U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
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OREGON II CRUISE 96-02 (220)
4/16-6/9/96

INTRODUCTION

The NOAA Ship OREGON II departed Pascagoula, MS on April 17, 1996 to conduct the SEAMAP spring bluefin tuna ichthyoplankton/ marine mammal survey. Ninety-four stations along a predefined cruise track were targeted for sampling on each of two legs. Standard SEAMAP operations were implemented at 91 sampling sites during Leg 1, April 17 - May 4 and 80 sites during Leg 2, May 7-26. Leg 3 (May 28 - June 9) of the cruise consisted of marine mammal operations only.

OBJECTIVES

1. Collect ichthyoplankton with 60cm bongos and double neuston gear for abundance and distribution of eggs, larvae and small juveniles of bluefin tuna.

2. Collect water samples from surface, mid-depth and maximum depth for dissolved oxygen and salinity reference determinations.

3. Collect vertical profile measures of environmental parameters using the CTD.

4. Collect chlorophyll samples from surface waters.

5. Collect line-transect data to estimate abundances and define the distributions of cetaceans in oceanic and selected 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 from selected cetacean species for genetic analysis in order to study the stock structure of Gulf of Mexico cetaceans.

8. Collect data on the distribution and abundance of seabirds and other marine life.

9. Collect data on species identity, distribution and abundance, and stock structure of flyingfish.

OPERATIONAL PLAN

Cruise operations commenced off the Alabama-NW Florida shelf. A total of 188 stations, approximately 30 nautical miles apart, were planned for completion in accordance with standard SEAMAP ichthyoplankton protocols during Legs 1 and 2. The marine mammal operational plan over the course of this survey is outlined as follows:

Marine Mammal Survey

The OREGON II has been used extensively since 1990 for cetacean surveys in the Gulf of Mexico. 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 maintained a search of the area near the ship using unaided eye or 7X hand-held binoculars, and recorded data. Data were recorded on a laptop computer using a BASIC data acquisition program interfaced with a Global Positioning System (GPS). Data collected on the survey environment 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.

Legs 1 and 2 were conducted in conjunction with the SEAMAP ichthyoplankton sampling. Line-transect sampling was conducted while traveling between stations during daylight hours (Figures 2 & 4). Leg 3 was a dedicated cetacean survey that focused on the northeastern Gulf continental slope (100-2000 m) and shelf waters (Figure 6).

As required by Marine Mammal Research Permit No. 738 issued to the Southeast Fisheries Science Center under Marine Mammal Protection Act guidelines, data on the behavioral responses of cetaceans to the survey vessel were recorded. A complete set of these responses can be obtained from the Pascagoula Laboratory. Results were very typical of those from previous surveys. Some species (dwarf/pygmy sperm whales and all Ziphiids are very intolerant of the vessel and usually dove, while others regularly came to the bow to ride the pressure wave (bottlenose dolphins and most Stenella spp.). Some displayed a mixed response that ranged from bow-riding to mild to strong avoidance behavior ("blackfish," Risso's dolphin, and striped dolphins).

Cetacean Biopsy

Biopsy samples of skin and blubber were collected from selected cetacean species (designated by Permit No. 738) for genetic and contaminant analyses. A pole-spear, cross-bow and modified rifle were used for obtaining samples and each was fitted with specially designed heads that extract a small plug of tissue from animals at close range. Samples were collected from bow-riding animals at the bow of the OREGON II and from a small boat. Because of the additional staffing requirements of biopsy sampling, almost all of the effort was confined to Leg 3 when additional staff could be accommodated. As required by Permit No. 738, data on each sampling attempt were recorded and included 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 National Marine Fisheries Service, Pascagoula Laboratory.

Birds

Data on seabirds and non-passerines encountered by observers while searching for cetaceans were recorded. Species were identified to the lowest taxonomic level possible and flock-size enumerated. While observers had a wide range of experience in identifying birds, searching for cetaceans was the primary objective and most observers could not quickly identify bird sightings to species except under the best circumstances. Passerine neotropical migrants, which can be numerous in the Gulf during spring, were not recorded.

Flyingfish

As part of a taxonomic revision of the flyingfishes (family Exocoetidae), flyingfish specimens were opportunistically collected with a dipnet during a standardized one-hour sampling period each night when the ship was stopped for environmental sampling (Leg 1 & 2) or for the night (Leg 3).

Environmental

A continuous flow thermo-salinograph and fluorometer recorded the surface temperature, salinity and fluorescence 24 hr/day and data were downloaded to data file every 60 seconds during all three legs. For Leg 3, CTD casts to 500 m or maximum depth were made at the beginning and end of each transect line. For the longer transect lines, CTD casts were made at the one-third and two-thirds points of the line distance, and for the shorter lines, in the middle of the line. Water samples were taken once per day at the surface, mid-depth and maximum depth for chlorophyll and salinity calibration. XBTs were deployed every 18.5 km (10 NM) beginning at

and seaward of the 100 m isobath. Three CTD casts were made to 850 m in the western, central, and eastern part of the survey area, so that CTD salinity could be splined to XBT temperature profiles.

RESULTS

SEAMAP Ichthyoplankton

Leg 1 (4/16 - 5/4)

During Leg 1, stations 04001 - 04091, a 60cm bongo was taken at whole degree positions and double neuston samples were taken at all planned positions along with the associated environmental and hydrographic data. In response to a marine mammal request, the N - S transects along 090, 091, 092, 093, 094, 095, and 096 west longitude, were reduced by 30 miles each in an effort to insure track completion for ichthyoplankton and track diversion time for marine mammal observations. The ichthyoplankton stations were completed preserving the overall clockwise pattern. Weather forced the cancellation of three stations as shown in Figures 1 and 7.

Leg 2 (5/7 - 5/26)

Cruise operations were executed with the operational and station protocols outlined for the survey. Constant problems with the CTD, its cable, and its winch, resulted in the completion of eighty of the 94 pre-selected stations, 04092 - 04172 (Figures 3 and 8). Stations sampled during the month of May, were designated for sorting as priority samples, for bluefin tuna larvae and juveniles. A composite of the coverage effort for Legs 1 and 2 is shown in Figure 5.

Environmental and Deposition of Samples

Locations and numbers of CTD and XBT stations for all three legs of the cruise are shown in Figures 7-9. A summary of SEAMAP sampling effort during OREGON II cruise 96-02 (220) is presented in Tables 1 and 2. After the assignment of SEAMAP numbers to SEAMAP samples, left bongos were deposited with Mr. Ken Stuck at Gulf Coast Research Lab, for processing, analysis and storage. Left neuston samples were prepared for shipment to Dr. Stephen Turner at NMFS Miami, for sorting. The right bongo and neuston SEAMAP samples were prioritized and shipped to SZIOP, Szczecin, Poland for sorting. Data from the CTD profiles, chlorophyll samples, and all remaining data were returned to NMFS Mississippi Laboratories for analysis, comparison and archiving.

Marine Mammal

During the 44 survey days, 6401 transect kilometers were surveyed (Leg 1, 2580; Leg 2, 2428; & Leg 3, 1393 km) (Table 3, Figures 2, 4 & 6). Daily effort ranged up to 10.8 hours/day and 207 km/day and averaged 145 km/survey day. Mechanical problems with the ship eliminated effort on one day during Leg 2 and delayed the departure of Leg 3 by one day. Poor weather eliminated effort on one day during Leg 3.

During the entire cruise, 263 cetacean groups were sighted (Leg 1, 52; Leg 2, 125; & Leg 3, 86 groups) with 235 and 28 groups classified as on- and off-effort sightings, respectively. At least one group was sighted each survey day with a maximum of 29 sightings on one day (Table 4). At least 16 species were sighted. The most commonly sighted species were pantropical spotted dolphins (56 sightings), bottlenose dolphins (40), Risso's dolphin (31), sperm whales (24), and Atlantic spotted dolphins (21) and these five species comprised about 65% of the identified sightings (Table 5).

The largest group sizes for Gulf of Mexico cetaceans encountered to date were sighted during this cruise and consisted of an estimated 750 spinner dolphins and 650 pantropical spotted dolphins in separate sightings. Eight spinner dolphin groups averaged 355 dolphins and other Stenella spp. averaged about 20-90 dolphins/group. Groups-sizes of other species were more typical of previous years (Tables 5 & 6). Groups of sperm whales, Kogidae, and Ziphiidae generally contained fewer than five animals; and Risso's dolphins and bottlenose dolphins groups averaged 8.6 and 15.4, respectively. A summary of group-size, water depth and sea surface temperature from each sighting is provided in Table 5. Associations between cetacean species included Risso's dolphin and bottlenose dolphin, Atlantic spotted dolphin and bottlenose dolphin (twice), and Risso's dolphin and pantropical spotted dolphin (Table 6).

Cetaceans were encountered in all areas of the Gulf of Mexico surveyed (Figures 2, 4 and 6). Sighting were more common in some areas than other (e.g., near the Mississippi River delta), but in some cases, this may reflect sighting conditions rather than true cetacean distribution. Bottlenose dolphins and Atlantic spotted dolphins were the only species sighted in continental shelf waters (e.g., Destin Dome lease area) and were sighted at maximum depths of 702 and 222 m, respectively (Tables 5 & 6).

Pantropical spotted dolphin sightings were widely distributed in deep waters that averaged just over 1800 m. All of the Ziphiid sightings were in waters over 1000 m. All (4 sightings) of the "blackfish" (Globicephalinae) were sighted west of the Mississippi River delta. The two Bryde's whale sightings and the unidentified

Balaenopterid whale sighting occurred on the upper continental slope in the northeastern Gulf. All of the spinner dolphin sightings were east of the Mississippi River delta and all of the Clymene dolphins west of the delta.

Preliminary observations were recorded on the prevalence of bite wounds from cookie-cutter sharks (Isistius sp.) on Gulf of Mexico cetaceans. As indicated by the presence of crater wounds or healed scars, a minimum of 66 (30.2%) of 218 groups of identified cetaceans contained at least one animal that showed evidence of Isistius attacks, including at least 15 of the 16 species recorded during the cruise.

On Leg 3, equipment to obtain recordings of cetacean vocalizations was temporarily installed on the ship (eight sonobuoys, a receiver, tape recorder and antenna). Sonobuoys were deployed among separate groups of bottlenose dolphins and Atlantic spotted dolphins but technical problems prevented any recordings from being made. Because the problems could not be resolved, only four sonobuoys were deployed.

Cetacean Biopsy

Forty-nine biopsy samples were collected (Leg 1, 2; Leg 2, 0; & Leg 3, 47 samples) from six species which include bottlenose dolphin (21 samples), Atlantic spotted dolphin (14), pantropical spotted dolphin (6), spinner dolphin (5), Risso's dolphin (2) and striped dolphin (1). Most (38/49) samples were collected from the bow of the OREGON II and the rest (11/49) from a small boat. All skin and blubber samples were sent to the NMFS Charleston (South Carolina) Laboratory for storage and analyses.

