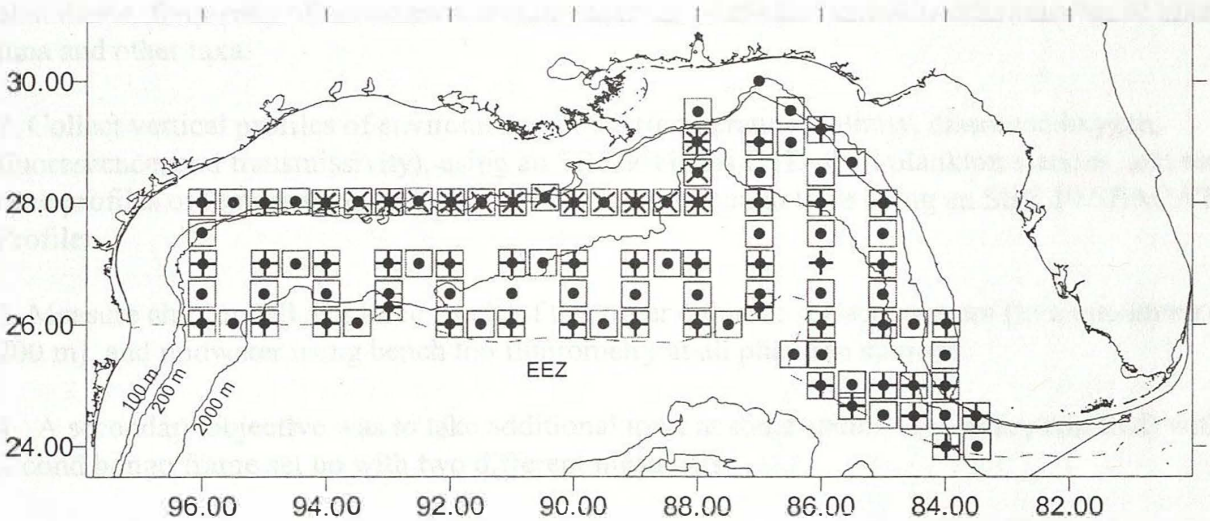
CRUISE RESULTS

Southeast Area Monitoring and Assessment Program (SEAMAP) 2006 Spring Ichthyoplankton Survey

NOAA Ship *Gordon Gunter* Cruise GU-06-02 (37)
April 22 – May 29, 2006



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INTRODUCTION

The NOAA Ship *Gordon Gunter* departed Pascagoula, MS on 22 April 2006 to initiate the Southeast Area Monitoring and Assessment Program (SEAMAP) Spring Ichthyoplankton Survey in the northern Gulf of Mexico. The SEAMAP Program is a cooperative State/Federal/University program designed to collect biological and environmental data from waters of the U.S. Gulf of Mexico. During the Spring Survey, plankton samples are collected from a systematic grid of stations to assess distribution, occurrence and abundance of the early life stages of a variety of species of fishes and invertebrates. The survey specifically targets larval bluefin tuna (*Thunnus thynnus*). A total of 35 successful sea days were worked over two legs during the cruise: Leg 1, 22 April – 7 May and Leg 2, 10 May – 29 May 2006.

OBJECTIVES

1. Collect ichthyoplankton samples with bongo and neuston nets for Gulf-wide estimates of abundance, frequency of occurrence, and distribution of the larvae and small juveniles of bluefin tuna and other taxa.

2. Collect vertical profiles of environmental data (temperature, salinity, dissolved oxygen, fluorescence, and transmissivity), using an SBE 9/11plus CTD at all plankton stations, and real-time profiles of temperature, salinity and depth during bongo tows using an SBE 19 SEACAT Profiler.

3. Measure chlorophyll a at three levels of the water column: surface, bottom (to a maximum of 200 m), and midwater using bench top fluorometry at all plankton stations.

4. A secondary objective was to take additional tows at some stations (as time permitted) with a second bongo frame set up with two different mesh nets.

5. In addition, as time would permit, we were to conduct deep plankton tows (500 m) to collect larvae of special interest after primary objectives were completed.

METHODS

Environmental Data Collection

Environmental data were collected at each designated ichthyoplankton station in accordance with procedures outlined in the SEAMAP data collections manual. Most regular SEAMAP stations included a CTD cast to near bottom or a maximum depth of 200 m. The Seabird SBE 9/11 Plus CTD was used with a dual suite of the following sensors: SBE 03 temperature sensor, SBE 04 conductivity sensor, SBE digiquartz pressure sensor, SBE 43 dissolved oxygen sensor, Wetlabs Wetstar fluorometer, and Wetlabs C-Star transmissometer. Information from shipboard sensors was accessed via the Scientific Computer System (SCS), which continuously displayed and recorded the ship's position, heading, speed, wind direction, wind speed, barometric pressure, sea surface temperature, air temperature and water depth. Each

sampling event was conducted through the SCS and data (environmental and biological) for each event were then ingested into Microsoft Access for later analysis. Water samples were taken, using Niskin bottles attached to a carousal sampler, at the surface, midwater, and near-bottom (up to 200 m maximum) for bench top fluorometric analysis using the Welshmeyer method. Temperature, salinity and depth were recorded in real time during all bongo net tows using a Seabird SBE19 SEACAT Profiler.

Oxygen titration was to be conducted once every five days to check the oxygen readings from the SBE 43 dissolved oxygen sensor insitu. In addition, titration analyses were to be conducted daily to gather data on the use of handheld Hach 10 Dissolved Oxygen Meter. This survey was to be one source of comparison data to help provide a procedure that performed well to get accurate corresponding readings between the handheld meter and the Winkler method titration. These handhelds, if performance was significant, would then be used on the smaller vessels for validation of their insitu dissolved oxygen measurements.

