

U.S. Department of Commerce  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Southeast Fisheries Center  
Mississippi Laboratories  
Pascagoula Facility  
P O Drawer 1207  
Pascagoula, MS 39568-1207

**NOAA Ship GORDON GUNTER Cruise 98-01 (01)**  
September 4, 1998 to September 30, 1998

**INTRODUCTION**

The NOAA Ship GORDON GUNTER departed Pascagoula, MS on September 4, 1997 to initiate the Southeast Area Monitoring and Assessment Program (SEAMAP) fall ichthyoplankton survey in the northern Gulf of Mexico. Four tropical disturbances, a less than optimal deployment/retrieval system for the gear, and a starboard engine problem set the stage for a loss of time from which survey efforts could not be recovered. A total of 15 successful sea days were worked over two Legs during the cruise: Leg 1, September 4 - 17 and Leg 2, September 18 - 30.

**OBJECTIVES**

**SEAMAP:**

1. Collect ichthyoplankton with bongo and neuston gear for abundance and distribution of eggs, larvae, and small juveniles of king and Spanish mackerel, clupeids, lutjanids and sciaenids.
2. Obtain station associated environmental and oceanographic data throughout the survey area using the SBE 25 - 03 Sea logger Conductivity, Temperature and Depth recorder (CTD), outfitted with a SBE 13/22/23 dissolved oxygen sensor, a Sea Tech Fluorometer, and a Sea Tech Transmissiometer.
3. Obtain real time depth, temperature and salinity data for each of the bongo profiles using the SEACAT SBE - 19.
4. Collect larval fish in coordination with the Gulf Coast Research Laboratory red drum project using the standard 60cm MARMAP bongo array.
5. Collect line-transect data to estimate abundance and define distribution of cetacean species in continental shelf waters of the northern Gulf of Mexico
6. Collect associated environmental data at designated stations in order to define cetacean habitats.
7. Obtain biopsy samples of skin and blubber from selected cetacean species for genetic and contaminant analysis in order to study the stock structure of Gulf of Mexico cetacean.



## **METHODS**

### **Cetacean Visual Survey**

The survey was scheduled to complete the cruise track in two "legs" from the 68.3 m NOAA Ship GORDON GUNTER. Leg 1 was scheduled for 3-17 September and Leg 2, 18-30 September (Table 1). This survey was conducted in conjunction with SEFSC ichthyoplankton sampling along a predetermined track line at stations uniformly spaced throughout continental shelf waters of the U.S. Gulf of Mexico (Figures 1 & 2). The track line was transited 24-hours a day. Line-transect sampling (Buckland et al. 1993) was conducted while traveling between stations during daylight hours. A maximum of 2,400 km of daytime line-transect effort was possible if the entire track line was transited.

Line-transect data were collected by two teams of three observers during daylight hours, weather permitting (i.e., no rain, Beaufort sea state <6). Each team consisted of skilled observers experienced in shipboard cetacean observation and identification techniques. Two observers searched for cetaceans using 25X "bigeye" binoculars mounted on the ship's flying bridge. The third observer recorded data and maintained a search of the area near the ship using unaided eye or 7X hand-held binoculars. Data were recorded on a laptop computer using a BASIC data acquisition program interfaced with a global positioning system (GPS). Environmental data included measures of sea state, weather, wind, and glare. Cetacean sighting data included species, group-size, presence of calves, bearing from the bow, linear distance from the ship, surface temperature, depth, and behavioral observations.

As required by Research Permit Nos. 738 and 779-1339 issued to the SEFSC by the National Marine Fisheries Service (NMFS), Office of Protected Resources, data on behavioral responses of cetaceans to the survey vessel were recorded. A complete set of these responses can be obtained from the Pascagoula Laboratory.

### **Cetacean Biopsy**

In order to study cetacean stock structure, biopsy samples of skin and blubber were collected from selected species (designated by Permit No. 738) for genetic and contaminant analysis. A modified .22 caliber dart rifle was used for obtaining samples, and each dart was fitted with specially designed heads that extract a small plug of tissue from animals at close range. Samples were collected from animals riding at the bow of the GORDON GUNTER. As required by Permit No. 738, data on each sampling attempt were recorded, including date, time, platform, sampler and recorder name, field number, device, species, location (GPS), number of hits and misses, body location struck, and whether a sample was taken. A complete log can be obtained from the Pascagoula Laboratory.

### **Ichthyoplankton**

All cruise objectives, environmental and ichthyoplankton, were implemented in accordance with procedures outlined in the SEAMAP data collections manual.

A predefined cruise track of one hundred and eighteen stations were targeted for the survey. One hundred and three SEAMAP stations approximately thirty nautical miles apart were targeted during Legs 1 & 2. Primary station operations were to consist of a bongo tow outfitted with a Seabird SBE 19 profiler, a neuston tow, and a Seabird SBE 25 CTD profile.