A single skin biopsy sample from a whale shark (Rhiniodon typus) was also obtained during the cruise; the specimen was sent to Dr. Scott Eckert, Hubbs Sea World, San Diego, California, and will be used in conjunction with a worldwide molecular genetic analysis of the species.

Birds

Over 2250 bird flocks and 28 species were recorded (Table 7). Unidentified storm petrel flocks were recorded most often and made up 509 (23%) of the sightings. Identified storm petrel species consisted of Madeiran (band-rumped) (47 sightings), Wilson's (14) and Leach's (2). Unidentified terns made up the next largest category with 219 flock sightings. Identified terns included sooty (139), black (95), bridled/sooty (62) and sandwich (61). There were 195 egret flocks sighted. Most of these were probably cattle egrets (Bubulcus ibis). Laughing gulls (238 flocks) and Audubon's shearwater (137) were common seabirds. Flock-sizes were generally small (means <10) but flocks containing up to 200 birds were recorded.

Flyingfish

A total of 34 one-hour dipnet stations were sampled and 243 flyingfish specimens comprising 10 species of five genera were collected. All specimens will be donated to the fish collection at the Los Angeles County Museum of Natural History.

CRUISE PARTICIPANTS

Leg 1 (4/16-5/4)

Alonzo N. Hamilton, Jr.	Field Party Chief	NMFS Pascagoula, MS
Denice Drass	Fishery Biologist	NMFS Pascagoula, MS
Robert Ford	Fishery Biologist	NMFS Pascagoula, MS
Carol Roden	Mammals Cruise Leader	NMFS Pascagoula, MS
Jon Peterson	Biologist 1	JCWS Pascagoula, MS[1]
Carolyn Rogers	Biologist 1	JCWS Pascagoula, MS
Anthony Martinez	Computer Specialist	NMFS Miami, FL
James Tobias	Fishery Biologist	NMFS Miami, FL
Inta Berzins	Secretary	NMFS Miami, FL
Bob Pitman	I.D. Specialist	NMFS La Jolla, CA
Todd Pusser	Cooperator	NMFS Pascagoula, MS

Leg 2 (5/7 - 26)

Alonzo N. Hamilton, Jr.	Field Party Chief	NMFS Pascagoula, MS
Robert Ford	Fishery Biologist	NMFS Pascagoula, MS
Carol Roden	Mammals Cruise Leader	NMFS Pascagoula, MS
Carolyn Rogers	Biologist 1	JCWS Pascagoula, MS
Jack Javech	Illustrator	NMFS Miami, FL
Anthony Martinez	Computer Specialist	NMFS Miami, FL
James Tobias	Fishery Biologist	NMFS Miami, FL
Cynthia Brown	Fishery Biologist	NMFS Miami, FL
Blair Maise	Cooperator	NMFS Miami, FL
Todd Pusser	Cooperator	NMFS Pascagoula, MS
Bob Pitman	Fishery Biologist	NMFS La Jolla, CA

Leg 3 (5/28-6/9)

Keith Mullin	Field Party Chief	NMFS, Pascagoula, MS
Carol Roden	Biologist	NMFS, Pascagoula, MS
Wayne Hoggard	Fishery Biologist	NMFS, Pascagoula, MS
Jon Peterson	Biologist 1	JCWS, Pascagoula, MS
Carolyn Rogers	Biologist 1	JCWS, Pascagoula, MS
Robert Pitman	Fishery Biologist	NMFS, La Jolla, CA

[1] Johnson Controls World Services

CRUISE PARTICIPANTS - Leg 3 (Continued)

Carrie Hubbard	Contract Observer	University of Alabama
Sarah Stienessen	Cooperator	Texas A&M Univ. at Galveston
Spencer Lynn	Cooperator	Texas A&M Univ. at Galveston
Shannon Hesse	Cooperator	SE Missouri State University
Dagmar Ferti	NBS/MMS Observer	MMS, New Orleans, LA

Submitted by:

Alonzo N. Hamilton, Jr.
Field Party Chief

Approved by:

Scott Nichols, Director,
Mississippi Laboratories

Bradford E. Brown, Director
Southeast Science & Research Center

Table 1. Summary of ichthyoplankton effort.

SAMPLE TYPE	NUMBER OF SAMPLES	
	LEG 1	LEG 2
BONGOS:		
SEAMAP LEFT	43	38
SEAMAP RIGHT	43	38
NEUSTONS:		
SEAMAP LEFT	91	81
SEAMAP RIGHT	91	81
TOTALS	268	238

Table 2. Summary of environmental samples.

GEAR TYPE	NUMBER OF SAMPLES		
	LEG 1	LEG 2	LEG 3
CHLOROPHYLL	17	8	8
SALINITY*			
(Reference)			
surface	16	9	8
middepth	14	5	8
maximum depth	15	8	8
XBT	4	23	65
HYDROCASTS	16	9	0
CTD PROFILES		(63)	
SBE 25	83	57	26
SBE 19	0	25**	0

* Represents reference samples for CTD calibration.
** Most were conducted in tandem with the SBE 25 as a redundant measure.

Table 3. Effort, Beaufort sea state and number of sightings for each day of NOAA Ship OREGON II Cruise 220, April-June 1996.

Leg Date	Effort hours	Transect kilometers	Average Sea State	Number of Sightings
Leg 1				
16 Apr	Depart Pascagoula			
17 Apr	6.8	117	2.4	2
18 Apr	6.8	108	4.2	2
19 Apr	8.7	166	4.3	2
20 Apr	8.1	155	4.7	1
21 Apr	9.1	183	4.4	2
22 Apr	9.6	160	4.4	4
23 Apr	7.5	126	3.0	4
24 Apr	3.3	69	4.3	1
25 Apr	8.1	149	3.6	12
26 Apr	7.8	168	3.3	2
27 Apr	8.7	168	2.8	4
28 Apr	8.3	174	5.1	2
29 Apr	3.9	75	2.3	1
30 Apr	5.5	117	2.8	2
01 May	9.2	174	4.7	3
02 May	10.8	197	4.6	3
03 May	9.6	193	3.3	2
04 May	3.4	81	2.0	3
	Arrive Pascagoula			
Total		2580		52
Leg 2				
07 May	Depart Pascagoula			
08 May	7.1	134	3.0	5
09 May	9.0	168	4.7	3
10 May	8.6	151	5.4	3
11 May	Key West for repairs			
12 May	6.8	170	2.3	5
13 May	7.7	139	2.1	5
14 May	7.8	151	5.0	2
15 May	3.6	71	5.6	2
16 May	9.7	158	4.5	4
17 May	7.7	150	2.8	8
18 May	8.6	170	2.3	11
19 May	7.4	142	3.4	7
20 May	8.4	165	3.0	8

continued

Table 3. (Continued)

Leg Date	Effort hours	Transect kilometers	Average Sea State	Number of Sightings
21 May	6.7	124	2.8	7
22 May	5.8	104	1.0	29
23 May	6.4	114	3.3	9
24 May	6.1	115	5.0	1
25 May	9.6	202	3.1	16
26 May	Arrive Pascagoula			
Total		2428		125
Leg 3				
28 May	Delay for repairs			
29 May	2.2	54	5.1	1
	Depart Pascagoula			
30 May	10.1	207	3.8	7
31 May	8.7	171	2.7	6
01 Jun	0	0	>6.0	1
02 Jun	10.8	193	3.9	2
03 Jun	8.6	164	2.1	8
04 Jun	7.1	138	1.8	19
05 Jun	6.0	111	1.2	23
06 Jun	8.4	160	2.9	11
07 Jun	6.3	116	3.2	7
08 Jun	4.4	79	4.1	1
09 Jun	Arrive Pascagoula			
Total		1393		86
TOTAL		6401		263

Table 4. Number of sightings of cetacean species during each leg of NOAA Ship OREGON II Cruise 220 conducted in the U.S. Gulf of Mexico, April-June 1996.

Species	Leg 1	Leg 2	Leg 3	Total
Bryde's whale (*Balaenoptera edeni*)	0	1	1	2
Unid. balaenopterid whale (*Balaenoptera* sp.)	0	0	1	1
Sperm whale (*Physeter macrocephalus*)	8	14	2	24
Pygmy sperm whale (*Kogia breviceps*)	0	3	1	4
Dwarf sperm whale (*Kogia simus*)	1	3	0	4
Dwarf/pygmy sperm whale (*Kogia* sp.)	0	2	6	8
Cuvier's beaked whale (*Ziphius cavirostris*)	0	2	0	2
Unid. mesoplodon (*Mesoplodon* sp.)	1	4	0	5
Unidentified ziphiid (*Z. cavirostris*/*Mesoplodon*)	1	2	0	3
Striped dolphin (*Stenella coeruleoalba*)	1	0	2	3
Spinner dolphin (*Stenella longirostris*)	2	1	3	6
Clymene dolphin (*Stenella clymene*)	5	3	0	8
Pantropical spotted dolphin (*Stenella attenuata*)	11	30	15	56
Atlantic spotted dolphin (*Stenella frontalis*)	2	7	12	21

continued

Table 4. (Continued)

Species	Leg 1	Leg 2	Leg 3	Total
Unidentified stenellid (*Stenella* sp.)	0	2	0	2
Bottlenose dolphin (*Tursiops truncatus*)	8	14	18	40
Bottlenose/At. spotted dolphin (*T. truncatus*/*S. frontalis*)	0	3	7	10
Risso's dolphin (*Grampus griseus*)	5	16	10	31
Killer whale (*Orcinus orca*)	0	1	0	1
Pilot whale (*Globicephala* sp.)	0	2	0	2
Melon-headed whale (*Peponocephala electra*)	0	1	0	1
Unidentified dolphin	5	12	8	25
Unidentified small whale	1	2	2	5
Unidentified large whale	1	0	0	1
Unidentified odontocete	1	2	0	3
TOTAL	53	127	88	268

Table 5. Number of sightings (n) and mean group-size, water depth and sea surface temperature of species of cetaceans in the U.S. Gulf of Mexico sighted during NOAA Ship OREGON II Cruise 220, April-June 1996.

