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Status of the International Fisheries off the Middle Atlantic Coast

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US-USSR BILATERAL NEGOTIATIONS
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Status of the International Fisheries
off the Middle Atlantic Coast

US-USSR BILATERAL TECHNICAL REFERENCE DOCUMENT

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1. INTRODUCTION

This reference document is arranged in five sections. Section II includes the tables of landings statistics for ICNAF Statistical Area 6 for the period 1963 - 1971, and preliminary estimates of U.S. landings for 1972. Section III presents a brief synopsis of the ICNAF conservation regulations for 1972 - 1973 and of the current U.S.-U.S.S.R. Bilateral Agreement. General results of research vessel surveys are presented in Section IV, including tabular data on abundance, and general distribution patterns of major species in the Mid-Atlantic area. Section V presents brief synopses of the status of important stocks.

In sections II-IV, tables and figures are numbered separately within each section in the following manner: table 2.2 represents the second table in Section II; figure 3.3 represents the third figure in Section III, etc. In Section V, table and figure numbers are prefixed with a letter corresponding to the letter assigned to the species (see table of contents), and numbered separately for each species.

It should be noted that the distribution patterns shown in Section IV are to be regarded only in a generalized sense; i.e., inshore vs offshore, Mid-Atlantic vs Georges Bank. The shaded areas generally were constructed by enclosing areas where individual catches exceeded 20 pounds. In the Mid-Atlantic, spring surveys were conducted in March, and fall surveys from mid-September to mid-October. Although each figure represents a composite based on two surveys in successive years, it must be remembered that the survey trawl is not 100 percent efficient for any species, and its efficiency is quite low for semi-pelagic species. Furthermore, trawl efficiency probably is not the same at different depths for a given species. For these reasons, and because survey stations are selected at random (and fish are not distributed uniformly), the research vessel data are subject to rather large sampling errors particularly when considering a single survey. However, they are invaluable in helping determine trends in abundance, because they are based on standardized gear and trawling methods. Two exceptions occurred in the 1969 and 1971 joint U.S.-U.S.S.R. fall groundfish surveys when the U.S.S.R. vessel used non-standard gear. Data points for these two surveys are included in data plots in this document but they are not considered in estimating trends. All Albatross IV surveys were conducted with a standard #36 yankee otter trawl.

In addition to this document, we have prepared a booklet summarizing distribution of 18 species from Cape Hatteras to Georges Bank based on selected spring and fall research vessel surveys. With the exception of menhaden and bluefish,which are rarely or seldom caught on surveys, all of the species described in this document are included in the "distribution" booklet. Other species included are cod, haddock, redfish, and winter flounder.

II. TABLES OF NOMINAL LANDINGS - STATISTICAL AREA 6

2.1. Annual nominal landings (metric tons, live weight) by species, country, and year from ICNAF Statistical Area 6.

2.2. Landings of selected species by the United States from SA 6 for 1972 (metric tons, live weight).

Table 2.1. Annual nominal landings (metric tons, live weight) by species, country and year from ICNAF Statistical Subarea 6*

Species	1963 Canada	1963 USSR	1963 USA	1963 Total	1964 Canada	1964 USSR	1964 USA	1964 Total
ALL SPECIES	70	7,872	703,202	711,144	1,766	28,177	689,392	719,335
TOTAL FINFISH	70	7,872	388,353	396,295	1,766	28,177	342,973	372,916
ALL GNDFSH & FLNDRS		6,924	57,913	64,837		26,624	84,729	111,353
COD			1,040	1,040			413	413
HADDOCK			41	41			22	22
SILVER HAKE		4,191	2,775	6,966		16,889	2,984	19,873
HALIBUT								
FLOUNDERS			7,689	7,689			6,811	6,811
Summer flounder			3,858	3,858			3,768	3,768
Yellowtail flounder			2,312	2,312			1,809	1,809
Other flounders			1,519	1,519			1,234	1,234
OTHER GROUNDFISH		2,733	46,368	49,101		9,735	74,499	84,234
Angler			129	129			109	109
King whiting								
Ocean pout		113	3	116		2	2	4
Pollock		770	668	1,438		8,372	601	8,973
Red hake								
Sculpin		1,231	14,525	15,756		459	13,038	13,497
Scup						147		147
Searobin			33	33			69	69
Tilefish			56	56			27	27
White hake								
Wolffish								
Groundfish (not spec.)		619	30,954	31,573		755	60,653	61,408
SEA HERRING		544	117	661		191	221	412
OTHER PELAGIC FISH	70	404	292,662	293,136	1,766	410	221,923	224,099
Bluefin tuna			1,552	1,552			1,917	1,917
Bluefish			1,150	1,150			780	780
Bonito			45	45			12	12
Butterfish		111	1,830	1,941	316	316	1,630	1,946
Little tuna			5	5			2	2
Mackerel		293	118	411		94	380	474
Menhaden			286,622	286,622			215,776	215,776
Skipjack tuna			940	940			505	505
Swordfish	4		192	196	868		724	1,592
Other tuna	66		208	274	898		197	1,095

Table 2.1 (contd). Annual nominal landings (metric tons, live weight) by species, country and year from ICNAF Statistical Subarea 6*

Species	1963 Canada	1963 USSR	1963 USA	1963 Total	1964 Canada	1964 USSR	1964 USA	1964 Total
OTHER FISH			37,661	37,661		952	36,100	37,052
Alewife 1/			19,359	19,359			16,138	16,138
Amberjack			15	15			5	5
Argentine						952		952
Atlantic croaker			304	304			418	418
Atlantic silverside			75	75			71	71
Black drum			167	167			56	56
Black sea bass			3,803	3,803			3,332	3,332
Carp			344	344			344	344
Catfish			1,495	1,495			1,393	1,393
Conger			1,474	1,474			2,649	2,649
Eel			392	392			379	379
Gizzard shad			12	12			39	39
Gray weakfish			1,002	1,002			1,219	1,219
Hickory shad			135	135			129	129
King mackerel			5	5			18	18
Mullets			313	313			149	149
Northern harvestfish			55	55			79	79
Red drum			15	15			12	12
Shad			2,189	2,189			2,328	2,328
Sharks			313	313			682	682
Sheepshead			86	86			308	308
Skates			8	8			13	13
Smelt							2	2
Spanish mackerel			62	62			34	34
Spot			750	750			1,615	1,615
Spotted weakfish			58	58			47	47
Striped bass			3,955	3,955			3,606	3,606
Sturgeon			22	22			30	30
White perch			943	943			676	676
Yellow perch			69	69			101	101
Other (not spec.)			241	241			228	228
SHELLFISH, ETC.			314,849	314,849			346,419	346,419
Bay scallop			2,393	2,393			4,113	4,113
Blue crab			37,234	37,234			44,395	44,395
Calico scallop								
Conchs			1,772	1,772			1,076	1,076
Green turtle								
Horseshoe crab			91	91			161	161
Lobster			737	737			1,003	1,003
Mussel			157	157			267	267
Ocean quahog			33,116	33,116			35,742	35,742
Oyster			89,536	89,536			108,074	180,074
Periwinkle								
Prawns			713	713			692	692
Quahogs								
Razor clam			16	16			12	12
Rock crab			10	10			20	20
Sea scallop			8,108	8,108			8,989	8,989
Sea urchin								
Soft clam			12,649	12,649			15,178	15,178
Squid			905	905			752	752
Surf clam			127,295	127,295			125,794	125,794
Terrapin			8	8				
Turtles			109	109			151	151

Table 2.1 (contd). Annual nominal landings (metric tons, live weight) by species, country and year from ICNAF Statistical Subarea 6*

Species	1965 Canada	1965 USSR	1965 USA	1965 Total	1966 Canada	1966 USSR	1966 Norway	1966 USA	1966 Total
ALL SPECIES	28,252	33,430	739,535	801,217	23,618	131,075	868	638,803	794,364
TOTAL FINFISH	1,117	33,264	356,326	390,707	453	131,027	868	226,836	359,184
ALL GNDFSH & FLNDRS		31,281	71,722	103,003	4	124,407		43,497	167,908
COD			274	274		75		196	271
HADDOCK			6	6		107		13	120
SILVER HAKE		17,728	3,299	21,027		92,924		3,277	96,201
HALIBUT						35			35
FLOUNDERS			8,537	8,537				9,452	9,452
Summer flounder			4,386	4,386				4,237	4,237
Yellowtail flounder			2,117	2,117				2,240	2,240
Other flounders			2,034	2,034				2,975	2,975
OTHER GROUNDFISH		13,553	59,606	73,159	4	31,266		30,559	61,829
Angler						1,689			1,689
King whiting			212	212				96	96
Ocean pout									
Pollock			2	2				48	48
Red hake		11,745	624	12,369		25,722		590	26,312
Sculpin									
Scup		718	11,069	11,787		566		8,154	8,720
Searobin								1,279	1,279
Tilefish			30	30				63	63
White hake			22	22				32	32
Wolffish						70			70
Groundfish (not spec.)		1,090	47,647	48,737	4	1,940		21,576	23,520
SEA HERRING		1,913	330	2,243		2,767		3,084	5,851
OTHER PELAGIC FISH	1,117	70	237,335	238,522	397	1,252		140,842	142,491
Bluefin tuna			948	948				242	242
Bluefish			1,068	1,068				1,218	1,218
Bonito			45	45				10	10
Butterfish		17	2,366	2,383				2,010	2,010
Little tuna			10	10				8	8
Mackerel		53	531	584		1,252		821	2,073
Menhaden			231,458	231,458				136,046	136,046
Skipjack tuna			4	4				10	10
Swordfish	826		869	1,695	367			427	794
Other tuna	291		36	327	30			50	80

Table 2.1 (contd). Annual nominal landings (metric tons, live weight) by species, country and year from ICNAF Statistical Subarea 6*

Species	1965 Canada	1965 USSR	1965 USA	1965 Total	1966 Canada	1966 USSR	1966 Norway	1966 USA	1966 Total
OTHER FISH			46,939	46,939	52	2,601	868	39,413	42,934
Alewife 1/			23,197	23,197				21,178	21,178
Amberjack			3	3				4	4
Argentine			166	166					
Atlantic croaker			881	881				716	716
Atlantic silverside			66	66				80	80
Black drum			84	84				229	229
Black sea bass			3,656	3,656				1,606	1,606
Carp			309	309				326	326
Catfish			1,276	1,276				665	665
Conger			5,819	5,819				3,799	3,799
Eel			605	605				498	498
Gizzard shad			65	65				7	7
Gray weakfish			1,554	1,554				903	903
Hickory shad			103	103				23	23
King mackerel			6	6				8	8
Mullets			90	90				58	58
Northern harvestfish			160	160				86	86
Red drum			49	49				6	6
Shad			2,644	2,644				2,161	2,161
Sharks			393	393	52	2,601	868	403	3,924
Sheepshead			158	158				392	392
Skates			23	23				12	12
Smelt			1	1					
Spanish mackerel			55	55				77	77
Spot			894	894				644	644
Spotted weakfish			60	60				20	20
Striped bass			3,205	3,205				3,733	3,733
Sturgeon			39	39				44	44
White perch			969	969				1,378	1,378
Yellow perch			136	136				95	95
Other (not spec.)			273	273				262	262
SHELLFISH, ETC.	27,135		383,375	410,510	23,165	48		413,267	436,480
Bay scallop			3,757	3,757				1,860	1,860
Blue crab			47,707	47,707				50,201	50,201
Calico scallop									
Conchs			994	994				1,977	1,977
Green turtle									
Horseshoe crab			96	96				60	60
Lobster			1,110	1,110				1,051	1,051
Mussel			625	625				282	282
Ocean quahog			36,335	36,335				38,921	38,921
Oyster			101,892	101,892				102,607	102,607
Periwinkle									
Prawns			730	730				360	360
Quahogs									
Razor clam			10	10				4	4
Rock crab			27	27				32	32
Sea scallop	27,135		29,023	56,158	23,165			52,063	75,201
Sea urchin									
Soft clam			14,719	14,719				14,084	14,084
Squid			774	774		48		980	1,028
Surf clam			145,436	145,436				148,712	148,712
Terrapin								5	5
Turtles			140	140				95	95

Table 2.1 (contd). Annual nominal landings (metric tons, live weight) by species, country and year from ICNAF Statistical Subarea 6*

Species	1967 Canada	USSR	USA	Japan	Ger(DR)	Total	1968 Canada	USSR	Poland	USA	Ger(FR)	Japan	Ger(DR)	Total
ALL SPECIES	747	47,086	596,687	452 2/	1,114	646,086	4,285	52,716	12,468	593,590	415	6,536	1,128	671,138
TOTAL FINFISH	697	46,573	198,810	(452) 2/	1,114	247,646	768	52,000	12,468	226,939	415	(3,836)	1,128	297,554
ALL GNDFSH & FLNDRS		34,409	35,749	(-)	56	70,214	71	25,816	193	23,591		(-)	89	49,760
COD			415			415			67	312			2	381
HADDOCK			24			24			41	8				49
SILVER HAKE		18,606	4,416			23,022		14,967	85	3,401				18,453
HALIBUT														
FLOUNDERS			12,111			12,111				8,078			5	8,083
Summer flounder			3,407			3,407				2,703				2,703
Yellowtail flounder			5,340			5,340				3,272				3,272
Other flounders			3,364			3,364				2,103			5	2,108
OTHER GROUNDFISH		15,803	18,783		56	34,642	71	10,849		11,792			82	22,794
Angler			18			18				19				19
King whiting			59			59				106				106
Northern puffer														
Ocean pout														
Pollock			2			2				4				4
Red hake		14,884	579			15,463		1,865		367				2,232
Sculpin														
Scup		549	5,589			6,138		469		4,047				4,516
Searobin		370	196			566		7,872		239				8,111
Tilefish										6				6
White hake			16			16				18				18
Wolffish														
Groundfish (not spec.)			12,324		56	12,380	71	643		6,986			82	7,782
SEA HERRING		3,187	591		895	4,673		16,132	11,582	151	413		873	29,151
OTHER PELAGIC FISH	673	6,851	127,246		163	134,933	697	7,648	448	166,868	2		158	175,821
Bluefin tuna			1,575			1,575				103				103
Bluefish			672			672				926				926
Bonito			9			9				28				28
Butterfish		764	1,657			2,421		315		1,129				1,444
Little tuna			7			7				6				6
Mackerel		6,087	675		163	6,925	16	7,333	448	928	2		158	8,885
Menhaden			122,395			122,395				163,609				163,609
Skipjack tuna														
Swordfish	611		246			857	681			137				818
Other tuna	62		10			72				2				2

Table 2.1 (contd). Annual nominal landings (metric tons, live weight) by species, country and year from ICNAF Statistical Subarea 6*

Species	1967 Canada	1967 USSR	1967 USA	1967 Japan	1967 Ger(DR)	1967 Total	1968 Canada	1968 USSR	1968 Poland	1968 USA	1968 Ger(FR)	1968 Japan	1968 Ger(DR)	1968 Total
OTHER FISH	24	2,126	35,224			37,374		2,404	245	36,329			8	38,986
Alewife[1/]		981	22,201			23,182		1,075		23,649				24,724
Amberjack													3	3
Argentine								810						810
Atlantic croaker			209			209				25				25
Atlantic silverside			66			66				56				56
Black drum			107			107				165				165
Black sea bass			1,278			1,278				1,178				1,178
Conger			2			2								
Eel			660			660				553				553
Gizzard shad														
Gray weakfish			626			626				907				907
Hickory shad														
King mackerel			4			4				2				2
Mullet			52			52				61				61
Northern harvestfish			20			20				40				40
Red drum														
Shad			1,938			1,938				2,082				2,082
Shark	24	390	3			417		519		24			5	548
Sheepshead														
Skates		188	13			201				36				36
Smelt										2				2
Spanish mackerel			22			22				44				44
Spot			2,332			2,332				704				704
Spotted weakfish			24			24				14				14
Striped bass			4,308			4,308				4,590				4,590
Sturgeon										19				19
Trout														
White perch			1,051			1,051				1,192				1,192
Other (not spec.)		567	308			875			245	986				1,231
SHELLFISH, ETC.	50	513	397,877			398,440	3,517	716		366,651		(2,700)		373,584
Bay scallop			937			937				828				828
Blue crab			41,921			41,921				31,071				31,071
Calico scallop														
Conchs			1,277			1,277				1,203				1,203
Horseshoe crab			25			25				37				37
Lobster			1,305			1,305				1,682				1,682
Mussel			59			59				438				438
Ocean quahog			41,732			41,732				40,855				40,855
Oyster			123,288			123,288				108,292				108,292
Periwinkle														
Prawns			336			336				375				375
Quahog														
Razor clam			33			33				18				18
Rock crab			15			15				25				25
Sea scallop	50		27,764			27,814	3,517			35,930				39,447
Sea urchin														
Soft clam			9,685			9,685				11,287				11,287
Squid		513	916			1,429		716		859		(2,700)[3/]		4,275
Surf clam			148,584			148,584				133,751				133,751
Terrapin														

Table 2.1 (contd). Annual nominal landings (metric tons, live weight) by species, country and year from ICNAF Statistical Subarea 6*

Species	1969 Canada	USSR	Poland	USA	Japan	Ger(DR)[5]	Bulgaria[5]	Total	1970 Canada	USSR	Poland	USA	Japan	Bulgaria[5]	Ger(FR)	Ger(DR)[5]	Total
ALL SPECIES	577	107,367	19,622	554,928	8,133	(2,000)	(100)	692,727	2,084	102,308	45,381	727,624	18,935	(175)	401	(2,250)	899,158
TOTAL FINFISH	562	107,222	19,622	168,722	(4,735)	(2,000)	(100)	303,913	2,084	102,308	45,381	275,962	10,621	(175)	401	(2,250)	439,182
ALL GNDFSH & FLNDRS		13,728	158	22,609				36,495		4,658	143	21,062	639				26,502
COD			158	426				584			143	364	1				508
HADDOCK												2					2
SILVER HAKE		7,138		3,165				10,303		3,044		2,248	256				5,548
HALIBUT																	
FLOUNDERS		898		7,631				8,529		130		8,598	164				8,892
Summer flounder				1,547				1,547				2,471					2,471
Yellowtail flounder				3,886				3,886		111		4,050	3				4,164
Other flounders		898		2,198				3,096		19		2,077	161				2,257
OTHER GROUNDFISH		5,692		11,387				17,079		1,484		9,850	218				11,552
Angler												12					12
King whiting												166					166
Northern puffer																	
Ocean pout																	
Pollock												1					1
Red hake		4,099		759				4,858		834		659					1,493
Sculpin										320							320
Scup		260		3,645				3,905		72		3,009	33				3,114
Searobin		145		1,590				1,735				141					141
Tilefish												14					14
White hake												15					15
Wolffish																	
Groundfish (not spec.)		1,188		5,393				6,581		258		5,833	185				6,276
SEA HERRING		38,210	12,653	1,585		(1,000)	(20)	53,468		22,406	15,859	708	198	(10)	356	(950)	40,487
OTHER PELAGIC FISH	561	39,176	4,977	106,327		(50)	(25)	151,116	2,084	68,034	27,153	224,853	7,935		45		330,104
Bluefin tuna				569				569	1,160			2,423					3,583
Bluefish				1,152				1,152				1,648					1,648
Bonito												8					8
Butterfish		1,613		1,694				3,307		8		1,478	6,898				8,384
Little tuna												3					3
Mackerel		37,563	4,977	491		(50)	(25)	43,106		68,026	27,153	957	1,037	(120)	45	(100)	97,428
Menhaden				102,338				102,338				218,304					218,304
Skipjack tuna																	
Swordfish	501			83				584	467			32					499
Other tuna	60							60	457								457

Table 2.1 (contd). Annual nominal landings (metric tons, live weight) by species, country and year from ICNAF Statistical Subarea 6*

Species	Canada	USSR	Poland	USA	1969 Japan	Ger(DR) 5/	Bulgaria 5/	Total	Canada	USSR	Poland	USA	1970 Japan	Bulgaria 5/	Ger(FR)	Ger(DR) 5/	Total
OTHER FISH	1	16,108	1,834	38,201		(950)	(55)	57,149	1	7,210	2,226	29,339	1,849	(65)		(1,180)	41,870
Alewife 1/		10,380		24,352				34,732		5,954		14,888					20,842
Amberjack																	
Argentine																	
Atlantic croaker												96					96
Atlantic silverside												41					41
Black drum												40					40
Black sea bass				1,179				1,179				1,067					1,067
Conger																	
Eel				709				709				873					873
Gizzard shad																	
Gray weakfish				1,441				1,441									
Hickory shad																	
King mackerel												5					5
Mullet												52					52
Northern harvestfish												22					22
Red drum												1					1
Shad				2,144				2,144				2,813					2,813
Shark	1	1,979		59				2,039	1	588		169	325				1,083
Sheepshead																	
Skates		473		262				735				146					146
Smelt																	
Spanish mackerel												104					104
Spot				597				597				3,092					3,092
Spotted weakfish																	
Striped bass				5,086				5,086				4,350					4,350
Sturgeon												42					42
Trout																	
White perch				1,398				1,398				1,104					1,104
Other (not spec.)		3,276	1,834	974		(950)	(55)	7,089		668	2,226	434		(65)		(1,180)	6,097
SHELLFISH, ETC.	15	145		386,206	(3,398)			389,764				451,662	8,314				459,976
Bay scallop				940				940				1,368					1,368
Blue crab				34,926				34,926				38,160					38,160
Calico scallop																	
Conchs				1,319				1,319				1,061					1,061
Horseshoe crab				2				2				7					7
Lobster				1,813				1,813				2,028					2,028
Mussel				1,427				1,427				532					532
Ocean quahog				42,650				42,650				43,433					43,433
Oyster				107,362				107,362				180,279					180,279
Periwinkle																	
Prawns				813				813				491					491
Quahogs				281				281				1,118					1,118
Razor clam																	
Rock crab				38				38				25					25
Sea scallop	15			15,794				15,809				8,828					8,828
Sea urchin																	
Soft clam				14,785	4/			14,785				14,147	4/				14,147
Squid		145		647	(3,398)			4,190				578	(8,136)				8,714
Surf clam				163,406				163,406				159,593					159,593
Terrapin				3				3				4					4
Turtle												10					10
Misc.													(178)				(178)

Table 2.1 (contd). Annual nominal landings (metric tons, live weight) by species, country and year from ICNAF Statistical Subarea 6*

1971

Species	Canada	USSR	Poland	USA	Japan	Romania	Bulgaria	Ger(FR)	Ger(DR)	Total
ALL SPECIES	567	113,960	96,178	721,343	12,528	6,061	34,306	1,621	72,985	1,059,549
TOTAL FINFISH	567	113,481	96,178	289,693	6,575	6,061	34,296	1,621	72,985	621,457
ALL GNDFSH & FLNDRS		22,014	278	26,607	919	42	2,126		1,019	53,005
COD			101	383						484
HADDOCK				8						8
SILVER HAKE		7,061	12	2,989	49	42	621			10,774
HALIBUT										
FLOUNDERS		1,128		10,643	7		125			11,903
Summer flounder		61		2,308						2,369
Yellowtail flounder		829		6,867	7		125			7,828
Other flounders		238		1,468						1,706
OTHER GROUNDFISH		13,825	165	12,584	863		1,380		1,019	29,836
Angler				13						13
King whiting				107						107
Northern puffer										
Ocean pout							2			2
Pollock				5					886	891
Red hake		8,285		821	7		1,218			10,331
Sculpin										
Scup		372	108	2,516			160		133	3,289
Searobin		792		110	20					922
Tilefish				41						41
White hake				51	105					156
Wolffish										
Groundfish (not spec.)		4,376	57	8,920	731					14,084
SEA HERRING		17,355	19,242	1,423	32	11	612		3,278	41,953
OTHER PELAGIC FISH	567	68,840	68,612	239,148	5,548	5,122	26,900	1,621	62,083	478,441
Bluefin tuna	486			1,251						1,737
Bluefish				1,523						1,523
Bonito				12						12
Butterfish		86		1,151	4,795		25			6,057
Little tuna				4						4
Mackerel		68,754	68,612	809	753	5,122	26,875	1,621	62,083	234,629
Menhaden				234,396						234,396
Skipjack tuna	81									81
Swordfish				2						2
Other tuna										

Table 2.1(contd). Annual nominal landings (metric tons, live weight) by species, country and year from ICNAF Statistical Subarea 6*

Species	Canada	USSR	Poland	USA	Japan	Romania	Bulgaria	Ger(FR)	Ger(DR)	Total
				1971						
OTHER FISH		5,272	8,046	22,515	76	886	4,658		6,605	48,058
Alewife[1/]		2,275	819	11,799			526		5,794	21,213
Amberjack										
Argentine										
Atlantic croaker				243						243
Atlantic silverside				100						100
Black drum				72						72
Black sea bass				583						583
Carp				136						136
Catfish				1,715						1,715
Conger				2						2
Eel				860						860
Gizzard shad										
Gray weakfish										
Hickory shad				24						24
King mackerel				6						6
Mullets				108						108
Northern harvestfish				49						49
Red drum				3						3
Shad				1,440						1,440
Sharks		2,997		89	76					3,162
Sheepshead				1						1
Skates				144					230	374
Smelt										
Spanish mackerel				53						53
Spot				545						545
Spotted weakfish										
Striped bass				3,077						3,077
Sturgeon				28						28
Trout										
White perch				1,113						1,113
Yellow perch				50						50
Other (not spec.)			7,227	275		886	4,132		581	13,101
SHELLFISH, ETC.		479		431,650	5,953		10			438,092
Bay scallop				538						538
Blue crab				41,110						41,110
Calico scallop										
Clam (Rangia)				5						5
Conchs				490						490
Green crab				1						1
Horshoe crab				9						9
Lobster				1,904						1,904
Mussel				544						544
Ocean quahog				46,610						46,610
Oyster				190,437						190,437
Periwinkle										
Prawns				2,415						2,415
Quahogs				1,118						1,118
Razor clam				13						13
Rock crab				23						23
Sea scallop				7,455						7,455
Sea urchin										
Soft clam				13,751						13,751
Squid		479		471	5,928		10			6,888
Surf clam				124,456						124,456
Terrapin										
Turtles										
Misc.										

Footnotes to Table 2.1

Annual nominal landings (metric tons live weight) by species, country and year from ICNAF Statistical Subarea 6

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* Figures in parentheses are estimates

1/ Includes blueback herring

2/ Reported as argentine and butterfish

3/ Squid estimates from Japanese 1969 proportion

4/ Squid figures from U. S. Fishery Attache, Japan

5/ Catches estimated using herring assessment proportion (Redbook 1972, Part I, pp. 46, 47) attributed to Ger(DR)

Table 2.2. Landings of selected species by the United States from SA6 for 1972 (metric tons, live weight)

Species	6 Month Total	Annual Estimate
Cod	208	343
Haddock	1	8
Silver hake	157	221
Summer flounder	1,106	3,043
Yellowtail flounder	4,032	8,593
Other flounders	941	1,385
Red hake	465	558
Scup	2,440	3,111
Sea herring	486	513
Butterfish	140	697
Mackerel	915	975
Menhaden	58,485	315,965
River herring	10,923	10,937
Black sea bass	500	720
Other finfish*	12,268	29,395
TOTAL FINFISH	93,066	376,464
Northern lobster	473	1,775
Surf clam	66,313	142,368
Sea scallop	6,368	11,304
Squid	497	660
Other shellfish, etc.**	191	686
TOTAL SHELLFISH	73,842	156,793
TOTAL LANDINGS	166,908	533,257

*Can contain some landings of species broken out in this Table. Final tabulations will adjust these entries.

**Does not include blue crab, oysters, hard clam, soft clam, or turtles.

III. SYNOPSES OF ICNAF CONSERVATION REGULATIONS FOR 1972-1973 AND US-USSR BILATERAL AGREEMENT

Table 3.1. International quota regulations applicable in ICNAF Convention Area and Statistical Area 6 for 1972 and recommendations for 1973 (metric tons, live weight).

Figure 3.1. Restricted fishing zones ICNAF SA 4 and 5.

3.2. US-USSR Bilateral zones.

SYNOPSIS OF ICNAF REGULATIONS FOR 1972-1973

1. Quota regulations

See Table 3.1.

2. Closed areas

See Figure 3.1.

3. Size regulations

1972

Sea herring

It is prohibited to take or possess sea herring less than 9 inches (22.7 cm) total length in ICNAF Division 4W south of 43°51'N latitude and Subarea 5 (outside territorial waters).

A vessel in any year may take an incidental catch of herring less than 9 inches of not more than 10% by weight of all herring caught in the areas specified in the above paragraph by that vessel during that year.

1973

Sea scallop

Prohibits the retention and landing of sea scallops "... (a) of a shell-size less than 95 mm, measured from the hinge to the opposite margin; and (b) the meats of which, are of an average weight of less than 11.3 grams, providing an average count of forty (40) units per pound or more."

4. Trawl regulations

(a) Species affected:

	SUBAREAS				
	1	2	3	4	5
Cod	x	x	x	x	x
Haddock	x	x	x	x	x
Redfish	x	x	x		
Halibut	x	x	x		
Witch	x	x	x	x	
Yellowtail			x	x	x
American plaice	x	x	x	x	
Greenland halibut	x	x	x		
Pollock			x		
Winter flounder				x	
White hake			x		

(b) Mesh size

1972

Subarea 1 - 130 mm

Subarea 2 through 5 - 114 mm for all species except yellowtail
130 mm yellowtail

Measurements are for manila material as standard.

Incidental catches - when fishing primarily for non-regulated species, vessels may take no more than the following amount of regulated species using smaller mesh:

(1) 2,268 kg of each, or 10% by weight for any trip.
(2) In any 12-month period, 10% by weight for each regulated species of all trawl-caught fish taken by such vessel in that period of 12 months.

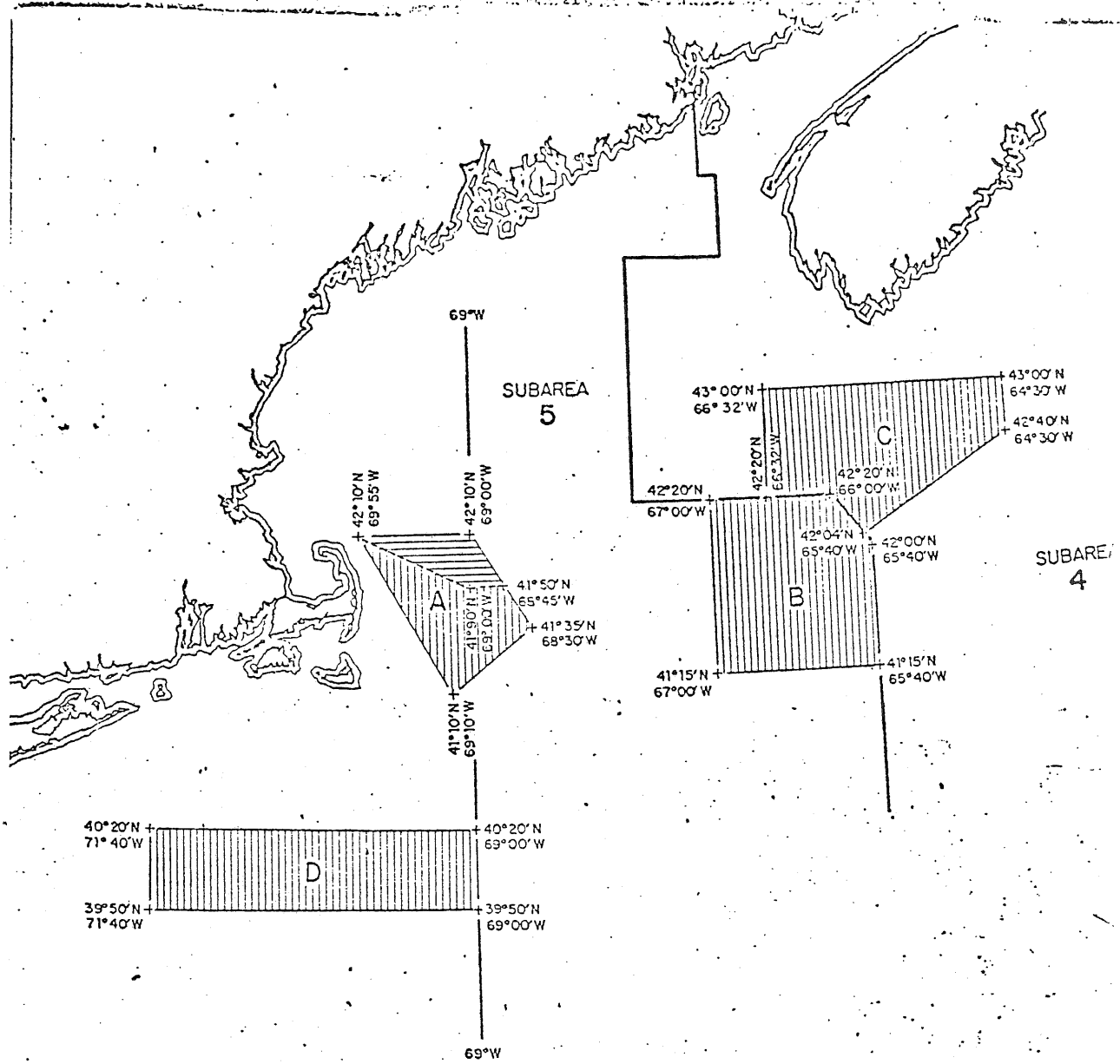
1974 (proposed)

In Subarea 5, minimum mesh size for all regulated species in all parts of net except codend will be 114 mm (4½ inches) and the codend mesh size will be 130 mm (5½ inches) using manila material as standard.

Table 3.1. International quota regulations applicable in ICNAF Convention Area and Statistical Area 6 for 1972 and recommendations for 1973 (metric tons, live weight).

Species/Area	Total	Canada	Denmark	France	Ger(FR)	Iceland	Italy	Japan	Norway	Poland	Portugal	Romania	Spain	USSR	UK	USA	Other Contract Govts	Non-Member
1972																		
SEA HERRING																		
4X - 4W[1]	65,000	35,700						1,000						26,300			1,000	1,000
5Y	30,000	6,000			2,500											21,000		
5Z - 6	150,000	5,800			31,600			1,200		49,400		600		48,200		4,000	1,000	8,200
HADDOCK																		
4X	9,000																	
4W	4,000				(GLOBAL QUOTAS)													
5	6,000																	
YELLOWTAIL																		
5 W of 69°	10,000																	
5 E of 69°	16,000				(GLOBAL QUOTAS)													
1973																		
COD																		
2J - 3K - 3L	575,500	71,064	13,895	51,352	41,336	6,224	6,056	6,000	17,480	40,944	121,384	7,008	91,512	81,536	19,708			
3Ps	50,500	9,200	2,000	4,400	500	500	500	500	2,500	500	1,100		23,000	3,900	1,900			
3N - 3Ø	103,500	12,700	2,909	601	1,009	909	909	909	3,309	1,109	7,709	909	41,409	27,100	2,009			
4Vs - 4W	60,500	18,400	1,150	500	550	450	450	450	450	550	1,150	450	31,550	2,900	450	1,050		
5Y	10,000	100														9,400	500	
5Z	35,000	4,000								400			5,800	2,900		19,600	2,300	
AM. PLAICE																		
3L - 3N - 3Ø	60,000	41,600	100	1,242	100	100	100	742	100	1,142	742	942	742	11,400	842	100		
YELLOWTAIL																		
3L - 3N - 3Ø	50,000	35,500	100	700	100	100	100	700	100	100	700	800	700	9,500	700	100		
5 W of 69°	10,000													400		9,000	600	
5 E of 69°	16,000															15,000	1,000	
SILVER HAKE																		
5Y	10,000															9,500	500	
5Ze	80,000													55,000		17,000	8,000	
5Zw - 6	80,000													47,000		25,000	8,000	
RED HAKE																		
5Zw - 6	40,000													22,000		15,000	3,000	
HADDOCK																		
4X	9,000																	
4W	4,000				(GLOBAL QUOTAS)													
5	6,000																	
SEA HERRING	RECOMMENDATIONS FORTHCOMING AT JANUARY, 1973 ICNAF MEETING																	

[1] South of 44°52' N latitude.



ICNAF CONSERVATION AREAS, 1972 AND 1973

A-B-C Fishing prohibited with gear capable of catching Demersal species during March, April and May. In Zones A and B this does not apply to vessels that fish with hooks having gape not less than 3cm.

D Prohibits directed fishing for Red and Silver Hakes during January, February and March in 1972. Prohibits directed fishing for Red and Silver Hakes during April in 1973

1972 AREAS

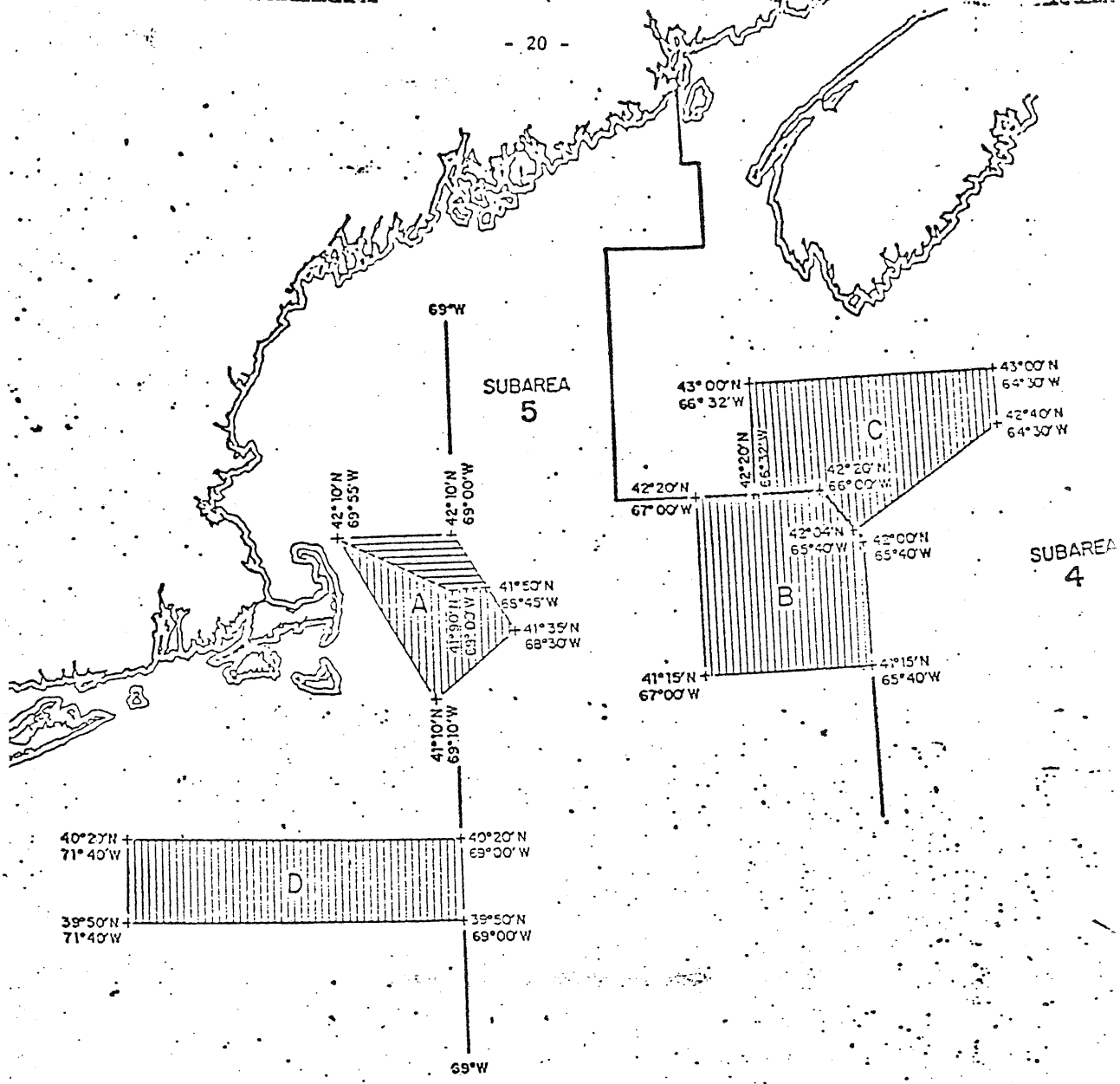
1972 AND 1973 AREAS

Fig. 3.1.

Table 3.1. International quota regulations applicable in ICNAF Convention Area and Statistical Area 6 for 1972 and recommendations for 1973 (metric tons, live weight).

Species/Area	Total	Canada	Denmark	France	Ger(FR)	Iceland	Italy	Japan	Norway	Poland	Portugal	Romania	Spain	USSR	UK	USA	Other Contract Govts	Non-Member
1972																		
SEA HERRING																		
4X - 4W[1]	65,000	35,700						1,000						26,300			1,000	1,000
5Y	30,000	6,000			2,500											21,000		
5Z - 6	150,000	5,800			31,600			1,200		49,400		600		48,200		4,000	1,000	8,200
HADDOCK																		
4X	9,000																	
4W	4,000				(GLOBAL QUOTAS)													
5	6,000																	
YELLOWTAIL																		
5 W of 69°	10,000																	
5 E of 69°	16,000				(GLOBAL QUOTAS)													
1973																		
COD																		
2J - 3K - 3L	575,500	71,064	13,896	51,352	41,336	6,224	6,056	6,000	17,480	40,944	121,384	7,008	91,512	81,536	19,708			
3Ps	50,500	9,200	2,000	4,400	500	500	500	500	2,500	500	1,100		23,000	3,900	1,900			
3N - 3Ø	103,500	12,700	2,909	601	1,009	909	909	909	3,309	1,109	7,709	909	41,409	27,100	2,009			
4Vs - 4W	60,500	18,400	1,150	500	550	450	450	450	450	550	1,150	450	31,550	2,900	450	1,050		
5Y	10,000	100														9,400	500	
5Z	35,000	4,000								400			5,800	2,900		19,600	2,300	
AM. PLAICE																		
3L - 3N - 3Ø	60,000	41,600	100	1,242	100	100	100	742	100	1,142	742	942	742	11,400	842	100		
YELLOWTAIL																		
3L - 3N - 3Ø	50,000	35,500	100	700	100	100	100	700	100	100	700	800	700	9,500	700	100		
5 W of 69°	10,000													400		9,000	600	
5 E of 69°	16,000															15,000	1,000	
SILVER HAKE																		
5Y	10,000															9,500	500	
5Ze	80,000													55,000		17,000	8,000	
5Zw - 6	80,000													47,000		25,000	8,000	
RED HAKE																		
5Zw - 6	40,000													22,000		15,000	3,000	
HADDOCK																		
4X	9,000																	
4W	4,000				(GLOBAL QUOTAS)													
5	6,000																	
SEA HERRING	RECOMMENDATIONS FORTHCOMING AT JANUARY, 1973 ICNAF MEETING																	

[1] South of 44°53' N latitude.



ICNAF CONSERVATION AREAS, 1972 AND 1973

A-B-C Fishing prohibited with gear capable of catching Demersal species during March, April and May. In Zones A and B this does not apply to vessels that fish with hooks having gape not less than 3cm.

D Prohibits directed fishing for Red and Silver Hakes during January, February and March in 1972. Prohibits directed fishing for Red and Silver Hakes during April in 1973

1972 AREAS

1972 AND 1973 AREAS

Fig. 3.1.

SYNOPSIS OF US-USSR BILATERAL AGREEMENTS

1. Agreement area south and west of ICNAF Convention Area to 34°N latitude.

2. Exchange of scientific and statistical data; and meetings of scientists of each Government at least annually.

3. *Refrain from fishing during the period 1 January through 15 April in Area E (see Figure 3.2).

4. *Refrain from increasing the catch of red hake, silver hake, scup, flounders, and black sea bass above the 1967 levels in the Agreement Area.

5. *Refrain from conducting specialized fisheries for scup and flounders and from increasing their incidental catch of these species.

6. Refrain from fishing menhaden during the period 1 January through 30 April in the Agreement Area.

7. Loading operations for Soviet fishing vessels in waters of the U. S. contiguous fishing zone (see Areas F and G, Figure 3.2).

8. Fishing area for Soviet vessels during the period 1 January through 31 March within the U. S. contiguous fishing zone (see Area H, Figure 3.2).

9. Facilitate entry into appropriate ports for fishing and fishery research vessels.

   Protocol to the Agreement, signed 2 February 1971, provides for the entry of not more than four (4) Soviet fishing vessels or fishery support vessels each month into each of the ports of Baltimore and Philadelphia.

10. Protocol to the Agreement, signed 2 February 1971, limits the Soviet catch of river herring not to exceed 4,000 metric tons in each year in the Agreement Area.

*Shall not apply to vessels under 110 feet in length or to vessels fishing for crustacea or molluscs.

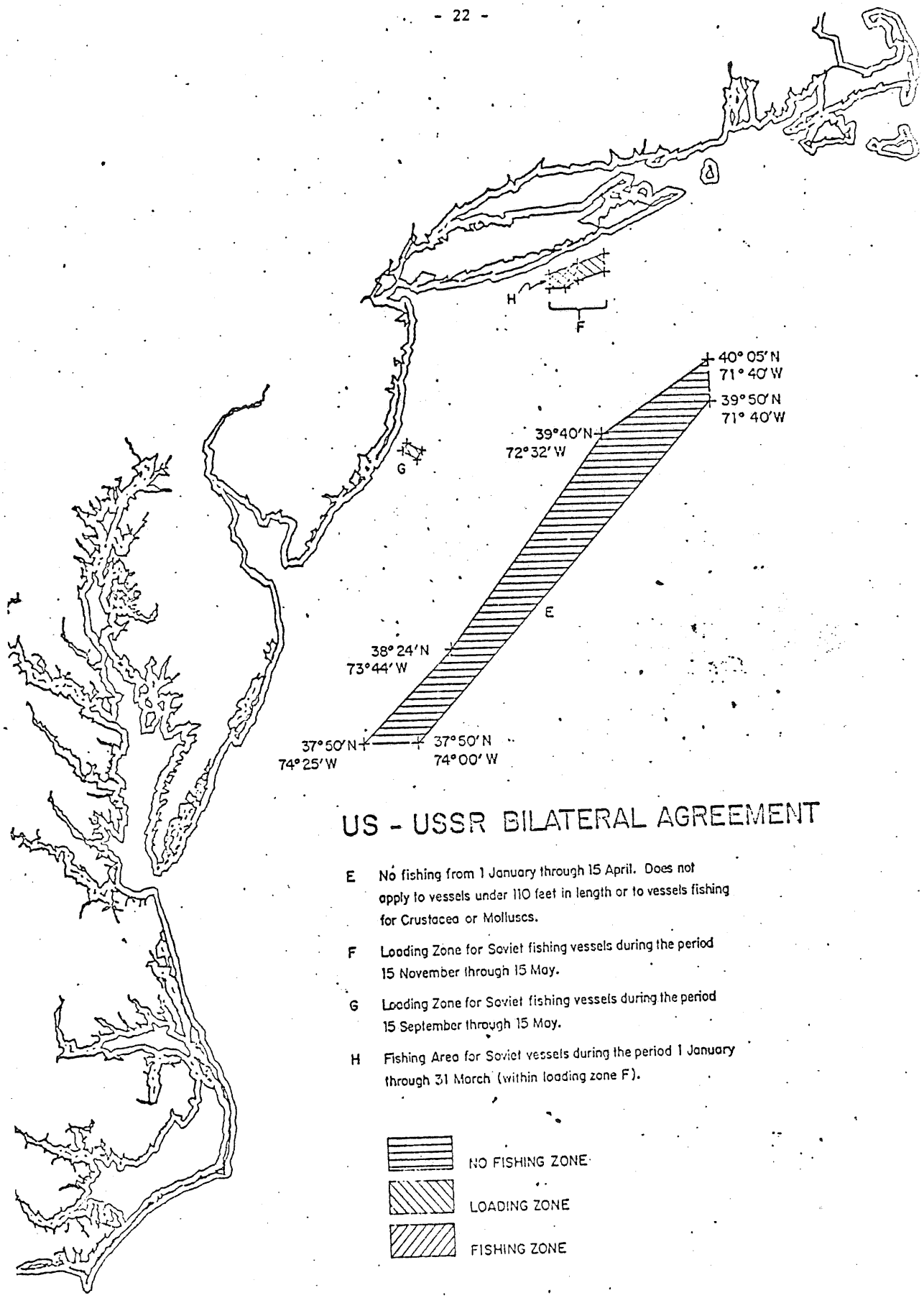

H
F
40° 05′ N
71° 40′ W
39° 50′ N
71° 40′ W
39°40′N
72°32′ W
G
E
38° 24′ N
73°44′ W
37°50′N
74°25′ W
37°50′ N
74°00′ W
US - USSR BILATERAL AGREEMENT
E No fishing from 1 January through 15 April. Does not apply to vessels under 110 feet in length or to vessels fishing for Crustacea or Molluscs.
F Loading Zone for Soviet fishing vessels during the period 15 November through 15 May.
G Loading Zone for Soviet fishing vessels during the period 15 September through 15 May.
H Fishing Area for Soviet vessels during the period 1 January through 31 March (within loading zone F).
NO FISHING ZONE
LOADING ZONE
FISHING ZONE
34° N

Fig. 3.2.

IV. SURVEY RESULTS

Figure 4.1. Groundfish survey sampling strata.

4.2. Typical groundfish survey pattern.

Table 4.1. Stratified mean catch (pounds) per standard haul on research vessel surveys from Cape Hatteras to Cape Cod (sampling strata 1-12, 61-76 combined).

4.2. Stratified mean catch (pounds) per standard haul on research vessel surveys in the Mid-Atlantic (Cape Hatteras to Hudson Canyon; sampling strata 1-4, 61-76 combined).

4.3. Stratified mean catch (pounds, log scale) per standard haul on research vessel surveys from Cape Hatteras to Cape Cod (sampling strata 1-12, 61-76 combined).

