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BYCATCHES IN SALMON DRIFT-NETS AT WEST GREENLAND IN 1972

BY

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WITH 1 FIGURE, 14 TABLES AND APPENDIX

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Abstract

On the basis of catch-per-unit-effort of bycatches by commercial vessels, estimates have been derived on numbers of individuals of various species captured by the non-Greenlandic vessels fishing for Atlantic salmon at West Greenland during 1972. Of all bycatches, seabirds were taken most frequently, murres (*Uria lomvia*) being most common with an estimated kill of about 207,000 individuals. Estimated approximate kills of other seabird species occurring less frequently were: dovekie (*Plautus alle*)—10,000, greater shearwater (*Puffinus gravis*)—2700, black guillemot (*Cepphus grylle*)—1800 and Atlantic puffin (*Fratercula arctica*)—900. Of fish species only Atlantic cod (*Gadus morhua*) was taken in significant quantities (about 11,000 individuals).

Of marine mammals harbour porpoise (*Phocoena phocoena*) and seals were taken most frequently with estimated kills of about 1400 and 300 individuals respectively.

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Introduction

During the course of the Joint ICES/ICNAF Salmon Tagging Experiment at West Greenland during autumn 1972, information was obtained on bycatches in salmon drift nets. The catches of seals, porpoises and seabirds by salmon drift nets in Greenland waters were of sufficient magnitude to arouse the attention and the sentiments of the public. Fears were expressed that these incidental catches might compete with local hunting and that the survival of one species, Brunnich's thick-billed murre (*Uria lomvia*) might be menaced (TULL, GERMAIN & MAY, 1972). LEAR & CHRISTENSEN (1975) estimated that the numbers of harbour porpoise (*Phocoena phocoena*) taken as bycatches by the non-Greenlandic salmon driftnet fishery in West Greenland in 1972 were in the neighborhood of 1500 animals.

Effort has previously been made to estimate the seasonal quantity of murres captured in drift-nets, but the results were equivocal as the basic material was rather scarce (TULL, GERMAIN & MAY, 1972). The observations made during the international salmon tagging experiment supply sufficient information on bycatches to make reliable estimates on the total numbers of each species caught in 1972 by vessels not registered in Greenland, i.e. the main part of the salmon drifters operating in this area.

The object of this report is to list the bycatches entering the salmon fishery and to assess the total losses especially of those species retained by salmon drift-nets in large quantities.

Gear and Methods

Bycatches were recorded by the scientific staff of 4 research vessels and observers placed on board 8 commercial vessels (in the following called "observer vessels") over the whole salmon fishing season, i.e. from the end of July to mid October. Not all observers, however, were consistent in reporting bycatches. One observer gave no information on birds at all, two observers reported only on the more common species such as murres, porpoises and seals and another did not record bycatches after mid-September. In cases when large numbers of a species were captured making exact counting tedious, the observer made an estimate.

Each set of data on bycatches was accompanied by information on position, date and the time of the day the nets were shot and hauled. The bycatches were grouped by week, by coastal area and by distances (subareas) from the West Greenland coast. The divisions were selected with special reference to an appropriate distribution of the salmon fishery on fishing grounds. The designations and the boundaries of areas and subareas (see Fig. 1) are the following:

Area I	70°30′N–68°40′N Disko Banke and coastal bank west of Disko
Area II	68°40′N–66°35′N Store Hellefiskebanke
Area III	66°35′N–65°25′N Lille Hellefiskebanke
Area IV	65°25′N–63°35′N Sukkertoppen Banke and Fyllas Banke
Area V	63°35′N–62°00′N Fiskenæs Banke and Dana Banke
Area VI	62°00′N–60°00′N Coastal bank West and South of Arsuk
Subarea 1	Inside Baseline
Subarea 2	Baseline – 6-mile limit
Subarea 3	6-mile limit – 12-mile limit
Subarea 4	12-mile limit – 30-mile limit
Subarea 5	30-mile limit – 60-mile limit

A few sets were made outside the divisions above. The corresponding bycatches are referred to as the Davis Strait and the Labrador Sea, north and south of latitude 60°00′N, respectively.

The number of individuals captured by a fishing gear is obviously not only dependent on the abundance of the single species and the amount of gear used, but also on the availability of the species to the gear. Therefore, it may be useful to supply some basic information about the gear in which the bycatches were taken.

More than 90 % of the drift-nets operated by the commercial vessels were manufactured from 0.5–0.6 mm monofilament nylon twine with a stretched mesh size of 130–140 mm. The remainder were multifilament nylon nets. The length of the nets varied from 18 m to 37 m, but by far the majority were about 33 m; they extended from the surface to a depth of about 5 m. The top of the net was kept afloat by floats or a

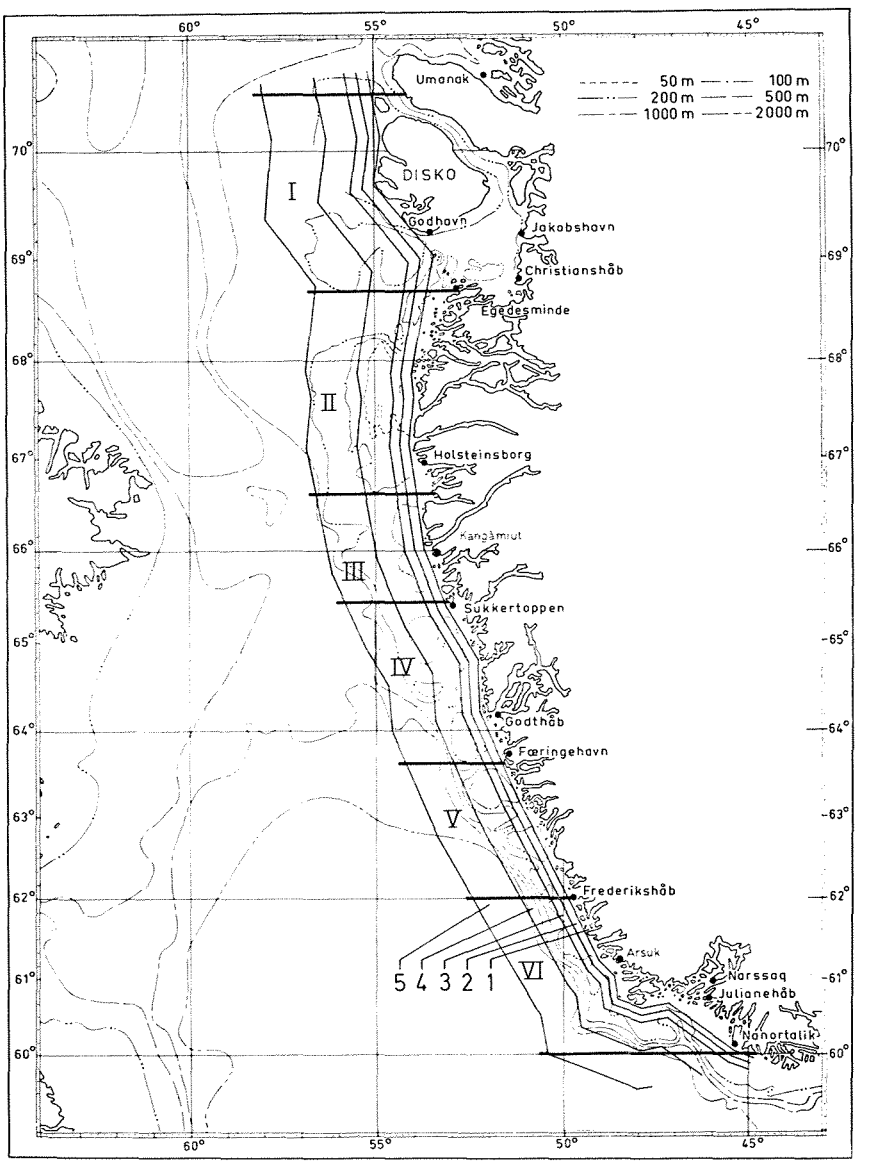

Fig. 1. Area map of West Greenland showing fishing areas (I–VI) and subareas (1–5).

floating rope. The net was tightly stretched since a combined sinking and hauling rope with a lead core was mounted to the footrope.

