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By-catches in salmon drift nets at West Greenland in 1972¹

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Introduction

In connection with the "Joint ICES/ICNAF Salmon Tagging Experiment at West Greenland" in the autumn 1972 the opportunity to obtain information on bycatches in salmon drift-nets operated in this area was taken. The recording of bycatches was not only a matter of purely academic interest. Seals, porpoises and some species of seabirds are retained by salmon drift-nets in Greenland waters to such an extent that the attention of the public has been aroused. Fear is expressed that these unintended catches might be a perceptible competition to the local hunting and that the maintenance of one species, Brünnich's guillemot is menaced.

Effort has previously been made to estimate the seasonal quantity of guillemots captured in drift-nets, but the results were too uncertain, as the basic material was rather scarce (Tull, Germain and May, 1972). The observations made during the international salmon tagging experiment may however supply sufficient information on bycatches to make a relative probable estimate on the total amount of the species of particular interest caught in 1972 by vessels not registered in Greenland, i.e. the main part of the salmon drifters operating in this area.

Gear and Methods

The recording of bycatches was carried out by the scientific staff of 4 research vessels and observers placed on board 8 commercial vessels (in the following called "observer vessels") in the whole salmon fishing season, i.e. from the end of July to mid October. Not all observers however were consistent in reporting bycatches. Two observers gave no information on sea-

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birds at all, one observer only reported on the more common species as gull-lemots, porpoises and seals and on one of the vessels involved no recording of bycatches took place after mid September. In cases when large amounts of a species were captured which made exact counting impossible, the observer to the best of his ability 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. With a view to show in a perspicuous way the occurrence of the single species in relation to time and place, the bycatches will be grouped in weeks, in coastal areas and within distances (subareas) from the West Greenland coast. The divisions are selected with special reference to an appropriate distribution of the salmon fishery on fishing grounds. The designations and the limits of areas and subareas (see fig. 1) are the following:

Area I	70°30'N - 68°40'N Disko Bank and coastal bank west of Disko.
Area II	68°40'N - 66°35'N Store Hellefisk Bank.
Area III	66°35'N - 65°25'N Lille Hellefisk Bank.
Area IV	65°25'N - 63°35'N Sukkertoppen Bank and Fylla Bank.
Area V	63°35'N - 62°00'N Fiskenæs Bank and Dana Bank.
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 shots of nets were made outside the divisions above. The corresponding bycatches are referred to the Davis Str. 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 the availability to the gear of the species has to be considered. Before going into details regarding this question, it may be useful to supply some basic information about the gear in which the bycatches in question were taken.

The majority (more than 90 %) of the drift-nets operated by the commercial vessels were manufactured from monofilament nylon twine 0.5 - 0.6 mm with a 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 great

nets, a study which is out of the scope of this report. Though no individual consideration has been taken, the catch-per-unit-effort estimations below may after all give some idea of the occurrence of at least some of the species. As the most appropriate common measure of effort for these estimations, the quantity of nets x fishing time was selected, expressed as naut. miles of nets x number of hours between net shooting and hauling, in the following abbreviated "mile-hour" or mh. Also this measure of effort has its weak points. It does not consider the fact that in general the catchability of drift-nets is decreasing with increasing fishing time as the effect of wind and current 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 that the availability of many species is dependent on diurnal fluctuations of vertical migration, surface activity and perceptibility of the gear related to light intensity.

As mentioned in the introduction, of greatest importance are the present data on bycatches for the estimations of seasonal total catches of the species most frequently occurring in the drift net fishery at West Greenland.

The basis for the estimations are the information on the total effort in 1972 of the non-Greenlandic salmon fleet, comprising 12 Danish, 4 Faroese and 6 Norwegian vessels. The only effort data available from all vessels are number of nets used x sets made. Consequently catch per unit effort of the bycatches reported on by the observer vessels has to be expressed as number of individuals caught per nets set. Table 1 shows the total effort of the non-Greenlandic salmon fleet grouped in weeks, in areas and in the subareas 1-4 and 5. Lack of exact fishing positions of some of the vessels do not allow a more detailed subarea grouping.

