1,089,181	1,089,181	49.57**
LOF	8	1,629,826	203,728	
YQ	1	872,145	872,145	39.69**
LOF	7	757,681	108,240	
YC	1	359,762	359,762	16.37**
LOF	6	397,919	66,319	3.02**
Month	11	36,343,890		
ML	1	13,736,800	13,736,800	625.12**
LOF	10	22,607,090	2,260,709	
MQ	1	7,116,289	7,116,289	323.84**
LOF	9	15,490,801	1,721,200	
MC	1	496,406	496,406	22.59**
LOF	8	14,994,395	1,874,299	85.29**
Depth	9	224,866,537		
DL	1	135,288,745	135,288,745	6,156.58**
LOF	8	89,577,792	11,197,224	
DQ	1	69,255,653	69,255,653	3,151.62**
LOF	7	20,322,139	2,903,163	
DC	1	11,907,000	11,907,000	541.85**
LOF	6	8,415,139	1,402,523	63.82**
Size	3	1,868,210		
SL	1	1,595,689	1,595,689	72.61**
LOF	2	272,521	136,261	
SQ	1	76,646	76,646	3.49ns
SC	1	195,874	195,874	8.91**
Residual	10560	232,052,355	21,975	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 102. Polynomial lack of fit analysis for log-transformed directed effort per unit water surface area for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	604.092		
YL	1	318.119	318.119	829.38**
LOF	8	285.973	35.747	
YQ	1	137.698	137.698	359.00**
LOF	7	148.275	21.182	
YC	1	45.521	45.521	118.68**
LOF	6	102.754	17.126	44.65**
Month	11	1,198.264		
ML	1	113.304	113.304	295.40**
LOF	10	1,084.960	108.496	
MQ	1	318.728	318.728	830.97**
LOF	9	766.232	85.137	
MC	1	6.969	6.969	18.17**
LOF	8	759.263	94.908	247.44**
Depth	9	50,750.566		
DL	1	36,665.209	36,665.209	95,591.42**
LOF	8	14,085.357	1,760.670	
DQ	1	9,620.103	9,620.103	25,080.99**
LOF	7	4,465.254	637.893	
DC	1	91.304	91.304	238.04**
LOF	6	4,373.950	728.992	1,900.59**
Size	3	539.819		
SL	1	493.925	493.925	1,287.73**
LOF	2	45.894	22.947	
SQ	1	45.754	45.754	119.29**
SC	1	0.140	0.140	0.36^{ns}
Residual	10560	4,050.442	0.384	

ns = not significant, P = 0.05.

Table 103. Polynomial lack of fit analysis for catch per nominal days fished per unit water surface area for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	438,532		
YL	1	16,480	16,480	15.57**
LOF	8	422,052	52,757	
YQ	1	227,955	227,955	214.95**
LOF	7	194,097	27,728	
YC	1	582	582	0.55^{ns}
LOF	6	193,515	32,253	30.41**
Month	11	371,160		
ML	1	123,600	123,600	116.55**
LOF	10	247,560	24,756	
MQ	1	194,596	194,596	183.50**
LOF	9	52,964	5,885	
MC	1	3,209	3,209	3.03^{ns}
LOF	8	49,755	6,219	5.86**
Depth	9	4,695,806		
DL	1	4,296,194	4,296,194	4,051.18**
LOF	8	399,612	49,952	
DQ	1	24,375	24,375	22.98**
LOF	7	375,237	53,605	
DC	1	13,685	13,685	12.90**
LOF	6	361,552	60,259	56.82**
Size	3	662,151		
SL	1	660,019	660,019	622.38**
LOF	2	2,133	1,066	
SQ	1	126	126	0.12^{ns}
SC	1	2,007	2,007	1.89^{ns}
Residual	10560	1,119,8,652	1,060	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 104. Polynomial lack of fit analysis for log-transformed catch per nominal days fished per unit water surface area for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	1,577.08		
YL	1	254.01	254.01	172.85**
LOF	8	1,323.07	165.38	
YQ	1	679.29	679.29	462.46**
LOF	7	643.78	91.97	
YC	1	1.85	1.85	1.26^{ns}
LOF	6	641.93	106.99	72.81**
Month	11	564.40		
ML	1	5.78	5.78	3.93*
LOF	10	558.62	55.86	
MQ	1	258.74	258.74	176.07**
LOF	9	299.88	33.32	
MC	1	6.14	6.14	4.18*
LOF	8	293.74	36.72	24.99**
Depth	9	67,700.75		
DL	1	56,694.34	56,694.34	38,580.66**
LOF	8	11,006.41	1,375.80	
DQ	1	6,139.93	6,139.93	4,178.24**
LOF	7	4,866.48	695.21	
DC	1	128.88	128.88	87.70**
LOF	6	4,737.60	789.60	537.33**
Size	3	2,361.18		
SL	1	2,322.84	2,322.84	1,580.70**
LOF	2	38.34	19.17	
SQ	1	38.09	38.09	25.92**
SC	1	0.25	0.25	0.17^{ns}
Residual	10560	15,577.94	1.47	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01

Table 105. Polynomial lack of fit analysis for catch per directed effort per unit water surface area for white shrimp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	402,091		
YL	1	3,060	3,060	2.36^{ns}
LOF	8	399,031	49,879	
YQ	1	193,118	193,118	149.23**
LOF	7	205,913	29,416	
YC	1	1,820	1,820	1.41^{ns}
LOF	6	204,093	34,016	26.29**
Month	11	523,111		
ML	1	179,348	179,348	138.59**
LOF	10	343,763	34,376	
MQ	1	280,820	280,820	217.01**
LOF	9	62,943	6,994	
MC	1	7,992	7,992	6.18*
LOF	8	54,951	6,869	5.31**
Depth	9	6,271,660		
DL	1	5,745,898	5,745,898	4,440.22**
LOF	8	525,762	65,720	
DQ	1	102,309	102,309	79.06**
LOF	7	423,453	60,493	
DC	1	141	141	0.11^{ns}
LOF	6	423,312	70,552	54.52**
Size	3	746,922		
SL	1	744,028	744,028	574.96**
LOF	2	2,895	1,447	
SQ	1	214	214	0.17^{ns}
SC	1	2,681	2,681	2.07^{ns}
Residual	10560	13,665,228	1,294	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 106. Polynomial lack of fit analysis for the catch of *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	1,004,322		
YL	1	32,140	32,140	7.41**
LOF	8	972,182	121,523	
YQ	7	594,569	594,569	137.14**
LOF	7	377,613	53,945	
YC	1	22,857	22,857	5.27*
LOF	6	354,756	59,126	13.64**
Month	11	4,726,308		
ML	1	2,601,528	2,601,528	600.05**
LOF	10	2,124,780	212,478	
MQ	1	190,537	190,537	43.95**
LOF	9	1,934,243	214,916	
MC	1	724,697	724,697	167.15**
LOF	8	1,209,546	151,193	34.87**
Depth	9	39,240,070		
DL	1	27,992,553	27,992,553	6,456.59**
LOF	8	11,247,517	1,405,940	
DQ	1	7,720,390	7,720,390	1,780.74**
LOF	7	3,527,127	503,875	
DC	1	2,755,798	2,755,798	635.64**
LOF	6	771,329	128,554	29.65**
Size	3	985,317		
SL	1	954,473	954,473	220.15**
LOF	2	30,844	15,422	
SQ	1	12,875	12,875	2.97ns
SC	1	17,969	17,969	4.14*
Residual	10560	45,782,865	4,335	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01

Table 107. Polynomial lack of fit analysis for nominal days fished for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	651,381		
YL	1	6,501	6,501	0.24^{ns}
LOF	8	644,880	80,610	
YQ	1	242,861	242,861	8.78**
LOF	7	402,019	57,431	
YC	1	75,051	75,051	2.71^{ns}
LOF	6	326,968	54,495	1.97^{ns}
Month	11	1,486,733		
ML	1	625,706	625,706	22.63**
LOF	10	861,027	86,103	
MQ	1	138,657	138,657	5.02*
LOF	9	722,370	80,263	
MC	1	53,744	53,744	1.94^{ns}
LOF	8	668,626	83,578	3.02**
Depth	9	19,360,116		
DL	1	12,006,893	12,006,893	434.27**
LOF	8	7,353,223	919,153	
DQ	1	4,787,327	4,787,327	173.15**
LOF	7	2,565,896	366,557	
DC	1	2,209,834	2,209.834	79.93**
LOF	6	356,062	59,344	2.15*
Size	3	930,047		
SL	1	652,730	652,730	23.61**
LOF	2	277,317	138,659	
SQ	1	209,576	209,576	7.58**
SC	1	67,741	67,741	2.45^{ns}
Residual	10560	291,966,900	27.648	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 108. Polynomial lack of fit analysis for log-transformed nominal days fished for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	569.404		
YL	1	270.863	270.863	821.01**
LOF	8	298.541	37.318	
YQ	1	178.674	178.674	541.58**
LOF	7	119.867	17.124	
YC	1	11.319	11.319	34.31**
LOF	6	108.548	18.091	54.54**
Month	11	375.216		
ML	1	71.375	71.375	216.34**
LOF	10	303.841	30.384	
MQ	1	164.087	164.087	494.36**
LOF	9	139.754	15.528	
MC	1	60.901	60.901	184.60**
LOF	8	78.853	9.857	29.88**
Depth	9	19,706.550		
DL	1	17,584.212	17,584.212	53,299.28**
LOF	8	2,122.338	265.292	
DQ	1	361.199	361.199	1,094.83**
LOF	7	1,761.139	251.591	
DC	1	406.046	406.046	1,230.76**
LOF	6	1,355.093	225.849	775.50**
Size	3	1,610.554		
SL	1	1,390.490	1,390.490	4,214.70**
LOF	2	220.064	110.032	
SQ	1	217.452	217.452	659.12**
SC	1	2.612	2.612	7.92**
Residual	10560	3,483.898	0.330	

** = significant at P = 0.01.

Table 109. Polynomial lack of fit analysis for directed effort for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	220,751		
YL	1	71,915	71,915	97.41**
LOF	8	148,836	18,605	
YQ	1	100,687	100,687	136.38**
LOF	7	48,149	6,878	
YC	1	17,158	17,158	23.24**
LOF	6	30,991	5,165	7.00**
Month	11	468,501		
ML	1	221,197	221,197	299.60**
LOF	10	247,304	24,730	
MQ	1	14,033	14,033	19.01**
LOF	9	233,271	25,919	
MC	1	37,312	37,312	50.54**
LOF	8	195,959	24,495	33.18**
Depth	9	7,491,820		
DL	1	5,092,399	5,092,399	6,897.39**
LOF	8	2,399,421	299,928	
DQ	1	1,440,977	1,440,977	1,951.73**
LOF	7	958,444	136,921	
DC	1	678,833	678,833	919.44**
LOF	6	279,611	46,602	63.12**
Size	3	8,177		
SL	1	2,645	2,645	3.58^{ns}
LOF	2	5,532	2,766	
SQ	1	2,195	2,195	2.97^{ns}
SC	1	3,337	3,337	4.52*
Residual	10560	7,796,528	738	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 110. Polynomial lack of fit analysis for catch per nominal days fished for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	582,385		
YL	1	1,445	1,445	3.29^{ns}
LOF	8	580,940	72,618	
YQ	1	148,014	148,014	337.15**
LOF	7	432,926	61,847	
YC	1	77,185	77,185	175.81**
LOF	6	355,741	59,290	135.06**
Month	11	1,938,986		
ML	1	934,956	934,956	2,129.65**
LOF	10	1,004,030	100,403	
MQ	1	83,194	83,194	189.50**
LOF	9	920,836	102,315	
MC	1	459,064	459,064	1,045.66**
LOF	8	461,772	57,722	131.48**
Depth	9	9,834,439		
DL	1	8,983,334	8,983,334	20,462.27**
LOF	8	851,105	106,388	
DQ	1	687,436	687,436	1,565.84**
LOF	7	163,669	23,381	
DC	1	17,384	17,384	39.60**
LOF	6	146,285	24,381	55.54**
Size	3	476,859		
SL	1	310,268	310,268	706.73**
LOF	2	166,591	83,296	
SQ	1	160,875	160,875	366.44**
SC	1	5,716	5,716	13.02**
Residual	10560	4,636,046	439	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 111. Polynomial lack of fit analysis for log-transformed catch per nominal days fished for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	840.894		
YL	1	536.810	536.810	895.63**
LOF	8	304.084	38.011	
YQ	1	108.005	108.005	119.84**
LOF	7	196.079	28.011	
YC	1	3.146	3.146	3.49^{ns}
LOF	6	192.933	32.156	35.68**
Month	11	427.631		
ML	1	110.434	110.434	122.53**
LOF	10	317.197	31.720	
MQ	1	104.542	104.542	116.00**
LOF	9	212.655	23.628	
MC	1	82.628	82.628	91.68**
LOF	8	130.027	16.253	18.03**
Depth	9	33,378.333		
DL	1	30,528.457	30,528.457	33,873.63**
LOF	8	2,849.876	356.235	
DQ	1	2,203.301	2,203.301	2,444.73**
LOF	7	646.575	92.368	
DC	1	18.798	18.798	20.58**
LOF	6	627.777	104.630	116.13**
Size	3	3,102.482		
SL	1	2,454.274	2,454.274	2,723.20**
LOF	2	648.208	324.104	
SQ	1	635.277	635.277	704.89**
SC	1	12.931	12.931	14.35**
Residual	10560	9,517.151	0.901	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 112. Polynomial lack of fit analysis for catch per directed effort for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	650,925		
YL	1	113,679	113,679	222.24**
LOF	8	537,246	67,155	
YQ	1	63,501	63,501	124.14**
LOF	7	473,745	67,678	
YC	1	42,976	42,976	84.02**
LOF	6	430,769	71,795	140.36**
Month	11	2,479,436		
ML	1	1,121,313	1,121,313	2,192.16**
LOF	10	1,358,123	135,812	
MQ	1	130,589	130,589	255.30**
LOF	9	1,227,534	136,393	
MC	1	563,638	563,638	1,101.91**
LOF	8	663,896	82,987	162.24**
Depth	9	13,745,691		
DL	1	13,321,143	13,321,143	26,042.74**
LOF	8	424,548	53,069	
DQ	1	264,129	264,129	516.37**
LOF	7	160,419	22,917	
DC	1	1,423	1,423	2.78^{ns}
LOF	6	158,996	26,499	51.81**
Size	3	402,041		
SL	1	229,744	229,744	449.15**
LOF	2	172,297	86,149	
SQ	1	167,759	167,759	327.97**
SC	1	4,538	4,538	8.87**
Residual	10560	5,401,555	512	

ns = not significant, P = 0.05

** = significant at P = 0.01.

Table 113. Polynomial lack of fit analysis for catch per unit water surface area for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	43,540,791		
YL	1	168,598	168,598	0.34^{ns}
LOF	8	43,372,193	5,421,524	
YQ	1	18,466,394	18,466,394	36.87**
LOF	7	24,905,799	3,557,971	
YC	1	10,113,711	10,113,711	20.19**
LOF	6	14,792,088	2,465,348	4.92**
Month	11	276,657,566		
ML	1	167,016,652	167,016,652	333.45**
LOF	10	109,640,914	10,964,019	
MQ	1	7,223,714	7,223,714	14.42**
LOF	9	102,417,200	11,379,689	
MC	1	65,487,384	65,487,384	130.75**
LOF	8	36,929,816	4,616,227	9.22**
Depth	9	1,216,261,211		
DL	1	871,612,068	871,612,068	1,740.19**
LOF	8	344,649,143	43,081,143	
DQ	1	63,340,754	63,340,754	126.46**
LOF	7	281,308,389	40,186,913	
DC	1	224,750,360	224,750,360	448.72**
LOF	6	56,558,029	9,426,338	18.82**
Size	3	13,434,418		
SL	1	5,498,170	5,498,170	10.98**
LOF	2	7,936,248	3,968,124	
SQ	1	4,415,493	4,415,493	8.82**
SC	1	3,520,755	3,520.755	7.03**
Residual	10560	5,289,215,953	500.873	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 114. Polynomial lack of fit analysis for log-transformed catch per unit water surface area for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	4,600.53		
YL	1	2,714.12	2,714.12	983.20**
LOF	8	1,886.41	235.80	
YQ	1	1,041.46	1,041.46	377.27**
LOF	7	844.95	120.71	
YC	1	0.02	0.02	0.01^{ns}
LOF	6	844.93	140.82	51.01**
Month	11	1,824.51		
ML	1	304.15	304.15	110.18**
LOF	10	1,520.36	152.04	
MQ	1	746.04	746.04	270.25**
LOF	9	774.32	86.04	
MC	1	314.49	314.49	113.92**
LOF	8	459.83	57.48	20.82**
Depth	9	136,920.15		
DL	1	126,197.94	126,920.15	45,977.07**
LOF	8	10,722.21	1,340.28	
DQ	1	3,237.34	3,237.34	1,172.73**
LOF	7	7,484.87	1,069.27	
DC	1	1,540.94	1,540.94	558.25**
LOF	6	5,943.93	990.66	358.87**
Size	3	19,139.13		
SL	1	16,015.08	16,015.08	5,801.49**
LOF	2	3,124.05	1,562.03	
SQ	1	3,123.36	3,123.36	1,131.44**
SC	1	0.69	0.69	0.25^{ns}
Residual	10560	29,150.99	2.76	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 115. Polynomial lack of fit analysis for nominal days per unit water surface area for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	120,370		
YL	1	1,825	1,825	0.26^{ns}
LOF	8	118,545	14,818	
YQ	1	26,659	26,659	3.73^{ns}
LOF	7	91,866	13,127	
YC	1	13,349	13,349	1.87^{ns}
LOF	6	78,517	13,086	1.83^{ns}
Month	11	115,126		
ML	1	31,750	31,750	4.44*
LOF	10	83,376	8,338	
MQ	1	15,225	15,225	2.13^{ns}
LOF	9	68,151	7,572	
MC	1	13,618	13,618	1.91^{ns}
LOF	8	54,533	6,817	0.95^{ns}
Depth	9	722,381		
DL	1	453,778	453,778	63.48**
LOF	8	268,603	33,575	
DQ	1	76,822	76,822	10.75**
LOF	7	191,781	27,397	
DC	1	85,394	85,394	11.95**
LOF	6	106,387	17,731	2.48*
Size	3	33,510		
SL	1	17,611	17,611	2.46^{ns}
LOF	2	15,899	7,950	
SQ	1	9,293	9,293	1.30^{ns}
SC	1	6,606	6 606	0.92^{ns}
Residual	10560	75,487,464	7,148	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 116. Polynomial lack of fit analysis for log-transformed nominal days fished per unit water surface area for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	1,635.44		
YL	1	1,001.51	1,001.51	1,103.38**
LOF	8	633.93	79.24	
YQ	1	338.13	338.13	372.52**
LOF	7	295.80	42.26	
YC	1	27.79	27.79	30.62**
LOF	6	268.01	44.67	49.21**
Month	11	495.43		
ML	1	27.84	27.84	30.67**
LOF	10	467.59	46.76	
MQ	1	238.95	238.95	263.26**
LOF	9	228.64	25.40	
MC	1	56.22	56.22	61.94**
LOF	8	172.42	21.55	23.74**
Depth	9	38,115.36		
DL	1	34,827.95	34,827.95	38,370.67**
LOF	8	3,287.41	410.93	
DQ	1	169.43	169.43	186.66**
LOF	7	3,117.98	445.43	
DC	1	1,167.96	1,167.96	7,286.77**
LOF	6	1,950.02	325.00	358.06**
Size	3	6,583.42		
SL	1	5,667.12	5,667.12	6,243.58**
LOF	2	916.30	458.15	
SQ	1	912.30	912.30	1,005.10**
SC	1	4.00	4.00	4.41*
Residual	10560	9,585.01	0.91	

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 117. Polynomial lack of fit analysis for directed effort per unit water surface area for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	22,805		
YL	1	11,424	11,424	148.79**
LOF	8	11,381	1,423	
YQ	1	2,502	2,502	35.59**
LOF	7	8,879	1,268	
YC	1	5,688	5,688	74.08**
LOF	6	3,191	532	6.93**
Month	11	14,900		
ML	1	6,652	6,652	86.64**
LOF	10	8,248	825	
MQ	1	343	343	4.47*
LOF	9	7,905	878	
MC	1	2,264	2,264	29.49**
LOF	8	5,641	705	9.18**
Depth	9	198,351		
DL	1	118,806	118,806	1,547.40**
LOF	8	79,545	9,943	
DQ	1	8,028	8,028	104.56**
LOF	7	71,517	10,217	
DC	1	63,672	63,672	829.30**
LOF	6	7,845	1,308	17.04**
Size	3	10,475		
SL	1	9,665	9,665	125.88**
LOF	2	809	405	
SQ	1	35	35	0.46^{ns}
SC	1	774	774	10.08**
Residual	10560	810,775	77	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 118. Polynomial lack of fit analysis for log-transformed directed effort per unit water surface area for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	1,918.76		
YL	1	1,363.89	1,363.89	1,552.59**
LOF	8	554.87	69.36	
YQ	1	278.09	278.09	316.56**
LOF	7	276.78	39.54	
YC	1	73.63	73.63	83.82**
LOF	6	203.15	33.86	38.54**
Month	11	439.08		
ML	1	23.17	23.17	26.38**
LOF	10	415.91	41.59	
MQ	1	199.52	199.52	227.12**
LOF	9	216.39	24.04	
MC	1	49.62	49.62	56.49**
LOF	8	166.77	20.85	23.73**
Depth	9	34,961.87		
DL	1	32,033.71	32,033.71	36,465.63**
LOF	8	2,928.16	366.02	
DQ	1	336.28	336.28	382.80**
LOF	7	2,591.88	370.27	
DC	1	991.28	991.28	1,128.43**
LOF	6	1,600.60	266.77	303.68**
Size	3	6,661.07		
SL	1	5,756.40	5,756.40	6,552.81**
LOF	2	904.67	452.34	
SQ	1	900.58	900.58	1,025.18**
SC	1	4.09	4.09	4.66*
Residual	10560	9,276.57	0.88	

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 119. Polynomial lack of fit analysis for catch per nominal days fished per unit water surface area for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	534.806		
YL	1	4.145	4.145	3.53^{ns}
LOF	8	530.661	66.333	
YQ	1	111.336	111.336	94.87**
LOF	7	419.325	59.904	
YC	1	11.582	11.582	9.87**
LOF	6	407.743	67.957	57.90**
Month	11	1,838.717		
ML	1	995.477	995.477	848.22**
LOF	10	843.240	84.324	
MQ	1	4,013	4.013	3.42^{ns}
LOF	9	839.227	93.247	
MC	1	469.095	469.095	399.70**
LOF	8	370.132	46.267	39.42**
Depth	9	7,503.926		
DL	1	1,744.779	1,744.779	1,486.68**
LOF	8	5,759.147	719.893	
DQ	1	5,154.768	5,154.768	4,342.23**
LOF	7	604.379	86.340	
DC	1	246.635	246.635	210.15**
LOF	6	357.744	59.624	50.80**
Size	2	1,525.709		
SL	1	1,156.253	1,156.253	985.21**
LOF	2	369.457	184.728	
SQ	1	366.727	366.727	312.48**
SC	1	2.730	2.730	2.33^{ns}
Residual	10560	12,393.319	1'.174	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 120. Polynomial lack of fit analysis for log-transformed catch per nominal days fished per unit water surface area for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	1,692.08		
YL	1	1,346.93	1,346.93	714.30**
LOF	8	345.15	43.14	
YQ	1	134.26	134.26	71.20**
LOF	7	210.89	30.13	
YC	1	0.98	0.98	0.52ns
LOF	6	209.91	34.99	18.56**
Month	11	317.69		
ML	1	38.90	38.90	20.63**
LOF	10	278.79	27.88	
MQ	1	84.16	84.16	44.63**
LOF	9	194.63	21.63	
MC	1	45.11	45.11	23.92**
LOF	8	149.52	18.69	9.91**
Depth	9	49,919.07		
DL	1	42,362.42	42,362.42	22,465.61**
LOF	8	7,556.65	944.58	
DQ	1	6,877.42	6,877.42	3,647.23**
LOF	7	679.23	97.03	
DC	1	325.15	325.15	490.15**
LOF	6	354.08	59.01	31.29**
Size	3	6,865.68		
SL	1	5,548.38	5,548.38	2,924.41**
LOF	2	1,317.29	658.65	
SQ	1	1,296.43	1,296.43	687.52**
SC	1	20.86	20.86	11.06**
Residual	10560	19,912.53	1.89	

ns = not significant, P = 0.05.

** = significant at P = 0.01.

Table 121. Polynomial lack of fit analysis for catch per directed effort per unit water surface area for *Penaeus* spp.

	d.f.	Sum of Squares	Mean Squares	F Value
Year	9	542.864		
YL	1	91.718	91.718	69.48**
LOF	8	451.146	56.393	
YQ	1	37.088	37.088	28.40**
LOF	7	414.058	59.151	
YC	1	5.092	5.092	3.86*
LOF	6	408.966	68.161	51.64**
Month	11	2,241.051		
ML	1	1,191.195	1,191.195	902.42**
LOF	10	1,049.856	104.986	
MQ	1	10.399	10.399	7.88**
LOF	9	1,039.457	115.495	
MC	1	560.721	560.721	424.79**
LOF	8	478.736	59.842	45.33**
Depth	9	8,676.799		
DL	1	2,991.500	2,991.500	2,266.28**
LOF	8	5,685.299	710.662	
DQ	1	4,295.017	4,295.017	3,253.79**
LOF	7	1,390.282	198.612	
DC	1	442.510	442.510	335.23**
LOF	6	947.772	157.962	119.67**
Size	3	1,475.315		
SL	1	1,073.047	1,073.047	812.91**
LOF	2	402.269	201.134	
SQ	1	399.405	399.405	302.58**
SC	1	2.864	2.864	2.17^{ns}
Residual	10560	13,939.267	1.320	

ns = not significant, P = 0.05.

* = significant at P = 0.05.

** = significant at P = 0.01.

Table 122. Annual means for the various catch, effort, and derived variables for brown shrimp.

Response Variables	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Catch, C	474.72	706.25	539.49	502.64	659.41	646.72	707.32	448.53	435.33	380.71
ln (C+1)	2.0112	1.9900	2.3084	2.6488	2.6767	2.5293	2.8947	2.6046	2.7405	2.6657
Days fished, F	6.951	15.496	7.897	9.660	10.355	17.883	11.358	9.643	6.987	7.276
ln (F+1)	0.6824	0.6344	0.7442	0.9472	0.9208	0.8731	0.9972	0.9216	0.9056	0.8563
Directed effort, E	4.6956	6.3481	6.1560	8.6043	8.1599	7.9270	9.2568	8.3056	6.3976	6.0689
ln (E+1)	0.6120	0.5862	0.7060	0.9171	0.8852	0.8373	0.9736	0.9011	0.8879	0.8286
C/F	26.226	36.358	40.489	33.804	39.009	35.582	40.226	27.001	36.182	35.985
ln [(C/F)+1]	1.5653	1.6024	1.8748	1.9917	2.0061	1.9731	2.2087	2.0100	2.1856	2.1686
C/E	33.822	43.575	43.994	37.714	42.621	39.236	43.339	29.632	38.313	39.338
ln [(C/E)+1]	1.6539	1.6693	1.9201	2.0260	2.0484	2.0045	2.2380	2.0398	2.2111	2.2059
C/A	6648.7	7510.8	6246.5	5852.3	6861.8	6422.2	9593.1	7447.9	6356.9	5791.1
ln [(C/A)+1]	2.8627	2.8183	3.2758	3.7352	3.7118	3.5579	4.0850	3.8247	3.9715	3.8618
F/A	99.60	125.03	99.44	96.94	96.62	330.15	140.04	158.12	110.67	99.47
ln [(F/A)+1]	1.3832	1.2931	1.5090	1.8505	1.7817	1.6985	1.9798	1.9179	1.9033	1.8177
E/A	70.77	74.11	77.77	89.67	83.99	78.04	120.45	149.29	106.30	89.22
ln [(E/A)+1]	1.2941	1.2329	1.4605	1.8121	1.7383	1.6570	1.9509	1.8897	1.8795	1.7818
C/F/A	350.97	429.45	451.25	379.85	473.13	433.40	536.65	368.40	440.98	446.54
ln [(C/F/A)+1]	2.8520	2.8715	3.2394	3.4294	3.4124	3.3729	3.7377	3.5692	3.7461	3.7051
C/E/A	441.35	492.46	487.77	409.69	502.69	470.39	567.77	392.86	458.39	474.62
ln [(C/E/A)+1]	2.9396	2.9391	3.2847	3.4616	3.4541	3.4033	3.7668	3.5984	3.7719	3.7420

Table 123. Monthly means for the various catch, effort, and derived variables for brown shrimp.

Response Variable	MONTH											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Catch, C	272.8	306.7	281.1	213.1	571.7	1091.9	1171.0	1222.2	645.3	321.0	240.6	269.8
ln (C+1)	1.9414	2.0267	2.0485	1.8998	2.6578	3.2237	3.4138	3.6939	3.0234	2.3047	1.8921	1.9408
Days fished, F	5.465	6.619	7.091	5.655	18.806	17.663	23.662	16.521	10.552	5.008	3.077	4.170
ln (F+1)	0.6659	0.7464	0.7599	0.6697	0.9086	1.0647	1.1891	1.3561	1.0180	0.6668	0.5374	0.5848
Directed effort, E	5.235	6.327	6.768	5.296	6.326	12.373	11.625	13.728	7.338	3.900	2.964	3.752
ln (E+1)	0.6517	0.7317	0.7440	0.6505	0.8587	1.0124	1.1232	1.2898	0.9586	0.6323	0.5235	0.5682
C/F	22.198	20.099	19.235	19.612	31.537	50.550	52.815	52.856	46.029	40.729	33.927	31.480
ln [(C/F)+1]	1.5703	1.5432	1.5817	1.5329	2.1223	2.4835	2.4900	2.5721	2.2877	2.0049	1.6405	1.6704
C/E	23.881	21.304	20.567	21.547	37.930	57.328	60.369	60.627	51.862	44.420	36.413	33.829
ln [(C/E)+1]	1.5897	1.5607	1.6065	1.5604	2.1836	2.5461	2.5613	2.6541	2.3625	2.0378	1.6624	1.6922
C/A	4,661	4,816	4,809	3,489	6,451	10,079	10,714	13,797	9,273	5,588	4,036	4,888
ln [(C/A)+1]	2.8990	3.0174	3.0701	2.8722	3.8786	4.4287	4.5905	4.9459	4.1477	3.3203	2.7728	2.8824
F/A	87.62	104.59	118.15	86.30	161.57	143.13	361.55	177.16	171.97	88.60	51.86	79.47
ln [(F/A)+1]	1.4388	1.5635	1.5878	1.4436	1.8827	2.0511	2.1778	2.4456	1.9599	1.4553	1.2249	1.3142
E/A	85.24	100.17	112.82	81.59	86.25	109.70	103.53	153.28	105.94	69.58	50.15	69.81
ln [(E/A)+1]	1.4189	1.5431	1.5670	1.4177	1.8198	1.9861	2.0999	2.3683	1.8883	1.4148	1.2037	1.2912
C/F/A	343.89	310.07	293.08	289.31	364.54	525.44	549.99	600.13	508.12	497.92	457.09	439.38
ln [(C/F/A)+1]	2.9583	2.9568	3.0152	2.9267	3.6528	3.9861	3.9639	4.1093	3.7421	3.4066	2.9592	3.0416
C/E/A	363.21	328.06	309.75	309.59	422.33	577.91	610.23	662.84	566.20	538.36	488.54	467.86
ln [(C/E/A)+1]	2.9776	2.9743	3.0405	2.9533	3.7127	4.0459	4.0338	4.1922	3.8191	3.4389	2.9806	3.0616

Table 124. Statistical area means for the various catch, effort, and derived variables for brown shrimp.

Response Variable	Brown Shrimp				
	13	14	15	16	17
Catch, C	725.33	599.50	472.42	385.10	570.61
ln (C+1)	2.9263	2.0620	2.5253	2.4386	2.5755
Days fishes, F	15.388	9.271	11.030	6.818	9.280
ln (F+1)	1.0150	0.6985	0.8163	0.7875	0.9191
Directed effort, E	8.6202	6.7997	6.3537	6.0328	8.0822
ln (E+1)	0.9669	0.6747	0.7820	0.7598	0.8789
C/F	40.114	30.030	36.225	35.802	33.274
ln [(C/F)+1]	2.1867	1.6121	2.0897	1.9895	1.9135
C/E	44.807	33.331	40.471	39.474	37.781
ln [(C/E)+1]	2.2479	1.6407	2.1337	2.0225	1.9624
C/A	18,672	6,308	3,424	2,328	3,686
ln [(C/A)+1]	4.6113	2.9585	3.6147	3.2712	3.3882
F/A	400.23	102.12	67.11	44.47	66.07
ln [(F/A)+1]	2.4643	1.4175	1.6615	1.4290	1.5881
E/A	239.61	77.61	53.55	40.67	58.59
ln [(E/A)+1]	2.4033	1.3861	1.6174	1.3941	1.5402
C/F/A	1076.9	317.5	326.5	218.0	219.1
ln [(C/F/A)+1]	4.2041	2.9372	3.5305	3.1938	3.1003
C/E/A	1171.6	348.3	352.9	235.3	243.9
ln [(C/E/A)+1]	4.2673	2.9646	3.5735	3.2253	3.1488

Table 125. Depth interval means for the various catch, effort, and derived variables for brown shrimp.

Response Variable	DEPTH INTERVAL									
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
Catch, C	1036.0	498.7	788.2	851.0	562.4	747.6	476.9	358.4	103.4	31.3
ln (C+1)	1.6030	2.5137	3.2193	3.5261	3.7505	3.9287	2.9841	2.0780	0.9075	0.3265
Days fished, F	27.843	6.602	17.541	9.837	9.124	12.730	8.725	7.253	2.186	0.775
ln (F+1)	0.6052	0.6859	1.0315	1.1518	1.2551	1.3966	1.0530	0.7772	0.3259	0.1175
Directed effort, E	10.836	4.795	7.934	8.856	8.413	12.119	8.310	6.992	2.109	0.771
ln (E+1)	0.4946	0.6303	0.9829	1.1096	1.2258	1.3703	1.0378	0.7671	0.3209	0.1156
C/F	28.541	56.343	48.683	52.928	47.199	46.665	34.063	21.341	9.110	2.787
ln [(C/F)+1]	1.2779	2.3529	2.6348	2.7889	2.8703	2.8834	2.2263	1.4860	0.6545	0.2357
C/E	42.274	65.367	53.912	58.144	49.462	48.972	35.422	22.172	9.477	2.899
ln [(C/E)+1]	1.4009	2.4246	2.6965	2.8455	2.9055	2.9209	2.2457	1.4996	0.6610	0.2379
C/A	8,676	2,830	7,353	9,048	8,030	11,617	8,279	8,609	3,023	757
ln [(C/A)+1]	2.1502	3.3107	4.3586	4.9462	5.4570	5.6893	4.3689	3.1380	1.4405	0.5243
F/A	196.89	41.57	309.25	103.90	123.41	184.86	142.39	163.49	63.81	18.68
ln [(F/A)+1]	0.9957	1.2153	1.9059	2.2878	2.6790	2.8932	2.2172	1.6955	0.7957	0.2937
E/A	82.82	27.28	67.18	92.01	112.16	177.36	136.64	157.63	60.97	18.45
ln [(E/A)+1]	0.8615	1.1421	1.8453	2.2333	2.6414	2.8602	2.1977	1.6826	0.7892	0.2914
C/F/A	217.47	313.41	475.93	615.20	651.76	675.77	535.13	471.94	252.76	70.27
ln [(C/F/A)+1]	2.3072	3.4897	4.0416	4.4558	4.7923	4.8546	3.9274	2.9845	1.7642	1.0838
C/E/A	332.84	366.50	523.55	669.02	681.48	707.83	554.72	490.55	264.50	73.38
ln [(C/E/A)+1]	2.4276	3.5588	4.1036	4.5113	4.8267	4.8939	3.9467	2.9983	1.7709	1.0861

Table 126. Size class means for the various catch effort, and derived variables for brown shrimp.

Response Variable	Brown Shrimp			
	≤ 20	21-30	31-50	≥ 51
Catch, C	444.27	499.76	625.80	632.54
ln (C+1)	2.9271	3.0164	2.5628	1.5159
Days fished, F	8.915	8.126	8.843	15.547
ln (F+1)	1.0315	1.0336	0.8345	0.4895
Directed effort, E	8.3950	7.2069	6.8859	6.2231
ln (E+1)	1.0049	0.9990	0.7956	0.4504
C/F	36.765	39.798	37.633	26.160
ln [(C/F)+1]	2.1656	2.2672	2.0663	1.3341
C/E	39.910	44.155	42.298	30.330
ln [(C/E)+1]	2.1997	2.3123	2.1157	1.3782
C/A	6669.5	7859.6	7262.7	5742.0
ln [(C/A)+1]	4.1643	4.2783	3.6603	2.1723
F/A	134.93	128.76	112.54	167.77
ln [(F/A)+1]	2.0881	2.1105	1.7075	0.9422
E/A	127.77	113.52	80.53	54.20
ln [(E/A)+1]	2.0526	2.0658	1.6585	0.8961
C/F/A	479.65	507.04	453.97	285.65
ln [(C/F/A)+1]	3.7282	3.8435	3.5255	2.4756
C/E/A	512.45	550.00	497.51	321.67
ln [(C/E/A)+1]	3.7615	3.8885	3.5739	2.5196

Table 127. Month by depth interval means for selected variables for brown shrimp.

Response Variable	Depth Interval	MONTH											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ln (C+1)	0-5	0.140	0.088	0.129	0.401	2.766	4.011	4.126	4.067	1.959	1.053	0.248	0.249
	5-10	0.554	0.517	0.542	0.580	3.350	5.369	5.192	5.277	3.512	2.526	1.503	1.242
	10-15	1.349	1.535	1.759	1.670	3.356	5.748	6.252	6.035	5.146	2.698	1.515	1.568
	15-20	1.658	1.609	1.725	1.731	3.258	4.776	6.435	6.633	5.861	3.894	2.742	1.993
	20-25	3.245	3.023	2.982	2.856	3.458	3.847	4.587	5.407	4.481	3.839	3.773	3.507
	25-30	3.775	3.861	3.875	3.658	3.833	3.920	3.568	4.115	4.190	3.905	4.381	4.065
	30-35	3.744	3.831	3.625	3.246	2.803	2.442	2.348	2.650	2.565	2.335	2.776	3.445
	35-40	2.996	3.308	2.994	2.696	2.254	1.117	0.795	1.610	1.683	1.862	1.315	2.307
	40-45	1.413	1.552	1.722	1.300	0.795	0.482	0.399	0.719	0.487	0.705	0.479	0.838
	45-50	0.385	0.824	1.028	0.745	0.489	0.225	0.106	0.061	0.055	0.000	0.000	0.000
ln (E+1)	0-5	0.006	0.006	0.006	0.067	0.854	1.518	1.485	1.347	0.439	0.137	0.029	0.040
	5-10	0.073	0.063	0.071	0.057	0.833	1.629	1.594	1.587	0.807	0.443	0.229	0.177
	10-15	0.341	0.389	0.500	0.452	0.999	1.954	2.189	2.136	1.569	0.626	0.295	0.346
	15-20	0.342	0.487	0.515	0.495	1.014	1.413	2.307	2.547	2.003	1.028	0.643	0.432
	20-25	1.057	1.051	1.033	0.896	1.167	1.236	1.471	1.960	1.537	1.142	1.125	1.036
	25-30	1.398	1.514	1.506	1.406	1.405	1.112	1.064	1.510	1.480	1.285	1.378	1.385
	30-35	1.351	1.487	1.449	1.289	1.003	0.642	0.655	0.918	0.925	0.766	0.852	1.117
	35-40	1.169	1.371	1.271	1.038	0.795	0.318	0.218	0.531	0.560	0.655	0.468	0.810
	40-45	0.504	0.608	0.672	0.490	0.289	0.138	0.102	0.218	0.158	0.227	0.164	0.283
	45-50	0.133	0.299	0.381	0.279	0.160	0.068	0.038	0.018	0.012	0.000	0.000	0.000

Table 127. (cont'd)

Response Variable	Depth Interval	MONTH											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ln [(C/E)+1]	0-5	0.261	0.142	0.246	0.459	2.407	3.008	3.083	3.255	1.916	1.385	0.315	0.333
	5-10	0.912	0.798	0.842	0.956	3.296	4.289	4.061	4.161	3.456	2.866	1.871	1.588
	10-15	1.469	1.652	1.644	1.694	2.943	4.259	4.468	4.223	3.035	2.547	1.621	1.803
	15-20	1.652	1.381	1.603	1.754	2.668	3.818	4.416	4.332	4.273	3.551	2.715	1.983
	20-25	2.590	2.299	2.365	2.374	2.689	2.915	3.549	3.722	3.235	3.180	3.057	2.891
	25-30	2.711	2.685	2.767	2.605	2.853	3.240	2.772	2.841	3.006	3.019	3.419	3.132
	30-35	2.767	2.756	2.517	2.300	2.134	2.161	1.893	1.908	1.825	1.811	2.169	2.709
	35-40	2.065	2.192	1.978	1.948	1.729	0.952	0.684	1.249	1.245	1.299	0.933	1.721
	40-45	1.027	1.014	1.278	0.908	0.566	0.409	0.366	0.544	0.353	0.517	0.358	0.592
	45-50	0.314	0.592	0.739	0.500	0.371	0.173	0.073	0.046	0.048	0.000	0.000	0.000
ln [(C/E/A)+1]	0-5	0.987	0.863	1.000	1.243	3.654	4.416	4.513	4.748	3.095	2.442	1.086	1.083
	5-10	1.831	1.694	1.674	1.877	4.665	5.675	5.385	5.564	4.649	4.067	2.980	2.646
	10-15	2.551	2.874	2.835	2.887	4.492	6.026	6.252	5.955	5.697	3.852	2.781	3.040
	15-20	2.976	2.608	2.906	3.115	4.359	5.750	6.514	6.448	6.353	5.375	4.341	3.390
	20-25	4.456	4.046	4.143	4.158	4.657	4.813	5.622	5.882	5.201	5.144	4.996	4.803
	25-30	4.656	4.604	4.768	4.545	4.904	5.286	4.588	4.707	4.968	4.988	5.532	5.182
	30-35	4.708	4.766	4.387	4.115	3.826	3.749	3.365	3.413	3.326	3.331	3.804	4.570
	35-40	3.856	4.105	3.819	3.741	3.384	2.121	1.704	2.548	2.588	2.702	2.106	3.305
	40-45	2.378	2.378	2.829	2.196	1.639	1.344	1.258	1.546	1.239	1.521	1.259	1.666
	45-50	1.199	1.676	1.933	1.511	1.309	0.973	0.815	0.768	0.771	0.693	0.693	0.693

Table 128. Month by size class means for selected variables for brown shrimp.

Response Variable	Size Class	MONTH											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ln (C+1)	≤ 20	2.953	3.273	3.525	3.495	3.490	2.965	2.544	2.928	2.808	2.411	2.229	2.504
	21-30	2.729	2.917	2.911	2.563	2.945	2.873	3.118	3.904	3.709	3.263	2.562	2.704
	31-50	1.737	1.638	1.481	1.261	2.175	3.432	4.237	4.600	3.618	2.478	2.082	2.015
	≥ 51	0.347	0.278	0.276	0.281	2.021	3.625	3.757	3.344	1.960	1.067	0.695	0.540
ln (E+1)	≤ 20	1.135	1.366	1.520	1.424	1.276	0.833	0.647	0.861	0.870	0.686	0.647	0.793
	21-30	0.969	1.079	1.068	0.860	0.901	0.760	0.892	1.389	1.320	1.048	0.805	0.897
	31-50	0.460	0.447	0.354	0.269	0.558	1.089	1.584	1.847	1.234	0.671	0.539	0.515
	≥ 51	0.043	0.034	0.033	0.049	0.700	1.368	1.390	1.063	0.409	0.144	0.103	0.068
ln [(C/E)+1]	≤ 20	2.049	2.092	2.205	2.289	2.514	2.512	2.257	2.395	2.219	2.029	1.844	1.991
	21-30	2.036	2.076	2.114	2.026	2.492	2.518	2.593	2.741	2.607	2.485	2.012	2.047
	31-50	1.658	1.584	1.641	1.540	2.055	2.645	2.851	2.895	2.608	2.186	1.864	1.861
	≥ 51	0.616	0.491	0.466	0.386	1.674	2.508	2.544	2.585	2.015	1.451	0.930	0.870
ln [(C/E/A)+1]	≤ 20	3.643	3.770	3.961	4.068	4.306	4.059	3.663	3.885	3.657	3.435	3.228	3.464
	21-30	3.625	3.721	3.786	3.622	4.190	4.026	4.084	3.311	4.178	4.083	3.471	3.566
	31-50	3.073	3.017	3.077	2.891	3.464	4.150	4.418	4.508	4.143	3.621	3.233	3.293
	≥ 51	1.570	1.389	1.338	1.233	2.892	3.949	3.971	4.065	3.299	2.616	1.990	1.922

Table 129. Depth interval by size class means for selected variables for brown shrimp.

Response Variable	Size Class	DEPTH INTERVAL									
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
ln (C+1)	≤ 20	0.404	1.712	2.910	3.465	4.392	5.267	4.496	3.623	1.911	0.886
	21-30	0.966	2.376	3.606	4.206	3.886	5.124	4.126	2.981	1.195	0.351
	31-50	1.979	2.167	3.854	4.030	3.993	3.843	2.536	1.430	0.482	0.065
	≥ 51	3.063	2.800	2.507	2.324	1.731	1.481	0.778	0.278	0.042	0.003
ln (E+1)	≤ 20	0.048	0.245	0.747	0.987	1.459	2.044	1.811	1.531	0.768	0.345
	21-30	0.141	0.456	1.057	1.411	1.764	1.932	1.507	1.119	0.409	0.104
	31-50	0.524	0.915	1.323	1.410	1.296	1.198	0.712	0.383	0.104	0.013
	≥ 51	1.266	0.905	0.805	0.631	0.385	0.307	0.121	0.036	0.003	0.000
ln [(C/E)+1]	≤ 20	0.591	2.109	2.668	2.941	3.256	3.433	2.860	2.195	1.208	0.573
	21-30	1.245	2.584	3.049	3.244	3.395	3.419	2.827	2.016	0.854	0.288
	31-50	1.772	2.742	2.988	3.038	3.116	3.109	2.277	1.327	0.508	0.076
	≥ 51	1.995	2.262	2.081	2.159	1.856	1.722	1.018	0.460	0.075	0.015
ln [(C/E/A)+1]	≤ 20	1.416	3.189	4.032	4.618	5.328	5.629	4.831	4.057	2.665	1.639
	21-30	2.222	3.745	4.557	5.081	5.529	5.611	4.798	3.806	2.092	1.172
	31-50	2.889	3.936	4.498	4.775	5.126	5.165	4.003	2.737	1.518	0.817
	≥ 51	3.184	3.365	3.327	3.572	3.323	3.170	2.155	1.394	0.809	0.717

Table 130. Annual means for the various catch, effort, and derived variables for white shrimp.

Response Variables	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Catch, C	572.54	443.02	430.89	816.80	745.53	788.68	729.16	561.27	518.34	515.83
ln (C+1)	1.4908	1.5281	1.4529	1.9951	2.0834	2.0928	2.0294	1.7302	1.8047	1.7793
Days fished, F	9.207	11.769	8.541	11.651	12.114	12.087	19.401	15.344	12.105	9.866
ln (F+1)	0.5791	0.5965	0.5538	0.7228	0.7424	0.7936	0.8013	0.7051	0.7573	0.6958
Directed effort, E	7.108	7.092	6.918	10.414	8.788	11.280	11.733	11.938	10.405	9.183
ln (E+1)	0.5411	0.5542	0.5231	0.6980	0.7052	0.7762	0.7747	0.6754	0.7333	0.6814
C/F	16.214	16.181	16.963	28.125	30.308	24.246	21.814	14.956	16.114	17.278
ln [(C/F)+1]	1.0562	1.0944	1.0578	1.5644	1.5916	1.5101	1.4570	1.2052	1.2278	1.2660
C/E	20.358	19.378	18.974	30.741	33.808	26.011	23.771	16.814	18.331	18.306
ln [(C/E)+1]	1.1067	1.1482	1.0965	1.5978	1.6321	1.5370	1.4916	1.2435	1.2597	1.2844
C/A	3719.0	3033.1	2819.3	5318.1	4811.6	5091.7	4052.4	3290.5	3344.5	2945.8
ln [(C/A)+1]	1.9601	2.0316	1.9256	2.6668	2.7774	2.8087	2.7565	2.3513	2.4296	2.3847
F/A	60.52	107.78	61.99	72.11	82.92	74.15	94.38	84.37	80.60	58.23
ln [(F/A)+1]	0.9553	0.9984	0.9297	1.2044	1.2703	1.3648	1.3729	1.2058	1.2632	1.1821
E/A	42.302	48.187	45.822	65.265	56.753	73.937	70.905	66.482	67.139	52.988
ln [(E/A)+1]	0.9088	0.9482	0.8934	1.1745	1.2270	1.3433	1.3412	1.1700	1.2336	1.1647
C/F/A	144.00	146.84	142.84	239.18	266.79	231.96	210.66	167.55	192.50	153.88
ln [(C/F/A)+1]	2.0418	2.1037	2.0433	2.6752	2.7277	2.6685	2.6269	2.3051	2.3262	2.3465
C/E/A	180.02	178.0	161.67	255.68	289.96	239.61	228.78	185.14	227.39	164.40
ln [(C/E/A)+1]	2,0919	2.1586	2.0827	2.7089	2.7662	2.6961	2.6620	2.3440	2.3586	2.3651

Table 131. Monthly means for the various catch, effort, and derived variables for white shrimp.

Response Variable	MONTH											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Catch, C	593.8	298.8	224.2	225.0	536.1	524.4	244.8	215.3	586.8	1482.9	1435.5	954.0
ln (C+1)	1.8529	1.7143	1.6468	1.7279	1.9517	1.6775	1.2310	1.4685	1.8567	2.2525	2.1716	2.0087
Days fished, F	9.386	5.847	5.316	6.358	12.805	9.746	4.747	4.482	14.231	24.768	32.587	16.295
ln (F+1)	0.6866	0.6104	0.5784	0.6504	0.8193	0.6462	0.4131	0.4823	0.7294	0.9812	0.9328	0.7985
Directed effort E	7.956	4.982	4.628	5.353	11.468	8.908	4.141	3.529	9.374	21.832	18.661	12.885
ln (E+1)	0.6567	0.5818	0.5522	0.6202	0.7964	0.6259	0.3955	0.4591	0.6944	0.9513	0.8929	0.7648
C/F	21.755	17.473	17.156	16.622	16.691	19.819	17.546	19.232	22.164	24.497	25.221	23.505
ln [(C/F)+1]	1.3691	1.3518	1.3376	1.2918	1.3178	1.2348	1.0227	1.2031	1.3513	1.4179	1.3408	1.3662
C/E	24.822	19.741	19.287	18.409	17.819	21.596	19.447	21.687	24.702	27.337	28.973	26.990
ln [(C/E)+1]	1.4088	1.3944	1.3749	1.3322	1.3450	1.2586	1.0504	1.2378	1.3946	1.4547	1.3858	1.4084
C/A	3,866	1,955	1,256	1,233	2,913	2,561	1,124	1,305	3,401	9,291	10,428	6,600
ln [(C/A)+1]	2.5347	2.4018	2.3193	2.3726	2.5935	2.2095	1.6601	1.9862	2.4383	2.8971	2.7995	2.6669
F/A	70.05	41.79	30.15	34.73	69.64	46.83	21.35	29.31	112.46	152.38	206.90	117.54
ln [(F/A)+1]	1.2336	1.1394	1.0753	1.1520	1.3391	1.0461	0.7129	0.8597	1.1743	1.5254	1.4880	1.3468
E/A	57.61	35.18	25.92	29.48	62.51	43.03	18.57	21.25	53.61	133.73	135.82	90.27
ln [(E/A)+1]	1.1979	1.1037	1.0413	1.1153	1.3117	1.0208	0.6897	0.8242	1.1342	1.4915	1.4437	1.3077
C/F/A	209.96	170.36	164.99	170.37	149.60	164.79	139.09	159.63	189.34	239.12	259.90	252.29
ln [(C/F/A)+1]	2.5133	2.5001	2.4702	2.3986	2.4196	2.2534	1.9764	2.2134	2.4052	2.5210	2.4426	2.4890
C/E/A	236.54	188.86	185.37	181.84	157.14	180.20	155.12	181.86	212.29	265.48	297.06	285.65
ln [(C/E/A)+1]	2.5534	2.5441	2.5080	2.4398	2.4461	2.2761	2.0044	2.2469	2.4494	2.5582	2.4881	2.5317

Table 132. Statistical area means for the various catch, effort, and derived variables for white shrimp.

