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Status of fisheries and research carried out  
in Subarea 5 and Statistical Area 6 in 1974

by

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Reports on research carried out in 1974 in Subarea 5 and Statistical Area 6 have been submitted by Canada, Federal Republic of Germany, German Democratic Republic, Japan, Poland, Spain, USA, and USSR. Documents containing information on the status and management of resources and of environmental conditions in these areas are: Res.Docs. 75/9, 13, 14, 15, 18, 19, 32, 37, 38, 40, 41, 44, 46, 48, 49, 50, 51, 58, 59, 60, 61, 62, 64, 65, 66, 67, 68, 69, 70, 71, 74, 80, 81, 82, 93, 94, 100, 102, 103, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 117, and 118; Summ.Docs. 75/4, 7, 12, 13, 15, 16, 17, 18, 24, 25, 28, 29, 30, and 36.

1. Status of the Fisheries

The 1974 catch of finfish and squid, except menhaden, large pelagics and billfishes, was 940,000 tons and in 1973, 1,154,000 tons. The second tier quota for these species was 924,900 tons.

Species which showed decreases in catch from 1973 to 1974 were mackerel (381,000 tons in 1973 to 295,000 tons in 1974), herring (235,000 tons to 185,000 tons), redfish (17,000 tons to 11,000 tons), red hake (67,000 tons to 34,000 tons), yellowtail flounder (31,000 tons to 25,000 tons), angler (7,000 tons to 1,000 tons), sculpins (9,000 tons to 3,000 tons), butterfish (19,000 tons to 13,000 tons), alewives (17,000 tons to 13,000 tons), and menhaden (331,000 tons to 250,000 tons).

Few species showed increases in catch, notably argentine (2,500 tons to 20,000 tons), dogfish (14,000 tons to 18,000 tons), and sea scallones (55,000 tons to

73,000 tons). The silver hake catches showed a slight decline (132,000 tons in 1973 to 130,000 tons in 1974. Squid catches levelled off in 1974 at 56,000 tons (57,000 tons in 1973).

Landings for 1972, 1973, and 1974 and the corresponding TACs are given in Table 1 for each species and group under management in Subarea 5 and Statistical Area 6.

Table 1. Summary of nominal catches (1972-74) and TACs (1973-75) for species and species groups under quota management in Subarea 5 and Statistical Area 6 (stock areas combined).

Species	Nominal catches (000 tons)			TACs (000 tons)		
	1972	1973	1974	1973	1974	1975
Cod	32	35	34	45	45	43
Haddock	7	6	5	6	0	6
Redfish	19	17	10	30	30	25
Silver hake	120	136	130	90	90	95
Red hake	75	66	34	40	70	65
Pollock <sup>1</sup>	13	13	12	55 <sup>1</sup>	55 <sup>1</sup>	55 <sup>1</sup>
Yellowtail <sup>2</sup>	39	31	25	26	26	20
Other flounders	24	22	22	25	25	25
Herring <sup>3</sup>	217 (19)	218 (16)	166 (19)	175	175	166
Mackerel	387	381	295	450	304	310 <sup>4</sup>
Argentine		3	20	-	25	-
Other finfish	168	155	131	-	125	150
Squid <sup>5</sup>	49	57	56	-	71	71
Overall 2nd tier	1,165	1,154	940	-	923.9	850

<sup>1</sup> TAC includes Div. 4VWX.

<sup>2</sup> Includes catch in Statistical Area 6 not covered in TAC in 1973 and 1974.

<sup>3</sup> Catches and TACs excludes juveniles in Div. 5Y. Catches of juveniles given in parentheses.

<sup>4</sup> Applies to Subarea 3-5 and Statistical Area 6.

<sup>5</sup> Nominal catches include both Illex and Loligo; the scientific TAC recommended was intended to pertain to Loligo only.