4.4. Stratified mean catch (number, log scale) per standard haul on research vessel surveys from Cape Hatteras to Cape Cod (sampling strata 1-12, 61-76 combined).

Figure 4.3. Distributional pattern for silver hake, mackerel, alewife, and sea herring, spring surveys.

4.4. Distributional pattern for squid, yellowtail, silver hake, and red hake, spring surveys.

4.5. Distributional pattern for yellowtail, mackerel, and sea herring, spring surveys.

4.6. Distributional pattern for yellowtail, silver hake, and red hake, spring surveys.

4.7. Distributional pattern for haddock, cod, and silver hake, fall surveys.

4.8. Distributional pattern for yellowtail, mackerel, and sea herring, fall surveys.

4.9. Distributional pattern for yellowtail, silver hake, and red hake, fall surveys.

Table 4.1. Stratified mean catch (pounds) per standard haul on research vessel surveys from Cape Hatteras to Cape Cod (sampling strata 1-12, 61-76 combined)

SPECIES	Oct'67 US	Oct'67 USSR	Mar'68 US	Oct'68 US	Oct'68 USSR	Mar'69 US	Oct'69 US	Oct'69 USSR	Mar'70 US	Oct'70 US	Oct'70 USSR	Mar'71 US	Sep'71 US	Sep'71 USSR	Mar'72 US	Sep'72 US	Sep'72 USSR
Sea herring	0.6	0.2	18.7	0.1	1.0	9.9	0	0.1	2.9	0	0	0.8	0	0	1.1		
Mackerel	1.3	1.7	17.8	0.4	0.2	0.2	4.6	17.0	7.3	0.04	1.3	10.7	0.1	1.0	5.2		
Alewife	1.7	0.4	6.6	0.1	0.2	5.2	0	0.2	6.7	0.2	0.08	2.7	.02	0.5	1.5		
Butterfish	6.3	11.1	6.0	23.2	36.7	8.8	11.8	161.8	1.5	6.7	26.1	2.3	12.0	46.0	20.5		
Red hake	3.4	29.2	3.3	6.2	11.2	2.2	6.2	32.5	3.2	4.8	9.6	7.0	4.4	45.9	7.4	8.0	
Silver hake	6.2	50.8	10.8	6.9	60.8	5.8	2.9	60.0	3.0	3.2	14.6	5.8	5.8	51.4	3.6	5.3	
Yellowtail	17.8	16.5	29.5	19.0	19.9	21.6	18.6	23.0	17.9	16.5	11.1	14.2	9.4	26.4	16.1	32.2	
Blackback	3.5	7.8	0.9	2.5	4.9	3.9	2.2	8.3	1.7	2.9	1.4	0.8	1.3	3.2	0.8	3.7	
Fluke	2.2	1.2	0.4	1.7	0.4	0.4	1.1	2.5	0.2	0.2	0.3	0.6	0.5	0.6	0.4		
Scup	3.4	4.0	5.2	1.2	4.2	0.9	10.4	11.5	7.0	0.5	1.2	5.6	0.6	4.0	5.3		

Table 4.2. Stratified mean catch (pounds) per standard haul on research vessel surveys in the Mid-Atlantic (Cape Hatteras to Hudson Canyon; sampling strata 1-4, 61-76 combined)

SPECIES	Oct'67		Mar'68	Oct'68		Mar'69	Oct'69		Mar'70	Sep'70		Mar'71	Sep'71		Mar'72	Sep'72	
	US	USSR	US	US	USSR	US	US	USSR	US	US	USSR	US	US	USSR	US	US	USSR
Sea herring	0	0	17.3	0	0	14.3	6.9	0	1.3	0	0	1.0	0	0	0.8		
Mackerel	1.7	1.3	27.0	0.2	0.02	0.3	0	0.1	8.1	.02	1.7	16.1	.02	0.0	1.9		
Alewife	0	0	8.1	0	0	6.9	0	0	9.3	0	0	1.9	0	0	0.7		
Butterfish	7.6	16.0	2.4	30.6	12.1	0.4	10.7	219.8	1.8	8.6	34.1	3.4	9.4	41.3	30.2		
Red hake	0.8	12.6	2.1	2.8	8.8	1.6	2.0	20.0	1.0	1.0	3.6	2.2	1.4	12.8	8.3	7.4	
Silver hake	4.8	37.1	12.6	3.3	37.8	6.0	1.0	21.7	2.1	0.9	8.1	5.2	1.5	19.4	3.1	1.5	
Yellowtail	13.0	15.0	23.9	18.9	23.8	19.5	13.9	19.8	15.8	14.3	2.5	11.1	5.3	20.5	14.0	29.4	
Blackback	4.0	10.2	5.4	2.6	1.3	0.3	1.6	6.5	0.7	0.6	0.4	0.1	1.0	1.6	0.1	0.6	
Fluke	3.1	1.8	0.4	2.6	0.6	0.5	1.2	3.4	0.3	0.3	0	0.9	0.7	0.2	0.7		
Scup	4.8	4.8	8.0	1.3	3.7	1.4	13.2	15.0	10.6	0.2	.01	8.6	0.4	1.0	8.2		

Table 4.3. Stratified mean catch (pounds, log scale) per standard haul on research vessel surveys from Cape Hatteras to Cape Cod (sampling strata 1-12, 61-76 combined)

SPECIES	Oct'67 US	Oct'67 USSR	Mar'68 US	Oct'68 US	Oct'68 USSR	Mar'69 US	Oct'69 US	Oct'69 USSR	Mar'70 US	Sep-Oct'70 US	Sep-Oct'70 USSR	Mar'71 US	Sep'71 US	Sep'71 USSR	Mar'72 US	Sep'72 US	Sep'72 USSR
Sea herring	0.19	0.08	1.46	0.07	0.20	0.77	.00	0.04	0.61	0.00	0.00	0.28	0.00	0.00	0.23		
Mackerel	0.19	0.21	0.77	0.10	0.11	0.04	0.14	0.47	0.64	0.02	0.11	0.58	0.06	0.09	0.45	0.02	0.12
Alewife	0.35	0.11	0.84	0.06	0.11	0.99	0.01	0.13	0.51	0.07	0.04	0.53	0.01	0.06	0.34	0.01	0.06
Butterfish	0.75	0.57	0.27	0.96	1.12	0.22	0.96	1.70	0.24	0.46	0.79	0.32	0.79	1.49	0.48	0.54	1.21
Red hake	0.70	1.59	0.69	0.67	1.36	0.49	0.79	1.54	0.80	0.80	1.09	0.72	0.73	1.70	0.70	0.70	0.71
Silver hake	1.17	2.24	1.15	1.38	2.69	1.01	0.78	2.35	0.78	0.85	1.63	1.02	1.00	2.45	0.82	0.82	1.39
Yellowtail	1.71	1.41	2.19	1.57	1.29	1.96	1.52	1.44	1.87	1.18	0.86	1.54	0.92	1.14	1.67	0.98	0.66
Blackback	0.78	1.04	0.28	0.60	0.44	0.44	0.51	0.92	0.35	0.44	0.29	0.20	0.41	0.60	0.21	0.47	0.17
Fluke	0.41	0.31	0.12	0.38	0.15	0.11	0.35	0.55	0.10	0.08	0.07	0.18	0.18	0.10	0.18	0.18	0.02
Scup	0.44	0.73	0.14	0.24	0.38	0.01	0.64	0.77	0.36	0.11	0.14	0.16	0.16	0.38	0.38	0.56	0.45

Table 4.4. Stratified mean catch (number, log scale) per standard haul on research vessel surveys from Cape Hatteras to Cape Cod (sampling strata 1-12, 61-76 combined)

SPECIES	Oct'67 US	Oct'67 USSR	Mar'68 US	Oct'68 US	Oct'68 USSR	Mar'69 US	Oct'69 US	Oct'69 USSR	Mar'70 US	Sep-Oct'70 US	Sep-Oct'70 USSR	Mar'71 US	Sep'71 US	Sep'71 USSR	Mar'72 US	Sep'72 US	Sep'72 USSR
Sea herring	0.31	0.14	2.19	0.17	0.28	1.36	.01	0.08	1.19	0.01	0.00	0.61	0.01	0.00	0.43		
Mackerel	0.35	0.43	1.38	0.13	0.12	0.13	0.19	0.61	0.85	0.03	0.21	0.80	0.11	0.16	0.69		
Alewife	0.55	0.19	1.79	0.12	0.20	1.84	0.05	0.17	0.91	0.14	0.12	1.16	0.04	0.07	0.63		
Butterfish	1.73	1.29	0.57	2.16	2.29	0.48	2.34	3.19	0.60	1.13	1.46	0.85	2.24	3.49	1.31		
Red hake	0.95	1.99	0.93	0.91	1.73	0.89	1.03	1.82	1.36	1.14	1.52	1.16	1.23	2.36	0.98		
Silver hake	2.11	3.09	2.51	2.52	3.67	1.80	1.98	2.87	1.97	2.16	2.63	2.17	2.13	3.41	1.59		
Yellowtail	2.08	1.80	2.58	1.97	1.56	2.45	1.84	1.72	2.23	1.49	1.08	1.87	1.21	1.43	1.93		
Blackback	0.93	1.21	0.40	0.77	0.53	0.56	0.61	1.08	0.38	0.53	0.32	0.26	0.53	0.73	0.29		
Fluke	0.32	0.27	0.08	0.29	0.13	0.09	0.23	0.36	0.07	0.06	0.07	0.12	0.15	0.07	0.19		
Scup	0.79	1.22	0.21	0.52	0.73	0.03	1.15	1.23	0.73	0.23	0.27	0.31	0.44	0.66	0.57		

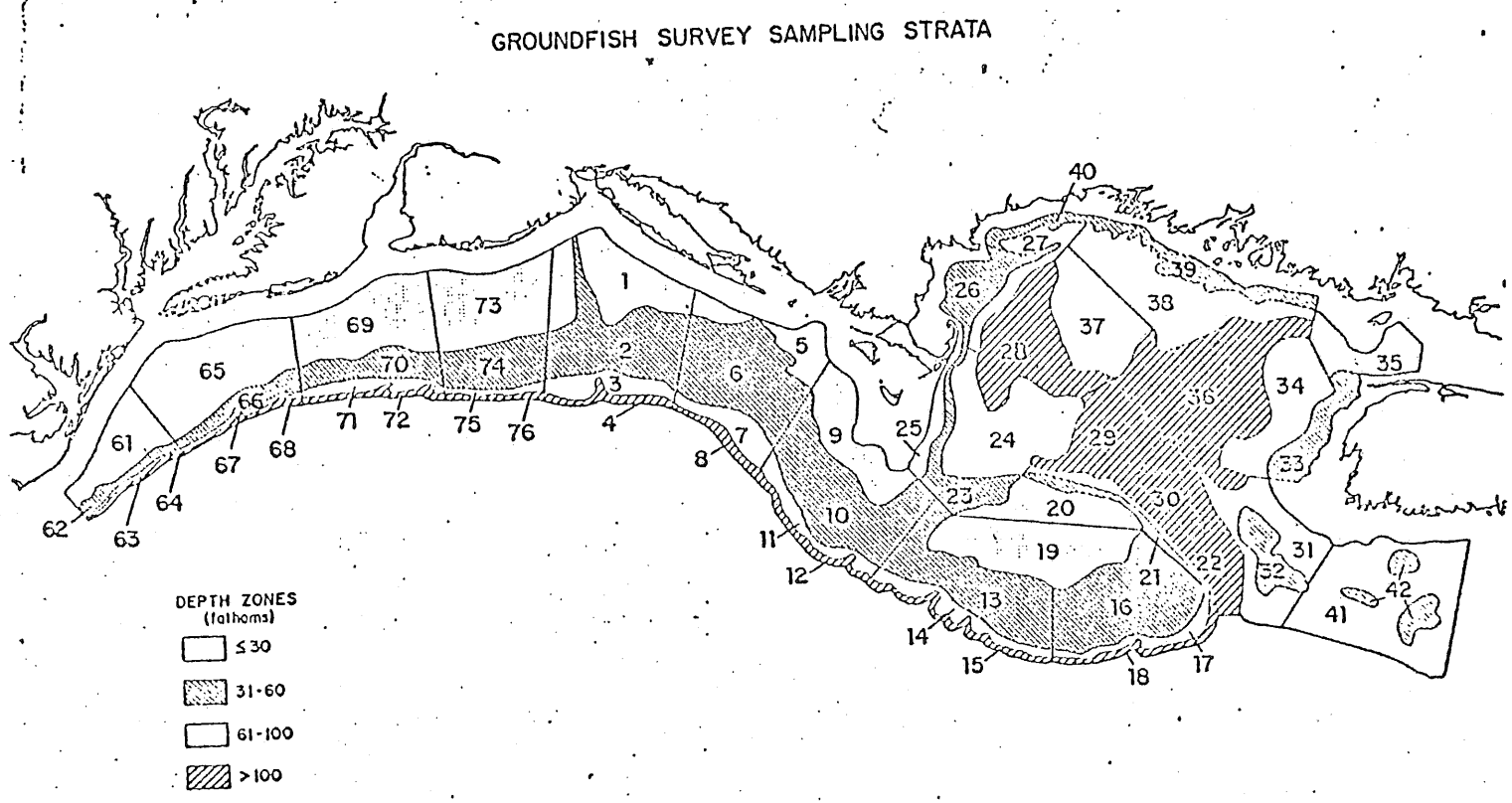

GROUNDFISH SURVEY SAMPLING STRATA
DEPTH ZONES
(fathoms)
≤30
31-60
61-100
>100

Fig. 4.1.

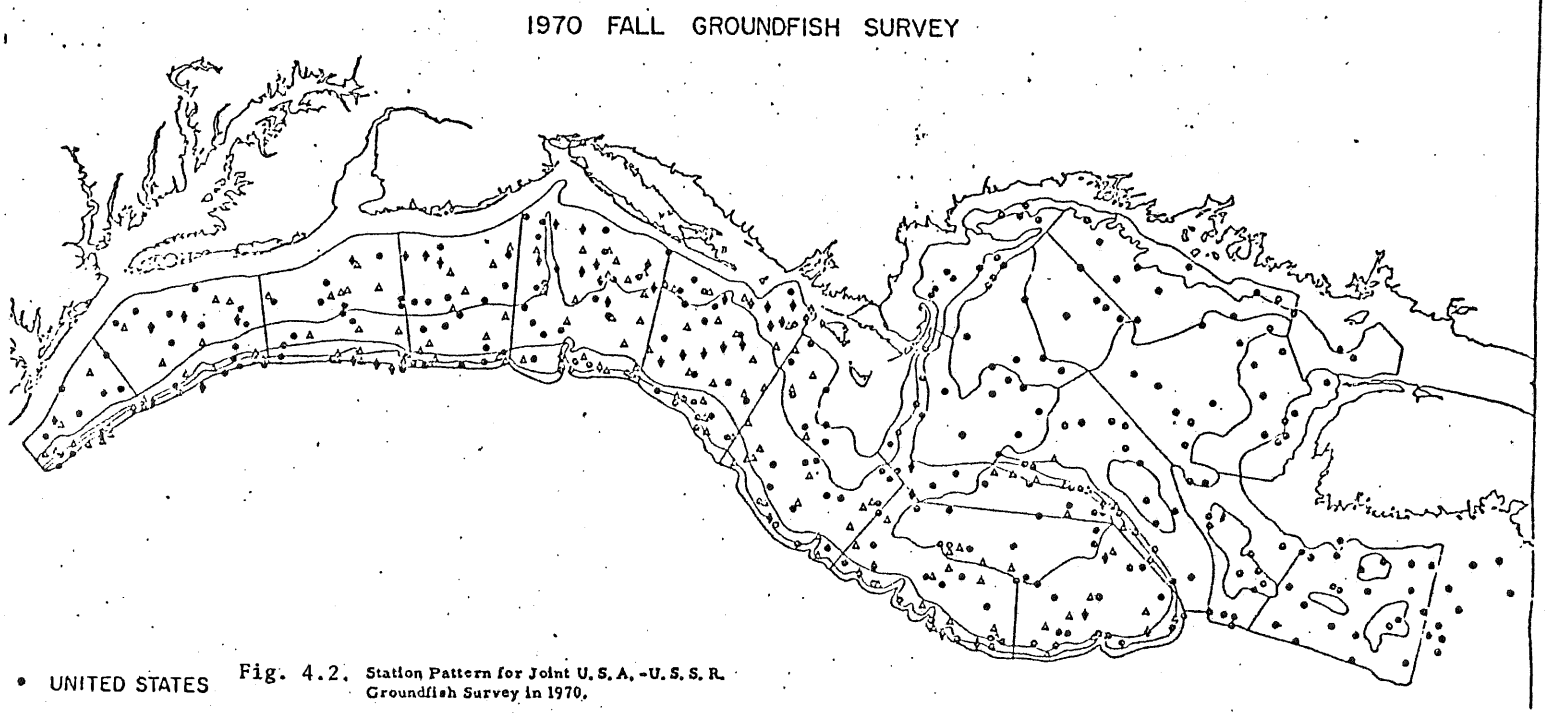
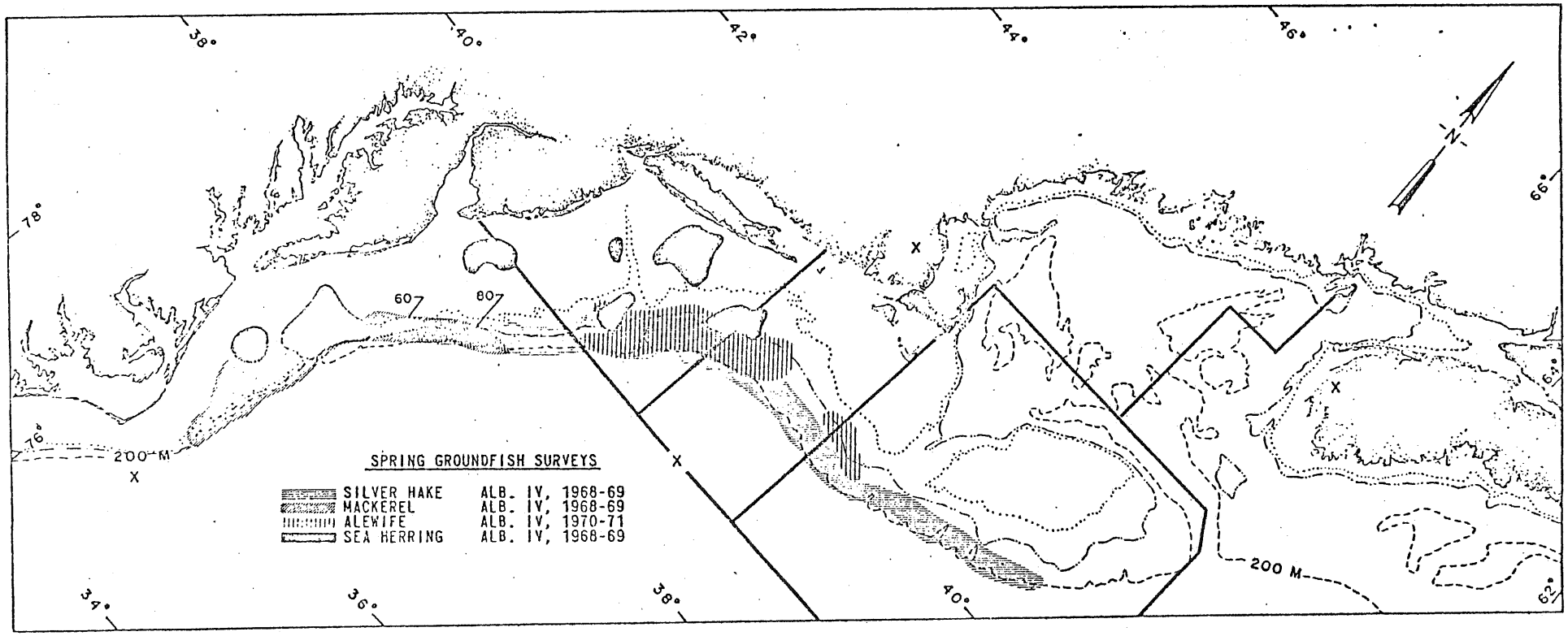


Fig. 4.2. Station Pattern for Joint U.S.A.-U.S.S.R. Groundfish Survey in 1970.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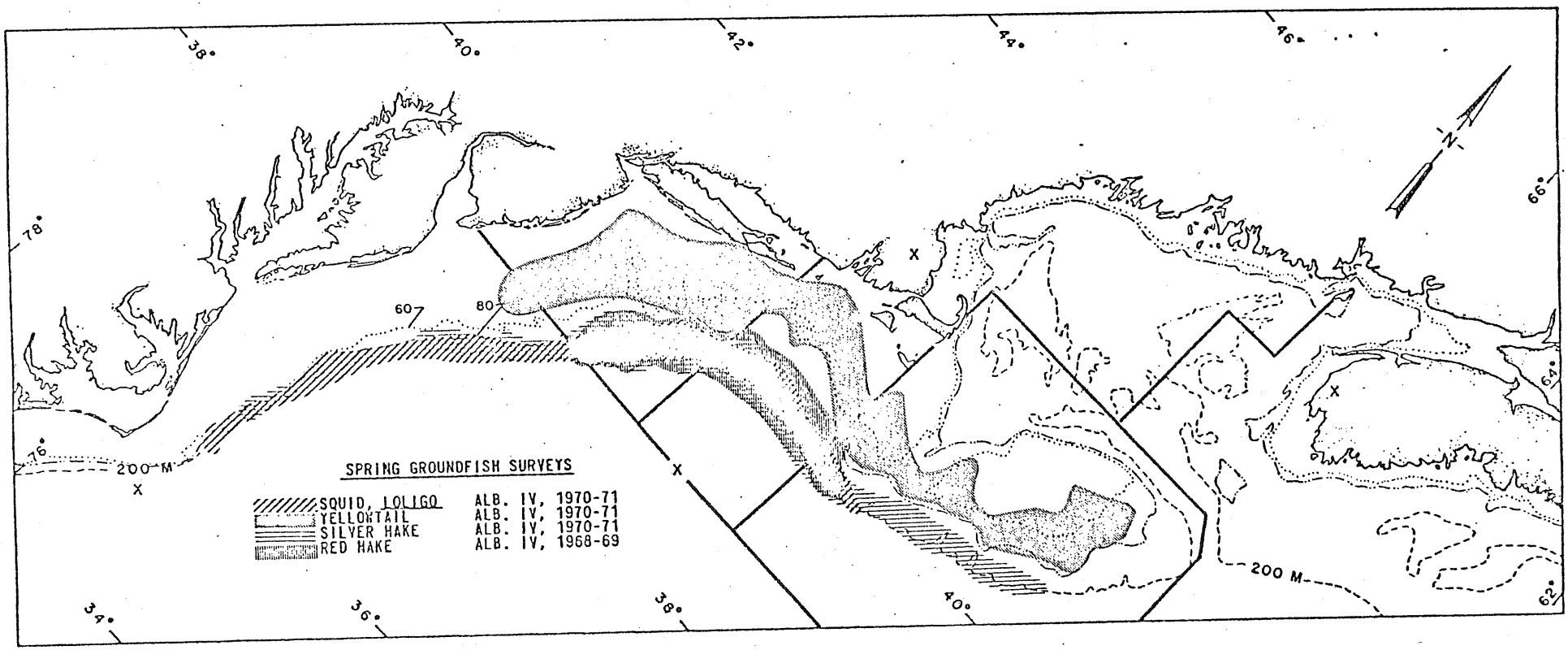
SPRING GROUNDFISH SURVEYS
SILVER HAKE ALB. IV, 1968-69
MACKEREL ALB. IV, 1968-69
ALEWIFE ALB. IV, 1970-71
SEA HERRING ALB. IV, 1968-69

Figure 4.3.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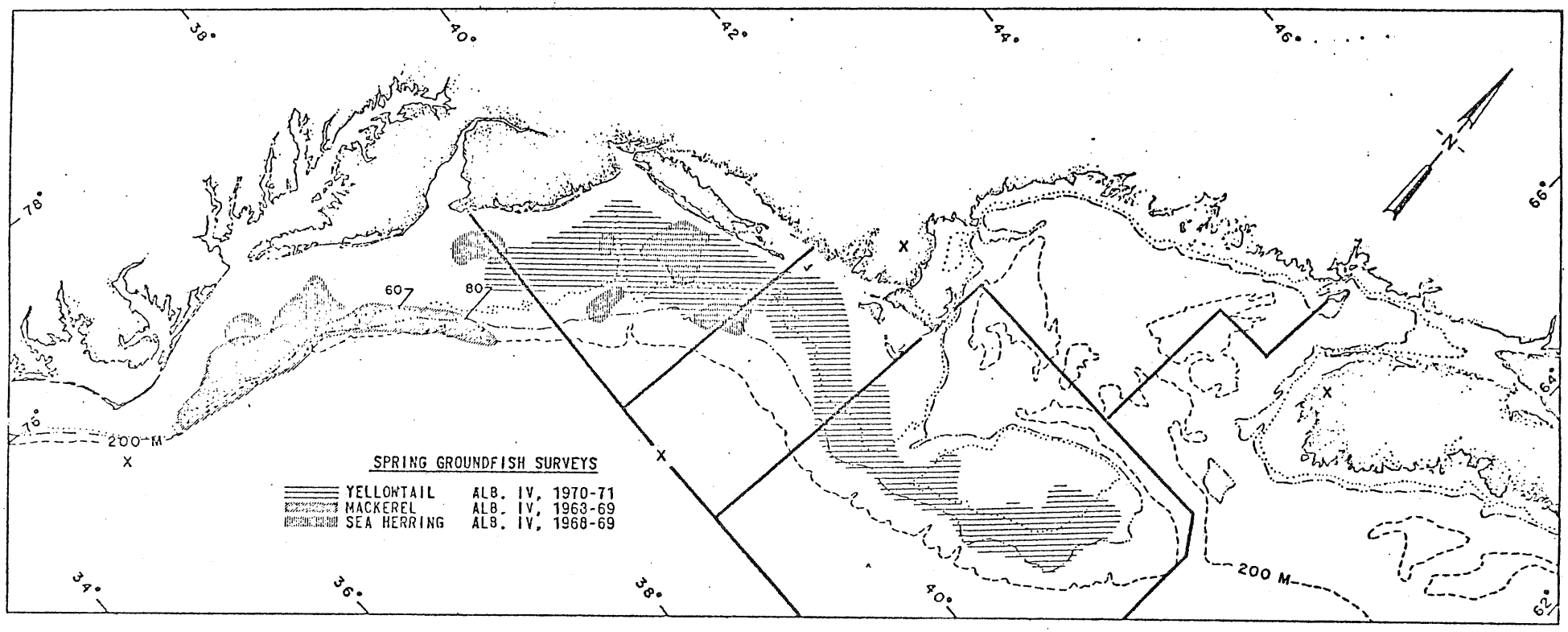
SPRING GROUNDFISH SURVEYS
SQUID, LOLIGO ALB. IV, 1970-71
YELLOWTAIL ALB. IV, 1970-71
SILVER HAKE ALB. IV, 1970-71
RED HAKE ALB. IV, 1968-69

Figure 4.4.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SPRING GROUNDFISH SURVEYS
YELLOWTAIL ALB. IV, 1970-71
MACKEREL ALB. IV, 1963-69
SEA HERRING ALB. IV, 1968-69

Figure 4.5

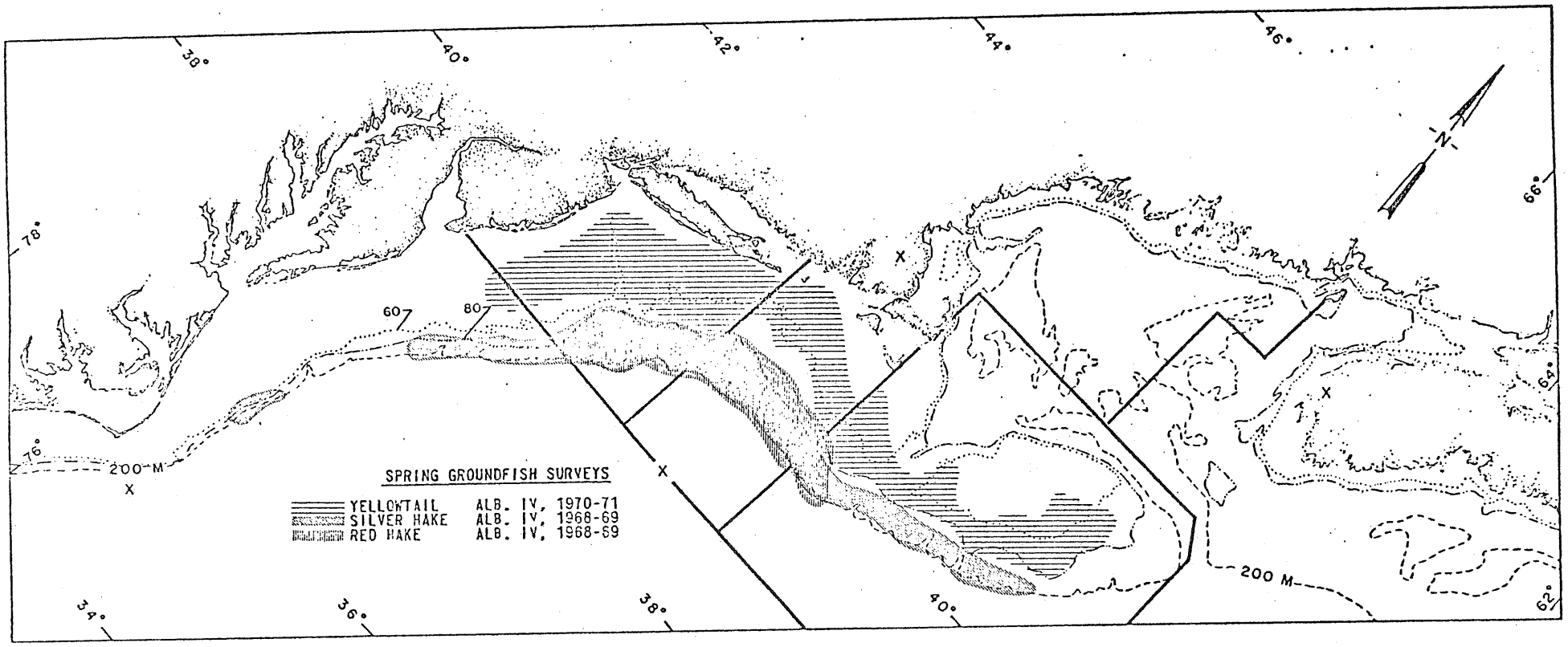
SPRING GROUNDFISH SURVEYS
YELLOWTAIL ALB. IV, 1970-71
SILVER HAKE ALB. IV, 1968-69
RED HAKE ALB. IV, 1968-69
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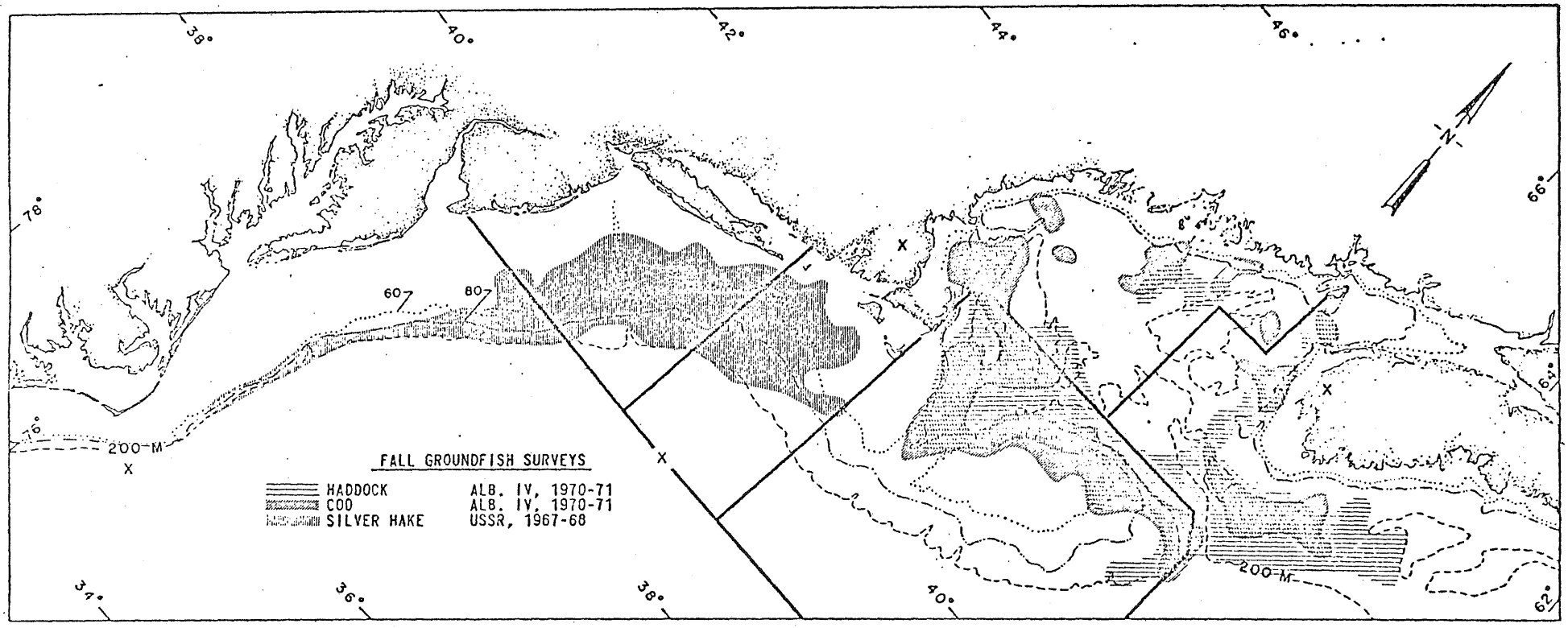
Figure 4.6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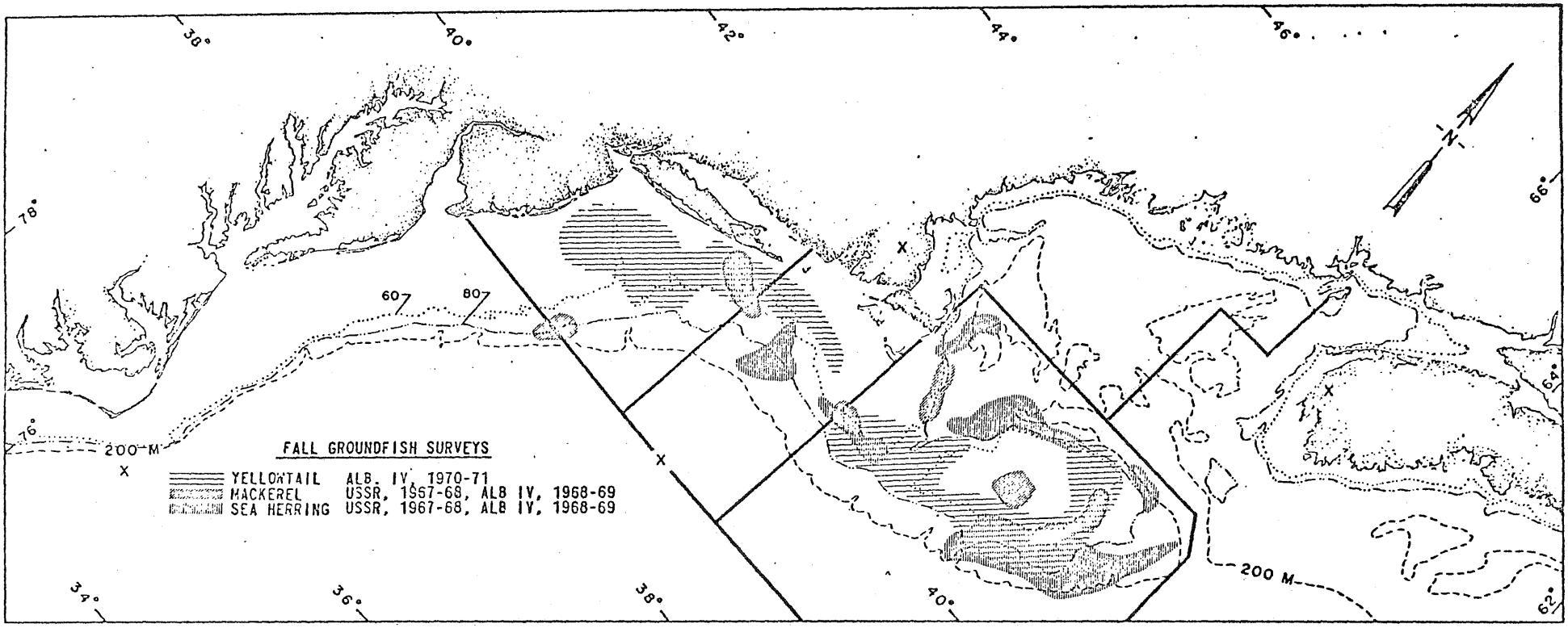
FALL GROUNDFISH SURVEYS
HADDOCK ALB. IV, 1970-71
COD ALB. IV, 1970-71
SILVER HAKE USSR, 1967-68

Figure 4.7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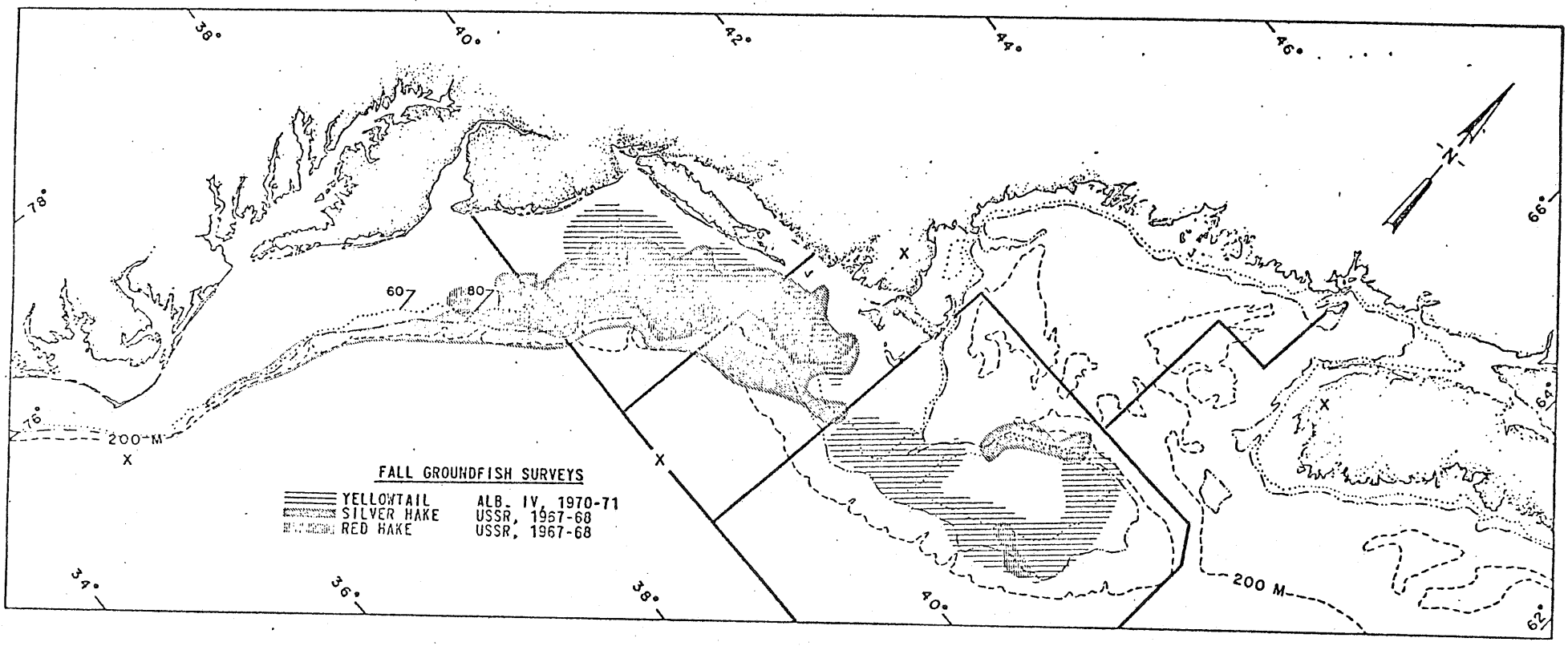
FALL GROUNDFISH SURVEYS
YELLOWTAIL ALB. IV, 1970-71
MACKEREL USSR, 1967-68, ALB IV, 1968-69
SEA HERRING USSR, 1967-68, ALB IV, 1968-69

Figure 4.8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FALL GROUNDFISH SURVEYS
YELLOWTAIL ALB. IV, 1970-71
SILVER HAKE USSR, 1967-68
RED HAKE USSR, 1967-68

Figure 4.9

V. STATUS OF STOCKS

A. Mackerel

It is probable that one mackerel stock occupies both Subarea (SA) 5 and 6, extending from the Gulf of Maine and Georges Bank to the Middle Atlantic. This stock winters offshore in the southern part of the Mid-Atlantic region. Principal USSR landings of mackerel from Div. 6C occur in January-March, and U. S. survey catches of mackerel in March are in deeper waters from Delaware Bay to Hatteras (Figure 4.5). About mid-April, mackerel begin moving inshore, and begin spawning and moving northward. Spawning usually continues through June by which time the stock is off southern New England; eggs and larvae are found all the way from the edge of the shelf to the mouths of estuaries but they appear most abundant near shore (Figures A-5, A-6). In autumn (October) mackerel are found chiefly in shoal waters on Georges Bank, and in southern New England (Figure 4.8), and soon thereafter they move southward and offshore to deeper waters.

Total landings increased exponentially in recent years (Table A-1, Figures A-1, A-2, A-3), going from 2,500 metric tons (MT) in SA 5 and 6 in 1963 to 349,000 MT in 1971. Landings in 1971 were 116,400 MT in SA 5 and 232,300 MT in SA 6. United States landings in SA 5 and 6 were 1,300 MT in 1963, peaked at 4,400 MT in 1969, and declined to 2,400 MT in 1971. The USSR increased its landings from 627 MT in 1964 to 127,800 MT in 1971. Landings by other nations, particularly Poland, East German, and Bulgaria, have also increased dramatically in recent years, going from 945 MT in 1967 to 80,500 MT in 1970 and 218,500 MT in 1971.

The increase in mackerel landings can be attributed to an apparent increase in recruitment, as well as to a diversion of fishing effort onto mackerel from declining sea herring stocks. Landings have been dominated by fish from the strong 1966 and 1967 year classes. USSR catches in SA 5 were comprised of 96 percent 2-3 year-olds in 1969, 82 percent 3-4 year-olds in 1970, and 75 percent 4-5 year-olds in 1971. Data do not indicate any particularly strong year classes since 1967, so the stock cannot continue to support the present level of landings nor further increases in landings without improved recruitment. Based on average historical landings it is quite likely that removals have already reached or exceeded the level of maximum sustained yield.

Commercial catch/effort data of the USSR and Poland provide an indication of a decline in stock abundance from 1968-1971 (Figure A-1). U. S. survey cruise data have documented the strong 1966 and 1967 year classes and also show a tendency for a decline in abundance since 1967 (Figure A-4).

Present data suggest that the mackerel stock is exploited very heavily and may possibly be overexploited now. It is strongly recommended that consideration be given to placing immediate curbs on removals.

Table A-1. Mackerel landings (metric tons) in ICNAF Subareas 5 and 6.

Year	U.S.	U.S.S.R.	Poland	Romania	Bulgaria	West Germany	East Germany	Japan	Canada	Spain	Cuba	Non-Member	Total
						Subarea 5							
1963	1,202	896	-	-	-	-	-	-	-	-	-	-	2,098
1964	1,264	533	-	-	-	-	-	-	-	-	-	-	1,797
1965	1,467	2,475	1	-	-	-	-	-	-	-	-	11	3,954
1966	1,903	5,446	6	-	-	-	-	-	-	-	-	3	7,358
1967	3,216	11,907	507	138	-	90	-	-	-	-	-	48	15,906
1968	3,001	33,961	10,160	283	-	119	-	1	-	-	-	3,252	50,777
1969	3,873	47,547	13,421	140	2,083	89	3,454	197	-	-	-	253	71,057
1970	3,092	56,457	40,987	758	4,007	1,004	4,999	463	-	-	-	-	111,767
1971	1,593	59,074	43,682	1,774	1,632	1,175	7,090	272	-	3	145	-	116,440
						Subarea 6							
1963	118	293	-	-	-	-	-	-	-	-	-	-	411
1964	380	94	-	-	-	-	-	-	-	-	-	-	474
1965	531	53	-	-	-	-	-	-	-	-	-	-	584
1966	821	1,252	-	-	-	-	-	-	-	-	-	-	2,073
1967	675	6,087	-	-	-	-	-	-	-	-	-	163	6,925
1968	928	7,333	448	-	-	2	-	-	16	-	-	158	8,885
1969	491	37,563	4,977	-	-	-	-	-	-	-	-	-	43,031
1970	957	68,026	27,153	-	-	45	-	1,037	-	-	-	-	97,218
1971	809	68,754	68,612	2,742	26,875	1,620	62,083	753	-	47	-	-	232,295
						Total							
1963	1,320	1,189	-	-	-	-	-	-	-	-	-	-	2,509
1964	1,644	627	-	-	-	-	-	-	-	-	-	-	2,271
1965	1,998	2,528	1	-	-	-	-	-	-	-	-	11	4,538
1966	2,724	6,698	6	-	-	-	-	-	-	-	-	3	9,431
1967	3,891	17,994	507	138	-	90	-	-	-	-	-	211	22,831
1968	3,929	41,294	10,608	283	-	121	-	1	16	-	-	3,410	59,662
1969	4,364	85,110	18,398	140	2,083	89	3,454	197	-	-	-	253	114,088
1970	4,049	124,483	68,140	758	4,007	1,049	4,999	1,500	-	-	-	-	208,985
1971	2,402	127,828	112,294	4,516	28,507	2,795	69,173	1,025	-	3	145	-	348,735

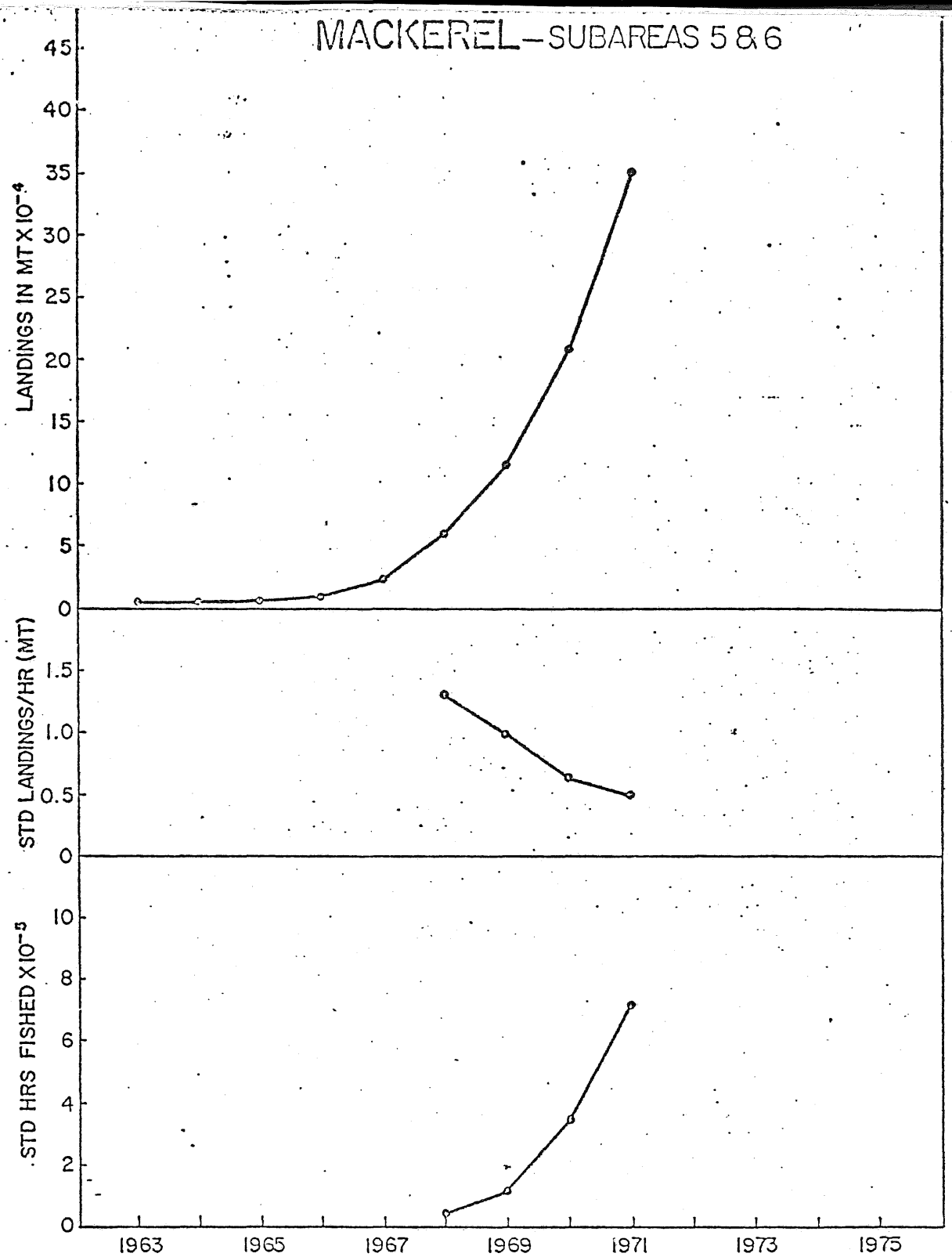


Figure A-1. Landings, standardized catch per effort, and standardized fishing effort for the ICNAF Subarea 5 and 6 mackerel stock. Standardized catch per effort determined from U.S.S.R. and Polish statistics.