Ichthyoplankton Sample Collection

Ichthyoplankton sample and data collection were implemented in accordance with procedures outlined in the SEAMAP data collections manual. A predefined cruise track of 97 SEAMAP stations approximately 30 nautical miles apart in a systematic grid pattern were targeted for each leg of the survey. Primary station operations consisted of a CTD profile, a neuston tow and every other station, a bongo tow with attached (on towing cable above the frame) SEACAT Profiler. Bongo samples were taken with the standard SEAMAP 61 cm bongo outfitted with two 0.335 mm mesh nets and towed in an oblique path from near bottom or 200 m maximum depth to the surface. Vessel speed was adjusted during the bongo tow to maintain a 45-degree wire angle in order to uniformly sample the water column. Water temperature, salinity and depth were monitored and recorded during each bongo tow. Neuston samples were taken using a 0.947 mm mesh net attached to a 1 x 2 m metal frame and towed for 10 minutes at a vessel speed (~ 2 knots) sufficient to keep the net opening half submerged in the water and thus maintaining a sampling depth of 0.5 m. Tows were shortened to no less than 5 minutes if sargassum began to accumulate in the net and make retrieval onto the deck difficult. Right bongo samples were initially preserved in 10% formalin and transferred to new 95% Ethanol (ETOH) after 48 hours. Left bongo and neuston samples were initially preserved in 95% ETOH and transferred to fresh ETOH after 24 hours.

The secondary dual mesh tows were to be taken as time permitted. A second standard SEAMAP 61 cm bongo frame was outfitted with a standard 0.335 mm mesh net on the right side and a 0.200 mm mesh net on the left side. Both samples were to be initially preserved in 10% formalin and transferred to new 95% ETOH after 48 hours.

The secondary deep tows were to be taken with the standard bongo 0.335 mesh nets to a depth of 500 m. These tows would only be conducted after all primary stations were completed because the SBE 19 Seacat profiler would have to be removed prior to these tows. A shallow rated profiler is primarily used during these surveys for the resolution needed during shallow stations. The maximum depth rating on the current profiler was 350 m.

RESULTS

Environmental Data

One hundred and sixty-one, SBE 9/11 plus CTD and 93, SBE 19 SEACAT profiles were taken during the cruise. The SBE 9/11 plus CTD profiles were post-processed at sea by the Field Party Chief using Seabird's SEASAVE processing software. All environmental data and data from the ship's SCS were returned to the NMFS Pascagoula Laboratory for editing, analysis and archival. During leg 1, two CTD casts were cancelled due to re-termination of the sea cable because of transmission difficulties. During leg 2, two CTD casts were cancelled due to lightening and one failed during the cast. Problems with the SBE 32 carousel caused communication errors with the unit during the entire survey and this unit needs servicing. Repairs were attempted at sea, but the unit is seized into the rosette frame. Water sampling was made difficult during leg 1 due to poorly operational Niskin bottles. Three bottles were repaired at sea and water samples were taken. Three replicates for each depth were measured for chlorophyll using the bench top Welshmeyer method at sea. Several stations do not have all depths sampled due to Niskin bottle and SBE 32 carousel firing difficulties on both legs of the survey. After station 127 on leg 2, chlorophyll analyses were stopped when correct size filters ran out and backups were the incorrect size.

Titrations were performed on both legs to check the oxygen readings from the SBE 43 dissolved oxygen sensor. However, problems with the Niskin bottles, firing of the carousel and pipettor problems prevented daily measurements during much of the survey. Due to lack of water in Niskin bottles during leg 2 (water needed for chlorophyll triplicates out of the same bottle), comparison was difficult for the handheld meter. After chlorophyll analysis was stopped, daily titrations were made using a replacement pipettor received between legs of the survey. Titration values were consistent with the dissolved oxygen readings from the insitu CTD meter. All three water bottles were fired at the bottom for excess water at this time, so the handheld meter was compared to the values from the other two methods.

Ichthyoplankton Data

Over the course of the *Gordon Gunter* survey, ichthyoplankton samples were collected at 162 of the original 194 planned SEAMAP stations (Figure 1 and 2). The ship was delayed departing 5 days at the beginning of leg 1 due to needed repairs to the main engine muffler. In addition, equipment and weather cancelled another two days sampling effort. For this reason, only 65 of the planned 97 stations for this leg were sampled. However, two additional stations outside the primary track line were sampled during leg 1. The first was sampled during the 60 mile run between portions of the track line and the second was added due to a small amount of extra time while working back towards Pascagoula at the end of the leg.

All 97 planned stations were sampled during leg 2 of the survey. Due to good weather and favorable currents, 15 stations were also sampled with the dual mesh Extrusion Study array. These bongo tows were deployed, in addition to the standard gear, at each of those 15 stations. A total of 164 stations were sampled during this survey resulting in the collection of 188 bongo samples (79 right; 79 left; 15 dual mesh right; 15 dual mesh left) and 163 neuston samples (Table 1).

