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 Gordon Gunter Cruise 06-05 (40)
10/10-11/20/06

INTRODUCTION

NOAA Ship Gordon Gunter departed Pascagoula, Mississippi on October 10, 2006 to conduct the fourth annual Fall Small Pelagics Survey. The primary goal was to study the abundance and distribution of small pelagic fishes in the northern Gulf of Mexico.

On 11/6, the ship was diverted from the Small Pelagics Survey and requested to return to Pascagoula on 11/6 to assist *NOAA Ship Oregon II* with the completion of the Shrimp/Bottomfish survey. *NOAA Ship Gordon Gunter* departed on 11/9 following a gear change and refit to conduct single-warp trawling.

Four survey days were lost due to mechanical problems, one due to hydraulic problems with the net reel and three due to problems with the port trawling winch. Two additional days were lost due to severe weather. The survey terminated in Pascagoula on November 20, 2006.

OBJECTIVES

Primary

Small Pelagics Survey

1. Sample the northern Gulf of Mexico with 90-ft high-opening fish trawls to determine the abundance and distribution of small pelagic fish species.

2. Collect size measurements to estimate size structures of sampled populations.

3. Conduct CTD casts to profile temperature, salinity, conductivity, transmissivity, dissolved oxygen concentrations and fluorometry.

4. Collect ichthyoplankton samples at selected trawling stations.

5. Collect benthic infauna with a bottom dredge at selected trawling stations.

6. Collect *chlorophyll-a* samples at surface, middle and maximum water depths.

7. Collect video data at sites where trawling is determined to be too risky due to bottom obstructions.

Shrimp/Bottomfish Survey

1) Sample the demersal fauna of the northcentral and northwestern Gulf of Mexico in depths of 5 to 60 fathoms.

2) Collect ichthyoplankton samples to determine the relative abundance and distribution of eggs and larvae of commercially and recreationally important fish species.

3) Conduct CTD casts to profile water temperature, salinity, dissolved oxygen, fluorometry and percent light transmission.

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

5) Collect fish and invertebrate samples as requested by staff members of the University of Southern Mississippi's Institute of Marine Sciences, Gulf Coast Research Laboratory (GCRL).

6) Collect batfish (*Ogcocephalus* sp.), pancake batfish (*Halieutichthys aculeatus*), frogfish (Antennaridae), goatfish (Mullidae), wenchmen (*Pristipomoides aquilonaris*), jacks (Carangidae), rough scad (*Trachurus lathami*), round scad (*Decapterus punctatus*), bigeye scad (*Selar crumenophthalmus*), tilefish (*Caulolatilus* sp.), grouper (*Epinephelus* sp. and *Mycteroperca* sp.), Atlantic angel sharks (*Squatina dumeril*), and red snapper (*Lutjanus campechanus*) for various age, growth and distributional studies.

7) Collect red porgies (*Pagrus pagrus*) for genetic studies by South Carolina Department of Marine Resources.

Secondary (to be accomplished only if surplus survey time is available)

1) Collect additional ichthyoplankton samples with bongo and neuston samplers.

MATERIALS AND METHODS

Trawling

Small Pelagics Survey

Proposed sampling sites were surveyed prior to gear deployment to insure there were no bottom obstructions that may damage towed trawls. If the trawl path appeared to be clear of obstructions, the ship proceeded to conduct one tow with a 90-ft, high-opening fish trawl. Each trawl was towed for 30 minutes after the gear had sufficiently settled on the bottom as determined by a net mensuration system, descent rate charts, or opinion of the Chief Boatswain. Targeted towing speed was 3 to 3.5 knots. Tow depth was kept as close to constant as possible and depended upon the depth at the beginning of the tow. At the end of 30 minutes, the ship was

requested to quickly increase speed to 5 knots for 2-5 minutes. This pulse helped force fish from the body of the net into the cod end.

Shrimp/Bottomfish Survey

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 2.5 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 Lon), 13-15 (89°00'-92°00' W Lon), 16-17 (92°00'-94°00' W Lon), 18-19 (west of 94°00' W Lon 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

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° 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 95% buffered formalin and then transferred to 95% ethyl alcohol 48 hours later.