Response Variable	White Shrimp				
	13	14	15	16	17
Catch, C	470.3	234.8	1026.9	690.8	627.9
ln (C+1)	1.8753	1.3070	2.1584	1.9515	1.6912
Days fished, F	10.497	4.631	21.844	13.131	10.697
ln (F+1)	0.6736	0.4312	0.8935	0.7943	0.6799
Directed effort, E	7.056	3.595	15.474	11.735	9.523
ln (E+1)	0.6380	0.4114	0.8595	0.7681	0.6527
C/F	22.047	15.923	22.291	20.713	19.725
ln [(C/F)+1]	1.4118	1.0629	1.5031	1.3575	1.1667
C/E	24.678	17.718	24.846	22.844	22.751
ln [(C/E)+1]	1.4572	1.0908	1.5442	1.3911	1.2024
C/A	7533.2	1936.6	3875.2	2753.2	3040.3
ln [(C/A)+1]	2.9274	1.8308	2.7898	2.4278	2.0574
F/A	188.00	39.11	76.91	52.35	52.44
ln [(F/A)+1]	1.5477	0.8261	1.3707	1.1608	0.9667
E/A	115.10	29.17	60.17	46.51	43.62
ln [(E/A)+1]	1.5030	0.8001	1.3315	1.1306	0.9354
C/F/A	481.71	131.38	144.32	93.92	94.26
ln [(C/F/A)+1]	2.9150	2.1014	2.5741	2.2978	2.0296
C/E/A	534.98	146.91	157.17	102.75	111.28
ln [(C/E/A)+1]	2.9615	2.1291	2.6148	2.3314	2.0658

Table 133. Depth interval means for the various catch, effort, and derived variables for white shrimp.

Response Variable	DEPTH INTERVAL									
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-25	45-50
Catch, C	3238.0	2313.4	403.1	47.7	23.5	7.8	3.5	1.2	0.6	1.6
ln (C+1)	5.7303	6.0931	3.5204	0.9980	0.6408	0.3762	0.2524	0.1253	0.0402	0.0117
Days fished, F	70,780	40.653	7.778	0.939	0.474	0.149	0.070	0.029	0.012	0.039
ln (F+1)	2.5629	2.6546	1.1615	0.2388	0.1269	0.0650	0.0372	0.0182	0.0072	0.0035
Directed effort, E	47.422	37.584	7.204	0.889	0.453	0.140	0.066	0.027	0.011	0.024
ln (E+1)	2.4080	2.5816	1.1252	0.2295	0.1231	0.0627	0.0357	0.0174	0.0068	0.0031
C/F	55.464	54.093	41.662	17.329	13.644	8.229	5.801	2.487	0.582	0.106
ln [(C/F)+1]	3.4805	3.6715	2.7809	1.0486	0.7748	0.5036	0.3664	0.1842	0.0532	0.0114
C/E	67.212	59.512	45.104	18.720	14.430	8.831	6.220	2.665	0.606	0.131
ln [(C/E)+1]	3.6671	3.7586	2.8311	1.0692	0.7787	0.5109	0.3716	0.1871	0.0526	0.0119
C/A	19,932	12,567	3,880	799	374	166	77	41	17	45
ln [(C/A)+1]	7.3261	7.4682	4.7868	1.5634	1.1163	0.7034	0.4932	0.2634	0.0854	0.0215
F/A	452.64	213.64	75.15	14.73	6.70	3.12	1.56	0.96	0.36	1.10
ln [(F/A)+1]	3.9552	3.8980	2.1753	0.6186	0.4151	0.2547	0.1657	0.0979	0.0364	0.0107
E/A	290.07	197.11	69.37	14.08	6.39	6.94	1.46	0.90	0.33	0.66
ln [(E/A)+1]	3.7798	3.8166	2.1292	0.6033	0.4073	0.2492	0.1618	0.0957	0.0354	0.0103
C/F/A	420.83	303.43	394.18	211.42	212.13	142.32	104.07	63.95	17.71	2.48
ln [(C/F/A)+1]	5.1605	5.1005	4.2672	2.1394	1.8248	1.4494	1.2428	0.9883	0.7833	0.7123
C/E/A	514.01	331.90	425.01	225.74	228.89	155.14	113.62	69.30	18.73	3.09
ln [(C/E/A)+1]	5.3507	5.1884	4.3174	2.1602	1.8268	1.4568	1.2481	0.9912	0.7819	0.7128

Table 134. Size class means for the various catch, effort, and derived variables for white shrimp.

Response Variables	White Shrimp			
	≤ 20	21-30	31-50	≥ 51
Catch, C	458.54	584.95	564.40	832.67
ln (C+1)	2.0354	1.9563	1.7680	1.4271
Days fished, F	8.840	11.397	10.838	17.782
ln (F+1)	0.7408	0.7464	0.7010	0.5898
Directed effort, E	7.948	9.497	9.111	11.350
ln (E+1)	0.7132	0.7171	0.6715	0.5620
C/F	24.587	22.225	18.851	14.897
ln [(C/F)+1]	1.5635	1.4335	1.2326	0.9720
C/E	27.157	24.841	21.208	17.063
ln [(C/E)+1]	1.6008	1.4735	1.2696	1.0046
C/A	2793.0	3584.0	3578.2	5355.6
ln [(C/A)+1]	2.8013	2.6399	2.3334	1.8519
F/A	54.63	75.42	71.25	109.75
ln [(F/A)+1]	1.3257	1.2812	1.1576	0.9331
E/A	48.431	57.305	56.931	72.989
ln [(E/A)+1]	1.2908	1.2452	1.1228	0.9017
C/F/A	257.80	217.32	162.38	118.98
ln [(C/F/A)+1]	2.7616	2.5678	2.2795	1.9255
C/E/A	283.24	241.10	182.03	136.09
ln [(C/E/A)+1]	2.7988	2.6082	2.3168	1.9583

Table 135. Depth interval by size class means for selected variables for white shrimp.

Response Variable	Size Class	DEPTH INTERVAL 0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
ln (C+1)	≤ 20	4.704	6.673	4.602	1.703	1.068	0.635	0.433	0.249	0.062	0.025
	21-30	5.463	6.659	4.191	1.161	0.784	0.530	0.345	0.153	0.075	0.007
	31-50	6.122	6.143	3.382	0.777	0.525	0.262	0.194	0.079	0.019	0.000
	≥ 51	6.632	4.898	1.906	0.351	0.186	0.079	0.038	0.020	0.005	0.015
ln (E+1)	≤ 20	1.701	2.922	1.625	0.404	0.204	0.096	0.059	0.036	0.009	0.004
	21-30	2.162	2.938	1.396	0.255	0.165	0.100	0.050	0.019	0.014	0.001
	31-50	2.607	2.633	1.031	0.185	0.102	0.045	0.031	0.011	0.003	0.000
	≥ 51	3.162	1.833	0.449	0.073	0.022	0.010	0.003	0.004	0.000	0.007
ln [(C/E)+1]	≤ 20	3.488	3.979	3.331	1.757	1.287	0.880	0.648	0.367	0.087	0.026
	21-30	3.715	3.935	3.225	1.292	0.935	0.661	0.488	0.239	0.087	0.014
	31-50	3.778	3.741	2.825	0.814	0.614	0.380	0.279	0.115	0.024	0.000
	≥ 51	3.687	3.381	1.944	0.414	0.279	0.122	0.072	0.027	0.013	0.008
ln [(C/E/A)+1]	≤ 20	5.122	5.473	4.988	3.111	5.561	2.003	1.669	1.278	0.838	0.737
	21-30	5.412	5.406	4.834	2.456	2.057	1.684	1.416	1.070	0.843	0.715
	31-50	5.495	5.155	4.283	1.808	1.588	1.266	1.108	0.878	0.732	0.693
	≥ 51	5.373	4.720	3.165	1.266	1.101	0.875	0.798	0.739	0.715	0.706

Table 136. Month by statistical area means for selected variables for white shrimp.

Response Variable	Statistical Area	MONTH											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ln (C+1)	13	2.496	1.998	1.702	1.533	1.581	1.128	0.734	0.989	1.595	2.676	3.174	2.897
	14	1.395	1.363	1.122	1.120	1.616	1.308	0.849	0.985	1.073	1.632	1.630	1.592
	15	2.342	2.250	2.278	2.363	2.328	2.098	1.516	1.736	2.079	2.457	2.191	2.265
	16	1.784	1.693	1.774	2.053	2.271	2.008	1.686	1.795	2.308	2.258	1.985	1.804
	17	1.247	1.268	1.360	1.571	1.963	1.846	1.371	1.837	2.229	2.240	1.879	1.485
ln (E+1)	13	0.867	0.673	0.494	0.465	0.517	0.317	0.164	0.267	0.539	1.057	1.249	1.048
	14	0.438	0.391	0.319	0.296	0.605	0.431	0.220	0.245	0.320	0.592	0.576	0.504
	15	0.936	0.838	0.821	0.937	0.982	0.823	0.524	0.568	0.830	1.111	1.011	0.933
	16	0.635	0.565	0.597	0.806	1.022	0.807	0.598	0.589	0.932	1.026	0.880	0.761
	17	0.407	0.443	0.530	0.597	0.856	0.751	0.473	0.627	0.851	0.970	0.748	0.579
ln [(C/E)+1]	13	1.890	1.552	1.490	1.306	1.275	0.985	0.720	0.982	1.301	1.826	2.102	2.058
	14	1.188	1.239	1.039	1.092	1.203	1.091	0.793	0.937	0.904	1.144	1.164	1.295
	15	1.679	1.743	1.874	1.681	1.597	1.541	1.305	1.352	1.451	1.520	1.250	1.535
	16	1.320	1.425	1.472	1.421	1.412	1.386	1.313	1.499	1.736	1.364	1.209	1.139
	17	0.967	1.014	1.000	1.162	1.237	1.291	1.122	1.418	1.581	1.420	1.204	1.015
ln [(C/E/A)+1]	13	3.692	3.168	3.078	2.767	2.706	2.193	1.792	2.186	2.668	3.499	3.911	3.877
	14	2.270	2.372	2.084	2.159	2.304	2.106	1.728	1.922	1.858	2.168	2.194	2.384
	15	2.805	2.930	3.101	2.854	2.715	2.601	2.302	2.337	2.458	2.541	2.178	2.557
	16	2.236	2.410	2.446	2.586	2.385	2.315	2.228	2.451	2.739	2.273	2.096	2.012
	17	1.764	1.841	1.831	2.033	2.121	2.166	1.973	2.338	2.525	2.310	2.061	1.828

Table 137. Month by depth interval means for selected variables for white shrimp.

Response Variable	Depth Interval	MONTH											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ln (C+1)	0-5	4.741	4.216	4.405	5.043	6.541	5.488	3.908	5.447	6.777	8.134	7.800	6.294
	5-10	6.231	5.810	5.512	5.624	6.473	5.833	3.976	4.387	6.315	7.798	8.057	7.101
	10-15	4.021	4.088	3.703	3.717	3.951	3.530	2.485	2.634	3.024	3.907	3.255	3.930
	15-20	1.177	0.735	0.869	1.312	0.853	1.001	1.165	1.142	1.161	0.858	0.989	0.716
	20-25	0.870	0.600	0.616	0.519	0.621	0.441	0.391	0.544	0.659	0.807	0.730	0.893
	25-30	0.552	0.440	0.487	0.384	0.312	0.129	0.165	0.225	0.342	0.476	0.492	0.511
	30-35	0.369	0.592	0.447	0.254	0.234	0.171	0.064	0.109	0.103	0.231	0.163	0.231
	35-40	0.309	0.309	0.202	0.173	0.171	0.014	0.034	0.036	0.000	0.104	0.014	0.138
	40-45	0.073	0.168	0.063	0.050	0.067	0.000	0.000	0.014	0.000	0.016	0.000	0.032
	45-50	0.000	0.016	0.000	0.035	0.044	0.000	0.000	0.000	0.000	0.000	0.000	0.045
ln (E+1)	0-5	1.768	1.539	1.681	1.980	2.979	2.319	1.385	1.959	3.071	4.071	3.555	2.590
	5-10	2.480	2.242	2.207	2.324	2.983	2.527	1.520	1.524	2.586	3.681	3.744	3.161
	10-15	1.470	1.453	1.074	1.267	1.458	1.095	0.717	0.651	0.797	1.202	1.039	1.279
	15-20	0.362	0.163	0.192	0.330	0.208	0.185	0.218	0.238	0.203	0.199	0.247	0.209
	20-25	0.210	0.115	0.108	0.099	0.115	0.039	0.057	0.113	0.161	0.148	0.147	0.166
	25-30	0.101	0.069	0.099	0.064	0.044	0.009	0.012	0.052	0.052	0.066	0.087	0.068
	30-35	0.057	0.099	0.066	0.035	0.054	0.021	0.002	0.006	0.005	0.038	0.021	0.024
	35-40	0.041	0.047	0.029	0.030	0.026	0.001	0.004	0.001	0.000	0.012	0.001	0.016
	40-45	0.012	0.030	0.012	0.005	0.011	0.000	0.000	0.001	0.000	0.001	0.000	0.009
	45-50	0.000	0.003	0.000	0.006	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.022

Table 137. (cont'd)

Response Variable	Depth Interval	MONTH											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ln [(C/E)+1]	0-5	3.457	3.170	3.261	3.548	3.827	3.464	2.952	3.894	3.878	4.090	4.401	4.062
	5-10	4.044	3.882	3.608	3.532	3.662	3.622	2.810	3.236	3.944	4.262	4.398	4.105
	10-15	2.849	3.019	3.183	2.888	2.926	2.843	2.169	2.537	2.820	3.163	2.480	3.098
	15-20	0.961	0.799	0.980	1.298	0.870	1.301	1.396	1.275	1.598	0.870	0.878	0.604
	20-25	0.907	0.715	0.804	0.648	0.807	0.701	0.565	0.692	0.833	0.922	0.765	0.985
	25-30	0.625	0.751	0.696	0.533	0.468	0.233	0.307	0.277	0.511	0.634	0.557	0.540
	30-35	0.518	0.790	0.675	0.406	0.371	0.254	0.142	0.230	0.222	0.302	0.220	0.389
	35-40	0.481	0.443	0.315	0.224	0.256	0.043	0.057	0.092	0.000	0.137	0.021	0.176
	40-45	0.104	0.217	0.091	0.078	0.073	0.000	0.000	0.021	0.000	0.023	0.000	0.024
	45-50	0.000	0.019	0.000	0.038	0.062	0.000	0.000	0.000	0.000	0.000	0.000	0.024
ln [C/E/A)+1]	0-5	5.041	4.708	4.802	5.256	5.663	5.076	4.374	5.661	5.653	5.908	6.260	5.808
	5-10	5.554	5.395	5.081	4.975	5.098	4.982	3.981	4.474	5.396	5.782	5.925	5.619
	10-15	4.433	4.698	4.883	4.399	4.408	4.218	3.363	3.797	4.155	4.684	3.999	4.772
	15-20	2.058	1.818	2.061	2.520	1.883	2.423	2.552	2.369	2.754	1.860	2.009	1.616
	20-25	2.073	1.769	1.890	1.638	1.877	1.677	1.475	1.651	1.854	2.033	1.826	2.159
	25-30	1.662	1.801	1.749	1.510	1.398	1.023	1.127	1.087	1.417	1.641	1.542	1.525
	30-35	1.488	1.901	1.682	1.305	1.260	1.061	0.877	1.024	1.011	1.146	1.024	1.199
	35-40	1.475	1.389	1.207	1.046	1.099	0.755	0.778	0.828	0.693	0.918	0.730	0.977
	40-45	0.872	1.053	0.850	0.824	0.817	0.693	0.693	0.730	0.693	0.732	0.693	0.731
	45-50	0.693	0.727	0.693	0.755	0.796	0.693	0.693	0.693	0.693	0.693	0.693	0.732

Table 138. Depth interval by statistical area means for selected variables for white shrimp.

Response Variable	Statistical Area	DEPTH INTERVAL									
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
ln (C+1)	13	5.057	5.355	3.413	1.505	1.303	0.992	0.590	0.302	0.049	0.000
	14	4.211	4.527	2.680	0.629	0.361	0.260	0.131	0.045	0.066	0.033
	15	6.993	6.933	4.501	1.302	0.757	0.330	0.304	0.162	0.071	0.017
	16	6.476	6.957	4.120	0.865	0.472	0.167	0.176	0.075	0.004	0.008
	17	5.915	6.695	2.888	0.689	0.310	0.131	0.061	0.042	0.011	0.000
ln (E+1)	13	1.982	2.169	1.130	0.419	0.276	0.187	0.098	0.050	0.006	0.000
	14	1.497	1.525	0.766	0.127	0.069	0.041	0.016	0.006	0.015	0.011
	15	3.225	3.163	1.600	0.296	0.114	0.043	0.038	0.018	0.012	0.003
	16	2.884	3.134	1.317	0.158	0.074	0.013	0.016	0.006	0.000	0.002
	17	2.452	2.917	0.814	0.147	0.083	0.029	0.011	0.006	0.001	0.000
ln [(C/E)+1]	13	3.412	3.461	2.649	1.323	1.334	1.105	0.707	0.360	0.074	0.000
	14	3.210	3.403	2.373	0.667	0.386	0.370	0.245	0.060	0.062	0.026
	15	4.008	3.927	3.333	1.412	1.102	0.567	0.491	0.320	0.103	0.025
	16	3.859	3.974	3.287	1.114	0.767	0.354	0.322	0.141	0.008	0.008
	17	3.846	4.028	2.513	0.830	0.364	0.158	0.093	0.055	0.017	0.000
ln [(C/E/A)+1]	13	5.759	5.738	4.999	2.833	2.850	2.486	1.868	1.337	0.825	0.693
	14	5.139	4.716	3.832	1.616	1.230	1.226	1.067	0.786	0.801	0.738
	15	4.827	5.652	4.968	2.625	2.231	1.514	1.382	1.170	0.858	0.733
	16	5.298	4.162	4.497	1.977	1.654	1.148	1.110	0.894	0.705	0.707
	17	5.731	4.675	3.291	1.749	1.169	0.910	0.813	0.770	0.719	0.693

Table 139. Month by size class means for selected variables for white shrimp.

Response Variable	Size Class	MONTH											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ln (C+1)	≤ 20	1.631	1.556	1.622	1.980	2.718	2.534	2.503	2.188	1.609	2.267	2.020	1.825
	21-30	1.994	1.796	1.702	1.882	2.110	2.090	1.487	1.144	2.235	2.654	2.297	2.087
	31-50	1.933	1.874	1.866	1.730	1.785	1.443	0.667	1.311	2.020	2.228	2.282	2.077
	≥ 51	1.854	1.631	1.398	1.321	1.194	0.643	0.267	1.230	1.563	1.891	2.087	2.046
ln (E+1)	≤ 20	0.526	0.467	0.466	0.649	1.123	1.204	0.909	0.680	0.470	0.886	0.743	0.618
	21-30	0.679	0.565	0.521	0.666	0.892	0.809	0.480	0.290	0.898	1.156	0.914	0.735
	31-50	0.668	0.637	0.679	0.658	0.743	0.511	0.150	0.447	0.832	0.970	0.965	0.797
	≥ 51	0.754	0.659	0.543	0.507	0.427	0.160	0.043	0.419	0.578	0.793	0.951	0.909
ln [(C/E)+1]	≤ 20	1.387	1.399	1.545	1.650	1.866	1.734	1.885	1.904	1.527	1.496	1.413	1.404
	21-30	1.567	1.544	1.520	1.466	1.396	1.509	1.267	1.142	1.553	1.657	1.495	1.565
	31-50	1.447	1.505	1.399	1.266	1.193	1.134	0.709	0.977	1.358	1.395	1.424	1.428
	≥ 51	1.234	1.129	1.036	0.948	0.924	0.657	0.340	0.928	1.141	1.272	1.211	1.237
ln [(C/E/A)+1]	≤ 20	2.533	2.567	2.782	2.925	3.240	2.938	3.132	3.165	2.625	2.608	2.534	2.538
	21-30	2.808	2.764	2.705	2.622	2.509	2.602	2.258	2.100	2.671	2.851	2.647	2.761
	31-50	2.602	2.687	2.529	2.329	2.202	2.092	1.533	1.892	2.398	2.465	2.527	2.544
	≥ 51	2.271	2.158	2.016	1.882	1.833	1.473	1.095	1.831	2.104	2.309	2.244	2.284

Table 140. Annual means for the various catch, effort, and derived variables for *Penaeus* spp.

Response Variables	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Catch, C	1047.3	1149.3	970.4	1319.4	1404.9	1435.4	1436.5	1009.8	953.7	896.5
ln (C+1)	3.0915	3.1117	3.2766	3.9236	3.9028	3.7427	4.0724	3.6613	3.7754	3.7542
Days fished, F	16.158	27.265	16.438	21.311	22.469	29.970	30.758	24.987	19.092	17.142
ln (F+1)	1.1841	1.1731	1.2211	1.5529	1.4983	1.4898	1.6272	1.4915	1.4992	1.4290
Effective effort, E	11.804	13.440	13.074	19.019	16.948	19.207	20.990	20.244	16.803	15.252
ln (E+1)	1.0901	1.0914	1.1628	1.5083	1.4400	1.4512	1.5885	1.4507	1.4666	1.3978
C/F	33.821	39.874	42.327	40.972	48.926	41.847	44.706	30.896	36.905	39.262
ln [(C/F)+1]	2.1155	2.1830	2.3206	2.6145	2.6344	2.4773	2.6783	2.4461	2.5653	2.6164
C/E	43.145	47.775	46.607	44.808	54.210	44.682	47.856	33.842	39.341	41.585
ln [(C/E)+1]	2.2330	2.2853	2.3884	2.6691	2.7044	2.5216	2.7209	2.4957	2.6053	2.6529
C/A	10,368	10,544	9,066	11,170	11,673	11,514	13,645	10,738	9,701	8.737
ln [(C/A)+1]	4.1983	4.2282	4.4749	5.2879	5.2036	5.0118	5.4938	5.0984	5.2188	5.1658
F/A	160.11	232.81	161.43	169.06	179.54	404.30	423.42	242.50	191.26	157.71
ln [(F/A)+1]	2.1433	2.1182	2.2365	2.7450	2.6338	2.5996	2.8826	2.7347	2.7401	2.6367
E/A	113.07	122.30	123.59	154.94	140.75	151.98	191.35	215.78	173.44	142.20
ln [(E/A)+1]	2.0301	2.0229	2.1684	2.6936	2.5681	2.5583	2.8395	2.6874	2.7024	2.6012
C/F/A	418.60	458.33	490.34	458.49	556.18	470.89	549.95	399.54	456.06	463.20
ln [(C/F/A)+1]	3.5592	3.6283	3.8278	4.2173	4.2021	4.0230	4.3450	4.1354	4.2554	4.2775
C/E/A	526.52	533.36	533.75	490.10	595.20	495.71	581.24	426.44	478.03	486.07
ln [(C/E/A)+1]	3.6770	3.7324	3.8962	4.2726	4.2728	4.0690	4.3878	4.1857	4.2960	4.3145

Table 141. Monthly means for the various catch, effort, and derived variables for *Penaeus* spp.

Response Variable	MONTH											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Catch, C	866.6	605.5	505.3	438.0	1107.7	1616.3	1415.8	1437.5	1232.1	1803.9	1676.1	1223.8
ln (C+1)	3.3665	3.3075	3.2679	3.1997	3.7231	3.9078	3.9080	4.1046	3.8926	3.8045	3.5773	3.4799
Days fished, F	14.851	12.466	12.407	12.012	31.611	22.409	28.410	21.003	24.783	29.777	35.665	20.465
ln (F+1)	1.2802	1.2862	1.2678	1.2501	1.5535	1.5092	1.4786	1.6062	1.5365	1.5163	1.3909	1.3074
Directed effort, E	13.190	11.310	11.397	10.649	18.295	21.281	15.766	17.258	16.712	25.731	21.625	16.638
ln (E+1)	1.2397	1.2463	1.2291	1.2047	1.4958	1.4523	1.4077	1.5360	1.4684	1.4742	1.3433	1.2621
C/F	35.932	29.035	27.949	26.719	29.768	47.004	51.733	50.773	44.882	45.929	46.851	42.745
ln [(C/F)+1]	2.3727	2.2996	2.3347	2.2520	2.4139	2.6183	2.6331	2.6815	2.5565	2.5361	2.4103	2.4547
C/E	40.051	31.938	30.657	29.540	33.632	52.431	58.689	57.296	49.601	49.569	51.807	47.359
ln [(C/E)+1]	2.4268	2.3556	2.3857	2.3103	2.4770	2.6857	2.7129	2.7629	2.6329	2.5863	2.4663	2.5121
C/A	8,527	6,771	6,065	4,722	9,365	12,640	11,837	15,102	12,674	14,878	14,464	11,488
ln [(C/A)+1]	4.6864	4.6520	4.6434	4.5203	5.1030	5.2103	5.1673	5.4300	5.1671	5.0717	4.7896	4.7741
F/A	157.67	146.38	148.31	121.03	231.21	189.97	382.91	208.47	284.42	240.98	258.76	197.01
ln [(F/A)+1]	2.4081	2.4420	2.4200	2.3609	2.7612	2.6494	2.5838	2.7941	2.6647	2.6130	2.4444	2.3999
E/A	142.85	135.35	138.74	111.07	148.76	152.73	122.09	174.53	159.54	203.32	185.97	160.08
ln [(E/A)+1]	2.3596	2.3934	2.3719	2.3058	2.6957	2.5840	2.5037	2.7152	2.5892	2.5653	2.3907	2.3471
C/F/A	448.11	376.02	356.23	344.60	349.65	513.95	549.19	593.08	516.64	546.20	546.14	527.76
ln [(C/F/A)+1]	3.9809	3.9236	3.9825	3.8500	4.0390	4.1822	4.1620	4.2642	4.1031	4.0900	3.9283	4.0387
C/E/A	488.07	406.10	384.85	370.69	387.57	562.54	607.33	650.57	567.60	582.85	595.06	575.45
ln [(C/E/A)+1]	4.0356	3.9812	4.0343	3.9808	4.1019	4.2505	4.2425	4.3467	4.1815	4.1408	3.9855	4.0968

Table 142. Statistical area means for the various catch, effort, and derived variables for *Penaeus* spp.

Response Variable	All *Penaeus* spp.				
	13	14	15	16	17
Catch, C	1195.6	834.3	1499.3	1075.9	1198.5
ln (C+1)	3.9994	2.8995	3.8928	3.6710	3.6786
Days fished, F	25.885	13.902	32.874	19.950	20.247
ln (F+1)	1.5409	1.0497	1.5651	1.4473	1.4731
Directed effort, E	15.676	10.395	21.828	17.767	17.605
ln (E+1)	1.4747	1.0116	1.5083	1.4041	1.4178
C/F	45.365	34.613	39.556	39.187	40.996
ln [(C/F)+1]	2.6947	2.0993	2.6034	2.4789	2.4417
C/E	50.211	38.301	43.993	42.947	46.452
ln [(C/E)+1]	2.7717	2.1490	2.6705	2.5308	2.5091
C/A	26,205	8,244	7,299	5,081	6,727
ln [(C/A)+1]	6.0722	4.0490	5.1802	4.6922	4.6795
F/A	568.23	141.24	144.01	96.81	118.51
ln [(F/A)+1]	3.4119	2.0135	2.6610	2.3099	2.3294
E/A	354.71	106.78	113.72	87.17	102.22
ln [(E/A)+1]	3.3349	1.9667	2.5962	2.2607	2.2670
C/F/A	1167.3	357.0	339.1	233.4	264.7
ln [(C/F/A)+1]	5.0036	3.5884	4.1397	3.7739	3.7214
C/E/A	1267.4	391.6	366.8	251.4	297.3
ln [(C/E/A)+1]	5.0826	3.6383	4.2072	3.8257	3.7897

Table 143. Depth interval means for the various catch, effort, and derived variables for *Penaeus* spp.

Response Variable	DEPTH INTERVAL									
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
Catch, C	4274.1	2812.1	1191.3	898.7	586.0	755.4	480.4	359.7	104.0	32.9
ln (C+1)	6.2909	6.7748	4.9787	3.7714	3.8309	3.9648	3.0082	2.0892	0.9126	0.3316
Days fished, F	98.623	47.255	25.319	10.776	9.599	12.879	8.795	7.282	2.198	0.814
ln (F+1)	2.9200	2.9985	1.8423	1.2660	1.2955	1.4107	1.0617	0.7805	0.3277	0.1198
Directed effort, E	58.258	42.378	15.139	9.745	8.867	12.259	8.376	7.020	2.121	0.794
ln (E+1)	2.7028	2.9008	1.7767	1.2217	1.2660	1.3840	1.0459	0.7703	0:3227	0.1176
C/F	59.211	64.205	57.356	52.863	47.448	46.970	34.224	21.461	9.164	2.820
ln [(C/F)+1]	3.6443	3.9531	3.4811	2.8821	2.9055	2.9101	2.2416	1.4966	0.6603	0.2390
C/E	76.539	72.190	63.100	58.270	49.817	49.298	35.669	22.299	9.537	2.945
ln [(C/E)+1]	3.8934	4.0617	3.5620	2.9458	2.9415	2.9483	2.2621	1.5104	0.6670	0.2415
C/A	28,608	15,397	11,233	9,846	8,404	11,783	8,357	8,650	3,040	801
ln [(C/A)+1]	7.9731	8.2460	6.5700	5.2681	5.5614	5.7425	4.4037	3.1590	1.4498	0.5323
F/A	649.53	255.21	384.39	118.63	130.11	187.98	143.94	164.46	64.17	19.78
ln [(F/A)+1]	4.4249	4.3679	3.2195	2.5025	2.7483	2.9222	2.2360	1.7061	0.8007	0.2985
E/A	372.89	224.39	136.55	106.08	118.55	180.30	138.10	158.53	61.31	19.11
ln [(E/A)+1]	4.1859	4.2611	3.1428	2.4449	2.7103	2.8886	2.2156	1.6929	0.7941	0.2960
C/F/A	460.31	368.12	566.02	615.94	654.60	678.60	537.14	476.30	254.74	71.05
ln [(C/F/A)+1]	5.3808	5.4402	5.1773	4.6042	4.8450	4.8941	3.9502	3.0029	1.7744	1.0893
C/E/A	606.17	412.09	620.94	673.45	686.22	710.93	558.80	495.09	266.63	74.55
ln [(C/E/A)+1]	5.6345	5.5495	5.2596	4.6680	4.8801	4.9340	3.9704	3.0169	1.7812	1.0918

Table 144. Size class means for the various catch effort, and derived variables for *Penaeus* spp.

Response Variables	All *Penaeus* spp.			
	≤ 20	21-30	31-50	≥ 51
Catch, C	902.8	1084.7	1190.2	1465.2
ln (C+1)	4.1618	4.1632	3.6235	2.5646
Days fished, F	17.754	19.523	19.680	33.329
ln (F+1)	1.6394	1.6332	1.3886	0.9997
Directed effort, E	16.343	16.704	15.997	17.573
ln (E+1)	1.5942	1.5824	1.3343	0.9423
C/F	42.409	43.503	41.587	32.274
ln [(C/F)+1]	2.7417	2.7396	2.5147	1.8585
C/E	46.091	47.842	46.234	37.356
ln [(C/E)+1]	2.7981	2.8026	2.5798	1.9243
C/A	9462.5	11,444	10,841	11,098
ln [(C/A)+1]	5.6759	5.6571	4.9372	3.4682
F/A	189.55	204.18	183.79	277.52
ln [(F/A)+1]	2.9986	2.9769	2.5053	1.6997
E/A	176.20	170.82	137.46	127.19
ln [(E/A)+1]	2.9449	2.9175	2.4421	1.6359
C/F/A	528.12	538.23	484.93	337.90
ln [(C/F/A)+1]	4.4734	4.4553	4.1026	3.1502
C/E/A	565.60	581.29	530.49	382.18
ln [(C/E/A)+1]	4.5307	4.5194	4.1681	3.2170

Table 145. Month by statistical area means for selected variables for *Eotanus* spp.

Response Variable	Statistical Area	MONTH											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ln (C+1)	13	4.233	3.758	3.403	3.094	3.643	3.729	3.527	4.256	4.076	4.699	4.877	4.697
	14	2.871	2.883	2.684	2.460	3.251	2.998	3.106	3.287	2.897	2.849	2.675	2.832
	15	3.805	3.746	3.965	3.938	3.940	4.008	4.122	4.111	4.034	3.834	3.458	3.753
	16	3.137	3.155	3.334	3.478	4.069	4.391	4.376	4.352	4.059	3.509	3.150	3.041
	17	2.785	2.995	2.954	3.029	3.712	4.414	4.408	4.516	4.397	4.130	3.726	3.077
ln (E+1)	13	1.579	1.396	1.229	1.058	1.357	1.264	1.184	1.547	1.508	1.849	1.925	1.801
	14	0.999	1.014	0.933	0.821	1.263	1.057	1.013	1.171	0.991	1.012	0.916	0.950
	15	1.485	1.479	1.543	1.592	1.657	1.513	1.539	1.543	1.536	1.493	1.347	1.371
	16	1.140	1.187	1.235	1.361	1.685	1.704	1.614	1.658	1.615	1.378	1.176	1.095
	17	0.996	1.155	1.206	1.191	1.517	1.724	1.688	1.761	1.692	1.637	1.352	1.093
ln {(C/E)+1}	13	2.921	2.632	2.443	2.326	2.503	2.707	2.573	2.958	2.809	3.077	3.151	3.161
	14	2.186	2.163	2.135	2.001	2.226	2.142	2.338	2.342	2.126	2.039	1.917	2.172
	15	2.639	2.586	2.811	2.657	2.542	2.763	2.835	2.717	2.715	2.691	2.367	2.721
	16	2.281	2.285	2.507	2.454	2.650	2.939	2.925	2.850	2.641	2.387	2.216	2.235
	17	2.106	2.112	2.034	2.113	2.463	2.878	2.893	2.947	2.873	2.737	2.681	2.273
ln {(C/E/A)+1}	13	5.391	4.998	4.724	4.499	4.715	4.877	4.619	5.263	5.091	5.518	5.599	5.698
	14	3.767	3.783	3.760	3.550	3.810	3.532	3.766	3.818	3.535	3.430	3.252	3.660
	15	4.179	4.167	4.510	4.312	4.129	4.296	4.387	4.199	4.206	4.165	3.722	4.216
	16	3.547	3.596	3.907	3.815	4.045	4.322	4.245	4.163	3.894	3.556	3.377	3.440
	17	3.294	3.363	3.271	3.364	3.810	4.225	4.196	4.290	4.181	4.035	3.977	3.471

Table 146. Year by depth interval means for selected variables for *Penaeus* spp.

Response Variable	Depth Interval	YEAR									
		1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
ln (C+1)	0-5	6.286	5.928	5.961	6.336	5.997	6.613	6.519	6.456	6.339	6.474
	5-10	6.050	6.389	6.279	6.557	7.073	7.360	7.311	6.865	6.967	6.896
	10-15	4.573	4.910	4.120	4.790	5.615	6.072	5.678	4.537	4.958	4.533
	15-20	3.348	3.333	4.056	3.966	4.787	4.571	4.186	2.577	3.488	3.402
	20-25	2.812	2.509	4.039	4.621	5.057	4.253	4.501	2.800	3.729	3.988
	25-30	2.753	3.050	3.510	4.532	5.161	4.053	4.717	3.575	3.720	4.577
	30-35	2.330	2.553	2.232	2.959	3.151	2.696	4.019	3.176	3.449	3.519
	35-40	1.470	1.412	1.764	1.322	1.670	1.463	2.658	3.360	2.994	2.778
	40-45	0.999	0.750	0.674	0.229	0.400	0.274	0.947	2.012	1.736	1.103
	45-50	0.294	0.282	0.130	-	0.118	0.071	0.188	1.256	0.374	0.272
ln (E+1)	0-5	2.611	2.529	2.474	2.705	2.461	2.859	2.830	2.933	2.810	2.815
	5-10	2.316	2.567	2.477	2.687	2.971	3.335	3.358	3.181	3.126	2.991
	10-15	1.620	1.607	1.326	1.627	1.995	2.330	2.286	1.577	1.864	1.535
	15-20	1.006	0.933	1.288	1.366	1.560	1.584	1.420	0.686	1.232	1.143
	20-25	0.802	0.658	1.306	1.661	1.744	1.406	1.563	0.911	1.293	1.314
	25-30	0.853	0.936	1.111	1.801	1.878	1.388	1.756	1.299	1.234	1.585
	30-35	0.785	0.828	0.727	1.088	1.091	0.962	1.380	1.183	1.222	1.194
	35-40	0.477	0.521	0.645	0.549	0.543	0.533	0.948	1.398	1.117	0.971
	40-45	0.331	0.250	0.237	0.090	0.122	0.089	0.288	0.836	0.628	0.356
	45-50	0.100	0.086	0.038	-	0.036	0.026	0.056	0.504	0.139	0.075
ln [(C/E)+1]	0-5	3.919	3.683	3.856	3.905	3.877	4.068	4.006	3.804	3.834	3.982
	5-10	3.988	4.053	4.092	4.126	4.281	4.136	4.091	3.827	3.963	4.059
	10-15	3.264	3.760	3.180	3.551	3.985	4.017	3.624	3.346	3.490	3.403
	15-20	2.737	2.855	3.183	2.973	3.627	3.409	3.048	2.354	2.676	2.597
	20-25	2.344	2.217	3.126	3.311	3.661	3.177	3.315	2.263	2.873	3.128

Table 146. (cont'd)

Response Variable	Depth Interval	YEAR									
		1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
ln [(C/E)+1] (cont'd)	25-30	2.205	2.502	2.757	3.038	3.656	3.077	3.305	2.622	2.855	3.467
	30-35	1.773	1.996	1.804	2.114	2.263	1.997	2.972	2.370	2.630	2.701
	35-40	1.141	1.000	1.308	0.853	1.275	1.084	1.919	2.243	2.179	2.102
	40-45	0.755	0.565	0.478	0.151	0.330	0.203	0.762	1.288	1.268	0.870
	45-50	0.205	0.221	0.100	-	0.088	0.047	0.166	0.840	0.285	0.220
ln [(C/E/A)+1]	0-5	5.585	5.341	5.593	5.648	5.542	5.823	5.755	5.588	5.652	5.819
	5-10	4.428	5.506	5.556	5.591	5.789	5.652	5.601	5.337	5.460	5.576
	10-15	4.818	5.435	4.744	5.195	5.686	5.844	5.405	5.061	5.291	5.116
	15-20	4.321	4.442	4.965	4.751	5.512	5.276	4.822	3.943	4.384	4.265
	20-25	4.026	3.803	5.101	5.426	5.800	5.217	5.421	4.018	4.823	5.167
	25-30	3.865	4.267	4.647	5.073	5.856	5.114	5.426	4.545	4.859	5.688
	30-35	3.291	3.564	3.278	3.787	3.886	3.578	4.970	4.223	4.525	4.602
	35-40	2.467	2.273	2.741	2.035	2.602	2.375	3.587	4.213	4.045	3.829
	40-45	1.940	1.630	1.482	0.949	1.217	1.040	1.915	2.833	2.762	2.043
	45-50	1.029	1.062	0.855	-	0.838	0.771	0.974	2.096	1.160	1.042

Table 147. Month by depth interval means for selected variables for *Penaeus* spp.

Response Variable	Depth Interval	MONTH											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ln (C+1)	0-5	4.799	4.217	4.450	5.107	7.413	7.404	6.599	6.396	6.885	8.109	7.802	6.310
	5-10	6.288	5.824	5.550	5.674	7.146	7.665	6.901	6.455	6.693	7.901	8.073	7.128
	10-15	4.228	4.337	4.056	4.027	5.145	6.608	6.787	6.396	5.551	4.692	3.684	4.233
	15-20	2.289	1.776	1.962	2.276	3.447	4.930	6.582	6.703	5.901	4.116	2.964	2.310
	20-25	3.360	3.108	3.055	2.959	3.491	3.862	4.611	5.450	4.521	3.986	3.898	3.669
	25-30	3.823	3.895	3.940	3.676	3.866	3.940	3.570	4.199	4.193	3.930	4.408	4.136
	30-35	3.756	3.894	3.670	3.264	2.856	2.474	2.349	2.651	2.572	2.353	2.794	3.465
	35-40	3.026	3.346	3.020	2.710	2.256	1.118	0.796	1.611	1.683	1.872	1.315	2.319
	40-45	1.414	1.605	1.723	1.300	0.796	0.482	0.399	0.719	0.487	0.705	0.479	0.842
	45-50	0.385	0.824	1.028	0.761	0.490	0.225	0.106	0.061	0.055	0.000	0.000	0.045
ln (E+1)	0-5	1.771	1.540	1.686	2.005	3.499	3.390	2.678	2.512	3.119	4.074	3.555	2.605
	5-10	2.495	2.251	2.221	2.337	3.356	3.433	2.754	2.485	2.809	3.738	3.756	3.176
	10-15	1.597	1.598	1.305	1.448	1.988	2.524	2.556	2.387	1.852	1.496	1.159	1.412
	15-20	0.708	0.557	0.599	0.702	1.116	1.505	2.389	2.591	2.039	1.138	0.760	0.557
	20-25	1.118	1.083	1.069	0.939	1.189	1.244	1.484	2.007	1.580	1.198	1.185	1.096
	25-30	1.419	1.525	1.532	1.415	1.413	1.117	1.066	1.541	1.484	1.291	1.395	1.410
	30-35	1.362	1.509	1.465	1.296	1.019	0.647	0.656	0.918	0.925	0.776	0.856	1.123
	35-40	1.180	1.384	1.276	1.042	0.797	0.319	0.219	0.531	0.560	0.657	0.468	0.811
	40-45	0.505	0.623	0.673	0.490	0.288	0.138	0.102	0.218	0.158	0.227	0.184	0.286
	45-50	0.133	0.299	0.381	0.282	0.160	0.068	0.038	0.018	0.012	0.000	0.000	0.022

Table 147. (cont'd)

Response Variable	Depth Interval	MONTH											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ln [(C/E)+1]	0-5	3.564	3.171	3.277	3.595	4.069	4.153	4.187	4.215	3.942	4.092	4.402	4.054
	5-10	4.068	3.885	3.618	3.567	3.901	4.352	4.308	4.178	4.053	4.303	4.399	4.109
	10-15	2.883	3.106	3.262	2.989	3.493	4.353	4.521	2.273	4.081	3.637	2.831	3.314
	15-20	1.965	1.476	1.745	2.006	2.710	3.828	4.466	4.342	4.253	3.613	2.766	2.178
	20-25	2.642	2.330	2.402	2.451	2.394	2.919	3.594	3.708	3.241	3.247	3.094	2.977
	25-30	2.746	2.719	2.825	2.623	2.854	3.258	2.772	2.896	3.006	3.067	3.439	3.175
	30-35	2.765	2.785	2.537	2.319	2.174	2.210	1.893	1.908	1.849	1.806	2.195	2.706
	35-40	2.083	2.229	2.011	1.947	1.729	0.952	0.683	1.249	1.245	1.323	0.933	1.742
	40-45	1.026	1.086	1.278	0.908	0.566	0.409	0.366	0.544	0.353	0.517	0.358	0.592
	45-50	0.314	0.592	0.739	0.519	0.371	0.173	0.073	0.046	0.048	0.000	0.000	0.024
ln [(C/E/A)+1]	0-5	5.169	4.709	4.818	5.311	5.932	5.980	5.952	6.046	5.725	5.910	6.261	5.800
	5-10	5.581	5.398	5.091	5.014	5.401	5.841	5.752	5.626	5.513	5.826	5.926	5.624
	10-15	4.469	4.826	5.000	4.572	5.211	6.188	6.351	6.037	5.767	5.278	4.387	5.028
	15-20	3.437	2.749	3.119	3.490	4.414	5.780	6.608	6.471	6.333	5.476	4.438	3.700
	20-25	4.536	4.093	4.197	4.268	4.662	4.817	5.688	5.868	5.215	5.237	5.052	4.927
	25-30	4.709	4.654	4.856	4.570	4.905	5.313	4.588	4.786	4.967	5.056	5.558	5.247
	30-35	4.705	4.811	4.415	4.140	3.882	3.820	3.366	3.414	3.357	3.326	3.843	4.567
	35-40	3.889	4.165	3.875	3.740	3.384	2.121	1.704	2.548	2.588	2.741	2.106	3.341
	40-45	2.377	2.501	2.829	2.196	1.639	1.344	1.258	1.546	1.239	1.521	1.259	1.667
	45-50	1.199	1.676	1.933	1.572	1.309	0.973	0.815	0.768	0.771	0.693	0.693	0.732

Table 148. Depth interval by statistical area means for selected variables for *Penaeus* spp.

Response Variable	Statistical Area	DEPTH INTERVAL 0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
ln (C+1)	13	5.956	6.256	5.146	4.038	4.508	4.961	4.278	2.946	1.256	0.278
	14	4.849	5.530	4.205	3.332	2.960	3.588	2.066	1.411	0.519	0.273
	15	7.468	7.418	5.677	3.888	3.490	3.525	3.141	2.312	1.171	0.501
	16	6.800	6.410	5.498	3.771	3.865	3.524	2.662	1.895	0.657	0.292
	17	6.382	7.260	4.367	3.828	4.332	4.227	2.895	1.882	0.961	0.314
ln (E+1)	13	2.426	2.534	1.808	1.258	1.531	1.821	1.582	1.107	0.454	0.089
	14	1.811	1.974	1.369	1.141	0.968	1.322	0.655	0.507	0.179	0.098
	15	3.523	3.397	2.169	1.207	1.046	1.102	1.072	0.854	0.403	0.176
	16	3.075	3.383	2.002	1.199	1.255	1.134	0.883	0.649	0.225	0.107
	17	2.679	3.216	1.536	1.304	1.530	1.543	1.037	0.735	0.351	0.118
ln [(C/E)+1]	13	3.836	3.959	3.697	3.146	3.289	3.439	2.981	2.031	0.881	0.212
	14	3.475	3.877	3.279	2.468	2.294	2.545	1.694	1.060	0.406	0.199
	15	4.140	4.123	3.842	3.146	2.989	2.877	2.424	1.681	0.880	0.375
	16	3.980	4.127	3.808	3.015	2.986	2.843	2.119	1.478	0.509	0.211
	17	4.037	4.223	3.195	2.954	3.151	3.037	2.093	1.302	0.659	0.210
ln [(C/E/A)+]	13	6.335	6.422	6.614	5.690	5.984	6.216	5.604	4.255	2.250	1.054
	14	5.478	5.256	4.998	4.077	3.909	4.327	3.291	2.369	1.389	1.032
	15	4.960	5.877	5.608	4.971	4.895	4.863	4.096	3.178	2.046	1.285
	16	5.434	5.324	5.086	4.163	4.785	4.390	3.474	2.795	1.489	1.038
	17	5.965	4.869	3.992	4.439	4.827	4.874	3.387	2.488	1.731	1.051

Table 149. Month by size class means for selected variables for *Penaeus* spp.

Response Variable	Size Class	MONTH											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ln (C+1)	≤ 20	4.066	4.272	4.474	4.700	5.074	4.374	3.870	3.877	3.618	4.001	3.793	3.824
	21-30	4.084	4.028	4.023	3.927	4.236	3.903	3.697	4.225	4.738	4.783	4.204	4.110
	31-50	3.176	3.076	2.958	2.670	3.096	3.707	4.304	4.796	4.440	3.932	3.769	3.559
	≥ 51	2.140	1.854	1.617	1.502	2.486	3.646	3.762	3.520	2.775	2.502	2.544	2.427
ln (E+1)	≤ 20	1.577	1.745	1.863	1.934	2.196	1.672	1.383	1.359	1.234	1.488	1.335	1.344
	21-30	1.538	1.533	1.499	1.446	1.669	1.406	1.236	1.558	1.975	1.999	1.611	1.517
	31-50	1.049	1.016	0.981	0.892	1.155	1.336	1.615	2.016	1.807	1.521	1.401	1.224
	≥ 51	0.795	0.691	0.573	0.548	0.964	1.395	1.396	1.211	0.857	0.889	1.026	0.963
ln [(C/E)+1]	≤ 20	2.755	2.761	2.899	3.032	3.042	2.896	2.730	2.740	2.604	2.711	2.678	2.731
	21-30	2.810	2.735	2.819	2.760	2.809	2.713	2.723	2.850	2.873	2.947	2.767	2.827
	31-50	2.444	2.444	2.461	2.288	2.247	2.635	2.856	2.884	2.774	2.635	2.621	2.667
	≥ 51	1.698	1.483	1.364	1.160	1.810	2.499	2.543	2.578	2.281	2.052	1.800	1.824
ln [(C/E/A)+1]	≤ 20	4.533	4.618	4.836	5.014	4.984	4.597	4.310	4.339	4.147	4.309	4.277	4.405
	21-30	4.601	4.551	4.692	4.581	4.623	3.309	4.261	4.469	4.536	4.667	4.402	4.540
	31-50	4.060	4.089	4.122	3.841	3.741	3.156	4.430	4.512	4.380	4.199	4.180	4.307
	≥ 51	2.949	2.666	2.487	2.196	3.060	3.940	3.969	4.068	3.663	3.388	3.083	3.135

Table 150. Depth interval by size class means for selected variables for *Peneaus* spp.

Response Variable	Size Class	Depth Interval									
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
ln (C+1)	≤ 20	4.747	6.750	5.190	3.877	4.497	5.291	4.511	3.629	1.912	0.876
	21-30	5.581	6.973	5.434	4.482	4.932	5.161	4.143	2.985	1.203	0.357
	31-50	6.637	7.051	5.471	4.202	4.057	3.887	2.575	1.444	0.489	0.065
	≥ 51	8.198	6.324	3.820	2.525	1.837	1.521	0.803	0.298	0.047	0.018
ln (E+1)	≤ 20	1.718	2.955	1.913	1.185	1.526	2.056	1.817	1.533	0.769	0.345
	21-30	2.201	3.070	1.986	1.516	1.798	1.950	1.517	1.120	0.412	0.105
	31-50	2.834	3.081	2.018	1.494	1.335	1.214	0.726	0.389	0.106	0.013
	≥ 51	4.059	2.496	1.190	0.692	0.404	0.315	0.124	0.039	0.003	0.007
ln [(C/E)+1]	≤ 20	3.511	4.007	3.568	3.097	3.281	3.445	2.869	2.202	1.207	0.573
	21-30	3.808	4.074	3.747	3.099	3.403	3.437	2.832	2.022	0.860	0.294
	31-50	4.031	4.121	3.801	3.097	3.129	3.148	2.301	1.331	0.513	0.076
	≥ 51	4.223	4.045	3.132	2.290	1.954	1.764	1.046	0.488	0.088	0.023
ln [(C/E/A)+1]	≤ 20	5.151	5.504	5.263	4.872	5.366	5.646	4.844	4.069	2.665	1.639
	21-30	5.530	5.570	5.505	5.170	5.543	5.638	4.805	3.814	2.102	1.182
	31-50	5.817	5.610	5.563	4.862	5.148	5.221	4.037	2.745	1.527	0.817
	≥ 51	6.040	5.514	4.708	3.768	3.464	3.232	2.195	1.440	0.830	0.729

APPENDIX B

FIGURES

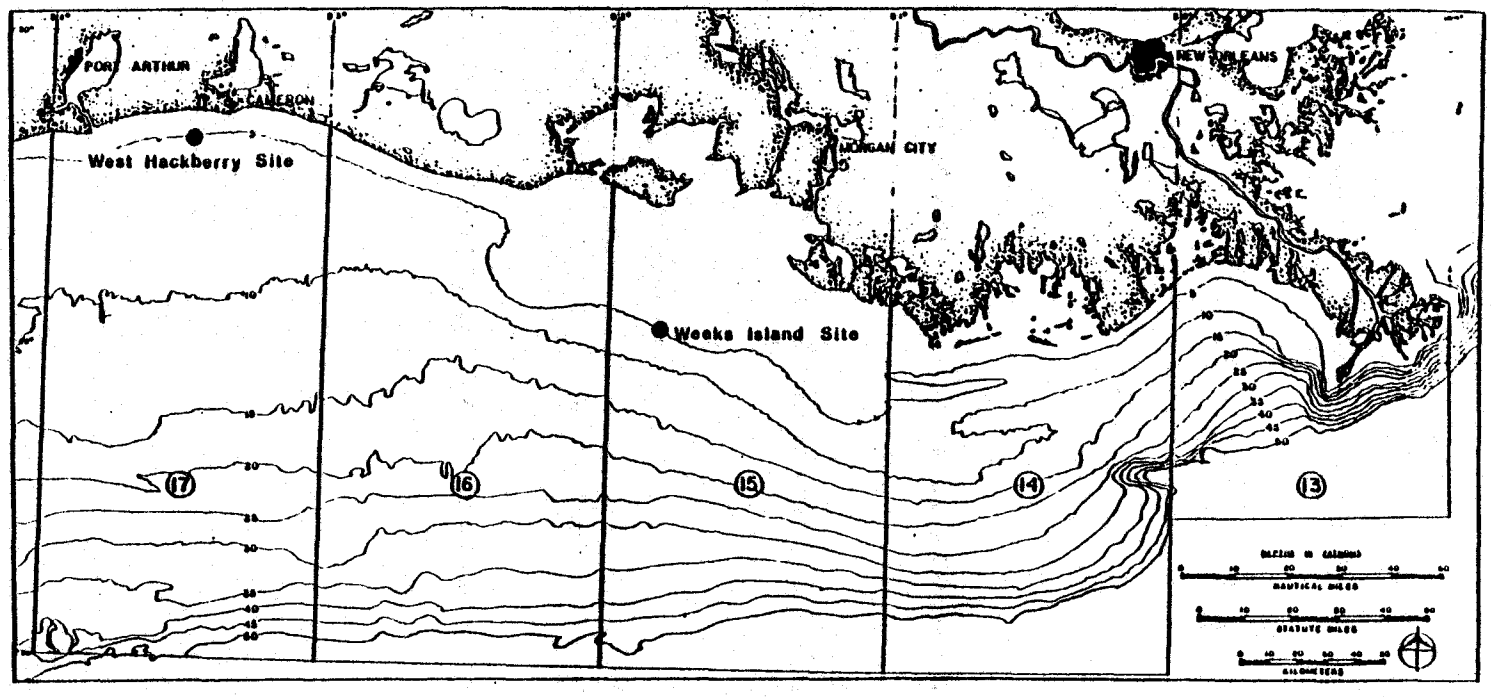

Fig. 1. Map of the study area showing the location of statistical areas.

