

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 229 (OT-97-06)  
10/8-11/20/97

## 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 passing of the Fishery Conservation and Management Act of 1976. Results of these surveys 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<sup>th</sup>, 1997 for the twenty-sixth annual fall survey. Two port calls were made to exchange scientific personnel; one in Galveston, Tex. on October 22<sup>nd</sup> and another in Pascagoula on November 7<sup>th</sup>. Two additional port calls were made; one in Port Isabel, Tex. on October 14<sup>th</sup> due to bad weather, and another in Galveston, Tex. on the 28<sup>th</sup> of October to medically evaluate an ill crew member.



## 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 fluorometry.
- 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 Institute of Marine Sciences, Gulf Coast Research Laboratory (GCRL).
- 8) Collect juvenile red snapper (*Lutjanus campechanus*) for the University of South Alabama.
- 9) Collect chlorophyll filtrations to compare with CTD acquired fluorometer readings.

## 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' 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 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 (bongo and neuston) 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 within two meters of bottom. 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, and fluorometer readings 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 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 one of two hundred thirty strata (83%) were successfully sampled by *NOAA Ship Oregon II* (Table 1). An additional 32 strata were sampled by state vessels (25 by *R/V Tommy Munro* of Mississippi and 7 by *R/V A. E. Verrill* of Alabama). Seven strata were not sampled because nets were torn due to bottom obstructions.

Two hundred twenty 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 74.2 kilograms per hour fished (kg/hr), a 23% decrease in relative abundance as compared to 1996 and 26% below the five year mean for 1992-1996. This was due to low catch rates for the East and West Delta areas (32% and 36% lower than 1996). A slight increase was observed off Texas (1%). Sciaenidae was the most abundant family caught with Atlantic croaker (*Micropogonias undulatus*) and spot (*Leiostomus xanthurus*) making the greatest contribution (Table 3).



Twenty bongo and twenty one neuston tows were accomplished (Figure 2). This figure is about half of the usual number accomplished during this survey because a substantial amount of survey time was lost due to bad weather, and ichthyoplankton sampling was sacrificed in order to accomplish the allotted trawl stations. Samples were returned to Pascagoula for processing and subsequent shipment to the appropriate sorting center.

Two hundred eighteen CTD casts were accomplished and eighty water samples were filtered to determine chlorophyll concentrations (Table 4).

Numerous fish and invertebrate samples were frozen and returned to staff members of the Institute of Marine Sciences, GCRL; and red snapper samples were forwarded to the University of South Alabama.

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

#### CRUISE PARTICIPANTS

10/8-22/97

##### NAME

Nathaniel Sanders, Jr.	Field Party Chief	NMFS Pascagoula, Miss.
Dan Foster	Watch Leader	NMFS Pascagoula, Miss.
Nelson May	Watch Leader	NMFS Pascagoula, Miss.
Warren Stuntz	Fishery Biologist	NMFS Pascagoula, Miss.
James Barbour	Fish. Gear Spec.	NMFS Pascagoula, Miss.
Carolyn Rogers	Biologist	Johnson Controls
Tim Daigle	Biologist	Johnson Controls
Melissa Bahnick	Biologist	Johnson Controls

10/24-11/7/97

Gilmore Pellegrin, Jr.	Field Party Chief	NMFS Pascagoula, Miss.
Nathaniel Sanders, Jr.	Watch Leader	NMFS Pascagoula, Miss.
Perry Thompson, Jr.	Watch Leader	NMFS Pascagoula, Miss.
Bennie Rohr	Fishery Biologist	NMFS Pascagoula, Miss.
Kevin Rademacher	Biologist	Johnson Controls
Denice Drass	Biologist	Johnson Controls
André Debose	Biologist	Johnson Controls

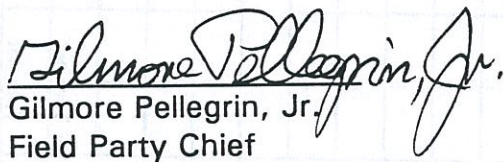
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Gilmore Pellegrin, Jr.  
Dominy Hataway  
Perry Thompson, Jr.  
Bennie Rohr  
Denice Drass  
Kirsten Larsen  
André Debose

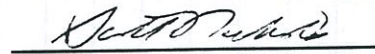
Field Party Chief  
Watch Leader  
Watch Leader  
Fishery Biologist  
Biologist  
Biologist  
Computer Specialist

NMFS Pascagoula, Miss.  
NMFS Pascagoula, Miss.  
NMFS Pascagoula, Miss.  
NMFS Pascagoula, Miss.  
Johnson Controls  
Inst. Mar. Sci., GCRL  
NMFS Bay St. Louis, Miss.

