Notes on Distributions of Lobsters from Selected Bottom Trawl Survey Cruises

by

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Mean number of lobsters per tow by depth intervals and strata

The mean number of lobsters per tow by 25-fathom depth intervals for five ALBATROSS IV groundfish survey cruises, 1970-74 (Table 1) was averaged by season and strata sets. (Figure 1 indicates standard strata and depth intervals).

Also, mean numbers of lobsters per tow were calculated for individual strata, by season for 1973-74. Seasonal means were averaged and the results plotted (Figures 2, 3, 4).

Fall surveys (September-November) for Southern New England (strata 1-12, 25) indicate a relatively low level of abundance in shallow water (0-75 fathoms) with increasing catches with depth, peaking in the 126-150 fathom depth interval. Spring (March-May) trends are similar with the exception that peak catches occur at a greater depth, 151-175 fathoms (Table 1). On an individual strata basis for both spring and fall the most productive strata were 4, 8, 12 (greater than 100 fathoms), followed by strata 10 which appears to be an area of concentration in the 31-60 fathom zone (Figure 2).

Fall surveys for Georges Bank (strata 13-23) show that lobsters are more numerous in shoal water 26-50 fathoms, while spring surveys indicate the greatest number of lobsters is concentrated in deep water 126-175 fathoms (Table 1), and when strata are arranged by depth zones on Georges Bank seasonal variations in mean numbers per tow are evident (Figure 3). During the fall lobsters tend to be more concentrated in the shallow depths (stratum 13) while a reversal is seen in the spring with lobsters being more abundant in deeper water (strata 15, 18). These seasonal differences in shoal waters of Georges Bank probably reflect the migratory behavior of lobsters in this area, with lobsters moving into shoal water during the spring and summer and returning to deeper water in the fall and winter.

In the Middle Atlantic region (strata 61-76) lobster abundance is low in spring and fall for the shallow water, 0-100 fathoms, and increases sharply thereafter peaking in the 101-126 and 126-150 depth intervals for fall and spring, respectively. Generally it appears that few lobsters are found in water less than 100 fathoms in the southern extent of its range during the period of our Survey (Table 1). For the Middle Atlantic strata (Figure 4) the pattern of abundance is similar to Southern New England. Here the lobsters are most numerous in 64, 68, 72, 76 (strata greater than 100 fathoms) for spring and fall.

Results of mean numbers per tow by 25-fathom depth intervals and strata indicate that lobsters tend to concentrate by depth with seasonal variations.

Seasonal plots

Seasonal plots of lobster distributions for the summer of 1969 and spring and fall of 1973 are shown in Figures 5, 6, 7. These plots indicate general areas of lobster concentrations. Lobsters are more abundant along the shelf edge, and concentrations vary seasonally.

Frequency distributions

To determine areas of concentrations, frequency distributions of numbers of lobsters per tow were calculated by season and year (Table 2). If the upper 10% (some other could serve as well) of the tows is selected as the point at which lobsters are considered to be concentrated, then the spring surveys (Table 2) show that three or more lobsters per tow would constitute an area of concentration, while fall surveys show that four or more lobsters per tow would indicate a concentration. The 10% level for the most recent summer survey (1969) is five lobsters per tow, which probably reflects a greater abundance of lobsters in earlier years, and may not currently apply. Since the surveys were conducted in a stratified random manner, the accumulative frequency distributions approximate the percentage of the total area surveyed that such concentrations would occupy.

Table 1. Mean number of lobsters per tow by strata sets and season for 25 fathom depth intervals (five year totals 1970-1974 averaged).

