OCS Study
MMS 97-0044

Cumulative Ecological Significance of Oil and Gas Structures in the Gulf of Mexico: A Gulf of Mexico Fisheries Habitat Suitability Model

Phase II—Model Desciption

MMS U.S. Department of the Interior
Minerals Management Service
Gulf of Mexico OCS Region

U.S. Department of the Interior
Geological Survey
Biological Resources Division

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Cumulative Ecological Significance of Oil and Gas Structures in the Gulf of Mexico: A Gulf of Mexico Fisheries Habitat Suitability Model

Phase II—Model Description

Authors

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April 1998

Prepared under MMS Contract
1445-CT0009-96-0005
by
LGL Ecological Research Associates, Inc.
1410 Cavitt Street
Bryan, Texas 77801

Published by

U.S. Department of the Interior
Minerals Management Service
Gulf of Mexico OCS Region

U.S. Department of the Interior
Geological Survey
Biological Resources Division

PROJECT COOPERATION

This study was procured to meet information needs identified by the Minerals Management Service (MMS) in concert with the U.S. Geological Survey, Biological Resources Division (BRD).

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SUGGESTED CITATION

LGL Ecological Research Associates, Inc. 1998. Cumulative Ecological Significance of Oil and Gas Structures in the Gulf of Mexico: A Gulf of Mexico Fisheries Habitat Suitability Model--Phase II Model Description. U.S. Dept. of the Interior, U.S. Geological Survey, Biological Resources Division, USGS/BRD/CR--1997-0009 and Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA, OCS Study MMS 97-0044. vii + 109 pp.

ACKNOWLEDGMENTS

We would like to thank Ms. Wilma Anderson and the Texas Shrimp Association for graciously allowing use of data and analytical products developed on one of their projects as input data for this project. We also thank our consultants and subcontractors for this project, namely A. Lissner, E. Waddell, and D. Heilprin of Science Applications International Corporation, Inc.; and C. Wilson, D. Stanley, and R.S. Carney of Louisiana State University. D. Stanley is especially thanked for making available a wealth of published and unpublished data resulting from his personal studies. Lastly, we are particularly grateful for the encouragement and direction provided by Robert S. Meyer, United States Geological Survey, and Pasquale Roscigno, Minerals Management Service.

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INTRODUCTION

On the order of 4,500 platforms have been placed in the Gulf since 1938 and are characterized by extensive biological communities (e.g. Gallaway and Lewbel 1982). Petroleum platform reefs differ from natural reefs in a number of significant ways, but two of the primary differences are that platforms span the entire water column and many, if not most, occur in areas where natural reefs are absent. It may prove more ecologically accurate to consider platform reefs as a new and distinct habitat rather than to assume that they are merely additions to existing reef systems. In either case, they have, over the decades, become a familiar and productive environment highly valued by man. After several decades, many of the offshore oil and gas fields areas are being exhausted, and the platforms are required to be removed. These removals have engendered a new controversy—what will the Gulf be like when the platforms are gone?

LGL Ecological Research Associates, Inc. (LGL) was awarded National Biological Service (NBS)[1] Contract No. 1445-CT96-0005 on 27 February 1996 to conduct a study to address the above-stated question. Project team composition also included representatives of Science Applications International Corporation, Inc. (SAIC) and Louisiana State University (LSU). The purpose of the study was to model the cumulative ecological significance of offshore oil and gas structures in the Gulf of Mexico, with the particular goal of being able to provide a qualitative or semi-quantitative index to the effects of structure removals and/or relocation. The models were developed for use by the Minerals Management Service (MMS) for evaluating effects of platform removals and making management decisions.

We approached the problem from a habitat perspective using Habitat Evaluation Procedures (HEP) developed by the U.S. Department of the Interior (USDI) (1980, 1982) to develop Habitat Suitability Index (HSI) models for key species. HSI models require a numerical rating of habitat under pre- and post-scenarios. An HSI is a unitless number bounded by 0 and 1, where 0

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[1] NBS is presently equivalent to the Biological Resources Division of the U.S. Geological Survey, U.S. Department of the Interior.

indicates unsuitable habitat and 1 indicates optimum habitat. Phase I of this study was dedicated to gathering the information necessary to develop the HSI models for the species or guilds in question. Development and use of HSI models require a clear understanding of environmental conditions in the modeled region and the habitat requirements of the species being evaluated.

The HSI modeling procedure we used consisted of five basic steps: 1) definition of system boundaries; 2) selection of marine guilds or evaluation species; 3) a determination of the total area and types of available habitats; 4) development of suitability indices for habitats and determination of the overall HSI for available habitat; and 5) prediction of past HSI's for areas where platforms had been removed.

The data and/or information needed for this project included the geographic distributions of physical habitat type (platforms, reefs, etc.), habitat variables of consequence (e.g., temperature, salinity, dissolved oxygen), and abundance of key organisms in the northern Gulf, all of which are necessary to model the relative value of regional habitats and develop the suitability index relationships.

The databases used in the model that were already available in a Geographic Information System (GIS) coverage or that were obtained during Phase I by LGL are identified in Table 1. In the workshops, the group developed a preliminary list of potential evaluation species or guilds that might be modeled if sufficient data were available, and habitat factors of likely significance to these species.

The Phase I bibliographic search resulted in sufficient data to produce species accounts for 11 reef fish (Table 2). Data were available to build suitability index relationships for adults for four of the species. Those four species, along with two others (grouper, other snapper) were then modeled and resulting HSI values mapped. Some data existed for three other listed species, Atlantic spadefish, king mackeral, and sheepshead, but not enough data to calculate the suitability index relationship. Seven species/ages subject to capture in trawls were also modeled and mapped.

Table 1. GIS coverages and Oracle tables held by LGL.

Coverage	Coverage Source, Data Source
Shoreline Map, Gulf of Mexico (GOM)	NMFS
Statistical Area Map, GOM	NMFS
Statistical Area/Depth Zone Map, Western GOM	LGL, NMFS
Bathymetry, GOM	MMS
Dead Zones, 85, 86, 90-95, GOM	LGL, LUMCON
NMFS Shrimp Bycatch, GOM	
Characterization	
Turtle data	LGL, NMFS
Station data	LGL, NMFS
Evaluation	
Turtle data	LGL, NMFS
Station data	LGL, NMFS
NMFS Shrimp Catch, GOM	
White, 86-96	LGL, NMFS
Brown, 86-96	LGL, NMFS
Pink, 86-96	LGL, NMFS
Other, 86-96	LGL, NMFS
Shrimp Boat Aerial Surveys, 1994, GOM	LGL, USCG
NMFS Shrimping Effort, 82-96, GOM	LGL, NMFS
NMFS Shrimp Boat Observer Data	
Henwood and Stuntz	
Turtle data	LGL, NMFS
Effort data	LGL, NMFS
TED Studies	
1. Turtle data	LGL, NMFS
Effort data	LGL, NMFS
2. Turtle data	LGL, NMFS
Effort data	LGL, NMFS
STSSN Turtle Strandings, 86-94, 80-95 GOM	LGL, NMFS
TAMU Turtle Satellite Tracks	LGL, TAMU
TAMU Turtle Radio Tracks, GOM	LGL, TAMU
Platforms in Federal Waters, GOM	MMS
Platforms in State and Federal Waters, GOM	LGL, NMFS, USCG
Removed Platforms, GOM 86-94	LGL, NMFS, MMS
Artificial Reef Permit Areas, GOM	MMS
Artificial Reef Planning Areas, GOM	MMS
Artificial Reef Sites, GOM	MMS
Topographic Features, Western GOM	MMS
Pinnacle Features, GOM	MMS
SEAMAP (1972-1996)	NMFS
Fall Groundfish Survey	NMFS
Offshore and Nearshore "Hang" Books	Texas A&M Sea Grant

Table 2. Fish species accounts from Phase I and model species from Phase II.

Species Accounts (Bold if also modeled)
Red Snapper
Cobia
Bluefish
King Mackeral
Sheepshead
Atlantic Spadefish
Gray Snapper
Great Barricuda
Gray Triggerfish
Blue Runner
Greater Amberjack
Modeled Only
Grouper
Other Snapper
Juvenile and Trawl Species Modeled in Prey Model
Red Snapper
Vermilion Snapper
Brown Shrimp
White Shrimp
Gulf Flounder
Atlantic Croaker
Trachypenaeus

METHODS

Spatial estimates of the abundance of juvenile reef fish (and other prey organisms of adult reef fish) having a benthic life stage over soft bottom habitat can be estimated from the National Marine Fisheries Service (NMFS) Fall Groundfish and Summer SEAMAP surveys. Nichols and Pellegrin (1989) provide the details of the sampling program history for these data. In brief, this time series began in 1972 as the "Fall Groundfish Survey" and concentrated on the north-central region of the Gulf as described above. The "primary survey area" was 5 to 50 fm waters between 88° and 91°30'W. During some years, spring and summer samples were also taken. The goal was to obtain triplicate tows of 10-min duration at "stations", which were randomly-selected 2.5 minute latitude-longitude grids within a 10-minute block that had been randomly selected from a list of all blocks. The station selection procedure was changed in 1978 but random selection of stations remained the keystone of the sampling plan. In 1985 and 1986, single 15-minute tows were taken at each site, and the program was expanded geographically with the intention of covering the region from Pensacola, Florida, to Brownsville, Texas. In 1987, the SEAMAP procedure, as described below, was adopted and continues to present. The region sampled extends from Pensacola to Brownsville.

Fall sampling has generally been restricted to October to November of each year. In the early years, sampling proceeded from east to west, so that missed samples were more frequent in the western part of the region sampled than the eastern part. Since 1987, fall sampling generally begins in mid-October in Statistical zones 10 and 11, then shifts to Brownsville (Zone 21) and proceeds back towards Pensacola. Typically, by the end of October sampling has reached the Galveston/Sabine region. The upper Texas coast and western-Louisiana are mainly sampled during the first 10 days of November, and sampling through the entire primary region occurs during 11-20 November. While the entire western Gulf is sampled within about a 1-mo period, temporal variation may cloud spatial differences.

NMFS has participated in and coordinated federal, state, and university summer sampling efforts since 1982 as part of the Summer SEAMAP program (Goodyear 1995). The trawl sampling gear are the same as used in the Fall Groundfish Survey (Nichols and Pellegrin 1989). The survey covers the area between Pensacola and Brownsville, from 5 to 60 fathoms. Stations are selected in a stratified random design, with strata established alongshore (based on commercial shrimp statistical areas), and by depth. Trawling is conducted perpendicular to the depth contours. Duration of each trawl is set by the distance between the inner and outer depth boundary for each stratum. A station begins at the intersection of a depth contour and a randomly chosen alongshore location. Measurement of depth by fathometer in the field determines when the end of the station is reached. Since 1987, the temporal distribution of sampling in the June-July program is much like that described for fall in terms of sampling sequence.

We used the data from 1985 through 1996 to index mean annual abundance patterns of seven species/ages subject to capture in a trawl. Following examination of the data, we determined that the finest spatial resolution that was practical for evaluating abundance patterns was blocks of 10-minutes of latitude by 10-minutes of longitude. Mean catch per hour trawling with a 40-ft wide trawl was then calculated for each species for each of the 560 final model cell blocks.

Following Odum (1971) we defined habitat as the place where an organism lives, or the place that one would go to find it. Thus, the quality of habitat for each species should be reflected by the abundance of the species using particular blocks. Our abundance data for individual blocks were categorized into 5 initial classes: blocks where the species was never caught, and the 4 quartiles of CPUE > 0.

Mean bottom temperature, bottom salinity, and depth values were then calculated from all SEAMAP sampling stations (not just trawl sites) within each model block. The values were assigned to 1° temperature and salinity ranges, and 10 fathom depth ranges. The data proved to be too sparse to allow seasonal modeling, thus data used for each model cell represents the mean over all years and seasons.

Oil and gas platforms locations were acquired from the United States Coast Guard, and the Minerals Management Service. A data set as of 1995 was created from those files, and the number of platforms in each model cell was calculated. Texas A & M Sea Grant provided a file of net hang locations, which was used to create a hang data set, from which the number of hangs in each model cell was calculated. The hang data set only includes data west of 89° 30′ W longitude. The model cells east of that location were calculated with no hang effect. ARC/INFO coverages containing polygons of dead zone distribution by year were overlaid upon the model cells to create a data set containing the number of years that each cell was influenced by the dead zone.

The bottom temperature, bottom salinity, depth zone, dead zone year counts, platform, and hang data sets were merged into one environmental data set. This data set was then merged with the species distribution data set to form the testing data set. Comparisons of temperature, salinity, depth, dead zone year counts, platform counts, and hang counts in high-use areas to the availability of the same variables in the overall cells was used to calculate scaled suitability indices for each of the variables for the range of observed values.

The HSI value for any model cell was then calculated as sixth root of the product of the suitability index for each variable for that cell.

A schematic of the model program is shown in Figure 1.

Adult Reef Fish Model

Catch statistics accumulated by Dr. David Stanley in eastern and western Louisiana, south of Cameron were used to develop a relationship between reef fish species catch and temperature, salinity, and platform depth. A total of 2,442 fish observations of 49 species were available. Platforms involved in the study were grouped by ten minute latitude and longitude block. Mean temperature, salinity, and depth for each block were calculated from all NMFS SEAMAP sampling data taken from locations within the block. If actual depth data was available for a sampled platform, that data was used rather than the block mean. This combined data set model cells with catch statistics and environmental data was used to create two new sets; one for overall availability of the habitat in the data set, and a second set with

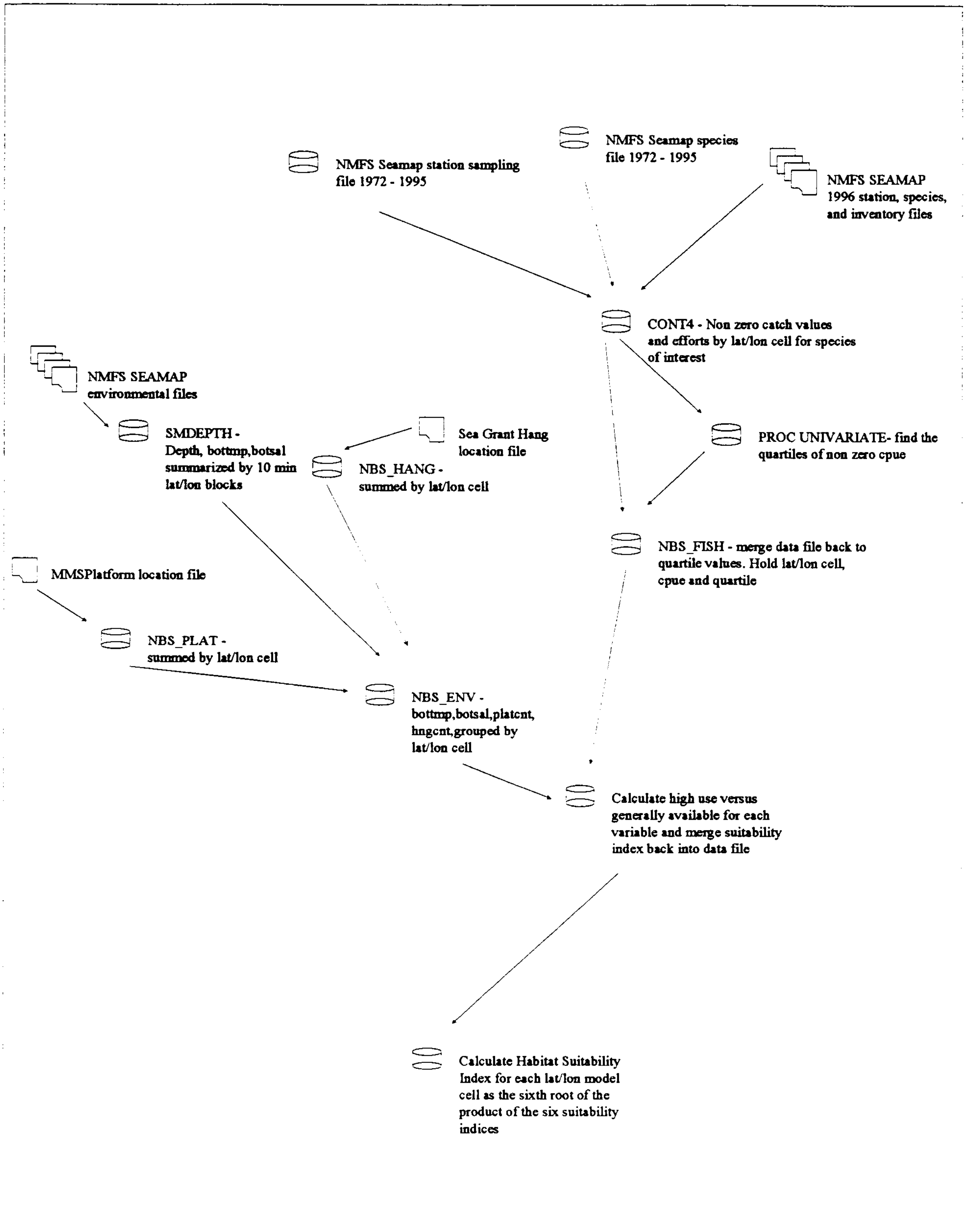


Figure 1. HEP Model for Trawlable Species

records for the species of interest only. Counts of unique platforms were then calculated for the overall available and the species of interest use by 10 fathom depth intervals. The differences between percent available and percent used by depth interval were then used to calculate a depth index. This same technique was then used to create temperature and salinity indices.

Data sets containing platform counts, hang counts, number of years (out of eleven) where the cell fell within the recognized dead zone area for the year, and the SEAMAP environmental data were then merged into a single environmental data set which included all 560 model cells. The temperature and salinity relationship data sets were then each merged with a copy of the environmental data set to create data sets with a temperature suitability index for each model cell and salinity suitability index for each model cell, respectively. The depth relationship data set was then merged with the environmental data set to create a depth index (shown as relidx in the data tables), which was then multiplied by a factor based on relief available in the cell (sppval in the data tables). This factor was calculated as the number of platforms plus one-tenth the number of hangs for cells where there was no record of dead zone years. For cells that occurred in the dead zone some years the formula was modified to be the number of platforms plus 11 minus the number of dead zone years divided by 11 times one-tenth the number of hangs. The natural log of the sppval value + 1 was assigned to lsppval. The depth by platform and hang component was then calculated as the ratio of a cell's lsppval variable to the maximum lsppval that occurred for the species of interest. The three remaining data sets (temperature indices, salinity indices, and depth/relief indices) were them merged to create a single data set in which the habitat suitability index for each cell was calculated as the cubed root of the product of the three indices. This final data set was then merged with a template data set which hold the latitude and longitude coordinates of the northwest corner of each model cell, and an internal identifier which is used to link the data set to an ARC/INFO polygon coverage of the model cells.

The schematic for the adult model is shown in Figure 2.

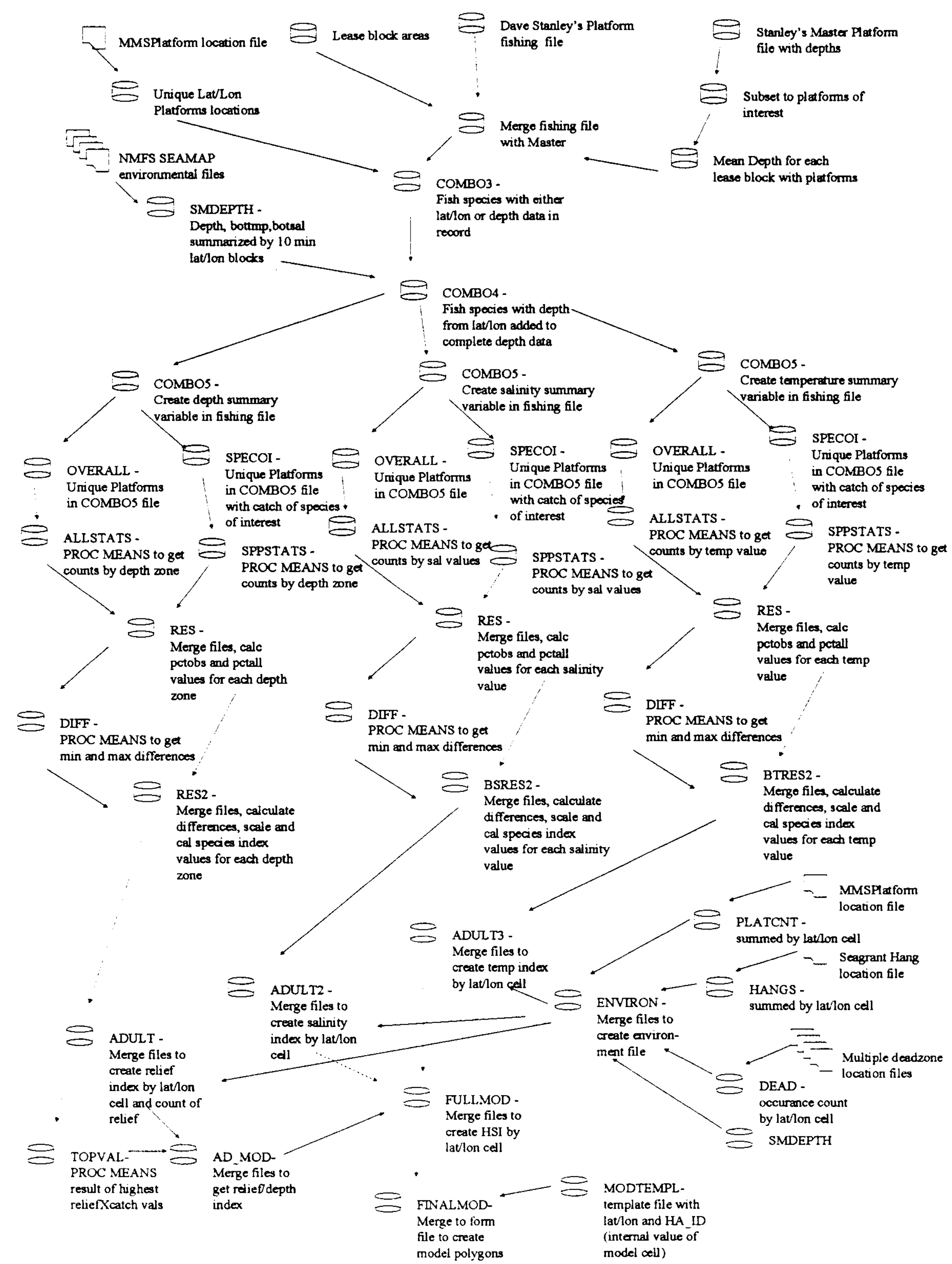


Figure 2. HEP Model for Adult Reef Fish

Red Snapper Platform Removal Assessment

MMS provided data sets of removed platforms from 1986 - 1994 were summarized by model cell and year. A total of 720 platforms were removed from 230 model cells during the period (Fig. 3). These platforms were then added back to the existing platforms as of 1995, and the adult reef fish model for red snapper was run, calculating a habitat suitability index value for each model cell with all platforms (removed and existing) in place. The resulting data set holds both the HSI value for the 1995 model (oldhsi) and the HSI value for the all platforms model (hsi). A Student's t test was performed on the matched, non zero observations.

