

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 02-03 (250)  
06/11-07/18/02

## INTRODUCTION

The *NOAA Ship OREGON II* departed Pascagoula on June 11, 2002 for the twenty-second annual Summer Southeast Area Monitoring and Assessment Program (SEAMAP) shrimp and 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 relative abundance information on groundfish in the same area.

Two survey days were lost due to mechanical and medical problems. The cruise terminated in Pascagoula on July 18, 2002. Two port calls were made to exchange scientific personnel; one in Pascagoula on June 14<sup>th</sup> and another in Galveston, Texas on July 2<sup>nd</sup>.

## 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 temperature, salinity, dissolved oxygen, fluorometry and percent light transmission throughout the water column.
- 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 cooperating agencies.

## 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, percent light transmission and fluorometer readings were recorded at the surface, mid, and maximum depths with a Seabird SBE 911+ CTD unit (complete profiles were archived for later analyses). Secchi disc, and percent cloud cover observations were also taken during daylight hours.

## RESULTS AND DISCUSSIONS

One hundred and ninety-two of two hundred thirty strata (84%) were successfully sampled by *NOAA Ship Oregon II* in shrimp statistical zones 11 through 21 (Table 1). An additional 32 strata were sampled by state vessels; 23 by *R/V Tommy Munro* of Mississippi and 9 by *R/V A. E. Verrill* of Alabama. One strata was not sampled because the net was torn on bottom obstructions and two strata were not sampled because the net was inadvertently towed in the wrong depth stratum. Three strata were not sampled due to time constraints.

Two hundred and thirty tows were required to sample the selected 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 76.5 kilograms per hour fished (kg/hr), a 10% increase in relative abundance as compared to 2001 and almost equal to the five year mean for 1997-2001 (78.6 kg/hr). Sciaenidae was again the most abundant family caught with Atlantic croaker (*Micropogonias undulatus*) making the greatest contribution (Table 3).

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

Fifty-one bongo and fifty 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. Two hundred twenty-four CTD casts, seventy-one cloud cover and sixty-nine 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

06/11 - 14/02

<u>NAME</u>	<u>TITLE</u>	<u>ORGANIZATION</u>
Nathaniel Sanders, Jr.	Field Party Chief	NMFS Pascagoula, Miss.
Gilmore Pellegrin, Jr.	Watch Leader	NMFS Pascagoula, Miss.
Andre Debose	Watch Leader	NMFS Pascagoula, Miss.
Mark McDuff	Comp. Spec.	NMFS Pascagoula, Miss.
Chuck Schroeder	Ship Sys. Spec.	Johnson Controls
Kirk Pellegrin	Cooperator	Pascagoula Police Dept.
Bronson Nagareda	Grad Student	Fla. Inst. Tech.
Helen Peterson	Teacher At Sea	Hattiesburg School System
Sandy Chang	Cooperator	NMAO, Washington, D.C.
Thomas Stepka	Cooperator	NMAO, Washington, D.C.
Dennis Shields	Cooperator	NMAO, Washington, D.C.

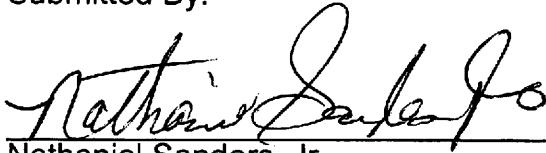
06/15 - 07/02/02

<u>NAME</u>	<u>TITLE</u>	<u>ORGANIZATION</u>
Nathaniel Sanders, Jr.	Field Party Chief	NMFS Pascagoula, Miss.
Perry Thompson, Jr.	Watch Leader	NMFS Pascagoula, Miss.
Kirsten Larsen	Watch Leader	Johnson Controls
Rex Herron	Ecologist	NMFS Stennis Space Center
Brandi Trigg	Fisheries Biologist I	Johnson Controls
Kris McNyset	Asst. Curator of Fish	U of Kansas Nat. Hist. Museum
Loukea Kovanis	Teacher At Sea	Wisconsin School System
Melissa Sheba	Cooperator	Duke University
Julie Stemp	Cooperator	Univ. of Southern Miss.
Catherine Coy	Cooperator	Duke University