Mean Depths (fm)	Southern New England Strata 1-12, 25		Georges Bank Strata 13-23		Middle Atlantic Strata 61-76	
	Fall Sep-Nov	Spring Mar-May	Fall Sep-Nov	Spring Mar-May	Fall Sep-Nov	Spring Mar-May
0-25	0.76	0.10	0.53	0.12	0.19	0.05
26-50	1.35	1.52	0.79	0.11	0.40	0.55
51-75	1.14	0.40	0.67	0.55	0.91	0.39
76-100	4.92	0.53	0.57	0.72	2.11	1.00
101-125	7.00	1.00	0.30	0.33	5.67	2.23
126-150	16.94	10.93	1.27	2.45	4.58	11.40
151-175	6.58	12.60	0.00	4.60	3.67	5.40
176-200	0.00	0.00	0.00	0.00	1.33	2.83

Table 2. Numbers of lobsters per tow with the corresponding number of tows and accumulative percent (strata 1-23, 25, 61-76).

Number of lobsters/ tow	Spring (March-May)				Fall (Sept-Nov)				Summer (Jul-Aug)	
	1973		1974		1973		1974		1969	
	tows	%	tows	%	tows	%	tows	%	tows	%
0	158	75.24	108	70.58	98	55.37	123	69.89	111	63.79
1	23	85.72	20	83.65	31	72.88	23	82.96	21	75.86
2	9	90.00	9	89.53	21	84.74	9	88.07	11	82.18
3	4	91.90	1	90.18	9	89.82	8	92.61	6	85.63
4	4	94.28	1	90.83	2	90.95	2	93.74	8	90.23
5	1	94.76	1	91.48	7	94.90	3	95.44	4	92.53
6	4	96.66	-	-	1	95.46	1	96.01	4	94.83
7	1	97.14	-	-	-	-	1	96.58	3	96.55
8	-	-	-	-	2	96.59	1	97.15	2	97.70
9	1	97.62	1	92.13	-	-	1	97.72	-	-
10	-	-	1	92.78	2	97.72	1	98.29	-	-
11	-	-	1	93.43	-	-	2	99.42	1	98.27
12	1	98.10	1	94.08	1	98.28	-	-	-	-
13	1	98.56	-	-	1	98.84	-	-	-	-
14	1	99.06	-	-	-	-	-	-	1	98.84
15	-	-	3	96.04	1	99.40	-	-	-	-
16	-	-	-	-	1	99.96	-	-	-	-
17	-	-	-	-	-	-	-	-	1	99.41
18	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	1	99.98
20	-	-	-	-	-	-	-	-	-	-
23	-	-	1	96.69	-	-	-	-	-	-
24	-	-	1	97.34	-	-	-	-	-	-
26	-	-	-	97.99	-	-	1	99.99	-	-
33	-	-	1	98.64	-	-	-	-	-	-
35	-	-	1	99.29	-	-	-	-	-	-
45	1	99.54	-	-	-	-	-	-	-	-
46	-	-	1	-	-	-	-	-	-	-
71	1	100.00	-	-	-	-	-	-	-	-
81	-	-	1	99.94	-	-	-	-	-	-

