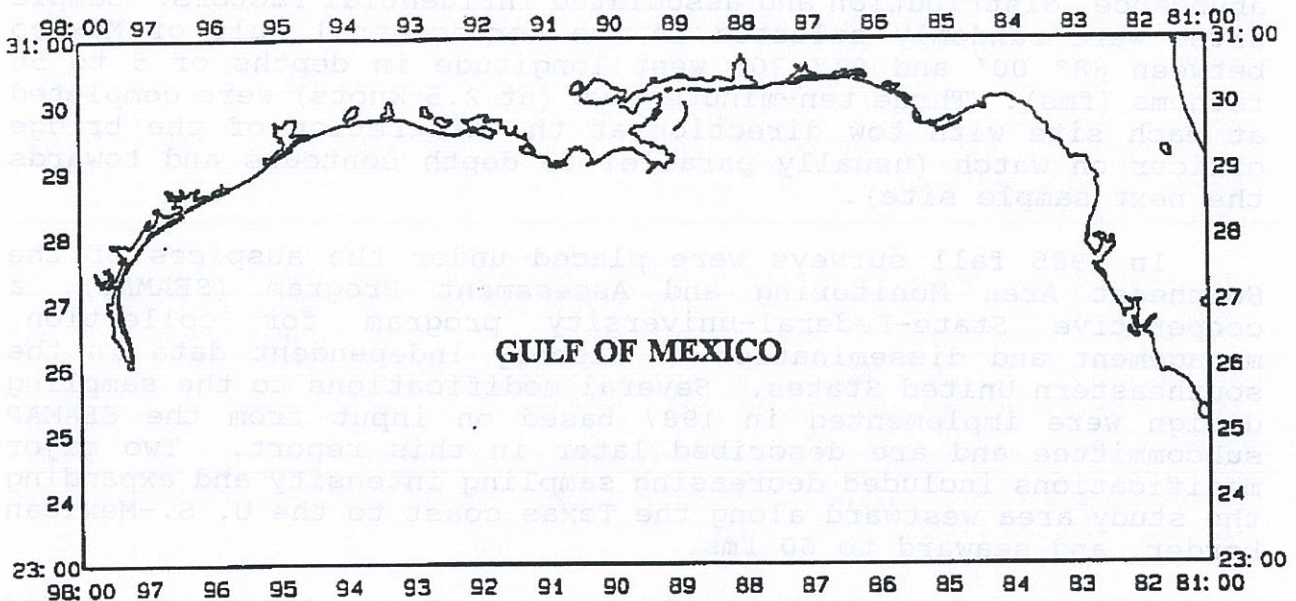


CRUISE RESULTS

Southeast Area Monitoring and Assessment Program (SEAMAP) Fall Bottomfish Survey

NOAA Ship OREGON II Cruise OT-96-06 (224)
10/08-11/24/96



U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
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INTRODUCTION

In 1972 the Mississippi Laboratories initiated a resource assessment program in response to concerns expressed by the industrial bottomfish fleet over declining catch per unit of fishing effort. Original objectives included the determination of the status of the multi-species bottomfish resource including abundance, distribution and associated influential factors. Sample sites were randomly selected in the northcentral Gulf of Mexico between 88° 00' and 91° 30' west longitude in depths of 5 to 50 fathoms (fms). Three ten-minute tows (at 2.5 knots) were completed at each site with tow direction at the discretion of the bridge officer on watch (usually parallel to depth contours and towards the next sample site).

In 1985 fall surveys were placed under the auspices of the Southeast Area Monitoring and Assessment Program (SEAMAP), a cooperative State-Federal-university program for collection, management and dissemination of fishery independent data in the southeastern United States. Several modifications to the sampling design were implemented in 1987 based on input from the SEAMAP subcommittee and are described later in this report. Two major modifications included decreasing sampling intensity and expanding the study area westward along the Texas coast to the U. S.-Mexican border, and seaward to 60 fms.

Fall resource assessment surveys have taken on added importance with the passage of the Fishery Conservation and Management Act of 1976. Results provide a long term time series of estimates of relative abundance for many species now being managed as a result of the Act. These surveys are also important as they provide government and non-government researchers a platform of opportunity for collecting data and specimens for scientific study.

The NOAA Ship Oregon II departed Pascagoula, Miss. on October 8, 1996 for the twenty-fifth annual fall survey. Two port calls were made to exchange scientific personnel; one in Galveston, Tex. on October 23 and another in Pascagoula on November 8. Two additional port calls were made; one in Port Isabel, Tex. on October 14 to repair ship's electronics, and another in Pascagoula, Miss. on November 16 due to bad weather and to repair the CTD unit.