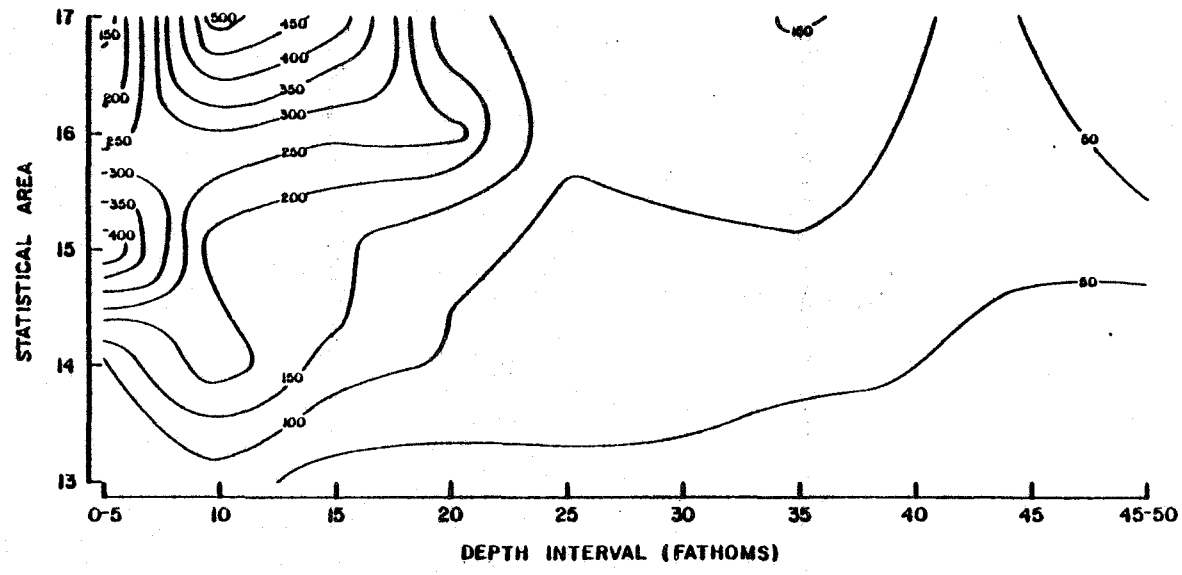

Fig. 2. Water surface area (hectares/1000) within statistical area-depth interval.

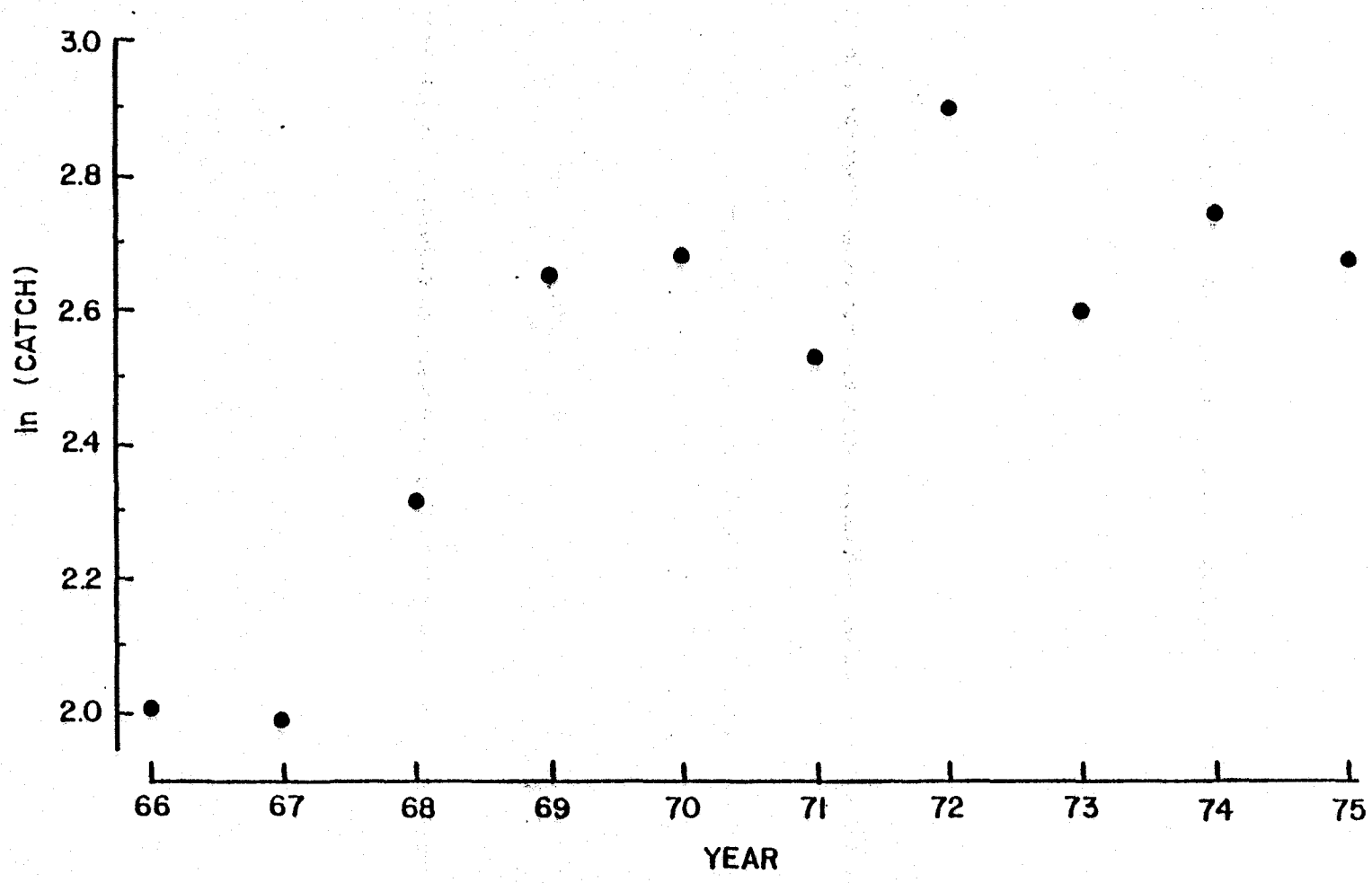

Fig. 3. Mean log-transformed catch by year for brown shrimp.

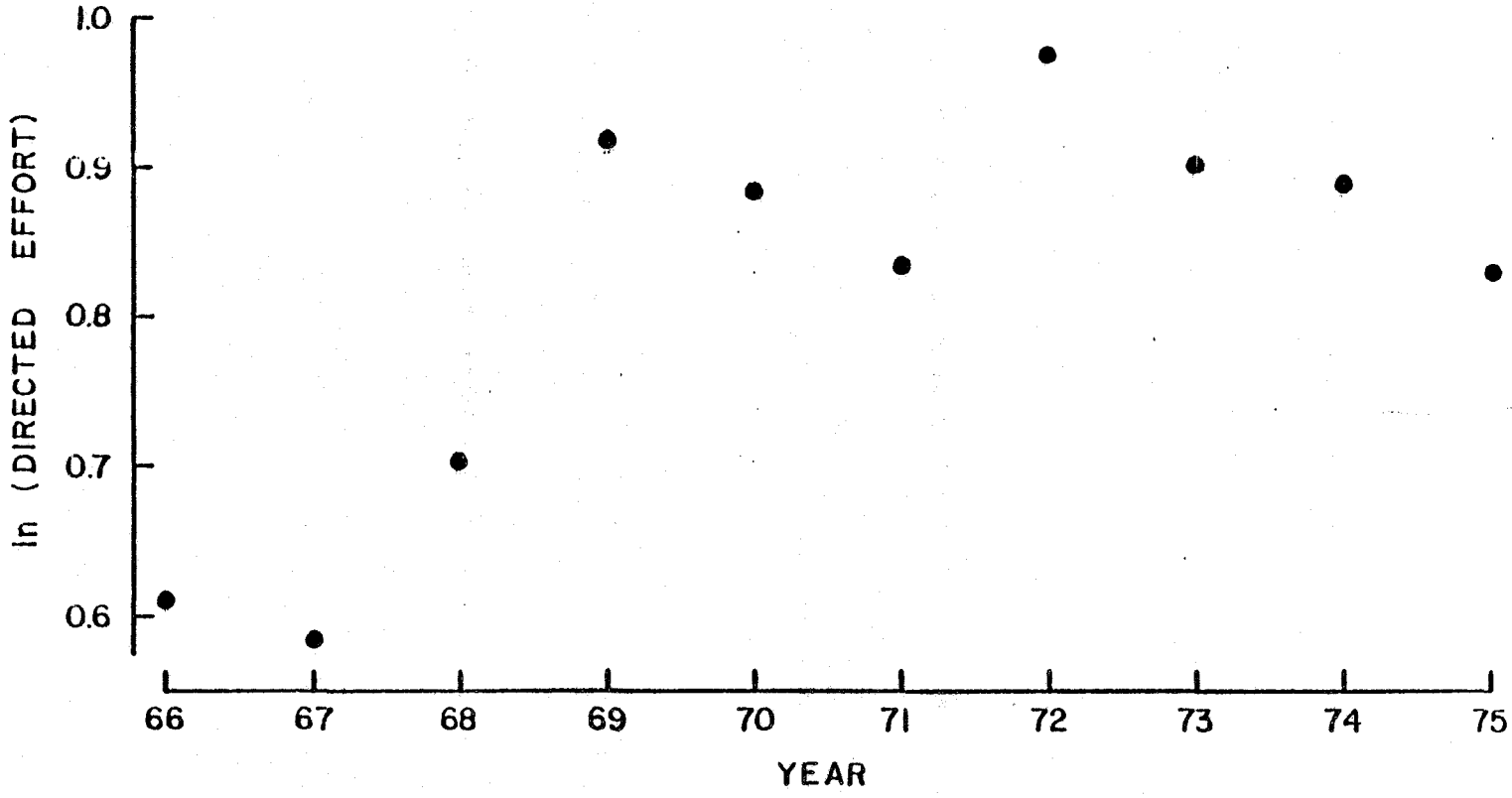

Fig. 4. Mean log-transformed directed effort by year for brown shrimp.

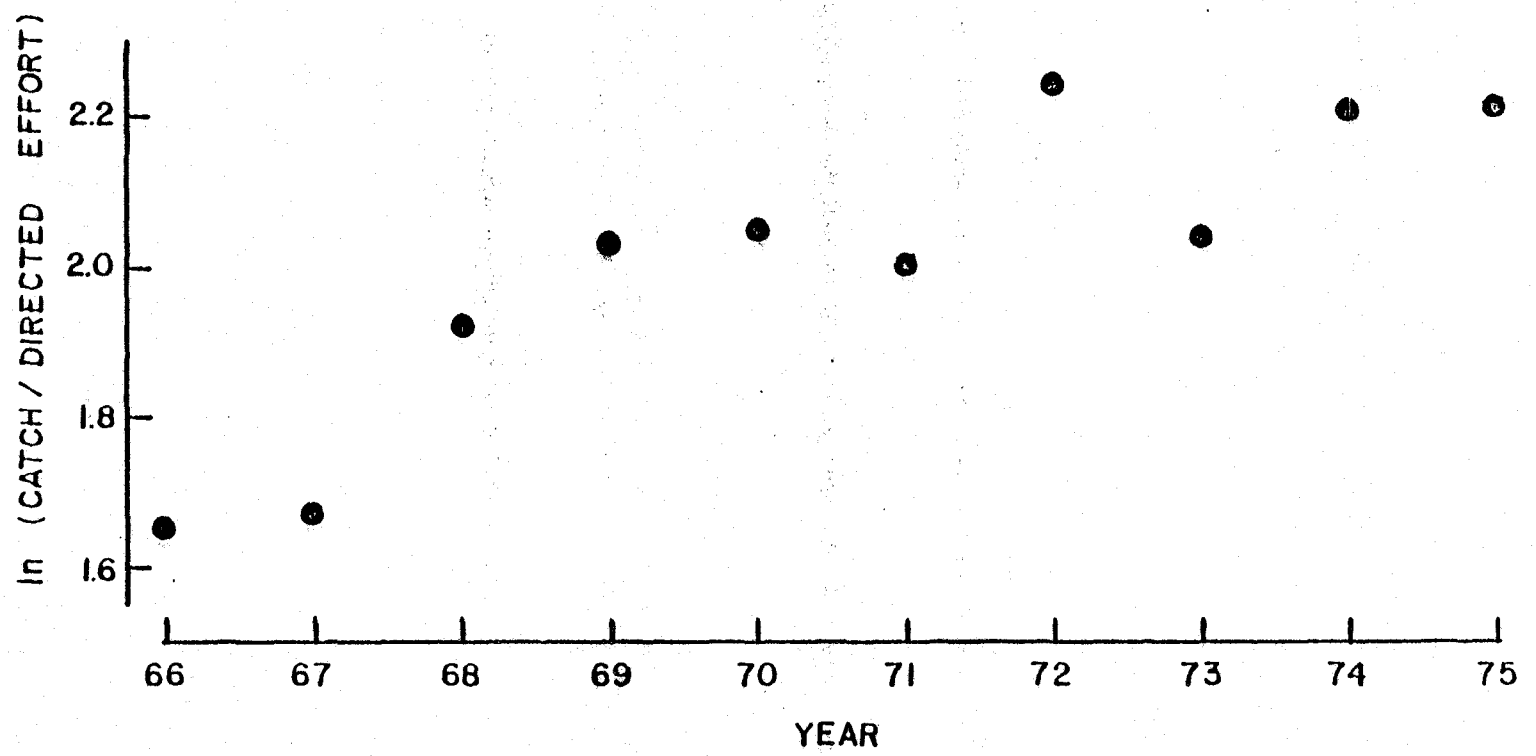

Fig. 5. Mean log-transformed catch per directed effort by year for brown shrimp.

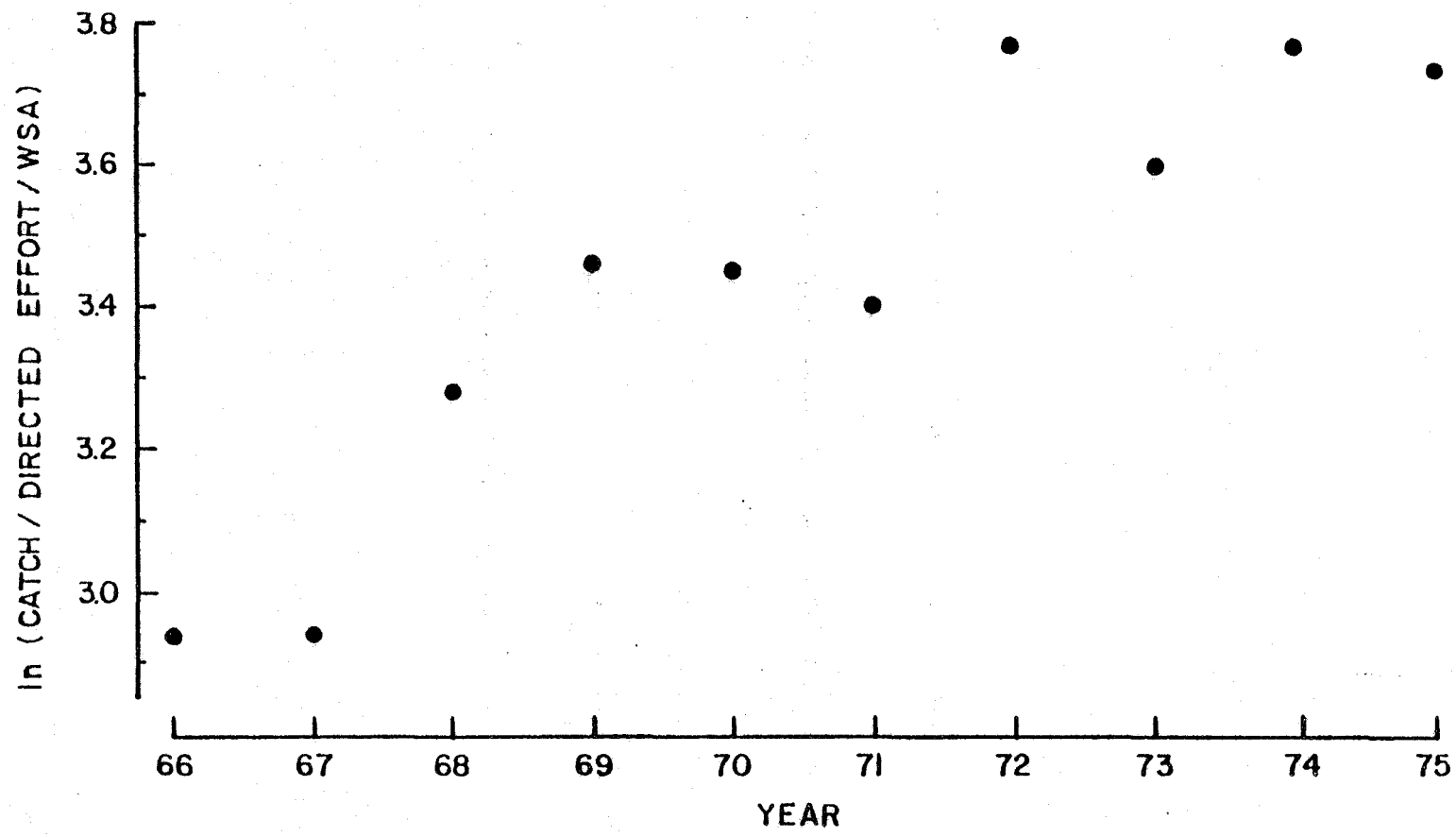

Fig. 6. Mean log-transformed catch per directed effort per water surface area by year for brown shrimp.

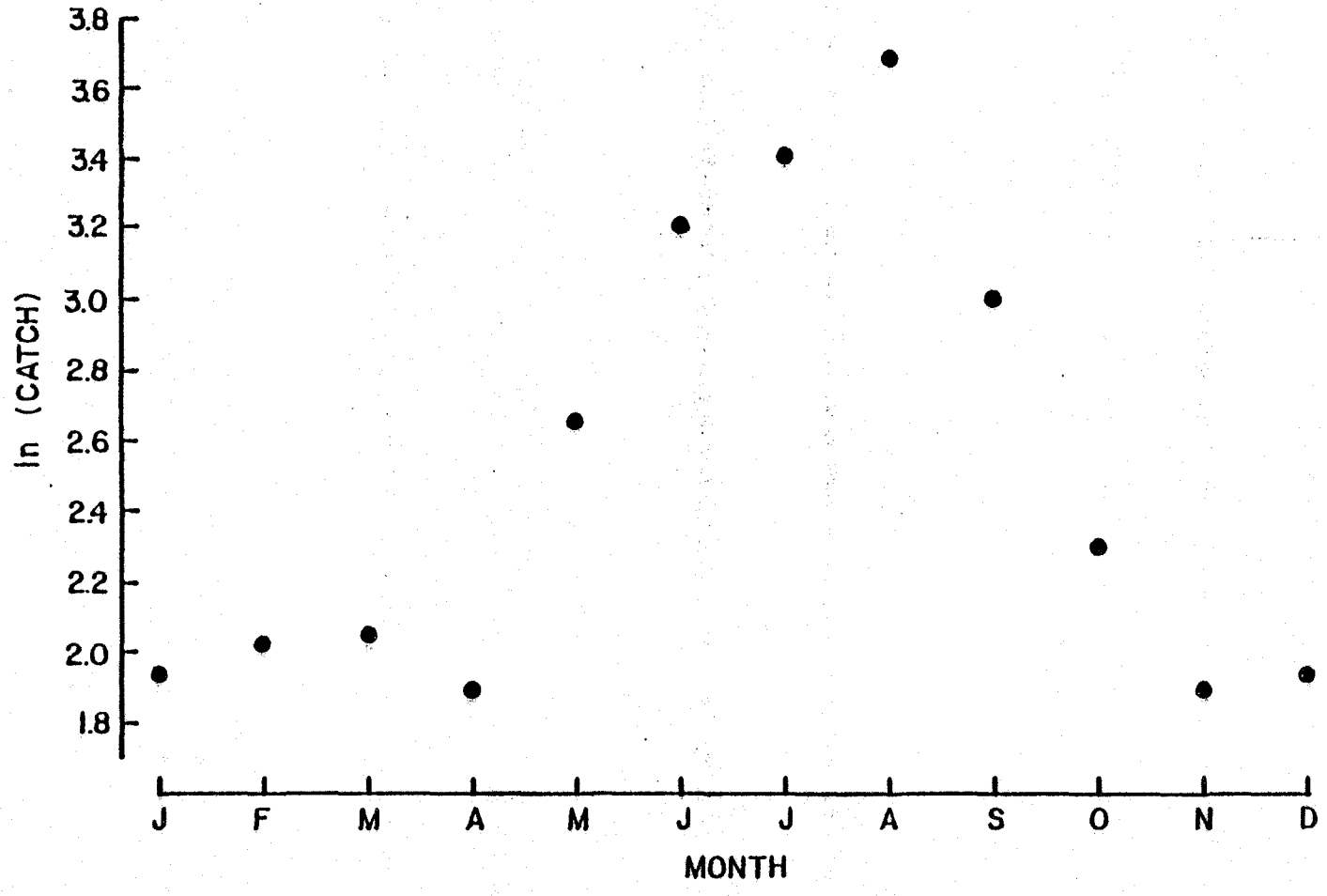

Fig. 7. Mean log-transformed catch by month for brown shrimp.

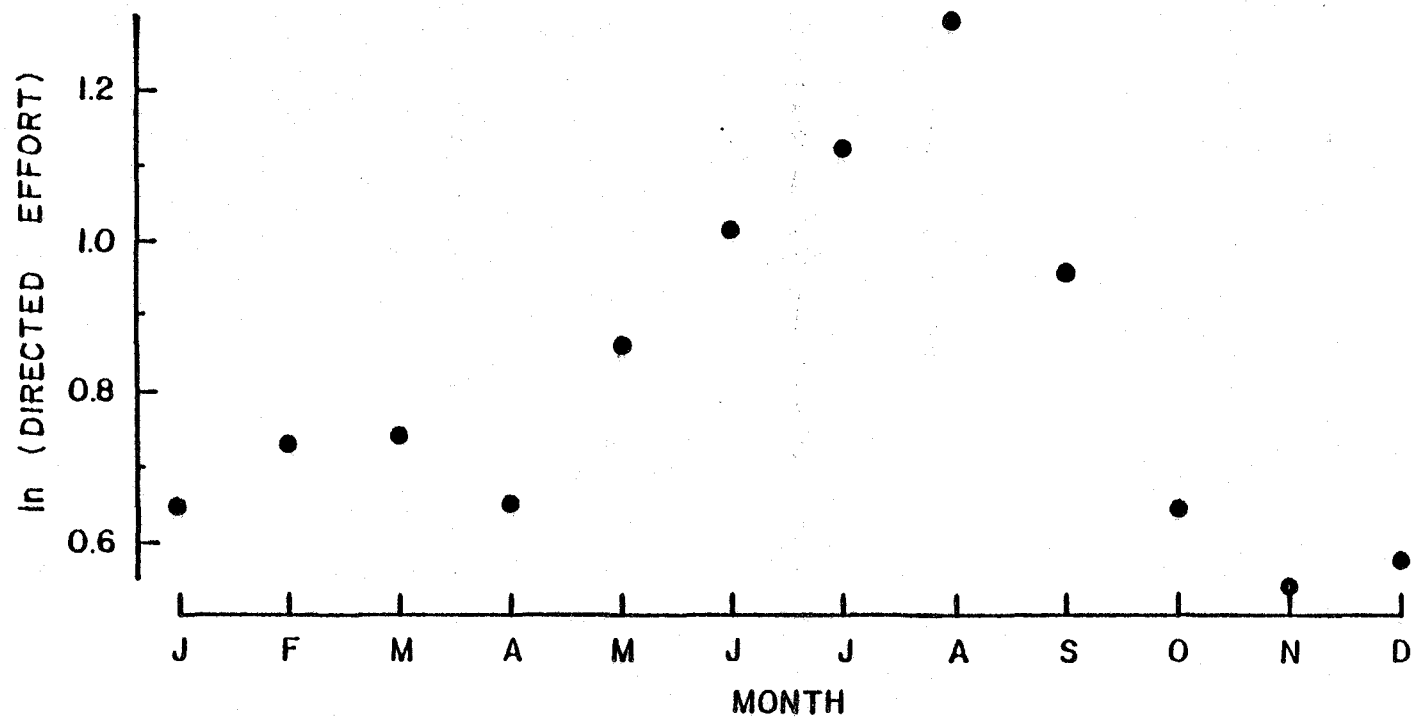

Fig. 8. Mean log-transformed directed effort by month for brown shrimp.

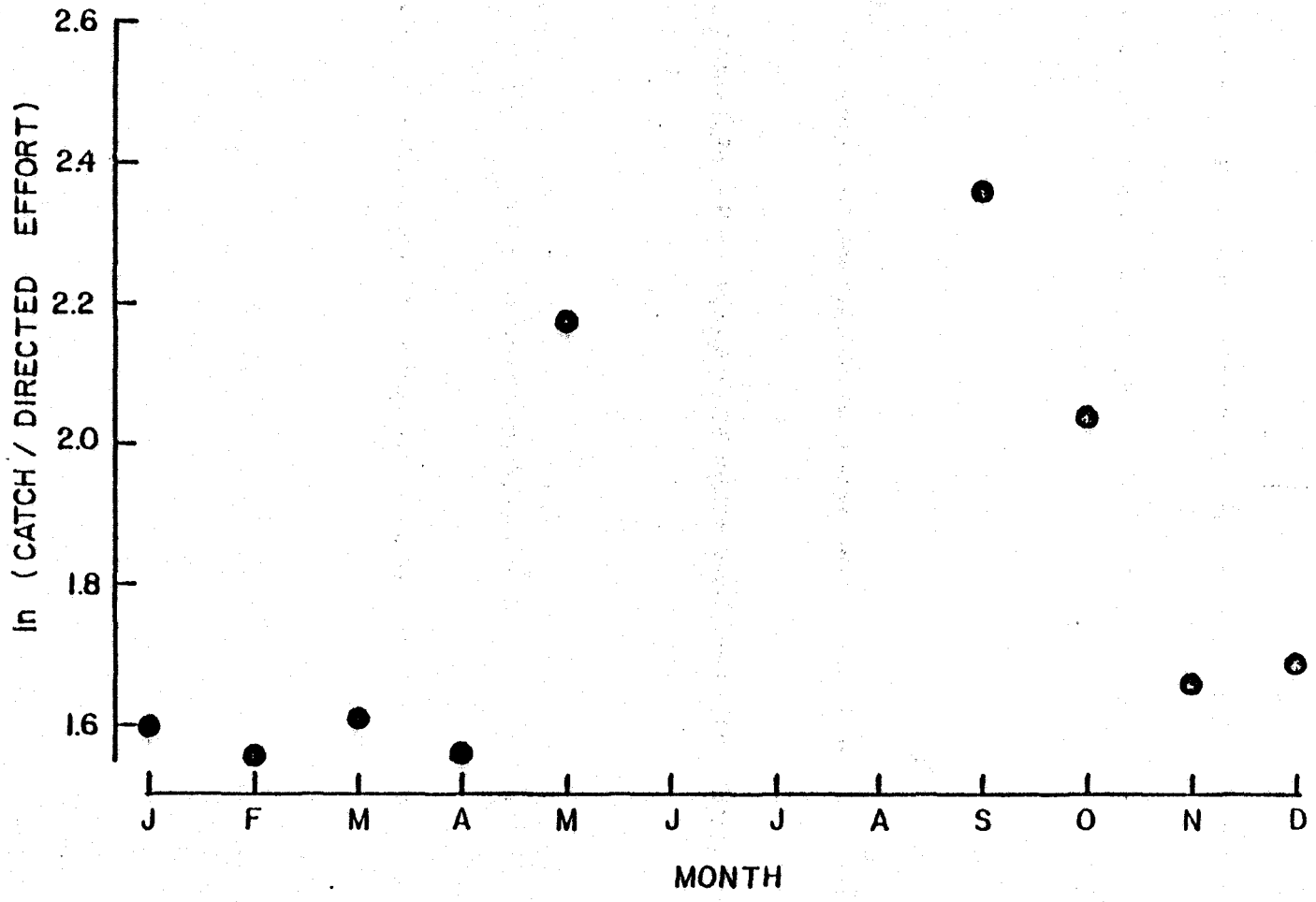

Fig. 9. Mean log-transformed catch per directed effort by month for brown shrimp.

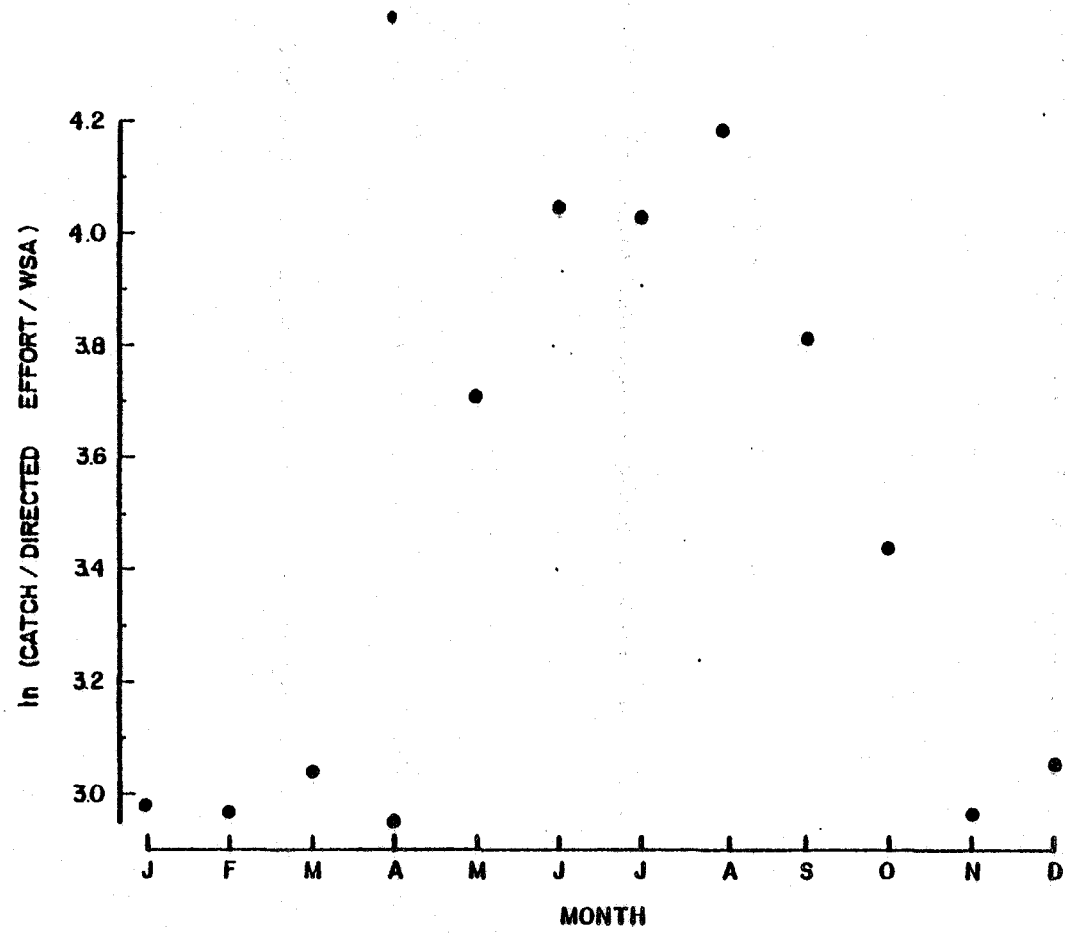

Fig. 10. Mean log-transformed catch per directed effort per water surface area by month for brown shrimp.

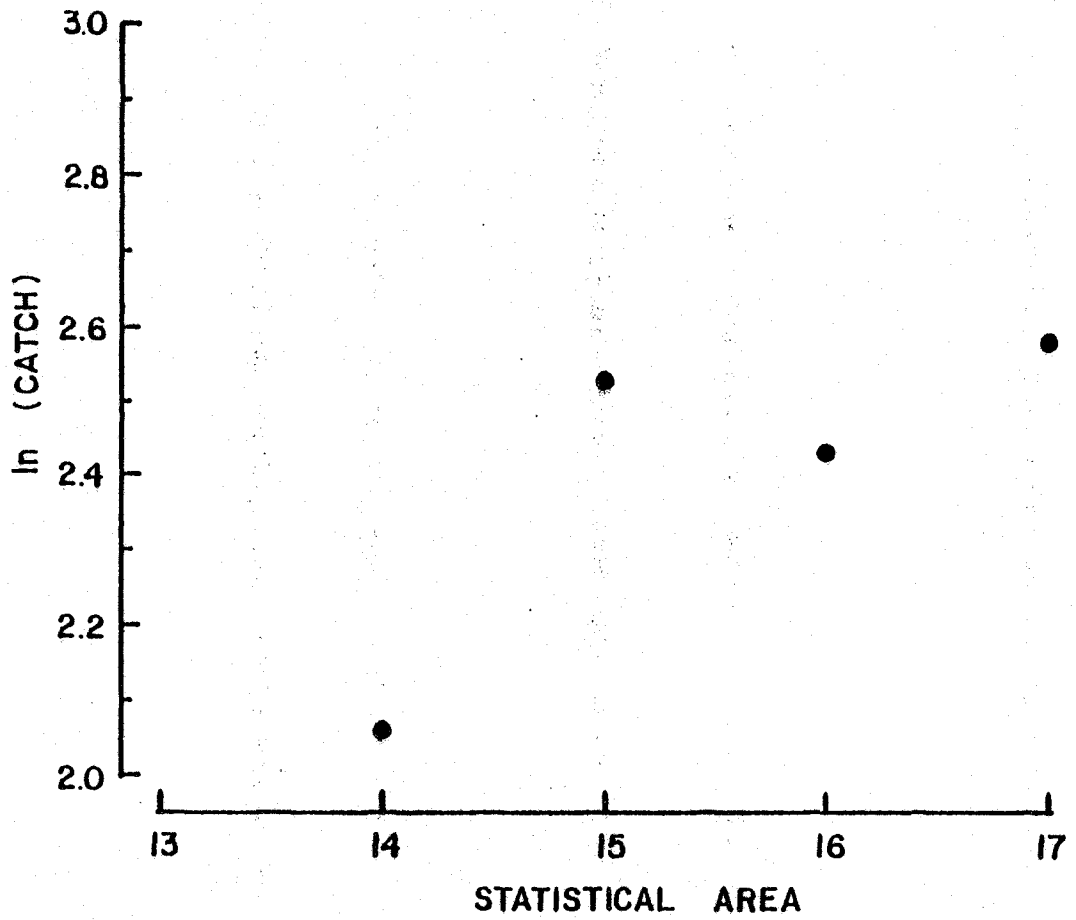

Fig. 11. Mean log-transformed catch by statistical area for brown shrimp.

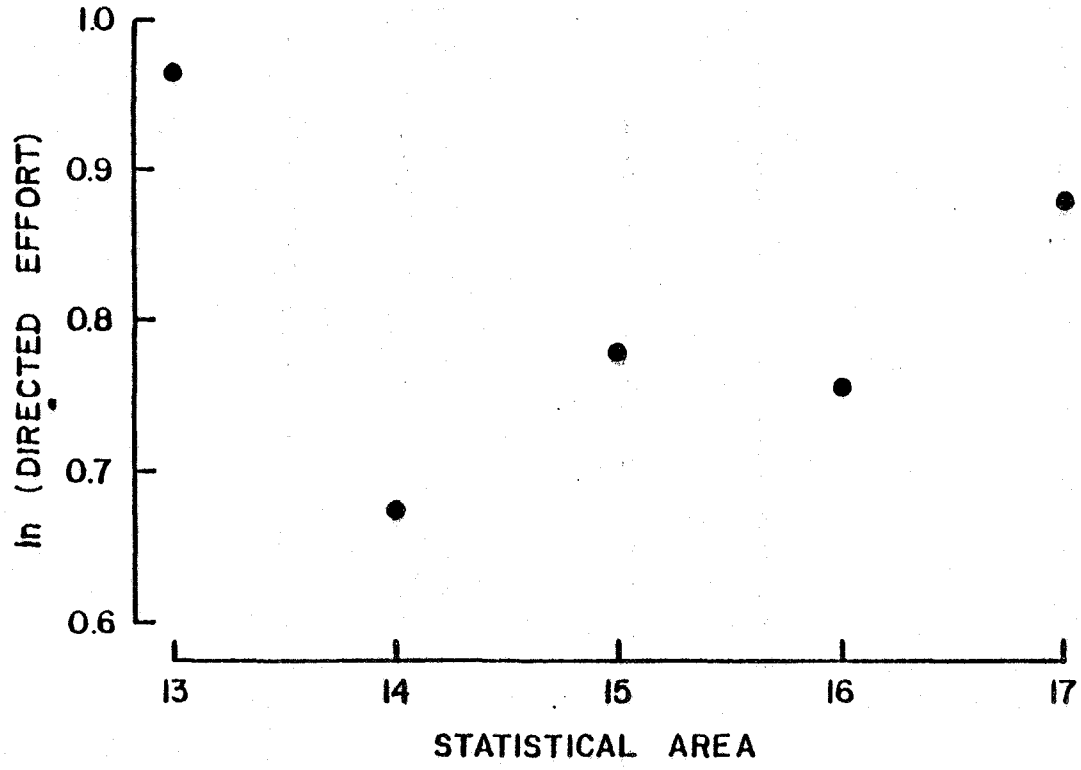

Fig. 12. Mean log-transformed directed effort by statistical area for brown shrimp.

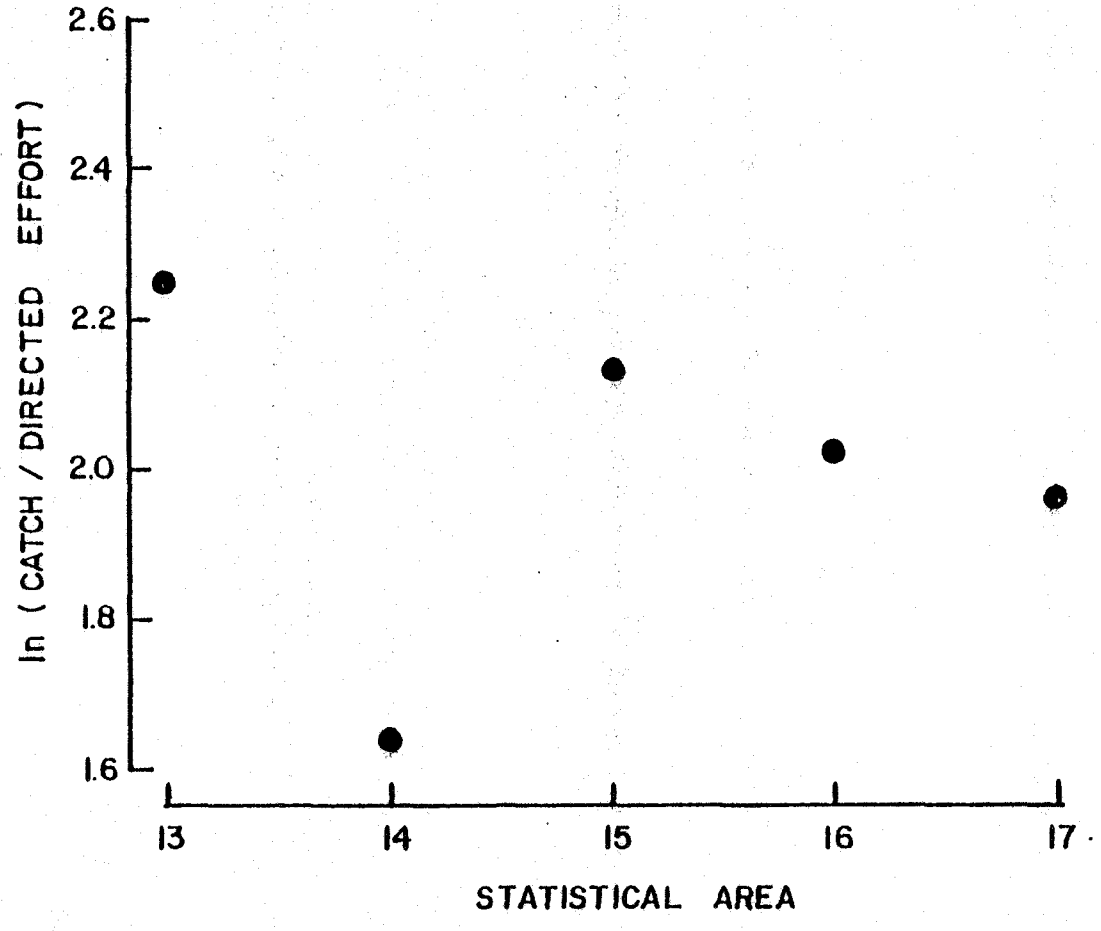

Fig. 13. Mean log-transformed catch per directed effort by statistical area for brown shrimp.

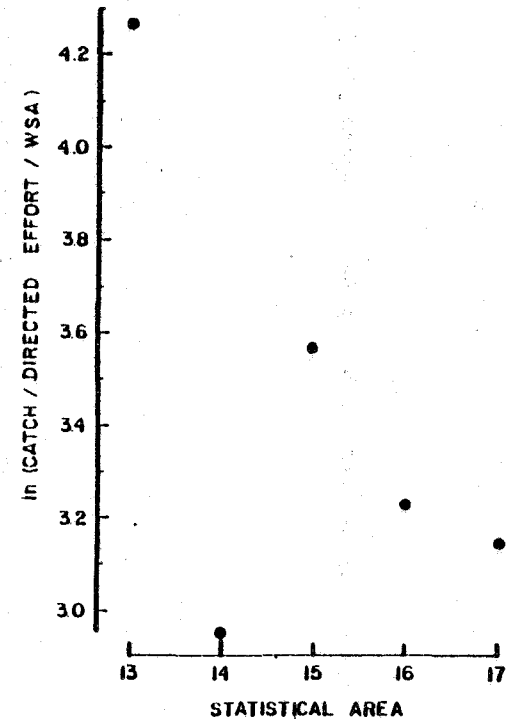

Fig. 14. Mean log-transformed catch per directed effort per water surface area by statistical area for brown shrimp.

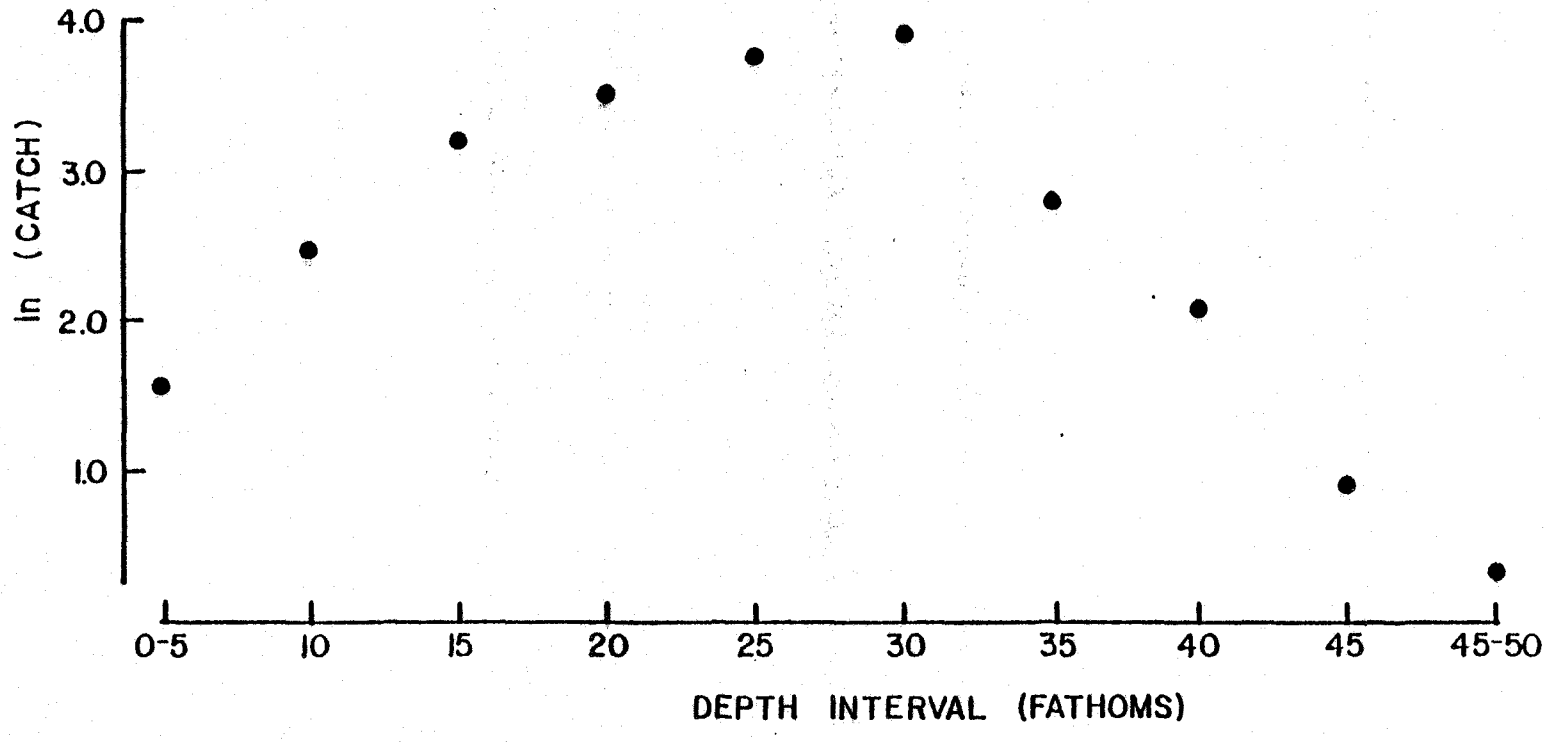

Fig. 15. Mean log-transformed catch by depth interval for brown shrimp.

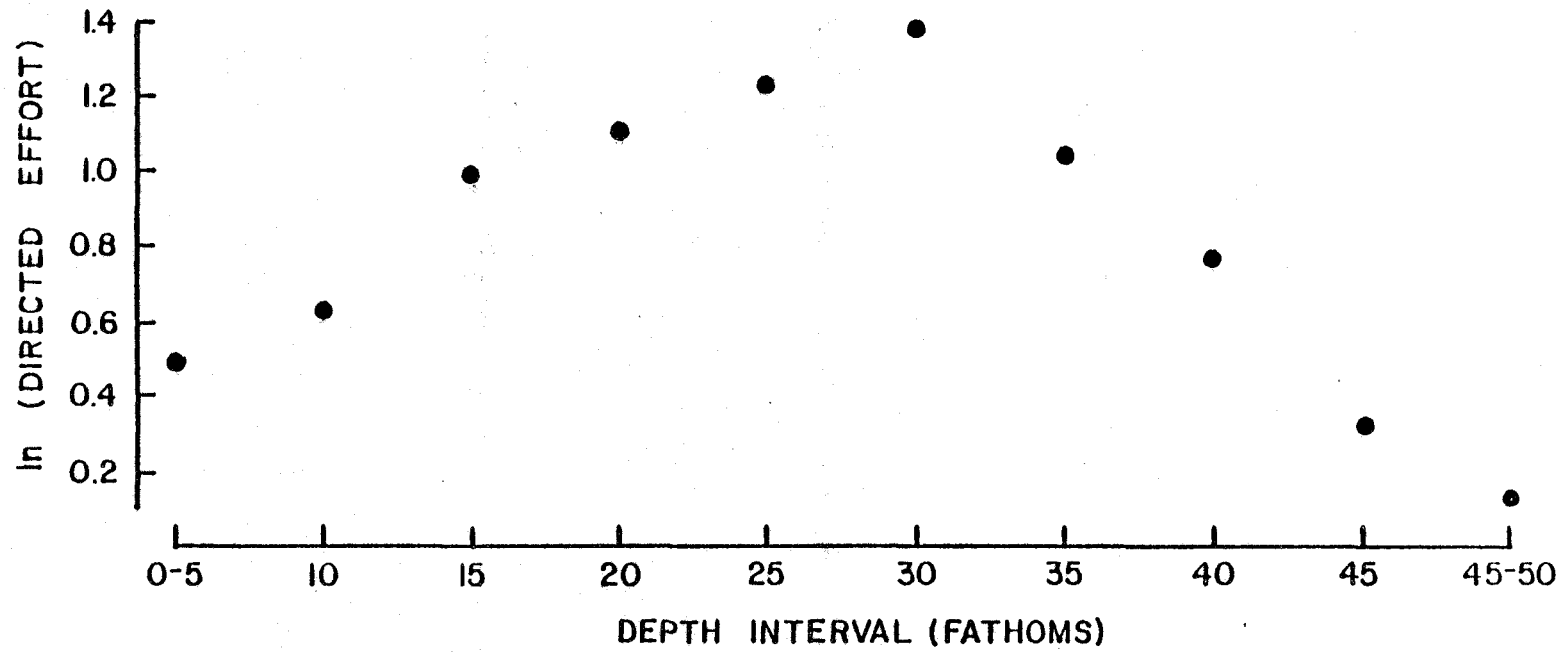

Fig. 16. Mean log-transformed directed effort by depth interval for brown shrimp.

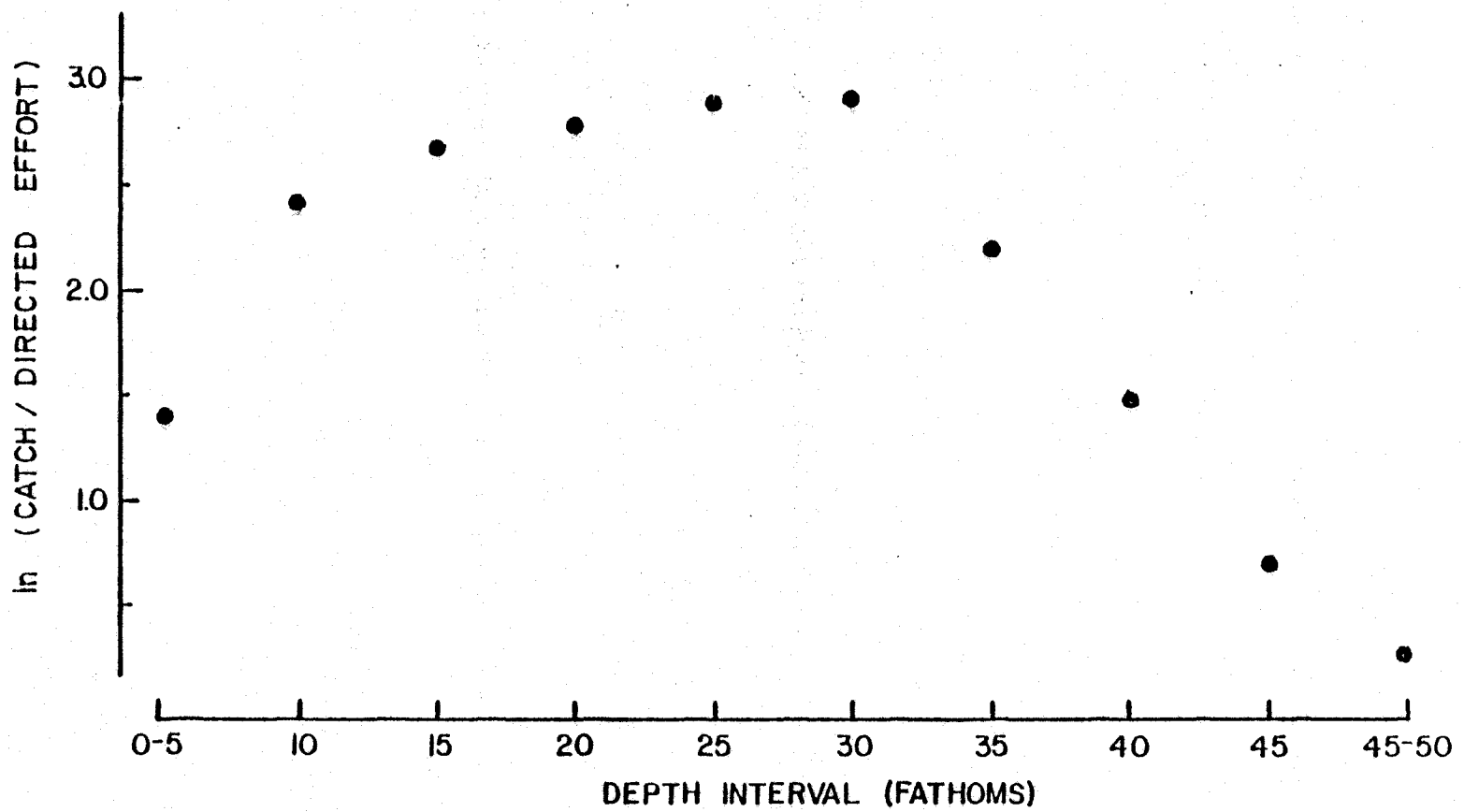

Fig. 17. Mean log-transformed catch per directed effort by depth interval for brown shrimp.