Usually 100 nets are tied in a so-called "link" measuring about 1.8 nautical miles. The links, equipped with buoys for the purpose of identification, are set in straight lines. However, depending on wind and current, the link will curve and often form a U-shaped line which, in good weather, usually results in increased fishing efficiency. In the case of

stormy weather or strong current the loops may collapse and the consequence is decreasing fishing power of the gear.

The maximum number of nets operated by each commercial vessel in 1972 varied between 850 and 450; on an average 440 nets were used per set, amounting to a total length of 7.8 naut. miles. In most cases the nets were set about sunset. Hauling started before sunrise and usually finished before noon, depending on weather, number of nets entangled, number of seabirds as bycatches, etc. This procedure applied to 80% of the sets made by the observer vessels. The rest of the sets were made after midnight and at varying times of the day and were often of shorter duration and with fewer nets because of unfavourable weather, ice conditions or proximity to the shore.

In contrast to the commercial gear, the nets used by the research vessels were 46 m long, 3–4 m deep, half with a mesh size of 130 mm and half with 150 mm, and manufactured of monofilament twine exclusively.

The main purpose of the research drift-netting, to produce a maximum number of viable salmon suitable for tagging, made special demands on the net operation. Fewer nets were used, maximum 120, averaging 45 (1.1 naut. miles) and fishing time was much shorter than in the commercial fishery. Moreover fishing had to be carried out mainly in daylight.

Results

The species list and numbers of individuals recaptured as bycatches by observer and research vessel are presented in Table 1. Thirty six (36) species are identified as bycatches including 2 shark species, 9 fish species, 19 bird species and 6 mammal species. Table 1 lists the species by both scientific, and common Canadian and Danish names but Tables 2–14 for brevity contain only common Canadian names of species caught.

The occurrence of each species is listed according to time and place of capture (Appendix I).

The occurrence, relative abundance and/or availability of the species entering the fishery in large quantities are presented in Tables 2–11. Estimates of numbers of individuals captured by observer vessels per 100 miles of net × fishing time (mile-hours) and per 100 nets × sets are used as indices of relative abundance and/or availability.

Assessments are made of the total number of bycatches entering the non-Greenlandic salmon fishery in 1972 based on estimated number of individuals captured by observer vessels per 100 nets set and total number of nets set by the 22 non-Greenlandic salmon vessels operating at West Greenland in 1972.

Table 1. *Species and number of individuals reported as bycatches in salmon drift-nets operated by observer and research vessels participating in the salmon tagging experiment at West Greenland in 1972*

	No. of individuals reported by observer vessels	research vessels
Selachii:		
Lamna nasus: Porbeagle: Sildehaj	1	
Somniosus microcephalus: Greenland shark: Havkal	1	
Sharks, unidentified	3	
Pisces:		
Salvelinus alpinus: Arctic char: Fjeldørred	10	3
Gadus morhua: Atlantic cod: Torsk	4219	1
Gadus ogac: Greenland cod: Uvak	9	
Cyclopterus lumpus: Lumpfish: Stenbider	169	3
Sebastes marinus: Redfish: Rødfisk	7	
Myoxocephalus scorpius: Shorthorn sculpin: Ulk	64	
Anarhichas minor: Spotted wolffish: Plettet Havkat	1	
Wolffish, unidentified: Havkat	5	
Reinhardtius hippoglossoides: Greenland halibut: Hellefisk	128	
Hippoglossoides platessoides: American plaice: Håising	3	
Aves:		
Gavia stellata: Red-throated loon: Rødstrubet Lom	5	
Gavia immer: Greater common loon: Islom	7	
Fulmarus glacialis: Atlantic fulmar: Mallemuk	96	
Puffinus gravis: Greater shearwater: Storskråpe	876	
Morus bassanus: Gannet: Sule	2	
Clangula hyemalis: Old squaw duck: Havlit	1	
Somateria mollissima: Common eiderduck: Edderfugl	4	
Somateria spectabilis: King eider: Kongeedderfugl		1
Phalaropus fulicarius: Red phalarope: Odinshane	1	
Stercocarius sp.: Jaeger: Kjove	19	
Rissa tridactyla: Kittiwake: Ride	21	1
Larus marinus: Great black-backed gull: Svartbag	1	
Larus hyperboreus: Glaucous gull: Gråmåge	1	
Gulls, unidentified: Måge	6	
Fratercula arctica: Atlantic puffin: Søpapegøje	438	3
Cepphus grylle: Black guillemot: Tejst	460	16
Alca torda: Northern razorbill: Alk	184	
Plautus alle: Dovekie: Søkonge	4019	11
Uria lomvia: Brunnich's thick-billed murre: Kortnæbet Lomvi	482	444
Uria aalge: Atlantic common murre: Atlantisk Lomvi		2
Murres, unidentified: Lomvir	78436	36
Seabirds, unidentified: Fugle	181	

(Continued)

Table 1. Continued

	No. of individuals reported by observer vessels	research vessels
Mammalia:		
Phocoena phocoena: Harbour Porpoise: Marsvin	561	12
Globicephala melaena: Pilot whale: Grindehval	1	
unidentified whale: Hval	1	
Pagophilus groenlandicus: Harp seal: Grønlandssæl	19	1
Cystophora cristata: Hooded seal: Klapmyds	7	
Phoca hispida: Ringed seal: Ringsæl	4	
Erignatus barbatus: Bearded seal: Remmesæl	2	
Seals, unidentified: Sæl	89	

As already mentioned, certain species were captured in such large quantities that exact counting was not feasible. This applied especially to the most frequently occurring seabirds. For the same reason the majority of the bycatches, mainly murres, are not determined to species. But uncertainity of identification also results in unspecified reporting of bycatches. Because of adverse weather and light condition, the deck of a commercial vessel hauling drift-nets does not offer the most favourable facilities for registration of catches by species and number.

Sharks

During the course of the tagging experiment 5 sharks were reported as bycatches by observer vessels, only 2 were identified – 1 was a porbeagle and 1 a Greenland shark.

Fish

Among all species retained by the nets, Atlantic salmon – the primary target species of the fishery—were caught in largest quantities. In total the observer and research catches amounted to 86,659 and 1,758 individuals respectively. Though outside the scope of this report, salmon are mentioned in order to compare their occurrence and/or availability with the most common bycatches. The relationship between catches of salmon and bycatches of murres has been used to estimate the total annual murre kill in the salmon fishery (TULL, GERMAIN & MAY, 1972). The distribution of effort of the salmon fishery is shown in Tables 2 and 3.

Arctic char were reported in low numbers over the entire research area, and inside a distance of 6 nautical miles from the coast.