Environmental

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 processed and archived for later analyses). Forel-ule water color, Secchi disc, and percent cloud cover observations were also taken during daylight hours.

Chlorophyll-a

Chlorophyll-a readings were taken at three levels of the water column: surface, midwater and bottom (to a maximum of 500 m), using a modified Welschmeyer method of bench top fluorometry. This procedure utilized the Turner Designs model 10-AU-005 fluorometer with optical kit 10-040R.

Bottom Grabs

Sediment samples were collected with a Shipek Grab which was deployed using the bongo winch. An SBE–19 CTD unit was mounted one meter above the grab to monitor water depth. Payout and retrieval rates were limited to 40 meters per minute.

Video Camera Drops

Video camera arrays were deployed off the starboard side with an articulating crane. Arrays were positioned just above the water and then released. After deployment and during soak time, a CTD profile of the water column was performed. Retrieval occurred at the ship's starboard, aft, using a pot hauler.

RESULTS AND DISCUSSIONS

Small Pelagics Survey

A total of eighty four stations were occupied during . Eighty trawling tows were required to sample the selected depth strata (Figure 1). Seven were unsuccessful because of a parted bridle, captured debris, gear off bottom (twice), gear bogged in mud, hung up on an obstruction and net fouled upon retrieval. Four were ichthyoplankton stations. Catch rates were summarized by three areas; Texas (west of 94°00' W Lon), West Delta (89°00'-94°00' W Lon), East Delta (east of 89°00' W Lon), and five depth strata < 60, 60-99, 100-149,150-199, and 200+ fms (Table 1). The mean total catch rate was 256.4 kilograms per hour fished (kg/hr). Sparidae was the most abundant family caught with longspine porgy making the greatest contribution (Table 2).

Shrimp/Bottomfish Survey

A total of seventy four stations were occupied. Sixty tows were required to sample the selected strata (Figure 2). Six were unsuccessful because of fouled gear (twice), a twisted bridle, untied cod-end, bogged net, and one tow was conducted in the wrong depth stratum. For summary purposes, data were grouped into two geographic areas: East Delta (88°00'-89°00' W Lon) and West Delta (89°00'-94°00' W Lon) and each geographic area was partitioned into six depth intervals: 5-9, 10-19, 20-29, 30-39, 40-49, and 50-60 fms (Table 3). The mean total catch rate was 141.8 kg/hr. Sciaenidae was the most abundant family caught with Atlantic croaker making the greatest contribution (Table 4).

Eighteen plankton stations were accomplished (Figure 3). Neuston and right side bongo samples were returned to the Pascagoula Facility 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 forty-five CTD casts, fifty-five cloud cover, fifty-eight water color, two chlorophyll–a samples (Table 5) and 20 bottom grab samples were collected (Figure 4). No video camera sets were successful because of electrical problems.

Bottom grab samples were sent to Dr. Romano at Jacksonville State University in Jacksonville, Alabama for analysis. Fish and invertebrate samples were frozen and returned to staff members of the GCRL, and red snapper samples were frozen and returned to the Pascagoula Facility.

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 Gordon Gunter* for a job well done. I also thank NAVOCEANO at Stennis Space Center, Bay St. Louis, Miss. for the use of their Shipek bottom-grab.

CRUISE PARTICIPANTS

October 09 – October 30, 2006

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Table 1. Mean estimates of relative abundance (kg/hr) and sample sizes (n) of total catch for the Small Pelagics portion of *NOAA Ship Gordon Gunter* Cruise 40 (GU-06-05).

Area	Depth										All Depths	
	< 60 fms		60-99 fms		100-149 fms		150-199 fms		200 + fms			
	n	Mean	n	Mean	n	Mean	n	Mean	n	Mean	n	Mean
East Delta	4	467.8	8	205.3	0		1	216.3	1	31.7	14	268.7
West Delta	22	280.6	7	222.4	3	13.6	4	44.2	1	24.3	37	215.4
Texas	13	425.3	3	375.5	2	74.8	1	39.9	3	46.4	22	317.5
Areas combined	39	348.0	18	240.3	5	38.1	6	72.1	5	39.0	73	256.4

Table 2. Organisms caught during the Small Pelagics portion of *NOAA Ship Gordon Gunter* Cruise 40 (GU-06-05) which comprised at least 1.0% of the total catch in terms of numbers and kilograms caught per hour fished (n = 73).