GROUNDFISH SURVEY SAMPLING STRATA

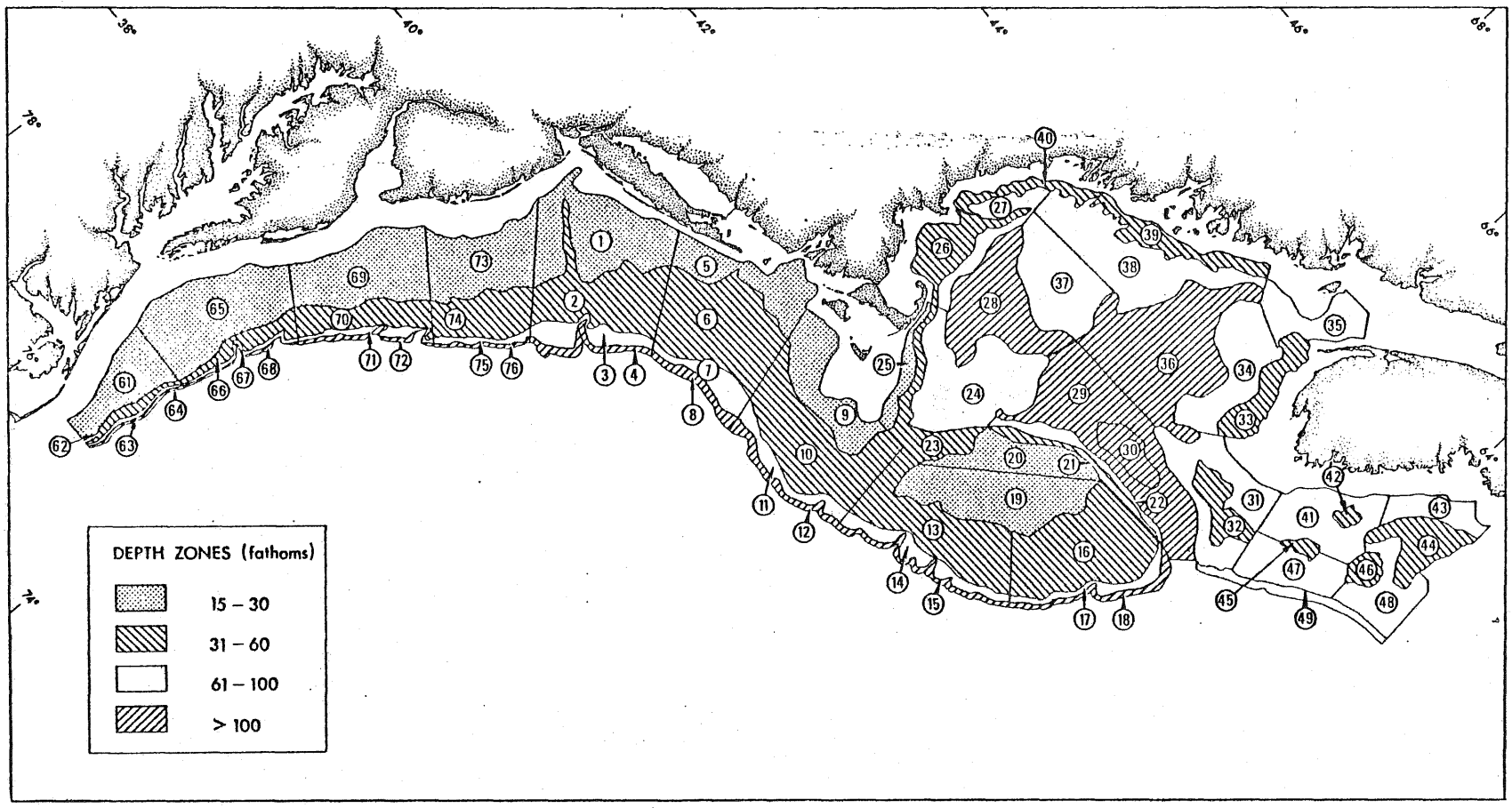

Figure 1.

