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NMFS-SEFSC-317

SEAMAP 1984 & 1985-ICHTHYOPLANKTON Larval Distribution and Abundance of Carangidae, Clupeidae, Coryphaenidae, Engraulididae, Gobiidae, Istiophoridae, Lutjanidae, Scombridae, Serranidae, and Xiphiidae in the Gulf of Mexico

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SEAMAP 1984 AND 1985 - ICHTHYOPLANKTON
Larval Distribution and Abundance of Carangidae, Clupeidae, Coryphaenidae, Engraulididae, Gobiidae, Istiophoridae, Lutjanidae, Scombridae, Serranidae, and Xiphiidae in the Gulf of Mexico

by

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The Southeast Area Monitoring and Assessment Program (SEAMAP) has conducted ichthyoplankton surveys in U.S. waters of the Gulf of Mexico since 1982. These surveys determine the distribution and abundance of pelagic eggs, larvae, and juveniles of fishes for the purpose of management, protection, and conservation of critical fishery habitats. This report presents the results of two years of surveys, 1984 and 1985. The National Marine Fisheries Service (NMFS), and participating components from Alabama Marine Resource Division (AMRD), Florida Department of Natural Resources (FDNR), Louisiana Department of Wildlife and Fisheries (LDWF), and Mississippi Gulf Coast Research Lab (GCRL) conducted sampling throughout 1984 except the months of January, February and September, and throughout 1985 except the months of February, April and May. A total of 14 cruises by five vessels were conducted in 1984 and 17 cruises by six vessels in 1985 (Tables 1, 2). Twenty-three of the 31 cruises employed oblique tows using a 60 cm bongo with 333 μ mesh nets, which were sent to 200 meters or within 5 meters of the bottom and towed to the surface. Five cruises by LDWF used a 20 cm bongo with 333 μ mesh for oblique tows in shallow coastal waters. In addition to the bongos, eighteen of the 31 cruises used a 1 x 2 meter neuston net which was towed at the surface for ten minutes, one LDWF used a $\frac{1}{2}$ meter ring net and one GCRL cruise employed a tucker trawl for a special red drum cruise. During a five station cruise by AMRD only a neuston net was employed.

Each spring there are cooperative cruises which target the pelagic stock of bluefin tuna larvae and eggs. In 1984 there was only one NMFS cruise conducted in April-May and one cruise in June-July targeting bluefin. A total of 473 samples were obtained. No bluefin tuna cruise was conducted in 1985.

The bluefin tuna cruises were conducted in offshore waters from the Florida Keys westward to 94 degrees west longitude. An evaluation of the larval bluefin tuna data was published by McGowan, and Richards (1987) and used to formulate bluefin tuna spawning stock size indices. These indices have been used by the International Commission for the Conservation of Atlantic Tunas (ICCAT) in its assessments (Scott et al; 1990; Scott and Turner, 1991).

A number of other cruises were made during this two year period. GCRL had one special cruise (25 samples) targeting red drum and one standard ichthyoplankton two day cruise (40 samples) in 1984. In 1985 there were three cruises and one special squid/butterfish cruise done by GCRL. LDWF had four cruises (147 samples) in 1984 and six cruises (293 samples) in 1985; NMFS had four cruises, other than the bluefin cruises (732 samples) in 1984, and four cruises (312 samples) in 1985. There was one cruise for AMRD in July of five neuston only stations in 1984 and one AMRD cruise in June of two bongo only stations in 1985. FDNR had one cruise per year, in 1984 the cruise was in August and had 20 stations (60 samples), in 1985 the cruise was in June and had 35 stations (101 samples).

Data gathered by the GCRL red drum cruise in 1984 was used

in two publications, Comyns, et al (1991) and Lyczkowski-Shultz, and Steen Jr. (1991). The samples from the special 1985 squid/butterfish cruise were just returned from Poland when this report was written and the data have not been analyzed yet.

In 1984 there was one cruise each in March, April, and May; three cruises each in June, July, August, and November; and two cruises each conducted in October and December. In 1985 there were 22 cruises; one cruise each in January, March, September and December; two cruises in October; three cruises each in July and August; four cruises done in November; and six cruises in June. (Table 1,2).

A total of 1636 samples were collected in 1984 and a total of 815 samples in 1985. In 1984 the left bongos were sent, in 1985 right bongos were sent, and all 1/2 meter net, Tucker trawl, and neuston samples were sent for both years to the Polish Plankton Sorting and Identification Center in Szczecin, Poland for sorting of eggs and fish larvae. The sorted larvae were counted, measured, and identified to the lowest taxon possible. The ichthyoplankton samples were then sent to the SEAMAP Ichthyoplankton Archiving Center (SAC), at FDNR, 100 Eighth Avenue, S.E., St. Petersburg, FL 33701-5095 for archiving and computer entry. Specimens of requested taxa of larval fish are loaned to qualified researchers. Corrections of identifications by these specialists are used to update the data base. The station data, and FDNR sample data were added to the Southeast Fisheries Center, Miami, FL A-10 data base, established in 1982 (NOAA Technical Memorandum NMFS-SEFC-144). All of the identifications are done by PSIOP personnel with the one exception. One of us (Richards) reviews all the identifications of the scombroid specimens from the spring ichthyoplankton surveys. However, identification of Thunnus species other than T. thynnus are not based on cleared and stained osteological examination which is the only reliable method (Richards et al. 1990). Rather, T. atlanticus are those specimens with ventral tail pigment and Thunnus sp. are those with no ventral tail pigment. All the T. thynnus are verified by their pigment pattern.

The charts (Figures 1-73) in this paper show distributions and abundances of selected fish taxa. Bongo and ring net tow plots are for the estimated number of larvae under 10 square meters of sea surface based on tows which had flow meters attached to the frames. Neuston net tow plots are for the actual number of larvae caught by the 1x2 m neuston net. These plots are summaries of each entire year. The data was downloaded from the NMFS's A-10 and plotted using version 4 of Surfer program. The symbol size is a linear proportional measurement with the symbol height at gridmin equal to 0.1 inches and the gridmax symbol height equal to 0.3 inches. The taxa plotted only include larvae identified to that family, genus or species. For example "Carangidae" contains only larvae identified to the familial level and not to a lower taxon of genus and species. The number of specimens identified to family level is

considerable compared to the number of larvae identified to lower taxa (Tables 3, 4).

In Tables 3 and 4 the taxa and number of individuals collected during 1984 and 1985 SEAMAP surveys are arranged phylogenetically. Table 5 compares the raw abundance rankings of the top ten families by year from 1982-1986. Tables 6 and 7 list the ten most abundant families during SEAMAP 1984 and 1985 respectively. Tables 8 and 9 lists the 20 most abundant taxa recorded from the SEAMAP 1984 and 1985 ichthyoplankton collections respectively, which are arranged in decreasing order of abundance. There are four ichthyoplankton reports available on the NMFS Miami A-10 data base, all of which are in the public domain. These reports may be accessed under the usercode of (MI10MBIO) on pack 109. An example of the needed statement is "Start (MI10MBIO) SEAMAP/REPORT/ONE/WFL on 109 (Pack)". The reports and contents are:

- 1.) SEAMAP/REPORT/ONE/WFL: gives a list by year of SEAMAP participants. It is organized by vessel; cruise; stations; SEAMAP sample number; gear; cruise date range and affiliation (Table 1,2).
- 2.) SEAMAP/REPORT/TWO/WFL: gives a listing of stations for participating vessels. It is organized by vessel, and cruise. It also contains the station number; SEAMAP sample number; position; date; time; gear; depth; volume of water filtered; and displacement volume. Table 10 is given as an example.
- 3.) SEAMAP/REPORT/THREE/WFL: gives a listing by station, vessel, and cruise of alphabetically arranged fish taxa caught. It also contains SEAMAP sample number; position; date; time; gear; mesh; displacement volume; depth; volume of water filtered; standard haul factor; distance net traveled in meters; number of larvae captured; length range in mm and computed number of larvae under 10 square meters of sea surface, for bongo tows with flow meters. This report can be selected for the whole year, or by month, or by a range in SEAMAP sample numbers. Table 11 is an example.
- 4.) SEAMAP/REPORT/FOUR/WFL: gives an alphabetical listing by taxon. It also contains vessel; cruise; station; gear; mesh; position; date; time; number of larvae; lengths and number of larvae under 10 meters square of sea surface. This report can be selected for one taxon or by the whole year (Table 12).

The following are brief descriptions of the 73 plots included in this report.

Station plots (Figure 1,2). The whole upper gulf of Mexico was sampled by 15 cruises in 1984, and 16 cruises in 1985 with extensive covering of the Louisiana and Mississippi continental shelf.

Carangidae (Figures 3,4 & 42,43). Jack larvae were found throughout the northern Gulf of Mexico in 1984 and along the continental shelf of Texas, Louisiana and Florida panhandle in 1985.

Clupeidae (Figures 5,6 & 44,45). Herring larvae were found along the continental shelf of Texas, Louisiana and Florida with a few in the center of the Gulf in 1984 and along the continental shelf of Louisiana and Florida for bongo tows and scattered along the entire shelf for neuston net tows in 1985.

Coryphaenidae (Figures 7-10 & 46-48). Dolphin larvae and dolphin larvae not identified to genus are represented in these plots. Dolphin larvae were found in low abundance in the open ocean and the continental shelf, during both years in the Gulf of Mexico.

Engraulididae (Figures 11,12 & 49,50). Anchovy larvae were extremely abundant along the continental shelf of Texas, Louisiana, Mississippi, Alabama, and northern Florida panhandle during both years.

Gobiidae (Figures 13,14 & 51,52). Goby larvae were abundant in the whole Gulf of Mexico, with the greatest concentrations being in the western half of the Gulf of Mexico during both years.

Istiophoridae (Figures 15-17). Istiophorus platypterus and billfish larvae not identified to genus are represented in these plots. There were no larvae found in 1985. In 1984 there were larvae at three to six locations in the Gulf of Mexico.

Lutjanidae (Figures 18,19 & 53,54). Snapper larvae were present in the continental shelf waters of the Gulf of Mexico during both years.

Sciaenidae (Figures 20,21 & 55). Croaker larvae were found along the north western continental shelf in 1984 and were abundant off Louisiana in 1985.

Auxis sp. (Figures 22,23 & 56,57). The frigate and bullet tunnies, which are the world's most abundant tuna, were found on the continental shelf and also in the open ocean in 1984. In 1985 they were found generally over the continental shelf.

Euthynnus alletteratus (Figures 24,25 & 58,59). Little tunny were widely distributed upon the continental shelf during both years.

Katsuwonus pelamis (Figures 26,27 & 60,61). Skipjack larvae were found in moderate abundance in the central and western Gulf of Mexico in 1984. In 1985 there were only a few occurrences on the continental shelf.

Thunnus sp. (Figures 28,29 & 62,63). These plots represent Thunnus larvae which could not be identified to species. Distribution was throughout the Gulf of Mexico, and off the Florida Keys in 1984. In 1985 distribution was along the continental shelf edge of the Florida panhandle and Texas.

Thunnus atlanticus (Figures 30,31 & 64,65). Blackfin tuna larvae were found along the continental shelf edge for both years and in the open ocean in 1984.

Thunnus thynnus (Figures 32,33). Bluefin tuna larvae were found sporadically in the central Gulf of Mexico in April, and May in 1984. Because there was no sampling in bluefin habitat in 1985 no data were obtained.

Scomberomorus sp. (Figures 34,35 & 66). Mackerel larvae not identified to species are shown in these plots. In 1984 larvae were found in bongo and ring net tows throughout the Gulf with the greatest abundance off the coast of Texas. The neuston tows had only four incidences of unidentifiable larvae. In 1985 there were scattered collections of mackerel larvae on the continental shelf.

Scomberomorus cavalla (Figures 36,37 & 67,68). King mackerel, a coastal species, were found sporadically along the continental shelf both years.

Scomberomorus maculatus (Figures 38,39 & 69,70). Spanish mackerel, which is also a coastal species, were most abundant during both years along the continental shelf off Louisiana, Mississippi, and Texas, with a few occurrences off Florida's shelf.

Serranidae (Figures 40,41 & 71,72). During both years, grouper larvae were abundant throughout the Gulf of Mexico. They were generally collected over shelf waters with some occurrence in oceanic waters.

Xiphiidae (Figure 73). Swordfish larvae were found in only two open ocean neuston tows in 1984.

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Table 1

SEAMAP 1984 PARTICIPANT SUMMARY TABLE

VESSEL	CRUISE	STATIONS	SAMPLES	GEAR	DATES	AFFILIATION
OREGON-II	143	40850-40987	2163- 2491	BONGO NEUSTN	840421-840516	NMFS
ALABAMA #23	135	1- 5	2492- 2496	NEUSTN	840725-840726	AL. MAR. RES.
OREGON-II	146	41301-41486	2497- 2539 2541- 3058	BONGO NEUSTN	840803-840827	NMFS
OREGON-II	145	41017-41294	3059- 3262	NEUSTN BONGO	840607-840722	NMFS
TOMMY MUNRO	01	A0001-B0179	3263- 3292	BONGO NEUSTN	840608-840610	GCRL
OREGON-II	142	40243-40626	3293- 3338	BONGO	840309-840326	NMFS
OREGON-II	149	42242-42277	3455- 3562	NEUSTN BONGO	841202-841217	NMFS
OREGON-II	148	41576-42204	3563- 3621	BONGO	841011-841110	NMFS
LOUISIANA25	06	C1001-07005	3622- 3662	BONGO	840605-840620	LDWF
LOUISIANA25	07	01001-07005	3663- 3702	BONGO	840709-840724	LDWF
LOUISIANA25	08	03011-50956	3703- 3727	RING	840814-841024	LDWF
LOUISIANA25	09	1001-07005	3728- 3769	BONGO	841031-841128	LDWF
BELLOWS	84	R1- R20	3770- 3828	BONGO NEUSTN	840815-840829	FLA.DNR
TOMMY MUNRO	RD84	1- 12	3829- 3862	TRAWL	841107-841108	GCRL
CSS HUDSON	8449	B01- B28	4949- 5003	BONGO	841212-841215	CAN/RICHARDS

Table 2

SEAMAP 1985 PARTICIPANT SUMMARY TABLE

VESSFL	CRUISE	STATIONS	SAMPLES	GEAR	DATES	AFFILIATION
OREGON-II	151	42326-42538	3863- 3919	BONGO	850306-850319	NMFS
BELLOWS	8516	1- 35	3920- 4021	NEUSTN BONGO	850606-850614	FLA. DNR
TOMMY MUNRO	85	178- 183	4022- 4036	BONGO NEUSTN	850611-850614	GCRL/MISSISSIPPI
OREGON-II	153	42795-43130	4037- 4148	NEUSTN BONGO	850611-850715	NMFS
LOUISIANA35	85	B192- W051	4149- 4192	BONGO NEUSTN	850619-850621	LDWF
OREGON-II	154	43144-43235	4193- 4333	NEUSTN BONGO	850731-850826	NMFS
OREGON-II	156	43500-43500	4334- 4336	BONGO NEUSTN	851102-851103	NMFS
LOUISIANA25	10	01001-07005	4337- 4378	BONGO	850610-850626	LDWF
LOUISIANA35	12	WN41- W052	4379- 4447	BONGO NEUSTN	850722-850726	LDWF
LOUISIANA35	13	WN46- WN52	4448- 4508	NEUSTN BONGO	850916-851004	LDWF
LOUISIANA35	15	WN50- WN51	4509- 4555	BONGO	851204-851214	LDWF
ALABAMA #23	85	B173- B177	4556- 4559	BONGO	850610-850612	ALABAMA
TOMMY MUNRO	852	001- 055	4560- 4619	NEUSTN BONGO	850802-850813	GCRL
TOMMY MUNRO	853	17006-17042	4620- 4625	BONGO NEUSTN	851112-851114	GCRL
TOMMY MUNRO	854	17101-17116	4626- 4640	NEUSTN BONGO	850822-850825	GCRL
A. NEEDLER	8501	0003- 0003	4641- 4641	BONGO	850107-850122	PSEFC
OREGON-II	156	42428-42428	5006- 5007	BONGO	851019-851102	NMFS
LOUISIANA25	14	1001- 7005	5218- 5253	BONGO	851105-851107	LDWF

Table 3. All identified ichthyoplankton taxa, number of lots and total number of individuals collected during SEAMAP 1984, arranged phylogenetically.

TAXON	LOTS	TOTAL
CLUPEIFORMES	21	473
CLUPEIDAE	102	1465
<u>Brevoortia</u> sp.	2	2
<u>Brevoortia guenteri</u>	11	229
<u>Brevoortia patronus</u>	28	2055
<u>Etrumeus teres</u>	30	466
<u>Harengula jaguana</u>	159	5447
<u>Opisthonema oglinum</u>	125	2443
<u>Sardinella aurita</u>	49	2188
ENGRAULIDIDAE	499	21514
<u>Anchoviella perfasciata</u>	7	9
<u>Anchoa</u> sp.	24	5705
<u>Anchoa hepsetus</u>	1	197
<u>Anchoa lyolepis</u>	4	3421
<u>Engraulis eurystole</u>	9	20
ANGUILLIFORMES	122	548
MORINGUIDAE	18	76
<u>Neoconger mucronatus</u>	1	1
NEMICHTHYIDAE	3	4
XENCONGRIDAE	4	4
MURAENIDAE	36	57
<u>Gymnothorax</u> sp.	2	5
SYNAPHOBRANCHIDAE	3	3
DYSOMMIDAE	2	2
CONGRIDAE	140	416
<u>Mystactichthys</u> sp.	1	2
MURAENESOCIDAE	1	1
NETTASTOMATIDAE	42	67
OPHICHTHIDAE	62	273
<u>Ophichthus</u> sp.	1	1
<u>Ophichthus puncticeps</u>	1	2
<u>Ophichthus gomesi</u>	32	83
<u>Ophichthus melanoporus</u>	1	1
<u>Myrophis</u> sp.	2	2
<u>Myrophis punctatus</u>	29	134
<u>Pseudomyrophis</u> sp.	3	3
<u>Pseudomyrophis fugesae</u>	14	22
<u>Bascanichthys bascanium</u>	14	20
<u>Letharchus velifer</u>	13	26
<u>Ahlia egmontis</u>	1	2
<u>Callechelys guineensis</u>	1	1
<u>Ethadophis akkistikos</u>	1	1
<u>Aplatophis chauliodus</u>	3	4
SALMONIFORMES		
ARGENTINIDAE	10	11

Table 3 - Continued

TAXON	LOTS	TOTAL
BATHYLAGIDAE	7	8
<u>Bathylagus</u> sp.	44	60
GONOSTOMATIDAE	221	1247
<u>Cyclothone</u> sp.	237	1471
<u>Gonostoma</u> sp.	25	41
<u>Vinciguerria</u> sp.	13	35
<u>Vinciguerria attenuata</u>	96	191
<u>Vinciguerria nimbaria</u>	116	209
<u>Vinciguerria poweriae</u>	19	33
<u>Diplophos taenia</u>	1	1
<u>Margrethia obtusirostre</u>	5	5
<u>Pollichthys maui</u>	19	34
<u>Valenciennellus tripunctulatus</u>	1	1
<u>Maurolicus muelleri</u>	103	748
STERNOPTYCHIDAE	45	93
<u>Argyropelecus</u> sp.	5	5
<u>Sternoptyx</u> sp.	32	69
CHAULIODONTIDAE	7	7
<u>Chauliodus</u> sp.	32	39
STOMIIDAE	9	10
<u>Stomias boa</u>	1	1
ASTRONESTHIDAE	3	3
<u>Astronesthes</u> sp.	2	2
MELANOSTOMIIDAE	34	44
<u>Eustomias</u> sp.	4	4
<u>Bathophilus</u> sp.	1	1
MALACOSTEIDAE	11	16
IDIACANTHIDAE		
<u>Idiacanthus fasciola</u>	1	1
MYCTOPHIFORMES	2	2
SYNODONTIDAE	244	3974
<u>Synodus foetens</u>	15	82
<u>Trachinocephalus myops</u>	5	15
CHLOROPHTHALMIDAE	8	12
<u>Chlorophthalmus</u> sp.	5	6
SCOPELOSAURIDAE	5	6
MYCTOPHIDAE	317	4439
<u>Myctophum</u> sp.	167	1461
<u>Myctophum nitidulum</u>	8	19
<u>Myctophum affine</u>	3	142
<u>Myctophum asperum</u>	1	1
<u>Hygophum</u> sp.	158	2261
<u>Hygophum reinhardtii</u>	4	15
<u>Notolychnus valdiviae</u>	109	385
<u>Centrobranchus</u> sp.	2	3
<u>Centrobranchus nigroocellatus</u>	38	66
<u>Diaphus</u> sp.	167	2136
<u>Ceratoscopelus</u> sp.	34	67

Table 3 - Continued

TAXON	LOTS	TOTAL
<u>Ceratoscopelus maderensis</u>	12	27
<u>Benthoosema</u> sp.	102	452
<u>Diogenichthys</u> sp.	2	3
<u>Diogenichthys atlanticus</u>	87	226
<u>Gonichthys cocco</u>	36	107
<u>Lobianchia</u> sp.	1	1
<u>Taaningichthys minimus</u>	2	2
<u>Lampanyctus</u> sp.	122	329
<u>Lepidophanes</u> sp.	1	1
<u>Lepidophanes guentheri</u>	7	8
<u>Notoscopelus resplendens</u>	18	22
<u>Lampadena</u> sp.	6	13
PARALEPIDIDAE	188	478
<u>Sudis</u> sp.	26	32
<u>Lestidiops</u> sp.	1	1
<u>Notolepis rissoi</u>	1	1
OMOSUDIDAE		
<u>Omosudis</u> sp.	2	2
ALEPISAUROIDAE	1	2
<u>Alepisaurus</u> sp.	4	4
EVERMANNELLIDAE	22	29
SCOPELARCHIDAE	57	99
GADIFORMES	3	8
MORIDAE	8	9
BREGMACEROTIDAE		
<u>Bregmaceros</u> sp.	327	5379
<u>Bregmaceros atlanticus</u>	1	1
GADIDAE	13	51
<u>Urophycis</u> sp.	2	6
<u>Urophycis chuss</u>	3	5
<u>Urophycis regius</u>	1	1
MERLUCCIIDAE		
<u>Merluccius</u> sp.	3	8
MACROURIDAE	21	32
OPHIDIIDAE	210	1838
CARAPIDAE	31	78
<u>Carapus</u> sp. (includes <u>Echiodon</u> sp.)	8	14
LOPHIIFORMES	2	2
CERATIOIDEI	98	196
ANTENNARIIDAE	30	51
<u>Histrio histrio</u>	3	8
ATHERINIFORMES		
EXOCOETIDAE	273	1736
<u>Cypselurus</u> sp.	3	3
<u>Hirundichthys</u> sp.	1	1
<u>Cheilopogon furcatus</u>	1	1
<u>Paraexocoetus brachypterus</u>	7	24
BELONIDAE	4	5

Table 3 - Continued

TAXON	LOTS	TOTAL
ATHERINIDAE	33	544
LAMPRIDIFORMES	1	1
TRACHIPTERIDAE	5	5
BERYCIFORMES		
MELAMPHAIDAE	71	103
<u>Melamphaes</u> sp.	1	1
HOLOCENTRIDAE	1	1
<u>Holocentrus</u> sp.	16	37
ZEIFORMES		
CAPROIDAE	4	5
SYNGNATHIFORMES		
FISTULARIIDAE	2	2
<u>Fistularia</u> sp.	2	2
SYNGNATHIDAE	44	89
<u>Syngnathus</u> sp.	34	64
<u>Hippocampus</u> sp.	8	10
<u>Hippocampus erectus</u>	4	10
SCORPAENIFORMES	11	73
SCORPAENIDAE	146	478
TRIGLIDAE	25	86
<u>Prionotus</u> sp.	85	212
CYCLOPTERIDAE	1	1
DACTYLOPTERIFORMES		
DACTYLOPTERIDAE		
<u>Dactylopterus volitans</u>	1	1
PERCIFORMES	51	78
SERRANIDAE	233	1708
<u>Diplectrum</u> sp.	67	419
<u>Serranus</u> sp.	20	40
<u>Serraniculus</u> sp.	2	4
<u>Serraniculus pumilio</u>	14	72
<u>Anthias</u> sp.	15	22
<u>Anthias nicholsi</u>	1	6
<u>Centropristis</u> sp.	14	29
<u>Epinephelus</u> sp.	12	42
<u>Hemanthias</u> sp.	21	30
<u>Hemanthias aureorubens</u>	1	1
<u>Liopropoma</u> sp.	9	12
<u>Plectranthias</u> sp.	1	2
<u>Hypoplectrus</u> sp.	1	1
GRAMMISTIDAE	1	4
<u>Rypticus</u> sp.	2	2
<u>Pseudograma</u> sp.	3	3
PRIACANTHIDAE	41	59
APOGONIDAE	19	74
<u>Apogon</u> sp.	22	57
<u>Howella</u> sp.	70	117

Table 3 - Continued

TAXON	LOTS	TOTAL
<u>Sphyraenops bairdianus</u>	4	4
ACROPOMATIDAE	1	1
<u>Synagrops</u> sp.	3	3
BRANCHIOSTEGIDAE	11	13
POMATOMIDAE		
<u>Pomatomus</u> sp.	2	4
<u>Pomatomus saltatrix</u>	12	20
RACHYCENTRIDAE		
<u>Rachycentron canadum</u>	3	6
ECHENEIDIDAE		
<u>Echeneis</u> sp.	1	1
CARANGIDAE	125	507
<u>Decapterus punctatus</u>	85	510
<u>Caranx</u> sp.	108	779
<u>Caranx crysos</u>	134	827
<u>Caranx hippos</u>	4	7
<u>Oligoplites saurus</u>	26	41
<u>Seriola</u> sp.	21	38
<u>Trachinotus</u> sp.	14	19
<u>Trachinotus carolinus</u>	2	2
<u>Chloroscombrus chrysurus</u>	289	8067
<u>Selene</u> sp.	56	145
<u>Selene setapinnis</u>	3	4
<u>Alectis ciliaris</u>	1	1
<u>Elagatis</u> sp.	1	1
<u>Elagatis bipinnulatus</u>	2	2
<u>Selar crumenophthalmus</u>	31	75
<u>Trachurus lathami</u>	14	21
<u>Hemicaranx amblyrhynchus</u>	1	1
CORYPHAENIDAE		
<u>Coryphaena</u> sp.	21	26
<u>Coryphaena hippurus</u>	28	45
<u>Coryphaena equiselis</u>	20	31
BRAMIDAE	6	7
LUTJANIDAE	148	198
<u>Lutjanus</u> sp.	1	1
<u>Lutanus griseus</u>	7	32
<u>Rhomboplites aurorubens</u>	26	57
<u>Pristipomoides aquilonaris</u>	2	4
LOBOTIDAE	7	29
GERREIDAE	3	16
HAEMULIDAE	1	1
SPARIDAE	36	303
<u>Lagodon rhomboides</u>	6	10
SCIAENIDAE	102	954
<u>Stellifer lanceolatus</u>	1	1
<u>Cynoscion</u> sp.	1	14
<u>Cynoscion arenarius</u>	10	10

Table 3 - Continued

TAXON	LOTS	TOTAL
<u>Cynoscion nebulosus</u>	24	106
<u>Cynoscion regalis</u>	67	652
<u>Bairdiella chrysoura</u>	4	5
<u>Menticirrhus</u> sp.	4	9
<u>Micropogonias undulatus</u>	20	1010
<u>Larimus fasciatus</u>	7	10
<u>Leiostomus xanthurus</u>	4	5
<u>Sciaenops ocellatus</u>	8	29
MULLIDAE	95	1129
KYPHOSIDAE	2	2
EPHIPPIDIDAE	30	88
<u>Chaetodipterus faber</u>	1	1
CHAETODONTIDAE	4	5
POMACANTHIDAE	2	3
POMACENTRIDAE	15	19
<u>Abudefduf saxatilis</u>	2	6
MUGILIDAE		
<u>Mugil</u> sp.	96	4515
<u>Mugil curema</u>	2	3
SPHYRAENIDAE	2	3
<u>Sphyraena</u> sp.	83	144
POLYNEMIDAE		
<u>Polydactylus</u> sp.	16	145
<u>Polydactylus octonemus</u>	2	2
LABRIDAE	205	1782
SCARIDAE	58	201
<u>Sparisoma</u> sp.	4	14
CHIASMODONTIDAE	4	6
URANOSCOPIDAE	9	15
<u>Uranoscopus</u> sp.	1	1
BLENNIIDAE	86	259
<u>Hypsoblennius hentzi</u>	64	354
<u>Hypleurochilus geminatus</u>	12	47
GOBIIDAE	399	9260
MICRODESMIDAE	2	2
<u>Microdesmus</u> sp.	1	1
ACANTHURIDAE		
<u>Acanthurus</u> sp.	10	36
GEMPYLIDAE	10	10
<u>Diplospinus multistriatus</u>	92	142
<u>Neopinnula orientalis</u>	1	1
<u>Gempylus serpens</u>	24	26
<u>Nesiarchus nasutus</u>	10	20
<u>Ruvettus pretiosus</u>	1	1
TRICHIURIDAE	10	11
<u>Trichiurus lepturus</u>	64	109
<u>Lepidopus caudatus</u>	2	2

Table 3 - Continued

TAXON	LOTS	TOTAL
SCOMBRIDAE	85	287
<u>Katsuwonus pelamis</u>	61	79
<u>Thunnus sp.</u>	38	73
<u>Thunnus thynnus</u>	29	67
<u>Thunnus atlanticus</u>	93	309
<u>Auxis sp.</u>	73	562
<u>Euthynnus alletteratus</u>	125	322
<u>Scomberomorus sp.</u>	62	388
<u>Scomberomorus maculatus</u>	64	378
<u>Scomberomorus cavalla</u>	18	31
<u>Acanthocybium solanderi</u>	2	2
<u>Scomber japonicus</u>	4	27
<u>Sarda sarda</u>	2	2
SCOMBROLABRACIDAE		
<u>Scombrolabrax heterolepis</u>	7	8
XIPHIIDAE	1	1
<u>Xiphias gladius</u>	2	2
ISTIOPHORIDAE	5	14
<u>Istiophorus sp.</u>	3	7
<u>Istiophorus platypterus</u>	10	18
NOMEIDAE	1	1
<u>Nomeus sp.</u>	2	2
<u>Nomeus gronovii</u>	4	4
<u>Cubiceps sp.</u>	59	173
<u>Psenes sp.</u>	38	94
TETRAGONURIDAE	1	1
STROMATEIDAE	79	199
<u>Peprilus sp.</u>	35	137
<u>Peprilus paru</u>	54	183
<u>Peprilus alepidotus</u>	6	17
GOBIESOCIDAE	6	9
<u>Gobiesox strumosus</u>	5	9
CALLIONYMIDAE	51	633
<u>Callionymus sp.</u>	31	178
PLEURONECTIFORMES	2	7
BOTHIDAE	217	1868
<u>Citharichthys sp.</u>	199	2987
<u>Citharichthys arctifrons</u>	2	19
<u>Citharichthys spilopterus</u>	3	17
<u>Syacium sp.</u>	206	3267
<u>Syacium papillosum</u>	6	19
<u>Bothus sp.</u>	215	866
<u>Monolene sp.</u>	1	1
<u>Etropus sp.</u>	8	56
<u>Etropus crossotus</u>	4	4
<u>Cyclopsetta sp.</u>	21	23
<u>Cyclopsetta fimbriata</u>	1	1

Table 3 - Continued

TAXON	LOTS	TOTAL
PLEURONECTIDAE	1	1
SOLEIDAE	18	23
<u>Trinectes maculatus</u>	1	4
CYNOGLOSSIDAE		
<u>Symphurus</u> sp.	307	5509
<u>Symphurus plagusia</u>	13	494
BALISTIDAE	90	256
<u>Stephanolepis hispidus</u>	49	245
<u>Stephanolepis setifer</u>	20	111
<u>Monacanthus ciliatus</u>	4	8
<u>Aluterus</u> sp.	14	23
<u>Balistes</u> sp.	2	2
<u>Balistes capriscus</u>	4	6
OSTRACIIDAE		
<u>Lactophrys</u> sp.	1	1
TETRAODONTIDAE	27	72
<u>Sphoeroides</u> sp.	161	751
DIODONTIDAE	5	6
<u>Chilomycterus schoepfi</u>	1	1

Table 4. All identified ichthyoplankton taxa, number of lots and total number of individuals collected during SEAMAP 1985, arranged phylogenetically.

TAXON	LOTS	TOTAL
CLUPEIFORMES	26	703
CLUPEIDAE	77	1475
<u>Brevoortia</u> sp.	44	5239
<u>Brevoortia guenteri</u>	8	2005
<u>Etrumeus teres</u>	15	501
<u>Harengula jaguana</u>	98	2776
<u>Opisthonema oglinum</u>	42	1405
<u>Sardinella aurita</u>	36	664
ENGRAULIDIDAE	268	7941
<u>Anchoa</u> sp.	70	1070
<u>Anchoa hepsetus</u>	1	16
<u>Anchoa lyolepis</u>	1	4
<u>Engraulis</u> sp.	3	16
<u>Engraulis eurystole</u>	27	161
ELOPIFORMES		
ELOPIDAE	2	2
<u>Elops saurus</u>	1	1
MEGALOPIDAE		
<u>Megalops atlanticus</u>	2	4
ANGUILLIFORMES	42	166
ANGUILLIDAE	1	1
MORINGUIDAE	2	5
MURAENIDAE	52	140
CONGRIDAE	98	283
MURAENESOCIDAE	1	1
NETTASTOMATIDAE	31	69
OPHICHTHIDAE	95	250
<u>Ophichthus</u> sp.	1	1
<u>Ophichthus gomesi</u>	44	93
<u>Ophichthus rex</u>	3	3
<u>Myrophis punctatus</u>	6	9
<u>Pseudomyrophis</u> sp.	1	3
<u>Pseudomyrophis fugesae</u>	11	16
<u>Phaenomonas longissimus</u>	1	1
<u>Callechelys muraena</u>	2	2
<u>Aplatophis chauliodus</u>	4	5
<u>Letharchus</u> sp.	1	1
SALMONIFORMES		
ARGENTINIDAE	6	10
BATHYLAGIDAE	1	1
<u>Bathylagus</u> sp.	7	7
GONOSTOMATIDAE	64	390
<u>Cyclothone</u> sp.	63	332
<u>Gonostoma</u> sp.	4	9
<u>Vinciguerria</u> sp.	6	13

Table 4 - Continued

TAXON	LOTS	TOTAL
<u>Vinciguerria attenuata</u>	34	61
<u>Vinciguerria nimbaria</u>	16	29
<u>Vinciguerria poweriae</u>	4	4
<u>Pollichthys maui</u>	4	4
<u>Maurolicus</u> sp.	1	5
<u>Maurolicus muelleri</u>	62	822
STERNOPTYCHIDAE	36	97
<u>Argyropelecus</u> sp.	5	5
CHAULIODONTIDAE	4	4
STOMIIDAE	5	6
MELANOSTOMIIDAE	4	4
MALACOSTEIDAE	1	1
MYCTOPHIFORMES		
SYNODONTIDAE	150	2937
<u>Synodus</u> sp.	1	1
<u>Synodus foetens</u>	13	41
CHLOROPHTHALMIDAE	2	2
<u>Chlorophthalmus</u> sp.	1	1
MYCTOPHIDAE	116	1339
<u>Myctophum</u> sp.	71	321
<u>Hygophum</u> sp.	30	85
<u>Hygophum reinhardtii</u>	13	19
<u>Notolychnus valdiviae</u>	33	129
<u>Centrobranchus nigropocellatus</u>	15	30
<u>Diaphus</u> sp.	81	910
<u>Ceratoscopelus</u> sp.	1	1
<u>Ceratoscopelus maderensis</u>	16	21
<u>Benthoosema</u> sp.	32	73
<u>Diogenichthys</u> sp.	1	2
<u>Diogenichthys atlanticus</u>	26	42
<u>Gonichthys cocco</u>	6	9
<u>Taaningichthys minimus</u>	1	2
<u>Lampanyctus</u> sp.	35	71
<u>Lepidophanes</u> sp.	1	2
<u>Notoscopelus resplendens</u>	3	4
PARALEPIDIDAE	70	201
<u>Paralepis</u> sp.	1	1
<u>Sudis</u> sp.	3	4
EVERMANNELLIDAE	2	2
SCOPELARCHIDAE	12	17
GADIFORMES		
MORIDAE	1	1
BREGMACEROTIDAE		
<u>Bregmaceros</u> sp.	197	4725
GADIDAE	1	4
<u>Urophycis</u> sp.	3	3
<u>Urophycis chuss</u>	4	6
<u>Urophycis regius</u>	1	1

Table 4 - Continued

TAXON	LOTS	TOTAL
MACROURIDAE	7	15
OPHIDIIDAE	136	882
CARAPIDAE	4	6
<u>Carapus</u> sp. (includes <u>Echiodon</u> sp.)	13	17
LOPHIIFORMES	3	3
CERATIOIDEI	69	186
ANTENNARIIDAE	11	13
<u>Histrio histrio</u>	2	4
ATHERINIFORMES	1	124
EXOCOETIDAE	93	560
<u>Cheilopogon</u> sp.	1	1
<u>Paraexocoetus brachypterus</u>	4	20
BELONIDAE	5	5
SCOMBERESOCIDAE		
<u>Scomberesox saurus</u>	1	1
ATHERINIDAE	11	32
LAMPRIDIFORMES	1	1
TRACHIPTERIDAE	2	2
BERYCIFORMES		
MELAMPHAIIDAE	32	53
HOLOCENTRIDAE	1	1
<u>Holocentrus</u> sp.	3	5
ZEIFORMES		
CAPROIDAE		
<u>Antigonia rubescens</u>	1	1
SYNGNATHIFORMES		
FISTULARIIDAE	1	1
SYNGNATHIDAE		
<u>Syngnathus</u> sp.	29	34
<u>Hippocampus</u> sp.	2	2
SCORPAENIFORMES	2	3
SCORPAENIDAE	87	496
TRIGLIDAE	1	6
<u>Prionotus</u> sp.	68	154
PERCIFORMES	9	13
SERRANIDAE	60	274
<u>Diplectrum</u> sp.	59	349
<u>Serranus</u> sp.	7	7
<u>Serraniculus pumilio</u>	24	34
<u>Anthias</u> sp.	1	1
<u>Anthias nicholsi</u>	1	1
<u>Centropristis</u> sp.	12	17
<u>Centropristis striata</u>	4	9
<u>Hemanthias</u> sp.	1	1
<u>Hemanthias aureorubens</u>	1	1
<u>Liopropoma</u> sp.	11	16
<u>Mycteroperca</u> sp.	1	1
<u>Holanthias</u> sp.	1	1

Table 4 - Continued

TAXON	LOTS	TOTAL
GRAMMISTIDAE	9	12
<u>Rypticus</u> sp.	6	7
<u>Pseudograma</u> sp.	1	1
PRIACANTHIDAE	22	49
APOGONIDAE	3	3
<u>Apogon</u> sp.	44	175
<u>Howella</u> sp.	16	17
ACROPOMATIDAE	10	11
<u>Synagrops</u> sp.	1	1
BRANCHIOSTEGIDAE	2	3
POMATOMIDAE		
<u>Pomatomus saltatrix</u>	2	4
RACHYCENTRIDAE	4	4
ECHENEIDIDAE	1	1
<u>Remora</u> sp.	1	1
CARANGIDAE	83	2651
<u>Decapterus</u> sp.	1	3
<u>Decapterus punctatus</u>	48	605
<u>Caranx</u> sp.	66	332
<u>Caanx bartholomaei</u>	1	1
<u>Caranx crysos</u>	76	1711
<u>Caranx hippos</u>	1	1
<u>Oligoplites saurus</u>	5	7
<u>Seriola</u> sp.	15	25
<u>Trachinotus</u> sp.	1	1
<u>Chloroscombrus chrysurus</u>	144	5480
<u>Selene vomer</u>	36	65
<u>Selene setapinnis</u>	6	10
<u>Elagatis bipinnulatus</u>	1	5
<u>Selar crumenophthalmus</u>	27	73
<u>Trachurus lathami</u>	14	50
CORYPHAENIDAE	1	1
<u>Coryphaena</u> sp.	6	12
<u>Coryphaena hippurus</u>	19	31
<u>Coryphaena equiselis</u>	5	5
BRAMIDAE	5	6
LUTJANIDAE	63	242
<u>Lutjanus campechanus</u>	8	20
<u>Lutanus griseus</u>	10	39
<u>Rhomboplites aurorubens</u>	44	110
<u>Pristipomoides aquilonaris</u>	18	82
LOBOTIDAE	10	29
<u>LOBotes surinamensis</u>	2	5
GERREIDAE	39	486
SPARIDAE	20	88
<u>Archosargus probatocephalus</u>	1	4
<u>Lagodon rhomboides</u>	6	9
SCIAENIDAE	54	1307

Table 4 - Continued

TAXON	LOTS	TOTAL
<u>Stellifer lanceolatus</u>	28	416
<u>Cynoscion</u> sp.	8	193
<u>Cynoscion nothus</u>	10	70
<u>Cynoscion arenarius</u>	42	498
<u>Cynoscion nebulosus</u>	12	37
<u>Bairdiella chrysa</u>	4	4
<u>Menticirrhus</u> sp.	11	88
<u>Micropogonias</u> sp.	1	31
<u>Micropogonias undulatus</u>	35	295
<u>Larimus fasciatus</u>	9	22
<u>Leiostomus xanthurus</u>	22	96
<u>Sciaenops ocellatus</u>	13	23
<u>Pogonias cromis</u>	2	3
MULLIDAE	22	225
KYPHOSIDAE	4	4
EPHIPPIDIDAE	21	62
CHAETODONTIDAE	1	3
POMACENTRIDAE	23	154
MUGILIDAE		
<u>Mugil</u> sp.	35	91
<u>Mugil curema</u>	1	3
SPHYRAENIDAE		
<u>Sphyraena</u> sp.	40	73
<u>Sphyraena borealis</u>	1	2
LABRIDAE	85	1466
SCARIDAE	16	30
CHIASMODONTIDAE	2	2
CLINIDAE	1	2
BLENNIIDAE	56	139
<u>Hypsoblennius hentzi</u>	48	146
<u>Hypleurochilus geminatus</u>	19	33
GOBIIDAE	262	3954
MICRODESMIDAE	46	214
<u>Microdesmus longipinnis</u>	3	5
ACANTHURIDAE		
<u>Acanthurus</u> sp.	3	3
GEMPYLIDAE		
<u>Diplospinus multistriatus</u>	16	19
<u>Neopinnula</u> sp.	1	1
<u>Neopinnula orientalis</u>	1	1
<u>Gempylus serpens</u>	3	4
<u>Ruvettus pretiosus</u>	1	1
TRICHIURIDAE		
<u>Trichiurus lepturus</u>	39	78
SCOMBRIDAE	31	157
<u>Katsuwonus pelamis</u>	12	15
<u>Thunnus</u> sp.	22	166
<u>Thunnus thynnus</u>	3	5

Table 4 - Continued

TAXON	LOTS	TOTAL
<u>Thunnus atlanticus</u>	50	403
<u>Auxis</u> sp.	73	354
<u>Euthynnus alletteratus</u>	129	713
<u>Scomberomorus</u> sp.	7	25
<u>Scomberomorus maculatus</u>	41	171
<u>Scomberomorus cavalla</u>	26	57
<u>Scomber japonicus</u>	1	3
SCOMBROLABRACIDAE		
<u>Scombrolabrax heterolepis</u>	1	1
ISTIOPHORIDAE		
<u>Istiophorus</u> sp.	6	22
NOMEIDAE		
<u>Cubiceps</u> sp.	31	40
<u>Psenes</u> sp.	13	19
STROMATEIDAE		
<u>Peprilus</u> sp.	79	229
<u>Peprilus paru</u>	3	4
<u>Peprilus alepidotus</u>	1	1
GOBIESOCIDAE	3	3
CALLIONYMIDAE		
<u>Callionymus</u> sp.	24	136
PLEURONECTIFORMES	1	1
BOTHIDAE	119	488
<u>Citharichthys</u> sp.	104	702
<u>Citharichthys cornutus</u>	2	2
<u>Citharichthys gymnorhinus</u>	2	2
<u>Citharichthys spilopterus</u>	20	39
<u>Syacium</u> sp.	127	1299
<u>Syacium papillosum</u>	20	100
<u>Bothus</u> sp.	86	201
<u>Bothus ocellatus</u>	2	3
<u>Etropus</u> sp.	9	28
<u>Eropus microstomus</u>	1	1
<u>Etropus crossotus</u>	34	182
<u>Cyclopsetta</u> sp.	11	26
<u>Trichopsetta ventralis</u>	1	2
SOLEIDAE	13	21
CYNOGLOSSIDAE		
<u>Symphurus</u> sp.	221	2076
BALISTIDAE	76	406
<u>Aluterus</u> sp.	1	1
<u>Balistes capriscus</u>	1	6
OSTRACIIDAE	2	6
TETRAODONTIDAE	2	2
<u>Sphoeroides</u> sp.	77	222
<u>Sphoeroides maculatus</u>	1	2

Table 5. Ranking by year of ten most abundant families from SEAMAP collections 1982 through 1986.