	Name	Percent of Total Number Caught	Percent of Total Catch Weight	Percent Frequency Of Capture	Weight Per Individual (gms)
1	Longspine porgy (*Stenotomus caprinus*)	29.0	23.1	63.0	44
2	Rough scad (*Trachurus lathami*)	19.5	21.9	79.5	63
3	Gulf butterfish (*Peprilus burti*)	5.7	9.0	39.7	88
4	Wenchman (*Pristipomoides aquilonaris*)	5.6	4.8	75.3	48
5	Pinfish (*Lagodon rhomboides*)	4.4	5.9	28.8	75
6	Dwarf goatfish (*Upeneus parvus*)	4.3	2.6	52.1	34
7	Longfin squid (*Loligo pealeii*)	2.6	2.0	67.1	43
8	Round herring (*Etrumeus teres*)	1.8	1.0	16.4	29
9	Atlantic bumper (*Chloroscomburus chrysurus*)	1.3	1.3	9.6	58
10	Silver-rag (*Ariomma bondi*)	1.2	1.7	13.7	78
11	Atlantic cutlassfish (*Trichiurus lepturus*)	1.1	2.9	31.5	142
12	Spot (*Leiostomus xanthurus*)	1.0	1.9	15.1	110
Totals		77.5	78.1		

Table 3. Mean estimates of relative abundance (kg/hr) and sample sizes (n) of total catch for the Shrimp/Bottomfish portion of *NOAA Ship Gordon Gunter* Cruise 40 (GU-06-05).

Area	Depth (fms)												Diurnal Period				All	
	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	0		5	88.9	7	123.1	2	78.1	5	144.3	3	135.8	8	136.5	14	107.1	22	117.8
West Delta	2	144.1	18	120.7	6	238.0	2	305.4	4	140.8	0		16	158.3	16	158.1	32	158.2
Areas combined	2	144.1	23	113.8	13	176.2	4	191.8	9	142.7	3	135.8	24	151.0	30	134.3	54	141.8

Table 4. Organisms caught during the Shrimp/Bottomfish portion of *NOAA Ship Gordon Gunter* Cruise 40 (GU-06-05) which comprised at least 1.0% of the total catch in terms of numbers and kilograms caught per hour fished (n = 54).

	Name	Percent of Total Number Caught	Percent of Total Catch Weight	Percent Frequency Of Capture	Weight Per Individual (gms)
1	Atlantic croaker (*Micropogonias undulatus*)	34.2	35.0	92.6	51
2	Spot (*Leiostomus xanthurus*)	7.9	13.8	85.2	87
3	Brown Shrimp (*Farfantepenaeus aztecus*)	7.0	2.2	96.3	15
4	Longspine porgy (*Stenotomus caprinus*)	6.0	5.4	63.0	45
5	Bigeye searobin (*Prionotus longispinosus*)	5.7	3.7	87.0	33
6	Lesser blue crab (*Callinectes similis)*	3.6	1.0	72.2	14
7	Sand seatrout (*Cynoscion arenarius*)	2.8	6.8	87.0	121
8	Pinfish (*Lagodon rhomboides*)	2.8	3.1	68.5	56
9	Silver jenny (*Eucinostomus gula)*	2.6	1.4	63.0	27
10	White shrimp (*Litopenaeus setiferus*)	2.1	1.0	35.2	23
11	Rock sea bass (*Centropristis philadelphica*)	1.2	1.2	75.9	52
12	Silver seatrout (*Cynoscion nothus*)	1.1	1.8	48.1	80
13	Inshore lizardfish (*Synodus foetens*)	1.0	3.3	74.1	161
	Totals	78.0	79.7		

Table 5. Summary of environmental samples and data collected during *NOAA Ship Gordon Gunter* Cruise 40 (GU-06-05).