OBJECTIVES

- 1) Sample the demersal fauna of the northcentral and northwestern Gulf of Mexico in depths of 5 to 60 fms.
- 2) Collect ichthyoplankton samples to determine the relative abundance and distribution of eggs and larvae of commercially and recreationally important fish species.
- 4) Conduct CTD casts to profile water temperature, salinity, dissolved oxygen, and chlorophyll concentrations.
- 5) Obtain length measurements to estimate size structures of sampled populations.
- 6) Conduct gear inter-calibration study with NOAA Ship Chapman.
- 7) Collect fish and invertebrate samples as requested by staff members of the Gulf Coast Research Laboratory (GCRL).
- 8) Collect spiral valves from targeted elasmobranchs for the University of Massachusetts, Dartmouth.
- 9) Collect juvenile red snapper (*Lutjanus campechanus*) for the University of South Alabama.
- 10) Collect white shrimp (*Penaeus setiferus*) for the South Carolina Wildlife and Marine Resources Department.
- 11) Collect rock sea bass (*Centropristis philadelphica*) and bank sea bass (*C. ocyurus*) for the Natural History Museum of Los Angeles County.

MATERIALS AND METHODS

Trawl samples were taken with a 40-ft shrimp net with 8-ft by 40-in chain bracketed wooden doors towed at 3.0 knots. A standard free tickler chain cut 42 inches shorter than the footrope was used to stimulate benthic organisms into the path of the oncoming net. 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 north latitude (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 sunrise and sunset. Minimum and maximum tow durations were 10 and 60 minutes respectively, depending on the time required to transect the respective depth strata. If a stratum was not completed in 60 minutes, 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 (bongo and neuston) were collected at half-degree intervals of latitude and longitude within the defined survey area. Plankton sample sites were occasionally relocated to nearest trawling sample sites to optimize survey time. Bongo tows were made with two conical 61-centimeter nets with 0.333 millimeter (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 within two meters (m) of bottom. Neuston sampling gear consisted of a 0.947 mm mesh net mounted on a 1 by 2 m 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 transferred to 95% ethyl alcohol 48 hours later.

Temperature, salinity, dissolved oxygen, and fluorescence measurements were recorded at the surface, mid, and maximum depths with a Seabird SBE 25 CTD unit (complete profiles were archived for later analyses). Water samples were collected once a day for comparative temperature, salinity, chlorophyll and dissolved oxygen measurements. Water samples were collected with Niskin bottles mounted on a General Oceanics rosette sampler attached to the CTD unit. Forel-ule water color, secchi disc, and percent cloud cover observations were also taken during daylight hours.

The gear inter-calibration study consisted of 30-minute tows conducted simultaneously with NOAA Ship Chapman at opportunistic locations during the two vessels respective surveys.

RESULTS

One hundred ninety nine of two hundred thirty strata were successfully sampled by NOAA Ship Oregon II (Table 1). One stratum was occupied but unsuccessfully sampled when the sampling net was torn by a bottom obstruction. Another stratum had to be repeated because the net was retrieved prior to scheduled haul-back to avoid a bottom obstruction. Two strata were not sampled because of logistical problems imposed by bad weather, and 28 strata were sampled by state vessels in compliance with their SEAMAP responsibilities (23 by RV Tommy Munro of Mississippi and 5 by RV A. E. Verrill of Alabama).

Two hundred thirty-one tows were required to sample the 199 strata occupied (Figure 1). Sciaenidae was the most abundant

family in terms of numbers and kilograms caught with Atlantic croaker (*Micropogonias undulatus*) and spot (*Leiostomus xanthurus*) making the greatest contribution (Table 2).

For summary purposes, data were grouped into three geographic areas; East Delta (88°00'-89°15'), West Delta (89°15'-94°00') and Texas (94°00'-98°00'), and six depth intervals; 5-9, 10-19, 20-29, 30-39, 40-49, and 50-60 fms. The mean total catch rate for the entire survey was 96.8 kilograms per hour fished (kg/hr), 62.1% of the 1995 mean (Table 3). This was due to lower mean catch rates in all areas, especially East Delta. Mean catch rates were 115.4, 123.1 and 67.2 kg/hr for East Delta, West Delta and Texas areas, respectively. These figures represented 28.4, 82.2 and 59.9 percent of the respective 1995 means.