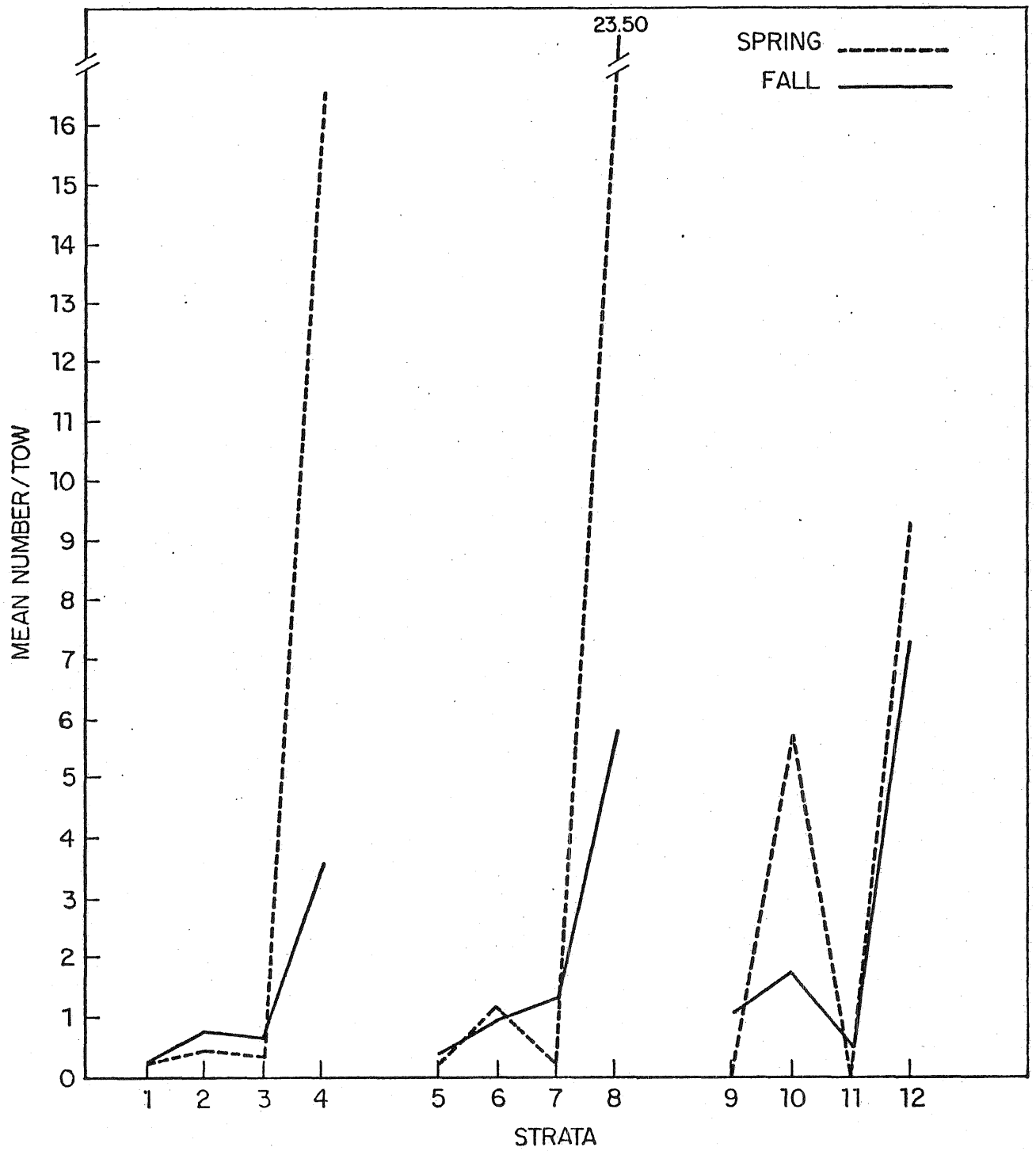

Figure 2. Mean number of lobsters per tow by strata for the Southern New England area.

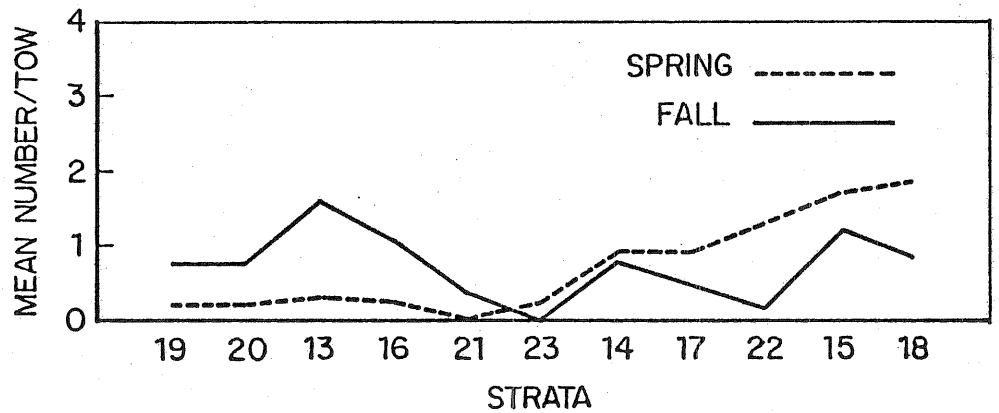

Figure 3. Mean number of lobsters per tow by strata for the Georges Bank area.