Activity	Number
CTD casts	145
Fish trawls	80
Shrimp trawls	60
Cloud Cover	55
Bongo tows	18
Neuston tows	18

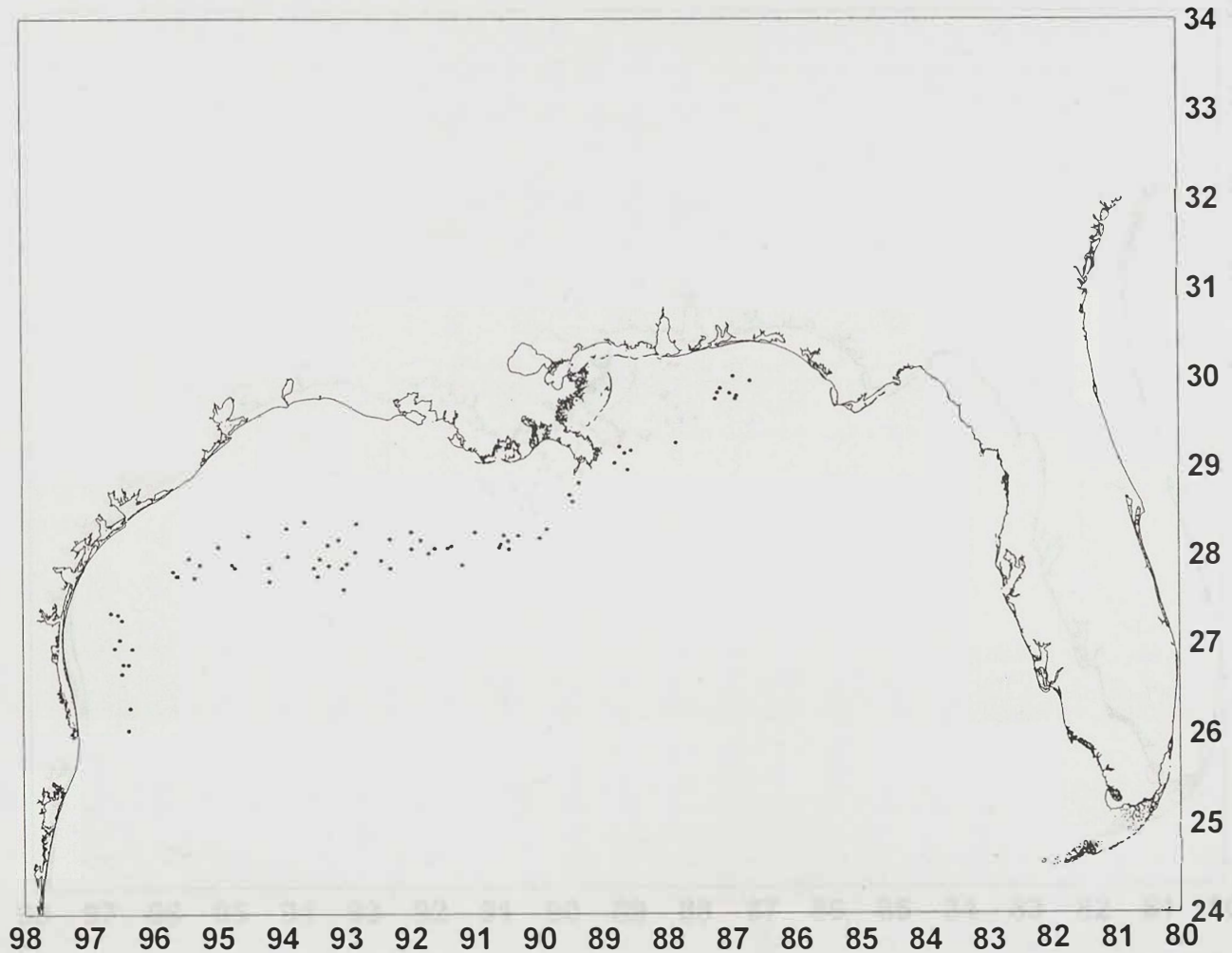

Figure 1. Fish trawl stations accomplished during the Small Pelagics portion of *NOAA Ship Gordon Gunter* Cruise 40 (GU-06-05).

