U S DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Center
P 0 Drawer 1207
Pascagoula, Miss. 39568-1207

NOAA Ship OREGON II Cruise 04-03 (259)
06/9-07/16/04

INTRODUCTION

The *NOAA Ship OREGON II* departed Pascagoula, Mississippi on June 9, 2004 for the twenty-fourth 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 state-Federal-university program for the collection, management and dissemination of fishery independent data.

The primary goal of this survey is to monitor relative abundance, spatial distribution and size composition 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 demersal organisms occurring in the study area.

Two survey days were lost due to mechanical problems and weather. The cruise terminated in Pascagoula, Mississippi on July 16, 2004.

OBJECTIVES

1) Determine 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, fluorometry and percent light transmission.

6) Collect hypoxic zone information and send real time environmental data to NOAA's National Coastal Data Development Center at Stennis Space Center in Bay St. Louis.

7) Obtain length measurements to estimate size structures of sampled populations.

8) Collect *Lutjanus campechanus, Pristipomoides aquilonaris, Caulolatilus species,* and *Epinephelus sp.* for scientists at the National Marine Fisheries Service (NMFS) in Pascagoula, Mississippi.

9) Collect *Centropristis sp.* for the NMFS laboratory in Beaufort, North Carolina.

10) Collect *Etropus crossotus, Paralichthys squamilentus, Trichopsetta ventralis,* and *Gymnachirus texae* for Dr. Thomas Munroe at the National Systematics Laboratory of the Smithsonian Institute in Washington, D.C.

11) Collect *Halieutichthys aculeatus,* and *Ogcocephalus sp.* for Bronson Nagareda of the Florida Institute of Techinology.

12) Collect *Micropogonias undulatus* and *Farfantepenaeus aztecus* for Kevin Craig, Ph.D. of the Duke University Marine Lab.

13) Collect *Lagocephalus laevigatus, Sphoeroides dorsalis, S. parvus* and *S. spengleri* for Eric Hilton, Ph.D. of the University of Massachusetts.

14) Collect elasmobranchs for Eric Hoffmayr, Ph.D. of the University of Southern Mississippi's Gulf Coast Research Laboratory.

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). Forel-ule water color, secchi disc, and percent cloud cover observations were also taken during daylight hours.

RESULTS AND DISCUSSIONS

One hundred and ninety-one strata (83%) were successfully sampled by *NOAA Ship OREGON II* (Table 1). An additional 34 strata were sampled by state vessels; 26 by *R/V Tommy Munro* of Mississippi and 8 by *R/V A. E. Verrill* of Alabama. 11 strata were not sampled because nets were torn on bottom obstructions.

Two hundred thirty six 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 58.5 kilograms per hour fished (kg/hr), a 15% decrease in relative abundance as compared to 2003 and a 17% decrease relative to the five year mean for 1999-2003 (70.4 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.*

Forty-seven bongo and forty-eight 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.

Two hundred and twenty-seven CTD casts, one hundred and six cloud cover, one hundred and eight water color, and ninety-four secchi disc measurements were collected (Table 4). Figure 3 shows stations where hypoxic conditions (dissolved oxygen readings $\leq$ 2 milligrams per liter) were encountered during the survey.

Fish and invertebrate samples were frozen and returned to staff members of the Institute of Marine Sciences, GCRL; red snapper samples were frozen for NMFS in Pascagoula, Mississippi.

ACKNOWLEDGMENTS

On behalf of Mississippi Laboratory 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

June 9-11, 2004

NAME	TITLE	ORGANIZATION
Kimberley A Johnson	Chief Scientist	NMFS, Pascagoula, MS
Andre Debose	Watch Leader	NMFS, Pascagoula, MS
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Nick Hopkins	FMES	NMFS, Pascagoula, MS
Chad Johnson	Fisheries Biologist	Johnson Controls, MS
Bronson Nagareda	Grad. Student	Florida Inst. of Tech., FL
Marcus Zokan	Grad. Student	Florida Inst. of Tech., FL
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Jean Bounds	Librarian	Pascagoula, MS

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Submitted By:

Kimberley A. Johnson
Field Party Chief

Approved By:

Scott Nichols, Director
Mississippi Laboratory

Nancy Thompson, Director
Southeast Fisheries Science Center

Table 1. Distribution of sampling effort by strata for *NOAA Ship OREGON II* Cruise 259 (OT-04-03). 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.