The catch-per-unit-effort data obtained by the research vessels are left out of the total bycatch estimations, as the research fishing differs significantly from the commercial fishery, as already mentioned. This is also the reason why the research and observer data are kept separate when estimating number of individuals caught per mile-hour as indices of relative abundance.

It must be pointed out that 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 unlike in several respects. Among other things, the home fishery of salmon are 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 not locally registered vessels.

Research fishery with salmon set gill-nets indicates 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 mainly belong to fish species; apart from salmon, most fre-

ter part were about 33 m, extending to a dept of about 5 m. The top of the net is kept floating at the sea surface by floats or a floating rope. The net area is relatively tightly stretched since a combined sinking and hauling rope with a lead core is mounted to the footrope.

Usually 100 nets are tied up in a so called "link" measuring a total of about 1.8 naut.miles. The links - equipped with buoys for the purpose of identification - are set in straight lines. After a while, depending on wind and current, the link however will curve, often form a horse shoe line which in good weather results in increasing catchability. In the case of stormy weather or strong current the loops may collapse and naturally the consequence is decreasing catchability of the gear.

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

The maximum number of nets operated by the commercial vessels in 1972 varied between 850 and 450; but on an average 440 nets were used per set, amounting to a total length of 7.8 naut. miles. In most cases the nets are shot about sunset. Hauling starts before sunrise and is usually finished before noon, depending on weather, number of nets entangled, number of seabirds as bycatches etc.. This line of action held good for 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, often of shorter duration and with a lesser amount of gear, owing to unfavourable weather or ice conditions or proximity to the shore.

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 numbers of 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.

When discussing the occurrence of the bycatches the availability to drift-nets of the single species has to be considered. The chances that individuals of fish, birds and mammals are retained by salmon drift-nets are among other things dependent on the extent these animals are actively moving around in the water layer between the surface and 5 m below and to what extent they are capable of detecting and avoiding the gear. As the availability of different species to salmon drift-nets are so highly variable, the catches of the gear do not quantitatively reflect the populations of the 5 m surface layer in the area fished. Even within the single species the behaviour of the individuals may change in time and space to such an extent that catch per unit of gear fished on different fishing grounds and in different periods do not necessarily represent relative abundance.

If, however, catch-effort data with all reservations involved are to be considered as indices of relative abundance, it is essential to choose an effort that in relation to the species concerned actually represents the effort of the gear. As to the present study of bycatches, this involves a thorough study of the behaviour of the single species in relation to drift-

quently cod and lumpsucker. Seabirds do not occur to any extent, except for black guillemots. Porpoise and seal are not considered to be available to set gill-nets (S.Aa. Horsted, personal communication).

No information exist on the composition and amount of bycatches in the drift-nets operated by vessels registered in Greenland. It may be assumed, however, that regarding seabirds, the bycatches per unit effort are somewhat lower than the corresponding ratio in the drift-nets of the non-Greenlandic vessels. The assumption is based on the fact that in contrast to the non-Greenlandic vessels, the local vessels at least until 1972, were mainly equipped with the more visible multifilament nets and that these vessels, being smaller in size, are generally drift-netting closer inshore and are consequently, to a greater extent, operating at daylight. The significance of light intensity in this connection will be dealt with in a later section when discussing bycatches of guillemots.

Even if the bycatch-per-unit-effort values based on the information obtained from the observer vessels, are supposed to represent the capture rate of the Greenlandic drift-netters too, the total bycatches taken by this part of the salmon fleet may still be a guess, as relevant effort data are not available. If however, the total yield of salmon in the local drift-net fishery can also be used as indices of relative effort for comparison with total yield of the non-Greenlandic fishery, a basis for a guess on the dimensions of the bycatches in the home fishery is established. In 1972 the total catch of salmon by Greenlanders amounted to 1320 metric tons. The drift-net fishery was responsible for more than 50 %, i.e. a total catch of the same order of magnitude as the total catch by the non-Greenlandic salmon fishery, at about 700 metric tons. In the 1970 and 1971 season the quantity of salmon taken by the Greenlandic drift-netters were probably about the same or less than that taken by the non-Greenlandic drift-netters.

Just as the catch-effort values of the bycatches reported by the observer vessels are considered to represent the bycatch rates in the non-Greenlandic drift-net fishery, in the same way these catch-effort values are only valid for the evaluation of total bycatches in the season 1972. The occurrence and abundance of the species entering the salmon drift-nets may change so much from season to season that the present data cannot without reservations be used for calculations of seasonal total bycatches in general.