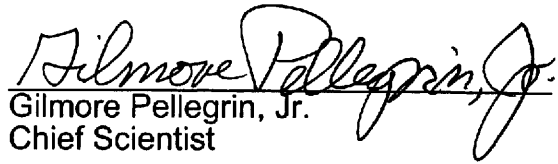
07/03 - 18/02

<u>NAME</u>	<u>TITLE</u>	<u>ORGANIZATION</u>
Gilmore Pellegrin, Jr.	Field Party Chief	NMFS Pascagoula, Miss.
Alonzo Hamilton	Watch Leader	NMFS Pascagoula, Miss.
L. Nelson May	Watch Leader	NMFS Stennis Space Center
Carolyn Burks	Res. Fish. Bio	NMFS Pascagoula, Miss.
Kim Foster	Fisheries Biologist I	Johnson Controls
Harriet Perry	Asst. Professor	Gulf Coast Research Lab.
Callie Hall	Physical Scientist	NASA
Melissa Sheba	Cooperator	Duke University
Kim Eubanks	Teacher At Sea	Maryland School System
Catherine Coy	Cooperator	Duke University
Sherrie Krause	Teacher at Sea	Texas School System

Submitted By:

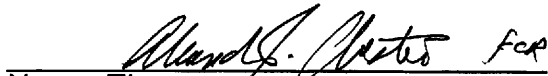


Nathaniel Sanders, Jr.  
Chief Scientist



Gilmore Pellegrin, Jr.  
Chief Scientist

Approved By:



Nancy Thompson,  
Director,  
Southeast Fisheries Science Center



Scott Nichols,  
Director,  
Mississippi Laboratory

Table 1. Distribution of sampling effort by strata for NOAA Ship Oregon II Cruise 250 (OT-02-03). 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. "Wrong Depth" indicates strata that were not sampled due to the net being inadvertently towed in the wrong depth strata.

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.	1	1	1	1	.	1	1	1	1
6-7	Ala.	1	Wrong Depth	1	1	Ala.	1	1	1	1
7-8	Ala.	1	1	1	1	.	1	1	1	1
8-9	Miss.	1	1	1	1	Miss.	1	1	1	1
9-10	Ala.	1	1	1	1	Miss.	1	1	1	1
10-11	Ala.	Wrong Depth	1	1	1	Miss.	1	1	1	1
11-12	Miss.	1	1	1	1	Miss.	1	1	1	1
12-13	Miss.	1	1	1	1	Miss.	1	1	1	1
13-14	Miss.	1	1	1	1	Miss.	1	1	1	1
14-15	Ala.	1	1	1	1	1	1	1	1	1
15-16	Ala.	1	1	1	1	1	1	1	1	1
16-17	Miss.	1	1	1	1	.	1	1	1	1
17-18	Miss.	1	1	1	1	Miss.	1	1	1	1
18-19	Miss.	1	1	1	1	Miss.	1	1	1	1
19-20	Ala.	1	1	1	1	1	1	1	1	1
20-22	Miss.	1	1	1	1	Miss.	1	1	1	1
22-25	Miss.	1	1	1	1	Miss.	1	1	1	1
25-30	Miss.	1	1	1	1	1	1	1	1	1
30-35	Miss.	1	1	1	1	1	1	1	1	1
35-40	Miss.	1	1	1	1	1	1	1	1	1
40-45	Miss.	1	1	1	1	1	1	1	1	1
45-50	1	1	1	1	1	1	1	1	1	1
50-60	1	1	1	1	Tore net	1	1	1	1	1

Table 2. Estimates of relative abundance for NOAA Ship Oregon II Cruise 250 (OT-02-03) 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	.	.	2	26.7	3	59.9	2	48.9	3	45.5	2	63.7	2	57.3	10	48.0	12	49.6
West Delta	20	67.9	43	53.6	20	41.3	11	34.5	9	62.0	6	97.5	54	58.7	52	50.3	106	54.6
Texas	20	235.4	41	101.3	23	42.9	12	31.2	10	48.9	5	87.0	56	104.2	55	96.2	111	100.3
All Areas	40	151.7	86	75.7	46	43.3	25	34.0	22	53.8	13	88.3	112	81.5	117	71.7	229	76.5

Table 3. NOAA Ship Oregon II Cruise 250 (OT-02-03), catches adjusted to 60-min tow and sorted in descending order of numbers caught.