A second approach to creating a semi-quantitative index to the effects of structure removals or relocations was to build an assessment model with a greater emphasis on platform contributions in the HSI. This model was constructed in the same manner as the adult reef fish model through the development of the suitability index relationships. Once the relationships were developed a suitability factor (SUITFACT) was created as the n^{th} root of the product of the n factors. This factor is an index to the value of each platform in a model cell. The HSI value for any model cell can then be estimated as the product of the number of platforms plus one-tenth the number of hangs in a cell and the suitability factor divided by two times the variable GOODCELL. If the factor is greater than 1 it is recorded as 1. In this manner the effect of adding or removing one or more platforms can be estimated for each model cell. The variable HOWMANY in the assessment data set reflects the number of platforms that could be removed from a cell before the cell HSI would be reduced enough to fall into a different quantile.

RESULTS

Habitat suitability indices were developed for 560 model cells located west of 87 degrees west longitude in the nearshore Gulf of Mexico for seven species/ages subject to catch in trawls, and six adult reef fish species (Fig. 4). Each cell is ten minutes of latitude tall (11.57 miles) by ten minutes of longitude wide (11.15 miles), forming an area of approximately 129 square miles (total model area 72,240 square miles). The number of high quality habitat cells (defined as HSI >= 0.5) ranged from juvenile Atlantic croaker

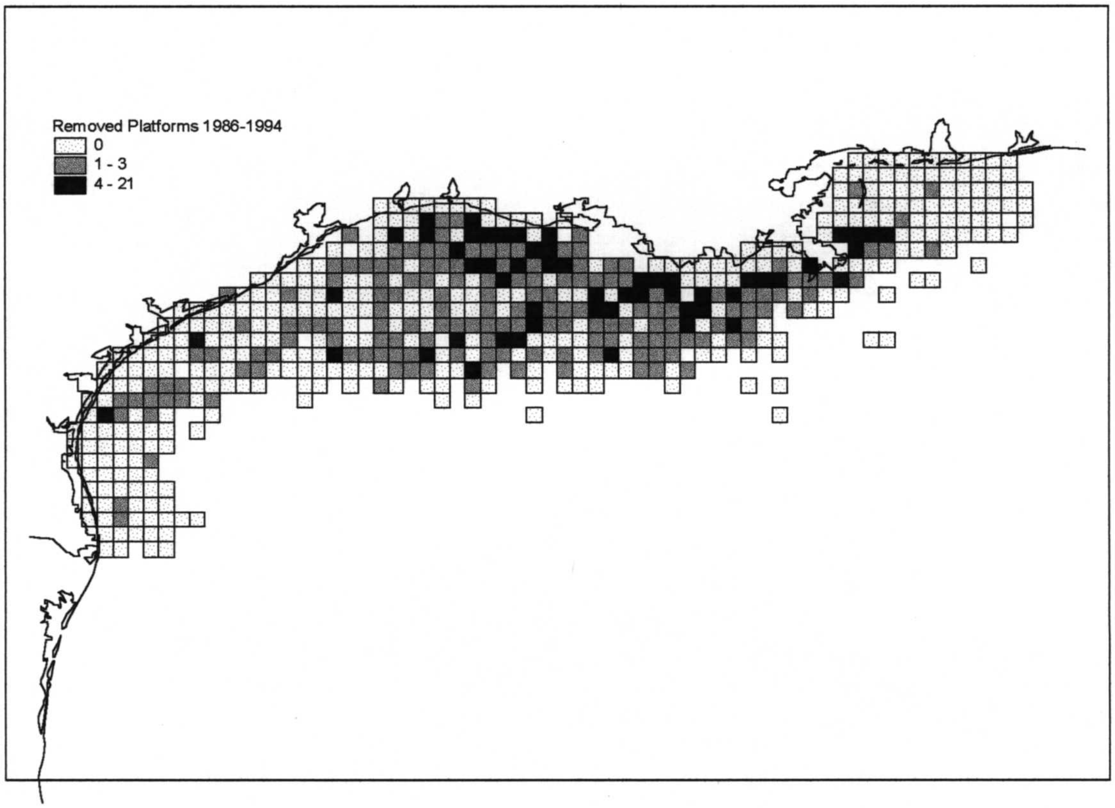
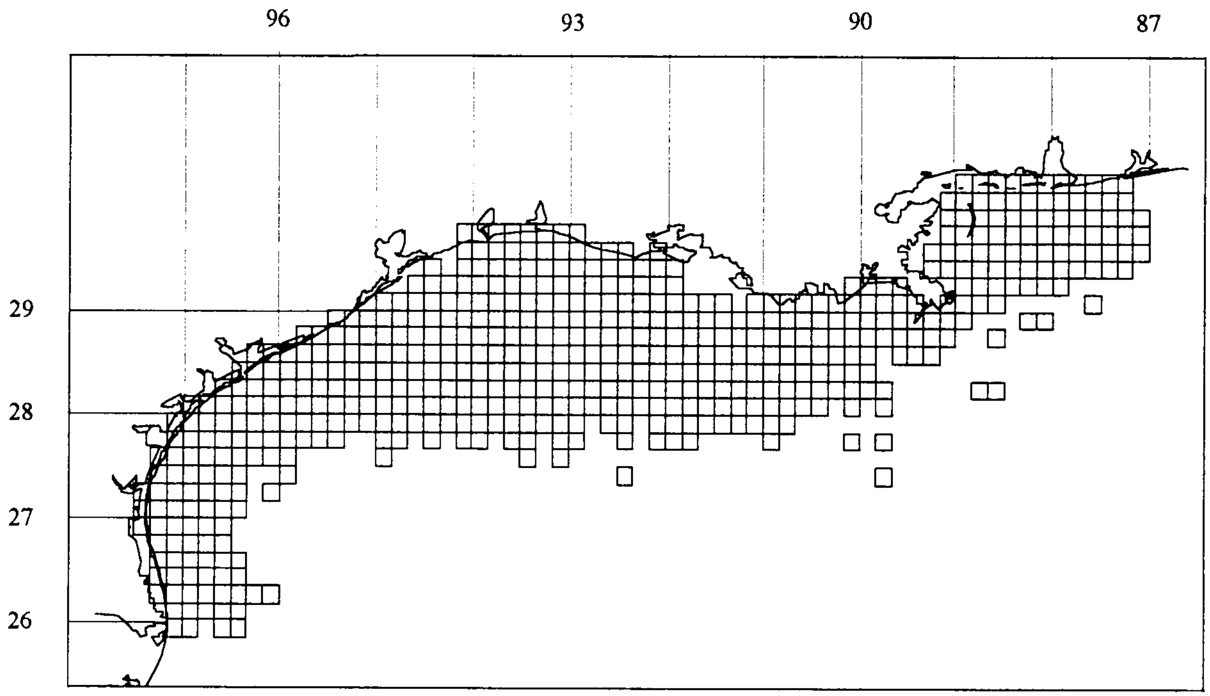


Figure 3. Removed Platforms



•560 Model Cells

•215 cells located offshore Texas

•345 cells located offshore Louisiana

•Each cell is 10 minutes latitude by 10 minutes longitude

•11.57 miles on North/South side (latitude)

•11.15 miles on East/West side (longitude)

•129 square miles per cell

•Total modeled area in Western Gulf: 72,240 sq. mi.

Figure 4. Habitat Model Cell Characteristics

with 150 (26.8% of the available cells) to adult Cobia with 46 (8.2%) with a mean value of 110.6 (19.8%).

Combining HSI values for all adult reef fish species in each of the cells results in 57 (10.2%) overall high quality habitat cells (combined cell value >= 3); combining trawlable species produce 83 (14.8%). Two hundred six (36.8%) of the cells represent high quality habitat to at least one of the adult reef fish species, whereas 365 (65%) of the cells represent high quality habitat to at least one of the trawl species. When cell HSI values are combined for all thirteen species 42 (7.5%) are overall high quality habitat cells (combined cell value >= 6.5) and 406 (72.5%) are high quality habitat for at least one species.

Suitability index relationships between species abundance and each of the environmental parameters are included in Appendices 1 and 2 for trawl species and adult reef fish, respectively.

Comparative maps of HSI values for the modeled trawl species and adult reef fish are included in Figures 5 and 6, respectively. The maps for trawl species show distinct groupings of nearshore species (white shrimp, gulf flounder, and Atlantic croaker), offshore species (vermilion snapper), and middle grounds species (red snapper and brown shrimp). Overall distribution of the adult reef fish also shows offshore species (grouper and other snapper), and middle ground species (red snapper, triggerfish, amberjack, and cobia).

Bottom temperature, bottom salinity, mean cell depth, number of platforms, and number of hangs are the environmental parameters used in the models (surface temperature and surface salinity are used for surface dwelling adult reef fish). Maps of the distribution of values of each parameter are shown in Figure 7.

Individual HSI distribution maps, plotted on the 20 fathom contour line for reference, and related environmental parameter range and preference charts for each of the trawl species are included in Appendix 3; adult reef fish species are in Appendix 4.

A red snapper platform removal assessment was constructed by adding back the 720 structures removed during 1986 - 1994 to the 230 models cells

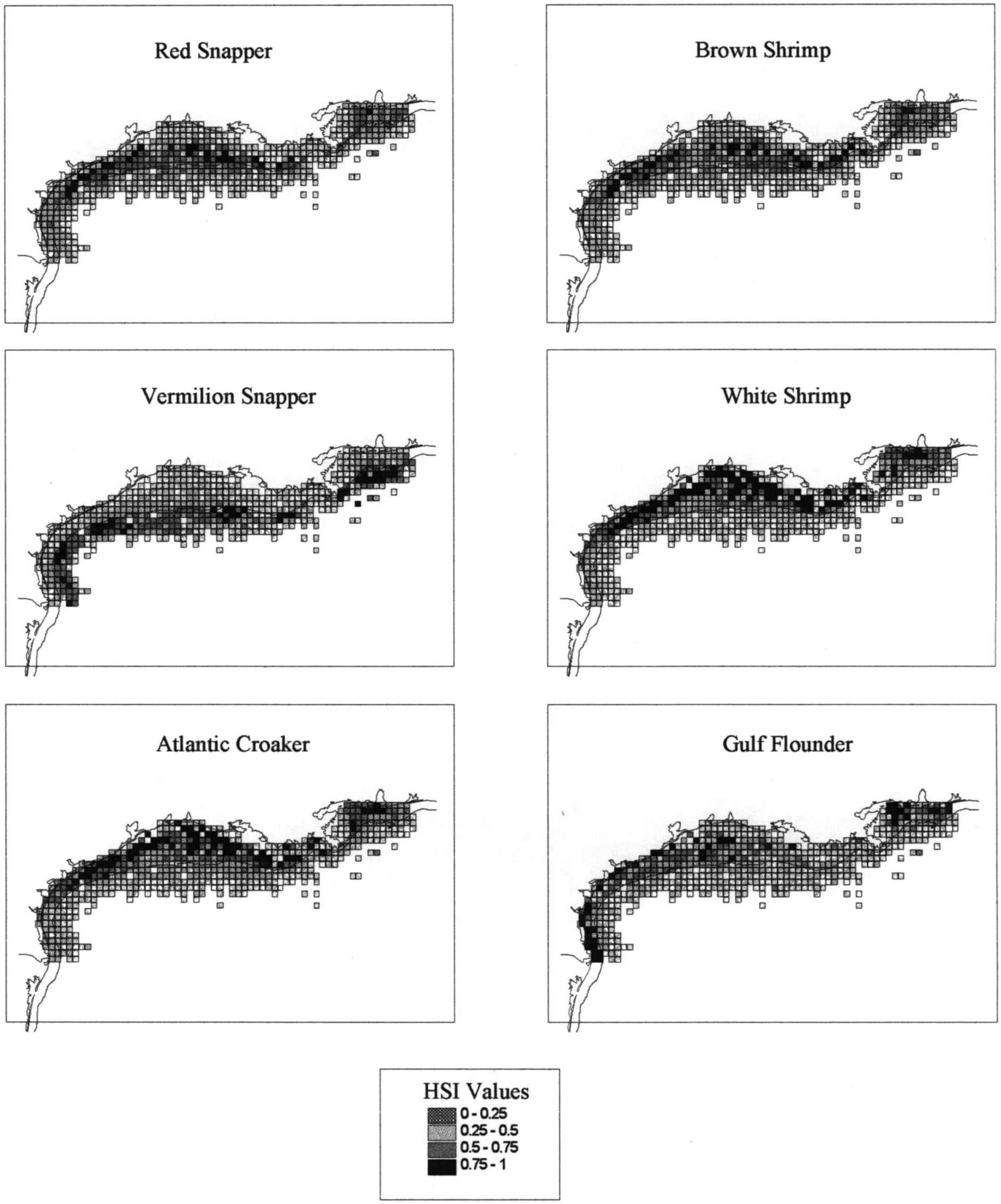


Figure 5. Habitat Suitability Indices for Trawlable Ages

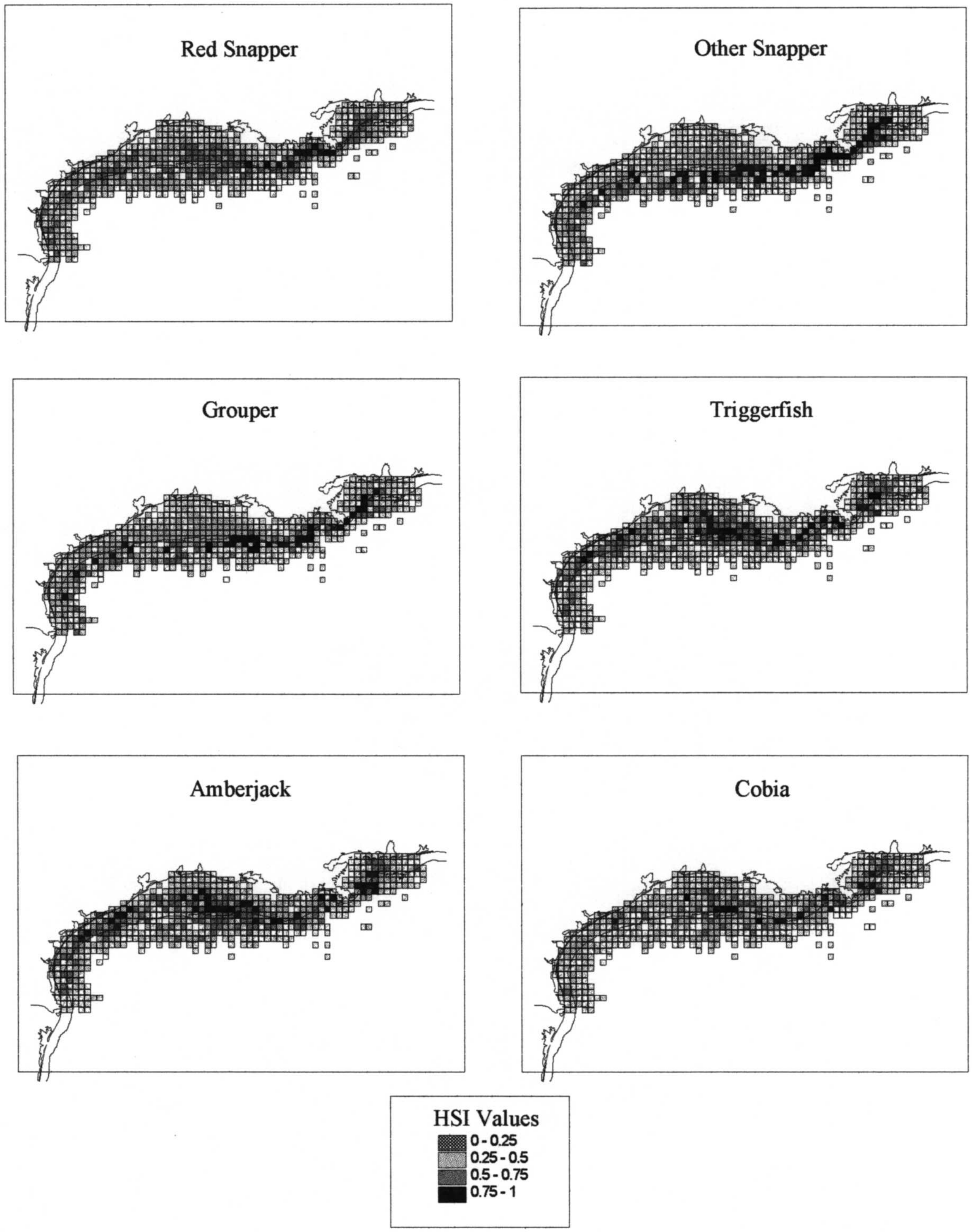


Figure 6. Habitat Suitability Indices for Adult Reef Fish

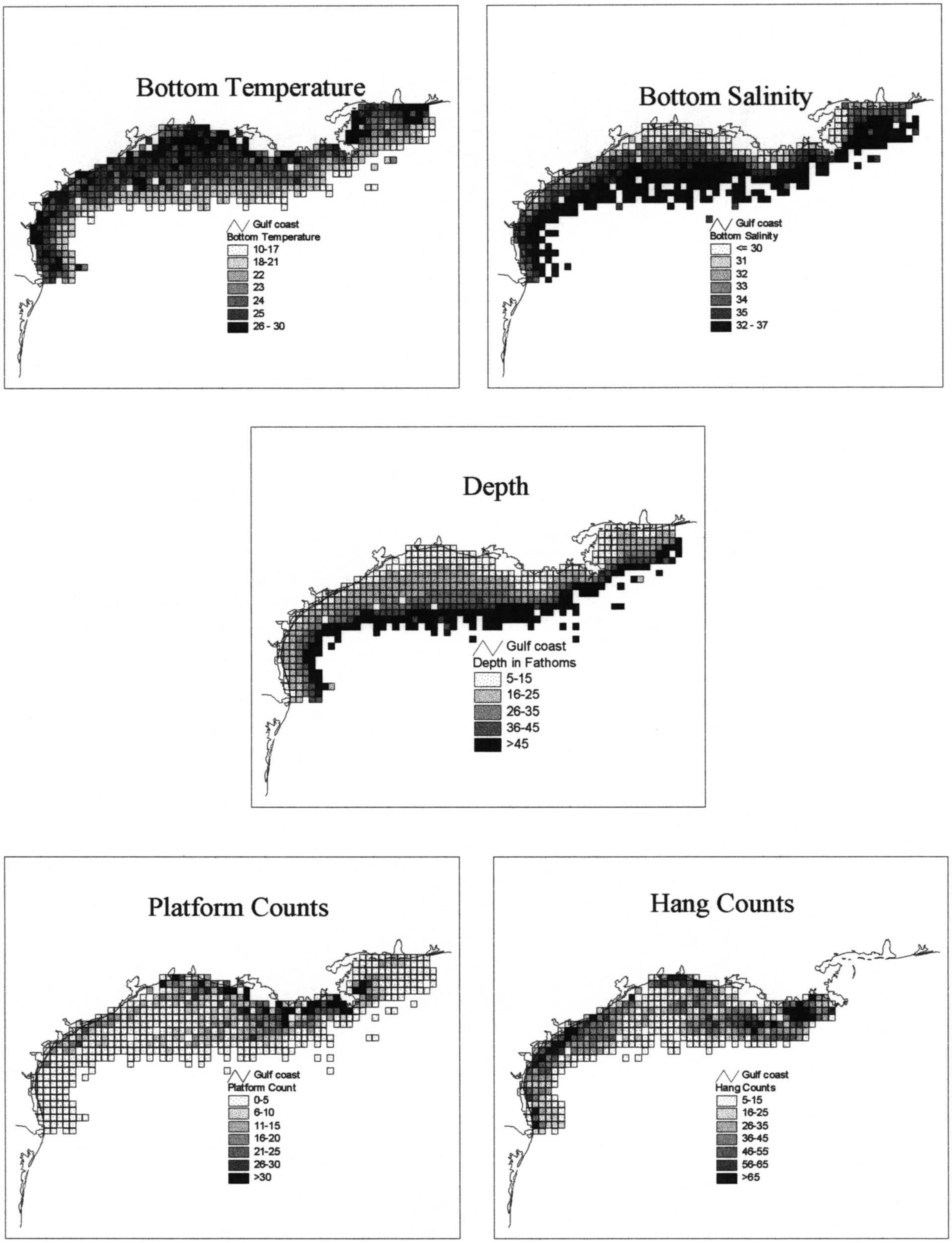


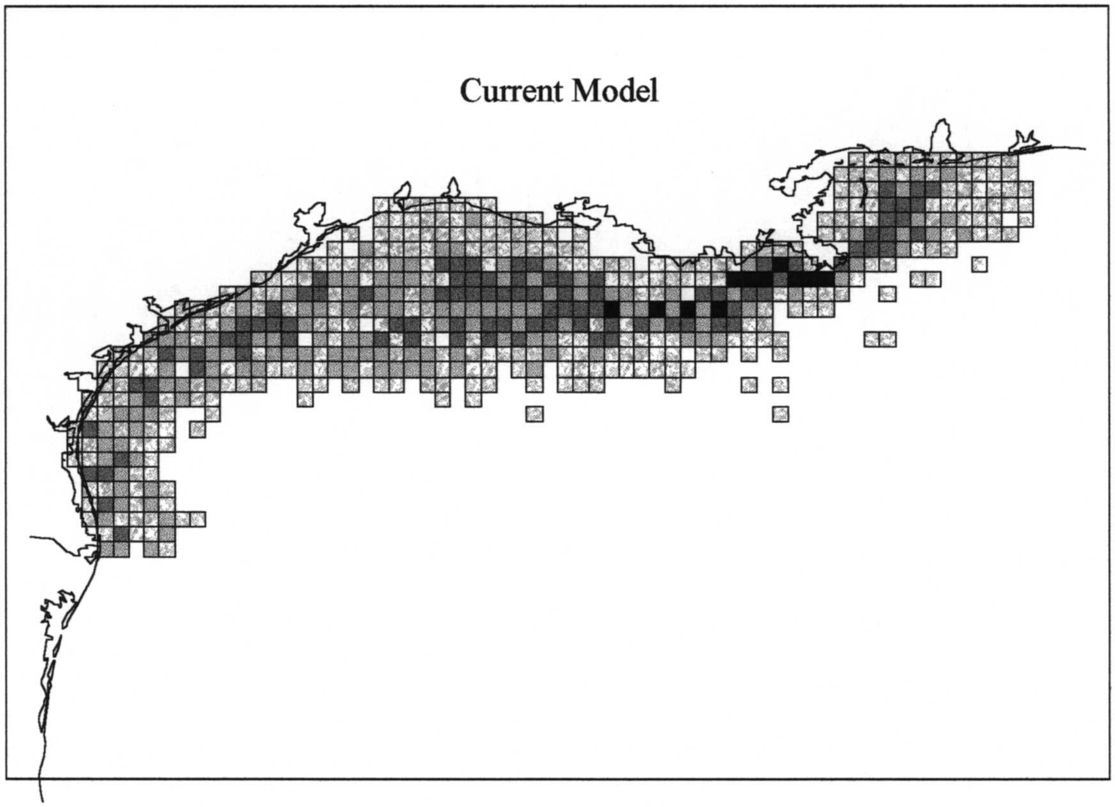
Figure 7. Habitat Model Environmental Parameters

where they were originally located and running the model for adult red snapper. The mean HSI value was significantly higher (2.6%) than that produced by the model after the platforms were removed. Although 132 cells are estimated to have decreased HSI values as a result of the removals (average 5.7%, maximum 38.7%), only 15 cells changed quartile categories, each moving down one value category. Maps reflecting both cases are provided in Figure 8.