Species	n	Group Size (animals)		Water Depth (meters)		Sea Surface Temperature (°C)	
		Mean(SE)	Range	Mean(SE)	Range	Mean(SE)	Range
alaenoptera edeni	2	3.0(1.00)	2- 4	210(5)	206- 215	25.5(2.50)	23.0-28.0
alaenoptera sp.	1	1.0		215		28.0	
yseter macrocephalus	24	1.9(0.25)	1- 5	1850(227)	547-3428	25.4(0.43)	22.3-27.8
ogia breviceps	4	1.3(0.25)	1- 2	1237(285)	384-1544	27.4(0.13)	27.0-27.6
ogia simus	4	4.0(0.82)	2- 6	697(112)	458- 888	26.9(1.34)	22.9-28.4
ogia sp.	8	1.8(0.53)	1- 5	663(142)	411-1538	27.3(0.27)	26.3-28.7
iphius cavirostris	2	2.5(1.50)	1- 4	1393(182)	1212-1575	26.3(0.05)	26.3-26.4
esoplodon sp.	5	1.4(0.24)	1- 2	1612(284)	1019-2594	26.4(0.92)	23.3-28.6
. cavirostris/Mesoplodon	3	1.3(0.33)	1- 2	2193(220)	1797-2557	25.5(1.23)	23.1-27.2
tenella coeruleoalba	3	43.7(18.35)	21- 80	715(301)	410-1316	26.3(0.89)	24.6-27.6
tenella longirostris	6	355.3(112.2)	32-750	481(56)	356- 731	25.6(0.98)	22.4-28.1
tenella clymene	8	77.0(13.55)	15-150	1926(240)	1130-3057	24.4(0.53)	22.1-26.4
tenella attenuata	56	91.6(13.44)	5-650	1808(127)	463-3372	26.2(0.23)	21.9-28.8
tenella frontalis	21	19.9(3.41)	4- 70	107(16)	22- 222	26.6(0.31)	22.3-28.3
tenella cly/longir/coerul	1	2.0		428		24.6	
ursiops truncatus	40	15.4(4.52)	1-172	212(26)	30- 702	25.6(0.36)	19.4-28.3
. truncatus/S. frontalis	10	2.5(0.52)	1- 5	128(68)	22- 719	26.6 (0.27)	25.1-28.4
rampus griseus	31	8.6(1.02)	2- 24	1133(191)	111-3437	26.3(0.39)	20.4-27.9
rcinus orca	1	4.0		1946		26.6	
lobicephala sp.	2	31.0(4.00)	27- 35	724(164)	560- 888	27.4(1.05)	26.3-28.4
eponocephala electra	1	125.0		1038		26.9	
Unidentified dolphin	25	2.9(0.62)	1- 15	924(212)	50-3187	26.3(0.37)	21.6-28.4
Unidentified small whale	5	1.4(0.40)	1- 3	1049(561)	124-3196	26.4(1.11)	22.0-28.1
Unidentified large whale	2	1.0(0.00)	1- 1	2001(1260)	741-3261	25.3(2.30)	23.0-27.6
Unidentified odontocete	3	1.3(0.33)	1- 2	883(339)	406-1538	25.3(1.99)	21.3-27.4

Table 6. Summary of cetacean sightings during NOAA Ship OREGON II Cruise 220 in the U.S. Gulf of Mexico, April-June 1996 (S = effort status of sighting).

Leg Date	Species	Group size	Position	SST °C	Depth (m)	S
LEG I						
1996 Apr 17	Tursiops truncatus	3	29°32′ 86°32′	19.4	156	on
1996 Apr 17	Tursiops truncatus	7	29°25′ 86°25′	19.7	220	on
1996 Apr 18	Stenella longirostris	750	27°33′ 85°00′	23.0	520	on
1996 Apr 18	Stenella longirostris	500	27°13′ 85°00′	22.4	439	on
1996 Apr 19	Stenella frontalis	11	25°15′ 84°00′	24.1	128	on
1996 Apr 19	Tursiops truncatus	8	25°08′ 84°00′	23.8	132	on
1996 Apr 20	Stenella attenuata	5	25°00′ 85°10′	25.9	3331	on
1996 Apr 21	Stenella attenuata	18	27°27′ 86°00′	22.2	3239	on
1996 Apr 21	Stenella attenuata	21	27°46′ 86°00′	21.9	3020	on
1996 Apr 22	Unidentified odontocete	1	29°00′ 86°32′	21.3	401	on
1996 Apr 22	Grampus griseus	2	29°00′ 86°45′	20.4	512	on
1996 Apr 22	Stenella attenuata	125	28°59′ 86°59′	22.6	695	off
1996 Apr 22	Unidentified large whale	1	28°39′ 87°00′	23.0	732	on
1996 Apr 23	Unidentified dolphin	1	26°03′ 87°23′	24.2	3148	on
1996 Apr 23	Stenella attenuata	150	26°00′ 87°35′	23.7	3148	on
1996 Apr 23	Stenella attenuata	125	26°00′ 87°52′	24.8	3111	on
1996 Apr 23	Stenella clymene	78	26°00′ 87°57′	24.8	3020	on
1996 Apr 24	Unidentified Ziphiidae	1	28°07′ 87°59′	23.1	2525	on
1996 Apr 25	Unidentified dolphin	1	28°59′ 88°32′	21.6	494	on
1996 Apr 25	Grampus griseus	8	29°00′ 88°36′	21.5	357	on
1996 Apr 25	Tursiops truncatus	8	28°53′ 89°00′	21.4	117	on
1996 Apr 25	Grampus griseus	3	28°45′ 89°00′	21.8	522	on
1996 Apr 25	Grampus griseus	3	28°42′ 89°00′	21.9	622	on
1996 Apr 25	Physeter macrocephalus	1	28°36′ 88°59′	22.3	805	on
1996 Apr 25	Physeter macrocephalus	1	28°31′ 88°59′	22.3	805	on
1996 Apr 25	Physeter macrocephalus	1	28°30′ 88°59′	22.3	805	on
1996 Apr 25	Physeter macrocephalus	1	28°26′ 88°59′	22.5	1007	on
1996 Apr 25	Physeter macrocephalus	4	28°24′ 88°59′	22.3	1105	on
1996 Apr 25	Physeter macrocephalus	2	28°20′ 88°59′	22.3	1157	on
1996 Apr 25	Physeter macrocephalus	1	28°19′ 88°59′	22.3	1157	on
1996 Apr 26	Stenella attenuata	80	25°59′ 89°04′	24.6	3111	on
1996 Apr 26	Physeter macrocephalus	1	26°00′ 89°52′	25.2	2928	on
1996 Apr 27	Stenella attenuata	75	27°30′ 90°30′	24.4	1007	on
1996 Apr 27	Unidentified dolphin	1	27°30′ 90°42′	24.6	1007	on
1996 Apr 27	Stenella coeruleoalba	80	27°30′ 90°50′	24.6	1299	on
1996 Apr 27	Stenella clymene	68	27°31′ 90°56′	23.9	1116	on
1996 Apr 28	Unidentified dolphin	2	26°04′ 92°00′	24.0	2150	on
1996 Apr 28	Stenella clymene	100	26°50′ 91°59′	24.2	1885	on
1996 Apr 29	Stenella clymene	75	26°16′ 92°59′	22.9	1885	on
1996 Apr 30	Stenella attenuata	50	27°23′ 95°00′	22.1	1116	on
1996 Apr 30	Stenella clymene	150	27°19′ 94°59′	22.1	1136	on
1996 May 01	Mesoplodon sp.	2	25°59′ 95°09′	23.3	1830	on
1996 May 01	Stenella attenuata	45	26°01′ 95°58′	22.4	1025	on
1996 May 01	Unidentified small whale	3	26°34′ 95°59′	22.0	1098	on
1996 May 02	Tursiops truncatus	12	27°59′ 95°00′	22.1	90	on
1996 May 02	Tursiops truncatus	7	27°59′ 94°35′	22.3	68	on
1996 May 02	Stenella frontalis	40	27°59′ 94°33′	22.3	66	on

continued

Table 6. (Continued)

Leg Date	Species	Group size	Position	SST °C	Depth (m)	S
1996 May 03	Grampus griseus	3	28°00′ 92°35′	22.3	110	on
	Tursiops truncatus	2				
1996 May 03	Unidentified dolphin	2	27°59′ 92°01′	22.4	110	on
1996 May 04	Stenella attenuata	40	28°18′ 89°19′	22.7	824	on
1996 May 04	Kogia simus	4	28°29′ 89°09′	22.9	549	on
1996 May 04	Tursiops truncatus	4	28°39′ 89°02′	23.1	694	off
LEG 2						
1996 May 08	Tursiops truncatus	1	29°22′ 86°21′	23.2	231	on
1996 May 08	Tursiops truncatus	2	28°53′ 85°54′	23.1	243	on
1996 May 08	Unidentified dolphin	4	28°46′ 85°47′	23.5	210	on
1996 May 08	Stenella frontalis	10	28°37′ 85°37′	24.4	207	on
1996 May 08	Balaenoptera edeni	2	28°29′ 85°29′	23.0	203	off
1996 May 09	Stenella attenuata	220	26°24′ 84°59′	25.4	3289	on
1996 May 09	Grampus griseus	9	26°11′ 85°00′	26.1	3312	on
1996 May 09	Tursiops truncatus	30	25°59′ 84°41′	26.1	481	on
1996 May 10	Stenella attenuata	20	24°26′ 84°05′	27.4	2379	on
1996 May 10	Unidentified dolphin	3	24°27′ 84°08′	27.5	2196	on
1996 May 10	Stenella longirostris	500	24°26′ 83°27′	25.6	351	on
1996 May 12	Tursiops truncatus	12	24°17′ 82°08′	26.2	242	on
1996 May 12	Tursiops truncatus	12	24°22′ 83°10′	26.0	384	on
1996 May 12	Tursiops truncatus	10	24°21′ 83°16′	26.5	320	on
1996 May 12	Grampus griseus	7	24°24′ 83°30′	27.3	575	on
1996 May 12	Stenella attenuata	100	24°25′ 83°41′	27.0	988	on
1996 May 13	Physeter macrocephalus	2	24°39′ 85°00′	27.4	3386	on
1996 May 13	Physeter macrocephalus	1	24°46′ 85°00′	27.6	3386	on
1996 May 13	Grampus griseus	15	25°00′ 85°48′	27.7	3294	on
1996 May 13	Grampus griseus	6	25°00′ 85°53′	27.8	3294	on
1996 May 13	Grampus griseus	4	25°02′ 85°59′	27.5	3395	on
1996 May 14	Grampus griseus	4	26°39′ 85°59′	27.7	3203	on
1996 May 14	Unidentified large whale	1	27°04′ 85°58′	27.6	3221	on
1996 May 15	Stenella sp.	2	28°59′ 86°35′	24.6	423	on
1996 May 15	Stenella attenuata	35	29°00′ 86°57′	24.6	672	on
1996 May 16	Physeter macrocephalus	3	27°24′ 87°00′	26.6	3038	on
1996 May 16	Physeter macrocephalus	1	27°22′ 87°00′	26.6	3038	on
1996 May 16	Stenella attenuata	30	26°47′ 86°59′	27.6	3001	on
1996 May 16	Unidentified dolphin	1	26°23′ 86°59′	27.9	3038	on
1996 May 17	Stenella clymene	15	26°41′ 87°59′	25.7	2699	on
1996 May 17	Stenella attenuata	150	27°04′ 87°59′	25.0	2745	on
1996 May 17	Mesoplodon sp.	1	27°18′ 88°00′	25.6	2562	on
1996 May 17	Unidentified dolphin	2	27°27′ 87°59′	25.8	2425	on
1996 May 17	Physeter macrocephalus	4	27°29′ 88°00′	25.8	2425	off
1996 May 17	Physeter macrocephalus	1	27°29′ 87°59′	25.9	2562	off
1996 May 17	Stenella attenuata	300	27°54′ 88°00′	26.2	2471	on
1996 May 17	Stenella attenuata	200	28°09′ 87°59′	25.4	2379	on
1996 May 18	T. truncatus/S. frontalis	5	29°36′ 87°59′	25.1	22	on
1996 May 18	Stenella frontalis	4	29°40′ 87°59′	26.2	22	on
1996 May 18	Tursiops truncatus	23	29°20′ 88°14′	25.2	86	on

continued

Table 6. (Continued)