One bongo sample was aborted (station 007) due to problems with the wire mounted SBE 19 unit. Repairs were made by the onboard Electronics Technician (ET). The winch readout was

not functional for collection of wire out data during the entire survey, so bongo samples could not be taken without the working SBE 19 CTD unit to display tow depth. A neuston sample was lost (station 027) when the sea cable termination separated during the neuston tow and the frame and net were lost. The onboard ET re-terminated the sea cable and the backup neuston frame and net were mounted for the next station. The following two bongo stations (stations 029 and 031) were not able to be sampled using the bongo array due to this loss. The SBE 19 unit that was mounted to the wire above the neuston frame was damaged when the sea cable separated. The ET mounted the backup unit to the wire, but it took approximately 14 hours to get it working. Due to the non-working winch readout and the sole SBE 19 unit now in use, we broke the track line and the ship was brought into Pensacola Bay and anchored. The safety boat was launched and met personnel from the Pascagoula lab with additional backup SBE 19 units and the broken unit was transferred back to the lab to begin repair procedures. There were very rough sea conditions offshore, so the ship was kept in Pensacola Bay until we could return offshore. The track line was picked up where we left off and continued until it was time to again break the track line and work our way back towards Pascagoula for the end of leg 1 (Table 2). Leg two was fully sampled and did not have any breaks in the track line (Table 3). We were unable to attempt any deep plankton tows to 500 m due to the winch readout not being operational / not calibrated.

Plankton samples were assigned SEAMAP numbers at sea. Right bongos, neustons, Dual Mesh Right Bongos and Dual Mesh Left bongos, will be shipped to ZSIOP Gdynia, Poland for sorting. Remaining left bongo samples will be deposited in the SEAMAP Invertebrate Archive at Gulf Coast Research Laboratory, University of Southern Mississippi, Ocean Springs, MS for archival.

ACKNOWLEDGEMENTS: I would like to thank acting Center Director Robert Smith at the USDA/APHIS/PPQ/CPHST/ANPCL, laboratory in Gulfport Mississippi for supplying de-ionized water for this survey during our recovery time from the destruction caused by Hurricane Katrina. I would also like to thank Electronics Technician Henry Jenkins for rotating onto leg 1 of this survey. We were scheduled to sail without an ET, and would have lost large amounts of survey time without his valuable assistance.

Submitted by:

Pamela J. Bond
Field Party Chief

Approved by:

Scott Nichols, Director
Mississippi Laboratories

FOR Nancy Thompson, Director
Southeast Science and Research Center

Table 1. Summary of ichthyoplankton collections taken during *Gordon Gunter* cruise 06-02 (37), 22 April – 29 May 2006.

Leg	CTD casts	Right - Bongo	Left – Bongo	Neuston
1	95	30	30	66
2	97	49	49	97
Totals	192	79	79	163

CRUISE PARTICIPANTS

Leg 1 (22 April – 7 May 2006)

Name / Title / Organization

Pam Bond / Field Party Chief / NMFS, Pascagoula, MS
Kim Johnson / Fishery Biologist / NMFS, Pascagoula, MS
John Moser / Fishery Biologist / NMFS, Pascagoula, MS
Alonzo Hamilton / Fishery Biologist / NMFS, Pascagoula, MS
Denice Drass / Fishery Biologist / NMFS, Pascagoula, MS

Leg 2 (10 May – 29 May 2006)

Name / Title / Organization

Pam Bond / Field Party Chief / NMFS, Pascagoula, MS
Denice Drass / Fishery Biologist / NMFS, Pascagoula, MS
Jeremy Hall / Fishery Biologist / NMFS, Miami, FL
David Hanisko / Fishery Biologist / NMFS, Pascagoula, MS
Lanora Lang / Fishery Biologist / IAP[1], Pascagoula, MS

[1] - IAP World Services

Table 2. Summary of plankton sampling effort during the Spring SEAMAP Ichthyoplankton Survey conducted from the NOAA Ship *Gordon Gunter*, cruise GU-06-02 (37), Leg 1, 22 April - 7 May 2006. P-Sta.# = Pascagoula station number; S-Sta.# = SEAMAP station number; Smp.# = SEAMAP sample number; R-B = Right Bongo; L-B = Left Bongo; NN = Neuston; Pres. = Initial preservative; Form = Formalin; ETOH = Ethyl alcohol.

P-Sta.#	S-Sta. #	Smp. #	Gear	Pres.	Date
001	B172	32639	NN	95% ETOH	23 April 06
002	B169	32640	NN	95% ETOH	23 April 06
003	B165	32641	R - B	10% Form	23 April 06
"	"	32642	L - B	95% ETOH	"
"	"	32643	NN	95% ETOH	"
004	B160	32644	NN	95% ETOH	23 April 06
005	B153	32645	R - B	10% Form	24 April 06
"	"	32646	L - B	95% ETOH	"
"	"	32647	NN	95% ETOH	"
006	B152	32648	NN	95% ETOH	24 April 06
007	B151	No Bongo Tow		10% Form	24 April 06
		SBE19 failure		95% ETOH	"
		32649	NN	95% ETOH	"
008	B150	32650	NN	95% ETOH	24 April 06
009	B149	32651	R - B	10% Form	24 April 06
"	"	32652	L - B	95% ETOH	"
"	"	32653	NN	95% ETOH	"
010	B147	32654	NN	95% ETOH	24 April 06
011	B131	32655	R - B	10% Form	25 April 06
"	"	32656	L - B	95% ETOH	"
"	"	32657	NN	95% ETOH	"
012	B130	32658	NN	95% ETOH	25 April 06
013	B129	32659	R - B	10% Form	25 April 06
"	"	32660	L - B	95% ETOH	"
"	"	32661	NN	95% ETOH	"