<u>FAMILY</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Bothidae	7	6	6	7	4
Bregmacerotidae	8	5	8	4	8
Carangidae	4	7	4	2	3
Clupeidae	1	3	2	1	5
Cynoglossidae	-	-	7	10	9
Engraulididae	3	1	1	3	2
Gobiidae	5	4	5	5	1
Gonostomatidae	6	9	-	-	-
Mugilidae	-	10	9	-	-
Myctophidae	2	2	3	8	7
Ophidiidae	-	-	-	-	10
Sciaenidae	9	8	-	6	6
Synodontidae	10	-	10	9	-

Table 6. Ten most abundant families collected (includes all genera and species level identifications) during SEAMAP 1984, arranged by decreasing number of individuals captured.

<u>FAMILY</u>	<u>TOTAL NO. SPECIMENS COLLECTED</u>
Engraulididae	30,866
Clupeidae	14,295
Myctophidae	11,889
Carangidae	11,047
Gobiidae	9,260
Bothidae	9,128
Cynoglossidae	6,003
Bregmacerotidae	5,380
Mugilidae	4,518
Synodontidae	4,071

Table 7. Ten most abundant families collected (includes all genera and species level identifications) during SEAMAP 1985, arranged by decreasing number of individuals captured.

<u>FAMILY</u>	<u>TOTAL NO. SPECIMENS COLLECTED</u>
Clupeidae	12,735
Carangidae	11,020
Engraulididae	9,208
Bregmacerotidae	4,725
Gobiidae	3,954
Sciaenidae	3,083
Bothidae	3,075
Myctophidae	3,060
Synodontidae	2,979
Cynoglossidae	2,076

Table 8. Twenty most abundant taxa identified from SEAMAP 1984 collections, arranged by decreasing number of individuals captured.

<u>TAXON</u>	<u>NO. LOTS</u>	<u>NO. SPECIMENS</u>
<u>Engraulididae</u>	499	21,514
<u>Gobiidae</u>	399	9,260
<u>Chloroscombrus chrysurus</u>	289	8,067
<u>Anchoa sp.</u>	24	5,705
<u>Symphurus sp.</u>	307	5,509
<u>Harengula jaguana</u>	159	5,447
<u>Bregmaceros sp.</u>	327	5,379
<u>Mugil sp.</u>	96	4,515
<u>Myctophidae</u>	317	4,439
<u>Synodontidae</u>	244	3,974
<u>Anchoa lyolepis</u>	4	3,421
<u>Syacium sp.</u>	206	3,267
<u>Citharichthys sp.</u>	199	2,987
<u>Opisthonema oglinum</u>	125	2,443
<u>Hygophum sp.</u>	158	2,261
<u>Sardinella aurita</u>	49	2,188
<u>Diaphus sp.</u>	167	2,136
<u>Brevoortia patronus</u>	28	2,055
<u>Bothidae</u>	217	1,868
<u>Ophidiidae</u>	210	1,838

Table 9. Twenty most abundant taxa identified from SEAMAP 1985 collections, arranged by decreasing number of individuals captured.

<u>TAXON</u>	<u>NO. LOTS</u>	<u>NO. SPECIMENS</u>
Engraulididae	268	7,941
<u>Chloroscombrus chrysurus</u>	144	5,480
<u>Brevoortia</u> sp.	44	5,239
Bregmacerotidae	197	4,725
Gobiidae	262	3,954
Synodontidae	150	2,939
<u>Harengula jaguana</u>	98	2,776
Carangidae	83	2,651
<u>Symphurus</u> sp.	221	2,076
<u>Brevoortia guenteri</u>	8	2,005
<u>Caranx crysos</u>	76	1,711
Clupeidae	77	1,475
Labridae	85	1,466
<u>Opisthonema oglinum</u>	42	1,405
Myctophidae	116	1,339
Sciaenidae	54	1,307
<u>Syacium</u> sp.	127	1,299
<u>Anchoa</u> sp.	70	1,070
<u>Diaphus</u> sp.	81	910
Ophidiidae	136	882

Table 10

SEAMAP 1985 LIST OF STATIONS FOR PARTICIPATING VESSELS

BELLOWS CRUISE 8516 FLA. DNR

STATION	SAMPLES	LATITUDE	LONGITUDE	DATE	TIME	GEAR	DEPTH	VWF	DISP VOL
1	3920- 3922	3000.00N	08659.90W	850606	0605	BONGO NEUSTN	58 1	219 0	
2	3923- 3925	3000.00N	08630.00W	850607	1254	BONGO NEUSTN	44 1	223 0	
3	3926- 3928	3000.00N	08600.00W	850607	1613	BONGO NEUSTN	25 1	44 0	
4	3929- 3931	2930.00N	08700.00W	850606	1335	BONGO NEUSTN	119 1	412 0	
5	3932- 3934	2930.00N	08630.00W	850607	0700	BONGO NEUSTN	159 1	441 0	
6	3935- 3937	2930.00N	08600.00W	850607	2056	BONGO NEUSTN	45 1	82 0	
7	3938- 3940	2930.00N	08530.00W	850608	2005	BONGO NEUSTN	11 1	52 0	
8	3941- 3943	2930.00N	08500.00W	850608	2338	BONGO NEUSTN	8 1	37 0	
9	3944- 3946	2830.00N	08430.00W	850609	1751	BONGO NEUSTN	16 1	48 0	
10	3947- 3949	2930.00N	08400.00W	850611	0140	BONGO NEUSTN	18 1	45 0	
11	3950- 3952	2930.00N	08330.00W	850611	0532	BONGO NEUSTN	3 1	33 0	
12	3953- 3955	2900.00N	08700.00W	850606	1853	BONGO NEUSTN	211 1	464 0	
13	3956- 3958	2900.00N	08630.00W	850606	2342	BONGO NEUSTN	215 1	329 0	
14	3959- 3961	2900.00N	08600.00W	850608	0116	BONGO NEUSTN	204 1	257 0	
15	3962- 3964	2900.00N	08530.00W	850608	1500	BONGO NEUSTN	59 1	289 0	
16	3965- 3967	2900.00N	08500.00W	850609	0408	BONGO NEUSTN	32 1	63 0	

Table 11

STATION

27 BELLOWS CRUISE 8516 FLA. DNR

SAMPLE	LATITUDE	LONGITUDE	DATE	TIME	GEAR	MESH	DISP. VOL.	DEPTH	VWF	SHF	DIST.
4000	2800.00N	08400.00W	85 613	2051	NEUSTN	.946		1	0	0.00	0
FAMILY	GENUS	SPECIES	NUMBER		LENGTH		NO. UNDER 10MSQ		ALIQUAT		
HOLOCENTRUS	SP.		3		3.0- 3.50		0				
PRIACANTHIDAE			1		3.5- 3.50		0				
DECAPTERUS	PUNCTATUS		2		1.9- 3.90		0				
BOTHUS	SP.		2		4.8- 5.70		0				
PALYSTIDAE			1		10.6- 10.60		0				
GORIIDAE			5		8.5- 10.50		0				
TOTAL LARVAE COUNT FOR SAMPLE			14								

Table 12

VESSEL	CRUISE	STATION	SAMPLE	GFAP	MESH	LATITUDE	LONGITUDE	DATE	TIME	NUM	LENGTH	10MSQ	ALIQ	

AGONIDAE														

OREGON-II	143	40935	2455	60CM	BONGO	.333	2730.00N	933C.00W	840511	0628	1	9.7	6.9	
OREGON-II	143	40937	2457	60CM	BONGO	.333	2730.00N	933C.00W	840511	0803	1	10.1	6.3	
OREGON-II	143	40981	2485	60CM	BONGO	.333	2600.00N	950C.00W	840515	1018	1	4.0	6.0	
OREGON-II	145	41265	3231	60CM	BONGO	.333	2800.00N	903C.00W	840717	1451	1	5.6	.0	

AHLIA EGMONTIS														

OREGON-II	143	40885	2270	1X2M	NEUSTON	.946	2730.00N	850C.00W	840429	0054	2	7.0	1.0	.0

ALECTIS CILIARIS														

OREGON-II	146	41360	2677	1X2M	NEUSTON	.946	2830.00N	923C.00W	840810	1400	1	7.5	.0	

ALEPISAUROIDAE														

OREGON-II	146	41448	2943	60CM	BONGO	.333	2747.00N	8508.00W	840824	0620	2	3.4	6.2	.0

ALEPISAURUS SP.														

OREGON-II	143	40956	2181	60CM	BONGO	.333	2600.00N	883C.00W	840423	0153	1	7.0	5.6	
OREGON-II	143	40913	2352	60CM	BONGO	.333	2730.00N	920C.00W	840508	1530	1	2.9	5.6	
OREGON-II	143	40955	2406	60CM	BONGO	.333	2630.00N	943C.00W	840513	0229	1	5.1	3.7	
OREGON-II	143	40928	2448	60CM	BONGO	.333	2730.00N	933C.00W	840510	2153	1	5.0	6.5	

ALUTERUS SP.														

OREGON-II	146	41312	2532	1X2M	NEUSTON	.946	3000.00N	883C.00W	840804	1143	2	12.5	13.0	.0
OREGON-II	146	41321	2560	1X2M	NEUSTON	.946	2845.00N	890C.00W	840805	2100	2	15.0	22.0	.0
OREGON-II	146	41428	2884	1X2M	NEUSTON	.946	2945.00N	873C.00W	840821	2218	4	25.5	33.5	.0
OREGON-II	146	41429	2887	1X2M	NEUSTON	.946	3000.00N	873C.00W	840822	0021	2	36.7	38.1	.0
OREGON-II	146	41437	2911	1X2M	NEUSTON	.946	3015.00N	860C.00W	840822	2109	2	13.0	25.4	.0
OREGON-II	146	41439	2917	1X2M	NEUSTON	.946	2945.00N	860C.00W	840823	0111	1	16.2	.0	.0
OREGON-II	146	41441	2922	60CM	BONGO	.333	2945.00N	853C.00W	840823	0705	1	10.5	.0	.0
OREGON-II	146	41473	3019	1X2M	NEUSTON	.946	2815.00N	833C.00W	840825	1451	1	17.2	.0	.0
OREGON-II	146	41474	3022	1X2M	NEUSTON	.946	2815.00N	840C.00W	840825	1805	1	20.0	.0	.0
OREGON-II	146	41475	3025	1X2M	NEUSTON	.946	2815.00N	843C.00W	840825	2113	1	24.0	.0	.0
OREGON-II	146	41476	3028	1X2M	NEUSTON	.946	2845.00N	8415.00W	840826	0104	2	24.9	24.9	.0
OREGON-II	146	41482	3046	1X2M	NEUSTON	.946	2945.00N	840C.00W	840826	2233	2	31.0	36.0	.0
OREGON-II	146	41485	3055	1X2M	NEUSTON	.946	2900.00N	850C.00W	840827	0844	1	16.0	.0	.0

○ OREGON-II 143	□ ALABAMA#23	△ OREGON-II 145
◇ OREGON-II 146	○ LOUISIANA35 07	+ OREGON-II 142
× OREGON-II 149	* OREGON-II 148	★ TOMMY MUNRO 01
● LOUISIANA25 06	■ LOUISIANA25 09	⊙ LOUISIANA25 08
✱ TOMMY MUNRO RD84	□ BELLOWS	

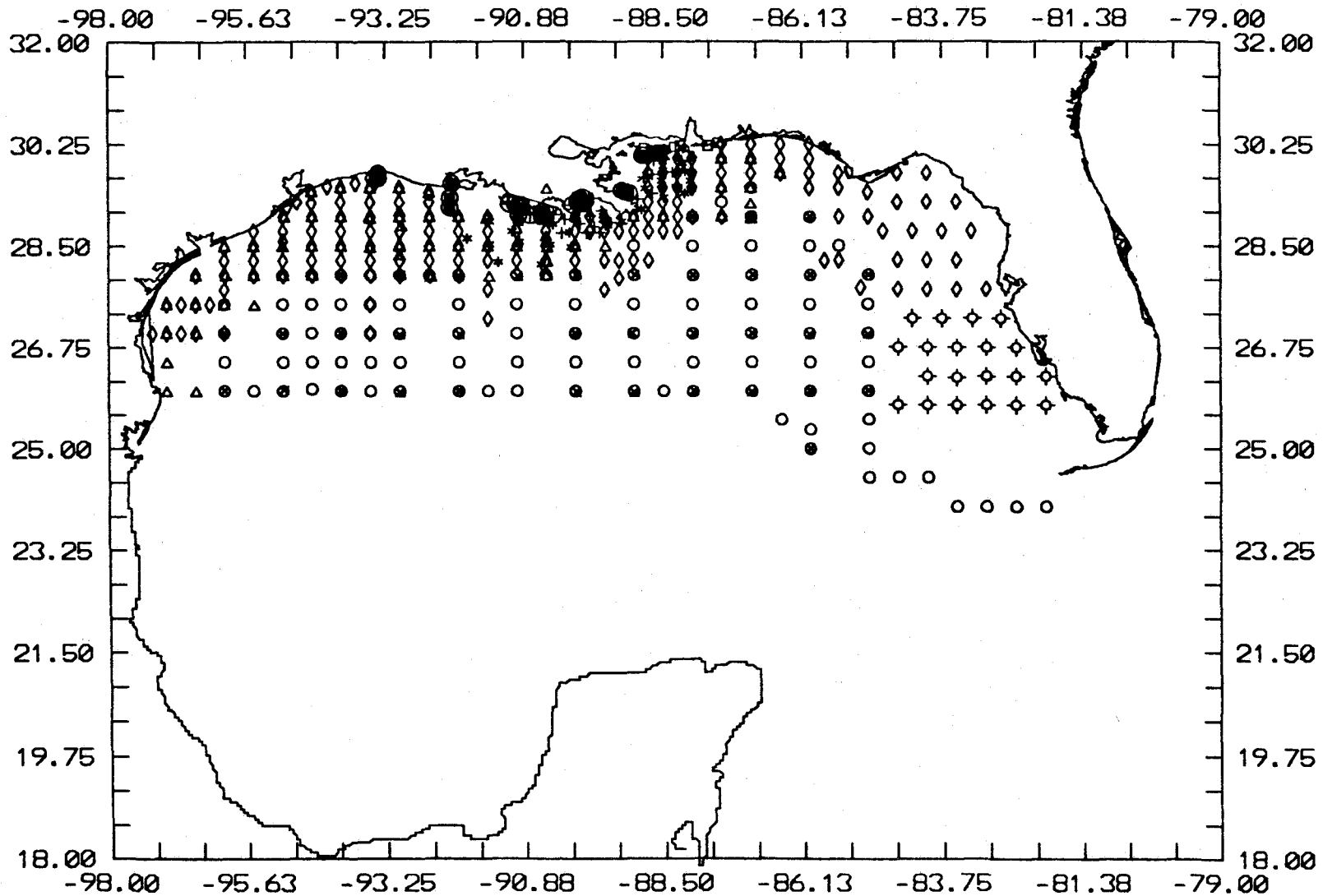


FIGURE 1 SEAMAP 1984 ICHTHYOPLANKTON STATIONS

○ OREGON-TI 151	□ BELLOWS	△ TOMMY MUNRO 85
◇ OREGON-TI 153	○ LOUISIANA35 85	+ OREGON-TI 154
× OREGON-TI 156	* LOUISIANA25 10	★ LOUISIANA35 12
● LOUISIANA35 13	■ LOUISIANA35 15	▲ ALABAMA #23
⊗ TOMMY MUNRO 852	⊖ TOMMY MUNRO 853	⊕ TOMMY MUNRO 854
⊙ LOUISIANA25 14		

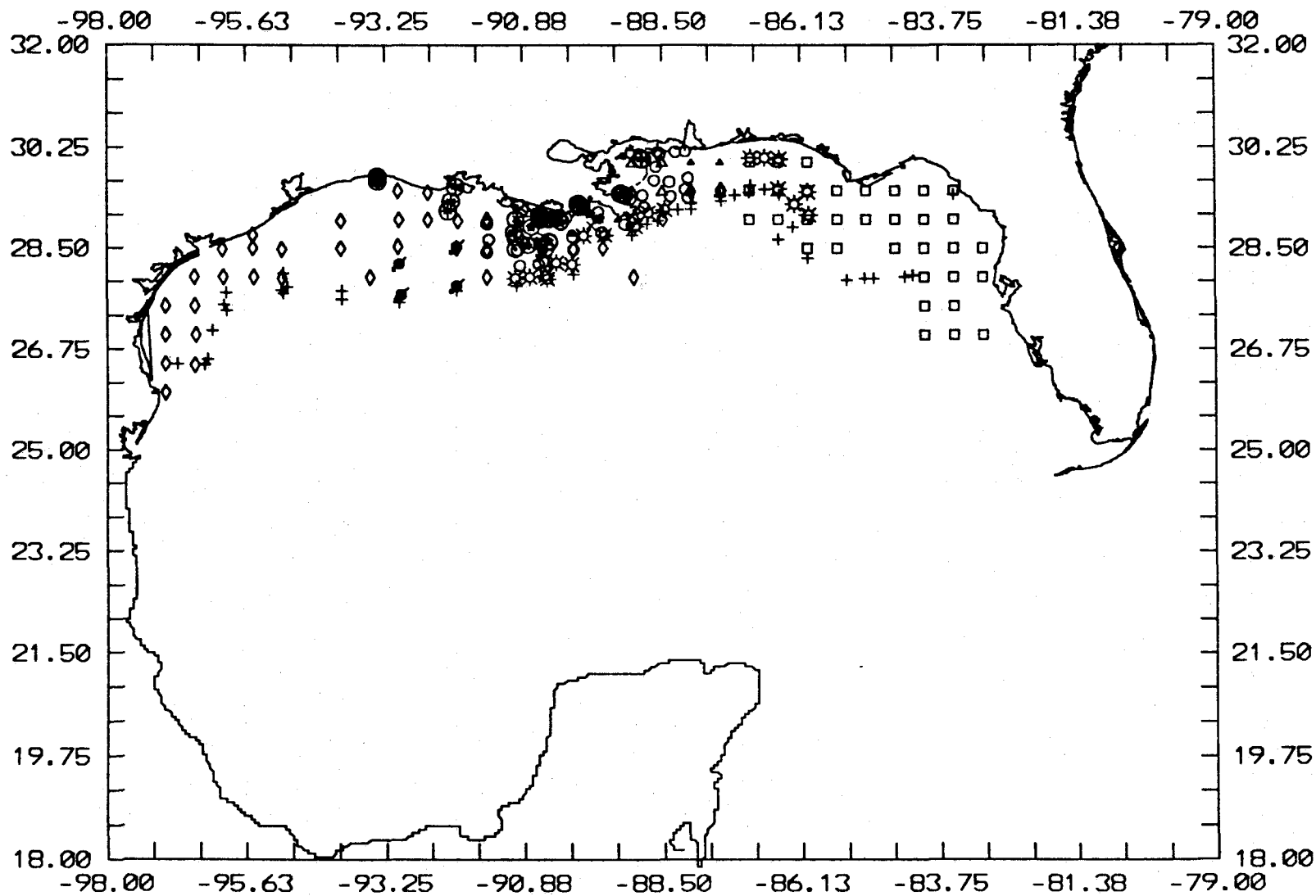


FIGURE 2 SEAMAP 1985 ICHTHYOPLANKTON STATIONS

FIGURE 3 BONGO+RING NET TOWS: NUMBER/10M2

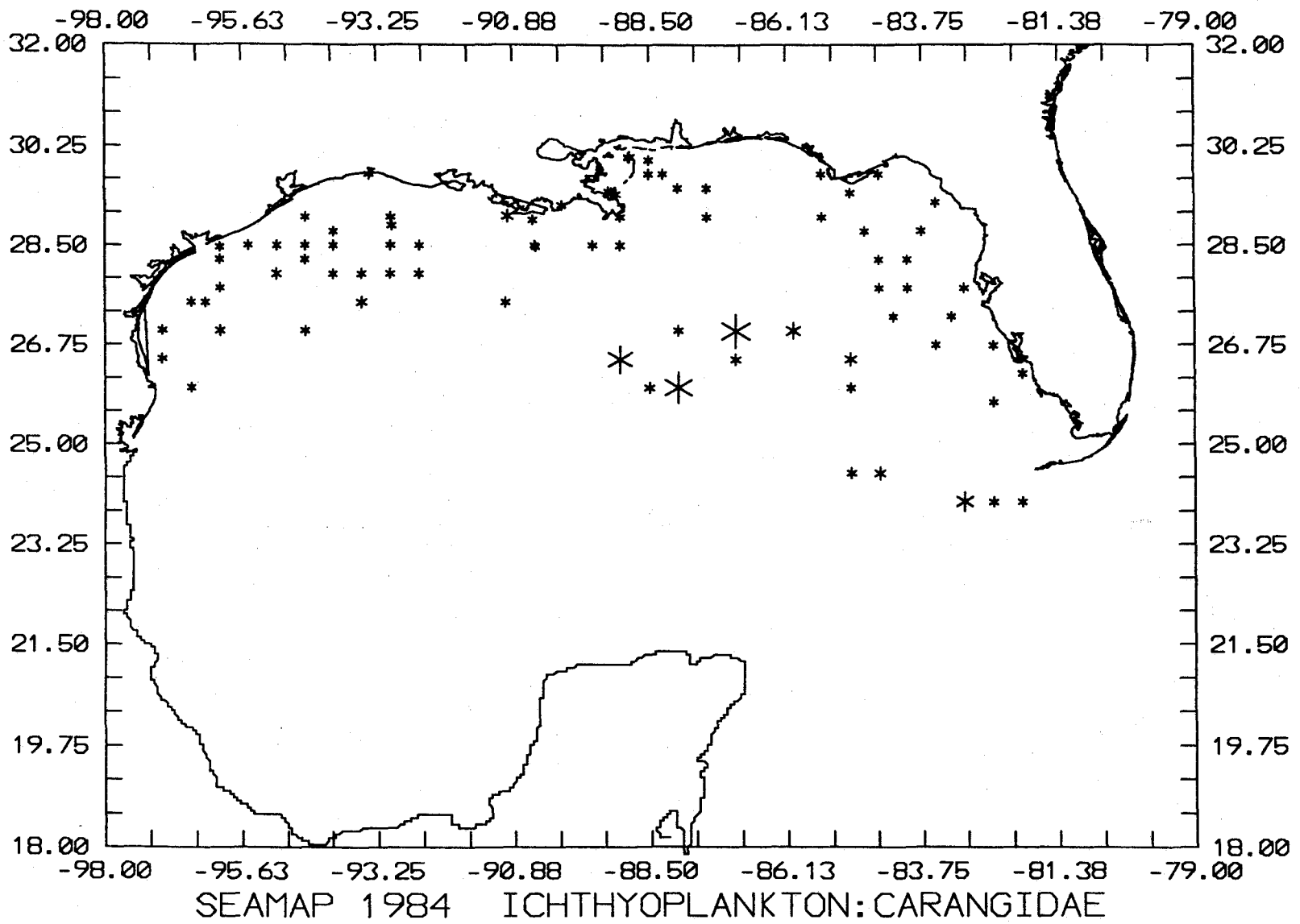


FIGURE 4 NEUSTON NET TOWS: NUMBER CAUGHT

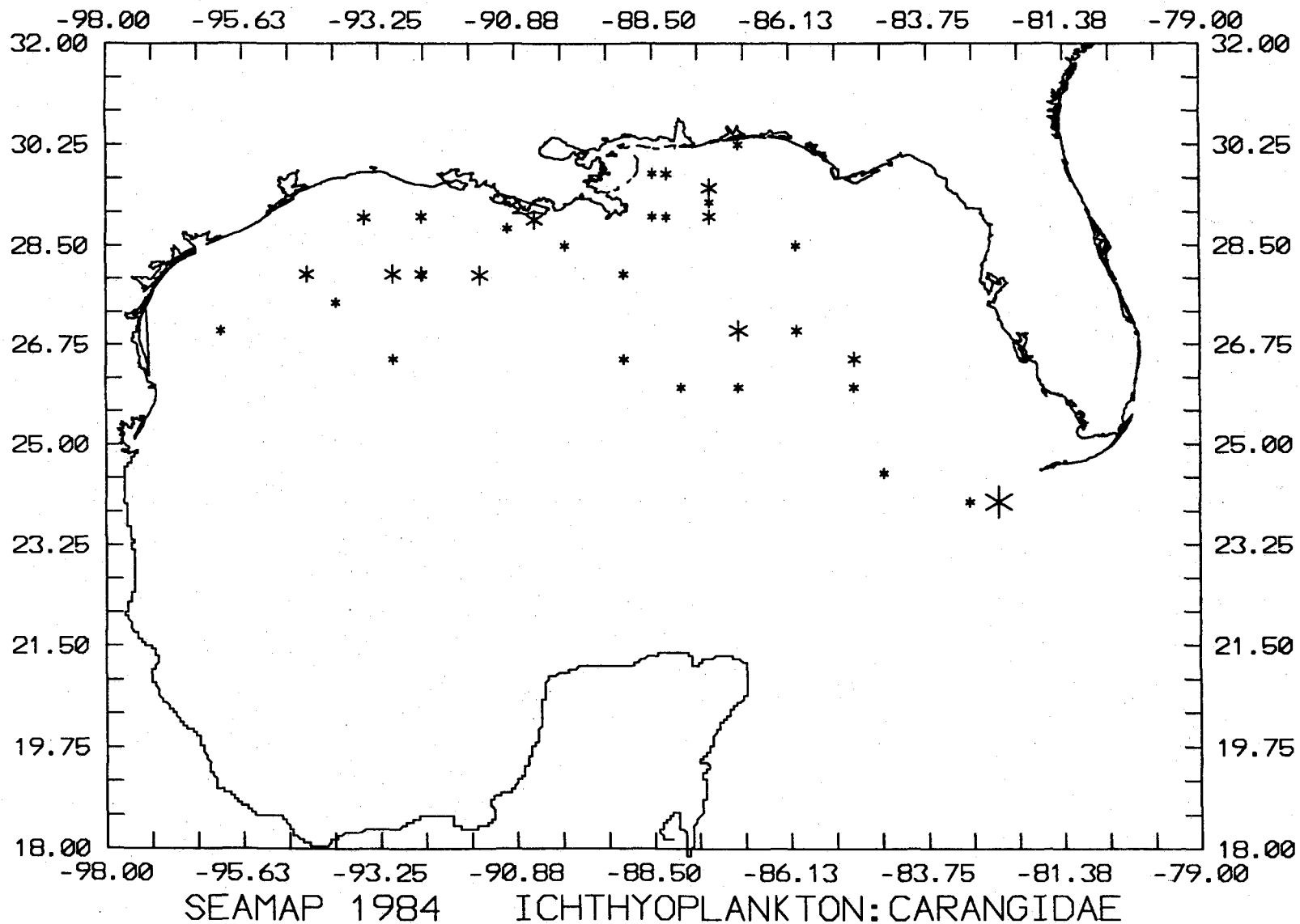


FIGURE 5 BONGO+RING NET TOWS: NUMBER/10M2

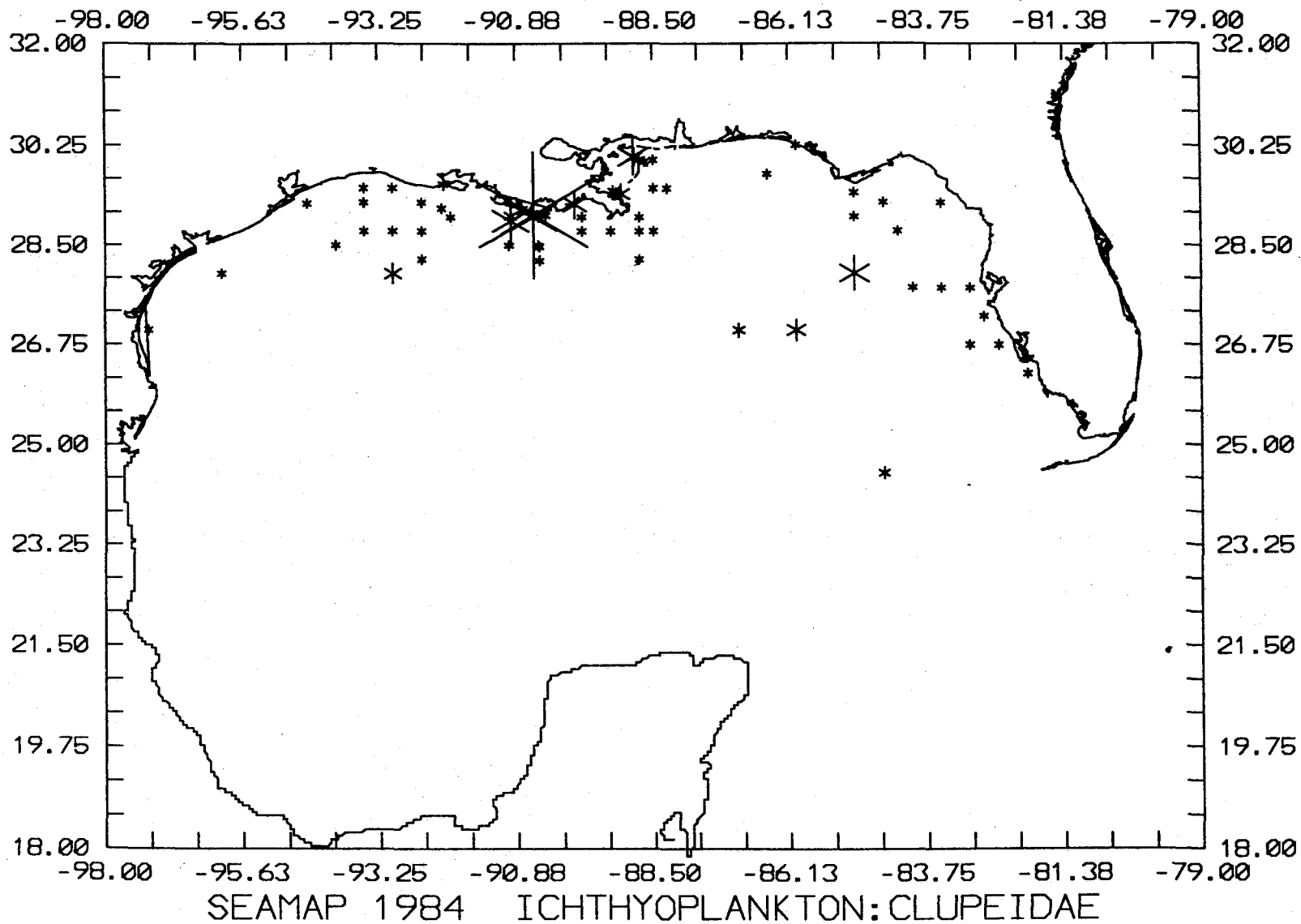


FIGURE 6 NEUSTON NET TOWS: NUMBER CAUGHT

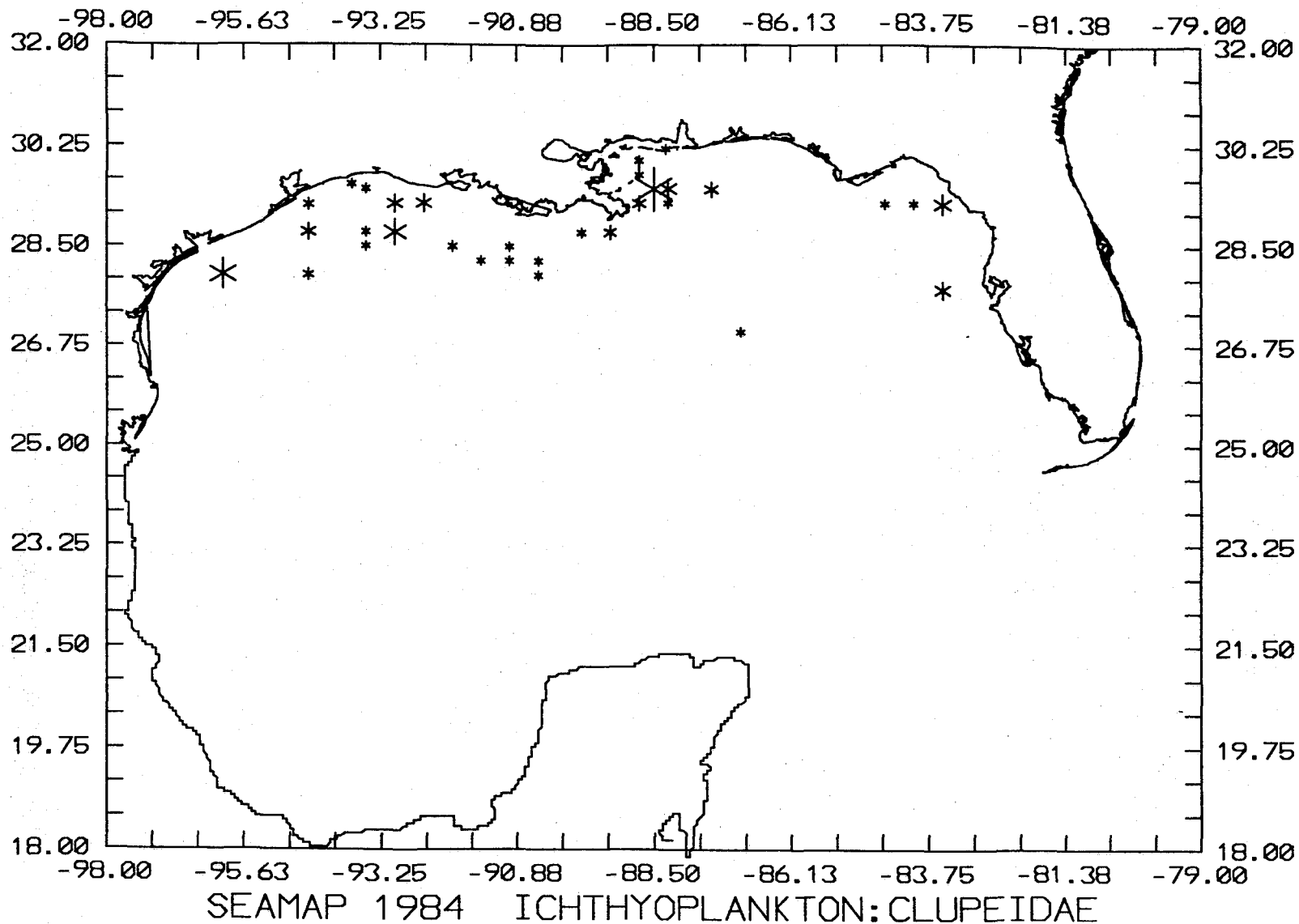
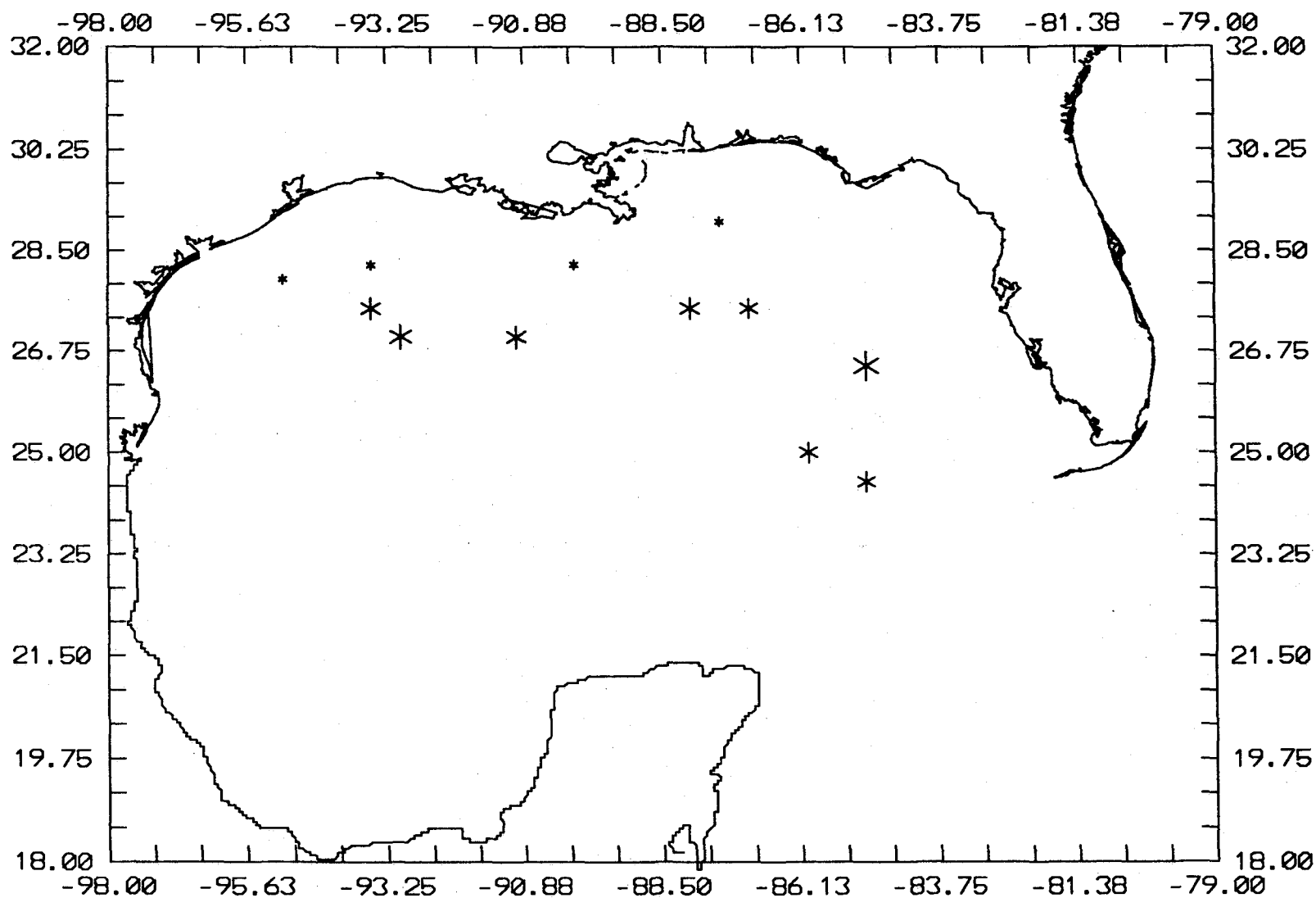


