

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

*NOAA Ship OREGON II* Cruise 05-04 (265)  
06/07/05 - 08/01/05

## INTRODUCTION

*NOAA Ship OREGON II* departed Pascagoula, Mississippi on June 14, 2005 for the twenty-fifth 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 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 (fm) and to provide additional biological and catch rate information on demersal organisms occurring in the study area.

Seventeen survey days were lost due to mechanical problems and weather. Leg I, from June 7 – 14, 2005, was canceled due to a leaking seal around the propeller shaft. Nine survey days were lost during Legs II and III due to an air conditioning failure. An additional 3 days were lost on Leg III due to Hurricane Dennis. Because of the number of lost survey days, seven days were added to the end of the survey: 2 days were obtained from Marine Operations Center, Atlantic; and 5 days of a subsequent Longline Survey were allocated to the Shrimp/Bottomfish Survey. An additional day was lost on Leg IV because the controllable pitch propeller malfunctioned. The cruise terminated in Pascagoula, Mississippi on August 01, 2005.

## 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 and send real time catch rate data to the SEAMAP coordinator.
- 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 located at the Stennis Space Center in Mississippi.
- 7) Obtain length measurements to estimate size structures of sampled FISH populations.
- 8) Collect *Lutjanus campechanus*, for scientists at the National Marine Fisheries Service (NMFS) in Pascagoula, Mississippi and for Dr. William Patterson of the University of West Florida.
- 9) Collect *Rhomboplites aurorubens* for Dr. Robert Allman of the National Marine Fisheries Service (NMFS) in Panama City, Florida.
- 10) Collect all *Seriola* species for Dr. Debra Murie of the University of Florida .
- 11) Collect *Caulolatilus* and *Epinephalus* species for scientists of the NMFS in Pascagoula, Mississippi.
- 12) Collect *Halieutichthys aculeatus*, and *Ogcocephalus* species for Bronson Nagareda of the Florida Institute of Technology.
- 13) Collect *Farfantepenaeus aztecus* for Brian Fry of the Louisiana Universities Marine Consortium (LUMCON).
- 14) Collect *Lagocephalus laevigatus*, *Sphoeroides dorsalis*, *Sphoeroides parvus*, *Sphoeroides spengleri*, and Carangidae for Eric Hilton of the University of Massachusetts.
- 15) Collect various shark, ray, and skates species for Dr. James Sulikowski of the University of Florida.
- 16) Collect squid specimens for Iliana Ruiz-Cooley of New Mexico State University.

## 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, but were never moved more than five miles. 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 after 48 hours. later.

Temperature, salinity, dissolved oxygen, percent light transmission and fluorometer measurements 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 fifty-six strata (68%) were successfully sampled by *NOAA Ship OREGON II* (Table 1). An additional 22 strata were sampled by state vessels; 14 by *R/V Tommy Munro* of Mississippi and 8 by *R/V A. E. Verrill* of Alabama. Six strata were not sampled because nets were torn on bottom obstructions. The remaining 46 strata were not sampled because of time lost due to mechanical problems and weather. The sampling protocol was modified in order to maximize spatial coverage (some stations deeper than 20 fathoms were not sampled).

One hundred seventy eight 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 90.7 kilograms per hour fished (kg/hr), a 55.1% increase in relative abundance as compared to 2004 and a 31.1% increase relative to the five year mean for 2000-2004 (69.2 kg/hr). This increase may be because some stations 20 fathoms and deeper were skipped to maintain spatial coverage. Historically, higher catch rates have been encountered inshore of 20 fathoms in comparison to offshore of 20 fathoms. 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*.

Thirty-four bongo and neuston stations were accomplished (Figure 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 eighty-six CTD casts, eighty-six cloud cover, ninety-five water color, and eighty-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 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 their efforts during a particularly difficult survey.