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

Table 2. Mean total catch rates (kg/hr) summarized by area, depth, and diel strata for *NOAA Ship OREGON II* Cruise 259 (OT-04-03).

Area	Depth												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	10.8	.	.	3	28.4	4	105.1	4	39.2	1	25.1	7	63.4	6	42.4	13	53.7
West Delta	18	14.3	44	62.7	21	53.3	15	59.3	8	58.2	5	87.3	58	46.3	53	61.1	111	53.4
Texas	18	109.4	42	66.0	19	49.3	11	29.3	8	43.7	3	62.2	52	53.3	49	76.9	101	64.7
Areas Combined	37	60.5	86	64.3	43	49.8	30	54.4	20	48.6	9	72.0	117	50.4	108	67.2	225	58.5

Table 3. Organisms caught during *NOAA Ship OREGON II* Cruise 259 (OT-04-03) which comprised at least 1.0% of the total catch in terms of numbers and kilograms caught per hour fished (n = 225).

	Name	Percent of Total Number Caught	Percent of Total Catch Weight	Percent Frequency Of Capture	Weight Per Individual (gms)
1	Atlantic croaker (*Micropogonias undulatus*)	13.1	17.3	43.1	63
2	Longspine porgy (*Stenotomus caprinus*)	12.4	1.0	76.0	43
3	Brown shrimp (*Farfantepenaeus aztecus*)	11.0	7.0	84.4	31
4	Roughback shrimp (*Rimapenaeus similis*)	8.8	1.6	40.8	9
5	Gulf butterfish (*Peprilus burti*)	6.5	10.8	62.2	80
6	Lesser blue crab (*Callinectes similis*)	4.3	1.8	60.8	20
7	Mantis shrimp (*Squilla empusa*)	3.3	1.6	44.8	24
8	Atlantic bumper (*Chloroscombrus chrysurus*)	3.1	5.1	38.2	79
9	Arrow squid (*Loligo plei*)	2.3	1.2	31.1	26
10	Squid (*Loligo pealeii*)	1.7	1.1	40.4	29
11	Spot (*Leiostomus xanthurus*)	1.3	3.5	20.8	131
12	Sand seatrout (*Cynoscion arenarius*)	1.2	1.7	26.2	71
13	Rough scad (*Trachurus lathami*)	1.2	1.0	36.4	44
Totals		70.7	65.4		

Table 4. Summary of environmental samples and data collected during *NOAA Ship OREGON II* Cruise 259 (OT-04-03).

	Surface	Mid-depth	Maximum Depth	Total
Temperature	226	226	226	678
Salinity	226	226	226	678
Dissolved Oxygen	226	226	226	678
Light Transmission	226	226	226	678
Secchi disk	--	--	--	94
Water color	--	--	--	108
Cloud cover	--	--	--	106
CTD	--	--	--	227*
Shrimp trawl	--	--	--	236**
Bongo	--	--	--	47
Neuston	--	--	--	48

* Data for one cast was accidentally overwritten electronically and lost.
** Shrimp trawl total consists of 11 nets torn on bottom obstructions.