FIGURE 7

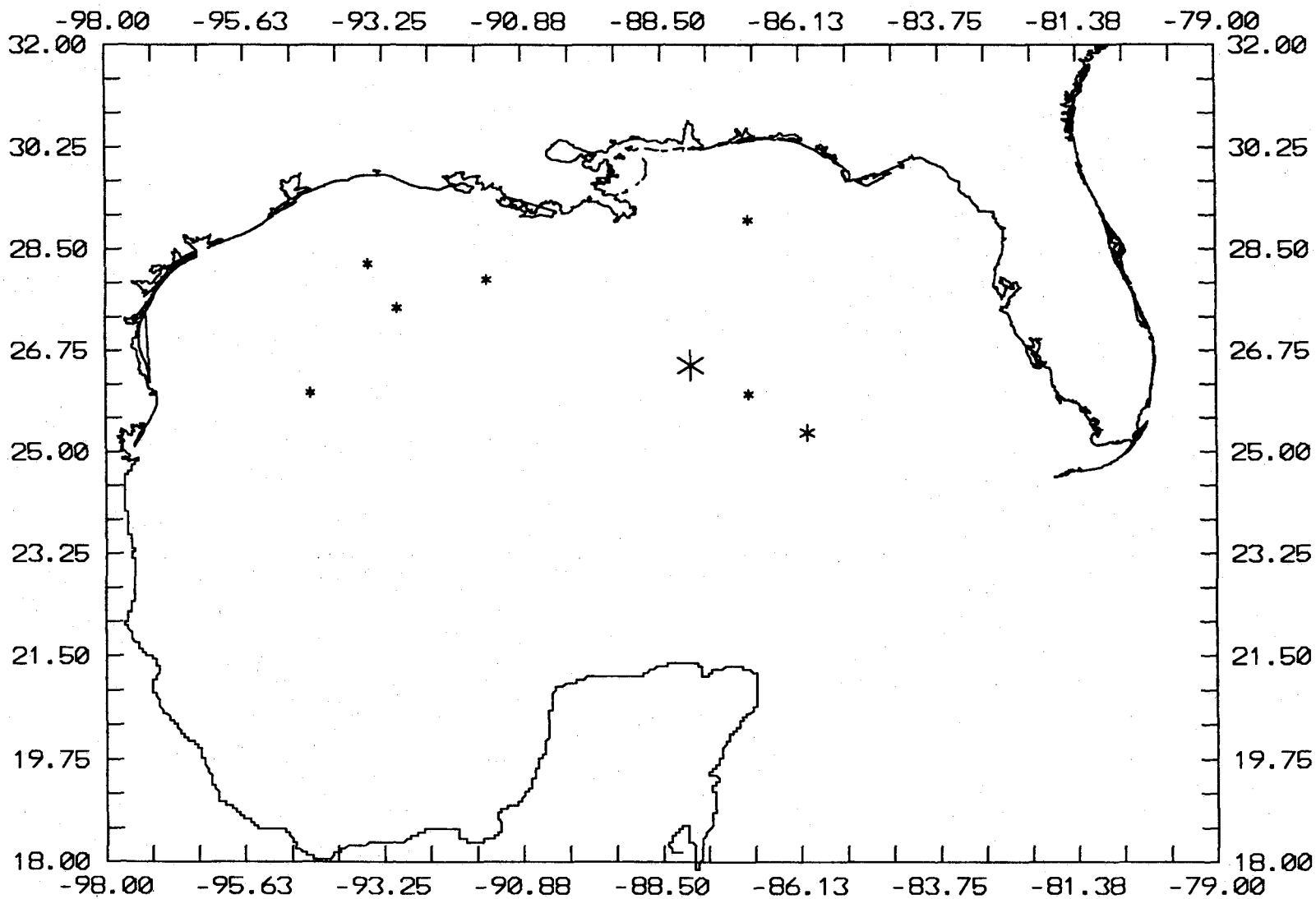
BONGO+RING NET TOWS:

NUMBER/10M²



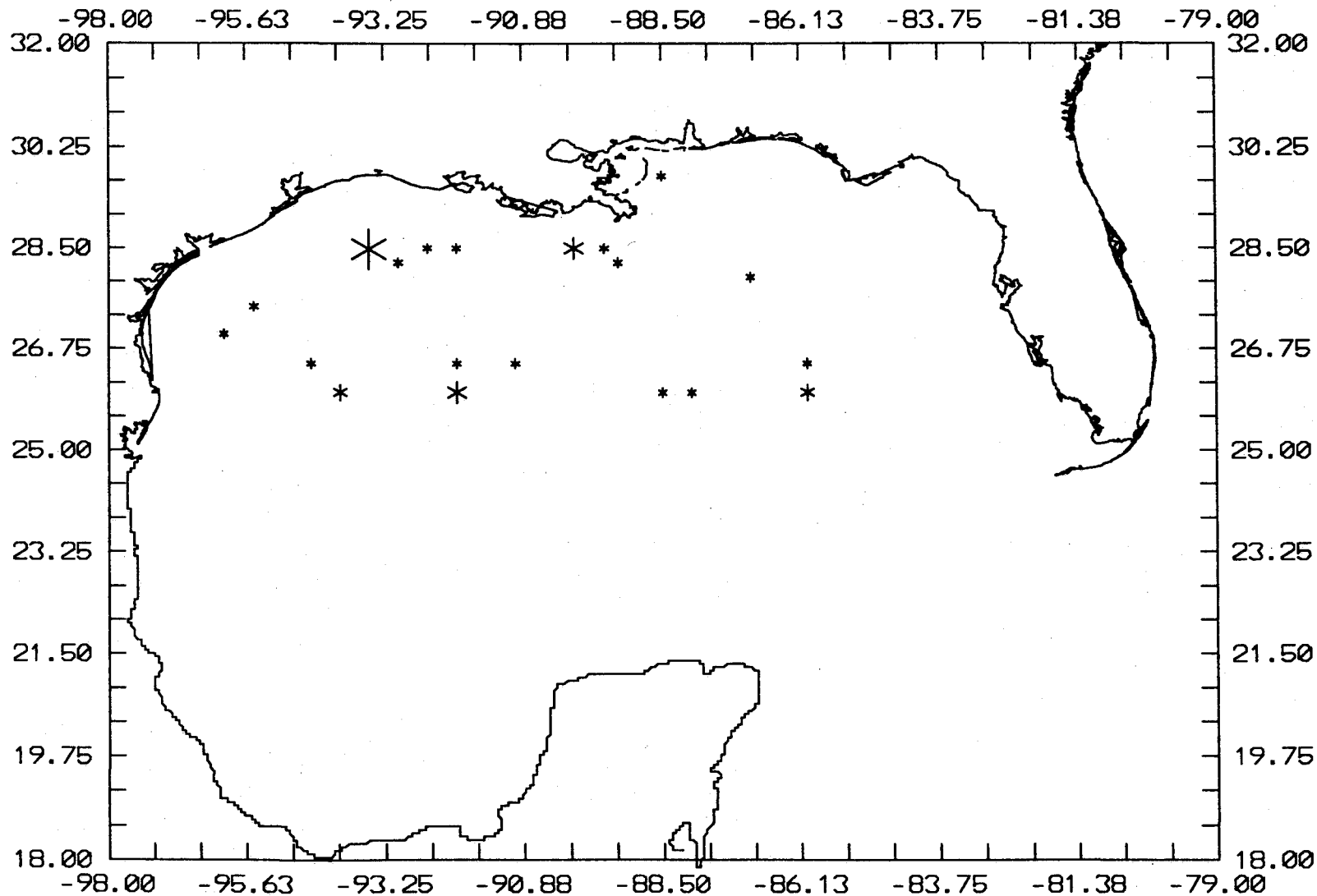
SEAMAP 1984 ICHTHYOPLANKTON: CORYPHAENA SP.

FIGURE 8 NEUSTON NET TOWS: NUMBER CAUGHT



SEAMAP 1984 ICHTHYOPLANKTON: CORYPHAENA SP.

FIGURE 9 NEUSTON NET TOWS: NUMBER CAUGHT



SEAMAP 1984 ICHTHYOPLANKTON: CORYPHAENA EQUISETIS

FIGURE 11

BONGO+RING NET TOWS:

NUMBER/M2

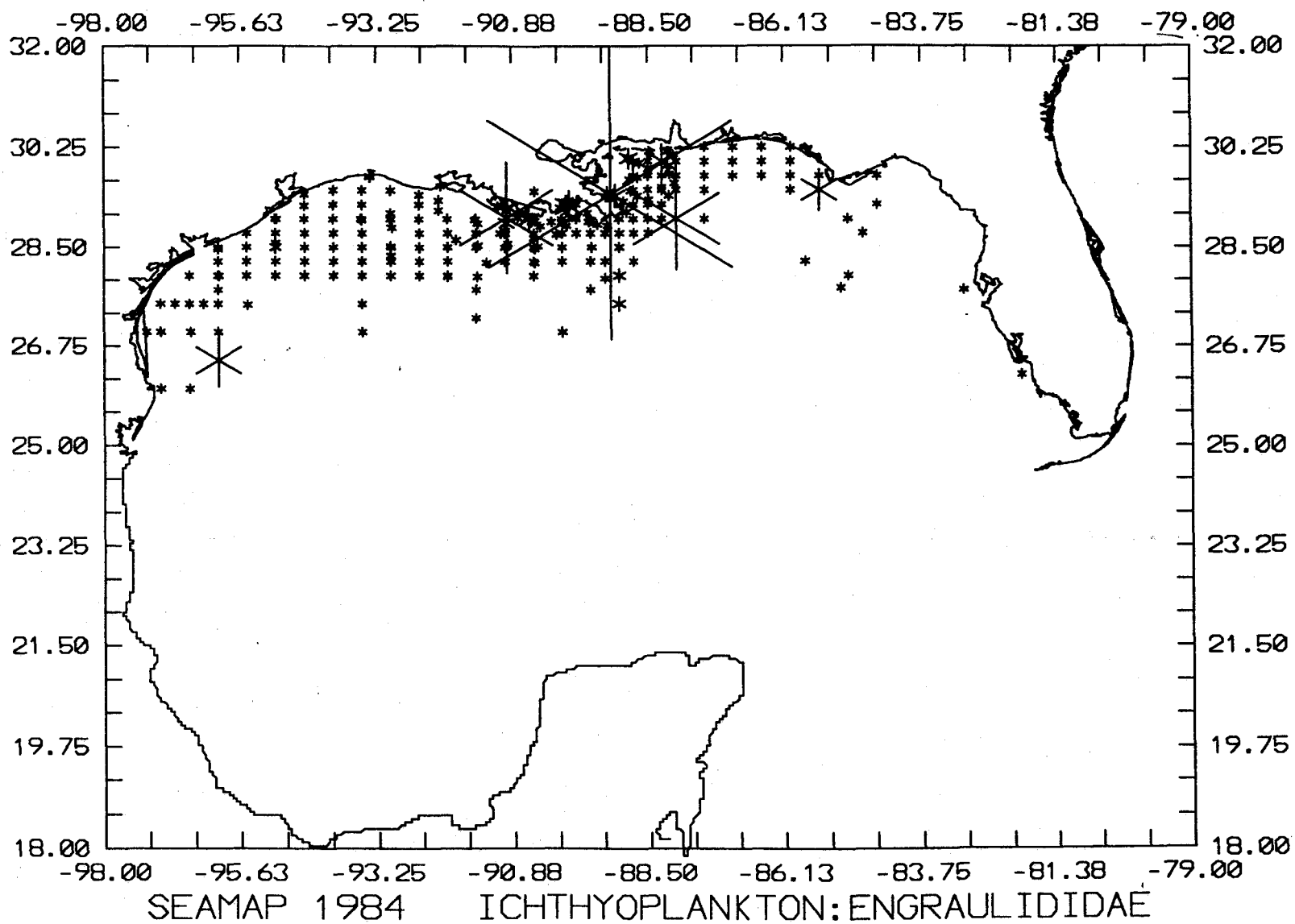
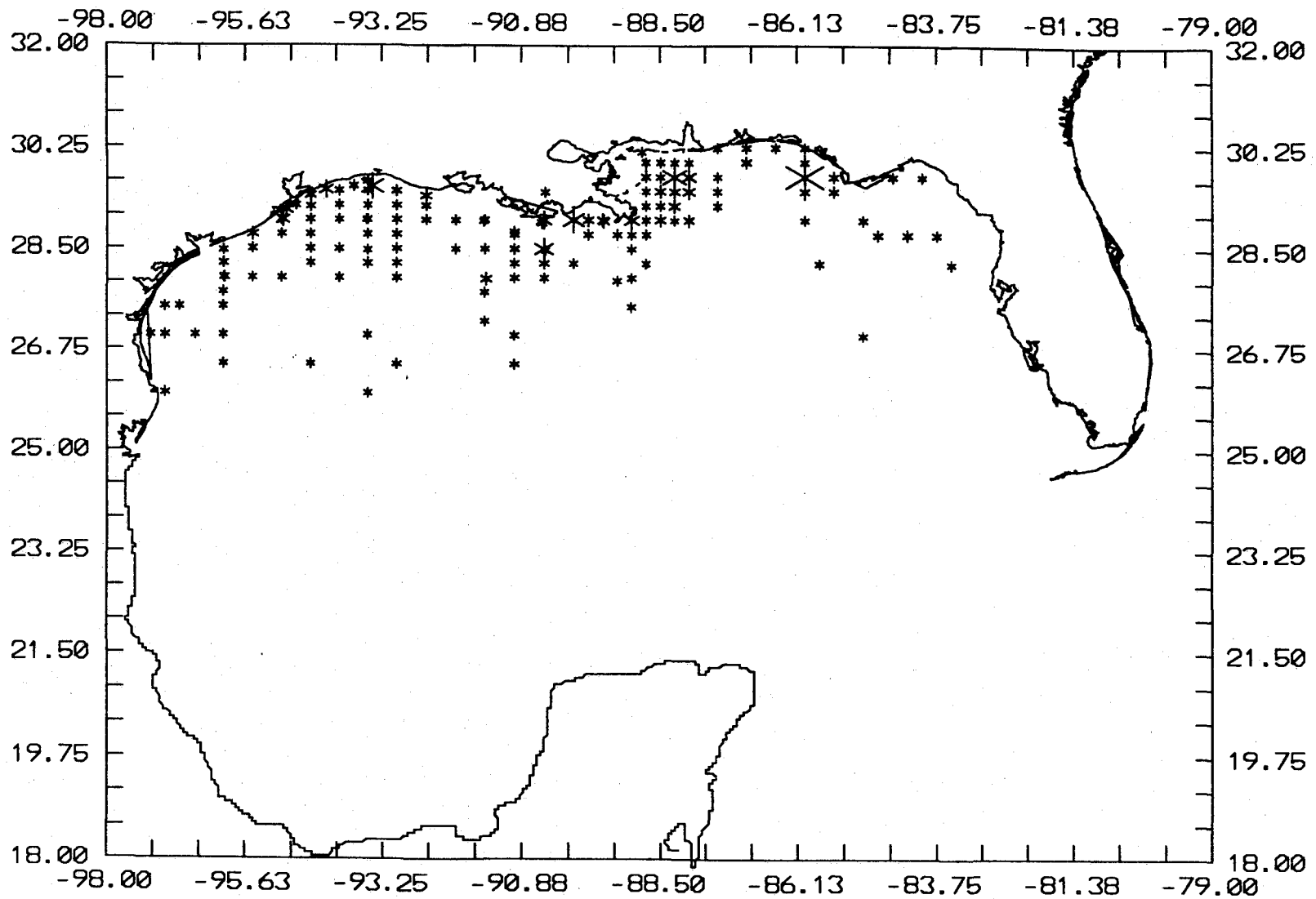
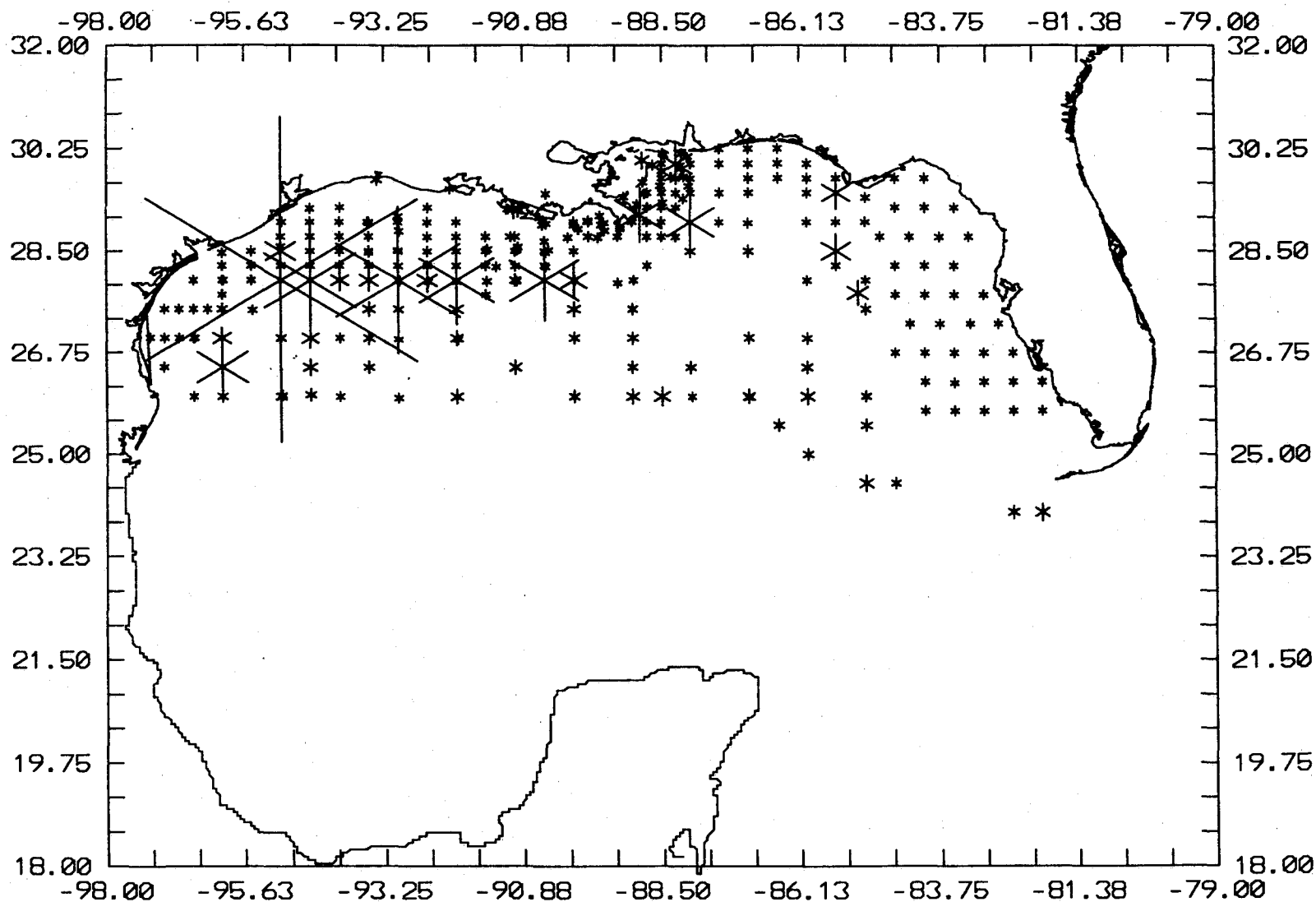


FIGURE 12 NEUSTON NET TOWS: NUMBER CAUGHT



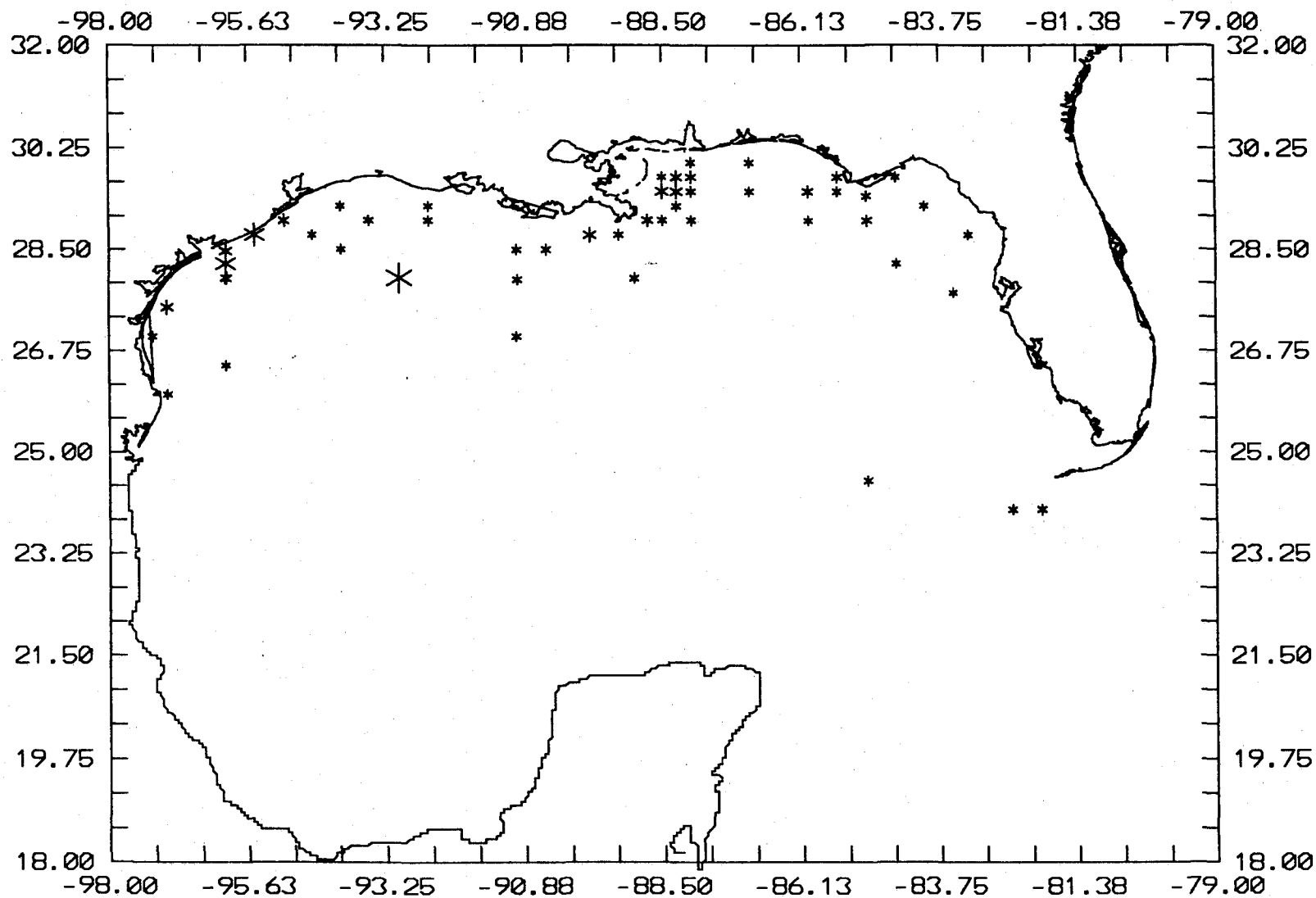
SEAMAP 1984 ICHTHYOPLANKTON: ENGRAULIDIDAE

FIGURE 13 BONGO+RING NET TOWS: NUMBER/10M2



SEAMAP 1984 ICHTHYOPLANKTON: GOBIIDAE

FIGURE 14 NEUSTON NET TOWS: NUMBER CAUGHT



SEAMAP 1984 ICHTHYOPLANKTON: GOBIIDAE

FIGURE 15 NEUSTON NET TOWS: NUMBER CAUGHT

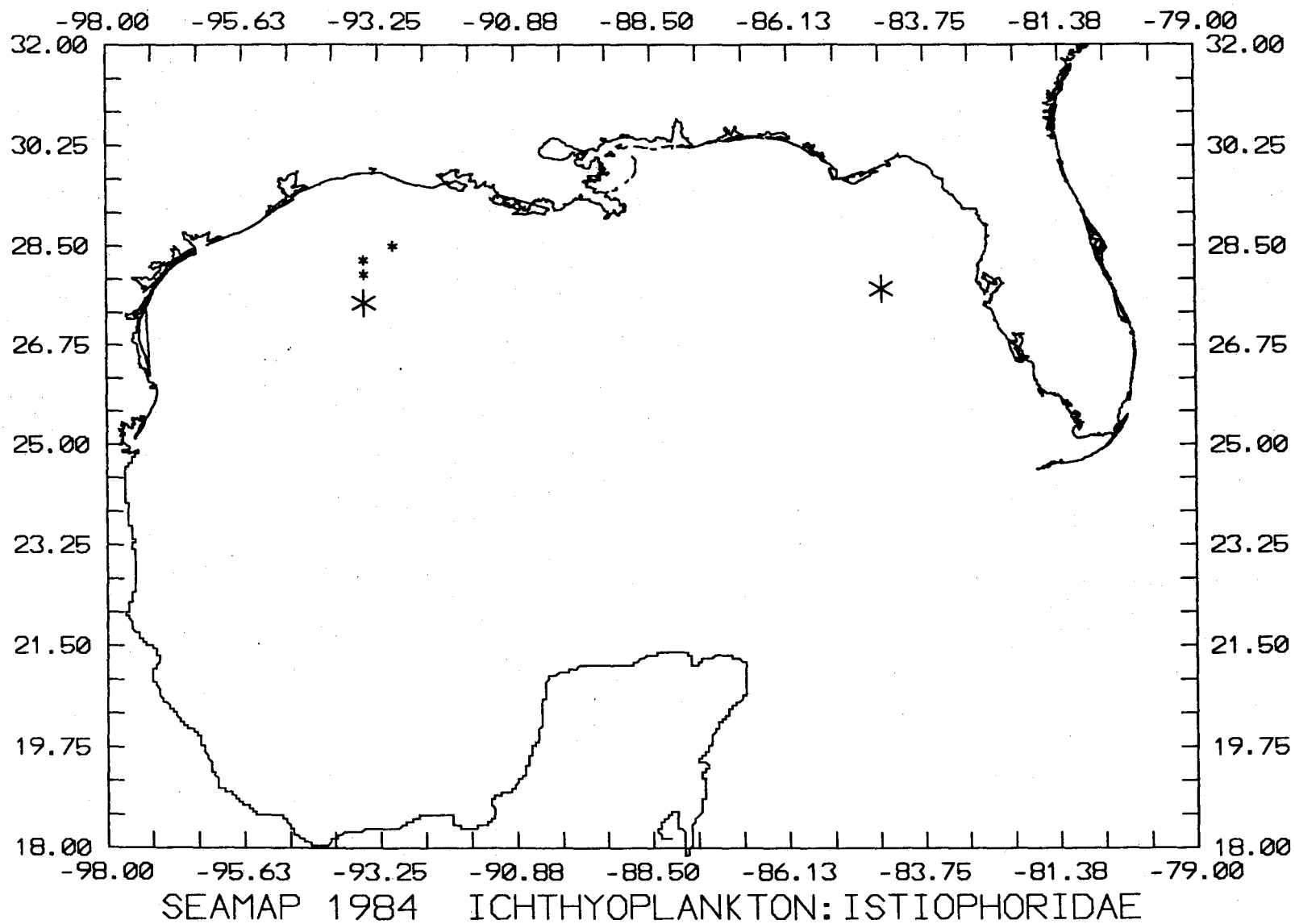


FIGURE 16 BONGO+RING NET TOWS: NUMBER 10M2

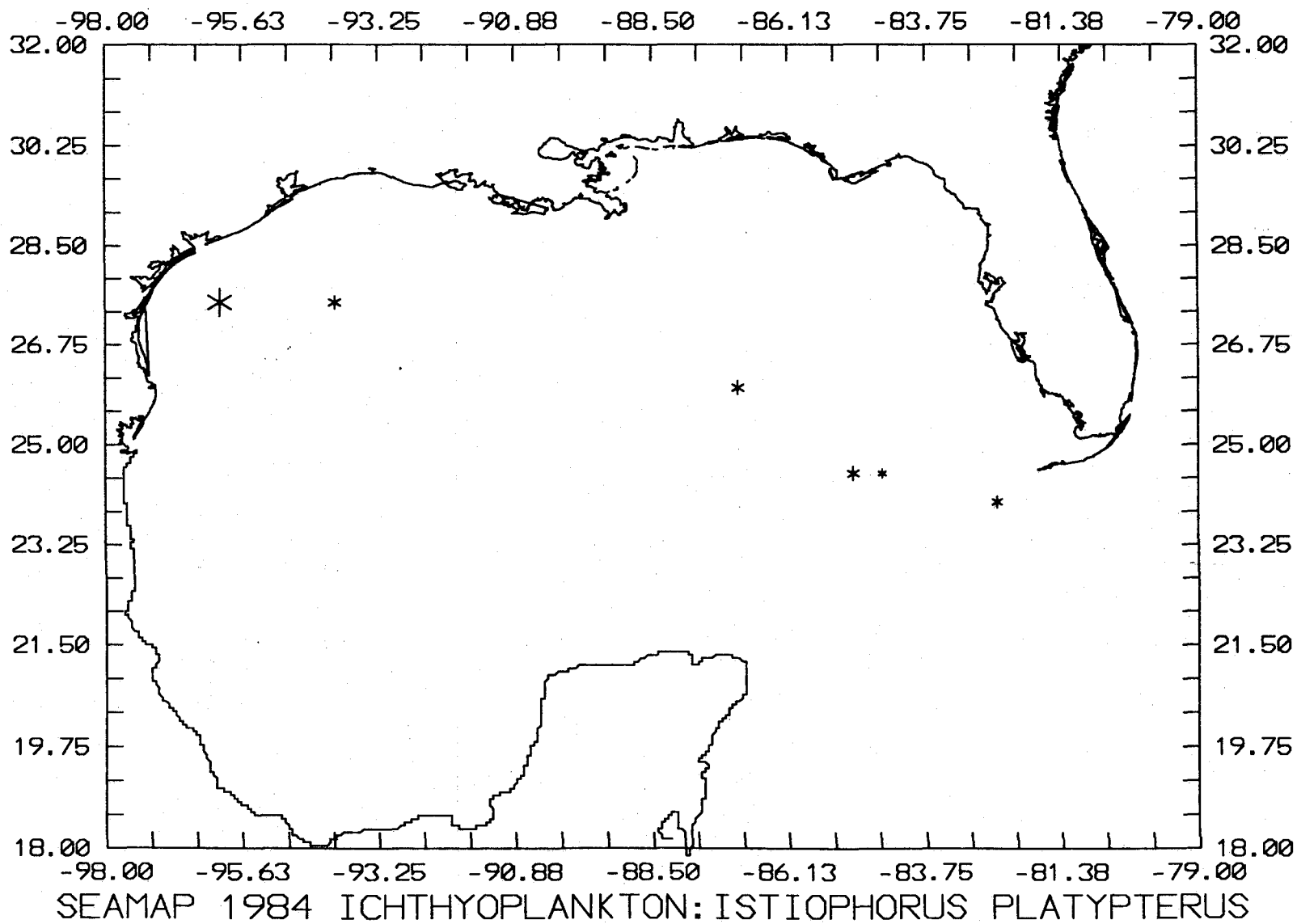
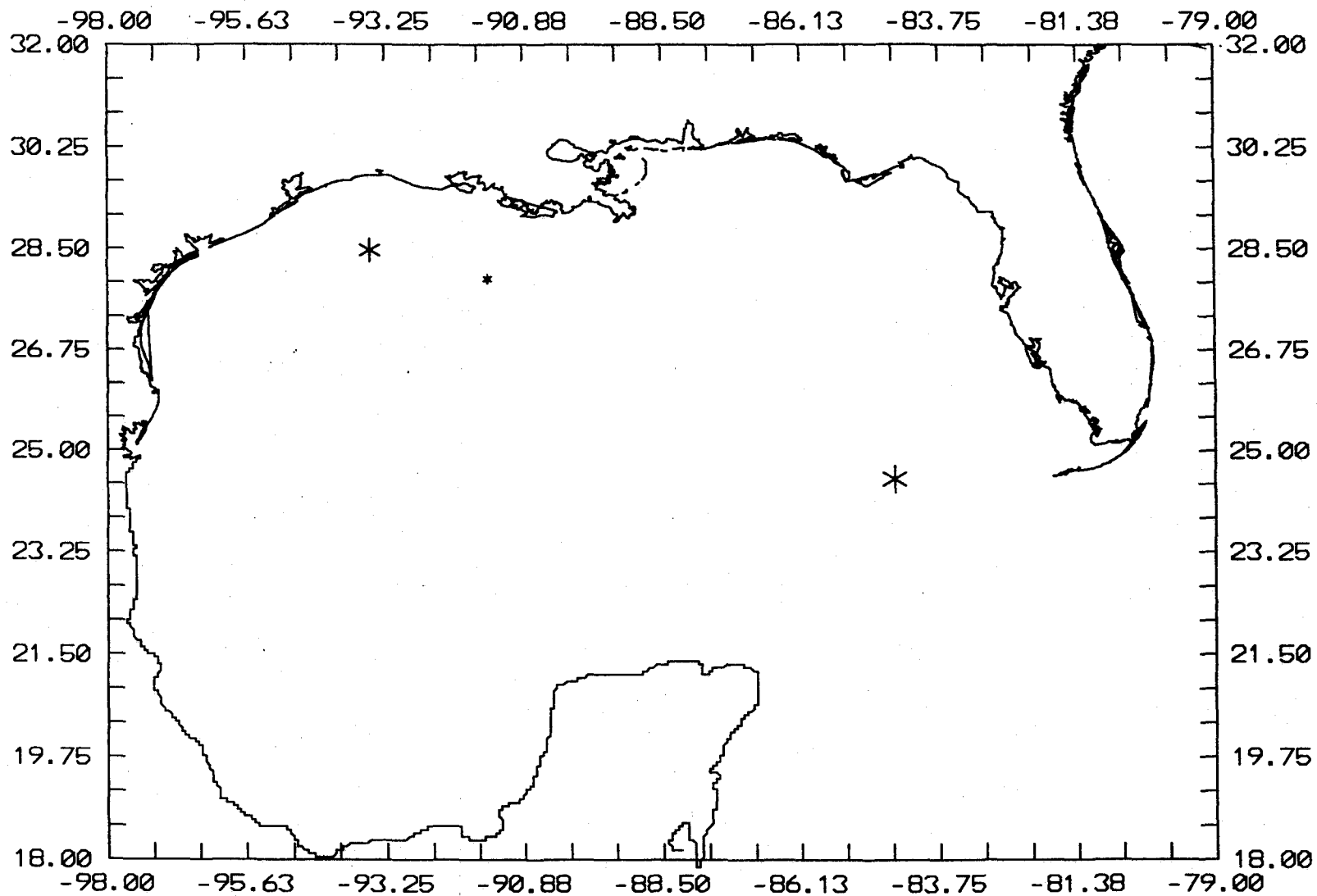
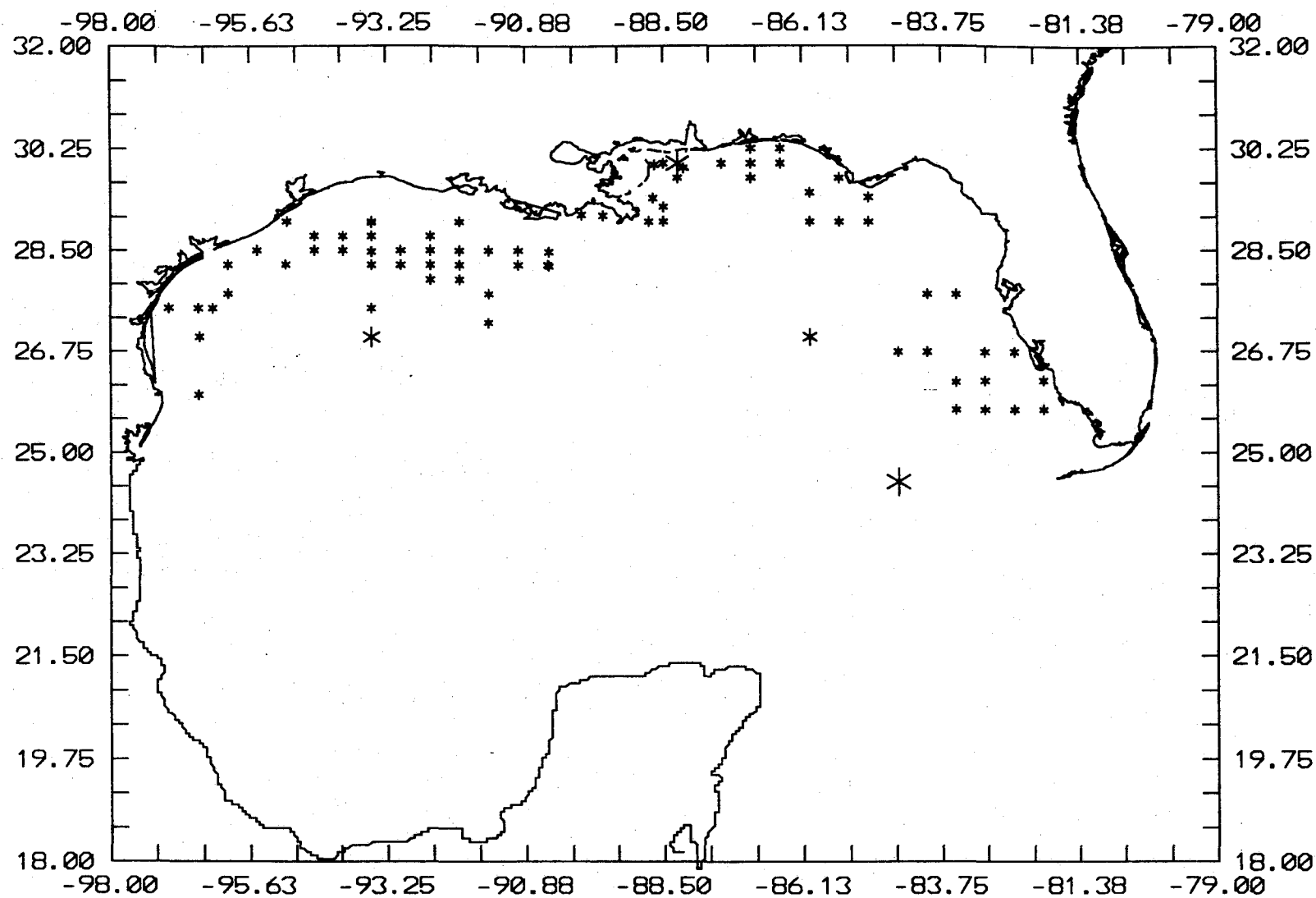


