

PELAGIC FISH COMMITTEE

by  
A. Maucorps

1984

BELGIUM

(R. DE CLERCK)

No market sampling of pelagic fish has been carried out in 1984. Research vessel surveys with bottom trawl on the juvenile herring and sprat were continued as given in the table below.

The research was limited to length measurements.

Research vessel catches

Area	Season	Objectives
IVc Belgian coast	April and September	Recording densities of immature herring and sprat

CANADA

(T.D. ILES)

All relevant research reported to NAFO.

DENMARK

No report received.

FINLAND

(R. PARMANNE & V. SJOBLUM)

No work carried out on pelagic fish other than reported to the Baltic Fish Committee.

FRANCE

(A. MAUCORPS)

Echantillonnage

HARENG

Zone	Période (trimestre)	Type de poisson	Nbre d'échantillons		Nombre de poissons mesurés	Nombre de poissons âgés	Examens des critères radiaux
			Bateau de recherche	Marché			
VI a north	1	géniteur	10		480	82	
North west	1	adultes	7	1	320	127	
North sea (03)	2	"		3	682	208	
	3	"		3	629	134	
	4	"		6	1 547	532	
Central North Sea (09)	1	juv.	19		1 480	46	
	3	adultes		3	684	133	
	4	"		1	283	75	
Southern North Sea Eastern Channel (12)	1	juv.	10	2	2 100	237	
	4	géniteur	19	13	8 700	1 004	
Celtic Sea (13)	3	adultes		2	509	166	
<u>ANCHOIS</u> Golfe de Gascogne VIII	2	adultes	12		3 592		
<u>CHINCHARD</u> VIII	2	juv.	18		10 614		
		adultes	9		392		
<u>MAQUEREAU</u> VIII	2	adultes	9		1 480		
<u>MERLAN BLEU</u> VIII	2	adultes	9		1 105		
<u>SARDINE</u> VIII	2	adultes	18		3 448		
<u>SPRAT</u> IV b IV e, VII d VIII	1	juv. et	19		1 981		
	1	adultes	10		1 413		
	2		9		1 552		

Campagnes de bateaux scientifiques

Zone	Dates	Objectif
Mer du Nord, Manche est et ouest Ecosse (IV, VII d, VI a)	7 - 30/02	IYFS (CIEM)
Golfe de Gascogne (VIII a - b)	28/04 - 15/05	Evaluation acoustique du stocks d'anchois de la côte des Landes et prospection sur les accores du plateau entre 46°00 et 49° N
Sud Mer du Nord - Manche Est (IV c - VII d)	7/11 - 30/11	Evaluation acoustique du stock de hareng des Downs

GERMAN DEMOCRATIC REPUBLIC

(L. DANKE)

Sampling Blue whiting

Area	Season	No of samples		No of fish	
		Research vessel	Market	Measured	Aged
VII, b, c	February		1	654	102
VII b,c	March		2	1083	155
Vib	March		1	514	100
XIVa	April		1	52	50
IIa	June		16	4859	97
IIa	June	7		2644	235
IIb	July	15		166	92
IVa E	August	2		1681	50
IIa	August	9		3851	150
Vb <sub>1</sub>	August	4		1280	

Research vessel surveys

Area	Date	Objectives
N-North Sea IVa <sub>E</sub>	2.8.84	Acoustic survey, midwater trawling hydrography
Norwegian Sea IIa	3.8.-23.8.84	
Norwegian Sea Vb <sub>1</sub>	23.8.-24.8.84	
Norwegian Sea IIa	25.8.84	
Norwegian Sea Vb <sub>1</sub>	25.8.-27.8.84	

FEDERAL REPUBLIC OF GERMANY

(D. SAHRHAGE)

<u>Sampling</u>		<u>Species HERRING</u>					
<u>Area</u>	<u>Season</u>	<u>Type of Fish</u>	<u>No of Samples</u>		<u>No of Fish</u>		
			<u>Research Vessel</u>	<u>Factory Ship</u>	<u>measured</u>	<u>aged</u>	<u>examined racially</u>
Hebrides	(01)	I imm+ad	5	-	2027	200	-
		II imm+ad	12	-	3326	200	-
		III ad+imm	14	-	4482	400	-
		IV adult	-	25	8610	200	-
W of Shetland	(02)	III ad+imm	2	-	507	100	-
		IV adult	-	6	2157	200	-
NW-North Sea	(03)	I imm+ad	11	-	2010	500	-
		II imm+ad	-	47	18835	500	-
		III ad+imm	19	-	3699	334	-
NE-North Sea	(04)	III ad+imm	4	-	378	100	-
NW of Ireland	(06)	II ad+imm	11	-	1764	300	-
		III ad+imm	7	-	1985	200	-
South Buchan	(08)	I immature	9	-	1393	335	-
		III imm+ad	6	-	941	100	-
Central North Sea	(09)	I immature	35	-	5211	700	-
		II imm+ad	25	-	2650	300	-
		III imm+ad	8	-	1517	200	-
W of Ireland	(10)	II -	9	-	169	-	-
		III adult	1	-	99	90	-
S-North Sea	(12)	I imm+ad	6	-	800	100	-
S of Ireland	(13)	I imm+ad	4	-	322	100	-
Bristol Channel	(14)	I ad+imm	4	-	249	100	-
West Channel	(15)	I -	3	-	72	-	-

Research Vessel Surveys

<u>Area</u>	<u>Date</u>	<u>Objectives</u>
Hebrides	(01) 04.01.-02.02.84	Gear Research
NW-North Sea	(03) 06.02.-09.03.84	International Young Fish Survey
South Buchan	(08)	
Central North Sea	(09)	
Central North Sea	(09) 17.02.-28.02.84	Groundfish Survey
Southern North Sea	(12)	
Hebrides	(01) 20.02.-28.03.84	Ground- and Pelagic Fish Survey
Central North Sea	(09)	

Hebrides	(01)	26.03.-04.05.84	Mackerel (adults, eggs) and other Pelagic Fish
NW of Ireland	(06)		
W of Ireland	(10)		
S of Ireland	(13)		
Bristol Channel	(14)		
West Channel	(15)		
NW-North Sea	(03)	18.06.-27.07.84	Ground- and Pelagic Fish Survey
NE-North Sea	(04)		
South Buchan	(08)		
Central North Sea	(09)		
Hebrides	(01)	14.08.-03.09.84	Herring, Mackerel, Sprat and Horse Mackerel Survey
W of Shetland	(02)		
NW- North Sea	(03)		
NW of Ireland	(06)		
Central North Sea	(09)		
W of Ireland	(10)		

<u>Sampling</u>			<u>Species SPRAT</u>	
Area	Season	<u>No of Samples</u>		<u>No of Fish</u>
		Research	Vessel	measured
N-North Sea	IVa	I	5	68
Central North Sea	IVb	I	32	1620
		II	20	670
S-North Sea	IVc	I	2	308
English Channel	VIIId,e	II	6	315
Bristol Channel	VIIIf	II	3	167
S of Ireland	VIIg-k	II	6	495
W of Ireland	VIIb,c	II	2	83
NW of Scotland	VIa	II	2	59