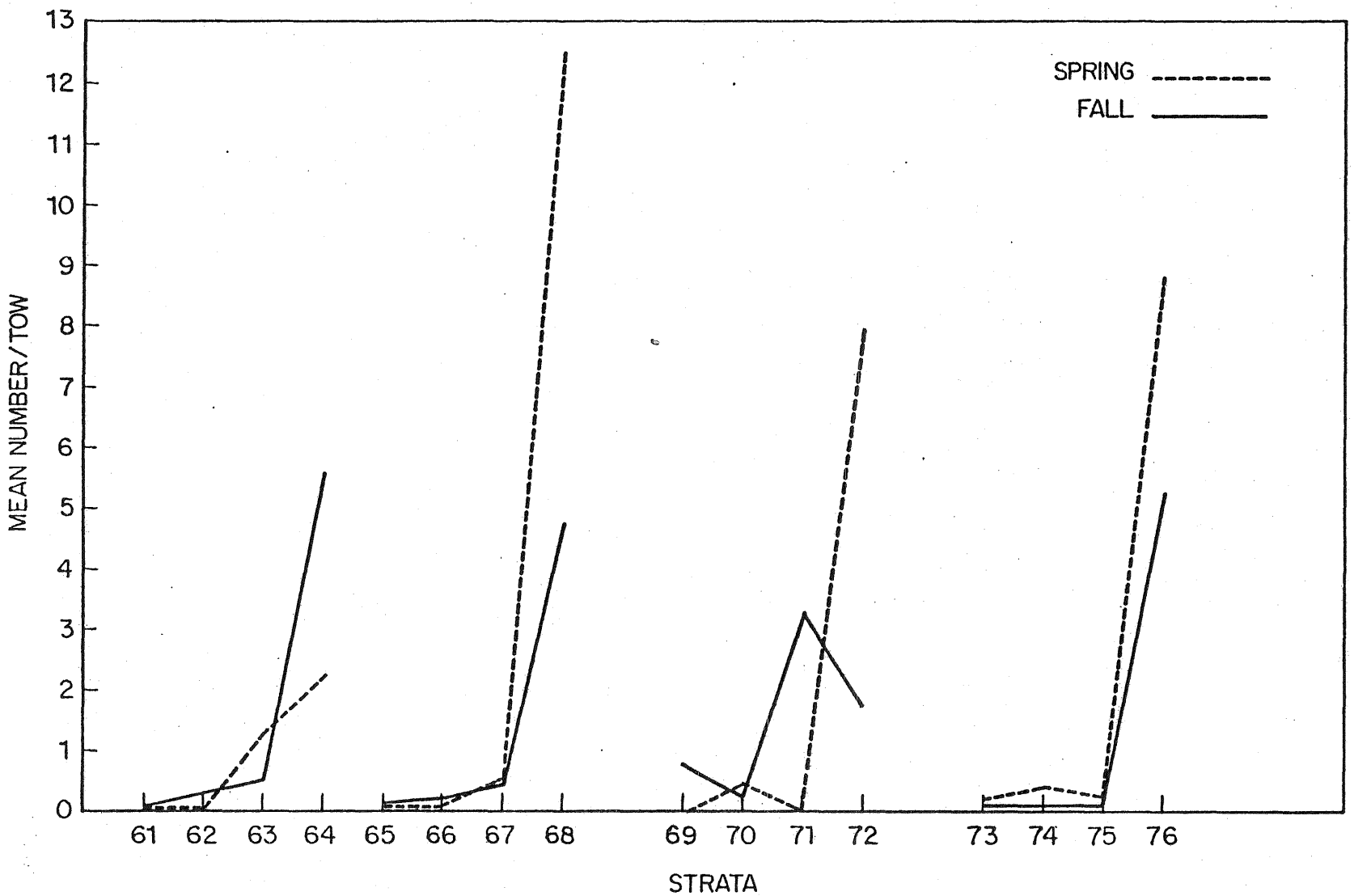

Figure 4. Mean number of lobsters per tow by strata for the Middle Atlantic area.