2. Assessment results

(a) Stocks in Subarea 5 and Statistical Area 6

1. Subarea 5-Statistical Area 6 all finfish and squid (2nd tier quota)

Previous analysis of this fishery and more recent reviews indicate that the level of exploitation, and hence the decline in stock biomass, did exceed the level associated with the MSY in the early 1970's, together with a reduction in fishable biomass of approximately 50%. Generalized production analyses further indicate that fishing mortality has exceeded the level corresponding to the MSY point by about 30% in 1972, and 25% in 1973. Bottom trawl survey abundance indices also declined sharply in 1974 (averaging approximately 40% of the 1973 level).

The sum of the recommended TACs for 1976 is 802,000 tons, down 24% from the 1975 value of 1,053,000 tons. The species TACs which include several Subareas were prorated as follows: pollock - 33% of the Div. 4VWX-Subarea 5 TAC or 18,000 tons mackerel - 80% of the Subarea 3-5 + Statistical Area 6 TAC or 248,000 tons. In formulating a composite second tier figure for 1976, the Assessments Subcommittee had to consider the following:

- i) Trends in bottom trawl survey abundance indices during the 1963-74 period, and the magnitude of the decline in the 1974 figures (down approximately 40% since 1973)
- ii) Species interactions, imply a different figure than the sum of the individual TACs; some studies indicate that the overall total TAC must be less than the sum of the individual species TACs.
- iii) The actual extent of biomass reduction beyond the MSY point (estimated as approximately 20-25%); and
- iv) The problem of by-catch in mixed fisheries, which varies in a complex manner depending on mesh size, vessel categories, closed areas and other variables.

Application of linear programming techniques to TAC allocation and by-catch data for the various national fisheries indicate an overall TAC of 66% of the summed TACs. This implies a second tier figure of approximately 540,000 tons, but in view

of the influence of recent regulations, efforts to limit by-catch, and the difficulty in identifying true incidental catches in the reported statistics, the Assessments Subcommittee considered 650,000 tons to be a realistic minimum level to correct the incidental catch problems and cause a reduction in fishing mortality, and a start toward recovery. A second tier TAC of 800,000 tons in 1976 would allow the stock to recover in approximately 13 years. A TAC of 650,000 tons could allow recovery in 7 years. Recruitment from that stock size should then allow an MSY catch to be taken about three years later. A TAC of 350,000 tons would allow stock recovery in three years.

## 2. Div. 5Y cod

The TACs for Div. 5Y cod have been set at 10,000 tons since 1973. However, commercial catch has averaged only 6,130 tons since 1932, and bottom trawl survey abundance indices indicate a continued decline in abundance since 1968; furthermore, current estimates of  $F$  for this area (0.5) appear to exceed estimates of  $F_{max}$  (0.3) computed on the basis of yield per recruit curves for Subarea 5.

The Assessments Subcommittee therefore

### recommends

a reduced TAC of 8,000 tons for 1976.

## 3. Div. 5Z cod

Commercial landings for this stock have declined somewhat in recent years. However, bottom trawl survey abundance indices have been relatively stable since 1963, and recruitment appears to be holding up well; furthermore, the current level of fishing effort appears to approximate that corresponding to the estimated MSY point. Therefore, no change in the TAC is advised for 1976.

## 4. Subarea 5 haddock

Available data indicate that haddock in Subarea 5 continue at a very low level and that recruitment remains poor. The Assessments Subcommittee

### recommends

that the 1976 TAC be set as low as possible, recognizing that an incidental

5. Subarea 5 redfish

Commercial and bottom trawl survey data indicate declining trends in abundance since 1971, while surplus production model analyses reveal MSY values ranging from 16,000-18,000 tons, well below earlier estimates of 30,000 tons.

The lower figures appear far more reasonable in view of the low productivity of redfish and the absence of an accumulated stock. Accordingly, the Assessments Subcommittee

recommends

a TAC of 17,000 tons for 1976, 8,000 tons lower than the 1975 figure.