Research Vessel Surveys

Area	Date	Objectives	
N-North Sea	IVa	International Young Fish Survey	
Central North Sea	IVb		
S-North Sea	IVc	Groundfish Survey	
English Channel	VIIId,e	Mackerel (adults, eggs) and other Pelagic Fish	
Bristol Channel	VIIIf		
S of Ireland	VIIg-k		
W of Ireland	VIIb,c		
NW of Scotland	VIa		
Central North Sea	IVb	18.06.-27.07.84	Ground- and Pelagic Fish Survey

<u>Sampling</u>				Species <u>MACKEREL</u>			
Area	Season	Type of Fish	<u>No of Samples</u>		<u>No of Fish</u>		
			Research Vessel	Factory Ship	measured	aged	
N-North Sea	II	-	5	-	398	-	
	IVa						
Central North Sea	III	adult	11	-	675	199	
	IVb						
NW of Scotland	II	ad+imm	32	-	4294	400	
	VIa	adult	6	-	877	200	
	IV	adult	-	5	1139	296	
W of Ireland	II	adult	15	-	2350	250	
	VIIb,c						
S of Ireland	II	ad+imm	44	-	5873	750	
	VIIg-k						
English Channel	II	ad+imm	6	-	1744	100	
	VIIId,e						
Bristol Channel	II	-	4	-	167	-	
	VIIIf						

Research Vessel Surveys

Area	Date	Objectives
NW of Scotland	VIa	Mackerel (adults, eggs) and other Pelagic Fish
W of Ireland	VIIb,c	
S of Ireland	VIIg-k	
Bristol Channel	VIIIf	
English Channel	VIIId,e	
N-North Sea	IVa	Ground- and Pelagic Fish Survey
Central North Sea	IVb	
NW of Scotland	VIa	Herring, Mackerel, Sprat and Horse Mackerel Survey

Sampling

Species HORSE MACKEREL

Area	Season	Type of Fish	<u>No of Samples</u>		<u>No of Fish</u>	
			Research Vessel	Factory Ship	measured	aged
English Channel	VIIId,e	I	all	6		104
		II	"	1	909	81
Bristol Channel	VIIIf	I	"	4	11	10
S of Ireland	VIIg-k	II	"	43	10931	713
W of Ireland	VIIb,c	II	"	21	1972	151
		III	"	12	2935	41
NW of Scotland	VIa	II	"	22	849	238
		III	"	60	8524	93

Research Vessel Surveys

Area		Date	Objectives
English Channel	VIIId,e	26.03.-04-05.84	Mackerel (adults, eggs) and other Pelagic Fish
Bristol Channes	VIIIf		
S of Ireland	VIIIg-k		
W of Ireland	VIIIf,c		
NW of Scotland	VIa		
W of Ireland	VIIIf,c	14.08.-03.09.84	Herring, Mayckerel, Sprat and Horse Mackerel Survey
NW of Scotland	VIa		

Sampling

Species BLUE WHITING

Area	Season	No of Samples		No of Fish		
		Research Vessel	measured	aged	examined racially	
Norwegian Sea	IIa I	8	2392	-	-	
N-North Sea	IVa I	5	957	50	50	
Iceland Grounds	Va I	11	2177	50	50	
Faroe Plateau	Vb I	4	1239	250	250	
NW of Scotland	VIa I	7	2900	100	100	
Rockall-Bank	VIf I	9	2677	50	50	
	III	33	7839	100	100	
W of Ireland	VIIIf,c I	6	1532	100	100	

Research Vessel Surveys

Area		Date	Objectives
W of Scotland	VIa	04.01.-02.02.84	Gear Research
Rockall-Bank	VIf		
W of Ireland	VIIIf		
Norwegian Sea	IIa	20.02.-28.03.84	Ground- and Pelagic Fish Survey
N-North Sea	IVa		
Iceland Grounds	Va		
Faroe Plateau	Vb		
NW of Scotland/ Rockall-Bank	VIa,b		
W of Ireland	VIIIf,c		
Rockall-Bank	VIf	19.07.-28.07.84	Ground Fish Survey



ICELAND

(Jakob Jakobsson)

Sampling BLUE WHITING

Area	Season	Type of fish	No. of samples		No. of fish	
			Res. vessels	Fish vessels	Measured	Aged
SE Iceland	June	Juvcnile, immature	5		320	320
S, SE Iceland						
Irminger Sea	August	Juvenile, immature	6		460	50
SW, S, SE Iceland	Sept.	Juvenile, immature	42		2845	

- Research vessel surveys

<u>Area</u>	<u>Date</u>	<u>Objective</u>
SE, E Iceland	.	Blue whiting migration, abundance
SW Norway Sea	3.6.-13.6.	estimates, hydrography, zooplankton.
S, E, N Iceland	9.8.-29.8.	Abundance estimates, 0-group fish
		survey, hydrography.
W, N Iceland	16.8.-29.8.	Abundance estimates, 0-group fish
		survey, hydrography.

Sampling CAPELIN

Area	Season	Type of fish.	No. of samples		No. of fish		
			Res. vessels	Fish vessels	measured	aged	ex. racially
W, N, E Iceland	Jan.-Apr.	Mixed	33	4	6458	3300	100
SE, E Iceland	Jan.-Apr.	Adult	15	28	4686	3520	200
Iceland, E-Greenland	Aug.	Mixed	36		6424	2740	
W, N, E Iceland	Oct.-Dec.	Mixed	51		7208	6570	

Research vessel surveys

Area	Date	Objective
W, N, E, SE Iceland	11.1.-9.2.	Abundance estimates
W, N, E, SE Iceland	11.1.-9.2.	Abundance estimates. T.S. measurements
S, W Iceland	29.2.-15.3.	Spawning migration
S, E, N Iceland	9.8.-29.8.	0-group capelin and other spp. 1-group capelin abundance estimates
W, N Iceland	16.8.-29.8.	0-group capelin and other spp. 1 group capelin abundance estimates
W, N, E Iceland	31.10.-21.11.	Abundance estimates
W, N, E Iceland	31.10.-21.11.	Abundance estimates

Sampling HERRING

Area	Season	Type of fish	No. of samples		No. of fish		
			Res. vessels	Fish vessels	measured	aged	ex. racially
E, SE, S, W, NW, N Iceland	Jan.-Sept.	Mixed	8	17	5309	1912	1912
SE, S, SW, W, NW, N, NE Iceland	Sep.-Dec. <sup>1)</sup>	Mixed		45	4483	3295	3295
E, SE Iceland	Sep.-Dec.	Mixed	19		4292	619	619

1) Fishing season

Research vessel surveys

Area	Date	Objective
S, E Iceland	11.1.-9.2.	Abundance estimates. T.S. measurements
E Iceland	10.12.-21.12.	Abundance estimates