Table 2. *Atlantic salmon*
Catches in commercial salmon drift-nets per unit effort

	Week no.		32	33	34	35	36	37	38	39	40	41	42	43
	Area	Sub-area	30/7-5/8	6/8-12/8	13/8-19/8	20/8-26/8	27/8-2/9	3/9-9/9	10/9-16/9	17/9-23/9	24/9-30/9	1/10-7/10	8/10-14/10	15/10-21/10
Number caught per 100 mile-hours of nets	I	1					226	119						
		2					258	163	54	39				
		3					235	166	47	2	31			
		4		110			93	147	45		33	44		
		5						99		74	58	52		
	II	1												
		2							54			38		
		3		287		40	86	54	50			92		
		4		143		53	111	37	64	34	16		39	
		5							61		44	34		
	III	1									179			
		2	127	243	277	163	159		112		27	74		
		3	265	216	267	129	42		51	28		232		
		4	293	189	138				55		37			
		5	265	107						88	38			
	IV	1												
		2	219		178	309	119		151					
		3	273		179	64								
		4	345		60	42								
		5	78	144										
	V	1		262					22	140				
		2		574	493	374			13	137	102	99	162	71
		3	189	1045	354									
		4		330	271	340			25	13				
		5			463					10		180		
	VI	1	70	168					140					
		2		83		215								
		3			69						20			
		4												
		5												
Number caught per 100 nets	I			14.6			48.6	37.6	13.6	20.1	15.5	15.4		
	II			44.9		13.0	25.5	13.3	13.2	10.1	9.4	11.3	9.0	
	III		67.4	52.7	71.9	32.5	33.3		10.7	22.9	10.5	17.3		
	IV		54.7	39.7	40.3	53.4	22.9		27.0					
	V		29.8	107.6	113.4	65.8			23.9	19.6	25.5	13.4	27.8	17.8
	VI		15.7	19.6	16.4	14.7					0.2	6.5		

Table 3. *Atlantic salmon*
Catches in research drift-nets per unit effort

Number caught per 100 mile-hours of nets

Area	Sub-area	Week no. 32 (30/7-5/8)	33 (6/8-12/8)	34 (13/8-19/8)	35 (20/8-26/8)	36 (27/8-2/9)	37 (3/9-9/9)	38 (10/9-16/9)	39 (17/9-23/9)	40 (24/9 30/9)	41 (1/10-7/10)	42 (8/10-14/10)	43 (15/10-21/10)
I	1					10							
	2		15	7				9					
	3												
	4												
	5							13					
II	1												
	2					0							
	3		17	24		13	88	63	39				
	4		293		23	48							
	5	137				24		50					
III	1												
	2												
	3	137		161	45			70					
	4		66					62					
	5	256				34							
IV	1						169	63	128			144	68
	2		372	113	152	33			53				
	3		63			14		33	11				
	4			147	123								
	5			57		15							
V	1			48	182					36			
	2			224	81				0				
	3		741	232	50		10						
	4						0						
	5		9			13							
VI	1			201	629						88		
	2			20									
	3					37	34						
	4												
	5		126			96	45						

Table 4. *Atlantic Cod*
Bycatches in commercial salmon drift-nets per unit effort

	Week no.		32	33	34	35	36	37	38	39	40	41	42	43
	Area	Sub-area	30/7-5/8	6/8-12/8	13/8-19/8	20/8-26/8	27/8-2/9	3/9-9/9	10/9-16/9	17/9-23/9	24/9-30/9	1/10-7/10	8/10-14/10	15/10-21/10
Number caught per 100 mile-hours of nets	I	1					0	0						
		2					0	0	0	0				
		3					0	0	0	0				
		4					0	0						
		5								0	0	0		
	II	1									0			
		2							0		0	0		
		3		0		0	1	0	0			0		
		4		0		0	0	0	0	0	0		0	
		5							0		0	0		
	III	1									0			
		2	3	0	0	< 1	1		1		0	0		
		3	0	< 1	2	1			0	0		0		
		4	0	0	0	0			0		0			
		5								0	0			
	IV	1					0							
		2	0		0	4			4					
		3	0		34	13								
		4	0											
		5	0	< 1										
	V	1		6					0					
		2		65	78	128			0	1	< 1		0	0
		3		45	54									
		4		247	11	1			0	0				
		5			75					0				
	VI	1	0	0										
		2		39		5								
		3			0									
		4												
		5												
Number caught per 100 nets	I						0	0	0	0	0	0		
	II			0		0	0.21	0	0	0	0	0	0	
	III		0.07	0.05	0.36	0.21	0.31		0.04	0	0	0		
	IV		0	0.07	3.02	1.54	0		0.67					
	V			15.27	17.02	20.74			0	0.12	0.06		0	0
	VI		0	6.55	0	0.33								

Atlantic cod constituted the greatest bycatch of fish with 94 % of individuals being reported from vessels operating at Fiskenæs Banke and Dana Banke during August. During the remainder of the season cod appeared sporadically in the nets (Table 4).

Lumpfish and shorthorn sculpin were of general occurrence in the driftnet fishery at West Greenland both in coastal waters and offshore.

Two-thirds of the recordings of Greenland halibut were from the northern part of Disko Banke and the coastal bank southwest of Disko during the last week of August while the remainder were taken during August-September at Fiskenæs Banke and Dana Banke.

Greenland cod, redfish, wolffish, and American plaice occurred only sporadically in the bycatches (Table 1).

Birds

Among the more than 85,000 birds reported as bycatches in the nets operated by the observer vessels, 181 were registered simply as seabirds. Except for a few specimens of gulls, the rest were determined to genus or species.

Except for a small number of murres the seabirds reported from the research fishery were determined to species.

The majority of the bird species retained by the salmon nets were more or less sparsely represented. The following species entered the fishery sporadically and shall not be further commented on: red-throated loon, greater common loon, gannet, oldsquaw duck, common eiderduck, king eider, red phalarope, kittiwake, great black-backed gull and glaucous gull.

The bycatches of Atlantic fulmar, almost 100 individuals, were made sporadically during a few fishing days within Areas III and IV, and more than 30 nautical miles from the coast (Appendix I).

A small number of jaegers were taken at two set stations. They were not identified, but probably belonged to the species *Stercocarius parasiticus* and/or *Stercocarius pomarinus*.

More than 75 % of the shearwaters recorded were not determined to species but probably are greater shearwater (*Puffinus gravis*). From Greenland other species (*Puffinus puffinus* and *Puffinus griseus*) are only reported in a few cases. With a single exception the catches were all made during August and more than 70 % at Fiskenæs Banke and Dana Banke (Table 5).

Most of the individuals of Atlanticpuffin. (about 400) were caught by the nets of an observer vessel during a single day's

fishing at Lille Hellefiskebanke, more than 30 nautical miles from the coast. The remainder were taken sporadically in time and place.

Table 5. *Greater shearwater*
Bycatches in commercial salmon drift-nets per unit effort

	Week no.		32	33	34	35	36	37	38	39	40	41	42	43
	Area	Sub-area	30/7-5/8	6/8-12/8	13/8-19/8	20/8-26/8	27/8-2/9	3/9-9/9	10/9-16/9	17/9-23/9	24/9-30/9	1/10-7/10	8/10-14/10	15/10-21/10
Number caught per 100 mile-hours of nets	I	1					<1	0						
		2					0	0	0	0				
		3					0	0	0					
		4					0	0						
		5												
	II	1												
		2							0			0		
		3		0		0	2		0			0		
		4		0			1	0	0	0	0		0	
		5							0		0	0		
	III	1									0			
		2	0	2	2	0	1		0		0	0		
		3	0	15	1	0			0	0		0		
		4	0	15					0		0			
		5								0	0			
	IV	1												
		2	0		0	1	3		0					
		3	<1			0								
		4	0											
		5	0	0										
	V	1		7					0					
		2		3	9	23			0	<1	0		0	0
		3		45	5									
		4		22	6	84			0	0				
		5			0					0				
	VI	1	4	3										
		2		0		0								
		3			8									
		4												
		5												
Number caught per 100 nets	I						0.02	0	0	0				
	II			0		0	0.33	0	0	0	0	0	0	
	III		0	3.43	0.33	0	0.27		0	0	0	0		
	IV		0.10	0	0	0.29	0.63		0					
	V			1.79	2.08	5.06			0	0.03	0		0	0
	VI		0.92	0.09	1.82	0								

Black guillemots were evenly distributed in the catches in time and place, but slightly more numerous at Lille Hellefiskebanke during August (Table 6).