Submitted By:

  
Gilmore Pellegrin, Jr.  
Field Party Chief

Approved By:

  
Scott Nichols, Director,  
Mississippi Laboratories

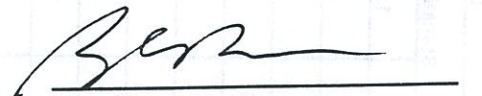
  
Bradford E. Brown,  
Director, Southeast Science  
& Research Center



Table 1. Distribution of sampling effort by strata for NOAA Ship Oregon II Cruise 229 (OT-97-06). 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)	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	11-12	13-15	16-17
5-6	Miss.	1	1	1	1	1	1	1	1	1	1	1	1
6-7	Miss.	1	1	1	1	Miss.	1	1	1	1	Miss.	1	1
7-8	Miss.	1	1	1	1	Miss.	1	1	1	1	Miss.	1	1
8-9	Ala.	1	1	1	1	Ala.	1	1	1	1	Ala.	1	1
9-10	Miss.	1	1	1	1	Miss.	1	1	1	1	Miss.	1	1
10-11	Ala.	1	1	1	1	Miss.	1	1	1	1	Miss.	1	1
11-12	Miss.	1	1	1	1	Miss.	1	1	1	1	Miss.	1	1
12-13	Miss.	1	1	1	1	Ala.	1	1	1	1	Ala.	1	1
13-14	Ala.	1	1	1	1	Miss.	1	1	1	1	Miss.	1	1
14-15	Ala.	1	1	1	1	Miss.	1	1	1	1	Miss.	1	1
15-16	Miss.	1	1	1	1	1	1	1	1	1	1	1	1
16-17	Miss.	1	1	1	1	Miss.	1	1	1	1	Miss.	1	1
17-18	Miss.	1	1	1	1	1	1	1	1	1	1	1	1
18-19	Ala.	1	1	1	1	Miss.	1	1	1	1	Miss.	1	1
19-20	Miss.	1	1	1	1	Miss.	1	1	1	1	Miss.	1	1
20-22	Tore net	1	1	1	Tore net	Miss.	1	Tore net	1	1	Miss.	1	1
22-25	1	1	1	1	1	1	1	1	1	1	1	1	1
25-30	1	1	1	1	1	Miss.	1	1	Tore net	1	Miss.	1	1
30-35	1	1	1	1	1	1	1	1	1	1	1	1	1
35-40	1	1	1	1	1	Miss.	1	1	1	1	Miss.	1	1
40-45	1	1	1	1	1	1	1	1	1	1	1	1	Tore net
45-50	1	1	1	Tore net	1	Miss.	1	1	1	1	Miss.	1	1
50-60	1	1	1	Tore net	Tore net	Miss.	1	1	1	1	Miss.	1	1

Table 2. Organisms caught during NOAA Ship Oregon II Cruise 229 (OT-97-06) which comprised at least 1.0% of the total catch in terms of numbers and kilograms caught per hour fished (n = 226).

	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> )	9.5	15.5	71.2	62.1
2	Longspine porgy ( <i>Stenotomus caprinus</i> )	12.7	11.6	70.4	34.4
3	Moonjelly ( <i>Aurelia aurita</i> )	1.1	10.0	41.2	346.5
4	Atlantic bumper ( <i>Chloroscombrus chrysurus</i> )	25.1	5.7	50.4	8.6
5	Gulf butterflyfish ( <i>Peprilus burti</i> )	2.9	4.9	60.2	63.4
6	Spot ( <i>Leiostomus xanthurus</i> )	1.6	4.2	54.9	101.1
7	Rough scad ( <i>Trachurus lathami</i> )	2.7	2.6	41.6	36.9
8	Brown shrimp ( <i>Penaeus aztecus</i> )	3.6	2.1	86.3	21.7
9	Rock sea bass ( <i>Centropristis philadelphica</i> )	1.2	1.5	69.5	45.2
10	Lesser blue crab ( <i>Callinectes similis</i> )	1.9	1.2	61.9	24.3
11	Red snapper ( <i>Lutjanus campechanus</i> )	1.2	1.0	63.3	32.0



Table 3. Mean catch rates (kg/hr) of five abundant finfish species and three shrimp species caught during NOAA Ship Oregon II Cruise 229 (OT-97-06) by area, depth and diel strata.