P-Sta.#	S-Sta. #	Smp. #	Gear	Pres.	Date
014	B128	32662	NN	95% ETOH	25 April 06
015	B125	32663	R - B	10% Form	25 April 06
"	"	32664	L - B	95% ETOH	"
"	"	32665	NN	95% ETOH	"
016	B126	32666	R - B	10% Form	25 April 06
"	"	32667	L - B	95% ETOH	"
"	"	32668	NN	95% ETOH	"
017	B127	32669	R - B	10% Form	26 April 06
"	"	32670	L - B	95% ETOH	"
"	"	32671	NN	95% ETOH	"
018	B263	32672	R - B	10% Form	26 April 06
"	"	32673	L - B	95% ETOH	"
"	"	32674	NN	95% ETOH	"
019	B262	32675	R - B	10% Form	26 April 06
"	"	32676	L - B	95% ETOH	"
"	"	32677	NN	95% ETOH	"
020	B7	32678	R - B	10% Form	26 April 06
"	"	32679	L - B	95% ETOH	"
"	"	32680	NN	95% ETOH	"
021	B72	32681	NN	95% ETOH	26 April 06
022	B266	32682	R - B	10% Form	27 April 06
"	"	32683	L - B	95% ETOH	"
"	"	32684	NN	95% ETOH	"
023	B261	32685	NN	95% ETOH	27 April 06

Table 2 continued.

P-Sta.#	S-Sta. #	Smp. #	Gear	Pres.	Date
024	B8	32686	R – B	10% Form	27 April 06
"	"	32687	L – B	95% ETOH	"
"	"	32688	NN	95% ETOH	"
025	B74	32689	NN	95% ETOH	27 April 06
026	B270	32690	NN	95% ETOH	27 April 06
027	B6	32691	R – B	10% Form	27 April 06
"	"	32692	L – B	95% ETOH	"
"	"	No NN sample, Frame lost; SBE 19 damaged		95% ETOH	"
028	B77	32693	NN	95% ETOH	28 April 06
029	B5	No bongo tow, SBE19+ backup not responding yet.		10% Form	28 April 06
"	"			95% ETOH	"
"	"	32694	NN	95% ETOH	"
030	B78	32695	NN	95% ETOH	28 April 06
031	B163	No bongo tow, SBE 19+ still not working		10% Form	28 April 06
"	"			95% ETOH	"
"	"	32696	NN	95% ETOH	"
032	B164	32697	NN	95% ETOH	28 April 06
033	B170	32698	NN	95% ETOH	28 April 06
034	B2	32699	R – B	10% Form	29 April 06
"	"	32700	L – B	95% ETOH	"
"	"	32701	NN	95% ETOH	"
035	B80	32702	NN	95% ETOH	2 May 06
036	B3	32703	R – B	10% Form	2 May 06
"	"	32704	L – B	95% ETOH	"
"	"	32705	NN	95% ETOH	"
037	B79	32706	NN	95% ETOH	2 May 06
038	B4	32707	R – B	10% Form	2 May 06
"	"	32708	L – B	95% ETOH	"

P-Sta.#	S-Sta. #	Smp. #	Gear	Pres.	Date
038	B4	32709	NN	95% ETOH	2 May 06
039	B76	32710	NN	95% ETOH	2 May 06
040	B9	32711	R - B	10% Form	2 May 06
"	"	32712	L - B	95% ETOH	"
"	"	32713	NN	95% ETOH	"
041	B273	32714	NN	95% ETOH	3 May 06
042	B10	32715	R – B	10% Form	3 May 06
"	"	32716	L – B	95% ETOH	"
"	"	32717	NN	95% ETOH	"
043	B66	32718	NN	95% ETOH	3 May 06
044	B11	32719	R – B	10% Form	3 May 06
"	"	32720	L – B	95% ETOH	"
"	"	32721	NN	95% ETOH	"
045	B288	32722	NN	95% ETOH	3 May 06
046	B12	32723	R – B	10% Form	3 May 06
"	"	32724	L – B	95% ETOH	"
"	"	32725	NN	95% ETOH	"
047	B63	32726	NN	95% ETOH	3 May 06
048	B13	32727	R - B	10% Form	4 May 06
"	"	32728	L - B	95% ETOH	"
"	"	32729	NN	95% ETOH	"
049	B291	32730	NN	95% ETOH	4 May 06
050	B14	32731	R - B	10% Form	4 May 06
"	"	32732	L - B	95% ETOH	"
"	"	32733	NN	95% ETOH	"
051	B62	32734	NN	95% ETOH	4 May 06

Table 2 continued.

P-Sta.#	S-Sta. #	Smp. #	Gear	Pres.	Date
052	B15	32735	R – B	10% Form	4 May 06
"	"	32736	L – B	95% ETOH	"
"	"	32737	NN	95% ETOH	"
053	B296	32738	NN	95% ETOH	4 May 06
054	B18	32739	R – B	10% Form	4 May 06
"	"	32740	L – B	95% ETOH	"
"	"	32741	NN	95% ETOH	"
*055	B60	32742	NN	95% ETOH	5 May 06
056	B195	32743	NN	95% ETOH	5 May 06
057	B17	32744	R – B	10% Form	5 May 06
"	"	32745	L – B	95% ETOH	"
"	"	32746	NN	95% ETOH	"
058	B190	32747	NN	95% ETOH	5 May 06
059	B16	32748	R – B	10% Form	5 May 06
"	"	32749	L - B	95% ETOH	"
"	"	32750	NN	95% ETOH	"

P-Sta.#	S-Sta. #	Smp. #	Gear	Pres.	Date
060	B185	32751	NN	95% ETOH	5 May 06
061	B83	32752	R - B	10% Form	6 May 06
"	"	32753	L - B	95% ETOH	"
"	"	32754	NN	95% ETOH	"
* 062	B64	32755	NN	95% ETOH	6 May 06
063	B250	32756	NN	95% ETOH	6 May 06
064	B82	32757	R – B	10% Form	6 May 06
"	"	32758	L – B	95% ETOH	"
"	"	32759	NN	95% ETOH	"
065	B81	32760	NN	95% ETOH	6 May 06
066	B27	32761	R – B	10% Form	6 May 06
"	"	32762	L – B	95% ETOH	"
"	"	32763	NN	95% ETOH	"
067	B312	32764	NN	95% ETOH	7 May 06

* Denotes stations added, not regularly on spring survey track.