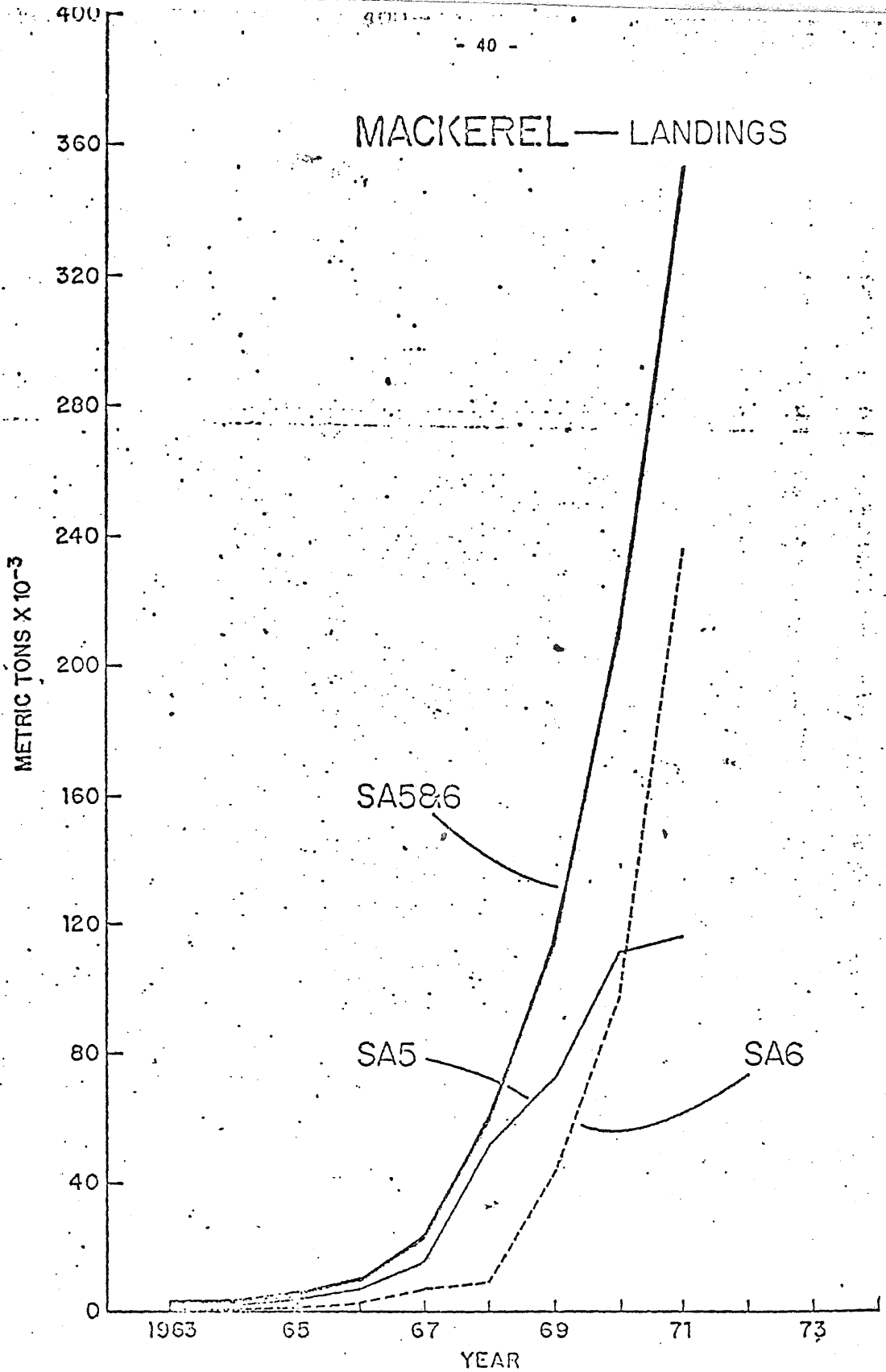


Figure A-2. Mackerel landings in ICNAF Subareas 5 and 6.

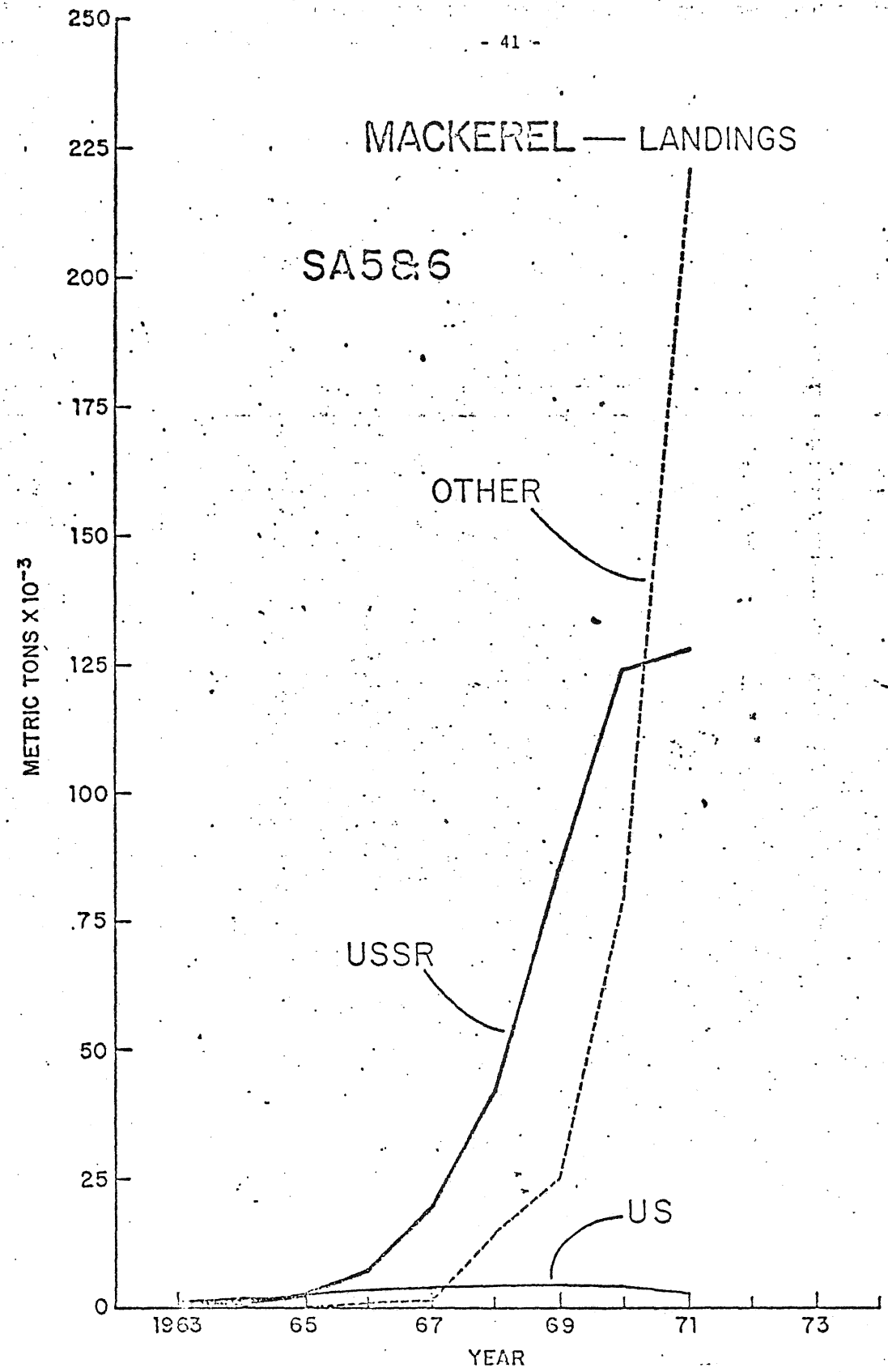
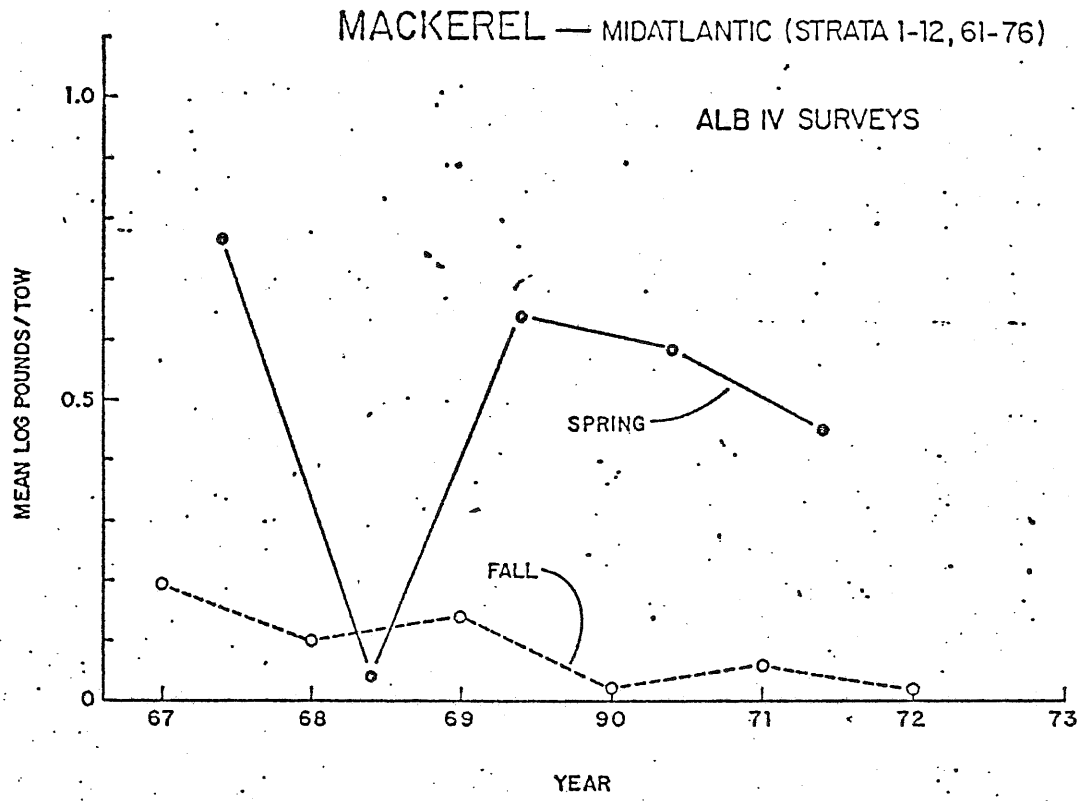


Figure A-3. United States and foreign countries landings of mackerel for the Georges Bank-Middle Atlantic stock.



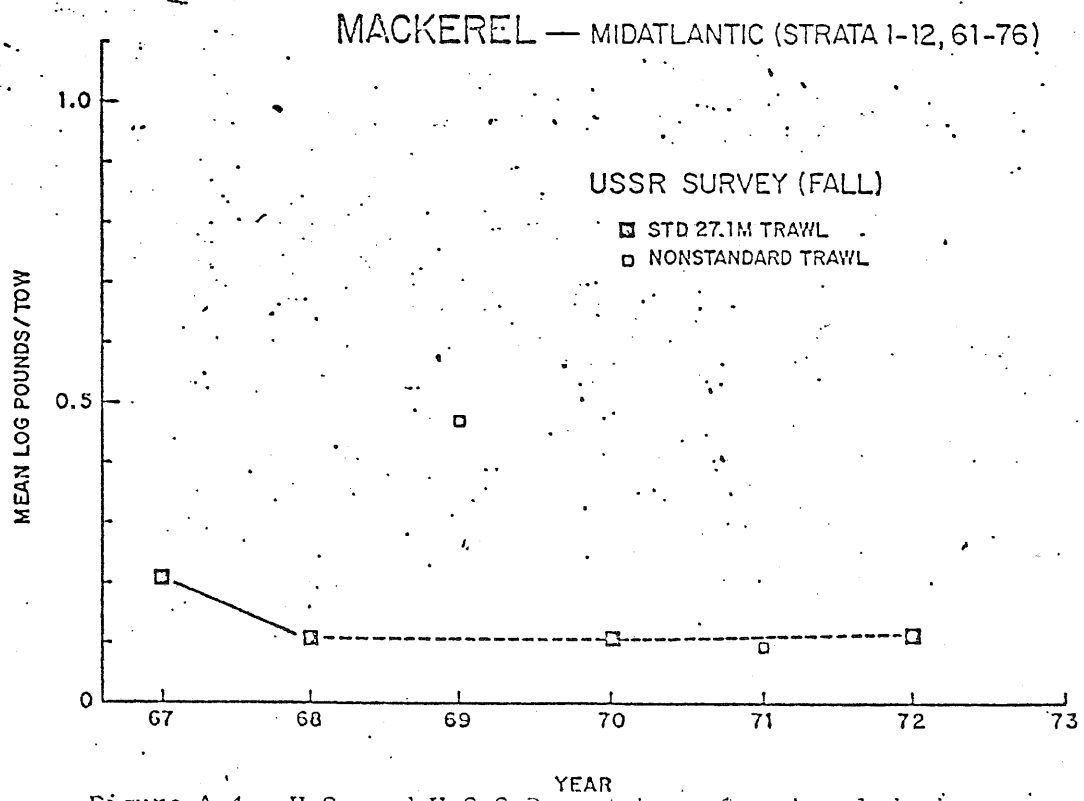
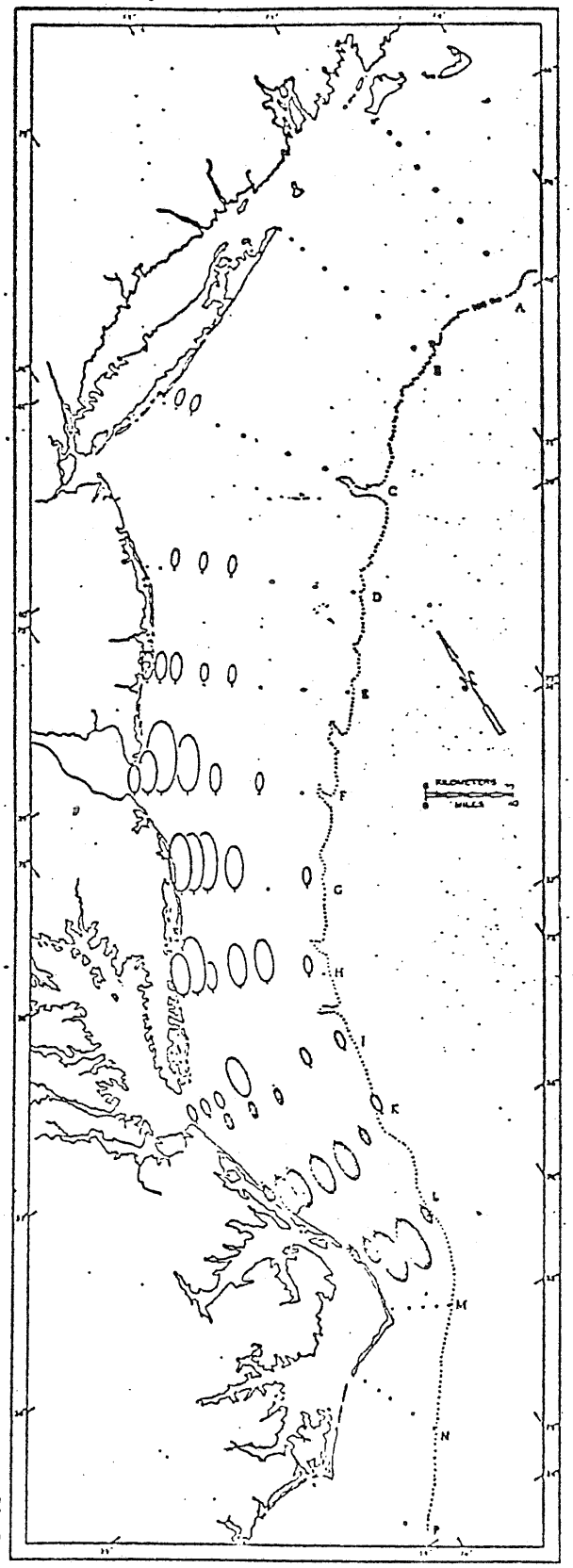


Figure A-4. U.S. and U.S.S.R. catches of mackerel during research vessel surveys.



Atlantic mackerel taken by Gulf V nets,

R.V. Dolphin

Cruise D-66-5

May 12 to 24, 1966

Eggs. — open symbols

Larvae — closed symbols

Number of Eggs or Larvae per station

1 to 10

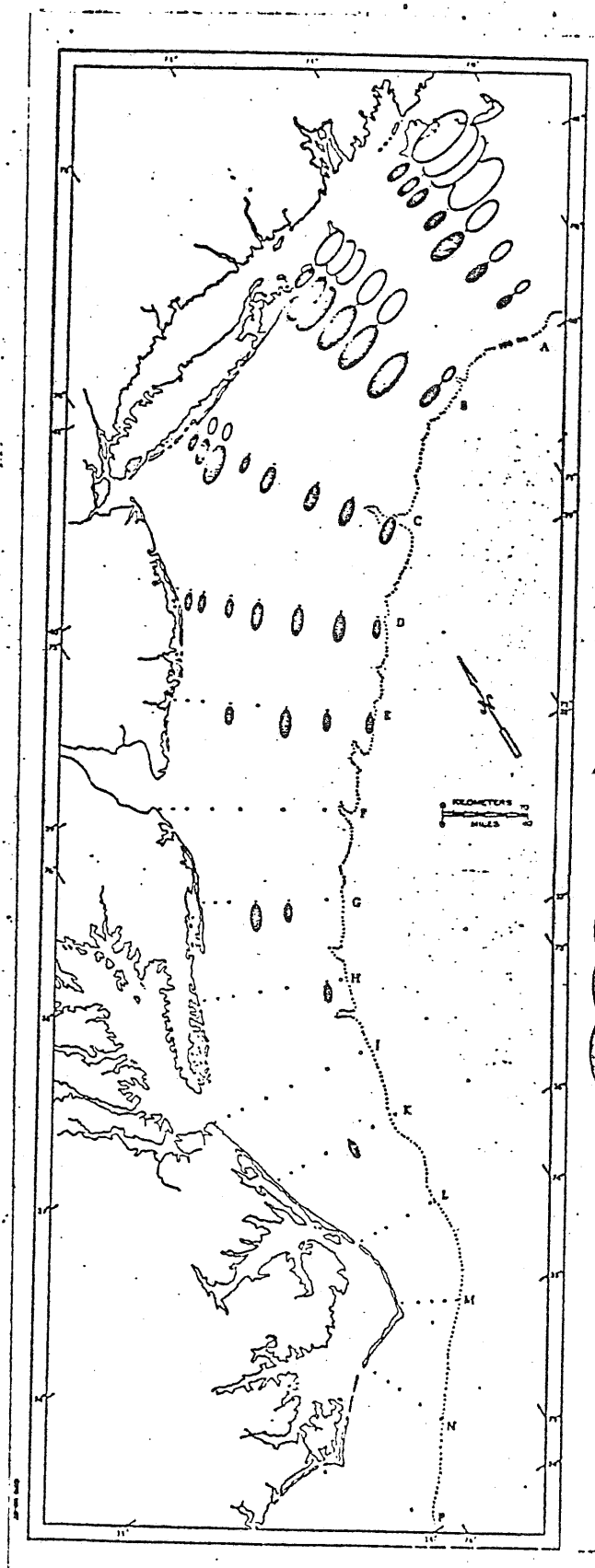
11 to 100

101 to 250

251 to 1000

1000+

Fig. A.5.



Atlantic mackerel taken by Gulf V nets, aboard R.V. Dolphin

Cruise D-66-7

June 17 to 29, 1966

Eggs - open symbols

Larvae - closed symbols

Number of Eggs or Larvae per station

1 to 10
11 to 100
101 to 250
251 to 1000
1000+

Fig. A.6.

B. Sea Herring

One stock of sea herring appears to exist on the Georges Bank - Middle Atlantic fishing grounds. In the fall the stock moves onto the northeast slope of Georges Bank to spawn (late September or early October). In late October, the herring move westward toward the Great South Channel and by late November are near the Nantucket Shoals. In December the stock moves south and is off New York and New Jersey by late December, over-wintering south of New Jersey during January and February. In March and April the stock begins to move back toward Georges Bank. Some fishing takes place during the winter months but the major fishing occurs on Georges Bank from April through November.

The offshore herring fishery first began in 1961 by the U.S.S.R., and its development was highly dependent upon the recruitment of two very strong year classes, 1960 and 1961. These two year classes provided 58 percent of the catch by number from 1964 to 1966 and 24 percent of the catch from 1967 to 1969. Subsequent year classes recruiting to the fishery have been very weak. The entry of Poland into the fishery in 1966, and West Germany and others in 1967, caused fishing effort to increase rapidly, tripling from 1967 to 1968 and greatly exceeding the optimum level of effort for the herring fishery. Landings increased rapidly with increasing effort reaching a peak of 373,000 metric tons in 1968, and then declining to 267,000 tons in 1971. (Table B-1, Figure B-1). With increased fishing effort and declining recruitment the herring stock declined drastically from 1964 to 1969. The decline in abundance was documented by catch/effort statistics of the commercial fleets and can be clearly seen in Albatross IV spring survey data (Figure B-1).

Catch quotas were recommended in 1972 on the basis of maintaining stock size and regulating fishing mortality so as not to exceed 0.5 (based on yield per recruit considerations). A catch quota of 90,000 metric tons was recommended to prevent a further stock decline assuming constant recruitment. A catch of 70,000 metric tons was suggested to allow for a possible 25 percent reduction in recruitment, and 50,000 metric tons was specified for allowing a slight increase in the stock and increasing the probability of achieving adequate long-term recruitment. A catch quota of 150,000 metric tons was accepted by the ICNAF Commission, however, which if achieved in 1972, will almost certainly reduce the stock size further, since indications are that recruitment in 1972 will be poor. Quotas for 1973 are currently being negotiated.

Although the bulk of sea herring are caught in 5Z, there are substantial quantities (40,000 tons) landed in SA 6 (Table B-1) and it should be noted that in the spring the distribution of sea herring overlaps that of mackerel, alewife, blueback, and yellowtail in the bilateral area (Figures 4-3, 4-5). The maximum catch of river herring (10,000 tons reported) by U.S.S.R. in SA 6 occurred in 1969, the same year when Soviet vessels also took the maximum catch (38,000 tons) of sea herring, and when the U.S.S.R. mackerel landings first became substantial (38,000 tons).

Table B-1. Sea herring landings (metric tons) in Division 5Z and Statistical Area 6.[1/]

		Canada	Ger(FR)	Iceland	Japan	Poland	Romania	USSR	USA	Ger(DR)	Bulgaria	Total		
1961	5Z							67,550	105			67,655	5Z	1961
	6												6	
	Total												Total	
1962	5Z					277		151,144	101			151,522	5Z	1962
	6												6	
	Total												Total	
1963	5Z							97,102	205			97,307	5Z	1963
	6							544	117			661	6	
	Total							97,646	322			97,968	Total	
1964	5Z					35		130,723	268			131,026	5Z	1964
	6							191	221			412	6	
	Total					35		130,914	489			131,438	Total	
1965	5Z					1,447		36,349	861	1,982		40,639	5Z	1965
	6							1,913	330			2,243	6	
	Total					1,447		38,262	1,191	1,982		42,882	Total	
1966	5Z					14,473		117,346	1,224	3,810		136,853	5Z	1966
	6							2,767	3,084			5,851	6	
	Total					14,473		120,113	4,308	3,810		142,704	Total	
1967	5Z	1,306	28,171			37,677	1,420	123,572	620	21,264		214,030	5Z	1967
	6							3,187	591	895		4,673	6	
	Total	1,306	28,171			37,677	1,420	126,759	1,211	22,159		218,703	Total	
1968	5Z	13,674	70,673	292	1	63,498	1,656	126,965	607	66,911		344,277	5Z	1968
	6		413			11,582		16,132	151	873		29,151	6	
	Total	13,674	71,086	292	1	75,080	1,656	143,097	758	67,784		373,428	Total	
1969	5Z	945	61,990	12,786	527	32,368	337	100,463	2,093	(42,500)	(645)	254,654	5Z	1969
	6					12,653		38,210	1,585	(1,000)	(20)	53,468	6	
	Total	945	61,990	12,786	527	45,021	337	138,673	3,678	(43,500)	(665)	308,122	Total	
1970	5Z	7	82,142		1,214	54,832	685	39,173	1,303	(25,600)	(200)	205,156	5Z	1970
	6		356		198	15,859		22,406	708	(950)	(10)	40,487	6	
	Total	7	82,498		1,412	70,691	685	61,579	2,011	(26,550)	(210)	245,643	Total	
1971	5Z	12,863	54,744		2,434	69,083	887	63,903	2,399	15,169	3,939	225,421	5Z	1971
	6				32	19,242	11	17,355	1,423	3,278	612	41,953	6	
	Total	12,863	54,744		2,466	88,325	898	81,258	3,822	18,447	4,551	267,374	Total	

1/ Figures in parenthesis are estimates.

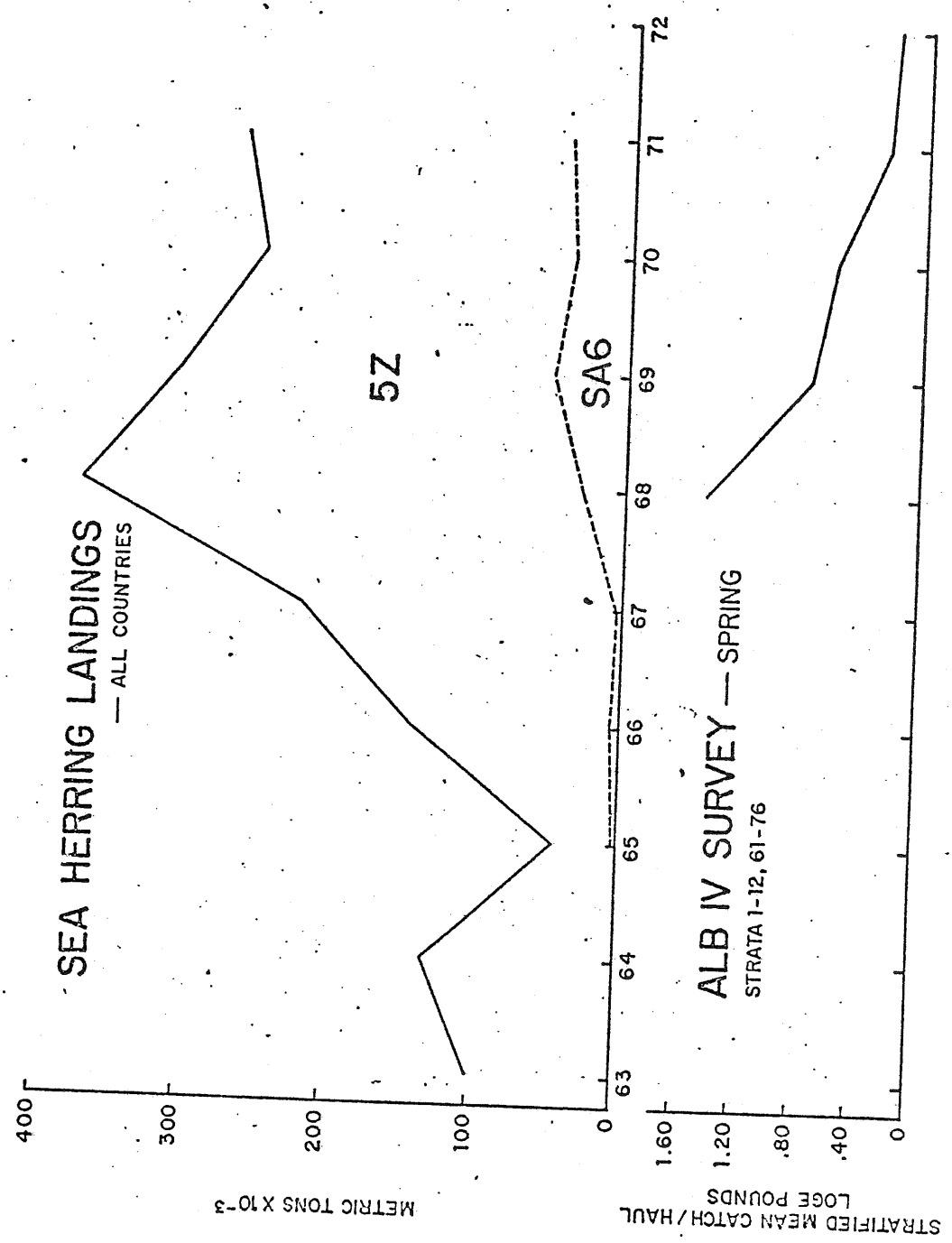


Fig. B-1. Sea herring landings in ICNAF Division 5Z and Subarea 6, and catches of sea herring during U. S. research vessel (Albatross IV) surveys.

C. Yellowtail Flounder

Current information suggests that there are three stocks of yellowtail within ICNAF Subarea 5. The two major populations are roughly separated by the 69°W meridian and occupy Georges Bank, and the southern New England-Middle Atlantic fishing grounds. A third, much smaller, population exists in the waters just off Cape Cod. Seasonal movements of yellowtail are small compared with species such as hake (Figure 4.4, 4.8). A fourth stock in SA 6 is presently considered separately for assessment purposes, as its relationship to the stock in southern New England waters is not known. Yellowtail distributions overlap with red and silver hake in the fall and sea herring in the spring (Figures 4.5, 4.9).

Total landings from 1963 to 1970 for Division 5 west of the 69°W meridian (5Zw plus Cape Cod) fluctuated between 24,300 MT (1970), 37,200 MT (1969), and averaged 28,200 MT over the period (Table C-1, Figure C-1). East of the 69°W meridian total landings fluctuated between 13,700 MT (1966), and 22,600 MT (1970), and averaged 18,000 MT over the same period. Subarea 6 landings generally were below 4,000 tons until 1971.

The 1971 ICNAF quotas of 16,000 MT in the management area east of 69° and 13,000 tons west of 69° served to reduce the catch to 17,706 MT on Georges Bank and to 15,998 MT in southern New England. Landings in SA 6, however, increased to 7,800 tons. Most of this increase resulted from catches along the SA 5 and 6 border where there is undoubtedly some overlap of the stocks.

Abundance indices computed from annual fall research vessel surveys suggest that the southern New England stocks declined in the middle 1960's and then remained fairly stable since 1970 (Figure C-1). The linear index for 1972 is the highest recorded over the last 10 years, but it probably reflects sampling error and is not an accurate reflection of change in stock size because recruiting year classes do not appear large enough to account for such an increase (Figure C-2). The logarithmic plot for the Middle Atlantic-southern New England area combined shows a decline in abundance in 1971 and 1972 to about half the level observed in 1967 (Figure C-1).

Yellowtail flounder population size for the southern New England stock probably will change little from 1971 to 1973 as indicated from prerecruit catches (Figure C-3). Assessment studies indicate an equilibrium MSY for the southern New England stock of 15,800 MT. Prior to the advent of the quota restriction, data indicate a trend toward overfishing but this appears to have been stabilized and it is hoped that regulation will allow the stock to return to the equilibrium MSY level. The quota for 1973 is the same as it was in 1972, 10,000 tons west of 69°.

Table C-1. Yellowtail flounder catch (metric tons x 10^{-3}) according to stock divisions.

	5Ze	5Zw	Cape Cod	SA 6	Total
1960	5.9	11.5	2.0		19.4
1961	5.7	17.0	2.4		25.1
1962	10.3	18.6	2.5		31.4
1963	16.7	27.9	4.6	2.3	51.5
1964	19.8	29.0	2.4	1.8	53.0
1965	19.2	27.8	2.0	2.1	51.1
1966	13.7	23.6	2.1	2.2	41.6
1967	15.3	25.8	2.3	5.3	48.7
1968	18.2	28.0	2.2	3.3	51.7
1969	20.9	35.6	1.6	3.9	62.0
1970	22.6	22.7	1.6	4.2	51.1
1971	15.7	12.6	2.3	7.8	38.4

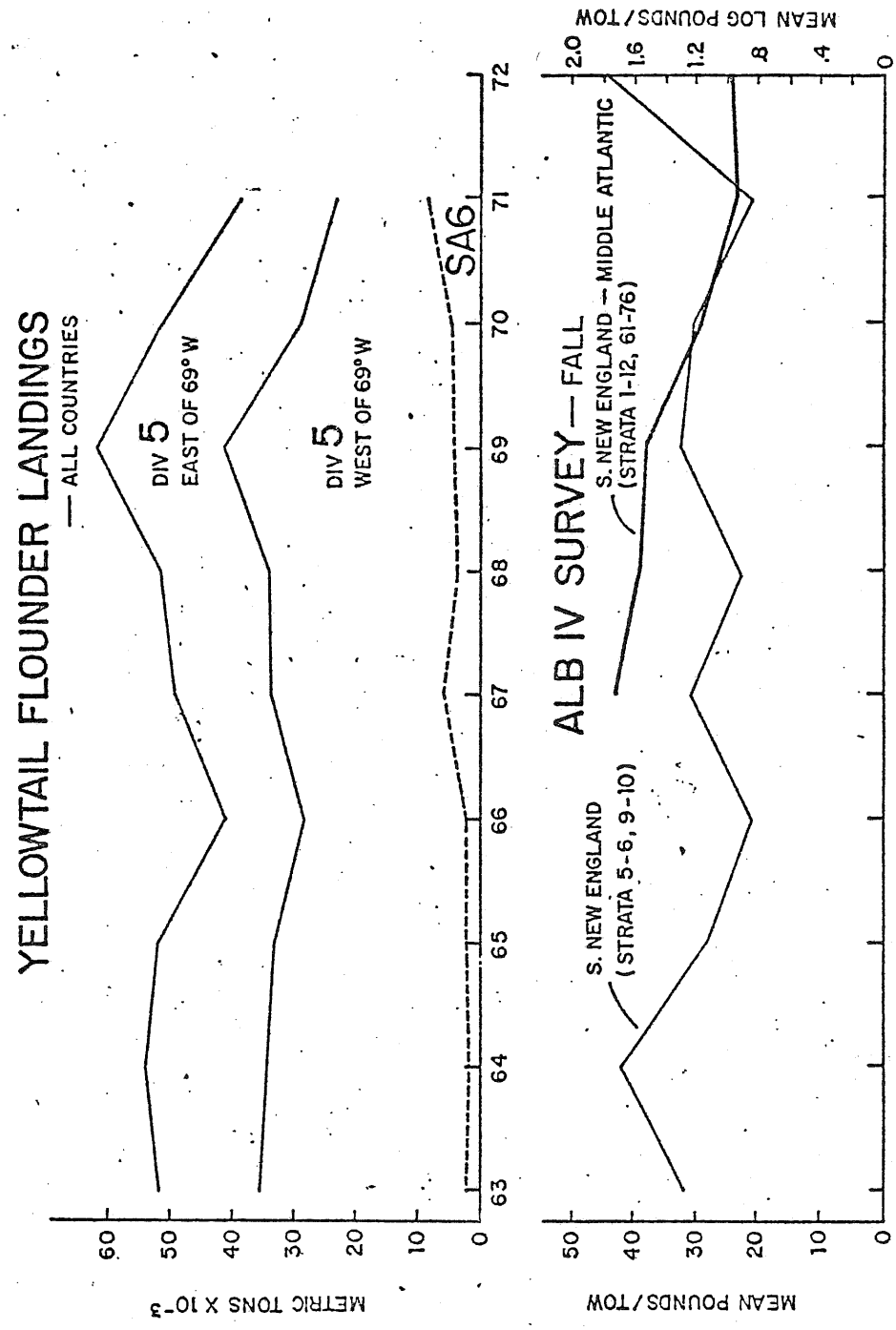


Fig. C-1. Yellowtail flounder landings, (metric tons) for ICNAF Subdivision 5Z and Statistical Area 6, and catches of yellowtail during U. S. research vessel surveys.

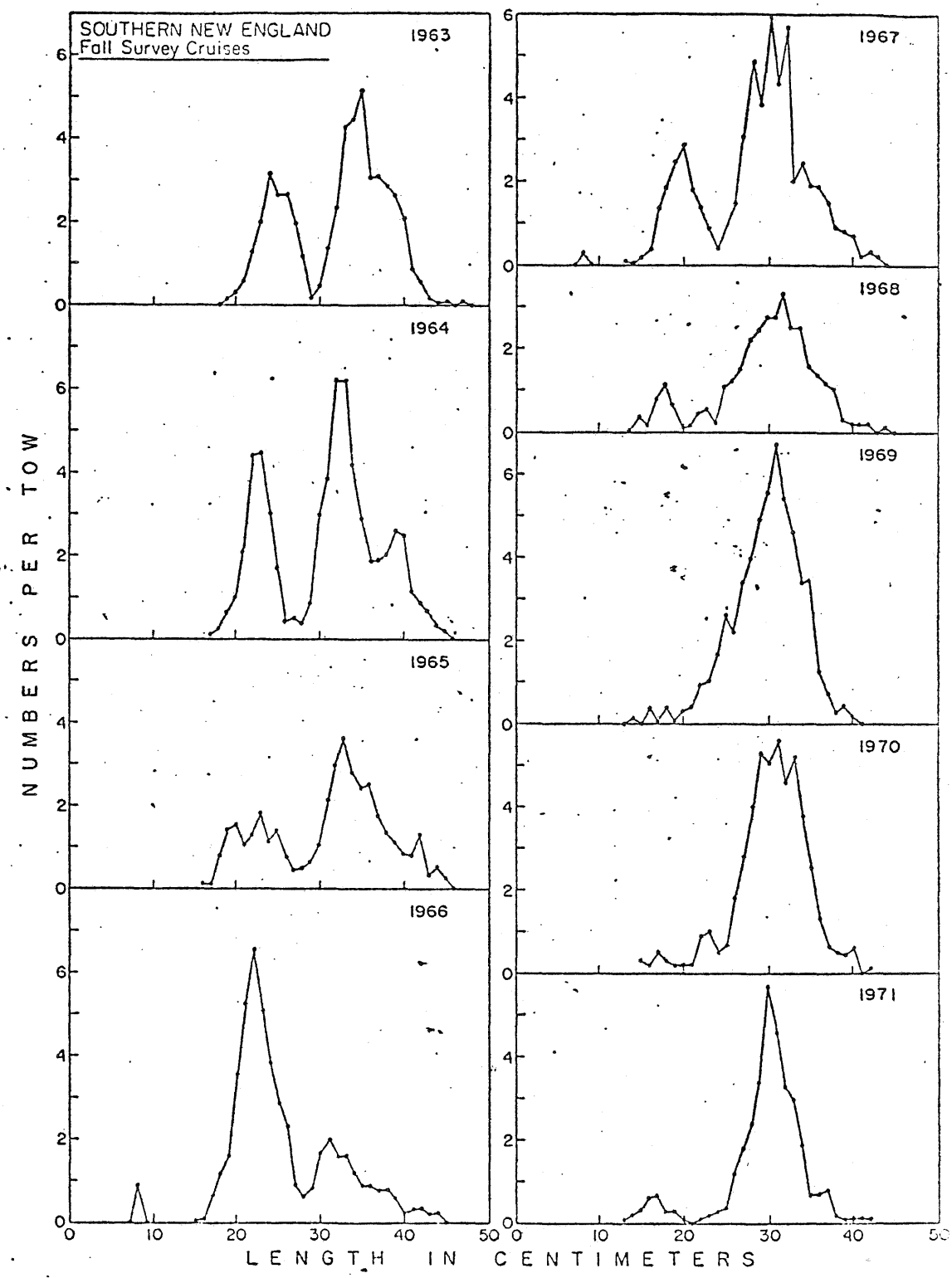


Figure C-2. Yellowtail flounder length frequence distribution from fall survey cruises for Southern New England.

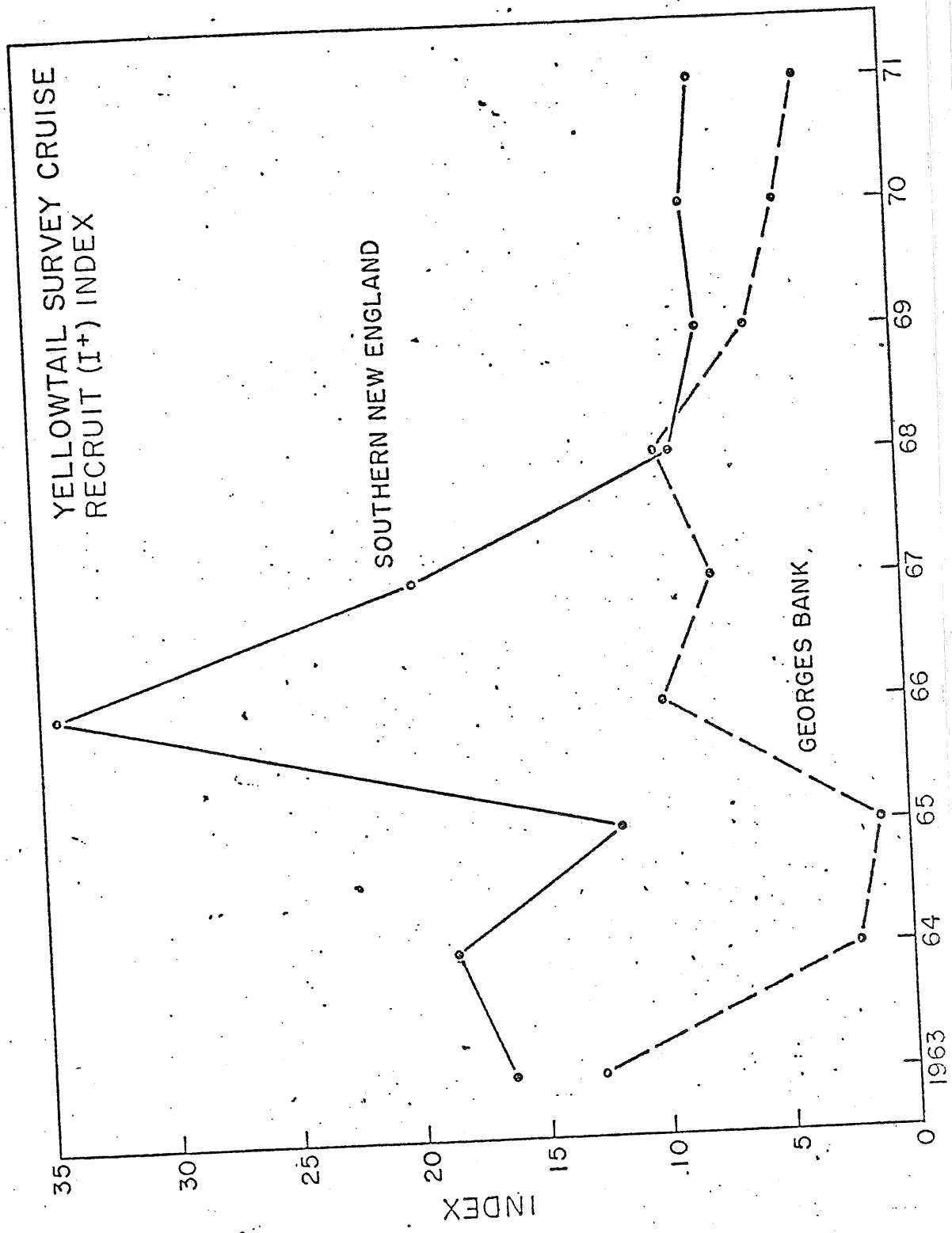


Figure C-3. U.S. research survey cruise abundance index for pre-recruit (I+) yellowtail flounder

D. Silver Hake

A single stock exists from Nantucket Shoals through the Middle Atlantic area which migrates seasonally, generally inhabiting inshore waters less than 50 fathoms from spring to fall and deep offshore waters to about 150 fathoms during the winter.

Spring and autumn survey cruises document the seasonal movement (Figures 4.3,4.7). During the spring when the stock is found in the deeper water along the edge of the shelf, the principal concentrations are located in Divisions 5Zw and 6A within the area from south of Nantucket to slightly south of Hudson Canyon. During the autumn, the fish are found in greatest numbers between Nantucket and Long Island in waters ranging from 25 to 45 fathoms primarily in Div 5Zw but also in the eastern portion of Div 6A. To facilitate assessment studies a boundary was set at 69° W latitude with the result that U.S. Statistical Area 526 (in Div 5Zw) is included in the area occupied by the southern New England-Middle Atlantic stock (Figure D-1).

Estimated landings from this stock (Subarea 6, Div 5Zw, and U.S. Statistical Area 526 in Div 5Ze) increased from 22,400 MT in 1963 to 155,500 MT in 1966 as the result of an intensive U.S.S.R. fishery (Table D-1, Figure D-2). Landings then dropped to 68,300 MT in 1967 and 45,900 MT in 1968 before rising to 70,900 MT in 1969. A sharp decrease to 24,700 MT occurred in 1970 followed by an increase to 35,000 MT in 1971. United States landings have declined every year following 1964. However, during January-July, 1972, U.S. landings increased 46 percent over the same period in 1971. Estimated landings by Divisions 5Z east and west, and Subarea 6 are shown in Figure D-3.

Relative abundance as measured by both U.S. and U.S.S.R. commercial catch/effort indices declined rapidly after 1965 and has appeared to stabilize at lower levels from 1967 through 1971 (Figure D-4). Preliminary data based on the U.S. industrial fishery indicate that catch/effort through June 1972 has decreased 62 percent from 1971. Autumn research survey cruise abundance indices show a general downward trend since 1968 and both U.S. and U.S.S.R. survey indices for 1972 are lower than the indices for 1970 and 1971 (Figure D-3). However, strong year classes were produced in 1966, 1968, 1971, and 1972 (Figure D-5). Stock abundance should improve somewhat beginning in 1973-1974 as the result of these latter two year classes, but not to former abundance levels because the present fishery is cropping off hake at a very young age. Most fish landed in the past have varied in age from 2 to 5 years, with ages 3-4 predominant. However, it is estimated that 28 percent of the 1970 landings were age one fish.

Present assessment studies suggest a maximum sustained yield of 69,000 MT for this stock. A quota of 80,000 MT was set at the 1972 ICNAF meeting for Subarea 6 and Div 5Zw in 1973, of which 25,000 MT was allocated to the U.S. In 1971 only 35,000 tons were landed by all countries combined, and it seems unlikely that the MSY can be achieved under the existing quota regime even with good recruitment.

The closed areas in Subarea 6 and Div 5Zw have been effective in reducing the U.S.S.R. catch. No marked change in U.S. landings has been evident (down in Div 5Zw, up in SA 6). However, the increased spring and autumn survey abundance indices in 1970 and 1971 are a possible response to reduced fishing effort. U.S. studies of the seasonal distribution of survey cruise catches of silver hake indicate that major concentrations exist within the closed areas later than the original January-March abstention period. The Subarea 5 closure was revised at the 1972 ICNAF meeting to prohibit fishing only during April, effective in 1973. Further liberalization of the closed area-season regulations would seem very unwise.

Table D-1. Silver hake catch statistics for the southern New England-Middle Atlantic stock.

