

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 07-03 (276)
06/06-08/04/07

INTRODUCTION

The NOAA Ship OREGON II departed Pascagoula, Mississippi on June 6, 2007 for the twenty-seventh 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 size composition and spatial distribution of penaeid shrimp stocks across the northern Gulf of Mexico in 5 to 60 fathoms (fms) and to provide additional biological and catch rate information on demersal organisms occurring in the study area.

Thirteen survey days were lost due to mechanical problems, such as a malfunctioning air conditioner, emergency generator, and engine room supply fan. Due to the loss of survey time from the original schedule, the cruise continued from July 26 through August 4. The survey terminated in Pascagoula, Mississippi on August 4, 2007.

OBJECTIVES

- 1) Determine size distribution of penaeid shrimp by depth across the U.S. northern and western Gulf of Mexico. Transmitted information weekly for real time reports of catch rates of penaeid species.
- 2) Obtain samples of brown, pink and white shrimp to determine length-weight relationships.
- 3) Sample the northern Gulf of Mexico with Southeast Area Monitoring and Assessment Program (SEAMAP) standard sampling gear to determine the abundance and distribution of benthic fauna.
- 4) Obtain length measurements to estimate size structure of sampled populations.

- 5) Conduct CTD casts to profile water temperature, salinity, dissolved oxygen, fluorometry and percent light transmission.
- 6) Collect ichthyoplankton samples to determine the relative abundance and distribution of eggs and larvae of commercially and recreationally important fish species.
- 7) Collect hypoxic zone information and send real time environmental data to the NOAA National Coastal Data Development Center at Stennis Space Center in Mississippi and NMFS in Galveston, Texas for analysis.
- 8) Collect *Caulolatilus* species, *Lutjanus campechanus*, and various shark species for scientists at the National Marine Fisheries Service (NMFS) in Pascagoula, Mississippi.
- 9) Collect *Raja texana*, *Squatina dumerii*, *Epinephalus* and *Mycteroperca* species for the NMFS laboratory at Panama City, Florida.
- 10) Collect *Lutjanus synagris*, *L. griseus*, and *Mycteroperca microlepis* for Dr. Joel Fodrie of the University of South Alabama's Dauphin Island Sea Laboratory.
- 11) Collect *Lutjanus campechanus* for Dr. Will Patterson of the University of West Florida.
- 12) Collect *Bregmaceros atlanticus*, *Steindachneria argentea*, and *Urophycis* species for graduate students at Cornell University, New York.
- 13) Collect various shark and ray specimens for Shoals Marine Laboratory, New Hampshire.
- 14) Collect shark and ray specimens for Dr. James Sulikowski of the University of New England.
- 15) Collect *Urophycis*, *Synodus*, *Saurida*, *Lepophidium*, *Ophidion*, *Centropristitis*, *Citharichthys*, *Syacium*, and *Symphurus* species for Dr. Gary Stringer of the University of Louisiana, Monroe.
- 16) Collect invertebrate species, including but not limited to shrimp, crab, and jellyfish species for 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).

Trawl catch data were electronically recorded at-sea with the Fishery Scientific Computing System (FSCS), version 1.6, developed by NOAA's System Development Branch of the Office of Marine & Aviation Operations. For FSCS to be operational, Scientific Computing System (SCS) version 3.3 was used to collect station metadata, including position, depth, date and time. SCS was also used to collect metadata for ichthyoplankton stations and CTD stations.

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. General Oceanic 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.

Vertical profiles of temperature, salinity, dissolved oxygen, percent light transmission and fluorometer readings were recorded with a Seabird SBE 911+ CTD unit. Forel-ule water color and percent cloud cover observations were also taken during daylight hours.

RESULTS AND DISCUSSIONS

One hundred and sixty-three strata (71%) were successfully sampled by *NOAA Ship OREGON II* (Table 1). An additional 28 strata were sampled by state vessels; 20 by *R/V Tommy Munro* of Mississippi and 8 by *R/V A. E. Verrill* of Alabama. Ten strata were not sampled because nets were torn on bottom obstructions.