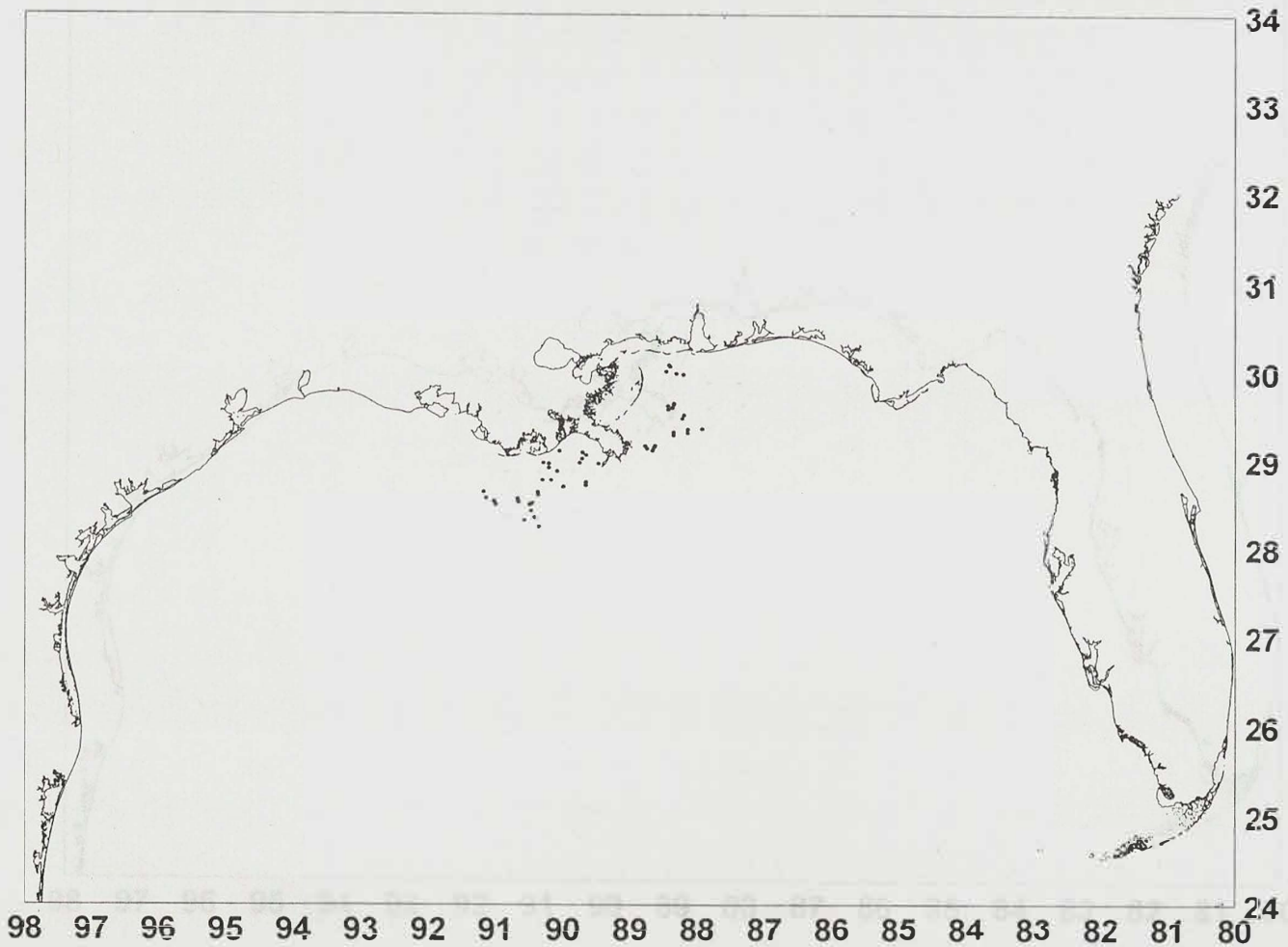

Figure 2. Shrimp trawl stations accomplished during the Shrimp/Bottomfish portion of *NOAA Ship Gordon Gunter* Cruise 40 (GU-06-05).