Forty-three bongo and neuston tows were accomplished (Figure 2). Numerous ichthyoplakton stations were cancelled due to high winds and rough seas. Samples were returned to Pascagoula for processing and subsequent shipment to the appropriate sorting center.

Two hundred twenty-one CTD casts were conducted. Fifty chlorophyll filtrations were returned to Pascagoula for analysis. A summary of environmental collections and accomplishments is presented in Table 4.

Collections of red snapper, white shrimp, bank and rock sea bass, and elasmobranch spiral valves were shipped to respective requestors.

Numerous fish and invertebrate samples were frozen and returned to staff members of GCRL.

Thirty-four paired comparison tows were conducted with NOAA Ship Chapman. Inter-vessel trends will be reported later as the two data sets are edited and analyzed.

Surplus survey time allowed for the continuation of Cruise 223 (OT-96-05), paired comparison towing with RV Tommy Munro. Thirty-one additional paired tows were conducted on November 22 and 23.

My thanks are extended to the scientific and vessel crew members whose cooperative efforts contributed to a successful survey.

CRUISE PARTICIPANTS

10/8-23/96

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Gilmore Pellegrin, Jr.	Field Party Chief	NMFS; Pasc., Miss.
Perry Thompson, Jr.	Watch Leader	NMFS; Pasc., Miss.
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10/25-11/8/96

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11/12-16/96

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11/19-24/96

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Director, Southeast
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Table 1. Distribution of sampling effort by strata for NOAA Ship Oregon II Cruise 96-06 (224). Numbers in table body indicate number of times strata were sampled. "Ala." and "Miss." indicate strata sampled by the respective states, "tore net" indicates strata which were unsuccessfully sampled due to bottom obstructions and "." indicate strata which weren't sampled due to logistical problems imposed by bad weather.

Depth Strata (fathoms)	Diurnal 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	Miss.	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	Miss.	1	1	1	1
9-10	Ala.	1	1	1	1	Miss.	1	1	1	1
10-11	Ala.	1	1	1	1	Miss.	1	1	1	1
11-12	Miss.	1	1	1	1	Ala.	1	1	1	1
12-13	Miss.	1	1	1	1	Miss.	1	1	1	1
13-14	Ala.	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
16-17	Miss.	1	1	.	1	1	1	1	1	1
17-18	Miss.	1	1	1	1	1	1	1	1	1
18-19	Miss.	1	1	1	1	1	1	1	1	1
19-20	Miss.	1	1	1	1	1	1	1	1	1
20-22	Miss.	1	1	1	1	1	1	1	1	1
22-25	Miss.	1	1	1	1	1	1	1	1	1
25-30	1	1	1	1	1	1	1	1	1	1
30-35	1	1	1	1	1	1	1	1	1	1
35-40	Tore net	1	1	1	1	1	1	1	1	1
40-45	1	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	1	1	1	1	1	1

Table 2. Organisms caught during NOAA Ship Oregon II Cruise 96-06 (224) which comprised at least 1.0% of the total catch in terms of numbers and kilograms caught per hour fished (n=231).

	Name	Percent of Total Number Caught	Percent of Total Catch Weight	Percent frequency of capture	Weight Per Individual (gms)
1	Atlantic bumper (<i>Chloroscombrus chrysurus</i>)	27.5	9.2	47.6	9.3
2	Longspine porgy (<i>Stenotomus caprinus</i>)	16.3	14.8	84.4	25.5
3	Atlantic croaker (<i>Micropogonias undulatus</i>)	13.7	23.3	75.3	47.6
4	Longspine swimming crab (<i>Portunus spinicarpus</i>)	7.6	2.4	30.3	8.9
5	Gulf butterflyfish (<i>Peprilus burti</i>)	2.4	3.8	55.8	44.9
6	Brown shrimp (<i>Penaeus aztecus</i>)	1.9	1.4	91.3	20.6
7	Spot (<i>Leiostomus xanthurus</i>)	1.8	6.3	61.5	96.5
8	Bigeye searobin (<i>Prionotus longispinosus</i>)	1.1	1.2	66.7	31.9
9	Rock sea bass (<i>Centropristis philadelphica</i>)	1.0	1.4	79.2	37.7

Table 3. Mean catch rates (kg/hr) of five abundant finfish species and three shrimp species caught during NOAA Ship Oregon II Cruise 96-06 (224) by area, depth and diel strata ("." indicates no data).