FIGURE 17 NEUSTON NET TOWS: NUMBER CAUGHT



SEAMAP 1984 ICHTHYOPLANKTON: ISTIOPHORUS PLATYPTERUS

FIGURE 18 BONGO+RING NET TOWS: NUMBER/10M²



SEAMAP 1984 ICHTHYOPLANKTON: LUTJANIDAE

FIGURE 19 NEUSTON NET TOWS: NUMBER CAUGHT

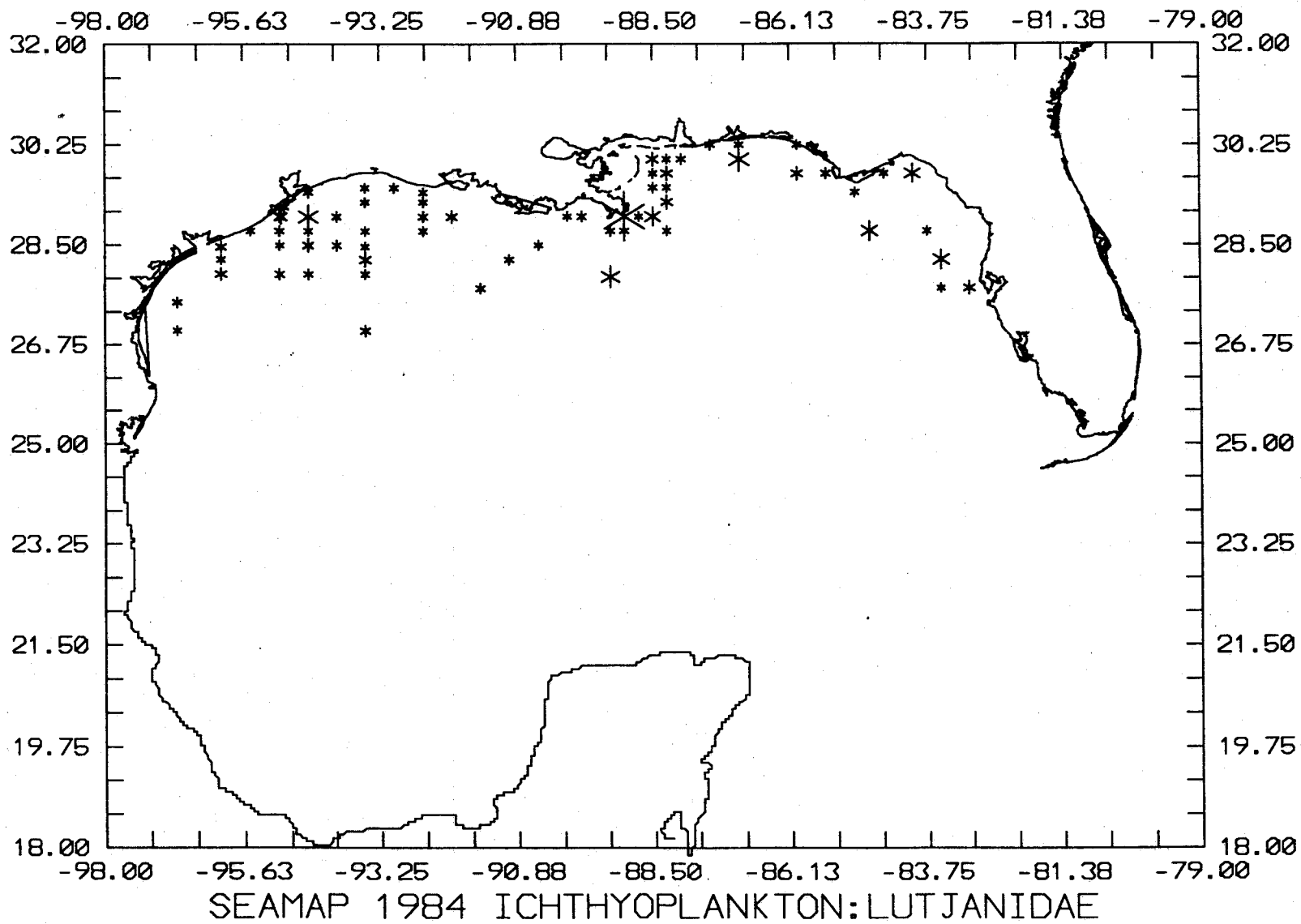
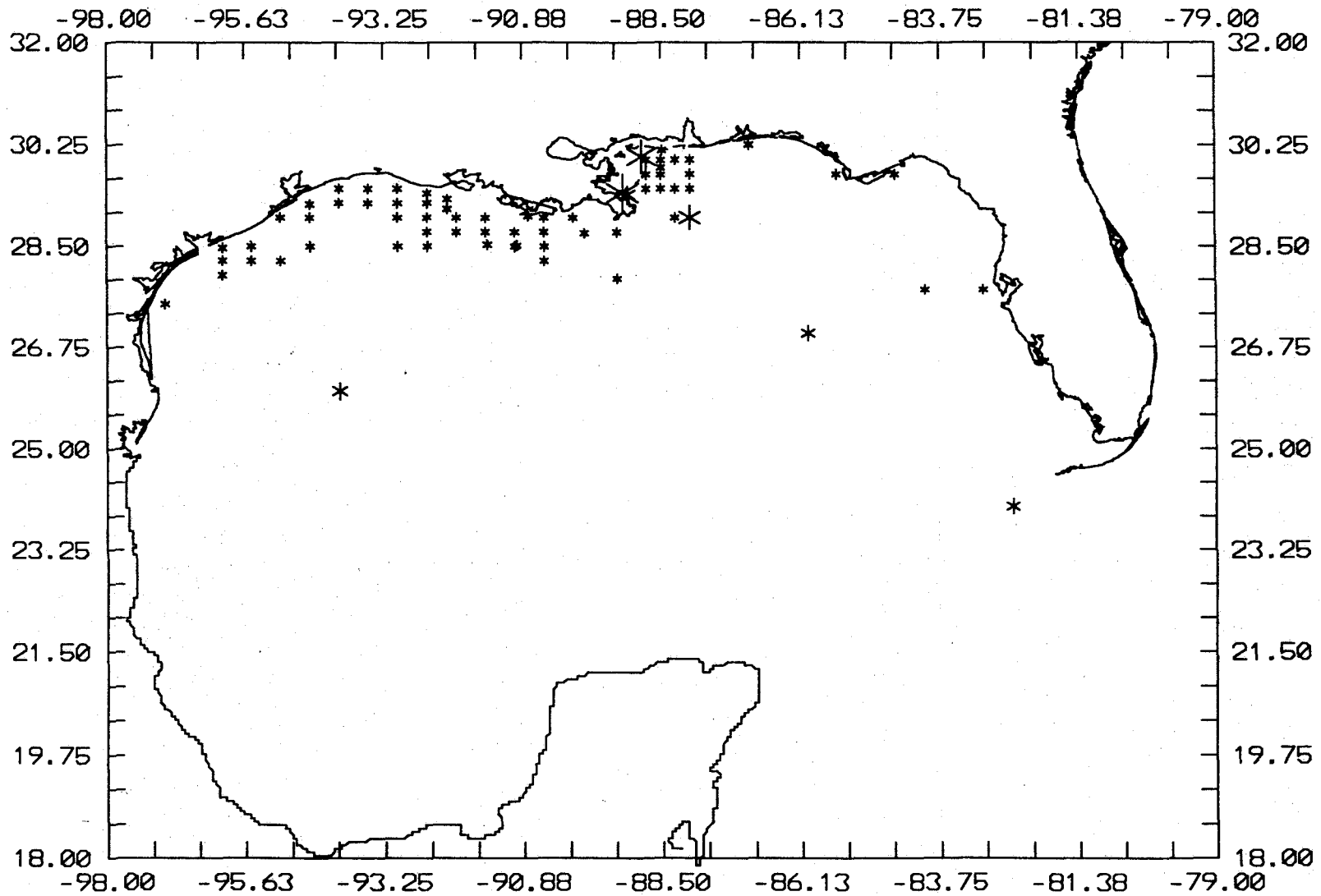


FIGURE 20 BONGO+RING NET TOWS: NUMBER/10M2



SEAMAP 1984 ICHTHYOPLANKTON: SCIAENIDAE

FIGURE 21 NEUSTON NET TOWS: NUMBER CAUGHT

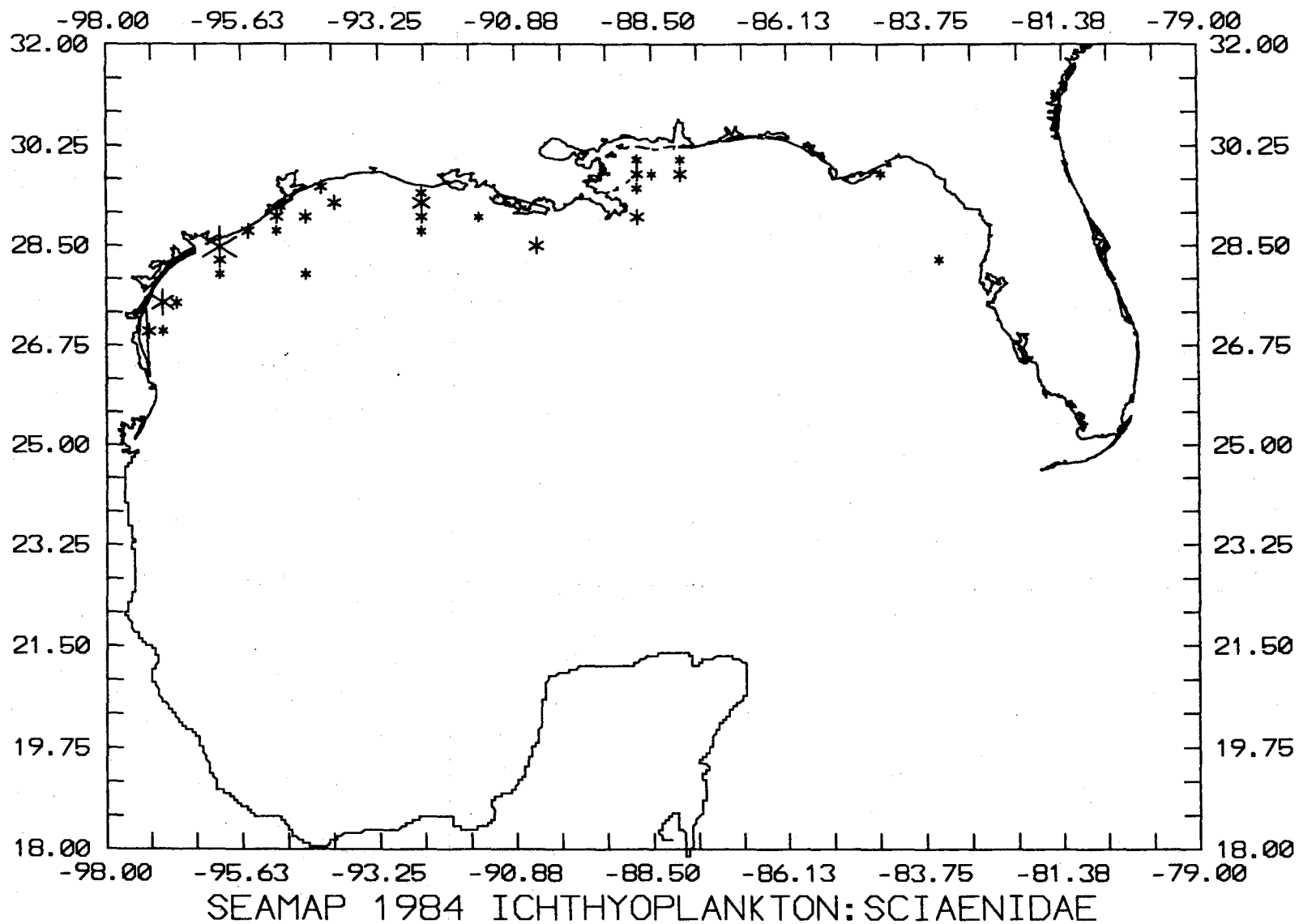
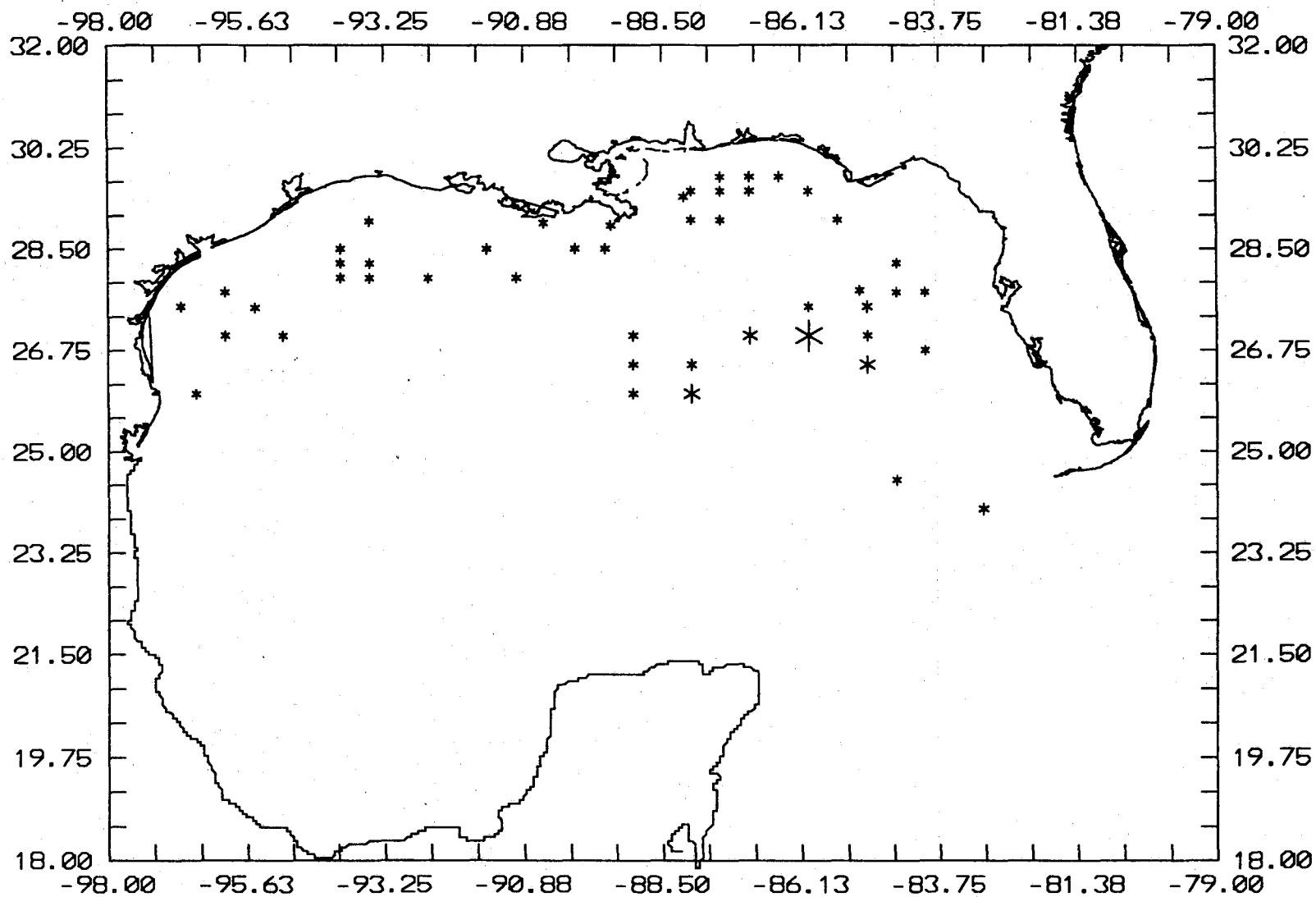


FIGURE 22 BONGO+RING NET TOWS: NUMBER/10M2



SEAMAP 1984 ICHTHYOPLANKTON: AUXIS SP.

FIGURE 23 NEUSTON NET TOWS: NUMBER CAUGHT

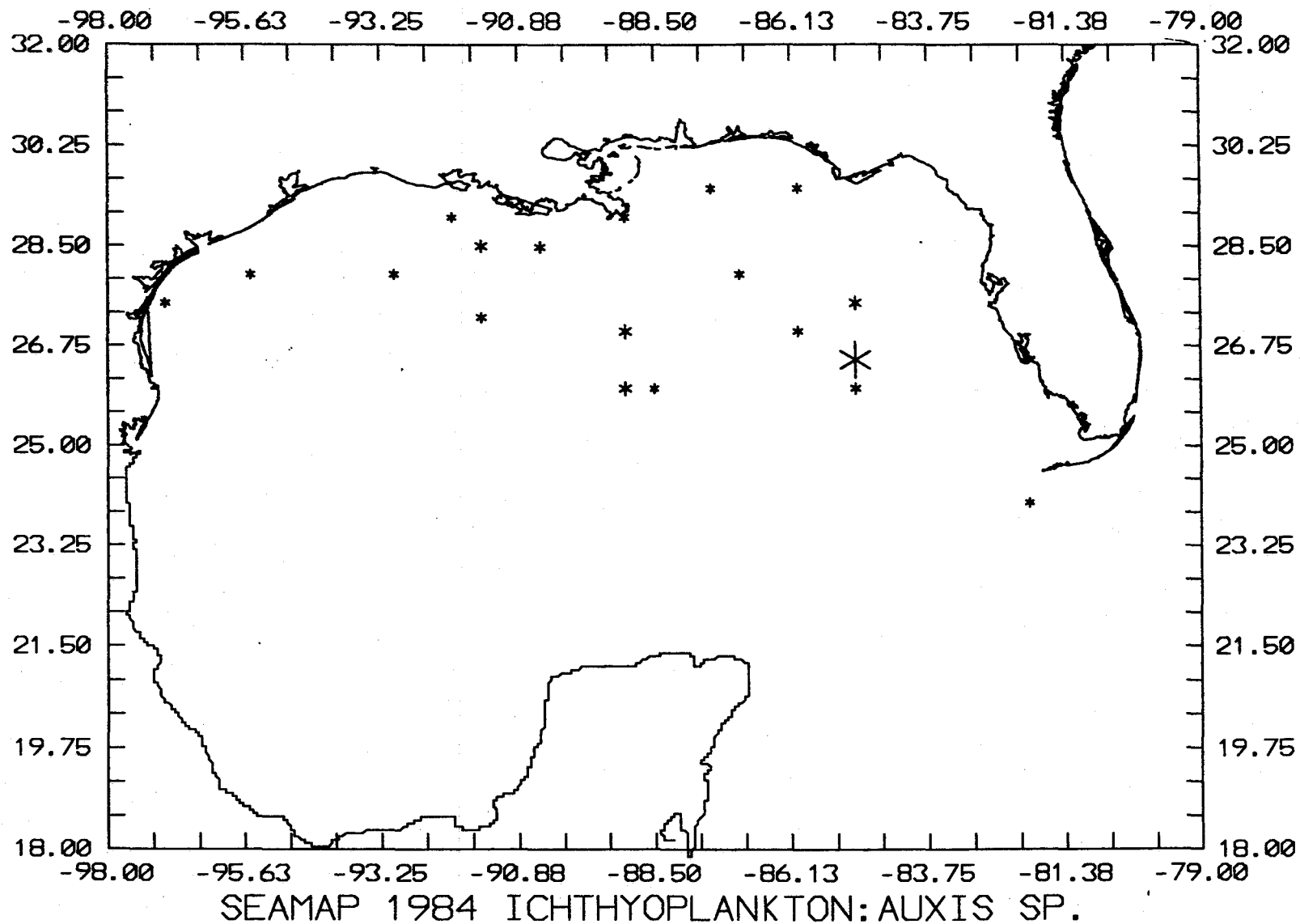
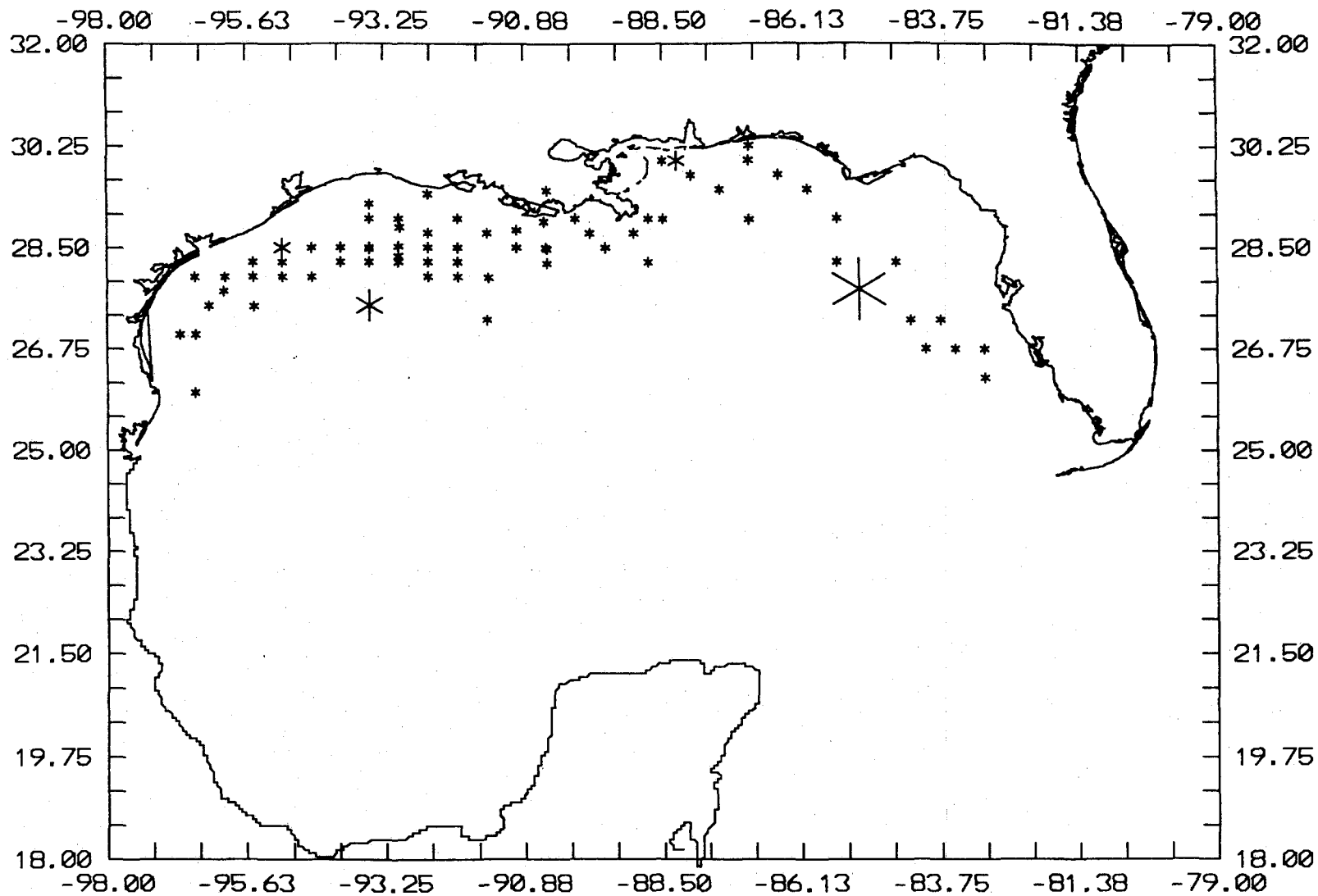


FIGURE 24 BONGO+RING NET TOWS: NUMBER/10M2



SEAMAP 1984 ICHTHYOPLANKTON: EUTHYNNUS ALLETTERATUS

FIGURE 25 NEUSTON NET TOWS: NUMBER CAUGHT

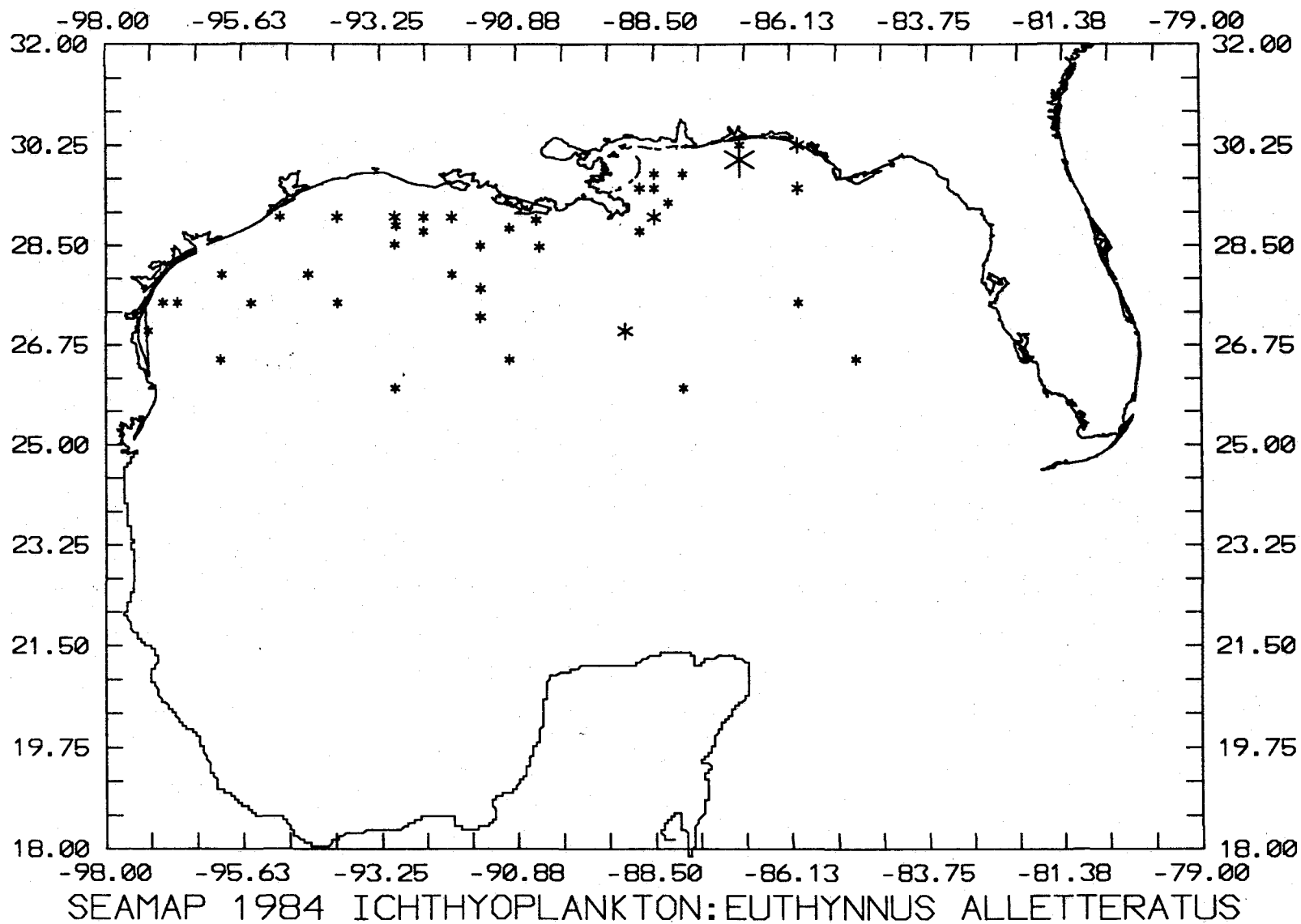
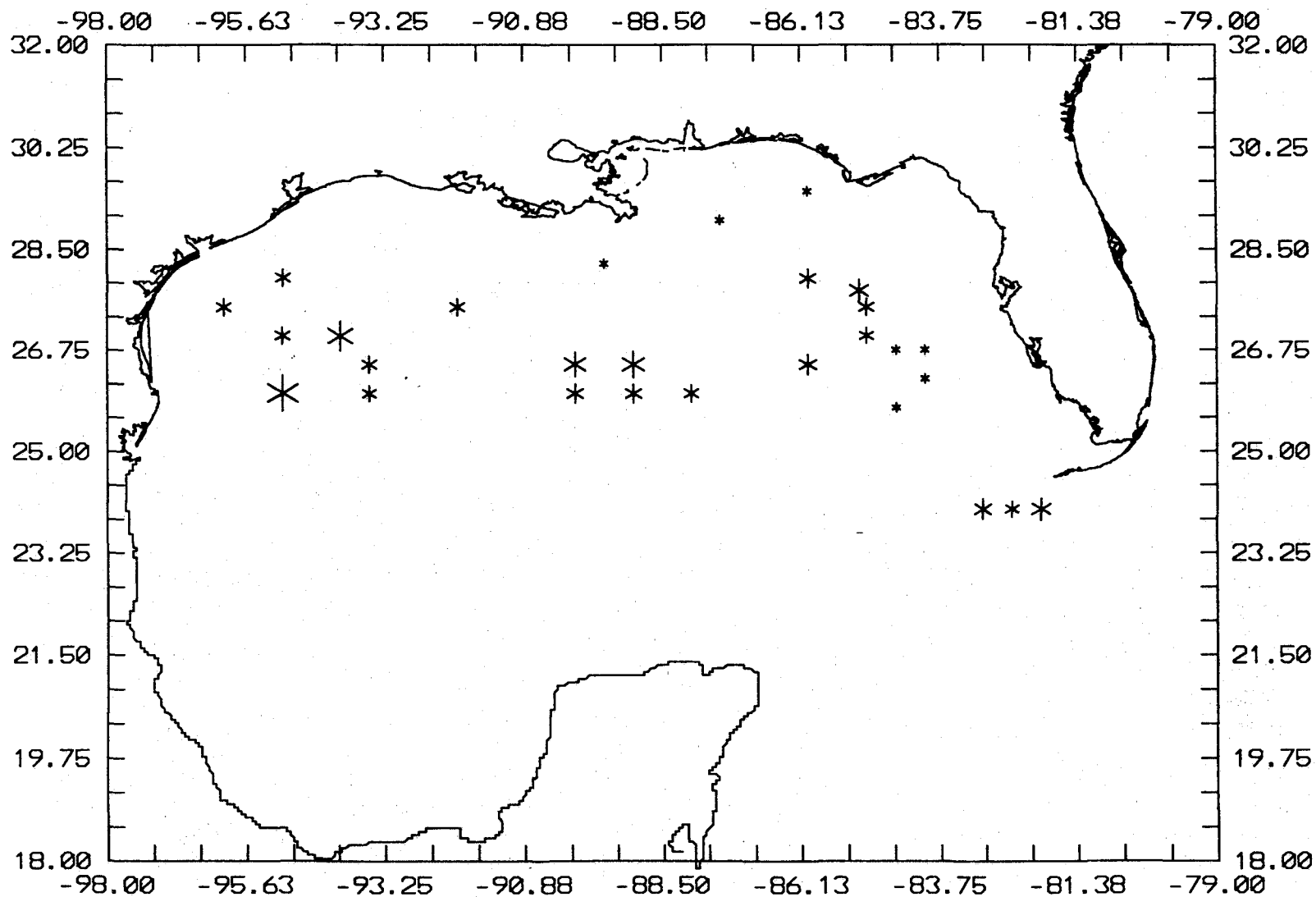
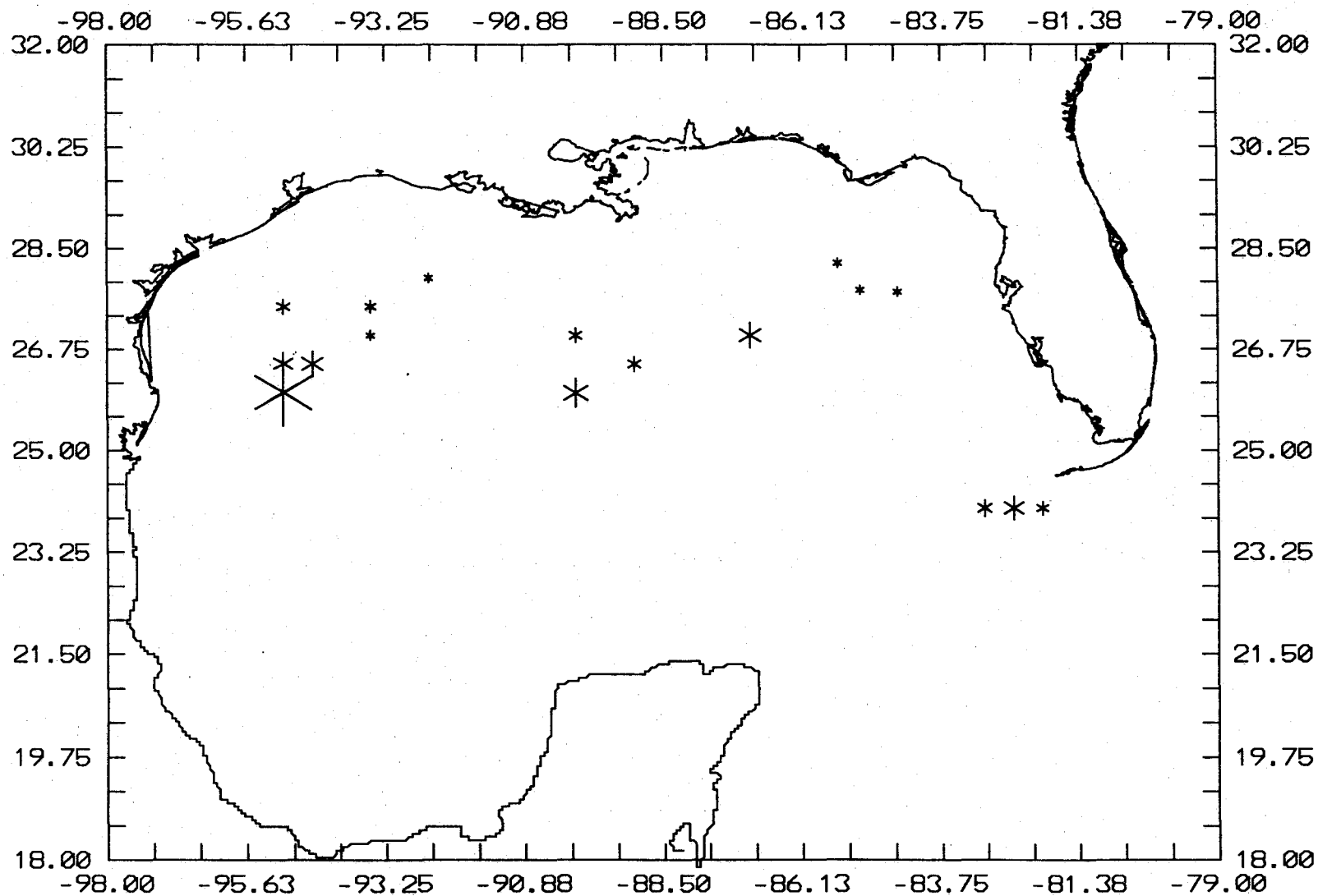


FIGURE 26 BONGO+RING NET TOWS: NUMBER/10M2



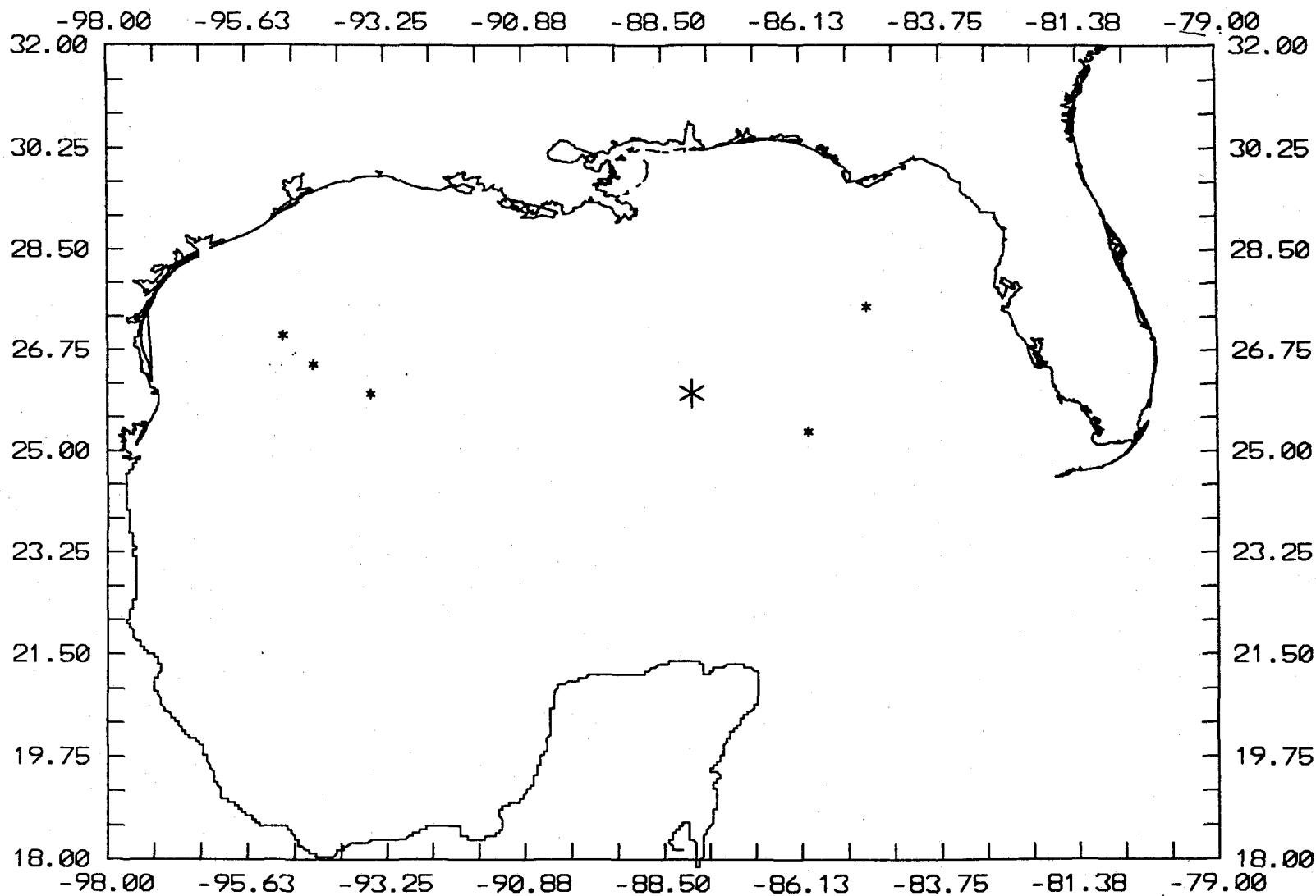
SEAMAP 1984 ICHTHYOPLANKTON: KATSUWONUS PELAMIS

FIGURE 28 BONGO+RING NET TOWS: NUMBER/10M2



SEAMAP 1984 ICHTHYOPLANKTON: THUNNUS SP.

