

U S DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Southeast Fisheries Center  
P O Drawer 1207  
Pascagoula, Miss. 39568-1207

*NOAA Ship Oregon II* Cruise 01-03 (246)  
06/12-07/25/01

## INTRODUCTION

The *NOAA Ship Oregon II* departed Pascagoula, Mississippi on June 12, 2001 for the twenty-first annual Summer Southeast Area Monitoring and Assessment Program (SEAMAP) Shrimp/Bottomfish Survey in the northern and western U.S. Gulf of Mexico. SEAMAP is a cooperative state-federal-university program for the collection, management and dissemination of fishery independent data.

The primary goal of this survey has been to monitor size composition and spatial distribution of penaeid shrimp stocks across the northern Gulf of Mexico in 5 to 60 fathoms (fm) and to provide additional biological and catch rate information on groundfish in the same area.

Twenty seven survey days were lost due to mechanical problems. The ship made two port calls: one into Pascagoula, Mississippi on June 13<sup>th</sup> and the other into Galveston, Texas on July 16<sup>th</sup>. Due to the number of lost in project days, the ship gave an additional 6 days after the scheduled termination day, in an attempt to meet project goals. The cruise terminated in Pascagoula, MS on July 25, 2001.

## OBJECTIVES

- 1) Determine abundance and size distribution of penaeid shrimp by depth across the U.S. northern and western Gulf of Mexico.
- 2) Obtain samples of brown, pink and white shrimp to determine length-weight relationships.
- 3) Sample the demersal fauna of the northcentral and northwestern Gulf of Mexico in depths of 5 to 60 fathoms.
- 4) Collect ichthyoplankton samples to determine the relative abundance and distribution of eggs and larvae of commercially and recreationally important fish species.
- 5) Conduct CTD casts to profile water temperature, salinity, dissolved oxygen and turbidity.
- 6) Obtain length measurements to estimate size structures of sampled populations.

7) Collect invertebrate samples as requested by staff members of the Institute of Marine Sciences, Gulf Coast Research Laboratory (GCRL).

8) Collect various species for research by different cooperators.

## MATERIALS AND METHODS

The sampling gear consisted of 40-ft shrimp nets with 8-ft by 40-in chain bracketed wooden doors. A standard free tickler chain cut 42 inches shorter than the footrope was used to stimulate benthic organisms out of the substrate and into the path of the oncoming net. Towing speed was targeted at 2.50 knots. Sample sites were randomly selected within area, depth and diel strata. Area strata consisted of Gulf coast shrimp statistical zones 11-12 (88°00'-89°00' w long), 13-15 (89°00'-92°00' w long), 16-17 (92°00'-94°00' w long), 18-19 (west of 94°00' w long and north of 28°00' n lat), and 20-21 (26°00'-28°00' n lat). Depth strata consisted of 1-fm intervals from 5 to 20 fms, a 2-fm interval from 20 to 22 fms, a 3-fm interval from 22 to 25 fms, 5-fm intervals from 25 to 50 fms and a 10-fm interval from 50 to 60 fms. Diel strata consisted of day and night, and were delimited by astronomical sunrise and sunset. Minimum and maximum tow durations were 10 and 55 minutes respectively, depending on the time required to transect the respective depth strata. If a stratum was not completed in 55 minutes then additional tows were made until it was covered. Tow direction was determined as the shortest distance between strata boundaries (generally perpendicular to depth contours).

Ichthyoplankton samples (conducted with bongo and neuston samplers) were collected at half-degree intervals of latitude and longitude within the defined survey area. Plankton sampling sites were occasionally relocated to the nearest trawling sample site to optimize survey time. Bongo tows were made with two conical 61-centimeter nets with 0.333 mm mesh netting. Digital flowmeters were suspended in each side of the frame to measure the amount of water filtered. Nets were towed at 1.5-2.0 knots to maintain a 45° wire angle of towing warp, and were fished to a maximum depth of 200 meters or within two meters of bottom in depths less than 200 meters. Neuston sampling gear consisted of a 0.947 mm mesh net mounted on a 1 by 2 meter frame. The net was towed for 10 minutes with the frame half submerged at the surface. Bongo and neuston samples were initially preserved in 10% buffered formalin and then transferred to 95% ethyl alcohol 48 hours later.