	Landings (MT)										Catch/Effort		Fishing Effort	
Year	U.S. Food	U.S. Industrial	U.S. Total	U.S.S.R.	Poland	Romania	Japan	Bulgaria	Other	Total	U.S. landings/day	U.S.S.R. landings/hour	U.S. days fished	U.S.S.R. hours fished
1944	6,252	-	6,252	-	-	-	-	-	-	6,252	-	-	-	-
1945	7,393	-	7,393	-	-	-	-	-	-	7,393	-	-	-	-
1946	7,720	-	7,720	-	-	-	-	-	-	7,720	-	-	-	-
1947	6,847	-	6,847	-	-	-	-	-	-	6,847	-	-	-	-
1948	2,115	-	2,115	-	-	-	-	-	-	2,115	-	-	-	-
1949	1,497	814	2,311	-	-	-	-	-	-	2,311	-	-	-	-
1950	1,323	3,121	4,444	-	-	-	-	-	-	4,444	-	-	-	-
1951	1,157	1,470	2,627	-	-	-	-	-	-	2,627	-	-	-	-
1952	1,782	1,872	3,654	-	-	-	-	-	-	3,654	-	-	-	-
1953	2,924	4,235	7,159	-	-	-	-	-	-	7,159	-	-	-	-
1954	3,617	5,121	8,738	-	-	-	-	-	-	8,738	-	-	-	-
1955	5,516	6,963	12,479	-	-	-	-	-	-	12,479	-	-	-	-
1956	3,038	10,379	13,417	-	-	-	-	-	-	13,417	-	-	-	-
1957	4,162	11,314	15,476	-	-	-	-	-	-	15,476	-	-	-	-
1958	3,111	9,045	12,156	-	-	-	-	-	-	12,156	-	-	-	-
1959	4,814	10,621	15,435	-	-	-	-	-	-	15,435	-	-	-	-
1960	6,219	2,085	8,304	-	-	-	-	-	-	8,304	-	-	-	-
1961	7,052	4,866	11,918	-	-	-	-	-	-	11,918	-	-	-	-
1962	6,491	5,600	12,091	-	-	-	-	-	-	12,091	-	-	-	-
1963	5,709	12,539	18,248	4,191	-	-	-	-	-	22,439	5.9	-	3,803	-
1964	5,539	19,489	25,028	26,963	-	-	-	-	-	51,991	11.5	-	4,521	-
1965	8,063	14,342	22,405	131,123	-	-	-	-	-	153,528	12.1	-	12,688	-
1966	7,246	3,381	10,627	144,855	-	-	-	-	-	155,482	1.9	-	81,833	-
1967	5,262	3,621	8,883	59,455	-	-	-	-	1	68,339	4.8	-	14,237	-
1968	4,963	3,554	8,517	36,750	636	-	37	-	-	45,940	2.8	1.64	16,407	28,012
1969	4,488	2,899	7,387	62,509	47	6	164	746	-	70,859	4.0	1.51	17,715	46,926
1970	4,943	1,430	6,373	17,514	3	48	325	403	-	24,666	2.0	2.10	12,333	11,746
1971	3,866	1,260	5,126	28,602	34	432	107	721	-	35,022	3.1	1.79	11,297	19,565

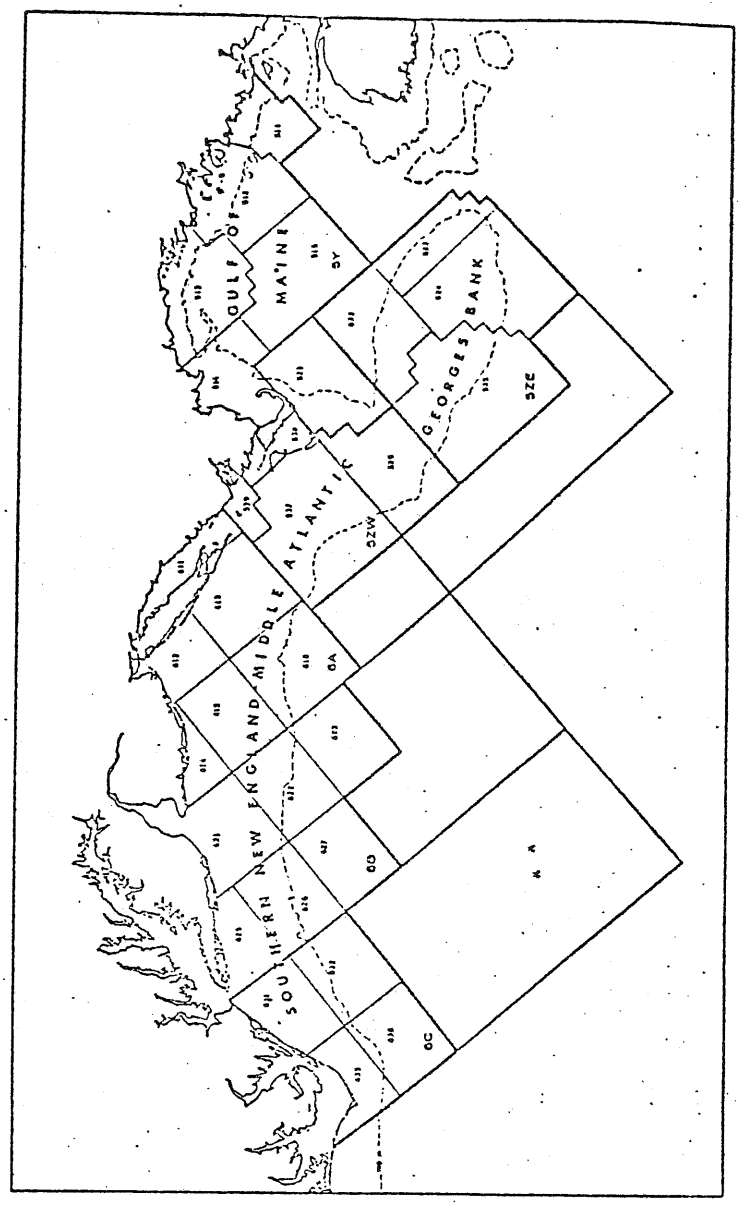


Fig. D-1. Map showing the boundaries used for the silver hake stocks in ICNAF Subareas 5 and 6 as defined by U.S. statistical areas.

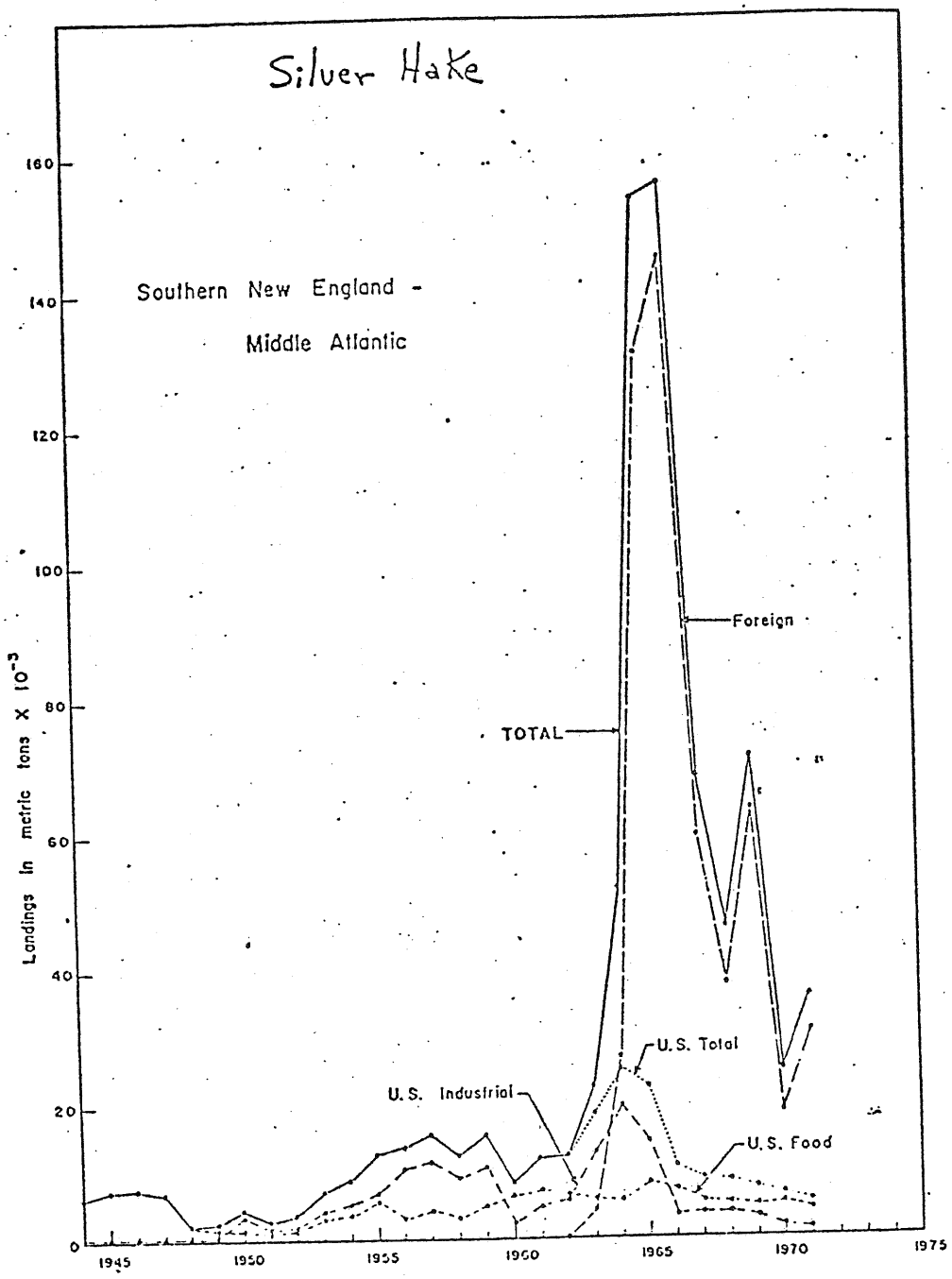


Fig. D-2. Silver hake landings in SA 6, 5Zw and U. S. Statistical Area 526 (in Div. 5Ze).

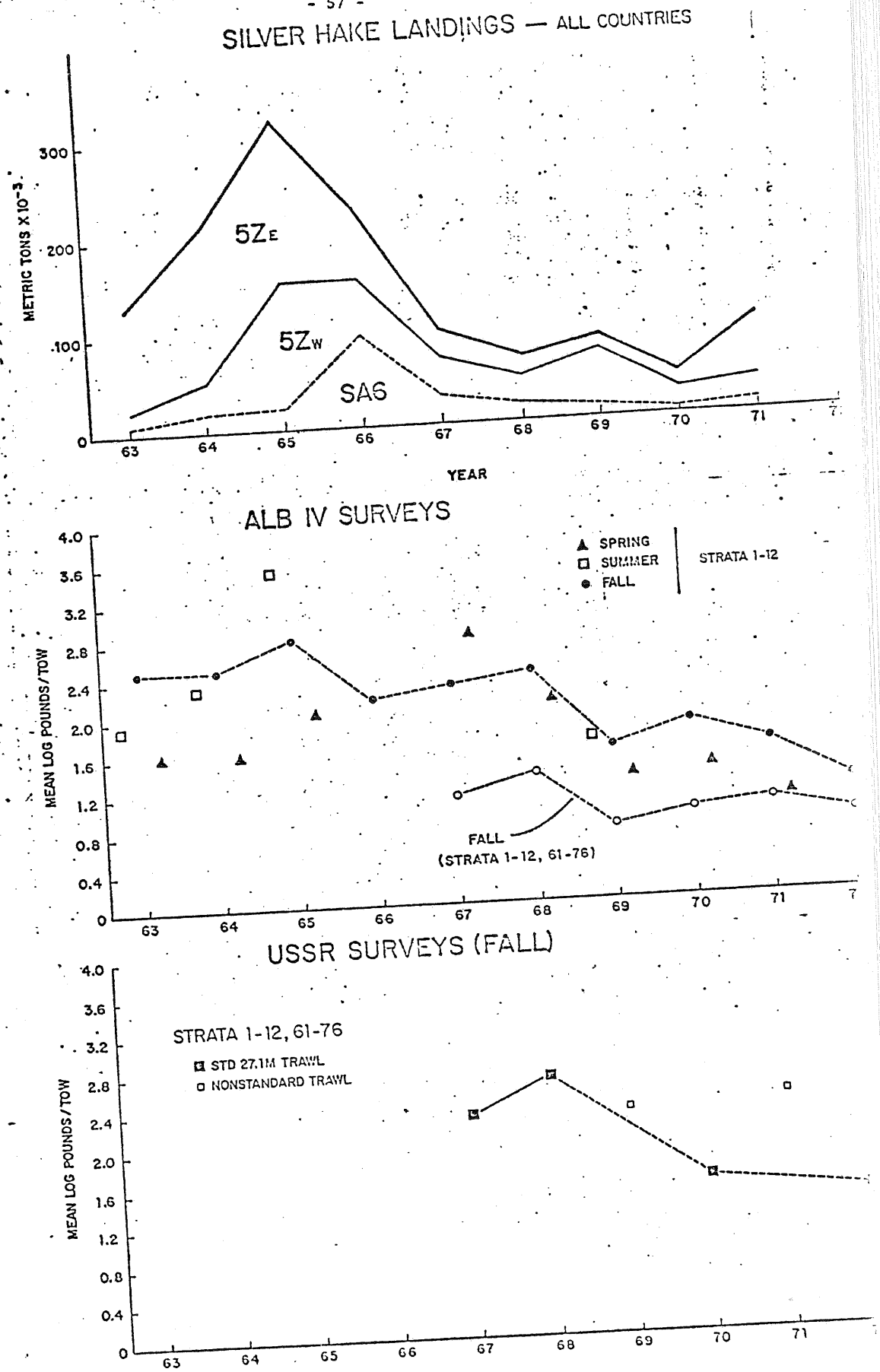


Fig. D-3. Silver hake landings for ICNAF Division 5Z and Subarea 6, and catches of silver hake during research vessel surveys.

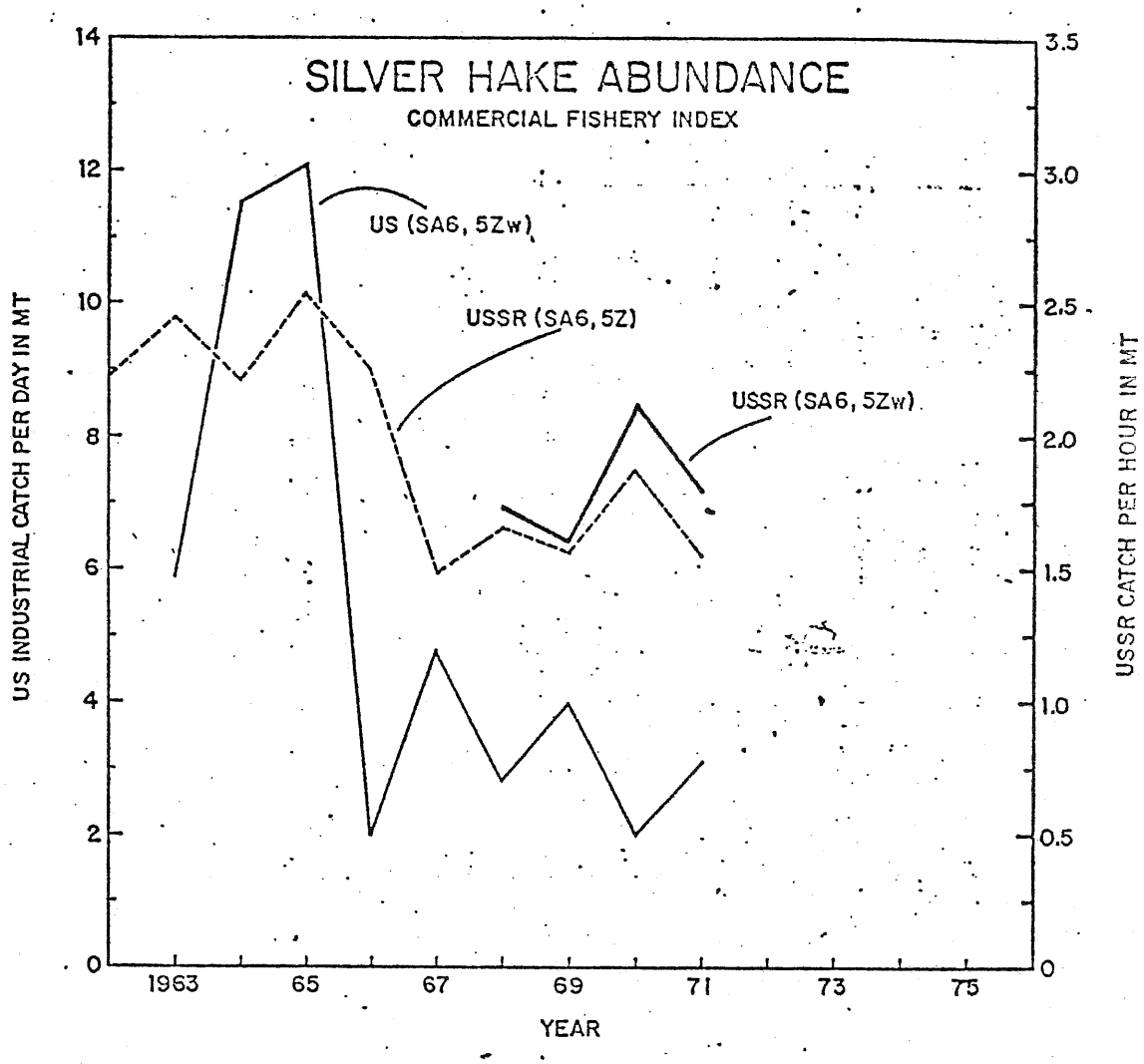


Fig. D-4. Commercial catch per unit of effort for silver hake.

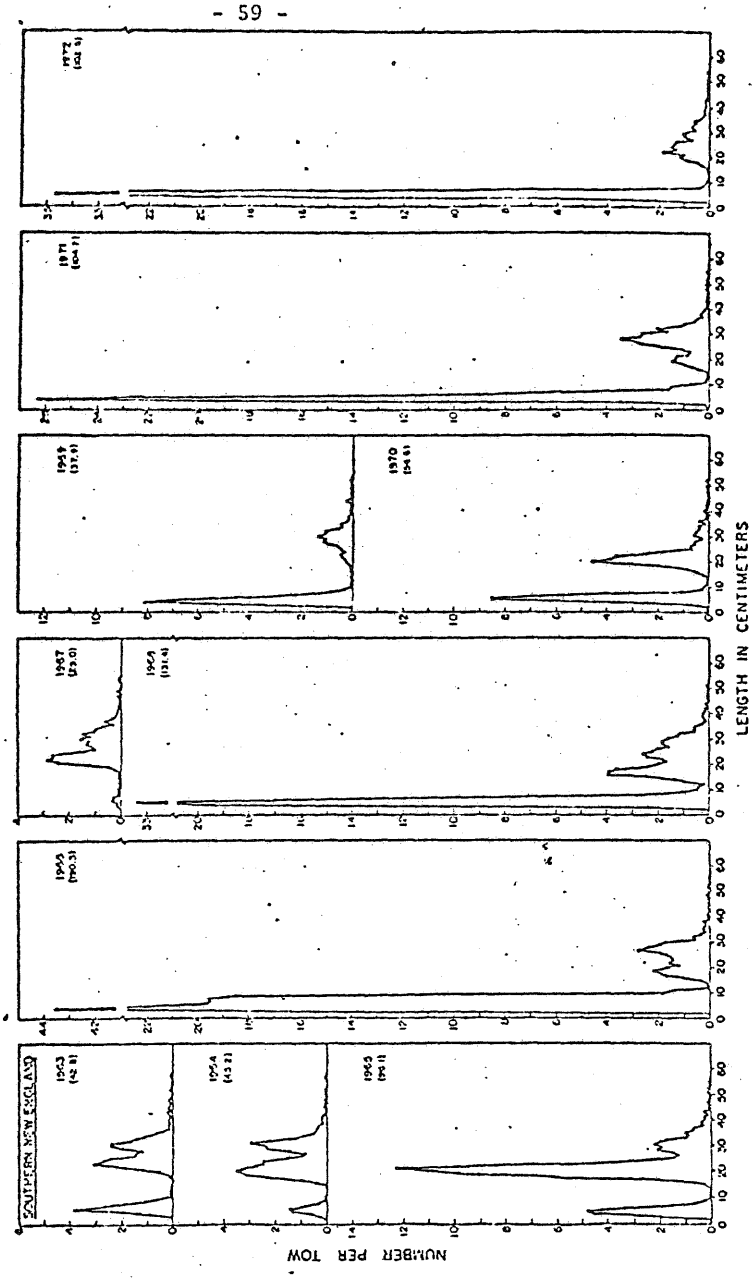


Fig. D-5. Length frequency distribution of the stratified mean number of silver hake per tow (given in parentheses) from the Southern New England - Middle Atlantic stock from U.S. Albatross IV fall groundfish survey cruises.

E. Red Hake

A continuous stock of red hake inhabits the waters from Cape Cod to the Middle Atlantic. This stock, like that of the silver hake, undergoes a migration inshore in the spring and offshore in late fall (Figures 4.4, 4.9). The stock appears to be most abundant between Hudson Canyon and Cape Cod. A second stock exists on Georges Bank (Div. 5Ze) and apparently undergoes a certain amount of mixing with the southern stock during the occupation of inshore waters. The boundary between the red hake stocks was set at the 69°W latitude line, as defined for silver hake stocks.

Total landings for the Southern New England-Middle Atlantic stock increased from only 4,300 MT in 1960 to 65,300 MT in 1966 as the result of the U.S.S.R. fishery (Table E-1, Figure E-1). They declined sharply after 1966 to 16,300 MT in 1968, then climbed abruptly to 51,800 MT in 1969 only to drop to 10,900 MT in 1970. Catches in 1971 increased to 28,900 MT. U.S. landings peaked at 32,600 MT in 1964, but then declined markedly and averaged only 5,100 MT during 1966-1971. U.S. catches are estimated to remain nearly the same in 1972 as in 1971.

Stock abundance as measured by U.S. industrial catch/day and survey cruise catch/tow dropped after 1964 to a low in 1966 and then improved to a level about half of the 1963-1964 average, where it remained through 1971 (Table E-1, Figure E-2). The U.S. commercial index during January-June decreased 24 percent from 1971 to 1972, which does not appear serious in light of the fluctuations experienced over the past several years. The 1972 fall survey index is also down slightly from that of 1971 (Figure E-2). Although there is evidence of recent improved recruitment on Georges Bank, there is no guarantee of significant improvement in abundance in southern New England because there are no strong year classes (such as the 1966 year class) indicated in that area (Figure E-3), and because the current quota is set just about at the MSY level.

U.S. studies have estimated maximum sustainable yield for the Southern New England-Middle Atlantic stock at 31,000-38,000 MT, while U.S.S.R. scientists have estimated MSY at 36,000-44,000 MT. A quota of 40,000 MT was set at the 1972 ICNAF meeting for SA 6 and Div 5Zw in 1973, of which 15,000 MT was designated for the U.S. At the current level of the U.S. fishery (5,000 tons) this implies a 1973 total catch on the order of 30,000 tons which will not allow for any major increase in abundance at the present recruitment level.

The closed areas in Div 5Zw and SA 6, as described earlier for silver hake, have similar applications for red hake. USSR landings have been greatly reduced since 1969, but U.S. landings have not improved. Stock abundance since the closures were imposed appears to have remained stable according to the U.S. fall survey indices or perhaps declined somewhat according to the USSR fall indices (Figure E-2).

The U.S. spring survey index suggests an increase in abundance since 1969 but the spring indices for the 1970's are believed to have a positive bias as a result of greater relative availability of red hake to the survey trawl because of warmer water conditions which resulted in the fish being distributed in shoaler water in the later years (Figures E-4, E-5). The 1972 survey was conducted about the same time (early March) as the surveys in 1968-1969, whereas in 1970 and 1971 the area was sampled 2-4 weeks later than in 1968-1969; in any case water temperatures averaged 2-4°C warmer in the 1970's than in 1968 and 1969 (Figures E-6, E-7, E-8, E-9, E-10). A bias could arise from such changes in distribution if: 1) a significant proportion of the stock were outside the depth range of the survey under cooler conditions, 2) trawl efficiency decreases with depth. There is some evidence that the U.S. survey trawl may be less efficient at greater depths and it is possible that hake go deeper than 200 fathoms in some years, but further analysis will be required to clarify these questions, and to estimate adjustment factors. In in case, the fall indices are considered to be the most reliable since changes in depth distribution of hake are less drastic in autumn. Similar changes were observed in spring distribution of other species in the 1970's, and these are described in the appropriate sections.

The commercial index declined in 1970, rose in 1971, and declined again in 1972 (Table E-1). Studies have shown that major red hake concentrations exist within the closed areas during April as well as January-March. Effective in 1973, the Div 5Zw area will be closed only during April.

Table E-1. Red hake catch statistics for Southern New England-Middle Atlantic. Landings and landings per day (from U. S. industrial fishery) are in metric tons.

Year	United States			Foreign			Grand Total	U.S. Landings per day	U.S. days fished
	Food	Industrial	Total	U.S.S.R.	Bulgaria[1]	Total			
1944	2,202	-	2,202	-	-	-	2,202	-	-
1945	7,664	-	7,664	-	-	-	7,664	-	-
1946	3,418	-	3,418	-	-	-	3,418	-	-
1947	5,079	-	5,079	-	-	-	5,079	-	-
1948	3,074	-	3,074	-	-	-	3,074	-	-
1949	19,182	2,362	21,544	-	-	-	21,544	-	-
1950	392	9,051	9,443	-	-	-	9,443	-	-
1951	1,241	4,262	5,503	-	-	-	5,503	-	-
1952	298	4,640	4,938	-	-	-	4,938	-	-
1953	301	9,613	9,914	-	-	-	9,914	-	-
1954	340	10,020	10,360	-	-	-	10,360	-	-
1955	1,003	12,417	13,420	-	-	-	13,420	-	-
1956	3,139	15,441	18,580	-	-	-	18,580	-	-
1957	902	19,858	20,760	-	-	-	20,760	-	-
1958	1,734	16,329	18,063	-	-	-	18,063	-	-
1959	1,000	19,986	20,986	-	-	-	20,986	-	-
1960	2,394	1,892	4,286	-	-	-	4,286	-	-
1961	750	7,355	8,105	-	-	-	8,105	-	-
1962	1,886	9,979	11,865	-	-	-	11,865	-	-
1963	1,823	27,786	29,609	770	-	770	30,379	13.00	2,337
1964	1,920	30,701	32,621	8,588	-	8,588	41,209	16.15	2,552
1965	1,618	23,354	24,972	35,335	-	35,335	60,307	8,14	7,409
1966	702	3,417	4,119	61,187	-	61,187	65,306	2.20	29,684
1967	618	5,560	6,178	36,827	-	36,827	43,005	5.64	7,625
1968	505	6,147	6,652	9,654	-	9,654	16,306	6.98	2,336
1969	563	4,968	5,531	46,159	105	46,264	51,795	8.19	6,324
1970	740	3,894	4,634	6,066	197	6,263	10,897	6.32	1,724
1971	607	2,765	3,372	-	-	-	-	7.00	-

1/ Non-member B

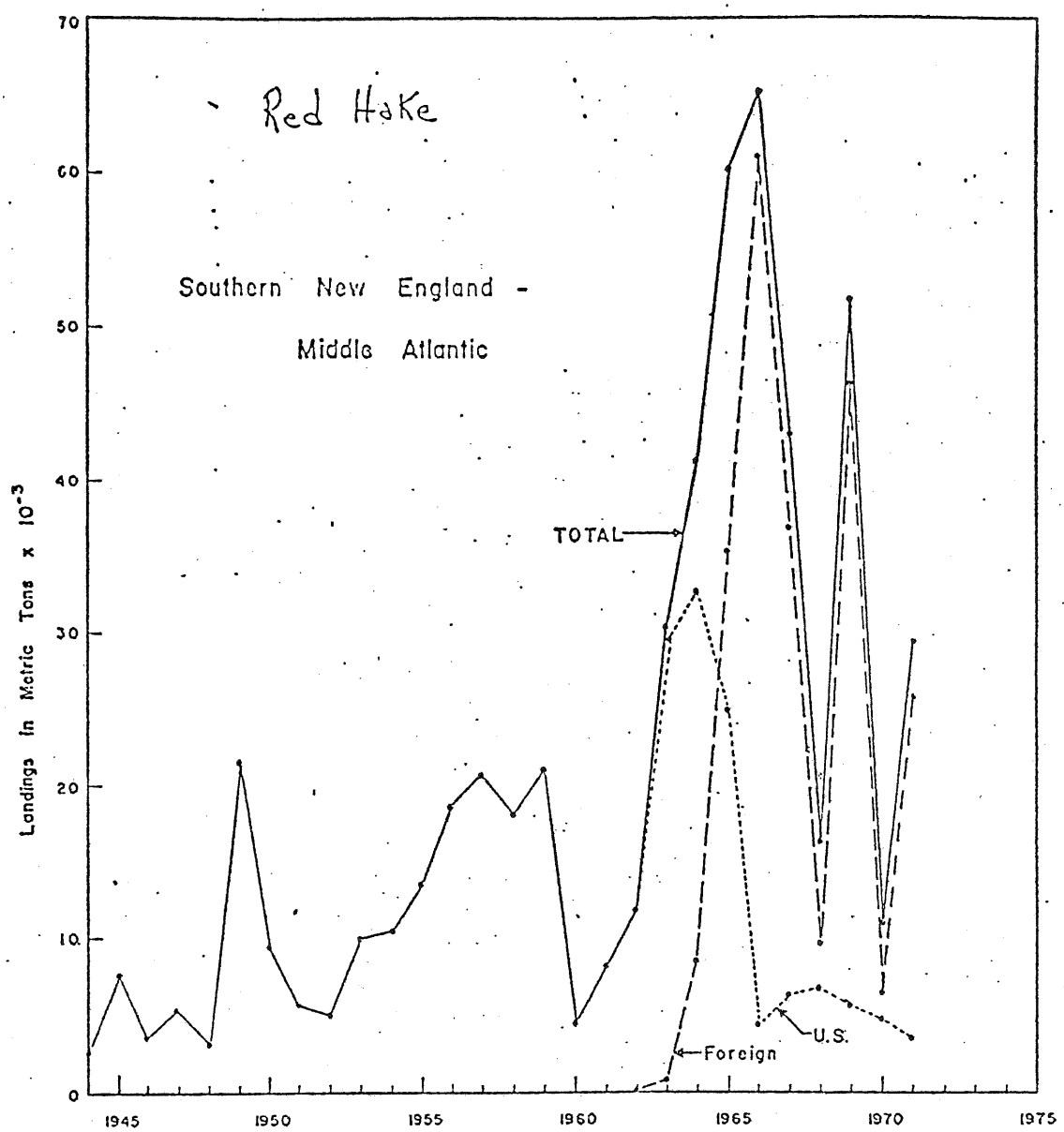


Fig. E-1. Red Hake landings in SA 6, 5Zw and U.S. Statistical Area 526 (in Div. 5Ze)

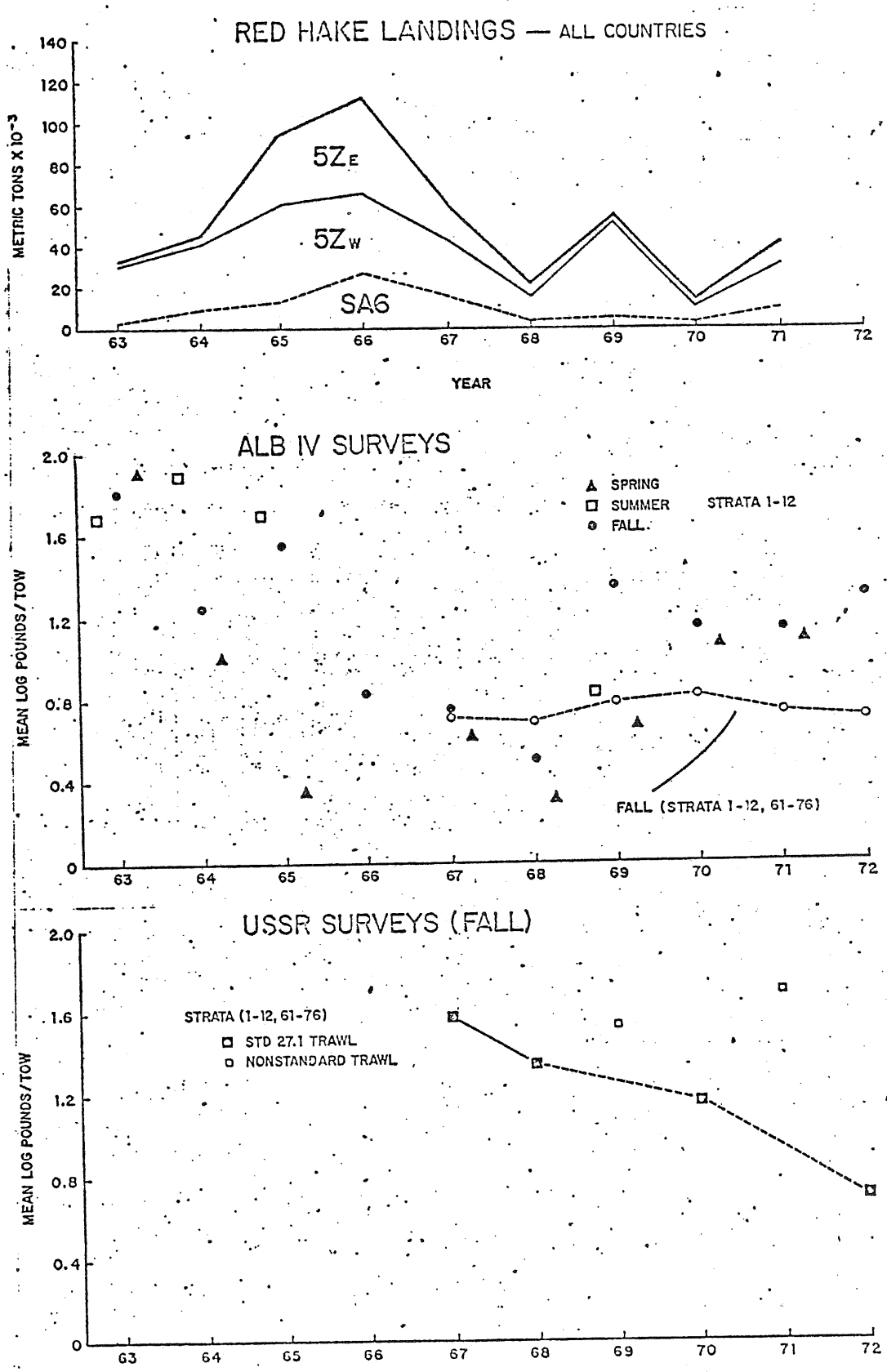


Figure E-2. Red hake landings for ICNAF Division 5Z and Subarea 6, and catches of red hake during research vessel surveys.

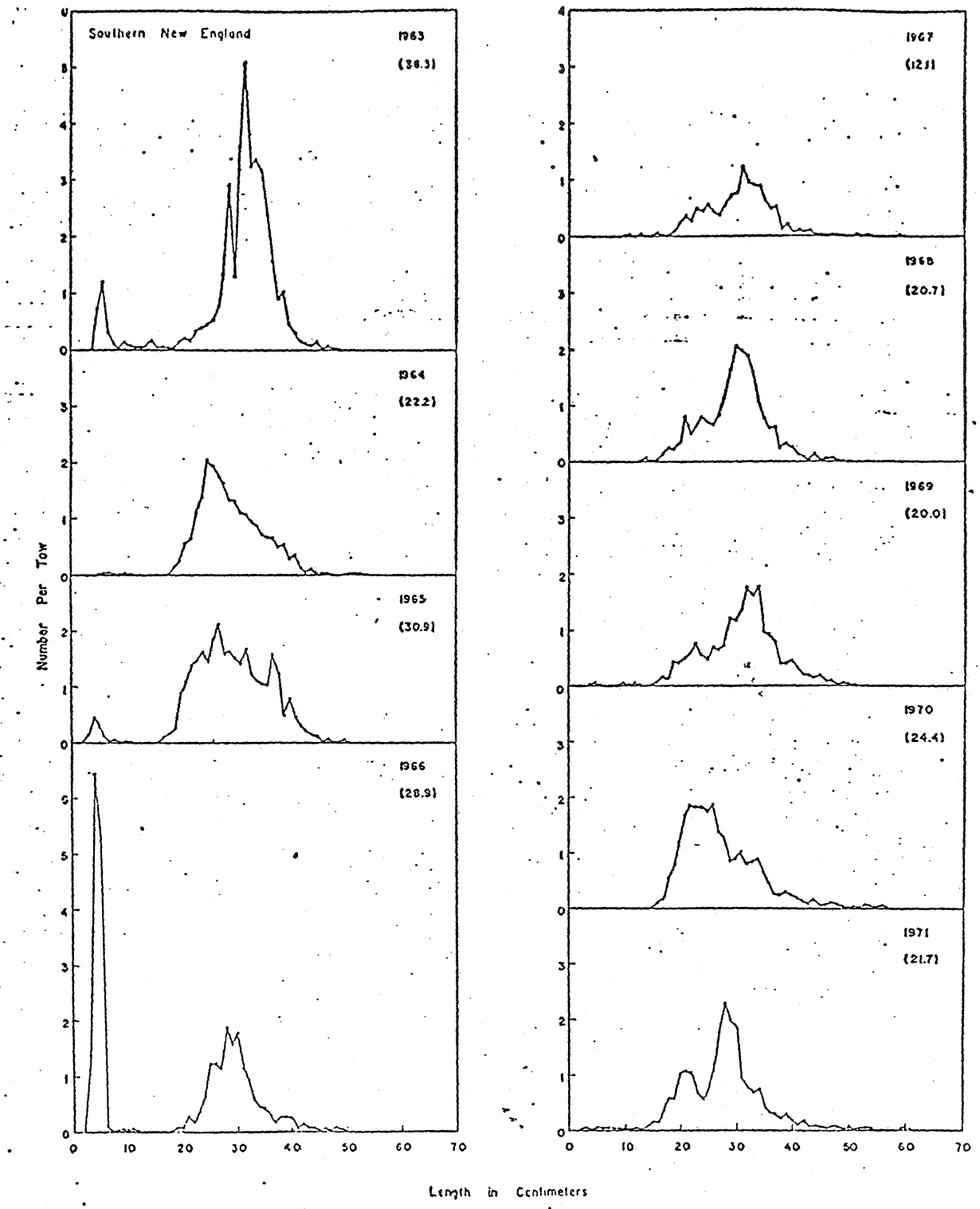


Figure E-3. Length frequency distribution of the stratified mean number of red hake per tow (given in parentheses) from the Southern New England - Middle Atlantic stock from Albatross IV fall groundfish survey cruises.

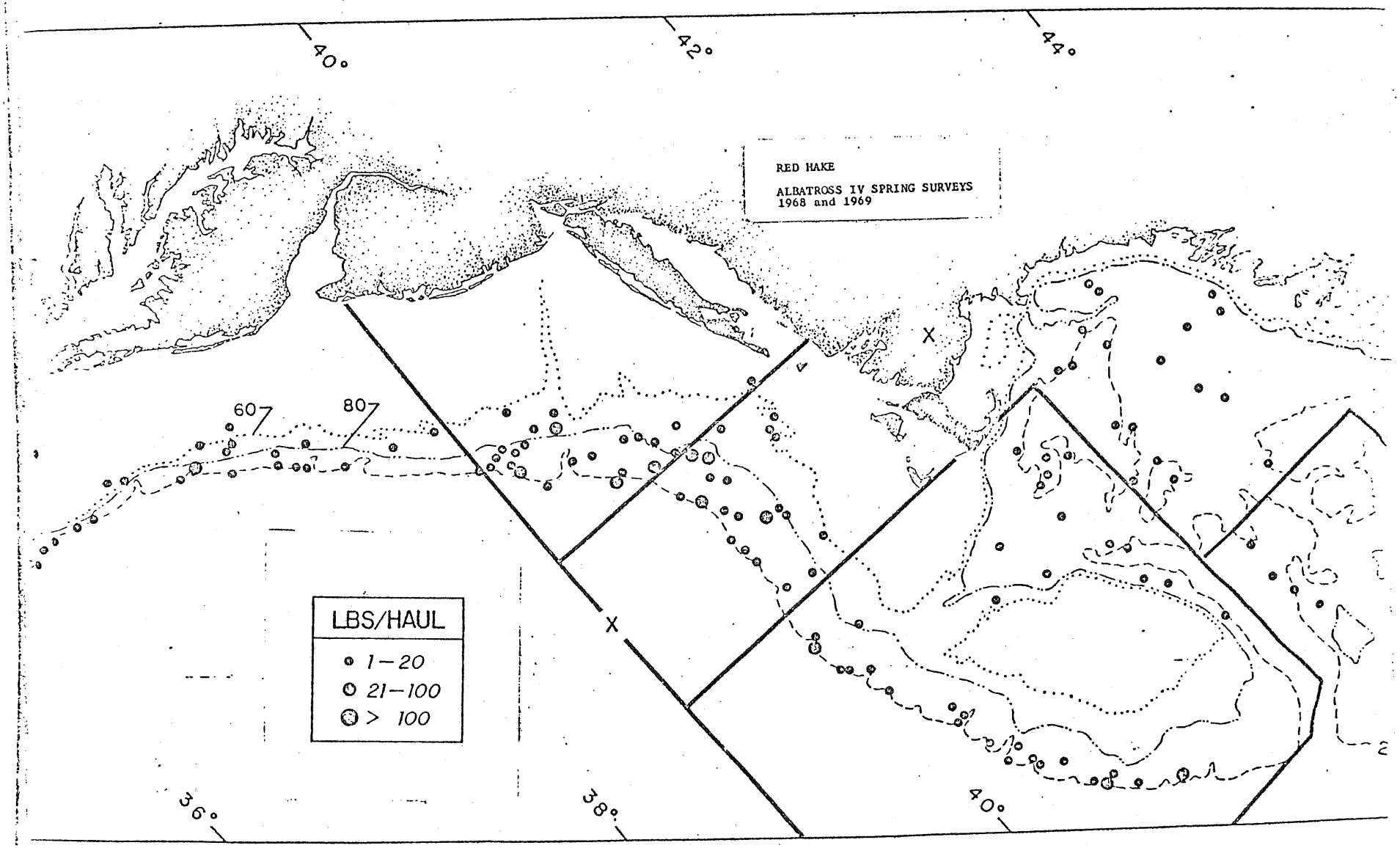

RED HAKE
ALBATROSS IV SPRING SURVEYS
1968 and 1969
40°
42°
44°
36°
38°
40°
60
80
X
X
LBS/HAUL
1–20
21–100
> 100

Figure E-4.

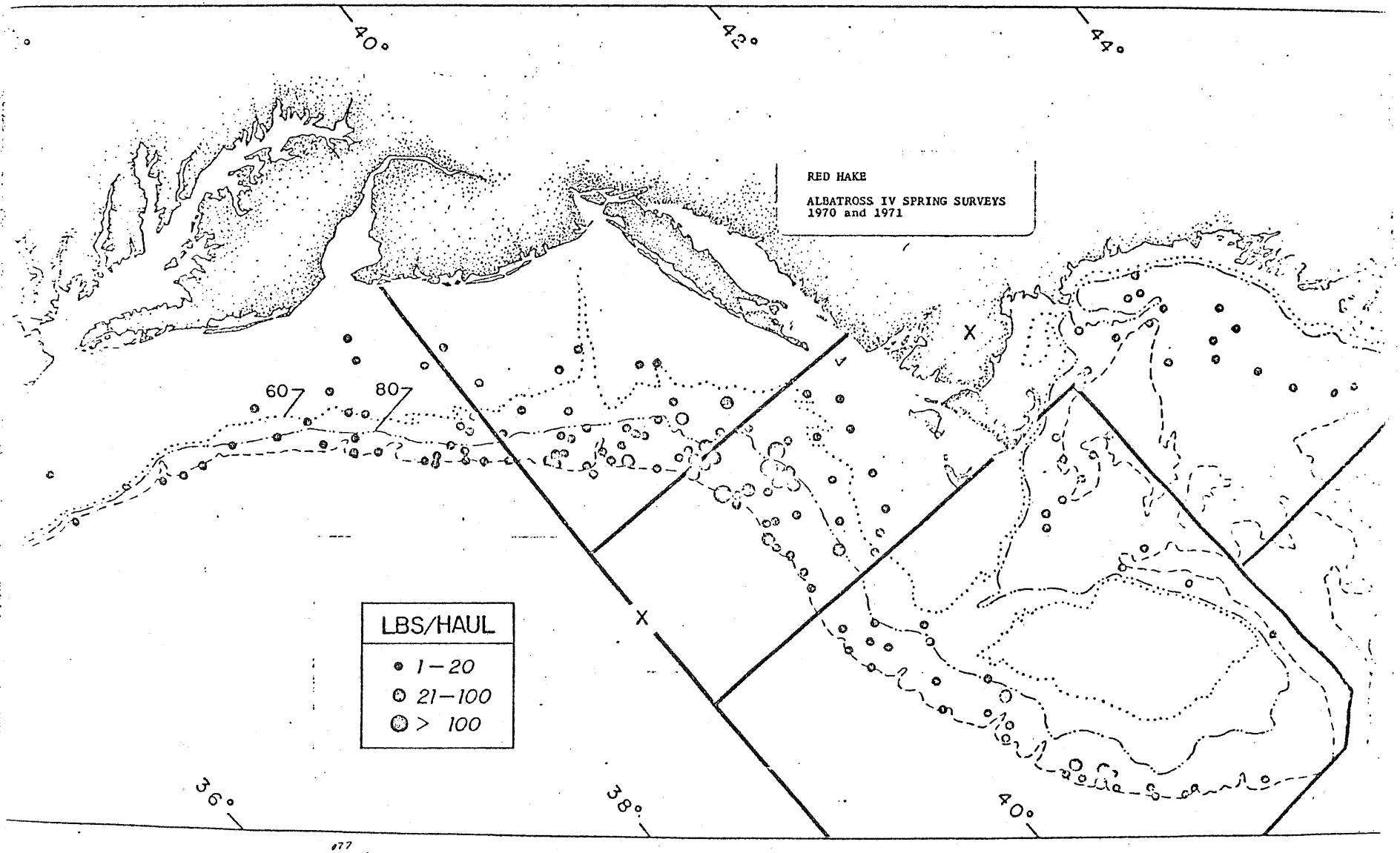

RED HAKE
ALBATROSS IV SPRING SURVEYS
1970 and 1971
LBS/HAUL
1 – 20
21 – 100
> 100
60
80
X
X
40°
42°
44°
36°
38°
40°

Figure E-5.

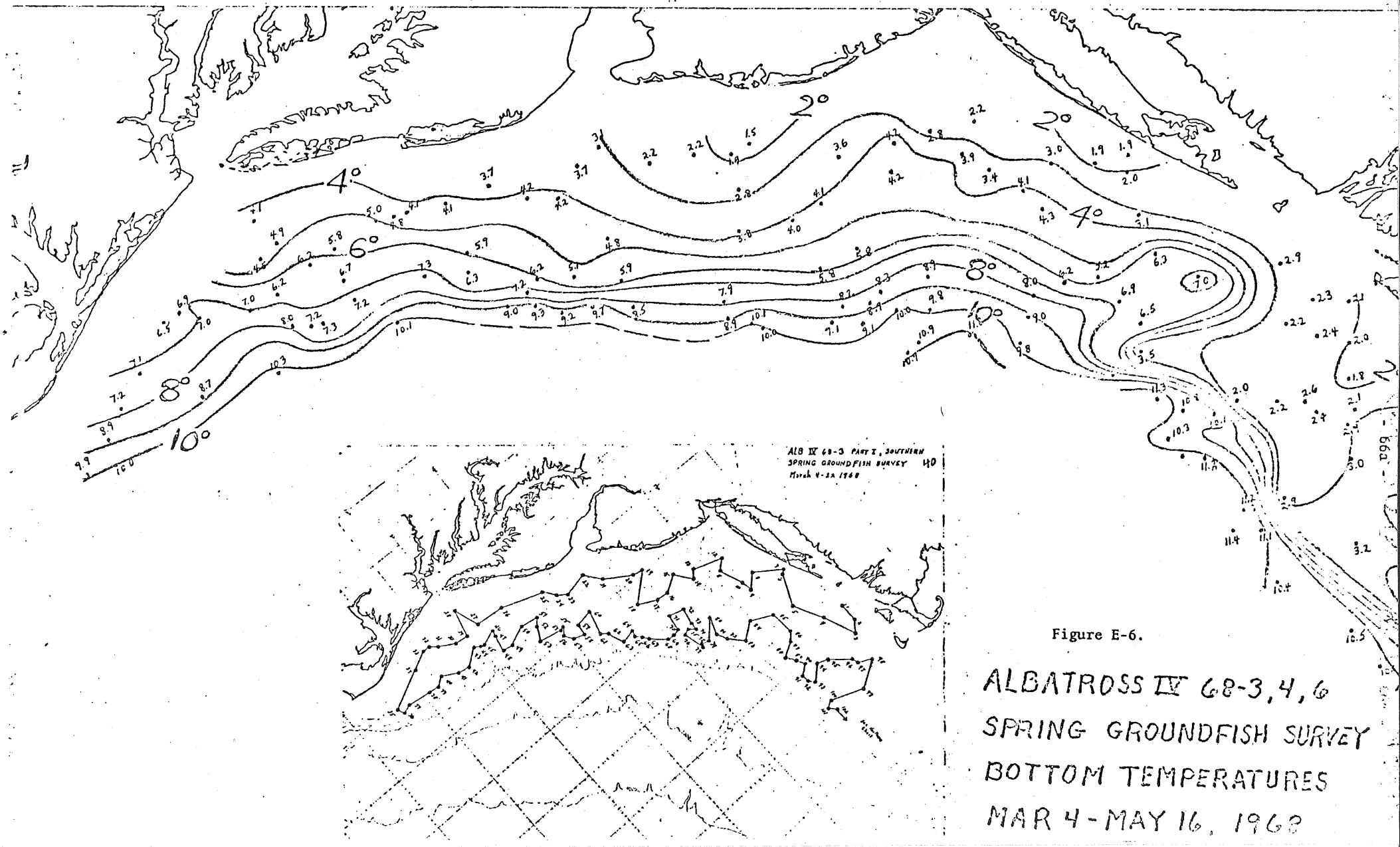


Figure E-6.