Results and Discussion

As an introduction the occurrence and relative abundance and/or availability of the actual object of the fishery, the salmon is shown in Table 2 and 3. The intention is not only to compare catches and bycatches, but also to demonstrate the distribution by time and place of the fishery by the research vessels and observer vessels. The total number captured by the two categories of vessels were 1758 and 95172 respectively. For further information on the salmon data, see the report on "Distribution and Abundance of Salmon at West Greenland".

The following list includes all species reported as bycatches by the vessels engaged in the international salmon tagging experiment at West Greenland in 1972.

Species and number of individuals:	observer and research vessels	
<u>Selachii:</u>		
<u>Lamna nasus</u> : Porbeagle	1	
<u>Somniosus microcephalus</u> : Greenland shark	1	
Sharks, unidentified	3	
<u>Pisces:</u>		
<u>Salvelinus alpinus</u> : Arctic char	10	3
<u>Gadus morhua</u> : Cod	4219	1
<u>Gadus ogac</u> : Greenland cod	9	
<u>Cyclopterus lumpus</u> : Lump sucker	169	30
<u>Sebastes marinus</u> : Redfish	7	
<u>Acanthocottus scorpius</u> : Shorthorn sculpin	64	
<u>Anarhichas minor</u> : Spotted wolffish	1	
Wolffish, unidentified	5	
<u>Reinhardtius hippoglossoides</u> : Greenland halibut	128	
<u>Hippoglossoides platessoides</u> : American plaice	3	
<u>Aves:</u>		
<u>Gavia stellata</u> : Red-throated diver	5	
<u>Gavia immer</u> : Northern diver	7	
<u>Fulmarus glacialis</u> : Fulmar	96	
<u>Puffinus gravis</u> : Great shearwater	876	
<u>Morus bassanus</u> : Gannet	2	
<u>Clangula hyemalis</u> : Long-tailed duck	1	
<u>Somateria mollissima</u> : Eiderduck	4	
<u>Somateria spectabilis</u> : King eider		1
<u>Phalaropus lobatus</u> : Red-necked phalarope	1	
<u>Stercorarius sp.</u> : Skuas	19	
<u>Rissa tridactyla</u> : Kittiwake	21	1
<u>Larus marinus</u> : Great black-backed gull	1	
<u>Larus hyperboreus</u> : Glaucous gull	1	
Gulls, unidentified	6	
Species and number of individuals:	observer and research vessels	
<u>Fratercula arctica</u> : Puffin	438	3
<u>Cepphus grylle</u> : Black guillemot	460	16
<u>Alca torda</u> : Razorbill	184	
<u>Plautus alle</u> : Little auk	4019	11
<u>Uria lomvia</u> : Brännich's guillemot	480	44
<u>Uria aalge</u> : Common guillemot		2
Guillemots, unidentified	78436	36
Seabirds, unidentified	181	

Mammalia:

<u>Phocaena phocaena</u> : Porpoise	561	12
<u>Globicephala melaena</u> : Pilot whale	1	
unidentified whale	1	
<u>Pagophilus groenlandicus</u> : Harp seal	19	1
<u>Cystophora cristata</u> : Hooded seal	7	
<u>Phoca hispida</u> : Ringed seal	4	
<u>Erignatus barbatus</u> : Bearded seal	2	
Seals, unidentified	89	

With the purposes discussed, the bycatches will be treated species by species and under the heading of each species following data will be given:

- 1) Occurrence and relative abundance and/or availability, shown by week, area and subarea as number reported and estimated number caught per 100 mile-hours of nets fished. In cases that the species in question occur to a greater number, the catch and the catch-per-unit-effort by the observer vessels will be shown in tables, otherwise they will be listed in the text just as the research catches.
- 2) Estimates of the total number captured by the non-Greenlandic fleet in 1972. Only species numerously occurring as bycatches will be treated. The basic material is total effort in number of nets set (Table 1) and estimates on number of individuals captured per 100 nets set (shown at the bottom of the table of occurrence).

SELACHII

Pleurotremata: Sharks.

Reported by observer vessels exclusively.