The platform assessment model was used to calculate the number of platforms that could be removed from a cell before it would cause a change in the HSI quarter value. By definition all of the platforms in the lowest quarter cells (approximately 1600) could be removed, since the cell quarter could not be reduced. For the other three quarters the model estimates that 40.8% could be removed from the second quarter, 26.9% from the third quarter, and 66.5% from the highest quarter.

The number of platforms that could be removed without changing the HSI quantile for a given area was a surprising outcome of this analysis. This unexpected result is, however, in agreement with the relative amount of hard-substrate habitat provided by platforms (0.4% of the total) as compared to natural sources and other bottom obstructions (Gallaway et al. 1997). In contrast, petroleum platform habitat differs from natural reef habitat in that it spans the entire water column. This feature extends hard bottom refuge into the water column when bottom water conditions are stressful to resident biota (e.g., hypoxia). We attempted to model this feature by making platforms ten times more valuable than natural bottom reefs. Even with this weighting, platform removal has far less than the anticipated effect on habitat-quality.

Stanley (1994) estimated that on the order of 5,307 (95% CI = 2,756) red snapper occurred during the fall to winter period of 1992 on a West Cameron platform. Render (1995) shows that these fish were almost all <2 years of age. We made the assumption that most juvenile red snapper during winter would occur between 10 and 20 fm. Within this area, Stanley's data files show a total of 820 platforms of which 465 are of a size equivalent to his study site where the population estimates were made. Thus, these 465 sites might be expected to harbor on the order of 2.5 million late age 1 or early age 2 red



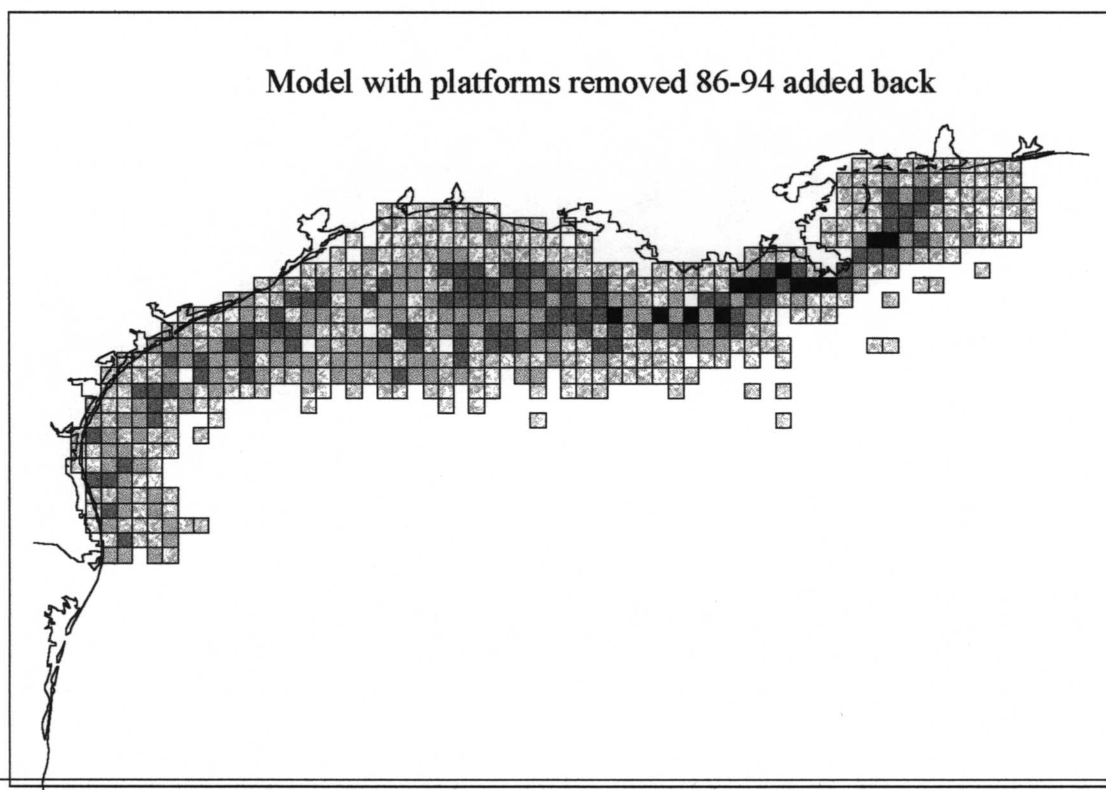


Figure 8. Red Snapper Platform Removal Assessment

snapper (95% CI = 1.2 to 3.7 million fish). For the 355 four-legged or smaller platforms, we arbitrarily assumed a population size one-fourth the major platform estimate, or 1,327 fish. This yields an additional 0.5 million fish for an estimated total of 3 million age 2 red snapper (95% CI = 1.7 to 4.2 million) at the beginning of the year in 1992. Goodyear (1995) estimated the total Gulf population of age 2 red snapper at the beginning of 1992 was 4.2 million fish, assuming a natural mortality rate of 0.1 (Table 98, page 147). Assuming all the estimates are correct, the available data would indicate that over 70% of the age 2 red snapper population occur at petroleum platforms during winter with the 95% CI being between 40 and 100%. If this is true, then the platforms are much more valuable than their proportional area would suggest. However, one or both of the standing stock estimates (platform and total) could be in error.

Above, we assumed that numbers of red snapper at a four-legged platform were the same as at a smaller caisson and did not attempt to estimate directly the relative numbers at natural habitats representing over 99.5% of the available hard substrate habitat in the western Gulf (Parker et al. 1983). Likewise, we did not consider any environmental conditions other than depth. In an attempt to refine this, we calculated an alternative estimate of the age 2 standing stocks at all habitats taking into account the model relationships between abundance and the environment.

Using Stanley's estimate of 5,307 red snapper at a major platform located in favorable habitat as a starting point, we estimated the number of snapper at four leg platforms and caissons to be 1,327 and 332, respectively. Then, using Stanley's calculation of percentage of platforms represented by each of the types (major 49%, four leg 11.7%, and caisson 39.3%) we estimated the composition of platforms and the potential number of snapper residing at the platforms within each model cell. This number was then multiplied by the environmental suitability factor from the model to calculate total number of red snapper associated with platforms in the cell. We speculated that hangs provided an index to natural habitat and non-platform artificial habitats and that, on average, the number of snapper associated with a hang (mostly small structures) is the same as that at a caisson, 332. Using the number of hangs located in each cell, and the mean number of hangs in all cells for cells east of

89.5 degrees West Longitude (where we have no data on hangs), we calculated the potential number of snapper at hangs for each cell. This number was also multiplied by the environmental suitability factor to calculate the total number of age 2 red snapper associated with hangs in each cell. This procedure produced an estimate of 8.09 million total age 2 red snapper in the Western Gulf, 5.57 million (69%) associated with platforms and 2.52 million associated with hangs. This total estimate corresponds with that of Goodyear (1995) for M = 0.2, and suggests platforms are high-value habitats when temperature-salinity-depth conditions are likewise favorable.

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APPENDIX 1

Tables of Suitability Indices for Trawlable Species

KEY TO TABLES

Environmental Factors

DEPTHZ:	Mean depth value of model cell in fathoms
BOTSAL:	Bottom salinity (ppt)
BOTTMP:	Bottom temperature (°C)
DZCOUNT:	Number of years that mapped dead zone included a cell location
HNGIDX:	Number of hangs in a cell
PLATIDX:	Number of platforms in a cell

Calculations

PCTHIGH:	Percentage of high use observations occurring at listed interval of the environmental variable
PCTALL:	Overall availability of listed interval habitat in all model cells
H_A:	Difference between high use percentage and overall availability of habitat
SCHA:	Scaling factor of H_A
TMPIDX: SALIDX: DPZIDX: DEADIDX: HANGSI: PLATSI:	Suitability index for each interval of listed environmental parameter

Habitat Index for Red Snapper (170151107)

DEPTHZ	PCTHIGH	PCTALL	H_A	SCHA	DPZIDX
10	0.13445	0.24869	-0.11423	0.01000	0.02540
20	0.54622	0.27671	0.26951	0.39374	1.00000
30	0.21849	0.14011	0.07838	0.20262	0.51459
40	0.06303	0.07706	-0.01403	0.11020	0.27988
50	0.03361	0.11033	-0.07672	0.04751	0.12067
60	0.00000	0.03853	0.00000	0.00000	0.00000
70	0.00000	0.00701	0.00000	0.00000	0.00000
80	0.00000	0.01576	0.00000	0.00000	0.00000
90	0.00000	0.01401	0.00000	0.00000	0.00000
110	0.00420	0.00701	0.00000	0.00000	0.00000
120	0.00000	0.00525	0.00000	0.00000	0.00000
130	0.00000	0.00525	0.00000	0.00000	0.00000
150	0.00000	0.00175	0.00000	0.00000	0.00000
160	0.00000	0.00175	0.00000	0.00000	0.00000
170	0.00000	0.00350	0.00000	0.00000	0.00000
180	0.00000	0.00175	0.00000	0.00000	0.00000
200	0.00000	0.00175	0.00000	0.00000	0.00000
210	0.00000	0.00175	0.00000	0.00000	0.00000
220	0.00000	0.00525	0.00000	0.00000	0.00000
240	0.00000	0.00525	0.00000	0.00000	0.00000
250	0.00000	0.00175	0.00000	0.00000	0.00000
260	0.00000	0.00175	0.00000	0.00000	0.00000
280	0.00000	0.00350	0.00000	0.00000	0.00000
300	0.00000	0.00175	0.00000	0.00000	0.00000
310	0.00000	0.00525	0.00000	0.00000	0.00000
320	0.00000	0.00175	0.00000	0.00000	0.00000
360	0.00000	0.00350	0.00000	0.00000	0.00000
380	0.00000	0.00175	0.00000	0.00000	0.00000
390	0.00000	0.00175	0.00000	0.00000	0.00000
400	0.00000	0.00175	0.00000	0.00000	0.00000
490	0.00000	0.00175	0.00000	0.00000	0.00000
610	0.00000	0.00175	0.00000	0.00000	0.00000
770	0.00000	0.00350	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Red Snapper (170151107)

BOTSAL	PCTHIGH	PCTALL	H_A	SCHA	SALIDX
7	0.00000	0.00373	0.000000	0.00000	0.00000
8	0.00000	0.00187	0.000000	0.00000	0.00000
15	0.00000	0.00187	0.000000	0.00000	0.00000
19	0.00000	0.00187	0.000000	0.00000	0.00000
20	0.00000	0.00187	0.000000	0.00000	0.00000
23	0.00000	0.00187	0.000000	0.00000	0.00000
24	0.00000	0.00373	0.000000	0.00000	0.00000
25	0.00000	0.00933	0.000000	0.00000	0.00000
26	0.00000	0.00933	0.000000	0.00000	0.00000
27	0.00000	0.01119	0.000000	0.00000	0.00000
28	0.00000	0.01306	0.000000	0.00000	0.00000
29	0.00844	0.02799	0.000000	0.00000	0.00000
30	0.01688	0.02985	0.000000	0.00000	0.00000
31	0.02110	0.04478	0.000000	0.00000	0.00000
32	0.04219	0.04478	-0.002582	0.04878	0.33351
33	0.04641	0.04291	0.003503	0.05486	0.37511
34	0.18565	0.11381	0.071848	0.12321	0.84241
35	0.22363	0.12873	0.094897	0.14626	1.00000
36	0.42616	0.43657	-0.010407	0.04095	0.28001
37	0.02954	0.07090	-0.041360	0.01000	0.06837

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Red Snapper (170151107)

BOTTMP	PCTHIGH	PCTALL	H_A	SCHA	TMPIDX
4	0.00000	0.00175	0.00000	0.00000	0.00000
5	0.00000	0.00175	0.00000	0.00000	0.00000
6	0.00000	0.00175	0.00000	0.00000	0.00000
7	0.00000	0.00876	0.00000	0.00000	0.00000
8	0.00000	0.00876	0.00000	0.00000	0.00000
9	0.00000	0.00876	0.00000	0.00000	0.00000
10	0.00420	0.01401	0.00000	0.00000	0.00000
11	0.00000	0.00350	0.00000	0.00000	0.00000
12	0.00000	0.00350	0.00000	0.00000	0.00000
13	0.00000	0.00175	0.00000	0.00000	0.00000
14	0.00000	0.00701	0.00000	0.00000	0.00000
15	0.00000	0.00350	0.00000	0.00000	0.00000
16	0.00000	0.01401	0.00000	0.00000	0.00000
17	0.00000	0.01051	0.00000	0.00000	0.00000
18	0.00000	0.02627	0.00000	0.00000	0.00000
19	0.00420	0.03503	0.00000	0.00000	0.00000
20	0.01261	0.07531	0.00000	0.00000	0.00000
21	0.04202	0.08231	-0.04029	0.01000	0.05488
22	0.05462	0.05079	0.00383	0.05413	0.29703
23	0.12185	0.10508	0.01677	0.06706	0.36802
24	0.26050	0.16988	0.09063	0.14092	0.77331
25	0.31933	0.18739	0.13194	0.18223	1.00000
26	0.12605	0.08581	0.04024	0.09053	0.49679
27	0.03782	0.04553	-0.00772	0.04258	0.23364
28	0.00420	0.02277	0.00000	0.00000	0.00000
29	0.01261	0.01226	0.00000	0.00000	0.00000
30	0.00000	0.01226	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Red Snapper (170151107)

DZCOUNT	PCTHIGH	PCTALL	H_A	SCHA	DEADIDX
0	0.98739	0.97898	.0084107	0.018411	1
1	0.00840	0.00701	.0000000	0.000000	0
3	0.00000	0.00175	.0000000	0.000000	0
4	0.00420	0.00350	.0000000	0.000000	0
5	0.00000	0.00525	.0000000	0.000000	0
7	0.00000	0.00175	.0000000	0.000000	0
9	0.00000	0.00175	.0000000	0.000000	0

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Red Snapper (170151107)

HNGIDX	PCTHIGH	PCTALL	H_A	SCHA	HANGSI
10	0.27014	0.38511	-0.11496	0.01000	0.06247
20	0.17536	0.14255	0.03280	0.15777	0.98551
30	0.10427	0.11489	-0.01063	0.11434	0.71422
40	0.15640	0.12128	0.03512	0.16009	1.00000
50	0.10900	0.08723	0.02177	0.14673	0.91660
60	0.08057	0.07234	0.00823	0.13319	0.83201
70	0.03318	0.02553	0.00764	0.13261	0.82835
80	0.04265	0.02340	0.01925	0.14421	0.90085
90	0.00000	0.00426	0.00000	0.00000	0.00000
100	0.01896	0.01064	0.00832	0.13328	0.83257
110	0.00474	0.00213	0.00000	0.00000	0.00000
120	0.00474	0.00426	0.00000	0.00000	0.00000
140	0.00000	0.00638	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Red Snapper (170151107)

PLATIDX	PCTHIGH	PCTALL	H_A	SCHA	PLATSI
5	0.53782	0.59720	-0.059383	0.01000	0.07956
10	0.22269	0.16637	0.056314	0.12570	1.00000
15	0.08403	0.08056	0.003473	0.07286	0.57962
20	0.07563	0.05254	0.023091	0.09247	0.73569
25	0.02521	0.03853	0.000000	0.00000	0.00000
30	0.02101	0.01751	0.000000	0.00000	0.00000
35	0.01261	0.00876	0.000000	0.00000	0.00000
40	0.00420	0.01051	0.000000	0.00000	0.00000
45	0.00420	0.00701	0.000000	0.00000	0.00000
55	0.00000	0.00525	0.000000	0.00000	0.00000
70	0.00840	0.00350	0.000000	0.00000	0.00000
75	0.00000	0.00175	0.000000	0.00000	0.00000
85	0.00000	0.00175	0.000000	0.00000	0.00000
95	0.00000	0.00175	0.000000	0.00000	0.00000
110	0.00000	0.00175	0.000000	0.00000	0.00000
120	0.00000	0.00175	0.000000	0.00000	0.00000
140	0.00000	0.00175	0.000000	0.00000	0.00000
205	0.00420	0.00175	0.000000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Vermilion Snapper (170152001)

DEPTHZ	PCTHIGH	PCTALL	H_A	SCHA	DPZIDX
10	0.00935	0.24869	0.00000	0.00000	0.00000
20	0.27103	0.27671	-0.00568	0.01000	0.04517
30	0.34579	0.14011	0.20569	0.22137	1.00000
40	0.19626	0.07706	0.11920	0.13488	0.60932
50	0.15888	0.11033	0.04855	0.06423	0.29013
60	0.00935	0.03853	0.00000	0.00000	0.00000
70	0.00000	0.00701	0.00000	0.00000	0.00000
80	0.00935	0.01576	0.00000	0.00000	0.00000
90	0.00000	0.01401	0.00000	0.00000	0.00000
110	0.00000	0.00701	0.00000	0.00000	0.00000
120	0.00000	0.00525	0.00000	0.00000	0.00000
130	0.00000	0.00525	0.00000	0.00000	0.00000
150	0.00000	0.00175	0.00000	0.00000	0.00000
160	0.00000	0.00175	0.00000	0.00000	0.00000
170	0.00000	0.00350	0.00000	0.00000	0.00000
180	0.00000	0.00175	0.00000	0.00000	0.00000
200	0.00000	0.00175	0.00000	0.00000	0.00000
210	0.00000	0.00175	0.00000	0.00000	0.00000
220	0.00000	0.00525	0.00000	0.00000	0.00000
240	0.00000	0.00525	0.00000	0.00000	0.00000
250	0.00000	0.00175	0.00000	0.00000	0.00000
260	0.00000	0.00175	0.00000	0.00000	0.00000
280	0.00000	0.00350	0.00000	0.00000	0.00000
300	0.00000	0.00175	0.00000	0.00000	0.00000
310	0.00000	0.00525	0.00000	0.00000	0.00000
320	0.00000	0.00175	0.00000	0.00000	0.00000
360	0.00000	0.00350	0.00000	0.00000	0.00000
380	0.00000	0.00175	0.00000	0.00000	0.00000
390	0.00000	0.00175	0.00000	0.00000	0.00000
400	0.00000	0.00175	0.00000	0.00000	0.00000
490	0.00000	0.00175	0.00000	0.00000	0.00000
610	0.00000	0.00175	0.00000	0.00000	0.00000
770	0.00000	0.00350	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Vermilion Snapper (170152001)

BOTSAL	PCTHIGH	PCTALL	H_A	SCHA	SALIDX
7	0.00000	0.00373	0.00000	0.00000	0.00000
8	0.00000	0.00187	0.00000	0.00000	0.00000
15	0.00000	0.00187	0.00000	0.00000	0.00000
19	0.00000	0.00187	0.00000	0.00000	0.00000
20	0.00000	0.00187	0.00000	0.00000	0.00000
23	0.00000	0.00187	0.00000	0.00000	0.00000
24	0.00000	0.00373	0.00000	0.00000	0.00000
25	0.00000	0.00933	0.00000	0.00000	0.00000
26	0.00000	0.00933	0.00000	0.00000	0.00000
27	0.00000	0.01119	0.00000	0.00000	0.00000
28	0.00000	0.01306	0.00000	0.00000	0.00000
29	0.00000	0.02799	0.00000	0.00000	0.00000
30	0.00000	0.02985	0.00000	0.00000	0.00000
31	0.00000	0.04478	0.00000	0.00000	0.00000
32	0.00000	0.04478	0.00000	0.00000	0.00000
33	0.00000	0.04291	0.00000	0.00000	0.00000
34	0.03738	0.11381	-0.07642	0.01000	0.02576
35	0.13084	0.12873	0.00211	0.08853	0.22807
36	0.73832	0.43657	0.30175	0.38817	1.00000
37	0.09346	0.07090	0.02256	0.10899	0.28076

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Vermilion Snapper (170152001)