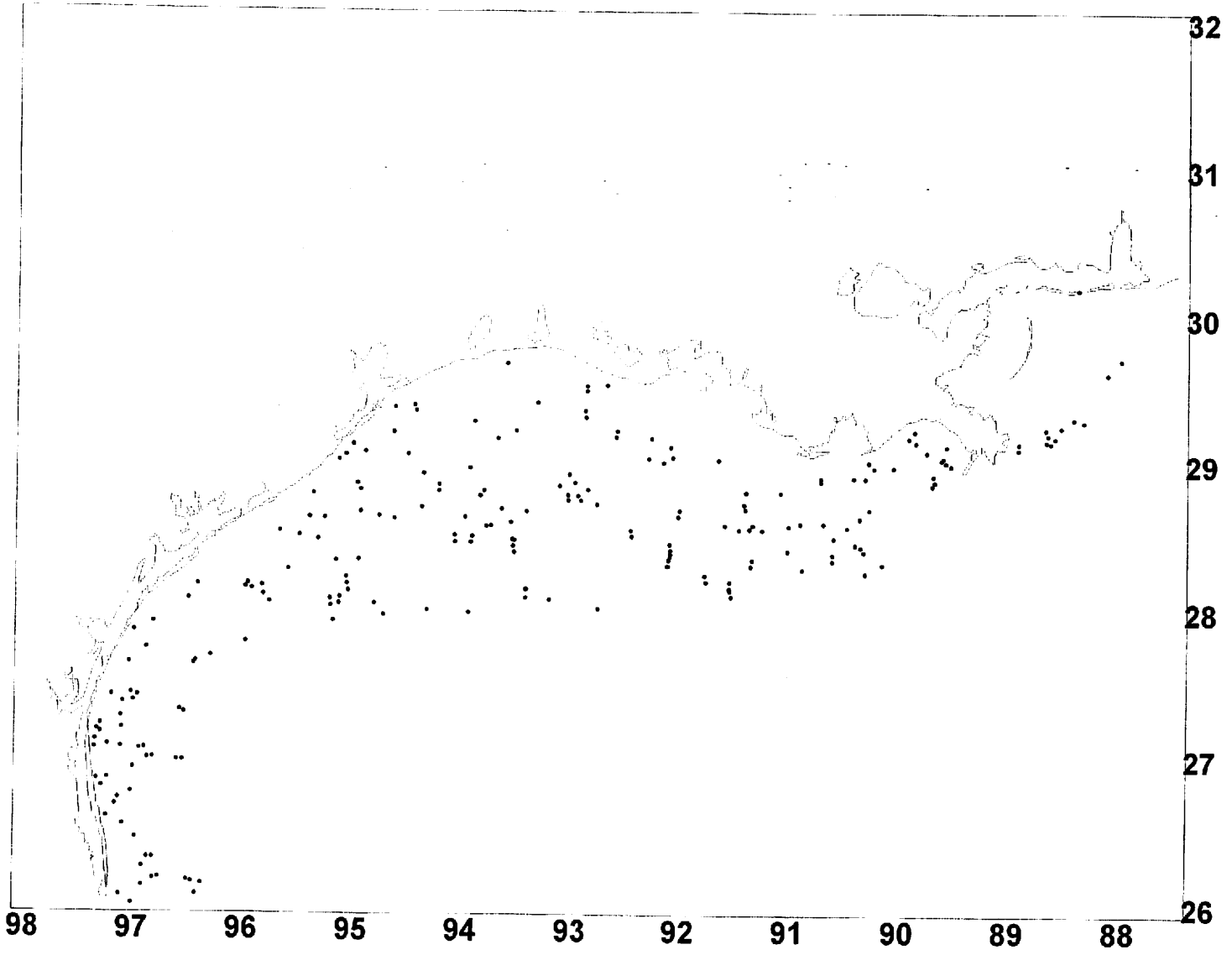

Figure 1. Shrimp trawl stations accomplished during *NOAA Ship OREGON II* Cruise 259 (OT-04-03).