Genus Species	Number	Weight (Kg)	Frequency Of Catch
<i>Chloroscombrus chrysurus</i>	122,154	5,362.6	110
<i>Micropogonias undulatus</i>	117,029	7,922.5	132
<i>Farfantepenaeus aztecus</i>	58,138	2,017.5	195
<i>Rimapenaeus similis</i>	47,012	432.4	113
<i>Stenotomus caprinus</i>	39,580	2,375.3	163
<i>Loligo plei</i>	24,162	704.5	110
<i>Callinectes similis</i>	23,094	651.5	145
<i>Peprilus burti</i>	23,052	2,358.8	131
<i>Portunus spinicarpus</i>	22,245	300.2	94
<i>Leiostomus xanthurus</i>	15,675	2,091.1	68
<i>Squilla empusa</i>	15,441	358.5	108
<i>Saurida brasiliensis</i>	11,857	137.3	104
<i>Cynoscion arenarius</i>	11,578	787.6	103
<i>Amusium papyraceum</i>	10,142	206.1	83
<i>Solenocera vioscai</i>	10,040	94.5	58
<i>Serranus atrobranchus</i>	9,565	215.8	97
<i>Prionotus longispinosus</i>	8,057	236.2	111
<i>Cynoscion nothus</i>	7,464	780.2	71
<i>Larimus fasciatus</i>	6,933	481.7	25
<i>Loligo pealeii</i>	6,512	262.1	72
<i>Lutjanus campechanus</i>	1,102	297.8	89
Total	590,832	28,074.2	



Table 4. Summary of environmental samples and data collected during NOAA Ship Oregon II Cruise 250 (OT-02-03).

	Surface	Mid-depth	Maximum depth	Total
Temperature	224	224	224	672
Salinity	224	224	224	672
Dissolved oxygen	224	224	224	672
Light Transmission	224	224	224	672
Secchi disk	--	--	--	69
Water color	--	--	--	--
Cloud cover	--	--	--	71
CTD	--	--	--	224
Shrimp trawl*	--	--	--	230
Bongo	--	--	--	51
Neuston	--	--	--	50

\* One tow deleted due to torn net.