BOTTMP	PCTHIGH	PCTALL	H_A	SCHA	TMPIDX
4	0.00000	0.00175	0.000000	0.00000	0.00000
5	0.00000	0.00175	0.000000	0.00000	0.00000
6	0.00000	0.00175	0.000000	0.00000	0.00000
7	0.00000	0.00876	0.000000	0.00000	0.00000
8	0.00000	0.00876	0.000000	0.00000	0.00000
9	0.00000	0.00876	0.000000	0.00000	0.00000
10	0.00000	0.01401	0.000000	0.00000	0.00000
11	0.00000	0.00350	0.000000	0.00000	0.00000
12	0.00000	0.00350	0.000000	0.00000	0.00000
13	0.00000	0.00175	0.000000	0.00000	0.00000
14	0.00000	0.00701	0.000000	0.00000	0.00000
15	0.00000	0.00350	0.000000	0.00000	0.00000
16	0.00000	0.01401	0.000000	0.00000	0.00000
17	0.00935	0.01051	0.000000	0.00000	0.00000
18	0.00935	0.02627	0.000000	0.00000	0.00000
19	0.03738	0.03503	0.002357	0.06079	0.39553
20	0.06542	0.07531	-0.009886	0.04855	0.31587
21	0.17757	0.08231	0.095258	0.15369	1.00000
22	0.09346	0.05079	0.042670	0.10110	0.65783
23	0.10280	0.10508	-0.002275	0.05616	0.36539
24	0.23364	0.16988	0.063767	0.12220	0.79510
25	0.21495	0.18739	0.027563	0.08599	0.55953
26	0.03738	0.08581	-0.048431	0.01000	0.06507
27	0.01869	0.04553	-0.026843	0.03159	0.20554
28	0.00000	0.02277	0.000000	0.00000	0.00000
29	0.00000	0.01226	0.000000	0.00000	0.00000
30	0.00000	0.01226	0.000000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Vermilion Snapper (170152001)

DZCOUNT	PCTHIGH	PCTALL	H_A	SCHA	DEADIDX
0	1	0.97898	0.021016	0.031016	1
1	0	0.00701	0.000000	0.000000	0
3	0	0.00175	0.000000	0.000000	0
4	0	0.00350	0.000000	0.000000	0
5	0	0.00525	0.000000	0.000000	0
7	0	0.00175	0.000000	0.000000	0
9	0	0.00175	0.000000	0.000000	0

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Vermilion Snapper (170152001)

HNGIDX	PCTHIGH	PCTALL	H_A	SCHA	HANGSI
10	0.36047	0.38511	-0.024641	0.011633	0.14955
20	0.11628	0.14255	-0.026274	0.010000	0.12855
30	0.12791	0.11489	0.013013	0.049287	0.63361
40	0.16279	0.12128	0.041514	0.077788	1.00000
50	0.09302	0.08723	0.005789	0.042063	0.54074
60	0.04651	0.07234	-0.025829	0.010445	0.13428
70	0.02326	0.02553	-0.002276	0.033998	0.43706
80	0.02326	0.02340	-0.000148	0.036126	0.46441
90	0.00000	0.00426	0.000000	0.000000	0.00000
100	0.02326	0.01064	0.012618	0.048892	0.62852
110	0.01163	0.00213	0.000000	0.000000	0.00000
120	0.00000	0.00426	0.000000	0.000000	0.00000
140	0.01163	0.00638	0.000000	0.000000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Vermilion Snapper (170152001)

PLATIDX	PCTHIGH	PCTALL	H_A	SCHA	PLATSI
5	0.64486	0.59720	0.047662	0.06346	0.57115
10	0.26168	0.16637	0.095307	0.11110	1.00000
15	0.07477	0.08056	-0.005794	0.01000	0.09001
20	0.00935	0.05254	0.000000	0.00000	0.00000
25	0.00935	0.03853	0.000000	0.00000	0.00000
30	0.00000	0.01751	0.000000	0.00000	0.00000
35	0.00000	0.00876	0.000000	0.00000	0.00000
40	0.00000	0.01051	0.000000	0.00000	0.00000
45	0.00000	0.00701	0.000000	0.00000	0.00000
55	0.00000	0.00525	0.000000	0.00000	0.00000
70	0.00000	0.00350	0.000000	0.00000	0.00000
75	0.00000	0.00175	0.000000	0.00000	0.00000
85	0.00000	0.00175	0.000000	0.00000	0.00000
95	0.00000	0.00175	0.000000	0.00000	0.00000
110	0.00000	0.00175	0.000000	0.00000	0.00000
120	0.00000	0.00175	0.000000	0.00000	0.00000
140	0.00000	0.00175	0.000000	0.00000	0.00000
205	0.00000	0.00175	0.000000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Brown Shrimp (228010701)

DEPTHZ	PCTHIGH	PCTALL	H_A	SCHA	DPZIDX
10	0.22083	0.24869	-0.02785	0.01000	0.04831
20	0.44583	0.27671	0.16913	0.20698	1.00000
30	0.22500	0.14011	0.08489	0.12275	0.59305
40	0.08333	0.07706	0.00628	0.04413	0.21320
50	0.02083	0.11033	0.00000	0.00000	0.00000
60	0.00417	0.03853	0.00000	0.00000	0.00000
70	0.00000	0.00701	0.00000	0.00000	0.00000
80	0.00000	0.01576	0.00000	0.00000	0.00000
90	0.00000	0.01401	0.00000	0.00000	0.00000
110	0.00000	0.00701	0.00000	0.00000	0.00000
120	0.00000	0.00525	0.00000	0.00000	0.00000
130	0.00000	0.00525	0.00000	0.00000	0.00000
150	0.00000	0.00175	0.00000	0.00000	0.00000
160	0.00000	0.00175	0.00000	0.00000	0.00000
170	0.00000	0.00350	0.00000	0.00000	0.00000
180	0.00000	0.00175	0.00000	0.00000	0.00000
200	0.00000	0.00175	0.00000	0.00000	0.00000
210	0.00000	0.00175	0.00000	0.00000	0.00000
220	0.00000	0.00525	0.00000	0.00000	0.00000
240	0.00000	0.00525	0.00000	0.00000	0.00000
250	0.00000	0.00175	0.00000	0.00000	0.00000
260	0.00000	0.00175	0.00000	0.00000	0.00000
280	0.00000	0.00350	0.00000	0.00000	0.00000
300	0.00000	0.00175	0.00000	0.00000	0.00000
310	0.00000	0.00525	0.00000	0.00000	0.00000
320	0.00000	0.00175	0.00000	0.00000	0.00000
360	0.00000	0.00350	0.00000	0.00000	0.00000
380	0.00000	0.00175	0.00000	0.00000	0.00000
390	0.00000	0.00175	0.00000	0.00000	0.00000
400	0.00000	0.00175	0.00000	0.00000	0.00000
490	0.00000	0.00175	0.00000	0.00000	0.00000
610	0.00000	0.00175	0.00000	0.00000	0.00000
770	0.00000	0.00350	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Brown Shrimp (228010701)

BOTSAL	PCTHIGH	PCTALL	H_A	SCHA	SALIDX
7	0.00000	0.00373	0.000000	0.00000	0.00000
8	0.00000	0.00187	0.000000	0.00000	0.00000
15	0.00000	0.00187	0.000000	0.00000	0.00000
19	0.00000	0.00187	0.000000	0.00000	0.00000
20	0.00000	0.00187	0.000000	0.00000	0.00000
23	0.00000	0.00187	0.000000	0.00000	0.00000
24	0.00000	0.00373	0.000000	0.00000	0.00000
25	0.00420	0.00933	0.000000	0.00000	0.00000
26	0.00840	0.00933	0.000000	0.00000	0.00000
27	0.00420	0.01119	0.000000	0.00000	0.00000
28	0.00420	0.01306	0.000000	0.00000	0.00000
29	0.01261	0.02799	0.000000	0.00000	0.00000
30	0.03782	0.02985	0.007964	0.05537	0.46006
31	0.04202	0.04478	-0.002759	0.04465	0.37097
32	0.05882	0.04478	0.014047	0.06145	0.51061
33	0.05882	0.04291	0.015913	0.06332	0.52611
34	0.13025	0.11381	0.016446	0.06385	0.53054
35	0.20168	0.12873	0.072949	0.12036	1.00000
36	0.39916	0.43657	-0.037408	0.01000	0.08309
37	0.03782	0.07090	-0.033080	0.01433	0.11904

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Brown Shrimp (228010701)

BOTTMP	PCTHIGH	PCTALL	H_A	SCHA	TMPIDX
4	0.00000	0.00175	0.000000	0.00000	0.00000
5	0.00000	0.00175	0.000000	0.00000	0.00000
6	0.00000	0.00175	0.000000	0.00000	0.00000
7	0.00000	0.00876	0.000000	0.00000	0.00000
8	0.00000	0.00876	0.000000	0.00000	0.00000
9	0.00000	0.00876	0.000000	0.00000	0.00000
10	0.00000	0.01401	0.000000	0.00000	0.00000
11	0.00000	0.00350	0.000000	0.00000	0.00000
12	0.00000	0.00350	0.000000	0.00000	0.00000
13	0.00000	0.00175	0.000000	0.00000	0.00000
14	0.00000	0.00701	0.000000	0.00000	0.00000
15	0.00000	0.00350	0.000000	0.00000	0.00000
16	0.00000	0.01401	0.000000	0.00000	0.00000
17	0.00000	0.01051	0.000000	0.00000	0.00000
18	0.00000	0.02627	0.000000	0.00000	0.00000
19	0.00417	0.03503	0.000000	0.00000	0.00000
20	0.01250	0.07531	0.000000	0.00000	0.00000
21	0.05000	0.08231	-0.032312	0.01000	0.07458
22	0.05417	0.05079	0.003379	0.04569	0.34075
23	0.18333	0.10508	0.078255	0.12057	0.89916
24	0.25417	0.16988	0.084289	0.12660	0.94416
25	0.27917	0.18739	0.091776	0.13409	1.00000
26	0.11667	0.08581	0.030852	0.07316	0.54564
27	0.03333	0.04553	-0.012201	0.03011	0.22456
28	0.00833	0.02277	0.000000	0.00000	0.00000
29	0.00417	0.01226	0.000000	0.00000	0.00000
30	0.00000	0.01226	0.000000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Brown Shrimp (228010701)

DZCOUNT	PCTHIGH	PCTALL	H_A	SCHA	DEADIDX
0	0.97917	0.97898	.00018243	0.010182	1
1	0.00417	0.00701	.00000000	0.000000	0
3	0.00000	0.00175	.00000000	0.000000	0
4	0.00417	0.00350	.00000000	0.000000	0
5	0.01250	0.00525	.00000000	0.000000	0
7	0.00000	0.00175	.00000000	0.000000	0
9	0.00000	0.00175	.00000000	0.000000	0

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Brown Shrimp (228010701)

HNGIDX	PCTHIGH	PCTALL	H_A	SCHA	HANGSI
10	0.29018	0.38511	-0.094928	0.01000	0.06927
20	0.12946	0.14255	-0.013089	0.09184	0.63616
30	0.09821	0.11489	-0.016679	0.08825	0.61129
40	0.16071	0.12128	0.039438	0.14437	1.00000
50	0.11161	0.08723	0.024373	0.12930	0.89565
60	0.09375	0.07234	0.021410	0.12634	0.87512
70	0.02679	0.02553	0.001254	0.10618	0.73551
80	0.04464	0.02340	0.021239	0.12617	0.87394
90	0.00000	0.00426	0.000000	0.00000	0.00000
100	0.02232	0.01064	0.011683	0.11661	0.80775
110	0.00446	0.00213	0.000000	0.00000	0.00000
120	0.00893	0.00426	0.000000	0.00000	0.00000
140	0.00893	0.00638	0.000000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Brown Shrimp (228010701)

PLATIDX	PCTHIGH	PCTALL	H_A	SCHA	PLATSI
5	0.48333	0.59720	-0.11386	0.01000	0.05742
10	0.21667	0.16637	0.05029	0.17416	1.00000
15	0.09583	0.08056	0.01527	0.13914	0.79892
20	0.07500	0.05254	0.02246	0.14633	0.84019
25	0.06250	0.03853	0.02397	0.14784	0.84887
30	0.01250	0.01751	0.00000	0.00000	0.00000
35	0.01250	0.00876	0.00000	0.00000	0.00000
40	0.01667	0.01051	0.00000	0.00000	0.00000
45	0.00417	0.00701	0.00000	0.00000	0.00000
55	0.00000	0.00525	0.00000	0.00000	0.00000
70	0.00417	0.00350	0.00000	0.00000	0.00000
75	0.00000	0.00175	0.00000	0.00000	0.00000
85	0.00417	0.00175	0.00000	0.00000	0.00000
95	0.00000	0.00175	0.00000	0.00000	0.00000
110	0.00000	0.00175	0.00000	0.00000	0.00000
120	0.00417	0.00175	0.00000	0.00000	0.00000
140	0.00417	0.00175	0.00000	0.00000	0.00000
205	0.00417	0.00175	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for White Shrimp (228010705)

DEPTHZ	PCTHIGH	PCTALL	H_A	SCHA	DPZIDX
10	0.47085	0.24869	0.22217	0.29155	1.00000
20	0.42152	0.27671	0.14482	0.21420	0.73470
30	0.08072	0.14011	-0.05939	0.01000	0.03430
40	0.02242	0.07706	0.00000	0.00000	0.00000
50	0.00448	0.11033	0.00000	0.00000	0.00000
60	0.00000	0.03853	0.00000	0.00000	0.00000
70	0.00000	0.00701	0.00000	0.00000	0.00000
80	0.00000	0.01576	0.00000	0.00000	0.00000
90	0.00000	0.01401	0.00000	0.00000	0.00000
110	0.00000	0.00701	0.00000	0.00000	0.00000
120	0.00000	0.00525	0.00000	0.00000	0.00000
130	0.00000	0.00525	0.00000	0.00000	0.00000
150	0.00000	0.00175	0.00000	0.00000	0.00000
160	0.00000	0.00175	0.00000	0.00000	0.00000
170	0.00000	0.00350	0.00000	0.00000	0.00000
180	0.00000	0.00175	0.00000	0.00000	0.00000
200	0.00000	0.00175	0.00000	0.00000	0.00000
210	0.00000	0.00175	0.00000	0.00000	0.00000
220	0.00000	0.00525	0.00000	0.00000	0.00000
240	0.00000	0.00525	0.00000	0.00000	0.00000
250	0.00000	0.00175	0.00000	0.00000	0.00000
260	0.00000	0.00175	0.00000	0.00000	0.00000
280	0.00000	0.00350	0.00000	0.00000	0.00000
300	0.00000	0.00175	0.00000	0.00000	0.00000
310	0.00000	0.00525	0.00000	0.00000	0.00000
320	0.00000	0.00175	0.00000	0.00000	0.00000
360	0.00000	0.00350	0.00000	0.00000	0.00000
380	0.00000	0.00175	0.00000	0.00000	0.00000
390	0.00000	0.00175	0.00000	0.00000	0.00000
400	0.00000	0.00175	0.00000	0.00000	0.00000
490	0.00000	0.00175	0.00000	0.00000	0.00000
610	0.00000	0.00175	0.00000	0.00000	0.00000
770	0.00000	0.00350	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for White Shrimp (228010705)

BOTSAL	PCTHIGH	PCTALL	H_A	SCHA	SALIDX
7	0.00000	0.00373	0.00000	0.00000	0.00000
8	0.00000	0.00187	0.00000	0.00000	0.00000
15	0.00000	0.00187	0.00000	0.00000	0.00000
19	0.00000	0.00187	0.00000	0.00000	0.00000
20	0.00000	0.00187	0.00000	0.00000	0.00000
23	0.00000	0.00187	0.00000	0.00000	0.00000
24	0.00448	0.00373	0.00000	0.00000	0.00000
25	0.01345	0.00933	0.00412	0.25787	0.77493
26	0.01794	0.00933	0.00861	0.26235	0.78841
27	0.01794	0.01119	0.00674	0.26049	0.78280
28	0.01345	0.01306	0.00039	0.25414	0.76372
29	0.04933	0.02799	0.02134	0.27508	0.82667
30	0.06278	0.02985	0.03293	0.28667	0.86149
31	0.09417	0.04478	0.04939	0.30314	0.91097
32	0.10314	0.04478	0.05836	0.31210	0.93792
33	0.07623	0.04291	0.03332	0.28706	0.86268
34	0.19283	0.11381	0.07902	0.33276	1.00000
35	0.15695	0.12873	0.02822	0.28196	0.84734
36	0.19283	0.43657	-0.24374	0.01000	0.03005
37	0.00448	0.07090	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for White Shrimp (228010705)

BOTTMP	PCTHIGH	PCTALL	H_A	SCHA	TMPIDX
4	0.00000	0.00175	0.000000	0.00000	0.00000
5	0.00000	0.00175	0.000000	0.00000	0.00000
6	0.00000	0.00175	0.000000	0.00000	0.00000
7	0.00000	0.00876	0.000000	0.00000	0.00000
8	0.00000	0.00876	0.000000	0.00000	0.00000
9	0.00000	0.00876	0.000000	0.00000	0.00000
10	0.00000	0.01401	0.000000	0.00000	0.00000
11	0.00000	0.00350	0.000000	0.00000	0.00000
12	0.00000	0.00350	0.000000	0.00000	0.00000
13	0.00000	0.00175	0.000000	0.00000	0.00000
14	0.00000	0.00701	0.000000	0.00000	0.00000
15	0.00000	0.00350	0.000000	0.00000	0.00000
16	0.00000	0.01401	0.000000	0.00000	0.00000
17	0.00000	0.01051	0.000000	0.00000	0.00000
18	0.00000	0.02627	0.000000	0.00000	0.00000
19	0.00000	0.03503	0.000000	0.00000	0.00000
20	0.00897	0.07531	0.000000	0.00000	0.00000
21	0.02242	0.08231	-0.059890	0.01000	0.05900
22	0.04036	0.05079	-0.010429	0.05946	0.35081
23	0.13901	0.10508	0.033935	0.10382	0.61255
24	0.24215	0.16988	0.072275	0.14217	0.83876
25	0.28700	0.18739	0.099605	0.16950	1.00000
26	0.15695	0.08581	0.071136	0.14103	0.83204
27	0.05830	0.04553	0.012762	0.08265	0.48764
28	0.02242	0.02277	-0.000346	0.06954	0.41030
29	0.02242	0.01226	0.010162	0.08005	0.47230
30	0.00000	0.01226	0.000000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for White Shrimp (228010705)

DZCOUNT	PCTHIGH	PCTALL	H_A	SCHA	DEADIDX
0	0.96413	0.97898	-0.014859	0.01	1
1	0.00897	0.00701	0.000000	0.00	0
3	0.00448	0.00175	0.000000	0.00	0
4	0.00000	0.00350	0.000000	0.00	0
5	0.01345	0.00525	0.000000	0.00	0
7	0.00448	0.00175	0.000000	0.00	0
9	0.00448	0.00175	0.000000	0.00	0

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for White Shrimp (228010705)

HNGIDX	PCTHIGH	PCTALL	H_A	SCHA	HANGSI
10	0.30928	0.38511	-0.075828	0.01000	0.08215
20	0.14948	0.14255	0.006931	0.09276	0.76198
30	0.09278	0.11489	-0.022110	0.06372	0.52341
40	0.10825	0.12128	-0.013029	0.07280	0.59801
50	0.10825	0.08723	0.021013	0.10684	0.87766
60	0.10825	0.07234	0.035907	0.12174	1.00000
70	0.04124	0.02553	0.015705	0.10153	0.83405
80	0.03608	0.02340	0.012678	0.09851	0.80919
90	0.00515	0.00426	0.000000	0.00000	0.00000
100	0.02062	0.01064	0.009980	0.09581	0.78702
110	0.00000	0.00213	0.000000	0.00000	0.00000
120	0.01031	0.00426	0.000000	0.00000	0.00000
140	0.01031	0.00638	0.000000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for White Shrimp (228010705)

PLATIDX	PCTHIGH	PCTALL	H_A	SCHA	PLATSI
5	0.38117	0.59720	-0.21603	0.01000	0.03501
10	0.18834	0.16637	0.02197	0.24800	0.86834
15	0.11211	0.08056	0.03155	0.25758	0.90189
20	0.11211	0.05254	0.05957	0.28560	1.00000
25	0.08072	0.03853	0.04219	0.26822	0.93915
30	0.03587	0.01751	0.01836	0.24439	0.85572
35	0.01794	0.00876	0.00000	0.00000	0.00000
40	0.01794	0.01051	0.00000	0.00000	0.00000
45	0.01345	0.00701	0.00000	0.00000	0.00000
55	0.00897	0.00525	0.00000	0.00000	0.00000
70	0.00448	0.00350	0.00000	0.00000	0.00000
75	0.00448	0.00175	0.00000	0.00000	0.00000
85	0.00448	0.00175	0.00000	0.00000	0.00000
95	0.00000	0.00175	0.00000	0.00000	0.00000
110	0.00448	0.00175	0.00000	0.00000	0.00000
120	0.00448	0.00175	0.00000	0.00000	0.00000
140	0.00448	0.00175	0.00000	0.00000	0.00000
205	0.00448	0.00175	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Trachypenaeus (228011800)