Cruise objectives associated with the GCRL red drum project were conducted at stations,



in the Mississippi Sound, along a predefined cruise track of fifteen stations approximately eight nautical miles apart. Larval fish samples were taken with the standard MARMAP 60cm bongo outfitted with two 0.335 micron mesh nets. Associated sea temperature profiles were recorded using the SEACAT SBE-19, mounted above the bongo frame.

## RESULTS

Over the course of this survey, ichthyoplankton was collected from 42 stations. 15 GCRL red drum stations (Figure 1), and 27 standard SEAMAP stations (Figure 2). A breakdown of samples collected by Leg of survey and gear is given in Table 1.

TABLE 1. Breakdown of Ichthyoplankton and Environmental Collections  
During GORDON GUNTER Cruise 98-01 (001)

GEAR TYPE	Leg I	Leg II
BONGO:		
SEAMAP:		
LEFT:	13	14
RIGHT:	13	14
GCRL:		
LEFT:	15	0
RIGHT:	15	0
NEUSTON:		
SEAMAP:		
LEFT:	13	11
RIGHT:	13	11
CTD PROFILES:		
SBE 25:	13	15
SBE 19:	28	14

Observed differences between left & right bongo and left & right neuston tows are the result of tow cancellations because of jellyfish smacks in sampling area, lost cod ends during bongo retrieval, weather, and bongo winch level- wind complications during the bongo tow.

Ichthyoplankton larvae collected during the GCRL red drum effort, were deposited with GCRL for sorting and analysis. SEAMAP numbers were assigned to all SEAMAP samples before deposition of left bongos with GCRL. Right bongos and neustons were shipped to ZSIOP Szczecin, Poland for sorting.

A summary of the environmental data collected is also presented in Table 1. Locations of CTD profiles are shown in Figures 1 and 2.

## Cruise synopsis

Weather was the primary factor that hindered completion of cruise objectives and limited the amount of effort accomplished. The Atlantic tropical basin was extremely active this season, producing 10 tropical cyclones between 19 August and 23 September. Four of these, two



tropical storms and two hurricanes, directly interfered with this survey. The result was three unscheduled port calls and 15 complete or partial days spent at the dock (Table 2). For a more detailed account of the cruise and an explanation of deviations from the original cruise plan, see the Appendix.

### Cetacean Visual Survey

During the 6 survey days, 725 transect km were surveyed (Leg 1, 283 km; Leg 2, 442 km) (Table 2). Daily effort ranged up to 11.5 hours/day and 220 km/day and averaged 6.3 hours/day and 121 km/day. In total, 42 cetacean groups were sighted (Leg 1, 26 groups; Leg 2, 16 groups) (Tables 3 & 4, Figures 3 & 4). Two of these groups were off-effort. The highest number of cetacean groups sighted on one day was 11 (Table 2). At least four species were sighted (Table 3). The most commonly sighted species were bottlenose dolphins (26 sightings) and Atlantic spotted dolphins (10 sightings; there were also 3 sightings identified as bottlenose or Atlantic spotted dolphins). During one day of transiting to the Texas coast through deeper water, a *Mesoplodon* sp., a group of *Globicephala* sp., and a group of unidentified dolphins were sighted (Tables 4 & 5).

The largest group recorded on this cruise consisted of 267 Atlantic spotted dolphins. As far as we know, this sighting represents the largest group of Atlantic spotted dolphins sighted in the Gulf of Mexico. Aerial surveys during 1989-1990 resulted in a range of group sizes of 2-137, and GulfCet I and GulfCet II surveys resulted in ranges of 3-55 and 1-85, respectively. This species also had the largest mean group size ( $X = 43.2$ ,  $SE = 25.57$ ). A summary of group size, water depth, and sea surface temperature for each species is presented in Table 5.

Cetaceans were encountered in all areas surveyed (Figures 3 & 4). Bottlenose dolphins and Atlantic spotted dolphins were the only species sighted in continental shelf waters (<100 m). The dominance of these two species along the continental shelf was not surprising and has been well documented by other surveys in the Gulf of Mexico (i.e., GulfCet I & II).

Observations were recorded on the prevalence of bite wounds from cookie-cutter sharks (*Isistius* sp.) on Gulf of Mexico cetaceans. Of all animals observed at close enough range to see the crater wounds or healed scars caused by cookie-cutter sharks, only one animal, a *Mesoplodon* sp., showed evidence of an *Isistius* attack. No bottlenose or Atlantic spotted dolphins observed at close range displayed any cookie-cutter shark wounds. The group of *Globicephala* sp. was not observed at close enough range to make a determination.