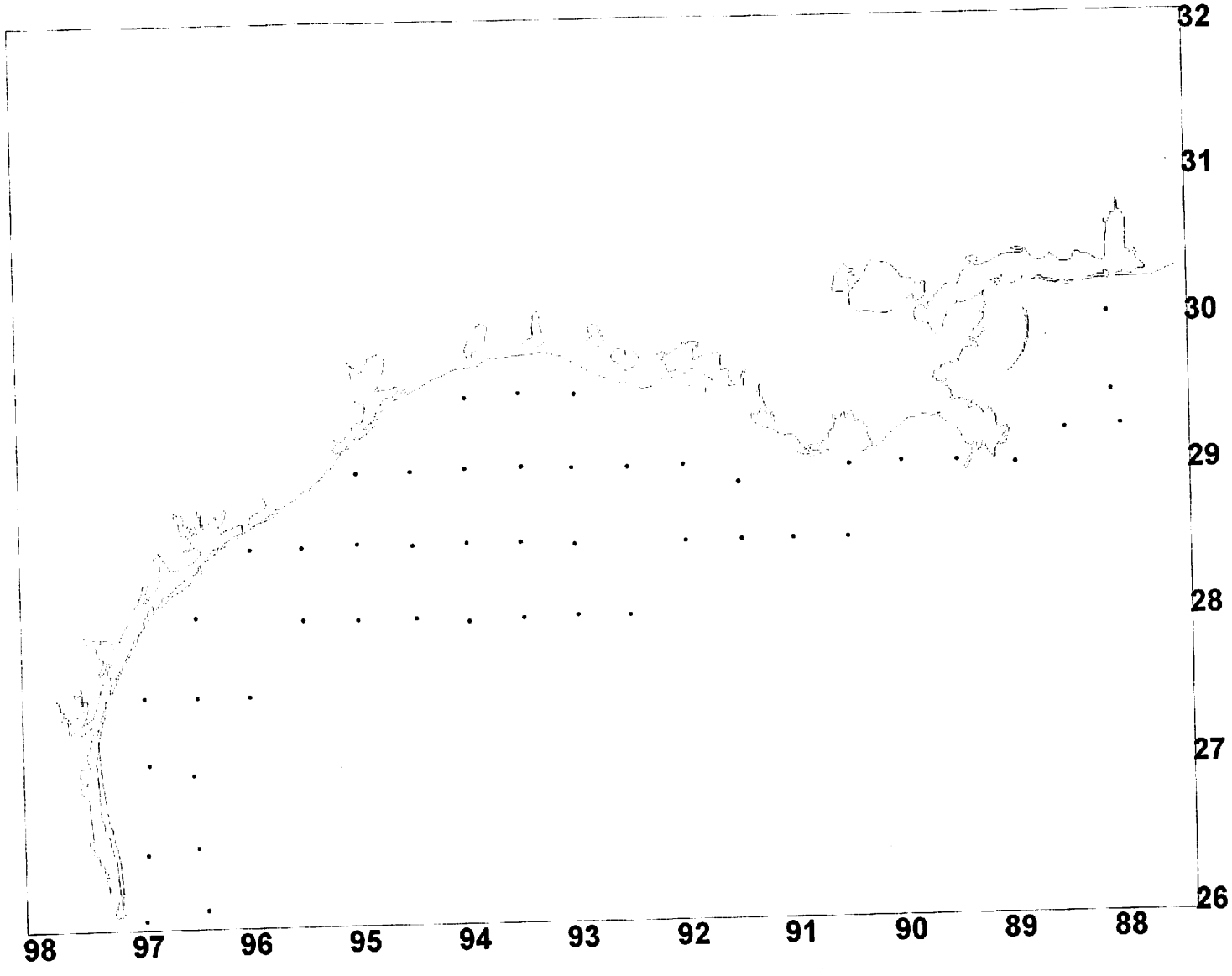

Figure 2. Ichthyoplankton sampling stations completed during *NOAA Ship OREGON II* Cruise 259 (OT-04-03).