## CRUISE PARTICIPANTS

June 14 – June 25, 2005

NAME	TITLE	ORGANIZATION
Kimberley A Johnson	Field Party Chief	NMFS, Pascagoula, MS
Michael Hendon	Watch Leader	IAP, Pascagoula, MS
Dean Landi	Watch Leader	IAP, Pascagoula, MS
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Adam Pollack	Fisheries Biologist	IAP, Pascagoula, MS
Noel Lamey	TeacherAtSea	Mississippi School Systems
Ryan Jones	Biological Aid	IAP, Pascagoula, MS
Larry Thomas	Grad.Student	Jacksonville State Univ., AL
Travis Ford	Grad.Student	University of Florida, FL
Loukea Kovanis	Biological Aid	IAP, Pascagoula, MS

July 4 – July 17, 2005

NAME	TITLE	ORGANIZATION
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Matthew Krachey	Fisheries Biologist	NMFS Center, Miami, FL
Loukea Kovanis	Biological Aid	IAP, Pascagoula, MS
Ryan Jones	Biological Aid	IAP, Pascagoula, MS
Larry Thomas	Grad.Student	Jacksonville State Univ., AL
Michael Felts	Cooperator	Pascagoula, Mississippi

July 27 – August 1, 2005

NAME	TITLE	ORGANIZATION
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Heidi Jones	TeacherAtSea	Indian School Systems, IN

Submitted By:

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Kimberley A. Johnson  
Field Party Chief

Approved By:

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Scott Nichols, Director  
Mississippi Laboratory

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Nancy Thompson, Director  
Southeast Fisheries Science Center

Table 1. Distribution of sampling effort by strata for *NOAA Ship OREGON II* Cruise 265 (OT-05-04). Numbers in table body indicate number of times strata were sampled. "Ala." and "Miss." indicate strata sampled by the respective states, and "Tore" 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	Miss.	1	1	1	1
6-7	Ala.	1	1	1	1	Miss.	1	1	1	1
7-8	Miss.	1	1	1	1	.	1	1	1	1
8-9	Miss.	1	1	1	1	Ala.	1	1	1	1
9-10	Ala.	1	1	1	1	Miss.	1	1	1	1
10-11	Miss.	1	1	1	1	Ala.	1	1	1	1
11-12	Miss.	1	1	1	1	Ala.	1	1	1	1
12-13	Ala.	1	.	1	1	Miss.	1	1	1	1
13-14	Miss.	1	1	1	1	.	1	1	1	1
14-15	Ala.	1	1	1	1	Miss.	1	1	.	1
15-16	Miss.	1	1	1	1	.	1	1	Tore	1
16-17	.	1	1	1	1	Miss.	.	1	1	1
17-18	Ala.	Tore	1	1	1	.	1	1	1	1
18-19	.	1	1	1	1	.	1	1	1	1
19-20	1	1	1	1	1	.	1	1	1	1
20-22	Miss.	1	1	1	1	1	.	1	1	1
22-25	.	.	1	1	1	.	.	1	1	1
25-30	1	1	1	1	1	.	.	1	Tore	1
30-35	1	.	1	1	1	.	.	1	1	1
35-40	.	.	.	.	1	Tore	.	.	.	1
40-45	Tore	.	.	.	1	1	.	.	.	1
45-50	Tore	.	.	.	1	1	.	.	.	1
50-60	1	.	.	.	1	1	.	.	.	1

Table 2. Mean total catch rates (kg/hr) observed during *NOAA Ship OREGON II* Cruise 265 (OT-05-04) 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	51.1	3	42.2	1	46.3	3	244.7	2	85.7	7	49.5	4	208.6	11	107.3
West Delta	17	139.3	38	132.5	9	96.7	2	48.7	.	.	.	.	33	95.8	33	157.8	66	126.8
Texas	17	82.3	39	74.3	23	35.4	9	51.0	4	45.2	3	101.3	48	62.0	47	65.4	95	63.7
Areas Combined	34	110.8	79	101.7	35	51.7	12	50.2	7	130.7	5	95.1	88	73.7	84	108.5	172	90.7