(J. MOLLOY)

Area	Season	Type of fish	No. of samples (Market)	No. of fish measured	No. of fish aged	No. of fish examined racially
Species; Herring						
Div. VI, a North West	II, IV, V, VI VII, IX, X, XII	Adult	28	6105	1046	1046
Div. VII, b-c West	I, III, IV, V, VI VII, VIII, IX, X, XI, XII	Adult	24	6417	991	991
Div. VII, f South West	II, IV, V, VI, VIII IX, X, XI, XII	Adult	28	2167	1148	1148
Div. VII, g Celtic Sea	I, II, VIII, IX, X, XI, XII	Adult	51	7439	1993	1993
Div. VII, a Irish Sea	I, II, VI, VII VIII, IX, XI	Adult	30	6208	1273	1273

Species; Mackerel						
Div. VI, a North West	I, II, III, IV, V VII, IX, XI, XII	Adult	28	6891	2628	-
Div. VII, b West	II, IV, VI	Adult	13	2494	483	-
Div. VII, j South West	I, II, IV	Adult	5	557	258	-

Species: Sprats						
Div. VII, j	I, II, X, XI, XII	Adult	24	4095	-	-
Div. VII, a	I, X	Adult	4	538		

Research Vessel Surveys 1984

Area	Time	Objective
Celtic Sea	October to February '85	Larval survey to obtain estimate of abundance of herring population
VI, a North west	October to November	Larval survey to obtain estimate of abundance of herring population
VII, a Irish Sea	February	Young herring survey

THE NETHERLANDS

(A. CORTEN)

## Herring/Sampling

Area	Quarter of year	Type of fish	No. of samples		No. of fish		
			research vessel	market	measured	aged	examined racially
Via North	2	adult	-	1	140	25	-
" "	3	"	-	13	1,597	325	-
Via South + VIIb, c	1	"	-	1	125	25	-
" " "	3	"	-	3	366	75	-
" " "	4	"	-	5	682	125	-
IVa West	2	"	-	12	1,768	300	-
" "	3	"	-	26	3,779	650	-
08 South Buchan	2	"	-	3	480	75	-
" " "	3	"	-	1	171	25	-
09 Central North Sea	2	"	-	1	134	25	-
" " " "	3	"	-	12	1,877	300	-
" " " "	3	spawning	-	2	287	50	-
12 Southern North Sea	1	adult	-	37	6,675	925	-
" " " "	2	"	-	3	455	75	-
" " " "	3	"	-	1	130	25	-
" " " "	4	"	-	19	3,624	475	-
" " " "	4	spawning	-	7	1,168	175	-
South Ireland	3	adult	-	1	121	25	-
" "	4	"	-	2	389	50	-
Total			-	150	23,963	3,750	-

Herring/ Research vessel surveys

Area	Dates	Objectives
IVa, b, c North Sea	31 Jan. - 2 March	ICES Young Fish Survey
IVa Northern North Sea	2 July - 12 July	Tag recapture + echo survey
IVa Northern North Sea	29 Aug. - 18 Sept.	ICES Herring larval survey
IVb Central North Sea	11 Sept. - 20 Sept.	ICES Herring larval survey
IVc + VIIId Southern North Sea	10 Dec. - 20 Dec.	ICES Herring larval survey
IVc Dutch Waddensea	20 Febr. - 19 Apr.	Herring larval survey

Mackerel/Sampling

Area	Quarter of year	Type of fish	No. of samples		No. of fish		
			research vessel	market	measured	aged	examined racially
IVa Northern North Sea	2	adults	-	2	104	50	-
" " " "	3	"	-	10	527	187	-
IVb Central North Sea	2	"	-	3	313	75	-
" " " "	3	"	-	4	260	104	-
" " " "	4	"	-	1	59	25	-
IVc Southern North Sea	2	"	-	11	1,004	275	-
" " " "	3	"	-	3	289	75	-
" " " "	4	"	-	2	148	50	-
VIa N.W. Ireland	1	"	-	2	97	50	-
" " "	2	"	-	4	283	100	-
" " "	3	"	-	4	302	100	-
" " "	4	"	-	6	425	150	-
VII South of Ireland	1	"	-	43	3,808	1,075	-
" " "	2	"	-	21	1,454	525	-
" " "	3	"	-	1	87	25	-
" " "	4	"	-	3	203	75	-
Total				120	9,363	2,941	-

Mackerel/Research vessel surveys

Area	Dates	Objectives
IVa, b Central/Northern North Sea	22 May - 14 June	ICES mackerel egg survey
IVa Northern North Sea	17 July - 24 July	Mackerel parasites

Horse mackerel/Sampling

Area	Quarter of year	Type of fish	No. of samples		No. of fish		
			research vessel	market	measured	aged	examined racially
VIa N.W. Ireland	3	adult	-	3	205	75	-
" " "	4	"	-	6	667	150	-
VII South Ireland	1	"	-	9	850	225	-
" " "	2	"	-	10	1,136	250	-
" " "	3	"	-	2	371	50	-
" " "	4	"	-	8	1,376	200	-
Total			-	38	4,605	950	-

NORWAY

(O.E. DAHL & A. DOMMASNES)

Herring (Clupea Harengus)  
Sampling

South of 62° N

Area	Season	Type of fish	Research vessel	Market	No. of fish measured	No. of fish aged	No. of fish exam. racially
Skagerrak	I	Adult	1	3	400	400	300
IIla	II	Adult		3	300	300	300
	III	Adult		1	100	100	100
	IV	Mixed		4	400	400	400
Northern	I	Immat.	1	-	100	100	-
North Sea	II	Adult	-	236	19748	1200	700
IVa	III	Adult	25	151	15115	1748	384
	IV	Adult		23	1921		
Norwegian coast	I	Adult	+	1	100	100	100
	II	Adult	-	4	381	381	281
	III	Immat.	-	3	300	300	300
	IV	Immat.	4	-	215	215	100
Central	I	Immat.	23		1884	1884	875
North Sea	II	Adult	-	28	2237	56	
IVb	III	Adult	-	34	2980	81	81
	IV	Adult	-	36	3061	151	151
NW North Sea	III	Adult	-	13	1100		
VIa	IV	Adult	-	12	1075	100	100

Research vessel survey

Area	Season	Objectives
North Sea	Jan/Feb	Int. Young fish survey, herring
NW North Sea	July	North Sea herring acoustic survey
Skagerrak along the Norw. coast north to Varanger-fjord	Oct/Nov/Dec	Fish survey, 0-group sprat/herring

Sprat (Sprattus sprattus)  
Sampling

Area	Season	Type of fish	No. of samples of Research vessel	Market	No. of fish measured	No. of fish aged
Norwegian coast IVa	IV	Mixed	10	-	1000	1000
Central North Sea IVb	I	Adult	10	44	5380	200