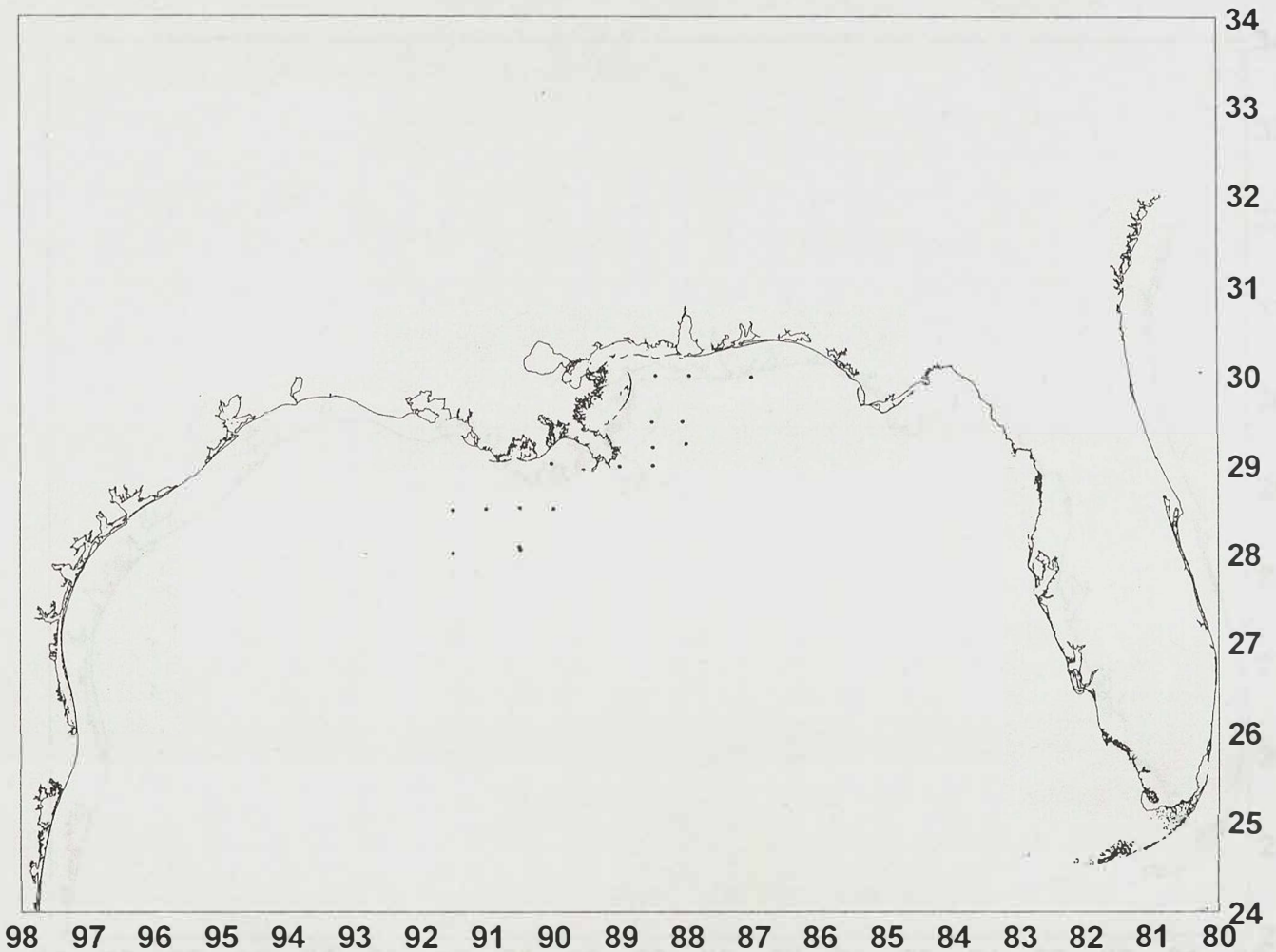

Figure 3. Ichthyoplankton stations accomplished during *NOAA Ship Gordon Gunter* Cruise 40 (GU-06-05).