FIGURE 29 NEUSTON NET TOWS: NUMBER CAUGHT



SEAMAP 1984 ICHTHYOPLANKTON: THUNNUS SP.

FIGURE 30 BONGO+RING NET TOWS: NUMBER/10M2

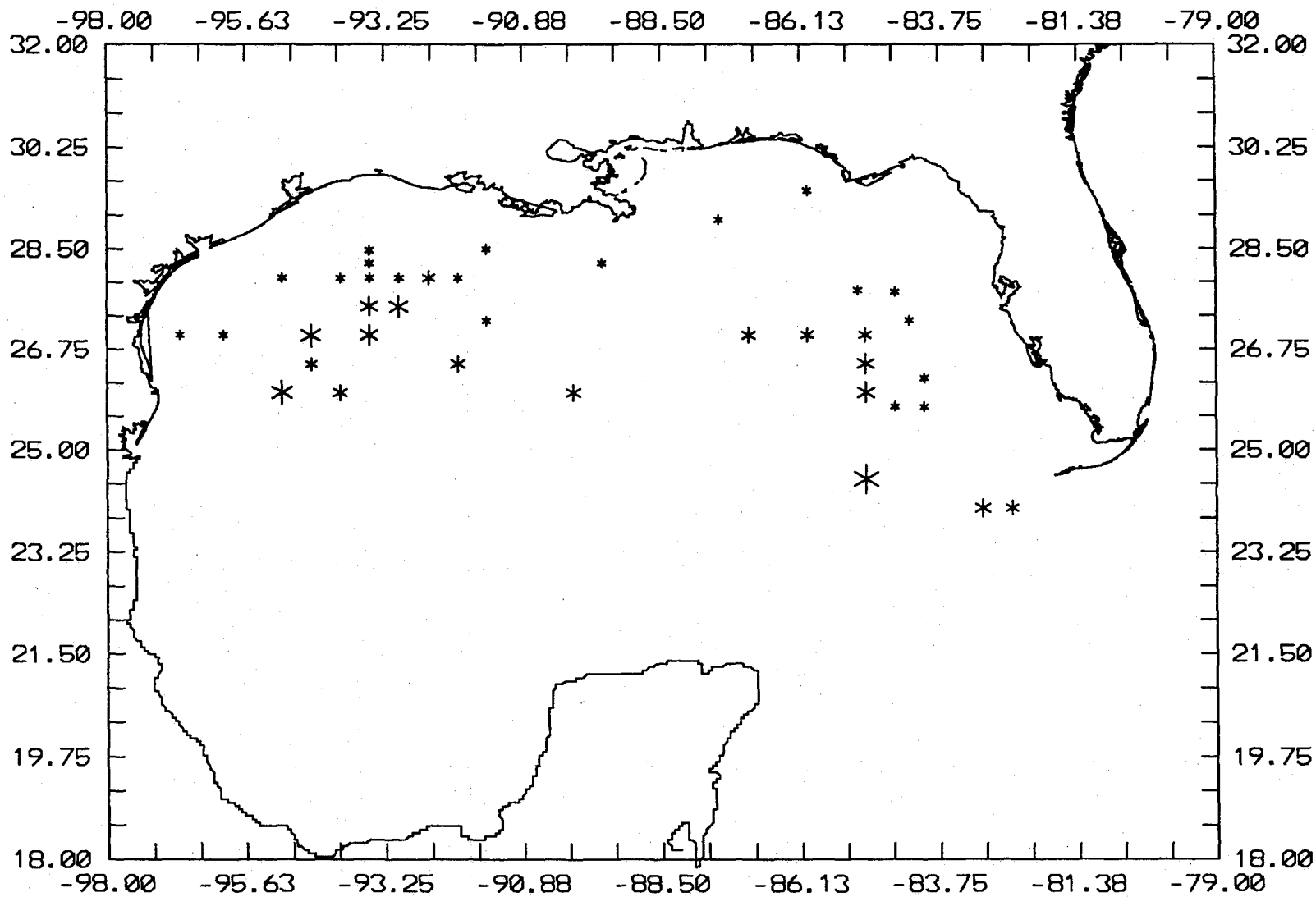


FIGURE 32 BONGO+RING NET TOWS: NUMBER/10M2

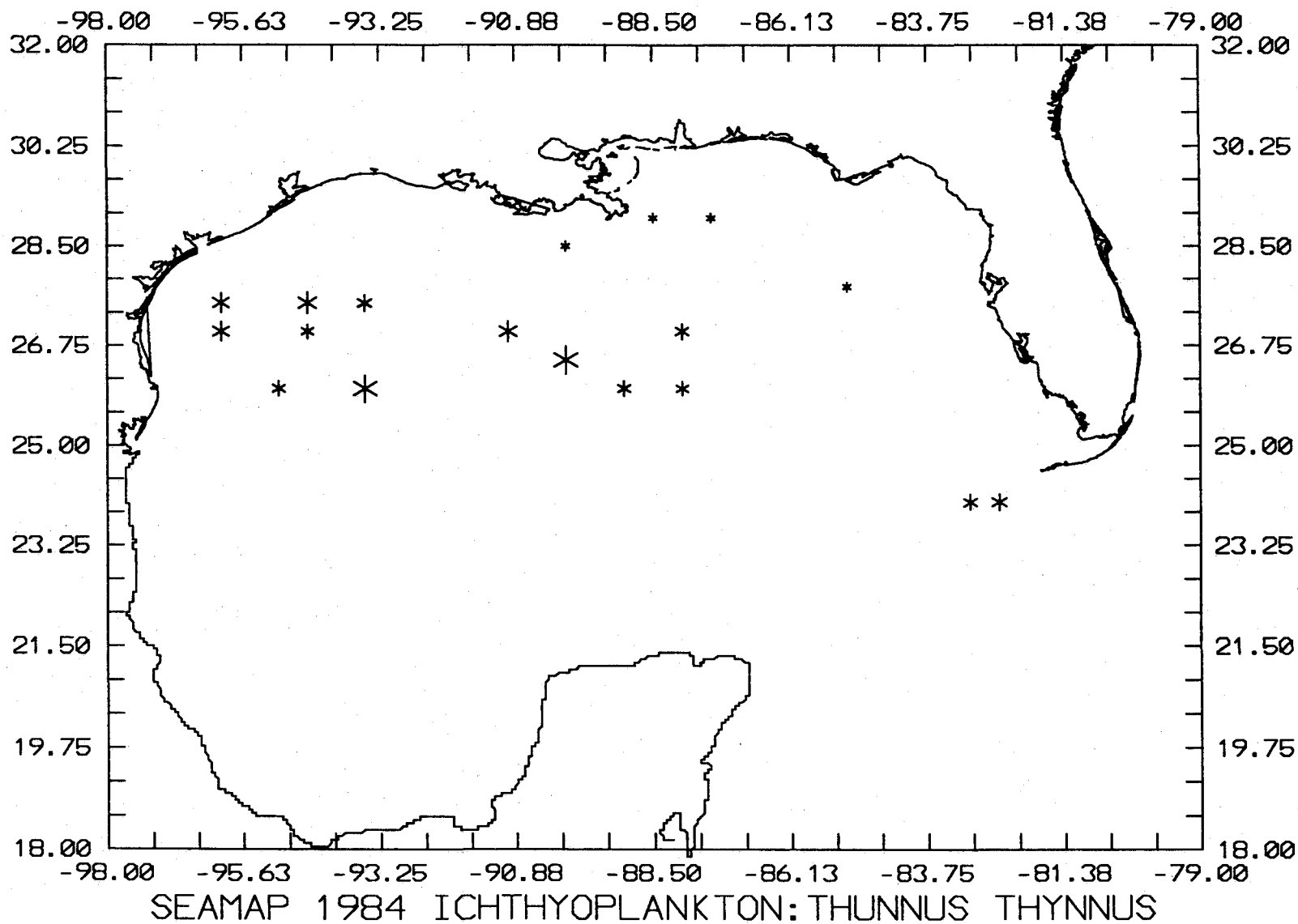


FIGURE 33 NEUSTON NET TOWS: NUMBER CAUGHT

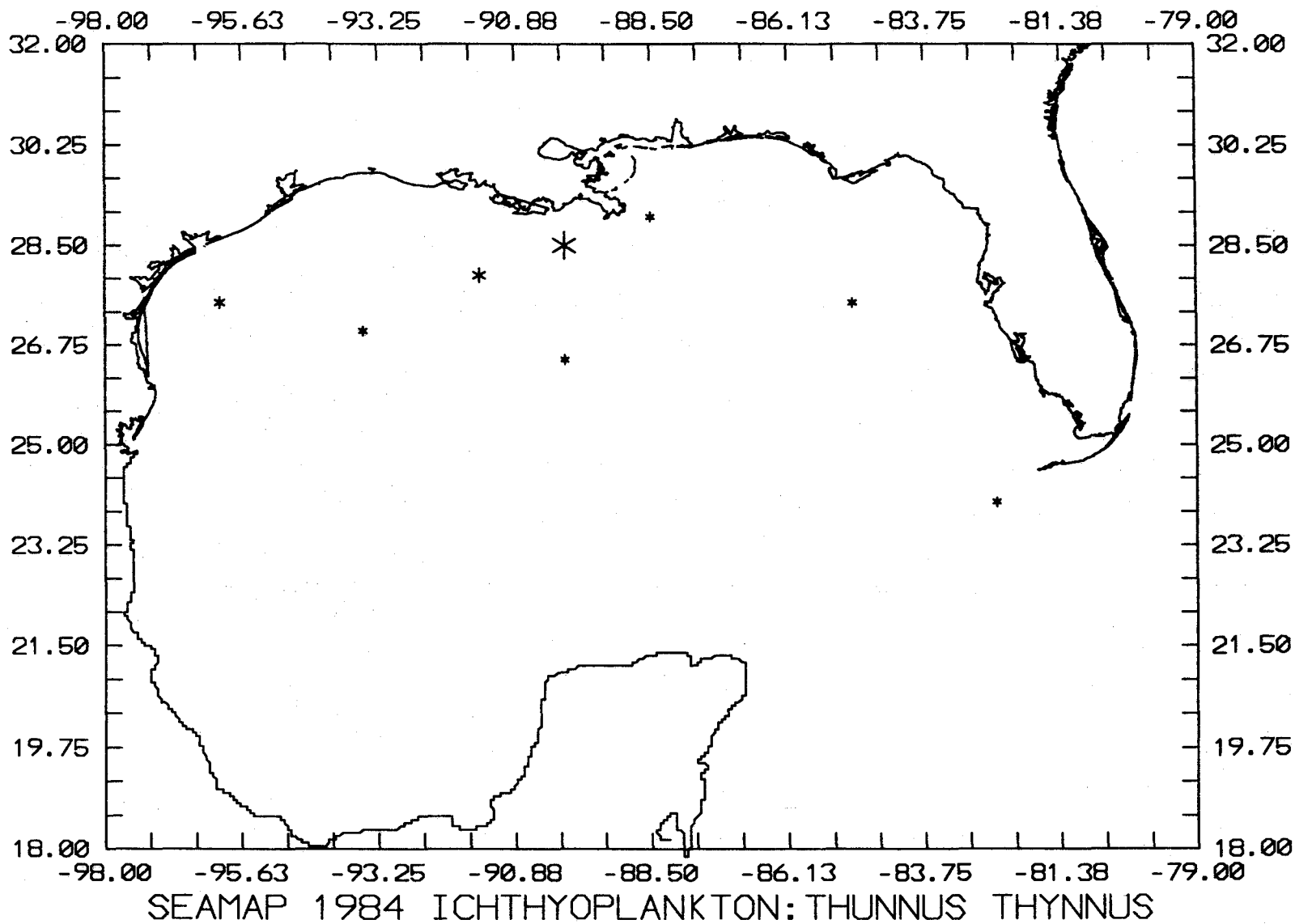


FIGURE 34 BONGO+RING NET TOWS: NUMBER/10M2

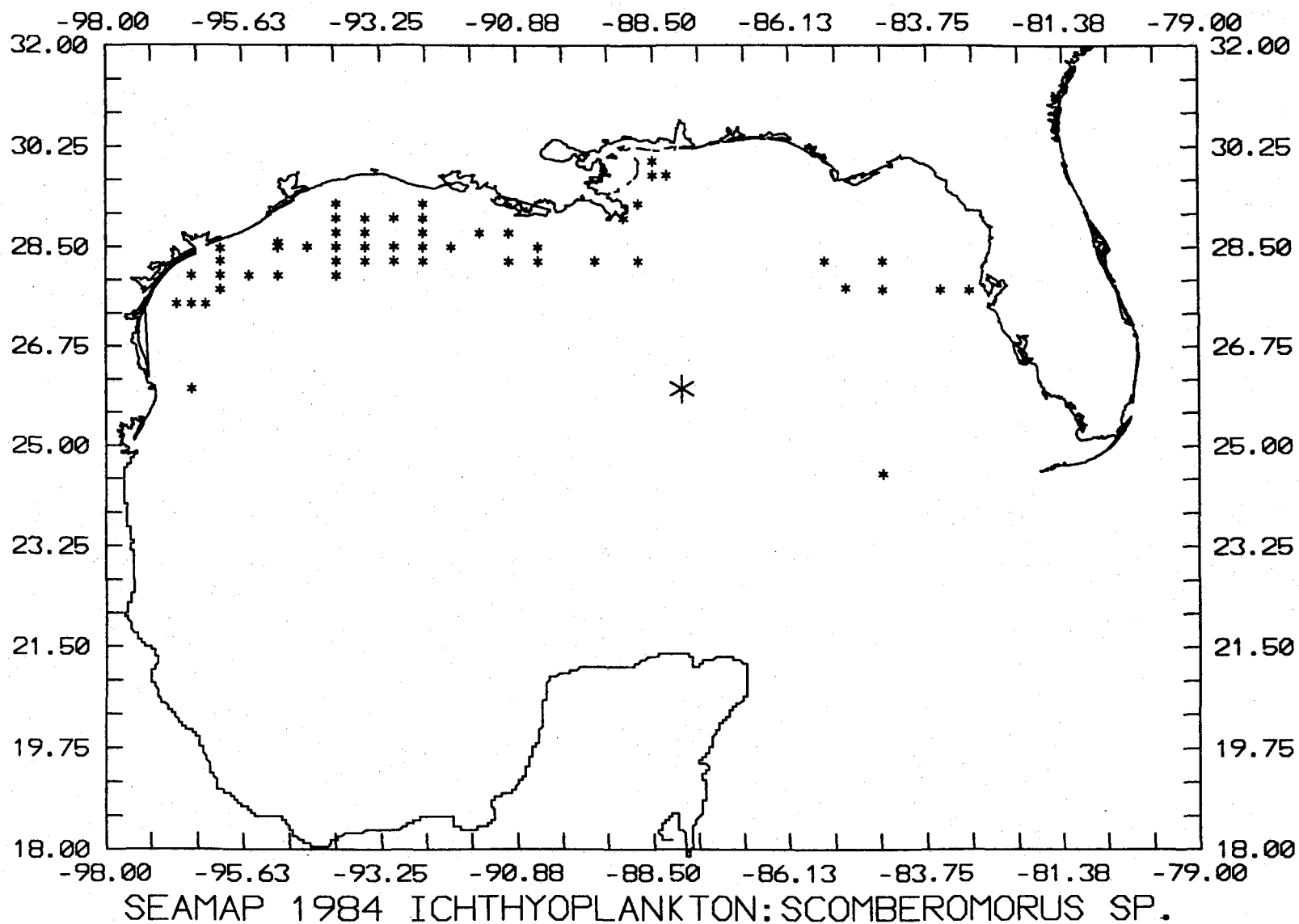


FIGURE 35 NUESTON NET TOWS: NUMBER CAUGHT

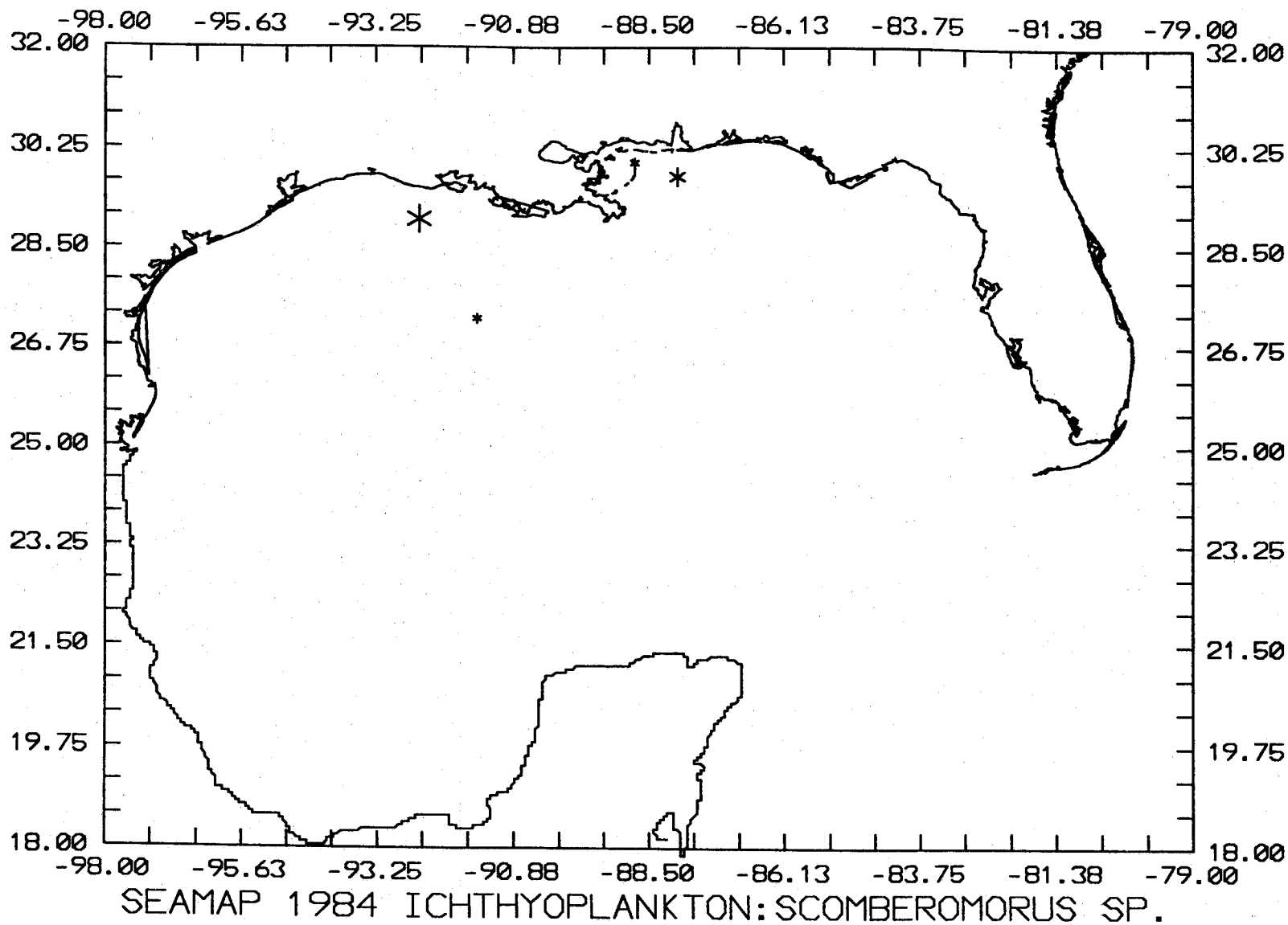
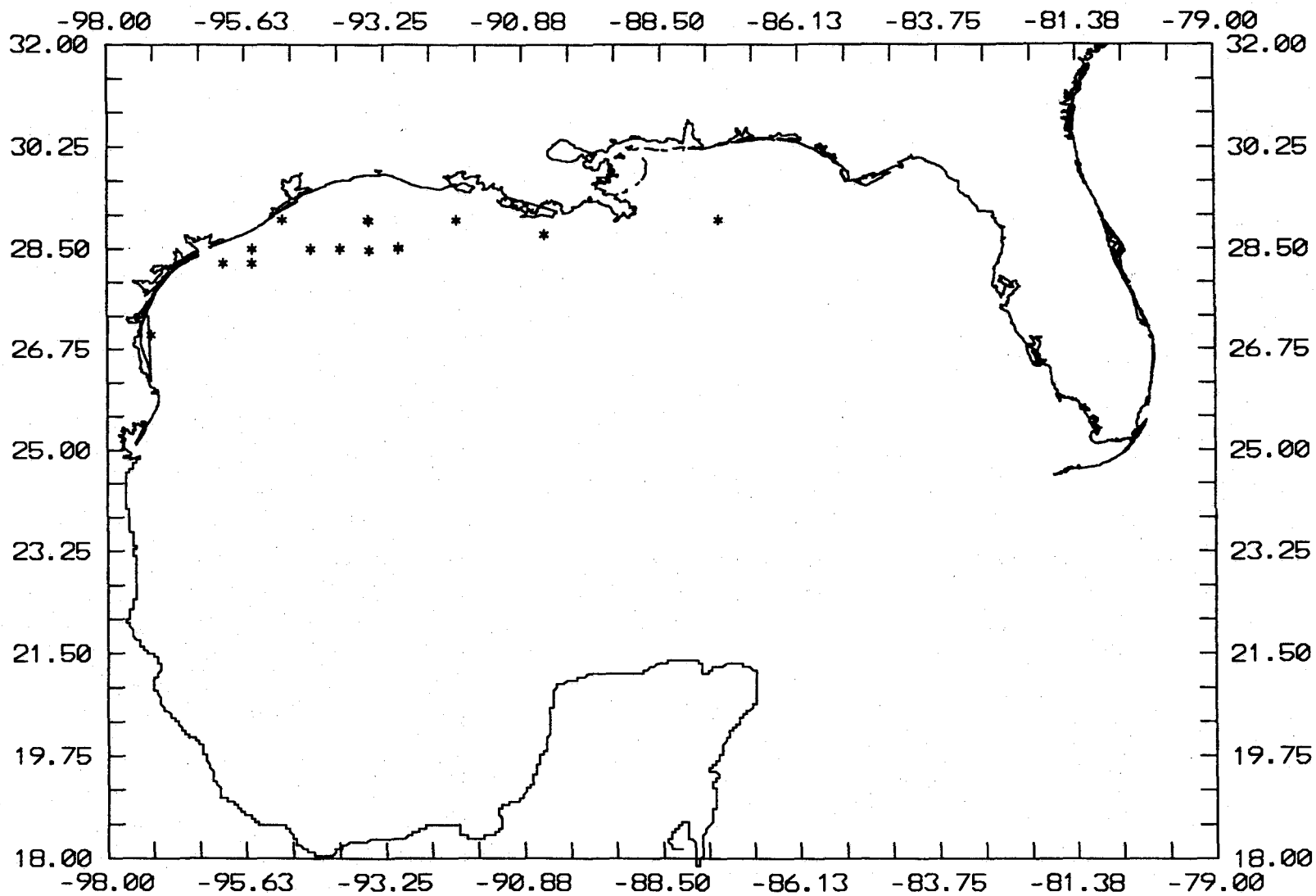
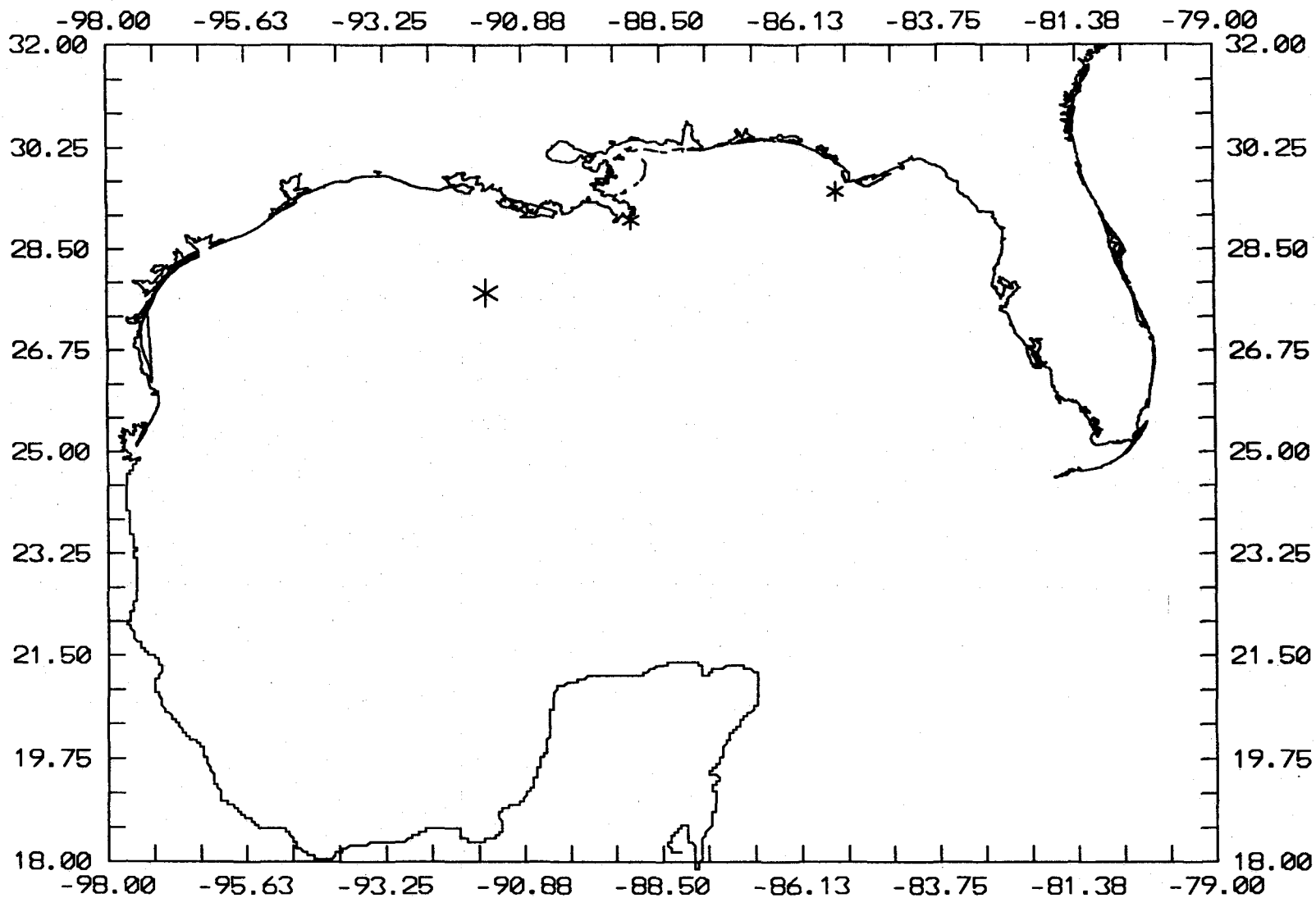


FIGURE 36 BONGO+RING NET TOWS: NUMBER/10M²



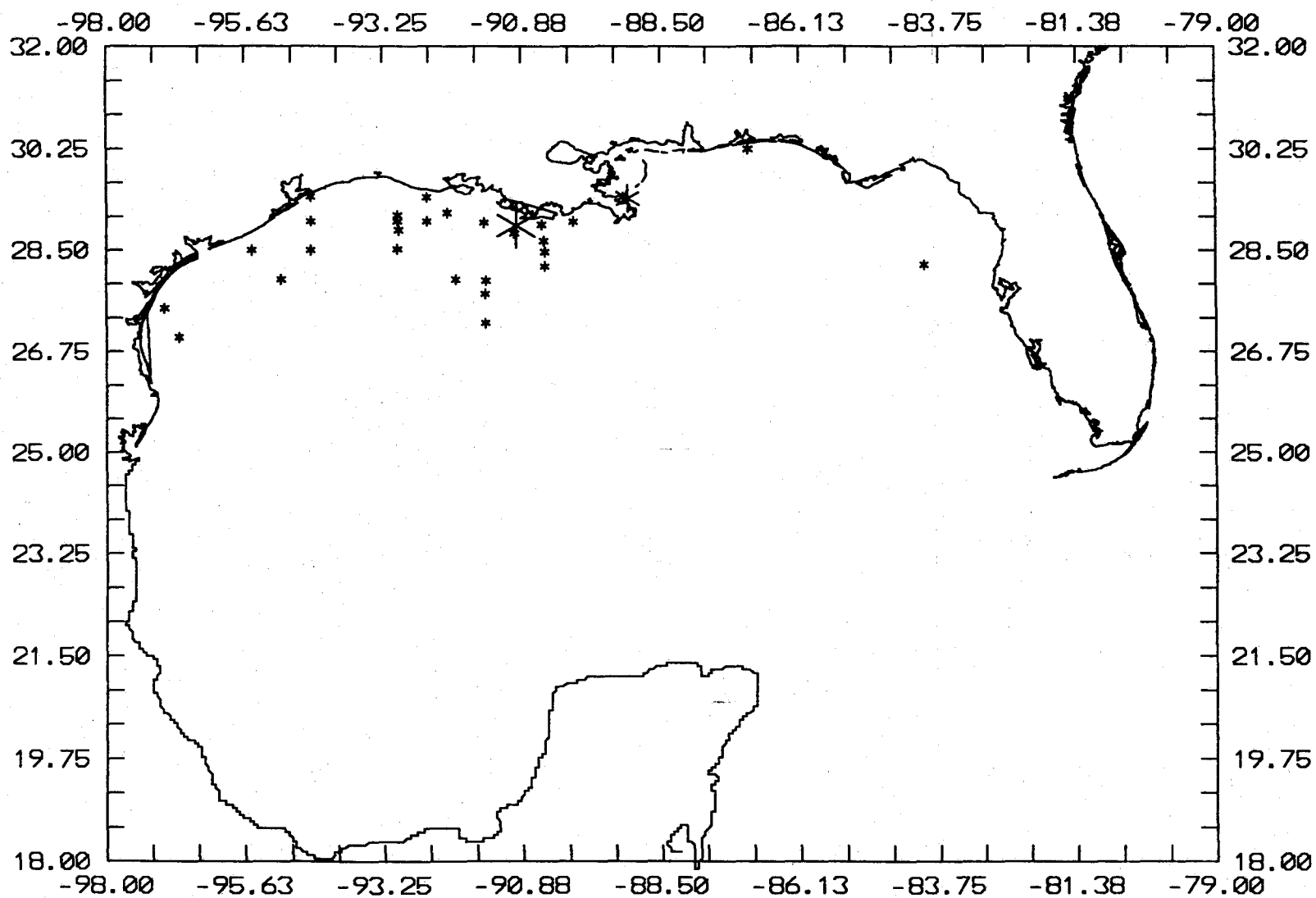
SEAMAP 1984 ICHTHYOPLANKTON: SCONBEROMORUS CAVALLA

FIGURE 37 NEUSTON NET TOWS: NUMBER CAUGHT



SEAMAP 1984 ICHTHYOPLANKTON: SCOMBEROMORUS CAVALLA

FIGURE 38 BONGO+RING NET TOWS: NUMBER/10M2



SEAMAP 1984 ICHTHYOPLANKTON: SCOMBEROMORUS MACULATUS

FIGURE 39 NEUSTON NET TOWS: NUMBER CAUGHT

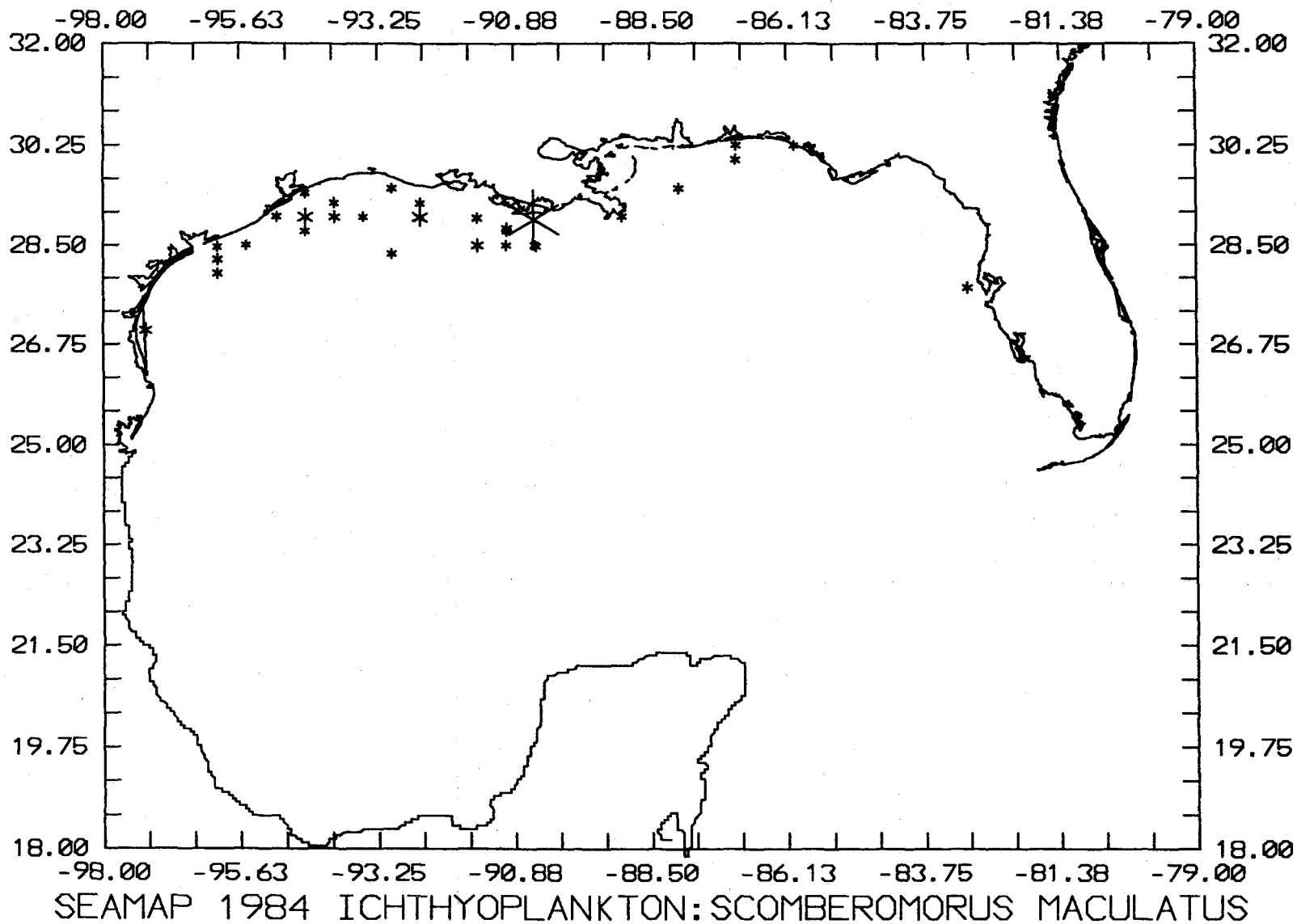
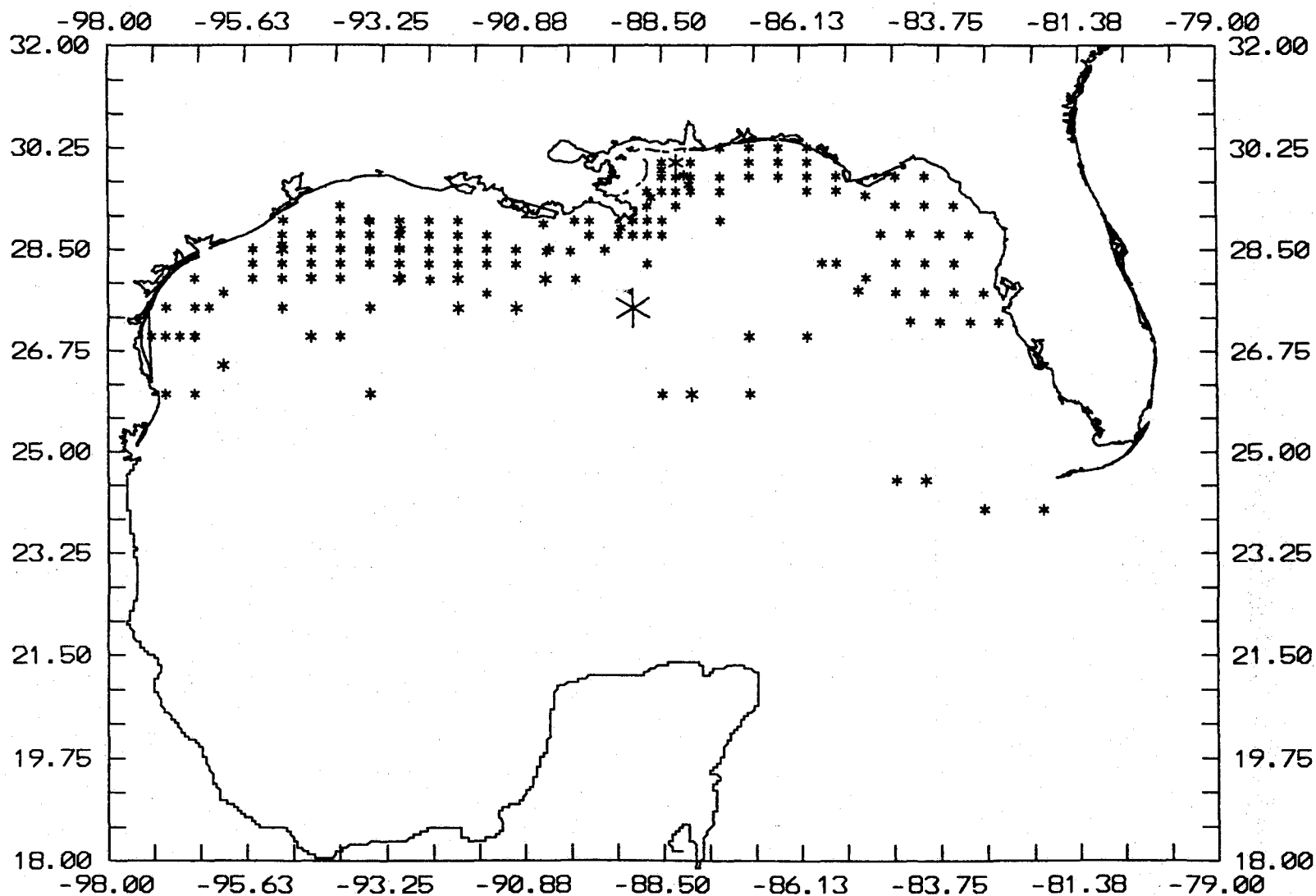


FIGURE 40

BONGO+RING NET TOWS:

