

Summary of Mackerel Catch Data  
from the  
USSR R/V ARGUS 1978 Winter Mackerel Survey  
and the  
USA R/V ALBATROSS IV 1978 Spring Bottom Trawl Survey

by

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The purpose of this report is to: (1) summarize the mackerel catch data from a bottom trawl survey conducted from Georges Bank to Cape Hatteras by the USSR R/V ARGUS during 28 January - 23 March 1978 and (2) compare these data with mackerel catches obtained during the standard USA 1978 spring bottom trawl survey.

The principal objective of the ARGUS survey was to investigate the winter distribution, relative abundance, and age structure of mackerel in the continental shelf waters extending from the southwestern part of Georges Bank to Cape Hatteras. Approximately 150 trawl stations, randomly selected using the standard USA bottom trawl survey strata, were occupied (Figure 1). Tows of 30-minutes duration at 4.5 knots were made at each station during daylight hours using a Soviet HAKE-815 bottom trawl with an 8-10 mm cod end liner. Hydroacoustical searching was done at night in an attempt to locate mackerel concentrations. The total catch from each trawl tow was processed for total weight and length frequency of all species according to standard USA survey procedures. Samples were retained for age and growth analysis.

Mackerel catches occurred at 65 of the random stations (Figure 1) ranging in number from 1 to 17,158 and in weight from 0.1 to 6,358 kg per tow. A total of 29,769 mackerel were caught (average = 458 per tow) weighing a total of 11,793 kg (average = 181 kg per tow).

The stratified mean catch (number) per tow including only those strata in which mackerel were caught (strata 2-4, 6, 7, 9-11, 13-15, 61, 62, 64-72, 74-76) was 63.1 (Table 1). An age/length key from samples collected during the survey was applied to the length frequency of the stratified mean catch per tow. The results (Table 1) indicated that the 1974 year class was predominant in the catch (39.4%) followed by the 1973 year class (22.1%). The recruiting year classes (1976 and 1977) comprised only 7.8 and 0.6%, respectively, of the catch.

Twenty-five (25) additional non-random stations were occupied following completion of the random stations in the area near the edge of the continental shelf between Delaware and Chesapeake Bays (Figure 2) in strata 66-68, 70-72. These tows were in an area of high mackerel abundance based on hydroacoustic traces as well as bottom temperature and depth.

Mackerel were caught at 22 of the 25 non-random stations ranging in number from 104 to 38,754 and in weight from 31 to 15,540 kg per tow. A total of 141,103 mackerel were caught (average = 6,414 per tow) weighing 55,168 kg (average = 2,508 kg per tow). The length and age composition of these catches was similar to that of the catches at the random stations. The 1974 and 1973 year classes comprised 38.3 and 24.1%, respectively, of the catches, and the 1976 and 1977 year classes comprised 4.8 and <0.1%, respectively (Table 2).

During the USA 1978 spring bottom trawl survey by the R/V ALBATROSS IV, mackerel were caught at 28 (Figure 3) of the 191 random stations in strata 1-25, 61-76 totalling 611 fish weighing 266 kg. These stations were sampled during the period 20 March - 25 April. The stratified mean catch (number) per tow for these strata was 3.1 (Table 3). The length frequency and age composition of the stratified mean catch per tow was similar to that from the ARGUS survey. The 1974 year class was predominant with 31.4% of the catch, followed by 19.3% for the 1973 year class. The 1976 and 1977 year classes comprised 11.0 and 5.8%, respectively.

Mackerel catches by the ARGUS were larger than by the ALBATROSS IV due to the much larger size of the net, the greater fishing power, and the faster towing speed of the ARGUS. Aside from the differences in magnitude of the catches, the length and age composition was quite similar. These similarities tend to indicate that both surveys sampled the population adequately to define the relative abundance of the predominant age groups as well as the recruiting age groups. Estimates of the sizes of the 1977 and 1976 year classes at ages 1 and 2 (Anderson and Overholtz 1978), based on the USA spring survey data, suggest that these are relatively weak in comparison to earlier year classes; this is qualitatively supported by the results of the ARGUS survey.