6. Div. 5Y silver hake

Landings for this stock have decreased in recent years in spite of substantial recruitment. Apparently, discard of small hake has been of major importance in this fishery, as available data indicate that total catch has greatly exceeded reported landings in recent years. The failure of the fishery to recover in spite of good recruitment implies that the current TAC of 15,000 tons should be reduced, and accordingly, the Assessments Subcommittee

recommends

that the 1976 TAC be set at 10,000 tons.

7. Subdiv. 5Ze silver hake

Commercial and bottom trawl survey abundance indices (US data) declined (38%) in 1974, the survey abundance index reaching its lowest level since 1967. Survey data indicated a strong 1974 year-class; however, it should be noted that a close correlation has not been found between past survey predictions and actual year-class strength.

Virtual population analysis indicated an  $F$  of 0.93 to 0.95 in 1974, substantially above the estimated value for  $F_{max}$  (0.45). Further analyses indicated that if  $F$  in 1976 is maintained at the expected 1975 level, then a catch of 80,000 tons could be achieved but the stock size would decrease; (2) if the stock size is to be maintained, then the 1976 catch be 65,000 tons; and (3) if, however, the objective is to reduce fishing mortality to  $F_{max}$ , then the 1976 catch should be 50,000 tons which would result

in an increase in stock size.

The best advice would, therefore, appear to be to recommend a 1976 TAC of 50,000 tons. The USSR scientists felt that no TAC reduction below the 1975 level of 80,000 tons could be justified since the 1974 year-class actually could be much more abundant than assumed in the estimates.

8. Subdiv. 5Zw-Statistical Area 6 silver hake

US commercial and bottom trawl survey abundance indices have both declined in recent years; the 1974 survey abundance index was the lowest on record. Survey data again indicated a strong 1974 year-class.

Virtual population analysis indicated an F value of 0.68 in 1974, substantially above the estimated value of  $F_{max}$  (0.45). A 1976 catch of 43,000 tons would occur at  $F_{max}$ , and stock size would remain stable; consequently, the Assessments Subcommittee

recommends

a TAC of 43,000 tons for 1976.

9. Subdiv. 5Ze (east of 69° W) red hake

Catch declined 33% between 1973 and 1974. US bottom trawl survey data indicated a 50% decline in relative abundance between 1973 and 1974; however, the 1974 level was equivalent to the 1964-74 average and recruitment appeared to be holding up well. A USSR assessment indicated a TAC of 26,000 tons for this stock for 1976 and this figure was recommended by the Assessment Subcommittee.

10. Subdiv. 5Zw-Statistical Area 6 red hake (west of 69°W)

Catch decreased approximately 23% between 1973 and 1974; the US bottom trawl survey data revealed a 90% decline in relative stock abundance from 1972 to 1974, with the 1974 value being the lowest on record. No correlation has been found between survey abundance indices and subsequent year-class strength in this area, and consequently, no reliable recruitment estimates are available. A USSR assessment indicated a 1976 catch of 16,000 tons, which may be optimistic in that catch in 1975 was not considered in the analysis. The Assessments Subcommittee therefore

recommends

that the TAC be reduced from 45,000 to 16,000 tons.

11. Subarea 5 (east of 69°W) yellowtail flounder

US commercial and bottom trawl survey abundance indices stabilized during the 1971-73 period but declined again in 1974. In the absence of a detailed assessment, the Assessments Subcommittee considered this evidence to be insufficient to recommend a reduction in the current TAC level of 16,000 tons, and accordingly, no change is recommended for 1976.

12. Subarea 5 (west of 69°W)-Statistical Area 6 yellowtail flounder

The condition of the yellowtail stocks in this area remains poor, and abundance indices computed for 1974 were very low. In the absence of data delineating the relationships between yellowtail flounder groups in this area, and recognizing the depressed condition of these groups, the Assessments Subcommittee

recommends

that these stocks should be managed under a single TAC and that this TAC should be held to the lowest possible level, recognizing that by-catch may approach 4,000 tons.