Area	Depth (fms)						Diurnal period		Total
	5 - 9	10-19	20-29	30-39	40-49	50-60	Day	Night	
Atlantic bumper									
East delta	.	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0
West delta	4.0	0.9	0.1	0.0	0.0	0.0	0.8	1.5	1.2
Texas	5.7	41.1	10.3	0.8	0.1	0.0	35.9	0.5	18.2
All areas	4.8	19.9	4.9	0.3	0.0	0.0	17.5	0.9	8.9
Longspine porgy									
East delta	.	68.8	20.3	17.2	17.3	1.8	8.8	35.8	27.3
West delta	12.0	21.5	21.1	11.6	10.3	16.1	20.2	13.7	16.8
Texas	1.0	9.2	19.0	7.8	12.9	9.8	14.1	5.0	9.5
All areas	6.6	18.0	20.0	10.8	12.5	11.0	16.6	12.2	14.4
Atlantic croaker									
East delta	.	7.6	1.3	3.9	11.4	0.4	8.2	3.8	5.2
West delta	23.7	88.7	44.4	6.4	0.3	5.6	43.1	47.6	45.4
Texas	0.5	4.6	4.8	1.4	0.1	0.0	1.9	3.8	2.8
All areas	12.4	44.7	20.2	4.1	2.1	2.2	21.5	23.5	22.5
Gulf butterfish									
East delta	.	0.0	0.6	6.1	1.9	0.0	5.3	0.2	1.9
West delta	10.7	1.7	5.1	4.9	2.6	6.6	9.2	0.6	4.8
Texas	0.4	2.4	6.3	2.9	1.2	5.4	5.5	0.2	2.8
All areas	5.7	1.9	5.1	4.3	1.9	5.1	7.2	0.4	3.7

Table 3. (continued)

Area	Depth (fms)						Diurnal period		Total
	5 - 9	10-19	20-29	30-39	40-49	50-60	Day	Night	
Spot									
East delta	.	4.1	4.3	4.0	8.3	12.9	7.0	5.5	6.0
West delta	0.6	9.2	13.6	37.4	3.9	0.0	14.1	7.8	10.9
Texas	1.6	1.1	3.4	0.9	0.1	0.0	1.5	1.4	1.4
All areas	1.1	5.1	7.6	18.3	3.2	2.0	7.7	4.7	6.1
Brown shrimp									
East delta	.	0.0	1.3	1.8	3.1	2.9	2.1	1.5	1.7
West delta	0.3	2.0	1.9	2.6	1.7	0.6	1.1	2.1	1.6
Texas	0.2	1.3	1.4	0.9	2.5	1.0	0.4	1.9	1.1
All areas	0.3	1.5	1.5	1.8	2.3	1.1	0.8	1.9	1.4
White shrimp									
East delta	.	0.2	0.0	0.0	0.0	0.1	0.0	0.1	0.0
West delta	1.1	0.3	0.1	0.0	0.3	0.0	0.3	0.4	0.4
Texas	2.7	0.6	0.0	0.0	0.0	0.0	0.9	0.6	0.8
All areas	1.9	0.4	0.0	0.0	0.1	0.0	0.6	0.5	0.5
Pink shrimp									
East delta	.	0.3	0.1	0.0	0.0	0.0	0.0	0.1	0.1
West delta	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Texas	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.2
All areas	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.1

Table 3. (continued)

Area	Depth (fms)						Diurnal period		Total
	5 - 9	10-19	20-29	30-39	40-49	50-60	Day	Night	
			Crustacea						
East delta	.	3.0	3.9	4.5	16.2	35.2	6.5	11.2	9.7
West delta	2.4	4.7	6.0	8.3	6.8	84.5	2.4	15.1	8.9
Texas	4.9	5.2	5.0	3.5	6.1	5.1	2.2	7.8	5.0
All areas	3.6	4.9	5.3	5.9	8.1	40.3	2.5	11.4	7.2
			Finfish						
East delta	.	125.8	60.2	62.2	104.8	117.1	85.9	91.6	89.8
West delta	89.5	151.2	113.5	85.4	42.3	94.9	115.0	107.3	111.1
Texas	25.1	72.0	62.7	34.3	55.7	70.3	80.7	29.9	55.3
All areas	58.1	112.3	82.7	61.9	58.4	87.0	97.0	71.4	83.7
			Total catch						
East delta	.	131.9	65.0	136.0	122.1	153.5	93.5	125.5	115.4
West delta	100.8	157.6	120.0	94.9	52.3	183.3	120.7	125.5	123.1
Texas	58.8	79.5	68.1	38.3	64.0	76.6	92.5	41.9	67.2
All areas	80.3	119.2	88.5	77.7	69.0	129.5	105.8	88.6	96.8
			Sampling distribution (number of tows)						
East delta	0	4	5	4	4	2	6	13	19
West delta	22	39	16	14	10	5	52	54	106
Texas	21	39	19	12	9	6	53	53	106
All areas	43	82	40	30	23	13	111	120	231

Table 4. Summary of environmental samples and data collected during NOAA Ship Oregon II Cruise 96-06 (224).