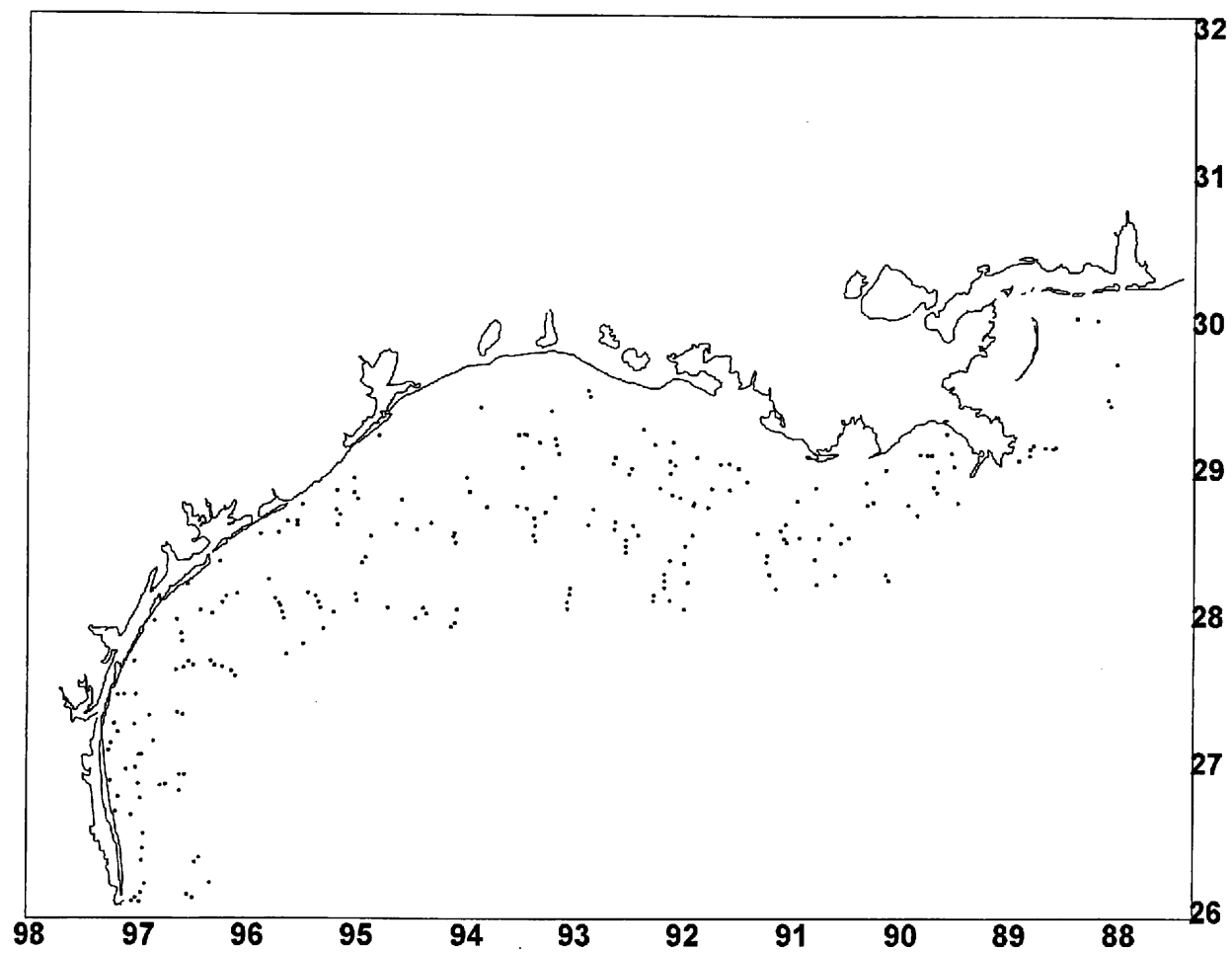


Figure 1. Shrimp trawl stations accomplished during NOAA Ship Oregon II Cruise 250 (OT-02-03).