NUMBER/10M2



SEAMAP 1984 ICHTHYOPLANKTON: SERRANIDAE

FIGURE 41 NEUSTON NET TOWS: NUMBER CAUGHT

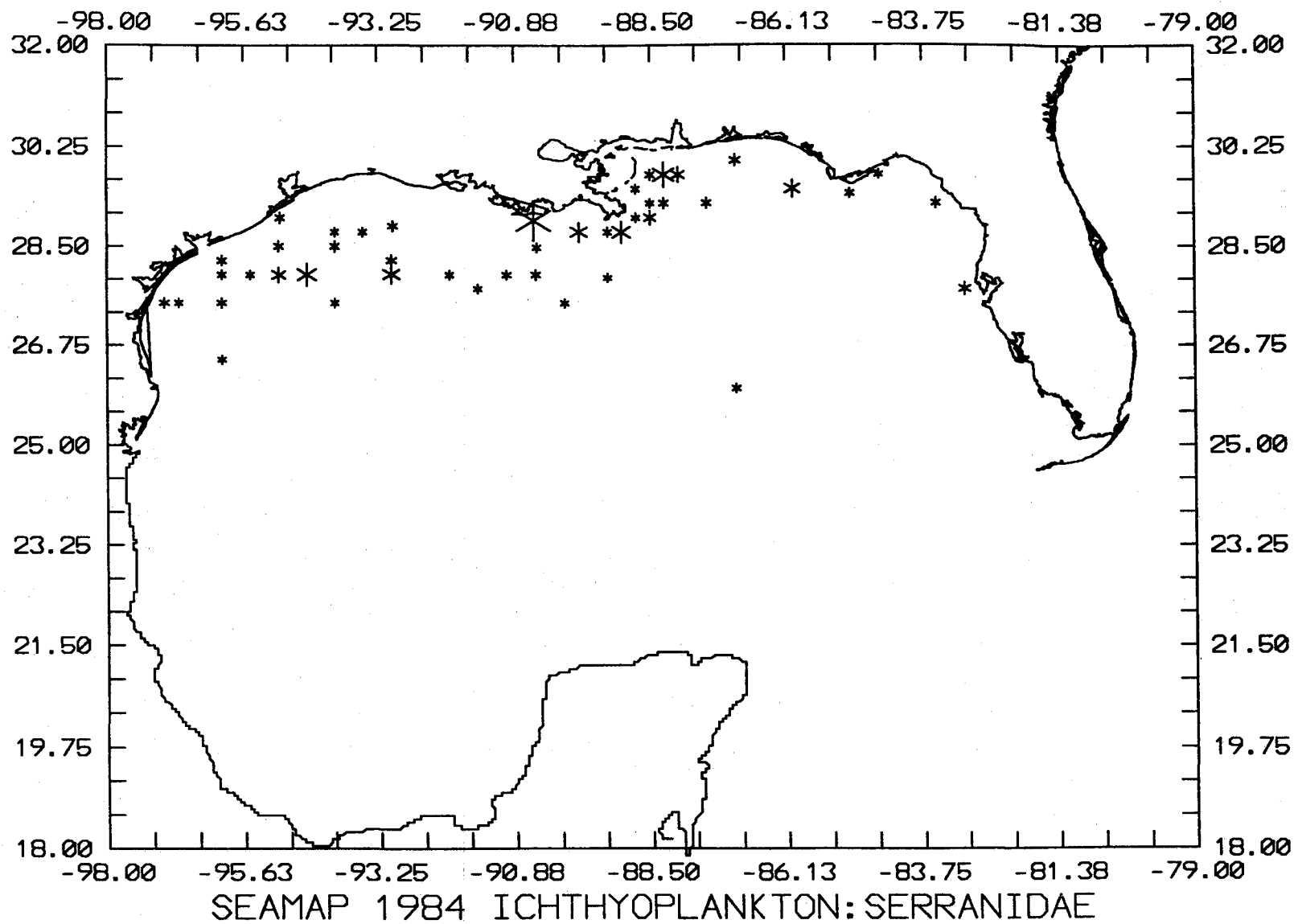
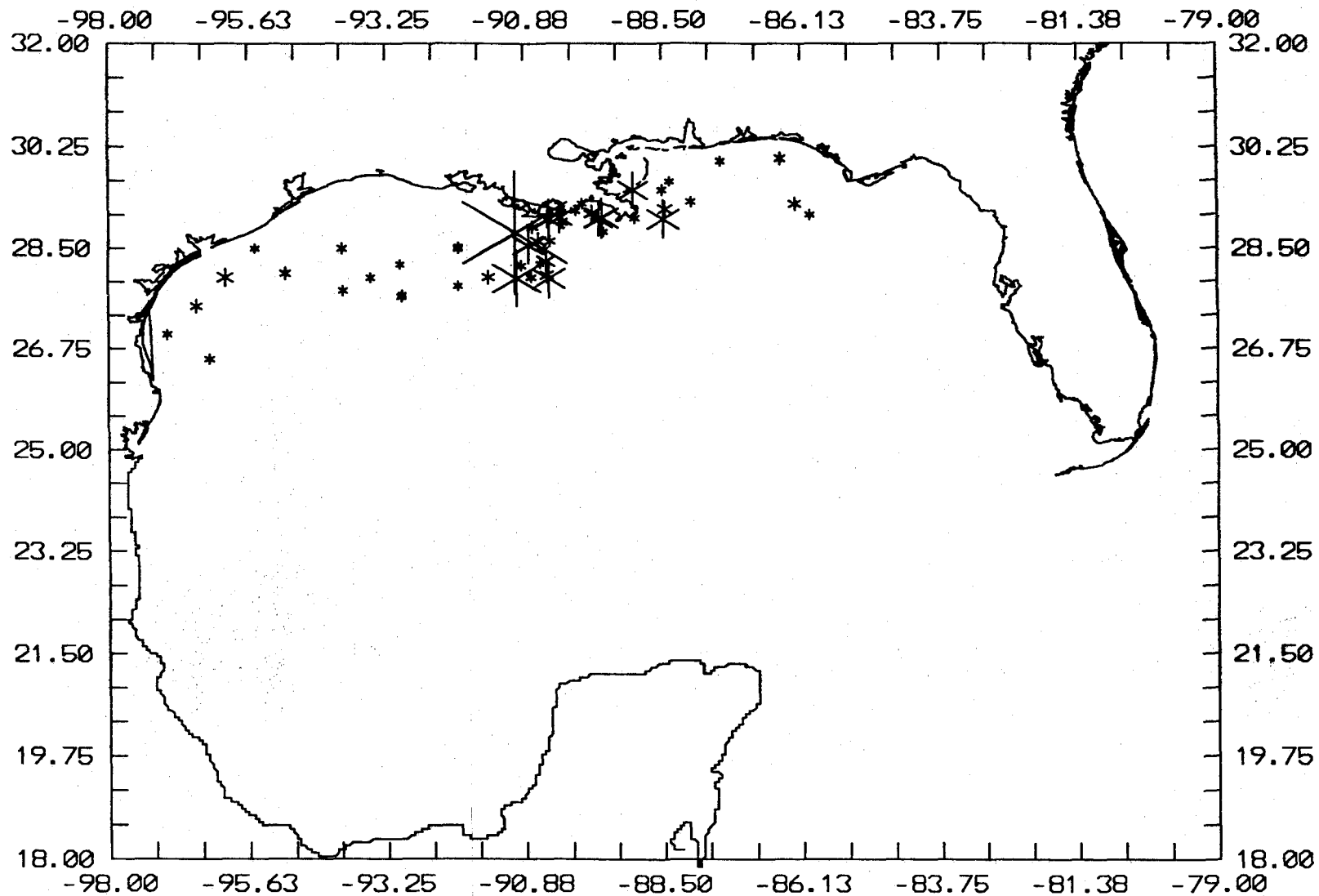


FIGURE 42 BONGO+RING NET TOWS: NUMBER/10M2



SEAMAP 1985 ICHTHYOPLANKTON: CARANGIDAE

FIGURE 43 NEUSTON NET TOWS: NUMBER CAUGHT

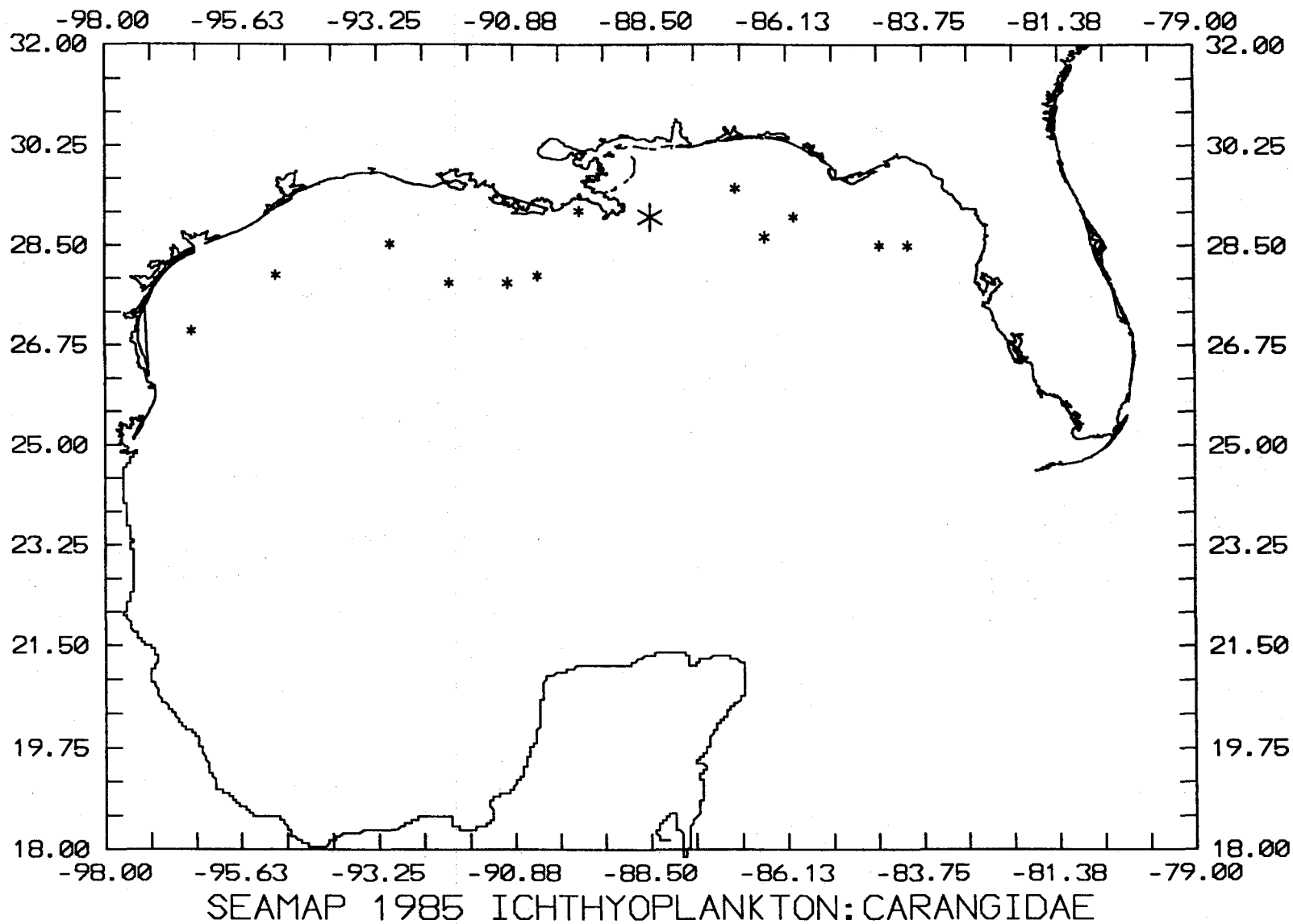


FIGURE 44 BONGO+RING NET TOWS: NUMBER/10M2

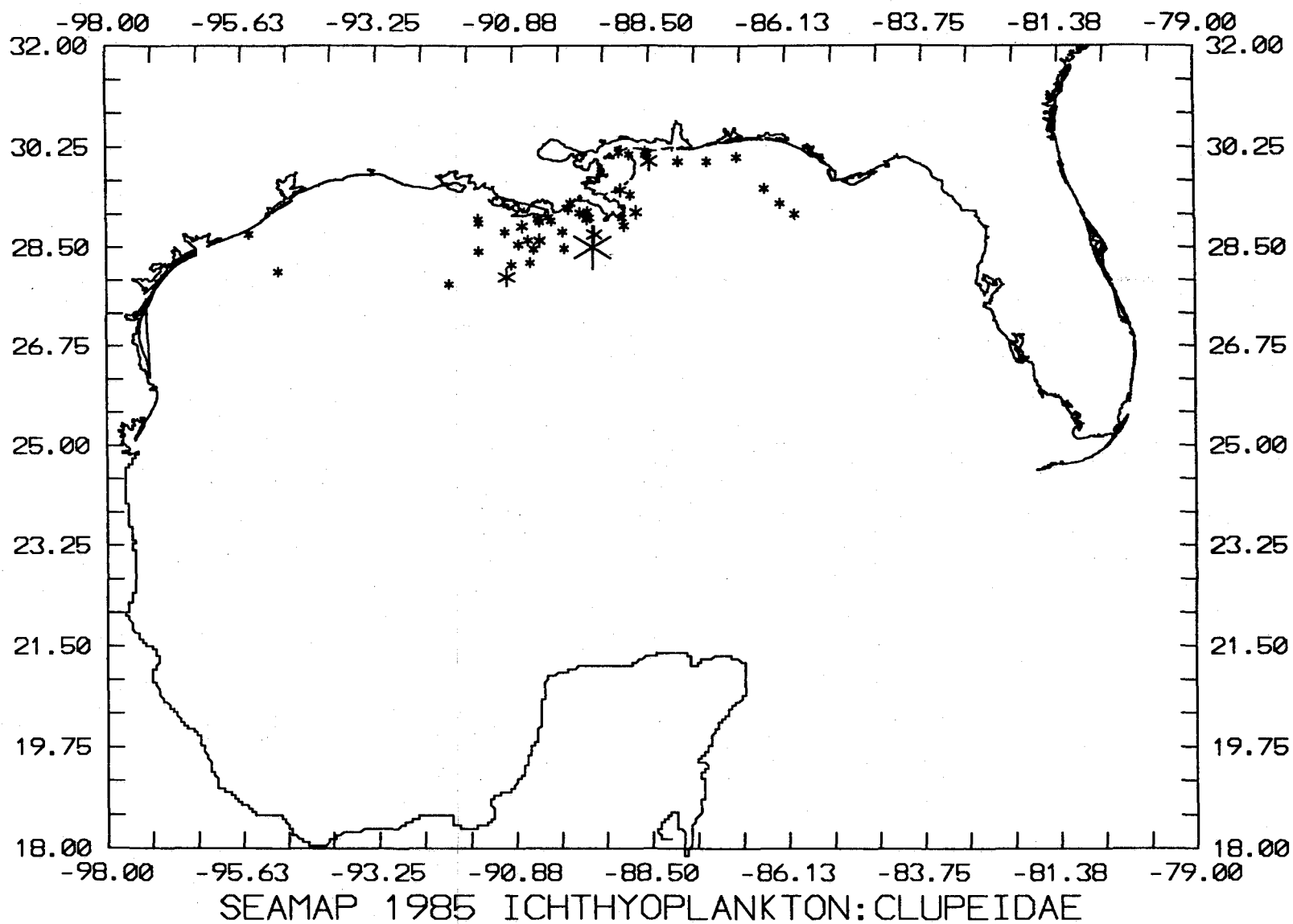
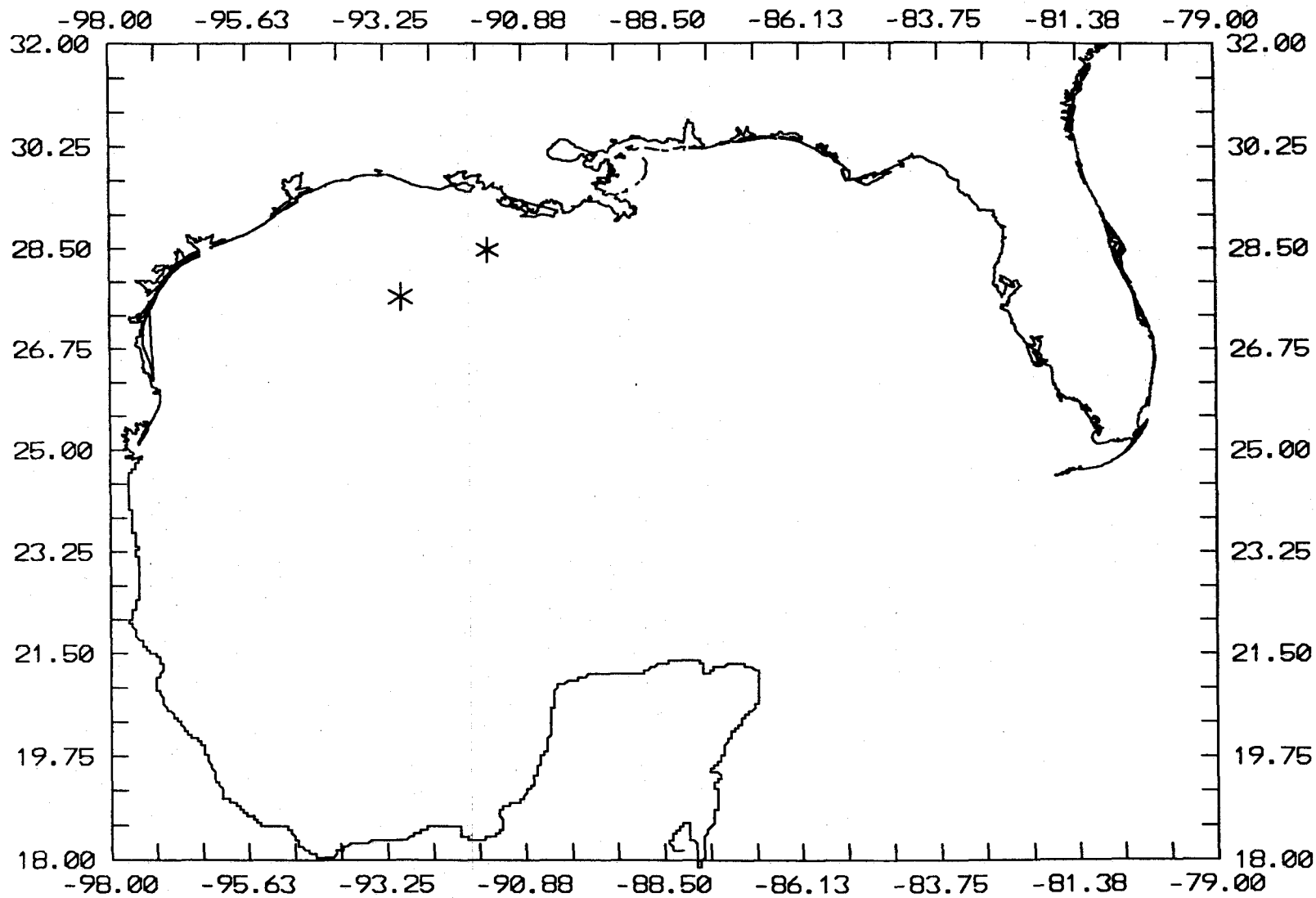
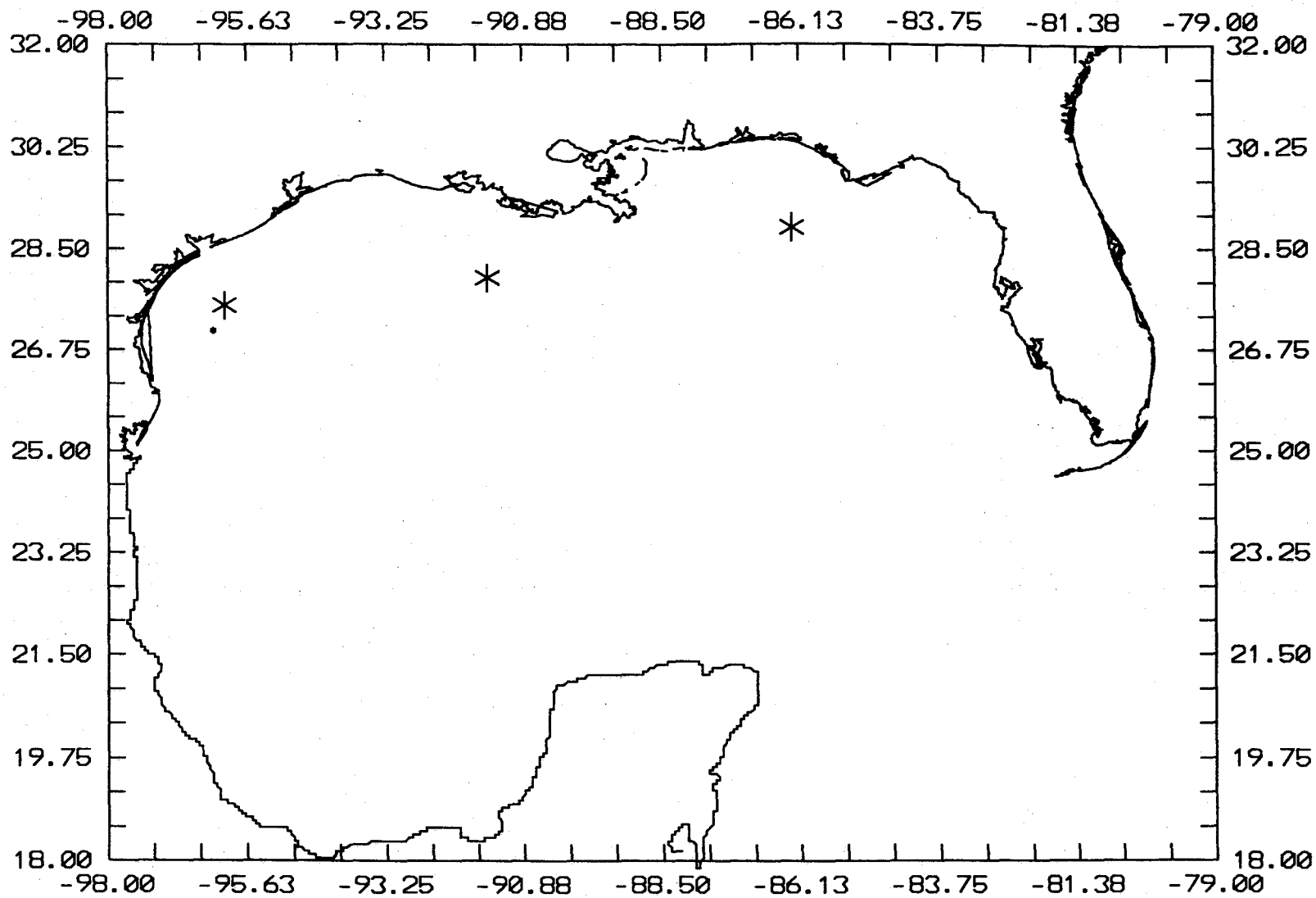


FIGURE 46 BONGO+RING NET TOWS: NUMBER/10M2



SEAMAP 1985 ICHTHYOPLANKTON: CORYPHAENA SP.

FIGURE 47 NEUSTON NET TOWS: NUMBER CAUGHT



SEAMAP 1985 ICHTHYOPLANKTON: CORYPHAENA SP.

FIGURE 48 NEUSTON NET TOWS: NUMBER CAUGHT

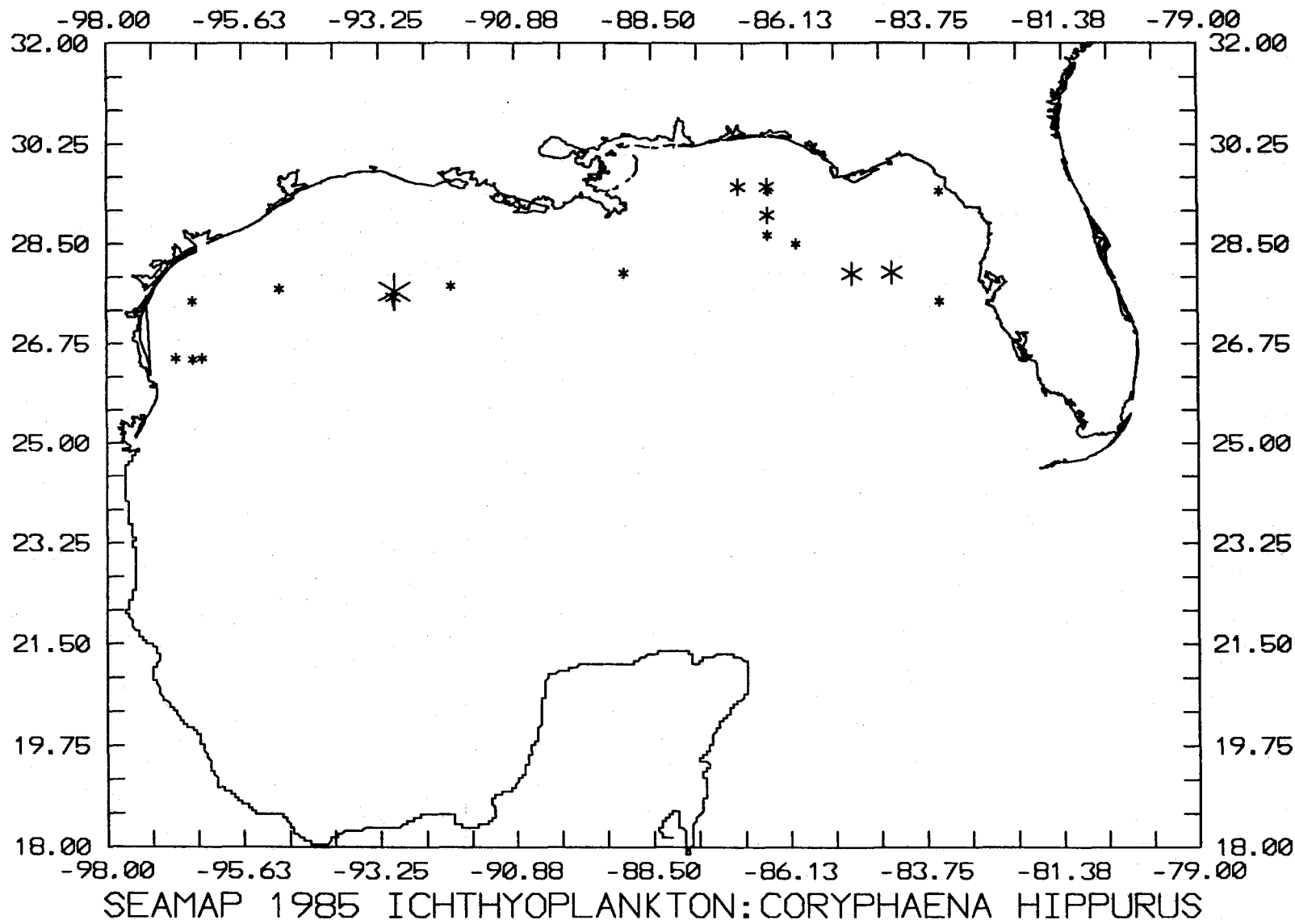


FIGURE 49 BONGO+RING NET TOWS: NUMBER/10M2

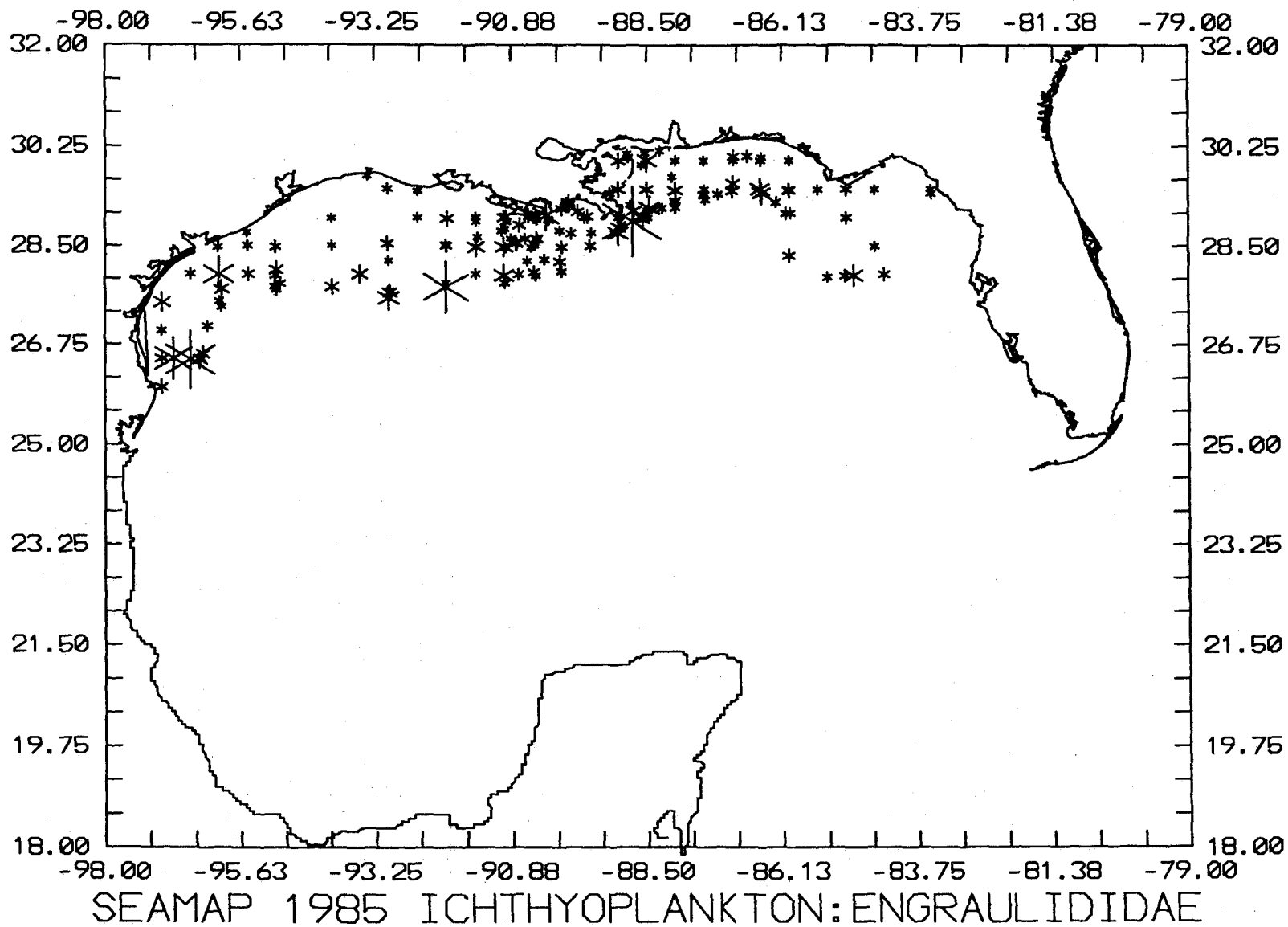


FIGURE 50 NEUSTON NET TOWS: NUMBER CAUGHT

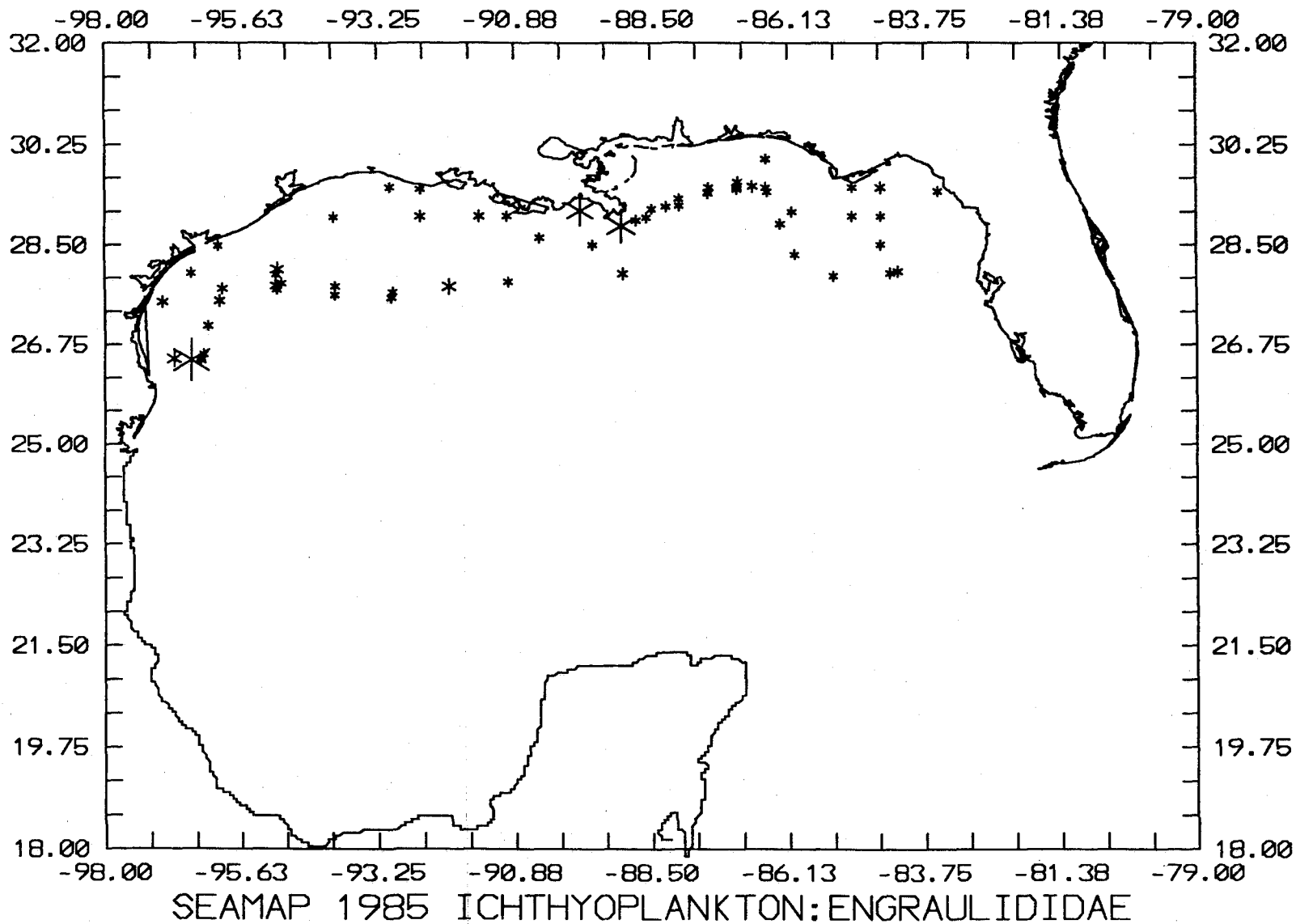
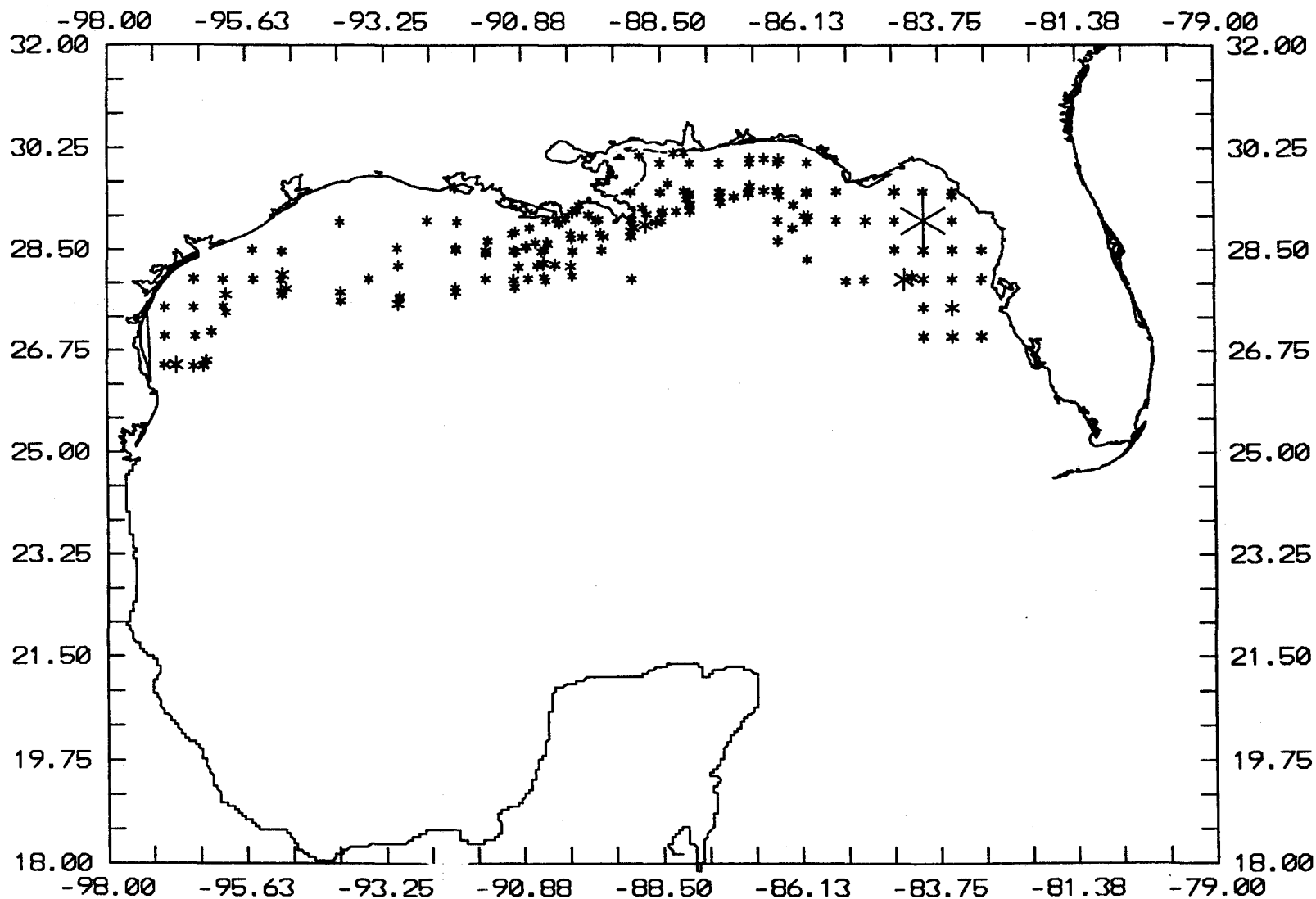