CRUISE PARTICIPANTS

Two hundred thirteen 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 112.8 kilograms per hour fished (kg/hr), a 19.5% increase in relative abundance as compared to 2006 and a 45% increase relative to the five year mean for 2002-2006 (77.8 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 pink shrimp, *Farfantepenaeus duorarum* and white shrimp, *Litopenaeus setiferus*.

Forty-two 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.

One hundred and seventy-three CTD casts, sixty-eight cloud cover and forty-eight water color were collected (Table 4). Figure 3 shows stations where hypoxic conditions (dissolved oxygen readings ≤ 2 milligrams per liter) were encountered during the survey.

Specimen collections were shipped to the appropriate requesting scientists upon arrival in Pascagoula.

ACKNOWLEDGMENTS

On behalf of Mississippi Laboratory and the scientific party, I would like to thank the Commanding Officer and the crew of *NOAA Ship OREGON II* for a job well done.

NAME	TITLE	ORGANIZATION
Alexis Tronflier	Watch Leader	NMFS, Pascagoula, MS
Andre Delouis	Watch Leader	NMFS, Pascagoula, MS
Laura Lang	Phyeres Biologist II	IAP, Mississippi
Danny Scudiel	Field Station Intern	IAP, Mississippi
Leotis Terrance-Wilson	Cooperator, Teacher	Michigan School System
March Gillespie	Teacher/Advisor	NC School System
Christina Owhren	Graduate Student	NC State University
Brian Carlin	Cooperator, Director	W.A. Rouseffs Estuarine Group

CRUISE PARTICIPANTS

June 6 – 22, 2007

NAME	TITLE	ORGANIZATION
Kimberley A Johnson	Field Party Chief	NMFS, Pascagoula, MS
Alonzo Hamilton	Watch Leader	NMFS, Pascagoula, MS
Andre Debose	Watch Leader	NMFS, Pascagoula, MS
John Moser	Res. Fish Biologist	NMFS, Pascagoula, MS
Keith Bates	Gear Specialist	IAP, Mississippi
Michael Felts	Fish. Biologist II	IAP, Mississippi
Kristen Kelly	Grad student, Intern	IAP, Mississippi
Roderick Magee	Intern	IAP, Mississippi
Loukea Kovanis-Wilson	Cooperator, Teacher	Michigan School System
Bronson Nagareda	Cooperator, Aquarist	Hawaii

June 24 – July 3, 2007

NAME	TITLE	ORGANIZATION
Kimberley A Johnson	Field Party Chief	NMFS, Pascagoula, MS
L. Nelson May	Watch Leader	NMFS, Stennis, MS
Dean Landi	Watch Leader	IAP, Mississippi
Carrie Horton	Fisheries Biologist II	IAP, Mississippi
Michael Felts	Fisheries Biologist	IAP, Mississippi
Kristen Kelly	Grad student, Intern	IAP, Mississippi
Danny Schindel	Grad Student, Intern	IAP, Mississippi
Loukea Kovanis-Wilson	Cooperator, Teacher	Michigan School System
Bronson Nagareda	Cooperator, Aquarist	Hawaii

July 7 – July 9, 2007

NAME	TITLE	ORGANIZATION
Kimberley A Johnson	Field Party Chief	NMFS, Pascagoula, MS
Alonzo Hamilton	Watch Leader	NMFS, Pascagoula, MS
Andre Debose	Watch Leader	NMFS, Pascagoula, MS
Lanora Lang	Fisheries Biologist II	IAP, Mississippi
Danny Schindel	Grad Student, Intern	IAP, Mississippi
Loukea Kovanis-Wilson	Cooperator, Teacher	Michigan School System
Mandi Gillespie	TeacherAtSea	NC School System
Christina Durham	Graduate Student	NC State University
Susan Carlin	Cooperator, Director	WA Fisheries Enhancement Group