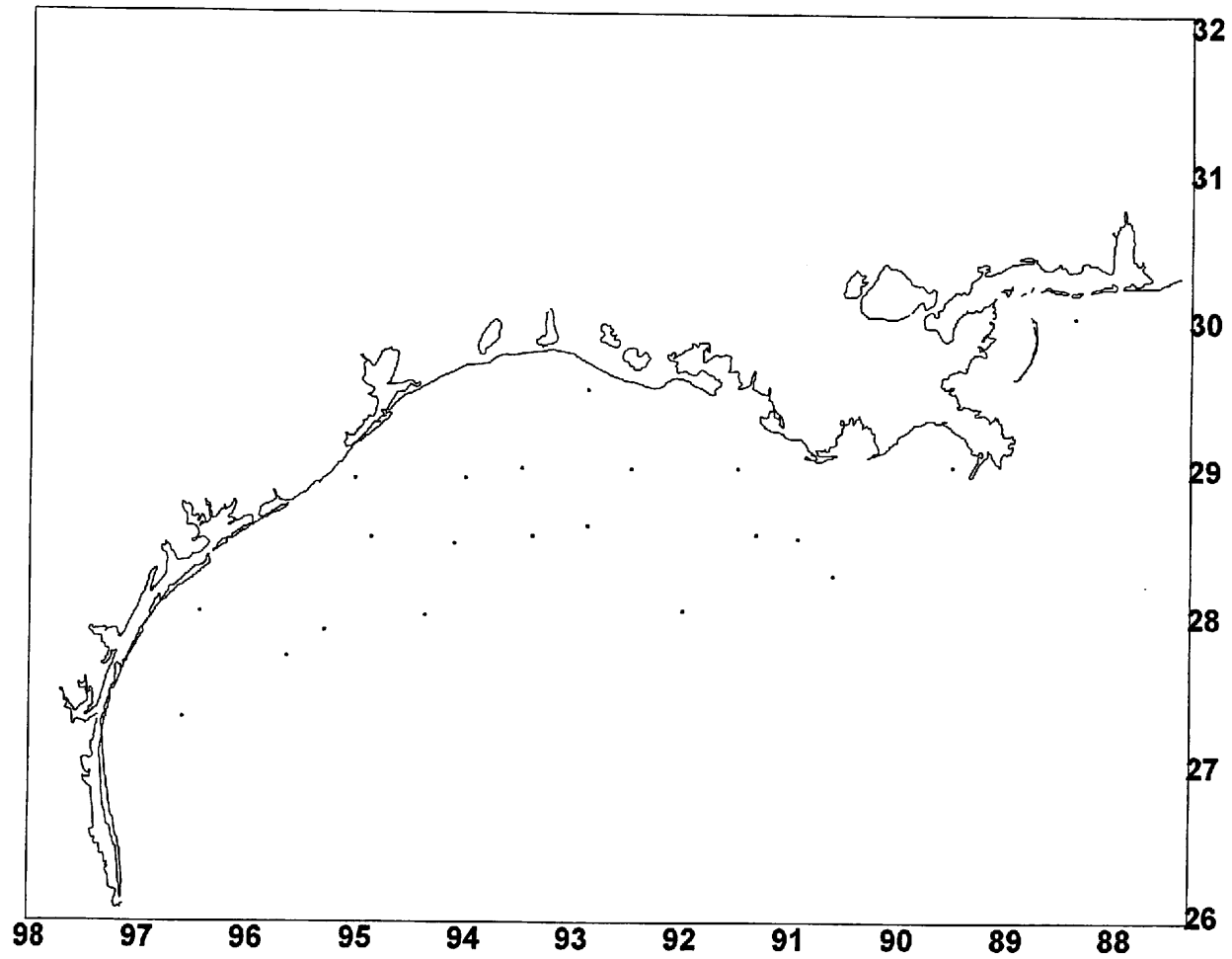
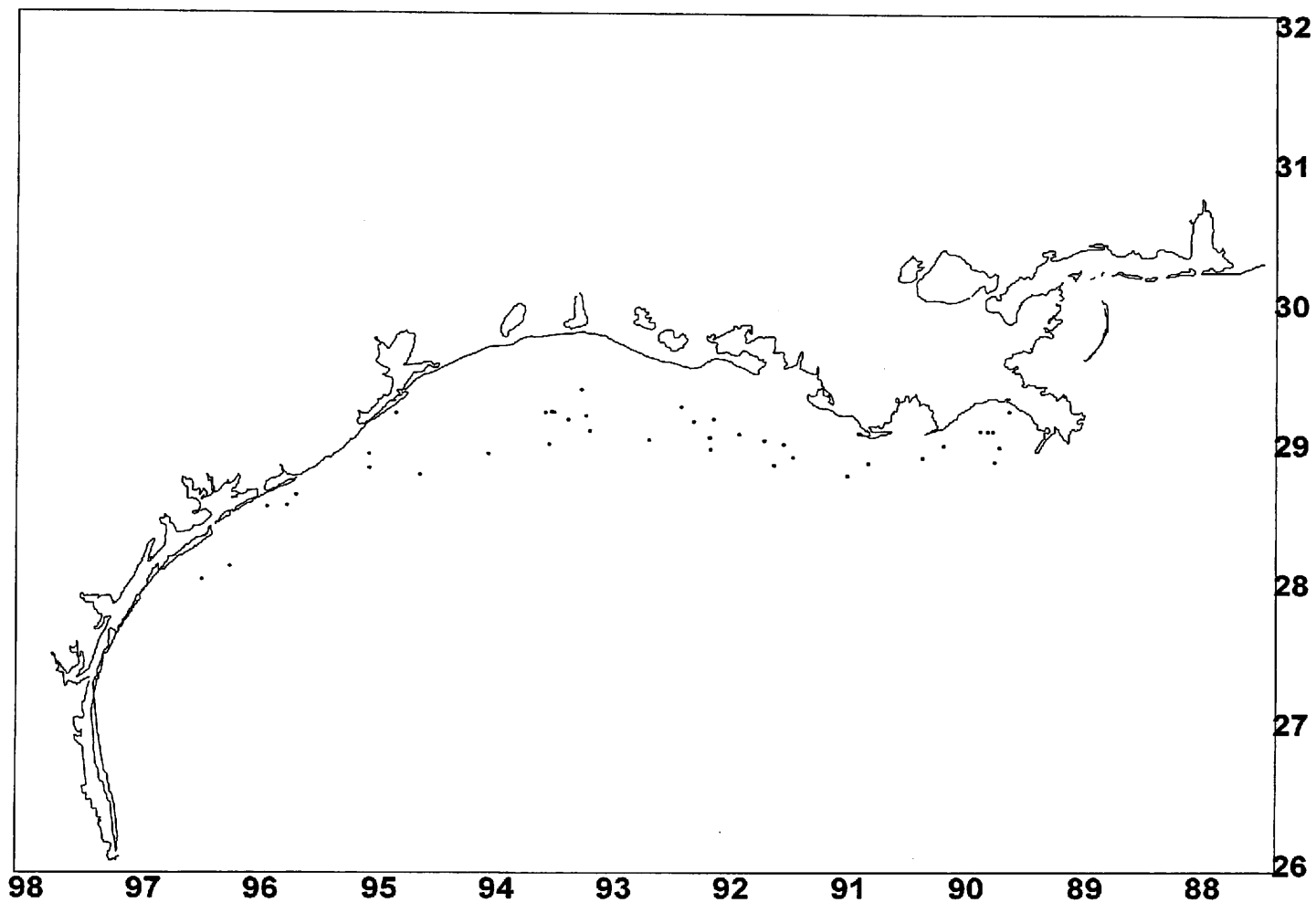


Figure 2. Ichthyoplankton sampling stations completed during *NOAA Ship Oregon II* Cruise 250 (OT-02-03).



**Figure 3.** Location where hypoxic conditions (bottom dissolved oxygen measurements  $\leq 2.0$  milligrams per liter) were encountered during *NOAA Ship Oregon II* Cruise 250 (OT-02-03).