#### Literature Cited

Anderson, E.D., and W.J. Overholtz. 1978. Status of the Northwest Atlantic mackerel stock - 1978. NMFS, NEFC, Woods Hole Lab. Ref. No. 78-49 (mimeo).

Table 1. Age composition and length frequency of the stratified mean catch (number) per tow of mackerel from the January-March 1978 bottom trawl survey in SA 5-6 (strata 1-15, 61-76) by the USSR R/V ARGUS. (Note: only random stations included and only strata with mackerel catches.)

Fork length (cm)	Year class											Total
	1977	1976	1975	1974	1973	1972	1971	1970	1969	1968	1967+	
17	.014	-	-	-	-	-	-	-	-	-	-	.014
18	.036	-	-	-	-	-	-	-	-	-	-	.036
19	.068	-	-	-	-	-	-	-	-	-	-	.068
20	.036	-	-	-	-	-	-	-	-	-	-	.036
21	-	-	-	-	-	-	-	-	-	-	-	-
22	.028	-	-	-	-	-	-	-	-	-	-	.028
23	.019	-	-	-	-	-	-	-	-	-	-	.019
24	.126	-	-	-	-	-	-	-	-	-	-	.126
25	.048	-	-	-	-	-	-	-	-	-	-	.048
26	-	.135	-	-	-	-	-	-	-	-	-	.135
27	-	.374	-	-	-	-	-	-	-	-	-	.374
28	-	1.261	.097	-	-	-	-	-	-	-	-	1.358
29	-	.503	-	-	-	-	-	-	-	-	-	.503
30	-	.446	.074	.074	-	-	-	-	-	-	-	.595
31	-	.445	.668	.445	-	-	-	-	-	-	-	1.558
32	-	.626	1.668	3.858	.626	-	-	-	-	-	-	6.777
33	-	.909	2.907	8.541	2.181	.182	-	-	-	-	-	14.719
34	-	.233	2.558	7.442	6.512	1.163	-	-	-	-	-	17.908
35	-	-	.438	3.501	3.501	1.532	1.094	-	.219	-	-	10.284
36	-	-	-	.737	1.105	.737	.553	-	.368	-	.368	3.869
37	-	-	-	.298	-	.298	.149	-	.298	-	.447	1.490
38	-	-	-	-	-	.072	.072	.072	.574	-	.287	1.077
39	-	-	-	-	-	-	-	-	-	-	1.117	1.117
40	-	-	-	-	-	-	-	-	-	-	.710	.710
41	-	-	-	-	-	-	-	-	-	-	.199	.199
42	-	-	-	-	-	-	-	-	-	-	.081	.081
Total	.375	4.932	8.410	24.896	13.925	3.984	1.868	.072	1.459	-	3.209	63.129
%	0.6	7.8	13.3	39.4	22.1	6.3	3.0	0.1	2.3	-	5.1	100.0

Table 2. Age composition and length frequency of the total mackerel catch at non-random stations in SA 6 (strata 66-68, 70-72) from the January - March 1978 bottom trawl survey by the USSR R/V ARGUS.