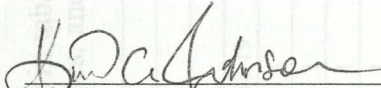
July 26 – August 4, 2007

NAME	TITLE	ORGANIZATION
Kimberley A Johnson	Field Party Chief	NMFS, Pascagoula, MS
Alonzo Hamilton	Watch Leader	NMFS, Pascagoula, MS
Andre Debose	Watch Leader	NMFS, Pascagoula, MS
John Moser	Res. Fish. Biologist	NMFS, Pascagoula, MS
Lanora Lang	Fisheries Biologist II	IAP, Mississippi
Dean Landi	Fisheries Biologist II	IAP, Mississippi
Christian Jones	Fisheries Biologist II	IAP, Mississippi
Joseph Salisbury	Fisheries Biologist I	IAP, Mississippi
Roderick Magee	Intern	IAP, Mississippi
Loukea Kovanis-Wilson	Cooperator, Teacher	Michigan School System
Bradley Easton	Student	IL School System

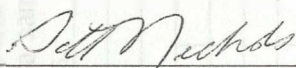

Scott Nichols, Director
Mississippi Laboratory


Amy Cooper, Acting Director
Southeast Fisheries Science Center

Submitted By:


Kimberley A. Johnson
Field Party Chief

Approved By:


Scott Nichols, Director
Mississippi Laboratory

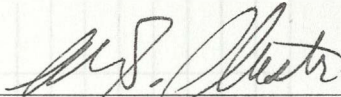

Alex Chester, Acting Director
Southeast Fisheries Science Center

Table 1. Distribution of sampling effort by strata for NOAA Ship GREGORY (1976-107-00). Multiple body indicates number of these strata were sampled. "Aa," and "Ab" indicate strata sampled by respectively "A" and "B" teams. "T" indicates strata which were processed by sampling due to bottom resistance.

Depth (m)	Stratum	11-17	17-21	21-25	25-29	29-33	33-37	37-41	41-45	45-49	49-53	53-57	57-61	61-65	65-69	69-73	73-77	77-81	81-85	85-89	89-93	93-97	97-101	Total	Total		
1-4	Mix																										
4-7	Mix																										
7-8	Mix																										
8-12	Mix																										
12-15	Mix																										
15-17	Mix																										
17-18	Mix																										
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27-30	Mix																										
30-35	Mix																										
35-40	Mix																										
40-45	Mix																										
45-50	Mix																										
50-60	Mix																										

Table 1. Distribution of sampling effort by strata for *NOAA Ship OREGON II* Cruise 276 (OT-07-03). Number in table body indicates 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
6-7	Miss.	.	1	1	1	1	.	1	1	1
7-8	Miss.	1	1	1	1	Ala.	.	1	1	1
8-9	Ala.	1	1	1	1	Ala.	1	1	1	1
9-10	Ala.	.	1	1	1	Miss.	1	1	1	1
10-11	Miss.	.	1	1	1	Ala.	.	Tore Net	1	1
11-12	Miss.	.	1	1	1	Miss.	1	1	1	1
12-13	Miss.	1	1	1	1	Miss.	1	1	1	1
13-14	Ala.	1	1	1	1	.	.	1	1	1
14-15	Ala.	1	1	1	1	Miss.	1	1	1	1
15-16	Miss.	.	1	Tore Net	1	.	.	1	1	1
16-17	Miss.	1	1	1	1	Tore Net	1	1	1	1
17-18	Miss.	1	1	1	1	Miss.	1	1	1	1
18-19	Ala.	1	1	1	1	Miss.	1	1	1	1
19-20	Miss.	1	1	1	1	.	.	1	1	1
20-22	Miss.	.	1	1	1	1	1	1	1	1
22-25	Miss.	1	1	1	1	.	.	1	1	1
25-30	Miss.	.	1	1	1	Miss.	.	Tore Net	1	1
30-35	1	.	1	1	1	1	.	1	1	1
35-40	1	.	1	1	Tore Net	1	.	1	1	1
40-45	1	1	1	1	1	1	.	1	1	1
45-50	1	1	1	1	1	Tore Net	.	1	1	1
50-60	1	.	1	Tore Net	Tore Net	1	.	Tore Net	Tore Net	1

Table 2. Mean catch rates (kg/hr) of total live catch for NOAA Ship OREGON II Cruise 276 (OT-07-03) by area, depth, and diel strata.