ALBATROSS IV 68-3,4,6
SPRING GROUNDFISH SURVEY
BOTTOM TEMPERATURES
MAR 4 - MAY 16, 1968

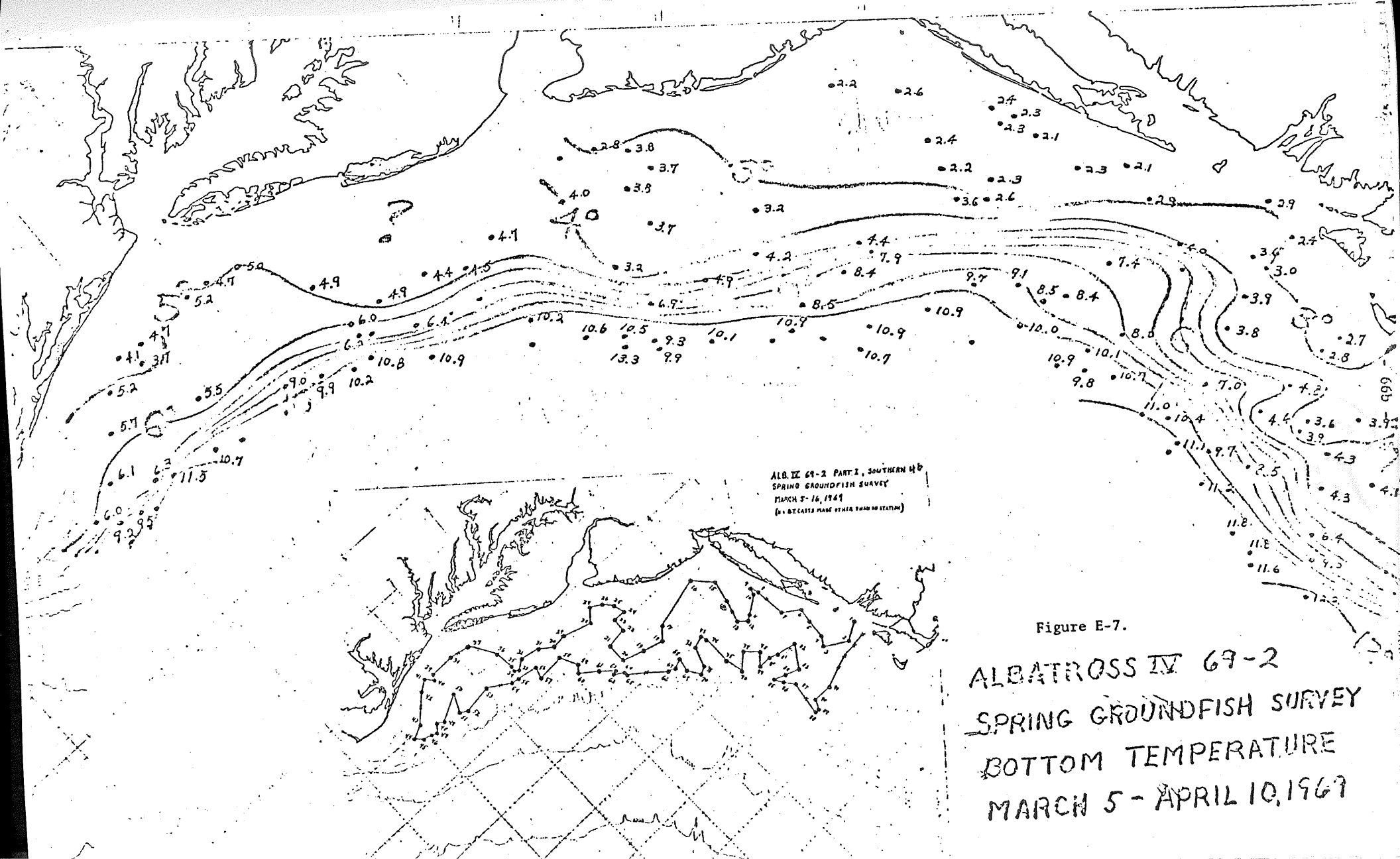


Figure E-7.

ALBATROSS IV 69-2
SPRING GROUNDFISH SURVEY
BOTTOM TEMPERATURE
MARCH 5 - APRIL 10, 1969

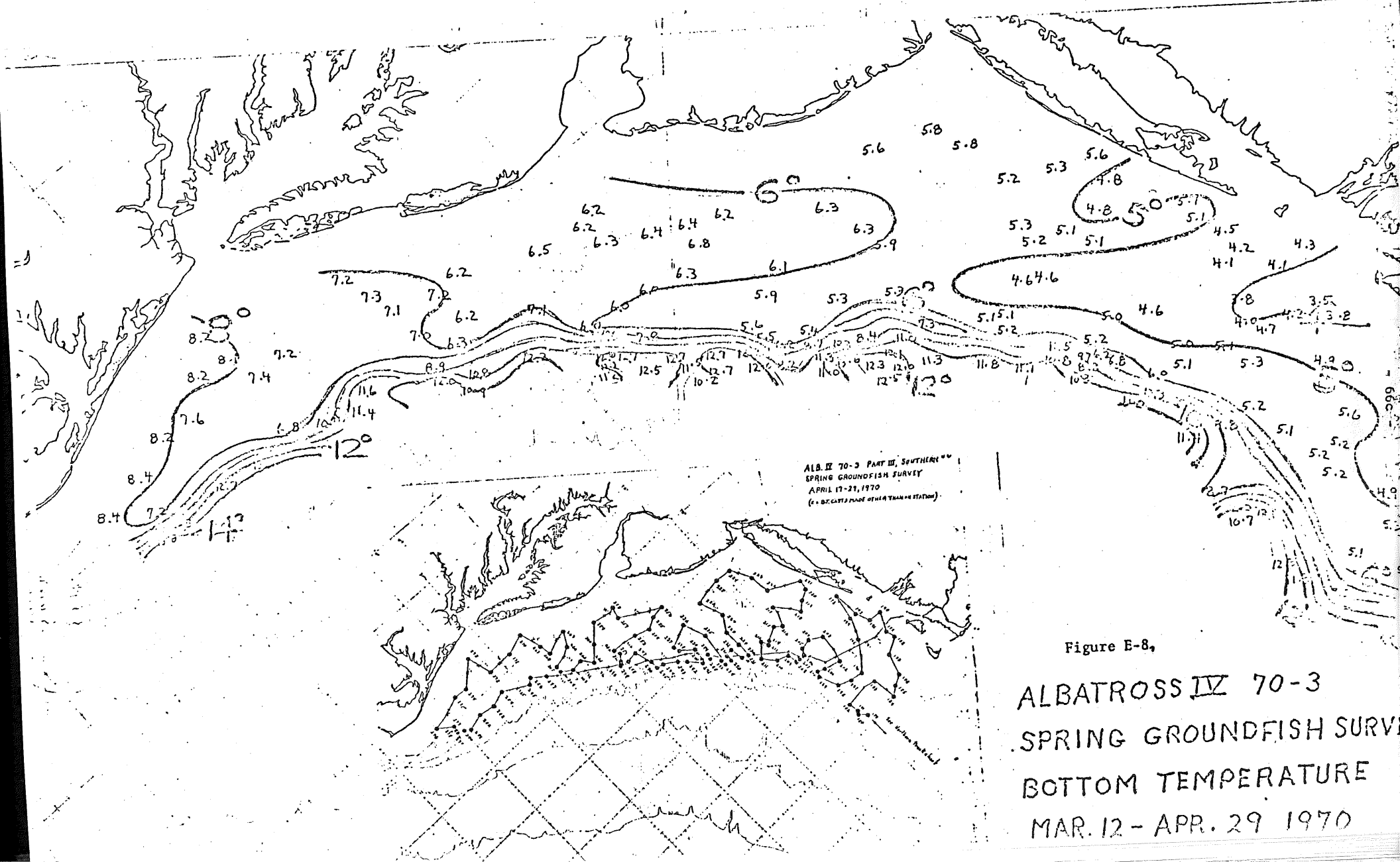


Figure E-8.

ALBATROSS IV 70-3
SPRING GROUNDFISH SURVE
BOTTOM TEMPERATURE
MAR. 12 - APR. 29 1970

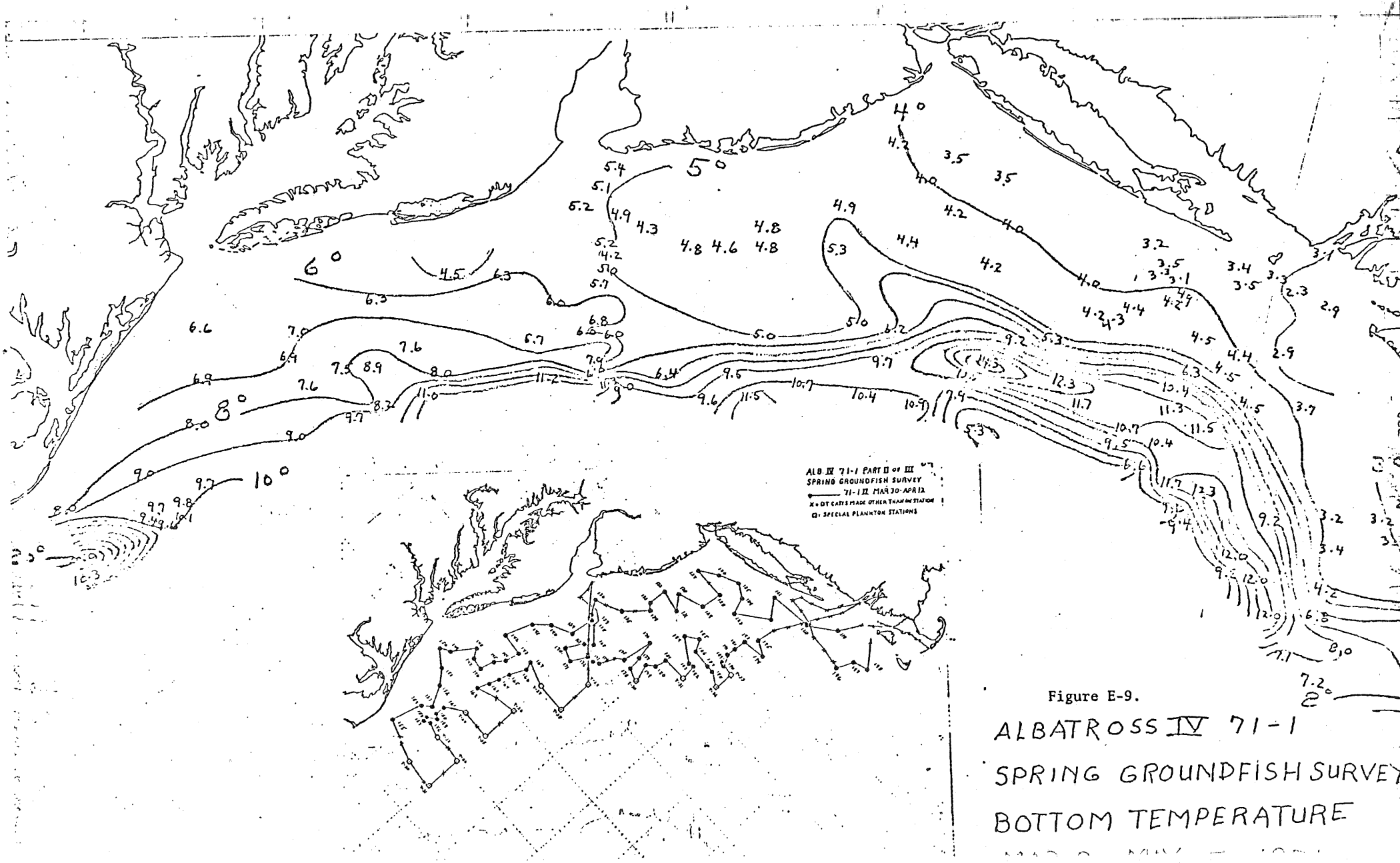


Figure E-9.

ALBATROSS IV 71-1
SPRING GROUNDFISH SURVEY
BOTTOM TEMPERATURE

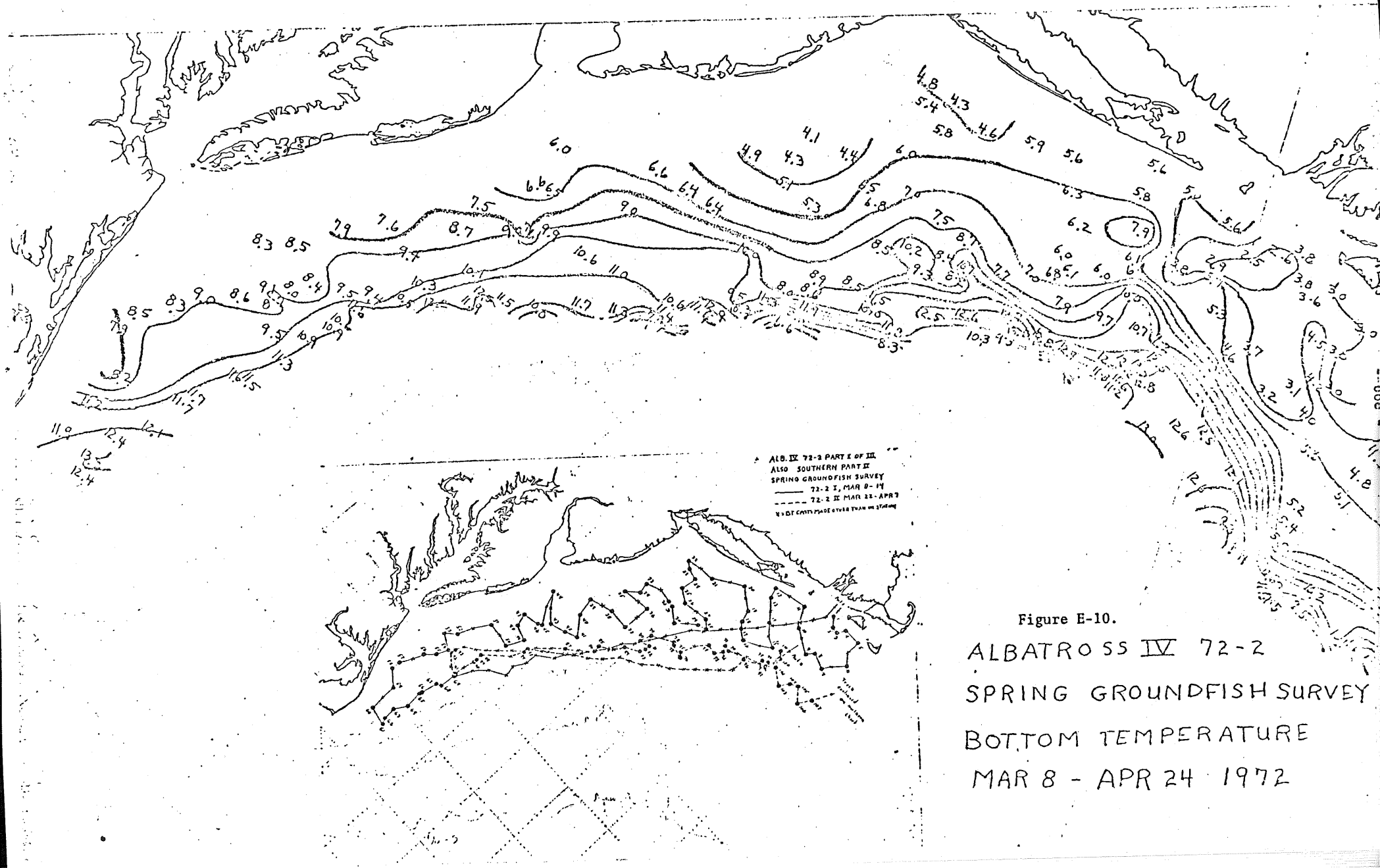


Figure E-10.

ALBATROSS IV 72-2

SPRING GROUNDFISH SURVEY

BOTTOM TEMPERATURE

MAR 8 - APR 24 1972

F. River Herring

The U.S. river herring fishery catches both alewife (Alosa pseudoharengus) and blueback (Alosa aestivalis) in the spring when they enter the estuaries and streams to spawn. The offshore fishery exploits primarily adults during late winter and early spring before they move into the coast for spawning; the extent to which immature fish are exploited at sea is unknown. Adults surviving the spawning runs return to the sea, normally returning two to three more times to spawn. Exploitation on the high seas has now added another source of mortality, which appears to have reduced spawning runs. Distribution of the various stocks at sea is not well known, but both species of river herring are found in deeper waters throughout the Mid-Atlantic bight in spring months (Figures F-1, F-2).

U.S. landings of river herring showed an upward trend from the late 1950's to the mid 1960's, stabilized at approximately 22,000 tons from 1966-1969, and then dropped drastically to about half that level (10,000 tons) by 1972, following the onset in 1969 of the foreign offshore fishery on river herring (Table F-1). In 1969, U.S.S.R. took about 10,000 tons, which together with the U.S. inshore landings of 24,000 tons, increased total landings to 35,000 tons which was more than 50 percent above the average U.S. landings for the period 1963-1968 (Figure F-3). In 1970 U.S.S.R. landings declined to 6,000 tons, and U.S. landings dropped below 15,000 tons. Although the U.S.S.R. agreed to reduce its 1971 catch to 4,000 tons, other countries entered the fishery and the combined foreign landings in 1971 exceeded 9,000 tons (Table F-1). Thus, a significant offshore fishery has been maintained since 1969, and although total landings in 1970 and 1971 remained near the average for the 1960's, the U.S. catch dropped to only half its former level.

The decline in U.S. catch was due partly to a reduction in the number of pound nets fished in 1970-1972, but moreso to a drastic decline in catch/net/season (Figure F-4). Reduced availability of river herring inshore seems quite clearly related to the increased offshore harvest, and the increase in the latter is approximately equivalent to the decrease in the inshore fishery.

Abundance indices for alewife in U.S. spring research vessel surveys conducted offshore, suggest lower abundance in 1970-1972 as compared with 1968 and 1969 (Figure F-5). This fact, plus the facts that spawning runs in 1971 were the lowest on record and the 1972 year class appears relatively poor (indicating poor recruitment in 1976-1978), suggest that current levels of harvest are probably too high. Maximum harvest probably should not exceed 20,000 tons per year during the next few years, and even then further declines in abundance seem likely.

Table F-1. Catch of river herring (alewife and blueback) in ICNAF subarea 6, Atlantic Ocean, by various countries. Catch is in metric tons, round weight[1].

	INSHORE			OFFSHORE					
	Virginia	North Carolina	Total U.S.A.	U.S.S.R.	East Germany	Bulgaria	Poland	Total Foreign	Total All Countries
1966[2]	13,182	5,680	21,178						21,178
1967	12,776	8,387	22,201	981				981	23,182
1968	14,663	7,044	23,649	1,075	126	0		1,201	24,850
1969	13,814	8,966	24,352	10,380		570		10,950	35,302
1970	6,827	5,227	14,888	5,954		746		6,700	21,588
1971	4,666	5,745	11,799	2,275	5,794	526	819	9,419	21,213
1972	5,069	5,079	10,937*						
1966-69 Average	14,108	7,519	22,770						
1970-72 Average	5,520	5,350						9,023[3]	
1966-71 Average									24,552

[1]One metric ton = 2204.6 lbs.
[2]First year of subarea 6 ICNAF statistics.
[3]1969-1971 average
*Preliminary

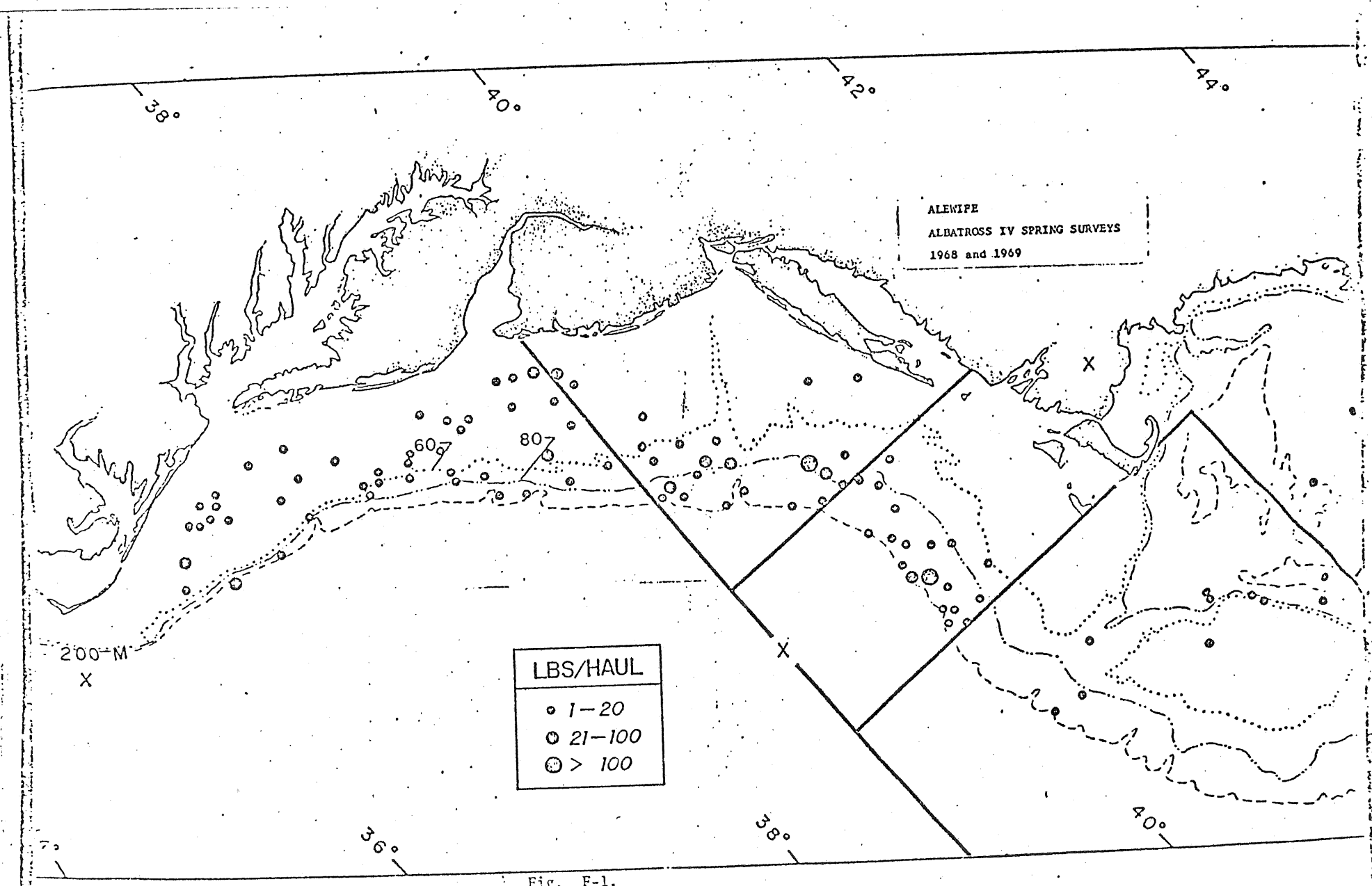

ALEWIFE
ALBATROSS IV SPRING SURVEYS
1968 and 1969
38°
40°
42°
44°
36°
38°
40°
60
80
200 M
LBS/HAUL
1—20
21—100
> 100

Fig. F-1.

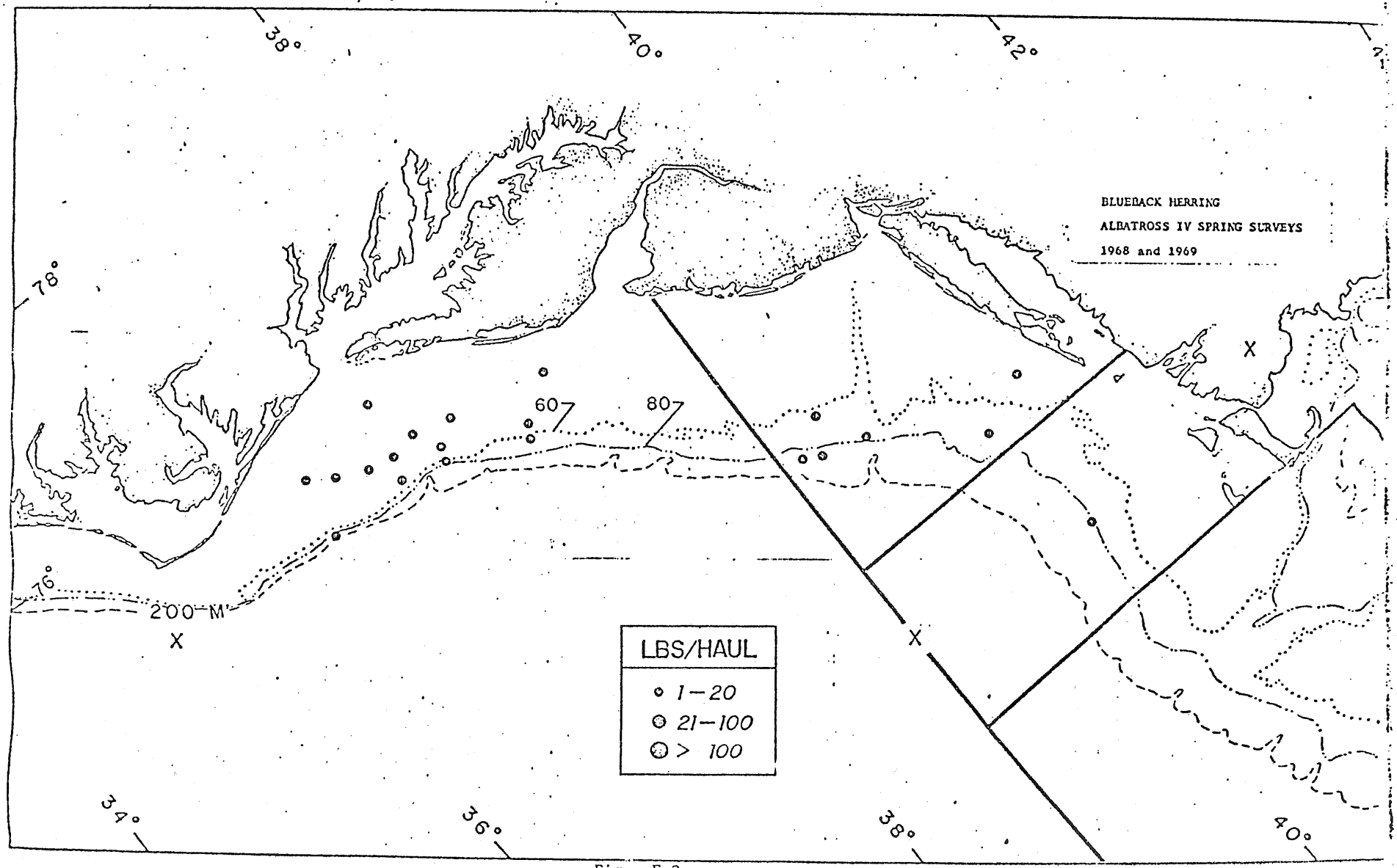

BLUEBACK HERRING
ALBATROSS IV SPRING SURVEYS
1968 and 1969
LBS/HAUL
1–20
21–100
> 100
38°
40°
42°
78°
76°
60
80
200 M
X
34°
36°
38°
40°

Fig. F-2.

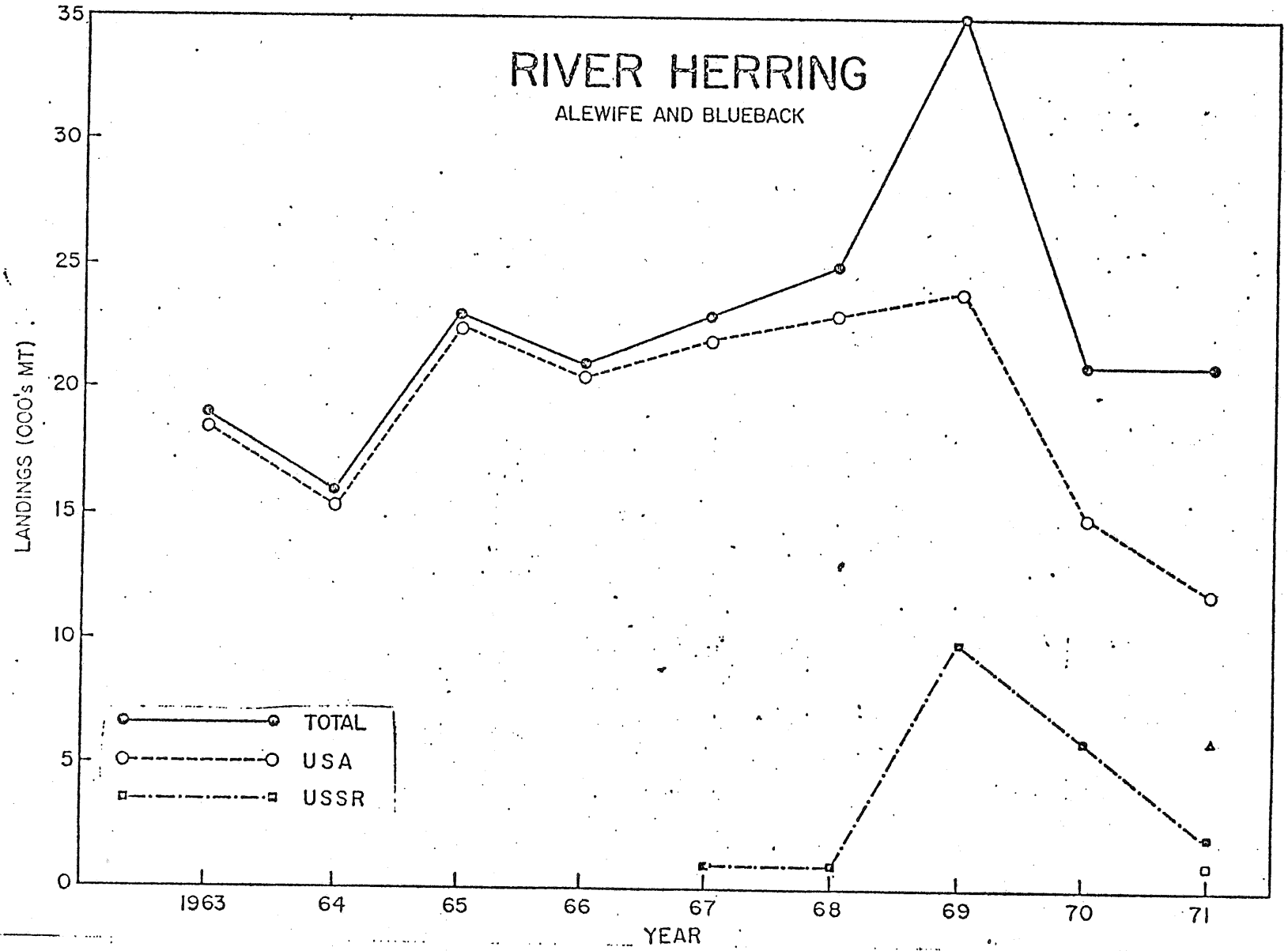


Fig. F-3. River herring landings in Statistical Area 6.

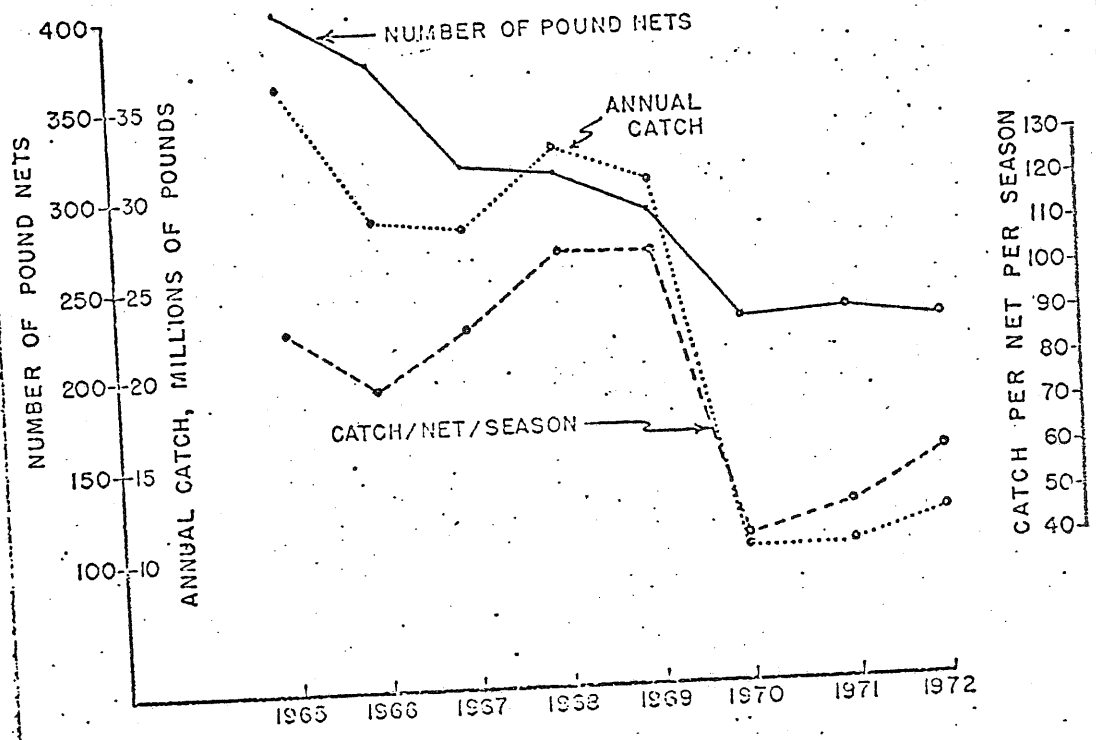


Figure F-4. Fishing effort and catch rate in the river herring fishery of Virginia and the Potomac River.

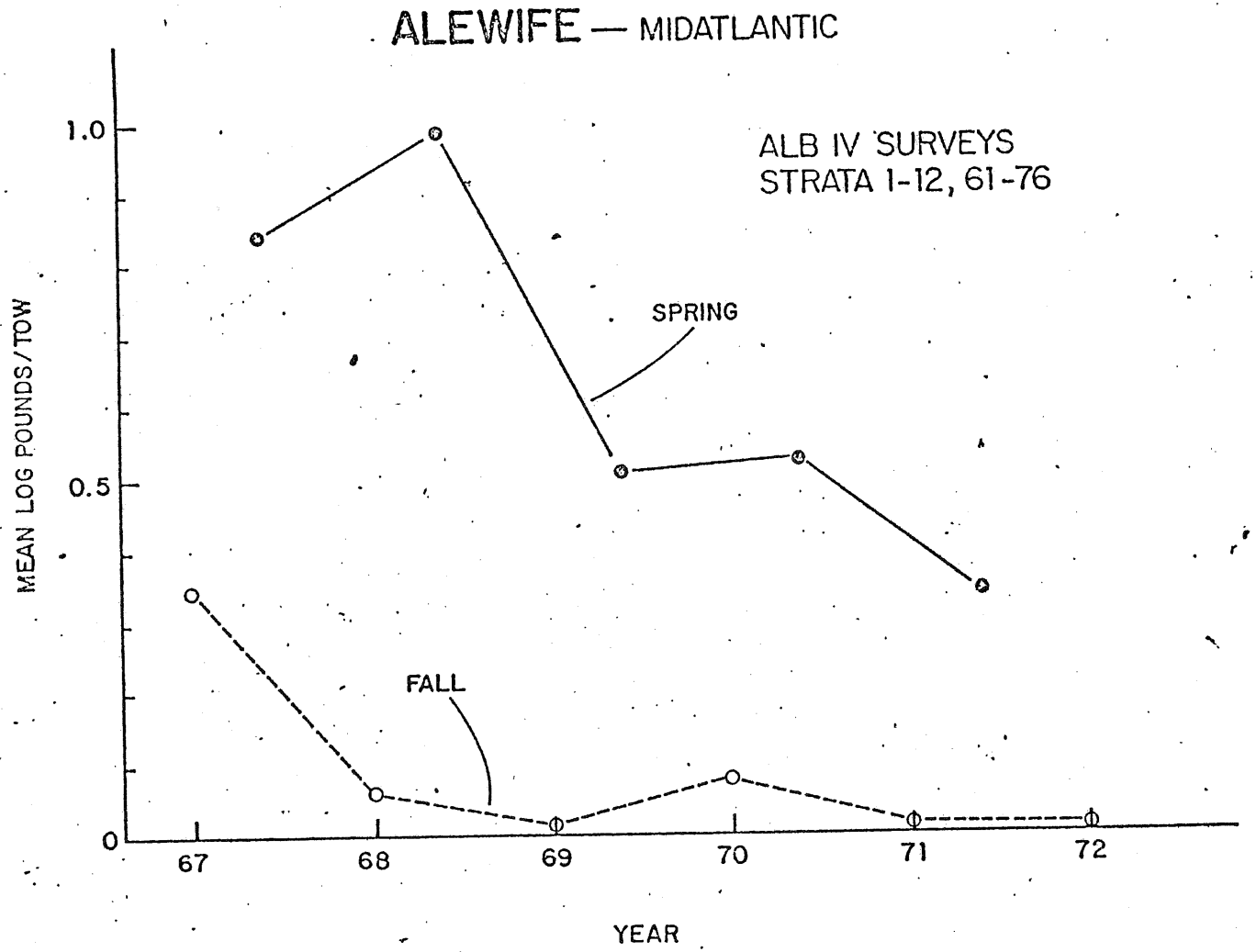

ALEWIFE — MIDATLANTIC
ALB IV SURVEYS
STRATA 1-12, 61-76
SPRING
FALL
MEAN LOG POUNDS/TOW
1.0
0.5
0
67
68
69
70
71
72
YEAR

Fig. F-5.

G. Scup

This species is found principally from Cape Cod to South Carolina. From November to March scup generally tend to be concentrated along the 100 fathom curve from Hudson Canyon to Cape Hatteras, and then begin moving inshore in April with warming of the water (Figures G-1 to G-4). The scup which overwinter off the New Jersey coast move northward as well as inshore to the southern New England area in the spring. Spawning occurs inshore from May to July. There is some evidence based on tagging, distribution, and meristic studies, that the scup found off southern New England and Chesapeake in the summer, form two distinct subpopulations. However, it appears that these populations intermingle in winter.

Scup have long been an important sport and commercial species for U. S. fishermen in the Mid-Atlantic. In recent years, the principal commercial component is the winter offshore trawl fishery (March-April) off Delaware and New Jersey, and the trawl fishery in January-April off Chesapeake Bay. Total commercial landings on the U. S. east coast fluctuated from 16-20,000 tons during the 1950's, reached a peak of 22,000 tons in 1960, and have declined steadily since 1960. In the Mid-Atlantic (Statistical Area 6) which accounts for about 80 percent of the U. S. scup harvest, commercial landings dropped from 15,000 tons in 1963 to 3,000 tons in 1971, and remained at this low level in 1972 (Figure G-5). Until recently, reported foreign landings of scup have remained low relative to U. S. landings, but in 1971 the foreign catch of about 800 tons represented nearly 25 percent of the total.

Relative abundance estimates in terms of catch per trip for the New York trawl fishery showed a drop from 12 tons/trip in 1961 to only one ton/trip in 1970 and 1971, suggesting a substantial decline in abundance. Reduced abundance was also indicated in the late 1960's by declining catch per trip in the winter trawl fishery from Hampton, Virginia; and in that fishery the proportion of "large" fish in the landings decreased substantially in the late 1960's which is another indication of declining stock size.

Estimated sport fish harvest of scup in 1965 in New England and the Mid-Atlantic was about 14,000,000 pounds, based on the 1965 angler survey. A comparable survey in 1970 showed a drop to 4,400,000 pounds in spite of an increase of nearly 20 percent in the estimated number of anglers. While the accuracy of these catch estimates is not high, the decline undoubtedly is real and still another indication of reduced abundance of scup.

Abundance indices based on research vessel surveys are difficult to interpret because of the substantial seasonal and diurnal movements of scup. Fall surveys occur in September and early October just when scup are beginning their offshore migrations, and the proportion of the stock available to the trawl varies from one year to another. Nevertheless, from the fall surveys there is some indication that the abundance was lower in 1970 and 1971 than in 1967 and 1968 (Figure G-6). The 1972 index is the second highest observed during the fall Mid-Atlantic surveys, and probably does indicate recruitment of a better than average year class. Albatross IV spring surveys suggest a rather steady increase in abundance since 1967 but this may instead reflect a positive bias in the spring indices as a result of a shift in winter distribution of scup in relation to changes in water temperature. Essentially, scup have been more available to the trawl in recent spring surveys because they have been in somewhat shoaler water due to warm temperatures (compare Figures G-1 and G-2).

In conclusion, there is good evidence that scup stocks have declined significantly in the last decade. The decline cannot be directly related to increased foreign exploitation on the basis of reported landings, but the stock is currently at such a low level that even incidental foreign catches make up a significant proportion of the total. In view of the vulnerability of scup to offshore trawling in winter and spring months, it would seem desirable to maintain or even expand the closed area in SA 6.

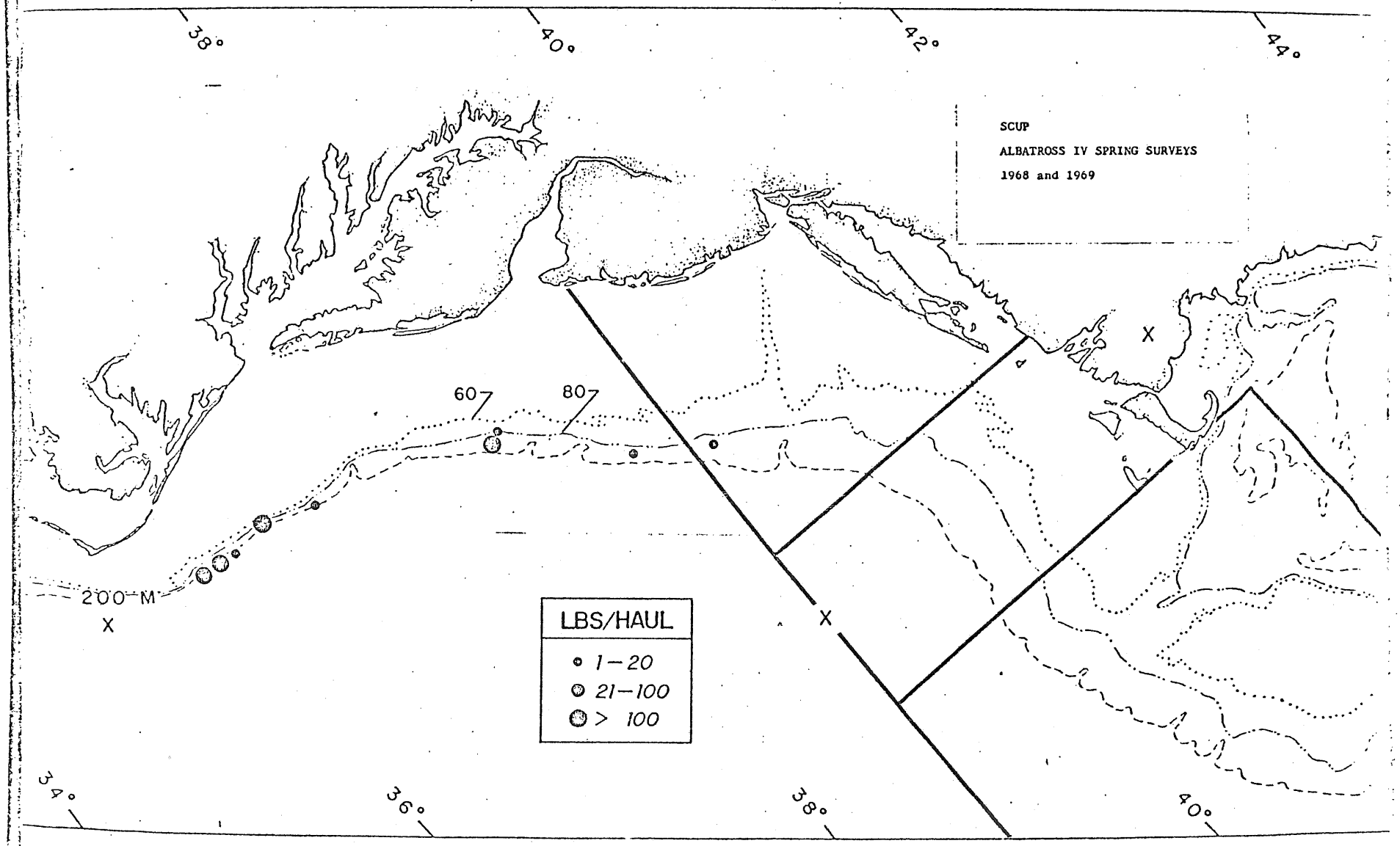

38°
40°
42°
44°
SCUP
ALBATROSS IV SPRING SURVEYS
1968 and 1969
60
80
200 M
X
X
X
LBS/HAUL
1–20
21–100
> 100
34°
36°
38°
40°

Fig. G-1

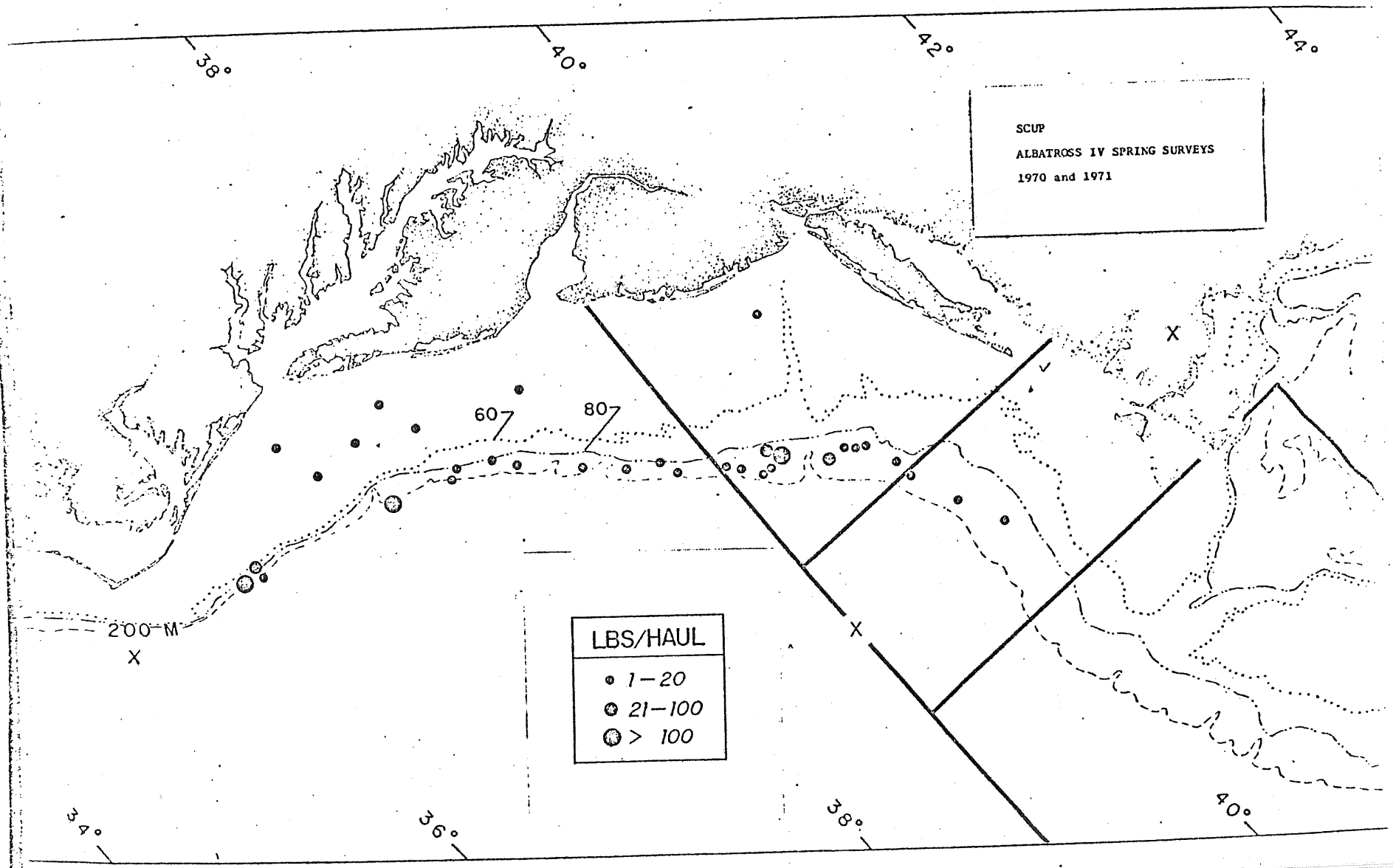

SCUP
ALBATROSS IV SPRING SURVEYS
1970 and 1971
38°
40°
42°
44°
34°
36°
38°
40°
60
80
200 M
LBS/HAUL
1–20
21–100
> 100

Fig. G-2.

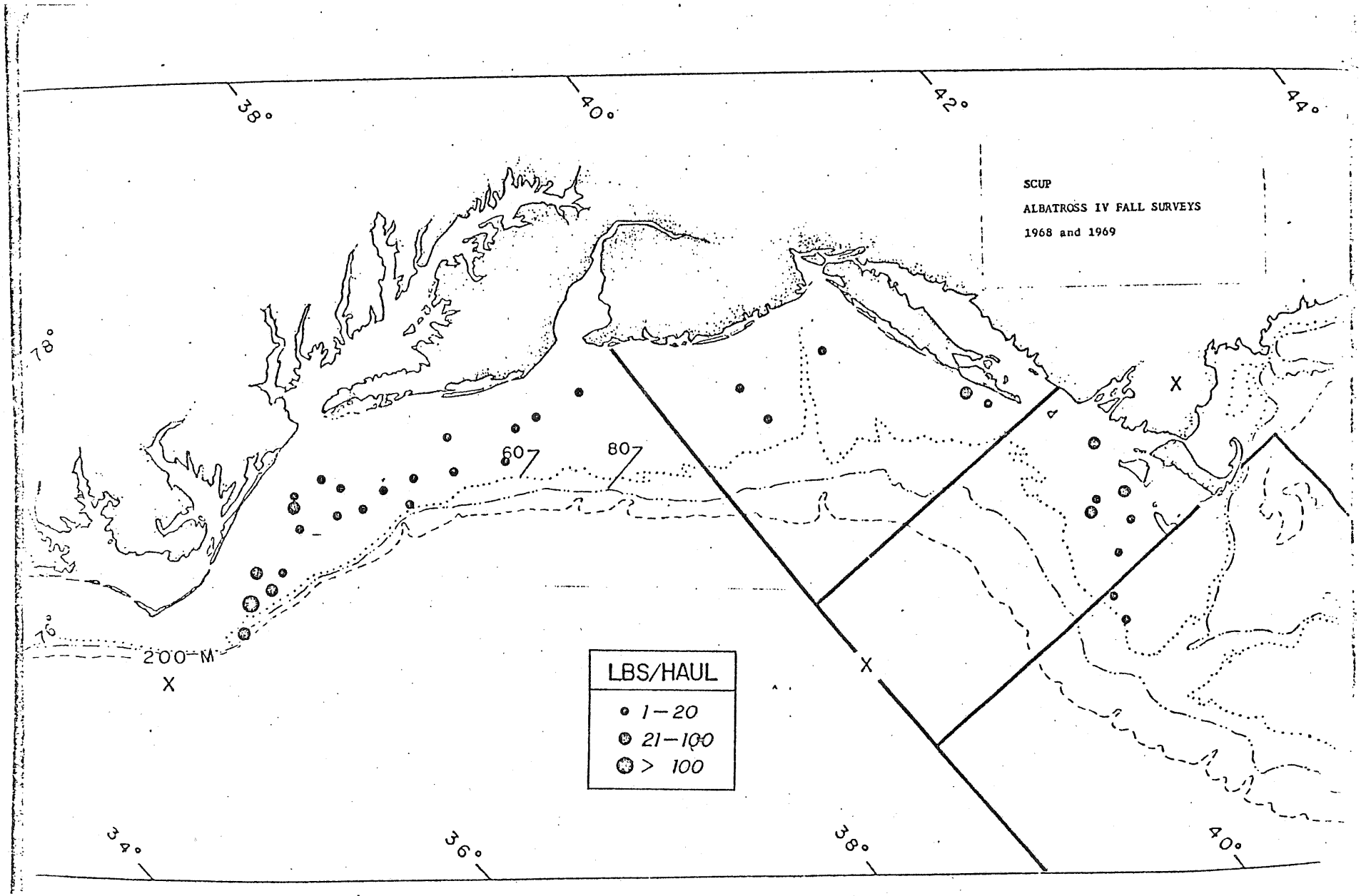

SCUP
ALBATROSS IV FALL SURVEYS
1968 and 1969
38°
40°
42°
44°
78°
76°
60
80
200 M
X
LBS/HAUL
1 – 20
21 – 100
> 100
34°
36°
38°
40°

Fig. G-3.