Research vessel surveys

Area	Season	Objectives
North Sea	Jan/Feb	Int. Young Fish Survey, sprat
Skagerrak - along the Norw. coast north to Varanger-fjord	Oct/Nov/Dec	Fish survey, 0-group, sprat/herring



Mackerel (Scomber scombrus)  
Sampling

Area	Season	Type of fish	No. of samples		No. of fish measured	No. of fish aged
			Research vessel	Market		
Norwegian Sea. IIa	III	Mixed		4	391	388
Skagerrak IIIa	II	Mixed		1	100	99
Northern North Sea IVA	II	Mixed		1	99	98
	III	Mixed	3	5	713	712
	IV	Mixed		3	224	223
Central North Sea IVb	III	Mixed	1		100	100
NW North Sea. VIa	IV	Mixed		2	200	200
SW Ireland VIIg-k	II	Mixed	5		495	492

Research vessel surveys

Area	Season	Objectives
North Sea	Jun/Aug	Egg and larval survey, mackerel

Tagging

Area	Season	Type of tag	No. tagged	Type of fish
SW Ireland VIIg-k	II	Int. steel	14 512	Mackerel
North Sea - Skagerrak IVa,b. IIIa	III	Int. steel	13 587	Mackerel

Herring (*Clupea harengus*) North of 62°N

Sampling 1984

Area	Season	Type of fish	No. of samples		No. of fish measured	No. of fish aged	No. of fish exam.rac.
			Research vessels	Market			
Norw. coast (Finnmark)	I	Juv.	5		386	71	
	II	"	16		1468	389	
	III	"	7		553	135	
	IV	Mixed	13		1121	428	
Barents Sea I	I	Juv.	11		500	20	
	II	"	24		2189	752	
	III	"	14		1194	322	
	IV	"	6		773		
Norw. coast IIa	I	Mixed	34	49	7552	2407	
	II	"	9	1	905	809	
	III	"	5	3	678	548	
	IV	"	57	11	5979	3147	
<b>Total</b>			<b>201</b>	<b>64</b>	<b>23298</b>	<b>9028</b>	

Research vessel surveys 1984

Area	Date	Objectives
Norwegian coast 62°N - 70°N	January - March	Experimental fishing for re-capture of tags. Acoustic survey of spawning grounds. Sampling of commercial fishery.
Norwegian coast 62°N - 70°N	April - May	Distribution of herring larvae.
Norwegian coast 62°N - 69°N	April - May	Tagging
Barents Sea	May - June	Acoustic survey of I-group
Barents Sea/ Norwegian Sea	June	Post-larvae distribution
Barents Sea/ Norwegian Sea	August	0-group distribution
Norwegian coast 62°N - 70°N	November - December	0- and I-group acoustic survey sampling commercial fishery
Norwegian coast north of 70°N, southern Barents Sea	November - December	0- and I-group acoustic survey

Tagging 1984

Area	Season	Type of tags	No. tagg.	Type of fish	Recoveries
Norw. coast	II	internal	29313	adult	

Capelin (Mallotus villosus)

Sampling 1984

Area	Season	Type of fish	No. of samples Research vessels	Market	No. of fish measured	No. of fish aged	No. of fish exam.rac.
Barents Sea I - IIa - IIb	I - IV	Mixed	307	2063	237313	27860	
Jan Mayen IIa	III	"		159	16510	1648	
Total			307	2222	253823	29508	

Research vessel surveys 1984

Area	Date	Objectives
Barents Sea	January - February	Mature capelin
Barents Sea	March - April	Spawning grounds
Barents Sea	May - June	Late spawning capelin
Barents Sea	May - June	Larvae
Jan Mayen	August	Scouting, sampling commercial catches
Barents Sea	August	0-group survey
Barents Sea	September	Acoustic survey

Tagging 1984

None

Blue whiting (Micromesistius potassou)

Sampling 1984

Area	Season	Type of fish	No. of samples Research vessels	Market	No. of fish measured	No. of fish aged	No. of fish exam.rac.
Barents Sea	I	Mixed	8		197	66	
Norwegian Sea	I	"	16		903	514	
	II	"	9		458	234	
IIa	III	"	26	13	3149	1818	
Northern Norwegian Sea.IIb	I	"	2		45		
North Sea	I	"	4	24	1814	418	
IVa	II	"	1	37	2382	509	
IVb	III	"	8	31	2647	564	
	IV	"		20	1387	200	
West of the British Isles.	I	"	18	103	8450	2296	
	II	"	14	136	9850	1102	
Faroes	III	"		1	100	50	
Vb,VIa,VIIb.	IV	"		10	825		
VIIb.c.g.h. i.k							
Total			106	375	32207	7771	

Research vessel surveys 1984

Area	Date	Objectives
West of British Isles	March - April	Acoustic survey - abundance, distribution and structure of spawning stock.
Norwegian shelf	April - May	Distribution and structure.
Norwegian Sea	August	Acoustic survey (international). Abundance, distribution and structure of total stock.

Tagging 1984

None

Great silver smelt (Argentina silus)

Sampling 1984

Area	Season	Type of fish	No. of samples Research vessels	Market	No. of fish measured	No. of fish aged	No. of fish exam.rac.
Norwegian Sea	I	Mixed	1	1	121	121	
IIa	II	"	22	30	3861	1962	
North Sea	I	"	1	1	52	32	
IVa	II	"	2		131	131	
West of the British Isles	I	"	1		11	11	
Via.b	II	"	3		67	67	
Total			30	32	4243	2324	

Research vessel surveys 1984

Area	Date	Objectives
Norwegian shelf	April - May	Distribution and structure

Tagging 1984

None

Poland

No report received.

PORTUGAL

Echantillonnage

(L. BARRACA)

Espèce - Sardina pilchardus (Walb.)

Région	Saison	Type de poissons	N. échantillons		N. poissons mesurés	N. poissons dont âge déterminé	
			Navire de recherche	Marché		otolithes	écailles
IXa	1 <sup>er</sup> trimestre	Tous	-	135	10212	645	267
	2 <sup>ème</sup> trimestre		-	208	15364	450	103
	3 <sup>ème</sup> trimestre		-	237	17396	413	160
	4 <sup>ème</sup> trimestre		23	181	18714	389	193
	TOTAL			23	761	61686	1897

Campagne d'investigation

Région	Date	Objectifs
IXa (plateforme continentale portugaise)	22 novembre - 10 décembre	campagne acoustique expérimentale, pour la sardine

## Echantillonnage

Espèce - Micromesistius poutassou (Risso)

Région	Saison	Type de poissons	N. échantillons		N. poissons mesurés	N. poissons dont âge déterminé	N. de poissons observés par races
			Navire de recherche	Marché			
IXa	1 <sup>er</sup> trimestre	Tous	-	104	6574	-	76
	2 <sup>ème</sup> trimestre		50	127	12507	-	53
	3 <sup>ème</sup> trimestre		10	99	8622	-	-
	4 <sup>ème</sup> trimestre		-	107	7957	-	-
	TOTAL			60	437	35660	-

## Campagne d'investigation\*

Région	Date	Objectifs
IXa	15 - 31 mai	distribution du merlan bleu en profondeur et son comportement pendant le jour et pendant la nuit

\* cette campagne n'a été pas seulement réalisée pour étudier le merlan bleu



## Echantillonnage

Espèce - Scomber scombrus L.