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	2	86.1	.	.	2	337.7	8	127.0	5	121.5	2	74.2	8	91.5	11	171.6	19	137.9
West Delta	13	101.0	36	199.2	11	137.2	12	50.8	10	49.8	1	38.8	46	95.5	37	182.3	83	134.2
Texas	17	168.3	41	111.1	24	57.0	17	44.8	9	60.2	3	60.8	56	99.6	55	85.3	111	92.5
Areas Combined	32	135.8	77	152.3	37	94.1	37	64.5	24	68.6	6	61.6	110	96.6	103	129.4	213	112.8

1	Brook stickleback (<i>Clinocentrus bairdii</i>)				1.3					4.3				5.6				31
2	Spot-tail shiner (<i>Parachanna obscura</i>)				5.6					4.2				9.8				34
6	Lesser blue crab (<i>Callinectes sapidus</i>)				5.0					1.7				6.7				19
7	Atlantic bumper (<i>Chloroceryle leucorhoa</i>)				2.0					2.0				4.2				70
8	Silver sea trout (<i>Cynoscion nebulosus</i>)				1.0					2.4				3.4				13
9	Atlantic cutthroat shiner (<i>Pomoxis regalis</i>)				1.2					2.0				4.6				94
Total					75.4					75.0								

Table 3. Organisms caught during NOAA Ship OREGON II Cruise 276 (OT-07-03) which comprised at least 1.0% of the total catch in terms of numbers and kilograms caught per hour fished (n = 213).

	Name	Percent of Total Number Caught	Percent of Total Catch Weight	Percent Frequency Of Capture	Weight Per Individual (gms)
1	Atlantic croaker (<i>Micropogonias undulatus</i>)	33.1	37.7	60.0	62
2	Gulf butterfish (<i>Peprilus burti</i>)	9.8	10.4	70.8	58
3	Longspine porgy (<i>Stenotomus caprinus</i>)	8.5	8.9	79.8	57
4	Rough scad (<i>Trachurus lathami</i>)	7.3	4.3	60.5	32
5	Brown shrimp (<i>Farfantepenaeus aztecus</i>)	6.6	4.2	85.9	34
6	Lesser blue crab (<i>Callinectes similis</i>)	5.0	1.7	66.1	19
7	Atlantic bumper (<i>Chloroscombrus chrysurus</i>)	2.0	2.9	34.2	79
8	Silver seatrout (<i>Cynoscion nothus</i>)	1.5	2.4	36.1	85
9	Atlantic cutlassfish (<i>Trichiurus lepturus</i>)	1.2	2.0	47.8	94
Totals		75.4	75.0		

Table 4. Summary of environmental samples and data collected during *NOAA Ship OREGON II* Cruise 276 (OT-07-03)

	Surface	Mid-depth	Maximum Depth	Total
Temperature	171	171	171	513
Salinity	171	171	171	513
Dissolved Oxygen	171	171	171	513
Light Transmission	171	171	171	513
Water color	--	--	--	48
Cloud cover	--	--	--	68
*CTD	--	--	--	172
**Shrimp trawl	--	--	--	223
Bongo	--	--	--	42
Neuston	--	--	--	42