13. Subarea 5-Statistical Area 6 mackerel

The relative contribution of the northern and southern contingents to the mackerel fisheries in Subareas 3-5 and Statistical Area 6 remains uncertain, but it was generally agreed that a combined assessment was the most appropriate stock evaluation approach. Accordingly, the Mackerel Working Group prepared a combined assessment for mackerel in Subarea 3-5 and Statistical Area 6.

Research vessel survey data proved too variable to permit evaluation of trends in abundance since 1973. Commercial abundance indices for the US and GDR mackerel fleets dropped significantly in 1974, while those for the Polish fleet remained at the 1973 level. The 1973 and 1974 year-classes both appear strong from examination of stock/recruitment curves in relation to environmental parameters.

The assessment prepared by the Group indicated that an F of 0.6 would provide

a catch of 310,000 tons. This level would allow 99% of the maximum yield per recruit to be achieved and would also place the 1977 stock biomass at the level which has provided maximum recruitment in the past 10 years, adjusting for environmental variations. It was noted, however, that the 1976 population would primarily consist of very young fish, thus creating the possibility for loss in yield per recruit.

Accordingly, the Assessments Subcommittee

recommends

a TAC of 310,000 tons for 1976, accompanied by a minimum size limit of 25 cm total length.

14. Subarea 5-Statistical Area 6 squid (Loligo and Illex)

Biomass estimates from Japanese commercial data indicate a stable population for Loligo since 1968. US bottom trawl survey data indicate no consistent trends since that year for either species.

Analyses of yield-per-recruit and stock/recruitment considerations indicated that removals could be about 50% of the stock biomass. As a virtual population analysis for Loligo indicated a stock size of 88,000 tons for Subarea 5 +Statistical Area 6 at the start of the 1972/73 season, the Assessments Subcommittee

recommends

a TAC of 44,000 tons for Loligo for 1976.

Acceptable estimates of stock size for Illex are not available, although removals are believed to have averaged around 20,000 tons in Subarea 5 and Statistical Area 6 in recent years. Accordingly, the Assessments Subcommittee

recommends

a precautionary quota of 30,000 tons for 1976.

15. Subarea 5-Statistical Area 6 other flounders

Commercial landings for this group of species have declined almost continuously since 1969, while bottom trawl survey data indicate a biomass decline of approximately 36% since 1963. Considering these trends and the additional implications of extensive mortalities contributed by US sport fisheries on these species, the Assessments

Subcommittee

recommends

that the TAC be reduced from 25,000 to 20,000 tons for 1976.

16. Div. 5Y herring

Constraints imposed by the Commission (June 1974 Meeting Proceedings No. 20, Appendix II, p. 240) state that the Div. 5Y catch in 1976 must maintain the adult stock at a minimum of 60,000 tons and that the 1976 TAC must not exceed that for 1975 unless adult stock size has reached the level that will provide maximum sustainable yield by the end of 1976. Assessment results indicate that the adult stock size will not reach this level; consequently, the 1976 TAC cannot exceed the 1975 level of 25,000 tons. To maintain an adult stock size of 60,000 tons in 1976, a catch of 9,000-21,000 tons could be taken, depending on the size of the 1973 year-class. In view of the present state of the stock, the Assessments Subcommittee

recommends

that the 1976 TAC be set as close to 9,000 tons as possible.

This would allow for recruitment at the lower level in 1973 and would allow some rebuilding of the stock if recruitment of this year-class proves to be higher.

17. Div. 5Z-Statistical Area 6 herring

Trawl survey data suggest a strong decline in abundance during 1974. Constraints imposed by the Commission (January 1974 Meeting Proceedings No. 7, Appendix II, p. 93) specify that an adult stock of 225,000 tons be maintained in 1976 and that the 1975 TAC can only be increased if stock size has reached the level that will provide the maximum sustainable yield by the end of 1976. Assessment results indicate that adult stock size will not reach this level, and the TAC for 1976 therefore cannot be advised to exceed the 1975 level of 150,000 tons. In order to prevent a decline in stock size below 225,000 tons, a TAC of from 60,000 to 100,000 tons could be taken dependent on recruitment of the 1973 year-class. The Assessments Subcommittee therefore

recommends

setting the 1976 TAC as close to 60,000 tons as possible to allow for the lower recruitment estimate and to permit some rebuilding of the stock provided that recruitment is, in fact, higher.