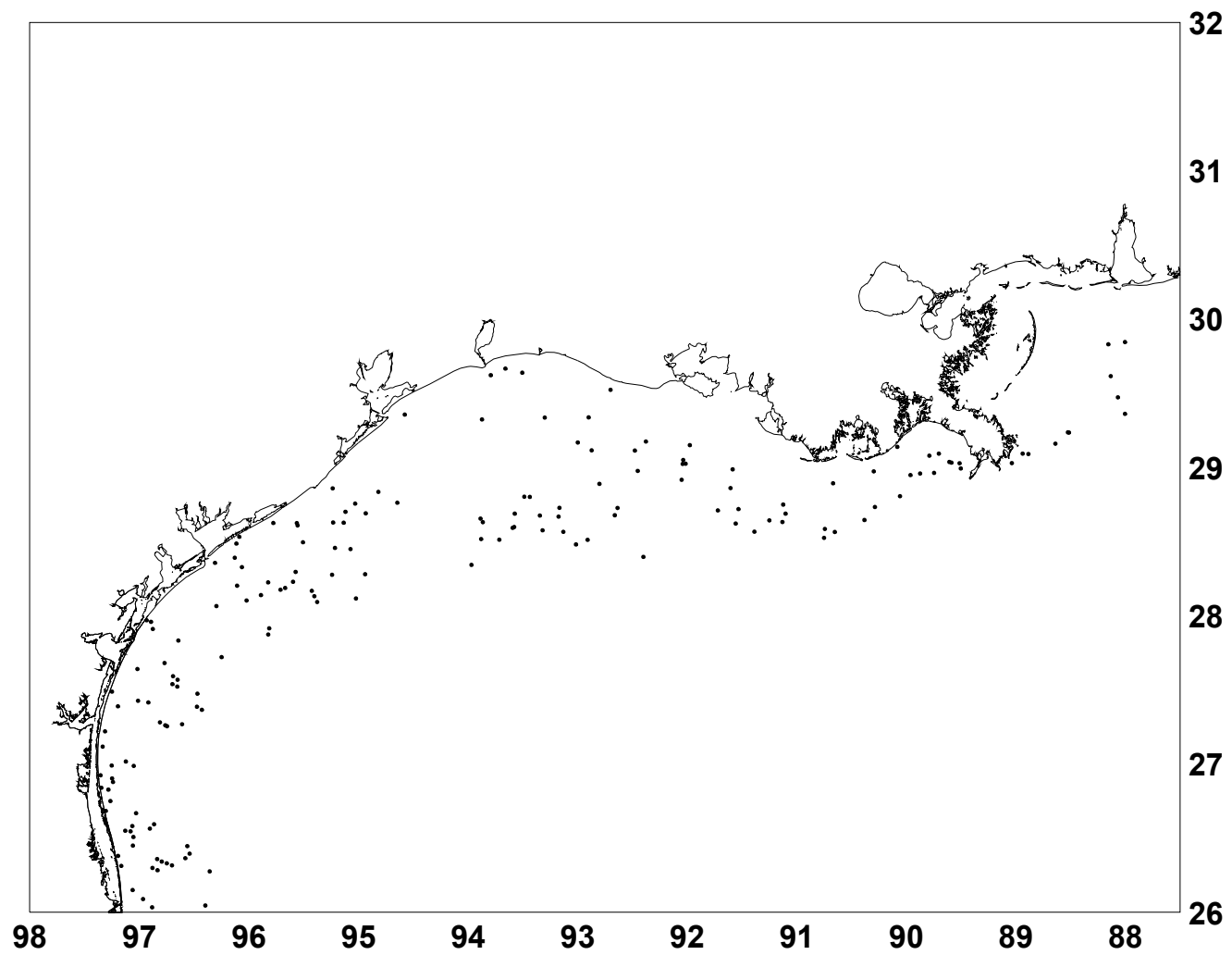
Table 3. Organisms caught during *NOAA Ship OREGON II* Cruise 265 (OT-05-04) which comprised at least 1.0% of the total catch in terms of numbers and kilograms caught per hour fished (n = 172).

	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> )	24.8	32.0	42.4	61
2	Longspine porgy ( <i>Stenotomus caprinus</i> )	21.0	11.6	81.3	26
3	Brown shrimp ( <i>Farfantepenaeus aztecus</i> )	4.8	3.4	82.5	33
4	Atlantic bumper ( <i>Chloroscombrus chrysurus</i> )	4.6	6.8	53.4	70
5	Arrow squid ( <i>Loligo pleii</i> )	3.6	2.2	59.3	29
6	Lesser blue crab ( <i>Callinectes similis</i> )	3.1	1.7	70.9	26
7	Gulf butterfish ( <i>Peprilus burti</i> )	2.5	3.7	62.7	69
8	Spot ( <i>Leiostomus xanthurus</i> )	2.0	5.8	26.1	135
9	Rough scad ( <i>Trachurus lathami</i> )	1.6	1.0	48.2	31
10	Silver seatrout ( <i>Cynoscion nothus</i> )	1.0	1.8	23.8	87
Totals		69.4	70.6		