Area	Depth (fms)					Diurnal Period		Total
	5 - 9	10-19	20-29	30-39	40-49	50-60	Day	Night
Atlantic croaker								
East Delta	6.5	44.1	6.4	15.8	0.0	0.0	7.5	17.1
West Delta	27.5	30.5	16.0	0.6	0.0	0.0	10.8	27.1
Texas	0.6	5.9	3.2	1.2	0.1	0.0	2.9	3.6
All Areas	13.9	19.0	9.0	2.7	0.0	0.0	7.2	15.8
Longspine porgy								
East Delta	0.1	35.1	23.5	10.7	11.8	6.0	14.8	22.4
West Delta	0.0	9.3	13.9	16.3	8.1	8.2	11.8	6.7
Texas	0.0	4.2	12.5	11.1	12.0	4.1	8.2	4.3
All Areas	0.0	7.5	15.0	13.7	10.2	7.2	10.6	6.6
Atlantic bumper								
East Delta	0.1	0.6	1.2	0.0	0.0	0.0	0.8	0.2
West Delta	0.7	3.6	0.3	0.0	0.0	0.0	3.0	0.0
Texas	17.1	9.7	1.4	2.4	0.5	0.0	16.1	0.6
All Areas	8.7	6.5	0.9	0.9	0.2	0.0	8.2	0.3
Gulf butterflyfish								
East Delta	0.3	0.0	13.9	6.8	0.9	0.5	11.6	0.0
West Delta	1.2	3.9	1.3	7.6	3.0	7.7	7.4	0.1
Texas	0.4	2.9	4.1	6.5	1.5	0.0	5.7	0.2
All Areas	0.8	3.3	4.6	7.1	2.1	5.5	7.1	0.2



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	6.5	16.5	1.7	6.1	0.0	0.0	2.8	6.4
West Delta	0.3	5.4	2.8	7.1	1.1	0.1	4.3	3.1
Texas	1.1	3.6	2.7	0.8	0.0	0.0	1.8	2.7
All Areas	0.8	4.8	2.5	4.7	0.5	0.1	3.1	3.1
Brown shrimp								
East Delta	0.0	0.6	0.4	1.5	0.4	0.2	0.5	0.8
West Delta	0.3	1.7	1.6	3.0	1.2	0.1	0.6	2.4
Texas	0.2	2.4	2.6	1.6	1.0	0.1	1.2	2.3
All Areas	0.2	2.0	1.8	2.3	1.0	0.1	0.8	2.3
White shrimp								
East Delta	0.7	0.0	0.0	0.1	0.0	0.0	0.0	0.2
West Delta	1.0	0.3	0.0	0.0	0.0	0.0	0.2	0.4
Texas	1.9	0.2	0.0	0.0	0.0	0.0	0.4	0.5
All Areas	1.4	0.3	0.0	0.0	0.0	0.0	0.3	0.4
Pink shrimp								
East Delta	0.0	2.2	0.3	0.0	0.0	0.0	0.0	0.9
West Delta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Texas	0.3	0.5	0.0	0.2	0.0	0.0	0.2	0.4
All Areas	0.2	0.3	0.1	0.1	0.0	0.0	0.1	0.3



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	1.4	4.1	1.6	4.8	1.6	0.5	0.9	5.1
West Delta	2.4	3.4	3.9	4.0	2.9	0.7	1.4	5.0
Texas	4.7	8.7	9.1	4.8	3.3	2.3	3.7	10.0
All Areas	3.5	6.0	5.7	4.4	2.8	1.0	2.3	7.3
Finfish								
East Delta	64.2	174.9	62.4	71.8	45.4	30.0	54.9	100.0
West Delta	76.0	79.4	65.8	56.3	36.3	48.3	65.3	70.7
Texas	56.0	44.8	39.8	52.6	44.1	38.8	59.8	35.2
All Areas	66.0	65.0	54.5	56.9	40.8	44.6	62.0	56.5
Total Catch								
East Delta	79.4	184.9	67.1	77.0	51.9	34.0	56.6	113.4
West Delta	110.7	85.8	70.7	61.9	42.8	52.7	69.6	88.5
Texas	84.8	68.8	60.8	60.1	51.9	43.4	71.6	64.5
All Areas	97.3	80.0	66.0	63.1	47.9	48.9	69.2	79.2
Sampling Distribution (number of tows)								
East Delta	1	2	7	4	3	1	11	7
West Delta	20	41	17	17	8	7	55	55
Texas	20	40	17	12	7	2	47	51
All Areas	41	83	41	33	18	10	113	113



Table 4. Summary of environmental samples and data collected during *NOAA Ship Oregon II* Cruise 229 (OT-97-06).