Table 6. *Black guillemot*
Bycatches in commercial salmon drift-nets per unit effort

	Week no.		32	33	34	35	36	37	38	39	40	41	42	43
	Area	Sub-area	30/7-5/8	6/8-12/8	13/8-19/8	20/8-26/8	27/8-2/9	3/9-9/9	10/9-16/9	17/9-23/9	24/9-30/9	1/10-7/10	8/10-14/10	15/10-21/10
Number caught per 100 mile-hours of nets	I	1					< 1	0						
		2					2	1	2	2				
		3					1	< 1	6					
		4					< 1	< 1						
		5												
	II	1												
		2							< 1			0		
		3		0		4	5		4			9		
		4		0			4	6	3	0	0		0	
		5							0		0	0		
	III	1									0			
		2	0	7	0	12	7		1		1	0		
		3	0	< 1	5	< 1			0	0		0		
		4	0	0					0		0			
		5								0	0			
	IV	1												
		2	0		< 1	2	2		0					
		3	0			0								
		4	0											
		5	0	0										
	V	1		0					0					
		2		< 1	< 1	1			3	2	0		< 1	< 1
		3		0	0									
		4		< 1	0	0			0	0				
		5			0					0				
	VI	1	0	0										
		2		0		5								
		3			0									
		4												
		5												
Number caught per 100 nets	I						0.34	0.19	0.67	0.64				
	II			0		0.57	1.24	1.00	0.27	0	0	0.57	0	
	III		0	0.35	0.89	1.77	1.49		0.04	0	0.09	0		
	IV		0	0	0.08	0.54	0.32		0					
	V			0.07	0.07	0.21			0.32	0.27	0		0.17	0.09
	VI		0	0	0	0.33								

Table 7. *Dovekie*
Bycatches in commercial salmon drift-nets per unit effort

	Week no.		32	33	34	35	36	37	38	39	40	41	42	43
	Area	Sub-area	30/7-5/8	6/8-12/8	13/8-19/8	20/8-26/8	27/8-2/9	3/9-9/9	10/9-16/9	17/9-23/9	24/9-30/9	1/10-7/10	8/10-14/10	15/10-21/10
Number caught per 100 mile-hours of nets	I	1					83	45						
		2					43	12	0	0				
		3					11	86	8		104			
		4		0			23	4	0		0	68		
		5									99	86		
	II	1												
		2							0			0		
		3		0		0	0		0			0		
		4		0			0	10	0	0	0		0	
		5							28		10	0		
	III	1									0			
		2	0	0	0	0	0		0		3	0		
		3	0	0	0	0	0		0	0		0		
		4	0	0					0		12			
		5	0	0						32	31			
	IV	1												
		2	0		0	0	0		0					
		3	0			0								
		4	0			0								
		5	0	0										
	V	1		0					0					
		2		0	0	0			0	< 1	0	0	0	6
		3	0	0	0									
		4		0	0	0			0	1				
		5			0					0				
	VI	1	0	0										
		2		0		0								
		3			0									
		4												
		5												
Number caught per 100 nets	I			0			7.88	10.26	0.88	0	11.74	16.25		
	II			0		0	0	1.50	1.84	0	1.85	0	0	
	III		0	0	0	0	0		0	8.08	4.16	0		
	IV		0	0	0	0	0		0					
	V		0	0	0	0			0	0.05	0	0	0	1.45
	VI		0	0	0	0								

Northern razorbills were caught in small quantities mainly on Lille Hellefiskebanke and Sukkertoppen Banke.

More than 75% of the dovekies were captured on the coastal banks west of Disko and on Disko Banke. With a few exceptions the remaining specimens were taken west of Store Hellefiskebanke and Lille Hellefiskebanke (Table 7). Furthermore 25 individuals were reported by an observer vessel while survey fishing in the southwestern part of the Davis Strait.

Of a total of 482 murres caught by research vessels 444 were identified as Brunnich's thick-billed murre (*Uria lomvia*) and 2 as Atlantic common murre (*Uria aalge*).

About 78,500 individuals were reported in the catches by observer vessels, of which 482 were identified as Brunnich's thick-billed murres.

Since the Atlantic common murre (*Uria aalge*) occurs only rarely in Greenland, breeding in only one region at Sermilinguaq fjord (SALOMONSEN, 1950), it may be assumed that almost all the murres taken in West Greenland are Brunnich's thick-billed murres (*Uria lomvia*).

The occurrence and/or availability based on observer and research vessel catches including all records of murres are presented in Tables 8 and 9.

Murres were taken as bycatches by observer vessels during the whole season, in almost all subareas and on an average in rather large quantities (Table 8). Unlike the commercial fishery relatively few of the research drift net operations resulted in catches of murres and when catches did occur, the numbers were usually very low (Table 9).

Mammals

One pilot whale and one unidentified whale were reported by observer vessels.

Harbour porpoise occurred frequently in the salmon nets during the whole fishing season and on all fishing grounds. Besides the catches along the West Greenland coast 2 individuals were reported from a commercial vessel which was survey fishing in the Davis Strait (lat. 62°55'N, long. 59°40'W) in late September (Table 10).

Four species of seals were reported as bycatches: harp seal, hooded seal, ringed seal and bearded seal, but most of the seals retained were not identified. With a single exception the seals were netted by the observer vessels.

Table 11 shows the relative abundance and/or availability of seals as bycatches. This includes all individuals recorded. The seals particularly occurred in the salmon fishery on the northernmost fishing grounds.

Table 8. *Murre*
Bycatches in commercial salmon drift-nets per unit effort

	Week no.		32	33	34	35	36	37	38	39	40	41	42	43
	Area	Sub-area	30/7-5/8	6/8-12/8	13/8-19/8	20/8-26/8	27/8-2/9	3/9-9/9	10/9-16/9	17/9-23/9	24/9-30/9	1/10-7/10	8/10-14/10	15/10-21/10
Number caught per 100 mile-hours of nets	I	1					142	318						
		2					314	299	240	153				
		3					263	710	215		784			
		4					165	146	75		393	411		
		5						304			594	432		
	II	1												
		2							305			712		
		3		< 1		52	49	81	156			1803		
		4		< 1		0	102	80	322	2842	37		359	
		5							40		122	773		
	III	1									56			
		2	13	21	31	38	86		4		86	89		
		3	9	8	25	8	2740		99	125		0		
		4	30	6	0				129		113			
		5	8	5						127	85			
	IV	1												
		2	11		108	147	85		206					
		3	55		0	202								
		4	33			19								
		5	73	27										
	V	1		116					84					
		2		20	131	13			315	366	277	404	79	68
		3	51	91	107									
		4		83	34	1518			416	63				
		5			13					89				
	VI	1	44	0										
		2		< 1		5								
		3			145									
		4												
		5												
Number caught per 100 nets	I						57.12	102.60	36.01	18.40	112.68	87.50		
	II			0.04		7.43	16.29	17.21	45.50	849.21	28.19	227.74	83.33	
	III		3.73	2.12	7.12	5.47	61.65		12.74	35.77	24.32	15.71		
	IV		9.29	7.52	22.69	36.26	16.27		36.67					
	V		7.98	13.68	27.91	25.68			51.14	47.33	69.13	57.05	13.57	17.27
	VI		9.85	0.09	34.09	0.33								

Table 9. *Murre*
Bycatches in research drift-nets per unit effort

Number caught per 100 mile-hours of nets

Week no.		32	33	34	35	36	37	38	39	40	41	42	43
Area	Sub-area	30/7-5/8	6/8-12/8	13/8-19/8	20/8-26/8	27/8-2/9	3/9-9/9-	10/9-16/9	17/9-23/9	24/9-30/9	1/10-7/10	8/10-14/10	15/10-21/10
	1					2							
	2							9					
I	3		0	0									
	4												
	5							4					
	1												
	2					0							
II	3		0	0		0	66	0	111				
	4		0		7	0							
	5	0				0		19					
	1												
	2												
III	3	0		0	0			44					
	4		0					6					
	5	0				22							
	1						0	0	8			0	0
	2		0	0	23	0			39				
IV	3		0			22		60	71				
	4			0	2								
	5			0		0							
	1			0	0					29			
	2			13	0		759		21				
V	3		0	0	10								
	4						20						
	5		0			4							
	1			0	0						3		
	2			0									
VI	3					3	0						
	4												
	5		0			10	4						
Davis Str.		0											
Labrador Sea			0		0								