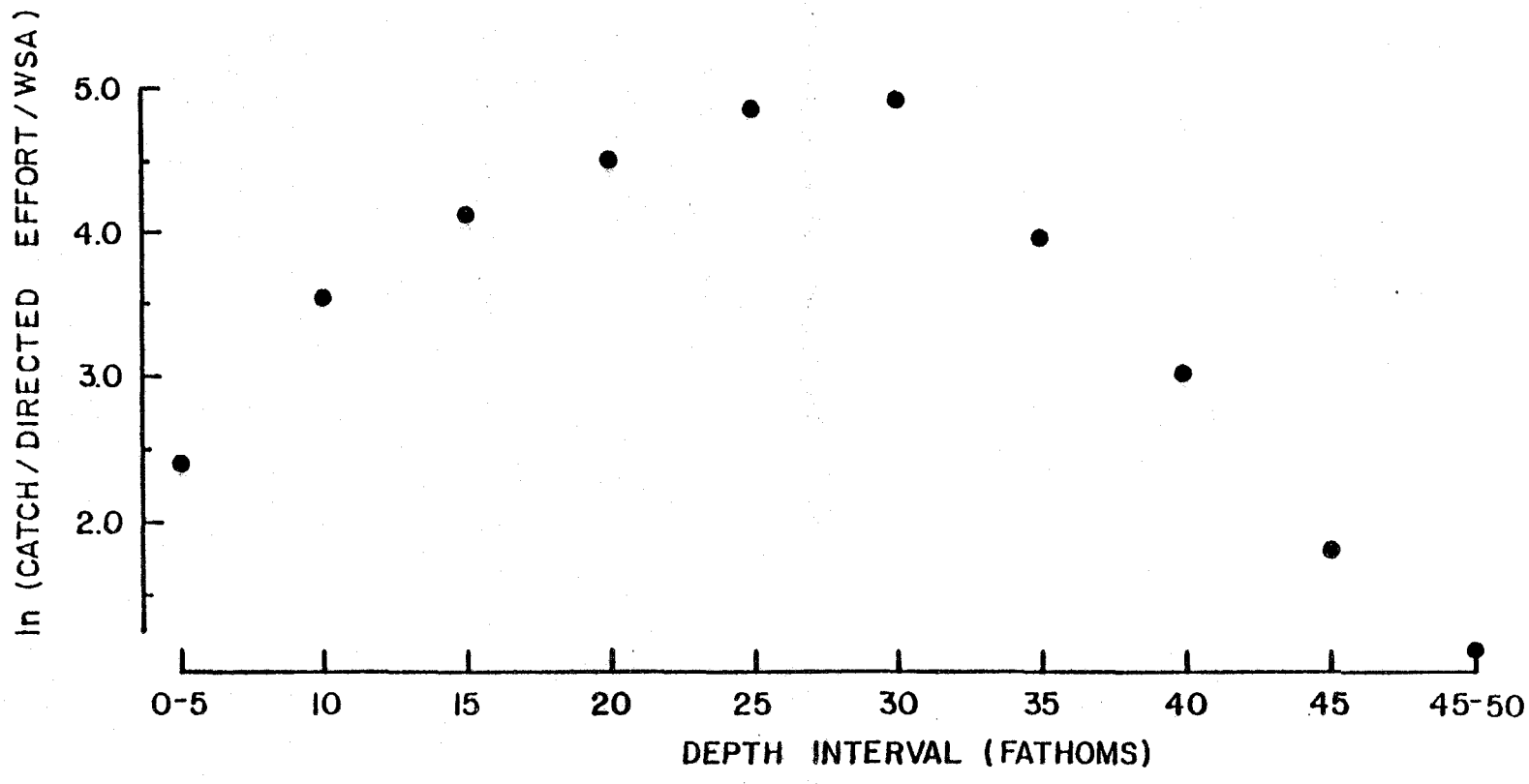

Fig. 18. Mean log-transformed catch per directed effort per water surface area by depth interval for brown shrimp.

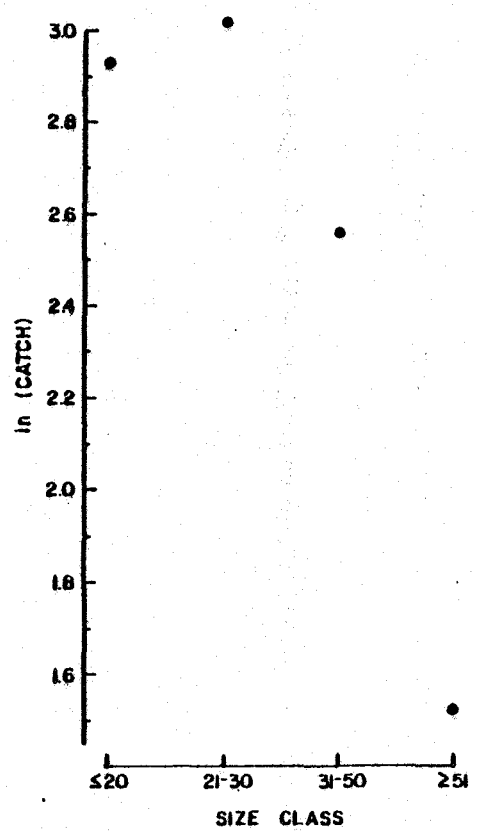

Fig. 19. Mean log-transformed catch by size class for brown shrimp.

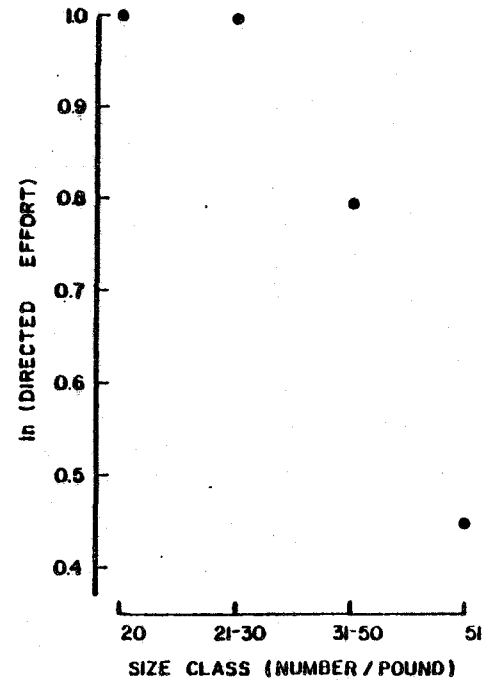

Fig. 20. Mean log-transformed directed effort by size class for brown shrimp.

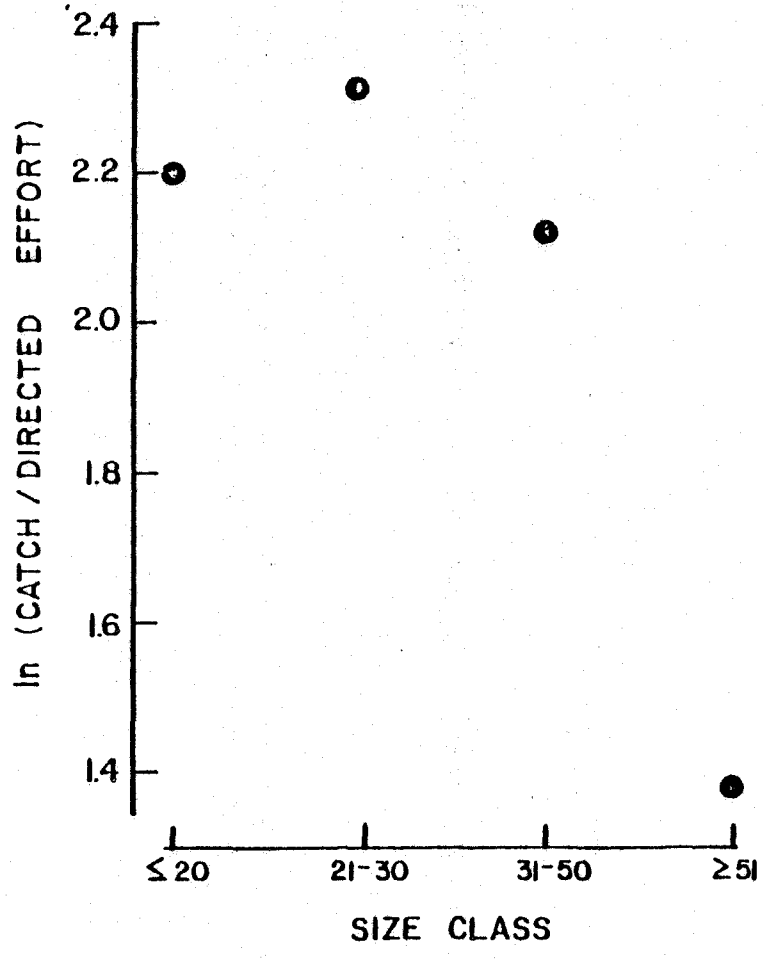

Fig. 21. Mean log-transformed catch per directed effort by size class for brown shrimp.

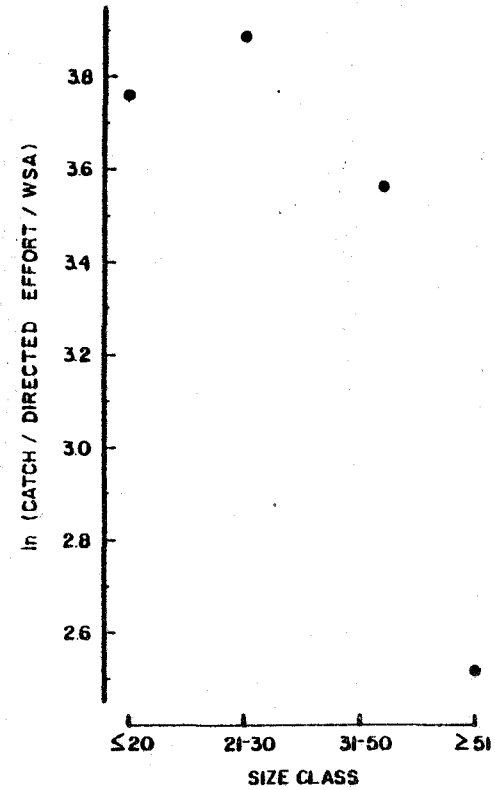

Fig. 22. Mean log-transformed catch per directed effort per water surface area by size class for brown shrimp.

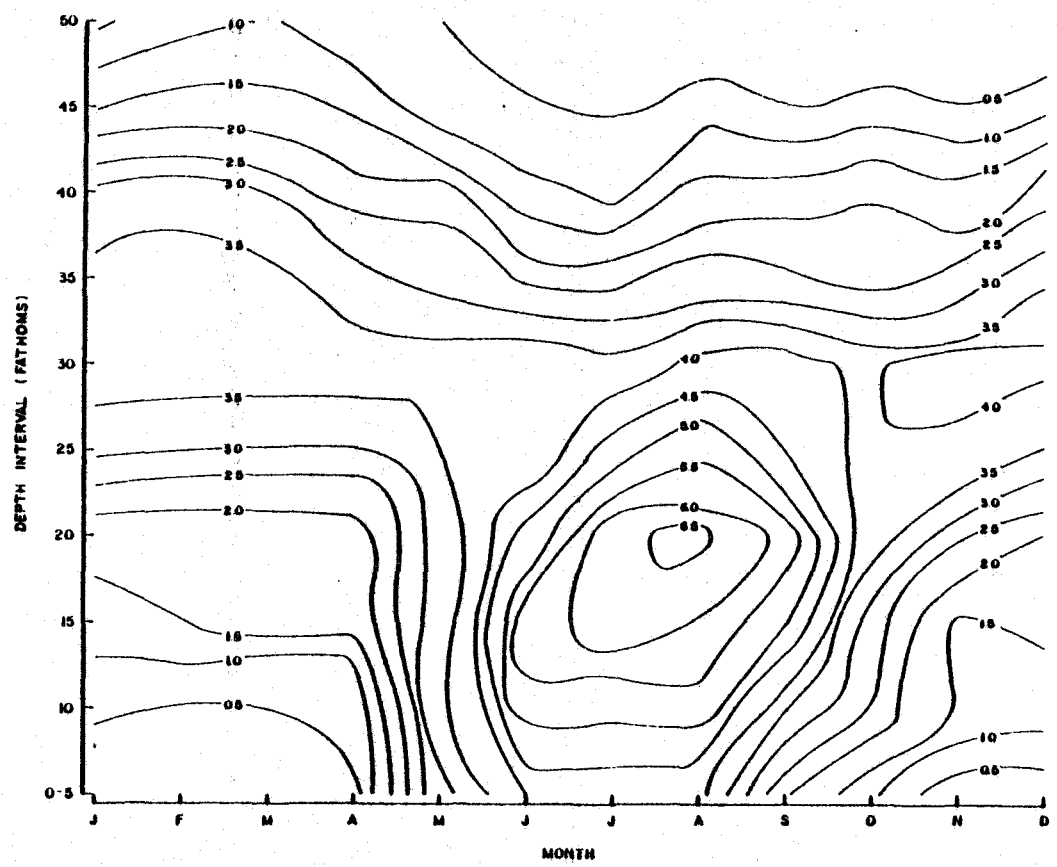

Fig. 23. Mean log-transformed catch by depth interval by month for brown shrimp.

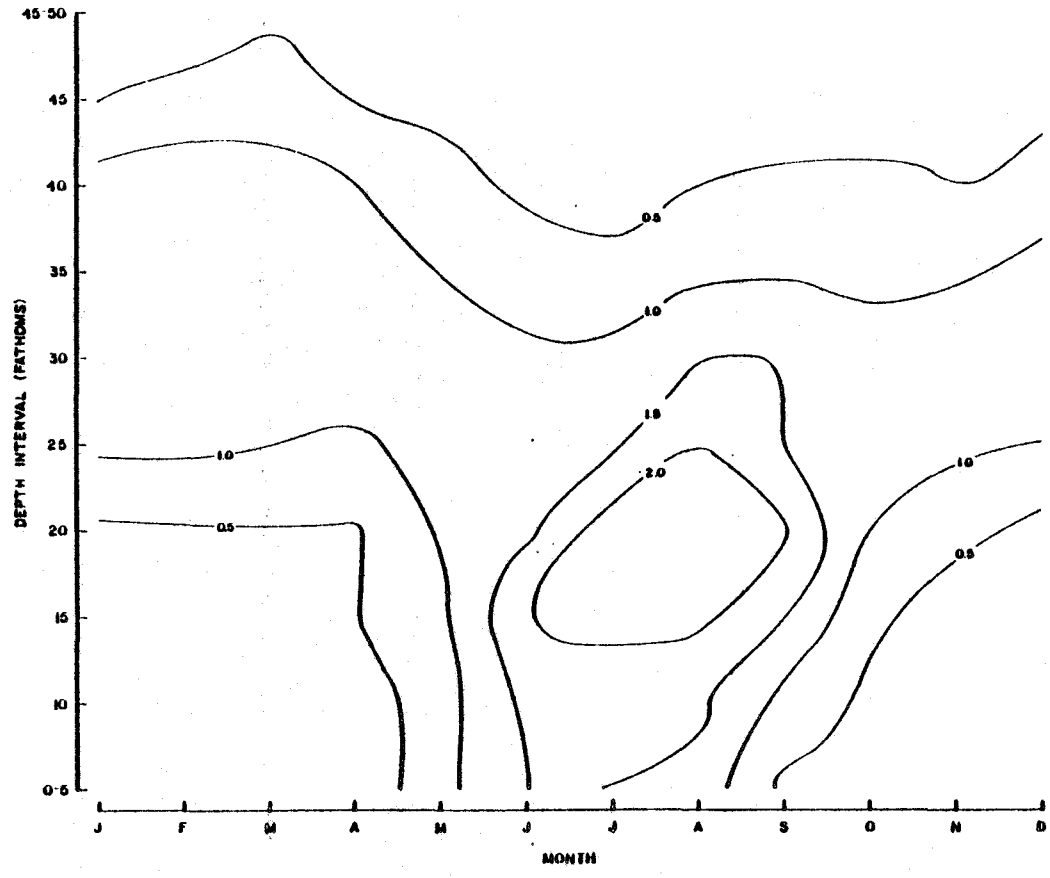

Fig. 24. Mean log-transformed directed effort by depth interval by month for brown shrimp.

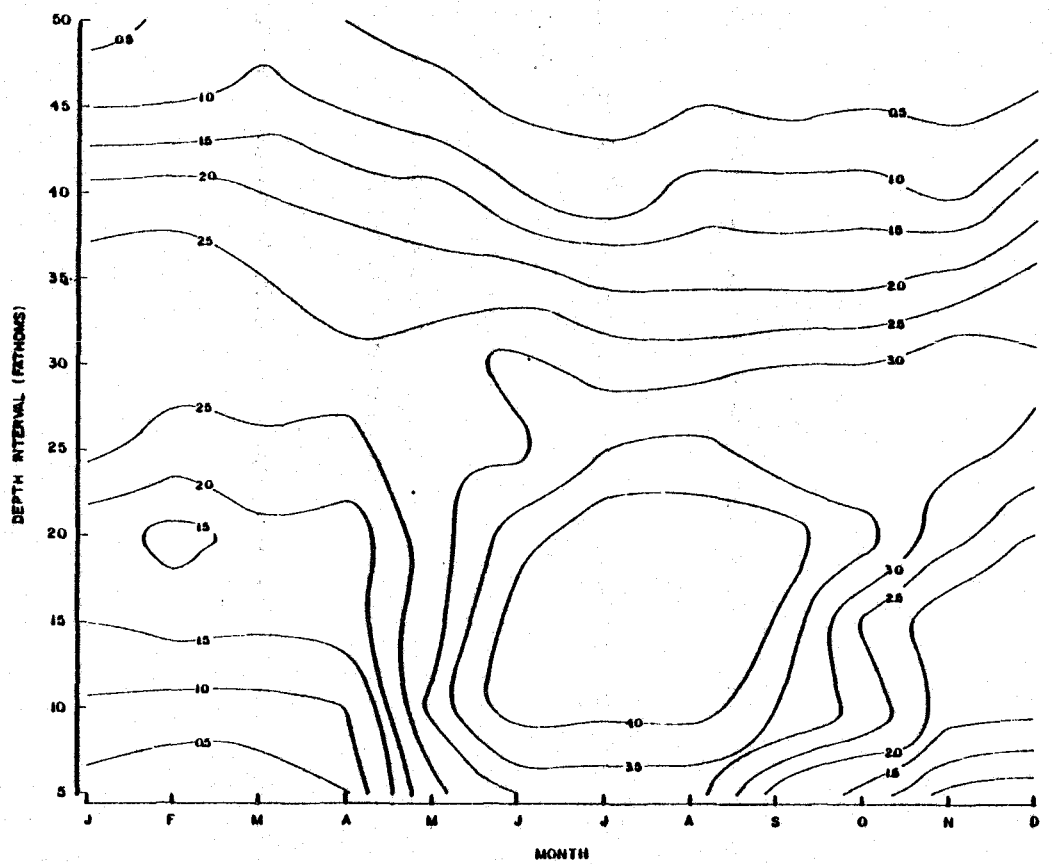

Fig. 25. Mean log-transformed catch per directed effort by depth interval by month for brown shrimp.

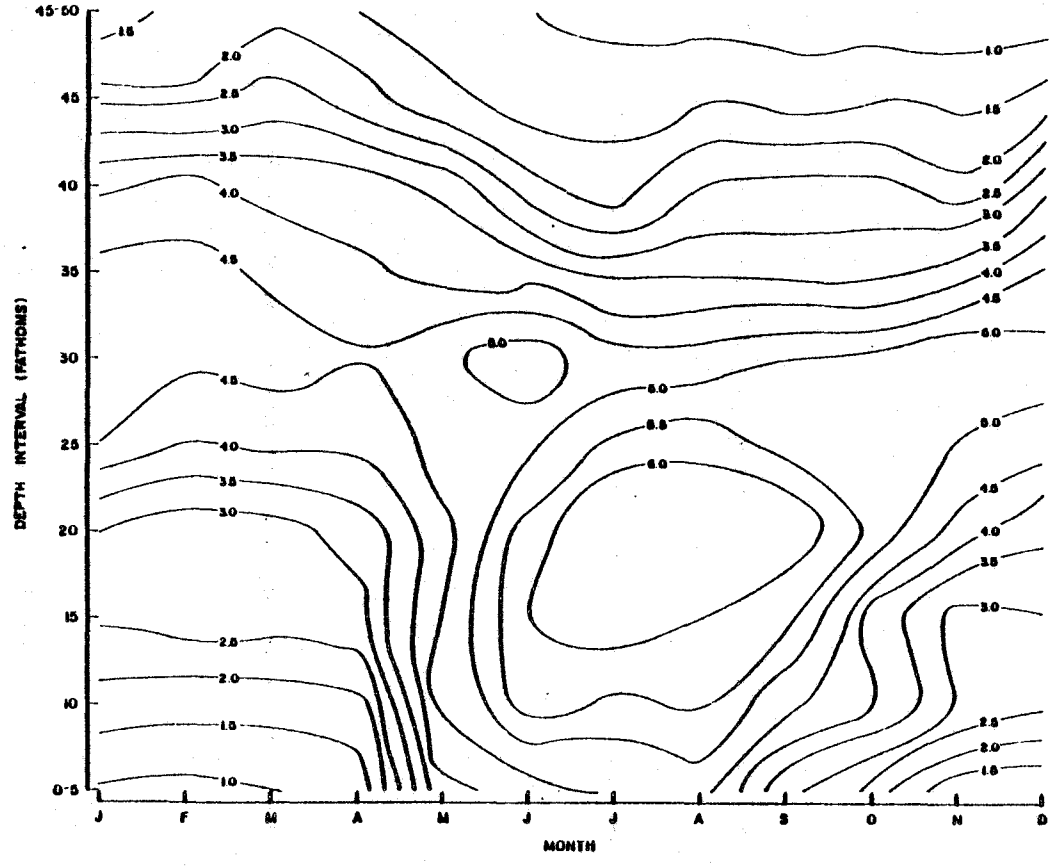

Fig. 26. Mean log-transformed catch per directed effort per water surface are by depth interval by month for brown shrimp.

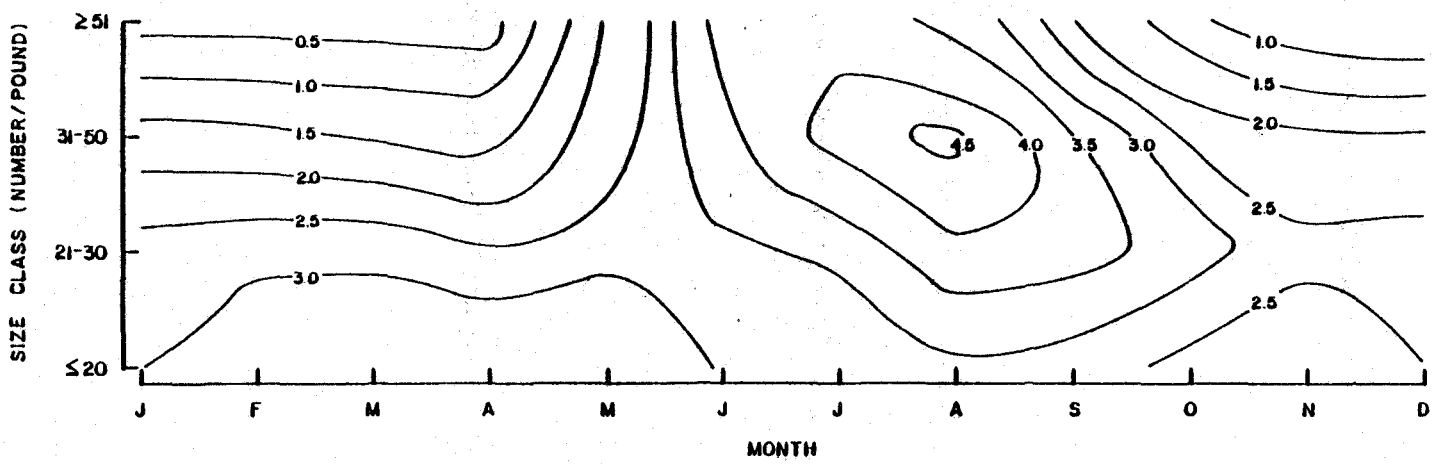

Fig. 27. Mean log-transformed catch by size class by month for brown shrimp.

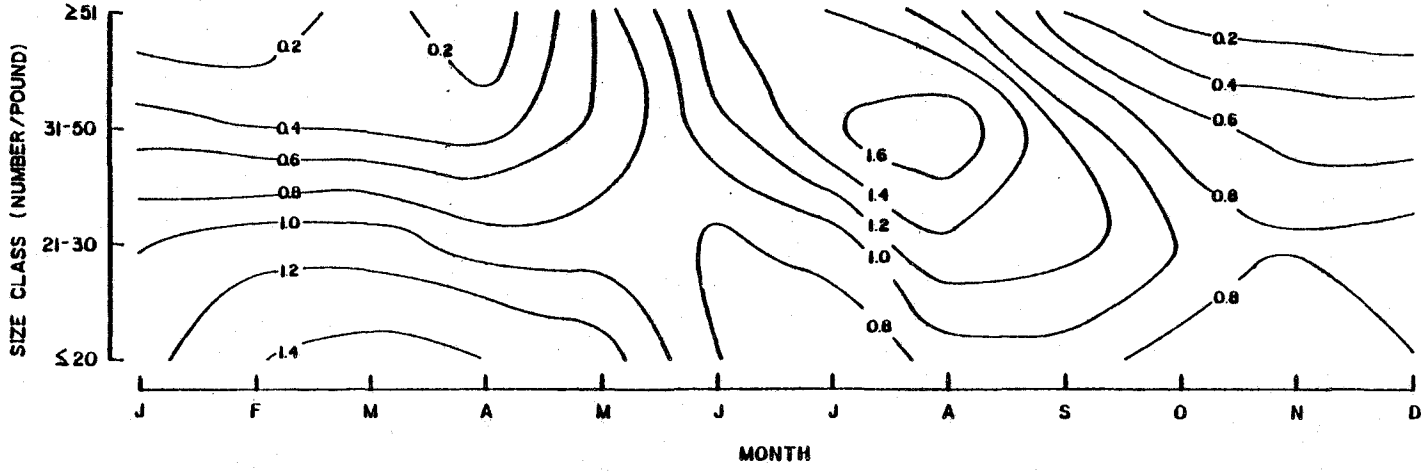

Fig. 28. Mean log-transformed directed effort by size class by month for brown shrimp.

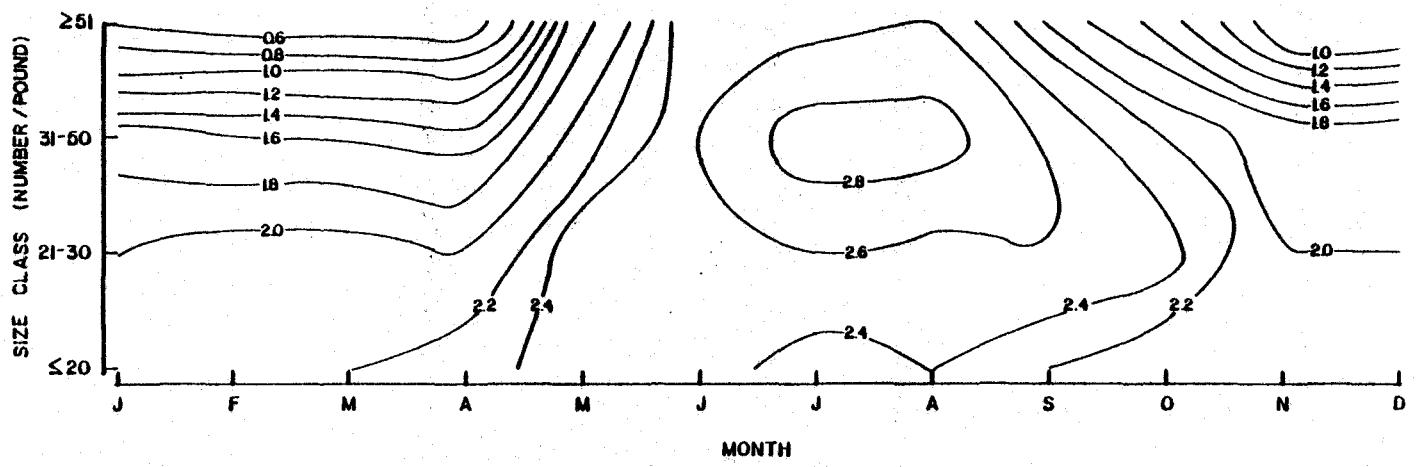

Fig. 29. Mean log-transformed catch per directed effort by size class by month for brown shrimp.

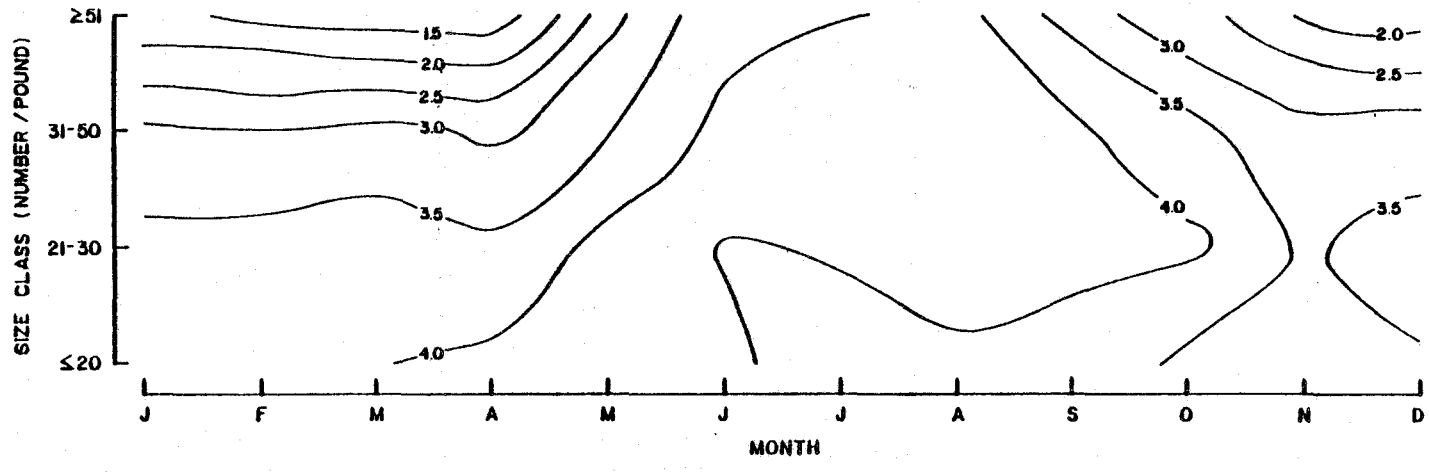

Fig. 30. Mean log-transformed catch per directed effort per water surface area by size class by month for brown shrimp.

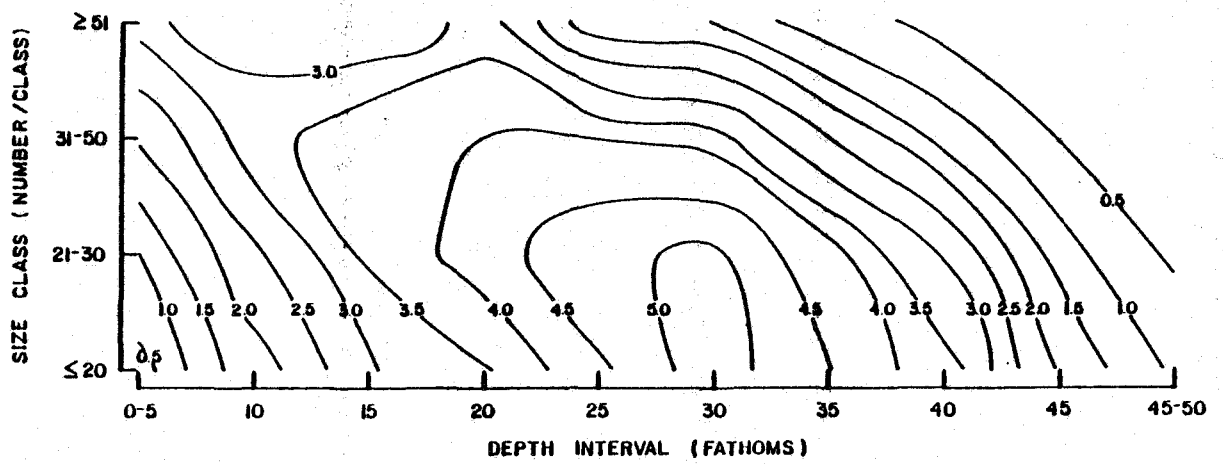

Fig. 31. Mean log-transformed catch by size class by depth interval for brown shrimp.

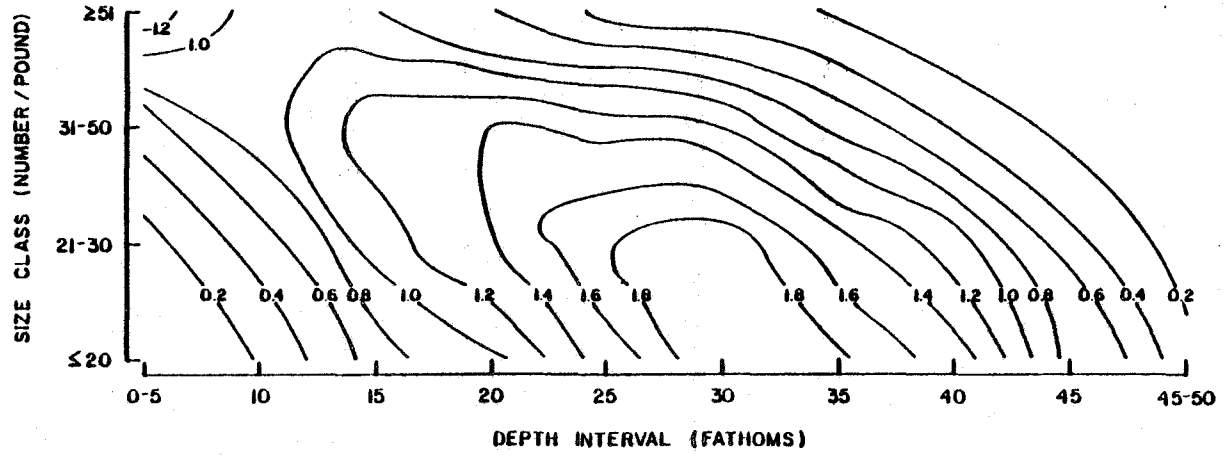

Fig. 32. Mean log-transformed directed effort by size class by depth interval for brown shrimp.

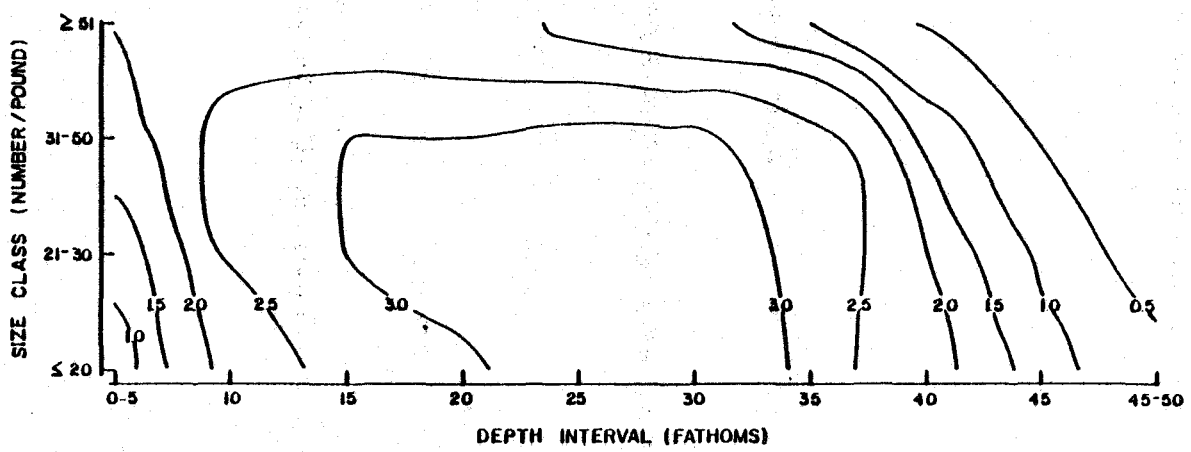

Fig. 33. Mean log-transformed catch per directed effort by size class by depth interval for brown shrimp.

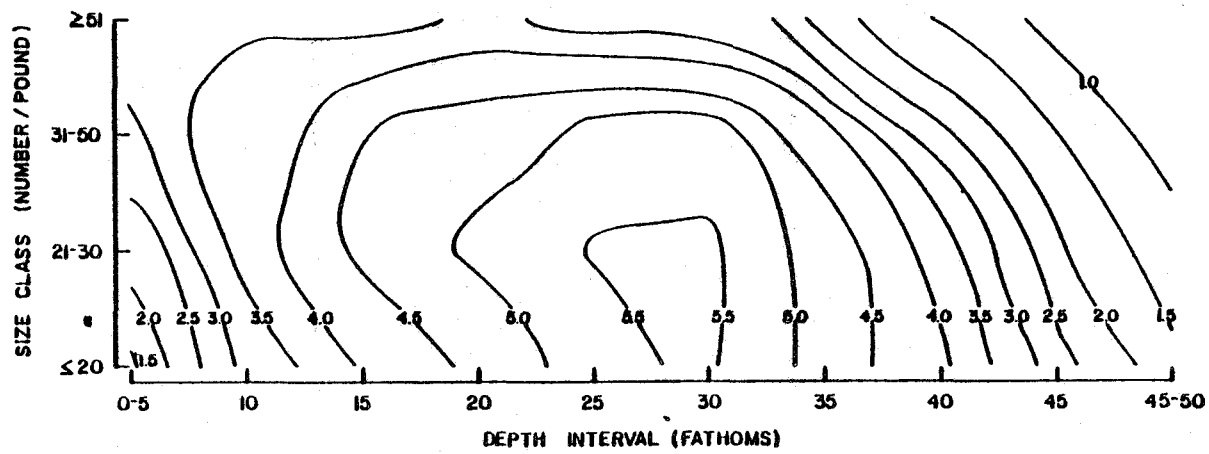

Fig. 34. Mean log-transformed catch per directed effort per water surface area by size class by depth interval for brown shrimp.

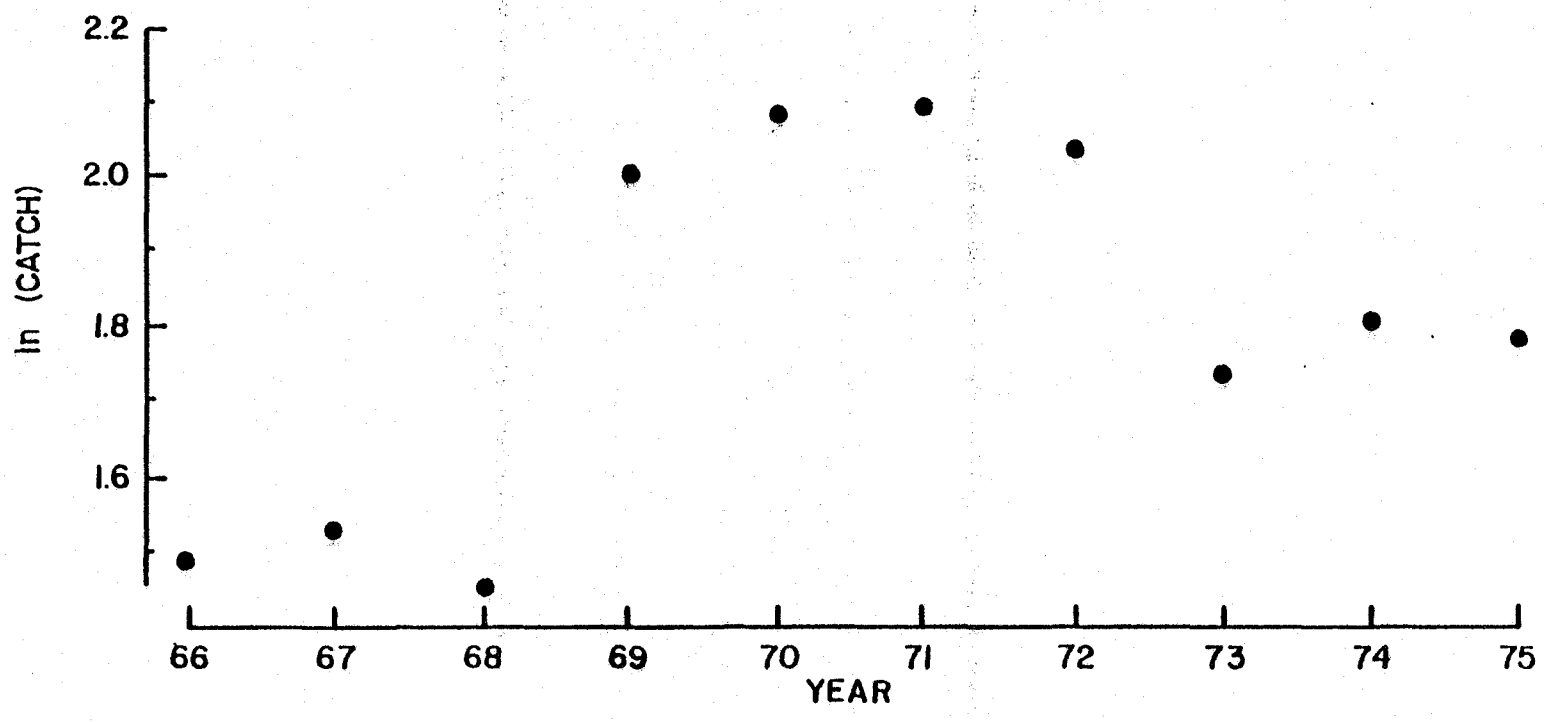

Fig. 35. Mean log-transformed catch by year for white shrimp.

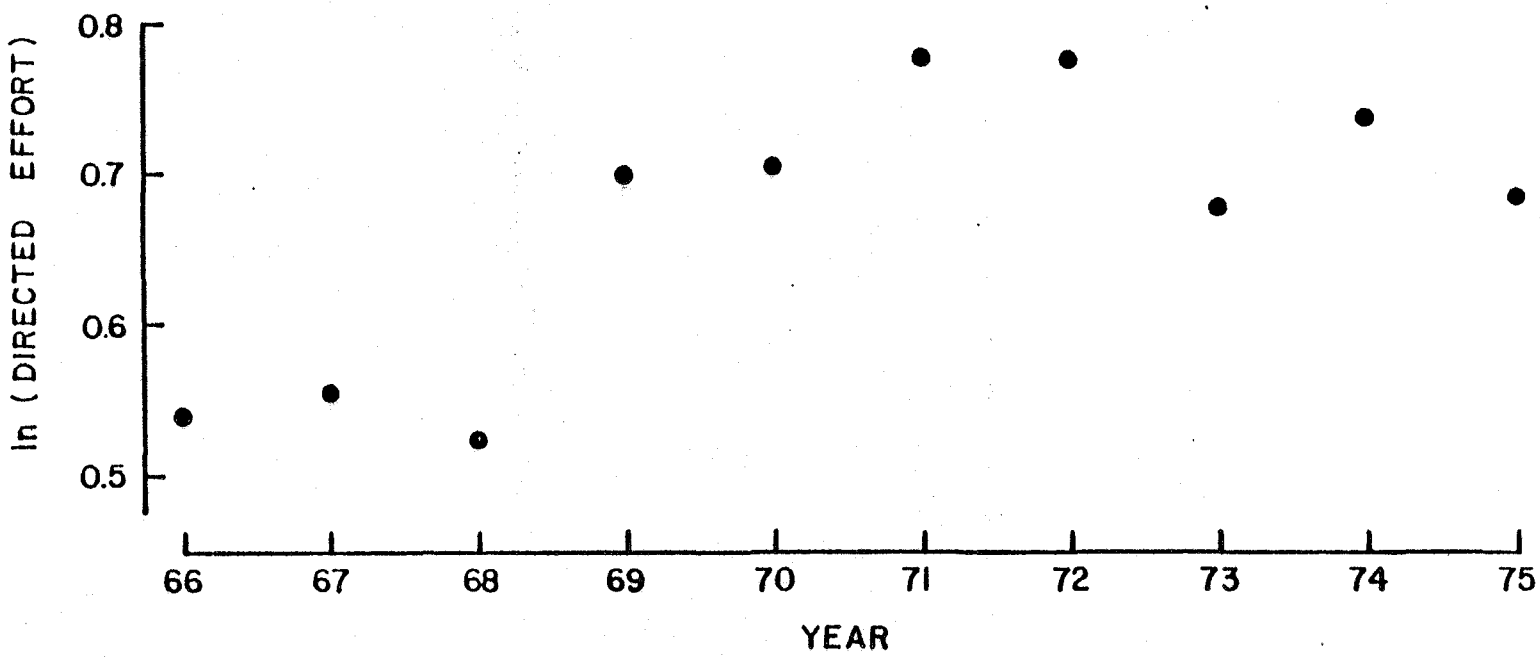

Fig. 36. Mean log-transformed directed effort by year for white shrimp.

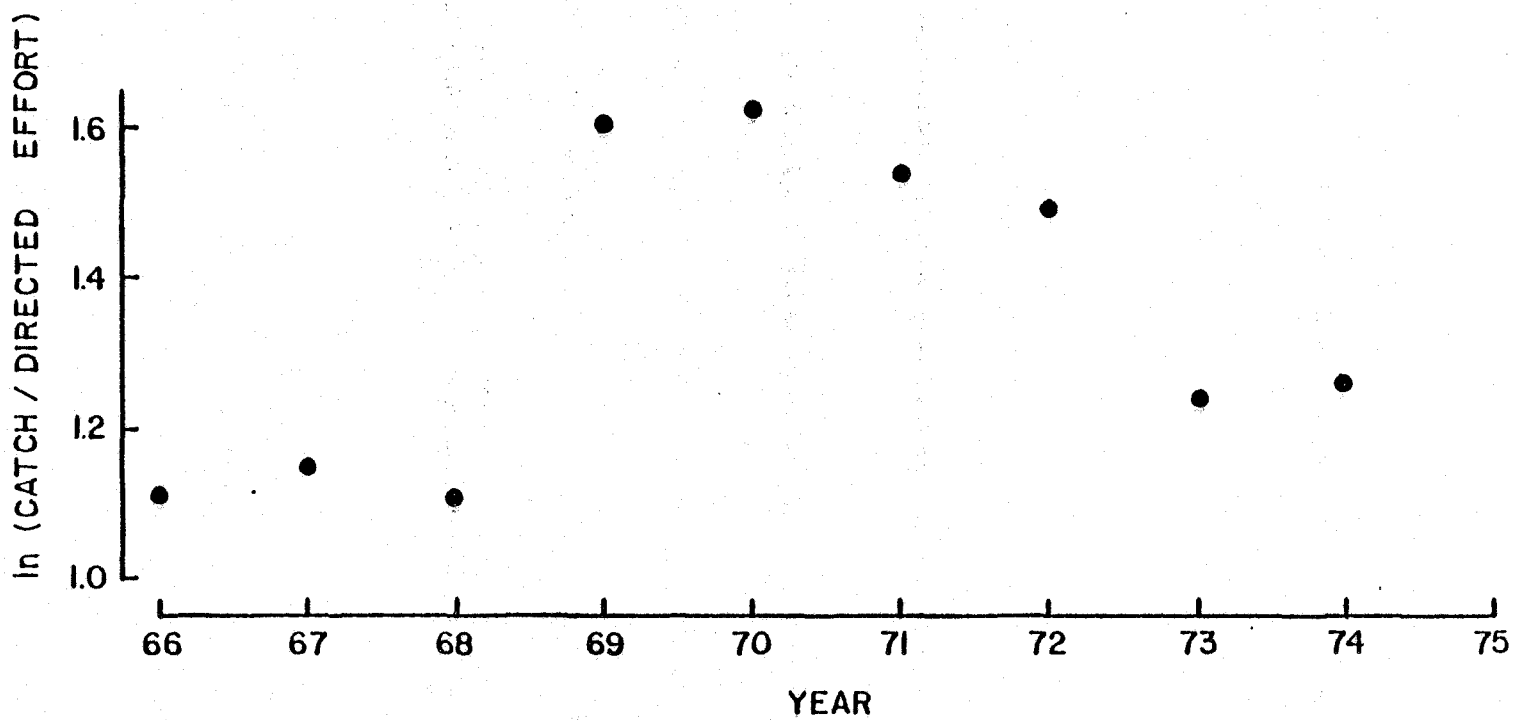

Fig. 37. Mean log-transformed catch per directed effort by year for white shrimp.

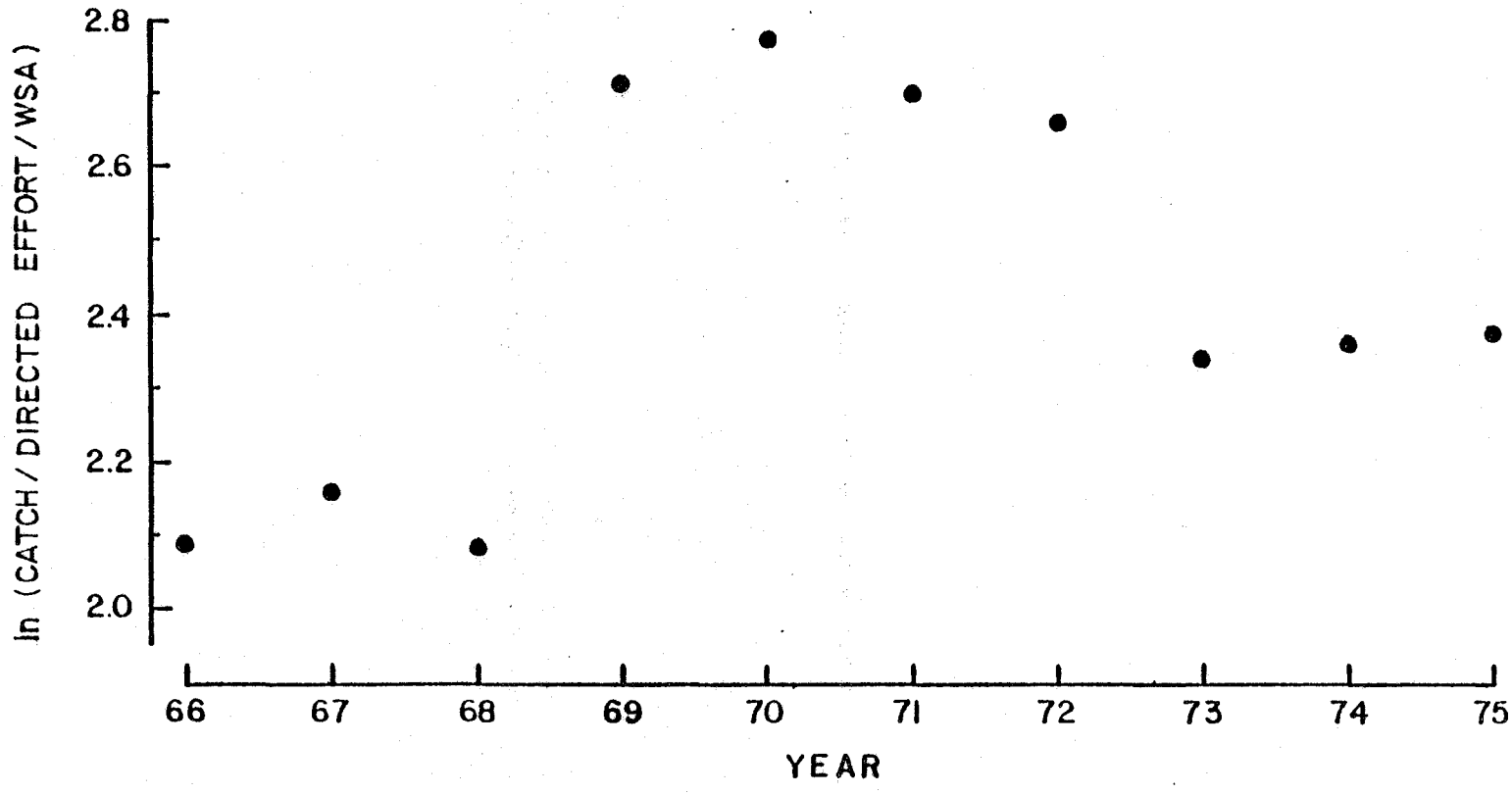

Fig. 38. Mean log-transformed catch per directed effort per water surface area by year for white shrimp.