Temperature, salinity, dissolved oxygen and turbidity readings were recorded at the surface, mid, and maximum depths with a Seabird SBE 911+ CTD unit (complete profiles were archived for later analyses). Water color, secchi disc, and percent cloud cover observations were also taken during daylight hours.

## RESULTS AND DISCUSSIONS

Sixty strata (26%) were successfully sampled by *NOAA Ship Oregon II* in shrimp statistical zones 11 through 21 (Table 1). An additional 33 strata (14%) were sampled by state vessels; 23 by *R/V Tommy Munro* of Mississippi and 10 by *R/V A. E. Verrill* of Alabama. One strata was not sampled because the net was torn on bottom obstruction. Fifty-nine strata (26%) were sampled by Pascagoula aboard the *R/V Tommy Munro* due to mechanical problems of the *NOAA Ship Oregon II* (refer to *R/V Tommy Munro* Cruise Report 13-01 for the data collected during that survey).

Sixty-five tows were required to sample the completed strata (Figure 1). For summary purposes, data were grouped into three geographic areas; East Delta (88°00'-89°15' w long), West Delta (89°15'-94°00' w long) and Texas (94°00'-98°00' w long), and six depth intervals; 5-9, 10-19, 20-29, 30-39, 40-49, and 50-60 fms (Table 2). The mean total catch rate for the entire survey was 96.1 kilograms per hour fished (kg/hr), a 47.6% increase in relative abundance as compared to 2000, and a 30.6% increase over the mean of 73.6 kg/hr for the past five years, 1996-2000. *Stenotomus caprinus* was the most abundant species caught (Table 3).

Brown shrimp (*Farfantepenaeus aztecus*) was the most abundant commercial shrimp species, followed by Pink shrimp (*Farfantepenaeus duorarum*), and White shrimp (*Litopenaeus setiferus*).

Twenty bongo and neuston stations were accomplished (Fig. 2). Neuston and right side bongo samples were returned to Pascagoula for subsequent shipment to the Polish Sorting Center for sorting and identification according to standard SEAMAP protocol. Left bongo samples were sent to the SEAMAP Plankton Archiving Center at the Institute of Marine Science's Gulf Coast Research Laboratory in Ocean Springs, Mississippi.

Figure 3 shows stations where hypoxic conditions (dissolved oxygen readings  $\leq$  2 milligrams per liter) were encountered during the survey. Seventy-three CTD casts, twenty-four cloud cover, twenty-five water color and thirty secchi disc measurements were collected (Table 4).

#### ACKNOWLEDGMENTS

On behalf of Mississippi Laboratories and the scientific party I would like to thank the Commanding Officer and the crew of the NOAA Ship Oregon II for a job well done during the survey.

## CRUISE PARTICIPANTS

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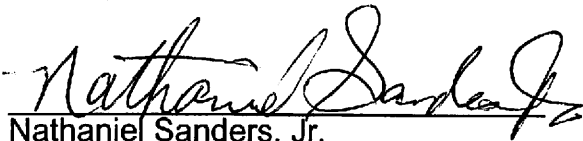
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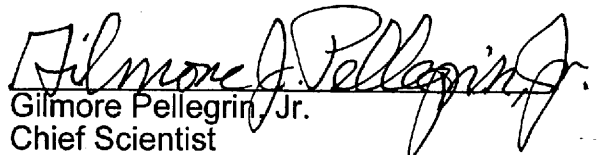
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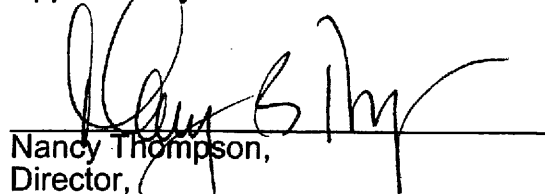
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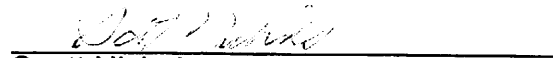
  
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Table 1. Distribution of sampling effort by strata for NOAA Ship Oregon II Cruise 246 (OT-01-03). Numbers in table body indicate number of times strata were sampled. "Ala." and "Miss." indicate strata sampled by the respective states, and "tore net" indicates strata which were unsuccessfully sampled due to bottom obstructions. "T.Munro" indicates strata that were sampled aboard the R/V Tommy Munro by Pascagoula laboratory.