Table 10. *Harbour Porpoise*
Bycatches in commercial salmon drift-nets per unit effort

	Week no.		32	33	34	35	36	37	38	39	40	41	42	43
	Area	Sub-area	30/7-5/8	6/8-12/8	13/8-19/8	20/8-26/8	27/8-2/9	3/9-9/9	10/9-16/9	17/9-23/9	24/9-30/9	1/10-7/10	8/10-14/10	15/10-21/10
Number caught per 100 mile-hours of nets	I	1					< 1	0						
		2					0	0	0					
		3					< 1	< 1	0	1	0			
		4		8			< 1	< 1	0		0	0		
		5						0			0	< 1		
	II	1												
		2					< 1	< 1	0			< 1		
		3		2		0	< 1	0	< 1			< 1		
		4		2		2			0	< 1	0		< 1	
		5							0		0	0		
	III	1									4			
		2	1	2	2	< 1	2		0		0	0		
		3	5	2	2	1	0		0	0		0		
		4	2	2	1	0			0		0			
		5	2	2						< 1	< 1			
	IV	1												
		2	5		2	1	1		6					
		3	12		< 1	< 1								
		4	< 1			< 1								
		5	0	2										
	V	1		< 1					2					
		2		3	1	4			6	3	3	< 1	2	3
		3	< 1	0	1									
		4		1	0	3			3	0				
		5			0					1				
	VI	1	0	0										
		2		0		0								
		3			0									
		4												
		5												
Number caught per 100 nets	I			1.00			0.08	0.04	0	0.17	0	0.06		
	II			0.45		0.09	0.21	0.06	0.02	0.24	0	0.08	0.17	
	III		0.77	0.54	0.50	0.20	0.40		0	0.13	0.15	0		
	IV		0.48	0.62	0.31	0.19	0.24		1.00					
	V		0.12	0.54	0.30	0.58			0.80	0.43	0.71	0.38	0.40	0.64
	VI		0	0	0	0								

Table 11. *Seal*
Bycatches in commercial salmon drift-nets per unit effort

	Week no.		32	33	34	35	36	37	38	39	40	41	42	43
	Area	Sub-area	30/7-5/8	6/8-12/8	13/8-19/8	20/8-26/8	27/8-2/9	3/9-9/9	10/9-16/9	17/9-23/9	24/9-30/9	1/10-7/10	8/10-14/10	15/10-21/10
Number caught per 100 mile-hours of nets	I	1					<1	0						
		2					<1	<1	<1	0				
		3					<1	<1	12	<1	1			
		4		0			2	<1			0	0		
		5						3		1	1	3		
	II	1												
		2							<1			<1		
		3		0		0	<1	0	<1			0		
		4		1		<1	<1	0	0	<1	0		0	
		5							<1		0	0		
	III	1									0			
		2	<1	<1	0	0	0		0		0	0		
		3	0	0	0	<1	0		0	0		0		
		4	0	0	<1	0			0		<1			
		5	0	0						<1	<1			
	IV	1												
		2	0		0	0	<1		0					
		3	2		0	<1								
		4	<1			<1								
		5	0	0										
	V	1		0					0					
		2		<1	<1	<1			0	0	0	0	0	0
		3	0	0	<1									
		4		0	0	1			0	0				
		5			0					0				
	VI	1	0	3										
		2		0		0								
		3			0									
		4												
		5												
Number caught per 100 nets	I			0			0.11	0.06	0.16	0.07	0.26	0.72		
	II			0.06		0.18	0.07	0	0.14	0.24	0	0.04	0	
	III		0.01	0.01	0.01	0.01	0		0	0.08	0.04	0		
	IV		0.10	0	0	0.03	0.08		0					
	V		0	0.01	0.10	0.07			0	0	0	0	0	0
	VI		0	0.09	0	0								

Table 12
Effort of the non-Greenlandic drift-net salmon fishery at West Greenland in 1972

	Week no.	32	33	34	35	36	37	38	39	40	41	42	43	44
	Area	30/7-5/8	6/8-12/8	13/8-19/8	20/8-26/8	27/8-2/9	3/9-9/9	10/9-16/9	17/9-23/9	24/9-30/9	1/10-7/10	8/10-14/10	15/10-21/10	22/10-28/10
Number of nets used x sets made	I		500			23735	34313	10870	11880	18796	5215			
	II		20620		8566	23350	10620	11215	4525	3850	7850	2850	300	900
	III	24034	20904	34746	16190	7300		3200	9640	9720	2000			
	IV	2700	2450	1925	8590	5445	3880	5600	4480	1200	800	2600	1900	
	V	7220	17020	27950	15838		700	5308	12850	5400	5735	7000	2400	500
	VI	650	1115	220	900	7200	3840	2420	4180	689	400			
	Davis Strait									2039				
	Labrador Sea									1302	434			

A comparison of Table 12, showing distribution of the effort of the total commercial fishery and Tables 2, 4–8 and 10–11, showing number of individuals (salmon or other species) caught per 100 nets by observer vessels reveals, however, that the observer vessels have not operated in all combinations of areas and weeks fished by the total fleet. Consequently no information on bycatches was available from this unsampled part of the commercial fishery and these bycatches cannot be estimated without special reservation, as the occurrences of most species were not evenly distributed. The salmon fishery not sampled by the observer vessels comprised 7 % of the total effort, i.e. the estimated total number of individuals taken by the non-Greenlandic salmon vessels in 1972 may be raised with a percentage of that order.

In order to demonstrate numerically the consequences of the drift net salmon fishery at West Greenland for other species, the total bycatches by commercial salmon vessels not registered in Greenland were estimated (Table 13). The estimates were based on number of individuals of the single species retained per 100 nets per week and area, and the total number of nets operated by the non-Greenlandic salmon fleet, likewise distributed in time and space.

The unidentified seabirds captured during the 35th week in Areas III-3 and V-2 were assumed to be of the same species as the identified birds reported as bycatches from these same fishing grounds during that particular week. For the purpose of estimating total catches, the sea birds were distributed proportionally to the identified species, i.e. the number of greater shearwater, black guillemots and murres were increased by 234, 19 and 220 respectively.

Table 13

Estimated numbers of fish, birds and mammals taken by the non-Greenlandic salmon drift-net fishery at West Greenland during 1972 by fishing area.