Results from behavioral responses of cetaceans to the survey vessel were typical of those from previous surveys. Of 41 groups for which responses were recorded, 15 groups demonstrated no response to the vessel. Of the 26 groups for which a response was observed, 15 groups responded by bow-riding, 7 groups by approaching the ship, and 1 group by fleeing the ship.

### Cetacean Biopsy

One biopsy sample (field number 980914-01) was collected from an Atlantic spotted dolphin during Leg 1. The sample was collected from the bow of the GORDON GUNTER on 14 September at 14:23 (27°51'59N/95°29'09W). The skin and blubber sample was sent to the NMFS Charleston (South Carolina) Laboratory for analysis and storage.

All other data were returned to the NMFS, Mississippi Laboratories for analysis, editing,



comparison, and archiving.

# CHINESE EASTERN TRADITION

Leg 1 (15-17 September 1998)

Name	Title	Organization
Edward K. Kelly	Cooperator	Novia University, FL
Walter Ingram	Cooperator	NMFS, Pascagoula, MS
Kim Williams	Fishery Biologist	FDEP, St. Petersburg, FL
Dennis Dugas	Fishery Biologist II	ICWS, Pascagoula, MS
Alonso Hamilton, Jr.	Chief Scientist	NMFS, Pascagoula, MS

## Manuscript/Photocopy/Map

Michael Newcomer	Fishery Biologist I	ICWS, Pascagoula, MS
Anthony Martinez	Computer Specialist	NMFS, Miami, FL
James Tobias	Fishery Biologist	NMFS, Miami, FL
Carrie Hubbard	Fish and Wildlife Biologist II	NMFS, Pascagoula, MS
Carol Robson	Biologist	ICWS, Pascagoula, MS
Carolyn Burke	Fish and Wildlife Biologist II	NMFS, Pascagoula, MS
Keith Mullin	Fishery Biologist	NMFS, Pascagoula, MS

Leg 2 (18-20 September 1998)

Jung Lee	Cooperator	NMFS, Pascagoula, MS
Jennifer Miller	Fishery Biologist I	ICWS, Pascagoula, MS
Dennis Dugas	Fishery Biologist II	ICWS, Pascagoula, MS
Alonso Hamilton, Jr.	Chief Scientist	NMFS, Pascagoula, MS

## Manuscript/Photocopy/Map

Charlotte Cress	Contractor	NMFS, Pascagoula, MS
Michael Newcomer	Fishery Biologist I	ICWS, Pascagoula, MS
Katherine Mares	Fishery Biologist II	ICWS, Pascagoula, MS
Anthony Martinez	Computer Specialist	NMFS, Miami, FL
Carrie Hubbard	Fish and Wildlife Biologist II	ICWS, Pascagoula, MS
Carolyn Burke	Fish and Wildlife Biologist II	ICWS, Pascagoula, MS
Keith Mullin	Fishery Biologist	NMFS, Pascagoula, MS

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## CRUISE PARTICIPANTS

### Name

### Title

### Organization

Leg 1 (3-17 September 1998)

#### Ichthyoplankton

Alonzo Hamilton, Jr.	Chief Scientist	NMFS, Pascagoula, MS
Denice Drass	Fishery Biologist II	JCWS, Pascagoula, MS
Kim Williams	Fishery Biologist	FDEP, St. Petersburg, FL
Walter Ingram	Cooperator	NMFS, Pascagoula, MS
Edward Keith	Cooperator	Nova University, FL

#### Mammal/Ichthyoplankton

Keith Mullin	Fishery Biologist	NMFS, Pascagoula, MS
Carolyn Burks	Fish and Wildlife Biologist II	JCWS <sup>1</sup> , Pascagoula, MS
Carol Roden	Biologist	NMFS, Pascagoula, MS
Carrie Hubard	Fish and Wildlife Biologist II	JCWS, Pascagoula, MS
James Tobias	Fishery Biologist	NMFS, Miami, FL
Anthony Martinez	Computer Specialist	NMFS, Miami, FL
Michael Newcomer	Fishery Biologist I	JCWS, Pascagoula, MS

Leg 2 (18-30 September 1998)

#### Ichthyoplankton

Alonzo Hamilton, Jr.	Chief Scientist	NMFS, Pascagoula, MS
Denice Drass	Fishery Biologist II	JCWS, Pascagoula, MS
Jennifer Miller	Fishery Biologist I	JCWS, Pascagoula, MS
Jung Lee	Cooperator	NMFS, Pascagoula, MS