Depth Strata (fathoms)	Diel Strata									
	Day					Night				
	Statistical Zones					Statistical Zones				
	11-12	13-15	16-17	18-19	20-21	11-12	13-15	16-17	18-19	20-21
5-6	Ala.	T.Munro	.	1	1	Miss.	.	.	1	1
6-7	Miss.	.	.	.	1	Ala.	T.Munro	.	.	.
7-8	Miss.	T.Munro	.	.	1	Miss.	T.Munro	T.Munro	1	1
8-9	Miss.	tore net	.	.	1	Miss.	T.Munro	.	.	1
9-10	Miss.	T.Munro	.	1	1	Miss.	T.Munro	.	1	1
10-11	Ala.	T.Munro	T.Munro	.	1	.	T.Munro	.	.	1
11-12	Ala.	T.Munro	.	1	1	Miss.	T.Munro	.	1	1
12-13	Miss.	T.Munro	1	.	1	Miss.	T.Munro	.	.	.
13-14	Miss.	T.Munro	.	.	1	Miss.	T.Munro	T.Munro	1	1
14-15	Ala.	T.Munro	.	.	1	Ala.	T.Munro	T.Munro	.	1
15-16	Ala.	T.Munro	T.Munro	1	1	Miss.	T.Munro	T.Munro	1	1
16-17	Ala.	T.Munro	T.Munro	.	1	Ala.	T.Munro	.	.	1
17-18	Miss.	T.Munro	.	1	1	Miss.	T.Munro	.	.	1
18-19	Ala.	T.Munro	T.Munro	.	.	Miss.	T.Munro	T.Munro	.	.
19-20	Miss.	T.Munro	.	1	1	Miss.	T.Munro	T.Munro	1	1
20-22	Miss.	T.Munro	.	.	1	Miss.	T.Munro	T.Munro	.	.
22-25	1	T.Munro	.	1	1	Miss.	T.Munro	T.Munro	1	1
25-30	.	T.Munro	T.Munro	.	1	.	T.Munro	.	.	1
30-35	Miss.	T.Munro	T.Munro	1	1	1	T.Munro	.	1	1
35-40	.	T.Munro	T.Munro	.	1	.	T.Munro	.	.	1
40-45	.	T.Munro	T.Munro	1	.	1	T.Munro	.	1	.
45-50	.	T.Munro	.	.	1	.	T.Munro	.	.	1
50-60	.	T.Munro	.	.	.	.	T.Munro	.	.	.

Table 2. Estimates of relative abundance for NOAA Ship Oregon II Cruise 246 (OT-01-03) by area, depth and diel strata. *N* represents number of tows and *Mean* represents average total catch in kg/hr.

Area	Depth (fms)												Diurnal Period				Total	
	5 - 9		10-19		20-29		30-39		40-49		50-60		Day		Night			
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
East Delta	.	.	.	.	1	10.3	1	192.0	1	302.2	.	.	1	10.3	2	247.1	3	168.2
West Delta	.	.	1	222.7	.	.	.	.	.	.	.	.	1	222.7	.	.	1	222.7
Texas	10	114.7	25	118.3	13	39.7	7	61.5	5	75.7	.	.	33	75.5	28	108.2	61	90.5
All Areas	10	114.7	26	122.3	14	37.6	8	77.9	6	113.4	.	.	35	77.8	30	117.5	65	96.1

Table 3. NOAA Ship Oregon II cruise 246 (OT-01-03), Summer 2001 catches Adjusted To 60- Min Tow Sorted in Descending Order of Number Caught.

Genus Species	Number	Weight (Kg)	Frequency Of Catch
<i>Stenotomus caprinus</i>	34,676	1,180.6	56
<i>Micropogonias undulatus</i>	30,690	2,170.9	31
<i>Chloroscombrus chrysurus</i>	25,298	1,272.2	25
<i>Farfantepenaeus aztecus</i>	24,336	808.8	58
<i>Callinectes similis</i>	22,200	688.6	50
<i>Upeneus parvus</i>	17,995	644.2	55
<i>Rimapenaeus similis</i>	10,475	102.9	29
<i>Leiostomus xanthurus</i>	9,446	909.0	14
<i>Loligo plei</i>	8,598	397.4	35
<i>Sicyonia dorsalis</i>	8,011	40.4	32
<i>Saurida brasiliensis</i>	7,983	118.7	45
<i>Syacium gunteri</i>	7,205	286.5	55
<i>Renilla mulleri</i>	5,110	58.9	21
<i>Astropecten duplicatus</i>	4,654	10.6	19
<i>Tachurus lathami</i>	4,514	220.9	28
<i>Serranus atrobranchus</i>	4,294	85.0	34
<i>Peprilus burti</i>	4,225	400.2	30
<i>Loligo pealeii</i>	3,699	199.8	30
<i>Portunus spinicarpus</i>	3,183	54.7	17
<i>Squilla empusa</i>	2,905	82.9	29
<i>Lutjanus campechanus</i>	255	36.8	26
Total	239752	9,770.0	



Table 4. Summary of environmental samples and data collected during *NOAA Ship Oregon II* Cruise 246 (OT-01-03).