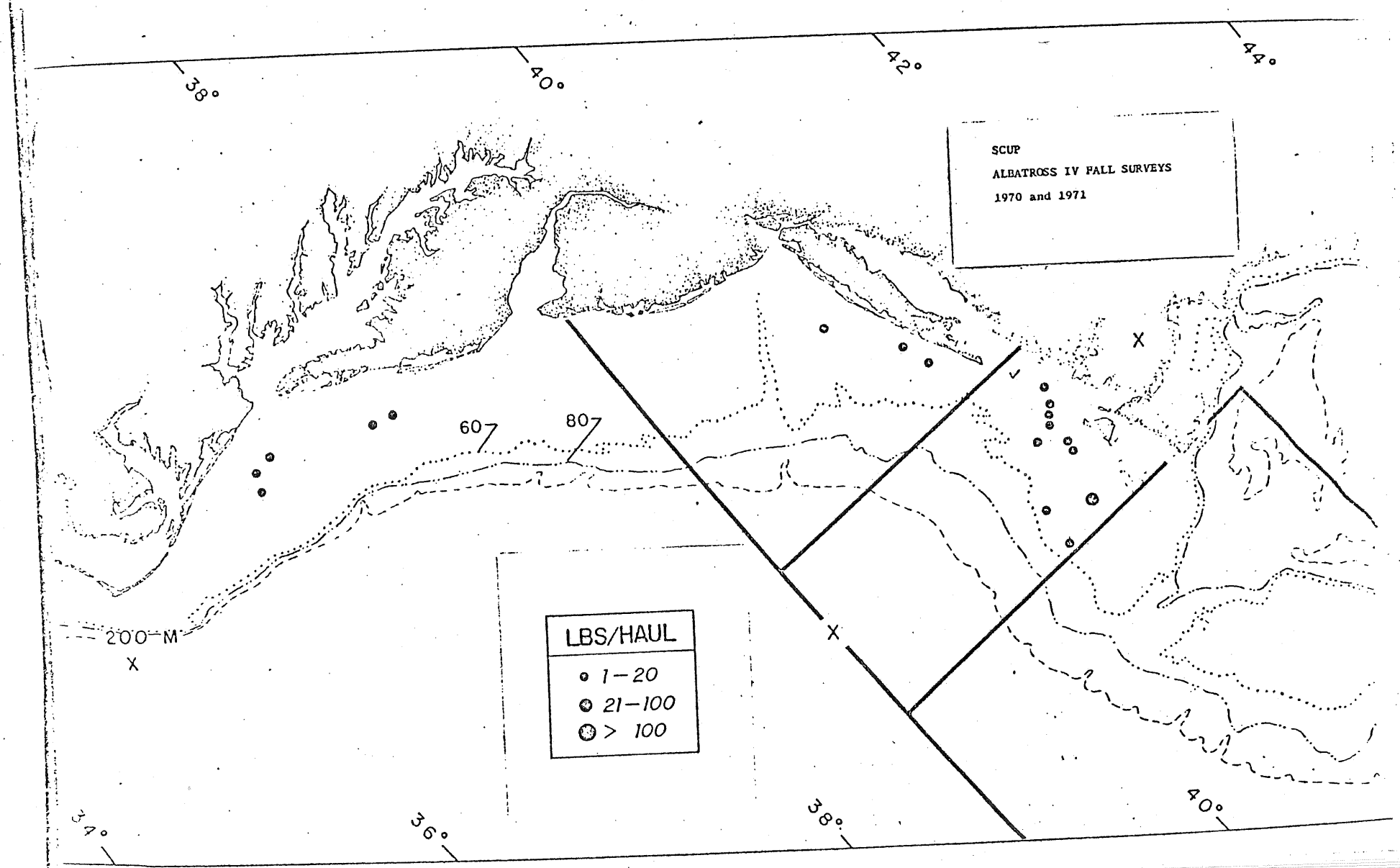

SCUP
ALBATROSS IV FALL SURVEYS
1970 and 1971
LBS/HAUL
1-20
21-100
> 100
38°
40°
42°
44°
34°
36°
38°
40°
60
80
200 M

Fig. G-4.

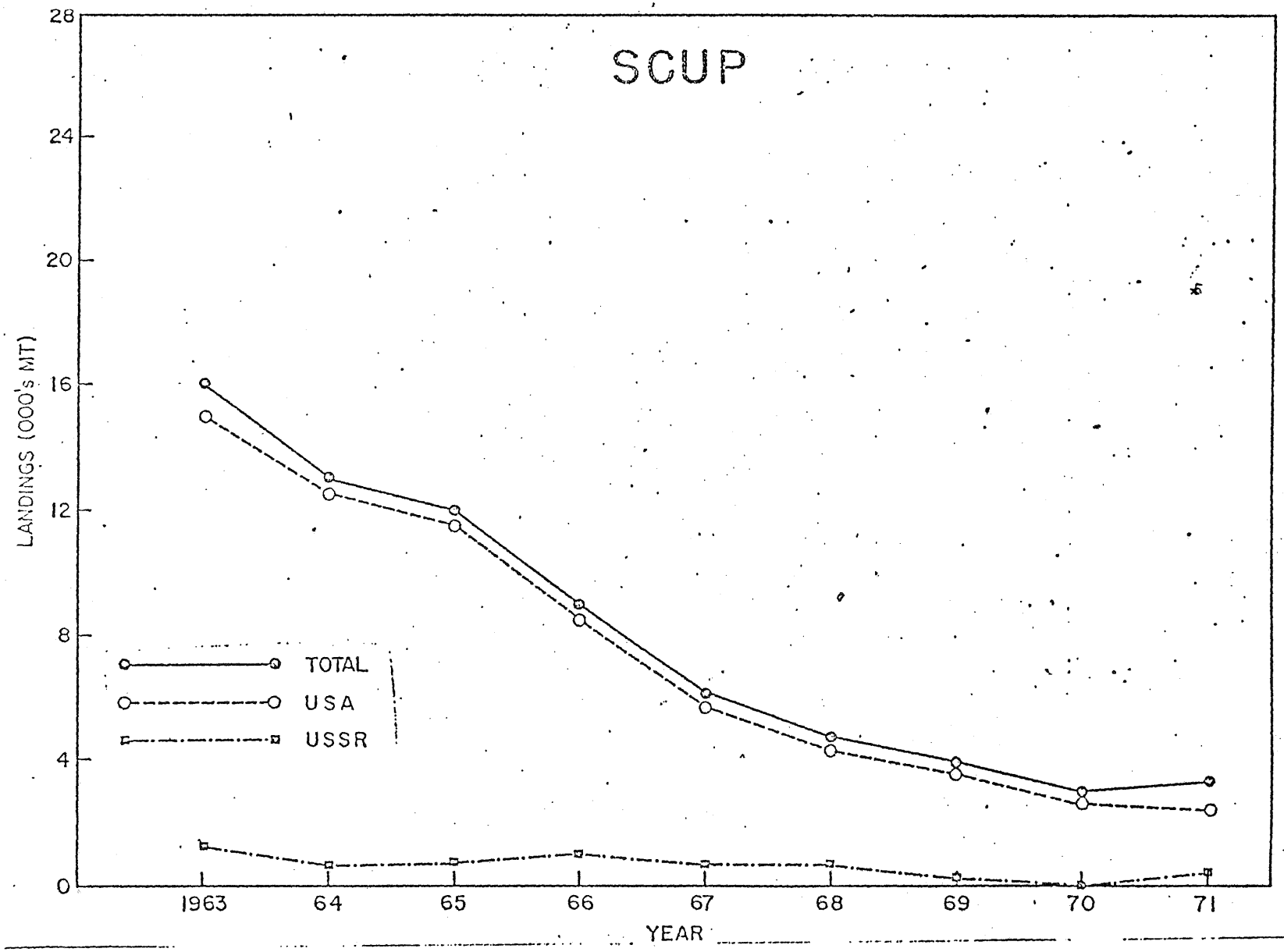
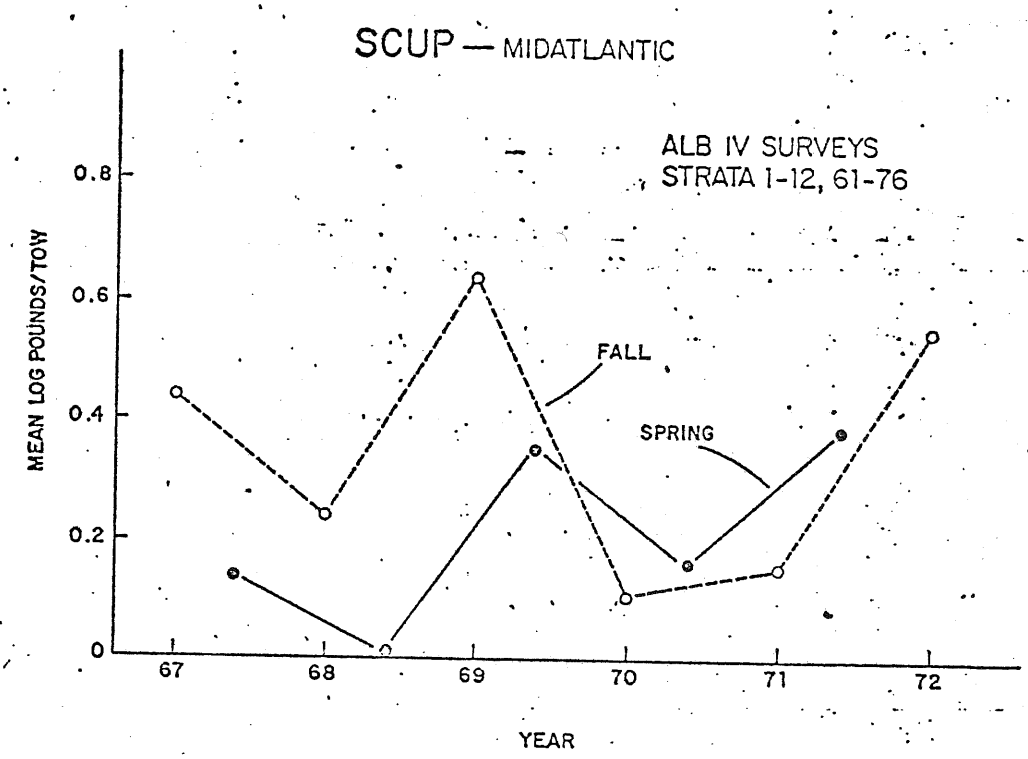


Fig. G-5. Scup landings in Statistical Area 6.


SCUP — MIDATLANTIC
ALB IV SURVEYS
STRATA 1-12, 61-76
FALL
SPRING
MEAN LOG POUNDS/TOW
0.8
0.6
0.4
0.2
0
67
68
69
70
71
72
YEAR

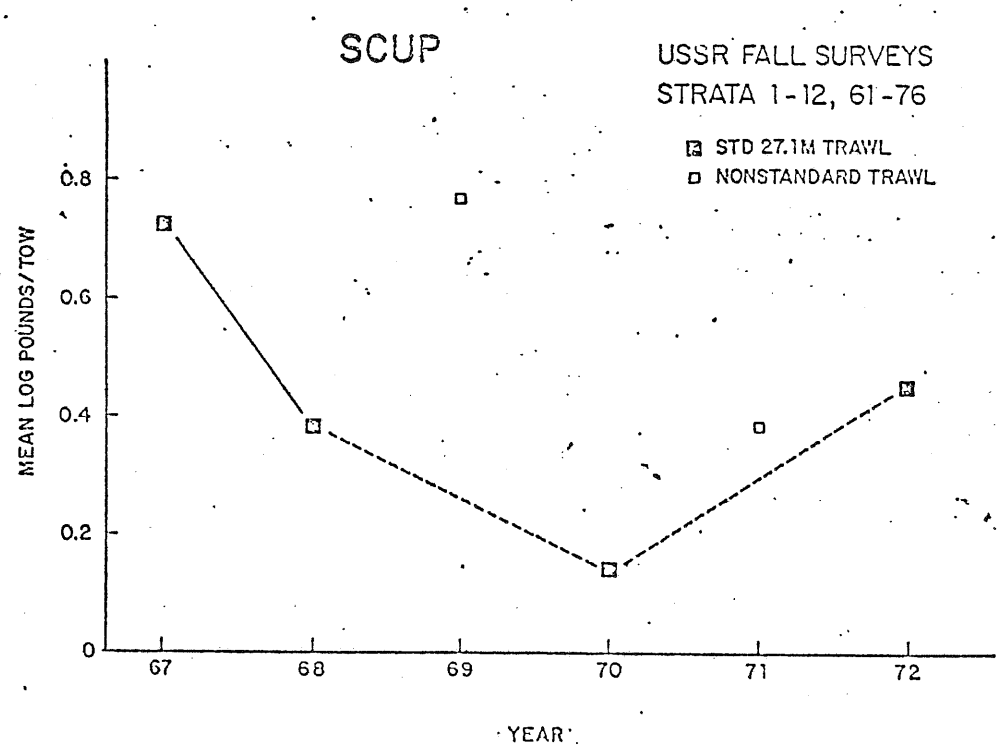

SCUP
USSR FALL SURVEYS
STRATA 1-12, 61-76
STD 27.1M TRAWL
NONSTANDARD TRAWL
MEAN LOG POUNDS/TOW
0.8
0.6
0.4
0.2
0
67
68
69
70
71
72
YEAR

Fig. G-6.

H. Butterfish

Landings of the United States fishery in SA 6 have held steady at about 2,000 tons or less since 1963 (Figure H-1). First foreign landings were reported in 1967, and in 1970 the total harvest exceeded 8,000 tons chiefly as a result of butterfish catches by Japan. Total landings declined to 6,000 tons in 1971 with the United States reporting only 1,100 tons. The estimated United States catch for 1972 is only 700 tons.

Abundance estimates from the winter trawl fishery in the Chesapeake Bight have shown no prominent trends during the period 1957-1972. Fall research vessel surveys in the mid-Atlantic, considering both Albatross IV and USSR indices, have also given no evidence of any major trend since 1967 (Figure H-2). The Albatross IV spring indices do show a pattern similar to that described for scup. Higher values were observed in the later years and as for scup, this appears to be the result of a more shoal distribution of butterfish caused by warmer temperatures (Figures H-3, H-4). The distribution of butterfish both seasonally and geographically is quite similar to that of scup, except that butterfish occur further east on Georges Bank (Figures H-3 to H-6). Consequently winter concentrations of butterfish are especially vulnerable to trawl fisheries, and a significant increase in foreign fishing could affect abundance quickly.

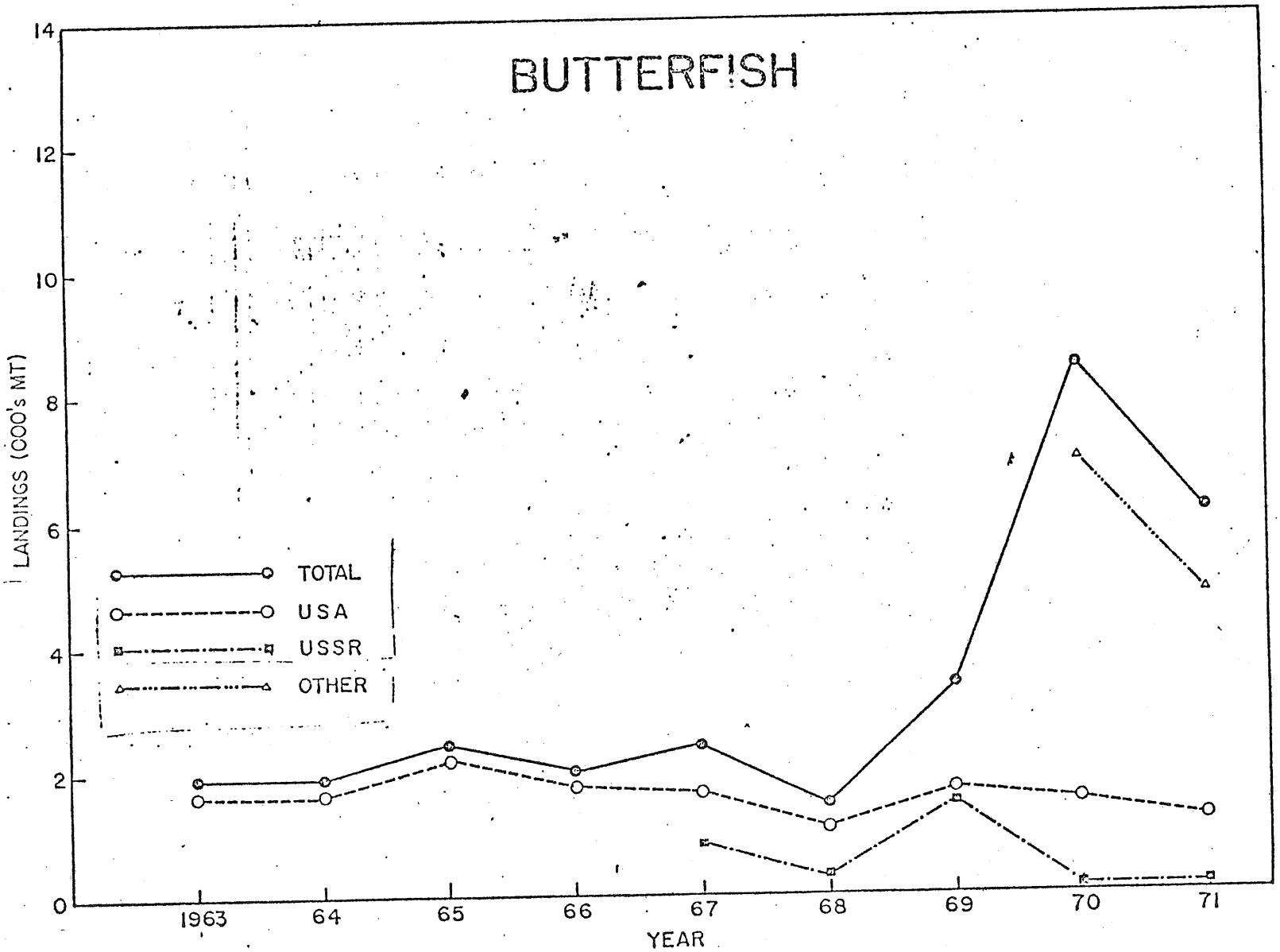
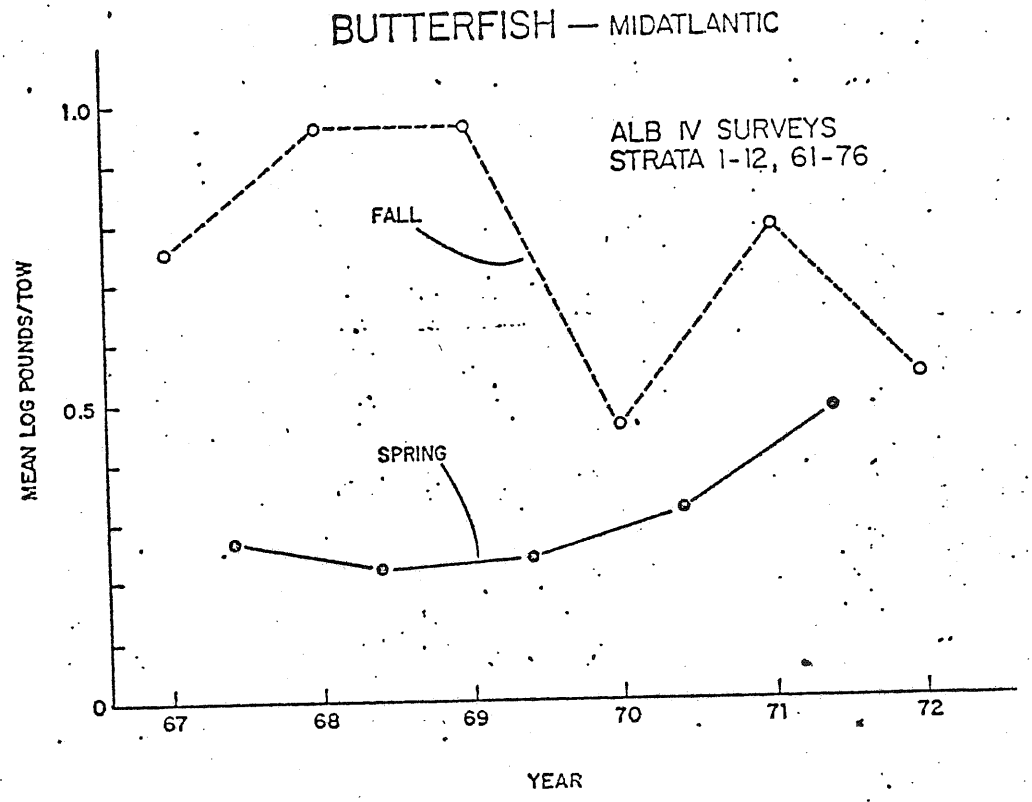


Fig. H-1. Butterfish landings in Statistical Area 6.


BUTTERFISH — MIDATLANTIC
ALB IV SURVEYS
STRATA 1-12, 61-76
FALL
SPRING
MEAN LOG POUNDS/TOW
1.0
0.5
0
67
68
69
70
71
72
YEAR

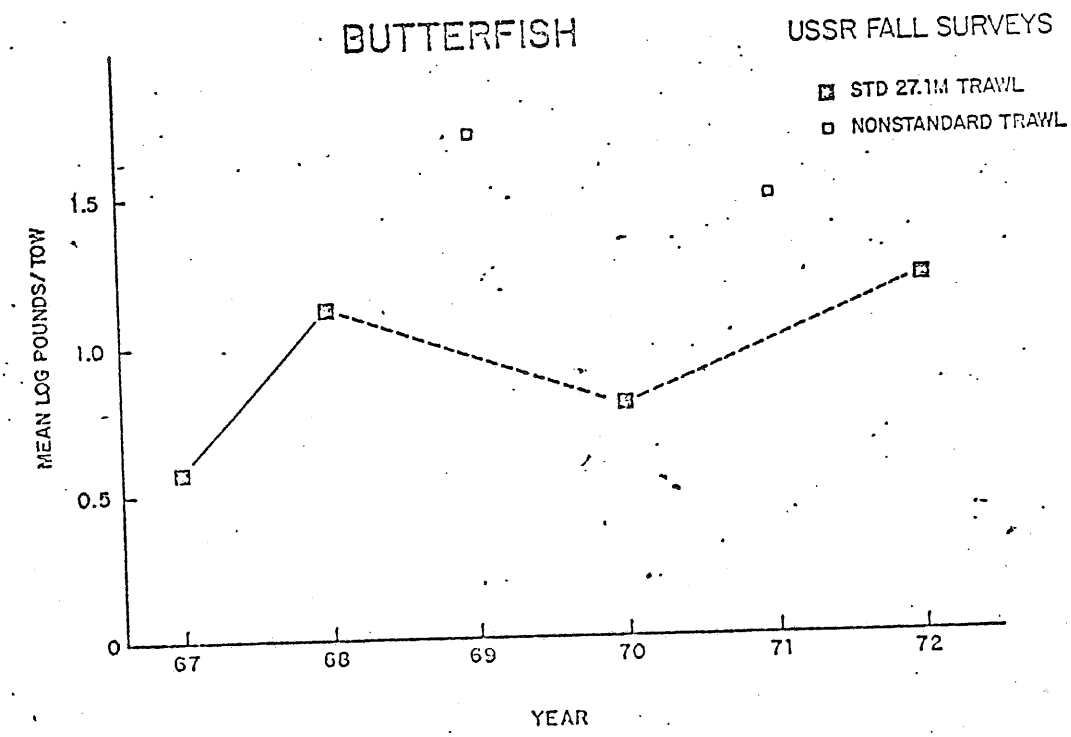

BUTTERFISH
USSR FALL SURVEYS
STD 27.1M TRAWL
NONSTANDARD TRAWL
MEAN LOG POUNDS/TOW
1.5
1.0
0.5
0
67
68
69
70
71
72
YEAR

Fig. II-2.

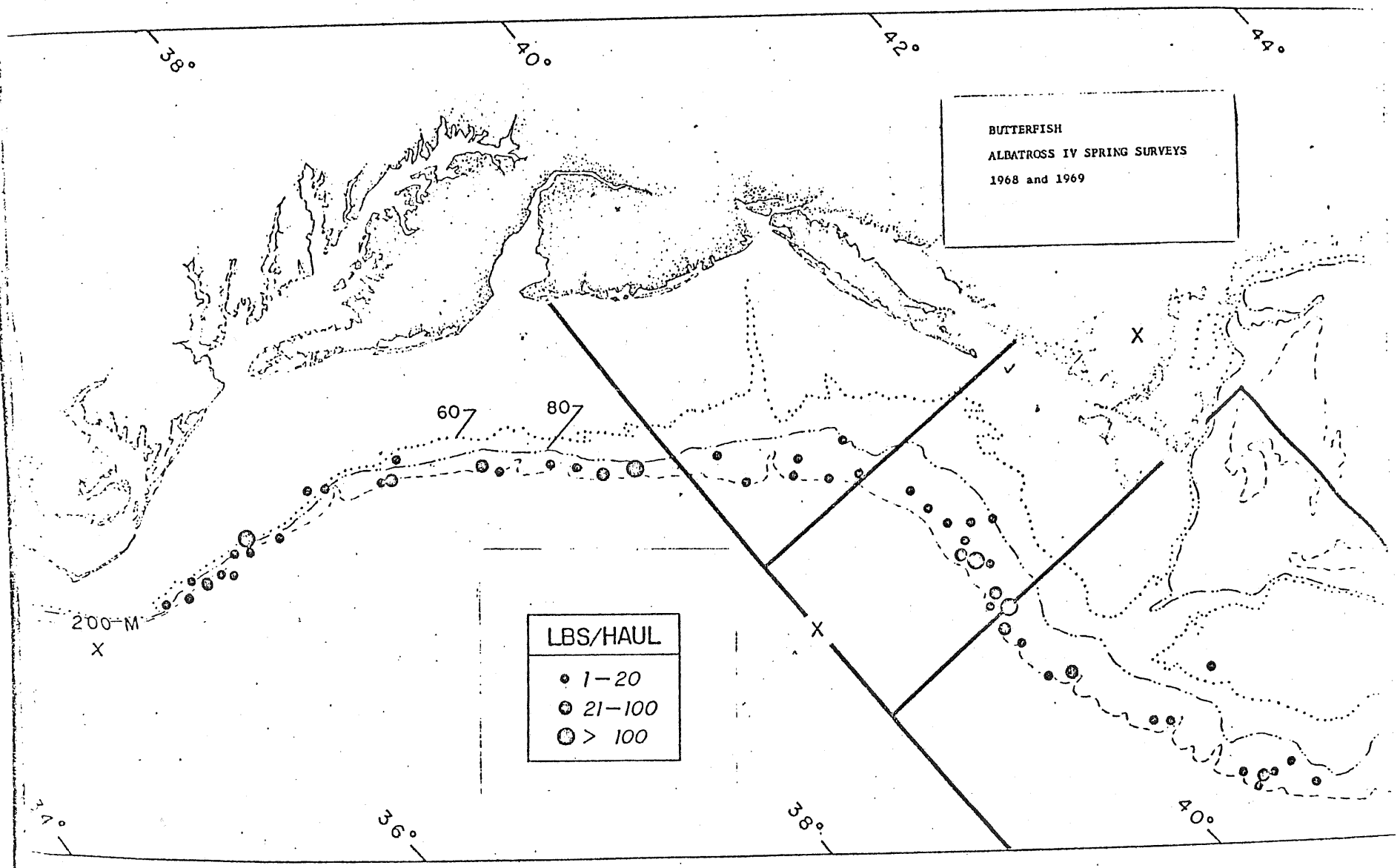

BUTTERFISH
ALBATROSS IV SPRING SURVEYS
1968 and 1969
38°
40°
42°
44°
60
80
200 M
LBS/HAUL
1–20
21–100
> 100
34°
36°
38°
40°

Fig. H-3.

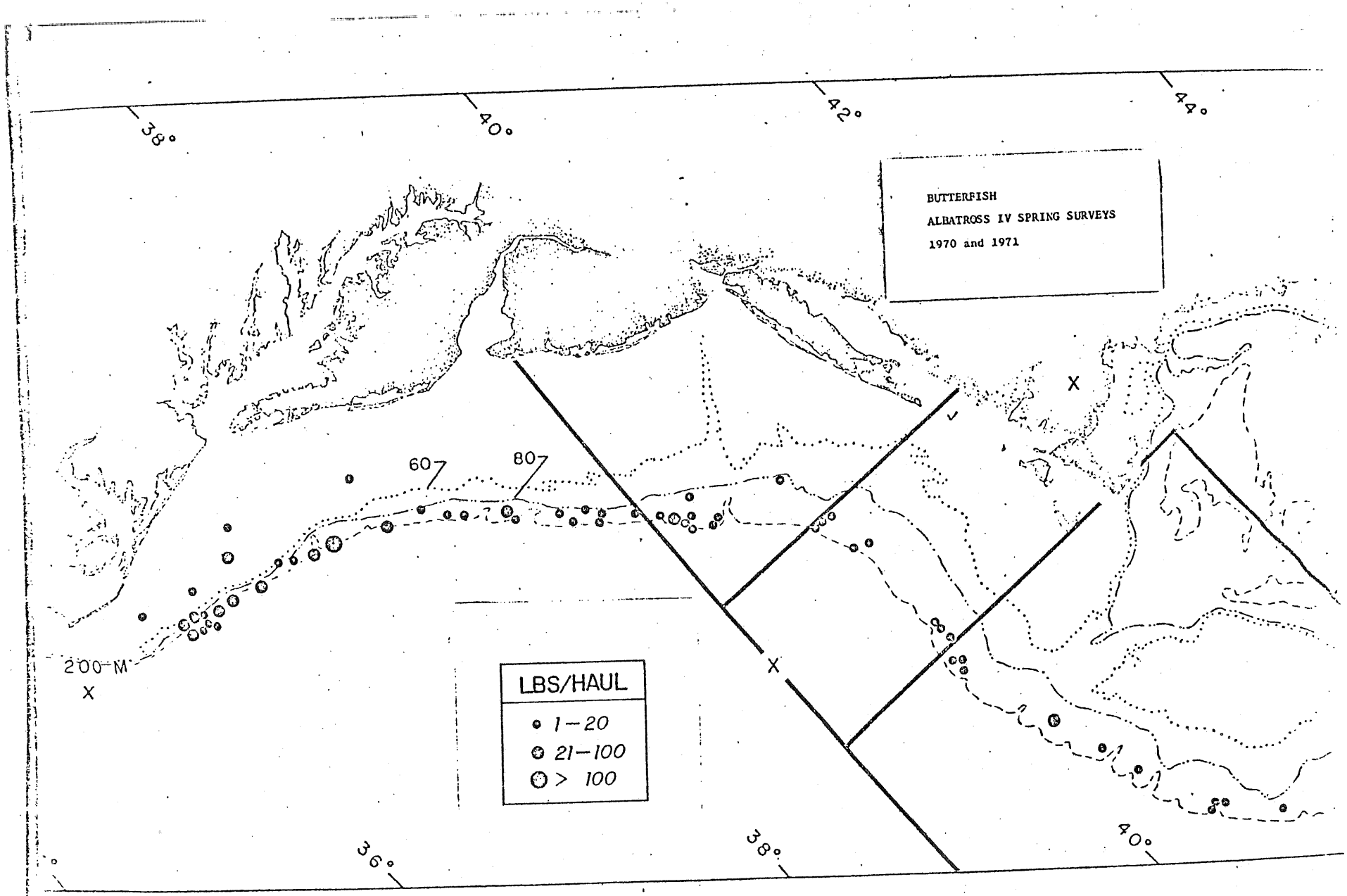

BUTTERFISH
ALBATROSS IV SPRING SURVEYS
1970 and 1971
38°
40°
42°
44°
36°
38°
40°
60
80
200 M
LBS/HAUL
1–20
21–100
> 100

Fig. H-4.

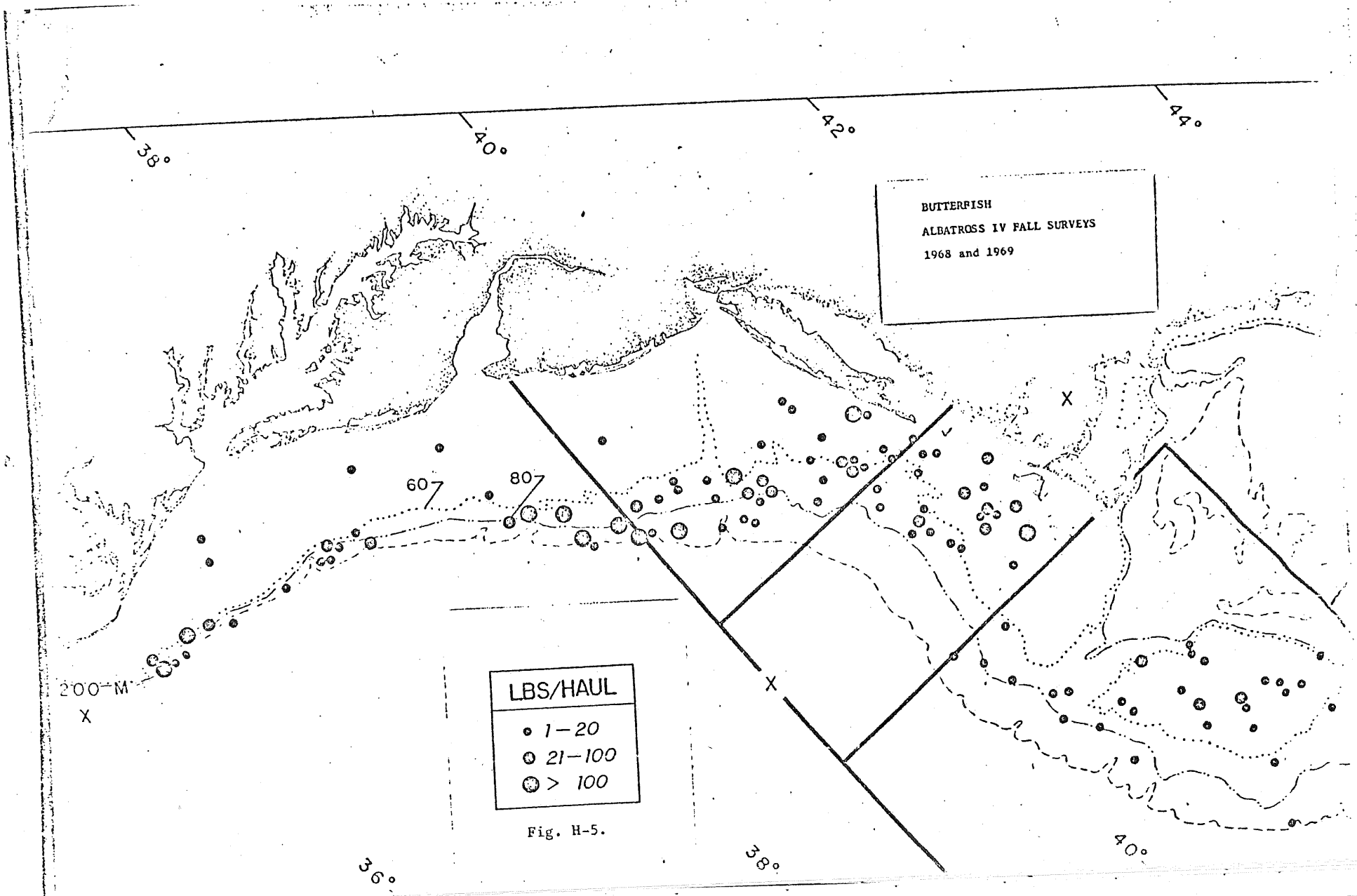

BUTTERFISH
ALBATROSS IV FALL SURVEYS
1968 and 1969
38°
40°
42°
44°
36°
38°
40°
60
80
200 M
X
LBS/HAUL
1–20
21–100
> 100

Fig. H-5.

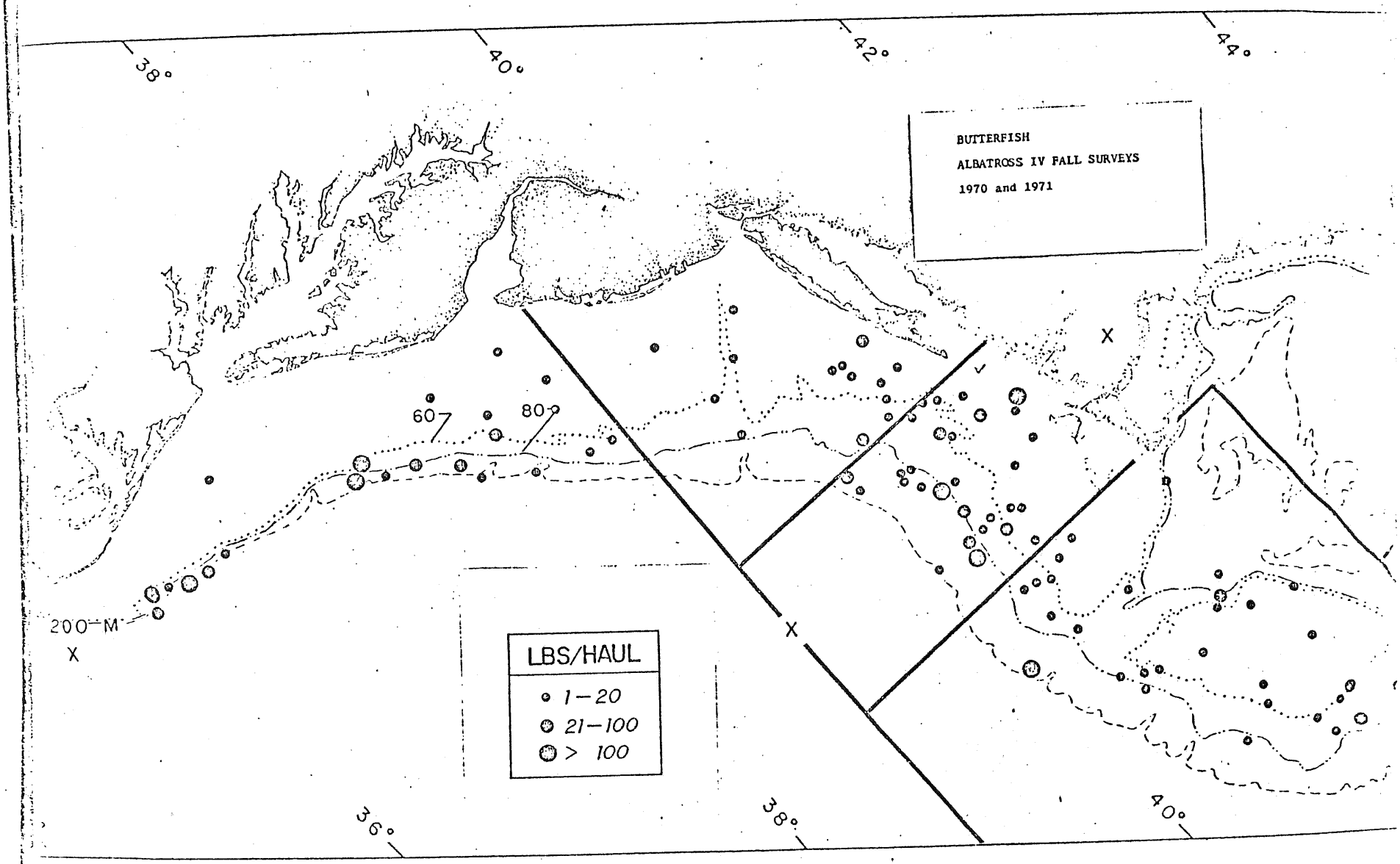

BUTTERFISH
ALBATROSS IV FALL SURVEYS
1970 and 1971
38°
40°
42°
44°
36°
38°
40°
60
80
200 M
X
LBS/HAUL
1–20
21–100
> 100

Fig. H-6.

I. Summer Flounder (Fluke)

This species ranges from Cape Cod to Florida and it is one of the most popular sport fish on the United States east coast. It is available to anglers near shore, and is subjected to an intense sport fishery in late spring and summer months throughout the Mid-Atlantic Bight. The sport harvest in 1970 was only 2/3 as large as in 1965 in spite of a 20 percent increase in number of anglers.

United States otter trawl catches declined sharply from 1960 to 1967 between Massachusetts and Maryland, but showed no trend in the Virginia trawl fishery. Total landings in SA 6 were about 4,000 tons from 1963 to 1966, and then dropped below 2,000 tons by 1969, and remained at the 2,000 ton level in 1970 and 1971 (Figure I-1). Virtually the entire catch is taken by small U. S. trawlers; reported landings by foreign vessels have remained low.

Abundance indices from fall research vessel surveys suggest a decline in the population since 1967 (Figure I-2). Again there is an indication of reversal in trend with the spring survey indices and again it appears to be related to the same shift in winter distribution described for scup and butterfish (Figures I-3, I-4). Offshore winter distribution of summer flounder is very similar to that of scup, with the fish concentrated along the edge of the shelf from Hudson Canyon to Cape Hatteras, and therefore vulnerable to any intensive fishery. Fall distribution is illustrated in Figures I-5 and I-6.

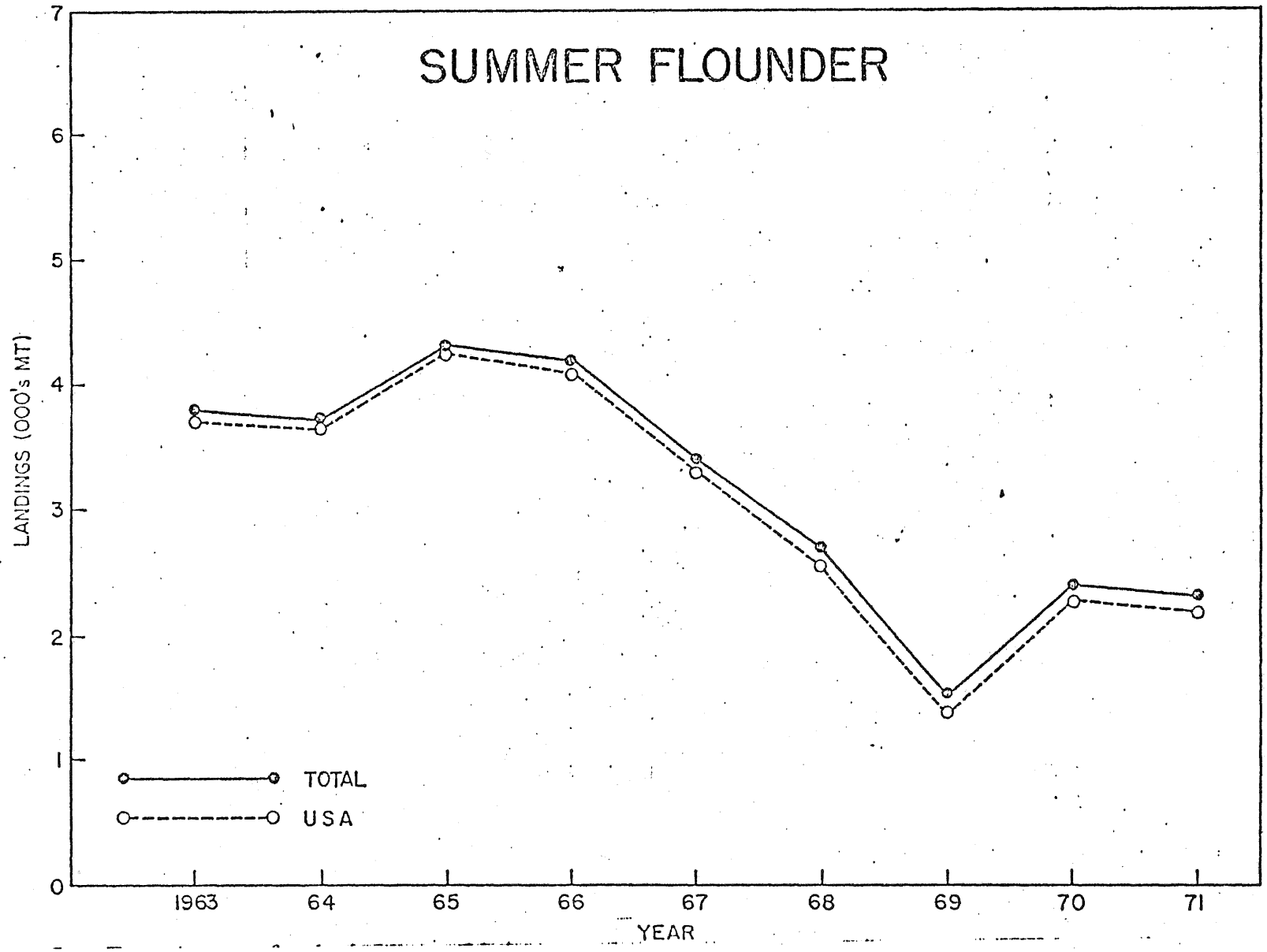
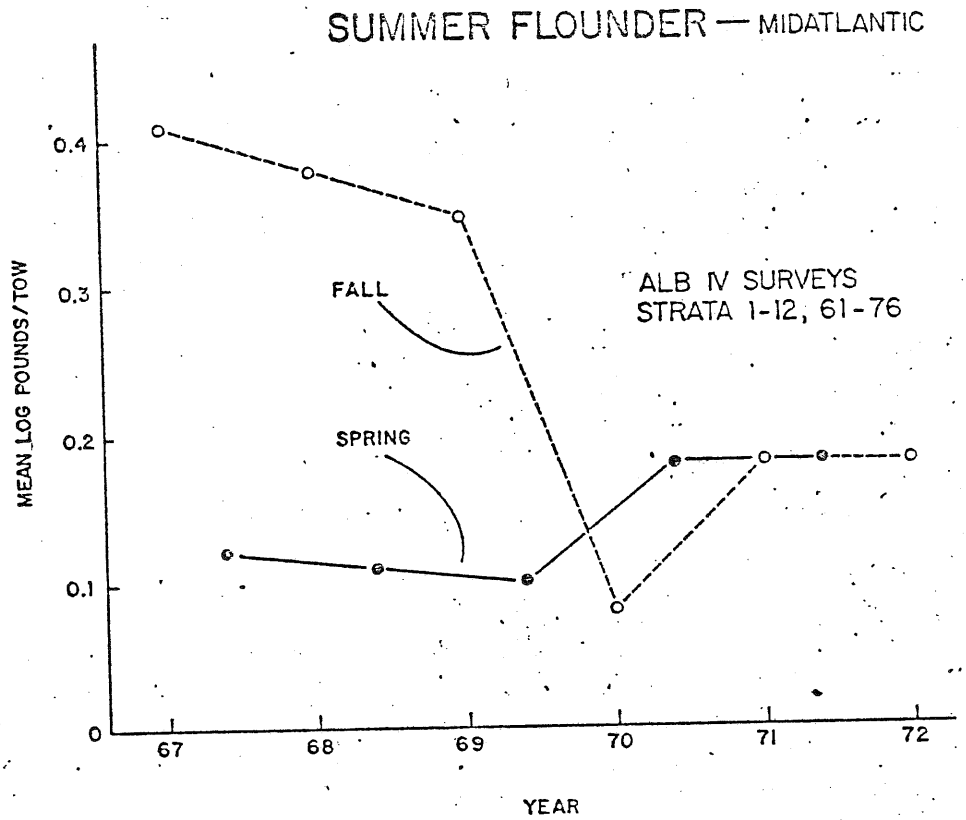


Fig. I-1. Summer flounder landings in SA 6.