Table 3. Summary of plankton sampling effort during the Spring SEAMAP Ichthyoplankton Survey conducted from the NOAA Ship *Gordon Gunter*, cruise GU-06-02 (37), Leg 2, 10 May – 29 May 2006. P-Sta.# = Pascagoula station number; S-Sta.# = SEAMAP station number; Smp.# = SEAMAP sample number; R-B = Right Bongo; L-B = Left Bongo; NN = Neuston; DM/R – B = Dual Mesh Right Bongo; DM/L – B = Dual Mesh Left bongo; Pres. = Initial preservative; Form = Formalin; ETOH = Ethyl alcohol; Date is GMT station date.

P-Sta.#	S-Sta. #	Smp. #	Gear	Pres.	Date
068	B172	32765	NN	95% ETOH	11 May 06
069	B169	32766	NN	95% ETOH	11 May 06
070	B165	32767	R – B	10% Form	11 May 06
"	"	32768	L – B	95% ETOH	"
"	"	32769	NN	95% ETOH	"
071	B160	32770	NN	95% ETOH	11 May 06
072	B153	32771	R – B	10% Form	12 May 06
"	"	32772	L – B	95% ETOH	"
"	"	32773	NN	95% ETOH	"
073	B152	32774	NN	95% ETOH	12 May 06
074	B151	32775	R – B	10% Form	12 May 06
"	"	32776	L – B	95% ETOH	"
"	"	32777	NN	95% ETOH	"
075	B150	32778	NN	95% ETOH	12 May 06
076	B149	32779	R - B	10% Form	12 May 06
"	"	32780	L - B	95% ETOH	"
"	"	32781	NN	95%ETOH	"
077	B147	32782	NN	95% ETOH	13 May 06
078	B131	32783	R - B	10% Form	13 May 06
"	"	32784	L - B	95% ETOH	"
"	"	32785	NN	95% ETOH	"
079	B130	32786	NN	95% ETOH	13 May 06
080	B129	32787	R - B	10% Form	13 May 06
"	"	32788	L - B	95% ETOH	"
"	"	32789	NN	95% ETOH	"

P-Sta.#	S-Sta. #	Smp. #	Gear	Pres.	Date
081	B128	32790	NN	95% ETOH	13 May 06
082	B125	32791	R - B	10% Form	13 May 06
"	"	32792	L - B	95% ETOH	"
"	"	32793	NN	95% ETOH	"
083	B126	32794	R – B	10% Form	13 May 06
"	"	32795	L - B	95% ETOH	"
"	"	32796	NN	95% ETOH	"
084	B127	32797	R – B	10% Form	14 May 06
"	"	32798	L – B	95% ETOH	"
"	"	32799	NN	95% ETOH	"
085	B263	32800	R – B	10% Form	14 May 06
"	"	32801	L – B	95% ETOH	"
"	"	32802	NN	95% ETOH	"
086	B262	32803	R – B	10% Form	14 May 06
"	"	32804	L – B	95% ETOH	"
"	"	32805	NN	95% ETOH	"
087	B7	32806	R – B	10% Form	14 May 06
"	"	32807	L – B	95% ETOH	"
"	"	32808	NN	95% ETOH	"
088	B72	32809	NN	95% ETOH	14 May 06
089	B266	32810	R – B	10% Form	15 May 06
"	"	32811	L - B	95% ETOH	"
"	"	32812	NN	95% ETOH	"
090	B261	32813	NN	95% ETOH	15 May 06

Table 3 continued.

P-Sta.#	S-Sta. #	Smp. #	Gear	Pres.	Date
091	B8	32814	R – B	10% Form	15 May 06
"	"	32815	L – B	95% ETOH	"
"	"	32816	NN	95% ETOH	"
092	B74	32817	NN	95% ETOH	15 May 06
093	B270	32818	NN	95% ETOH	15 May 06
094	B6	32819	R – B	10% Form	15 May 06
"	"	32820	L – B	95% ETOH	"
"	"	32821	NN	95% ETOH	"
095	B77	32822	NN	95% ETOH	16 May 06
096	B5	32823	R – B	10% Form	16 May 06
"	"	32824	L – B	95% ETOH	"
"	"	32825	NN	95% ETOH	"
097	B78	32826	NN	95% ETOH	16 May 06
098	B163	32827	R – B	10% Form	16 May 06
"	"	32828	L – B	95% ETOH	"
"	"	32829	NN	95% ETOH	"
099	B164	32830	NN	95% ETOH	16 May 06
100	B170	32831	NN	95% ETOH	17 May 06
101	B2	32832	R – B	10% Form	17 May 06
"	"	32833	L – B	95% ETOH	"
"	"	32834	NN	95% ETOH	"
102	B80	32835	NN	95% ETOH	19 May 06
103	B3	32836	R – B	10% Form	19 May 06
"	"	32837	L – B	95% ETOH	"
"	"	32838	NN	95% ETOH	"
104	B79	32839	NN	95% ETOH	19 May 06
105	B4	32840	R – B	10% Form	19 May 06
"	"	32841	L – B	95% ETOH	"
"	"	32842	NN	95% ETOH	"