18. Subarea 5-Statistical Area 6 other finfish and argentine

Commercial landings for this group of species have remained relatively stable in recent years. However, US bottom trawl survey data indicate a 40% decline in biomass since 1963. It, therefore, appears evident that stocks are declining, although the information available is not judged sufficient to warrant a reduction at the present time. The Assessments Subcommittee therefore

recommends

that the 1976 TAC for other finfish and argentine remain at 150,000 tons.

(b) Stocks overlapping in Subareas 4 and 5

1. Div. 4VWX and Subarea 5 pollock

Commercial abundance indices have increased in recent years and recruitment levels appear to be holding up. Survey abundance indices have not shown any definite trends. In addition, recruitment appears to have been adequate to strong in recent years. No evidence has been found to indicate that this stock is declining under current catch levels, and the Assessments Subcommittee therefore

recommends

that the TAC be maintained at 55,000 tons for 1976.

3. Research activities

- (a) Species assessments (Res.Docs. 75/14, 15, 40, 44, 48, 59, 60, 62, 69, 74, 82, 94, 102, 103, 105, and 110; Summ.Docs. 75/4, 18, and 19)

Japan. Analytical assessment for Loligo in Subarea 5 and Statistical Area 6.

Spain. Analyses of commercial data to assess stocks of Loligo and Illex in Subarea 5 and Statistical Area 6.

USSR. Analytical assessments for Subdiv. 5Ze red hake and Subarea 5-Statistical Area 6 mackerel.

USA. Analytical assessments for Subdiv. 5Ze haddock, Div. 5Y, 5Ze, and 5Zw + Statistical Area 6 silver hake, Subareas 3-5 and Statistical Area 6 mackerel, and Subarea 5 and Statistical Area 6 summer flounder; general production model assessment for Subarea 5 redbfish; assessments (examination based on commercial and research vessel survey data) for Subarea 5-Statistical Area 6 squid, Subarea 5 and Statistical Area 6 butterfish; Subarea 5 and Statistical Area 6 herring, and Subarea 5 and Statistical Area 6 mackerel; preparation of stock records for Div. 5Y and Subdiv. 5Ze silver hake, Subarea 5 and Statistical Area 6 mackerel, Div. 5Y, Subdiv. 5Ze and Statistical Area 6 herring.

(b) Growth and mortality (Res.Docs. 75/19, 46, 48, 58, 60, 61, 69, 74, 102, 104, and 113)

FRG. Mean weights at aged 1970 year-class herring in Subdiv. 5Ze, growth of 1970 year-class herring.

Japan. Age and growth of Loligo in Subarea 5 and Statistical Area 6.

USSR. Growth and mortality rates for Illex in the western Atlantic, and for alewife from Subarea 5.

USA. Growth and mortality rates for Div. 5Y and Subdiv. 5Ze cod, Subarea 5 and Statistical Area 6 Loligo and Illex; growth rates for Subarea 5 and Statistical Area 6 butterfish; mortality rates for Subdiv. 5Ze haddock, and Subarea 5 and Statistical Area 6 summer flounder; overwinter larval mortality of herring larvae on Georges Bank.

(c) Spawning and fecundity (Res.Doc. 75/37; Summ.Docs. 75/16 and 36)

FRG. Stages of maturity for herring.

Poland. Seasonal progression of herring spawning on Georges Bank from commercial data.

USA. Spawning and fecundity of haddock, cod, pollock, and yellowtail flounder in Subarea 5; in situ studies of ecological factors affecting herring spawning and egg hatching in Div. 5Y.

(d) Food habits (Summ.Docs. 75/16, 29, and 30)

GDR. Mackerel and Subarea 5-Statistical Area 6.

USSR. Larval red and silver hake and herring in Subarea 5.