Leg Date	Species	Group size	Position	SST °C	Depth (m)	S
1996 May 18	Tursiops truncatus	10	29°10′ 88°21′	26.8	124	on
1996 May 18	Grampus griseus	24	28°59′ 88°30′	26.1	525	on
1996 May 18	Unidentified dolphin	1	29°01′ 88°36′	27.5	366	off
1996 May 18	Tursiops truncatus	10	29°01′ 88°37′	27.7	220	on
1996 May 18	Tursiops truncatus	11	29°02′ 88°44′	27.6	201	on
1996 May 18	Tursiops truncatus	15	29°00′ 88°58′	27.5	64	on
1996 May 18	Unidentified dolphin	2	28°59′ 88°59′	27.4	81	on
1996 May 18	Grampus griseus	4	28°46′ 88°59′	25.6	604	on
1996 May 19	Stenella attenuata	13	27°06′ 88°59′	26.1	2196	on
1996 May 19	Stenella attenuata	200	27°01′ 89°00′	26.1	2288	on
1996 May 19	Stenella attenuata	150	26°52′ 89°00′	25.9	2269	on
1996 May 19	Stenella attenuata	650	26°48′ 89°00′	26.1	2677	on
1996 May 19	Physeter macrocephalus	3	26°34′ 88°59′	26.4	3294	on
1996 May 19	Physeter macrocephalus	1	25°58′ 89°09′	26.3	3203	on
1996 May 19	Physeter macrocephalus	1	25°59′ 89°12′	26.3	3248	on
1996 May 20	Unidentified Ziphiidae	2	27°08′ 89°59′	26.1	2196	on
1996 May 20	Stenella attenuata	150	27°12′ 90°00′	26.2	1354	on
1996 May 20	Grampus griseus	20	27°21′ 90°00′	26.3	1254	on
1996 May 20	Stenella attenuata	150	27°23′ 90°00′	26.4	1241	on
1996 May 20	Ziphius cavirostris	4	27°26′ 89°59′	26.4	1197	on
1996 May 20	Physeter macrocephalus	1	27°43′ 90°00′	26.8	897	on
1996 May 20	Physeter macrocephalus	2	27°44′ 90°00′	26.8	878	on
1996 May 20	Tursiops truncatus	75	27°59′ 90°08′	26.6	346	on
1996 May 21	Stenella attenuata	20	27°21′ 91°00′	25.9	1373	on
1996 May 21	Stenella attenuata	18	27°19′ 91°00′	25.9	1336	on
1996 May 21	Stenella attenuata	15	27°17′ 91°00′	25.8	1373	on
1996 May 21	Stenella attenuata	20	27°12′ 91°00′	25.7	1556	on
1996 May 21	Stenella clymene	55	26°56′ 91°00′	25.8	1830	on
1996 May 21	Orcinus orca	4	26°50′ 91°00′	26.6	1922	on
1996 May 21	Unidentified dolphin	1	26°09′ 91°00′	28.1	2946	on
1996 May 22	Stenella clymene	75	26°32′ 92°00′	26.4	1647	on
1996 May 22	Stenella attenuata	45	26°36′ 92°01′	26.6	1647	on
1996 May 22	Stenella attenuata	40	26°40′ 92°00′	26.6	1647	off
1996 May 22	Grampus griseus	12	26°41′ 92°00′	26.5	1647	on
1996 May 22	Stenella attenuata	45	26°42′ 91°59′	26.5	1739	on
1996 May 22	Stenella attenuata	20	26°55′ 91°59′	26.7	1501	on
1996 May 22	Mesoplodon sp.	1	27°01′ 91°59′	27.6	1427	on
1996 May 22	Kogia breviceps	1	27°02′ 91°59′	27.0	1482	on
1996 May 22	Kogia breviceps	1	27°04′ 92°00′	27.4	1501	on
1996 May 22	Stenella attenuata	17	27°07′ 92°00′	27.5	1524	on
1996 May 22	Kogia breviceps	1	27°08′ 92°00′	27.5	1524	off
1996 May 22	Kogia sp.	5	27°09′ 91°59′	27.4	1519	on
1996 May 22	Grampus griseus	10	27°10′ 92°00′	27.4	1499	on
1996 May 22	Stenella attenuata	25	27°14′ 92°01′	28.8	1153	on
1996 May 22	Mesoplodon sp.	1	27°16′ 92°01′	28.6	1007	on
1996 May 22	Kogia sp.	3	27°17′ 92°01′	28.7	970	on
1996 May 22	Stenella attenuata	175	27°27′ 91°59′	28.1	778	on
1996 May 22	Globicephala sp.	27	27°30′ 91°58′	28.4	877	on

continued

Table 6. (Continued)

Leg Date	Species	Group size	Position	SST °C	Depth (m)	S
1996 May 22	Stenella attenuata	30	27°33′ 91°58′	28.4	377	off
1996 May 22	Unidentified dolphin	15	27°37′ 91°57′	28.4	377	off
1996 May 22	Kogia simus	2	27°37′ 91°57′	28.4	877	off
1996 May 22	Kogia simus	6	27°45′ 91°58′	27.9	452	on
1996 May 22	Kogia simus	4	27°49′ 91°59′	28.1	346	on
1996 May 22	Unidentified small whale	1	27°50′ 91°59′	27.7	220	on
1996 May 22	Stenella frontalis	15	27°52′ 91°56′	27.7	220	off
1996 May 22	Stenella frontalis	10	27°51′ 91°58′	27.7	220	on
1996 May 22	Unidentified dolphin	4	27°55′ 91°57′	27.8	135	on
1996 May 22	Stenella frontalis	30	27°59′ 91°57′	28.4	112	on
1996 May 22	Unidentified dolphin	1	27°38′ 92°59′	26.3	553	on
1996 May 23	Globicephala sp.	35	27°29′ 93°00′	26.6	769	on
1996 May 23	Stenella attenuata	100	27°23′ 92°58′	26.6	778	on
1996 May 23	Stenella attenuata	115	27°16′ 92°59′	26.9	1135	on
1996 May 23	Mesoplodon sp.	2	27°15′ 92°59′	26.9	1025	on
1996 May 23	Peponocephala electra	125	26°47′ 93°00′	27.1	1519	on
1996 May 23	Unidentified Odontocete	2	26°30′ 93°00′	27.1	1733	on
1996 May 23	Physeter macrocephalus	1	26°27′ 93°00′	27.2	1775	on
1996 May 23	Unidentified Ziphiidae	1	26°16′ 93°00′	27.1	1976	on
1996 May 23	Grampus griseus	4	26°29′ 93°59′	26.3	1556	on
1996 May 24	Ziphius cavirostris	1	28°06′ 91°11′	26.6	112	off
1996 May 25	Stenella frontalis	6	28°08′ 91°00′	26.4	101	off
1996 May 25	Tursiops truncatus	1	28°10′ 90°50′	26.4	93	on
1996 May 25	T. truncatus/S. frontalis	3	28°13′ 90°34′	26.5	77	on
1996 May 25	Unidentified dolphin	2	28°13′ 90°34′	26.6	73	on
1996 May 25	Stenella frontalis	10				
	Tursiops truncatus	2				
1996 May 25	T. truncatus/S. frontalis	4	28°18′ 90°18′	27.1	70	on
1996 May 25	Stenella attenuata	40	28°26′ 89°40′	27.1	695	on
1996 May 25	Grampus griseus	2	28°27′ 89°35′	27.1	732	on
1996 May 25	Stenella attenuata	25	28°27′ 89°34′	27.3	458	on
	Grampus griseus	6				
1996 May 25	Unidentified small whale	1	28°28′ 89°27′	27.3	458	off
1996 May 25	Physeter macrocephalus	3	28°31′ 89°12′	27.6	540	on
1996 May 25	Physeter macrocephalus	1	28°35′ 89°04′	27.8	540	on
1996 May 25	Grampus griseus	8	28°37′ 89°03′	27.7	586	on
1996 May 25	Unidentified dolphin	4	28°42′ 88°59′	27.6	659	off
1996 May 25	Unidentified odontocete	1	28°44′ 88°56′	27.4	695	on
1996 May 25	Grampus griseus	8	28°49′ 88°51′	27.8	604	on
LEG 3						
1996 May 29	Tursiops truncatus	3	29°31′ 87°50′	27.8	53	on
1996 May 30	Stenella attenuata	40	27°52′ 86°06′	27.7	3111	on
1996 May 30	Stenella attenuata	60	27°49′ 86°03′	27.8	3175	on
1996 May 30	Stenella attenuata	115	27°35′ 85°48′	27.6	3235	on
1996 May 30	Stenella attenuata	48	27°33′ 85°41′	27.7	3228	on
1996 May 30	Stenella attenuata	65	27°17′ 85°23′	27.8	1281	on
1996 May 30	Stenella attenuata	20	27°24′ 85°10′	28.2	745	on

continued

Table 6. (Continued)