Fork length (cm)	Year class											Total
	1977	1976	1975	1974	1973	1972	1971	1970	1969	1968	1967+	
21	1	-	-	-	-	-	-	-	-	-	-	1
22	-	-	-	-	-	-	-	-	-	-	-	-
23	40	-	-	-	-	-	-	-	-	-	-	40
24	13	-	-	-	-	-	-	-	-	-	-	13
25	-	-	-	-	-	-	-	-	-	-	-	-
26	-	313	-	-	-	-	-	-	-	-	-	313
27	-	175	-	-	-	-	-	-	-	-	-	175
28	-	983	75	-	-	-	-	-	-	-	-	1,058
29	-	757	-	-	-	-	-	-	-	-	-	757
30	-	951	159	159	-	-	-	-	-	-	-	1,269
31	-	433	649	433	-	-	-	-	-	-	-	1,515
32	-	737	1,963	4,539	737	-	-	-	-	-	-	7,976
33	-	1,892	6,055	17,786	4,541	379	-	-	-	-	-	30,653
34	-	599	6,588	19,165	16,769	2,996	-	-	-	-	-	46,117
35	-	-	1,141	9,128	9,128	3,994	2,852	-	571	-	-	26,814
36	-	-	-	1,909	2,864	1,909	1,431	-	955	-	955	10,023
37	-	-	-	927	-	928	463	-	928	-	1,391	4,637
38	-	-	-	-	-	265	265	265	2,119	-	1,059	3,973
39	-	-	-	-	-	-	-	-	-	-	3,304	3,304
40	-	-	-	-	-	-	-	-	-	-	1,928	1,928
41	-	-	-	-	-	-	-	-	-	-	434	434
42	-	-	-	-	-	-	-	-	-	-	85	85
43	-	-	-	-	-	-	-	-	-	-	18	18
Total	54	6,840	16,630	54,046	34,039	10,471	5,011	265	4,573	-	9,174	141,103
%	<0.1	4.8	11.8	38.3	24.1	7.4	3.6	0.2	3.2	-	6.5	100.0

Table 3. Age composition and length frequency of the stratified mean catch (number) per tow of mackerel from the 1978 USA spring bottom trawl survey in SA 5-6 (strata 1-25, 61-76).

Fork length (cm)	Year class											Total
	1977	1976	1975	1974	1973	1972	1971	1970	1969	1968	1967+	
18	.017	-	-	-	-	-	-	-	-	-	-	.017
19	.015	-	-	-	-	-	-	-	-	-	-	.015
20	.009	-	-	-	-	-	-	-	-	-	-	.009
21	-	-	-	-	-	-	-	-	-	-	-	-
22	.012	-	-	-	-	-	-	-	-	-	-	.012
23	.023	-	-	-	-	-	-	-	-	-	-	.023
24	.025	-	-	-	-	-	-	-	-	-	-	.025
25	.075	-	-	-	-	-	-	-	-	-	-	.075
26	.006	.030	-	-	-	-	-	-	-	-	-	.036
27	-	.084	-	-	-	-	-	-	-	-	-	.084
28	-	.071	-	-	-	-	-	-	-	-	-	.071
29	-	.070	-	-	-	-	-	-	-	-	-	.070
30	-	.038	.039	-	-	-	-	-	-	-	-	.077
31	-	.017	.040	.040	.007	-	-	-	-	-	-	.104
32	-	.035	.059	.222	.047	-	-	-	-	-	-	.363
33	-	-	.170	.262	.185	-	-	-	-	-	-	.617
34	-	-	.147	.342	.195	.147	-	-	-	-	-	.831
35	-	-	.051	.103	.155	.051	.051	-	-	-	.050	.462
36	-	-	-	.019	.019	.019	.019	.019	-	-	-	.093
37	-	-	-	-	-	-	.017	-	.017	-	.035	.069
38	-	-	-	-	-	-	-	.051	-	-	-	.051
39	-	-	-	-	-	-	-	-	-	-	.030	.030
40	-	-	-	-	-	-	-	-	-	.014	-	.014
Total	.182	.345	.506	.988	.608	.217	.087	.070	.017	.014	.115	3.149
%	5.8	11.0	16.1	31.4	19.3	6.9	2.8	2.2	0.5	0.4	3.7	100.0