USA. Cod, silver hake, haddock and other groundfish in Subarea 5 and Statistical Area 6; feeding composition between herring and mackerel.

(e) Distribution (Res.Docs. 75/49, 50, 60, 64, 66, 67, 71, 74, 109, 110, 112, and 118;

Summ.Docs. 75/16, 28, and 30)

France. Loligo and Illex on Georges Bank; ecological aspects of larval herring distribution on Georges Bank.

FRG. Herring larvae in Subarea 5.

Poland. Herring larvae in Subarea 5.

USSR. Herring larvae on Georges Bank in relation to hydrological and meteorological factors.

USA. Herring larvae in Subarea 5, and of herring juveniles, Loligo, Illex, butterfish, and deep-sea red crab in Subarea 5 and Statistical Area 6.

(f) Other biological studies (Res.Docs. 75/38 and 64;

Summ.Docs. 75/12, 13, 28, 29, and 30)

Canada. Movements of herring tagged off the Bay of Fundy.

France. Maturation, age composition, and sex ratios for Loligo and Illex on Georges Bank.

Commercial sampling for length frequencies, length and weight at age in Subarea 5 and Statistical Area 6 are as indicated:

Country	Species								
	Cod	Haddock	Silver hake	Red hake	Yellowtail flounder	<u>Loligo-Illex</u>	Mackerel	Herring	Other
FRG								x	
GDR							x	x	
Japan						x			x
Poland							x	x	
Spain	x					x			
USSR			x	x		x	x	x	
USA	x	x	x	x	x	x	x	x	x

(g) Hydrography (Res.Docs. 75/9, 49, 50, 64, 66, 67, 71, 80, 81, 107, and 111; Summ.Docs. 75/7, 16, 28, and 30)

Canada. Effects of coastal current action and river discharge on temperature fluctuations in the Gulf of Maine; study of inter-relationships between oceanographic processes and fish production in the Gulf of Maine.

France. Temperature profiles and salinities in autumn on Georges Bank.

FRG. Collection of temperature and salinity data in Subarea 5 during spring and autumn herring larval and young fish surveys.

Poland. Temperature, salinity, dissolved oxygen, and phosphate measurements in autumn in Subarea 5.

USSR. Collection of temperature and salinity data in autumn on Georges Bank during herring larval surveys; studies of water chemistry circulation and upwelling in summer and autumn on Georges Bank.

USA. Salinity and temperature profiles on Georges Bank during autumn larval herring surveys; temperature and salinity measurements in spring and autumn in Subarea 5 and Statistical Area 6 during larval groundfish surveys; salinity and temperature profiles along the southern edge of Georges Bank in August to determine the position of the coastal slope water interface, and experiments to determine the

average position of the coastal slope interface from Cape Hatteras to Martha's Vineyard; intensive hydrographic coverage of the Hudson Canyon area; monthly temperature profiles by Coast Guard and merchant vessels in Statistical Area 6; experiments to measure the dynamic response of the northern Gulf of Maine to the passage of low pressure systems; sea surface temperature measurements using infrared photography from monthly overflights over Subarea 5 and Statistical Area 6; review of the physical oceanography of Georges Bank.

- (h) Plankton (exclusive of larval herring studies) (Res.Docs. 75/66, 71, and 106;  
(Summ.Docs. 75/7, 16, 28, and 30)

France. Zooplankton distribution in Subarea 5 in autumn.

Poland. Zooplankton sampling in Subarea 5 in autumn.

USSR. Zooplankton sampling in Subarea 5 in autumn.

USA. Plankton sampling in spring and autumn during groundfish and larval herring surveys; seasonal ichthyoplankton sampling in Cape Cod Bay; continuous plankton recorder tows at regular intervals in Subarea 5 and Statistical Area 6; studies to improve density-gradient sorting techniques; an overview of the plankton communities in the Gulf of Maine.