Leg Date	Species	Group size	Position	SST °C	Depth (m)	S
1996 May 30	Tursiops truncatus	6	27°38′ 84°46′	28.3	205	on
	Stenella frontalis	12				
1996 May 31	Stenella frontalis	7	28°10′ 84°48′	26.8	99	off
1996 May 31	Stenella attenuata	40	27°43′ 85°26′	28.2	869	on
1996 May 31	Stenella attenuata	175	27°39′ 85°34′	28.5	1739	on
1996 May 31	Stenella attenuata	50	27°43′ 85°44′	28.3	2379	on
1996 May 31	T. truncatus/S. frontalis	1	28°03′ 85°38′	28.4	710	off
1996 May 31	Stenella longirostris	32	28°11′ 85°33′	28.1	381	on
1996 Jun 01	Stenella frontalis	9	28°21′ 85°21′	27.2	205	off
	T. truncatus/S. frontalis	2				
1996 Jun 02	Physeter macrocephalus	5	28°04′ 85°59′	27.0	877	on
1996 Jun 02	Unidentified small whale	1	27°47′ 86°06′	27.1	3157	on
1996 Jun 03	Stenella attenuata	120	28°08′ 86°09′	27.1	719	on
1996 Jun 03	Tursiops truncatus	15	28°31′ 86°11′	26.6	377	on
1996 Jun 03	Tursiops truncatus	8	28°36′ 86°11′	26.6	366	on
1996 Jun 03	Tursiops truncatus	6	28°42′ 86°13′	26.5	342	on
1996 Jun 03	Tursiops truncatus	10	29°17′ 86°14′	27.1	205	on
1996 Jun 03	Tursiops truncatus	4	29°23′ 86°14′	27.0	161	on
1996 Jun 03	Tursiops truncatus	5	29°34′ 86°15′	26.9	71	on
1996 Jun 03	Stenella frontalis	70	29°36′ 86°15′	26.6	62	on
1996 Jun 04	Stenella frontalis	15	29°50′ 86°15′	25.8	62	off
1996 Jun 04	Tursiops truncatus	15	29°52′ 86°15′	26.3	62	on
1996 Jun 04	Unidentified dolphin	4	29°56′ 86°14′	26.2	49	on
1996 Jun 04	Tursiops truncatus	12	30°03′ 86°16′	26.1	55	on
1996 Jun 04	Tursiops truncatus	17	30°07′ 86°17′	26.2	35	on
1996 Jun 04	T. truncatus/S. frontalis	2	30°11′ 86°17′	26.2	35	on
1996 Jun 04	T. truncatus/S. frontalis	5	30°11′ 86°19′	26.4	31	on
1996 Jun 04	Tursiops truncatus	12	30°11′ 86°19′	26.4	29	on
1996 Jun 04	T. truncatus/S. frontalis	1	30°12′ 86°21′	26.3	29	on
1996 Jun 04	Tursiops truncatus	4	30°12′ 86°21′	26.3	29	on
1996 Jun 04	T. truncatus/S. frontalis	1	30°11′ 86°30′	26.3	33	on
1996 Jun 04	T. truncatus/S. frontalis	1	30°11′ 86°30′	26.3	33	on
1996 Jun 04	Stenella frontalis	38	30°08′ 86°30′	26.8	38	on
1996 Jun 04	Stenella frontalis	20	30°07′ 86°31′	26.9	46	on
1996 Jun 04	Unidentified dolphin	1	29°59′ 86°31′	27.1	75	on
1996 Jun 04	Unidentified small whale	1	29°47′ 86°32′	27.4	123	on
1996 Jun 04	Unidentified dolphin	1	29°24′ 86°34′	27.4	313	on
1996 Jun 04	Kogia breviceps	2	29°18′ 86°36′	27.6	379	off
1996 Jun 04	Stenella coeruleoalba	30	29°18′ 86°34′	27.6	404	on
1996 Jun 05	Stenella coeruleoalba	21	29°14′ 86°38′	26.7	414	on
1996 Jun 05	Kogia sp.	1	29°11′ 86°37′	26.3	406	on
1996 Jun 05	Unidentified dolphin	1	29°10′ 86°37′	26.3	408	on
1996 Jun 05	Unidentified dolphin	1	29°08′ 86°37′	26.3	415	on
1996 Jun 05	Grampus griseus	20	29°10′ 86°37′	26.3	414	on
1996 Jun 05	Unidentified dolphin	5	29°02′ 86°36′	26.7	447	on
1996 Jun 05	Unidentified dolphin	8	29°01′ 86°37′	26.8	447	of
1996 Jun 05	Grampus griseus	12	29°00′ 86°38′	26.8	410	of
1996 Jun 05	Kogia sp.	1	29°00′ 86°38′	26.8	439	on
1996 Jun 05	Kogia sp.	1	29°00′ 86°36′	26.8	439	of

continued

Table 6. (Continued)

Leg Date	Species	Group size	Position	SST °C	Depth (m)	S
1996 Jun 05	Tursiops truncatus	45	29°01′ 86°37′	26.8	04	on
1996 Jun 05	Kogia sp.	1	28°58′ 86°33′	26.8	12	on
1996 Jun 05	Stenella longirostris	250	28°57′ 86°35′	27.	23	off
1996 Jun 05	Stenella longirostris	100	28°56′ 86°36′	27.	34	on
1996 Jun 05	Kogia sp.	1	28°47′ 86°37′	27.	85	on
1996 Jun 05	Grampus griseus	6	28°46′ 86°37′	27.	489	on
1996 Jun 05	Grampus griseus	10	28°43′ 86°38′	27	522	on
1996 Jun 05	Grampus griseus	8	28°37′ 86°38′	27.9	567	on
1996 Jun 05	Grampus griseus	4	28°36′ 86°39′	27.6	569	on
1996 Jun 05	Grampus griseus	8	28°33′ 86°38′	27.6	602	on
1996 Jun 05	Stenella attenuata	200	28°20′ 86°39′	27.4	844	on
1996 Jun 05	Stenella attenuata	100	28°07′ 86°41′	27.2	2937	on
1996 Jun 05	Grampus griseus	15	28°09′ 86°47′	27.0	1135	on
1996 Jun 06	Stenella attenuata	85	28°13′ 86°50′	26.8	1144	on
1996 Jun 06	Physeter macrocephalus	3	28°15′ 86°50′	26.7	1030	on
1996 Jun 06	Stenella attenuata	85	28°29′ 86°51′	27.2	737	on
1996 Jun 06	Grampus griseus	7	29°07′ 86°55′	27.5	604	on
1996 Jun 06	Kogia sp.	1	29°24′ 86°57′	27.7	567	on
1996 Jun 06	Tursiops truncatus	4	29°26′ 86°56′	27.4	556	off
1996 Jun 06	Unidentified dolphin	5	29°27′ 86°54′	27.4	556	off
1996 Jun 06	Tursiops truncatus	172	29°25′ 86°57′	27.5	479	on
1996 Jun 06	Grampus griseus	15	29°32′ 86°53′	27.8	304	on
1996 Jun 06	Balaenoptera sp.	1	29°39′ 86°58′	28.0	212	on
1996 Jun 06	Balaenoptera edeni	4	29°43′ 86°59′	28.0	212	on
1996 Jun 07	Stenella frontalis	28	29°50′ 86°59′	27.6	163	on
1996 Jun 07	Stenella frontalis	28	30°04′ 87°01′	27.1	26	on
1996 Jun 07	Stenella frontalis	7	30°11′ 87°01′	27.6	27	on
1996 Jun 07	Stenella frontalis	21	30°04′ 87°06′	27.3	31	on
1996 Jun 07	Tursiops truncatus	10	29°58′ 87°08′	27.3	55	on
1996 Jun 07	Stenella frontalis	25	29°55′ 87°08′	27.4	77	on
1996 Jun 07	Tursiops truncatus	5	29°40′ 87°17′	27.7	185	on
1996 Jun 08	Stenella attenuata	75	29°09′ 87°38′	27.2	1098	on

Table 7. Number of sightings (n) of flocks of birds in the U.S. Gulf of Mexico during NOAA Ship OREGON II Cruise 220, April - June 1996.

Species	n
Double-crested cormorant (*Phalacrocorax auritus*)	2
Ducks	42
Coot (*Fulica americana*)	2
Audubon's shearwater (*Puffinus lherminieri*)	137
Cory's shearwater (*Calonectris diomedea*)	1
Unidentified shearwater (*Puffinus*/*Calonectris*)	10
Leach's storm petrel (*Oceanodroma leucorhoa*)	2
Madeiran storm petrel (*Oceanodroma castro*)	47
Wilson's storm petrel (*Oceanites oceanicus*)	14
Unidentified storm petrel (Hydrobatidae)	509
Brown pelican (*Pelecanus occidentalis*)	5
Magnificent frigatebird (*Fregata magnificens*)	6
Northern gannet (*Sula bassana*)	23
Masked booby (*Sula dactylatra*)	2
White-tailed tropicbird (*Phaethon lepturus*)	1
Unidentified tropicbird (*Phaethon* sp.)	2
Parasitic jaegar (*Stercorarius parasiticus*)	8
Pomarine jaegar (*Stercorarius pomarinus*)	65
Long-tailed skua (*Stercorarius longicaudus*)	1
Unidentified jaegar (*Stercorarius* sp.)	19
Herring gull (*Larus argentatus*)	1
Laughing gull (*Larus atricilla*)	238
Unidentified gull (*Larus* sp.)	5
Black tern (*Chlidonias niger*)	95
Bridled tern (*Sterna anaethetus*)	35
Bridled/sooty tern (*S. anaethetus*/*fuscata*)	62
Common tern (*Sterna hirundo*)	5
Least tern (*Sterna antillarum*)	2
Royal tern (*Sterna maxima*)	10
Sandwich tern (*Sterna sandvicensis*)	61
Sooty tern (*Sterna fuscata*)	139
Brown noddy (*Anous stolidus*)	1
Unidentified tern (*Sternidae*)	219
Unidentified seabirds	267
Egret	195
Great blue heron (*Ardea herodias*)	2
Unidentified heron	1
Non-seabirds	14
Unidentified shorebirds	5
Unidentified phalarope (*Phalaropus* sp.)	2