SUMMER FLOUNDER — MIDATLANTIC
MEAN LOG POUNDS/TOW
0.4
0.3
0.2
0.1
0
FALL
SPRING
ALB IV SURVEYS
STRATA 1-12, 61-76
67
68
69
70
71
72
YEAR

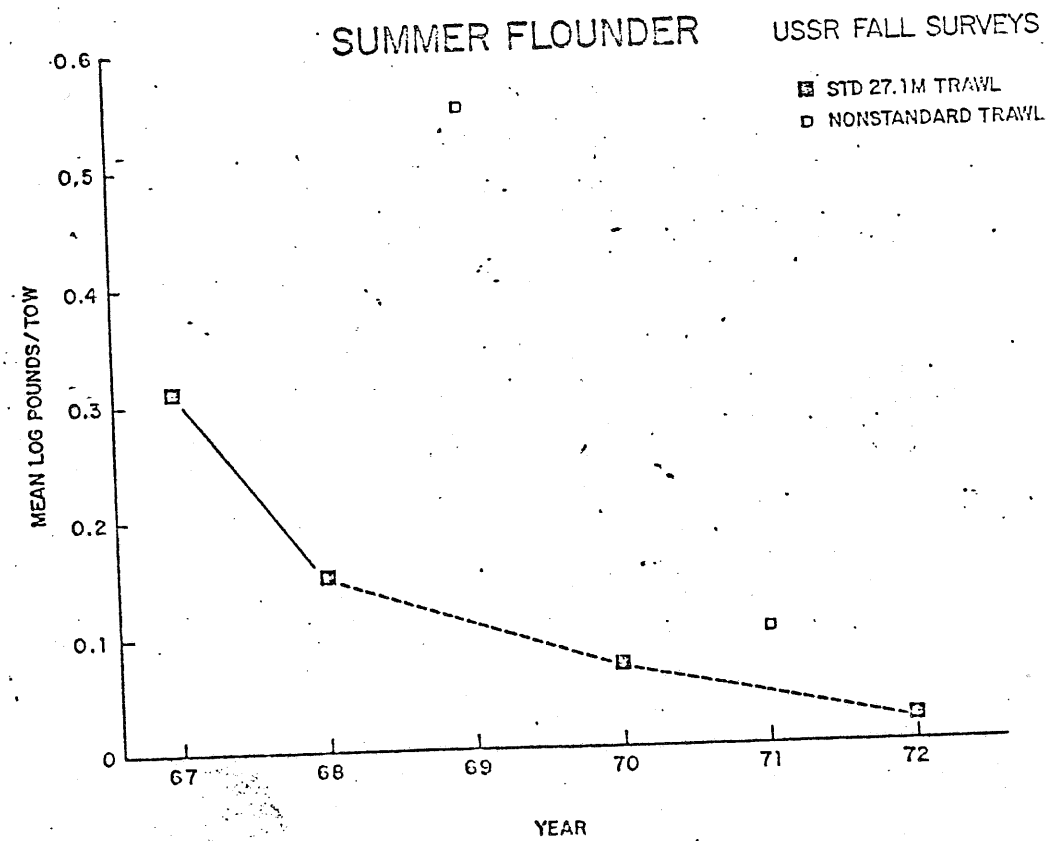
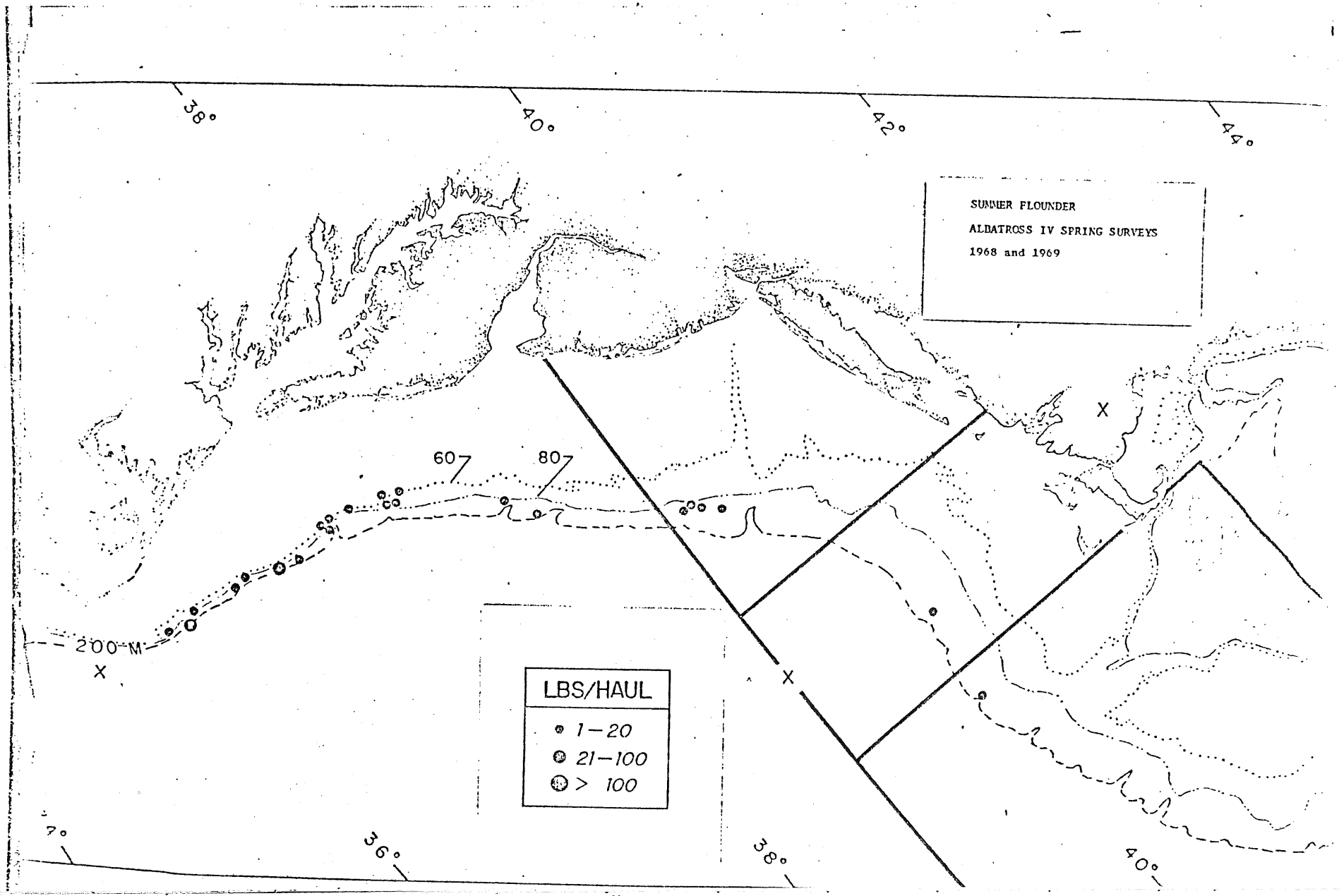
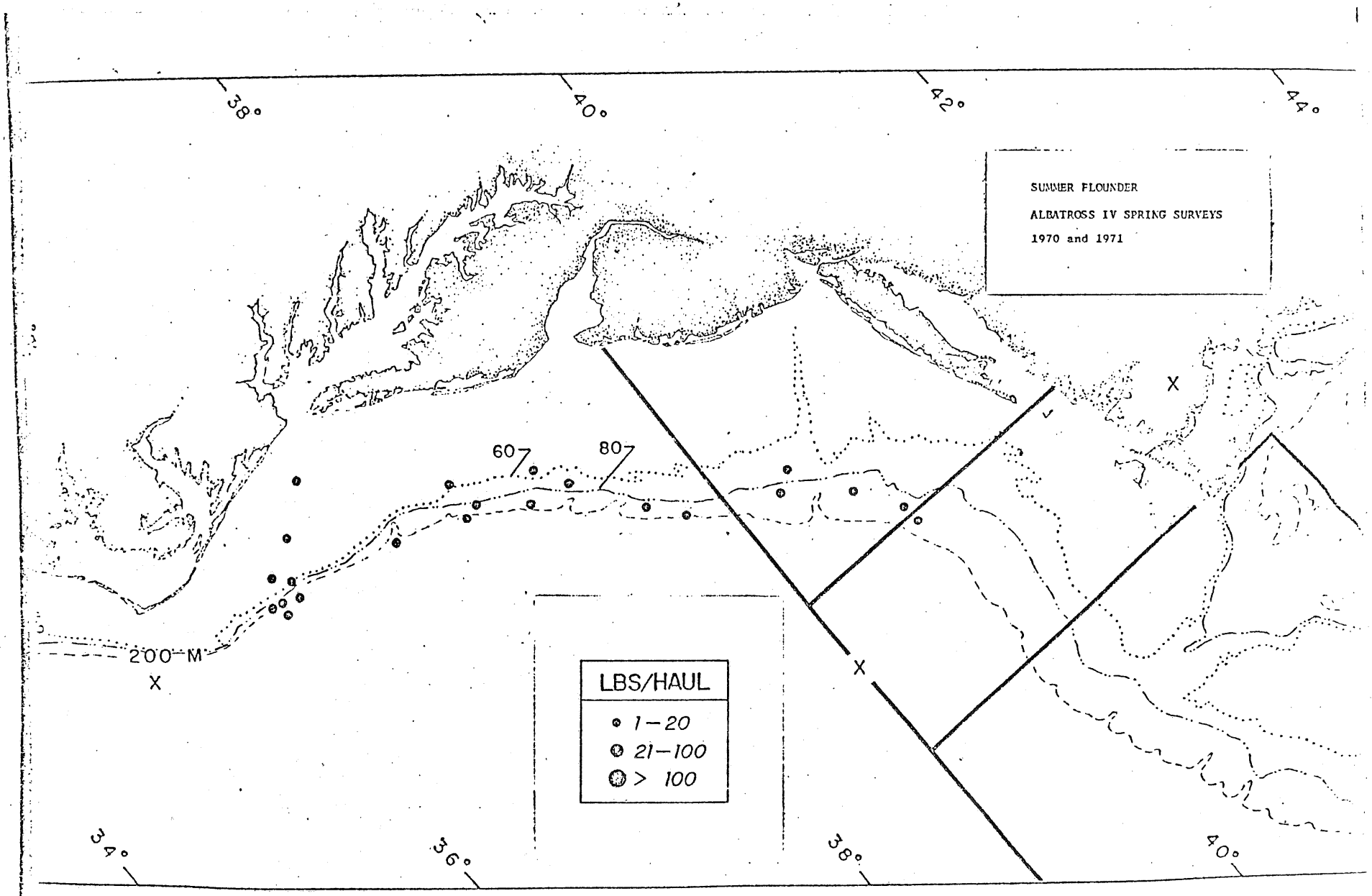
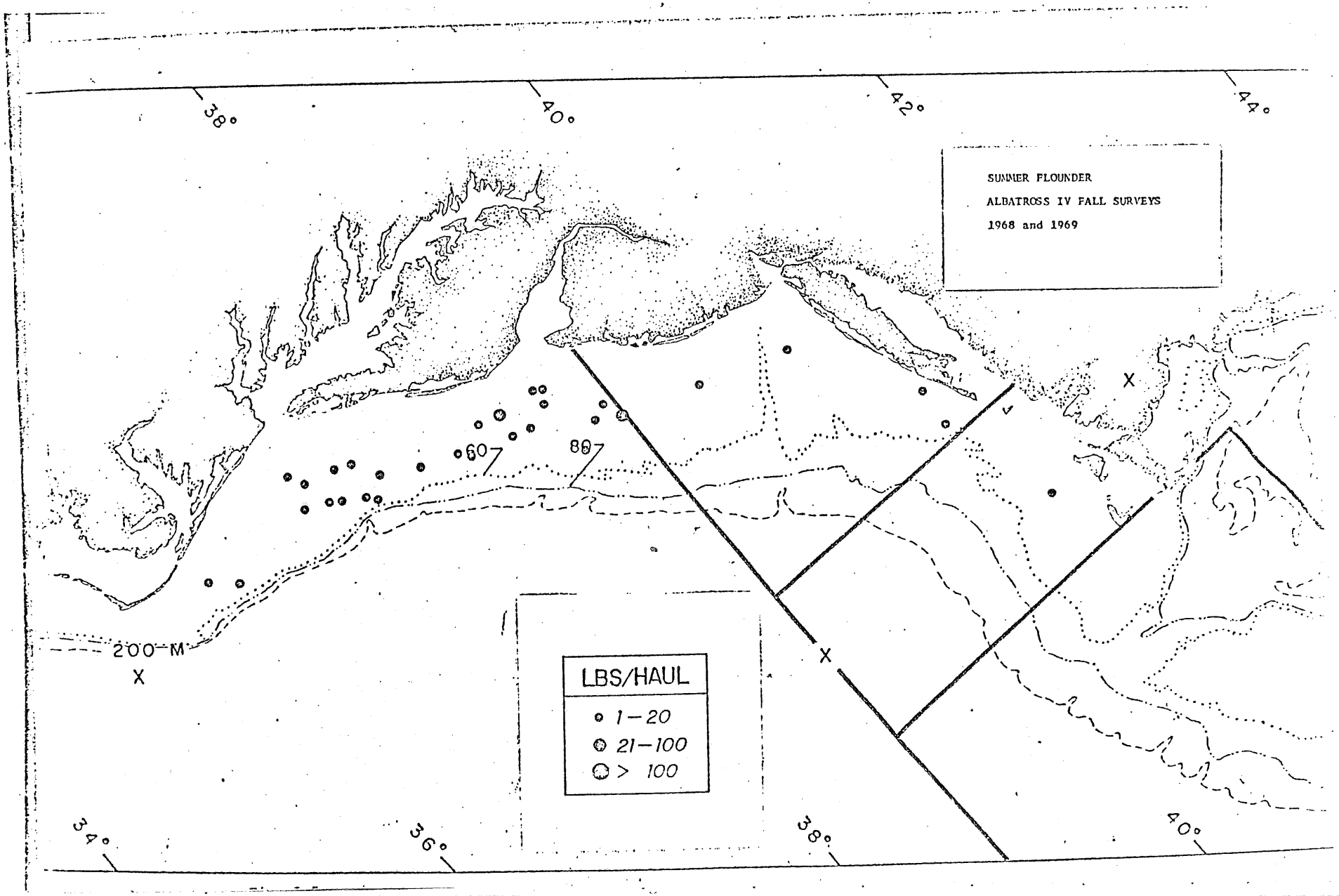
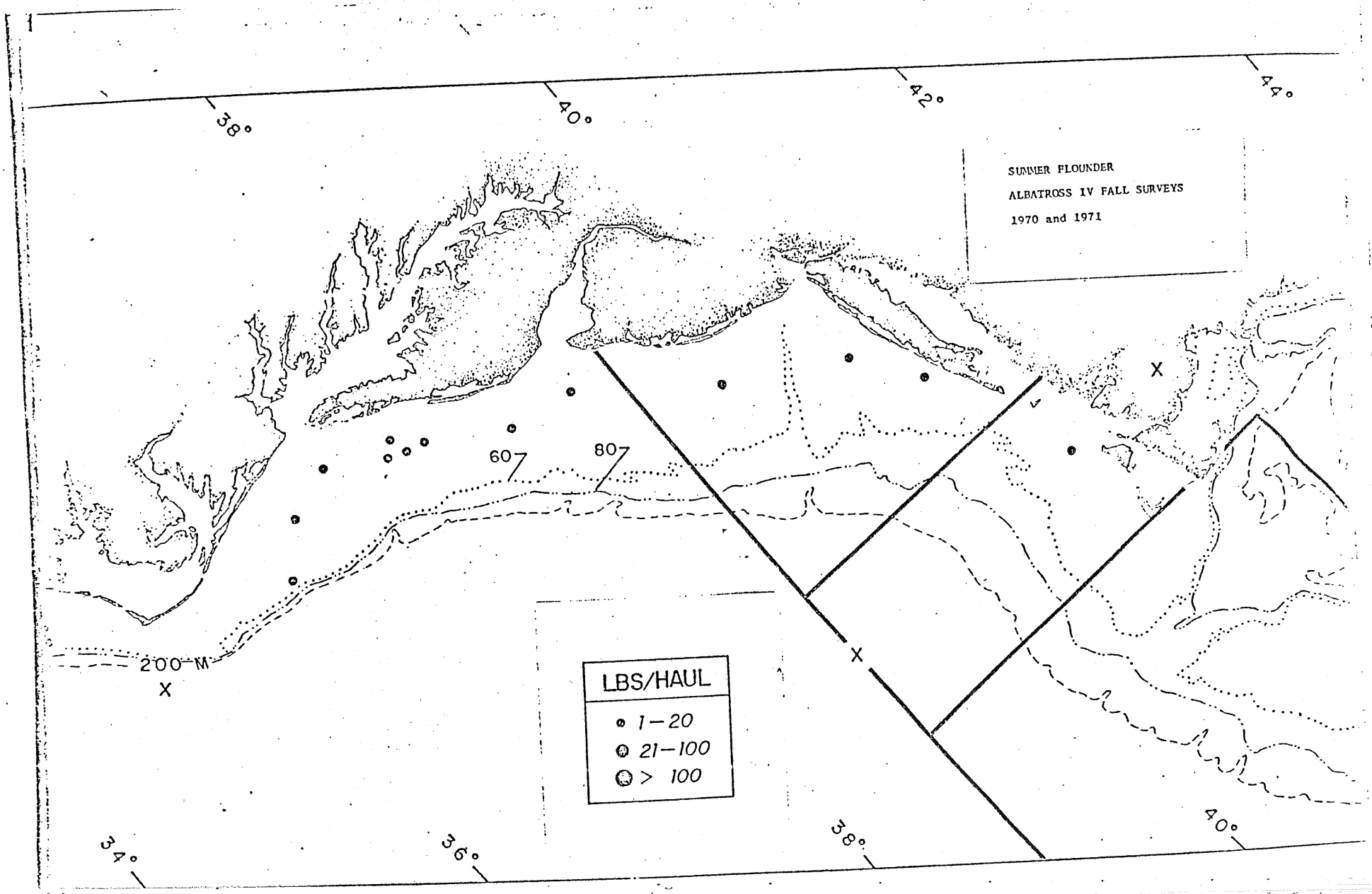

SUMMER FLOUNDER
USSR FALL SURVEYS
STD 27.1M TRAWL
NONSTANDARD TRAWL
MEAN LOG POUNDS/TOW
0.6
0.5
0.4
0.3
0.2
0.1
0
67
68
69
70
71
72
YEAR

Fig. 1-2.


SUMMER FLOUNDER
ALBATROSS IV SPRING SURVEYS
1968 and 1969
38°
40°
42°
44°
36°
38°
40°
60
80
200 M
X
LBS/HAUL
1–20
21–100
> 100


SUMMER FLOUNDER
ALBATROSS IV SPRING SURVEYS
1970 and 1971
38°
40°
42°
44°
34°
36°
38°
40°
60
80
200 M
X
LBS/HAUL
1–20
21–100
> 100


SUMMER FLOUNDER
ALBATROSS IV FALL SURVEYS
1968 and 1969
38°
40°
42°
44°
34°
36°
38°
40°
60
80
200-M
X
LBS/HAUL
1-20
21-100
> 100


SUMMER FLOUNDER
ALBATROSS IV FALL SURVEYS
1970 and 1971
38°
40°
42°
44°
34°
36°
38°
40°
60
80
200 M
X
LBS/HAUL
1–20
21–100
> 100

J. Sea Bass

Like scup, the black sea bass (Centropristis striata) is also important to both sport and commercial fishermen in the U.S. Commercial catches are taken chiefly by trawls and pots from New York to Florida, with the bulk of the harvest landed from the Mid-Atlantic region (New Jersey to Virginia). In late spring and summer sea bass are found inshore, generally over hard bottom, wrecks, etc., and in late fall and winter they move offshore as deep as 100 fathoms at which time they are most available to bottom trawls.

Landings increased from 5,800 tons in 1950 to 10,000 tons in 1952, and then dropped back to about 5,000 tons by 1955, after which they slowly declined to about 3,600 tons by 1965. Since 1965, however, landings dropped drastically and reached a low of 580 tons in 1971 (Figure J-1). Estimated U.S. landings for 1972 will be only 700 tons.

Although the U.S. is the only country with a directed fishery for sea bass, and no other countries report sea bass catches, the coincidence of the sudden decline with major increase in foreign trawling in the Mid-Atlantic suggests that incidental foreign catches of sea bass may be contributing to the decline of this valuable species. The winter trawl fishery off the Chesapeake Bight showed a substantial drop in catch/trip of sea bass in 1966 to the lowest level on record, and since then catch/trip has declined further (Figure J-2). A significant decrease in proportions of larger individuals has also been observed in the winter trawl fishery. Major reductions in catch/pot have also been recorded since 1965 for the pot fisheries.

Sport fish catches in the Mid-Atlantic area also have declined in spite of increased recreational fishing. The estimated 1970 catch of sea bass was about 20 percent lower than 1965, and yet numbers of anglers increased by nearly 20 percent.

The movement of sea bass offshore into deeper water in the late fall and winter months in the southern part of SA 6, and their vulnerability to bottom trawling at this time, makes it important to continue efforts to minimize foreign catches of this species. Sea bass did not move so far offshore in 1970 and 1971 because of the higher water temperatures (the same pattern noted for scup, fluke and butterfish), and in such years, they could be taken more frequently by foreign trawlers seeking mackerel and sea herring (Figures J-3 to J-6; see also Figure 4.5).

In addition to sea bass, there are other important species in the Cape Hatteras region whose protection from foreign trawlers should also be considered. In particular, there is a substantial sport fishery for snappers, groupers, porgies and grunts (all reef-type fishes) centered outside the 12-mile limit off the Carolinas. For example, the Atlantic Estuarine Fisheries Center recorded 25 party boats operating between Morehead City, North Carolina and Charleston, South Carolina, providing over 41,000 angler days of fishing in the summer of 1972. Much of the coral-head bottom which these fishes frequent can be fished with trawls rigged with rollers. Extension of the Bilateral area south to 31°, and inclusion of these species in the list of portected fishes should be considered.

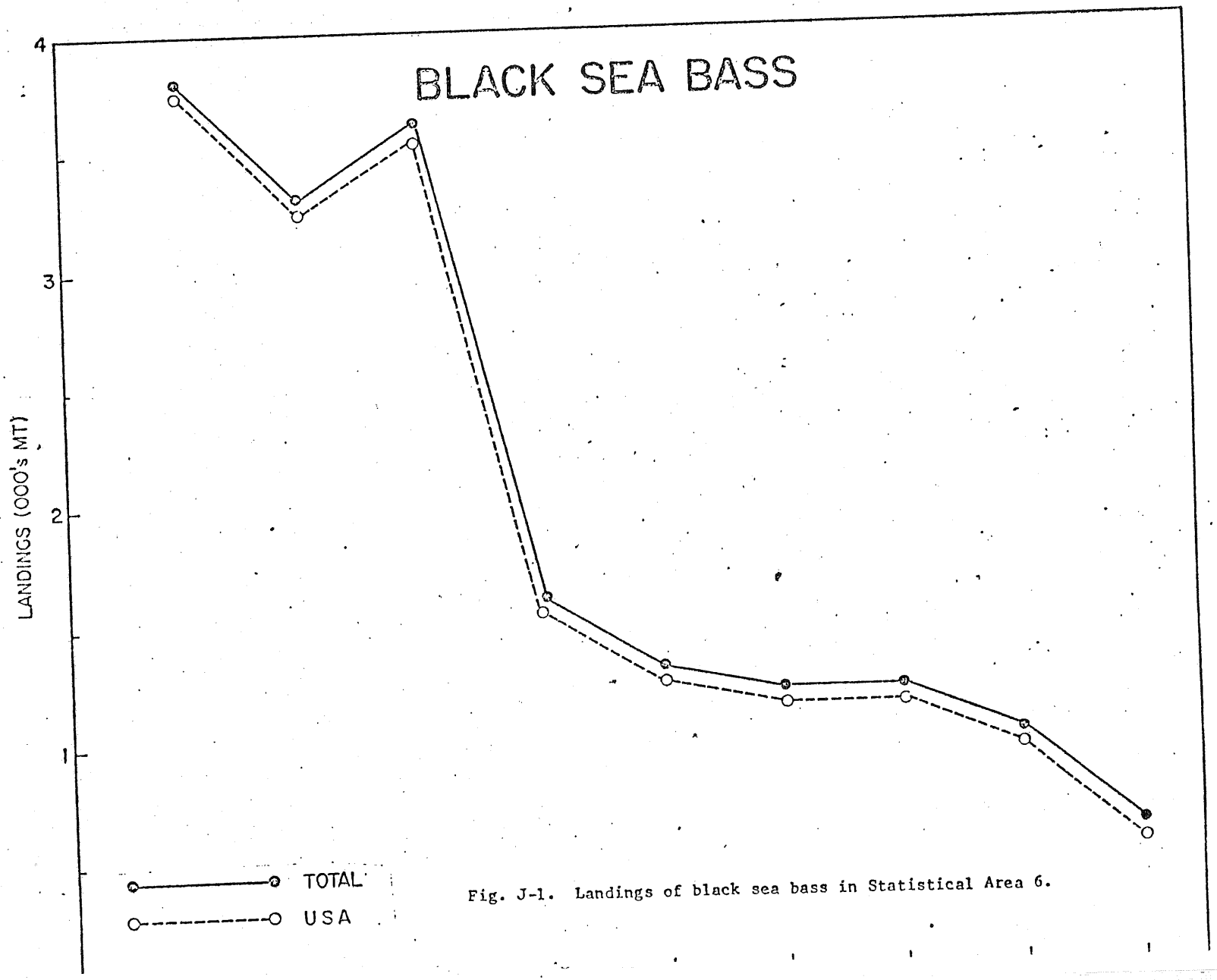


Fig. J-1. Landings of black sea bass in Statistical Area 6.

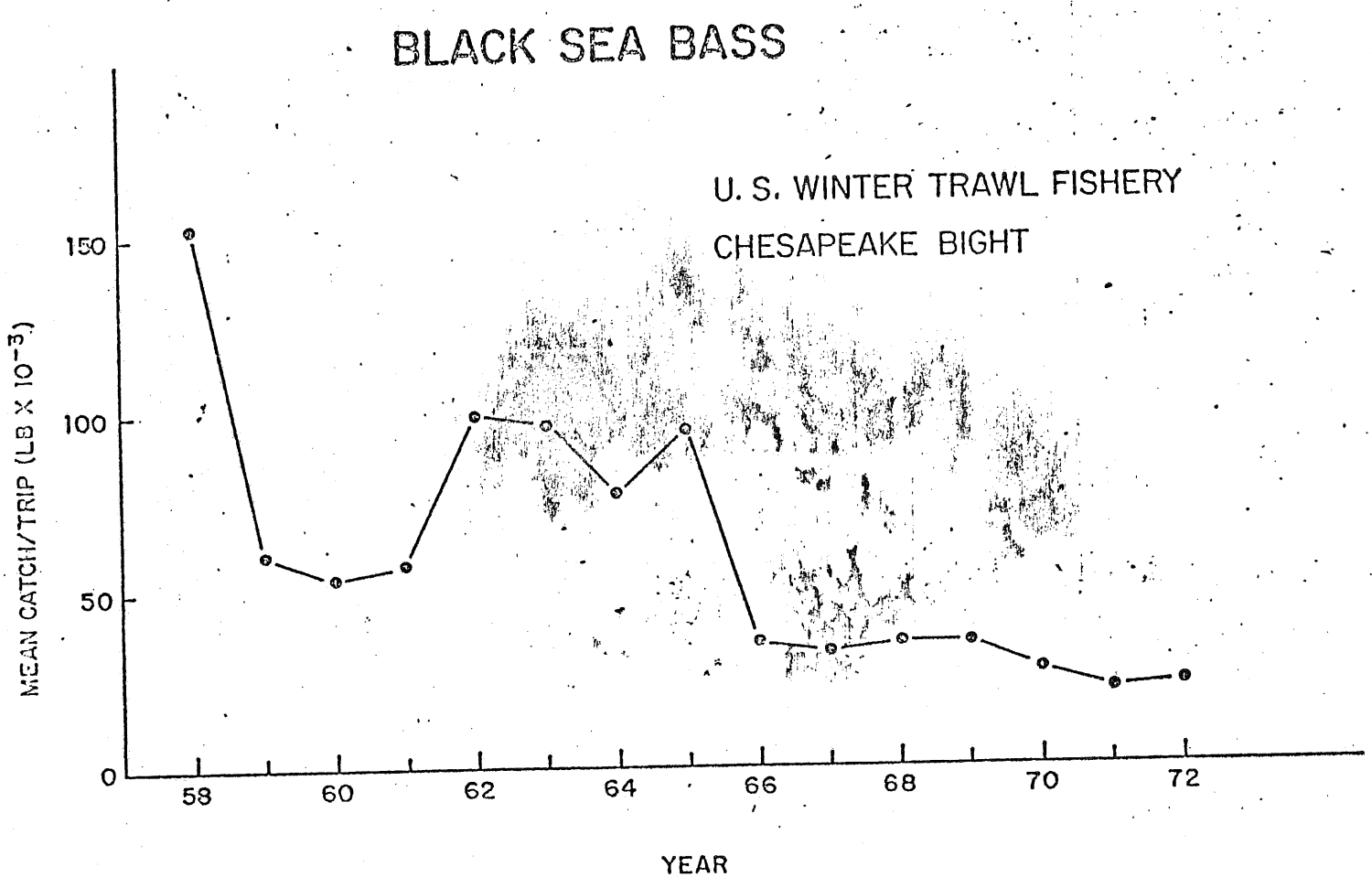

BLACK SEA BASS
U. S. WINTER TRAWL FISHERY
CHESAPEAKE BIGHT
MEAN CATCH/TRIP (LB X 10⁻³)
150
100
50
0
58
60
62
64
66
68
70
72
YEAR

Fig. J-2.

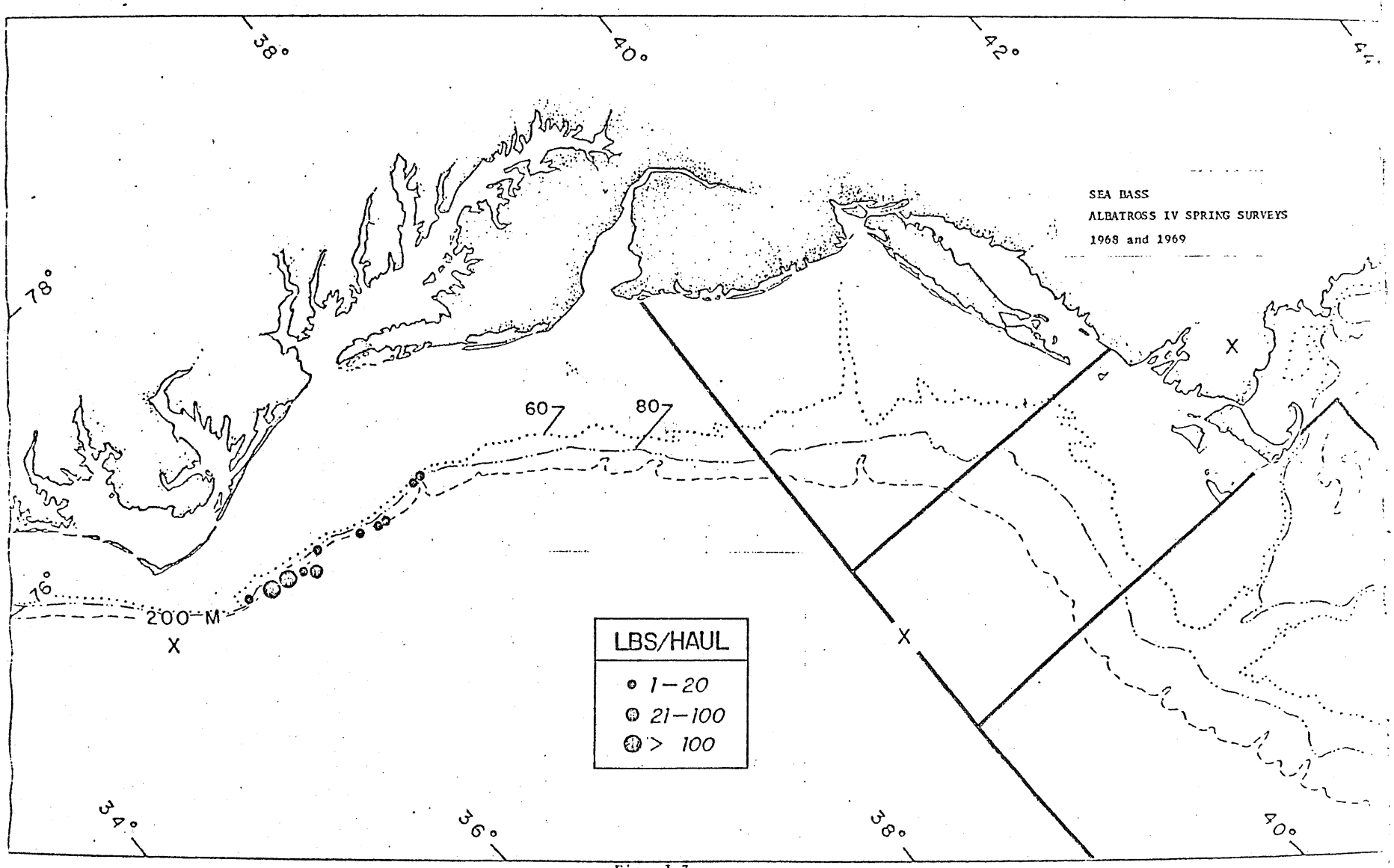

SEA BASS
ALBATROSS IV SPRING SURVEYS
1968 and 1969
38°
40°
42°
78°
76°
60
80
200-M
X
LBS/HAUL
1-20
21-100
> 100
34°
36°
38°
40°

Fig. J-3.

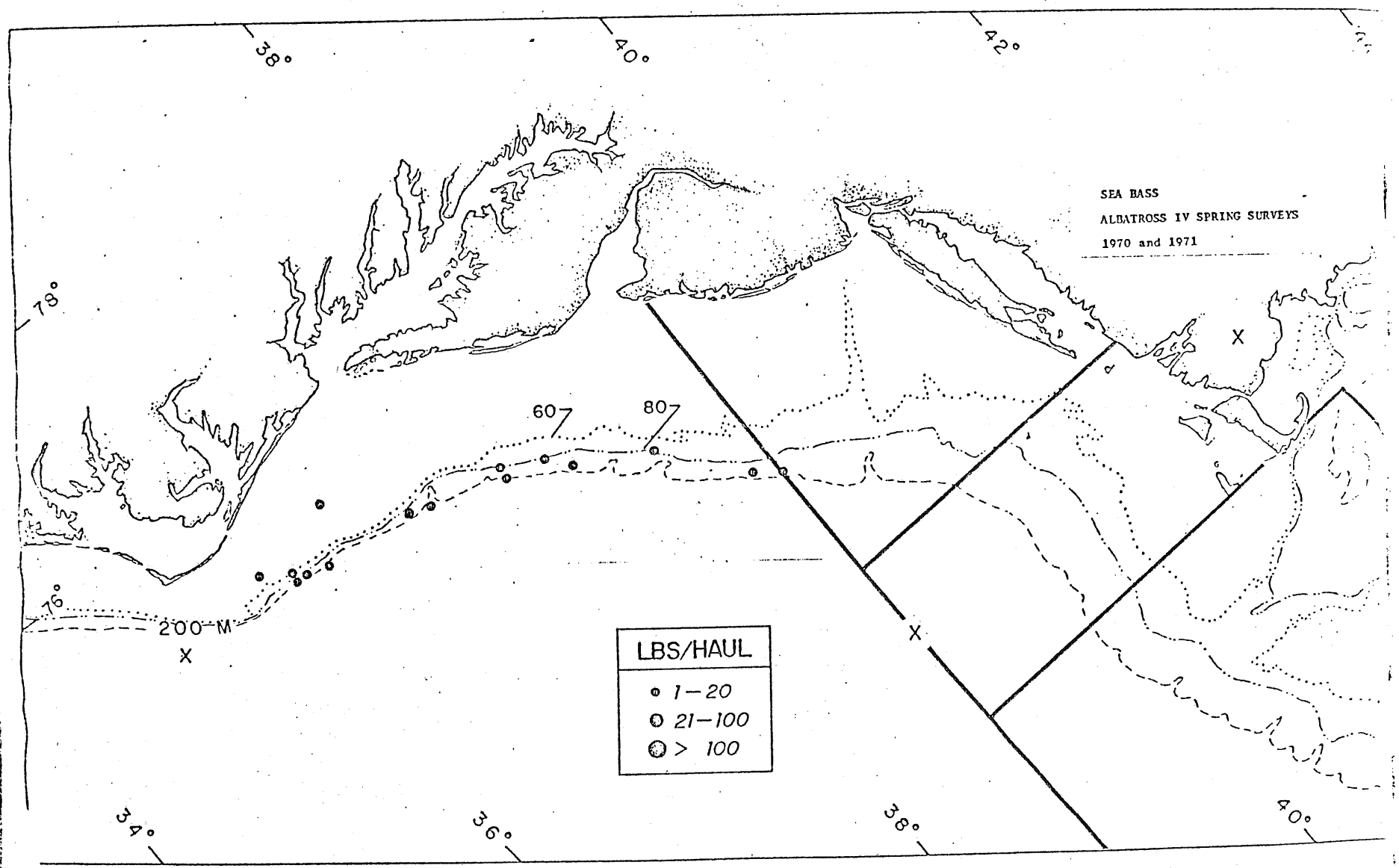

SEA BASS
ALBATROSS IV SPRING SURVEYS
1970 and 1971
38°
40°
42°
78°
76°
60
80
200-M
X
LBS/HAUL
1-20
21-100
> 100
34°
36°
38°
40°

Fig. J-4.

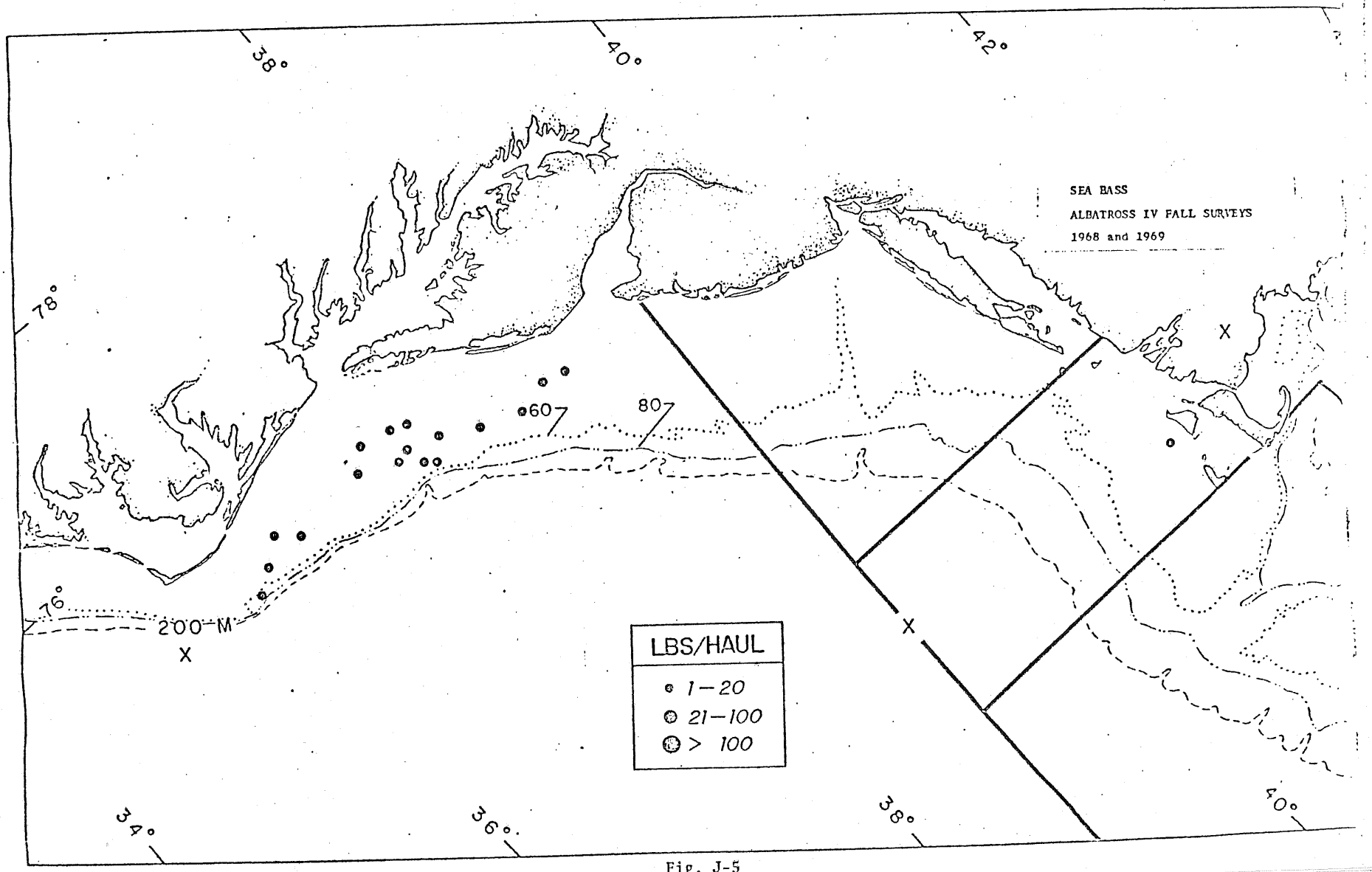

SEA BASS
ALBATROSS IV FALL SURVEYS
1968 and 1969
38°
40°
42°
78°
76°
200 M
60
80
X
LBS/HAUL
1–20
21–100
> 100
34°
36°
38°
40°

Fig. J-5

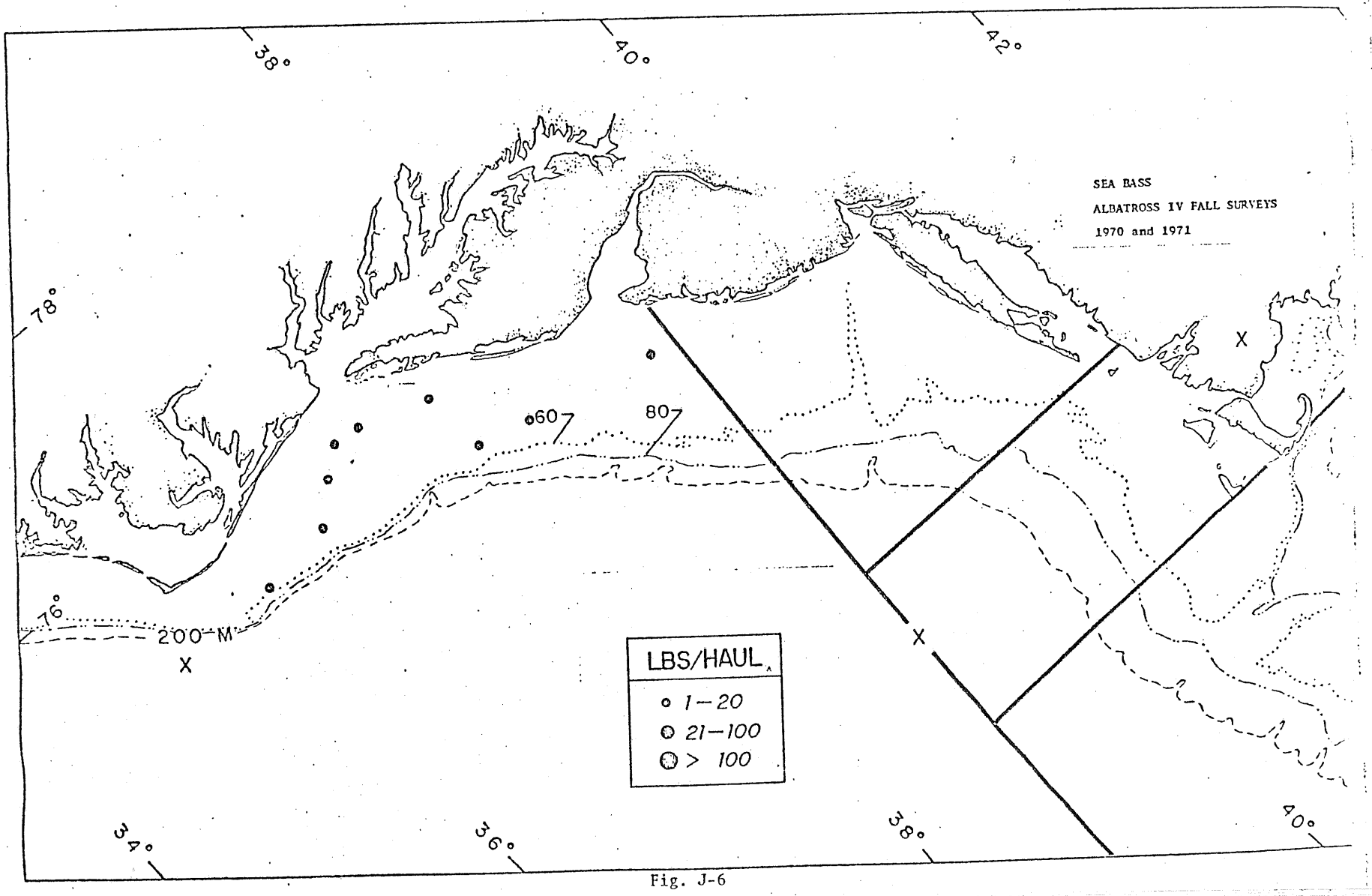

SEA BASS
ALBATROSS IV FALL SURVEYS
1970 and 1971
38°
40°
42°
78°
76°
60
80
200-M
X
LBS/HAUL
1—20
21—100
> 100
34°
36°
38°
40°

Fig. J-6

K. Menhaden

Atlantic menhaden occur from Maine to Florida and form one population. Most of the stock generally winters south of Cape Hatteras from January to March at which time a major portion of the population appears to be centered at least 60 miles off the Carolinas beyond the 100 fathom curve. In March and April menhaden begin a fairly rapid migration northward and inshore with older and larger fish leaving first and moving farther to the north. In late summer the reverse migration begins with the southward movement of fish (largely age 4+) from waters around Cape Cod. These fish appear to join with fish from Nantucket and Long Island Sounds and congregate in dense schools off Long Island in October. Menhaden from Long Island to Chesapeake including both adults and juveniles move southward during October-December, until reaching the offshore wintering grounds south of Hatteras.

Menhaden spawn somewhere along the Atlantic coast every month of the year but the bulk of spawning apparently occurs south of Hatteras on the wintering grounds where the largest numbers of eggs and larvae are found (Figures K-1, K-2). On the basis of the distribution of eggs and newly hatched larvae it appears that a major proportion of the adult stock is outside the 12-mile limit during January through March, whereas the remainder of the year virtually the entire population appears to be concentrated along the coast inside the 12-mile limit and inside the large bays and sounds. Behavior patterns of menhaden are such that the fish are often near the surface in summer and thus easily observed, but in winter they are usually well below the surface.

During the 1940's, average menhaden landings were about 300,000 tons. They increased rapidly during the early 1950's to a peak of over 700,000 tons in 1956 and have declined since then. The decline has been rapid since 1962 and in 1969 total landings in SA 6 (160,000 tons) reached the lowest level since 1940 (Figure K-3). The decline was particularly severe in the Mid-Atlantic area from Cape Cod to Chesapeake where many plants were forced to close due to scarcity of fish, primarily the older age groups. Landings increased significantly in 1970 and 1971 to over 200,000 tons and the preliminary estimate for 1972 is approximately 300,000 tons. There is some evidence for increased recruitment from the 1970 and 1971 year classes based on juvenile menhaden surveys conducted in the summer in estuaries. Also a significant part of the increase is in a rejuvenation of the fishery in the Mid-Atlantic area with the reappearance of older age classes of menhaden. While this is a hopeful sign, it is unlikely the stock will regain its former level of abundance (MSY is estimated at about 450,000 tons) unless fishing intensity is reduced.

So far there have been no reported menhaden landings by non-U.S. vessels. In any case, the only potential danger to the menhaden stock from foreign fleets would appear to be in the winter (January - March) when the bulk of the stock (including both juveniles and adults) is offshore from the Carolinas. At that time the fish would not appear to be available to conventional purse seine methods, but might conceivably be available to large midwater trawls. Furthermore, it should be noted that the menhaden wintering grounds apparently are south of 34°, the current southern limit of the bilateral area. To insure protection of the menhaden the southern limit should be extended at least to 31°.