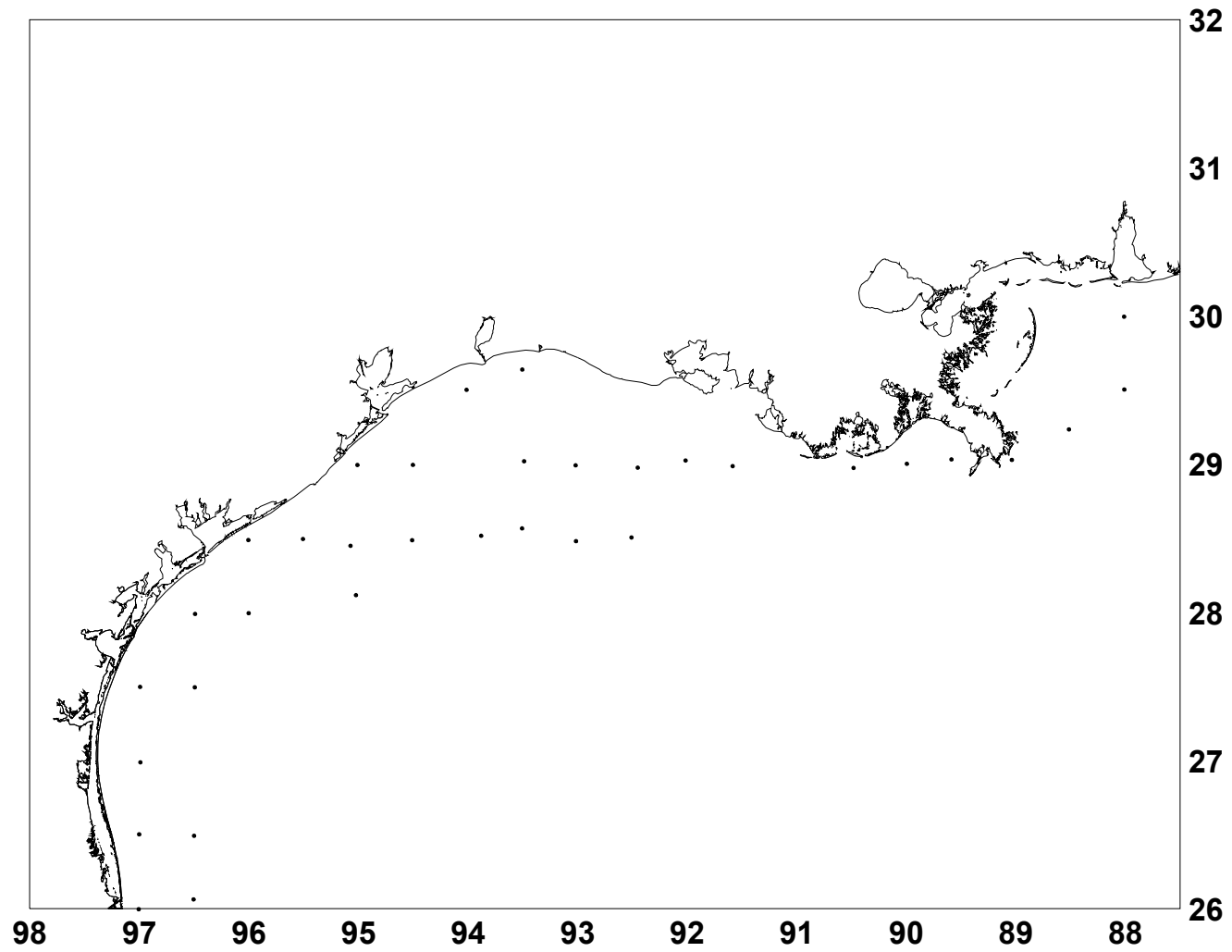
Table 4. Summary of environmental samples and data collected during *NOAA Ship OREGON II* Cruise 265 (OT-05-04)

	Surface	Mid-depth	Maximum Depth	Total
Temperature	186	186	186	558
Salinity	186	186	186	558
Dissolved Oxygen	186	186	186	558
Light Transmission	186	186	186	558
Secchi disk	--	--	--	84
Water color	--	--	--	95
Cloud cover	--	--	--	86
CTD	--	--	--	186
*Shrimp trawl	--	--	--	178
Bongo	--	--	--	34
Neuston	--	--	--	34