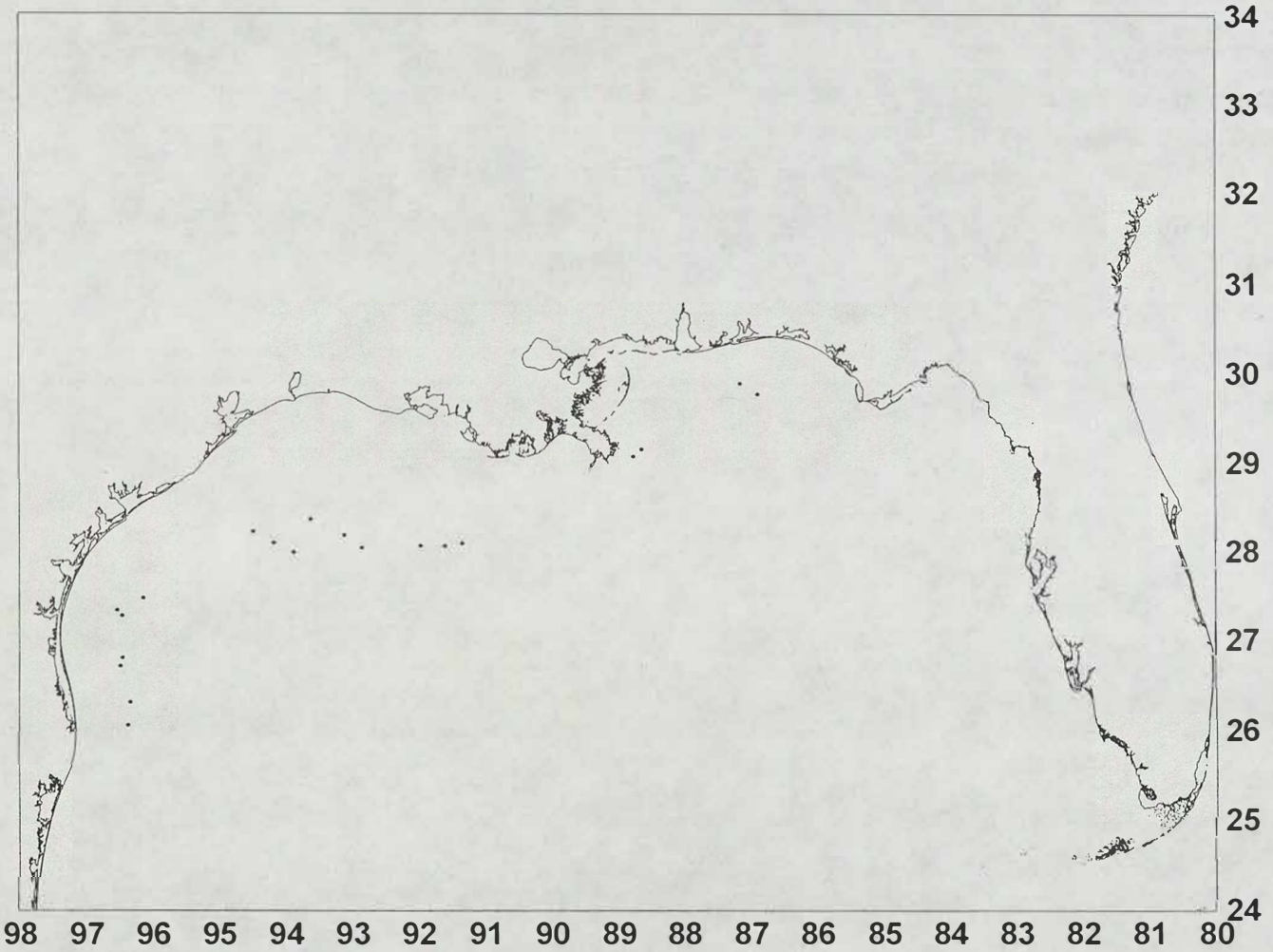

Figure 4. Locations of bottom grab samples taken during *NOAA Ship Gordon Gunter* Cruise 40 (GU-06-05).