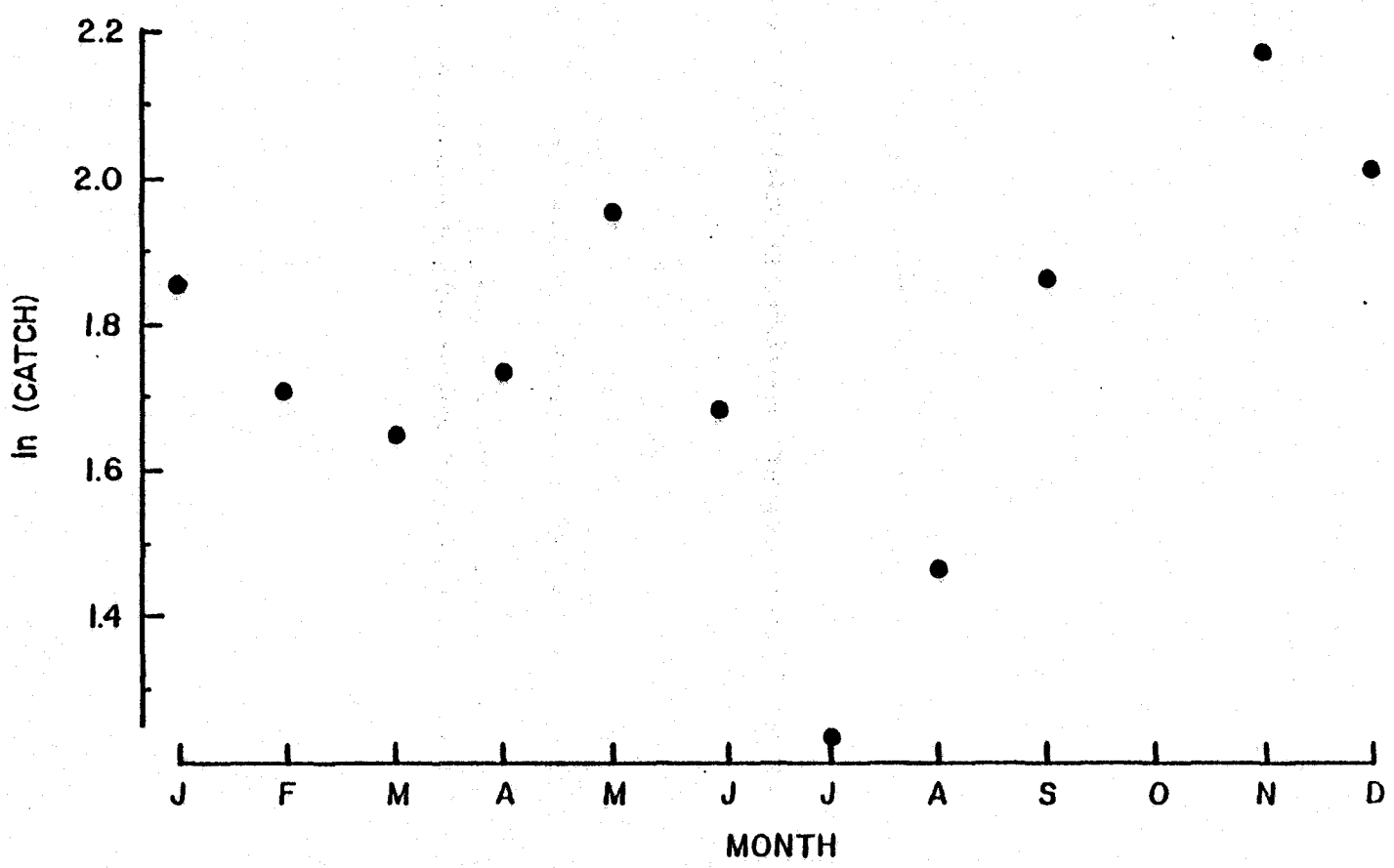

Fig. 39. Mean log-transformed catch by month for white shrimp.

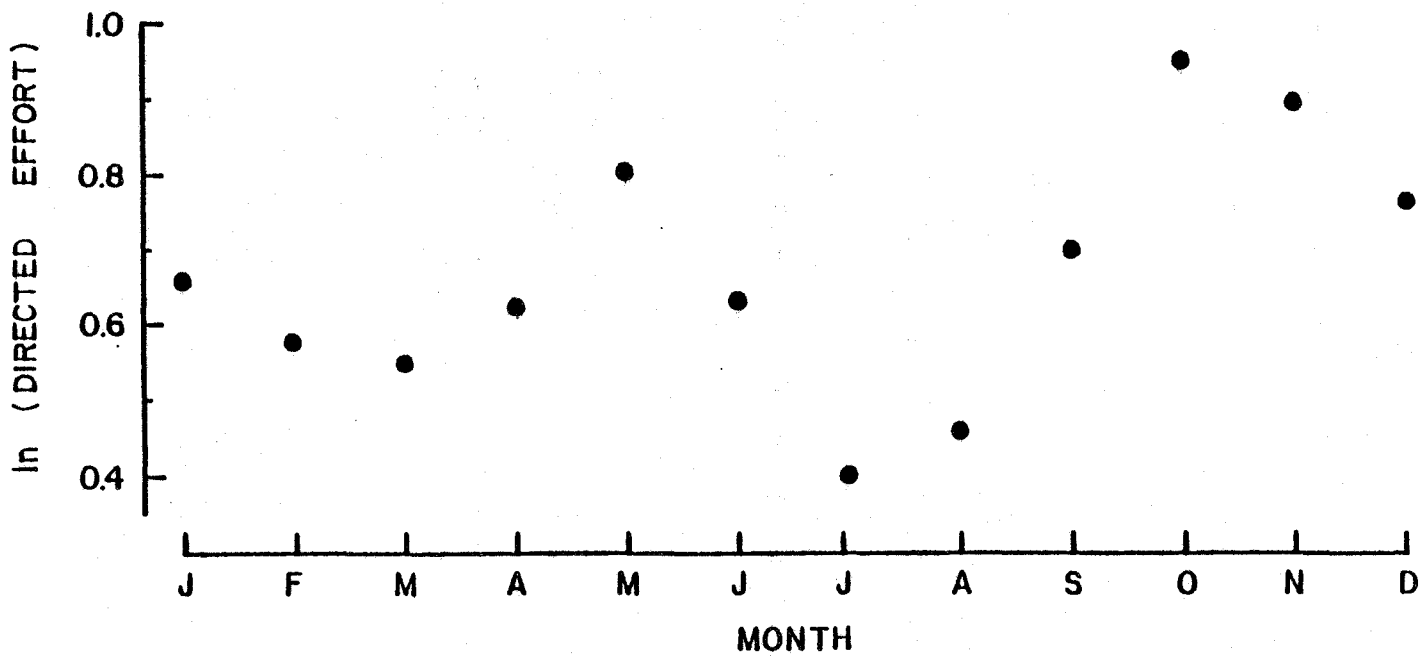

Fig. 40. Mean log-transformed directed effort by month for white shrimp.

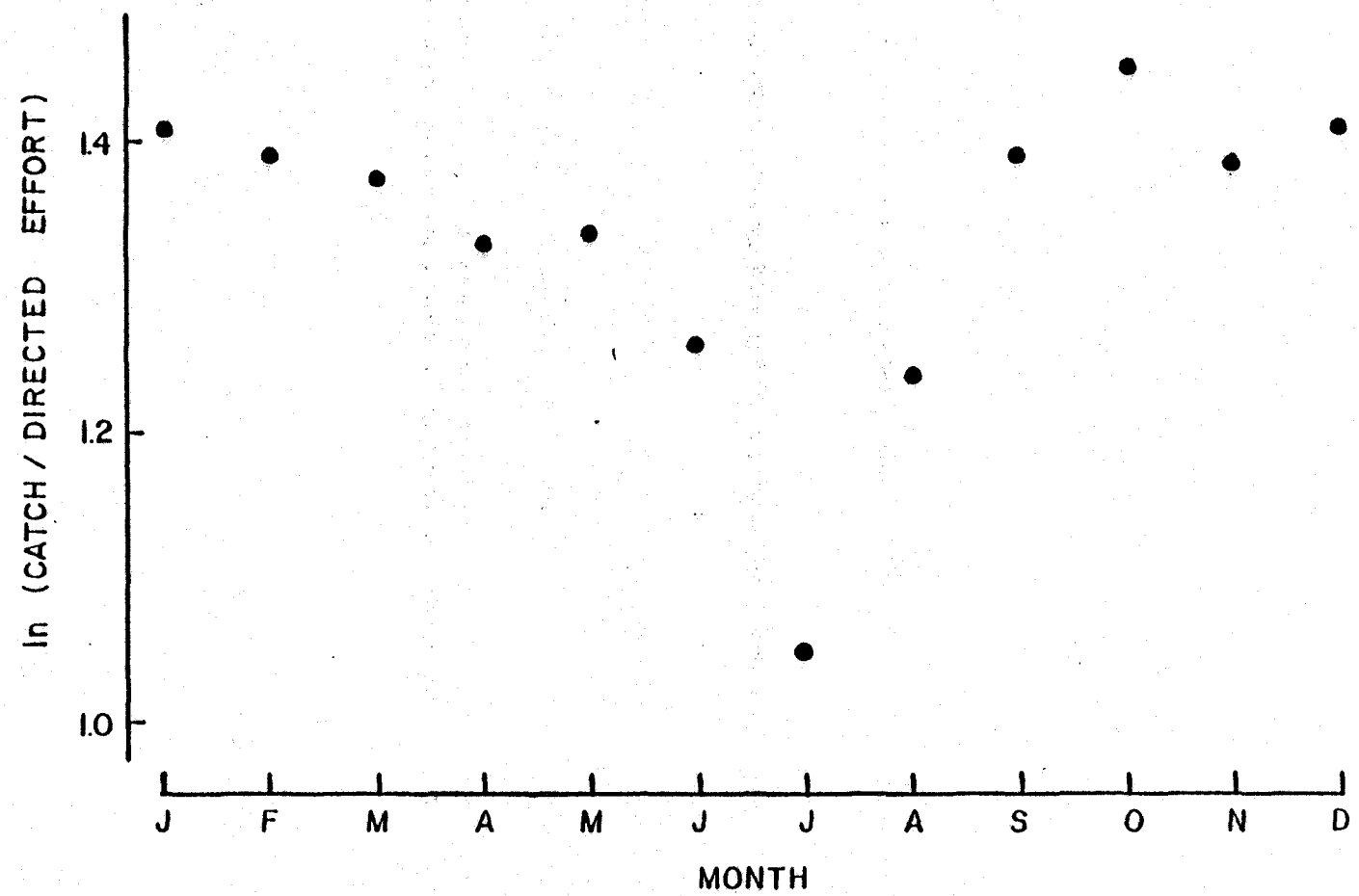

Fig. 41. Mean log-transformed catch per directed effort by month for white shrimp.

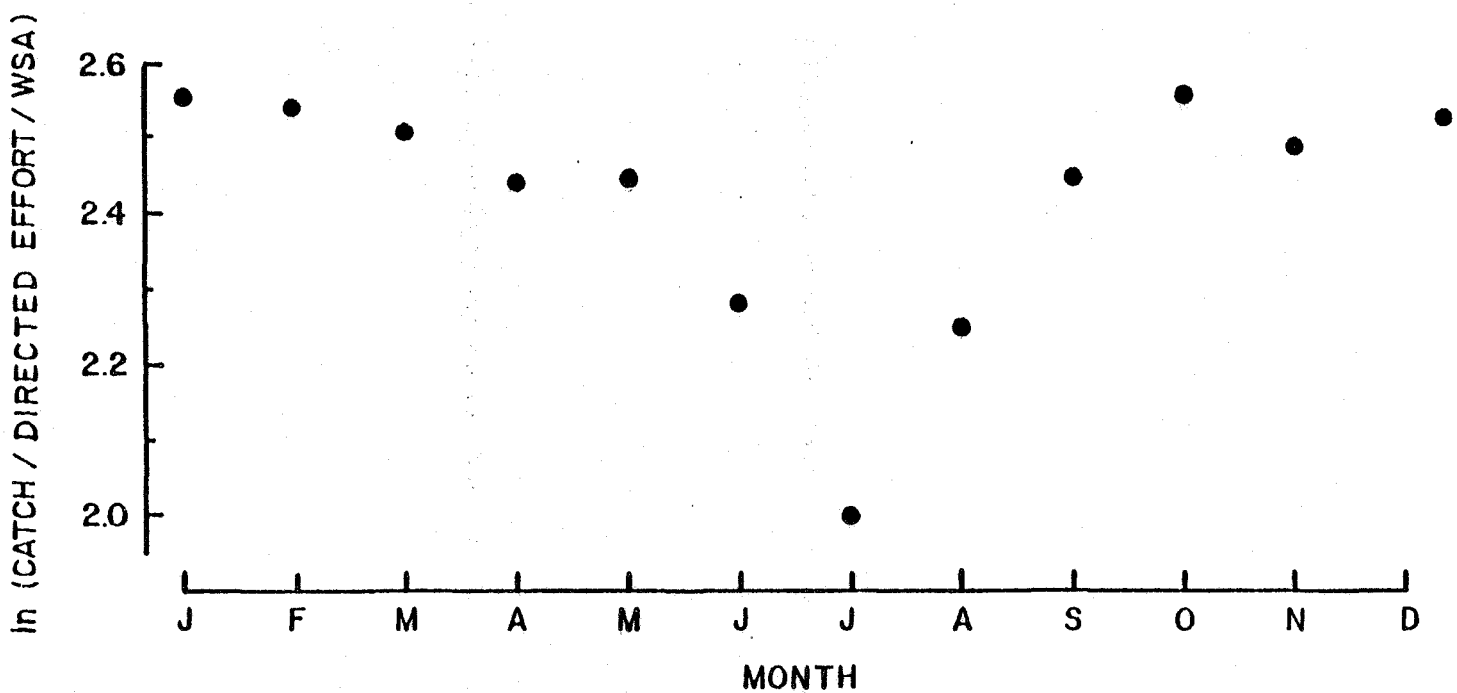

Fig. 42. Mean log-transformed catch per directed effort per water surface area by month for white shrimp.

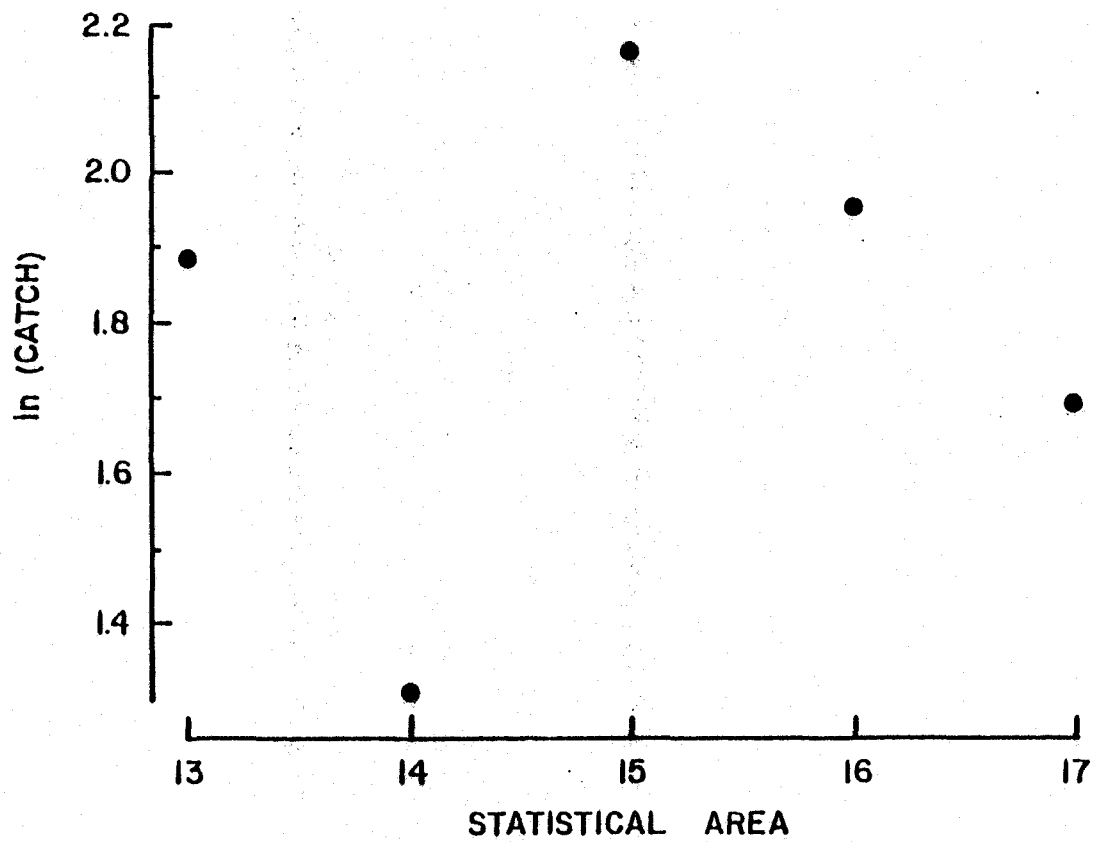

Fig. 43. Mean log-transformed catch by statistical area for white shrimp.

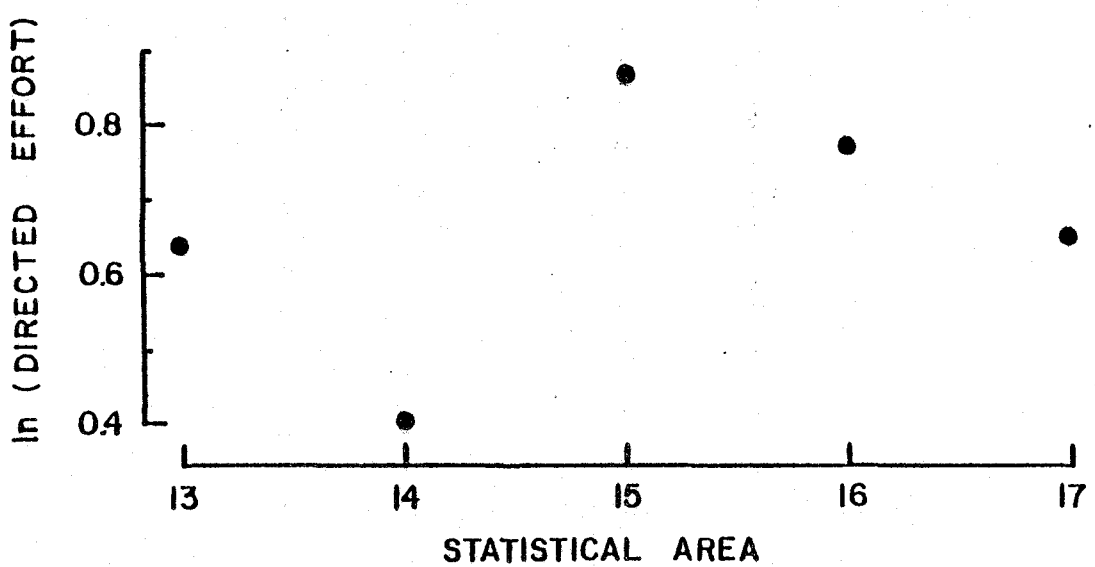

Fig. 44. Mean log-tranformed directed effort by statistical area for white shrimp.

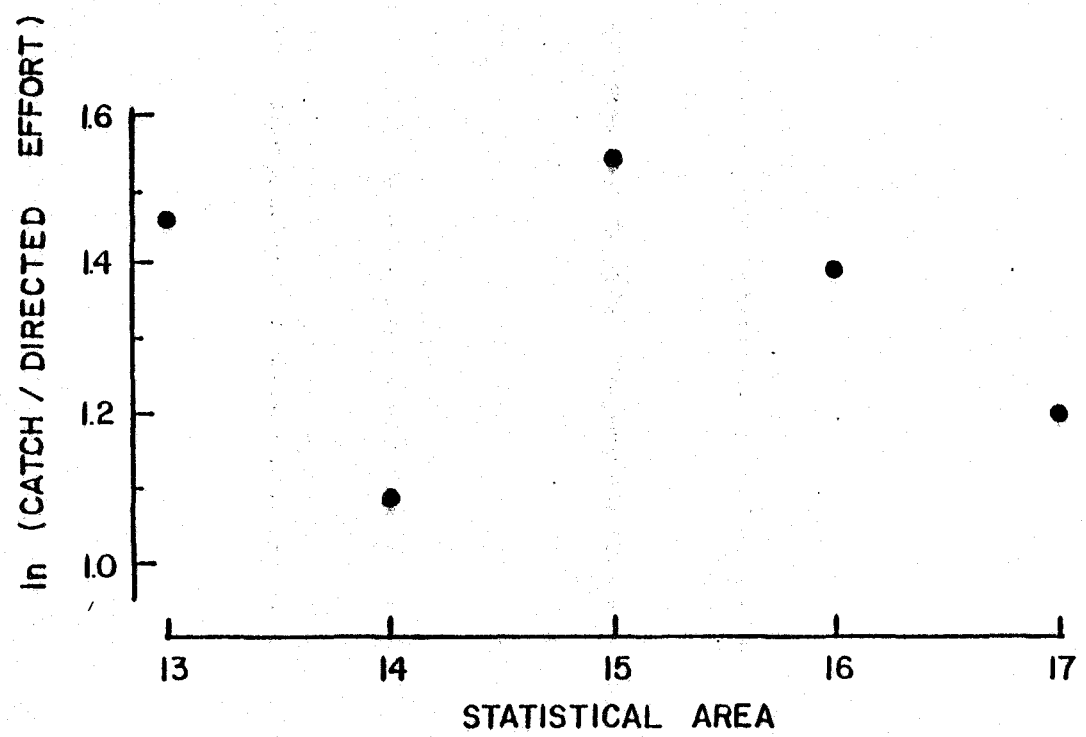

Fig. 45. Mean log-transformed catch per directed effort by statistical area for white shrimp.

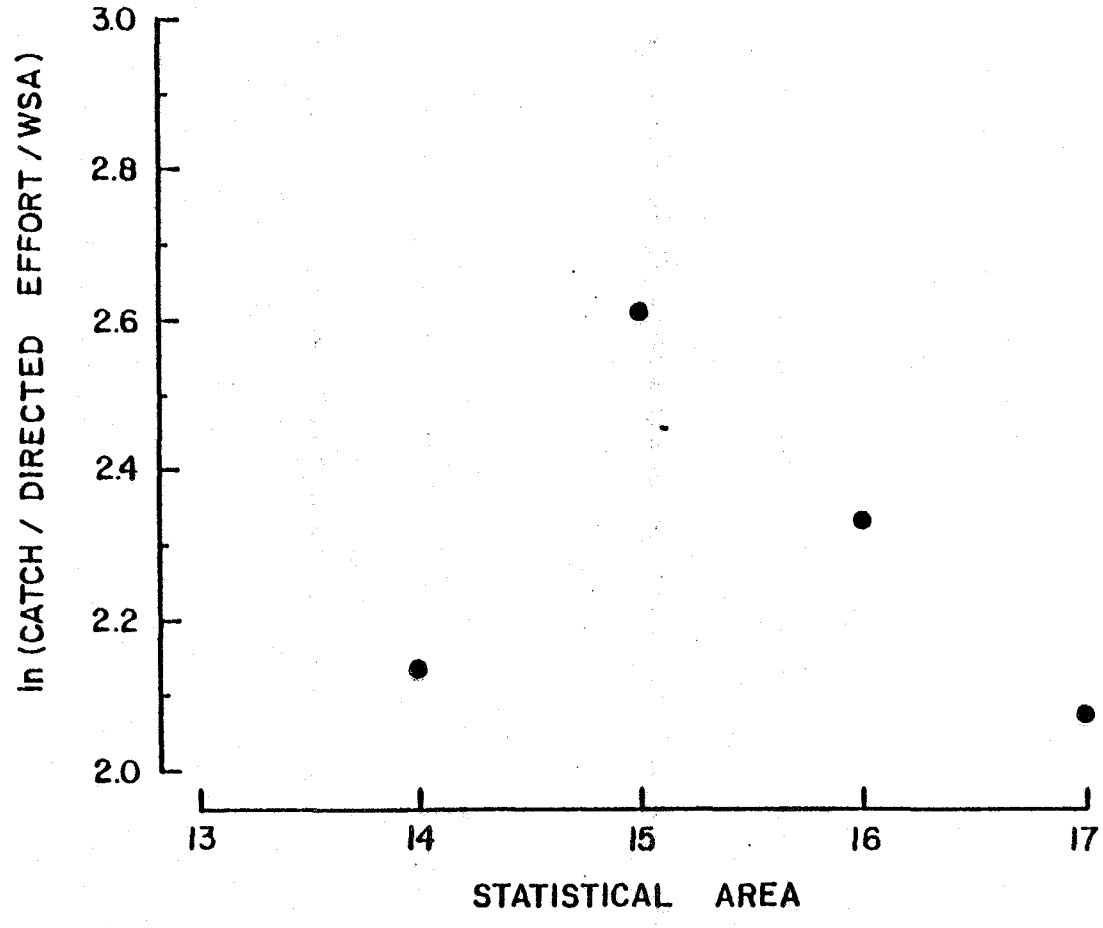

Fig. 46. Mean log-transformed catch per directed effort per water surface area by statistical area for white shrimp.

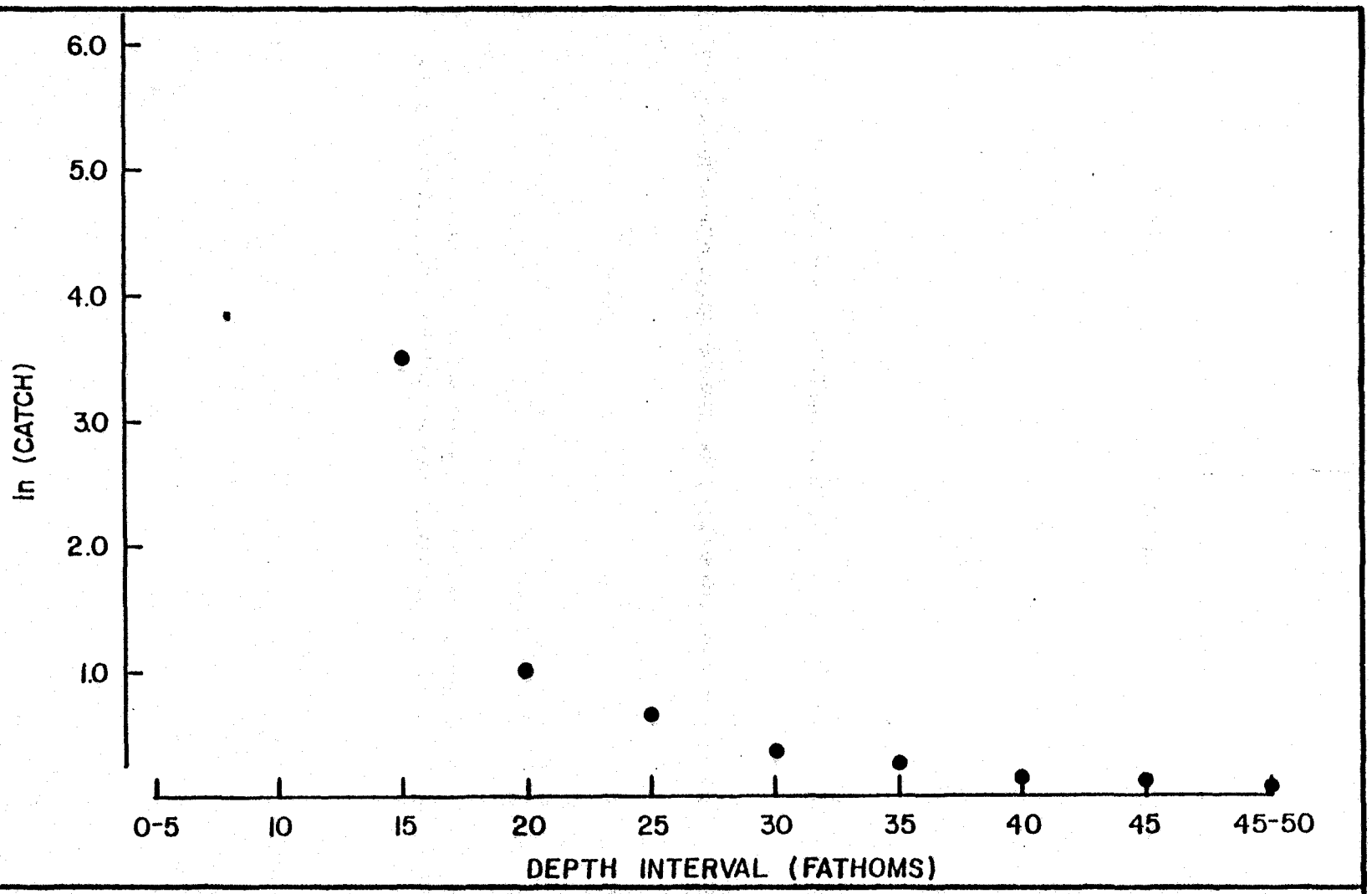

Fig. 47. Mean log-transformed catch by depth interval for white shrimp.

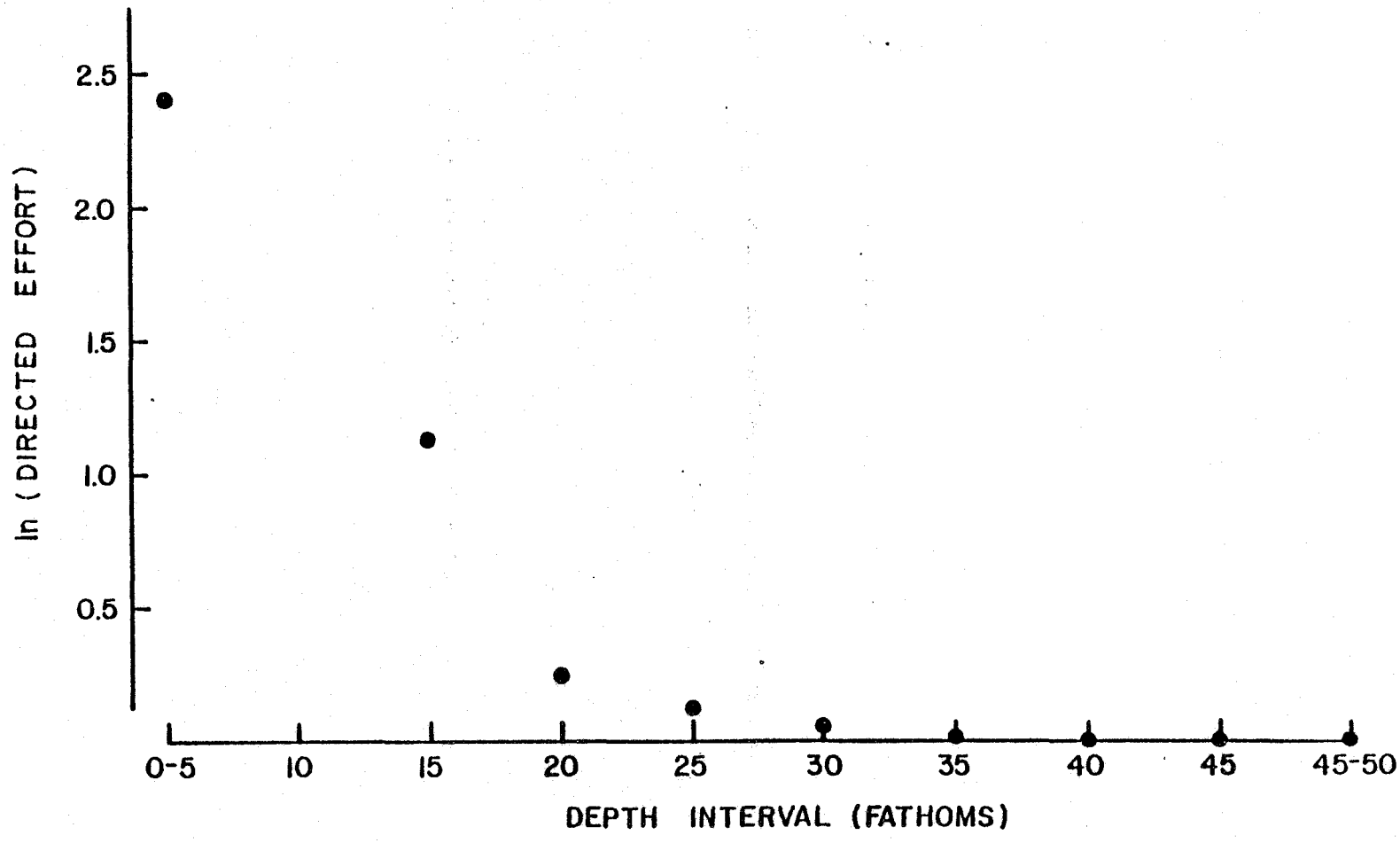

Fig. 48. Mean log-transformed directed effort by depth interval for white shrimp.

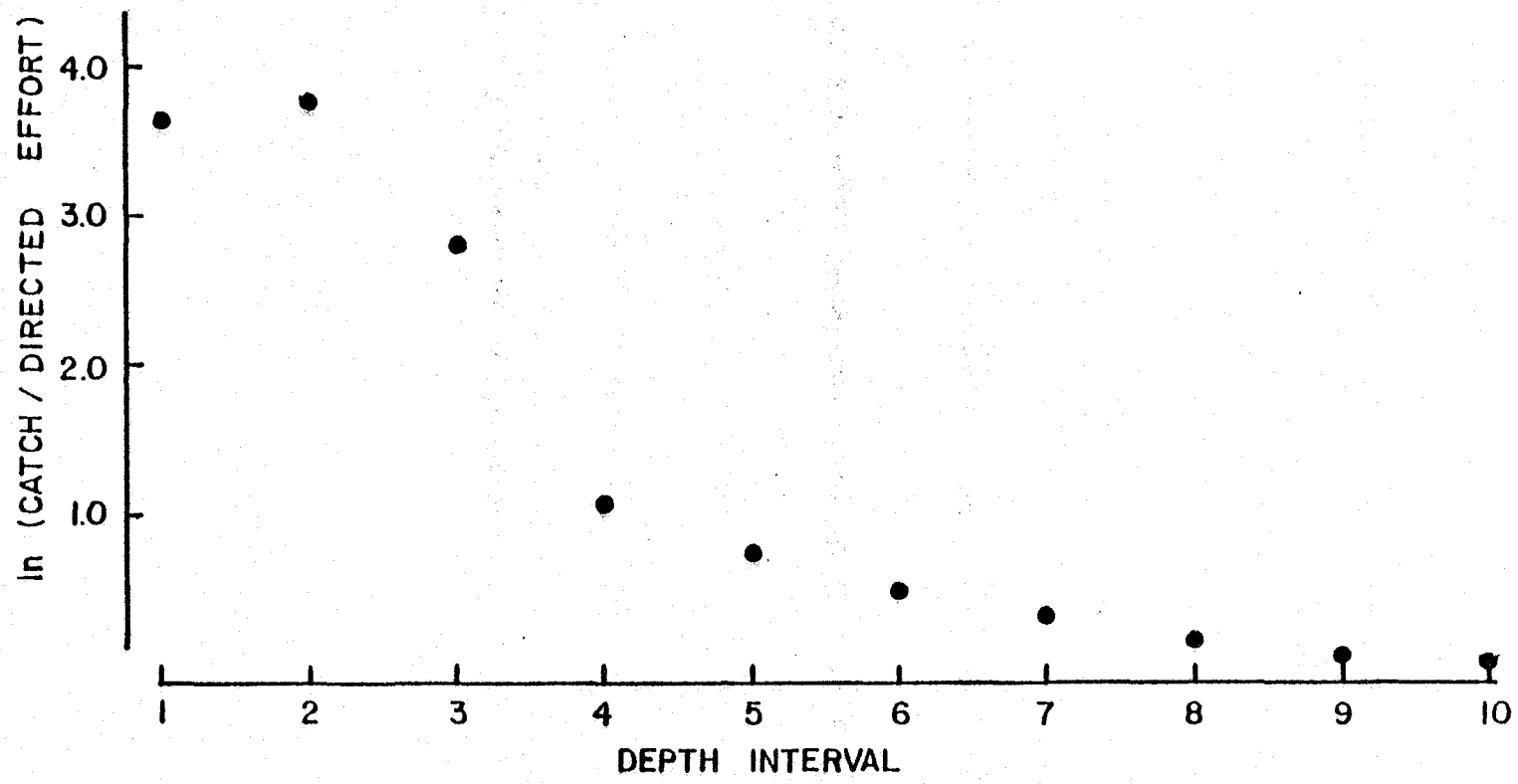

Fig. 49. Mean log-transformed catch per directed effort by depth interval for white shrimp.

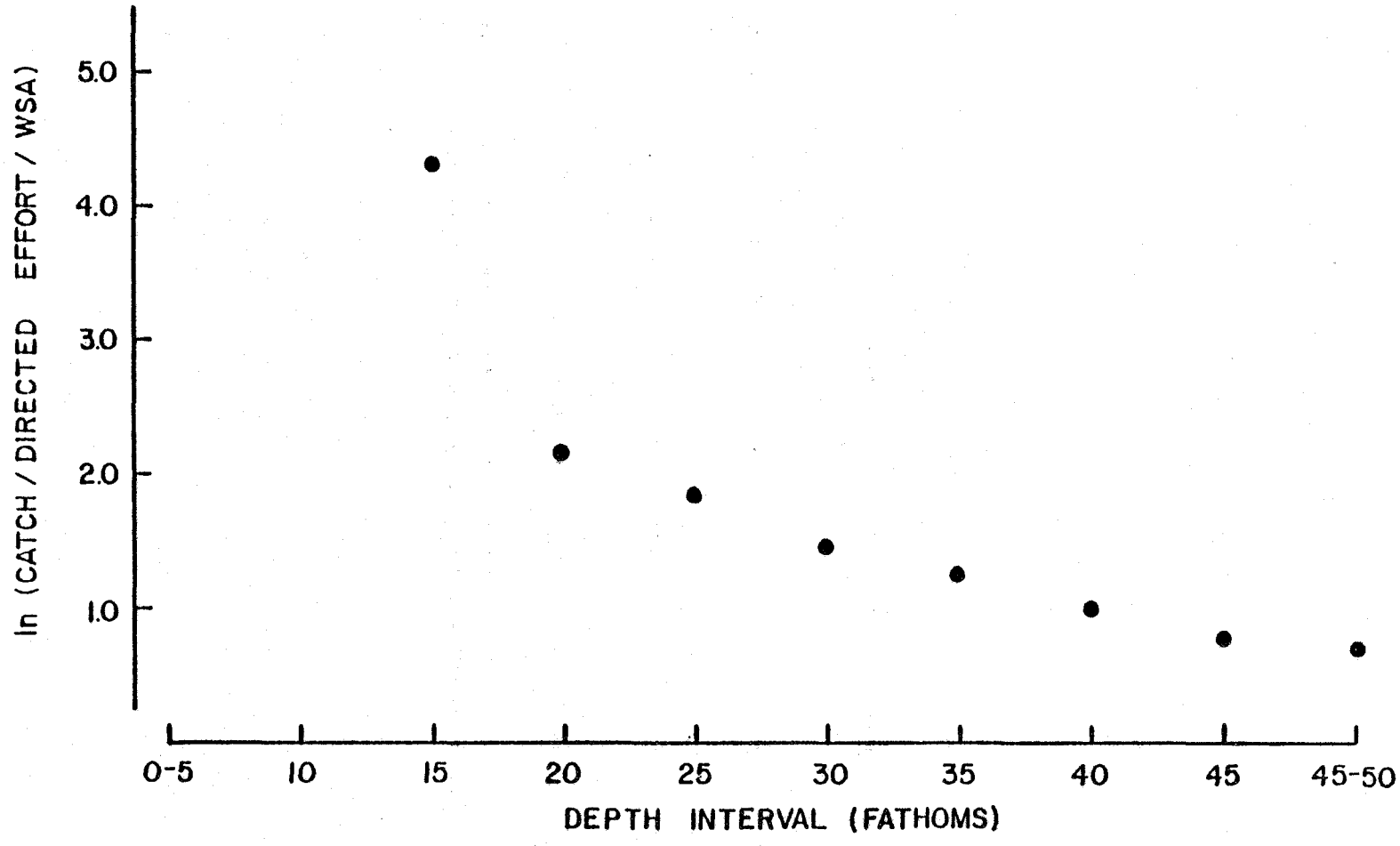

Fig. 50. Mean log-transformed catch per directed effort per water surface area by depth interval for white shrimp.

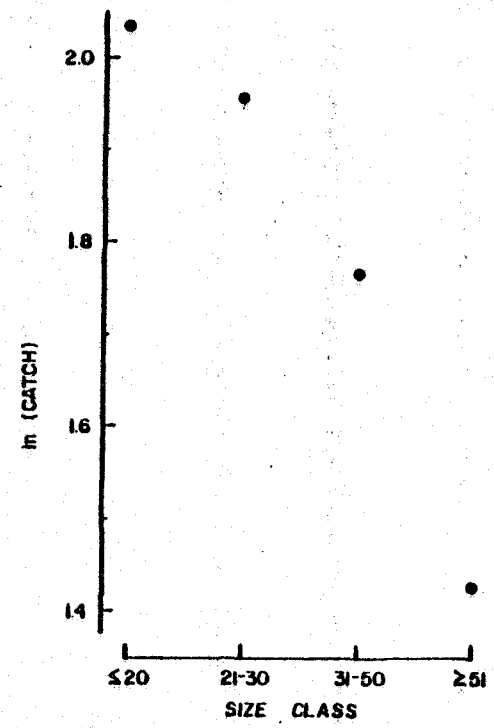

Fig. 51. Mean log-transformed catch by size class for white shrimp.

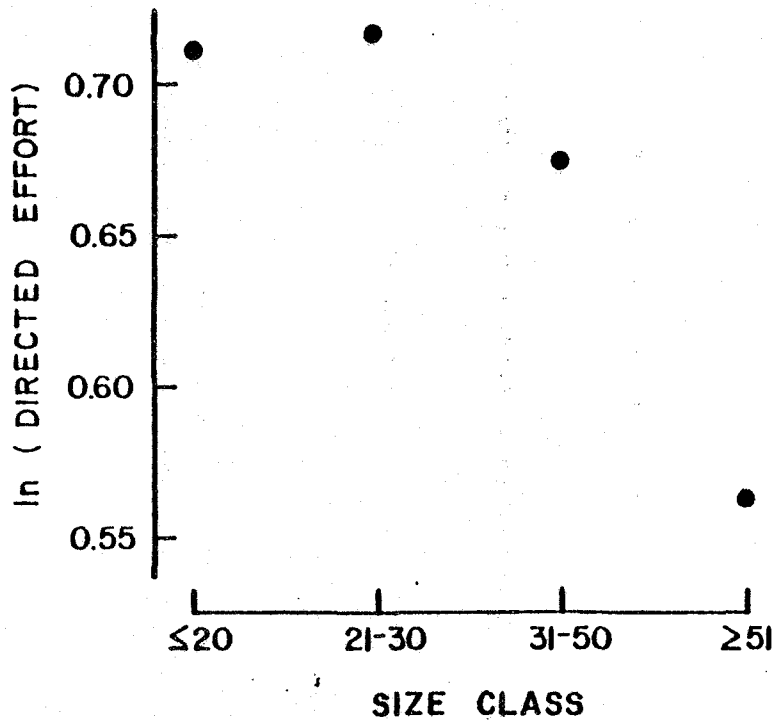

Fig. 52. Mean log-transformed directed effort by size class for white shrimp.

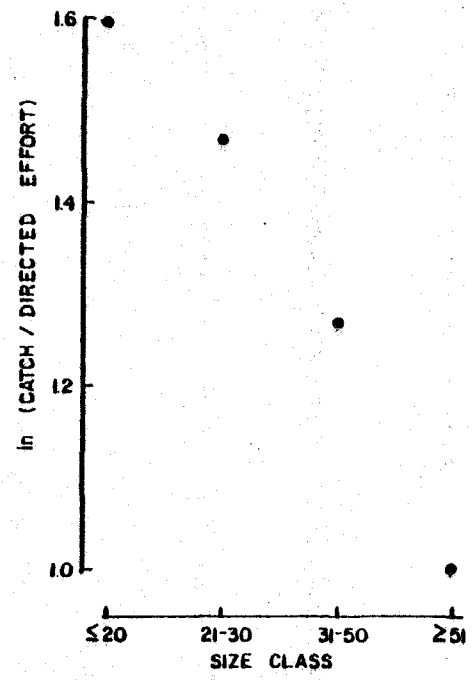

Fig. 53. Mean log-transformed catch per directed effort by size class for white shrimp.

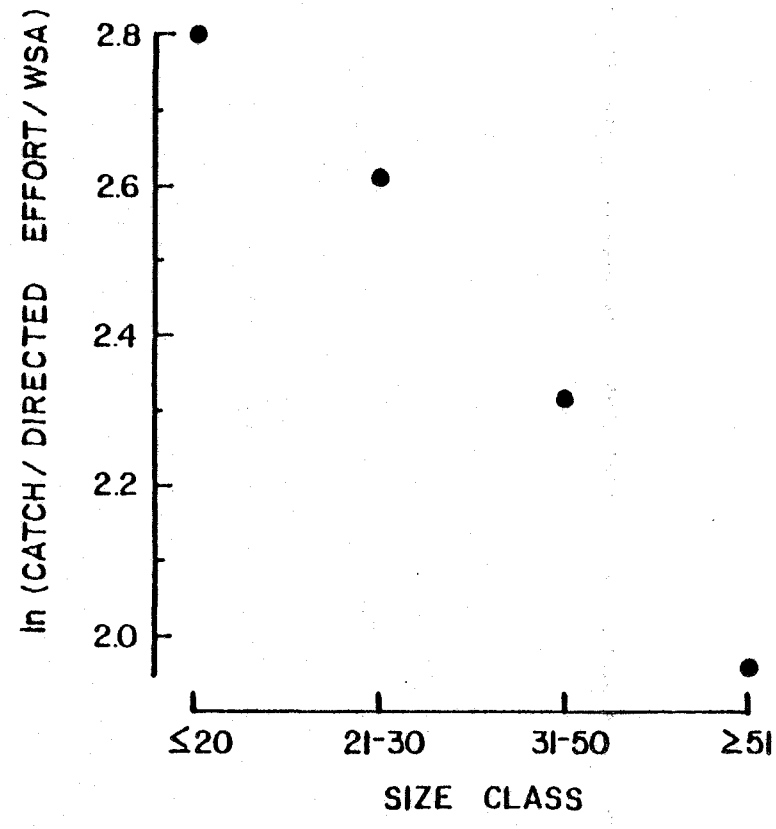

Fig. 54. Mean log-transformed catch per directed effort per water surface area by size class for white shrimp.

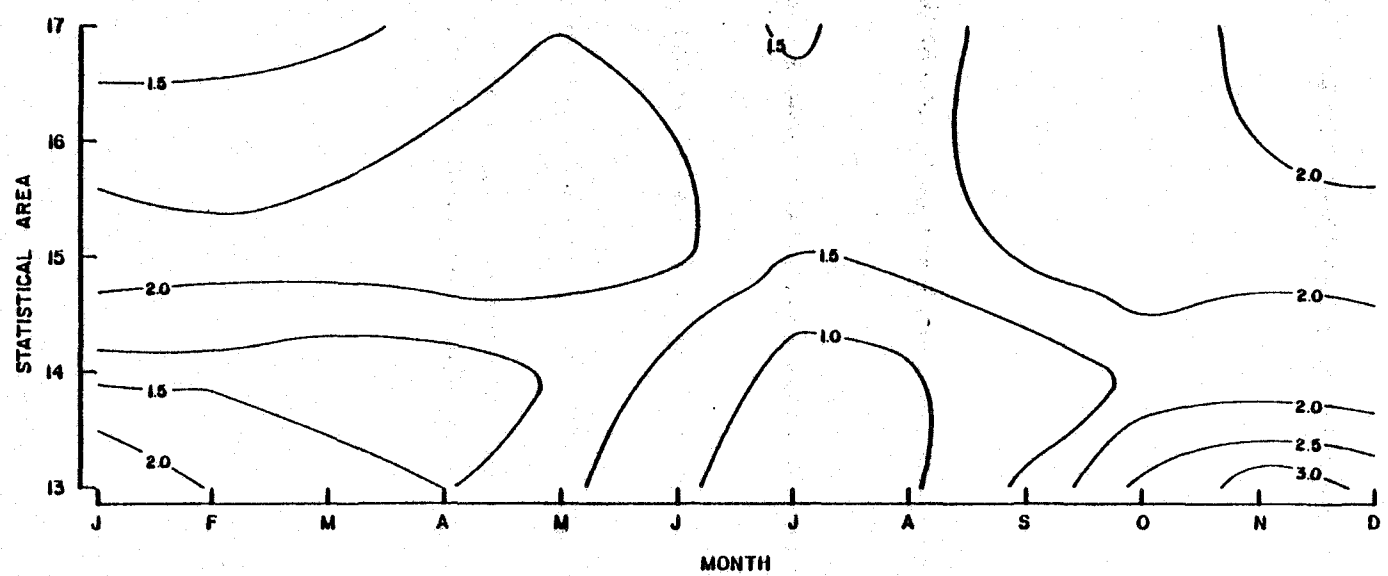

Fig. 55. Mean log-transformed catch by statistical area by month for white shrimp.

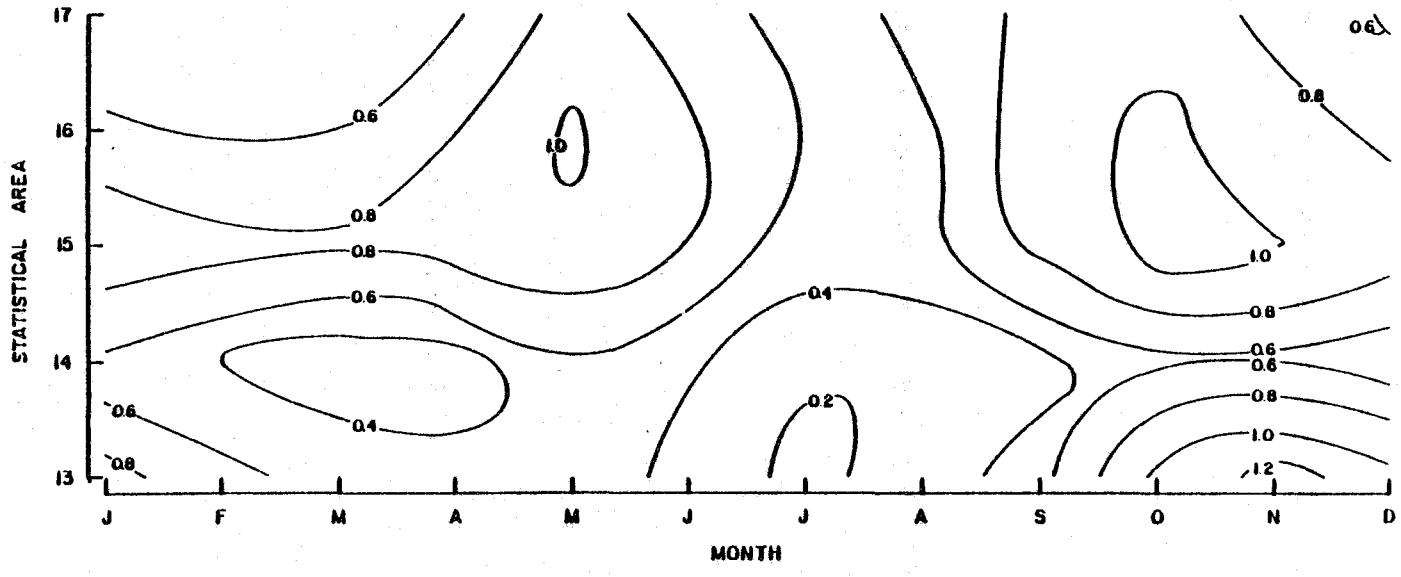

Fig. 56. Mean log-transformed directed effort by statistical area by month for white shrimp.

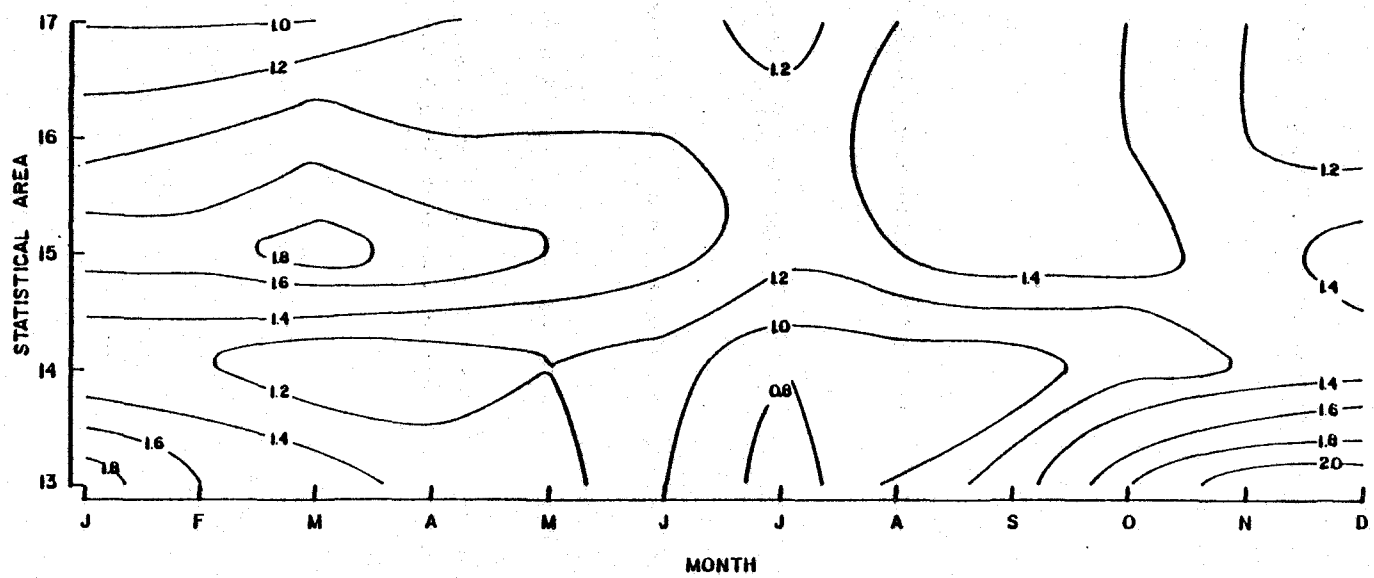

Fig. 57. Mean log-transformed catch per directed effort by statistical area by month for white shrimp.