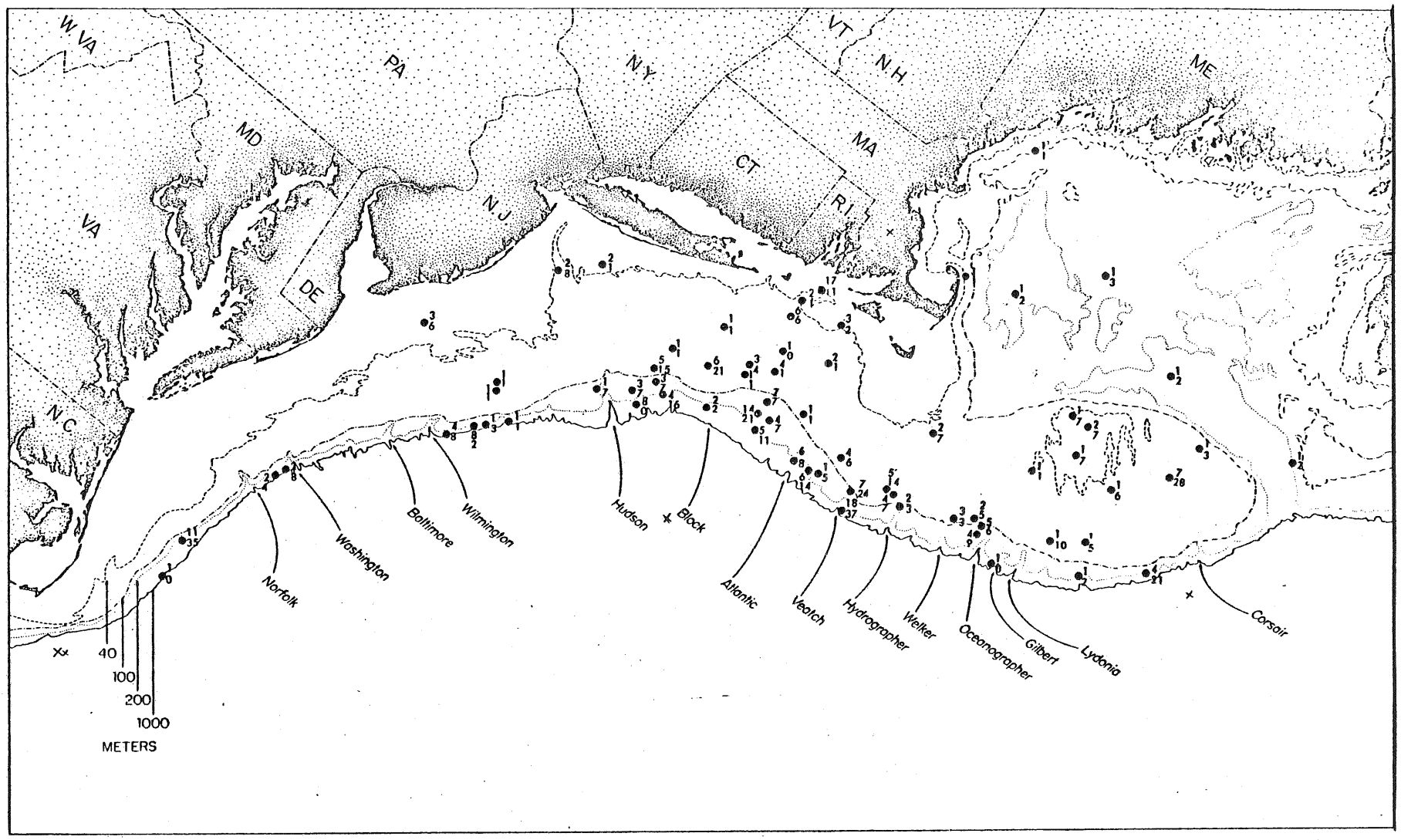

Figure 5. Distributional plots of lobsters in numbers and weight per tow for the ALBATROSS IV summer groundfish survey, 1969 (upper value is numbers, lower is weight).