	Surface	Mid-depth	Maximum depth	Total
Temperature	66	66	66	198
Salinity	66	66	66	198
Dissolved oxygen	66	66	66	198
Light Transmission	--	--	--	--
Secchi disk	--	--	--	30
Water color	--	--	--	25
Cloud cover	--	--	--	24
CTD	--	--	--	73
Shrimp trawl*	--	--	--	66
Bongo	--	--	--	20
Neuston	--	--	--	20

\* One tow deleted due to torn net.

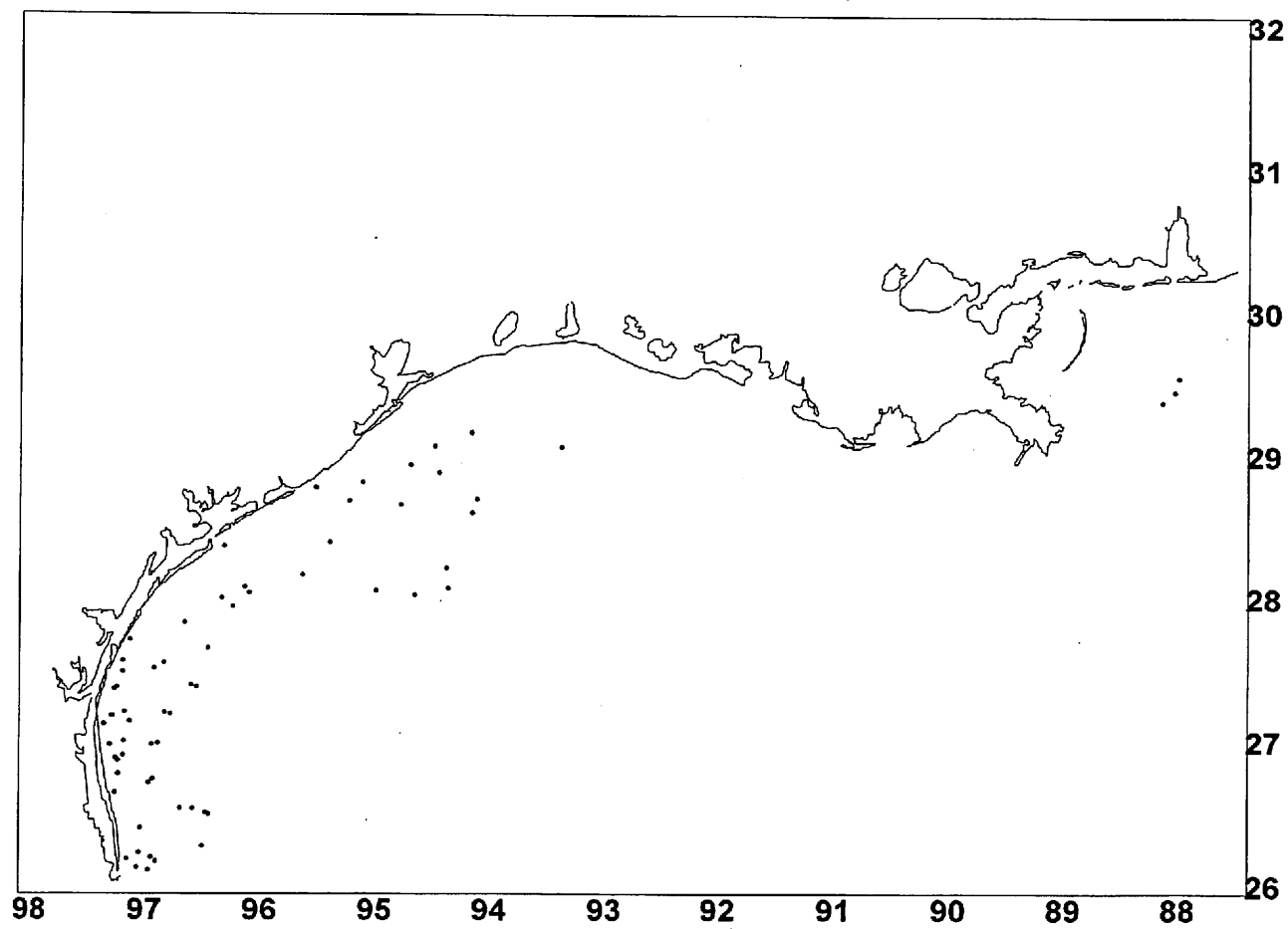
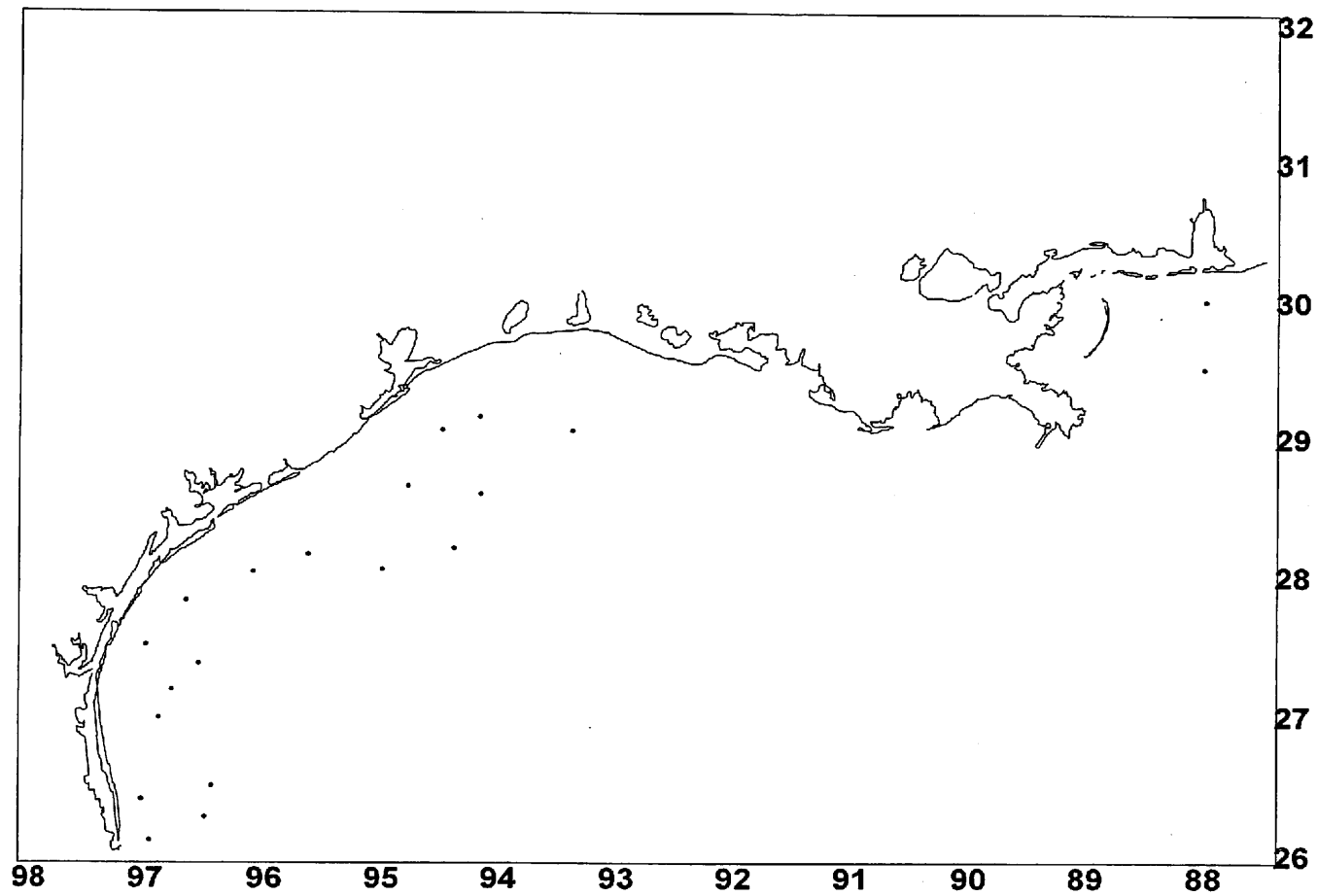
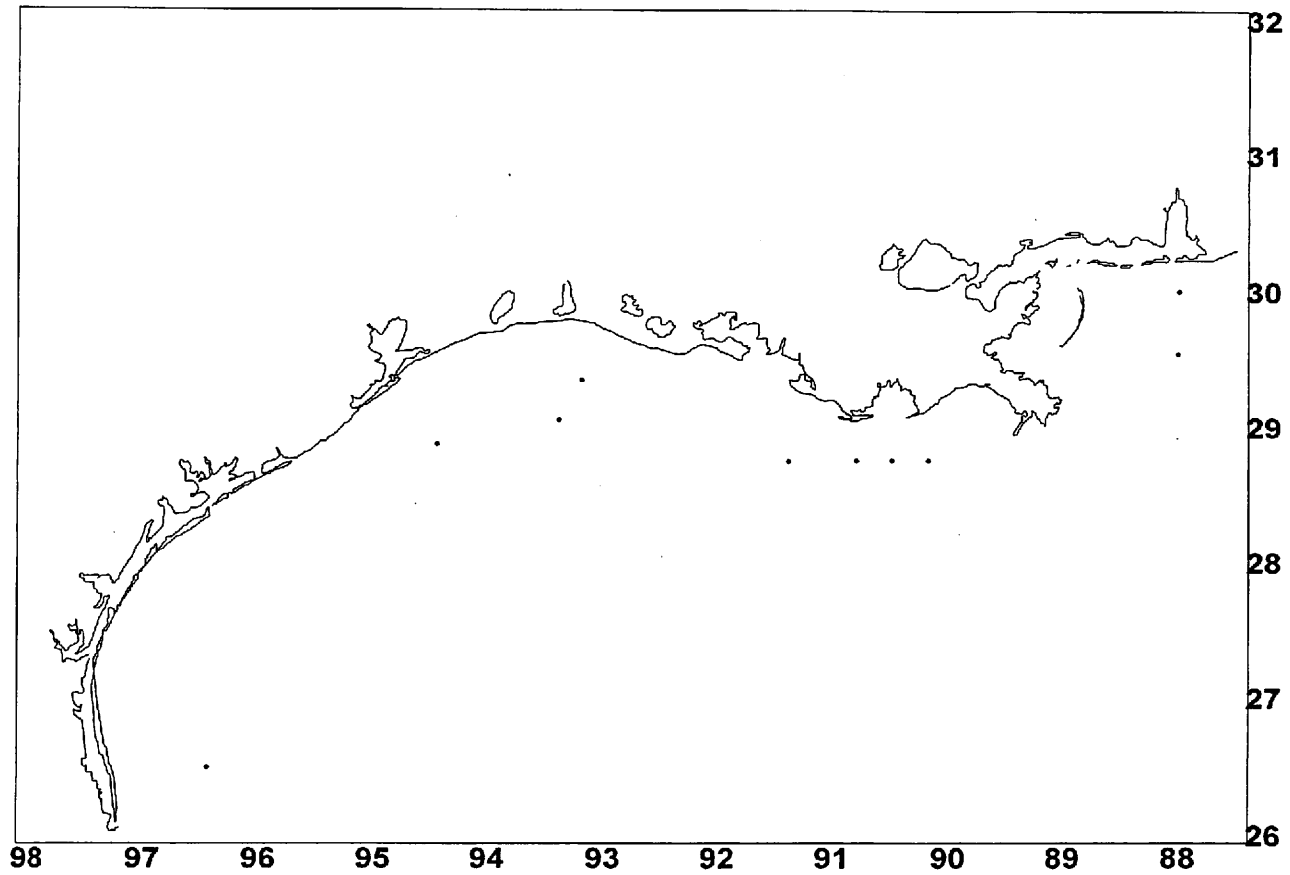


Figure 1. Shrimp trawl stations accomplished during NOAA Ship Oregon II Cruise 246 (OT-01-03).



**Figure 2.** Ichthyoplankton sampling stations completed during NOAA Ship Oregon II Cruise 246 (OT-01-03).



**Figure 3.** Locations where hypoxic conditions (bottom dissolved oxygen measurement  $\leq 2.0$  milligrams per liter) were encountered during NOAA Ship Oregon II Cruise 246 (OT-01-03).