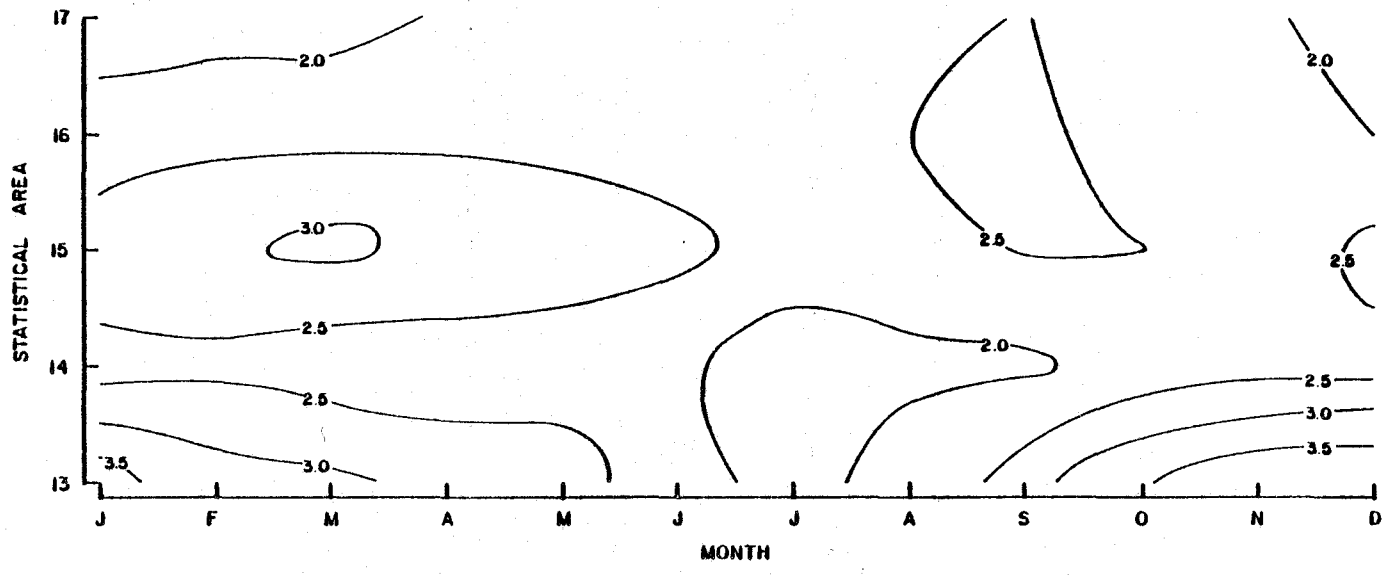

Fig. 58. Mean log-transformed catch per directed effort per water surface area by statistical area by month.

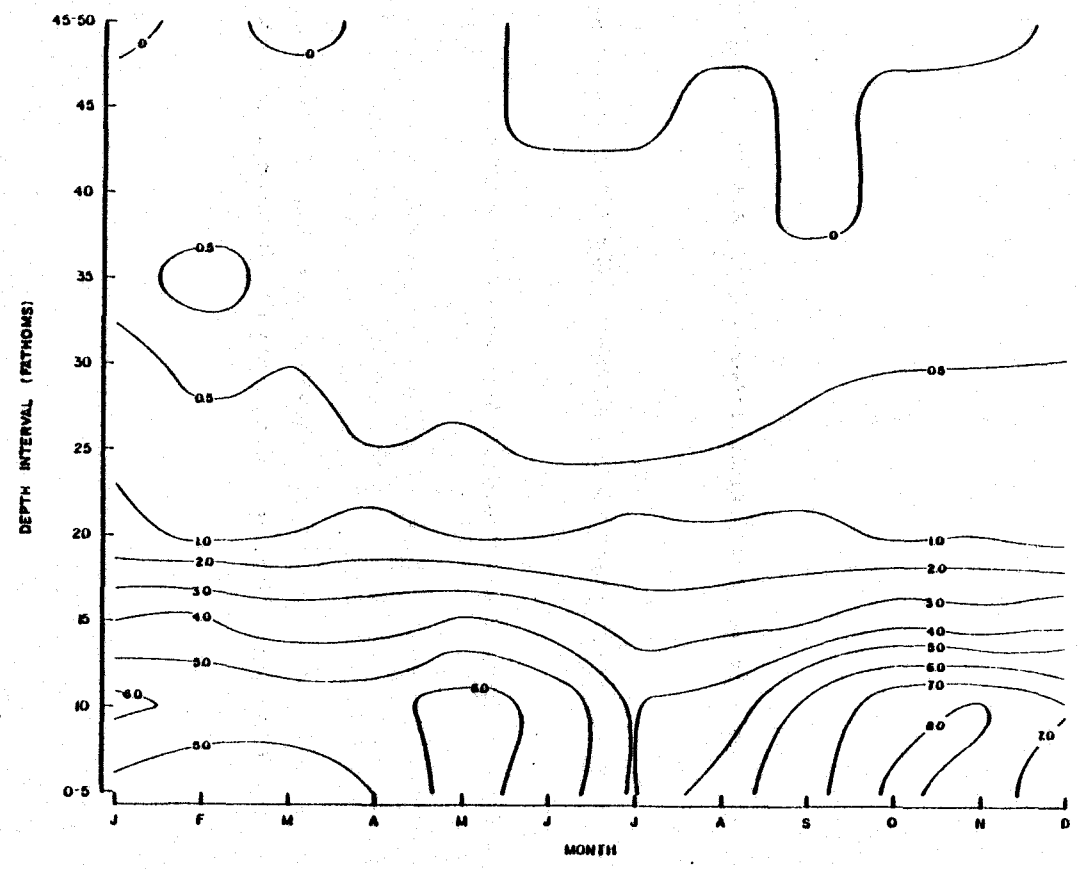

Fig. 59. Mean log-transformed catch by depth by month for white shrimp.

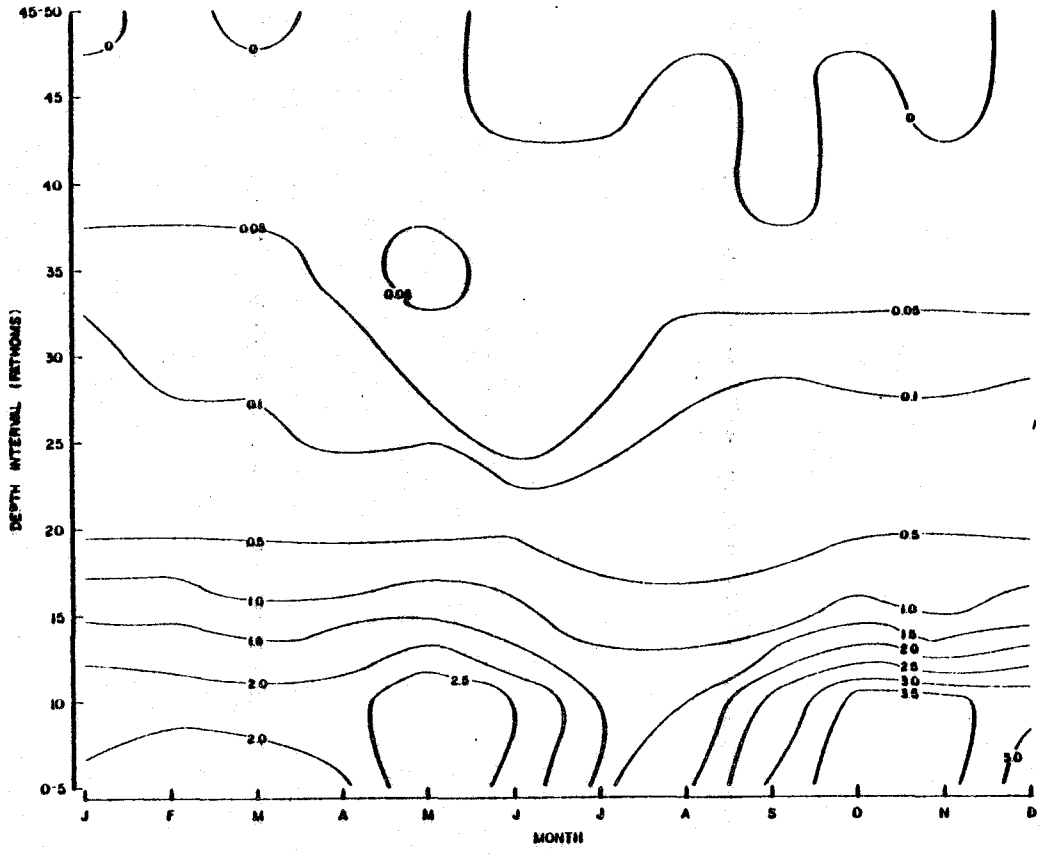

Fig. 60. Mean log-transformed directed effort by depth interval by month for white shrimp.

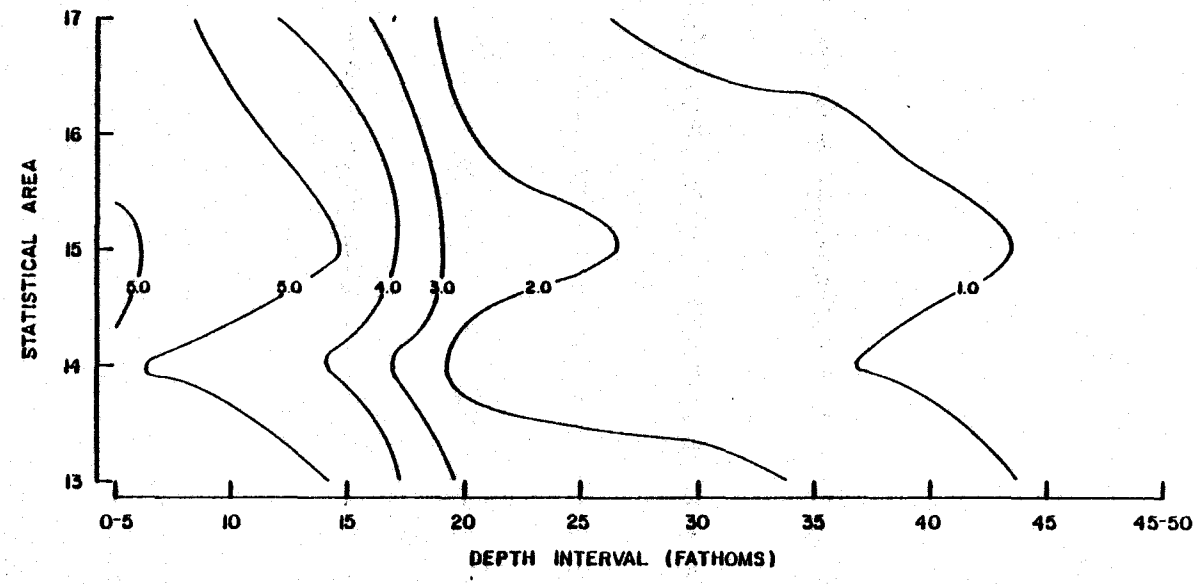

Fig. 61. Mean log-transformed catch by statistical area by depth interval for white shrimp.

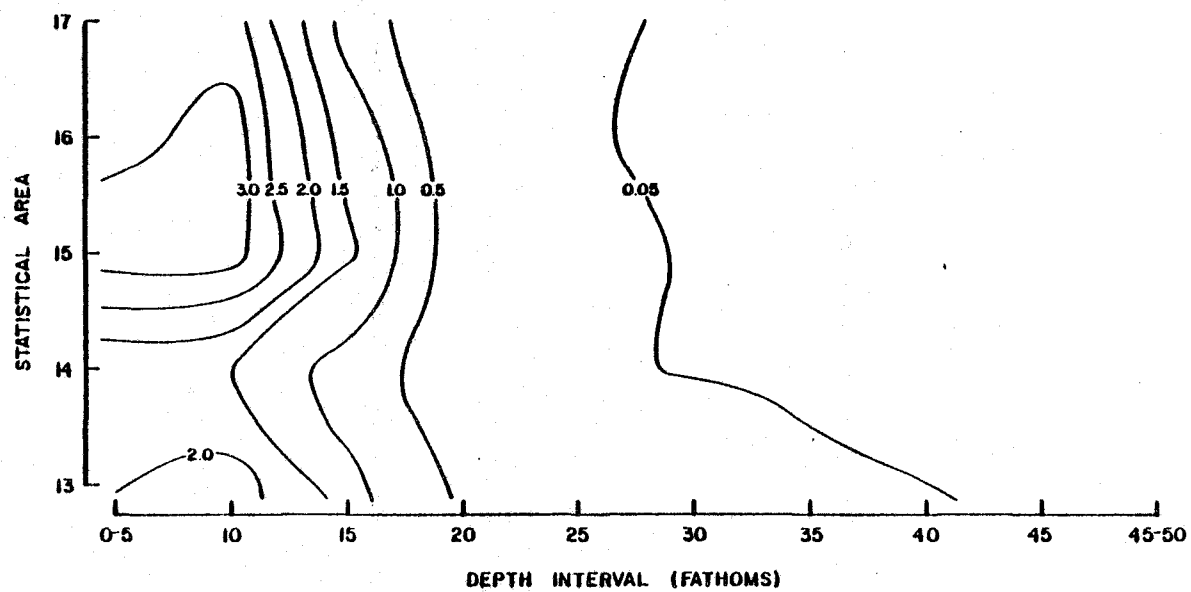

Fig. 62. Mean log-transformed directed effort by statistical area by depth interval for white shrimp.

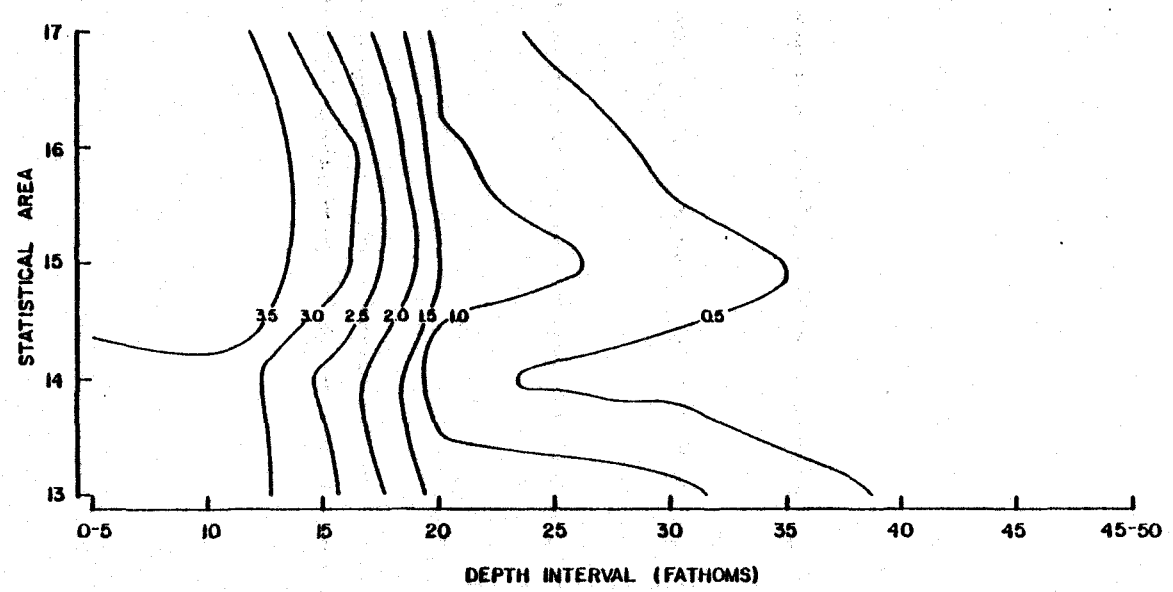

Fig. 63. Mean log-transformed catch per directed effort by statistical area by depth interval for white shrimp.

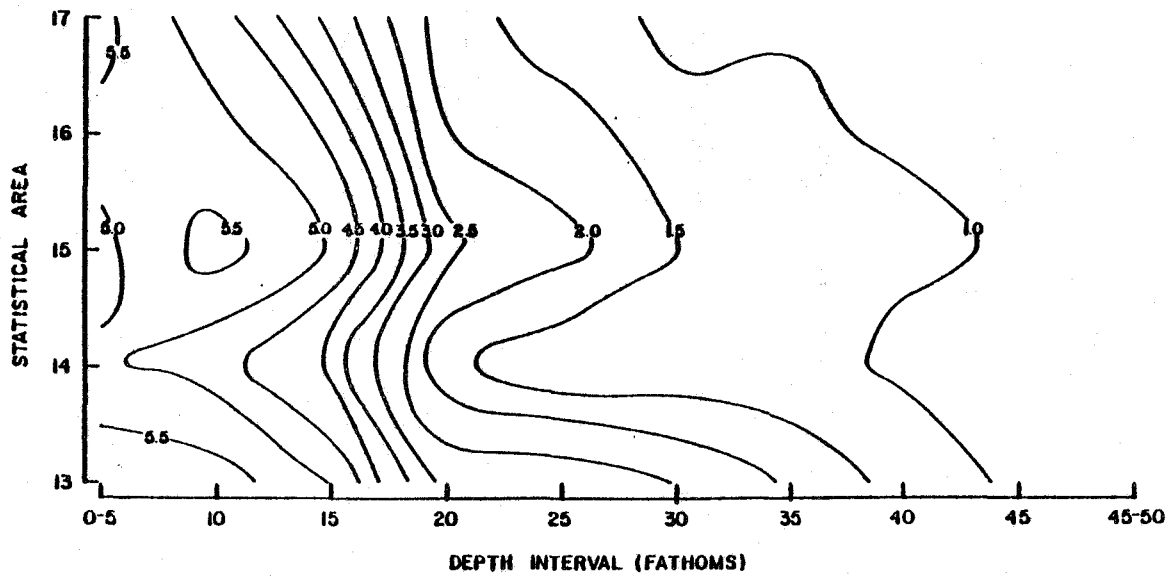

Fig. 64. Mean log-transformed catch per directed effort per water surface area by statistical area by depth interval for white shrimp.

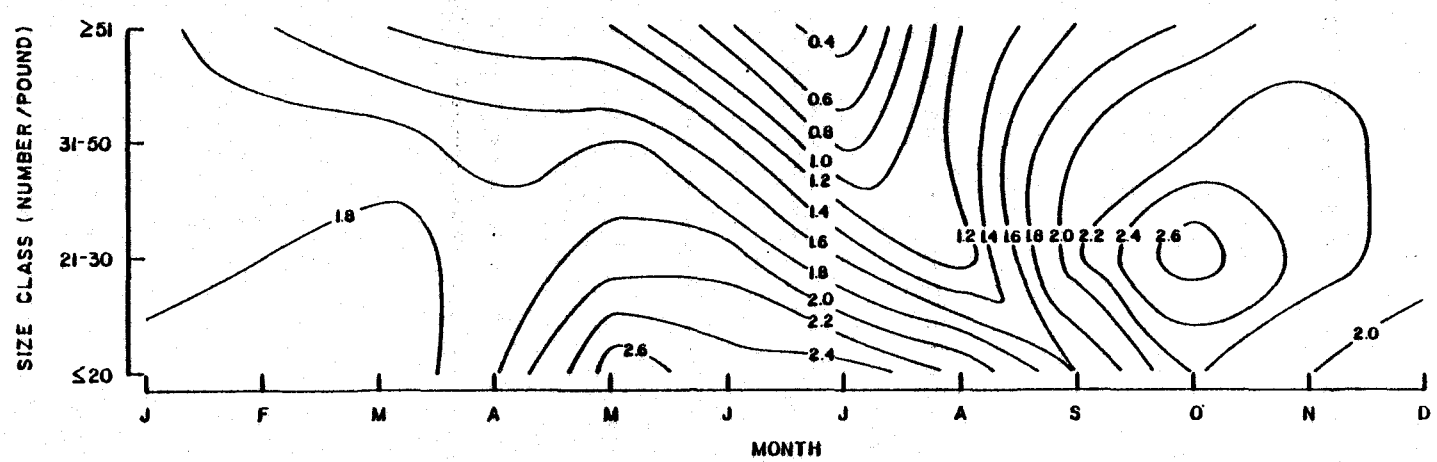

Fig. 65. Mean log-transformed catch by size class by month for white shrimp.

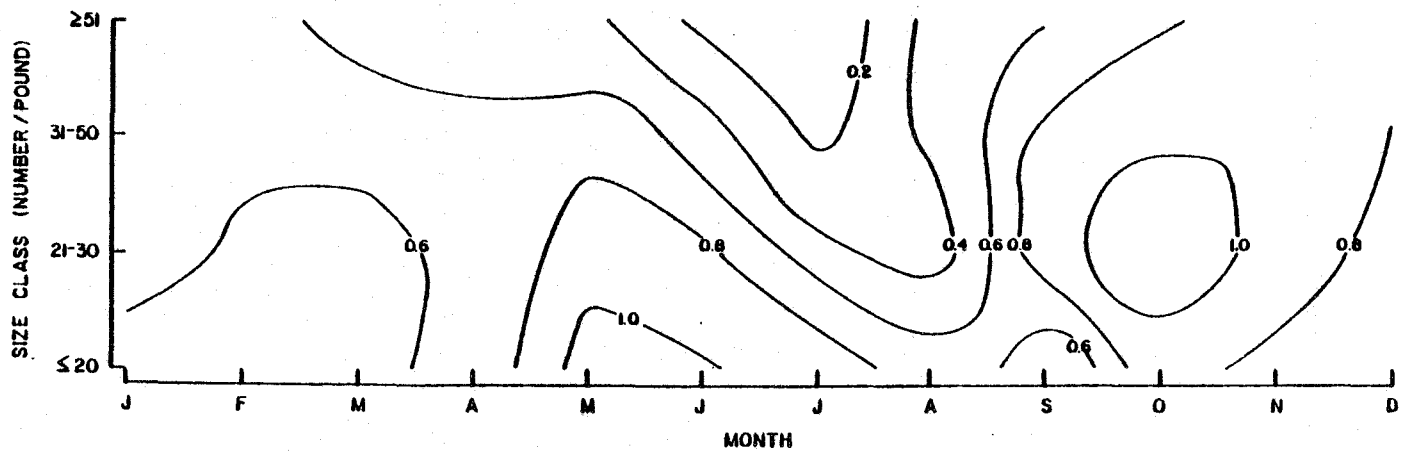

Fig. 66. Mean log-transformed directed effort by size class by month for white shrimp.

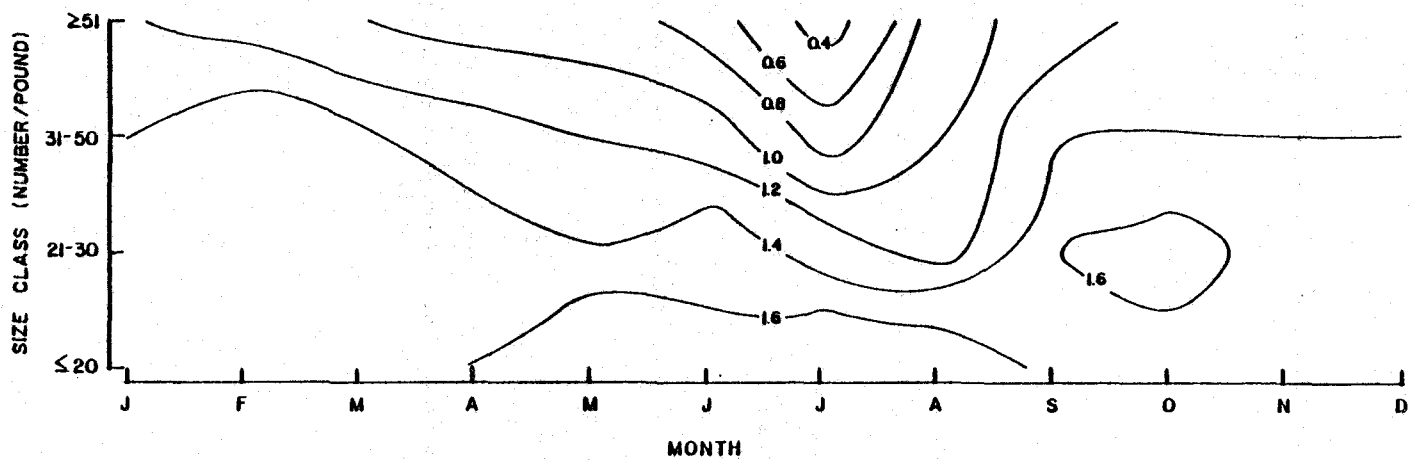

Fig. 67. Mean log-transformed catch per directed effort by size class by month for white shrimp.

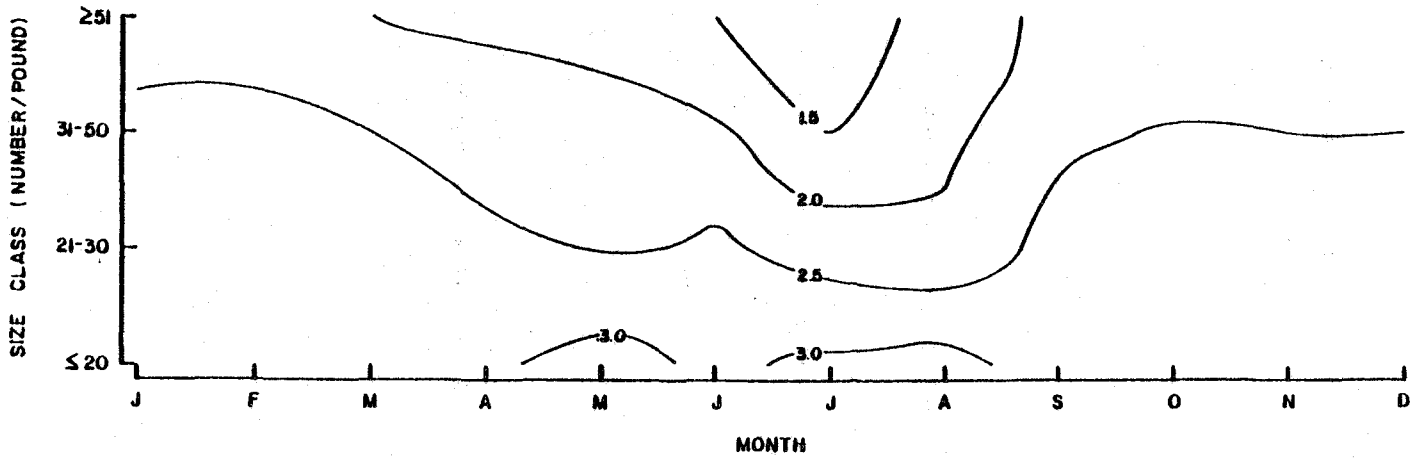

Fig. 68. Mean log-transformed catch per directed effort per water surface area by size class by month for white shrimp.

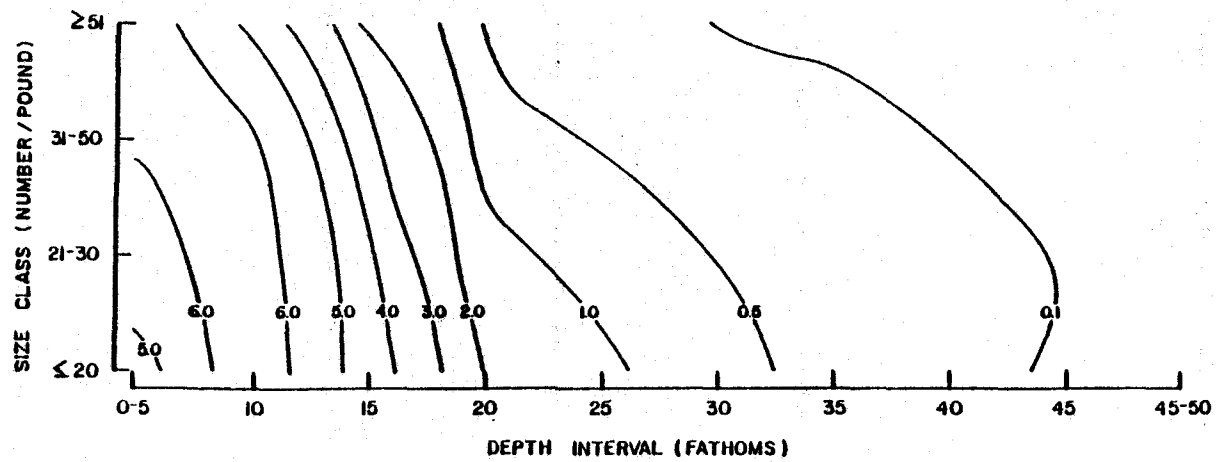

Fig. 69. Mean log-transformed catch by size class by depth interval for white shrimp.

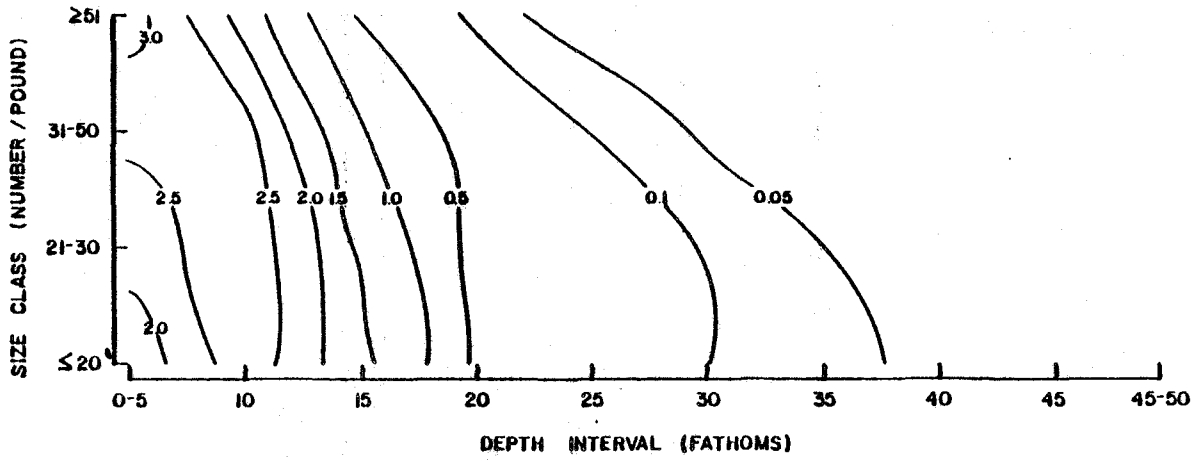

Fig. 70. Mean log-transformed directed effort by size class by depth interval for white shrimp.

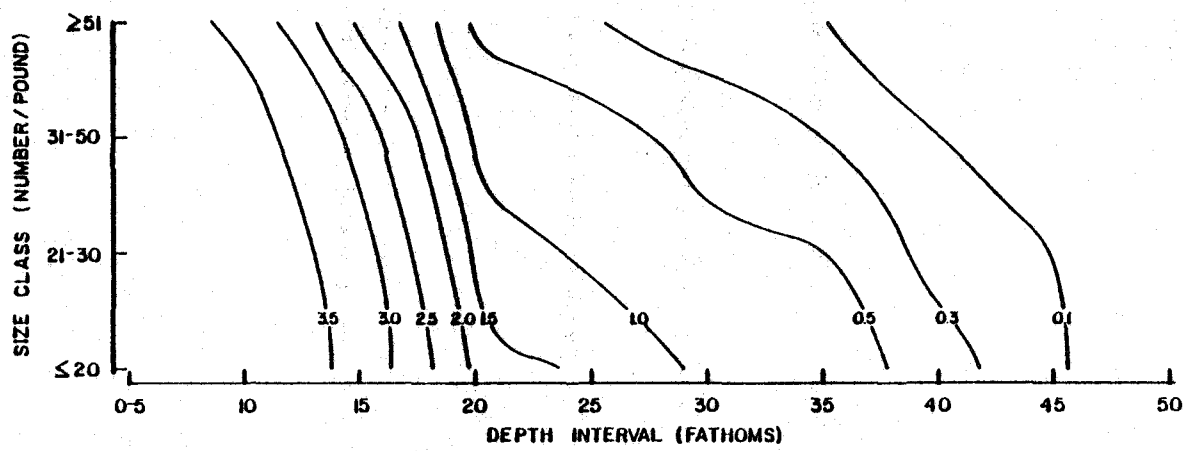

Fig. 71. Mean log-transformed catch per directed effort by size class by depth interval for white shrimp.

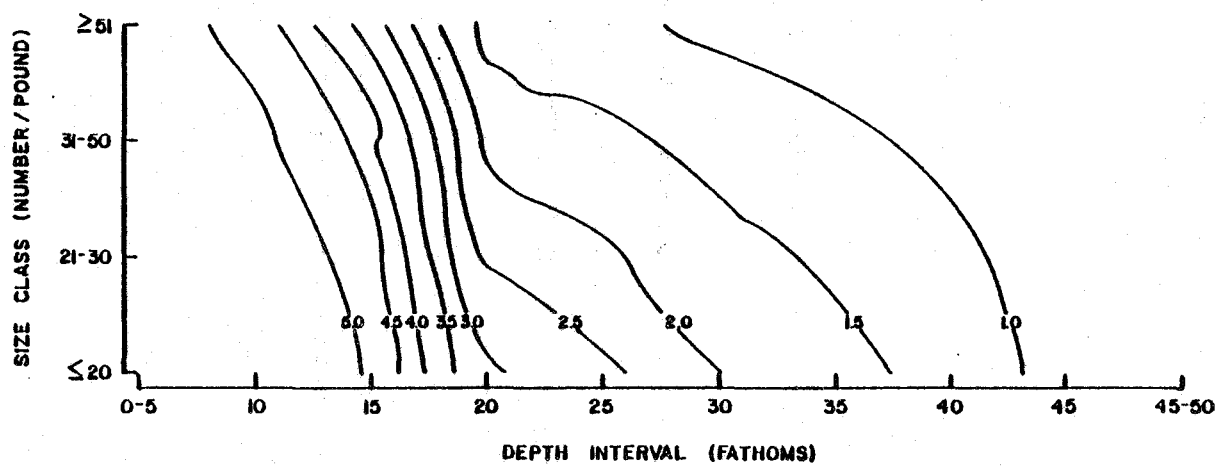

Fig. 72. Mean log-transformed catch per directed effort per water surface area by size class by depth interval for white shrimp.

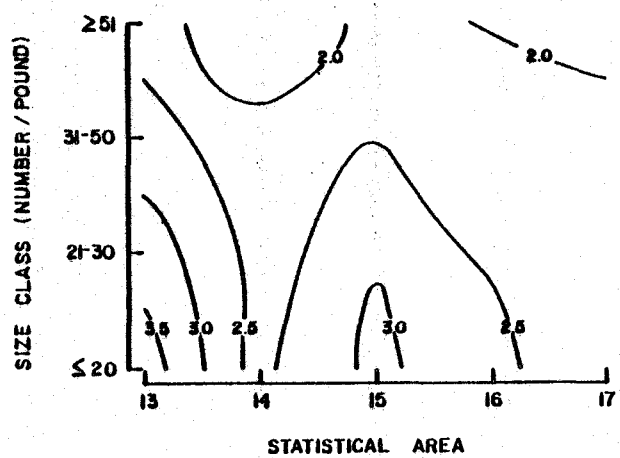

Fig. 73. Mean log-transformed catch per directed effort per water surface area by size class by statistical area for white shrimp.

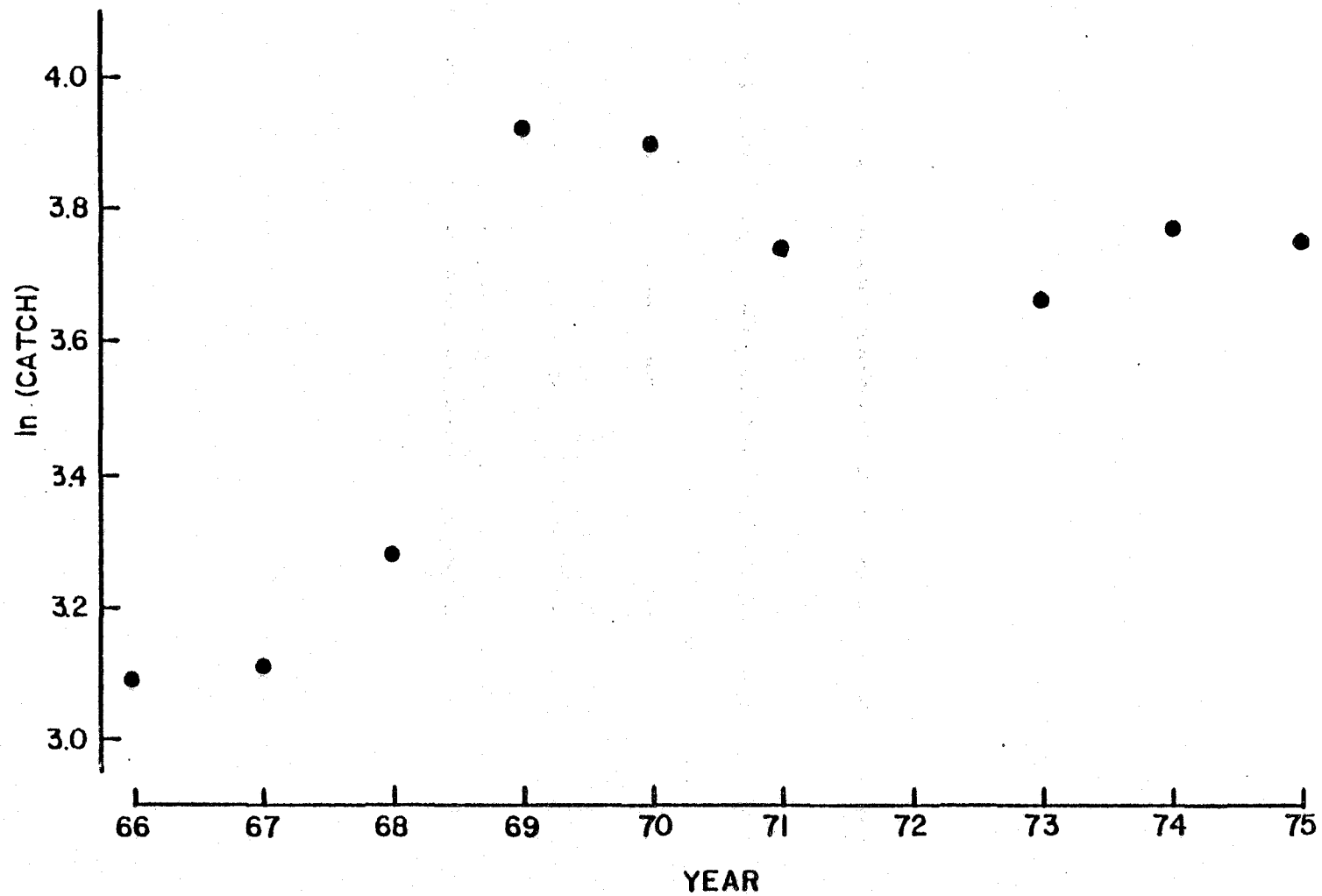

Fig. 74. Mean log-transformed catch by year for *Penaeus* spp.

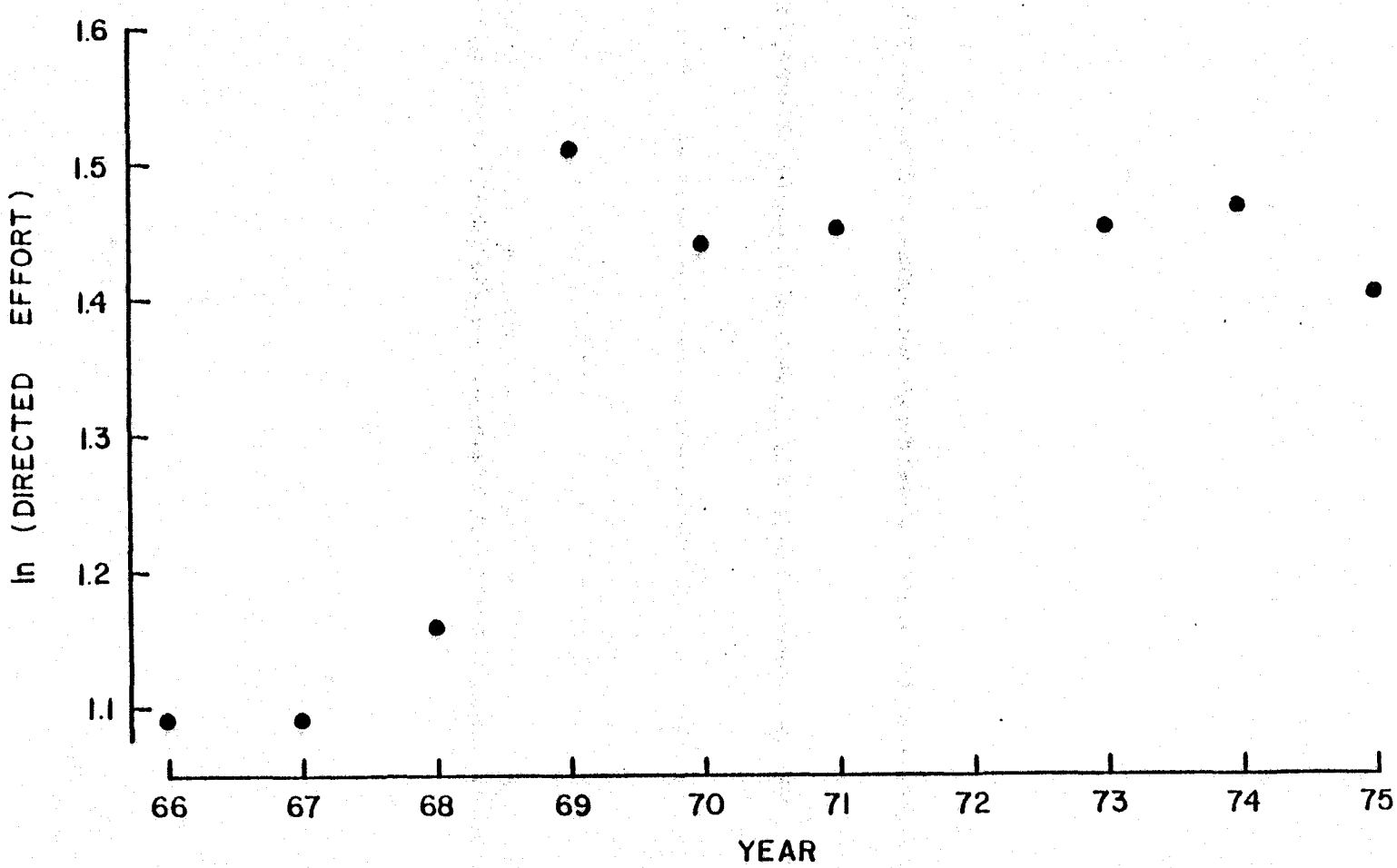

Fig. 75. Mean log-transformed directed effort by year for *Penaeus* spp.

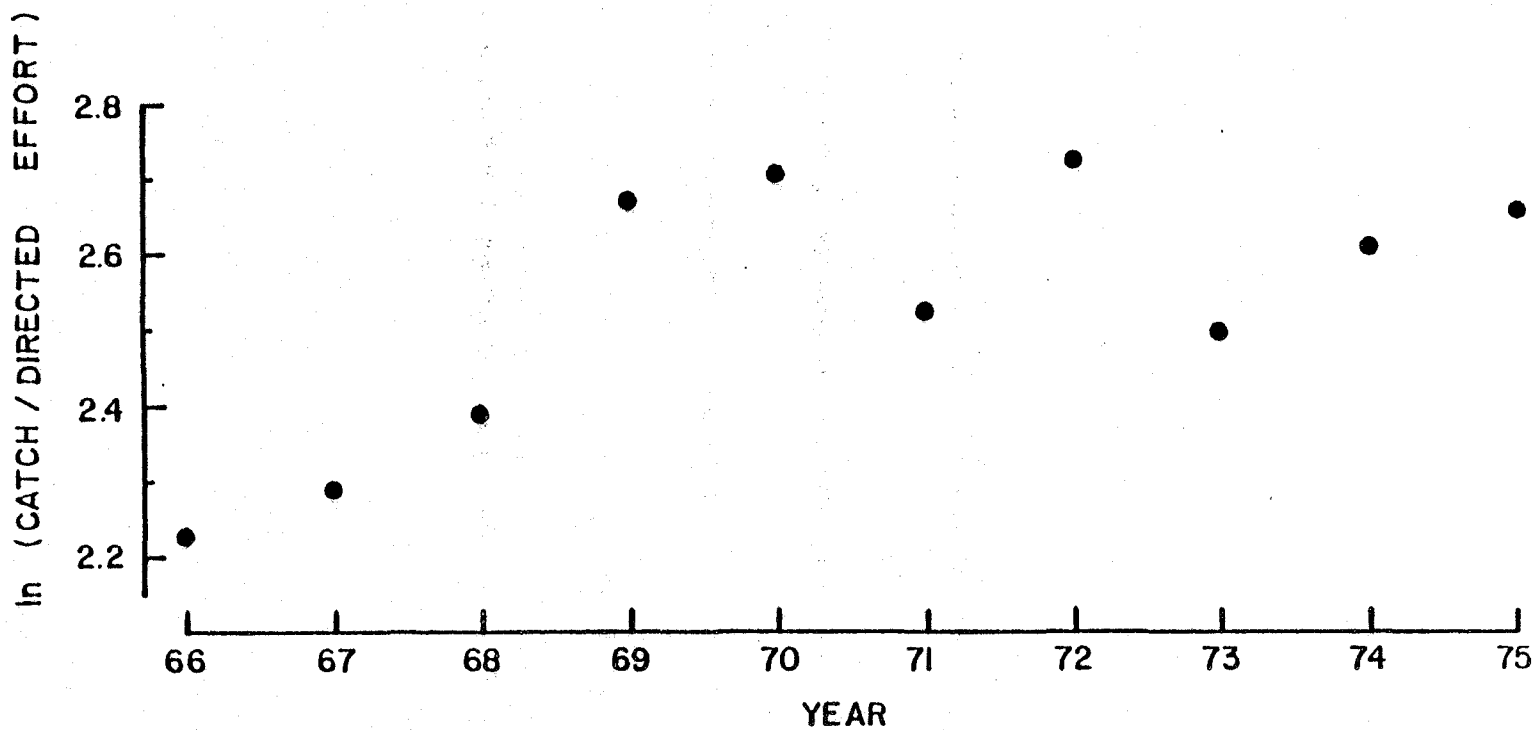

Fig. 76. Mean log-transformed catch per directed effort by year for *Penaeus* spp.

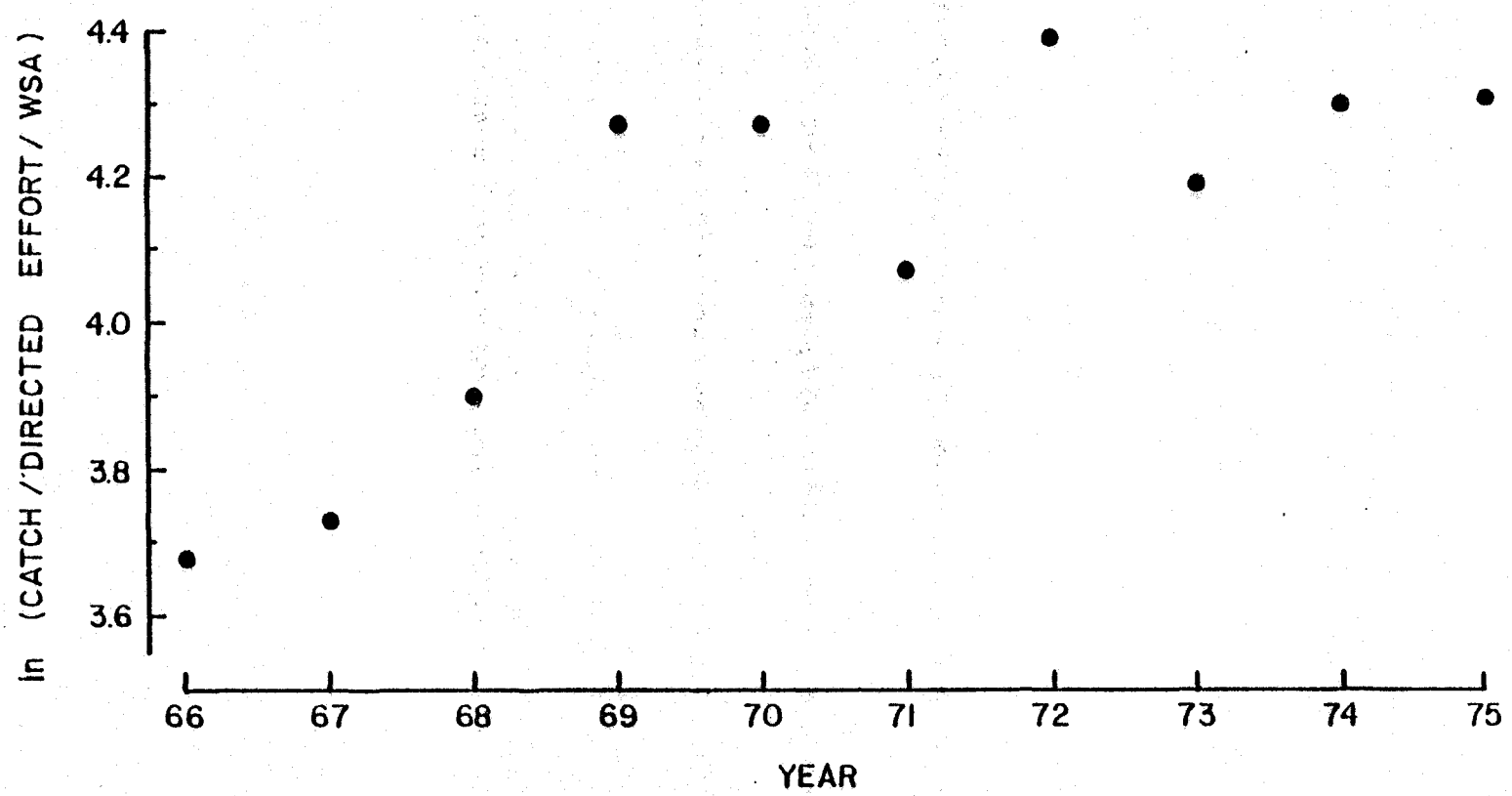

Fig. 77. Mean log-transformed catch per directed effort per water surface area by year for *Penaeus* spp.

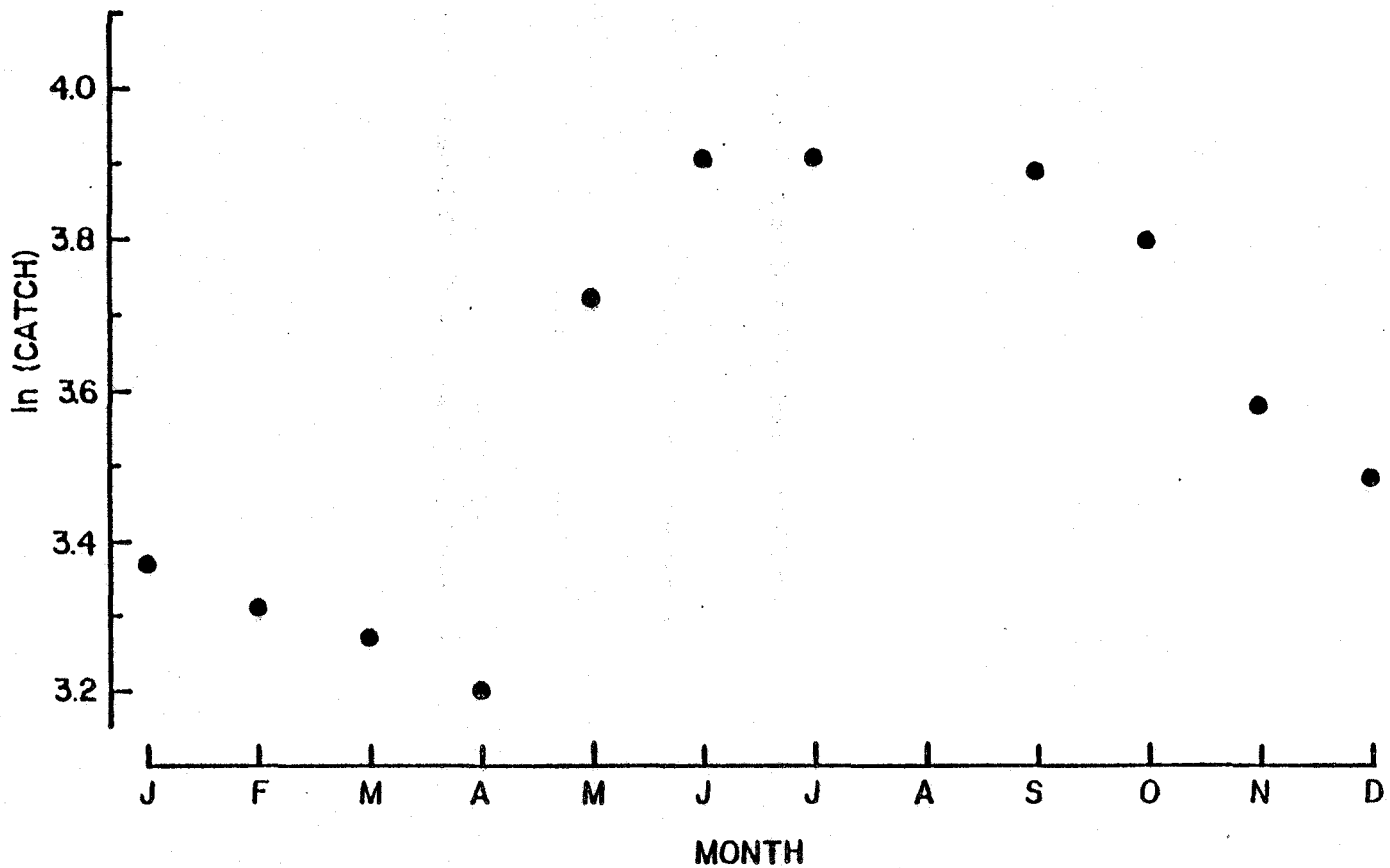

Fig. 78. Mean log-transformed catch by month for *Penaeus* spp.