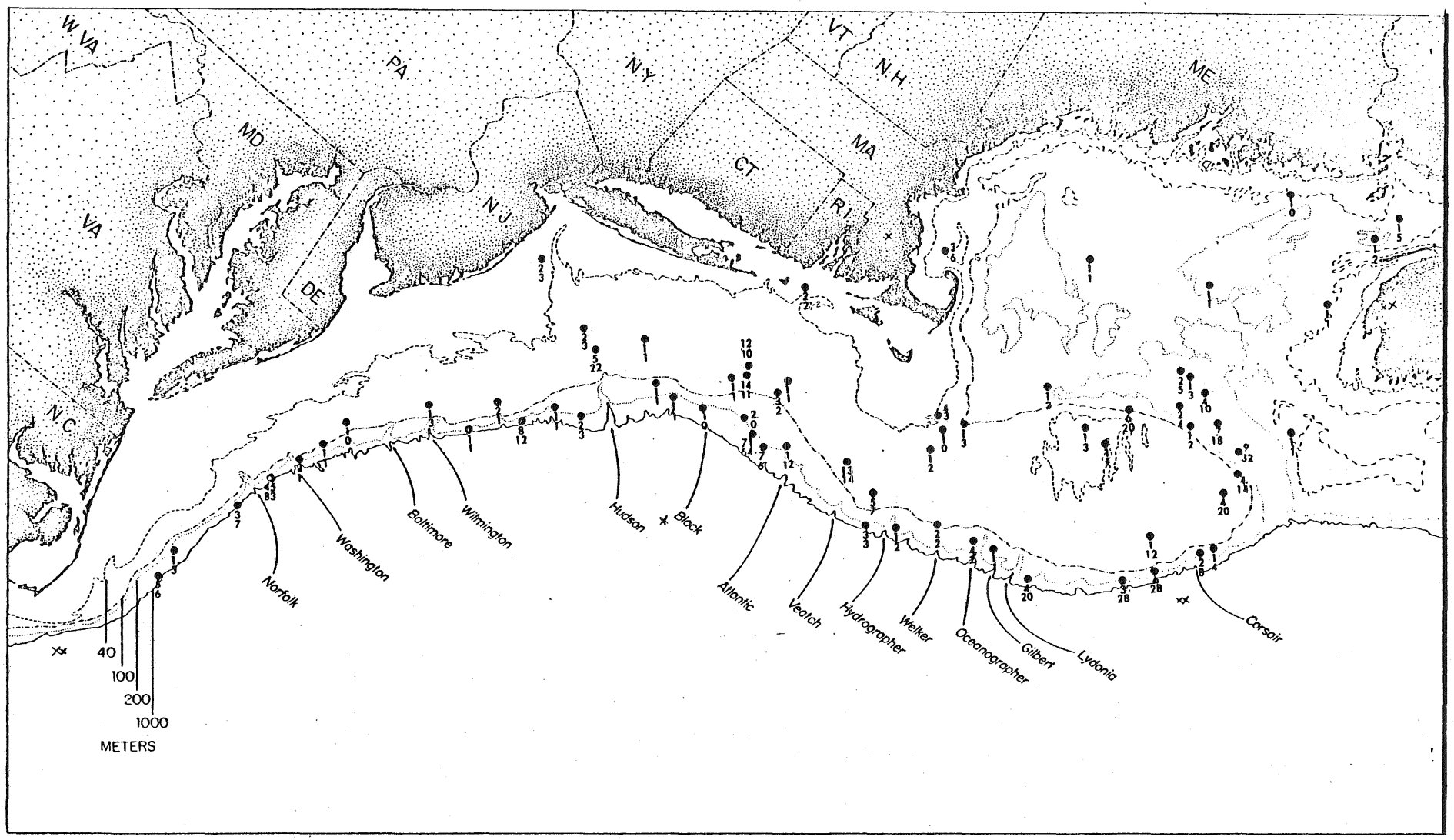

Figure 6. Distributional plots of lobsters in numbers and weight per tow for the ALBATROSS IV spring groundfish survey, 1973 (upper value is numbers, lower is weight).