	Area						Davis	
	I	II	III	IV	V	VI	Str.	total
Number of nets x set	105,309	94,646	127,734	41,570	107,921	21,614	2,039	500,833
Number of salmon caught.	30,508	24,063	56,859	17,673	72,581	7,769	51	209,504
Estimated number of other species caught								
Porbeagle.....	0	0	0	0	2	0	0	2
Greenland shark.....	3	0	0	0	0	0	0	3
Sharks, unidentified	2	0	3	0	0	0	0	5
Arctic char.....	2	0	31	0	16	0	0	49
Atlantic cod.....	0	49	209	229	10,659	76	0	11,222
Greenland cod.....	0	0	7	3	5	2	0	17
Lumpfish.....	44	65	126	52	235	1	4	527
Redfish.....	0	0	0	4	14	0	0	18
Shorthorn sculpin	0	26	64	42	59	0	0	191
Wolffish, not specified	0	0	9	4	0	0	4	17
Greenland halibut.....	162	0	0	0	95	0	0	257
American plaice.....	2	0	0	2	2	0	0	6
Red-throated loon.....	0	7	0	0	6	0	0	13
Greater common loon.....	0	0	0	0	17	0	0	17
Atlantic fulmar.....	4	1	126	86	4	0	0	221
Greater shearwater.....	5	77	851	62	1,691	11	0	2,697
Gannet.....	0	0	4	1	0	0	0	5
Old squaw duck.....	2	0	0	0	0	0	0	2
Eiderduck.....	4	4	0	0	2	0	0	10
Red phalarope.....	0	0	0	0	3	0	0	3
Jaeger.....	0	0	0	14	17	0	0	31
Kittiwake.....	28	0	10	6	0	0	0	44
Great black-backed gull...	0	0	1	0	0	0	0	1
Glaucous gull.....	0	0	0	0	2	0	0	2
Gulls, unidentified.....	0	0	2	0	11	0	0	13
Atlantic puffin.....	0	7	845	38	25	0	0	915
Black guillemot.....	295	520	788	65	131	3	0	1,802
Northern razorbill.....	68	32	380	114	6	0	0	600
Dovekie.....	8,541	436	1,183	0	41	0	93	10,294
Murre.....	80,604	71,144	15,733	6,927	31,938	143	143	206,632
Harbour porpoise.....	61	180	561	119	477	0	3	1,401
Pilot whale.....	0	0	0	0	2	0	0	2
Whale, unidentified.....	0	0	0	1	0	0	0	1
Seals, not specified.....	159	73	21	10	41	1	0	305

Table 14

Number of murres caught per 100 mile-hours of nets operated in the day and in the night at corresponding weeks, areas and subareas. (in bracket, actual number retained)

Week	Area	Subarea	Night fishing	Day fishing
32.....	III	2	15 (20)	(0)
		4	30 (110)	14 (1)
	V	3	52 (57)	45 (10)
33.....	II	4	1 (1)	(0)
	III	2	8 (73)	(0)
	V	2	48 (197)	(0)
	VI	1	(0)	(0)
34.....	III	2	31 (590)	(0)
35.....	III	2	38 (304)	(0)
	V	2	43 (248)	4 (3)
36.....	I	4	109 (411)	205 (220)
	III	2	99 (809)	16 (2)
38.....	II	5	47 (120)	13 (1)
	III	3	106 (225)	129 (15)
39.....	II	4	2926 (7000)	82 (6)
	III	5	139 (1320)	17 (8)
	V	2	365 (1983)	161 (92)
41.....	II	3	2437 (3000)	77 (35)

A comparison of number of murres caught per 100-mile hours of nets fished by night and by day on the same fishing grounds and during the same weekly periods demonstrated that the catch rate of murres by night was 8.5 times the catch rate by day (Table 14).

Discussion

Of all bycatches, seabirds occurred most frequently with murres being most common. Seabirds occurring less frequently but in moderately large numbers were dovekies, greater shearwaters, black guillemots and Atlantic puffins. Of fish species, only Atlantic cod were taken as a bycatch in sizeable quantities. Of marine mammals, harbour porpoises occurred frequently followed by seals in much lower numbers.

Obviously, the occurrence of the various species entering the salmon fishery as bycatches is not a measure of their relative abundance.

The chances that individuals of fish, birds and mammals are captured by salmon drift nets are first of all dependent on the activity of these organisms in the upper 5 m of the sea. But naturally also their ability to detect and avoid the net panel as well as their size and shape

is significant for their retention by the net. When one considers the great variations of these factors from species to species and even from one size or age group to another, it is obvious that the catches by drift nets do neither qualitatively nor quantitatively represent the populations of the area fished. The relative abundance and/or availability of the bycatches frequently encountered are demonstrated by means of catch-per-unit-effort data. These data do not signify any relation between abundance of the different species, and at best may only give an idea of relative abundance of a species at different dates and fishing grounds. With this in mind, it was of course essential to choose indices of effort that in relation to the species concerned actually represented the effort of the gear. In fact such a demand involves thorough studies on the reactions of the single species to drift-nets, and consequently cannot be fully satisfied in this report.

As the most appropriate common measure of effort, the quantity of nets × fishing time was selected, i.e. naut. miles of nets × number of hours between net shooting and hauling, abbreviated "mile-hour". It does not consider the fact, however, that the catchability of drift-nets changes with fishing time due to the effect of wind and current as previously mentioned. Other things being equal it means that the effort of a drift net set of long duration will be overestimated. Neither does it consider the fact that the availability of many species is dependent on diurnal, vertical migration, surface activity and perceptibility of the gear, etc. related to light intensity. A comparison of number of guillemots caught per 100 mile-hours of nets fished in thenight and in the day at the same fishing grounds and weekly periods clearly demonstrated this.

Also change of behaviour at different life phases of the organisms in question may influence the catchability and consequently render catch-effort figures incomparable as indices of abundance. In this respect also the migration pattern is of significance. The coincidence of the salmon fishing season and the migration of moulting murres along the West Greenland coast is quite possibly the reason this species is retained so numerously in the drift nets. When these murres dive for food or try, by diving, to evade obstacles on the sea surface such as headropes of drift nets, they are easily entangled in the meshes and very frequently drowned.

As realized from what is said above, the catch-effort figures in Tables 2–11 can only be used with great reservation to indicate relative abundance of the single species at different times and places, and do not necessarily indicate a relationship between abundance of the various species occurring as bycatches.

The bycatch-effort data needed for assessing the total bycatches of the salmon fishery at west Greenland must naturally be based on the

same indices of effort as available from all of the commercial vessels participating in this fishery. The only effort data existing on the total fishery by the 12 Danish, 4 Faroese and 6 Norwegian vessels comprising the non-Greenlandic salmon fleet are number of nets used per set, i.e. length of nets per fishing operation. Hence the catch per unit effort of the reported bycatches is estimated as number of individuals caught per 100 nets used. As shown in the tables the data are merely grouped in weeks and areas, as lack of exact fishing positions of part of the commercial fleet does not allow the more detailed subarea grouping.

The bycatch-data of the research vessels are not included in the estimations, because the research fishery differs too significantly from the commercial fishery.

The catch-per-unit-effort data of bycatches based on the records from the 8 observer vessels are only valid for the estimation of total bycatches in the salmon fishery by the vessels not registered in Greenland. As a basis for an estimate of the bycatches entering the local salmon fishery these data cannot be used directly, since the two fisheries are rather dissimilar in several respects. Among other things, the home fishery of salmon is carried out partly with set gill-nets on the coast and in the fjords and partly with drift nets inshore as well as offshore, but in general closer to the coast than the fishery by the non-Greenlandic vessels.

Research fishing with stationary salmon gill-nets indicated that the bycatches in this type of gear both qualitatively and quantitatively differ significantly from the bycatches entering the drift-nets. The individuals retained by the set gill-nets were mainly fish species; apart from salmon, most frequently cod and lump-fish. Seabirds did not occur to any notable extent, except for black guillemots. Porpoise and seal are not considered to be available to set gill-nets (S. Aa. Horsted, personal communications). No information exists on the composition and amount of bycatches in drift nets operated by vessels registered in Greenland. Even if the bycatch-per-unit-effort values of the observer vessels are assumed to be valid for Greenlandic drift netters, an estimate of their bycatches is still not accessible, as relevant effort data are not available. If one assumes however, that the ratios of bycatches to salmon caught by the local drift net vessels are similar to that of the observer vessels, a basis for a guess on the magnitude of bycatches in the total salmon drift net fishery at West Greenland in 1972 may be established. This year the yield of the Greenlandic and non-Greenlandic drift netting probably was of the same order, i.e. the total bycatches in salmon drift nets in West Greenland in 1972 would be double those figures presented in Table 13.