*1 CTD cast deleted due to corrupt data

**Includes ten unsuccessful tows.

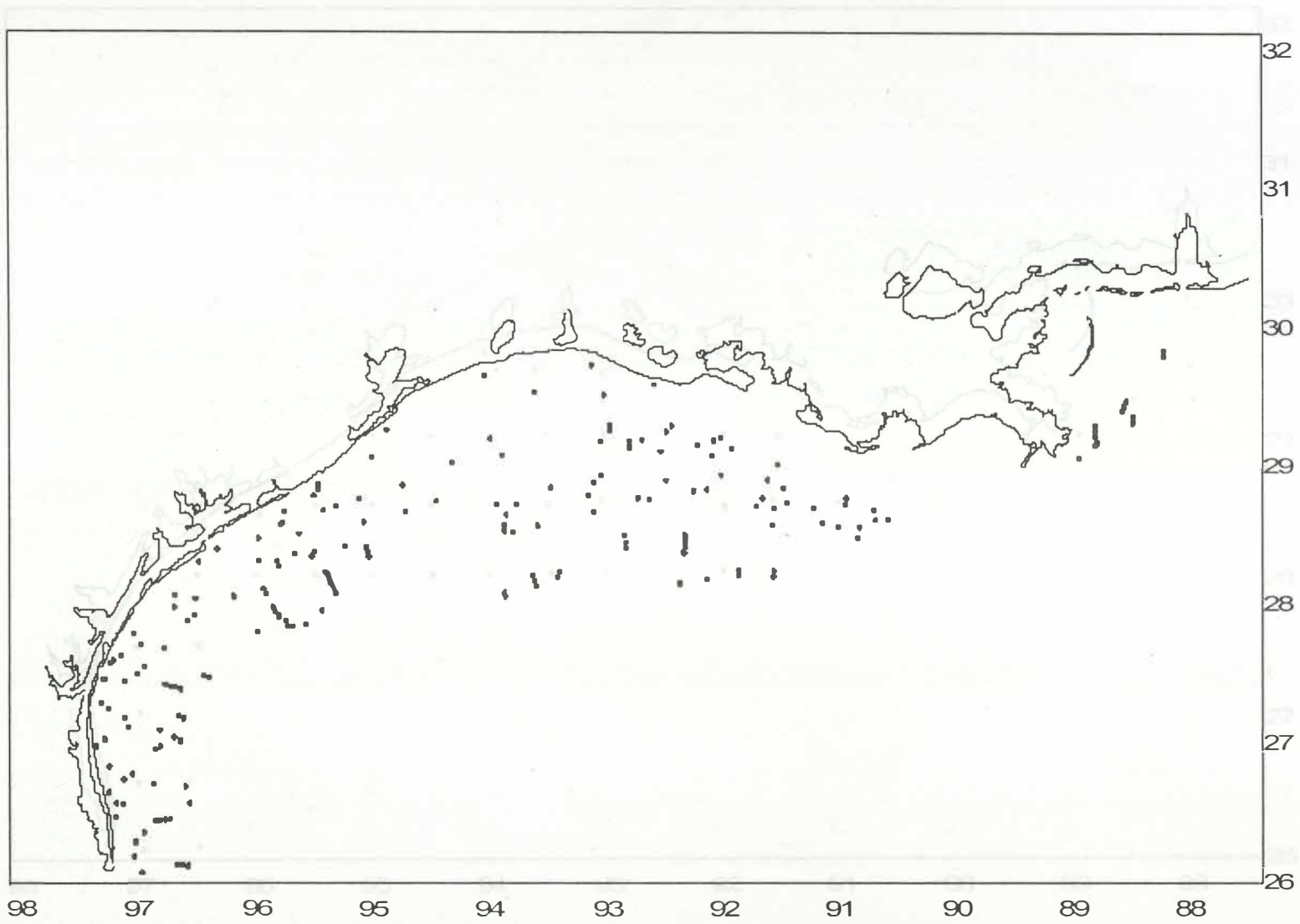


Figure 1. Shrimp trawl stations accomplished during *NOAA Ship OREGON II* Cruise 276 (OT-07-03).