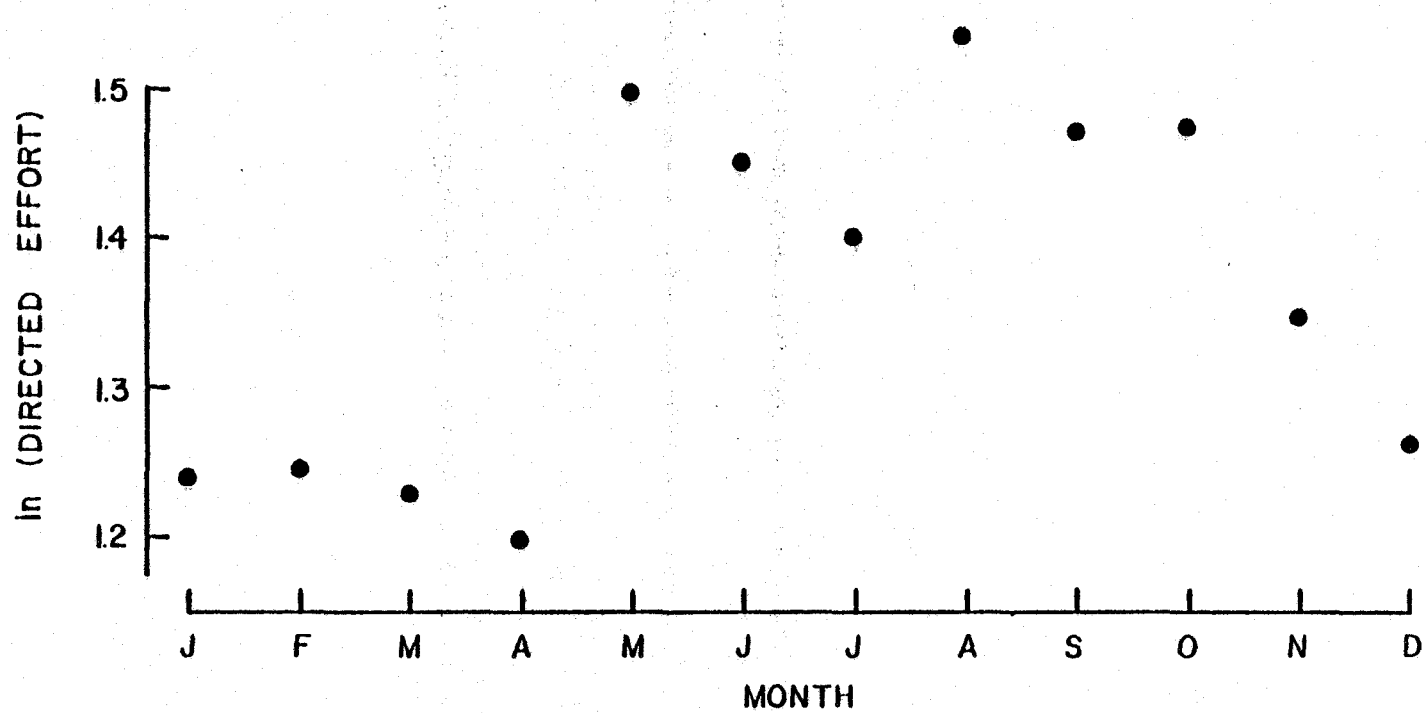

Fig. 79. Mean log-transformed directed effort by month for *Penaeus* spp.

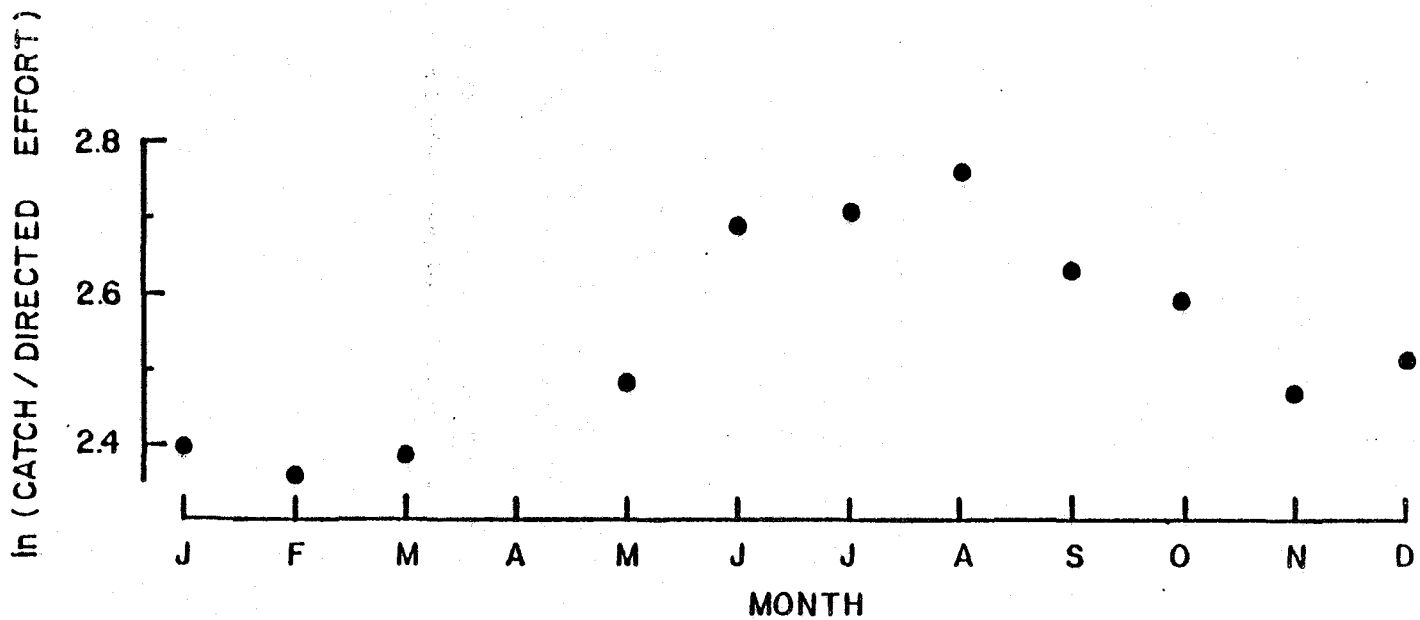

Fig. 80. Mean log-transformed catch per directed effort by month for *Penaeus* spp.

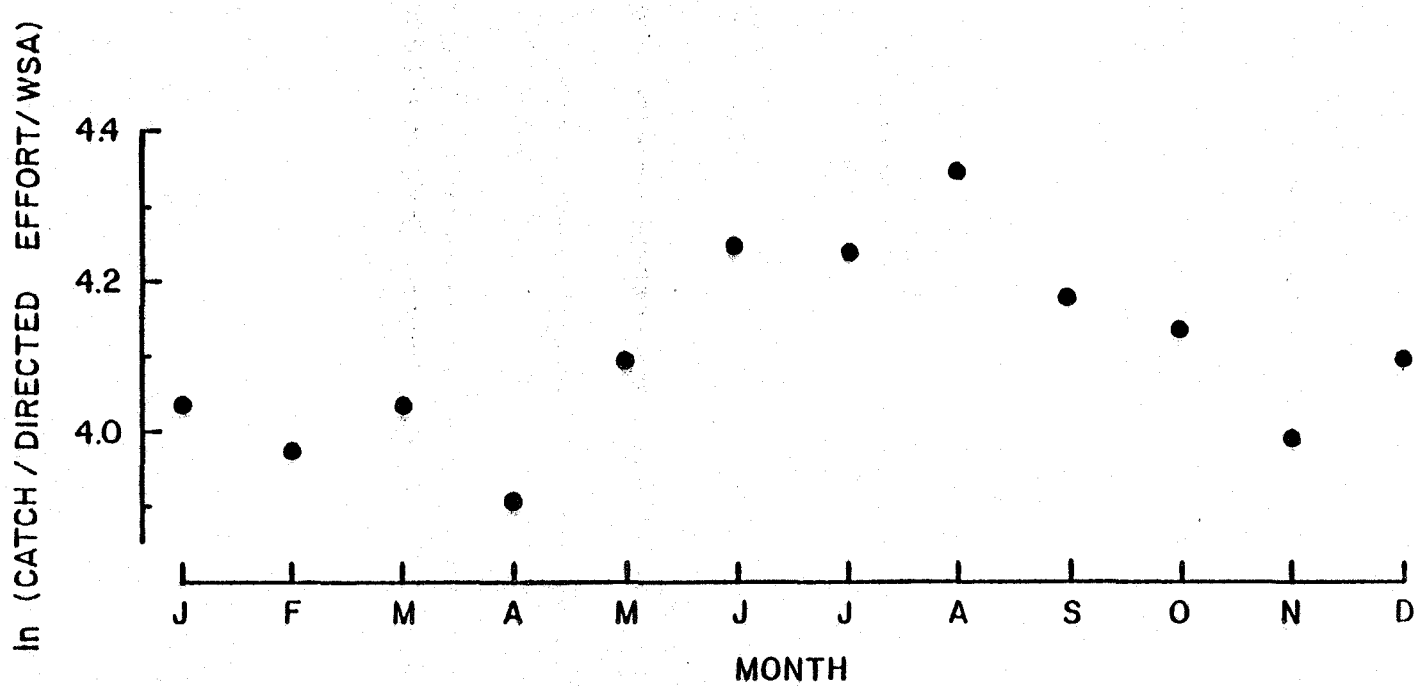

Fig. 81. Mean log-transformed catch per directed effort per water surface area by month for *Penaeus* spp.

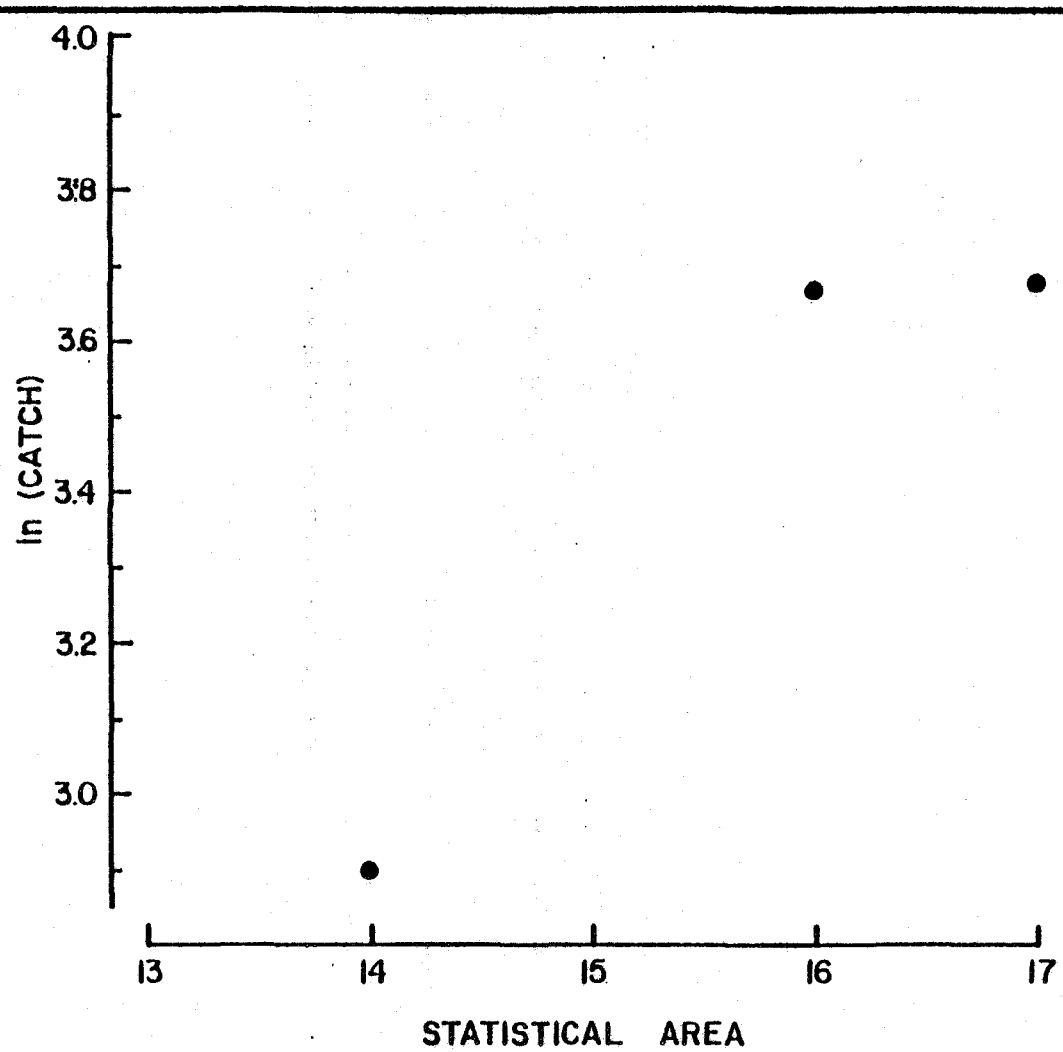

Fig. 82. Mean log-transformed catch by statistical area for *Penaeus* spp.

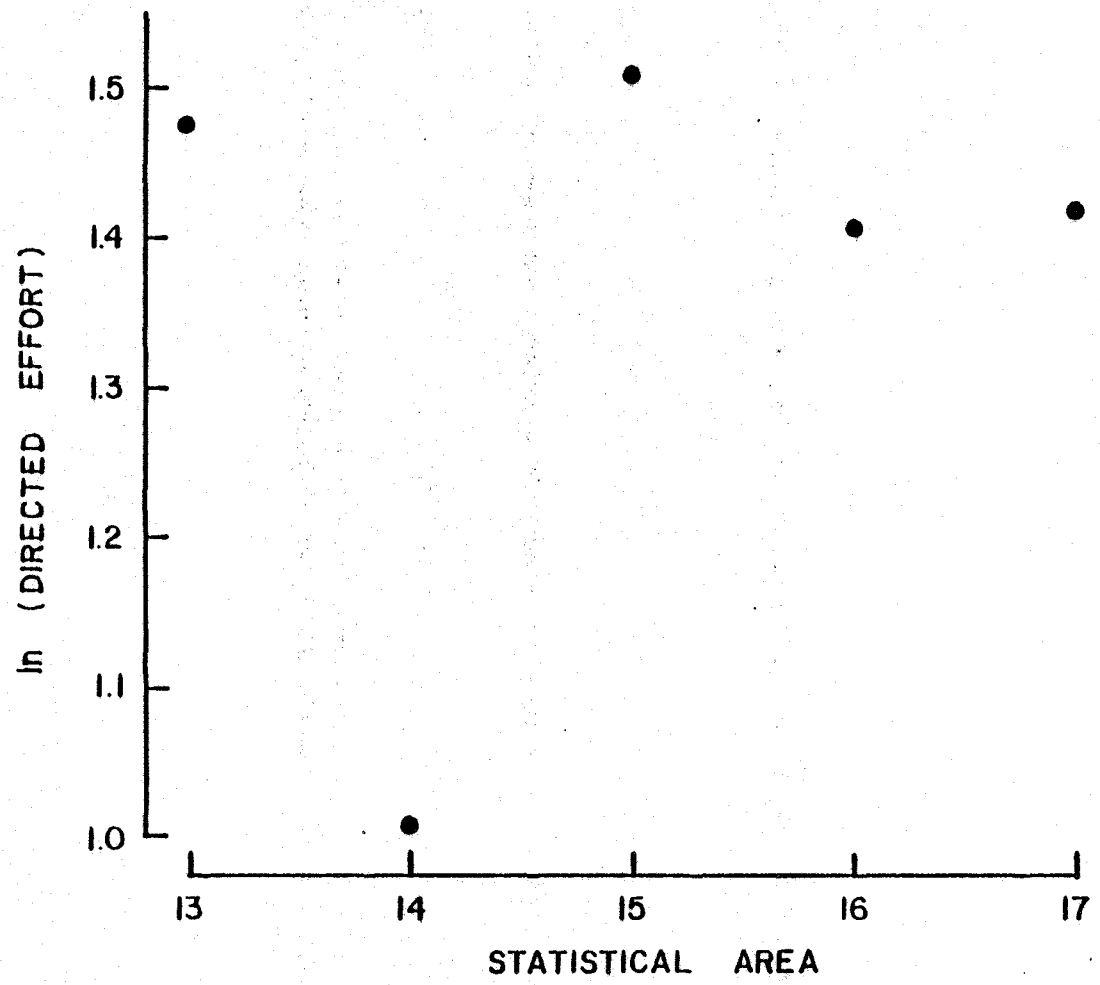

Fig. 83. Mean log-transformed directed effort by statistical area for *Penaeus* spp.

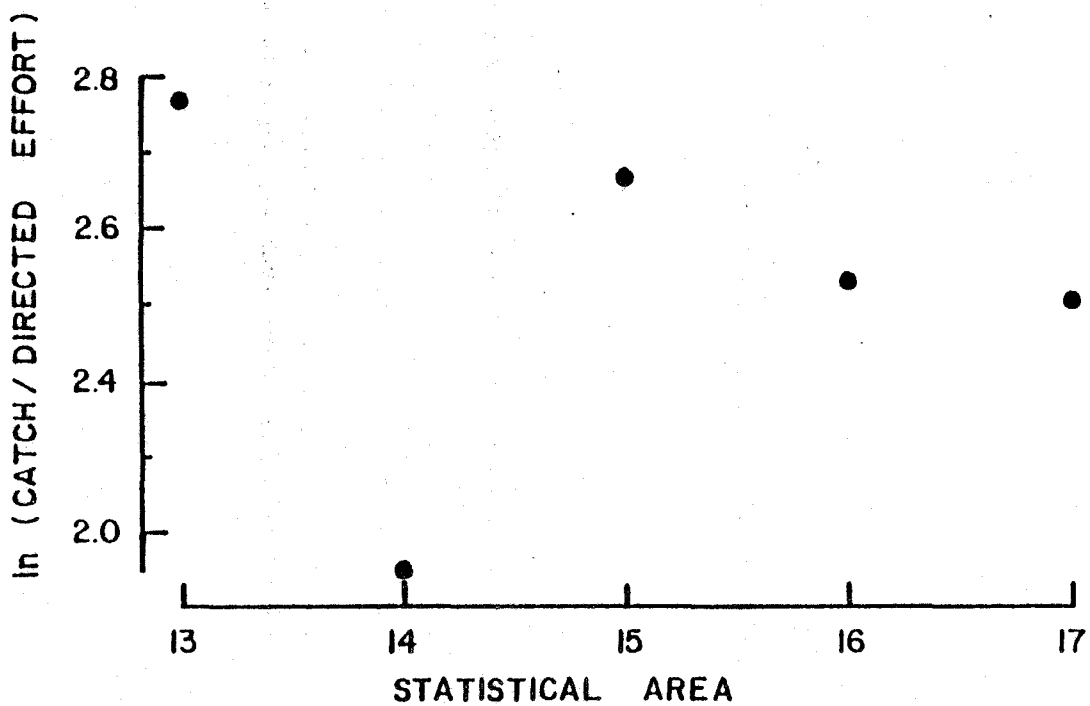

Fig. 84. Mean log-transformed catch per directed effort by statistical area for *Penaeus* spp.

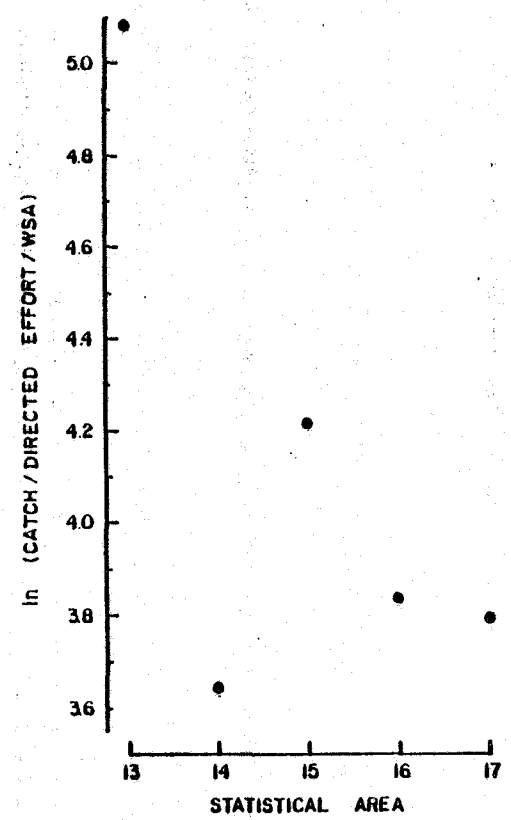

Fig. 85. Mean log-transformed catch per directed effort per water surface area by statistical area for *Penaeus* spp.

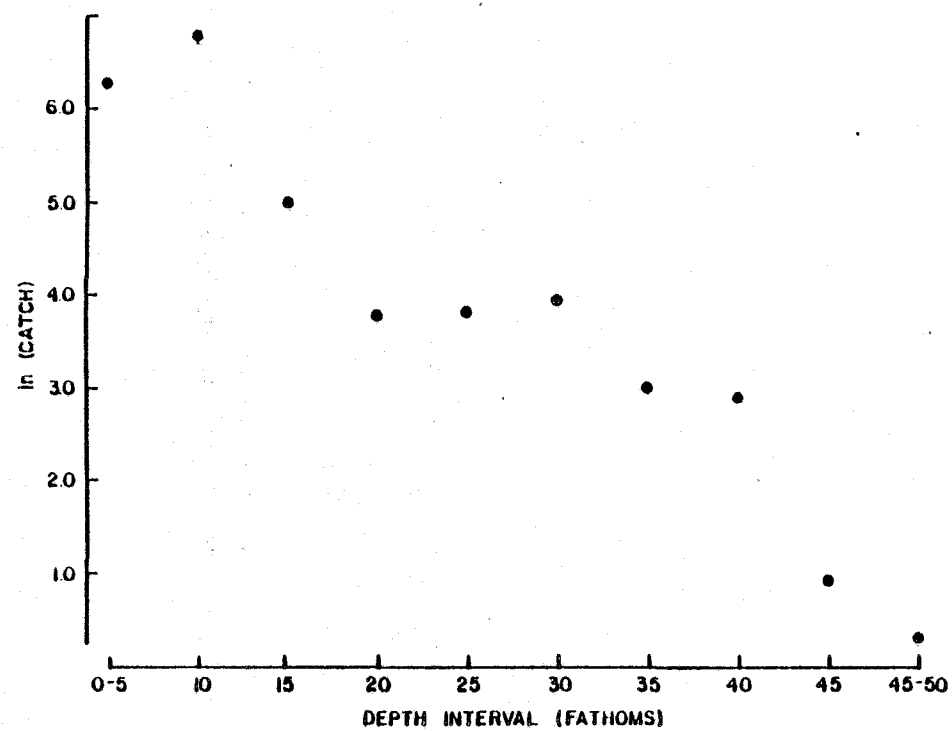

Fig. 86. Mean log-transformed catch by depth interval for *Penaeus* spp.

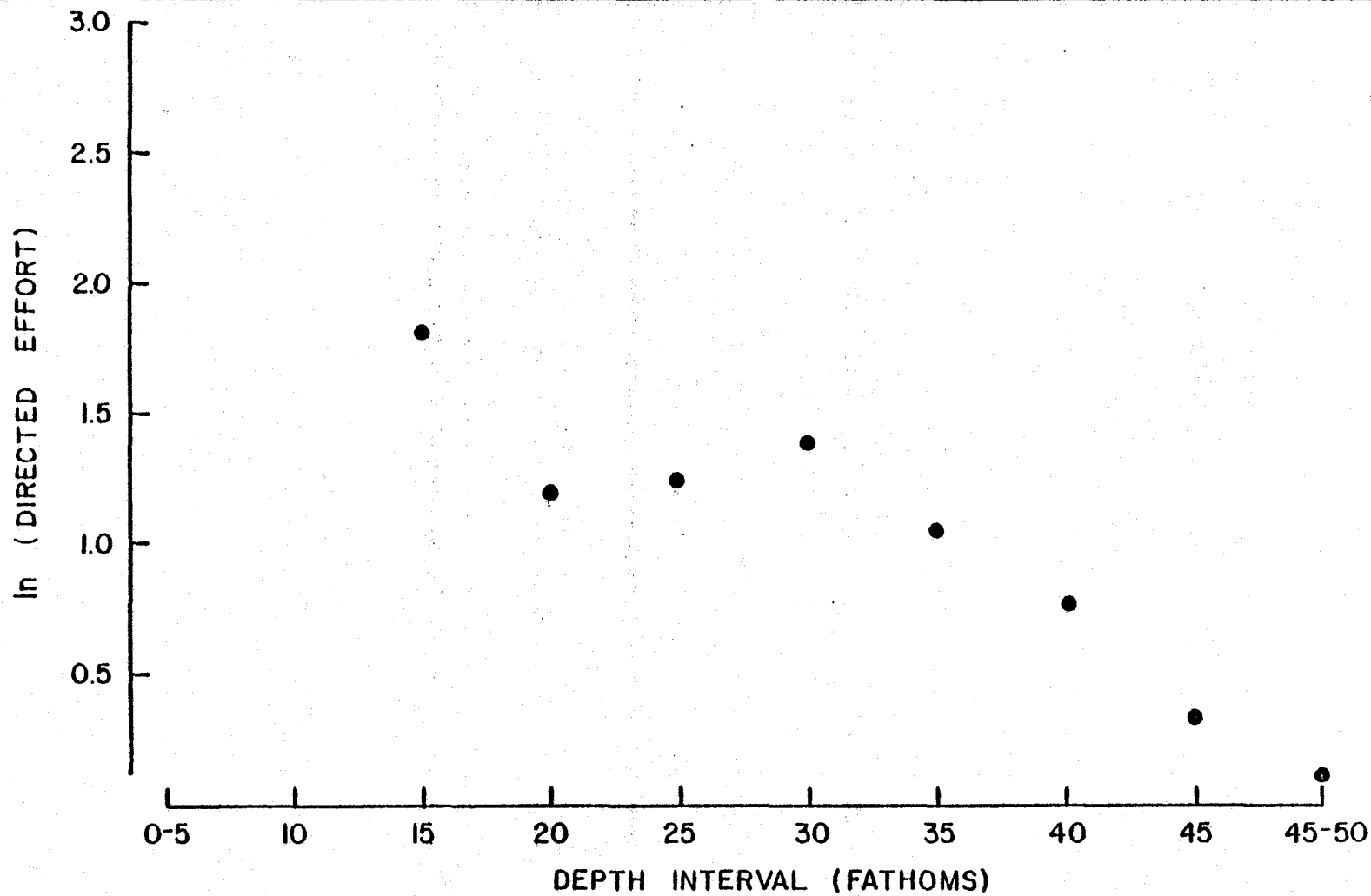

Fig. 87. Mean log-transformed directed effort by depth interval for *Penaeus* spp.

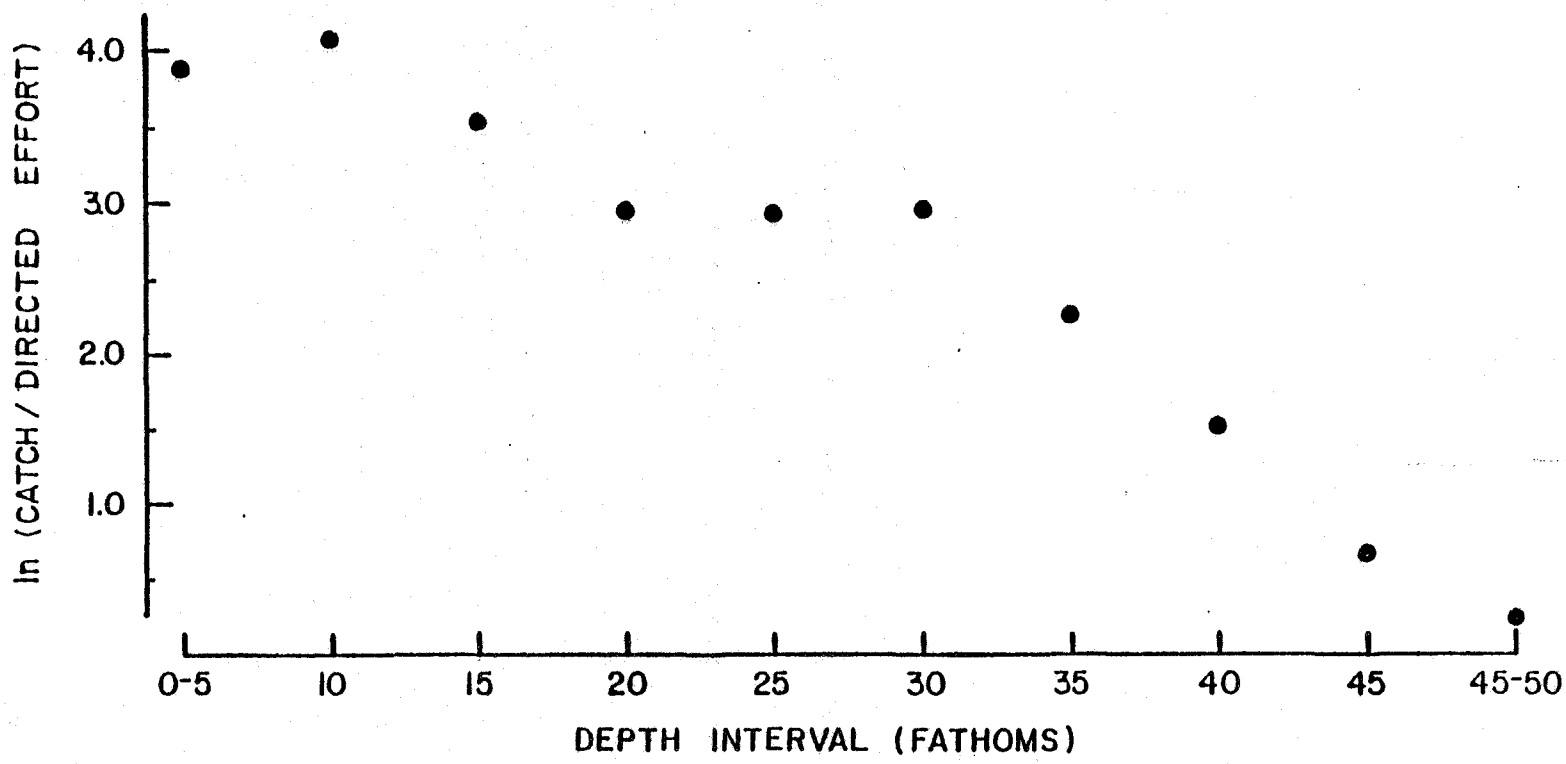

Fig. 88. Mean log-transformed catch per directed effort by depth interval for *Penaeus* spp.

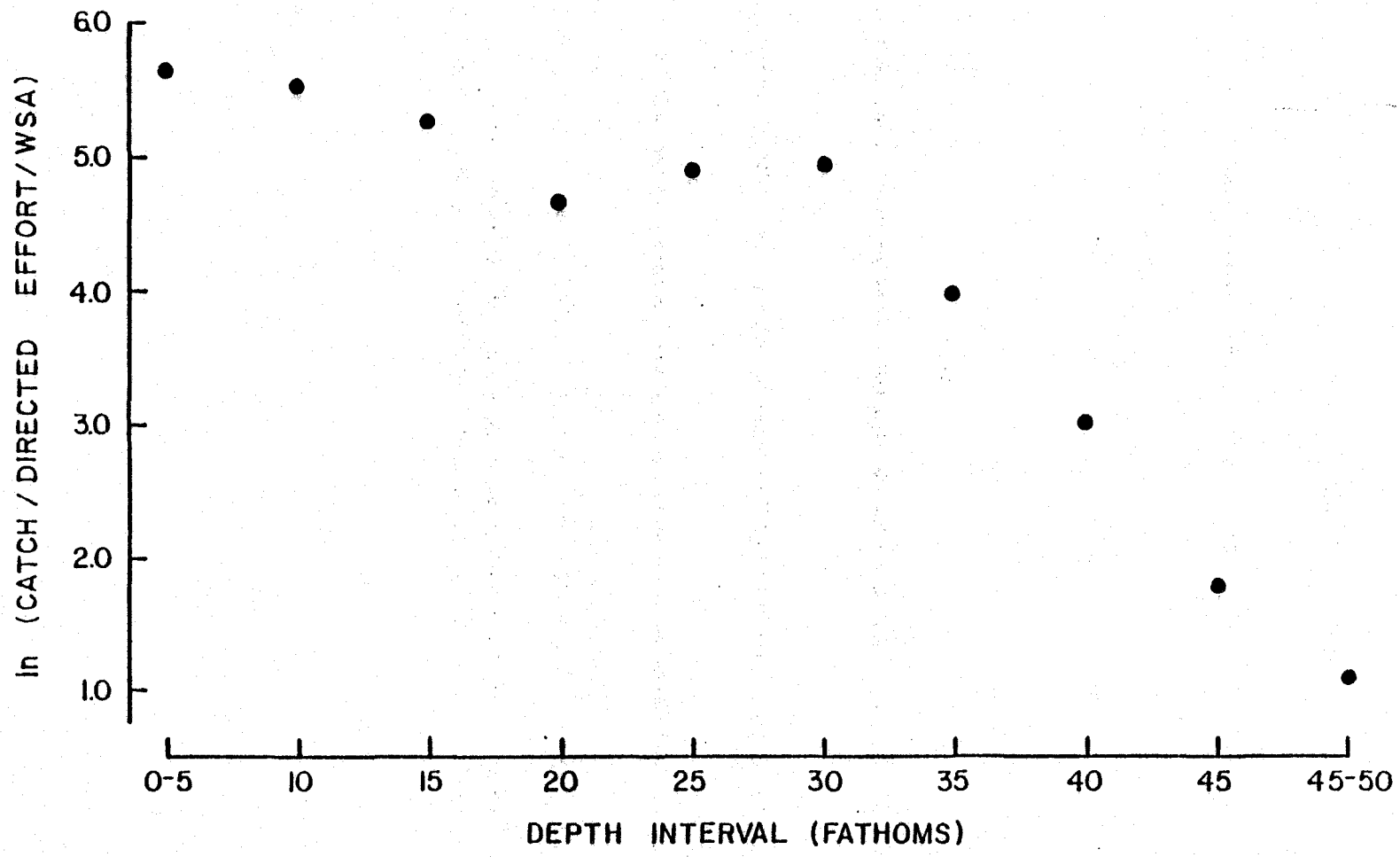

Fig. 89. Mean log-transformed catch per directed effort per water surface area by depth interval for *Penaeus* spp.

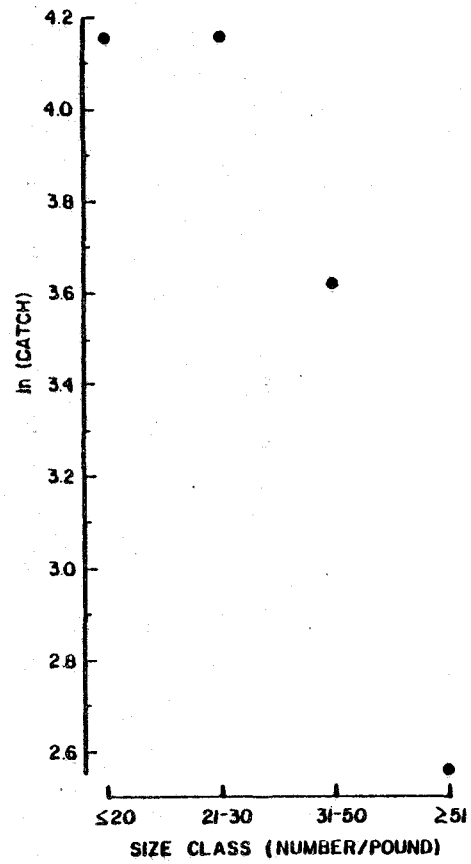

Fig. 90. Mean log-transformed catch by size class for *Penaeus* spp.

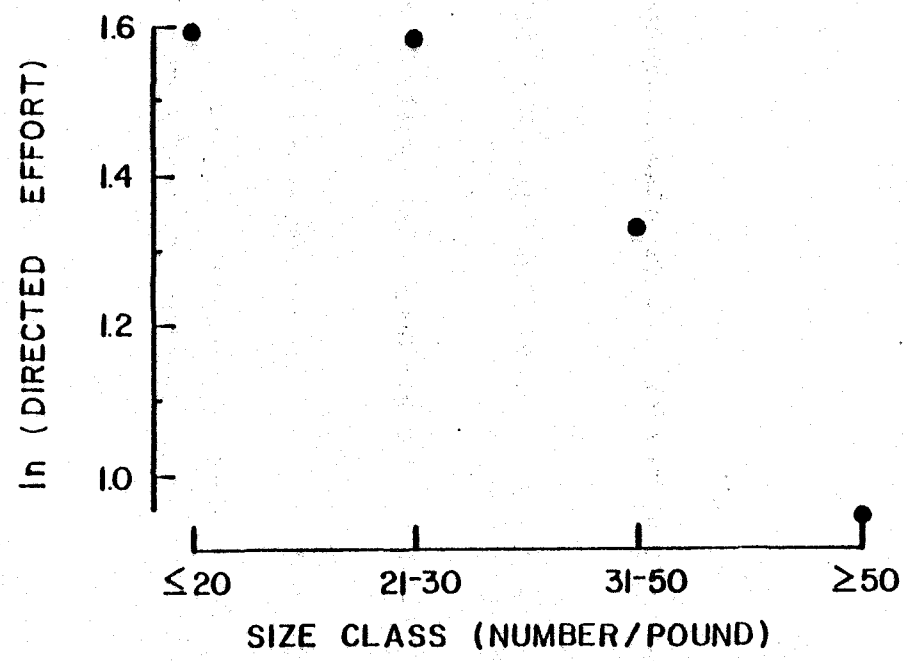

Fig. 91. Mean log-transformed directed effort by size class for *Penaeus* spp.

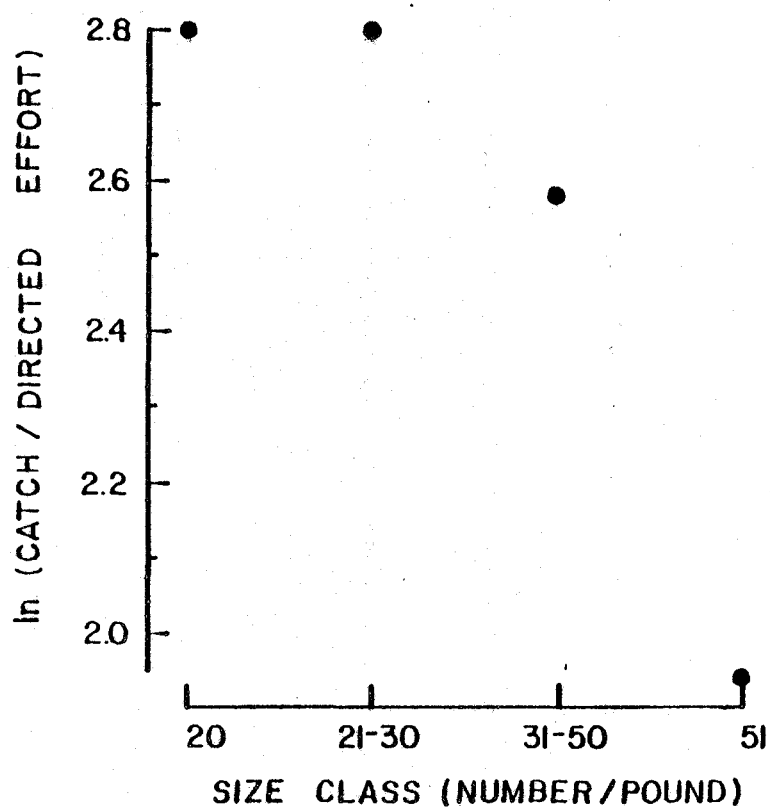

Fig. 92. Mean log-transformed catch per directed effort by size class for *Penaeus* spp.

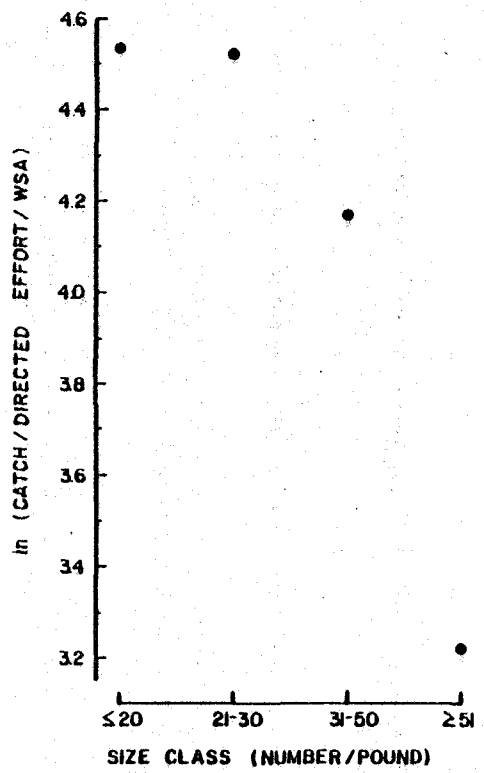

Fig. 93. Mean log-transformed catch per directed effort per water surface area by size class for *Penaeus* spp.

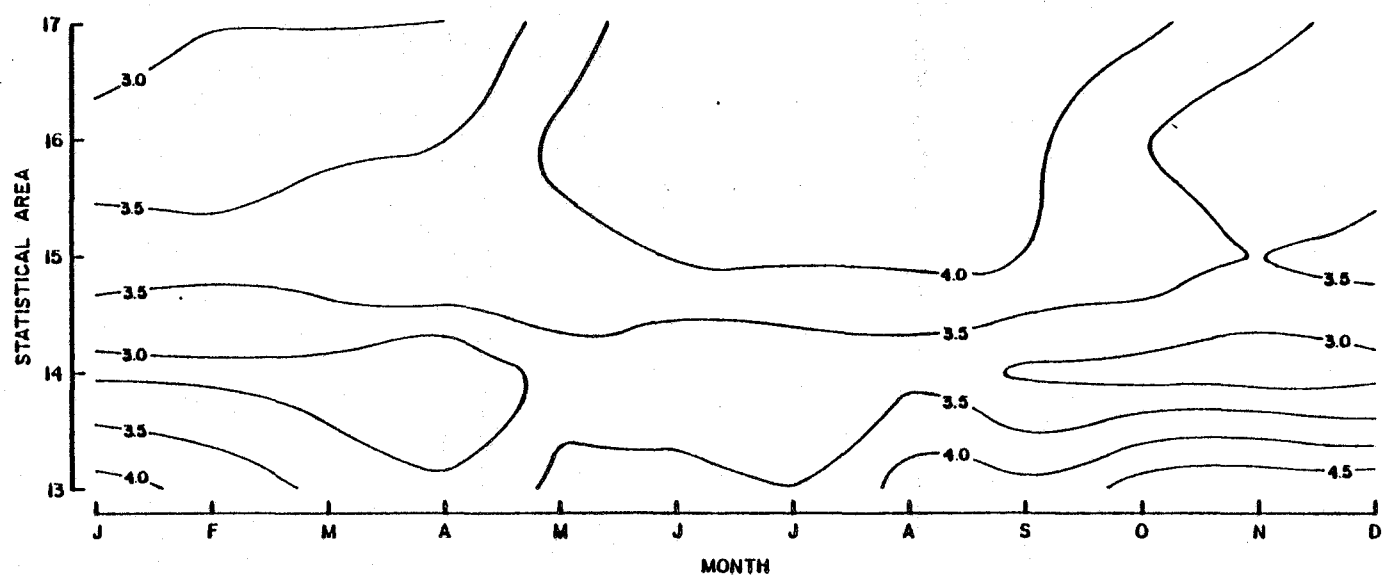

Fig. 94. Mean log-transformed catch by statistical area by month for *Penaeus* spp.

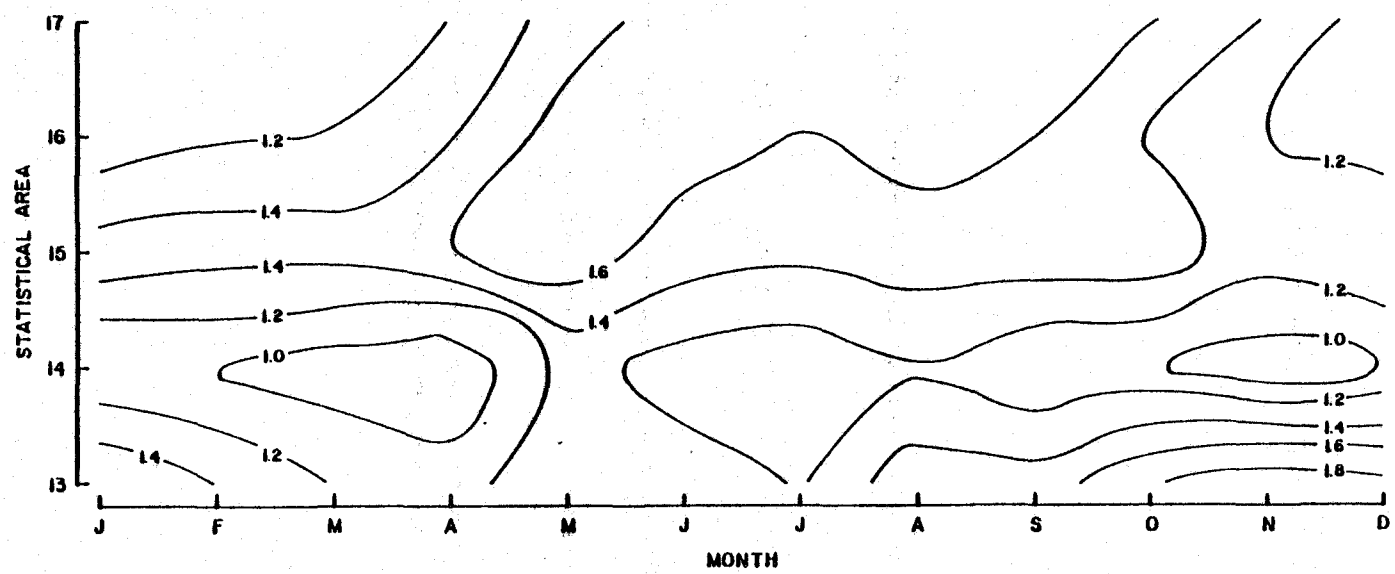

Fig. 95. Mean log-transformed directed effort by statistical area by month for *Penaeus* spp.

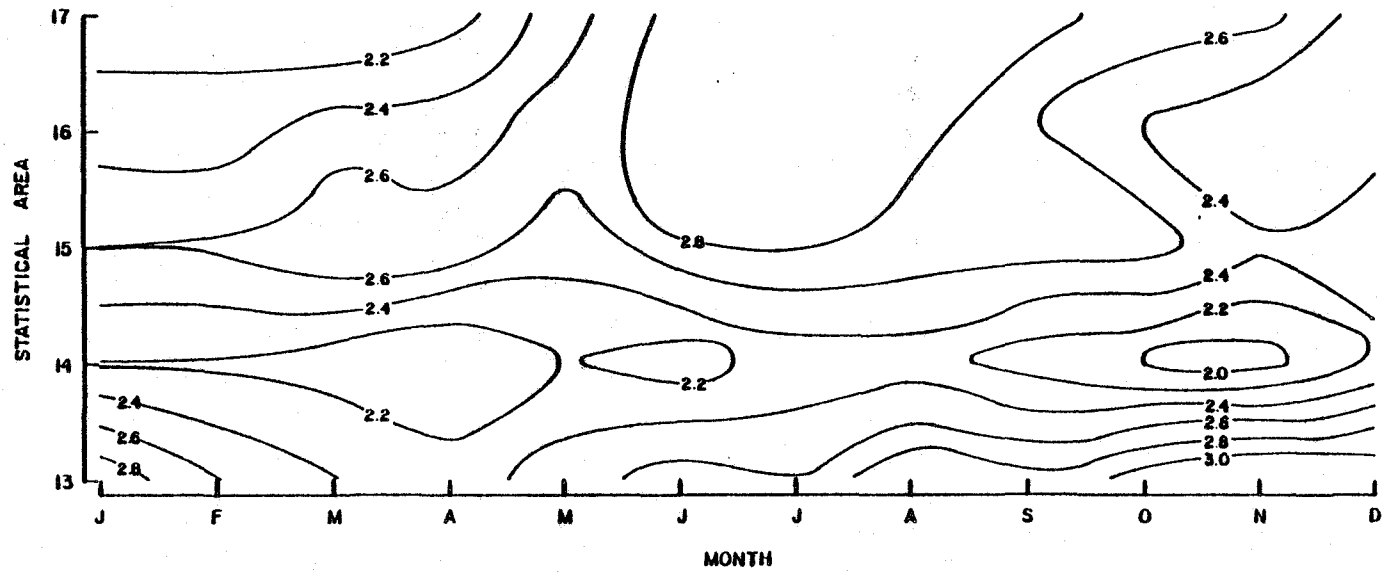

Fig. 96. Mean log-transformed catch per directed effort by statistical area by month for *Penaeus* spp.

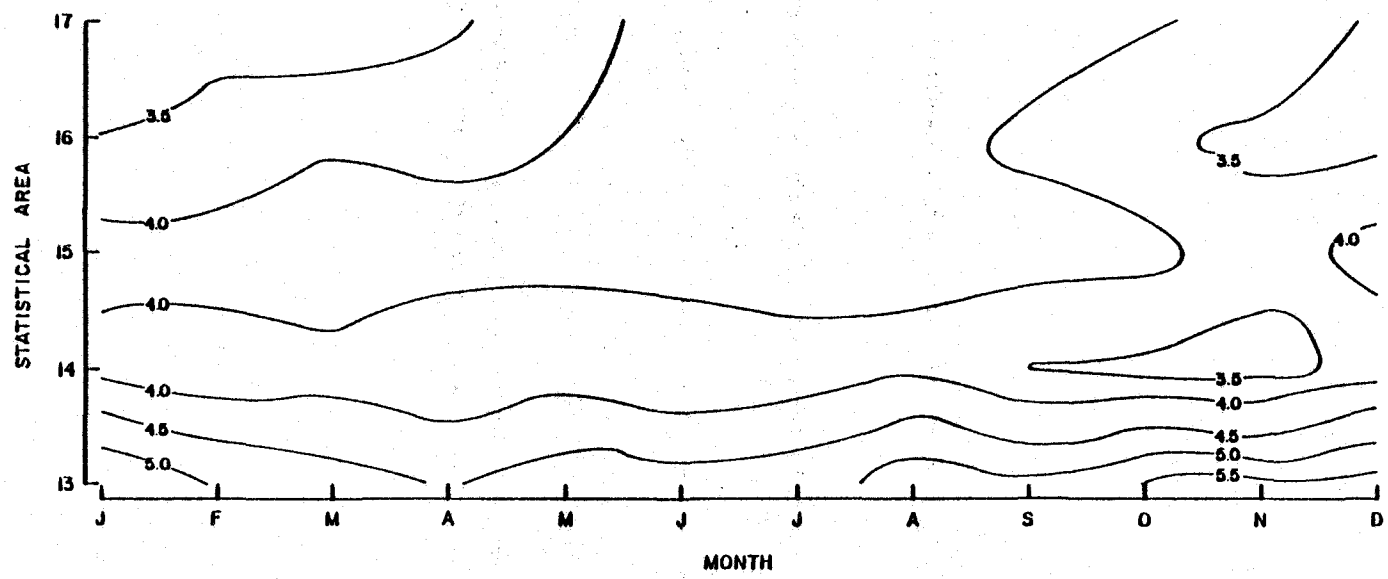

Fig. 97. Mean log-transformed catch per directed effort per water surface area by statistical area by month for *Penaeus* spp.