#### Mammal/Ichthyoplankton

Keith Mullin	Fishery Biologist	NMFS, Pascagoula, MS
Carolyn Burks	Fish and Wildlife Biologist II	JCWS, Pascagoula, MS
Carrie Hubard	Fish and Wildlife Biologist II	JCWS, Pascagoula, MS
Anthony Martinez	Computer Specialist	NMFS, Miami, FL
Katherine Maze	Fishery Biologist II	JCWS, Pascagoula, MS
Michael Newcomer	Fishery Biologist I	JCWS, Pascagoula, MS
Charlotte Cates	Contractor	NMFS, Pascagoula, MS

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Submitted by:

Alonzo N. Hamilton, Jr.  
Alonzo N. Hamilton, Jr.  
Chief Scientist

Approved by:

Scott Nichols  
Scott Nichols, Director  
Mississippi Laboratories

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



Table 2. Effort, Beaufort sea state, and number of sightings for each day of NOAA Ship GORDON GUNTER Cruise 001, September 1998 (WD = weather day, M = mechanical day).

Leg Date	Effort hours	Transect kilometers	Average Sea State	Number of Sightings
<b>Leg 1</b>				
03 September	WD- Hurricane Earl			
04 September	Departed Pascagoula, MS			
05 September	Transited to the west			
06 September	Transited to the west			
07 September	6.0	115	4.4	8
08 September	WD- Arrived Ingleside, TX; Tropical Storm Frances			
09 September	WD- Ingleside, TX; Tropical Storm Frances			
10 September	WD- Ingleside, TX; Tropical Storm Frances			
11 September	WD- Ingleside, TX; Tropical Storm Frances			
12 September	WD- Ingleside, TX; Tropical Storm Frances			
13 September	3.5	62	2.3	11
14 September	5.5	106	2.4	7
15 September	M— Anchored off Freeport, TX			
16 September	M/WD- Transited towards Pascagoula, MS; Tropical Storm Hermine			
17 September	Scheduled port call between legs; Arrived in Venice, LA			
Total	15.0	283		26
<b>Leg 2</b>				
18 September	Scheduled port call between legs; Venice, LA			
19 September	WD- Venice, LA; Tropical Storm Hermine			
20 September	WD- Venice, LA; Tropical Storm Hermine			
21 September	WD- Departed Venice, LA; Tropical Storm Hermine			
22 September	5.8	113	2.7	8
23 September	5.2	109	2.9	5
24 September	11.5	220	5.0	3
25 September	WD- Transited in safety fairway towards the west; Hurricane Georges			
26 September	WD- Arrived Ingleside, TX; Hurricane Georges			
27 September	WD- Ingleside, TX; Hurricane Georges			
28 September	WD- Ingleside, TX; Hurricane Georges			
29 September	WD- Departed Ingleside, TX; Hurricane Georges			
30 September	Official end of cruise; Transited			
01 October	At anchor while port of Pascagoula closed			
02 October	Returned to Pascagoula, MS			
Total	22.5	442		16
TOTAL	37.5	725		42



Table 3. Number of cetacean sightings for each leg of NOAA Ship GORDON GUNTER  
Cruise 001 conducted in the U.S. Gulf of Mexico, September 1998.

Species	Leg 1	Leg 2	Total
Bottlenose dolphin ( <i>Tursiops truncatus</i> )	17	9	26
Atlantic spotted dolphin ( <i>Stenella frontalis</i> )	8	2	10
Bottlenose dolphin/At. spotted dolphin ( <i>T. truncatus</i> / <i>S. frontalis</i> )	1	2	3
Pilot whale ( <i>Globicephala</i> sp.)	0	1	1
Unidentified Mesoplodon ( <i>Mesoplodon</i> sp.)	0	1	1
Unidentified dolphin	0	1	1
TOTAL	26	16	42

Table 4. Summary of cetacean sightings during NOAA Ship GORDON GUNTER Cruise 001 in the U.S. Gulf of Mexico, September 1998 (S = effort status of sighting, SST = Sea surface temperature).