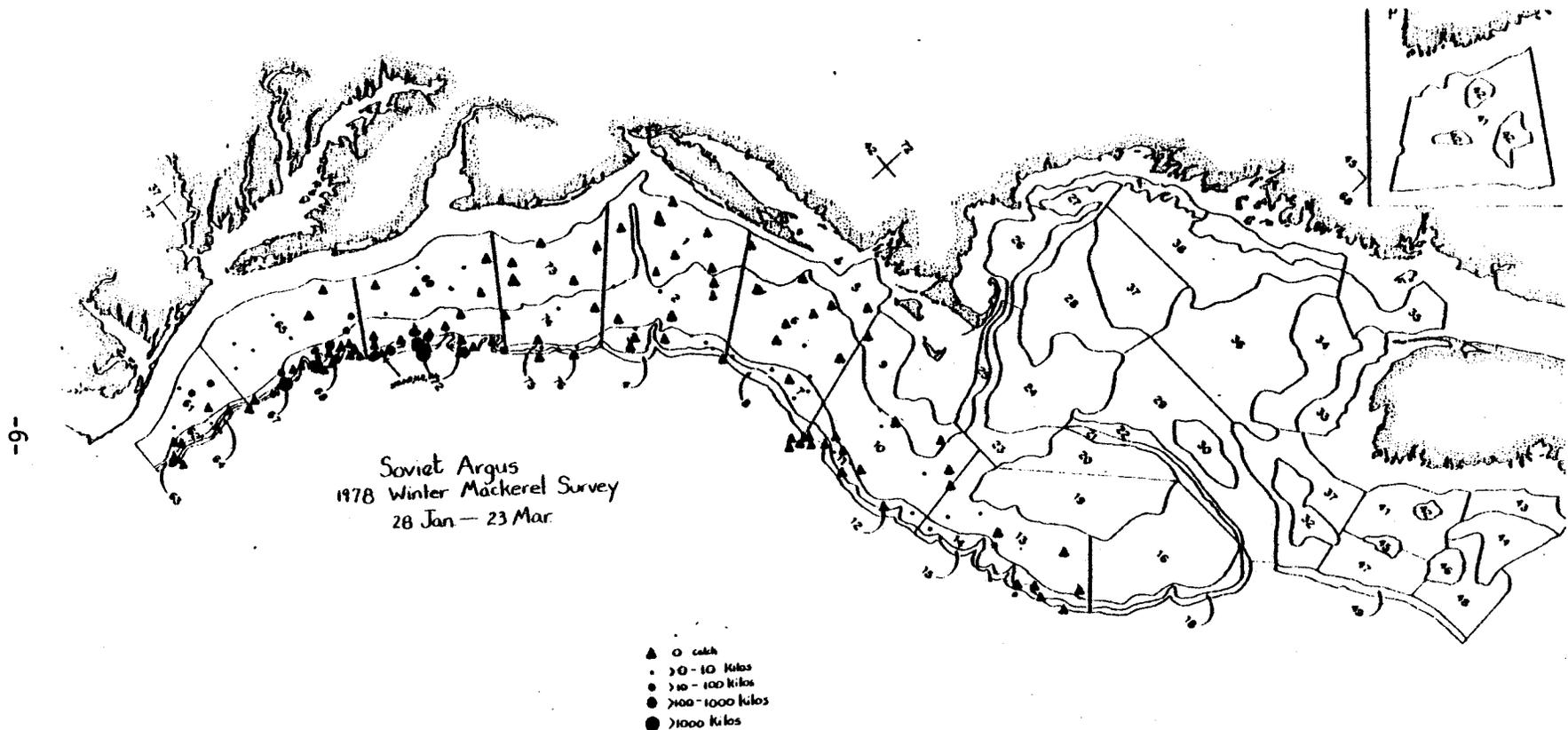


Figure 1. Distribution of mackerel catches (kg/tow) at random stations during the 1978 winter mackerel survey by the USSR R/V ARGUS.