Figure 9. Cetacean biopsy sample locations during GU-06-03.

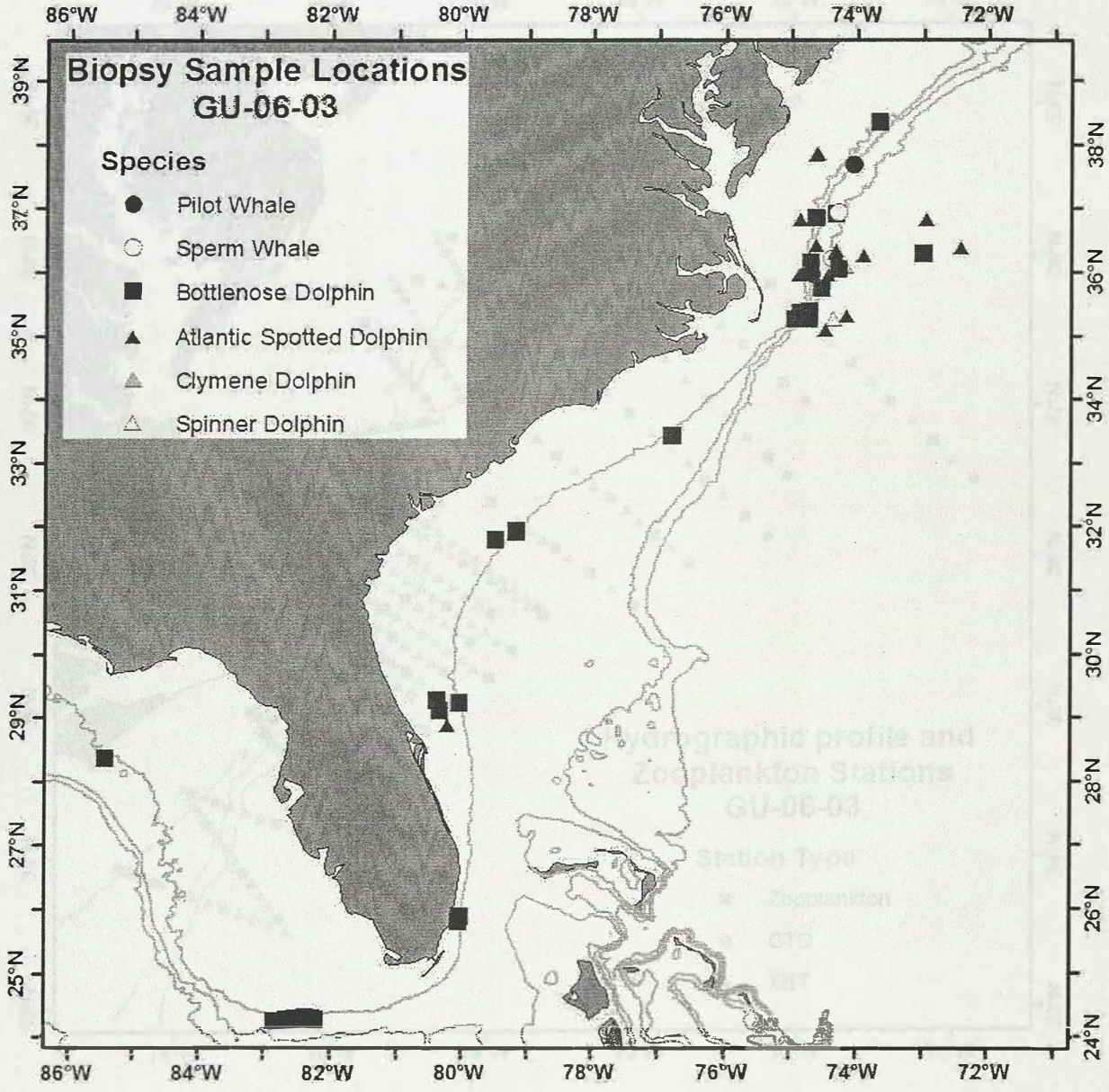

Figure 10. Hydrographic profiles and zooplankton sampling stations during GU-06-03.