Date	Species	Group- size	Position	SST(C)	Depth(m)	S
Sep 07	<u>Tursiops truncatus</u>	3	25°59' 96°57'	29.9	24	on
Sep 07	<u>Tursiops truncatus</u>	2	26°14' 96°59'	29.9	24	on
Sep 07	<u>Tursiops truncatus</u>	8	26°16' 97°00'	30.1	24	on
Sep 07	<u>Tursiops truncatus</u>	5	26°29' 96°50'	29.7	35	on
Sep 07	<u>Stenella frontalis</u>	42	26°30' 96°37'	29.6	5	on
Sep 07	<u>Tursiops truncatus</u>	12	26°36' 96°32'	29.6	86	on
Sep 07	<u>Stenella frontalis</u>	5	26°37' 96°32'	29.5	87	on
Sep 07	<u>Tursiops truncatus</u>	7	26°40' 96°33'	29.6	92	on
Sep 13	<u>Tursiops truncatus</u>	6	27°28' 96°52'	29.3	33	on
Sep 13	<u>Tursiops truncatus</u>	8	27°28' 96°49'	29.7	37	on
Sep 13	<u>Tursiops truncatus</u>	16	27°27' 96°46'	29.4	46	on
Sep 13	<u>Tursiops truncatus</u>	3	27°30' 96°41'	29.9	51	on
Sep 13	<u>Tursiops truncatus</u>	10	27°29' 96°39'	29.9	57	on
Sep 13	<u>Stenella frontalis</u>	6	27°28' 96°34'	30.7	60	on
Sep 13	<u>Stenella frontalis</u>	24	27°28' 96°33'	30.0	60	on
Sep 13	<u>Tursiops truncatus</u>	7	27°30' 96°30'	30.4	68	on
Sep 13	<u>Stenella frontalis</u>	16	27°31' 96°30'	30.1	64	on
Sep 13	<u>Tursiops truncatus</u>	5	27°33' 96°29'	29.8	57	on
Sep 13	<u>T. truncatus/S. frontalis</u>	3	27°35' 96°31'	29.6	55	on
Sep 14	<u>Tursiops truncatus</u>	11	27°38' 96°00'	29.2	119	on
Sep 14	<u>Stenella frontalis</u>	4	27°35' 95°59'	29.2	135	off
Sep 14	<u>Stenella frontalis</u>	2	27°36' 95°56'	29.2	145	on
Sep 14	<u>Stenella frontalis</u>	7	27°51' 95°29'	30.8	66	on
Sep 14	<u>Tursiops truncatus</u>	17	27°57' 95°28'	30.1	49	on
Sep 14	<u>Tursiops truncatus</u>	10	28°09' 95°29'	29.8	35	on
Sep 14	<u>Tursiops truncatus</u>	6	28°13' 95°32'	29.8	31	on
Sep 22	<u>Tursiops truncatus</u>	8	29°38' 88°29'	28.3	33	on
Sep 22	<u>T. truncatus/S. frontalis</u>	4	29°40' 88°29'	28.4	29	on
Sep 22	<u>Tursiops truncatus</u>	63	29°42' 88°29'	28.5	24	on
Sep 22	<u>Tursiops truncatus</u>	12	29°49' 88°31'	28.5	24	on
Sep 22	<u>Tursiops truncatus</u>	8	29°57' 88°27'	28.3	24	on
Sep 22	<u>Tursiops truncatus</u>	12	29°57' 88°28'	28.4	20	on
Sep 22	<u>T. truncatus/S. frontalis</u>	7	30°00' 88°30'	28.4	20	off
Sep 22	<u>Tursiops truncatus</u>	30	30°00' 88°28'	28.4	22	on
Sep 23	<u>Tursiops truncatus</u>	2	30°11' 86°30'	28.0	22	on
Sep 23	<u>Tursiops truncatus</u>	8	29°56' 86°39'	28.1	4	on
Sep 23	<u>Stenella frontalis</u>	59	29°58' 86°59'	29.9	55	on
Sep 23	<u>Tursiops truncatus</u>	22	29°58' 87°03'	28.9	59	on
Sep 23	<u>Stenella frontalis</u>	267	29°59' 87°01'	28.9	38	on
Sep 24	<u>Mesoplodon sp.</u>	1	28°46' 88°46'	28.6	1830	on
Sep 24	Unidentified dolphin	Unk	28°40' 88°56'	30.0	860	on
Sep 24	<u>Globicephala sp.</u>	18	28°24' 89°29'	28.9	613	on



Table 5. Number of sightings (n), mean group-size, water depth, and sea surface temperature for cetacean sightings in the U.S. Gulf of Mexico during NOAA Ship GORDON GUNTER Cruise 001, 3-30 September 1998.

Species	n	Group Size (animals)		Water Depth (meters)		Sea Surface Temperature (°C)	
		Mean (SE)	Range	Mean (SE)	Range	Mean (SE)	Range
<i>Tursiops truncatus</i>	26	11.6 (2.40)	2 - 63	42 (5)	4 - 119	29.3 (0.14)	28.0 - 30.4
<i>Stenella frontalis</i>	10	43.2 (25.57)	2 - 267	72 (13)	5 - 144	29.8 (0.20)	28.9 - 30.8
<i>T. truncatus/S. frontalis</i>	3	4.7 (1.20)	3 - 7	35 (10)	20 - 55	28.8 (0.40)	28.4 - 29.6
<i>Globicephala</i> sp.	1	18.0		613		28.9	
<i>Mesoplodon</i> sp.	1	1.0		1829		28.6	
Unidentified dolphin	1	unknown		860		30.0	