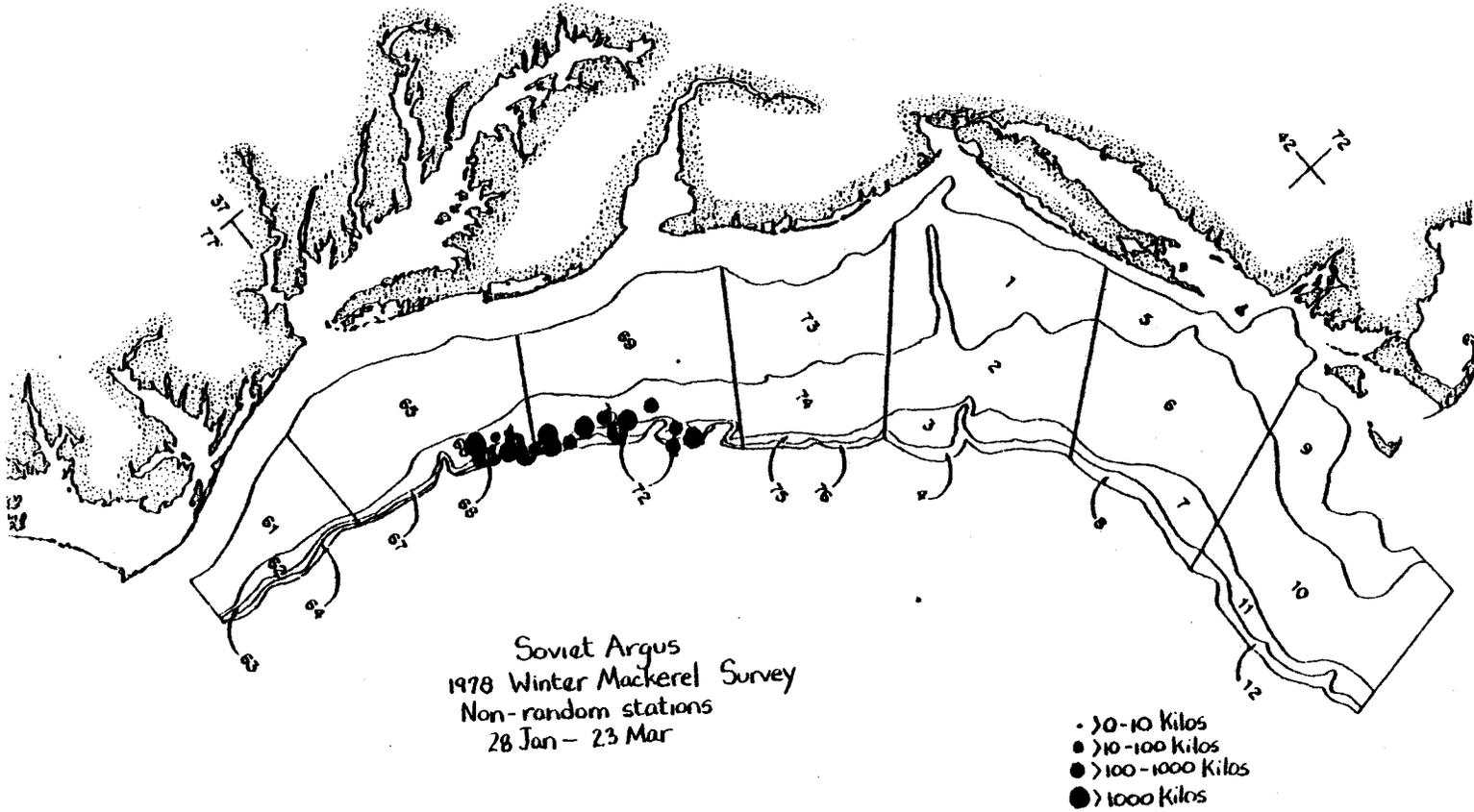


Figure 2. Distribution of mackerel catches (kg/tow) at non-random stations during the 1978 winter mackerel survey by the USSR R/V ARGUS.