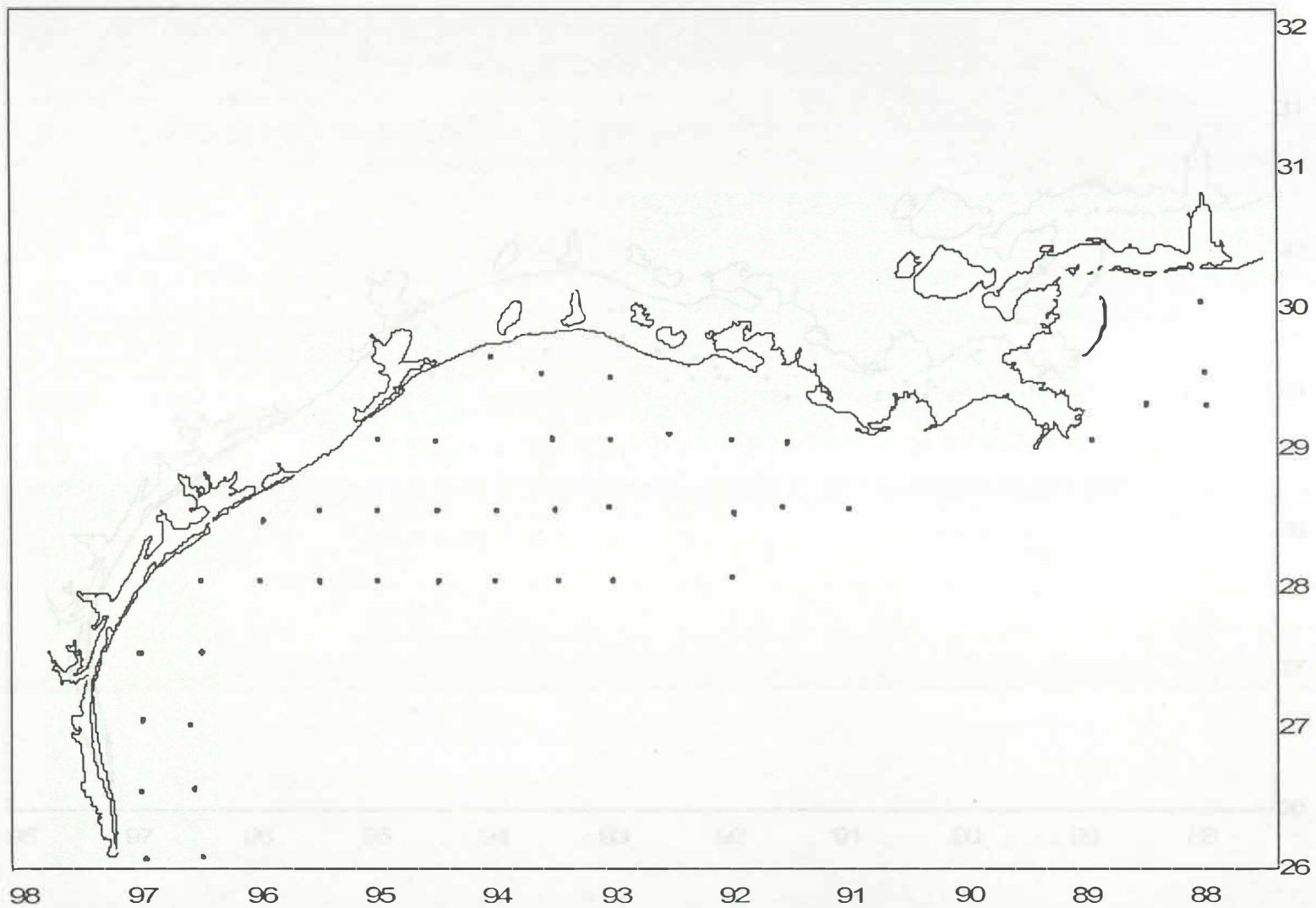


Figure 3. Locations where hypoxic conditions (bottom dissolved oxygen measurement <math>< 2.0 \text{ milligrams per liter}</math>) were encountered during NOAA Ship OREGON II Cruise 276 (OT-07-03).

Figure 2. Ichthyoplankton sampling stations completed during NOAA Ship OREGON II Cruise 276 (OT-07-03).