DEPTHZ	PCTHIGH	PCTALL	H_A	SCHA	DPZIDX
10	0.30252	0.24869	0.05383	0.13635	0.54283
20	0.44538	0.27671	0.16867	0.25119	1.00000
30	0.16807	0.14011	0.02796	0.11048	0.43983
40	0.03782	0.07706	-0.03924	0.04327	0.17228
50	0.03782	0.11033	-0.07252	0.01000	0.03981
60	0.00420	0.03853	0.00000	0.00000	0.00000
70	0.00000	0.00701	0.00000	0.00000	0.00000
80	0.00000	0.01576	0.00000	0.00000	0.00000
90	0.00420	0.01401	0.00000	0.00000	0.00000
110	0.00000	0.00701	0.00000	0.00000	0.00000
120	0.00000	0.00525	0.00000	0.00000	0.00000
130	0.00000	0.00525	0.00000	0.00000	0.00000
150	0.00000	0.00175	0.00000	0.00000	0.00000
160	0.00000	0.00175	0.00000	0.00000	0.00000
170	0.00000	0.00350	0.00000	0.00000	0.00000
180	0.00000	0.00175	0.00000	0.00000	0.00000
200	0.00000	0.00175	0.00000	0.00000	0.00000
210	0.00000	0.00175	0.00000	0.00000	0.00000
220	0.00000	0.00525	0.00000	0.00000	0.00000
240	0.00000	0.00525	0.00000	0.00000	0.00000
250	0.00000	0.00175	0.00000	0.00000	0.00000
260	0.00000	0.00175	0.00000	0.00000	0.00000
280	0.00000	0.00350	0.00000	0.00000	0.00000
300	0.00000	0.00175	0.00000	0.00000	0.00000
310	0.00000	0.00525	0.00000	0.00000	0.00000
320	0.00000	0.00175	0.00000	0.00000	0.00000
360	0.00000	0.00350	0.00000	0.00000	0.00000
380	0.00000	0.00175	0.00000	0.00000	0.00000
390	0.00000	0.00175	0.00000	0.00000	0.00000
400	0.00000	0.00175	0.00000	0.00000	0.00000
490	0.00000	0.00175	0.00000	0.00000	0.00000
610	0.00000	0.00175	0.00000	0.00000	0.00000
770	0.00000	0.00350	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Trachypenaeus (228011800)

BOTSAL	PCTHIGH	PCTALL	H_A	SCHA	SALIDX
7	0.00000	0.00373	0.000000	0.00000	0.00000
8	0.00000	0.00187	0.000000	0.00000	0.00000
15	0.00000	0.00187	0.000000	0.00000	0.00000
19	0.00000	0.00187	0.000000	0.00000	0.00000
20	0.00000	0.00187	0.000000	0.00000	0.00000
23	0.00000	0.00187	0.000000	0.00000	0.00000
24	0.00000	0.00373	0.000000	0.00000	0.00000
25	0.00422	0.00933	0.000000	0.00000	0.00000
26	0.00844	0.00933	0.000000	0.00000	0.00000
27	0.00844	0.01119	0.000000	0.00000	0.00000
28	0.00422	0.01306	0.000000	0.00000	0.00000
29	0.02532	0.02799	-0.002669	0.10635	0.64088
30	0.04219	0.02985	0.012343	0.12136	0.73135
31	0.05907	0.04478	0.014296	0.12331	0.74311
32	0.07595	0.04478	0.031173	0.14019	0.84482
33	0.06329	0.04291	0.020381	0.12940	0.77978
34	0.16878	0.11381	0.054970	0.16398	0.98823
35	0.18565	0.12873	0.056923	0.16594	1.00000
36	0.33755	0.43657	-0.099014	0.01000	0.06026
37	0.01688	0.07090	0.000000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Trachypenaeus (228011800)

BOTTMP	PCTHIGH	PCTALL	H_A	SCHA	TMPIDX
4	0.00000	0.00175	0.00000	0.00000	0.00000
5	0.00000	0.00175	0.00000	0.00000	0.00000
6	0.00000	0.00175	0.00000	0.00000	0.00000
7	0.00000	0.00876	0.00000	0.00000	0.00000
8	0.00000	0.00876	0.00000	0.00000	0.00000
9	0.00000	0.00876	0.00000	0.00000	0.00000
10	0.00000	0.01401	0.00000	0.00000	0.00000
11	0.00000	0.00350	0.00000	0.00000	0.00000
12	0.00000	0.00350	0.00000	0.00000	0.00000
13	0.00000	0.00175	0.00000	0.00000	0.00000
14	0.00000	0.00701	0.00000	0.00000	0.00000
15	0.00420	0.00350	0.00000	0.00000	0.00000
16	0.00000	0.01401	0.00000	0.00000	0.00000
17	0.00000	0.01051	0.00000	0.00000	0.00000
18	0.01261	0.02627	0.00000	0.00000	0.00000
19	0.00000	0.03503	0.00000	0.00000	0.00000
20	0.01261	0.07531	0.00000	0.00000	0.00000
21	0.04202	0.08231	-0.04029	0.01000	0.06203
22	0.04202	0.05079	-0.00877	0.04152	0.25755
23	0.13445	0.10508	0.02937	0.07967	0.49416
24	0.24370	0.16988	0.07382	0.12411	0.76983
25	0.29832	0.18739	0.11093	0.16122	1.00000
26	0.13445	0.08581	0.04864	0.09893	0.61365
27	0.05042	0.04553	0.00489	0.05518	0.34226
28	0.01261	0.02277	0.00000	0.00000	0.00000
29	0.01261	0.01226	0.00000	0.00000	0.00000
30	0.00000	0.01226	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Trachypenaeus (228011800)

DZCOUNT	PCTHIGH	PCTALL	H_A	SCHA	DEADIDX
0	0.97479	0.97898	-.0041943	0.01	1
1	0.00840	0.00701	0.0000000	0.00	0
3	0.00000	0.00175	0.0000000	0.00	0
4	0.00840	0.00350	0.0000000	0.00	0
5	0.00840	0.00525	0.0000000	0.00	0
7	0.00000	0.00175	0.0000000	0.00	0
9	0.00000	0.00175	0.0000000	0.00	0

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Trachypenaeus (228011800)

HNGIDX	PCTHIGH	PCTALL	H_A	SCHA	HANGSI
10	0.26341	0.38511	-0.12169	0.01000	0.05673
20	0.13659	0.14255	-0.00597	0.12572	0.71325
30	0.08780	0.11489	-0.02709	0.10460	0.59343
40	0.16585	0.12128	0.04458	0.17627	1.00000
50	0.10732	0.08723	0.02008	0.15177	0.86104
60	0.10732	0.07234	0.03498	0.16667	0.94554
70	0.03415	0.02553	0.00861	0.14031	0.79598
80	0.04878	0.02340	0.02538	0.15707	0.89107
90	0.00488	0.00426	0.00000	0.00000	0.00000
100	0.02439	0.01064	0.01375	0.14544	0.82512
110	0.00000	0.00213	0.00000	0.00000	0.00000
120	0.00976	0.00426	0.00000	0.00000	0.00000
140	0.00976	0.00638	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Trachypenaeus (228011800)

PLATIDX	PCTHIGH	PCTALL	H_A	SCHA	PLATSI
5	0.42857	0.59720	-0.16863	0.01000	0.04040
10	0.23529	0.16637	0.06892	0.24755	1.00000
15	0.08824	0.08056	0.00767	0.18630	0.75259
20	0.09664	0.05254	0.04410	0.22273	0.89974
25	0.06723	0.03853	0.02870	0.20732	0.83752
30	0.02101	0.01751	0.00000	0.00000	0.00000
35	0.01681	0.00876	0.00000	0.00000	0.00000
40	0.01261	0.01051	0.00000	0.00000	0.00000
45	0.00420	0.00701	0.00000	0.00000	0.00000
55	0.00420	0.00525	0.00000	0.00000	0.00000
70	0.00840	0.00350	0.00000	0.00000	0.00000
75	0.00000	0.00175	0.00000	0.00000	0.00000
85	0.00420	0.00175	0.00000	0.00000	0.00000
95	0.00000	0.00175	0.00000	0.00000	0.00000
110	0.00000	0.00175	0.00000	0.00000	0.00000
120	0.00420	0.00175	0.00000	0.00000	0.00000
140	0.00420	0.00175	0.00000	0.00000	0.00000
205	0.00420	0.00175	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Atlantic Croaker (170201902)

DEPTHZ	PCTHIGH	PCTALL	H_A	SCHA	DPZIDX
10	0.36250	0.24869	0.11381	0.18415	0.85866
20	0.42083	0.27671	0.14413	0.21446	1.00000
30	0.11667	0.14011	-0.02344	0.04689	0.21866
40	0.04167	0.07706	-0.03539	0.03494	0.16293
50	0.05000	0.11033	-0.06033	0.01000	0.04663
60	0.00833	0.03853	0.00000	0.00000	0.00000
70	0.00000	0.00701	0.00000	0.00000	0.00000
80	0.00000	0.01576	0.00000	0.00000	0.00000
90	0.00000	0.01401	0.00000	0.00000	0.00000
110	0.00000	0.00701	0.00000	0.00000	0.00000
120	0.00000	0.00525	0.00000	0.00000	0.00000
130	0.00000	0.00525	0.00000	0.00000	0.00000
150	0.00000	0.00175	0.00000	0.00000	0.00000
160	0.00000	0.00175	0.00000	0.00000	0.00000
170	0.00000	0.00350	0.00000	0.00000	0.00000
180	0.00000	0.00175	0.00000	0.00000	0.00000
200	0.00000	0.00175	0.00000	0.00000	0.00000
210	0.00000	0.00175	0.00000	0.00000	0.00000
220	0.00000	0.00525	0.00000	0.00000	0.00000
240	0.00000	0.00525	0.00000	0.00000	0.00000
250	0.00000	0.00175	0.00000	0.00000	0.00000
260	0.00000	0.00175	0.00000	0.00000	0.00000
280	0.00000	0.00350	0.00000	0.00000	0.00000
300	0.00000	0.00175	0.00000	0.00000	0.00000
310	0.00000	0.00525	0.00000	0.00000	0.00000
320	0.00000	0.00175	0.00000	0.00000	0.00000
360	0.00000	0.00350	0.00000	0.00000	0.00000
380	0.00000	0.00175	0.00000	0.00000	0.00000
390	0.00000	0.00175	0.00000	0.00000	0.00000
400	0.00000	0.00175	0.00000	0.00000	0.00000
490	0.00000	0.00175	0.00000	0.00000	0.00000
610	0.00000	0.00175	0.00000	0.00000	0.00000
770	0.00000	0.00350	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Atlantic Croaker (170201902)

BOTSAL	PCTHIGH	PCTALL	H_A	SCHA	SALIDX
7	0.00000	0.00373	0.00000	0.00000	0.00000
8	0.00000	0.00187	0.00000	0.00000	0.00000
15	0.00000	0.00187	0.00000	0.00000	0.00000
19	0.00000	0.00187	0.00000	0.00000	0.00000
20	0.00000	0.00187	0.00000	0.00000	0.00000
23	0.00000	0.00187	0.00000	0.00000	0.00000
24	0.00418	0.00373	0.00000	0.00000	0.00000
25	0.00837	0.00933	0.00000	0.00000	0.00000
26	0.01674	0.00933	0.00741	0.13598	0.81193
27	0.01255	0.01119	0.00000	0.00000	0.00000
28	0.01255	0.01306	0.00000	0.00000	0.00000
29	0.03766	0.02799	0.00967	0.13825	0.82545
30	0.04184	0.02985	0.01199	0.14057	0.83929
31	0.07531	0.04478	0.03054	0.15911	0.95004
32	0.08368	0.04478	0.03891	0.16748	1.00000
33	0.06695	0.04291	0.02404	0.15261	0.91121
34	0.14226	0.11381	0.02845	0.15703	0.93759
35	0.16318	0.12873	0.03445	0.16302	0.97339
36	0.31799	0.43657	-0.11858	0.01000	0.05971
37	0.01674	0.07090	-0.05416	0.07442	0.44433

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Atlantic Croaker (170201902)

BOTTMP	PCTHIGH	PCTALL	H_A	SCHA	TMPIDX
4	0.00000	0.00175	0.000000	0.00000	0.00000
5	0.00000	0.00175	0.000000	0.00000	0.00000
6	0.00000	0.00175	0.000000	0.00000	0.00000
7	0.00000	0.00876	0.000000	0.00000	0.00000
8	0.00000	0.00876	0.000000	0.00000	0.00000
9	0.00000	0.00876	0.000000	0.00000	0.00000
10	0.00000	0.01401	0.000000	0.00000	0.00000
11	0.00000	0.00350	0.000000	0.00000	0.00000
12	0.00000	0.00350	0.000000	0.00000	0.00000
13	0.00000	0.00175	0.000000	0.00000	0.00000
14	0.00000	0.00701	0.000000	0.00000	0.00000
15	0.00000	0.00350	0.000000	0.00000	0.00000
16	0.00000	0.01401	0.000000	0.00000	0.00000
17	0.00000	0.01051	0.000000	0.00000	0.00000
18	0.01250	0.02627	0.000000	0.00000	0.00000
19	0.00417	0.03503	0.000000	0.00000	0.00000
20	0.04583	0.07531	-0.029473	0.02951	0.20128
21	0.03333	0.08231	-0.048978	0.01000	0.06822
22	0.05000	0.05079	-0.000788	0.05819	0.39697
23	0.15833	0.10508	0.053255	0.11223	0.76564
24	0.22083	0.16988	0.050956	0.10993	0.74996
25	0.27500	0.18739	0.087609	0.14659	1.00000
26	0.11667	0.08581	0.030852	0.08983	0.61281
27	0.04583	0.04553	0.000299	0.05928	0.40438
28	0.02083	0.02277	-0.001934	0.05704	0.38915
29	0.01667	0.01226	0.004407	0.06339	0.43241
30	0.00000	0.01226	0.000000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Atlantic Croaker (170201902)

DZCOUNT	PCTHIGH	PCTALL	H_A	SCHA	DEADIDX
0	0.97500	0.97898	-.0039842	0.01	1
1	0.00833	0.00701	0.0000000	0.00	0
3	0.00000	0.00175	0.0000000	0.00	0
4	0.00000	0.00350	0.0000000	0.00	0
5	0.00833	0.00525	0.0000000	0.00	0
7	0.00417	0.00175	0.0000000	0.00	0
9	0.00417	0.00175	0.0000000	0.00	0

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Atlantic Croaker (170201902)

HNGIDX	PCTHIGH	PCTALL	H_A	SCHA	HANGSI
10	0.32057	0.38511	-0.064532	0.01000	0.08788
20	0.18182	0.14255	0.039265	0.11380	1.00000
30	0.08134	0.11489	-0.033554	0.04098	0.36010
40	0.11005	0.12128	-0.011229	0.06330	0.55628
50	0.11483	0.08723	0.027598	0.10213	0.89748
60	0.09091	0.07234	0.018569	0.09310	0.81813
70	0.02871	0.02553	0.003176	0.07771	0.68287
80	0.03349	0.02340	0.010089	0.08462	0.74361
90	0.00478	0.00426	0.000000	0.00000	0.00000
100	0.01435	0.01064	0.000000	0.00000	0.00000
110	0.00000	0.00213	0.000000	0.00000	0.00000
120	0.00478	0.00426	0.000000	0.00000	0.00000
140	0.01435	0.00638	0.000000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Atlantic Croaker (170201902)

PLATIDX	PCTHIGH	PCTALL	H_A	SCHA	PLATSI
5	0.39583	0.59720	-0.20136	0.01000	0.03488
10	0.24167	0.16637	0.07529	0.28666	1.00000
15	0.10000	0.08056	0.01944	0.23080	0.80516
20	0.10000	0.05254	0.04746	0.25883	0.90291
25	0.07083	0.03853	0.03230	0.24367	0.85004
30	0.03333	0.01751	0.01582	0.22718	0.79253
35	0.00833	0.00876	0.00000	0.00000	0.00000
40	0.01250	0.01051	0.00000	0.00000	0.00000
45	0.01250	0.00701	0.00000	0.00000	0.00000
55	0.00833	0.00525	0.00000	0.00000	0.00000
70	0.00417	0.00350	0.00000	0.00000	0.00000
75	0.00000	0.00175	0.00000	0.00000	0.00000
85	0.00000	0.00175	0.00000	0.00000	0.00000
95	0.00000	0.00175	0.00000	0.00000	0.00000
110	0.00417	0.00175	0.00000	0.00000	0.00000
120	0.00417	0.00175	0.00000	0.00000	0.00000
140	0.00417	0.00175	0.00000	0.00000	0.00000
205	0.00000	0.00175	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Gulf Flounder (183012401)

DEPTHZ	PCTHIGH	PCTALL	H_A	SCHA	DPZIDX
10	0.40909	0.24869	0.16040	0.18983	1.00000
20	0.31818	0.27671	0.04147	0.07090	0.37349
30	0.13636	0.14011	-0.00374	0.02568	0.13529
40	0.00000	0.07706	0.00000	0.00000	0.00000
50	0.09091	0.11033	-0.01942	0.01000	0.05268
60	0.00000	0.03853	0.00000	0.00000	0.00000
70	0.00000	0.00701	0.00000	0.00000	0.00000
80	0.04545	0.01576	0.02969	0.05912	0.31142
90	0.00000	0.01401	0.00000	0.00000	0.00000
110	0.00000	0.00701	0.00000	0.00000	0.00000
120	0.00000	0.00525	0.00000	0.00000	0.00000
130	0.00000	0.00525	0.00000	0.00000	0.00000
150	0.00000	0.00175	0.00000	0.00000	0.00000
160	0.00000	0.00175	0.00000	0.00000	0.00000
170	0.00000	0.00350	0.00000	0.00000	0.00000
180	0.00000	0.00175	0.00000	0.00000	0.00000
200	0.00000	0.00175	0.00000	0.00000	0.00000
210	0.00000	0.00175	0.00000	0.00000	0.00000
220	0.00000	0.00525	0.00000	0.00000	0.00000
240	0.00000	0.00525	0.00000	0.00000	0.00000
250	0.00000	0.00175	0.00000	0.00000	0.00000
260	0.00000	0.00175	0.00000	0.00000	0.00000
280	0.00000	0.00350	0.00000	0.00000	0.00000
300	0.00000	0.00175	0.00000	0.00000	0.00000
310	0.00000	0.00525	0.00000	0.00000	0.00000
320	0.00000	0.00175	0.00000	0.00000	0.00000
360	0.00000	0.00350	0.00000	0.00000	0.00000
380	0.00000	0.00175	0.00000	0.00000	0.00000
390	0.00000	0.00175	0.00000	0.00000	0.00000
400	0.00000	0.00175	0.00000	0.00000	0.00000
490	0.00000	0.00175	0.00000	0.00000	0.00000
610	0.00000	0.00175	0.00000	0.00000	0.00000
770	0.00000	0.00350	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Gulf Flounder (183012401)

BOTSAL	PCTHIGH	PCTALL	H_A	SCHA	SALIDX
7	0.00000	0.00373	0.00000	0.00000	0.00000
8	0.00000	0.00187	0.00000	0.00000	0.00000
15	0.00000	0.00187	0.00000	0.00000	0.00000
19	0.00000	0.00187	0.00000	0.00000	0.00000
20	0.00000	0.00187	0.00000	0.00000	0.00000
23	0.00000	0.00187	0.00000	0.00000	0.00000
24	0.00000	0.00373	0.00000	0.00000	0.00000
25	0.00000	0.00933	0.00000	0.00000	0.00000
26	0.00000	0.00933	0.00000	0.00000	0.00000
27	0.00000	0.01119	0.00000	0.00000	0.00000
28	0.00000	0.01306	0.00000	0.00000	0.00000
29	0.00000	0.02799	0.00000	0.00000	0.00000
30	0.04545	0.02985	0.01560	0.18944	0.65938
31	0.13636	0.04478	0.09159	0.26543	0.92385
32	0.00000	0.04478	0.00000	0.00000	0.00000
33	0.09091	0.04291	0.04800	0.22184	0.77213
34	0.22727	0.11381	0.11347	0.28731	1.00000
35	0.18182	0.12873	0.05309	0.22693	0.78984
36	0.27273	0.43657	-0.16384	0.01000	0.03481
37	0.04545	0.07090	-0.02544	0.14840	0.51652

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Gulf Flounder (183012401)

BOTTMP	PCTHIGH	PCTALL	H_A	SCHA	TMPIDX
4	0.00000	0.00175	0.00000	0.00000	0.00000
5	0.00000	0.00175	0.00000	0.00000	0.00000
6	0.00000	0.00175	0.00000	0.00000	0.00000
7	0.00000	0.00876	0.00000	0.00000	0.00000
8	0.00000	0.00876	0.00000	0.00000	0.00000
9	0.00000	0.00876	0.00000	0.00000	0.00000
10	0.00000	0.01401	0.00000	0.00000	0.00000
11	0.00000	0.00350	0.00000	0.00000	0.00000
12	0.00000	0.00350	0.00000	0.00000	0.00000
13	0.00000	0.00175	0.00000	0.00000	0.00000
14	0.00000	0.00701	0.00000	0.00000	0.00000
15	0.00000	0.00350	0.00000	0.00000	0.00000
16	0.00000	0.01401	0.00000	0.00000	0.00000
17	0.04545	0.01051	0.03495	0.08180	0.36666
18	0.00000	0.02627	0.00000	0.00000	0.00000
19	0.00000	0.03503	0.00000	0.00000	0.00000
20	0.04545	0.07531	-0.02985	0.01701	0.07622
21	0.04545	0.08231	-0.03686	0.01000	0.04482
22	0.00000	0.05079	0.00000	0.00000	0.00000
23	0.09091	0.10508	-0.01417	0.03269	0.14651
24	0.27273	0.16988	0.10285	0.14971	0.67102
25	0.36364	0.18739	0.17625	0.22310	1.00000
26	0.09091	0.08581	0.00509	0.05195	0.23286
27	0.04545	0.04553	-0.00008	0.04678	0.20967
28	0.00000	0.02277	0.00000	0.00000	0.00000
29	0.00000	0.01226	0.00000	0.00000	0.00000
30	0.00000	0.01226	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Gulf Flounder (183012401)

DZCOUNT	PCTHIGH	PCTALL	H_A	SCHA	DEADIDX
0	1	0.97898	0.021016	0.031016	1
1	0	0.00701	0.000000	0.000000	0
3	0	0.00175	0.000000	0.000000	0
4	0	0.00350	0.000000	0.000000	0
5	0	0.00525	0.000000	0.000000	0
7	0	0.00175	0.000000	0.000000	0
9	0	0.00175	0.000000	0.000000	0

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Gulf Flounder (183012401)