Région	Saison	Type de poissons	N. échantillons		N. poissons mesurés	N. poissons dont âge déterminé (otolithes)
			Navire de recherche	Marché		
IXa	1 <sup>er</sup> trimestre	Tous	-	224	17135	157
	2 <sup>ème</sup> trimestre		-	208	12267	171
	3 <sup>ème</sup> trimestre		-	166	9904	125
	4 <sup>ème</sup> trimestre		3	175	11290	356
	TOTAL			3	773	50596

Espèce - Scomber japonicus Houttuyn

Région	Saison	Type de poissons	N. échantillons		N. poissons mesurés	N. poissons dont âge déterminé (otolithes)
			Navire de recherche	Marché		
IXa	1 <sup>er</sup> trimestre	Tous	-	17	72	72
	2 <sup>ème</sup> trimestre		-	30	102	74
	3 <sup>ème</sup> trimestre		-	48	348	230
	4 <sup>ème</sup> trimestre		-	44	227	171
	TOTAL			-	139	749

## Echantillonnage

Espèce - Trachurus trachurus (L.)

Région	Saison	Type de poissons	N. échantillons		N. poissons mesurés	N. poissons dont âge déterminé (otolithes)
			Navire de recherches	Marché		
IXa	1 <sup>er</sup> trimestre	Tous	-	246	19915	462
	2 <sup>ème</sup> trimestre		34	257	23135	556
	3 <sup>ème</sup> trimestre		-	203	14643	402
	4 <sup>ème</sup> trimestre		-	202	14582	421
	TOTAL		34	908	72275	1841

## Campagne d'investigation

Région	Date	Objectifs
Aires sélectionnées de la plateforme continentale portugaise	14 - 31 mai	distribution d'espèce relativement à la plateforme continentale en des aires sélectionnées.

Spain

No report received.

SWEDEN  
(O. HAGSTRÖM)

Herring      Sampling

Area	Season	Type of fish	No. of Samples		No. of Fish		No. of Fish examined racially
			Research	Market	Measured	Aged	
Kattegat	I, II, III		15	68	29 110	3 287	3 065
	IV, V, VI		-	59	17 435	945	446
	VII, VIII, IX		5	75	25 915	1 534	866
	X, XI, XII		-	72	21 553	834	707
Skagerrak	I, II, III		10	9	7 467	1 939	1 939
	IV, V, VI		-	3	1 114	187	187
	VII, VIII, IX		10	30	12 495	2 881	1 415
	X, XI, XII		-	26	8 622	751	624
North Sea	-		-	-	-	-	-
Baltic	VIII, IX		9	-	4 300	1 380	138
Total			49	342	128 011	13 738	9 387

RESEARCH VESSEL SURVEYS

Area	Season	Objectives
Kattegat, Skagerrak	II	Investigation on young fish; herring larvae and stock separation
Kattegat, Skagerrak Baltic	VIII, IX	Acoustic survey; herring

UNITED KINGDOM, ENGLAND AND WALES  
(A C BURD)

Sampling 1984

Herring

Area		No of Samples		No of fish		
		Research Vessels	Market	Measured	Otolithed	Racial Investigation
North Sea	4A	2		319	277	277
	4B	44	12	10788	2497	2304
	4C	15	28	8874	2408	2408
West of Scotland	6A	1		45	45	45
Eastern English Channel	7D	2	9	1825	1091	1091
Western English Channel	7E	1		110	107	107

Sprat

Area		No of Samples		No of fish		
		Research Vessels	Market	Measured	Otolithed	Racial Investigation
North Sea	4B	32		3189	872	
	4C	26	6	6765	1568	
Eastern English Channel	7D	2		329	100	
Western English Channel	7E	15	6	2731	862	

Pilchard

Area		No of Samples		No of fish		
		Research Vessel	Market	Measured	Otolithed	Racial Investigation
South West	7E-H	2	17	2734	719	-
Biscay	8	2	-	232	232	-

Mackerel

Area		No of Samples		No of fish		
		Research Vessel	Market	Measured	Otolithed	Racial Investigation
North Sea	4	2	-	243	243	-
West of Scotland	6	1	-	16	16	-
Irish Sea	7A	2	-	1982	195	-
South West	7E-H	8	114	13438	1965	-
Celtic Sea - West of Ireland	7B, C, J	2	-	2251	191	-
Biscay	8	7	-	3486	798	24

Scad (Horse Mackerel)

Area		No of Samples		No of fish		
		Research Vessel	Market	Measured	Otolithed	Racial Investigation
North Sea	4	-	-	-	-	-
West of Scotland	6	1	-	55	-	-
Irish Sea	7A	1	-	72	72	-
South West	7E-H	4	3	3946	890	-
Celtic Sea - West of Ireland	7B, C, J	3	-	3371	649	-
Biscay	8	6	-	5368	872	-

RESEARCH VESSEL SURVEYS, 1984

Area	Month	Objectives
North Sea and English Channel	January	Herring Larval Survey
North Sea and English Channel	February	Herring Acoustic Survey
North Sea	February	International Young Fish Survey
Continental Slope	March	Trawl Survey
North Sea	July	Herring 0-gp survey
Celtic Sea and Western Channel	July	Groundfish survey
North Sea	August	Herring Acoustic Survey
Irish Sea	September	Young Fish Survey
North Sea	October	Herring Larval Survey
Continental Slope	November/December	Trawl Survey

UNITED KINGDOM

(Scotland)

(R.S. BAILEY)

HERRING

Sampling

Area	Season	Type of fish	No of samples		No of fish		
			Research Vessel	Market	Measured	aged	Examined racially
01 Hebrides	Jan-Mar	Mixed	0	7	1440	507	0
	July-Sept	Adult	2	0	173	63	0
02 West of Shetland	Jan-Mar	Mixed	5	2	2135	397	0
	Apr-Jun	Adult	0	10	2338	557	0
	Jul-Sept	Mixed	7	18	4285	814	200
	Oct-Dec	Adult	0	5	1141	220	0
03 North Western North Sea	Jan-Mar	Mixed	22	3	4115	747	0
	Apr-Jun	Adult	0	25	4774	649	0
	Jul-Sept	Mixed	61	23	8598	1739	290
	Oct-Dec	Immature	21	0	4080	226	0
04 North Eastern North Sea	Jul-Sept	Mixed	15	0	158	84	0
06 North West Ireland	Jul-Sept	"	1	0	259	59	0
07 West of Scotland	Jan-Mar	"	18	6	4900	1155	100
	Apr-Jun	Adult	0	55	8192	647	0
	Jul-Sept	Mixed	0	52	7523	889	0
	Oct-Dec	"	19	5	3576	1156	392
08 South Buchan	Jan-Mar	"	9	0	1138	169	0
	Jul-Sept	"	23	6	2275	525	0
	Oct-Dec	Immature	9	0	1092	122	0
09 Central North Sea	Jan-Mar	Mixed	24	0	3982	331	0
	Jul-Sept	"	24	0	1595	386	0
	Oct-Dec	Immature	2	0	425	23	0