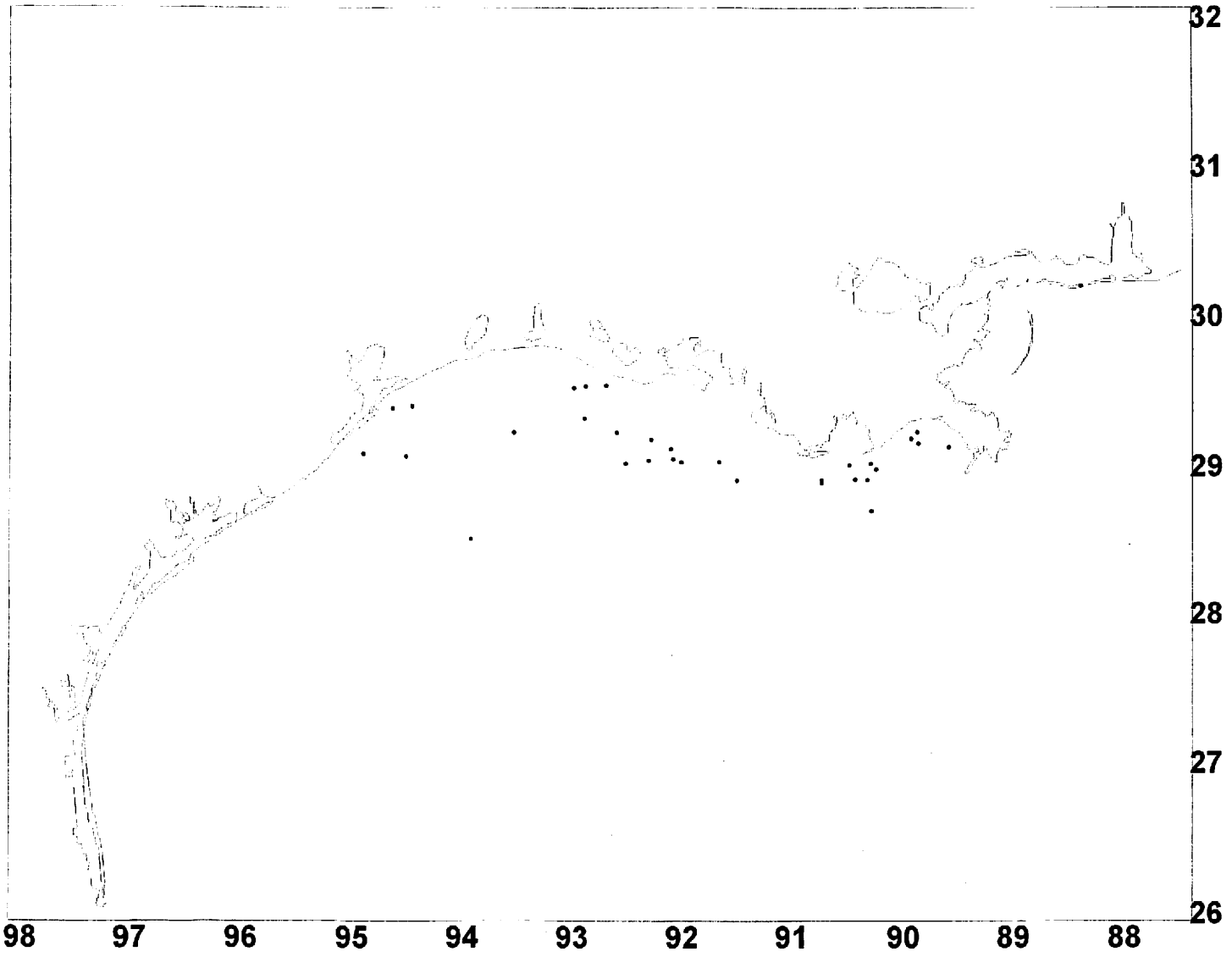

Figure 3. Locations where hypoxic conditions (bottom dissolved oxygen measurement ≤ 2.0 milligrams per liter) were encountered during *NOAA Ship OREGON II* Cruise 259 (OT-04-03).