The assumption above is, however, not quite well-founded as the

drift net fishery by vessels registered in Greenland and by vessels not registered in Greenland differs in several ways. While the vast majority of Danish, Faroese and Norwegian vessels were equipped with monofilament nylon nets, the local vessels mainly applied nets of multifilament twine. The vessels of the Greenlanders, being smaller in size, are generally drift netting closer inshore and are consequently, to a greater extent, fishing at daylight. The contrast of the two fisheries suggests that the bycatches, at least as to seabirds, did not enter the Greenlandic and the non-Greenlandic gear to the same extent. Fishing with the more visible multifilament net at daylight is obviously less dangerous to seabirds than monofiilament nets used in nighttime. It was demonstrated that considerably larger numbers of murres per unit effort were retained by the observer nets mainly fishing in the night than in the research nets operated in the light hours of the day.

An attempt has been made to estimate the annual murre kill in the West Greenland salmon fishery in 1969, 1970 and 1971 (TULL, GERMAIN & MAY, 1972). The estimates are based on ratios of murres caught to salmon caught by research fishing, combined with the seasonal total number of salmon caught by the commercial fishery. Obviously this method is rather uncertain as the ratios are based on a very limited fishery both in regard to time and fishing area. The ratio murres/salmon is not in the least a constant factor; on the contrary the ratios vary considerably from one week, area and subarea to another. To some degree the abundance and/or availability of the two species were even inversely proportional. Catch per unit effort of salmon was high in August with a more or less constant decline during the subsequent period, whereas the corresponding data of murres seems to be fairly low in the beginning of the season, attaining great proportions in September and remaining on a high level the remaining part of the season.

Although the data on bycatches supplied by the observer vessels is a good basis for estimates of total bycatches by the non-Greenlandic vessels in 1972, it is not safe to use the bycatch-per-unit-effort values or bycatch salmon ratios of this particular year to estimate total bycatches of other years. The occurrence and abundance of species retained by salmon drift nets is likely to change considerably from year to year and at any rate the variance of seasonal distribution of the fishery is significant (CHRISTENSEN & LEAR, 1974). Therefore it is much of a guess if the total kill of murres in the non-Greenlandic fishery in 1970 and 1971 is fixed at about 350,000 and 240,000 individuals, based on estimated number of nets set in the two seasons (798,000 and 543,000 respectively) and the number of murres captured per 100 nets set in 1972 (on an average 43, based on the effort of vessels reported murres).

The effort of the Greenlandic drift net vessels during 1970 and 1971

were probably about the same or less than the effort figures above but the gear was mainly multifilament nets which were probably less efficient for catching seabirds. Also the non-Greenlandic vessels were to a greater extent than in 1972 equipped with multifilament nets.

Estimates on bycatches in the drift net fishery at West Greenland previous to 1970 is still more doubtful, as information on effort of drift nets are scarce and besides monofilament nets were not used in this fishery except by a single vessel in 1969.

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Appendix I

Occurrence of the bycatches according to week, area and subarea, as reported by observer vessels and research vessels(marked ′)

Week	Area	Sub-area	No. caught
Selachii			
Lamna nasus: Porbeagle			
33	V	4	1
Somniosus microcephalus:			
Greenland shark			
39	I	?	1
Sharks, unidentified			
32	III	4	1
37	I	2	2
Pisces			
Salvelinus alpinus: Arctic char			
34	V	1	2′
35	V	2	6
	VI	1	1′
36	III	2	3
37	I	2	1
Gadus morhua: Atlantic cod			
32	III	2	4
33	II	3	1′
	III	3	3
	IV	5	1
	V	1	35
		2	725
		3	1
		4	403
	VI	2	73
34	III	3	27
	IV	3	37
	V	2	978
		3	596
		4	25
		5	6
35	III	2	5
		3	5
	IV	2	38
		3	25
	V	2	1195
		4	1
	VI	2	1
36	II	3	14
	III	2	9
38	III	2	1
	IV	2	2
39	V	2	7
40	V	2	2
Gadus ogac: Greenland cod			
32	IV	2	1
33	VI	2	2
35	IV	2	1
40	III	1	2
		2	1
42	V	2	2
Cyclopterus lumpus: Lumpfish			
32	III	3	4
		4	1
	IV	2	3
		3	2
		4	4
33	II	4	2
			2′
	III	3	2
		4	7
	IV	5	1
	V	1	1
		4	1
	VI	1	1
		5	1′
	Labr. Sea [1]		1′
34	II	3	2′
	III	3	5
	IV	5	1′
	V	2	1
35	III	3	3′

[1] lat. 56°48′N, long. 50°15′W.

Week	Area	Sub-area	No. caught
Cyclopterus lumpus, continued			
	IV	2	6
		3	1
		4	1′
	V	2	1
36	I	1	3
			1′
		2	1
		4	4
	II	4	8
	III	2	5
	IV	2	1
			1′
37	I	2	7
		3	4
		4	2
38	II	4	2
		5	3
	III	3	3
			2′
		4	4′
	IV	1	1′
		2	1
	V	1	1
39	II	3	3′
	III	3	3
	IV	1	1′
		2	[2]
	V	2	50
		4	12
		5	16
40	III	4	1
		5	1
	V	1	1′
	Davis Str.	[3]	1
41	VI	1	5′
Sebastes marinus: Redfish			
33	V	1	1
34	V	4	1
36	IV	2	1
38	V	1	2
		2	1
39	V	5	1

Week	Area	Sub-area	No. caught
Myoxocephalus scorpius: Shorthorn sculpin			
33	V	2	1
34	V	2	1
35	IV	2	1
	V	2	1
36	II	3	4
	III	2	7
	IV	2	5
38	II	4	4
	III	3	10
	IV	2	1
	V	2	2
		4	1
39	III	3	4
		5	1
	V	2	6
40	III	1	4
		2	1
	V	2	2
41	III	2	4
42	V	2	3
43	V	2	1
Anarhichas sp.: Wolffish			
35	III	2	1
		3	1
	IV	2	1
36	IV	2	1
40	Davis Str.	[4]	1
Reinhardtius hippoglossoides: Greenland halibut			
33	V	2	7
		4	2
34	V	2	3
		3	18
		4	3
36	I	1	1
		3	7
37	I	2	37
		3	45
		4	4
38	V	2	1

[2]) Uncounted number of juvenile individuals. [3]) and [4]) lat. 62°55′N, long. 59°40′W.

Week	Area	Sub-area	No. caught
Hippoglossoides platessoides: American plaice			
33	V	2	1
35	IV	3	1[2])
37	I	3	1
38	III	3	2′

Aves

Gavia stellata: Red-throated loon			
36	II	3	2
38	V	2	2
	?	?	1
Gavia immer: Greater common loon			
41	V	2	1
42	V	2	4
43	V	2	2
Fulmarus glacialis: Atlantic fulmar			
32	IV	5	23
33	V	4	2
34	IV	2	1
35	IV	2	5
37	I	2	2
38	II	5	1
39	III	3	1
		5	50
40	III	4	5
		5	6
Puffinus gravis: Greater shearwater			
32	IV	3	2
	VI	1	6
33	III	2	4
		3	106
		4	57
	V	1	41
		2	37
		3	1
		4	68
	VI	1	1
34	III	2	8
		3	11
	V	2	114
		3	56
		4	15
	VI	3	4
35	IV	2	12
	V	2	217
		4	75
36	I	1	2
	II	3	15
		4	6
	III	2	8
	IV	2	8
39	V	2	2
Morus bassanus: Gannet			
32	IV	5	1
35	III	2	1
Clangula hyemalis: Old squaw duck			
37	I	2	1
Somateria mollissima: Common eiderduck			
36	II	3	1
37	I	3	2
43	V	2	1
Somateria spectabilis: King eider			
39	II	3	1
Phalaropus lobatus: Red phalarope			
35	V	2	1
Stercocarius sp.: Jaeger			
32	IV	5	11
33	V	2	8
Rissa tridactyla: Kittiwake			
34	IV	2	1
35	III	2	1
	IV	2	2
36	I	1	1′
37	I	2	8
		3	6
39	III	5	3
Larus marinus: Great black-backed gull			
38	III	3	1
Larus hyberboreus: Glaucous gull			
42	V	2	1
Laridae unspecified: Gulls			
39	III	5	1
	V	2	2
42	V	2	3