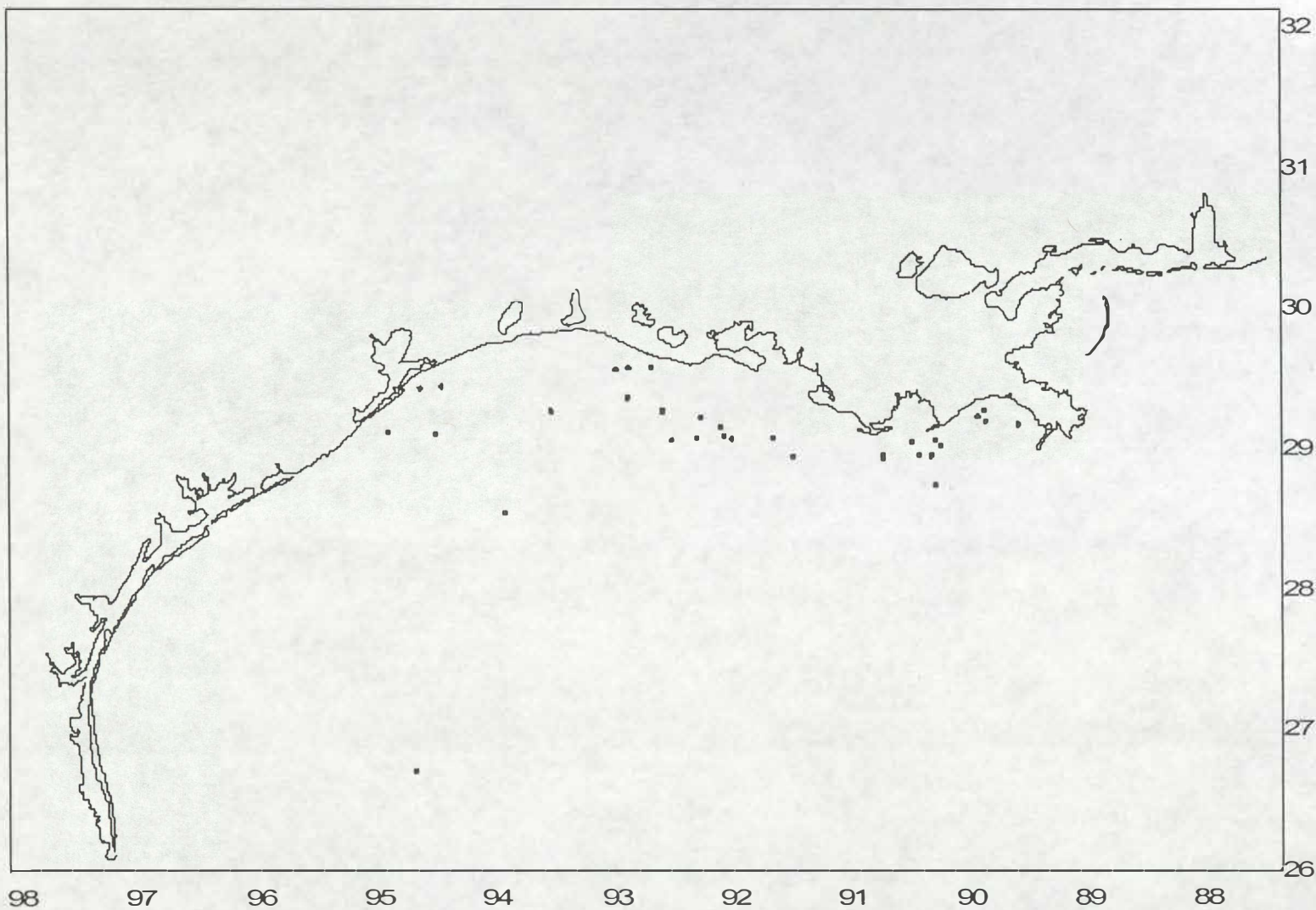


Figure 3. Locations where hypoxic conditions (bottom dissolved oxygen measurement ≤ 2.0 milligrams per liter) were encountered during *NOAA Ship OREGON II* Cruise 276 (OT-07-03).