HNGIDX	PCTHIGH	PCTALL	H_A	SCHA	HANGSI
10	0.47619	0.38511	0.091084	0.14840	1.00000
20	0.09524	0.14255	-0.047315	0.01000	0.06739
30	0.09524	0.11489	-0.019656	0.03766	0.25377
40	0.09524	0.12128	-0.026039	0.03128	0.21076
50	0.04762	0.08723	-0.039615	0.01770	0.11927
60	0.09524	0.07234	0.022898	0.08021	0.54052
70	0.04762	0.02553	0.022087	0.07940	0.53506
80	0.04762	0.02340	0.024215	0.08153	0.54940
90	0.00000	0.00426	0.000000	0.00000	0.00000
100	0.00000	0.01064	0.000000	0.00000	0.00000
110	0.00000	0.00213	0.000000	0.00000	0.00000
120	0.00000	0.00426	0.000000	0.00000	0.00000
140	0.00000	0.00638	0.000000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

Habitat Index for Gulf Flounder (183012401)

PLATIDX	PCTHIGH	PCTALL	H_A	SCHA	PLATSI
5	0.68182	0.59720	0.08462	0.21554	0.82837
10	0.04545	0.16637	-0.12092	0.01000	0.03843
15	0.04545	0.08056	-0.03511	0.09581	0.36823
20	0.18182	0.05254	0.12928	0.26020	1.00000
25	0.00000	0.03853	0.00000	0.00000	0.00000
30	0.04545	0.01751	0.02794	0.15886	0.61054
35	0.00000	0.00876	0.00000	0.00000	0.00000
40	0.00000	0.01051	0.00000	0.00000	0.00000
45	0.00000	0.00701	0.00000	0.00000	0.00000
55	0.00000	0.00525	0.00000	0.00000	0.00000
70	0.00000	0.00350	0.00000	0.00000	0.00000
75	0.00000	0.00175	0.00000	0.00000	0.00000
85	0.00000	0.00175	0.00000	0.00000	0.00000
95	0.00000	0.00175	0.00000	0.00000	0.00000
110	0.00000	0.00175	0.00000	0.00000	0.00000
120	0.00000	0.00175	0.00000	0.00000	0.00000
140	0.00000	0.00175	0.00000	0.00000	0.00000
205	0.00000	0.00175	0.00000	0.00000	0.00000

Prepared from NMFS SEAMAP and Groundfish Surveys 1985 - 1996

APPENDIX 2

Tables of Suitability Indices for Adult Reef Fish

KEY TO TABLES

Environmental Factors

DFATHS:	Mean depth value of model cell in fathoms
BOTSAL:	Bottom salinity (ppt)
BOTTMP:	Bottom temperature (°C)
SURSAL:	Surface salinity (ppt)
SURTMP:	Surface temperature (°C)

Calculations

PCTOBS:	Percentage of high use observations occurring at listed interval of the environmental variable
PCTALL:	Overall availability of listed interval habitat in all model cells
H_A:	Difference between high use percentage and overall availability of habitat
SCHA:	Scaling factor of H_A
SPPIDX:	Suitability index for each interval of listed environmental parameter

Adult Habitat Index for RED SNAPPER

DFATHS	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
0	0.01685	0.09524	-0.07838	0.01000	0.04403
10	0.37640	0.45238	-0.07598	0.01241	0.05463
20	0.45506	0.31633	0.13873	0.22711	1.00000
30	0.10674	0.07823	0.02851	0.11689	0.51470
40	0.01685	0.01701	-0.00015	0.08823	0.38849
50	0.02809	0.03401	-0.00592	0.08246	0.36308
60	0.00000	0.00340	-0.00340	0.00000	0.00000
170	0.00000	0.00340	-0.00340	0.00000	0.00000

Adult Habitat Index for RED SNAPPER

BOTSAL	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
7	0.00000	0.00649	-0.006494	0.00000	0.00000
28	0.00000	0.01948	-0.019481	0.00000	0.00000
29	0.00962	0.02597	-0.016359	0.00000	0.00000
30	0.00000	0.05844	-0.058442	0.00000	0.00000
31	0.04808	0.09091	-0.042832	0.02561	0.15594
32	0.00000	0.00649	-0.006494	0.00000	0.00000
33	0.04808	0.07143	-0.023352	0.04509	0.27457
34	0.18269	0.14935	0.033342	0.10178	0.61979
35	0.37500	0.27922	0.095779	0.16422	1.00000
36	0.33654	0.29221	0.044331	0.11277	0.68671

Adult Habitat Index for RED SNAPPER

BOTTMP	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
10	0.00000	0.00645	-0.006452	0.00000	0.00000
11	0.00000	0.00645	-0.006452	0.00000	0.00000
18	0.03846	0.03871	-0.000248	0.06161	0.49383
19	0.04808	0.03226	0.015819	0.07768	0.62261
20	0.03846	0.03871	-0.000248	0.06161	0.49383
21	0.01923	0.02581	-0.006576	0.05529	0.44312
22	0.25000	0.18710	0.062903	0.12476	1.00000
23	0.38462	0.33548	0.049132	0.11099	0.88962
24	0.03846	0.09032	-0.051861	0.01000	0.08015
25	0.17308	0.18065	-0.007568	0.05429	0.43516
26	0.00000	0.01290	-0.012903	0.00000	0.00000
27	0.00962	0.01935	-0.009739	0.00000	0.00000
28	0.00000	0.01935	-0.019355	0.00000	0.00000
29	0.00000	0.00645	-0.006452	0.00000	0.00000

Adult Habitat Index for GROUPER

DFATHS	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
0	0.00877	0.09524	-0.08647	0.00000	0.00000
10	0.26316	0.45238	-0.18922	0.01000	0.02673
20	0.49123	0.31633	0.17490	0.37412	1.00000
30	0.15789	0.07823	0.07966	0.27889	0.74544
40	0.03509	0.01701	0.01808	0.21730	0.58083
50	0.04386	0.03401	0.00985	0.20907	0.55882
60	0.00000	0.00340	-0.00340	0.00000	0.00000
170	0.00000	0.00340	-0.00340	0.00000	0.00000

Adult Habitat Index for GROUPER

BOTSAL	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
7	0.00000	0.00649	-0.00649	0.00000	0.00000
28	0.00000	0.01948	-0.01948	0.00000	0.00000
29	0.00000	0.02597	-0.02597	0.00000	0.00000
30	0.01370	0.05844	-0.04474	0.05617	0.19492
31	0.00000	0.09091	-0.09091	0.00000	0.00000
32	0.00000	0.00649	-0.00649	0.00000	0.00000
33	0.06849	0.07143	-0.00294	0.09797	0.34001
34	0.10959	0.14935	-0.03976	0.06115	0.21220
35	0.32877	0.27922	0.04955	0.15046	0.52214
36	0.47945	0.29221	0.18724	0.28815	1.00000

Adult Habitat Index for GROUPER

BOTTMP	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
10	0.01370	0.00645	0.007247	0.06647	0.45498
11	0.00000	0.00645	-0.006452	0.00000	0.00000
18	0.06849	0.03871	0.029783	0.08901	0.60923
19	0.06849	0.03226	0.036235	0.09546	0.65339
20	0.04110	0.03871	0.002386	0.06161	0.42171
21	0.00000	0.02581	-0.025806	0.00000	0.00000
22	0.27397	0.18710	0.086876	0.14610	1.00000
23	0.35616	0.33548	0.020681	0.07991	0.54693
24	0.04110	0.09032	-0.049227	0.01000	0.06845
25	0.13699	0.18065	-0.043659	0.01557	0.10655
26	0.00000	0.01290	-0.012903	0.00000	0.00000
27	0.00000	0.01935	-0.019355	0.00000	0.00000
28	0.00000	0.01935	-0.019355	0.00000	0.00000
29	0.00000	0.00645	-0.006452	0.00000	0.00000

Adult Habitat Index for OTHER SNAPPER

DFATHS	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
0	0.00000	0.09524	-0.09524	0.00000	0.00000
10	0.31034	0.45238	-0.14204	0.01000	0.03140
20	0.48276	0.31633	0.16643	0.31847	1.00000
30	0.12069	0.07823	0.04246	0.19449	0.61072
40	0.03448	0.01701	0.01748	0.16951	0.53227
50	0.04310	0.03401	0.00909	0.16113	0.50594
60	0.00862	0.00340	0.00522	0.00000	0.00000
170	0.00000	0.00340	-0.00340	0.00000	0.00000

Adult Habitat Index for OTHER SNAPPER

BOTSAL	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
7	0.00000	0.00649	-0.00649	0.00000	0.00000
28	0.00000	0.01948	-0.01948	0.00000	0.00000
29	0.00000	0.02597	-0.02597	0.00000	0.00000
30	0.00000	0.05844	-0.05844	0.00000	0.00000
31	0.04348	0.09091	-0.04743	0.02101	0.09317
32	0.00000	0.00649	-0.00649	0.00000	0.00000
33	0.02899	0.07143	-0.04244	0.02600	0.11529
34	0.11594	0.14935	-0.03341	0.03503	0.15535
35	0.36232	0.27922	0.08310	0.15154	0.67199
36	0.44928	0.29221	0.15707	0.22551	1.00000

Adult Habitat Index for OTHER SNAPPER

BOTTMP	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
10	0.01449	0.00645	0.00804	0.09724	0.47100
11	0.00000	0.00645	-0.00645	0.00000	0.00000
18	0.07246	0.03871	0.03375	0.12295	0.59555
19	0.04348	0.03226	0.01122	0.10042	0.48640
20	0.02899	0.03871	-0.00972	0.07947	0.38495
21	0.02899	0.02581	0.00318	0.09237	0.44745
22	0.30435	0.18710	0.11725	0.20645	1.00000
23	0.39130	0.33548	0.05582	0.14502	0.70244
24	0.01449	0.09032	-0.07583	0.01337	0.06474
25	0.10145	0.18065	-0.07920	0.01000	0.04844
26	0.00000	0.01290	-0.01290	0.00000	0.00000
27	0.00000	0.01935	-0.01935	0.00000	0.00000
28	0.00000	0.01935	-0.01935	0.00000	0.00000
29	0.00000	0.00645	-0.00645	0.00000	0.00000

Adult Habitat Index for SPADEFISH

DFATHS	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
0	0.0625	0.09524	-0.03274	0.10609	0.34063
10	0.6250	0.45238	0.17262	0.31145	1.00000
20	0.1875	0.31633	-0.12883	0.01000	0.03211
30	0.1250	0.07823	0.04677	0.18560	0.59592
40	0.0000	0.01701	-0.01701	0.00000	0.00000
50	0.0000	0.03401	-0.03401	0.00000	0.00000
60	0.0000	0.00340	-0.00340	0.00000	0.00000
170	0.0000	0.00340	-0.00340	0.00000	0.00000

Adult Habitat Index for SPADEFISH

BOTSAL	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
7	0.0	0.00649	-0.00649	0.00000	0.00000
28	0.0	0.01948	-0.01948	0.00000	0.00000
29	0.0	0.02597	-0.02597	0.00000	0.00000
30	0.0	0.05844	-0.05844	0.00000	0.00000
31	0.1	0.09091	0.00909	0.11130	0.33647
32	0.0	0.00649	-0.00649	0.00000	0.00000
33	0.3	0.07143	0.22857	0.33078	1.00000
34	0.2	0.14935	0.05065	0.15286	0.46211
35	0.2	0.27922	-0.07922	0.02299	0.06949
36	0.2	0.29221	-0.09221	0.01000	0.03023

Adult Habitat Index for SPADEFISH

BOTTMP	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
10	0.0	0.00645	-0.00645	0.00000	0.00000
11	0.0	0.00645	-0.00645	0.00000	0.00000
18	0.0	0.03871	-0.03871	0.00000	0.00000
19	0.0	0.03226	-0.03226	0.00000	0.00000
20	0.0	0.03871	-0.03871	0.00000	0.00000
21	0.0	0.02581	-0.02581	0.00000	0.00000
22	0.2	0.18710	0.01290	0.11323	0.42753
23	0.5	0.33548	0.16452	0.26484	1.00000
24	0.0	0.09032	-0.09032	0.00000	0.00000
25	0.3	0.18065	0.11935	0.21968	0.82948
26	0.0	0.01290	-0.01290	0.00000	0.00000
27	0.0	0.01935	-0.01935	0.00000	0.00000
28	0.0	0.01935	-0.01935	0.00000	0.00000
29	0.0	0.00645	-0.00645	0.00000	0.00000

Adult Habitat Index for AMBERJACK

DFATHS	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
0	0.00000	0.09524	-0.09524	0.00000	0.00000
10	0.14607	0.45238	-0.30631	0.01000	0.01712
20	0.58427	0.31633	0.26794	0.58426	1.00000
30	0.15730	0.07823	0.07907	0.39539	0.67673
40	0.02247	0.01701	0.00547	0.32178	0.55075
50	0.07865	0.03401	0.04464	0.36095	0.61780
60	0.01124	0.00340	0.00783	0.32415	0.55480
170	0.00000	0.00340	-0.00340	0.00000	0.00000

Adult Habitat Index for AMBERJACK

BOTSAL	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
7	0.00000	0.00649	-0.00649	0.00000	0.00000
28	0.00000	0.01948	-0.01948	0.00000	0.00000
29	0.00000	0.02597	-0.02597	0.00000	0.00000
30	0.00000	0.05844	-0.05844	0.00000	0.00000
31	0.00000	0.09091	-0.09091	0.00000	0.00000
32	0.00000	0.00649	-0.00649	0.00000	0.00000
33	0.01695	0.07143	-0.05448	0.04643	0.16390
34	0.10169	0.14935	-0.04766	0.05325	0.18799
35	0.40678	0.27922	0.12756	0.22847	0.80652
36	0.47458	0.29221	0.18237	0.28328	1.00000

Adult Habitat Index for AMBERJACK

BOTTMP	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
10	0.00000	0.00645	-0.006452	0.00000	0.00000
11	0.00000	0.00645	-0.006452	0.00000	0.00000
18	0.06780	0.03871	0.029087	0.07856	0.75670
19	0.03390	0.03226	0.001640	0.05112	0.49234
20	0.01695	0.03871	-0.021761	0.02771	0.26694
21	0.01695	0.02581	-0.008857	0.04062	0.39123
22	0.23729	0.18710	0.050191	0.09967	0.95998
23	0.38983	0.33548	0.054347	0.10382	1.00000
24	0.05085	0.09032	-0.039475	0.01000	0.09632
25	0.18644	0.18065	0.005796	0.05527	0.53236
26	0.00000	0.01290	-0.012903	0.00000	0.00000
27	0.00000	0.01935	-0.019355	0.00000	0.00000
28	0.00000	0.01935	-0.019355	0.00000	0.00000
29	0.00000	0.00645	-0.006452	0.00000	0.00000

Adult Habitat Index for COBIA

DFATHS	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
0	0.03409	0.09524	-0.061147	0.03760	0.20871
10	0.36364	0.45238	-0.088745	0.01000	0.05551
20	0.39773	0.31633	0.081401	0.18015	1.00000
30	0.10227	0.07823	0.024041	0.12279	0.68159
40	0.03409	0.01701	0.017084	0.11583	0.64297
50	0.05682	0.03401	0.022805	0.12155	0.67473
60	0.01136	0.00340	0.007962	0.10671	0.59234
170	0.00000	0.00340	-0.003401	0.00000	0.00000

Adult Habitat Index for COBIA

SURSAL	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
6	0.00000	0.00649	-0.006494	0.00000	0.00000
20	0.01923	0.04545	-0.026224	0.03647	0.25265
21	0.03846	0.02597	0.012488	0.07518	0.52079
22	0.00000	0.00649	-0.006494	0.00000	0.00000
23	0.01923	0.01948	-0.000250	0.06245	0.43257
24	0.01923	0.03896	-0.019730	0.04297	0.29763
25	0.01923	0.02597	-0.006743	0.05595	0.38759
26	0.05769	0.11039	-0.052697	0.01000	0.06927
27	0.01923	0.07143	-0.052198	0.01050	0.07273
28	0.15385	0.14286	0.010989	0.07369	0.51041
29	0.03846	0.07143	-0.032967	0.02973	0.20594
30	0.21154	0.12987	0.081668	0.14437	1.00000
31	0.09615	0.09091	0.005245	0.06794	0.47062
32	0.21154	0.12987	0.081668	0.14437	1.00000
33	0.00000	0.03247	-0.032468	0.00000	0.00000
34	0.07692	0.04545	0.031469	0.09417	0.65227
35	0.01923	0.00649	0.012737	0.07543	0.52252

Adult Habitat Index for COBIA

SURTMP	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
22	0.00000	0.00645	-0.00645	0.00000	0.00000
23	0.09615	0.10323	-0.00707	0.03556	0.22789
24	0.15385	0.16774	-0.01390	0.02873	0.18416
25	0.17308	0.19355	-0.02047	0.02216	0.14202
26	0.42308	0.30968	0.11340	0.15603	1.00000
27	0.07692	0.07097	0.00596	0.04859	0.31139
28	0.05769	0.09032	-0.03263	0.01000	0.06409
29	0.01923	0.05161	-0.03238	0.01025	0.06568
30	0.00000	0.00645	-0.00645	0.00000	0.00000

Adult Habitat Index for TRIGGERFISH

DFATHS	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
0	0.01887	0.09524	-0.07637	0.09356	0.25771
10	0.29245	0.45238	-0.15993	0.01000	0.02755
20	0.50943	0.31633	0.19311	0.36304	1.00000
30	0.14151	0.07823	0.06328	0.23321	0.64238
40	0.00943	0.01701	-0.00757	0.00000	0.00000
50	0.02830	0.03401	-0.00571	0.16422	0.45234
60	0.00000	0.00340	-0.00340	0.00000	0.00000
170	0.00000	0.00340	-0.00340	0.00000	0.00000

Adult Habitat Index for TRIGGERFISH

SURSAL	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
6	0.00000	0.00649	-0.00649	0.00000	0.00000
20	0.01563	0.04545	-0.02983	0.04369	0.24539
21	0.03125	0.02597	0.00528	0.07879	0.44260
22	0.00000	0.00649	-0.00649	0.00000	0.00000
23	0.00000	0.01948	-0.01948	0.00000	0.00000
24	0.03125	0.03896	-0.00771	0.06580	0.36964
25	0.00000	0.02597	-0.02597	0.00000	0.00000
26	0.04688	0.11039	-0.06351	0.01000	0.05617
27	0.01563	0.07143	-0.05580	0.01771	0.09949
28	0.15625	0.14286	0.01339	0.08691	0.48819
29	0.04688	0.07143	-0.02455	0.04896	0.27503
30	0.18750	0.12987	0.05763	0.13114	0.73669
31	0.12500	0.09091	0.03409	0.10761	0.60446
32	0.23438	0.12987	0.10450	0.17802	1.00000
33	0.03125	0.03247	-0.00122	0.07230	0.40612
34	0.07813	0.04545	0.03267	0.10619	0.59648
35	0.00000	0.00649	-0.00649	0.00000	0.00000

Adult Habitat Index for TRIGGERFISH

SURTMP	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
22	0.00000	0.00645	-0.006452	0.000000	0.00000
23	0.12500	0.10323	0.021774	0.084698	0.86157
24	0.20313	0.16774	0.035383	0.098306	1.00000
25	0.14063	0.19355	-0.052923	0.010000	0.10172
26	0.34375	0.30968	0.034073	0.096996	0.98667
27	0.09375	0.07097	0.022782	0.085706	0.87182
28	0.06250	0.09032	-0.027823	0.035101	0.35705
29	0.03125	0.05161	-0.020363	0.042560	0.43294
30	0.00000	0.00645	-0.006452	0.000000	0.00000

Adult Habitat Index for KING MACKERAL

DFATHS	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
0	0.00000	0.09524	-0.095238	0.00000	0.00000
10	0.46154	0.45238	0.009158	0.11440	0.65924
20	0.38462	0.31633	0.068289	0.17353	1.00000
30	0.09231	0.07823	0.014076	0.11931	0.68758
40	0.01538	0.01701	-0.001622	0.10362	0.59712
50	0.04615	0.03401	0.012140	0.11738	0.67643
60	0.00000	0.00340	-0.003401	0.00000	0.00000
170	0.00000	0.00340	-0.003401	0.00000	0.00000

Adult Habitat Index for KING MACKERAL

SURSAL	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
6	0.00000	0.00649	-0.00649	0.00000	0.00000
20	0.00000	0.04545	-0.04545	0.00000	0.00000
21	0.02632	0.02597	0.00034	0.09442	0.37219
22	0.00000	0.00649	-0.00649	0.00000	0.00000
23	0.02632	0.01948	0.00684	0.10091	0.39779
24	0.00000	0.03896	-0.03896	0.00000	0.00000
25	0.05263	0.02597	0.02666	0.12073	0.47592
26	0.02632	0.11039	-0.08407	0.01000	0.03942
27	0.10526	0.07143	0.03383	0.12791	0.50422
28	0.13158	0.14286	-0.01128	0.08280	0.32638
29	0.00000	0.07143	-0.07143	0.00000	0.00000
30	0.28947	0.12987	0.15960	0.25368	1.00000
31	0.18421	0.09091	0.09330	0.18738	0.73864
32	0.05263	0.12987	-0.07724	0.01684	0.06636
33	0.00000	0.03247	-0.03247	0.00000	0.00000
34	0.07895	0.04545	0.03349	0.12757	0.50287
35	0.02632	0.00649	0.01982	0.11390	0.44898

Adult Habitat Index for KING MACKERAL

SURTMP	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
22	0.00000	0.00645	-0.00645	0.00000	0.00000
23	0.13158	0.10323	0.02835	0.15346	0.48652
24	0.05263	0.16774	-0.11511	0.01000	0.03170
25	0.23684	0.19355	0.04329	0.16840	0.53388
26	0.50000	0.30968	0.19032	0.31543	1.00000
27	0.05263	0.07097	-0.01834	0.10677	0.33850
28	0.02632	0.09032	-0.06401	0.06110	0.19371
29	0.00000	0.05161	-0.05161	0.00000	0.00000
30	0.00000	0.00645	-0.00645	0.00000	0.00000

Adult Habitat Index for AMBERJACK

DFATHS	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
0	0.00000	0.09524	-0.09524	0.00000	0.00000
10	0.14607	0.45238	-0.30631	0.01000	0.01712
20	0.58427	0.31633	0.26794	0.58426	1.00000
30	0.15730	0.07823	0.07907	0.39539	0.67673
40	0.02247	0.01701	0.00547	0.32178	0.55075
50	0.07865	0.03401	0.04464	0.36095	0.61780
60	0.01124	0.00340	0.00783	0.32415	0.55480
170	0.00000	0.00340	-0.00340	0.00000	0.00000