FIGURE 51 BONGO+RING NET TOWS: NUMBER/10M2



SEAMAP 1985 ICHTHYOPLANKTON: GOBIIDAE

FIGURE 52 NEUSTON NET TOWS: NUMBER CAUGHT

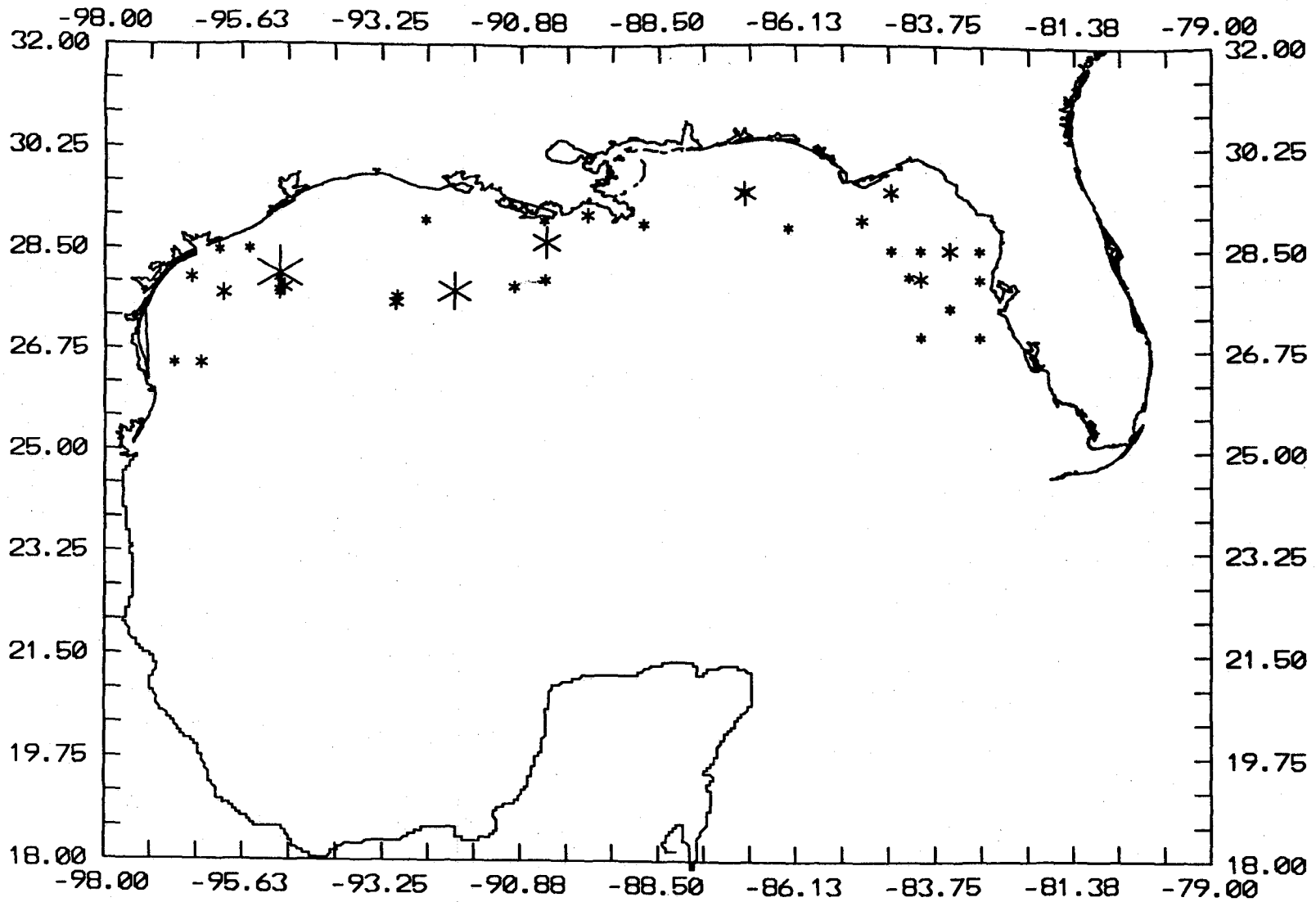


FIGURE 53 BONGO+RING NET TOWS: NUMBER/10M2

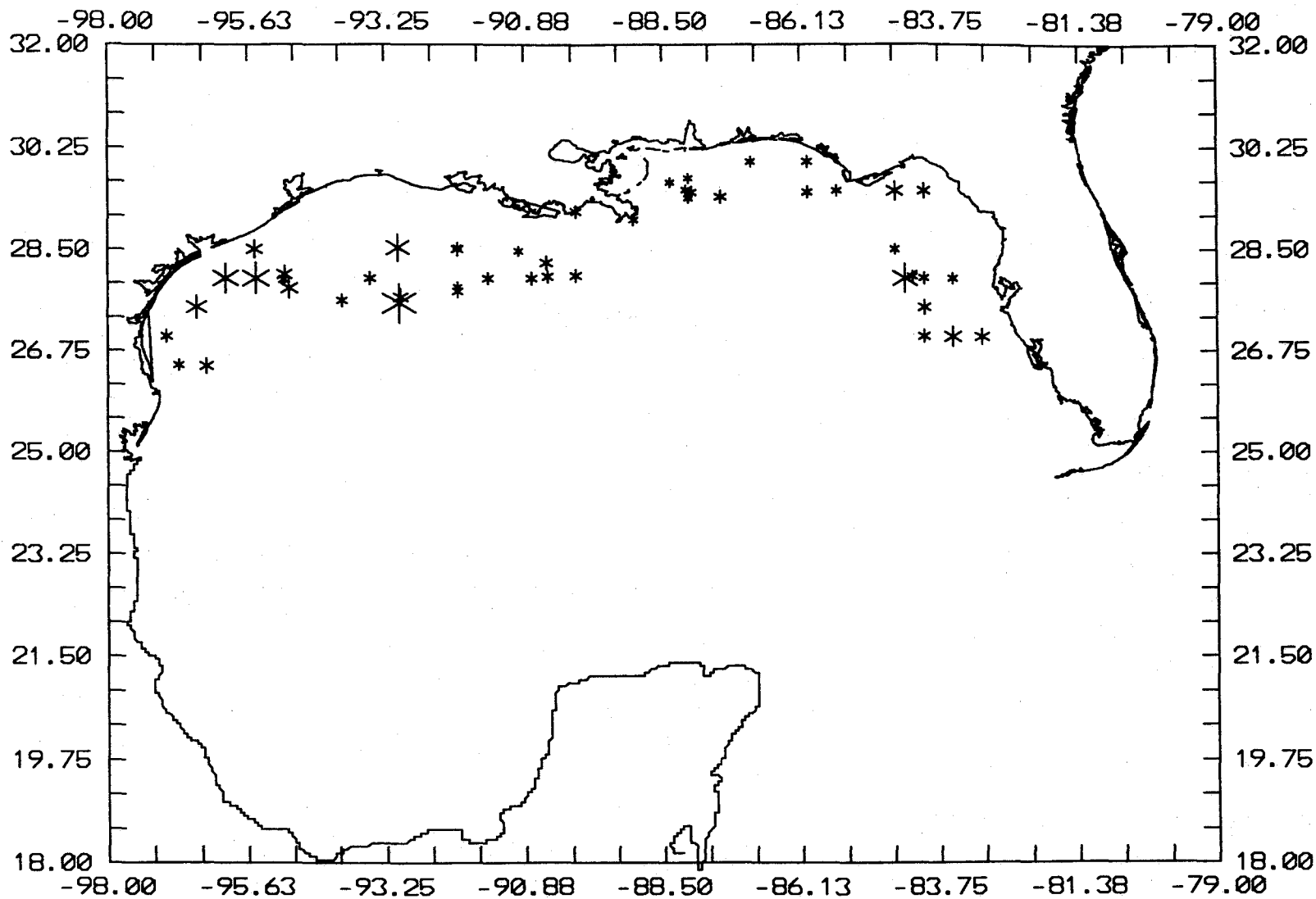


FIGURE 54 NEUSTON NET TOWS: NUMBER CAUGHT

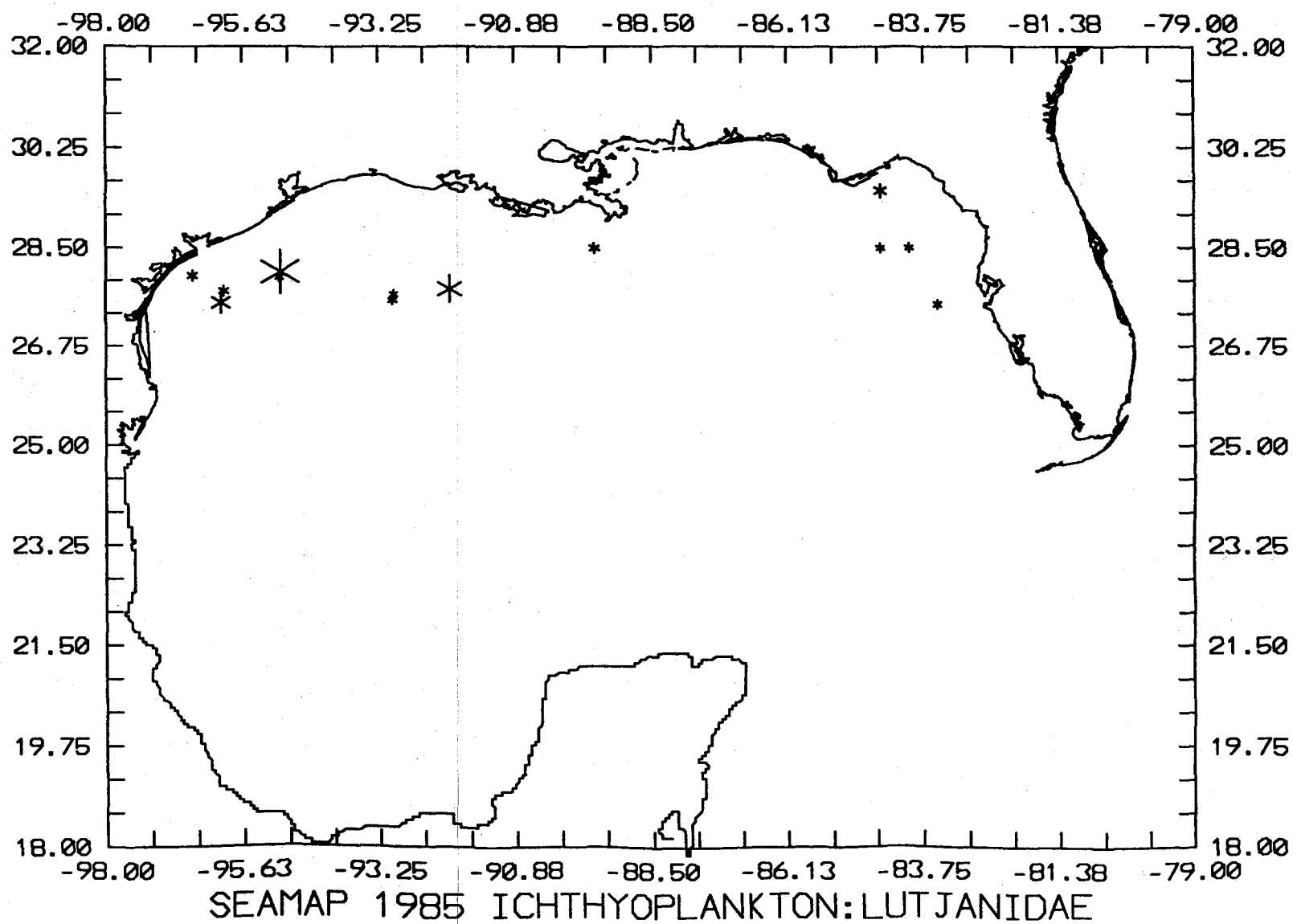


FIGURE 55 BONGO+RING NET TOWS: NUMBER/10M2

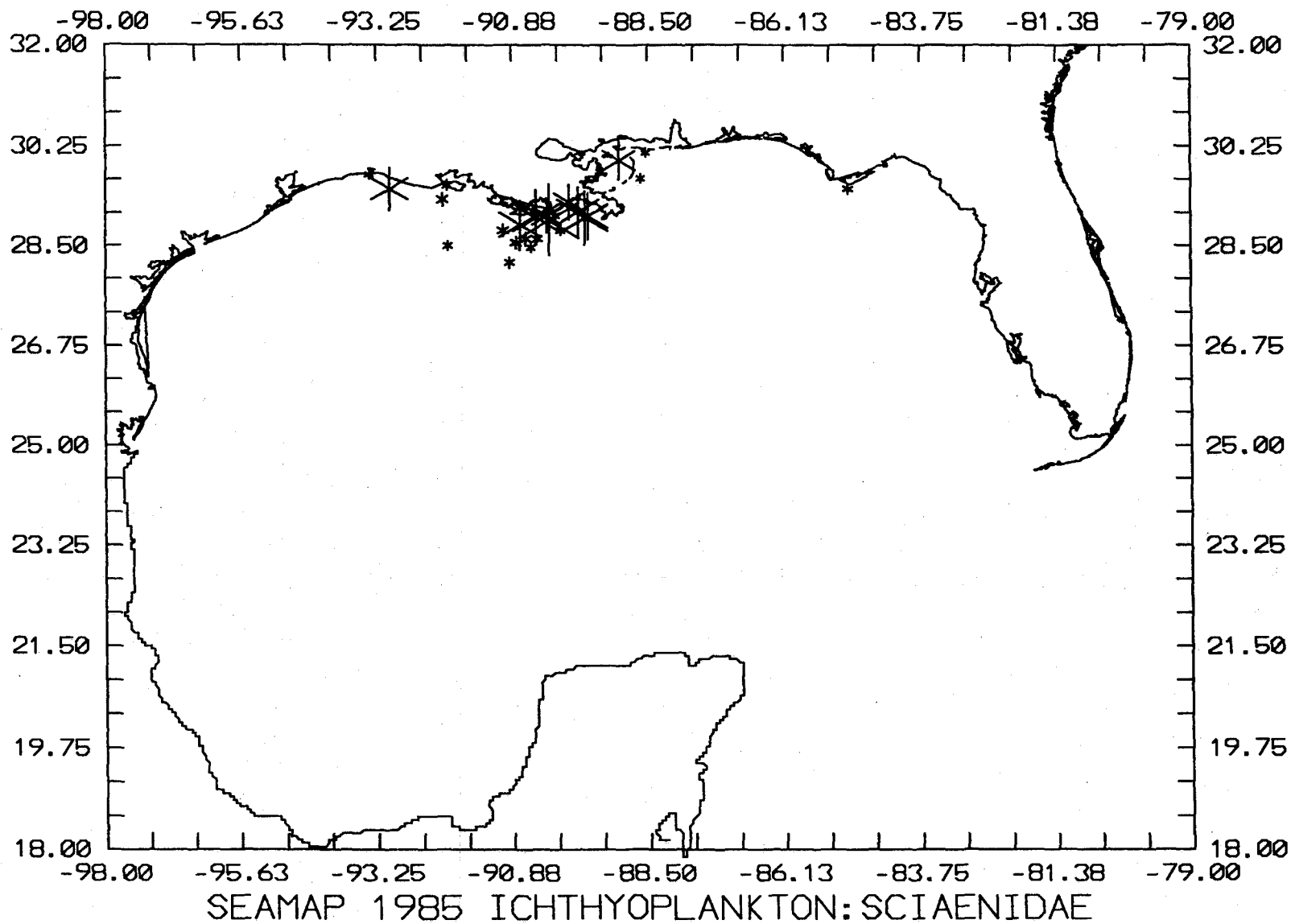


FIGURE 57 NEUSTON NET TOWS: NUMBER CAUGHT

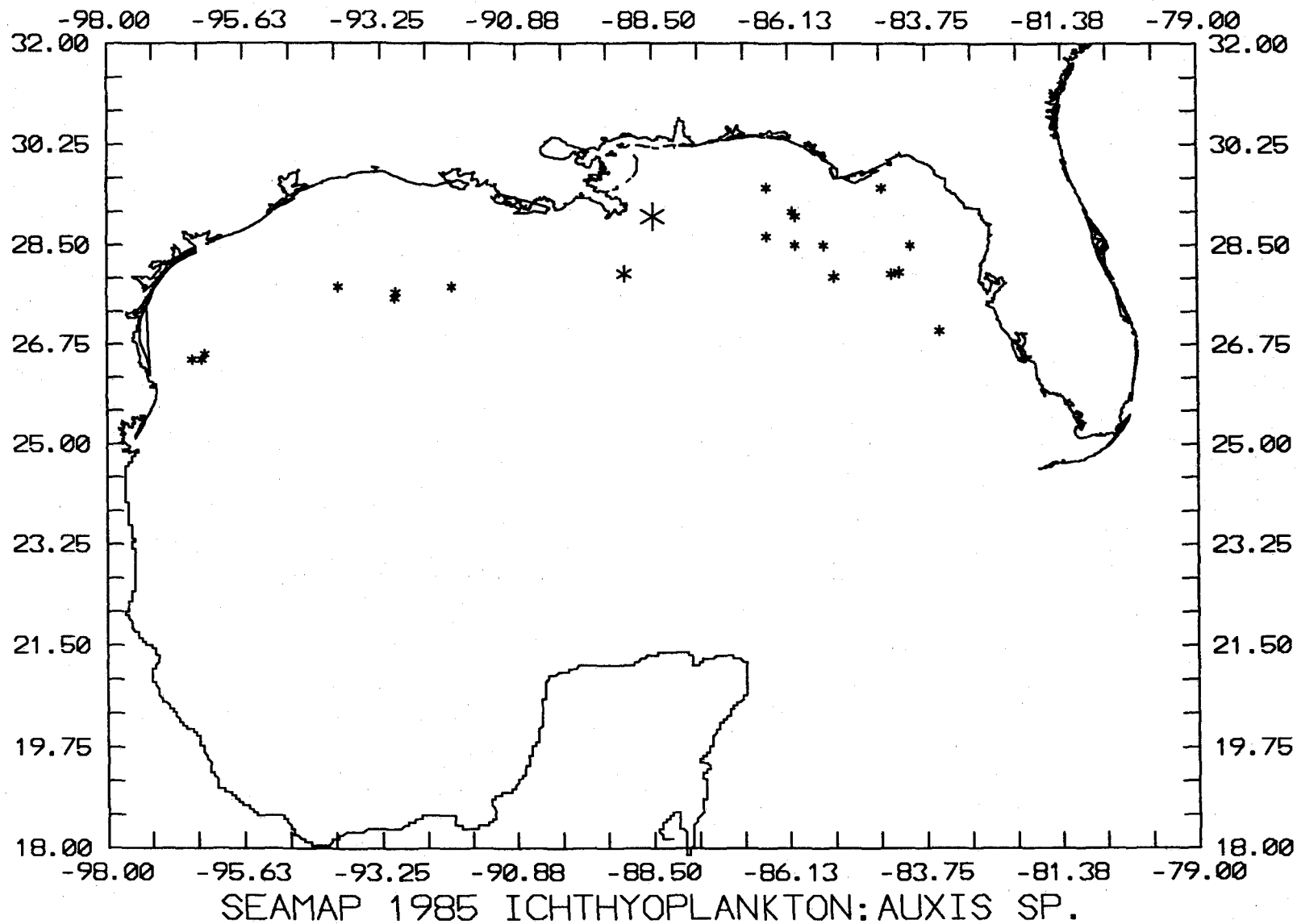
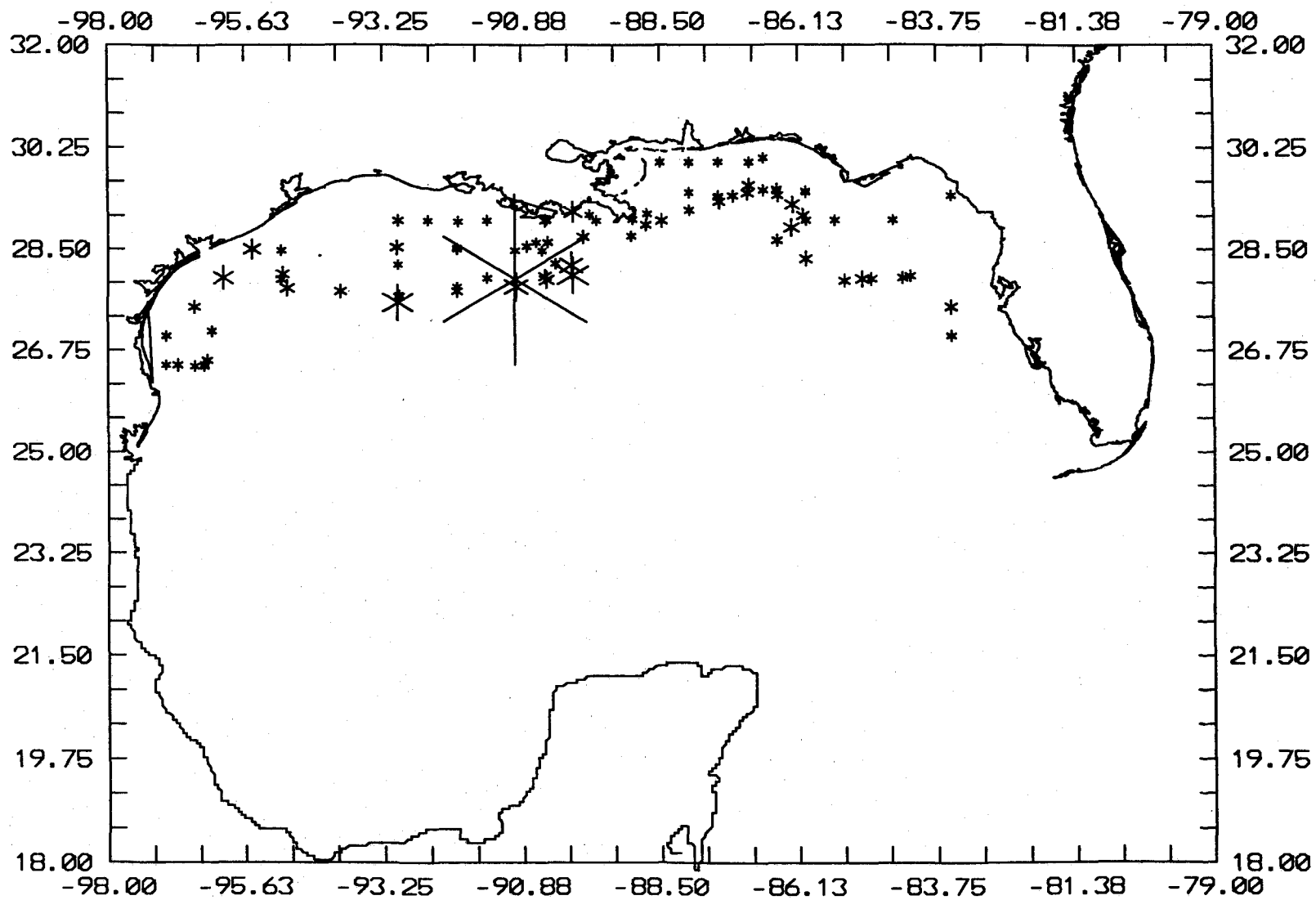


FIGURE 58 BONGO+RING NET TOWS: NUMBER/10M2



SEAMAP 1985 ICHTHYOPLANKTON: EUTHYNNUS ALLETTERATUS

FIGURE 59 NEUSTON NET TOWS: NUMBER CAUGHT

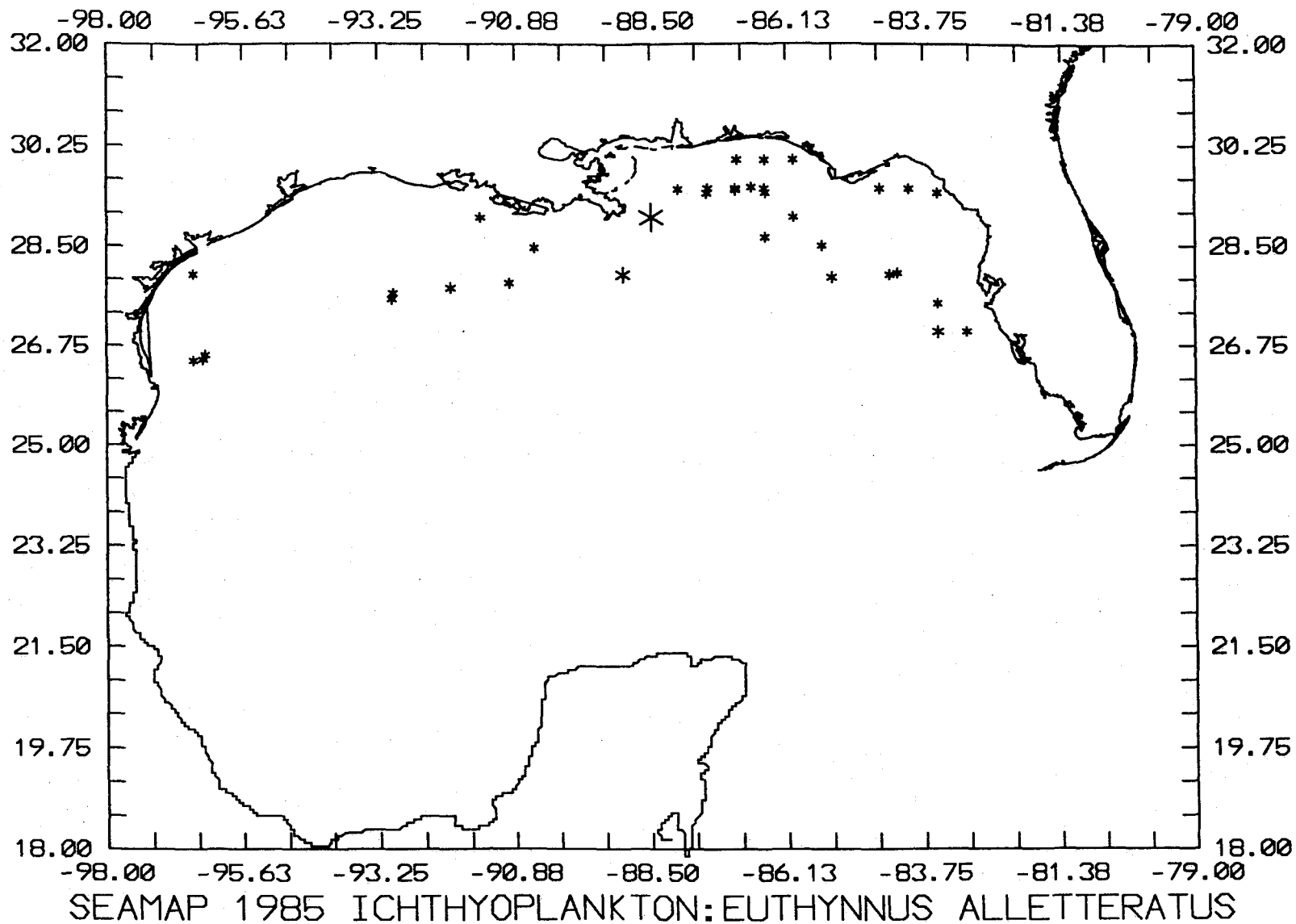
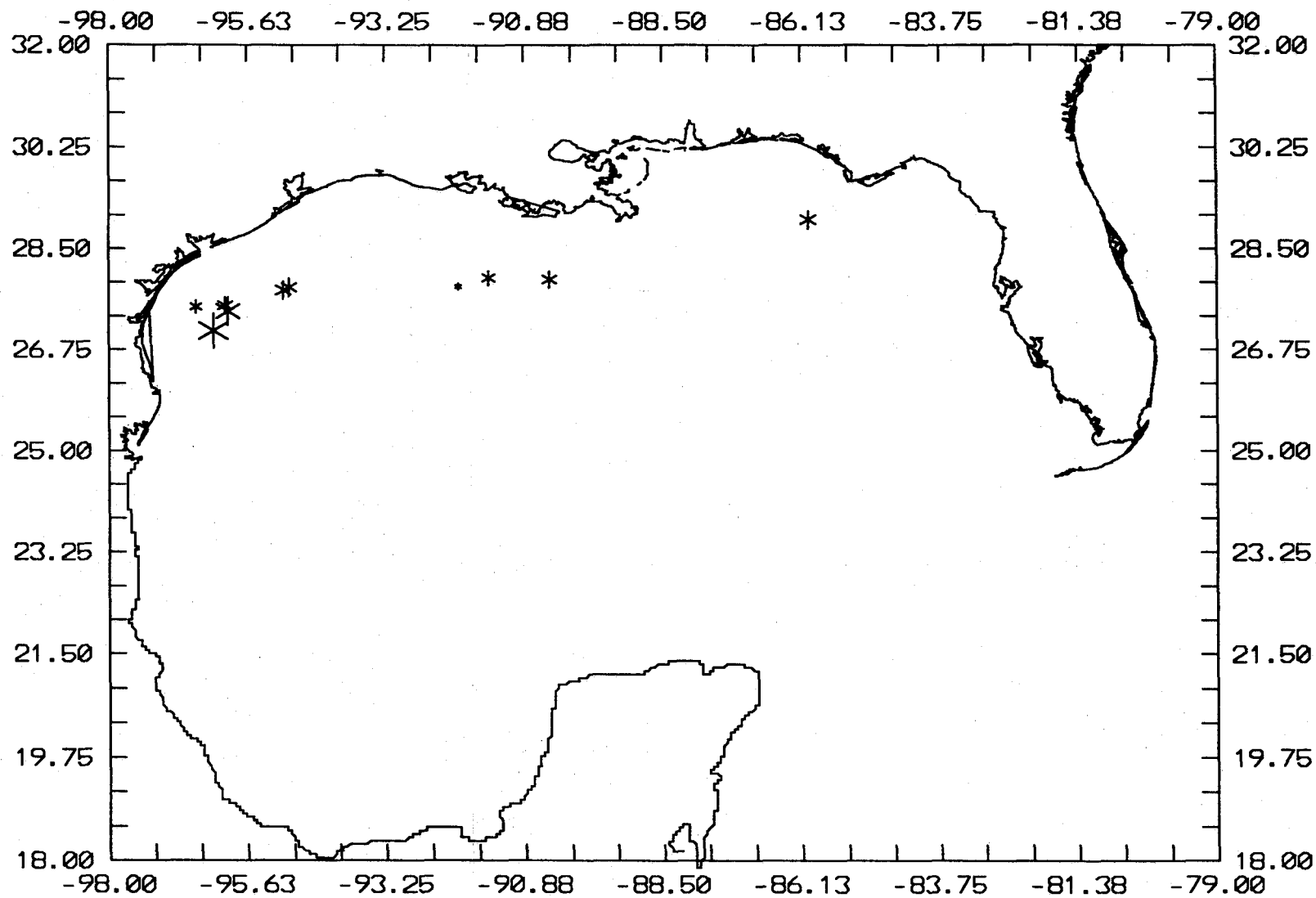


FIGURE 60 BONGO+RING NET TOWS: NUMBER/10M2



SEAMAP 1985 ICHTHYOPLANKTON: KATSUWONUS PELAMIS

FIGURE 61 NEUSTON NET TOWS: NUMBER CAUGHT

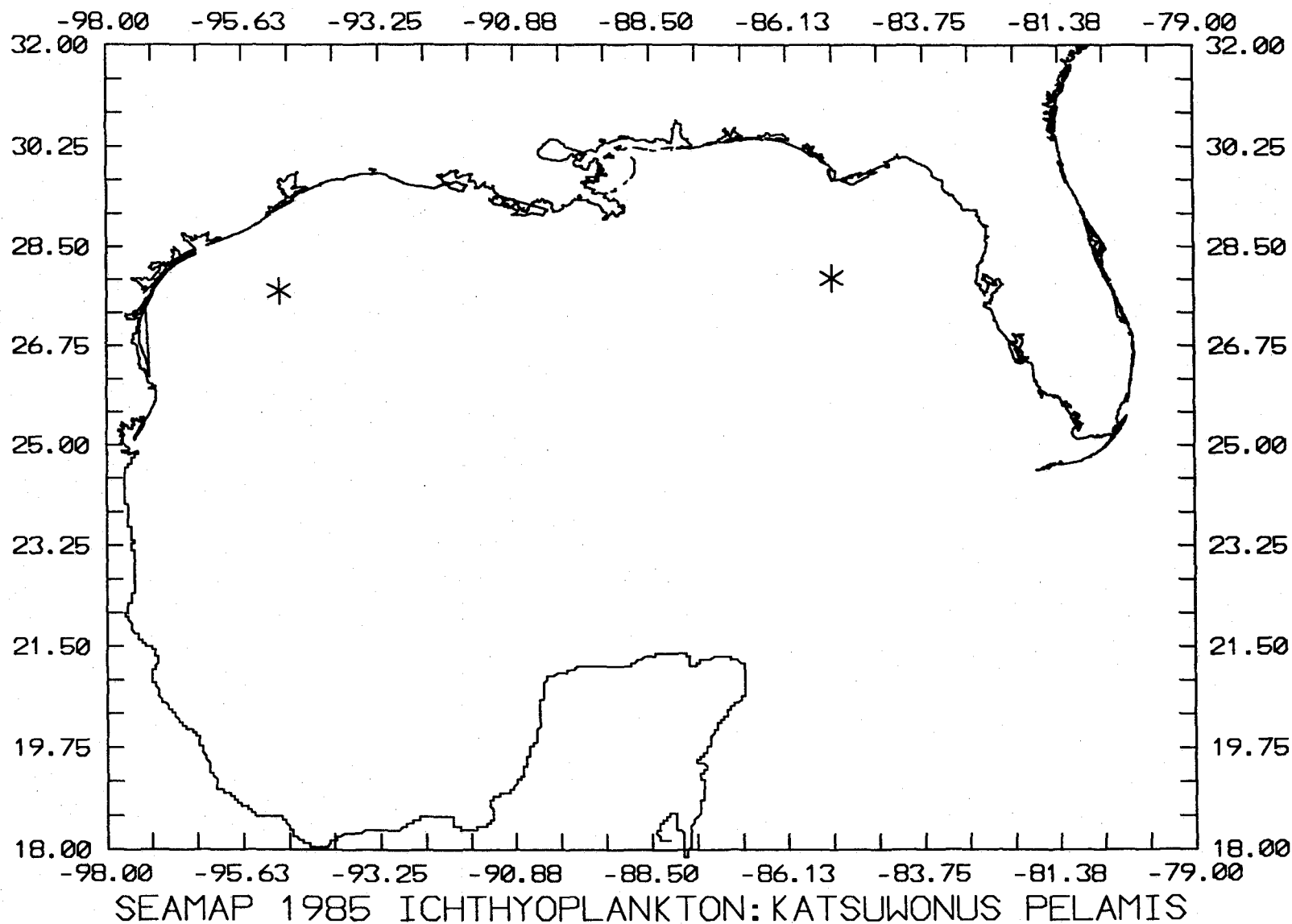


FIGURE 62 BONGO+RING NET TOWS: NUMBER/10M2

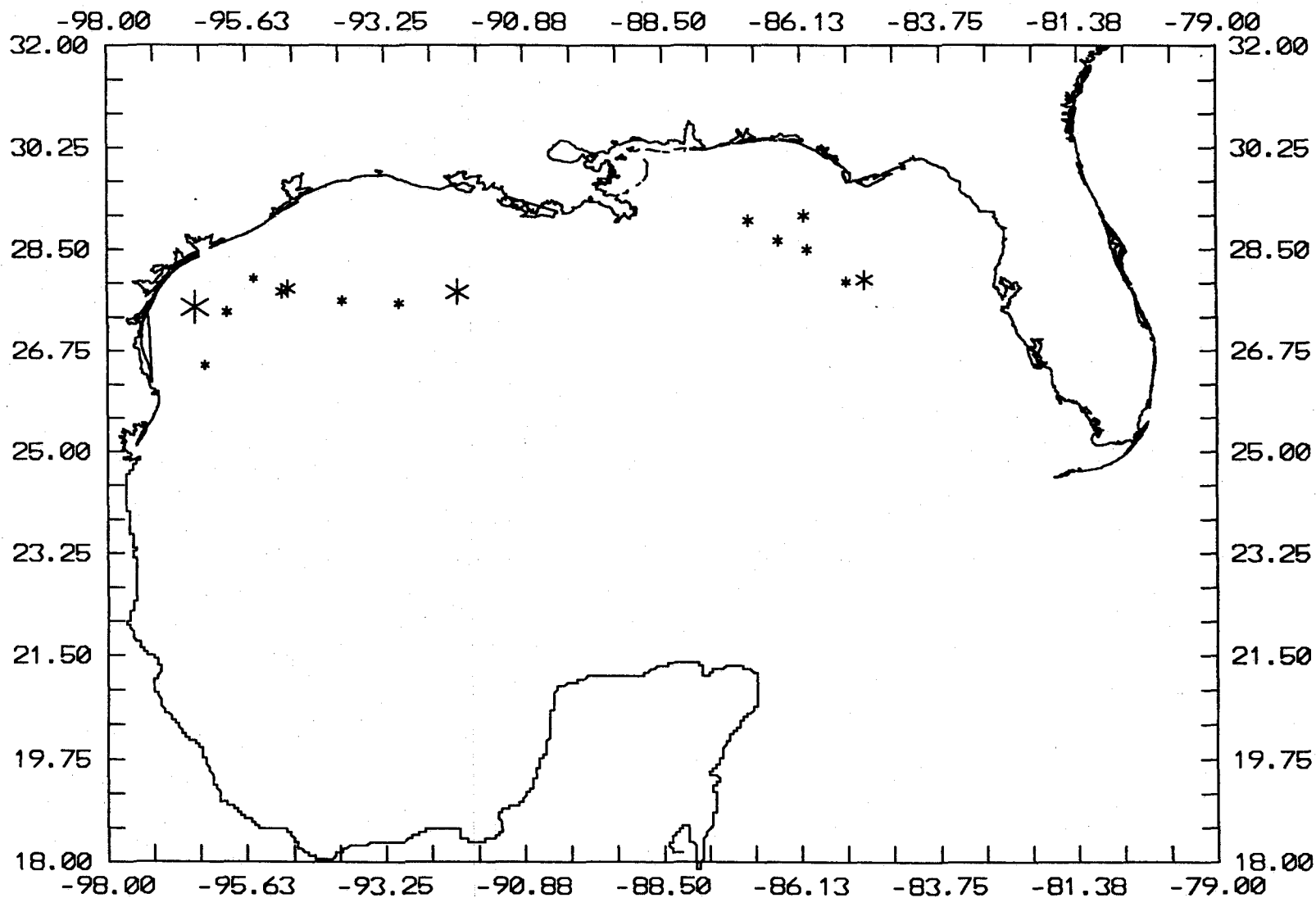
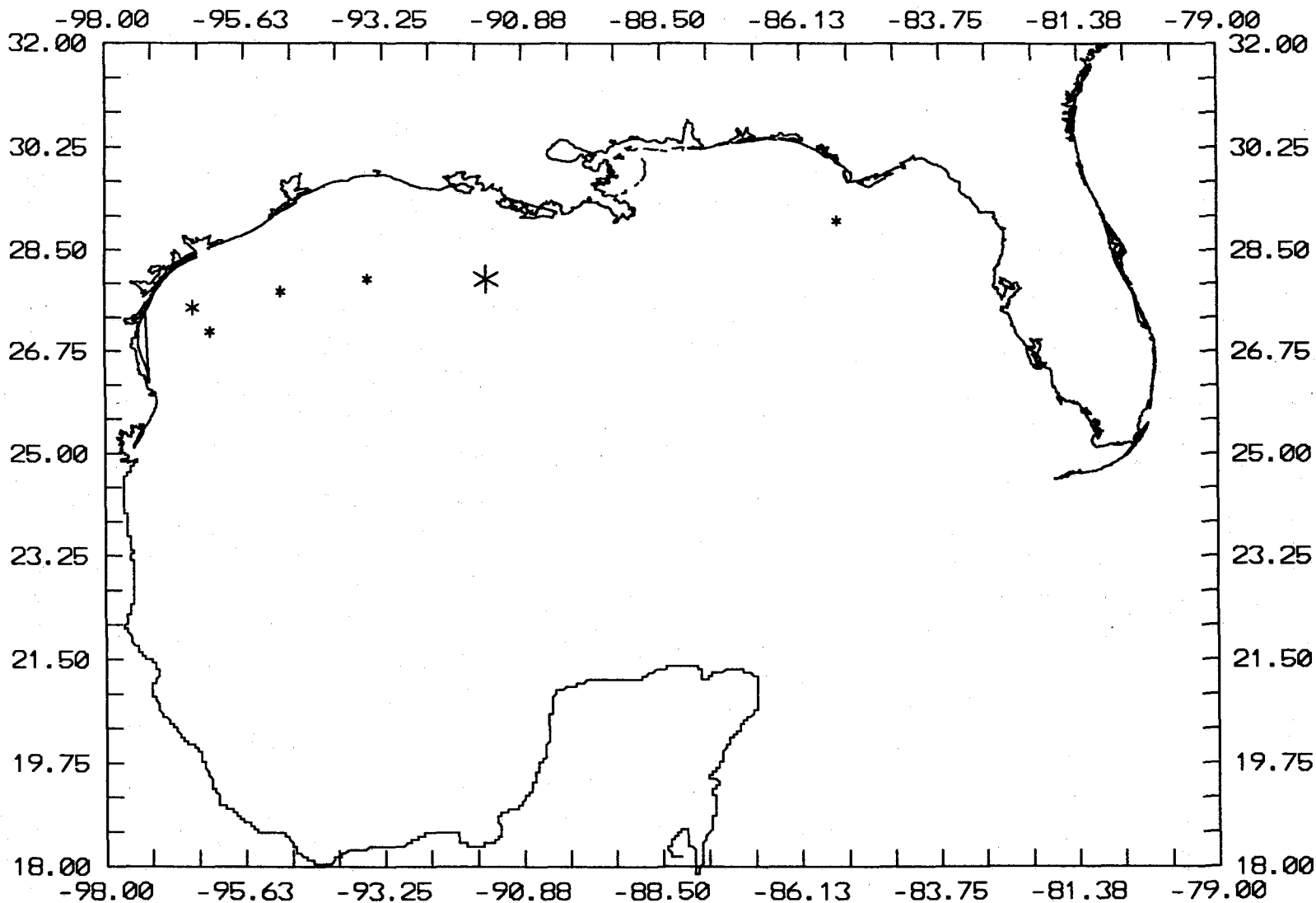
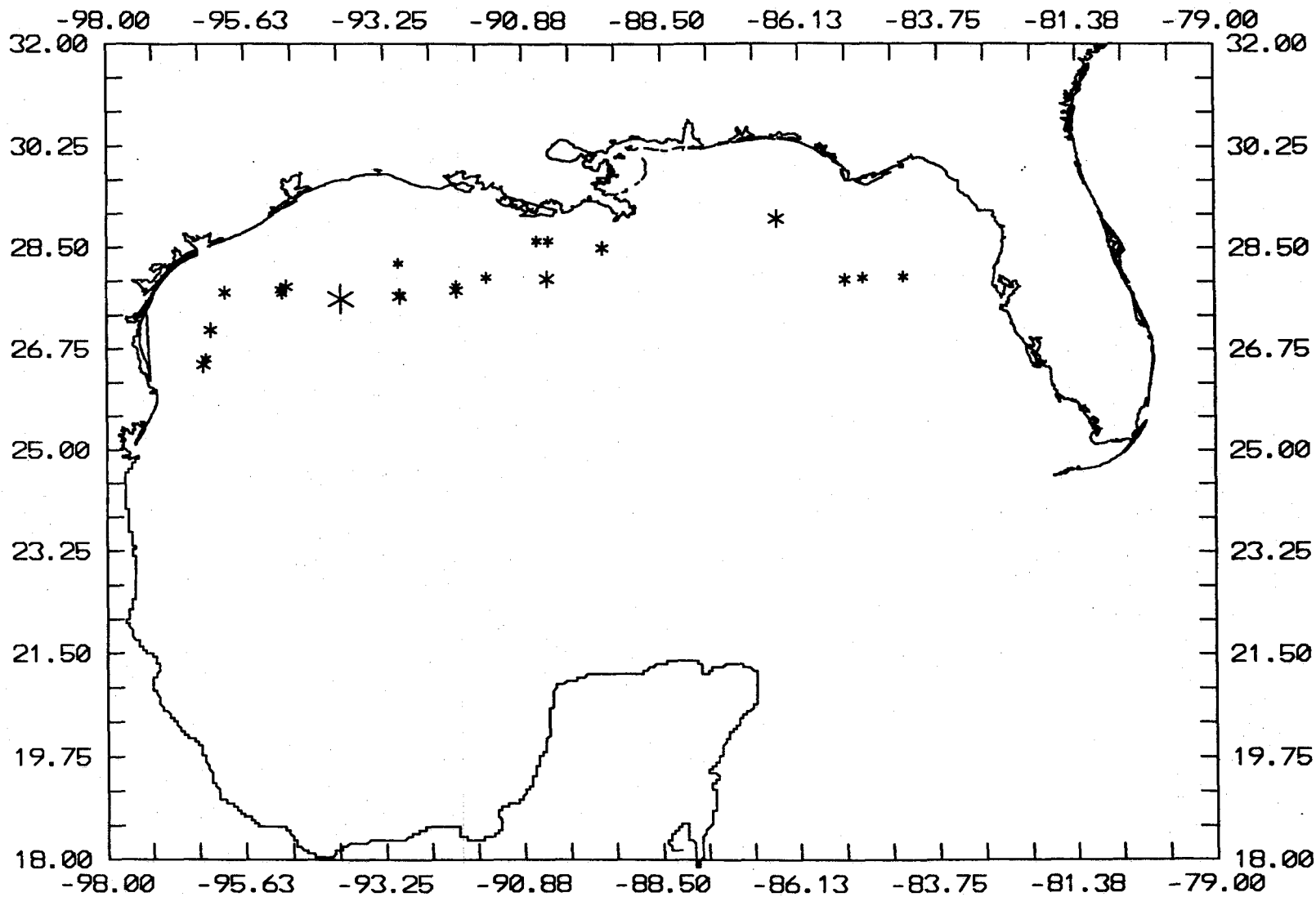


FIGURE 63 NEUSTON NET TOWS: NUMBER CAUGHT



SEAMAP 1985 ICHTHYOPLANKTON: THUNNUS SP.