<u>Week</u>	<u>Area</u>	<u>Subarea</u>	<u>No.caught</u>	<u>No.caught/100 mh</u>
32	III	4	1	<1
33	V	4	1 ⁺	<1
37	I	2	2	<1
39	I	?	1 ⁺⁺	<1

⁺ Lamna nasus: Porbeagle

⁺⁺ Somniosus microcephalus: Greenland shark

The remaining sharks were not identified.

PISCES

Salvelinus alpinus: Arctic char.

Reported by observer and research (") vessels.

<u>Week</u>	<u>Area</u>	<u>Subarea</u>	<u>No.caught</u>	<u>No.caught/100 mh</u>
34	V	1	2'	32
35	V	2	6	1
	VI	1	1'	6
36	III	2	3	< 1
37	I	2	1	< 1

Recordings from coastal waters exclusively.

Gadus morhua: Cod.

Reported by observer vessels (Table 4) and by research vessels, a single specimen (data below)

<u>Week</u>	<u>Area</u>	<u>Subarea</u>	<u>No.caught</u>	<u>No.caught/100 mh</u>
33	II	3	1	1

Recordings from nearly the whole season and from all fishing grounds south of Disko bank. Of the total quantity however, 94 % were taken in August at Fiskenes bank and Dana bank.

Estimated total number entering the commercial salmon fishery by non-Greenlandic vessels in 1972: 12.000.

Gadus ogac: Greenland cod.

Reported by observer vessels exclusively.

<u>Week</u>	<u>Area</u>	<u>Subarea</u>	<u>No.caught</u>	<u>No.caught/100 mh</u>
32	IV	2	1	2
33	VI	2	2	1
35	IV	2	1	< 1
40	III	1	2	4
		2	1	< 1
42	V	2	2	< 1

Recordings from coastal waters exclusively.

Cyclopterus lumpus: Lump sucker.

Reported by observer vessels (Table 5) and by research vessels (listed below).

<u>Week</u>	<u>Area</u>	<u>Subarea</u>	<u>No.caught</u>	<u>No.caught/100 mh</u>
33	II	4	2	6
	VI	5	1	2
	Davis Str.		1	3
34	II	3	2	3
	IV	5	1	4
35	III	3	3	11
	IV	4	1	< 1
36	I	1	1	2
	IV	2	1	2
38	III	3	2	5
		4	4	8
	IV	1	1	4
39	II	3	3	4
	IV	1	1	4
			2 uncounted number of juvenile individuals	
40	V	1	1	7
41	VI	1	5	15

Occurring in the salmon fishery along West Greenland both in coastal waters and far offshore in Davis str.

Sebastes marinus: Redfish.

Reported by observer vessels exclusively.

<u>Week</u>	<u>Area</u>	<u>Subarea</u>	<u>No.caught</u>	<u>No.caught/100 mh.</u>
33	V	1	1	< 1
34	V	4	1	< 1
36	IV	2	1	< 1
38	V	1	2	2
		2	1	< 1
39	V	5	1	< 1

Acanthocottus scorpius: Shorthorn sculpin

Reported by observer vessels exclusively.

Week	Area	Subarea	No.caught	No.caught/100 mh
33	V	2	1	< 1
34	V	2	1	< 1
35	IV	2	1	< 1
	V	2	1	< 1
36	II	3	4	< 1
	III	2	7	1
	IV	2	5	2
38	II	4	4	3
	III	3	10	4
	IV	2	1	< 1
	V	2	2	< 1
		4	1	< 1
39	III	3	4	3
		5	1	< 1
	V	2	6	< 1
40	III	1	4	9
		2	1	< 1
	V	2	2	< 1
41	III	2	4	2
42	V	2	3	< 1
43	V	2	1	< 1

General occurrence in the drift-net fishery at West Greenland throughout the whole season and in all areas.

Anarhichas sp.: Wolffish or catfish.

Reported by observer vessels exclusively.

Week	Area	Subarea	No.caught	No.caught/100 mh
35	III	2	1	< 1
		3	1	< 1
	IV	2	1	< 1
36	IV	2	1	< 1
40	Davis Str.		1	1

The individual referred to Davis Str. ($62^{\circ}55', 59^{\circ}40'W$) was identified as spotted wolffish (*Anarhichas minor*). The other specimens reported were not determined to species, but were probably spotted wolffish and/or atlantic wolffish (*Anarhichas lupus*).