Adult Habitat Index for AMBERJACK

SURSAL	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
6	0.00000	0.00649	-0.00649	0.00000	0.00000
20	0.00000	0.04545	-0.04545	0.00000	0.00000
21	0.00000	0.02597	-0.02597	0.00000	0.00000
22	0.00000	0.00649	-0.00649	0.00000	0.00000
23	0.00000	0.01948	-0.01948	0.00000	0.00000
24	0.03390	0.03896	-0.00506	0.11533	0.47119
25	0.00000	0.02597	-0.02597	0.00000	0.00000
26	0.00000	0.11039	-0.11039	0.00000	0.00000
27	0.01695	0.07143	-0.05448	0.06591	0.26929
28	0.15254	0.14286	0.00969	0.13007	0.53145
29	0.05085	0.07143	-0.02058	0.09981	0.40779
30	0.22034	0.12987	0.09047	0.21086	0.86150
31	0.11864	0.09091	0.02773	0.14812	0.60519
32	0.25424	0.12987	0.12437	0.24476	1.00000
33	0.08475	0.03247	0.05228	0.17267	0.70547
34	0.06780	0.04545	0.02234	0.14273	0.58316
35	0.00000	0.00649	-0.00649	0.00000	0.00000

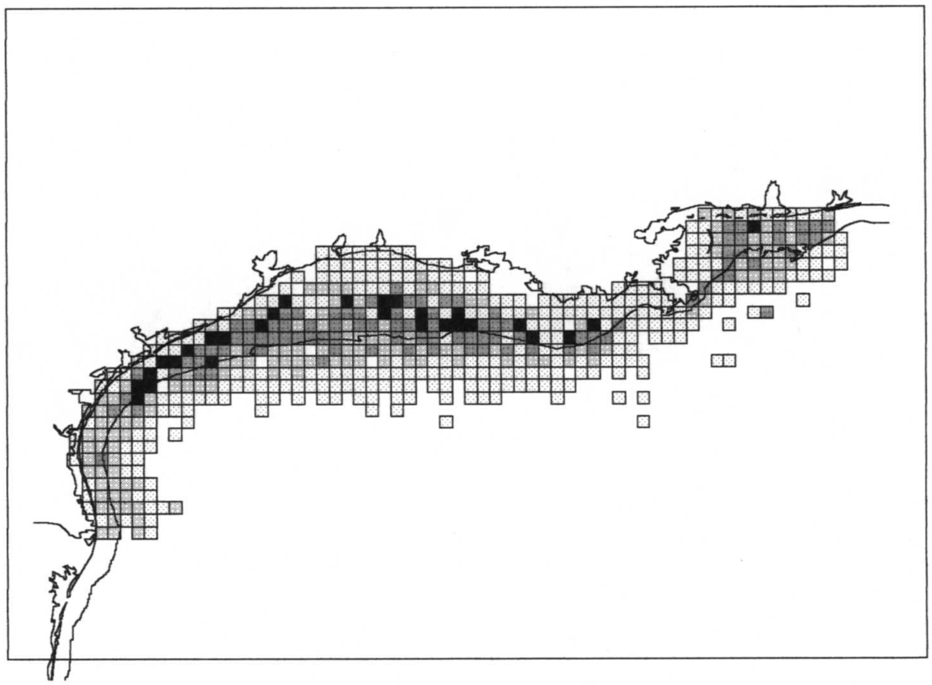
Adult Habitat Index for AMBERJACK

SURTMP	PCTOBS	PCTALL	H_A	SCHA	SPPIDX
22	0.00000	0.00645	-0.00645	0.00000	0.00000
23	0.03390	0.10323	-0.06933	0.01558	0.07215
24	0.13559	0.16774	-0.03215	0.05276	0.24435
25	0.11864	0.19355	-0.07490	0.01000	0.04632
26	0.44068	0.30968	0.13100	0.21590	1.00000
27	0.16949	0.07097	0.09852	0.18343	0.84958
28	0.06780	0.09032	-0.02253	0.06238	0.28892
29	0.03390	0.05161	-0.01771	0.06719	0.31120
30	0.00000	0.00645	-0.00645	0.00000	0.00000

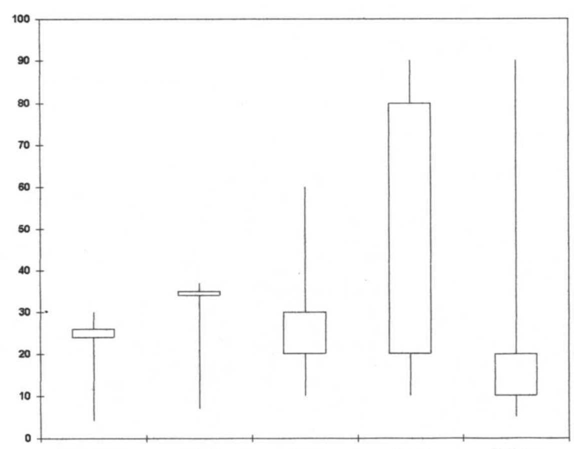
APPENDIX 3

HSI Maps for Trawlable Species

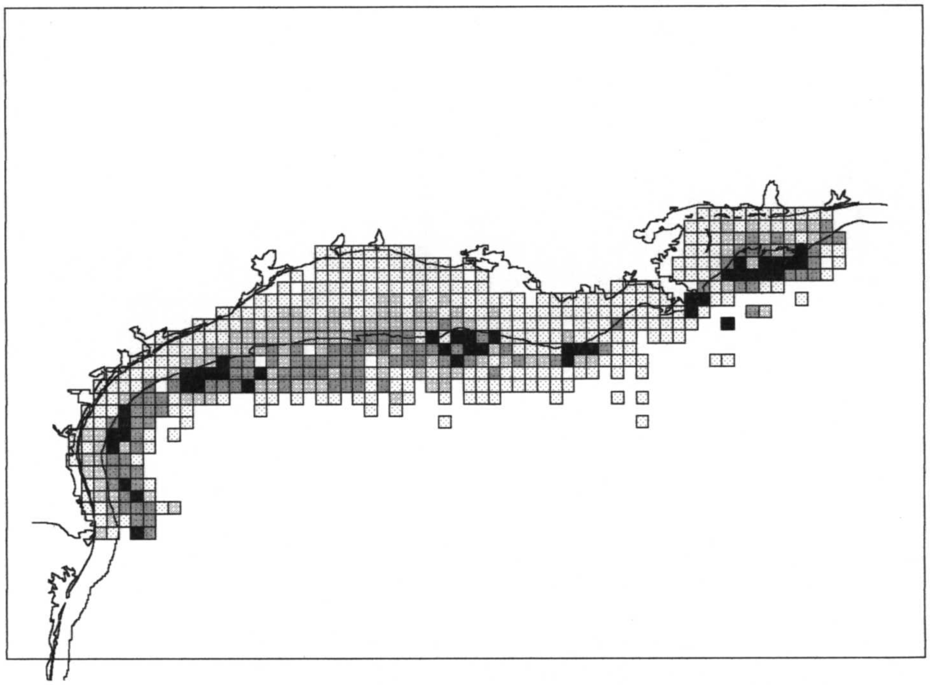
Juvenile Red Snapper



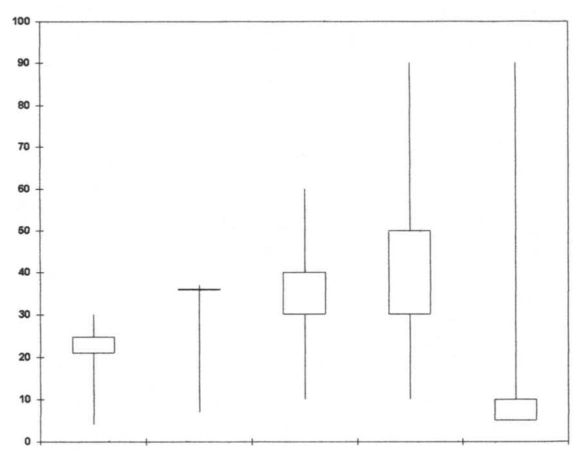
Environmental Parameter Ranges and Preferences



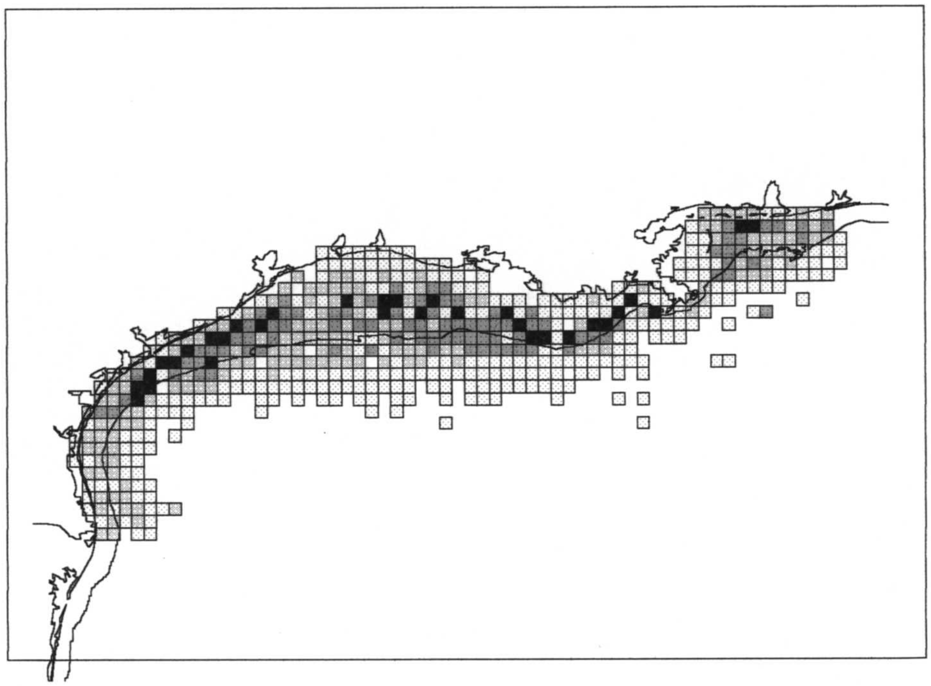
Juvenile Vermilion Snapper



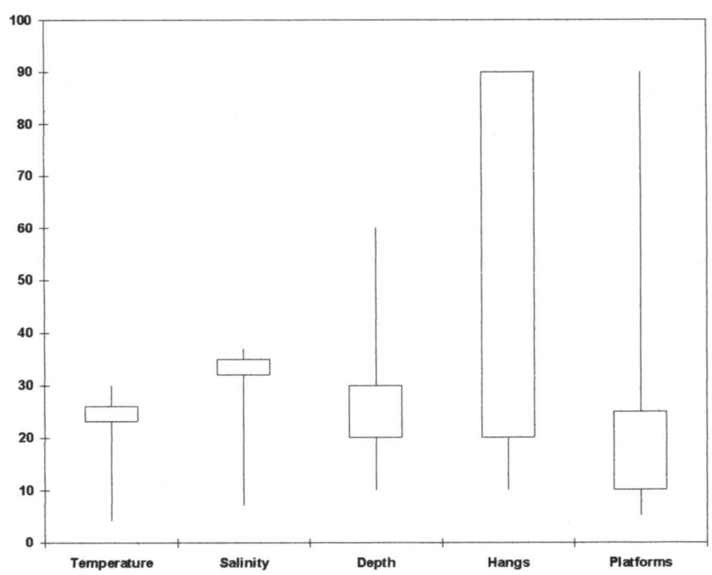
Environmental Parameter Ranges and Preferences



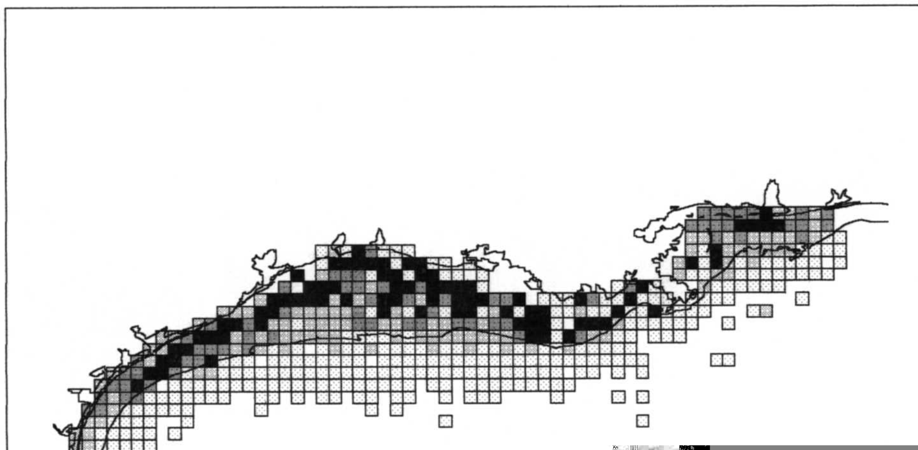
Brown Shrimp



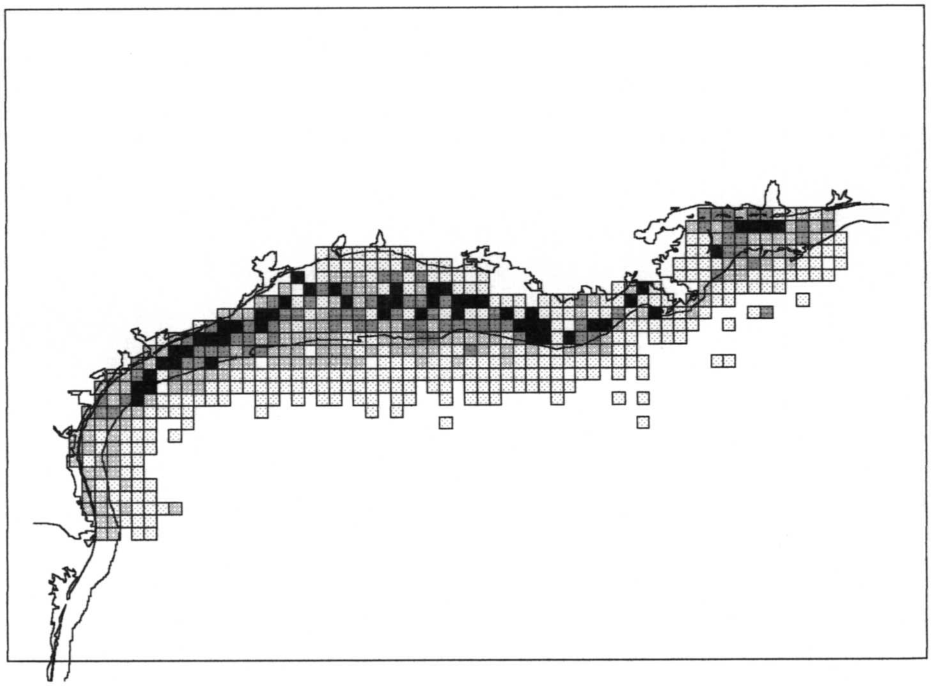
Environmental Parameter Ranges and Preferences



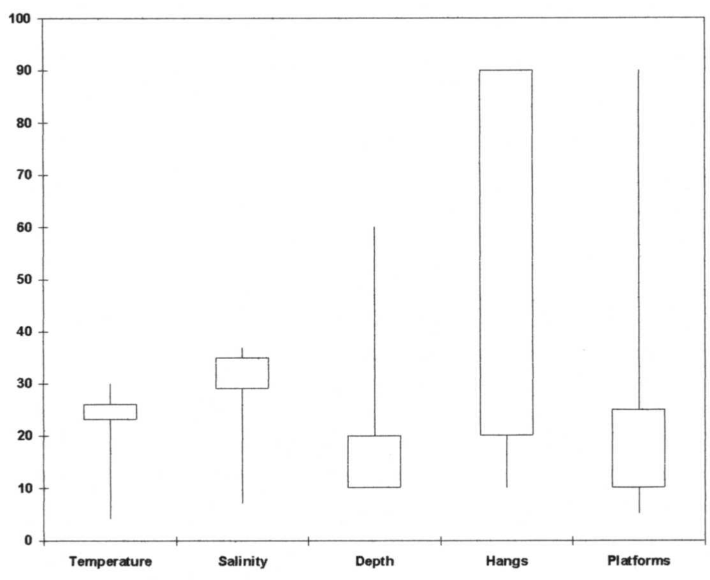
White Shrimp



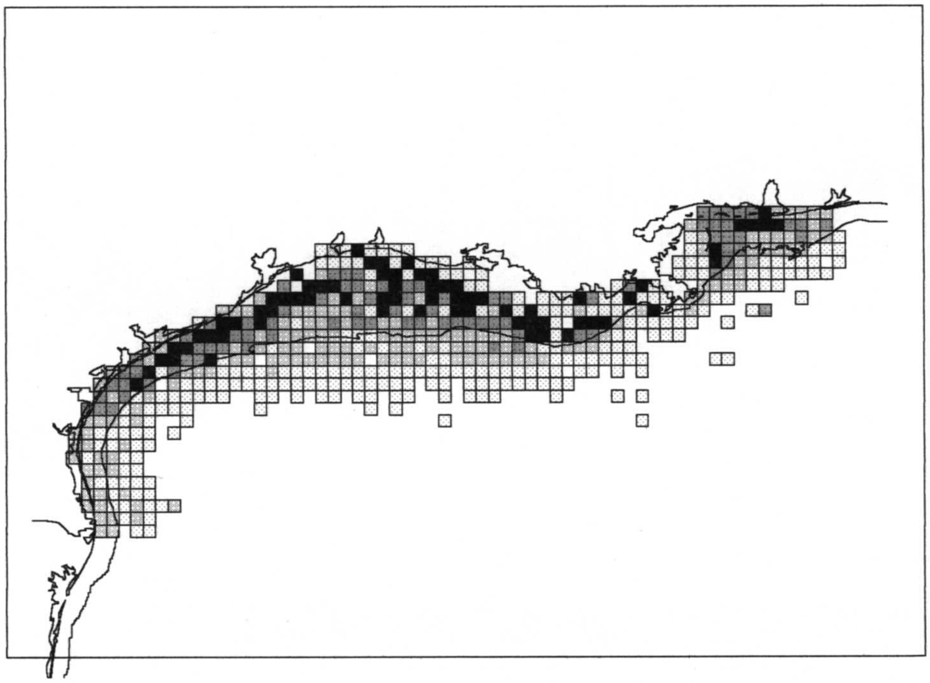
Trachypenaeus



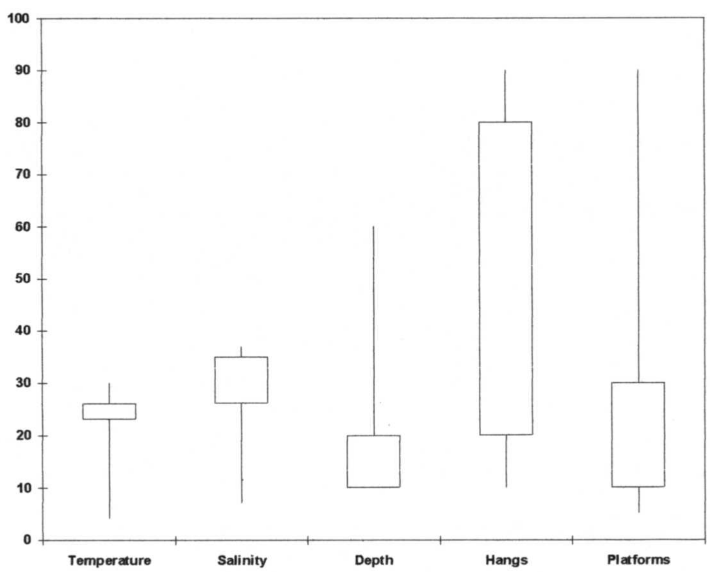
Environmental Parameter Ranges and Preferences



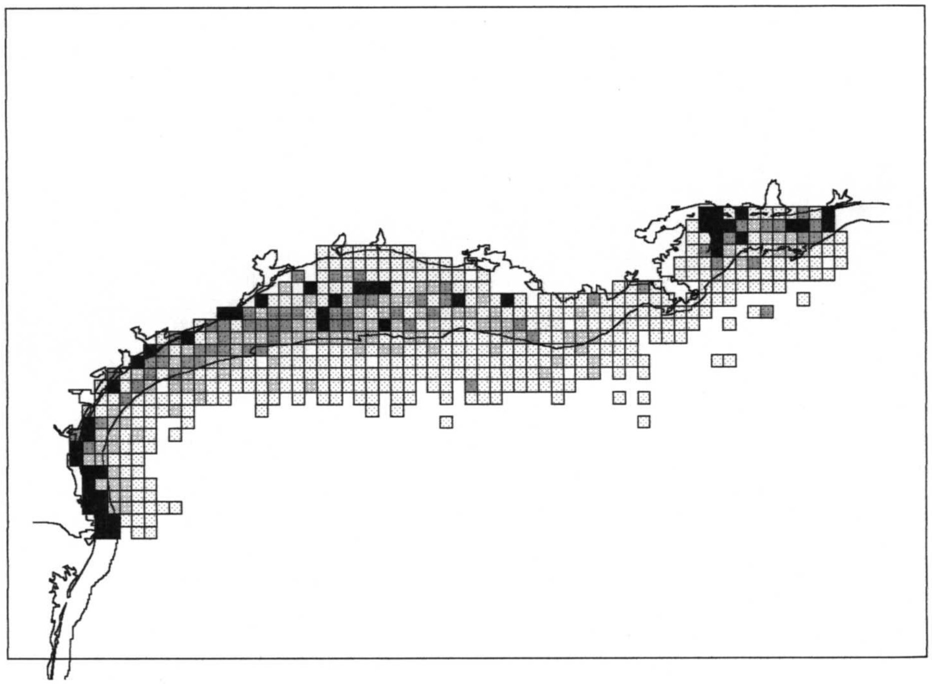
Juvenile Atlantic Croaker



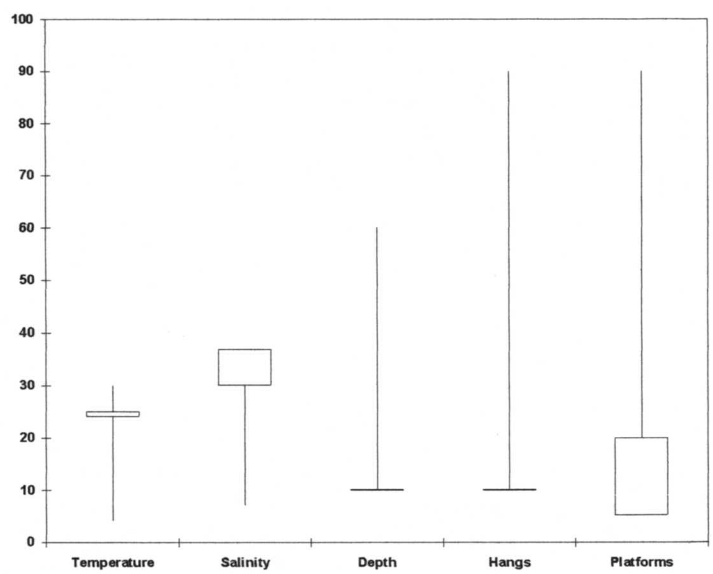
Environmental Parameter Ranges and Preferences