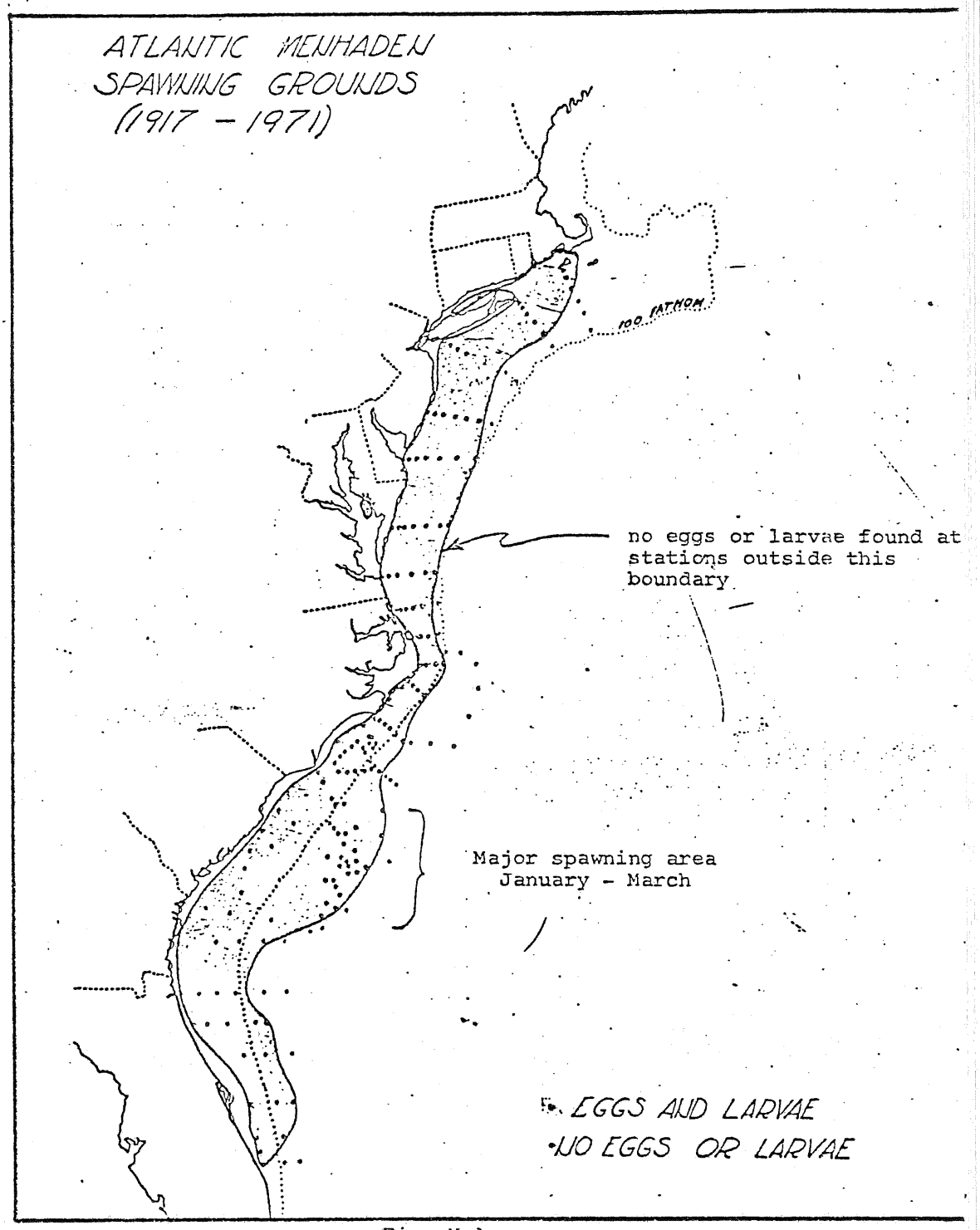

ATLANTIC MENHADEN
SPAWNING GROUNDS
(1917 - 1971)
100 FATHOM
no eggs or larvae found at stations outside this boundary
Major spawning area
January - March
EGGS AND LARVAE
NO EGGS OR LARVAE

Fig. K-1

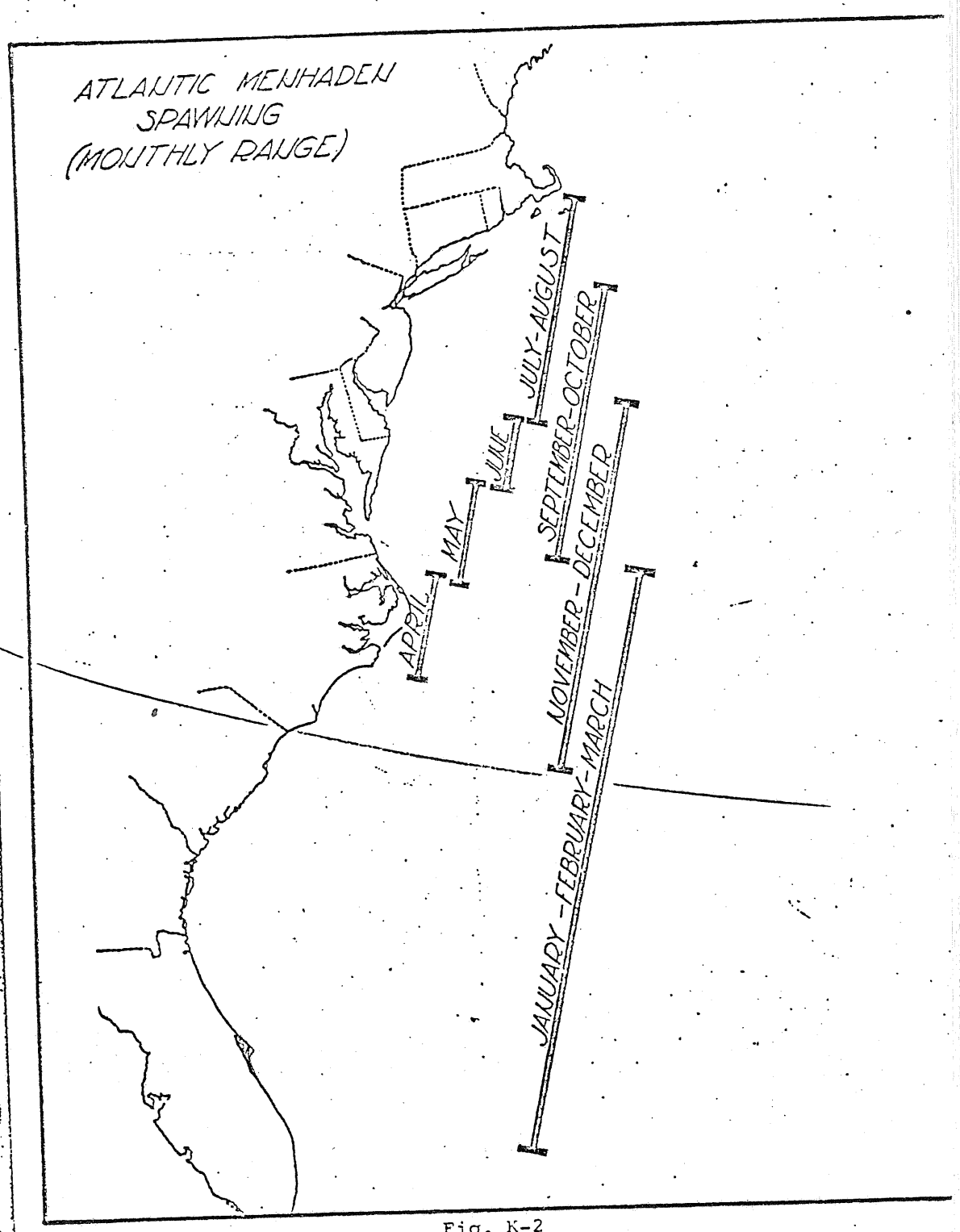

ATLANTIC MENHADEN
SPAWNING
(MONTHLY RANGE)
APRIL
MAY
JUNE
JULY-AUGUST
SEPTEMBER-OCTOBER
NOVEMBER-DECEMBER
JANUARY-FEBRUARY-MARCH

Fig. K-2

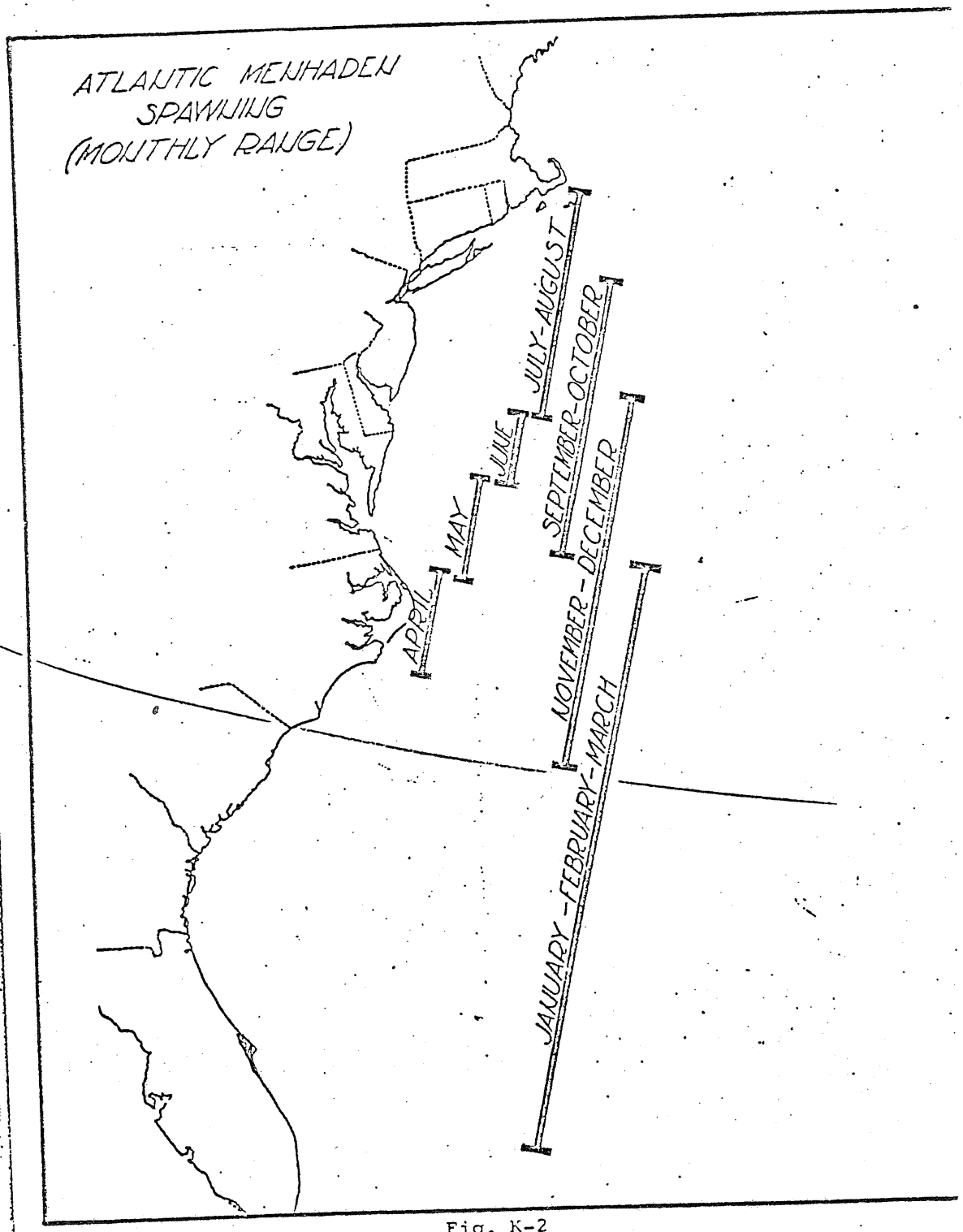

ATLANTIC MENHADEN
SPAWNING
(MONTHLY RANGE)
APRIL
MAY
JUNE
JULY-AUGUST
SEPTEMBER-OCTOBER
NOVEMBER-DECEMBER
JANUARY-FEBRUARY-MARCH

Fig. K-2

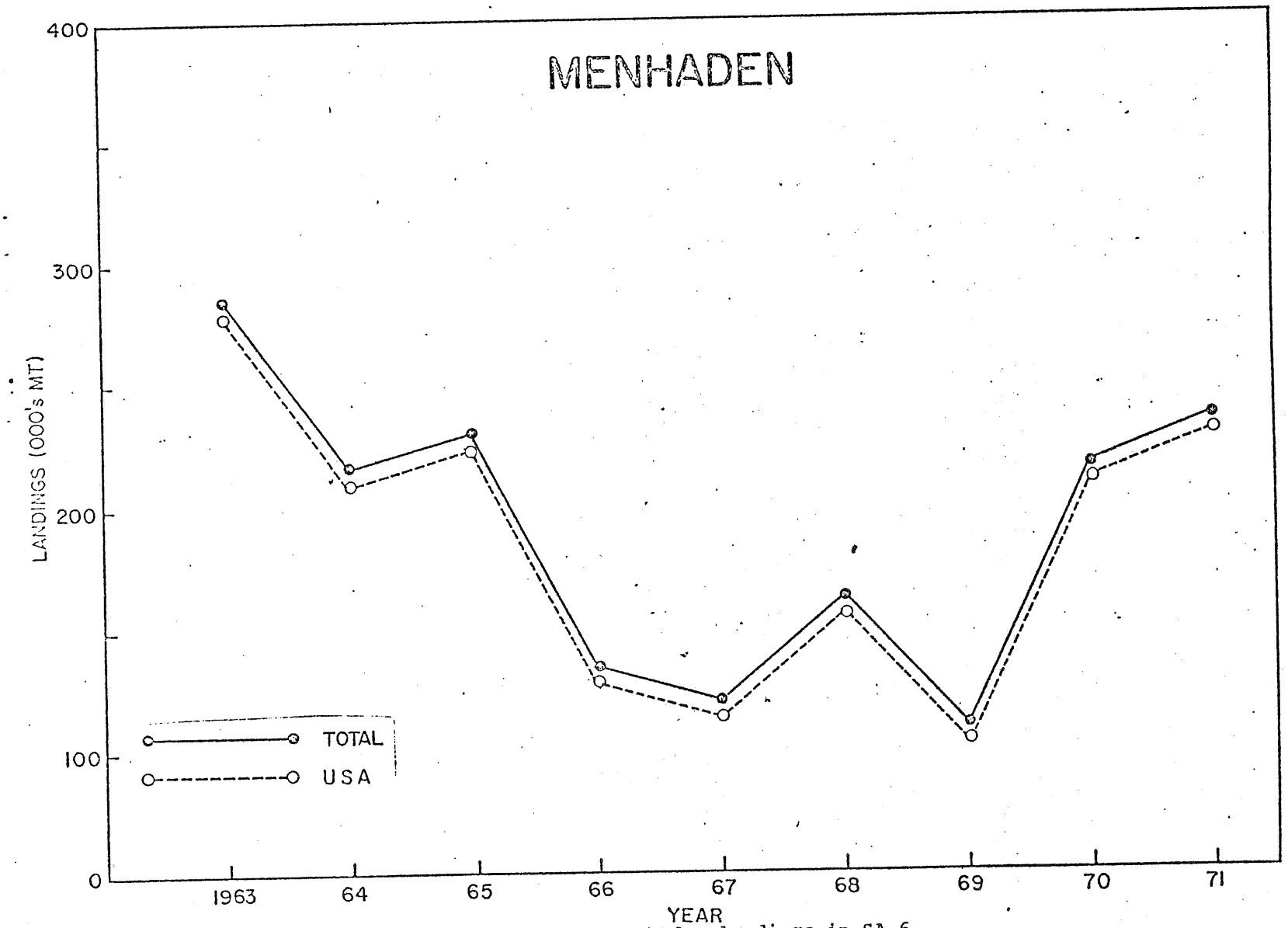


Fig. K-3 Menhaden landings in SA 6.

L. Bluefish

Bluefish are caught by anglers from late spring to fall in coastal waters from Florida to about Cape Ann. The estimated angler catch in 1970 was greater than in 1965 (Table L-1). Blues are warmwater fish and are not found in any numbers at temperatures lower than about 14° to 15° C, at least in summer. Tag returns and other information indicate that they move far south in the winter. However, some of the fish may occasionally winter in deep water off southern New England for there are records of commercial trawl catches then. Such catches probably are infrequent since we rarely take any in winter and spring Albatross IV groundfish surveys in the area from Cape Hatteras to Nova Scotia in depths out to about 150 fm.

Bluefish appear off southern Florida in midwinter and by March are caught in large numbers along the Florida east coast. Large schools pass the Carolinas in March and April, appear off Delaware in April, and are first caught off New York in April and May by commercial trawl fishermen some distance offshore. Off southern Massachusetts, first catches are reported in late May, but they are not caught close inshore until June. We catch a few bluefish each year in the Albatross IV fall groundfish survey. For the most part these are taken at stations nearest the shore (15-30 fm). In 1971, however, blues were more abundant than usual, and the largest numbers ever taken by Albatross IV were caught in depths slightly over 30 fm. Water temperatures also were higher than normal and this may have influenced offshore distribution as well as abundance. The Chesapeake winter trawl fishery also reported unusually high catches of bluefish in the 1970-1971 and 1971-1972 seasons.

Bluefish generally feed on pelagic species like menhaden and alewives. However, they also prey on bottom fish at times, and this probably is when they are vulnerable to trawl gear. Since some are caught by U.S. fishermen, no doubt foreign trawlers take some also, especially in times of high abundance. In general, however, it appears that the bulk of the bluefish stock is close inshore, and inside the 12-mile line, at least during the period when it is north of Cape Hatteras.

Table L-1.--Estimated catch of bluefish by anglers in 1965 and 1970, based on Bureau of Census surveys, in thousands of numbers and pounds.

Area	Number		Pounds	
	1965	1970	1965	1970
North Atlantic	15,501	10,693	63,303	50,161
Middle Atlantic	6,269	12,351	15,914	49,720
South Atlantic	8,070	12,851	11,292	19,271
East Gulf	115	86	308	351
West Gulf	570	477	2,392	1,308
Total	30,525	36,458	93,209	120,811

M. Squid

Squid represent a substantial resource in SA 6 which until recently has been virtually unexploited. The U. S. has maintained a small fishery (less than 1,000 tons) in the area for many years, and it was the only country reporting squid landings from SA 6 until the mid-1960's when USSR and Japan entered the fishery. Landings increased from 1,000 tons in 1966 to a peak of 10,000 tons in 1971 (Table M-1, Figure M-1). We do not yet have an estimate of sustainable yield for squid but a conservative estimate of average squid biomass based on survey catches would be on the order of 50-100,000 tons in the Mid-Atlantic-southern New England area (Cape Hatteras to Nantucket). Thus, current exploitation is probably below MSY for squid. There have been no significant trends in relative abundance of squid over the last five years in either the research vessel surveys (see Figure M-2), or the winter trawl fishery off Chesapeake.

From the standpoint of present U. S. interest in the fishery, the possible incidental catches of other species by foreign fleets concentrating on squid is of more immediate concern. In winter and spring squid are concentrated in deep water (60-100 fathoms) along the edge of shelf from Cape Hatteras to Georges Bank (Figure M-3) in much the same pattern as red and silver hake, mackerel, scup, butterfish, summer flounder, and sea bass. In late spring squid move into inshore waters to spawn, and then move back onto the shelf in summer, and by autumn are widely distributed over the shelf generally inside of 100 fathoms, and most abundant inside 60 fathoms in southern New England (Figure M-4). At this time their distribution pattern overlaps with areas of concentrations of yellowtail, red and silver hake, and semi-pelagic species including scup and butterfish. Unless gear is used which is highly selective for squid alone, an intensive squid fishery could significantly increase landings of other fishes, particularly semi-pelagic species.

Table M-1. Nominal catches (metric tons) of squid in Statistical Area 6.

Year	USA	USSR	Japan	Spain	Bulgaria	Total
1963	905	-	-	-	-	-
1964	752	-	-	-	-	-
1965	774	-	-	-	-	-
1966	980	48	-	-	-	1,028
1967	916	513	-	-	-	1,429
1968	859	761	2,700*	-	-	4,320
1969	722	158	3,398*	-	-	4,278
1970	578	-	8,136*	-	-	8,714
1971	471	479	5,941	3,941	10	10,842
1972**	660					

*Estimate
**Data not available for countries other than the U. S.

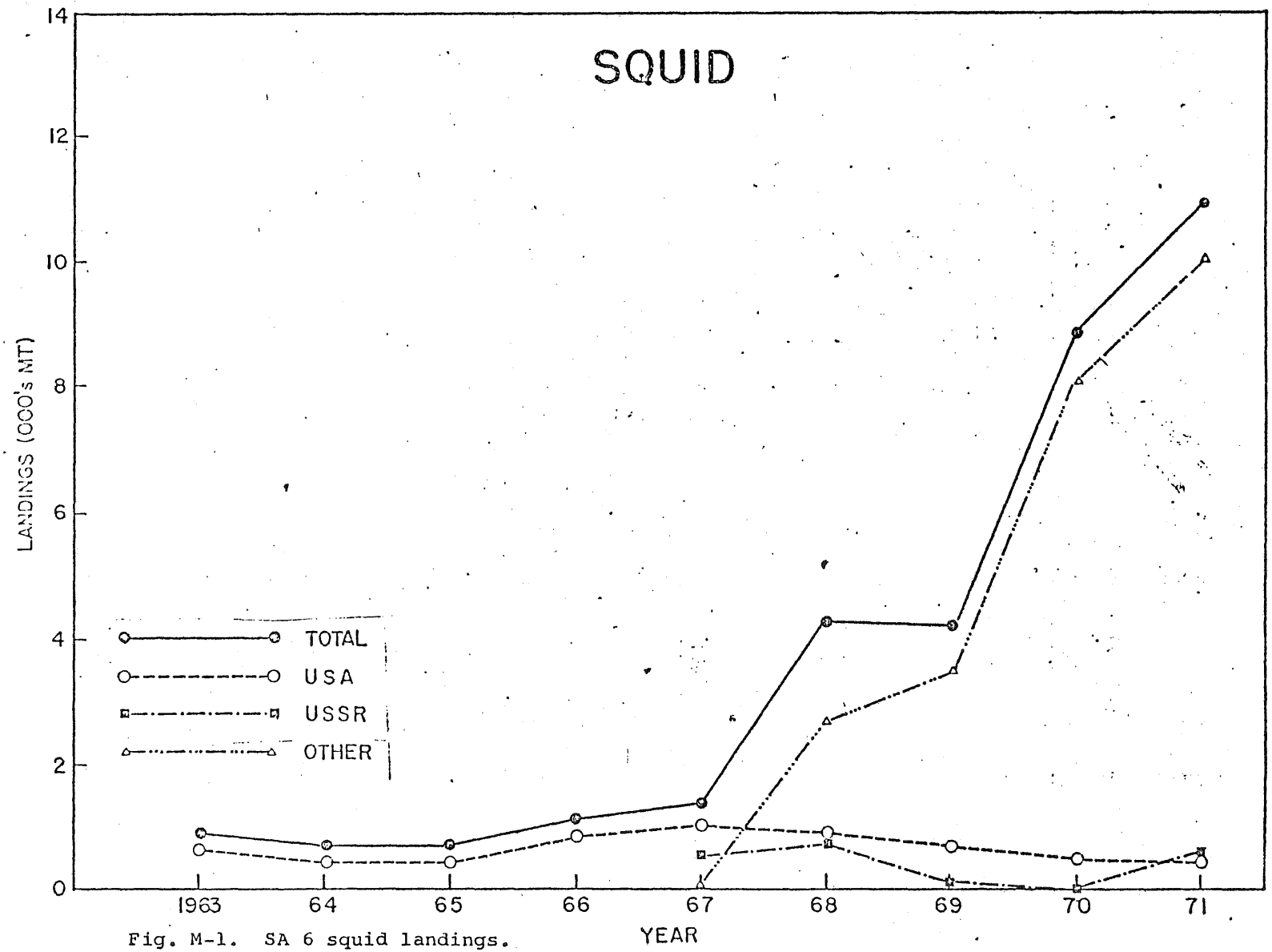


Fig. M-1. SA 6 squid landings.

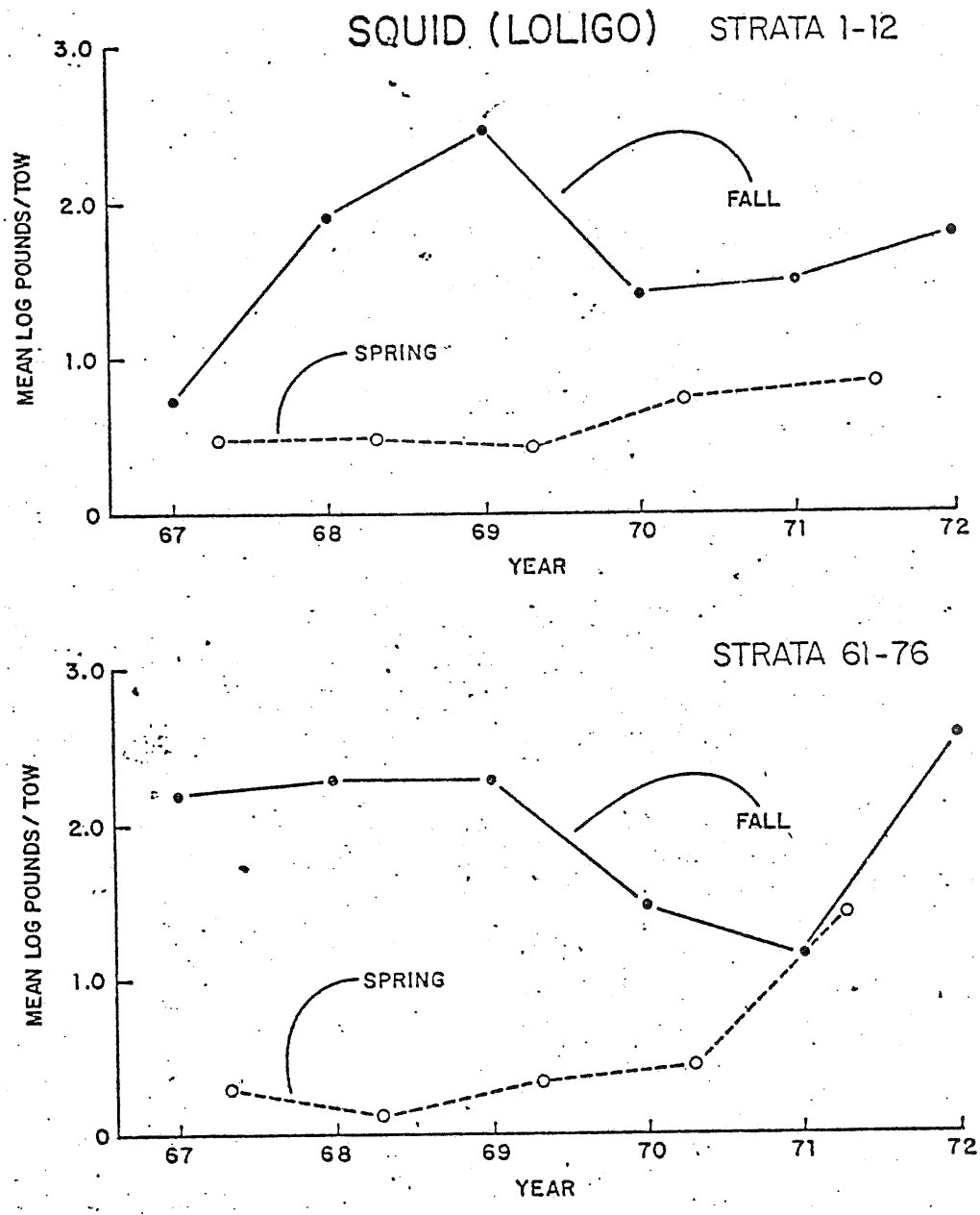

SQUID (LOLIGO) STRATA 1-12
MEAN LOG POUNDS/TOW
3.0
2.0
1.0
0
FALL
SPRING
67
68
69
70
71
72
YEAR
STRATA 61-76
MEAN LOG POUNDS/TOW
3.0
2.0
1.0
0
FALL
SPRING
67
68
69
70
71
72
YEAR

Fig. M-2.

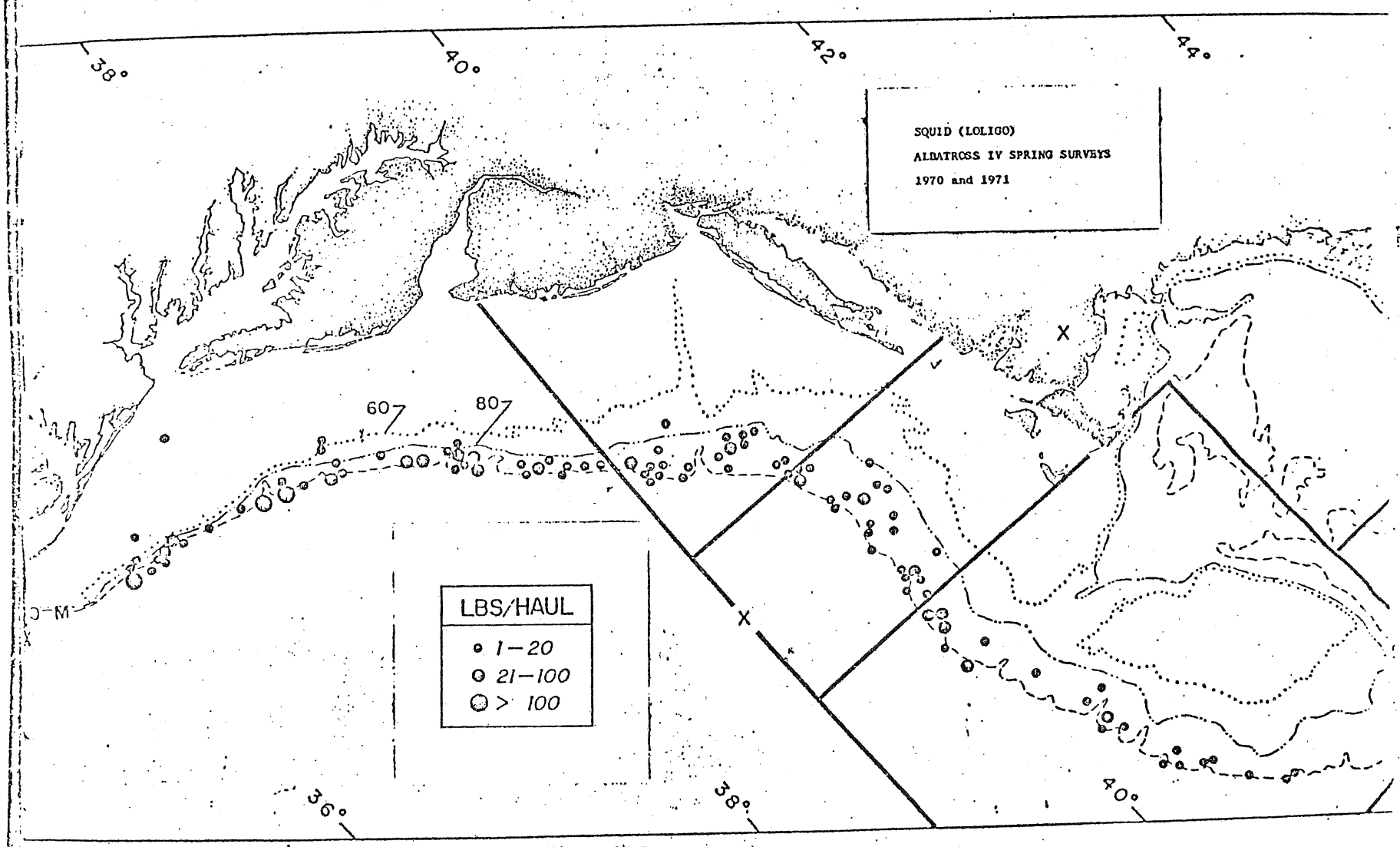

SQUID (LOLIGO)
ALBATROSS IV SPRING SURVEYS
1970 and 1971
LBS/HAUL
1–20
21–100
> 100
38°
40°
42°
44°
36°
38°
40°
60
80
X
X

Figure M-3

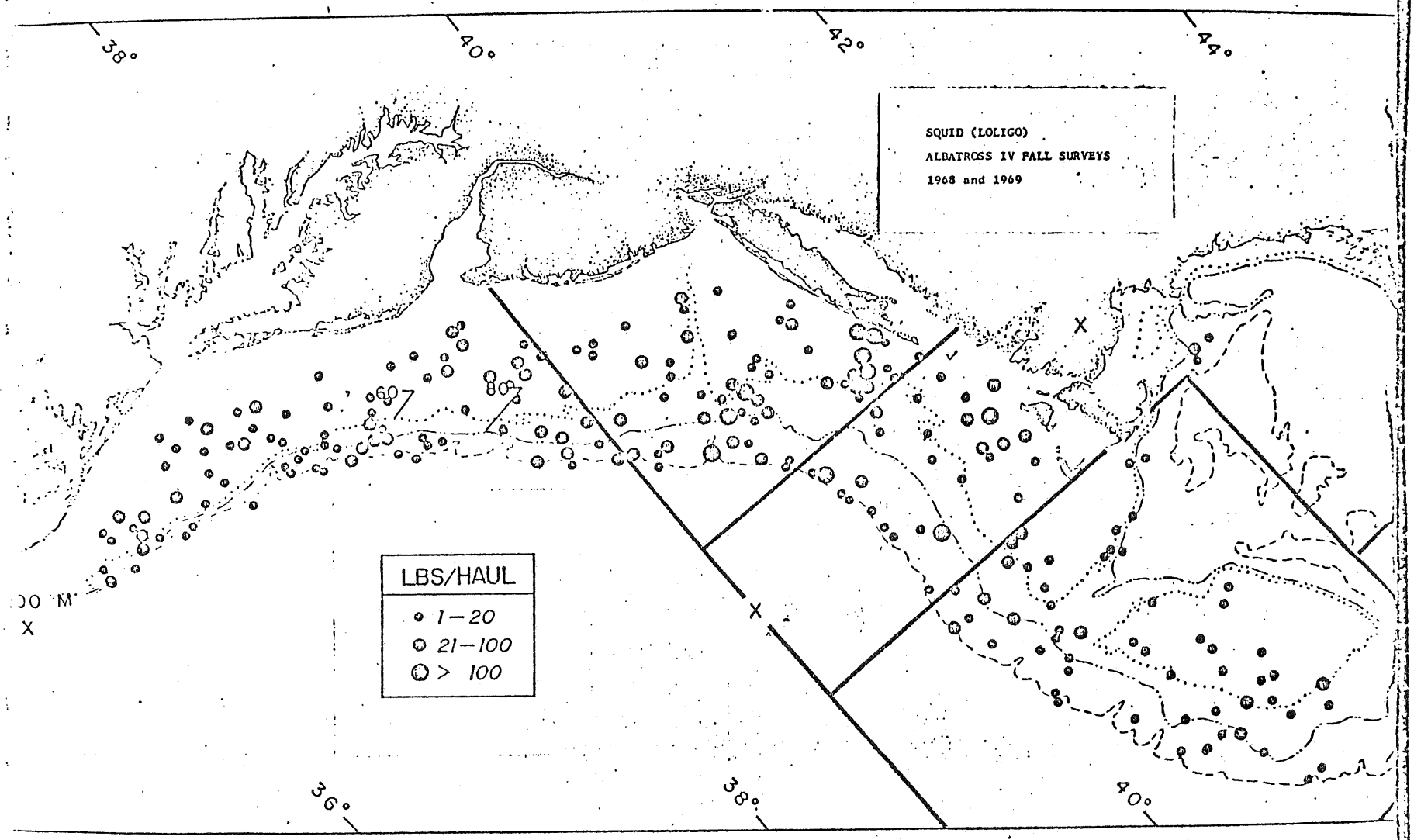

SQUID (LOLIGO)
ALBATROSS IV FALL SURVEYS
1968 and 1969
LBS/HAUL
1–20
21–100
> 100
38°
40°
42°
44°
36°
38°
40°
60
80
00 M

Figure M-4

N. Lobsters

Adequate assessment of the offshore lobster stocks has not yet been accomplished, but there is growing evidence that abundance is declining at least off southern New England. The magnitude of incidental lobster catches by foreign trawlers is unknown, and no catches have been reported from SA 6 since 1963. Lobsters are of course caught by otter trawls, and especially along the edge of the shelf in winter and spring when the lobsters are concentrated in a relatively narrow range of depth (Figure N-1). In summer and fall lobsters are distributed more widely over the shelf and are still vulnerable to trawling (Figure N-2). Outside of closing certain areas entirely to otter trawling, there is no way to eliminate incidental catches. The greatest potential threat lies in the development of directed foreign trawl fisheries for the lobster such as that being developed by Canada on southeast Georges. An agreement by USSR not to develop a lobster fishery would seem desirable.

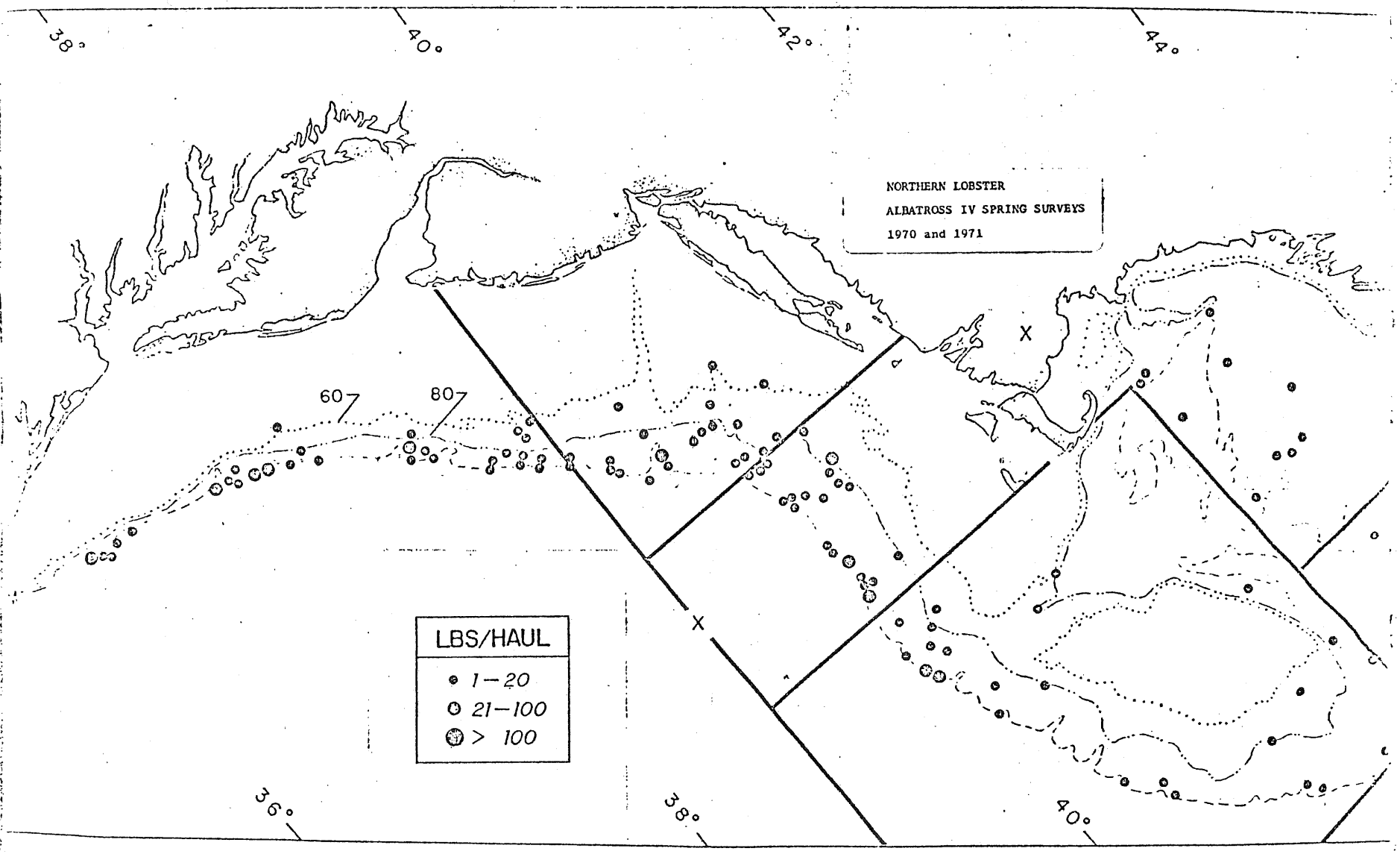

NORTHERN LOBSTER
ALBATROSS IV SPRING SURVEYS
1970 and 1971
LBS/HAUL
1—20
21—100
> 100
38°
40°
42°
44°
36°
38°
40°
60
80
X
X

Figure N-1

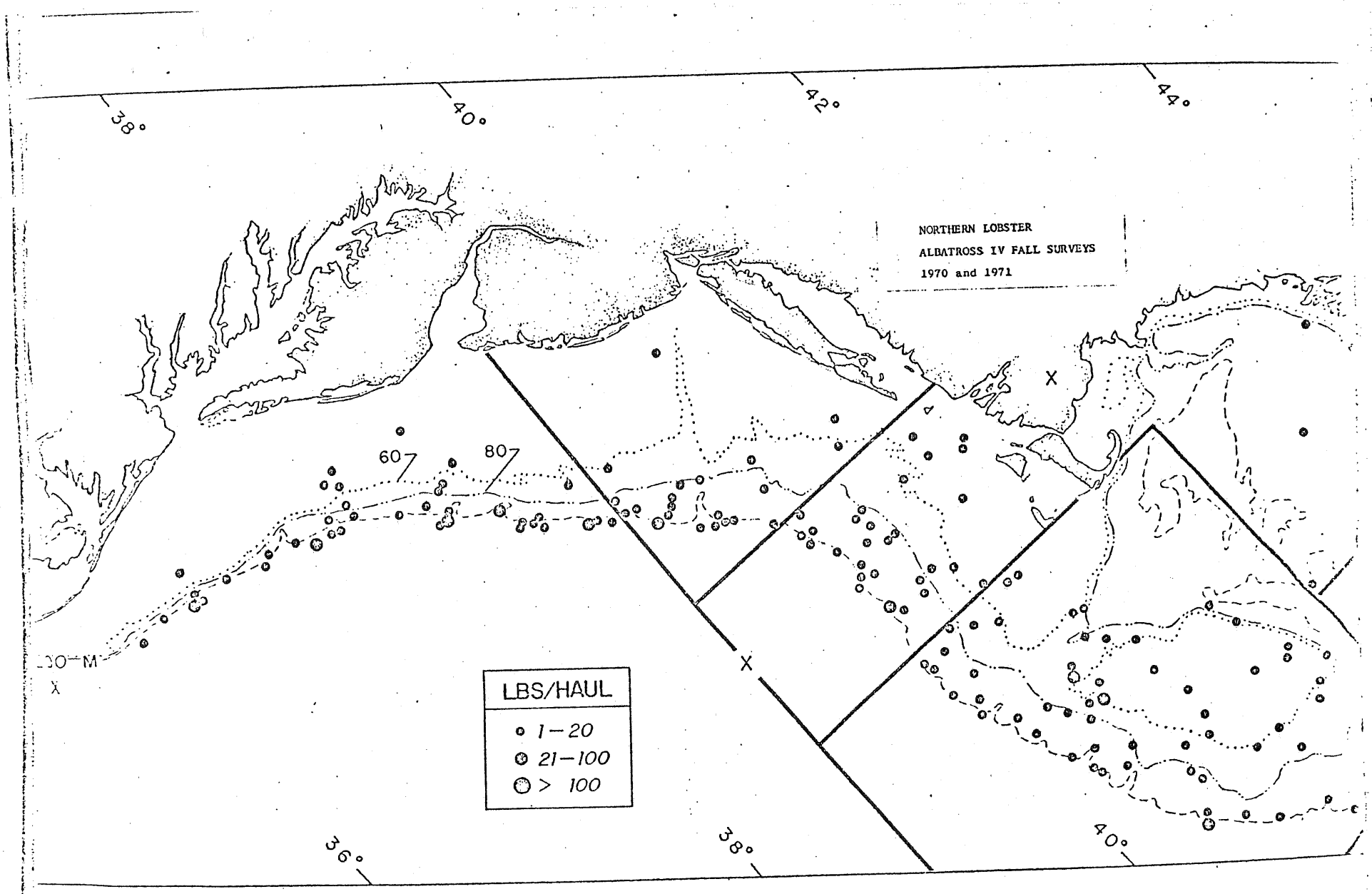

NORTHERN LOBSTER
ALBATROSS IV FALL SURVEYS
1970 and 1971
38°
40°
42°
44°
36°
38°
40°
60
80
LBS/HAUL
1–20
21–100
> 100

Figure N-2

O. Groundfish Biomass as a Whole

Mean catch per haul for all finfish species combined declined by more than 50 percent in the survey area south of Hudson Canyon (strata 61-76). Total finfish catch per haul was only 62 and 83 pounds in 1970 and 1971 as compared with 466 pounds in 1967, and 145 pounds in 1968 and 1969 (Table O-1). Although sampling errors are fairly large, they are not so large as to mask a decline of this magnitude. Even if species which exhibit unusually large sampling errors are excluded from the calculations (e.g. dogfish, searobins, skates and rays) basically the same picture emerges (Figure O-1). Of particular concern is the great reduction in flounders as a group, whose average catch per haul in 1970 and 1971 was little more than 1/10 (2½ pounds) the average (20 pounds) for 1968 and 1969 (Table O-1, Figure O-1).

This is the same general picture of rapid decline in biomass with the recent increase of foreign fishing, that was observed for southern New England and Georges Bank, and reported on at the 1973 mid-term meeting of ICNAF. The implications for overfishing in the Mid-Atlantic area would seem to be the same as for Subarea 5.

Table 0-1. Mean catch per per haul (lbs) of principal fish and invertebrates for the Middle Atlantic area (strata 61-76) for Albatross IV autumn surveys in 1967-1971.[1/]

Species	1967	1968	1969	1970[2/]	1971
Silver hake	1.8	2.0	0.3	0.5	0.6
Red hake	0.3	1.8	1.0	0.4	0.8
Spotted hake	2.0	6.0	2.2	6.5	7.3
Summer flounder	4.4	3.3	1.7	0.1	0.9
Yellowtail flounder	7.4	12.2	8.0	0.1	0.7
Winter flounder	3.8	2.8	1.4	0.1	0.4
Other flounders	1.5	4.4	1.3	0.8	1.8
Butterfish	7.9	40.0	8.5	11.8	11.0
Scup	5.8	1.8	18.5	0.2	0.6
Round herring	0.3	0.3	0.6	5.6	11.3
Common searobin	286.8	30.4	11.9	15.0	6.9
Spiny dogfish	105.3	6.9	10.9	-	-
Smooth dogfish	18.0	8.6	3.4	-	6.2
Other sharks	4.3	3.2	5.0	4.1	3.5
Skates and rays	9.0	18.3	64.9	15.5	28.1
All other finfish	7.5	3.2	6.3	1.5	2.6
Total finfish	466.1	145.2	145.9	62.2	82.7
Lobster	2.0				1.4
Sea scallop	1.3				0.6
Squid (all)	23.9				6.0
Total invertebrates	27.2				8.0

1/ Compilation of invertebrate catch not yet complete for 1968-1970.

2/ 1970 survey in early September.

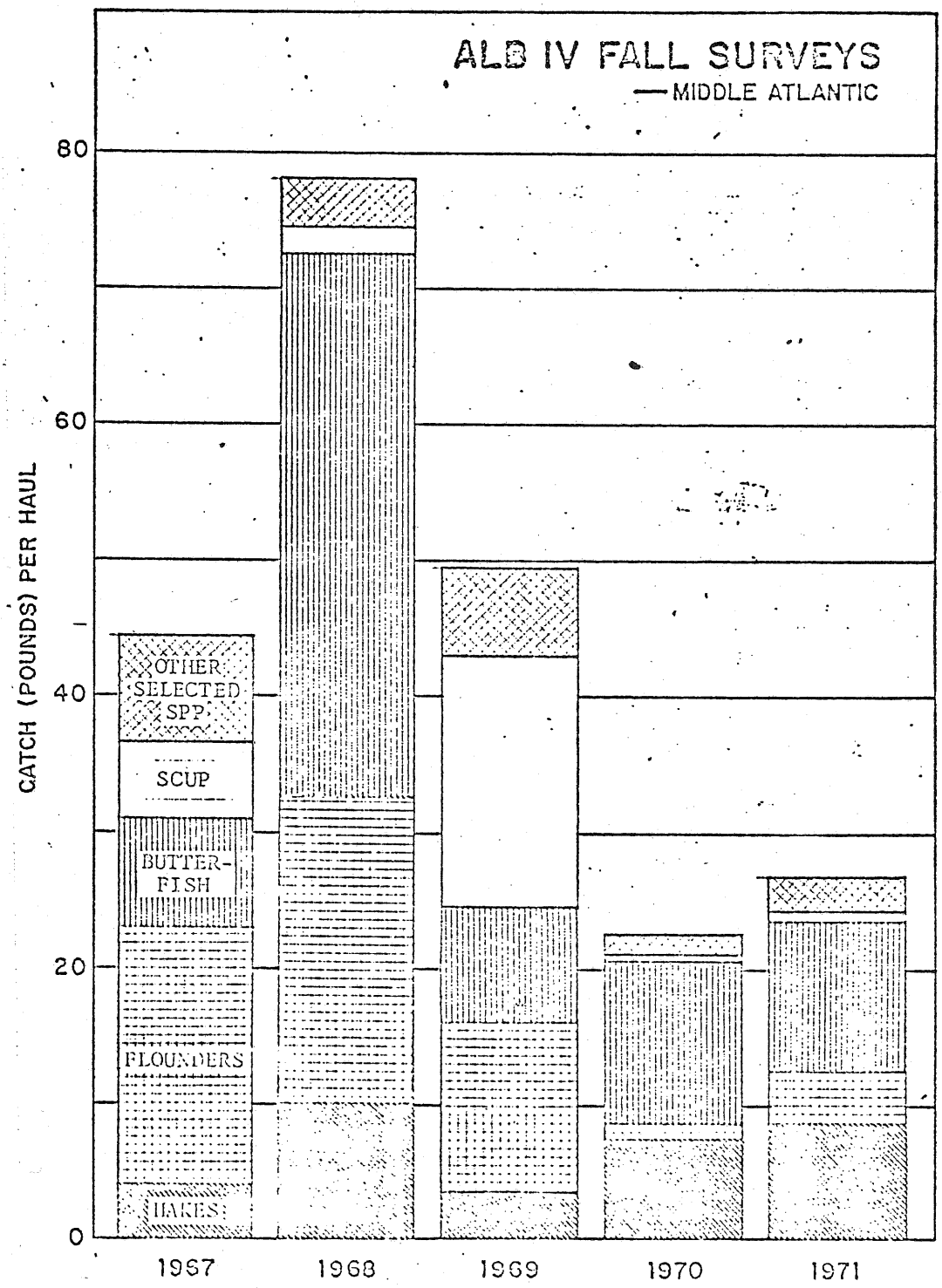

ALB IV FALL SURVEYS
—MIDDLE ATLANTIC
CATCH (POUNDS) PER HAUL
80
60
40
20
0
OTHER SELECTED SPP
SCUP
BUTTER-FISH
FLOUNDERS
HAKES
1967
1968
1969
1970
1971

Figure 0-1.