Reinhardtius hippoglossoides: Greenland halibut.

Reported by observer vessels exclusively.

Week	Area	Subarea	No.caught	No.caught/100 mh
33	V	2	7	< 1
		4	2	< 1
34	V	2	3	< 1
		3	18	2
36	I	4	3	< 1
		1	1	< 1
37	I	3	7	< 1
		2	37	2
		3	45	2
38	V	4	4	< 1
		2	1	< 1

Hippoglossoides platessoides: American plaice

Reported by observer vessels and research vessel (').

Week	Area	Subarea	No.caught	No.caught/100 mh
33	V	2	1	< 1
35	IV	3	1 ⁺	< 1
37	I	3	1	< 1
38	III	3	2 ⁺	7

⁺ Noted as flounder (*Pleuronectes flesus*). As this species is not found in Greenland waters, and as the American plaice regarding shape and colour is much like the flounder, the record is supposed to be an American plaice.

AVES

Gavia stellata: Red-throated diver.

Reported by observer vessels exclusively.

Week	Area	Subarea	No.reported	No.caught/100 mh
36	II	3	2	< 1
38	V	2	2	< 1
	?	?	1	< 1

Gavia immer: Northern diver.

Reported by observer vessels exclusively.

Week	Area	Subarea	No.reported	No.caught/100 mh
41	V	2	1	< 1
42	V	2	4	< 1
43	V	2	2	< 1

Fulmarus glacialis: Fulmar

Reported by observer vessels exclusively.

Week	Area	Subarea	No. reported	No. caught/100 mh
32	IV	5	23	29
33	V	4	2	< 1
34	IV	2	1	1
35	IV	2	5	< 1
37	I	2	2	< 1
38	II	5	1	1
39	III	3	1	< 1
		5	50	4
40	III	4	5	1
		5	6	1

Puffinus gravis: Great shearwater

Reported by observer vessels exclusively (Table 6).

Less than 25 % of the individuals recorded are identified as great shearwater. The remaining part is named shearwater, but probably belong also to the species above. From Greenland other species (P. puffinus and P. griseus) are only reported in a few cases.

With a single exception the catches recorded were all made in August and more than 70 % on Fiskenss Bank and Dana Bank.

Estimated number entering the commercial salmon fishery by non-Greenlandic vessels in 1972: 2700

Morus bassanus: Gannet

Reported by observer vessels exclusively.

Week	Area	Subarea	No. reported	No. caught/100 mh
32	IV	5	1	< 1
35	III	2	1	1

Clangula hyemalis: Long-tailed duck

Reported by an observer vessel.

Week	Area	Subarea	No. reported	No. caught/100 mh
37	I	2	1	< 1

Somateria mollissima: Eiderduck

Reported by observer vessels exclusively.

Week	Area	Subarea	No. reported	No. caught/100 mh
36	II	3	1	< 1
37	I	3	2	< 1
43	V	2	1	< 1

Somateria spectabilis: King eider

Reported by research vessel.

<u>Week</u>	<u>Area</u>	<u>Subarea</u>	<u>No. reported</u>	<u>No. caught/100 mh</u>
39	II	3	1	1

Phalaropus lobatus: Red-necked phalarope.

Reported by an observer vessel.

<u>Week</u>	<u>Area</u>	<u>Subarea</u>	<u>No. reported</u>	<u>No. caught/100 mh</u>
35	V	2	1	< 1

Stercorarius sp.: Skuas

Reported by observer vessels exclusively.

Not determined to species, but probably St. parasiticus and/or St. pomarinus.

<u>Week</u>	<u>Area</u>	<u>Subarea</u>	<u>No. reported</u>	<u>No. caught/100 mh</u>
32	IV	5	11	6
33	V	2	8	< 1

Laridae: Gulls

Reported by observer vessels and a research vessel (').

Not all the gulls have been identified to species; the data of this family of seabirds have therefore been combined.