Week	Area	Sub-area	No. caught
Fratercula arctica: Atlantic puffin			
32	IV	3	2
		5	1
33	III	3	1
	IV	5	1
	V	1	1
		2	2
34	III	2	3
		3	3
	IV	2	6
	V	2	1
		4	1
35	IV	2	4
		4	2′
36	II	4	2
	IV	2	4
			1′
39	III	5	400
	V	4	1
		5	4
43	V	2	1
Cepphus grylle: Black guillemot			
33	III	2	14
		3	3
	V	2	5
		4	1
34	III	3	45
	IV	2	1
	V	2	7
35	II	3	2
	III	2	63
		3	3
	IV	2	22
	V	2	12
	VI	2	1
36	I	1	2
			1′
		2	18
		3	8
		4	5
	II	2	2′
		3	52
		4	26
	III	2	44
	IV	2	4
			1′
37	I	2	16
		3	15
		4	1
	II	4	2
	IV	1	1′
	VI	3	2′
38	I	2	9
		3	4
	II	2	2
		3	5
			1′
		4	4
	III	2	1
		4	1′
	IV	3	1′
	V	2	8
39	I	2	14
	II	3	1′
	IV	1	3′
		2	2′
	V	2	16
40	III	2	4
41	II	3	15
42	V	2	5
43	V	2	1
Alca torda: Northern razorbill			
32	IV	4	14
33	III	2	5
		3	6
		4	2
	IV	5	3
34	III	2	1
		3	33
	IV	2	4
35	III	2	4
	IV	2	40
36	I	1	5
		2	1
		3	4
		4	1
	II	3	4
	III	2	6
37	I	3	8
38	II	2	6
	III	3	4
	V	2	2
39	I	2	5
	V	2	1
40	III	2	25

Week	Area	Sub-area	No. caught
Plautus alle: Dovekie			
35	V	2	1′
36	I	1	259
		2	346
		3	85
		4	204
37	I	1	62
		2	196
		3	1693
		4	24
	II	4	3
38	I	2	1′
		3	40
		5	6′
	II	5	75
			3′
39	III	5	388
	V	2	2
		4	1
40	I	3	200
		5	50
	II	5	60
	III	2	10
		4	50
		5	125
	Davis Str.	[5])	25
41	I	4	50
		5	80
43	V	2	16
Uria lomvia: Brunnich's thick-billed murre			
35	II	4	1′
	IV	4	3′
36	I	1	1′
	III	5	2′
	V	5	1′
	VI	3	1′
		5	3′
37	II	3	30′
	V	2	227′
		4	2′
	VI	5	1′
38	I	2	2′
		5	2′
	II	5	5′
	III	3	18′
		4	3′
	IV	3	35′
	V	2	431
		4	47
		?	4
39	II	3	81′
	IV	2	12′
		3	13′
	V	2	1′
Uria aalge: Atlantic common murre			
37	II	3	1′
39	II	3	1′
Uria sp.: unidentified			
32	III	2	20
		3	39
		4	111
		5	39
	IV	2	7
		3	22
		4	72
		5	57
	V	3	67
	VI	1	64
33	II	3	1
		4	1
	III	2	40
		3	73
		4	21
		5	25
	IV	5	109
	V	1	638
		2	226
		3	2
		4	259
	VI	2	1
34	III	2	590
		3	289
	IV	2	278

[5]) lat. 62°55′N, long. 59°40′W.

Week	Area	Sub-area	No. caught
Uria sp., continued			
	V	2	1395
		2′	
		3	1174
		4	61
		5	1
	VI	3	75
35	II	3	26
	III	2	300
		3	44
	IV	2	1341
		3′	
		3	755
		4	40
	V	2	122
		3	1′
		4	1359
	VI	2	1
36	I	1	444
		2	3157
		3	1978
		4	1516
	II	3	493
		4	843
	III	2	805
		3	2000
	IV	2	205
		3	8′
37	I	1	435
		2	6796
		3	14057
		4	970
		5	200
	II	3	240
		6′	
		4	25
38	I	2	870
		3	1100
		4	50
	II	2	1145
		3	1210
		4	450
		5	105
	III	2	4
		3	249
		4	40
	IV	2	110
	V	1	94
		2	326
		4	384
39	I	2	860
	II	4	7006
	III	3	175
		5	1542
	IV	1	2′
		2	9′
	V	2	2541
		4	47
		5	173
40	I	3	1500
		4	600
		5	300
	II	4	150
		5	766
	III	1	25
		2	277
		4	460
		5	515
	V	1	4′
		2	2143
	Davis Str.	[6]	102
41	I	4	300
		5	400
	II	2	1500
		3	3035
		5	1500
	III	2	110
	V	2	890
	VI	1	1′
42	II	4	500
	V	2	407
43	V	2	190

[6]) lat. 60°00′N, long. 63°30′W: 35 individuals.
lat. 62°55′N, long. 59°40′W: 55 individuals.
lat. 66°30′N, long. 60°50′W: 12 individuals.

Week	Area	Sub-area	No. caught
Phocoena phocoena: Harbour porpoise			
32	III	2	2
		3	30
		4	15
		5	8
	IV	2	3
		3	5
		4	2
	V	3	1
33	I	4	5
	II	3	8
		4	24
			3′
	III	2	4
		3	22
		4	9
		5	10
	IV	2	1′
		5	9
	V	1	4
		2	36
		3	2′
		4	4
34	II	3	1′
	III	2	38
		3	33
			1′
		4	4
	IV	2	4
		3	1
	V	2	15
		3	14
35	II	4	1
	III	2	7
		3	8
	IV	2	9
		3	1
		4	1
	V	2	31
		4	3
36	I	1	1
		3	3
		4	6
	II	2	10
		3	14
		4	1′
	III	2	18
	IV	2	3
37	I	3	6
		4	2
	II	2	2
	V	2	1′
	VI	5	2′
38	II	3	1
	IV	2	3
	V	1	2
		2	15
		4	3
39	I	1–5	10
	II	4	2
	III	5	6
	V	2	23
		5	2
40	III	1	2
		5	3
	V	2	22
	Davis Str. [7]		2
41	I	5	1
	II	2	1
		3	1
	V	2	6
42	II	4	1
	V	2	12
43	V	2	7
Globicephala melaena: Pilot whale			
39	V	5	1
Pagophilus groenlandicus: Harp seal			
32	III	2	1
	IV	3	1
		4	1
33	V	2	1
34	III	4	1
	V	2	1
		3	2
36	I	2	1
		3	1
	II	2	1′
		3	2
37	I	2	1
		3	1
38	I	2	1
	II	2	1
39	II	4	2
41	II	2	1

[7]) lat. 62°55′N, long. 59°40′W.

Week	Area	Sub-area	No. caught
Cystophora cristata: Hooded seal			
34	V	2	4
		3	1
35	V	2	1
40	III	5	1
Phoca hispida: Ringed seal			
33	III	2	1
36	II	4	1
38	II	2	2
Erignatus barbatus: Bearded seal			
33	VI	1	1
37	I	4	1
Seals, unspecified			
33	II	4	4
34	V	2	1
		3	1
35	II	4	2
	III	3	1
	IV	3	1
		4	1
	V	2	2
		4	1
36	I	1	3
		2	1
		4	9
	II	3	1
		4	4
	IV	2	1
37	I	2	3
		3	5
		4	1
		5	2
38	I	3	8
	II	3	1
		5	1
39	I	3	1
		5	3
	III	5	4
40	I	3	2
		5	11
	III	4	2
41	I	5	13

Færdig fra trykkeriet 5. dec. 1977