	Surface	Mid-depth	Maximum depth	Total
Temperature	221	220	220	661
Salinity	221	220	220	661
Dissolved oxygen	221	220	220	661
Secchi disk	-	-	-	76
Water color	-	-	-	76
Cloud cover	-	-	-	77
Bottle cast	-	-	-	50
CTD	-	-	-	221
Shrimp trawl	-	-	-	274
Bongo	-	-	-	43
Neuston	-	-	-	43

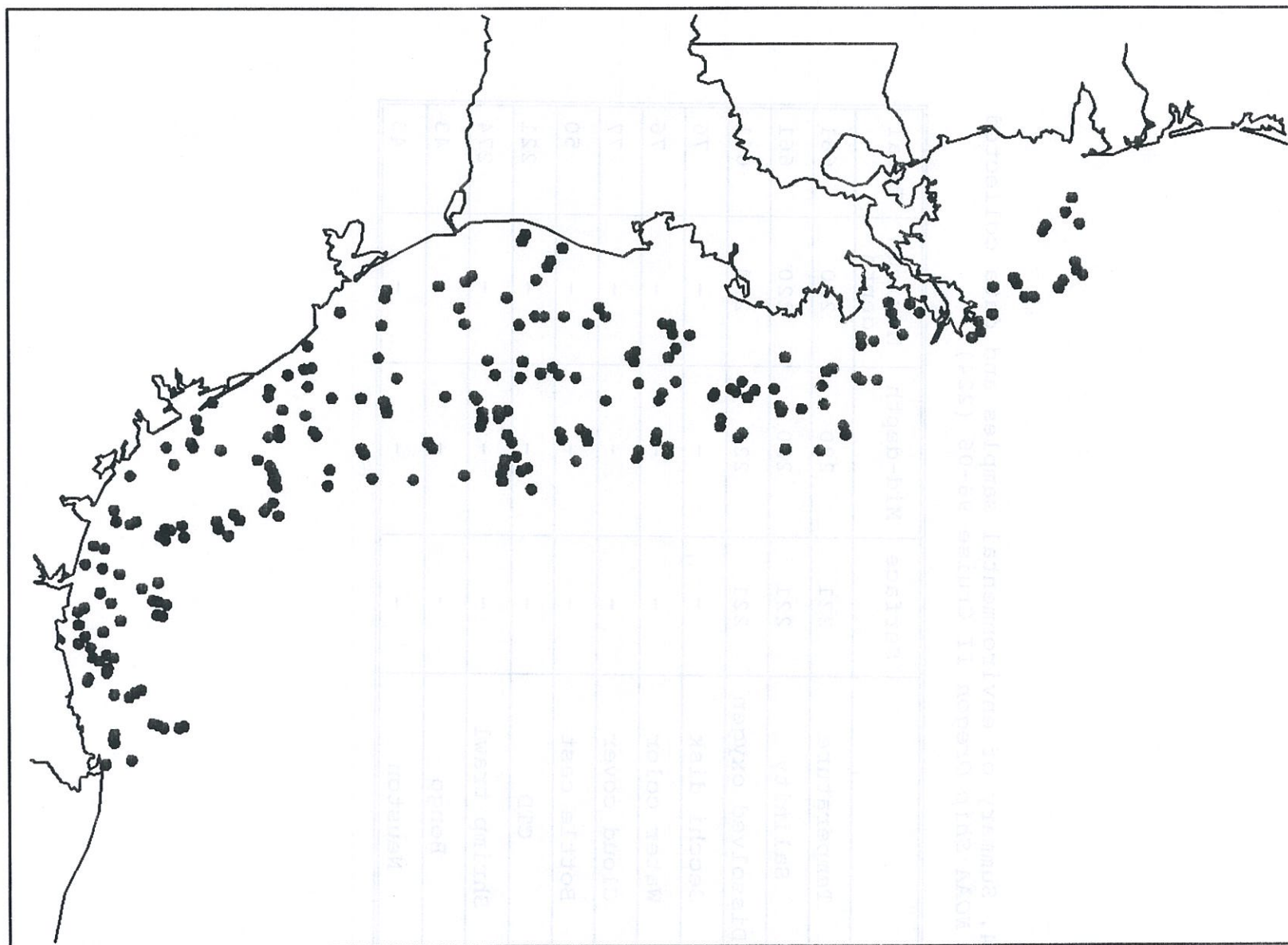


Figure 1. Shrimp trawl stations completed during NOAA Ship Oregon II cruise 96-06 (224).