Tagging

AREA	SEASON	TAG TYPE	NO. TAGGED	TYPE OF FISH	RECOVERIES
Northwestern North Sea	JUNE	MAGNETIC MICROTAG	10,000	ADULT	48



HERRING

Research Vessel Surveys

<u>Area</u>	<u>Season</u>	<u>Objectives</u>
North Western North Sea to Germany Bight	February	International Young Fish Survey
North and West of Scotland	Jan-Feb	Recruit Trawling Survey
Firth of Clyde (Ballantrae Bank)	Feb-Mar	Larval Survey, Acoustic and Trawling Survey
North Western North Sea	Jun-July	Microtagging and Tag Recovery (3)
North Western North Sea	July	Acoustic and Trawling Survey (2)
West of Scotland (Hebrides)	Aug-Sept	Trawling and Larval Surveys
Moray Firth to Firth of Forth	September	Larval Survey (1)
Northern North Sea	September	Larval Survey (1)
West of Scotland and North West Ireland	Sep-Oct	Larval Survey (1)
" " " " " " "	October	Larval Survey (1)
Firth of Clyde	November	Acoustic and Trawling Survey

Notes

- (1) In accordance with previous ICES resolutions
- (2) In accordance with C. Res. 1980/2:24
- (3) In accordance with C. Res. 1980/2:25

Additional Research Activities

Continuation of herring parasitological work with a view to using parasitological data for studying models of migration.

MACKEREL

Sampling

Area	Season	Type of Fish	No of Samples		No of Fish	
			Research Vessel	Market	Measured	Aged
IVa <u>Northern North Sea</u>	Jan - Mar	1mm/adult	8	1	216	104
	Apr - Jun	1mm/adult	37	1	717	371
	Jul - Sep	1mm/adult	5		235	73
	Oct - Dec	1mm/adult				
IVb <u>Central North Sea</u>	Jan - Mar	1mm	1		1	
	Apr - Jun	1mm/adult	4		143	143
	Jul - Sep	1mm/adult	26	1	504	319
	Oct - Dec	adult		1	58	54
VIa <u>West of Scotland</u>	Jan - Mar	1mm/adult	1	7	930	455
	Apr - Jun	1mm/adult		3	234	56
	Jul - Sep	1mm/adult	1	21	2094	627
	Oct - Dec	1mm/adult	14	72	8270	1619

Research Vessel Surveys

<u>Area</u>	<u>Date</u>	<u>Objectives</u>
North Sea	June	Egg Survey
North West of Scotland	October	Acoustic survey

Other Research Activities

Continuation of mackerel parasitological work with a view to determining stock mixing.

SPRAT

Sampling

Area	Season	No of Samples		No of Fish	
		Research	Commercial	Measured	Aged
IVa <u>Northern North Sea</u>	Jan - Mar	14	1	1904	244
	Apr - Jun				
	Jul - Sep	14		2435	411
	Oct - Dec	22	6	5441	417
IVb <u>Central North Sea</u>	Jan - Mar	39		5801	421
	Apr - Jun				
	Jul - Sep				
	Oct - Dec	13		2583	158
VIa <u>West of Scotland</u>	Jan - Mar	8	6	2150	205
	Apr - Jun				
	Jul - Sep				
	Oct - Dec	15	31	10017	743

Research Vessel Surveys

<u>Area</u>	<u>Date</u>	<u>Objectives</u>
Western North Sea	Jan	Acoustic and trawling survey (in accordance with C Res 1981/2:22)
Western North Sea	Dec	Acoustic and trawling survey (in accordance with C Res 1981/2:22)
Western North Sea	Dec	Inshore trawling and echo sounder survey

Squalus Ancanthias (Spurdog)

Sampling

Length measurements continued to be taken from commercial and research vessel samples.

Tagging

No new tagging experiments were carried out but recoveries from previous experiments continued to be monitored.

U. S. A.

(R. C. HENNEMUTH)

Atlantic Herring

Trends in relative abundance of Atlantic herring in 1984 were monitored based on Northeast Fisheries Center spring and autumn research-vessel surveys, and an additional survey was conducted in winter specifically to assess herring stocks in the Gulf of Maine/Middle Atlantic region. An estuarine sampling program conducted by the Massachusetts Division of Marine Fisheries, and larval herring studies conducted by the Maine Department of Marine Resources, provided independent estimates of year-class strength.

Studies were undertaken by the University of Maine and Maine Department of Marine Resources to document the distribution of spawning beds in coastal Maine waters.

The Massachusetts Division of Marine Fisheries, in cooperation with the Northeast Fisheries Center, tagged herring in the Southern Gulf of Maine region to clarify stock intermixture patterns.

The University of Massachusetts is completing studies, in conjunction with the Northeast Fisheries Center, to investigate stock structure, based on biochemical and morphometric analyses.

### Atlantic Mackerel

The Northeast Fisheries Center completed an assessment of the status of the Northwest Atlantic mackerel stock for use in establishing catch quotas in USA waters for 1985-86.

The Northeast Fisheries Center, the Polish Sea Fisheries Institute, and the GRYF Deep-Sea Fishing Company cooperated in a research fishery for mackerel during January-April 1985 between Georges Bank and Cape Hatteras, North Carolina. Two Polish factory stern trawlers participated in this fishery. In addition, the Polish R/V WIECZNO participated in a survey for mackerel (and sea herring) in the above area during April 1984.

The Northeast Fisheries Center completed analyses and several reports comparing mackerel egg health with surface-water heavy metals, toxic hydrocarbons, temperature, and salinity. There was further collection and analysis of data on the prevalence and intensity of infection of age-1 mackerel by hemoparasites.

### Butterfish

The Northeast Fisheries Center conducted assessment analyses on butterfish for use in managing that fishery in 1985-86.

### Spiny Dogfish

The Northeast Fisheries Center prepared a report on changes in abundance and population structure of spiny dogfish in the Northwest Atlantic.

## Sharks

The Northeast and Southeast Fisheries Centers completed a series of three papers on shark catches from fisheries in the Northwest and Western Central Atlantic and Gulf of Mexico, which will be published in 1985 as a NOAA Technical Report.

Northeast Fisheries Center staff members prepared several scientific and popular publications (in print) on apex predators, primarily on large Atlantic sharks. The subjects included: age and growth of mako and sandbar sharks; food habits and daily estimates of sandbar sharks and swordfish; biomass estimates and amount of prey consumed by sharks, tunas, and swordfish on Georges Bank; and distribution and abundance of white sharks in the Northwest Atlantic.