Juvenile Gulf Flounder



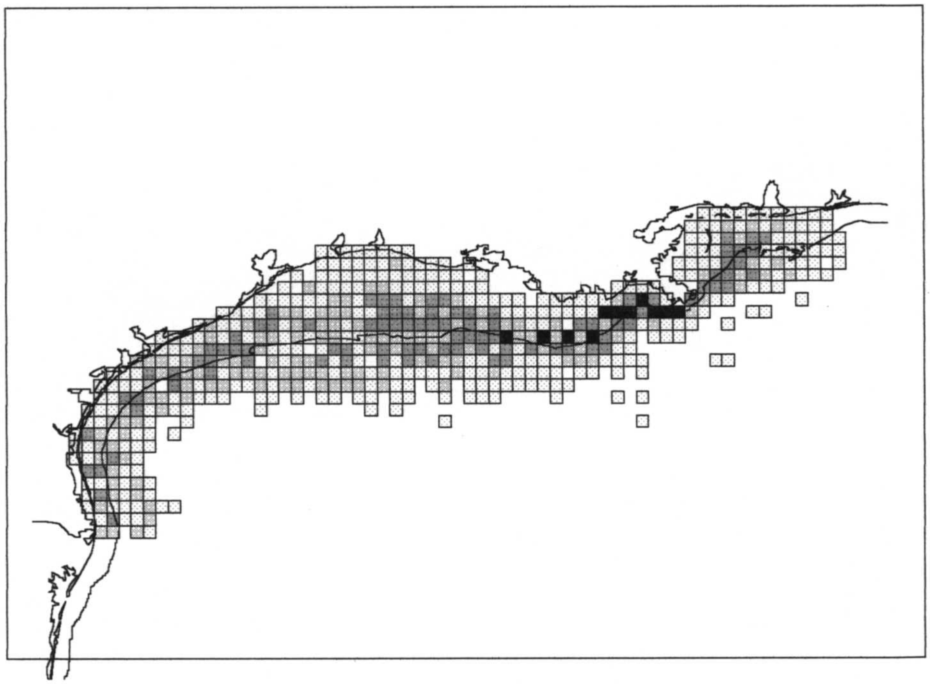
Environmental Parameter Ranges and Preferences



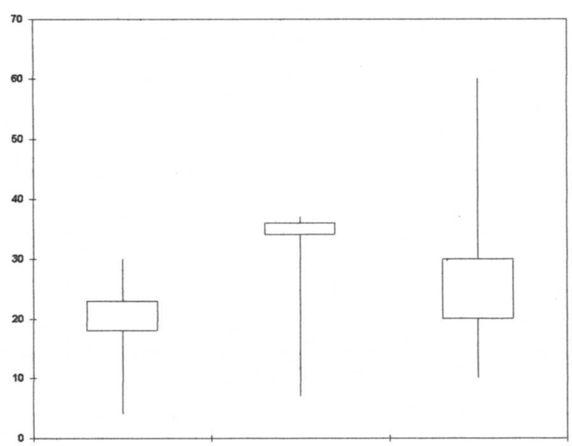
APPENDIX 4

HSI Maps for Adult Reef Fish

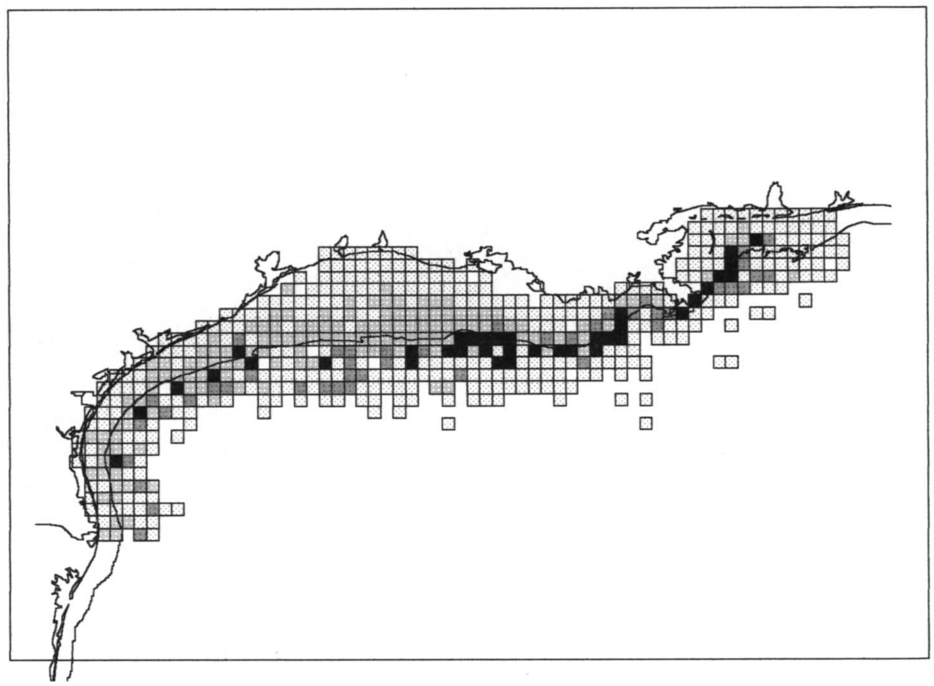
Adult Red Snapper



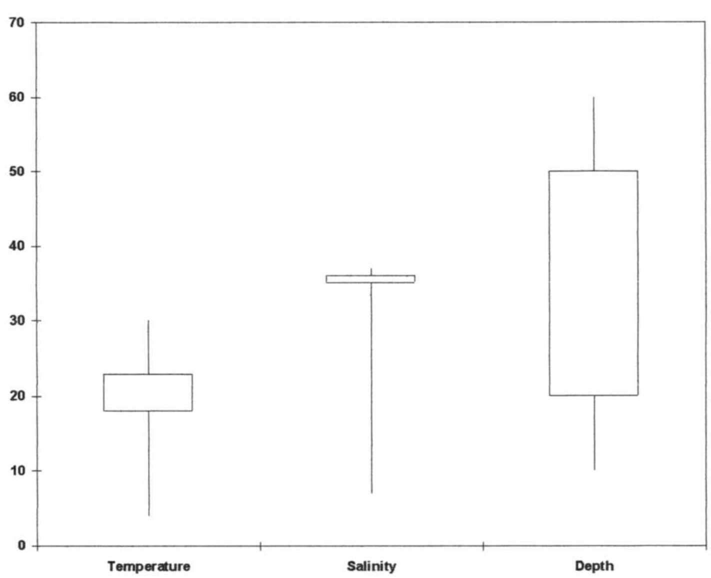
Environmental Parameter Ranges and Preferences



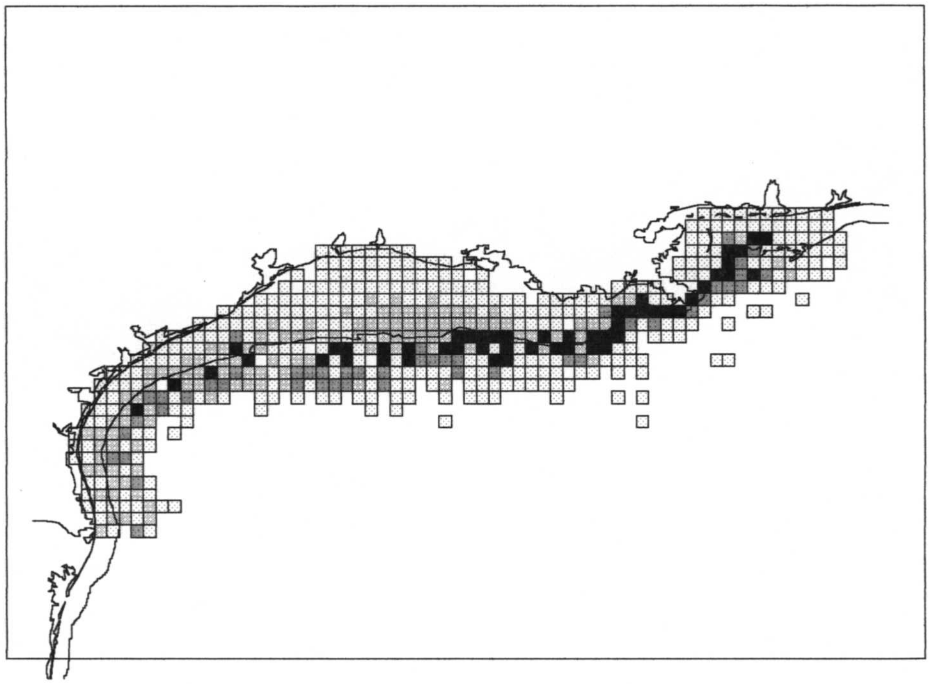
Grouper



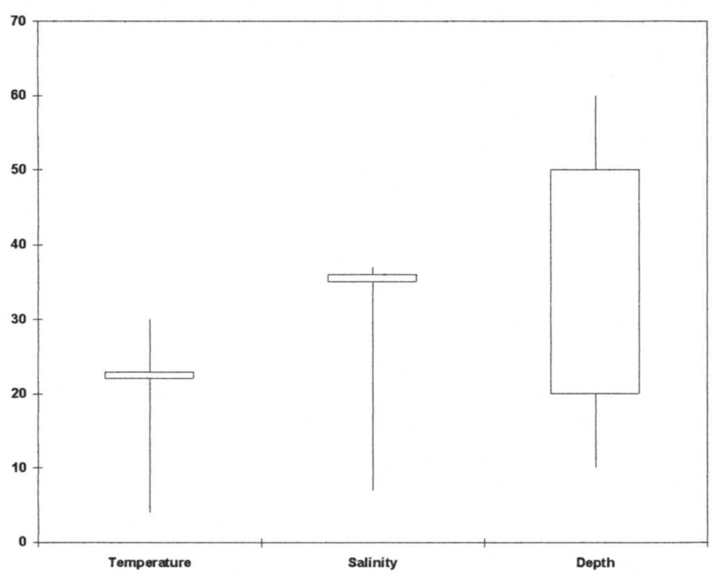
Environmental Parameter Ranges and Preferences



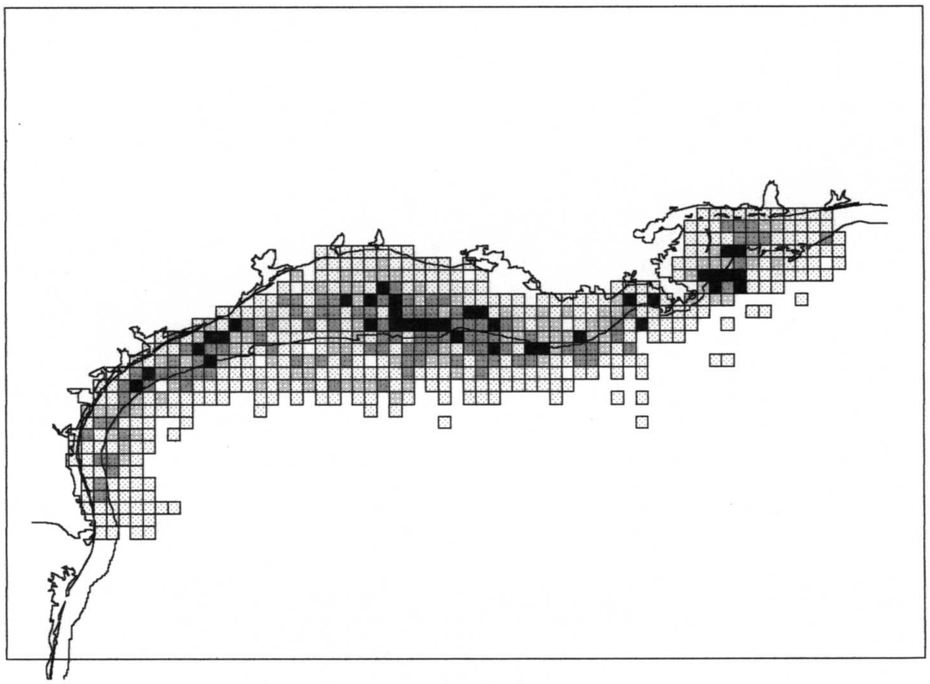
Other Snapper



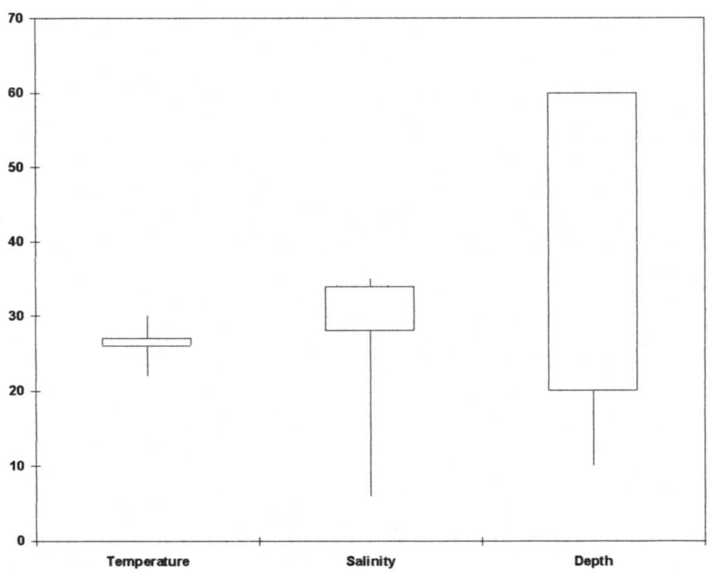
Environmental Parameter Ranges and Preferences



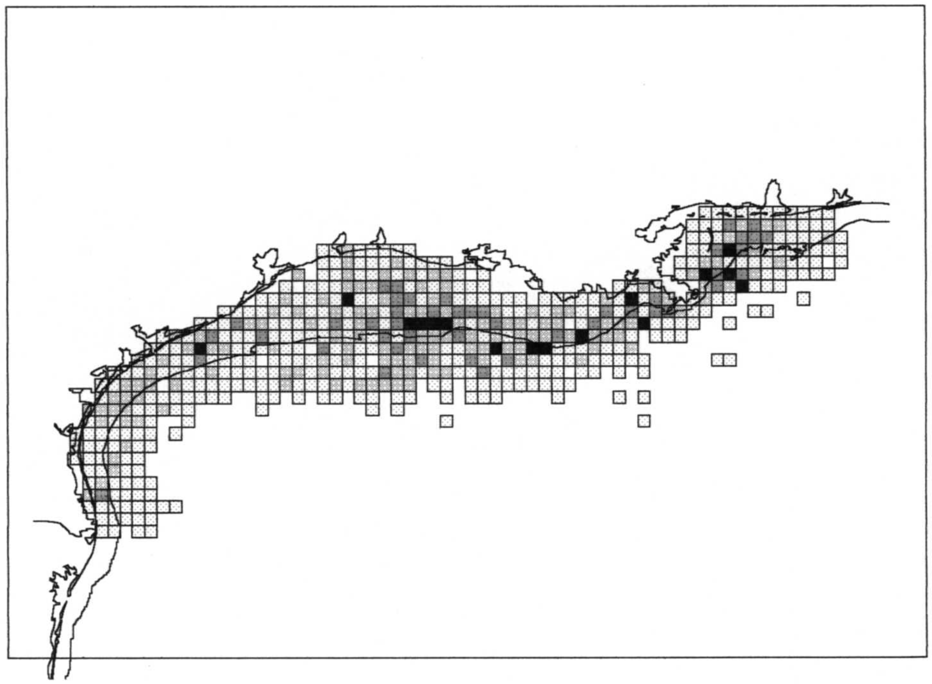
Amberjack

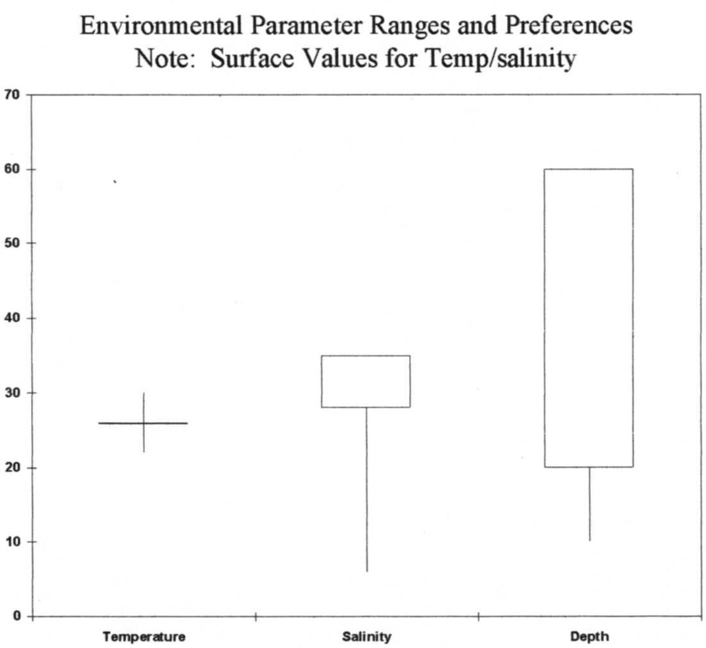


Environmental Parameter Ranges and Preferences
Note: Surface Values for Temp/salinity

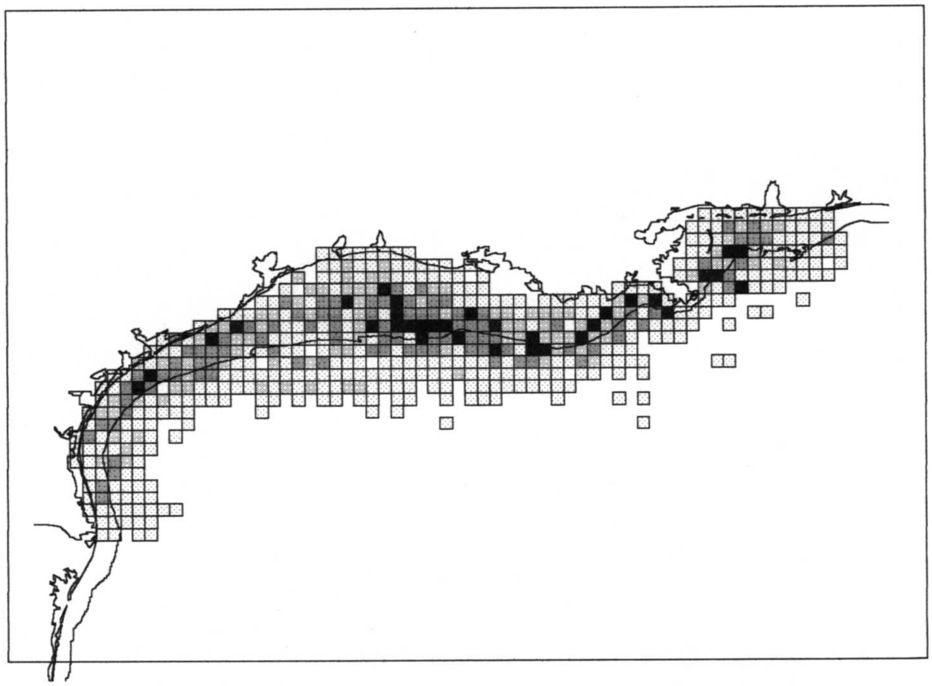


Cobia

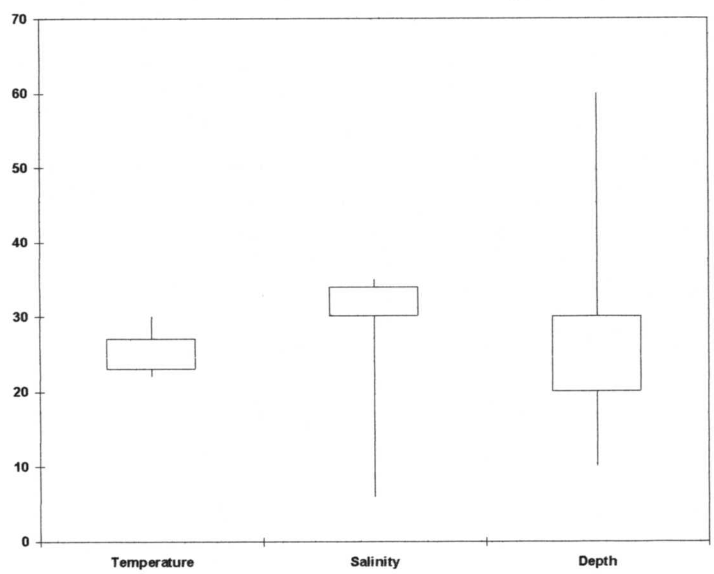



Environmental Parameter Ranges and Preferences
Note: Surface Values for Temp/salinity
70
60
50
40
30
20
10
0
Temperature
Salinity
Depth

Triggerfish



Environmental Parameter Ranges and Preferences
Note: Surface Values for Temp/salinity



The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

The Minerals Management Service Mission

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS **Minerals Revenue Management** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.