FIGURE 64 BONGO+RING NET TOWS: NUMBER/10M2



SEAMAP 1985 ICHTHYOPLANKTON: THUNNUS ALTANTICUS

FIGURE 65 NEUSTON NET TOWS: NUMBER CAUGHT

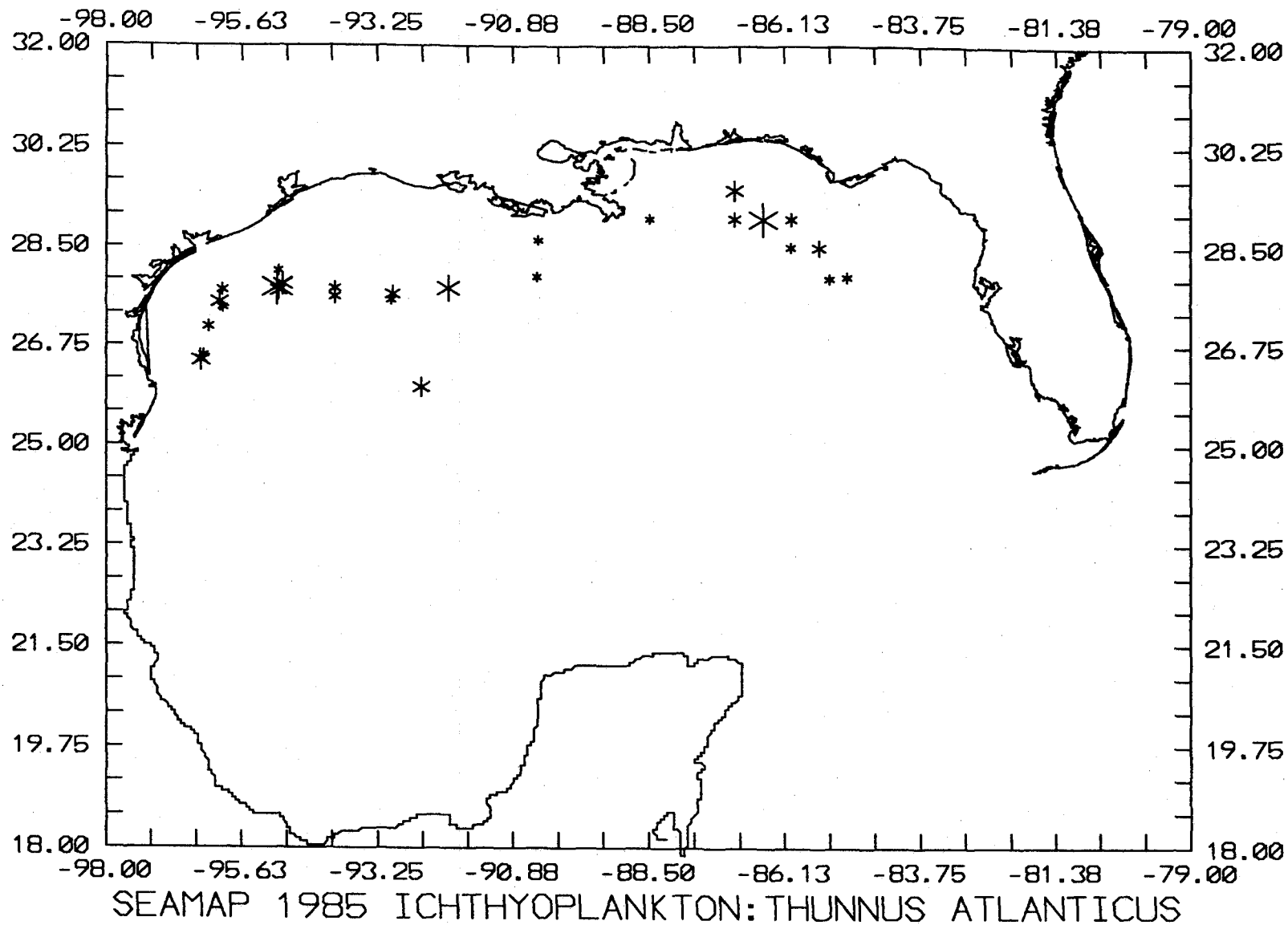
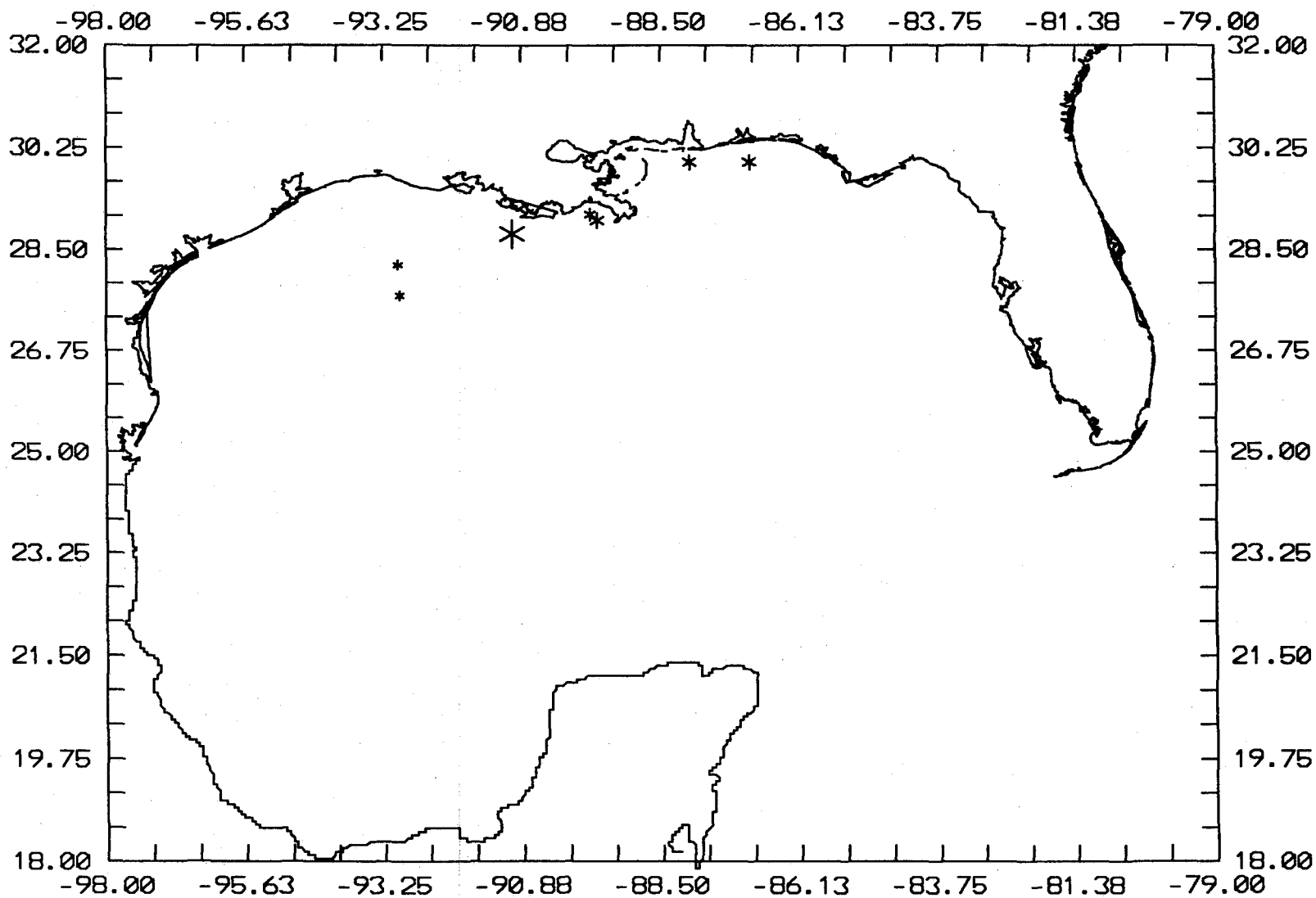
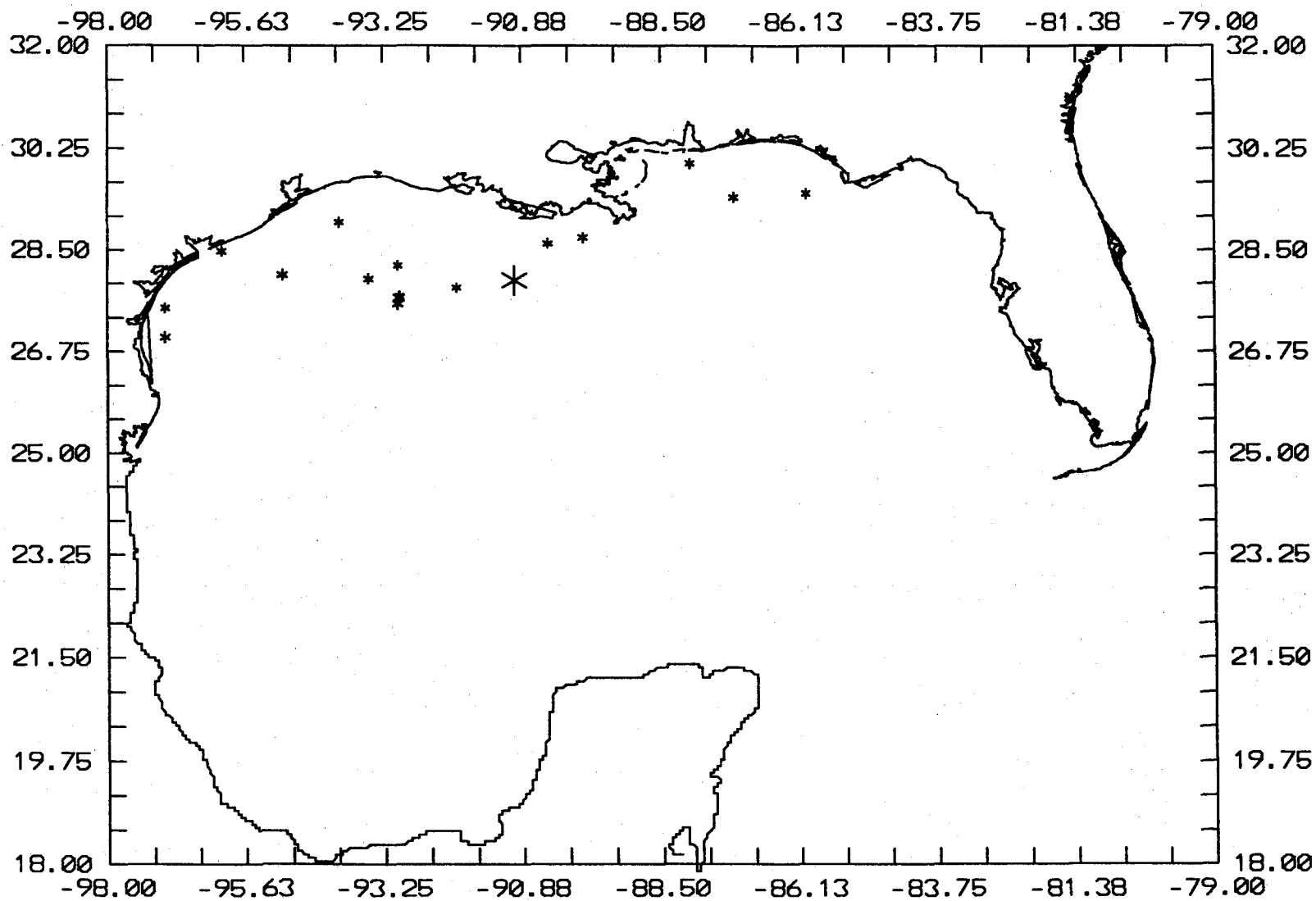


FIGURE 66 BONGO+RING NET TOWS: NUMBER/10M2



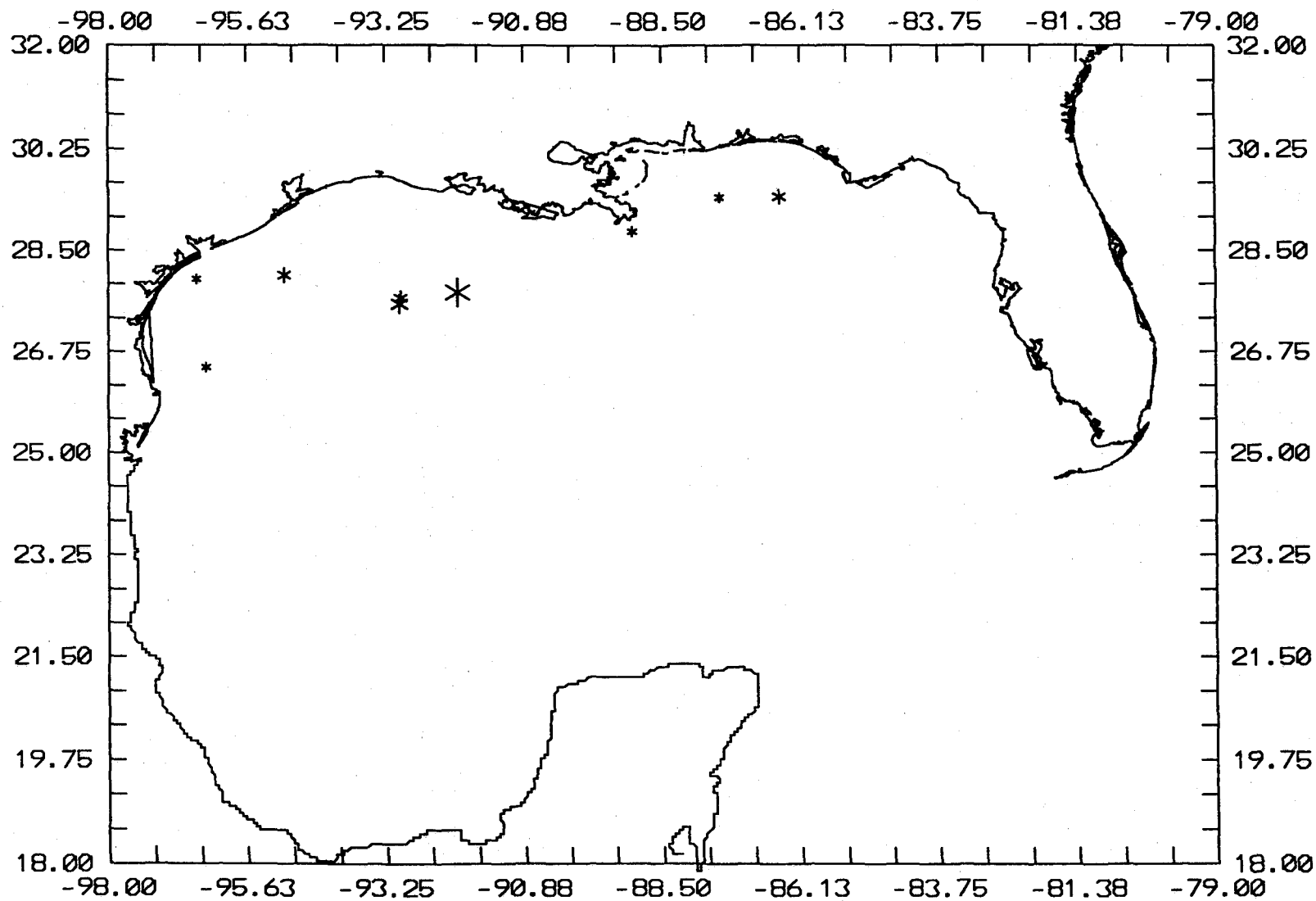
SEAMAP 1985 ICHTHYOPLANKTON: SCOMBEROMORUS SP.

FIGURE 67 BONGO+RING NET TOWS: NUMBER/10M2



SEAMAP 1985 ICHTHYOPLANKTON: SCOMBEROMORUS CAVALLA

FIGURE 68 NEUSTON NET TOWS: NUMBER CAUGHT



SEAMAP 1985 ICHTHYOPLANKTON: SCOMBEROMORUS CAVALLA

FIGURE 69 BONGO+RING NET TOWS: NUMBER/10M2

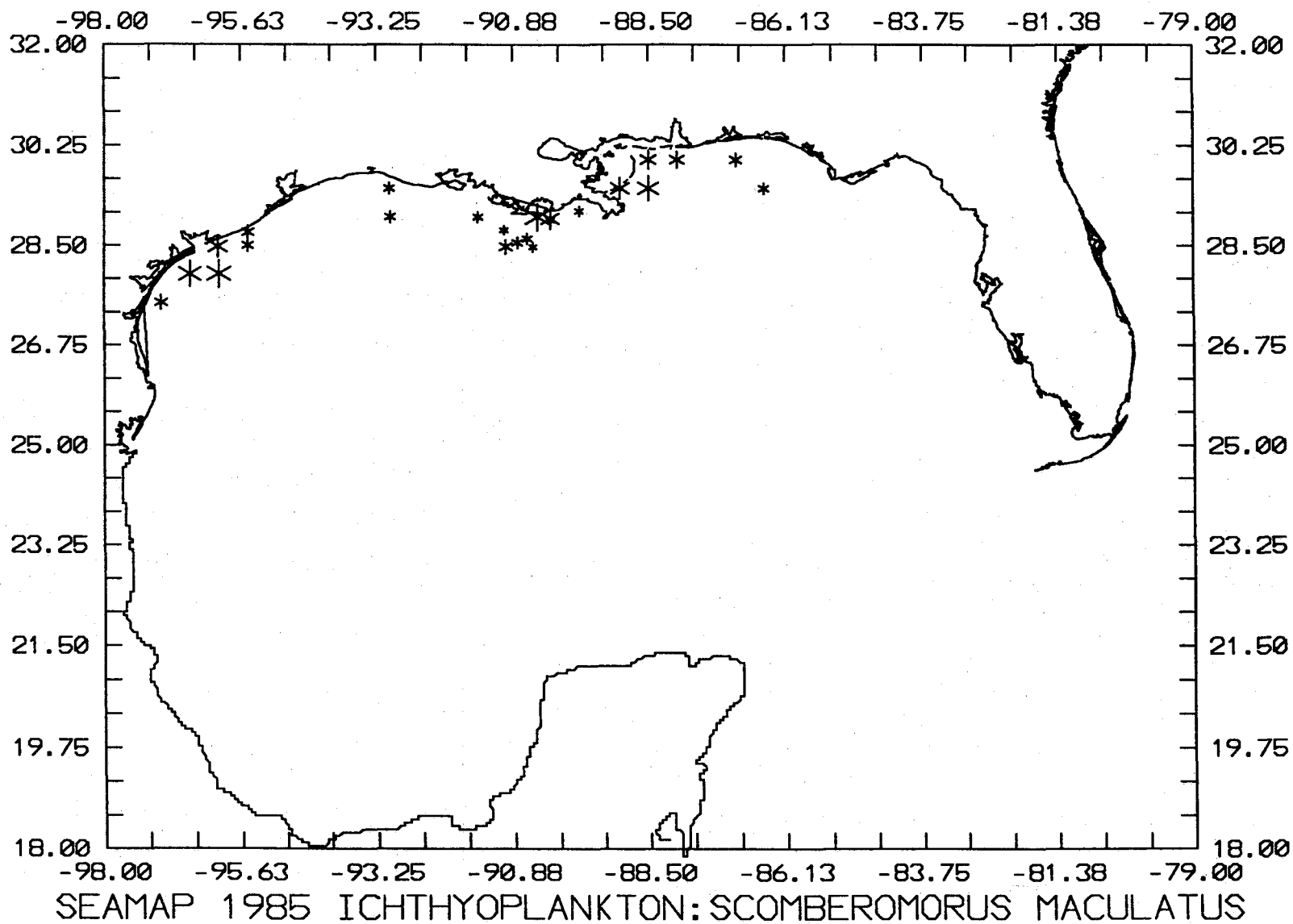


FIGURE 70 NEUSTON NET TOWS: NUMBER CAUGHT

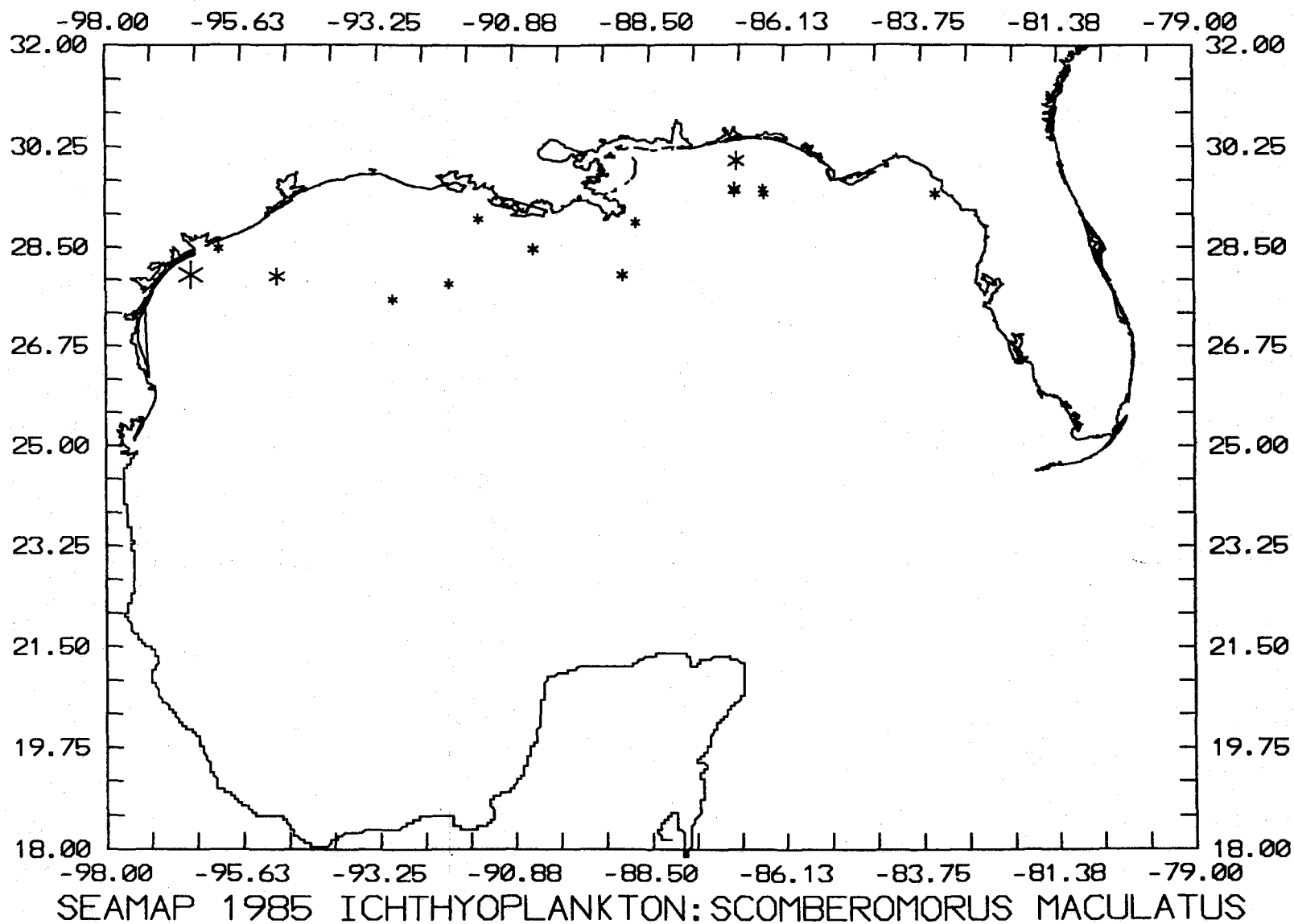
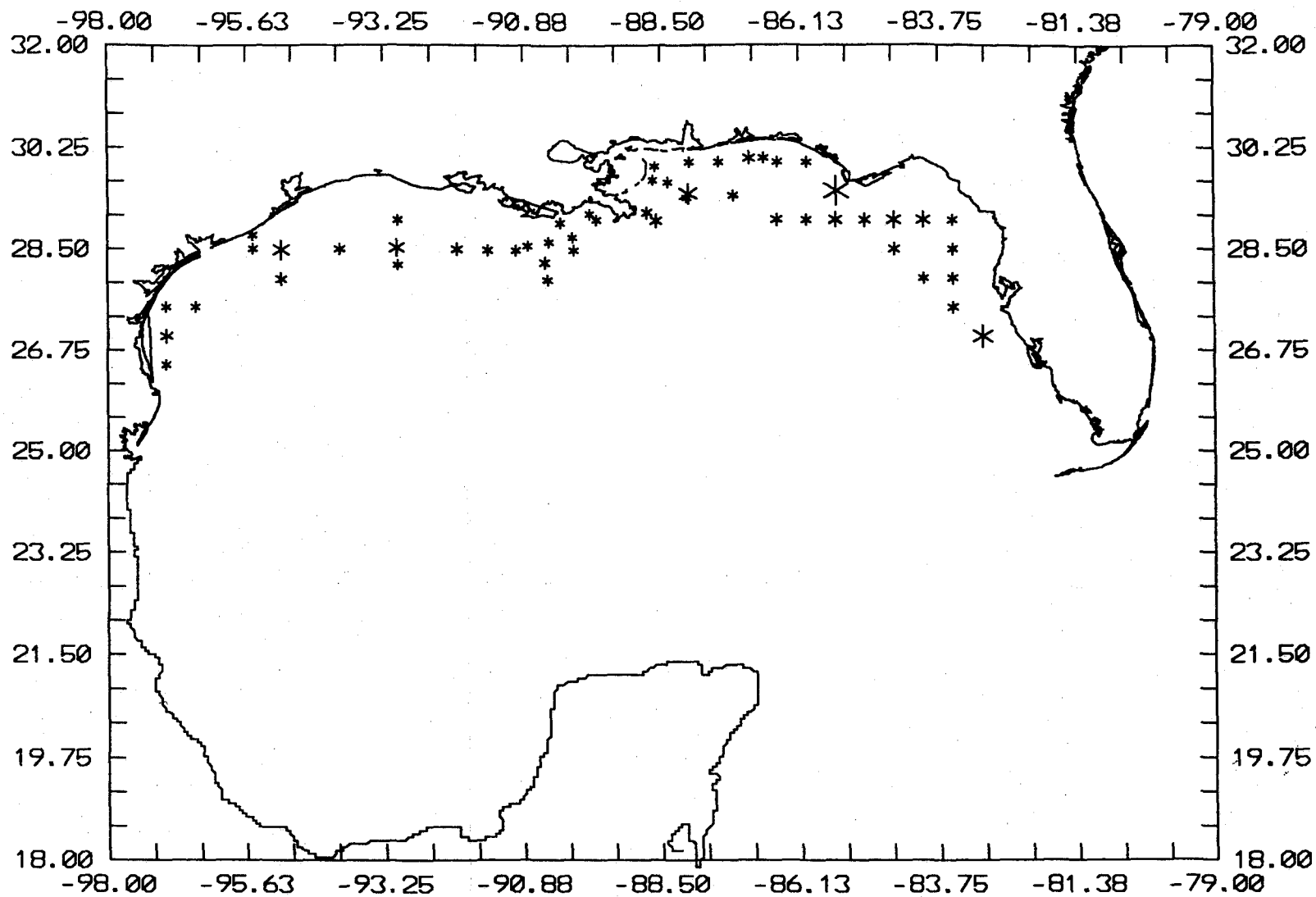


FIGURE 71 BONGO+RING NET TOWS: NUMBER/10M2



SEAMAP 1985 ICHTHYOPLANKTON: SERRANIDAE

FIGURE 72 NEUSTON NET TOWS: NUMBER CAUGHT

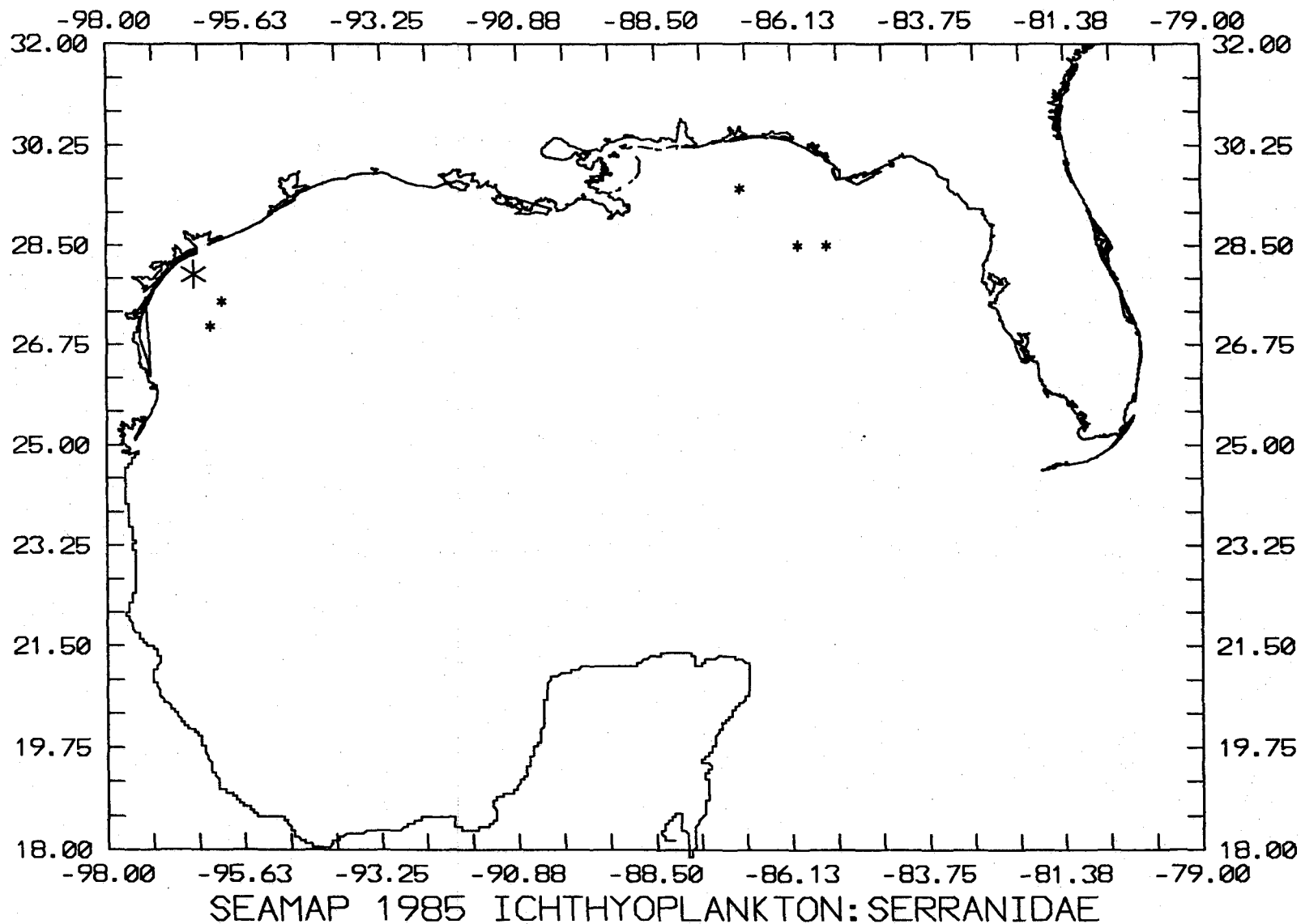
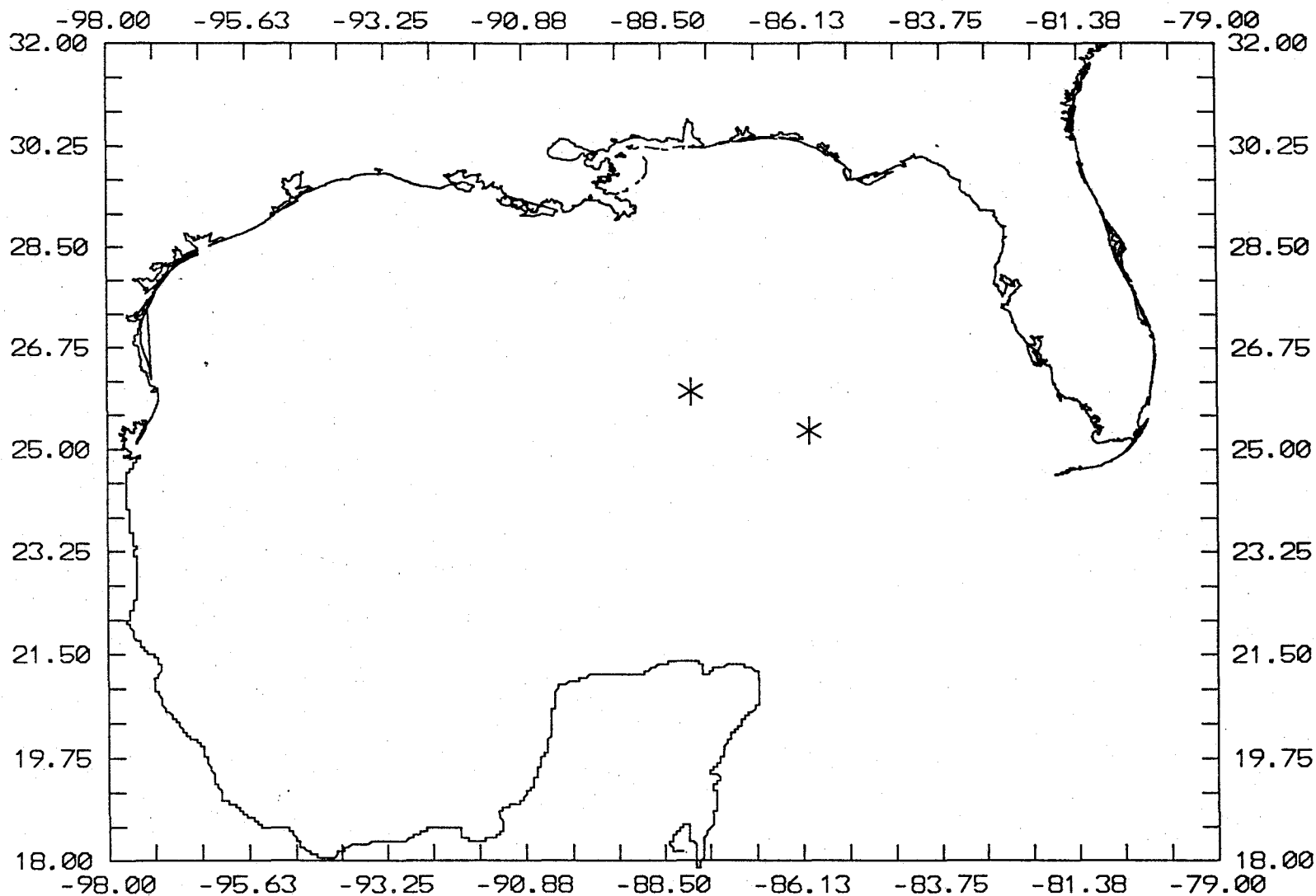


FIGURE 73 NEUSTON NET TOWS: NUMBER CAUGHT



SEAMAP 1984 ICHTHYOPLANKTON: XIPHIAS GLADIUS