<u>Week</u>	<u>Area</u>	<u>Subarea</u>	<u>No. reported</u>	<u>No. caught/100 mh</u>
34	IV	2	1 ⁺	< 1
35	III	2	1 ⁺	< 1
	IV	2	2 ⁺	< 1
36	I	1	1 ⁺	< 1 [']
37	I	2	8 ⁺	< 1
		3	6 ⁺	< 1
38	III	3	1 ⁺⁺	< 1
39	III	5	1	< 1
			3 ⁺	< 1
	V	2	2	< 1
42	V	2	3	< 1
	V		1 ⁺⁺⁺	< 1

⁺ Rissa tridactyla: Kittiwake

⁺⁺ Larus marinus: Great black-backed gull

⁺⁺⁺ Larus hyperboreus: Glaucous gull

Fratecula arctica: Puffin

Reported by observer vessels and research vessels (')

<u>Week</u>	<u>Area</u>	<u>Subarea</u>	<u>No. reported</u>	<u>No. caught/100 mh</u>	
32	IV	3	2	5	
		5	1	< 1	
33	III	3	1	< 1	
		IV	1	< 1	
		V	1	< 1	
		2	2	< 1	
34	III	2	3	< 1	
		3	3	< 1	
		IV	2	6	2
		V	2	1	< 1
		4	1	< 1	
35	IV	2	4	< 1	
		4	2'	1'	
36	II	4	2'	< 1	
		IV	2	4	2
			1'	2'	
39	III	5	400	33	
		V	4	1	
		5	4	2	
43	V	2	1	< 1	

Reported mainly in August and from Lille Hellefisk Bank to Dana Bank.

Cepphus grylle: Black guillemot

Reported by observer vessels (Table 7) and by research vessels (listed below).

<u>Week</u>	<u>Area</u>	<u>Subarea</u>	<u>No. reported</u>	<u>no caught/100 mh</u>	
36	I	1	1	2	
		II	2	8	
		IV	2	5	
37	IV	1	1	17	
		VI	3	7	
38	II	3	1	3	
		III	4	1	2
		IV	3	1	2
39	II	3	1	1	
		IV	1	3	12
		2	2	2	

Rather evenly distributed in time and place.

Estimated number entering the commercial salmon fishery by non-Greenlandic vessels in 1972: 1600.

Alca torda: Razorbill

Reported by observer vessels exclusively.

Week	Area	Subarea	No. reported	No. caught/100 mh	
32	IV	4	14	6	
33	III	2	5	3	
		3	6	< 1	
		4	2	< 1	
		5	3	< 1	
34	III	2	1	< 1	
		3	33	3	
		4	4	2	
35	III	2	4	1	
		IV	2	40	4
36	I	1	5	1	
		2	1	< 1	
		3	4	< 1	
		4	1	< 1	
		II	3	4	< 1
		III	2	6	< 1
		37	I	3	8
38	II	2	6	2	
		3	4	2	
		V	2	< 1	
39	I	2	5	< 1	
		V	2	< 1	
40	III	2	25	8	

Caught mainly north of Faringehavn.

Plautus alle: Little auk.

Reported by observer vessels (Table 8) and by research vessels (listed below).

Week	Area	Subarea	No. caught	No. caught/100 mh
35	V	2	1	32
38	I	2	1	5
		5	6	13
		II	5	3

Furthermore 25 individuals were recorded by an observer vessel survey fishing in the Davis Str. (Lat. 62°55'N, long 59°40'W). Estimated catch per 100 mh: 33.

More than 75 % were captured on the coastal banks west of Disko and on Disko Bank. With a few exceptions the remaining specimens were taken west of Store Hellefisk Bank and Lille Hellefisk Bank within 60 naut.miles from the coast.

Estimated number entering the commercial salmon fishery by non-Greenlandic vessels in 1972: 9900.

Uria sp.: Guillemots

Out of 482 individuals caught by research vessels 444 were identified as Br nnich's guillemot (U. lomvia) and 2 as common guillemot (U. aalge). About 78,500 were reported in the catches by observer vessels, but only about 480 were determined to species; these were all Br nnich's guillemots.

When demonstrating occurrence and/or availability based on observer and research vessel catches (Table 9 and 10 respectively), all guillemots are combined for the purposes of obtaining catch per effort and total catch estimates.