	Surface	Mid-depth	Maximum depth	Total
Temperature	219	217	217	753
Salinity	214	214	214	750
Dissolved oxygen	214	214	214	743
Chlorophyll	--	--	--	80
Secchi disk	--	--	--	53
Water color	--	--	--	46
Cloud cover	--	--	--	66
Bottle cast	--	--	--	41
CTD	--	--	--	218
Shrimp trawl	--	--	--	226
Bongo	--	--	--	21
Neuston	--	--	--	20

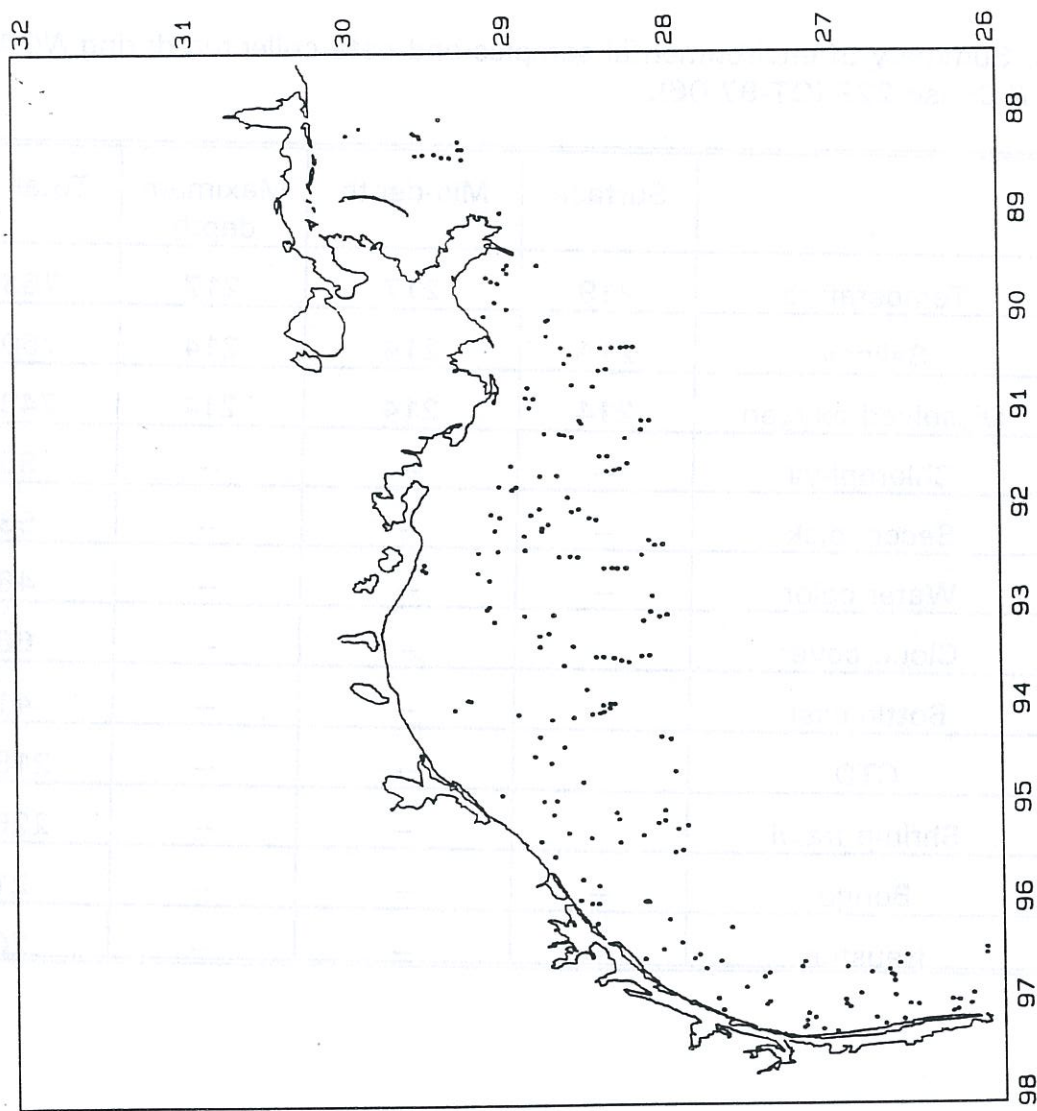


Figure 1. Shrimp trawl sampling stations completed during NOAA Ship Oregon II cruise 229 (OT-97-06).