Other publications dealt with results of the cooperative shark-tagging program. In 1984, over 4,000 sharks of two dozen species were tagged. Tag returns provide new information on the migration of several species of sharks and swordfish, including first estimates of transatlantic movements of the mako shark and several transatlantic recaptures from blue sharks. Some tags were returned after over ten years at liberty and over distances of 3,000 miles.

The Southeast Fisheries Center participated in a South Carolina Marine Resources Department project on the utilization of sharks for food. Information on the edibility characteristics was provided on seven species.

### Alewives, Blueback Herring, and Shads

The Atlantic States Marine Fisheries Commission began preparing a coastwide management plan for the East Coast stocks of these species. Research on the population dynamics of alewives and blueback herring was conducted by the Maine Department of Natural Resources and the Virginia Institute of Marine Science. The Connecticut Department of Environmental Protection studied the American shad population in the Connecticut River. Other states monitoring these stocks included Massachusetts, New Jersey, Pennsylvania, Maryland, Delaware, North Carolina, South Carolina, and Georgia.

### Bluefish

The State University of New York at Stony Brook continued an examination of factors influencing the offshore distribution of bluefish, based on Northeast Fisheries Center survey data.

The Northeast Fisheries Center is conducting studies on the feeding behavior and food preference of the species.

A study on the level of PCB's in bluefish from Atlantic coastal USA waters was begun, involving the Northeast and Southeast Fisheries Centers. The eventual planned use of these data will be for evaluation of the potential human consumption questions by State regulatory agencies.

### Striped Bass

The National Marine Fisheries Service and US Fish and Wildlife Service completed a study on the effects of fishing and pollution-related mortality on Maryland striped bass. Monitoring of East Coast stocks was continued by Massachusetts, Connecticut, New York, New Jersey, Maryland, Virginia, and North Carolina. Experimental studies were conducted on the effects of pH and contaminants on striped bass larvae in the Nanticoke River, Maryland (Johns Hopkins University). Additional studies were conducted on predation on striped bass larvae by other fish species (East Carolina University), the effects of contaminants on disease susceptibility (US Fish and Wildlife Service), the effects of chlorinated sewage effluent on the nutritional value of food organisms for striped bass larvae (University of Maryland), and stock identification using eye-lens protein analysis (University of Rhode Island) and mitochondrial DNA (City University of New York).

### Atlantic Menhaden

The Southeast Fisheries Center prepared an assessment update for the highly migratory Atlantic menhaden stock which ranges from the east coast of Florida to Nova Scotia along the Atlantic coast. This assessment is based on purse-seine landings data from 1940 through 1981 and port sampling data on size and age from 1955 through 1981. Results of annual coast-wide tagging studies are also incorporated into the assessment. Analytical methods used in the assessment include yield-per-recruit analysis, surplus-production models, and an investigation into spawner/recruit relationships. A new assessment is underway based on purse-seine landings and port sampling data through the 1984 fishing season. An age-structured population simulation model (MENSIM), prepared under contract by the University of North Carolina, is being used to address management concerns before the Atlantic States Marine Fisheries Commission.

### Gulf Menhaden

The Southeast Fisheries Center prepared an assessment update for the Gulf menhaden stock which ranges from the west coast of Florida to the Yucatan Peninsula in Mexico along the Gulf coast. This assessment is based on purse-seine landings data from 1946 through 1983 and port sampling data on age and size from 1964 through 1983. Results of annual coast-wide tagging studies are also incorporated into the assessment. Analytical methods used in the assessment include yield-per-recruit analysis, surplus-production models, an investigation into spawner/recruit relationships, and an age-structured population simulation model. Gulf menhaden management is coordinated through the Gulf States Marine Fisheries Commission.



### Ecosystem Studies

The Southeast Fisheries Center synthesized available ecological information and fishery data to quantify the relationship between primary production and coastal fishery yield along the east coast of the United States from 31<sup>0</sup> to 41<sup>0</sup> N latitude. Conclusions include: (1) algal production is inadequate to support the system, i.e., vascular plant production is also needed; (2) detritus, a frequent dietary constituent, still contains at least 40% of the plant material from which it was derived; (3) the most rapid advances in understanding this fishery production system may come from studies of detritus production and utilization, forage fish diets, and monthly rates of both forage fish and pre-recruits.

### Bluefin Tuna

The Southeast Fisheries Center continued its assessment of Atlantic bluefin tuna stocks in 1984, using catch and catch rate data on coastal rod-and-reel fisheries and high-seas longline fisheries. Indexes of abundance for large and small fish in the western Atlantic were developed and adjusted to remove variations due to varying catchability and aggregation of longline sets. A virtual population analysis calibrated to the CPUE indexes was conducted to estimate stock-size changes in recent years. A sample survey continues to provide an estimate of the magnitude of the catch of small fish caught by the rod-and-reel sport fishery and as a by-catch of the purse seine skipjack fishery. An analysis of the 1982-84 data on the rod-and-reel fishery is being undertaken. An ichthyoplankton survey was carried out in 1984 in the Gulf of Mexico bluefin tuna spawning grounds, thus continuing the time series of these data. Proposed tagging studies for bluefin tuna are being considered as a future means of indexing the abundance of juvenile fish. Refinement of the cohort analysis continued, using catch estimates and various measures of CPUE.

### Blue Marlin, White Marlin, Sailfish, and Swordfish

Emphasis in 1984 was placed on developing a USA swordfish data base in order to facilitate stock assessment research. Data for over 200,000 swordfish representing 1978-84 catches have been processed and are being used to investigate the management of the fishery through such measures as seasonal closures or minimum size limits. A review is also being completed of the stock structure hypotheses of swordfish. Work continues toward a comprehensive stock assessment of sailfish; data are being assembled on USA recreational and foreign longline

catches, and it is expected that a preliminary virtual population analysis will be conducted in 1985.

Work on age and growth studies of marlins, and monitoring of the USA recreational catch from tournament and dock sampling, continues to add valuable information which will be incorporated into assessments for these species. Over 100 sport-fishing tournaments were sampled in 1984 for catch and effort statistics of marlin and sailfish and for provision of materials for age analysis.

#### Tagging

The Cooperative Gamefish Tagging Program completed its 30th year of activity in 1984. This program enlists the cooperation of recreational anglers in tagging and releasing blue marlin, white marlin, sailfish, swordfish, and tunas. In 1984, anglers tagged and released 2,423 fishes of more than 12 species as of October.

U.S.S.R.

(PINRO, Murmansk)

During 1984 specialists from the PINRO laboratory of pelagic fish continued studies on biology of Atlanto-Scandian herring, blue whiting and, partly, mackerel in the Norwegian Sea, capelin and polar cod in the Barents Sea and in the Spitsbergen area.