P-Sta.#	S-Sta. #	Smp. #	Gear	Pres.	Date
106	B76	32843	NN	95% ETOH	20 May 06
107	B9	32844	R – B	10% Form	20 May 06
"	"	32845	L – B	95% ETOH	"
"	"	32846	NN	95% ETOH	"
108	B273	32847	NN	95% ETOH	20 May 06
109	B10	32848	R – B	10% Form	20 May 06
"	"	32849	L – B	95% ETOH	"
"	"	32850	NN	95% ETOH	"
110	B66	32851	NN	95% ETOH	20 May 06
111	B11	32852	R – B	10% Form	20 May 06
"	"	32853	L – B	95% ETOH	"
"	"	32854	NN	95% ETOH	"
112	B288	32855	NN	95% ETOH	20 May 06
113	B12	32856	R – B	10% Form	21 May 06
"	"	32857	L – B	95% ETOH	"
"	"	32858	NN	95% ETOH	"
114	B63	32859	NN	95% ETOH	21 May 06
115	B13	32860	R – B	10% Form	21 May 06
"	"	32861	L – B	95% ETOH	"
"	"	32862	NN	95% ETOH	"
116	B291	32863	NN	95% ETOH	21 May 06
117	B14	32864	R – B	10% Form	21 May 06
"	"	32865	L – B	95% ETOH	"
"	"	32866	NN	95% ETOH	"
118	B62	32867	NN	95% ETOH	21 May 06
119	B15	32868	R – B	10% Form	22 May 06
"	"	32869	L – B	95% ETOH	"
"	"	32870	NN	95% ETOH	"
120	B296	32871	NN	95% ETOH	22 May 06

Table 3 continued.

P-Sta.#	S-Sta. #	Smp. #	Gear	Pres.	Date
121	B18	32872	R – B	10% Form	22 May 06
"	"	32873	L – B	95% ETOH	"
"	"	32874	NN	95% ETOH	"
122	B59	32875	NN	95% ETOH	22 May 06
123	B19	32876	R – B	10% Form	22 May 06
"	"	32877	L – B	95% ETOH	"
"	"	32878	NN	95% ETOH	"
124	B299	32879	NN	95% ETOH	22 May 06
125	B20	32880	R – B	10% Form	23 May 06
"	"	32881	L – B	95% ETOH	"
"	"	32882	NN	95% ETOH	"
126	B58	32883	NN	95% ETOH	23 May 06
127	B21	32884	R – B	10% Form	23 May 06
"	"	32885	L – B	95% ETOH	"
"	"	32886	NN	95% ETOH	"
128	B304	32887	NN	95% ETOH	23 May 06
129	B24	32888	R – B	10% Form	23 May 06
"	"	32889	L – B	95% ETOH	"
"	"	32890	NN	95% ETOH	"
130	B55	32891	NN	95% ETOH	23 May 06
131	B25	32892	R – B	10% Form	23 May 06
"	"	32893	L – B	95% ETOH	"
"	"	32894	NN	95% ETOH	"
132	B307	32895	NN	95% ETOH	24 May 06
133	B26	32896	R – B	10% Form	24 May 06
"	"	32897	L – B	95% ETOH	"
"	"	32898	NN	95% ETOH	"
134	B54	32899	NN	95% ETOH	24 May 06

P-Sta.#	S-Sta. #	Smp. #	Gear	Pres.	Date
135	B27	32900	R – B	10% Form	24 May 06
"	"	32901	L – B	95% ETOH	"
"	"	32902	NN	95% ETOH	"
136	B312	32903	NN	95% ETOH	24 May 06
137	B28	32904	R – B	10% Form	24 May 06
"	"	32905	L – B	95% ETOH	"
"	"	32906	NN	95% ETOH	"
138	B52	32907	NN	95% ETOH	25 May 06
139	B29	32908	R – B	10% Form	25 May 06
"	"	32909	L – B	95% ETOH	"
"	"	32910	NN	95% ETOH	"
140	B313	32911	NN	95% ETOH	25 May 06
141	B30	32912	R – B	10% Form	25 May 06
"	"	32913	L – B	95% ETOH	"
"	"	32914	NN	95% ETOH	"
142	B240	32915	NN	95% ETOH	25 May 06
143	B31	32916	R – B	10% Form	25 May 06
"	"	32917	L – B	95% ETOH	"
"	"	32918	NN	95% ETOH	"
144	B332	32919	NN	95% ETOH	26 May 06
145	B231	32920	R – B	10% Form	26 May 06
"	"	32921	L – B	95% ETOH	"
"	"	32922	NN	95% ETOH	"
146	B226	32923	NN	95% ETOH	26 May 06
147	B223	32924	R – B	10% Form	26 May 06
"	"	32925	L – B	95% ETOH	"
"	"	32926	NN	95% ETOH	"
148	B217	32927	NN	95% ETOH	26 May 06

Table 3 continued.