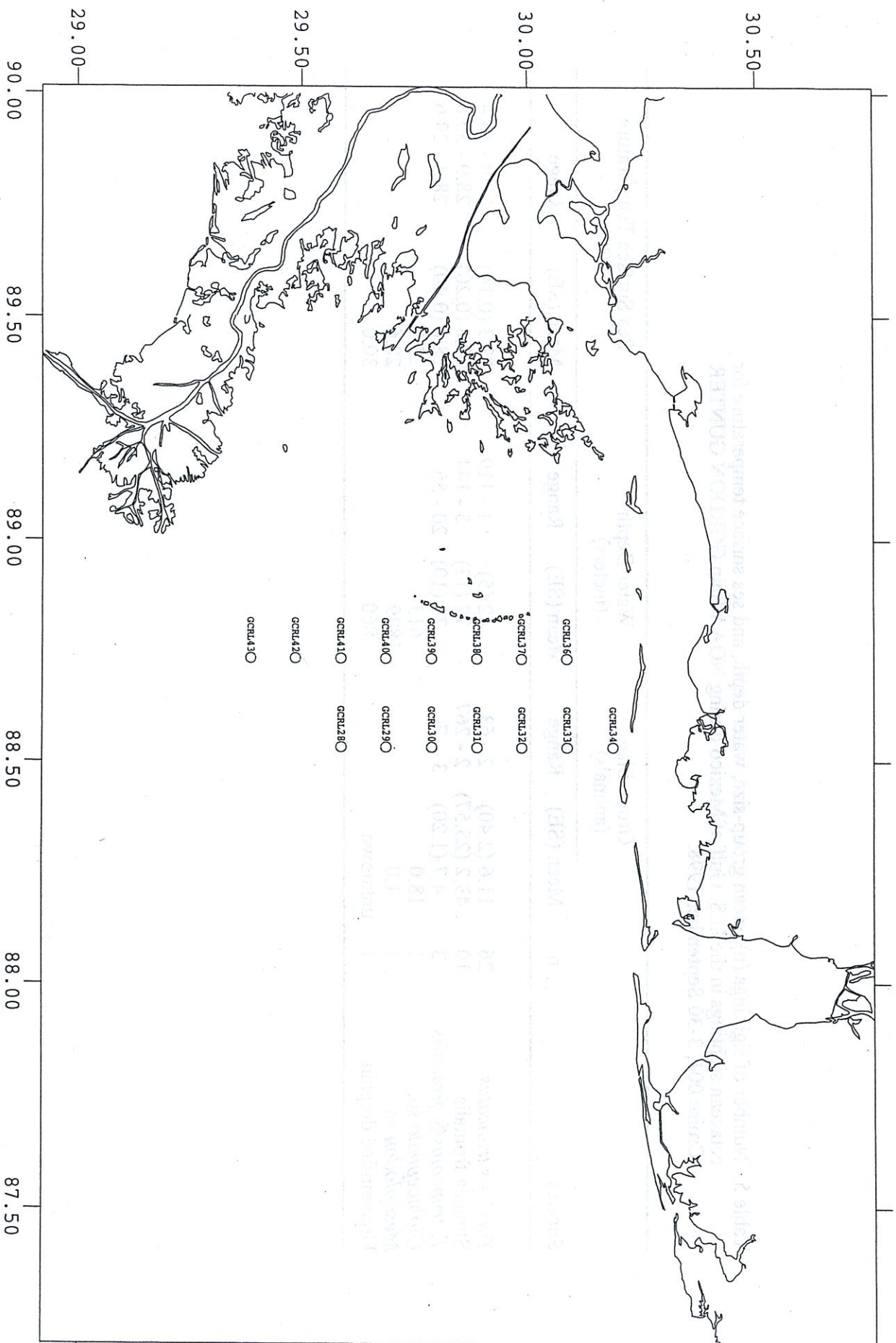


Figure 1. Gulf Coast Research Laboratory (GCRL) ichthyoplankton stations occupied during NOAA Ship Gordon Gunter cruise 9801.