Conditions of the commercial species stocks, peculiarities of their concentrations distribution, length and age composition of fish were studied during the research vessels "Persey III", "Menzelinsk", "Kokshaysk", "Alaid", "Artemida", "Vilnyus", "Captain Demidov" cruises.

In March-June the R/V "Persey III" carried out an acoustic survey of blue whiting stocks in the spawning grounds area and in the southern Norwegian Sea. In August this vessel took part in the international expedition on blue whiting stock assessment in the Norwegian Sea. As in previous years oceanographic observations in the Norwegian and Greenland Seas were carried out in May-June together with Icelandic scientists.

In August-September a joint Soviet-Norwegian survey of the O-group of commercial fishes of the Barents Sea and adjacent waters was carried out; in September an acoustic capelin stock survey was undertaken.

The results of investigations served as the basis for prepared for the ICES Working Groups recommendations on the size of allowable catch of pelagic fishes in future.

MATERIALS

collected on pelagic fishes in 1984

ICES area	Quarter	Month	Type of fish	Number of fish collected		Number of fish measured	Age determination	Racial analysis
				at sea	at market			
I	2	3	4	5	6	7	8	9
<u>Blue whiting</u>								
		I	Prespawning			124		
		II	Prespawning			339		
		III	Prespawning	I		6230	I00	
		Total		I		6693	I00	
			IV	Postspawning	2	8422	200	
		II	Y Feeding	7		28038	800	
		YI	Feeding	4		27361	400	
IIa		Total		13		63821	I400	
			YII	Feeding	6	19005	600	
		III	YIII	Feeding	5	17438	500	
		IX	Feeding			1452		
		Total		11		37895	1100	
		IV	X Feeding	2		6664	200	
		Gross amount		27		115073	2800	
IIb		III	YIII	Feeding	I	960	I00	
		IX	Feeding	3		571	300	
		Total		4		1531	400	
		IV	X Feeding			I00		
		Gross amount		4		1631	400	
IVa		II	IV	Postspawning	I	720	I00	
		Y	Feeding	2		695	200	
		YI	Feeding	I		696	I00	
		Gross amount		4		2111	400	
		I	I	Prespawning	I	4457	I00	
			II	Prespawning	2	4964	200	
			III	Spawning	I	2994	I00	
		Total		4		12415	400	
			IV	Postspawning	2	11415	200	
		II	Y	Postspawning	I	1273	I00	
		YI	Postspawning			1899		
Yb		Total		3		14587	300	

I	2	3	4	5	6	7	8	9
y b1		YΠ	Feeding	I		1654	100	
	III	YΠ	Feeding			947		
	Total			I		2601	100	
		X	Feeding	I		3509	100	
	IY	XI	Feeding			679		
		XΠ	Prespawning			2601		
	Total			I		6789	100	
	Gross amount			9		36392	900	
y I a	I	III	Spawning	I		1017	100	
	II	IY	Postspawn.	4		3096	400	
	Gross amount			5		4113	500	
y B	I	III	Spawning	8		9496	400	
	II	IY	Postspawn.			211		
	Gross amount			8		9707	400	
YΠ b,c	I	III	Spawning	2		5910	144	
YΠ	I	II	Prespawning	8		10059	400	
		III	Spawning	-		13341	400	
	Gross amount			13		23400	800	
XΠ	II	y	Feeding			513		
XIV	II	y	Feeding			308		
			<u>Polar cod</u>					
		I	Immature			986		
	I	II	Immature			365		
		III	Immature			735		
	Total					2086		
		IY	Feeding	I		1295	100	
	II	y	Feeding			438		
I	Total			I		1733	100	
		YΠ	Feeding	2		4068	200	
	III	YIII	Feeding	3		873	150	
		IX	Feeding	2		1138	150	
	Total			7		6079	500	
		X	Prespawning	4		3143	400	
	IY	XI	Prespawning	1		5917	100	
		XΠ	Prespawning			819		
	Total			5		9879	500	
	Gross amount			13		19777	1100	

	I	2	3	4	5	6	7	8	9
	Π	Y		Feeding			155		
		YI		Feeding	I		1023	100	
	Total				I		1178	100	
Π <sub>b</sub>		YΠ		Feeding	I		284	100	
		YIII		Feeding	3		879	149	
		IX		Feeding	I		1562	100	
	Total				5		2725	349	
	IV	X		Prespawning			323		
	Gross amount				6		4226	449	
<u>Mackerel</u>									
	Π	YI		Presp., postsp.	I		9819	150	
Π <sub>a</sub>		YΠ		Presp., postsp.			8218	153	
		YIII		Postspawning			33348	150	
		IX		Postspawning			4877	-	
	Total						66443	303	
	Gross amount						76262	453	
YI <sub>a</sub>	Π	IV		Prespawning			604		
	Π	YI		Presp., postsp.			3297		
Y <sub>b1</sub>		YIII		Postspawning			527		
		IX		Postspawning			987		
	Total						1514		
	Gross amount						4811		
Yb <sub>2</sub>	Π	YI		Postspawning I				100	
YΠ	I	II		Prespawning			280		
	Π	YI		Postspawning			1271		
	Gross amount						1551		
<u>Capelin</u>									
I		I		Prespawning	9		30659	900	
		II		Prespawning	8		23836	800	
		III		Spawning	6		8599	600	
	Total				23		63094	2300	
		IV		Feeding			420		
	Π	Y		Feeding	6		3213	600	
		YI		Feeding	7		4677	630	
	Total				13		8310	1230	
VIII d,e	II	V		Prespawning I			2272	50	
	II	VI		Postsp. presp. 4			5434	200	

I	2	3	4	5	6	7	8	9
I		YII	Feeding	2		1605	238	
	III	YIII	Feeding	3		24442	310	
		IX	Feeding	3		19885	300	
	Total			8		45932	848	
		X	Feeding	4		8725	400	
	IV	XI	Feeding	3		15624	300	
		XII	Feeding			8281		
	Total			7		32630	700	
	Gross amount			51		149956	5078	
II a		I	Prespawning	1		6659	100	
	I	II	Prespawning	3		13578	300	
		III	Spawning	2		3163	200	
	Gross amount			6		23400	600	
	I	I	Prespawning			590		
		YII	Feeding	I		739	100	
	III	YIII	Feeding	6		12132	550	
		IX	Feeding	11		45972	1050	
II b	Total			18		58843	1700	
		X	Feeding	6		42336	600	
	IV	XI	Feeding	3		22643	300	
		XII	Feeding	4		21293	400	
	Total			13		86272	1300	
	Gross amount			31		145705	3000	
			<u>Herring</u>					
	I	I	Immature			4349		
		IV	Immature			1267		
	II	V	Immature			1619		
		VI	Immature			1850		
I	Total					4736		
	Gross amount			4		16742	350	
II a	I	III	Spawn., postsp.			445		
	II	IV	Spawn., postsp.			369		
		V	Postspawning			94		
	Total					363		
	Gross amount					908		