- (i) Special studies (Res.Docs. 75/13, 18, 32, 41, 51, 61, 65, 68, 70, 93,  
100, 108, and 117;  
Summ.Docs. 75/15 and 16)

Canada. Simulation of the mackerel fishery in Subareas 3-5 and Statistical Area 6 to investigate effects of variation in fishing intensity on biomass, catch and recruitment; development of a model of the Div. 5Z scallop fishery accounting for spatial variation in recruitment and fishing effort.

Poland. Hydroacoustical studies of mackerel school size and density.

USA. Analyses of commercial data, research vessel survey data and data from existing stock assessments to evaluate effects of increased fishing effort on the fishable biomass of Subarea 5 and Statistical Area 6 and to obtain MSY estimates; linear programming simulations of expected 1975 national catches to estimate the impact of by-catch on attainment of national quotas; examination of catch data from G 1

selected fisheries to evaluate trends in by-catch ratios; formulation of graphical procedures to estimate parameters in surplus-yield models; comparisons between US and USSR silver hake ageing and evaluation of the effects of different methods in estimating year-class strength; use of growth and mortality data and stock/recruitment relationships to derive optimum exploitation rates for squid in Subarea 5 and Statistical Area 6; field trials of a modified, high-opening trawl for groundfish surveys; growth and survival of larval haddock, winter flounder, and summer flounder in relation to water temperature and concentration of planktonic prey; direct observations of herring on eggbeds, a conceptual model of stocks of herring, analyses of samples and behaviour in catches of larval herring, estimates of probability of recovery of finfish plus squid biomass under given second tier TACs.

(j) Research vessel cruises

The following table gives a summary of research cruises completed in Subarea 5 and Statistical Area 6 in 1974 by nation, together with dates and type of data collected:

<u>Country</u>	<u>Vessel</u>	<u>Date</u>	<u>Type of Cruise</u>
France	<u>Cryos</u>	6-24 September	Larval herring survey
FRG	<u>Walther Herwig</u>	19 March-4 April	Juvenile herring survey
	<u>Anton Dohrn</u>	15-26 November	Larval herring survey
Poland	<u>Wieczno</u>	14-24 September	Juvenile herring and mackerel survey
	<u>Wieczno</u>	26 September- 21 October	Larval herring survey
	<u>Wieczno</u>	23-29 October	Hydroacoustical survey
	<u>Wieczno</u>	30 October- 6 November	Groundfish survey
USSR	<u>Khronometer</u>	20 March-15 April	Hydroacoustic and groundfish surveys
	<u>Belogorsk</u>	6-17 September	Gear trials
	<u>Belogorsk</u>	20 September- 2 October	Autumn groundfish survey
	<u>Belogorsk</u>	7-21 October	Autumn groundfish survey
	<u>Belogorsk</u>	26 October- 3 November	Mackerel survey

<u>Country</u>	<u>Vessel</u>	<u>Date</u>	<u>Type of Cruise</u>
USA	<u>Albatross IV</u>	11-22 February	Larval herring survey
	<u>Albatross IV</u>	4-8 March	Gear trials
	<u>Albatross IV</u>	12-22 March	Groundfish survey
	<u>Albatross IV</u>	28 March-11 April	Groundfish survey
	<u>Albatross IV</u>	16 April-5 May	Groundfish survey
	<u>Albatross IV</u>	2 July	Gear trials
	<u>Albatross IV</u>	8-25 July	Megabenthic survey
	<u>Albatross IV</u>	30 July-7 August	Gear trials
	<u>Albatross IV</u>	13-23 August	Zooplankton and juvenile fish survey
	<u>Duchess II</u>	6-13 September	Larval herring survey
	<u>Albatross IV</u>	6-17 September	Gear trials
	<u>Albatross IV</u>	23 September- 4 October	Autumn groundfish survey
	<u>Delaware II</u>	8-16 October	Larval herring survey
	<u>Albatross IV</u>	8-24 October	Autumn groundfish survey
	<u>Albatross IV</u>	30 October- 12 November	Autumn groundfish survey
	<u>Albatross IV</u>	12-13 November	Autumn groundfish survey
	<u>Albatross IV</u>	4-19 December	Autumn groundfish survey