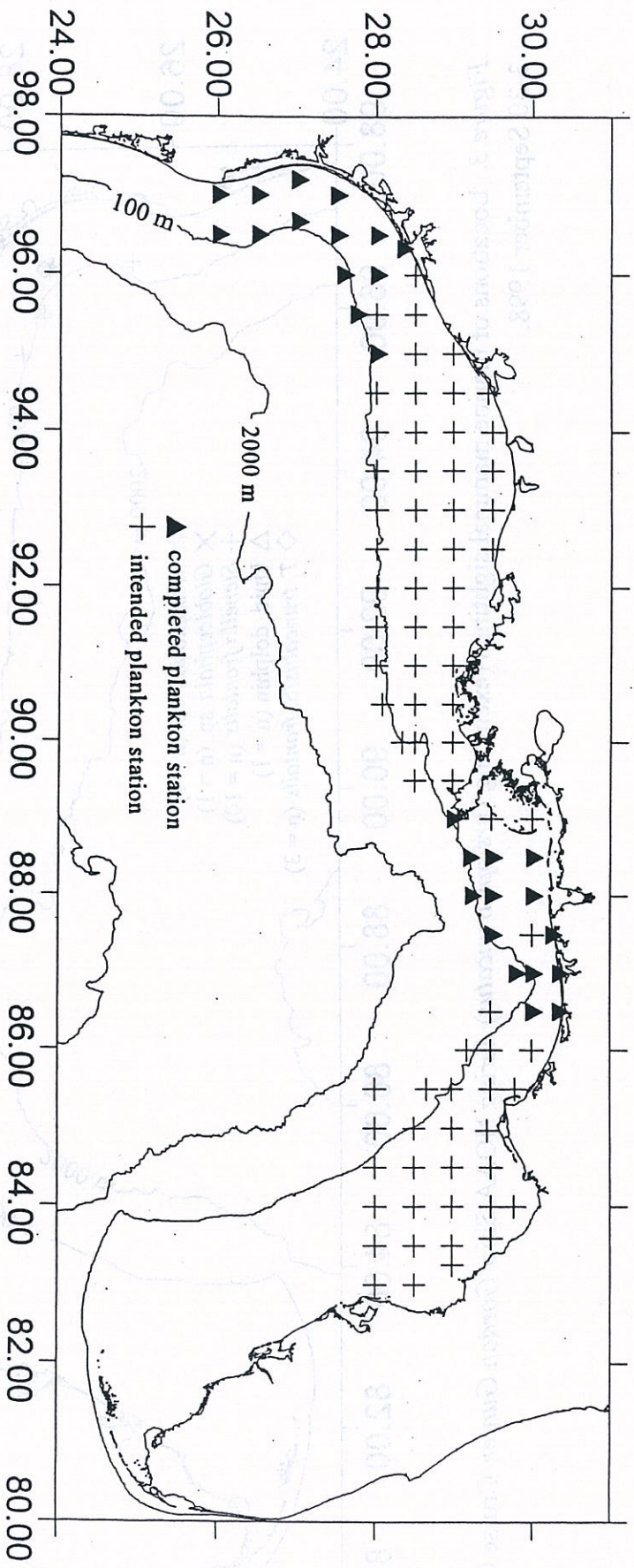


Figure 2. Location of SEAMAP ichthyoplankton/environmental stations (n=103) during Legs 1 and 2 of the NOAA Ship Gordon Gunter Cruise 001, 3-30 September 1998.