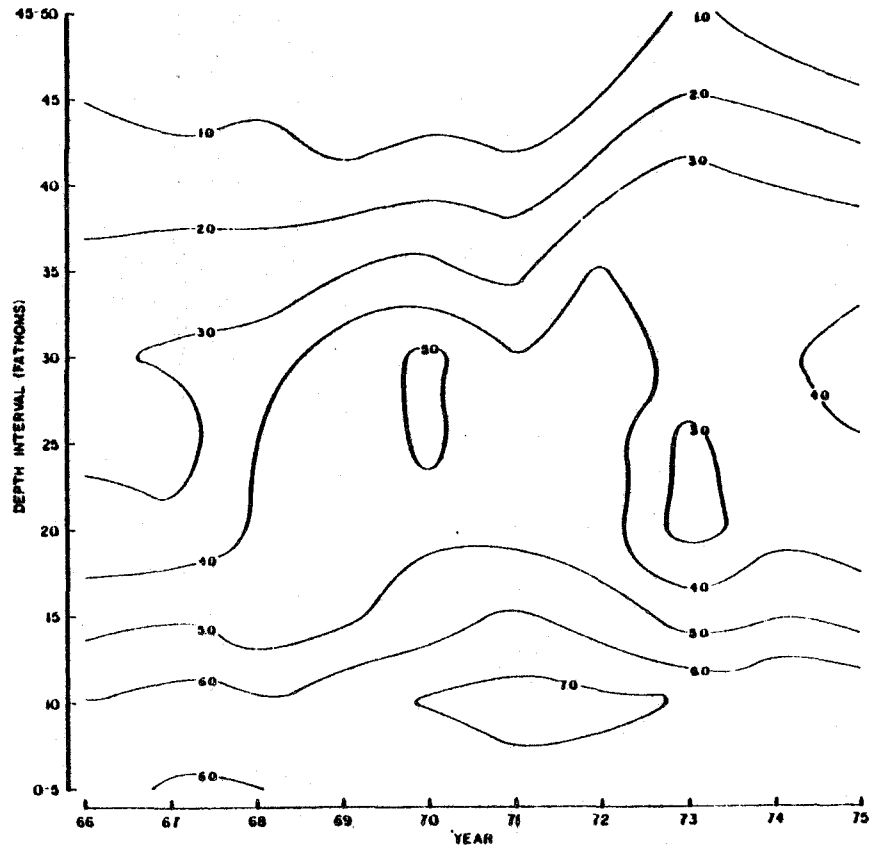

Fig. 98. Mean log-transformed catch by depth interval by year for *Penaeus* spp.

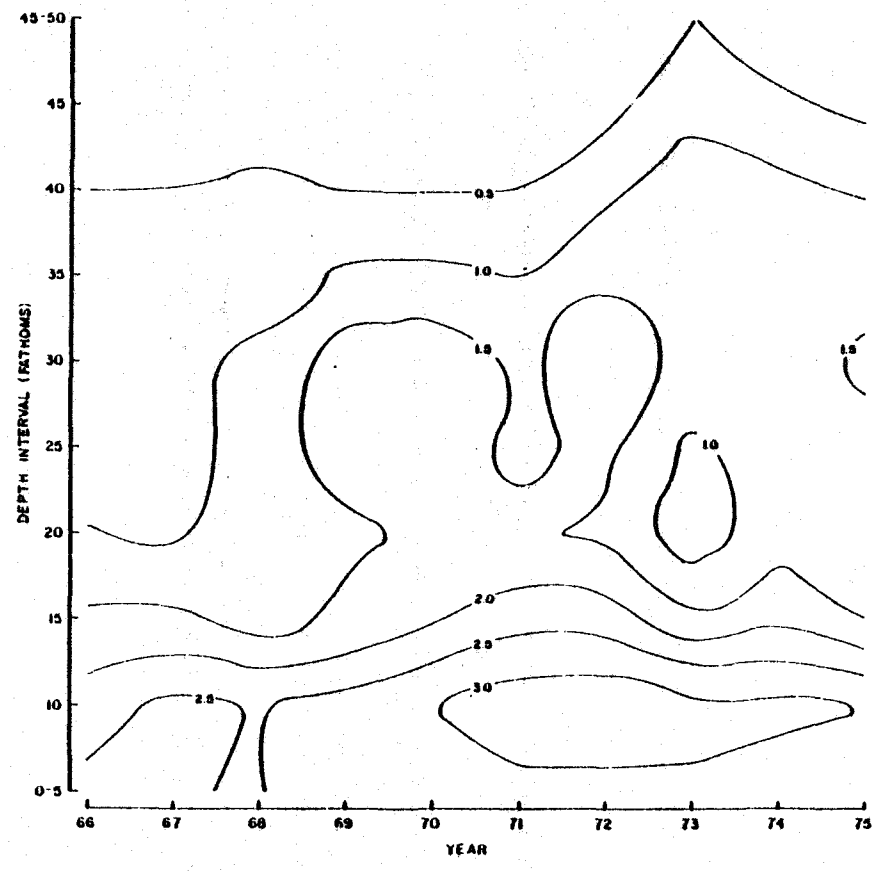

Fig. 99. Mean log-transformed directed effort by depth interval by year for *Penaeus* spp.

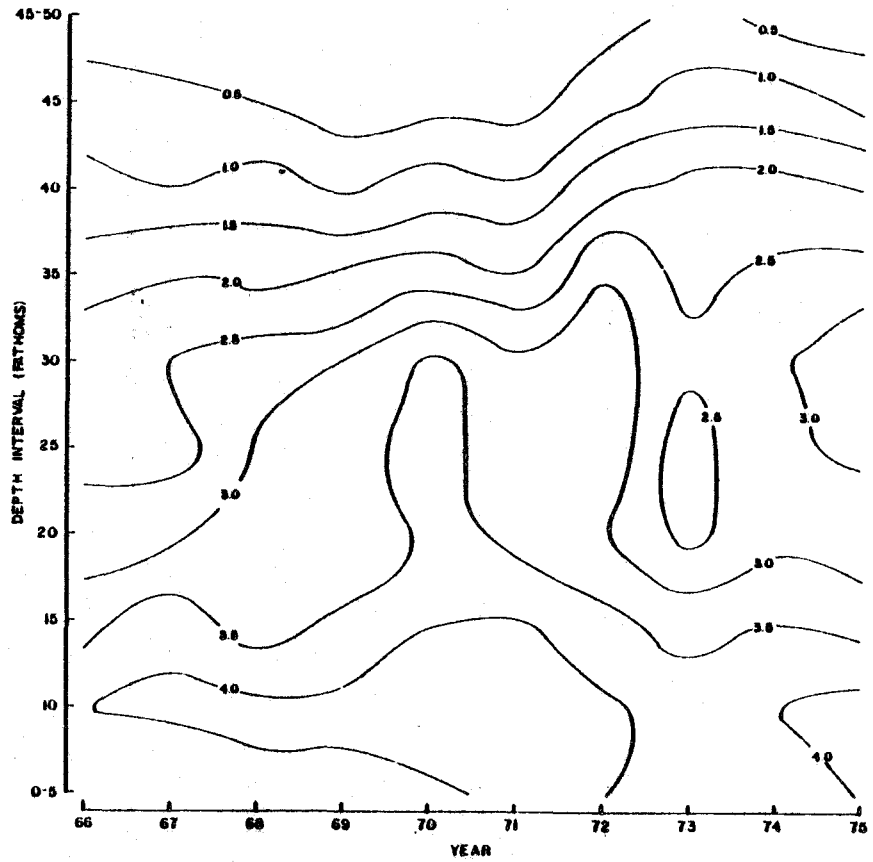

Fig. 100. Mean log-transformed catch per directed effort by depth interval by year for *Penaeus* spp.

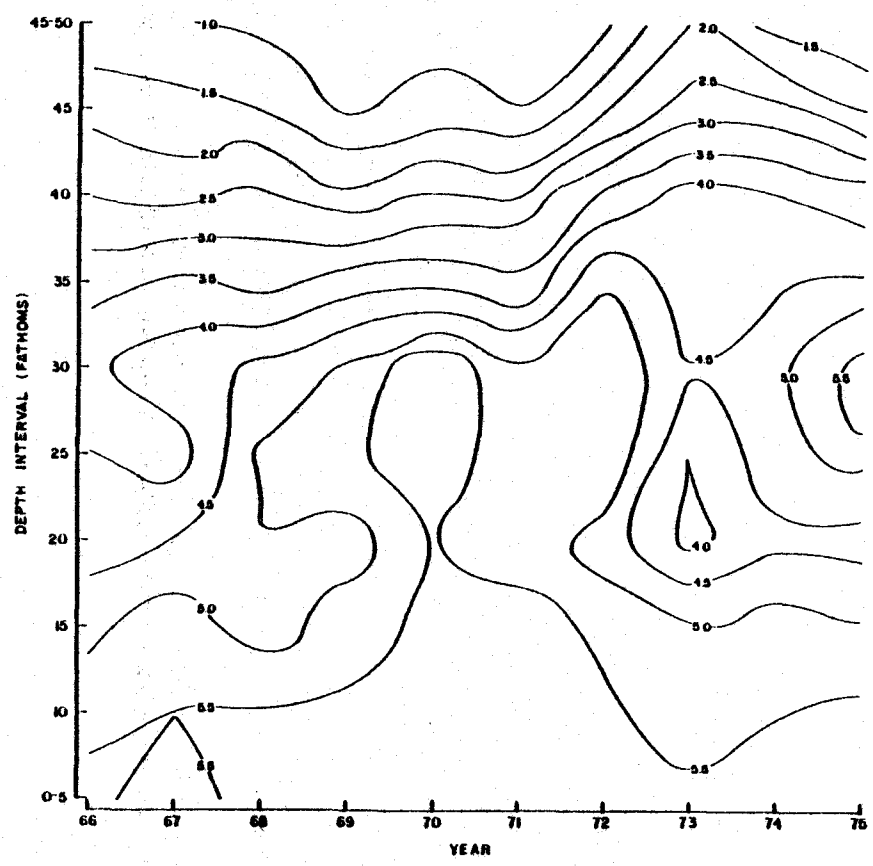

Fig. 101. Mean log-transformed catch per directed effort per water surface area by depth interval by year for *Penaeus* spp.

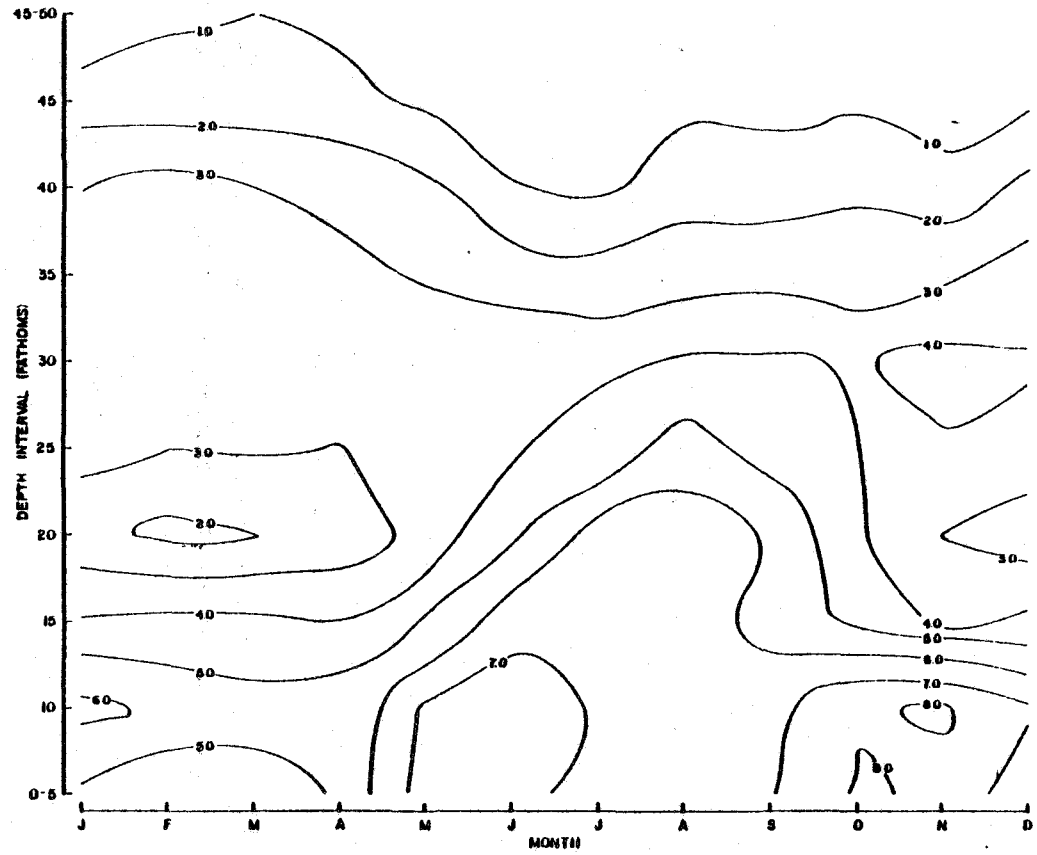

Fig. 102. Mean log-transformed catch by depth interval by month for *Penaeus* spp.

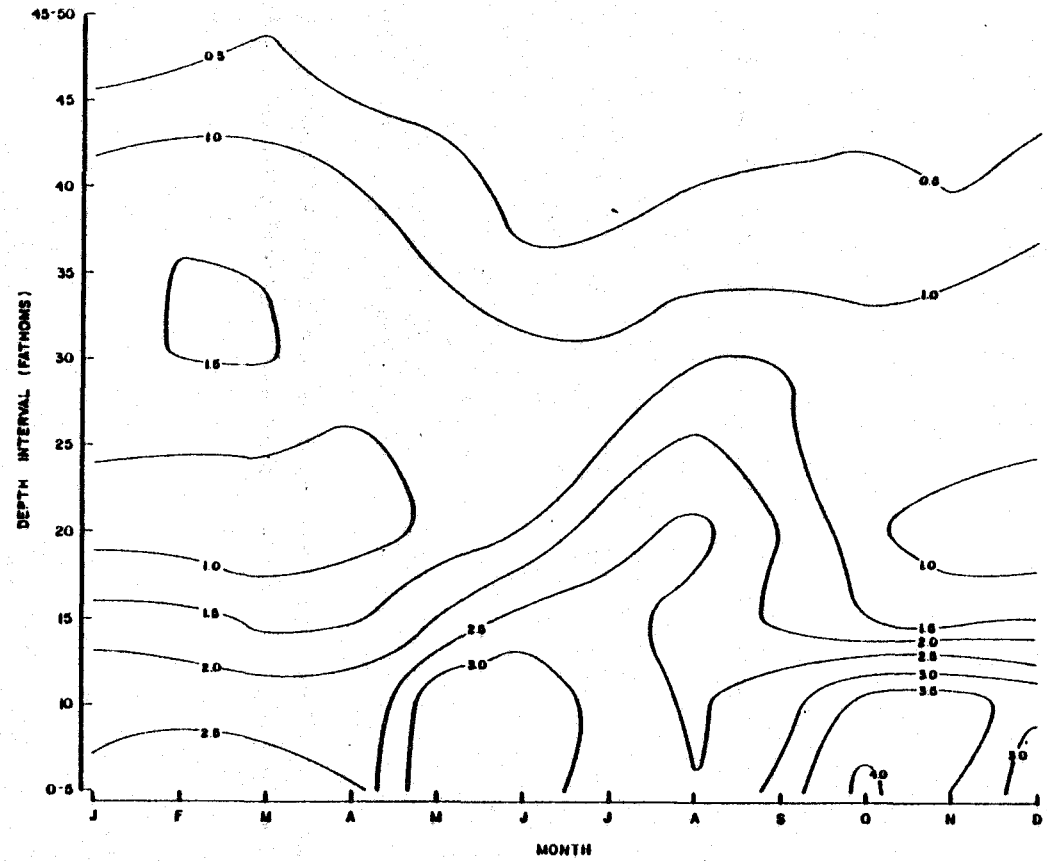

Fig. 103. Mean log-transformed directed effort by depth interval by month for *Penaeus* spp.

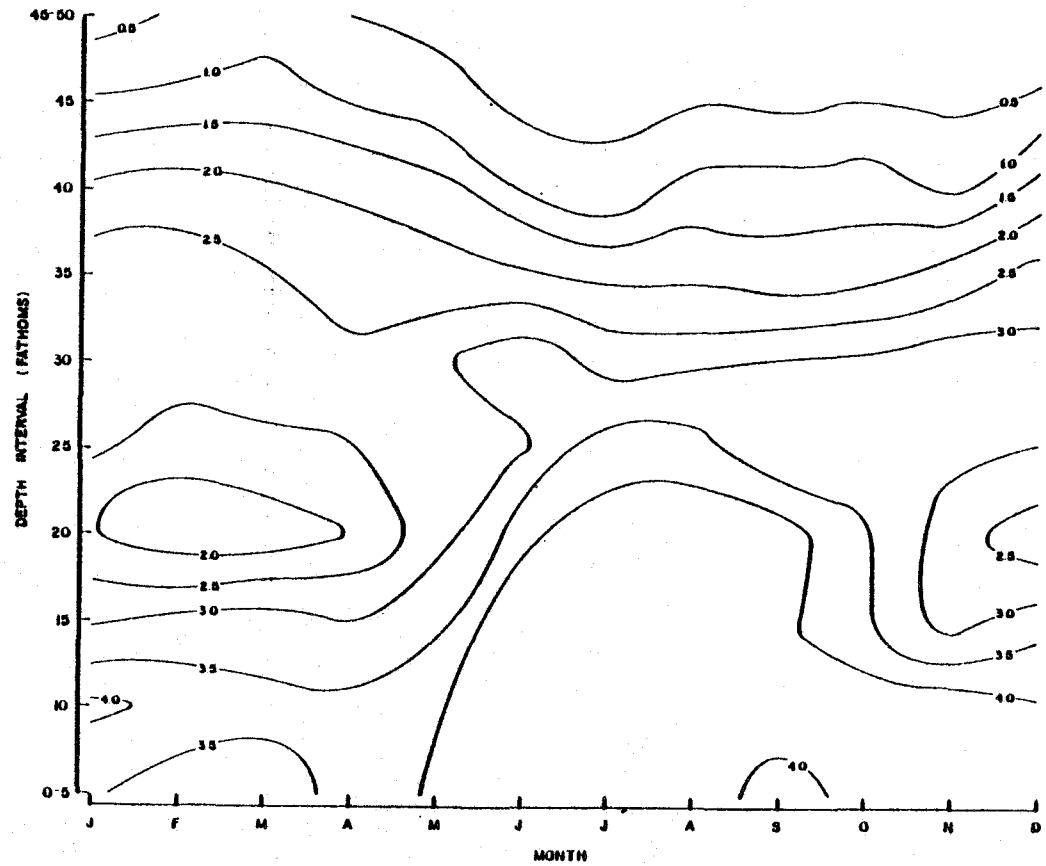

Fig. 104. Mean log-transformed catch per directed effort by depth interval by month for *Penaeus* spp.

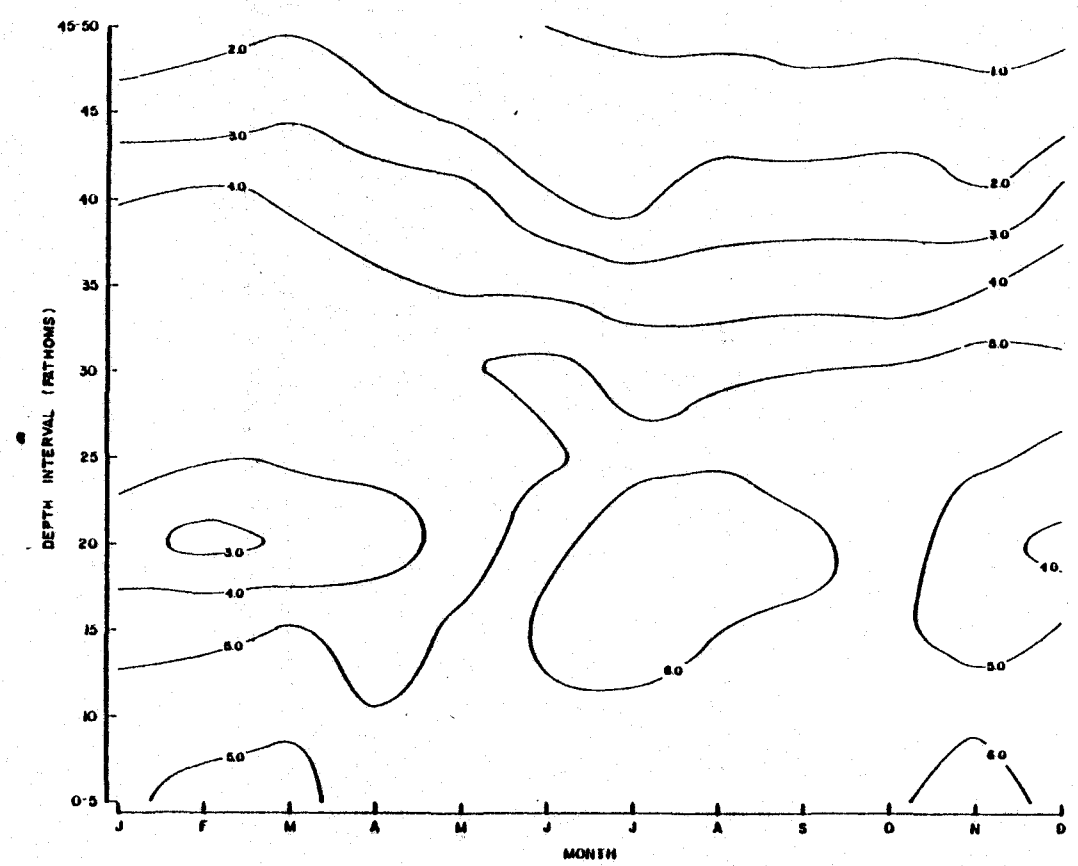

Fig. 105. Mean log-transformed catch per directed effort per water surface area by depth interval by month for *Penaeus* spp.

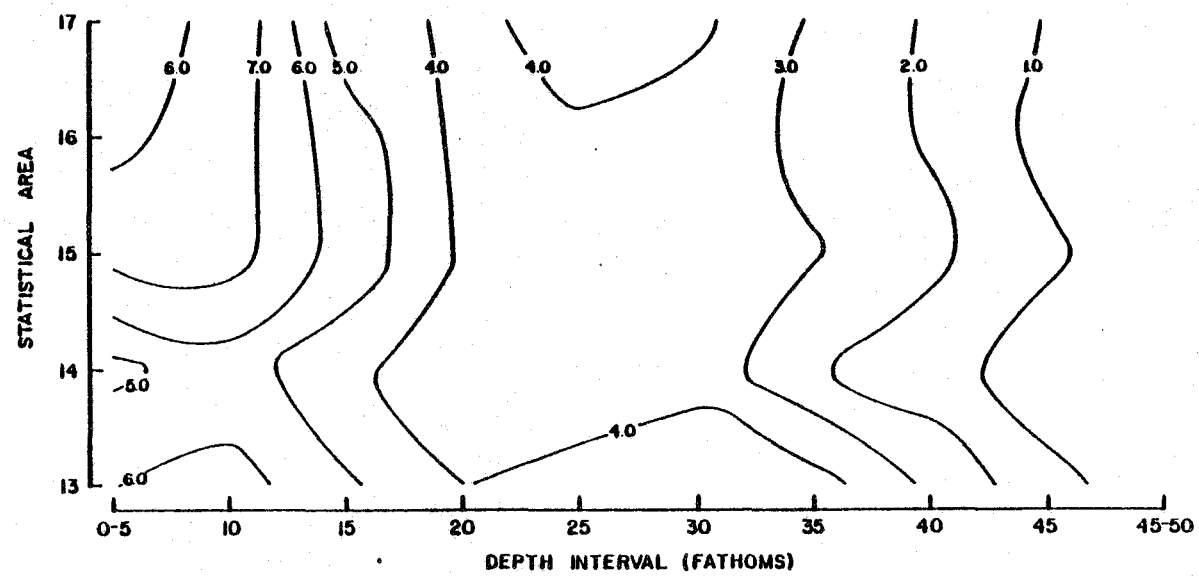

Fig. 106. Mean log-transformed catch by statistical area by depth interval for *Penaeus* spp.

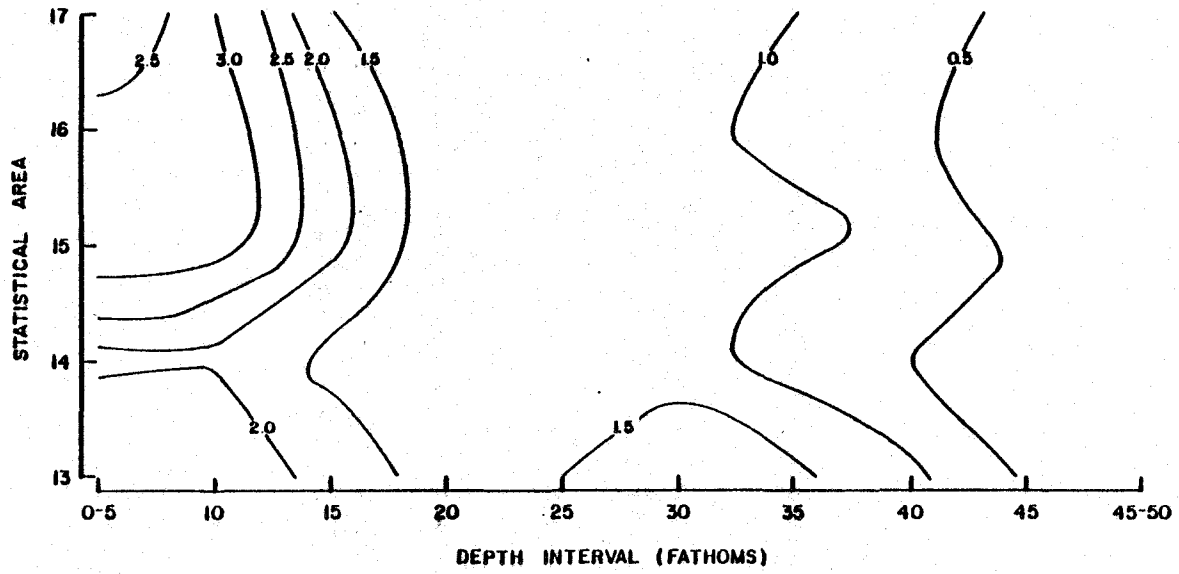

Fig. 107. Mean log-transformed directed effort by statistical area by depth interval for *Penaeus* spp.

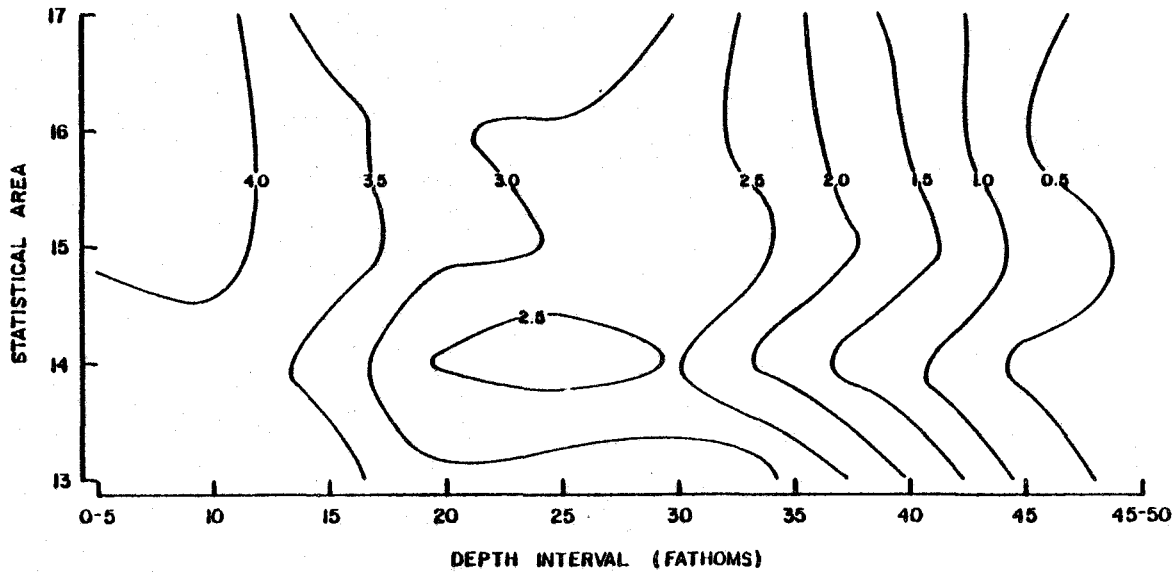

Fig. 108. Mean log-transformed catch per directed effort by statistical area by depth interval for *Penaeus* spp.

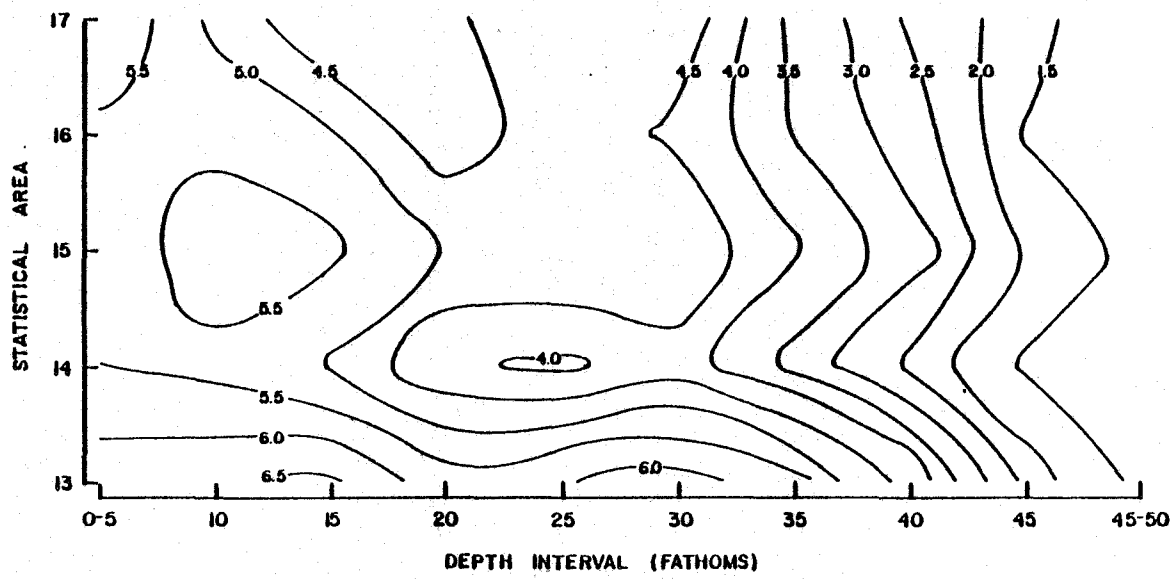

Fig. 109. Mean log-transformed catch per directed effort per water surface area by statistical area by depth interval for *Penaeus* spp.

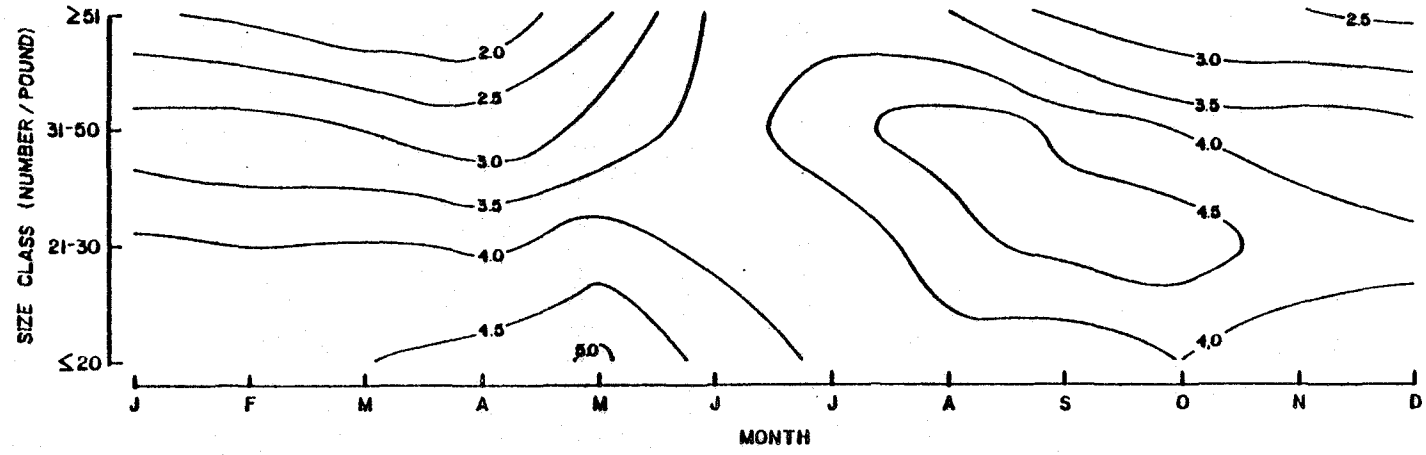

Fig. 110. Mean log-transformed catch by size class by month for *Penaeus* spp.

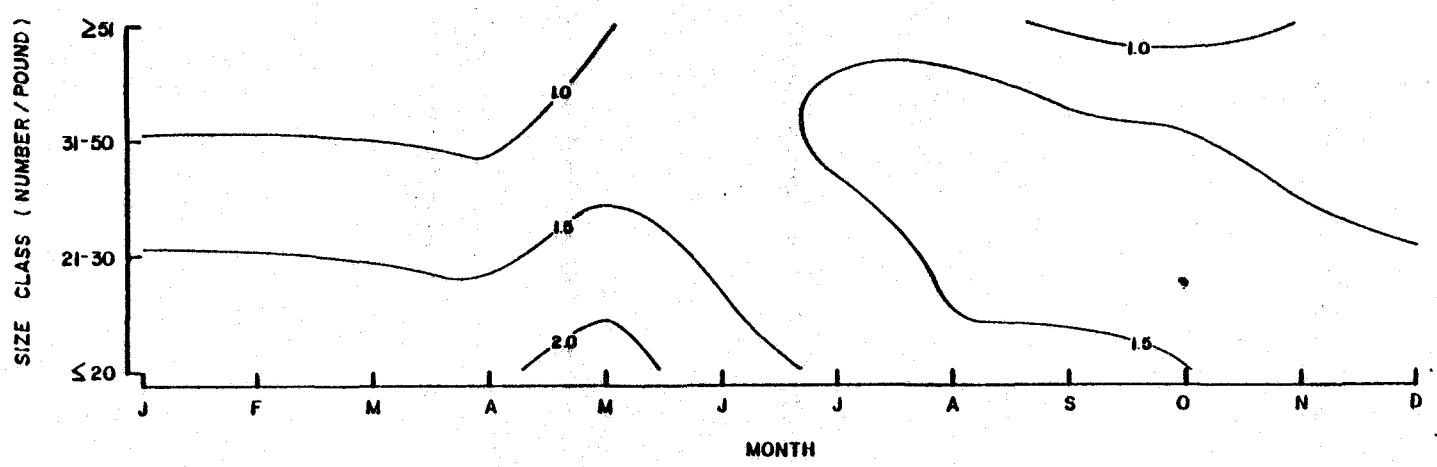

Fig. 111. Mean log-transformed directed effort by size class by month for *Penaeus* spp.

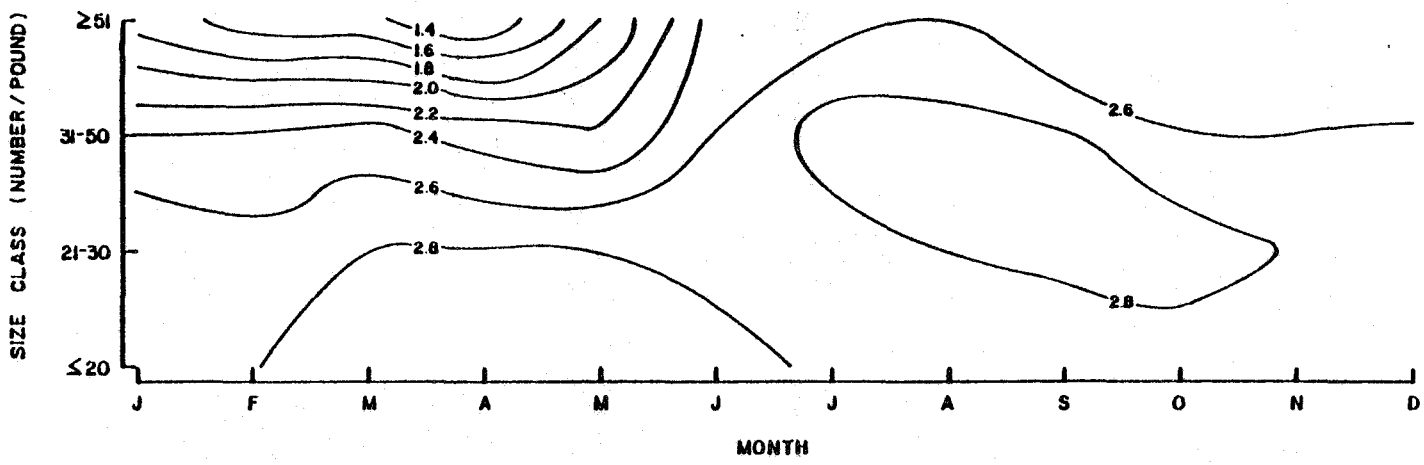

Fig. 112. Mean log-transformed catch per directed effort by size class by month for *Penaeus* spp.

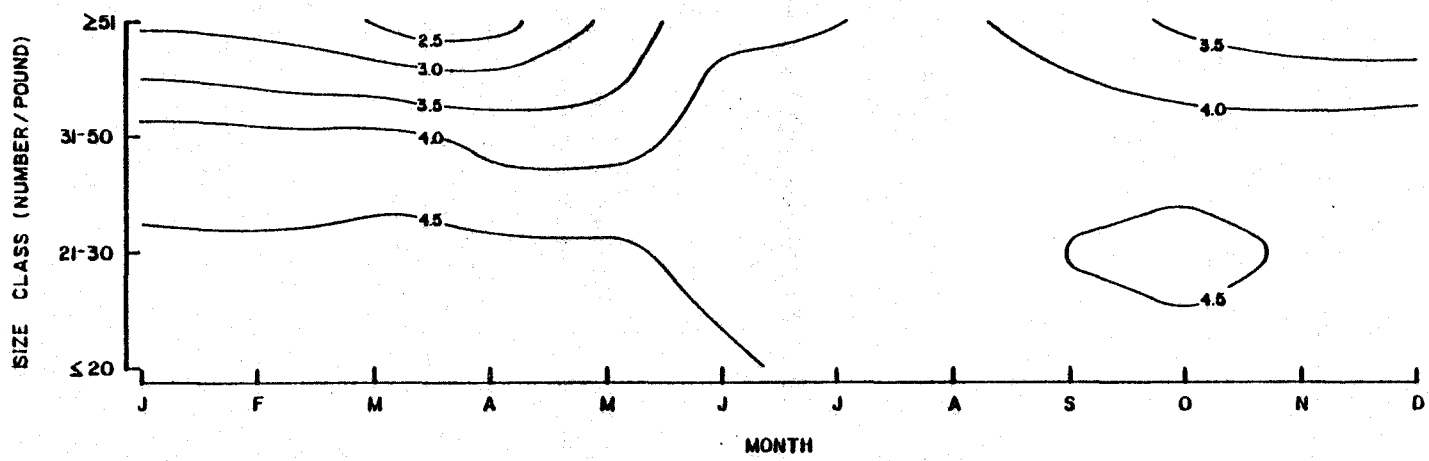

Fig. 113. Mean log-transformed catch per directed effort per water surface area by size class by depth interval for *Penaeus* spp.

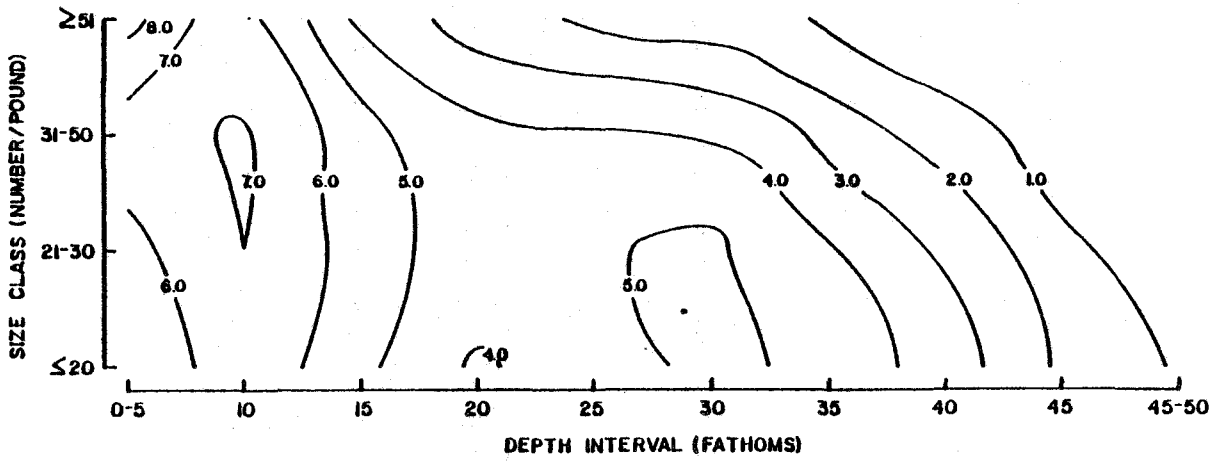

Fig. 114. Mean log-transformed catch by size class by depth interval for *Penaeus* spp.

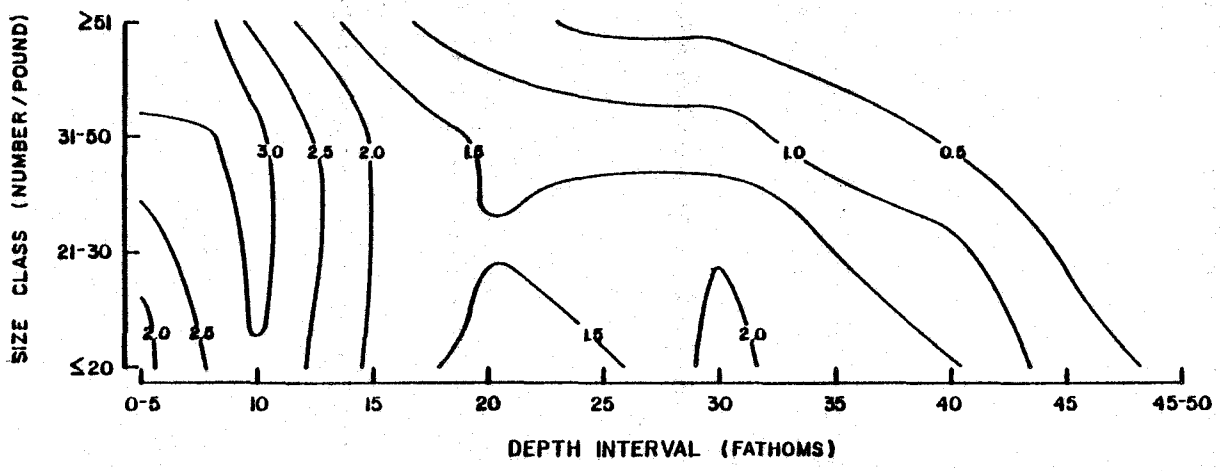

Fig. 115. Mean log-transformed directed effort by size class by depth interval for *Penaeus* spp.

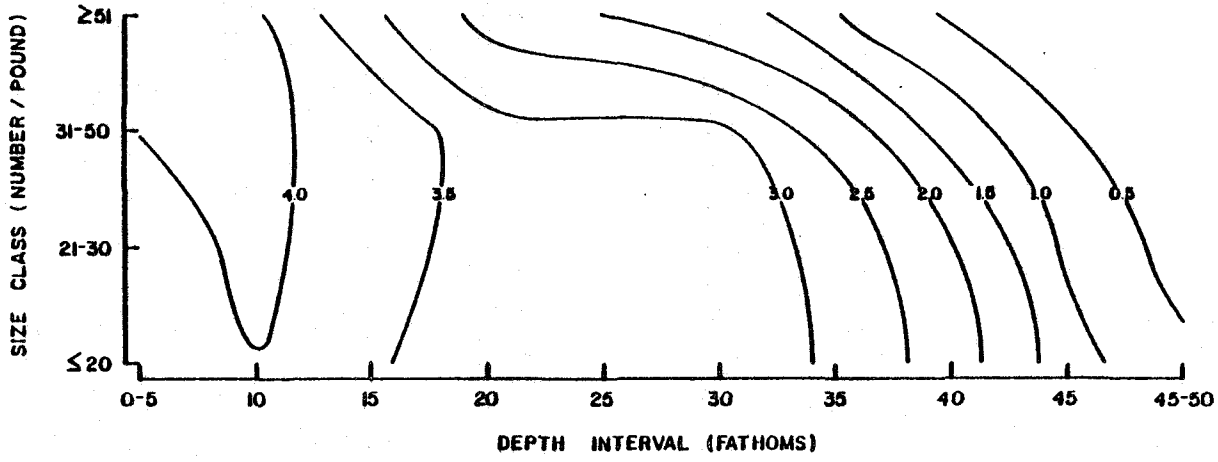

Fig. 116. Mean log-tranformed catch per directed effort by size class by depth interval for *Penaeus* spp.

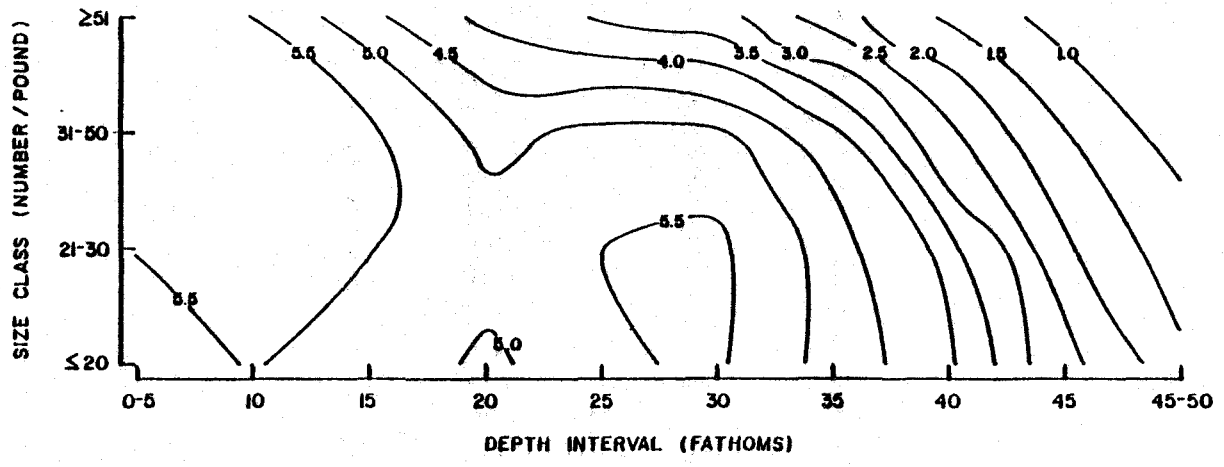

Fig. 117. Mean log-transformed catch per directed effort per water surface area by size class by depth interval for *Penaeus* spp.

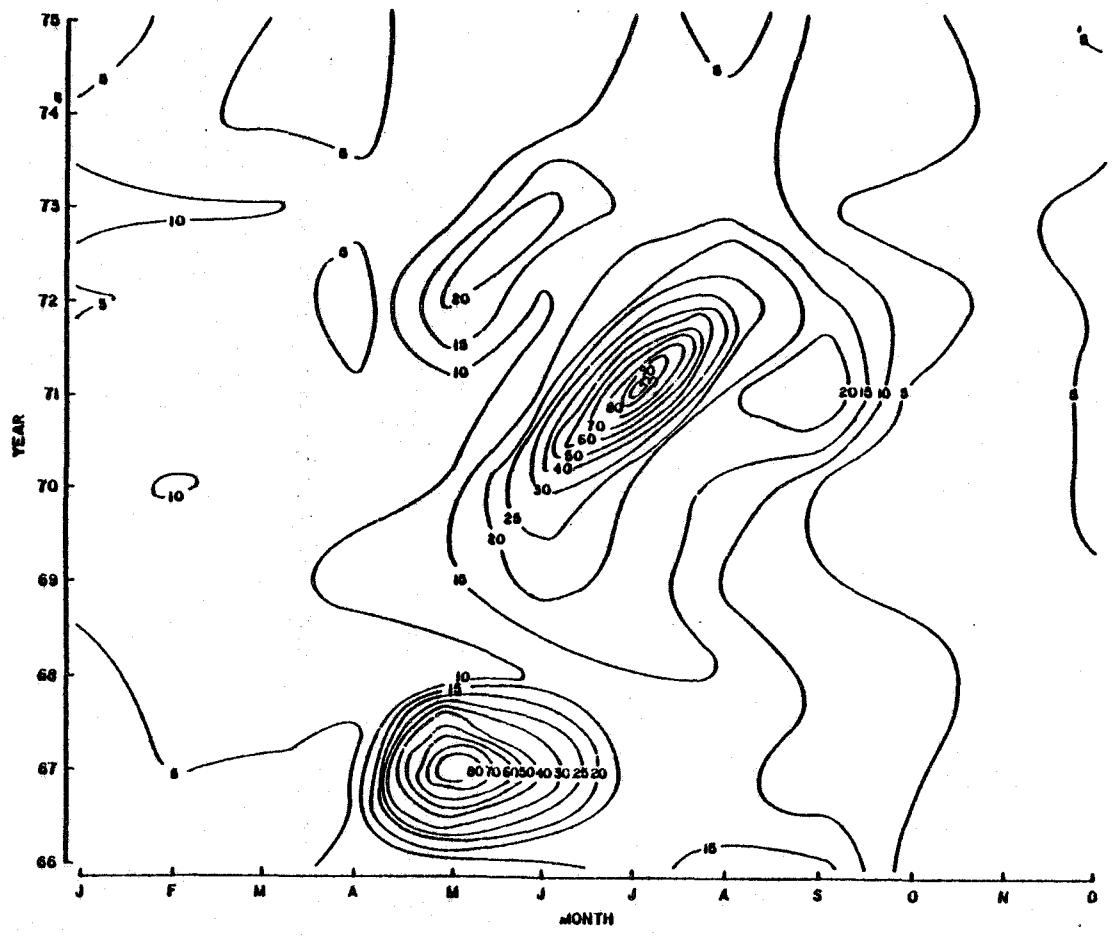

Fig. 118. Mean nominal days fished (x 100) by year by month for brown shrimp.

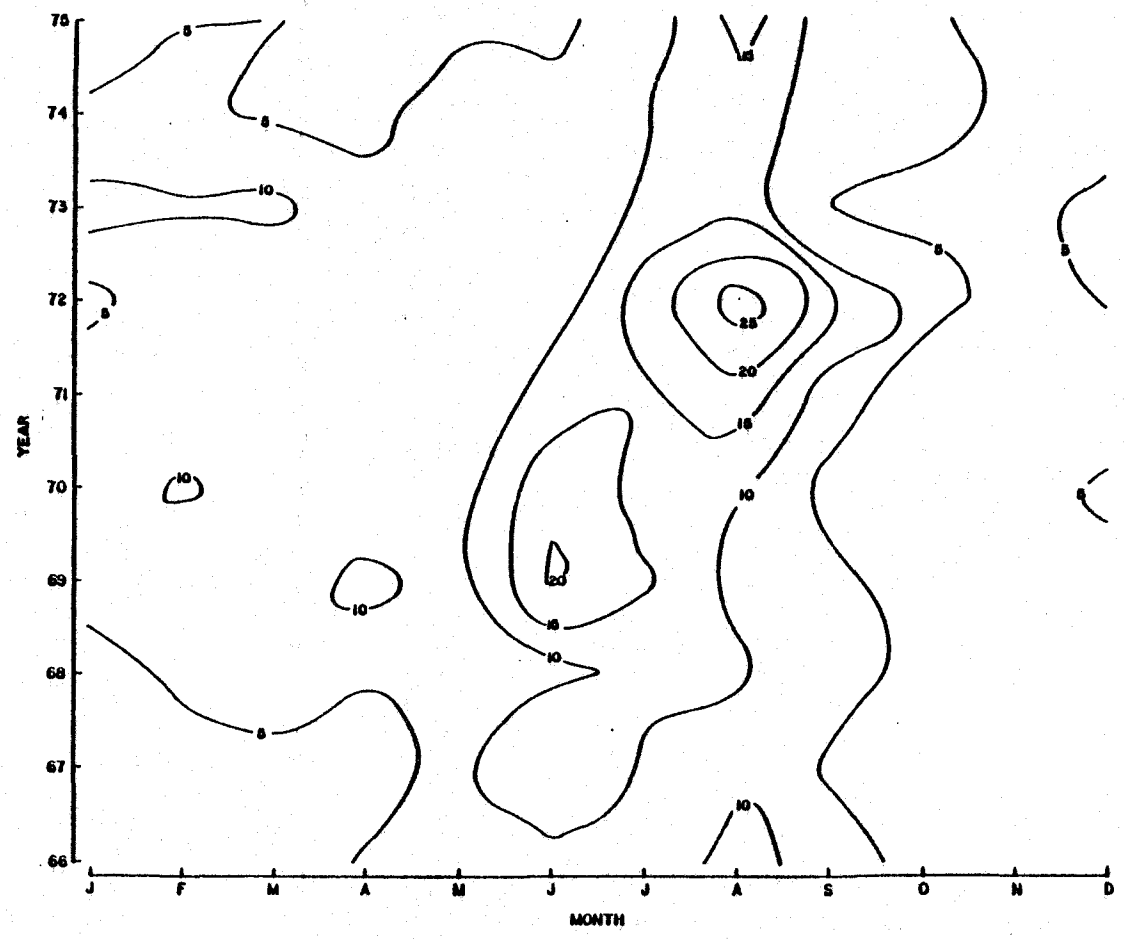

Fig. 119. Mean directed effort (days x 100) by year by month for brown shrimp.