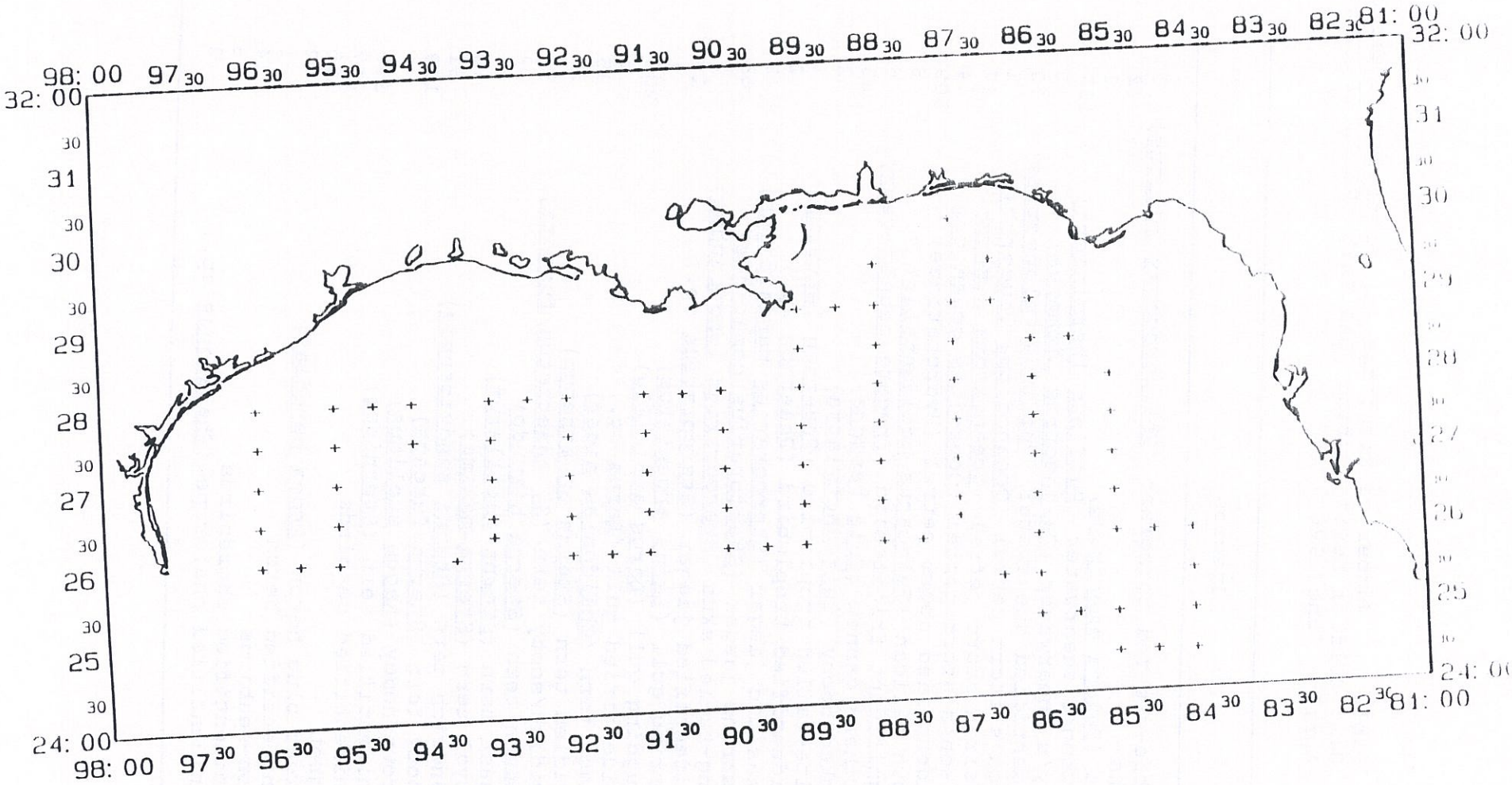

Figure 1. Location of SEAMAP ichthyoplankton stations during leg 1 of NOAA Ship Oregon II cruise 220.

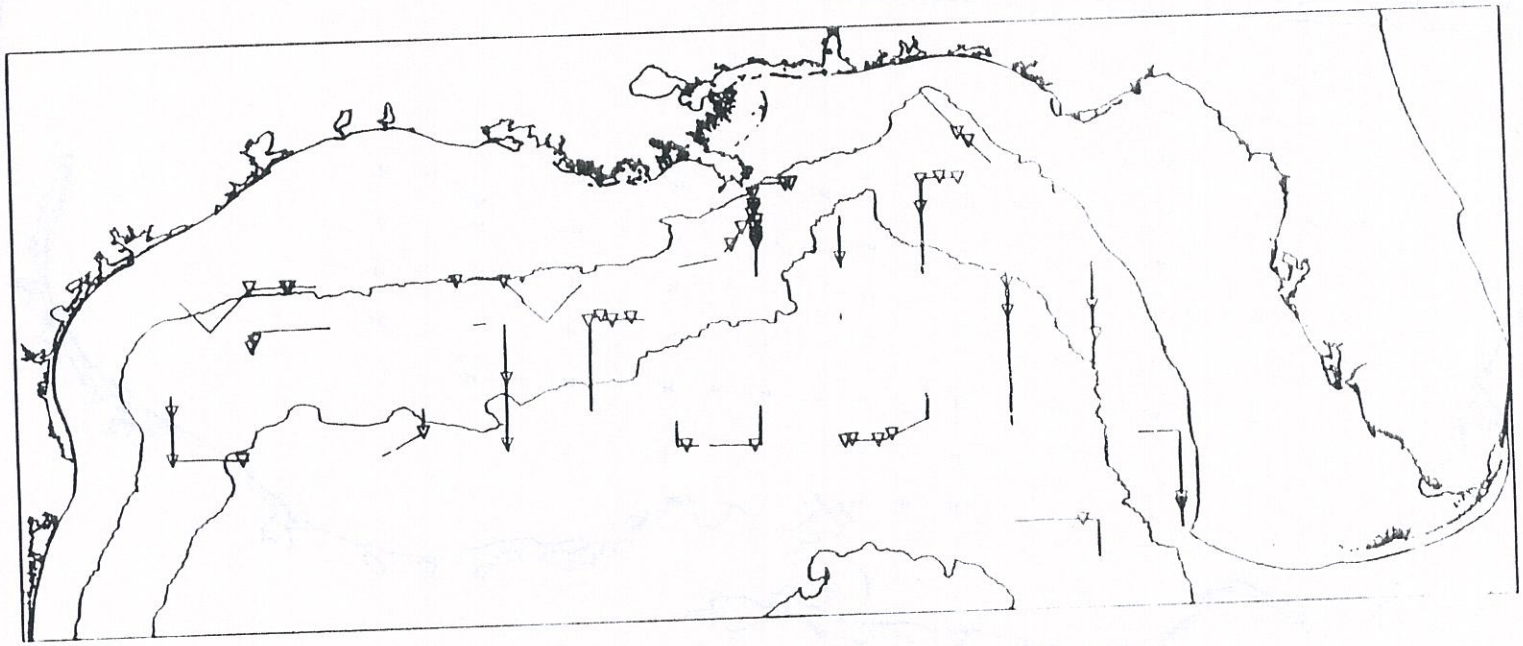

Figure 2. Location of line-transect survey effort (2580 km) and locations of cetacean sightings (n = 52) during NOAA Ship *Oregon II* Cruise 220, Leg 1 (17 April - 04 May 1996). The 100 m and 2000 m isobaths are shown.

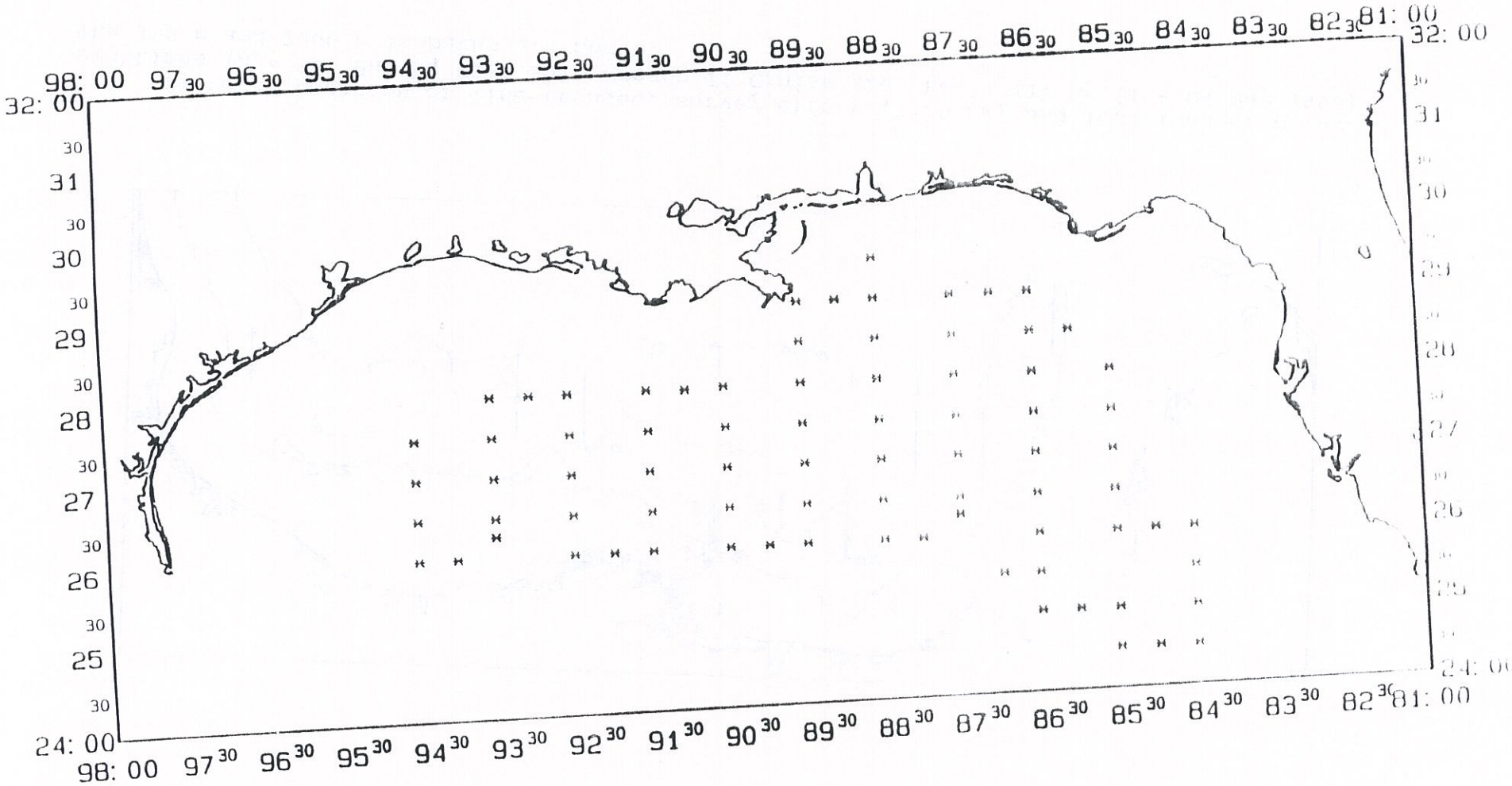

Figure 3. Location of SEAMAP ichthyoplankton stations during leg 2 of NOAA Ship Oregon II cruise 220.