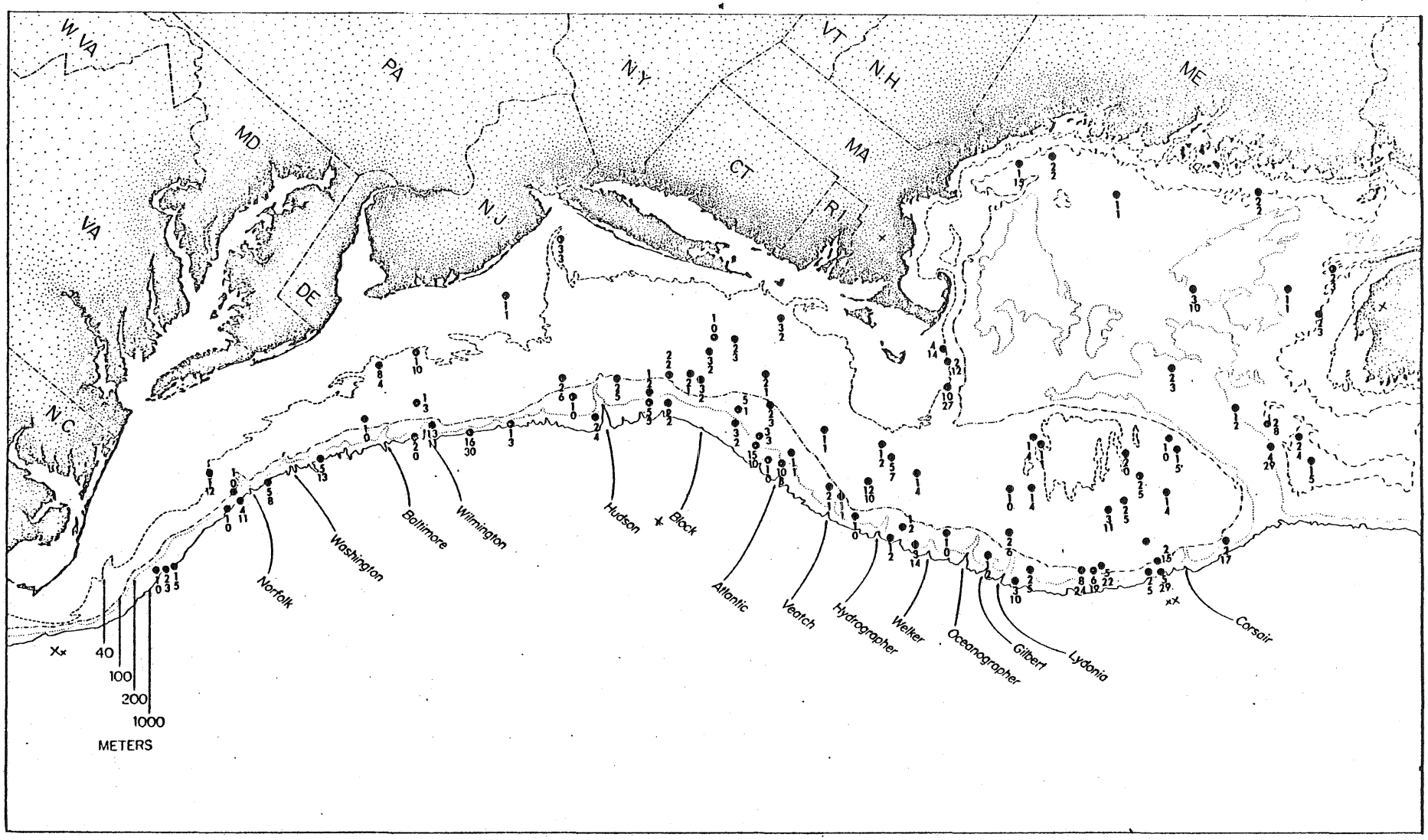

Figure 7. Distributional plots of lobsters in numbers and weight per tow for the ALBATROSS IV fall groundfish survey, 1973 (upper value is numbers, lower is weight).