P-Sta.#	S-Sta. #	Smp. #	Gear	Pres.	Date
149	B216	32928	R – B	10% Form	26 May 06
"	"	32929	L – B	95% ETOH	"
"	"	32930	NN	95% ETOH	"
"	"	32931	DM/R – B	10% Form	"
"	"	32932	DM/L – B	10% Form	"
150	B209	32933	NN	95% ETOH	26 May 06
"	"	32934	DM/R – B	10% Form	"
"	"	32935	DM/L – B	10% Form	"
151	B23	32936	R – B	10% Form	27 May 06
"	"	32937	L – B	95% ETOH	"
"	"	32938	NN	95% ETOH	"
"	"	32939	DM/R – B	10% Form	"
"	"	32940	DM/L – B	10% Form	"
152	B202	32941	NN	95% ETOH	27 May 06
"	"	32942	DM/R – B	10% Form	"
"	"	32943	DM/L – B	10% Form	"
153	B22	32944	R – B	10% Form	27 May 06
"	"	32945	L – B	95% ETOH	"
"	"	32946	NN	95% ETOH	"
"	"	32947	DM/R – B	10% Form	"
"	"	32948	DM/L – B	10% Form	"
154	B195	32949	NN	95% ETOH	27 May 06
"	"	32950	DM/R – B	10% Form	"
"	"	32951	DM/L – B	10% Form	"
155	B17	32952	R – B	10% Form	27 May 06
"	"	32953	L – B	95% ETOH	"
"	"	32954	NN	95% ETOH	"
"	"	32955	DM/R – B	10% Form	"
"	"	32956	DM/L – B	10% Form	"

P-Sta.#	S-Sta. #	Smp. #	Gear	Pres.	Date
156	B190	32957	NN	95% ETOH	27 May 06
"	"	32958	DM/R – B	10% Form	"
"	"	32959	DM/L – B	10% Form	"
157	B16	32960	R – B	10% Form	28 May 06
"	"	32961	L – B	95% ETOH	"
"	"	32962	NN	95% ETOH	"
"	"	32963	DM/R – B	10% Form	"
"	"	32964	DM/L – B	10% Form	"
158	B185	32965	NN	95% ETOH	28 May 06
"	"	32966	DM/R – B	10% Form	"
"	"	32967	DM/L – B	10% Form	"
159	B83	32968	R – B	10% Form	28 May 06
"	"	32969	L – B	95% ETOH	"
"	"	32970	NN	95% ETOH	"
"	"	32971	DM/R – B	10% Form	"
"	"	32972	DM/L – B	10% Form	"
160	B250	32973	NN	95% ETOH	28 May 06
"	"	32974	DM/R – B	10% Form	"
"	"	32975	DM/L – B	10% Form	"
161	B82	32976	R – B	10% Form	28 May 06
"	"	32977	L – B	95% ETOH	"
"	"	32978	NN	95% ETOH	"
"	"	32979	DM/R – B	10% Form	"
"	"	32980	DM/L – B	10% Form	"
162	B81	32981	NN	95% ETOH	28 May 06
"	"	32982	DM/R – B	10% Form	"
"	"	32983	DM/L – B	10% Form	"

Table 3 continued.

P-Sta.#	S-Sta. #	Smp. #	Gear	Pres.	Date
163	B1	32984	R – B	10% Form	29 May 06
"	"	32985	L – B	95% ETOH	"
"	"	32986	NN	95% ETOH	"
"	"	32987	DM/R – B	10% Form	"
"	"	32988	DM/L – B	10% Form	"