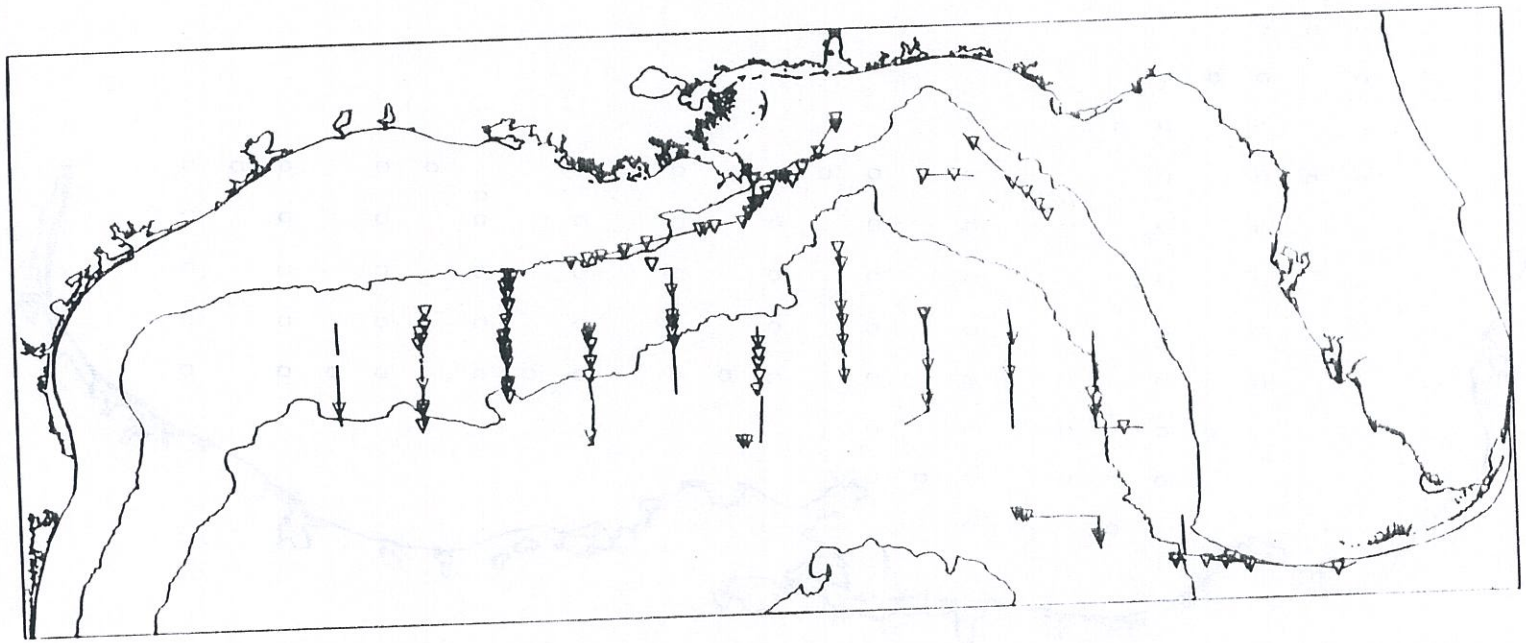

Figure 4. Location of line-transect survey effort (2428 km) and locations of cetacean sightings (n = 125) during NOAA Ship *Oregon II* Cruise 220, Leg 2 (07 May - 26 May 1996). The 100 m and 2000 m isobaths are shown.

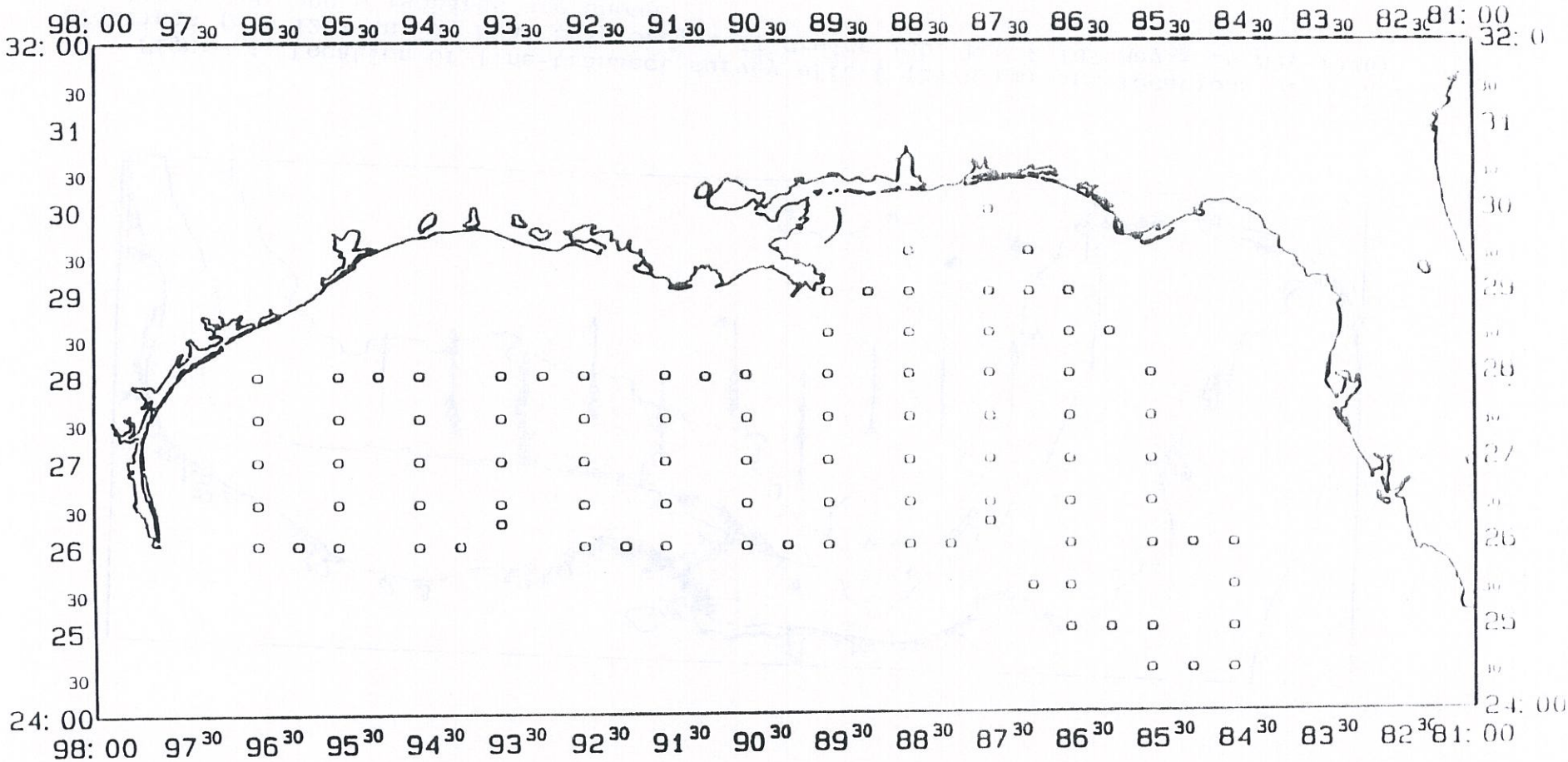

Figure 5. Location of SEAMAP ichthyoplankton stations selected for priority sorting for bluefin tuna. All stations were sampled in the month of May 1996.

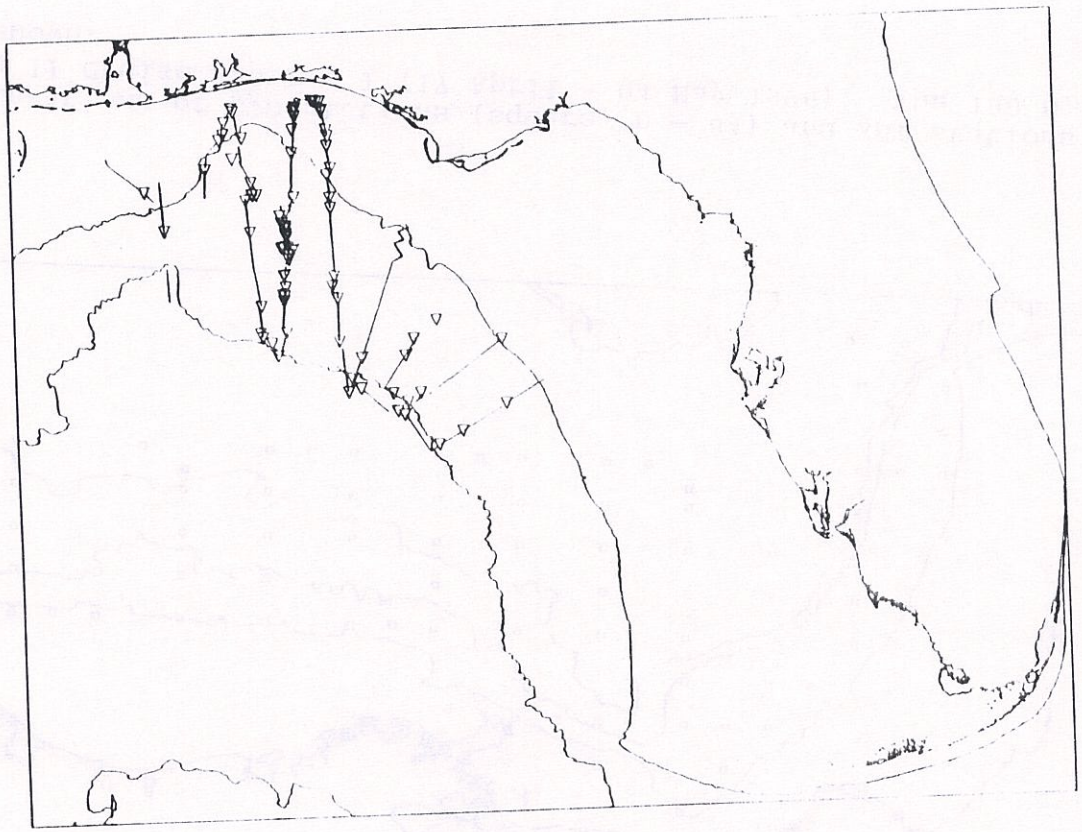

Figure 6. Location of line-transect survey effort (1393 km) and locations of cetacean sightings (n = 86) during NOAA Ship *Oregon II* Cruise 220, Leg 3 (29 May - 09 June 1996). The 100 m and 2000 m isobaths are shown.