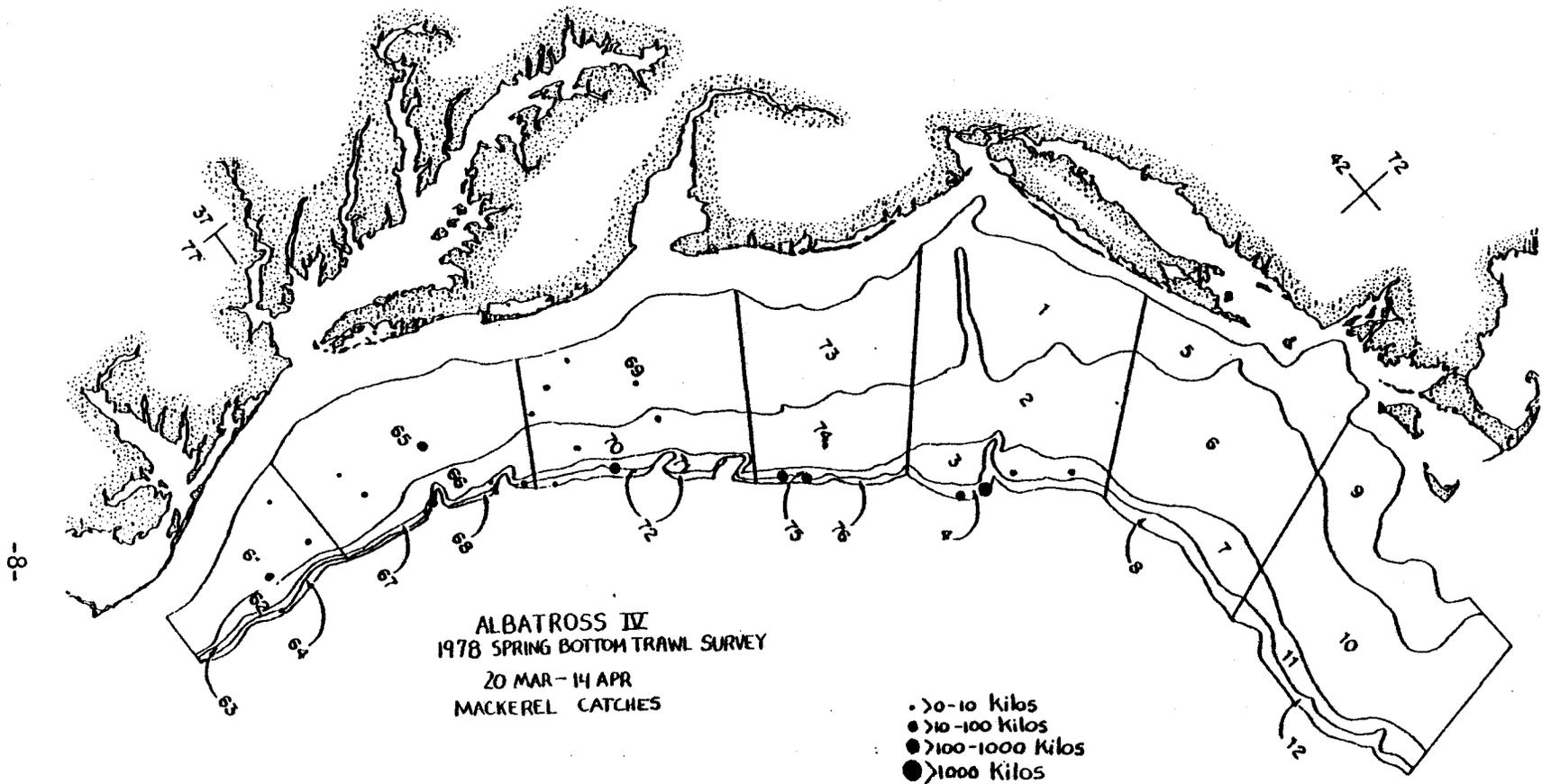


Figure 3. Distribution of mackerel catches (kg/tow) during the 1978 spring bottom trawl survey by the USA R/V ALBATROSS IV.