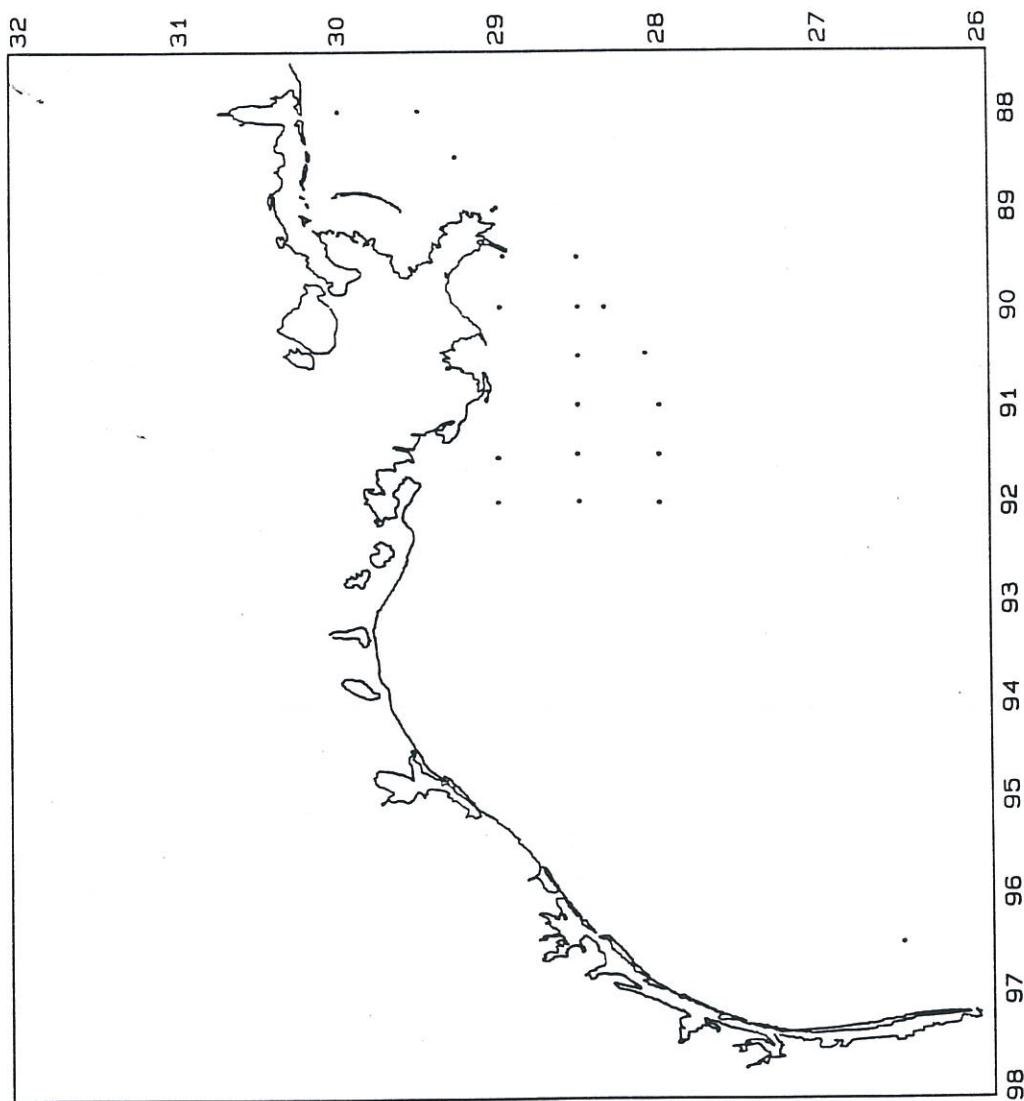


Figure 2. Ichthyoplankton sampling stations completed during NOAA Ship Oregon II cruise 229 (OT-97-06).