From observer vessel survey fishing in the Davis Str. bycatches of guillemots were recorded as follows:

Week	Position	No.caught	No.caught/100 mh
40	Lat. 66 ^o 30' N, long 60 ^o 50' W	12	5
	62 ^o 55' N, 59 ^o 40' W	55	73
	60 ^o 00' N, 63 ^o 30' W	35	61

Guillemots are retained in salmon drift-nets in Greenland waters to such an high extent because, the salmon fishery coincides with the migration along the West Greenland coast of moulting individuals which are unable to fly. When these guillemots are moving on the sea surface and trying by diving to evade obstacles such as the headrope of a drift-net, they are easily entangled in the meshes.

Although several factors, no doubt are influencing the netting of guillemots, the light intensity is probably one of the more important. A comparison of number of guillemots caught per 100 mile-hour of nets fished in the night and in the day within corresponding weeks, areas and subareas, as shown below, clearly demonstrates the capability of evading the nets at different levels of light condition. The figures in bracket are the number of mile-hours of nets fished.

Week	Area	Subarea	Night fishing	Day fishing	
32	III	2	15 (132.2)	0 (17.8)	
		4	30 (363.4)	14 (7.1)	
32	V	3	52 (110.0)	45 (22.0)	
33	II	4	1 (879.3)	0 (4.4)	
		III	2	8 (906.7)	0 (4.4)
		V	2	42 (474.6)	0 (154.2)
		VI	1	0 (13.6)	0 (22.7)
34	III	2	31 (924.9)	0 (29.3)	
35	III	2	38 (792.7)	0 (43.2)	
		V	2	40 (580.9)	3 (81.9)
36	I	4	109 (378.2)	205 (47.3)	
		III	2	99 (813.2)	16 (12.4)
38	II	5	47 (256.6)	13 (7.8)	
		III	3	97 (240.0)	129 (11.6)
39	II	4	2926 (239.2)	82 (7.3)	
		III	5	139 (952.2)	17 (46.4)
		V	2	365 (543.7)	161 (57.0)
41	II	3	2437 (123.1)	77 (45.2)	

Based on the bycatch data collected in connection with the salmon tagging experiment in 1972, the total catch of guillemots by non-Greenlandic vessels in 1972 is estimated to be 215,000.

Using the same data for estimation of the total catch of guillemots in seasons other than 1972 naturally involves a significantly greater degree of uncertainty, as already pointed out. Assuming however that per season the over all bycatch of guillemots per unit effort is constant, i.e. about 43 individuals per 100 nets set as estimated for 1972, and the total effort per season of the salmon fishery is known, a basis for a guess on the seasonal loss of guillemots could be established. Apart from 1972, information on total effort only exists for the years 1971 and 1972. For the 1971 season effort data corresponding to 86 % of the catches by non-Greenlandic vessels, were available and amounted to 467,310 nets set. A straightforward calculation consequently suggest a total catch of guillemots by non-Greenlandic vessels in 1971 at about 240,000 individuals.

A corresponding application of the effort data of the 1970-fishery, when net operation by 30 % of the vessels amounted to 239,317 nets set, rendered a bycatch of guillemots of about 350,000 specimens.

From the seasons before 1970 data on effort of the commercial salmon fishing at West Greenland are very scarce and are of very little value for the purpose in question, as both material and dimensions of the gear have changed since then. The only statistical data covering the whole fleet in all the seasons are total catches of salmon in metric tons. These data combined with a ratio of number of salmon caught: number of guillemot caught estimated from research drift-netting has been used in an attempt to estimate total loss of guillemots (Tull, Germain and May, 1972).

The uncertainty of this method is difficult to assess, as the ratios are estimated on the basis of a very limited fishery both in regard to time and fishing grounds. This is a rather serious objection as the ratio shows significant variations during the season and from one area to another, as demonstrated by Table 2 and 9. To some degree the abundance and/or availability of the species in question are even inversely proportional. Catch per unit effort of salmon is usually high in August with a more or less constant decline in the subsequent months, whereas the corresponding data of guillemots seems to be fairly low in the beginning of the season, attaining great dimensions in September and remaining on a high level the remainder of the season.

Unidentified Seabirds

From two observer catches made in the 35th week, area and subarea III-3 and V-2, 43 and 138 individuals of unidentified birds were reported.