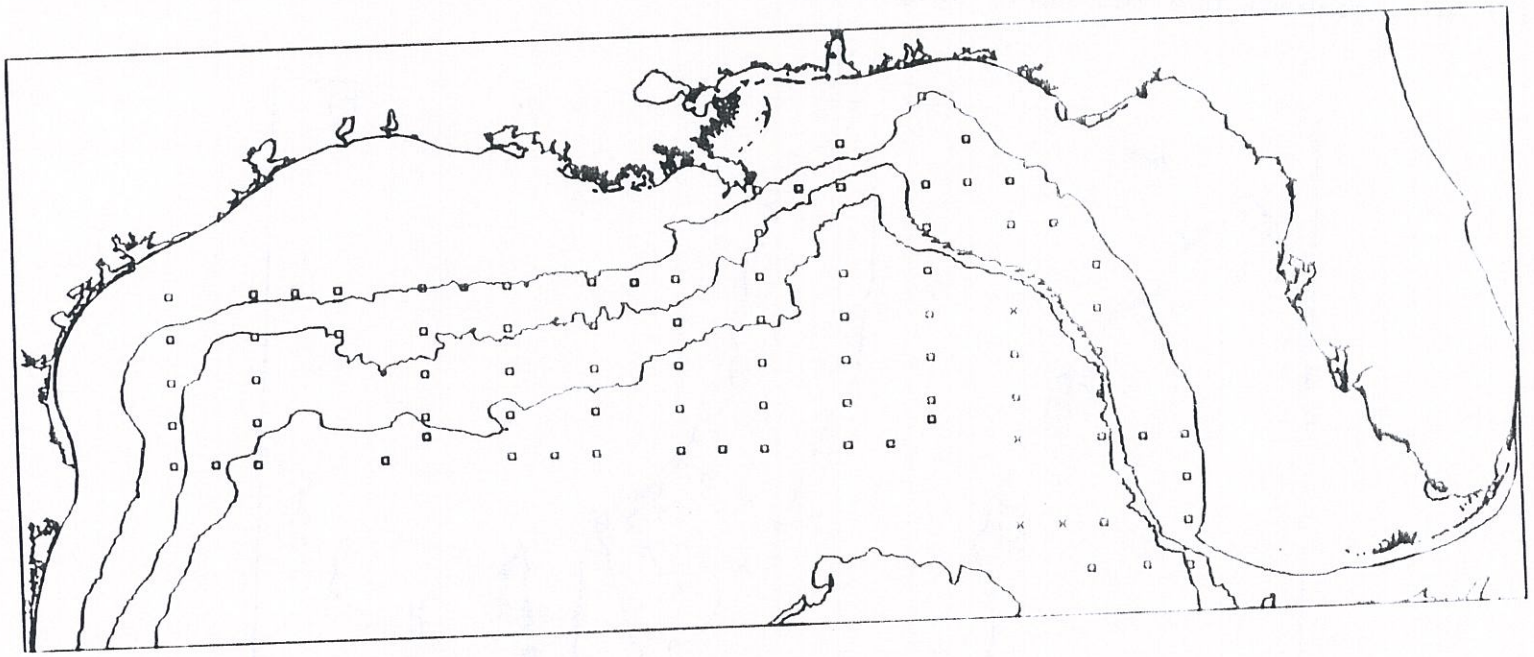

Figure 7. Locations of CTD stations (square, n = 84) and XBT stations (x, n = 4) from NOAA Ship *Oregon II* Cruise 220 Leg 1 (17 April - 04 May 1996). The 100 m, 1000 m and 2000 m isobaths are shown.

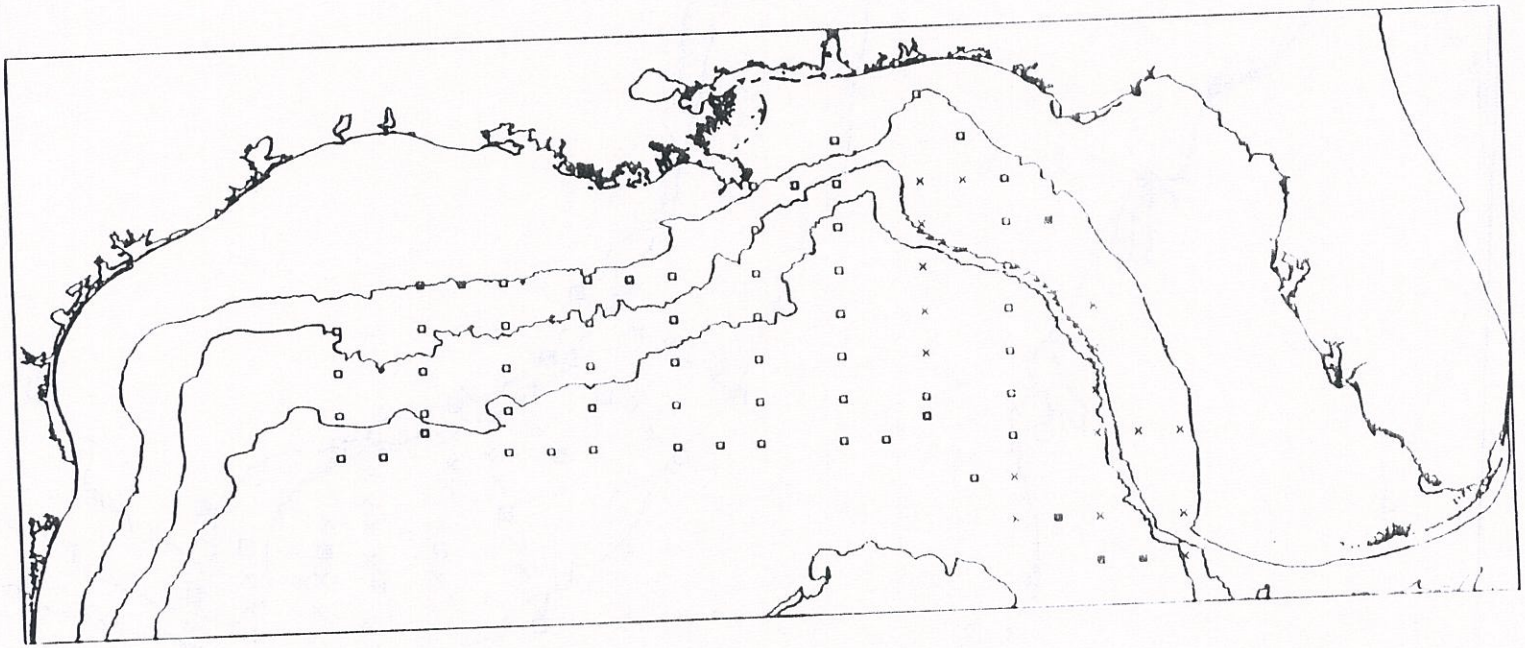

Figure 8. Locations of CTD stations (square, n = 62) and XBT stations (x, n = 23) from NOAA Ship *Oregon II* Cruise 220 Leg 2 (07 May - 26 May 1996). The 100 m, 1000 m and 2000 m isobaths are shown.

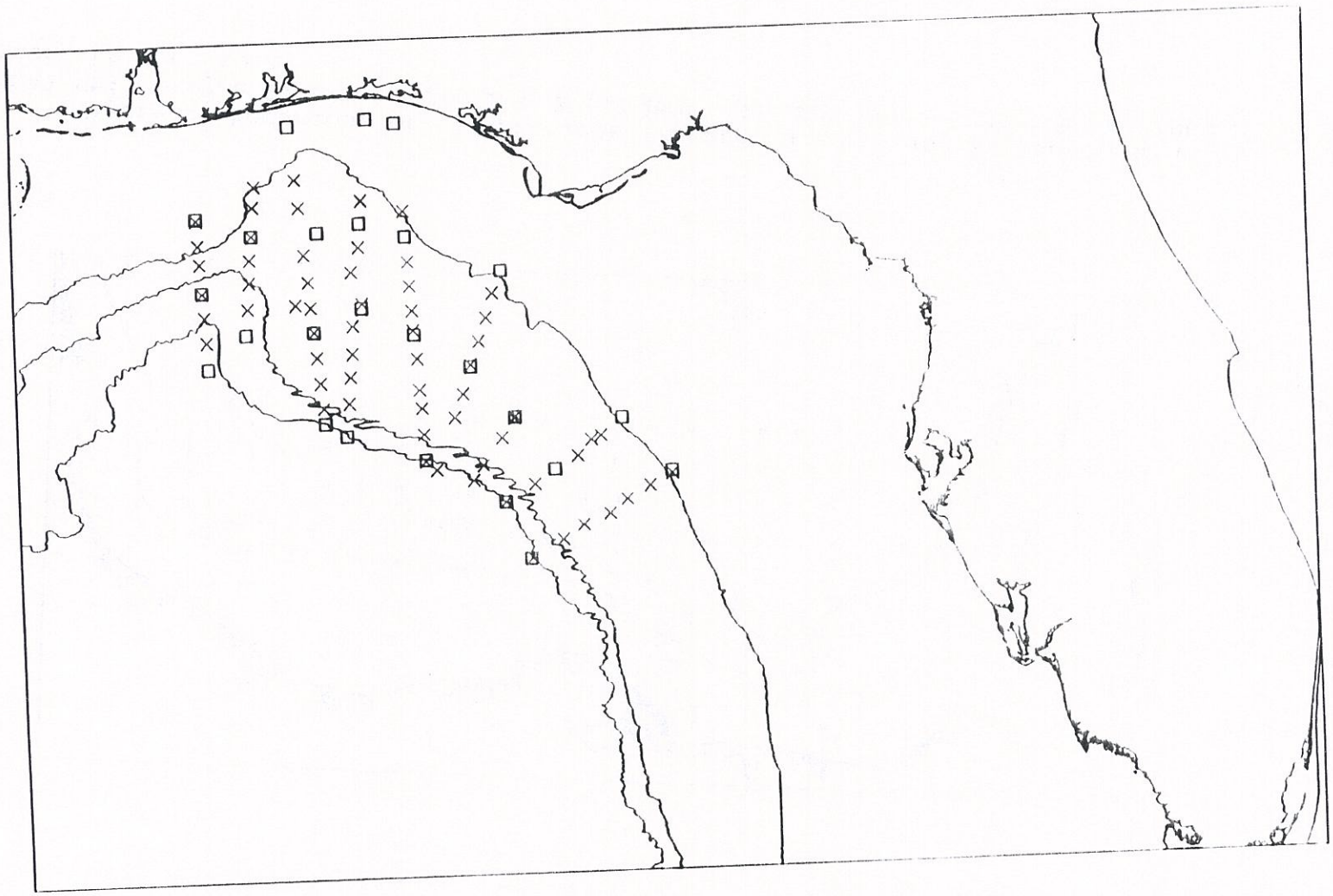

Figure 9. Locations of CTD stations (square, n = 26) and XBT stations (x, n = 65) from NOAA Ship *Oregon II* Cruise 220 Leg 3 (29 May - 09 June 1996). The 100 m, 1000 m and 2000 m isobaths are shown.