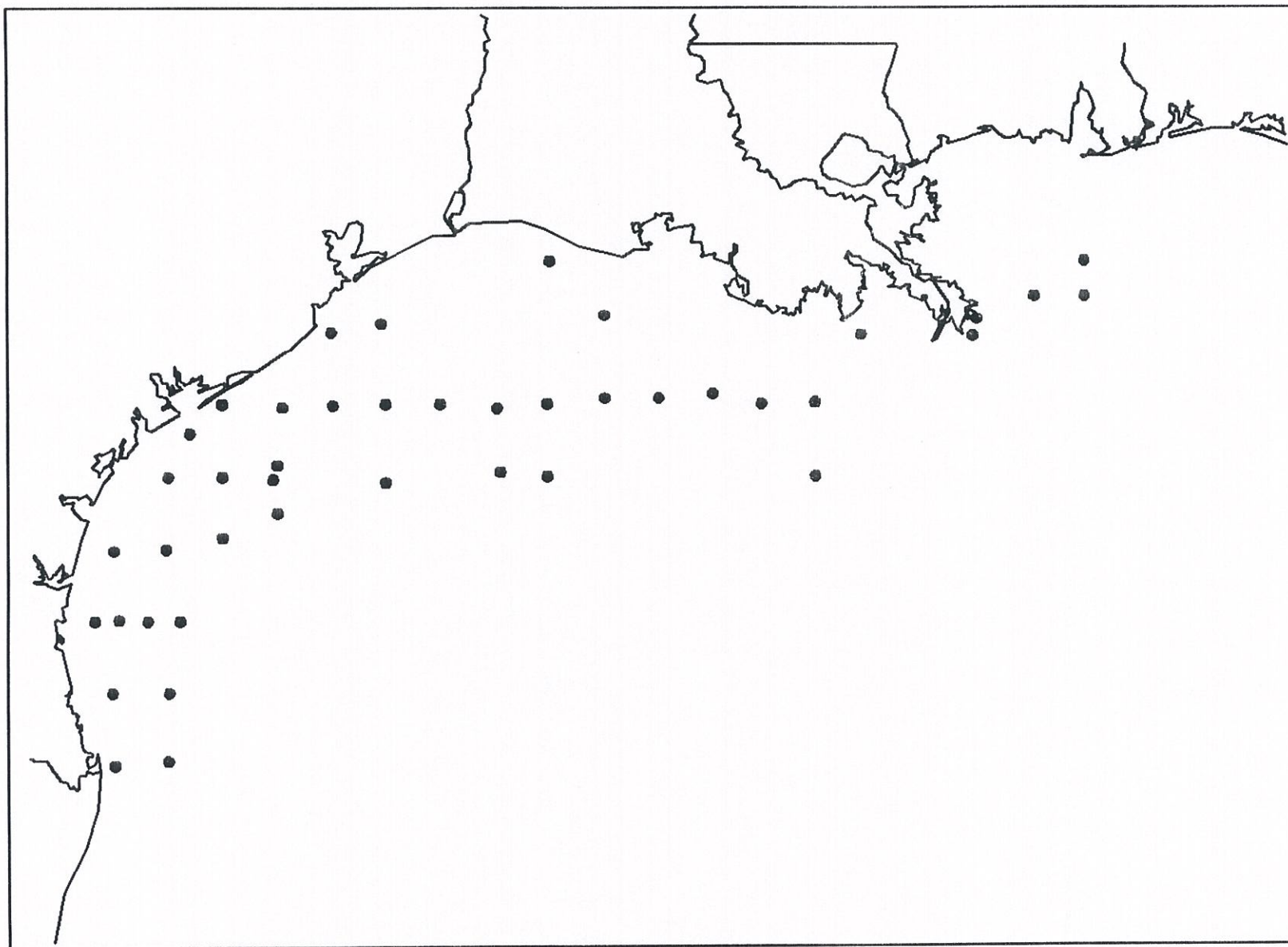


Figure 2. Plankton stations completed during NOAA Ship Oregon II cruise 96-06 (224).