P-Sta.#	S-Sta. #	Smp. #	Gear	Pres.	Date
164	B176	32989	NN	95% ETOH	29 May 06

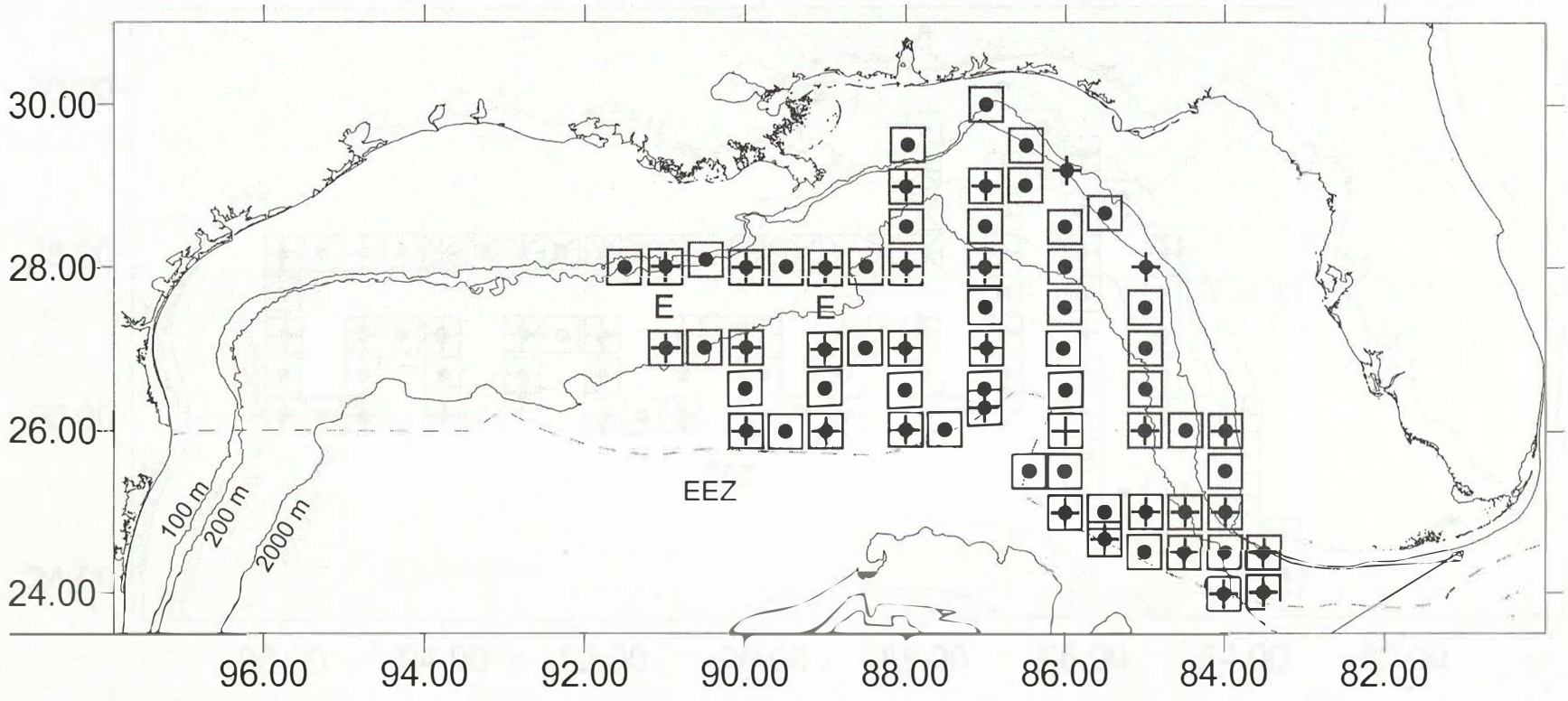

Figure 1. Ichthyoplankton stations occupied during leg 1 of the 2006 SEAMAP Spring Ichthyoplankton Survey. Dots represent completed neuston stations of the NOAA ship *Gordon Gunter* cruise GU-06-02 (37), April 22 to May 07, 2006. The crosses represent stations where bongo tows were completed. Squares represent stations where an environmental profile was collected using the SBE 9/11 CTD. Stations marked with an "E" were extra stations sampled at the end of the leg.

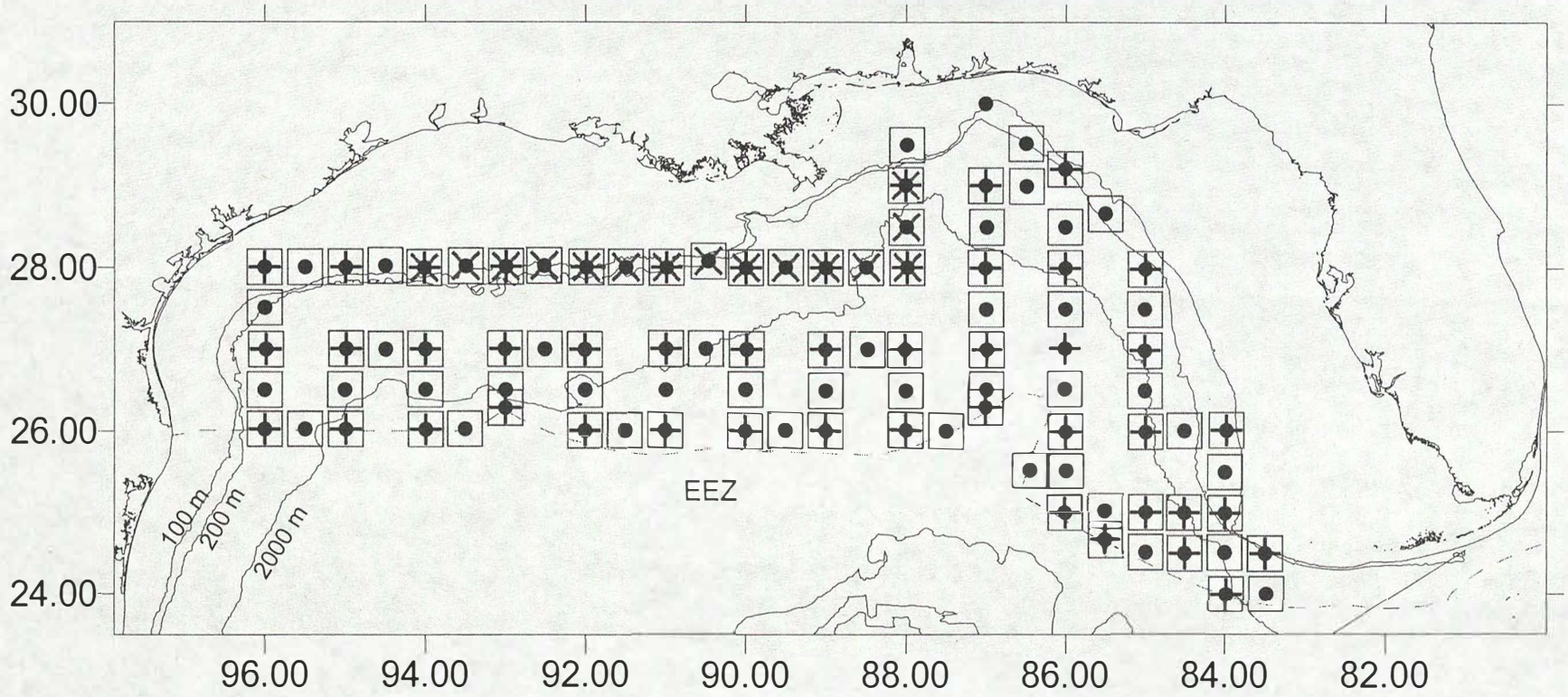

Figure 2. Ichthyoplankton stations occupied during leg 2 of the 2006 SEAMAP Spring Ichthyoplankton Survey. Dots represent completed neuston stations of the NOAA ship *Gordon Gunter* cruise GU-06-02 (37), May 10 - 29, 2006. The crosses represent stations where bongo tows were completed. Squares represent stations where an environmental profile was collected using the SBE 9/11 CTD. Stations marked with a gray X represent denote where a dual-mesh tow (0.333/0.202mm) bongo tow was taken in addition to the standard gear.