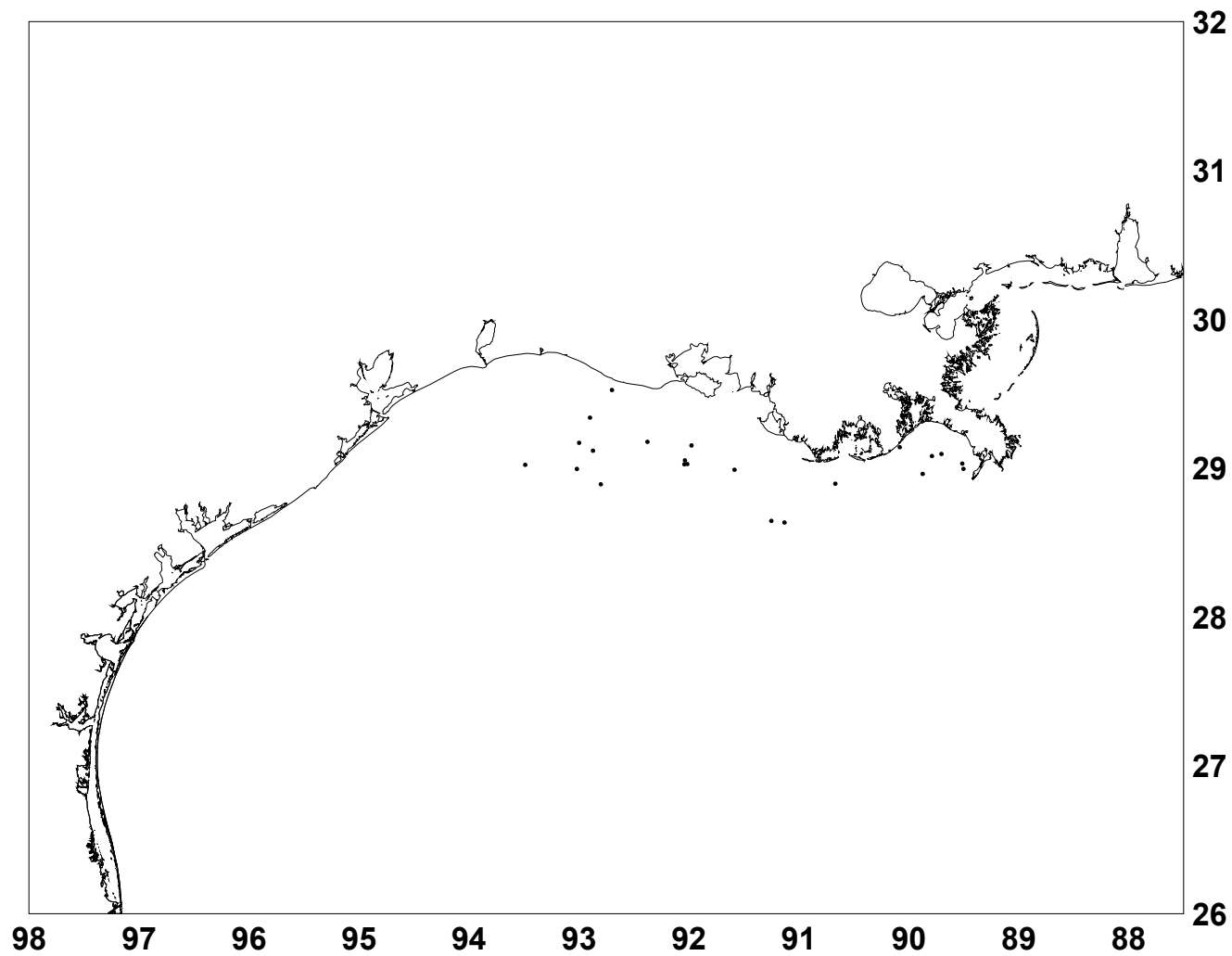
\*Shrimp trawl total consists of 6 nets torn on bottom obstructions.



**Figure 1.** Shrimp trawl stations accomplished during *NOAA Ship OREGON II* Cruise 265 (OT-05-04).



**Figure 2.** Ichthyoplankton sampling stations completed during *NOAA Ship OREGON II* Cruise 265 (OT-05-04).



**Figure 3.** Locations where hypoxic conditions (bottom dissolved oxygen measurements  $\leq 2.0$  milligrams per liter) were encountered during *NOAA Ship OREGON II* Cruise 265 (OT-05-04).