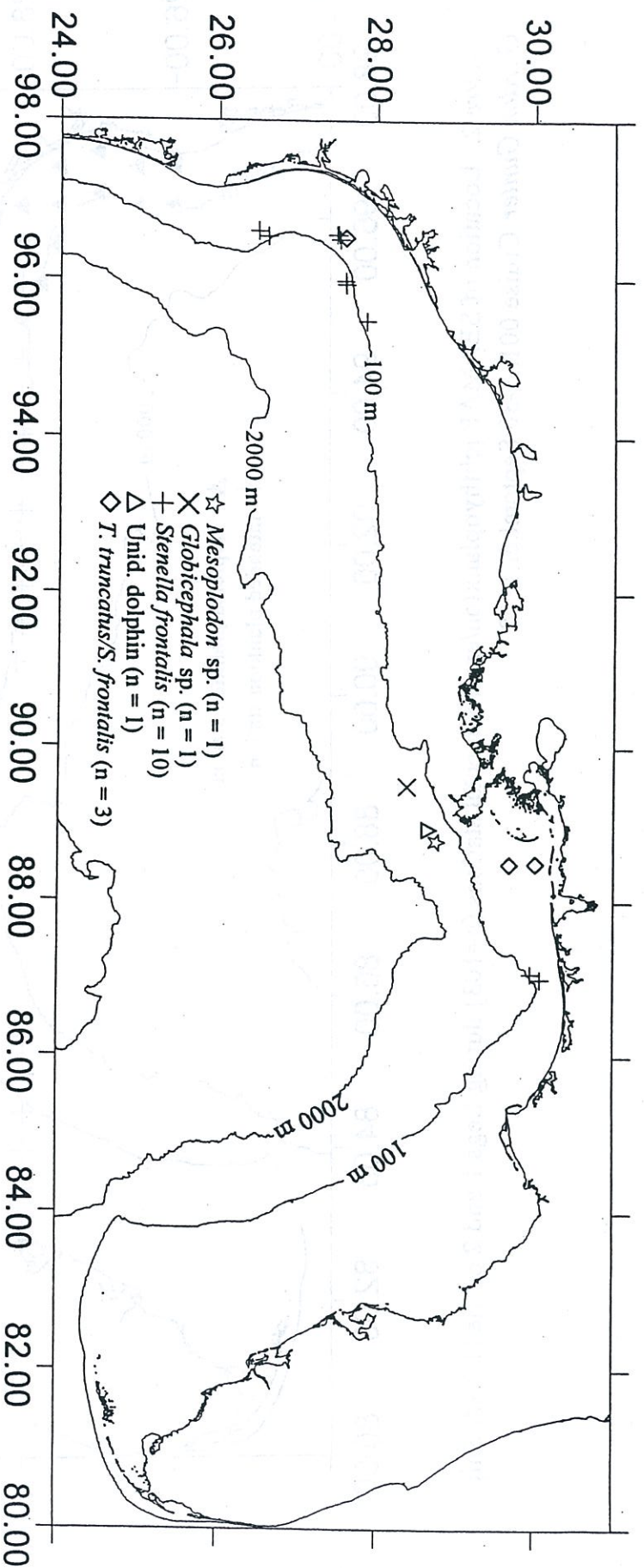


Figure 3. Locations of marine mammal sightings (excluding *Tursiops truncatus*) during NOAA Ship Gordon Gunter Cruise 001, 3-30 September 1998.



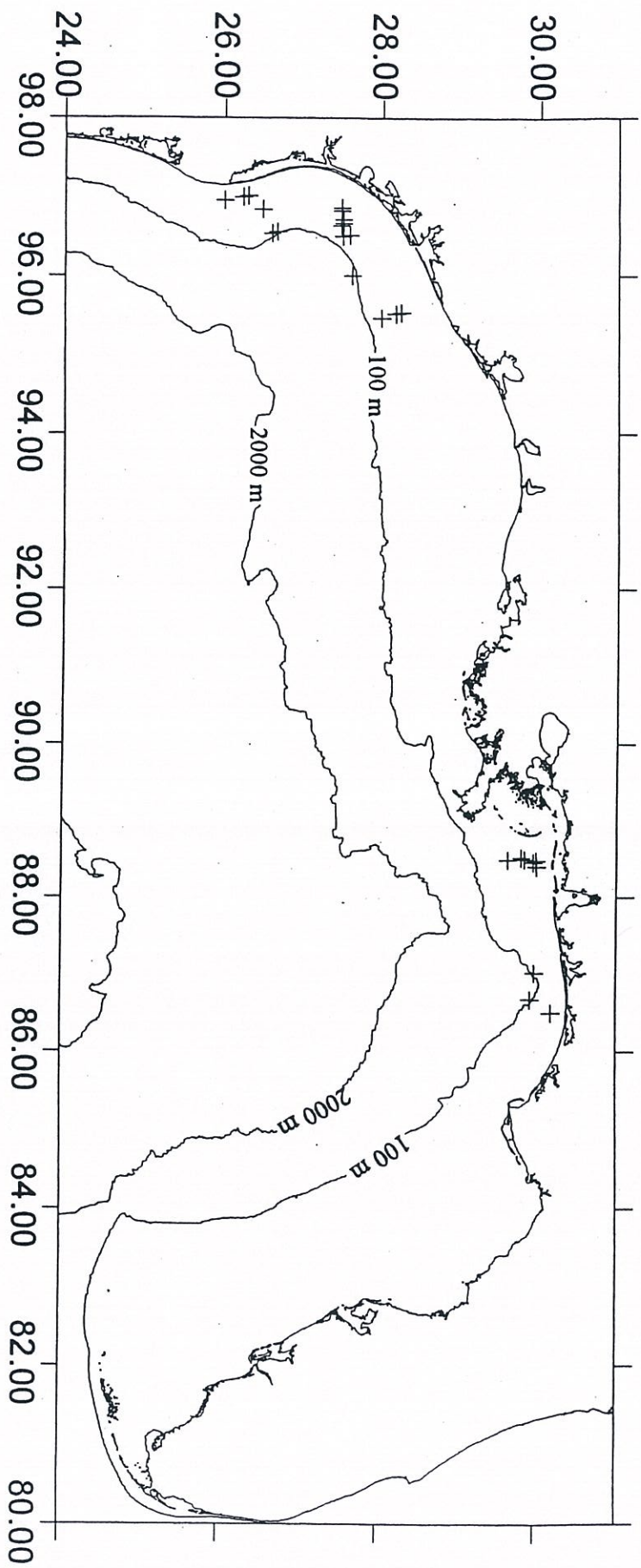


Figure 4. Locations of *Tursiops truncatus* (n = 26) sightings during NOAA Ship Gordon Gunter Cruise 001, 3-30 September 1998.