A proportion of these birds is included in the estimate on total catches of guillemots, viz. a proportion equal to the percentage of guillemots entering the total bycatches of identified seabirds made in the respective weeks, areas and subareas.

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Whales: Apart from one pilot whale and one unidentified whale, both reported by observer vessels, this group of bycatches was represented by the porpoise.

Phocaena phocaena: Porpoise.

Reported by observer vessels (Table 1b) and by research vessels as listed below.

<u>Week</u>	<u>Area</u>	<u>Subarea</u>	<u>No. caught</u>	<u>No. caught/100 mi</u>
33	II	4	3	9
	IV	2	1	4
	V	3	2	21
34	II	3	1	1
	III	3	1	4
36	II	4	1	4
37	V	2	1	3
	VI	5	2	8

The occurrences were relatively even distributed over the whole season and all fishing grounds. Besides the catches along the West Greenland coast 2 individuals were reported from a survey fishery in Davis Str. (lat. 62°55'N, long 59°40'W) in late September.

Estimated number entering the commercial salmon fishery by non-Greenlandic vessels in 1972: 1500.

Globicephala melaena: Pilot whale.

Reported as a juvenile specimen.

Week	Area	Subarea	No.caught	No.caught/100 mh
39	V	5	1	<1

Whale, unidentified.

Week	Area	Subarea	No.caught	No.caught/100 mh
35	IV	4	1	<1

Seals: Four species of seals were reported, but the majority of this group of bycatches was not identified. A single harp seal (') was captured by a research vessel; the remaining lot entered the catches of the observer vessels.

Pagophilus groenlandicus: Harp seal

Week	Area	Subarea	No.caught	No.caught/100 mh	
32	III	2	1	<1	
		3	1	3	
		4	1	<1	
33	V	2	1	<1	
34	III	4	1	<1	
		V	2	<1	
		3	2	<1	
36	I	2	1	<1	
		3	1	<1	
		II	2	1'	4
		3	2	<1	
37	I	2	1	<1	
		3	1	<1	
38	I	2	1	<1	
		II	1	<1	
39	II	4	2	<1	
41	II	2	1	<1	

Cystophora cristata: Hooded seal

Week	Area	Subarea	No.caught	No.caught/100 mh
34	V	2	4	<1
		3	1	<1
35	V	2	1	<1
40	III	5	1	<1

Phoca hispida: Ringed seal

Week	Area	Subarea	No.caught	No.caught/100 mh
33	III	2	1	<1
36	II	4	1	<1
38	II	2	2	<1

Erignatus barbatus: Bearded seal

Week	Area	Subarea	No.caught	No.caught/100 mh
33	VI	1	1	3
37	I	4	1	< 1

The occurrence and abundance and/or availability of the total bycatches of seals are shown in Table 11.

Estimated total catch of seals entering the salmon fishery by non-Greenlandic vessels in 1972: 300.

References:

Tull, C.E., P. Germain and A.W. May, 1972: Mortality of Thick-billed Murres in the West Greenland Salmon Fishery. Nature, Vol. 237, No. 5349: 42-44.

Table 1. Effort of the drift-nets salmon fishery at West Greenland in 1972: number of nets used x sets made.

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
I	1-4	500			23735	33873	10870	11000	8796	3290			
	5					440		880	10000	1925			
II	1-4	20620		8566	23350	10620	9915	3325	1325	7125	2850	300	900
	5						1300	1200	2525	725			
III	1-4	20554	19224	34746	16190	7300		3200	3340	6770	2000		
	5	3480	1680						6300	2950			
IV	1-4	1400	1000	1925	8590	5445	3880	5600	4180	1200	800	2600	1900
	5	1300	1450							300			
V	1-4	7220	17020	27850	15538		700	5308	11850	5400	5590	7000	2400
	5			100	300				1000		145		
VI	1-4	650	1115	220	900	7200	3840	2420	4180	689	400		
	5												
Total	1-4	29824	59479	64741	49784	67030	52513	37313	37875	24180	19205	12450	4600
	5	4780	3130	100	300		440	1300	9680	15475	2795		1400

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
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							54			38		
	2							50			92		
	3		287		40	86	54	54					
	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		79	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	340								
	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 mile-hour of nets	I					48.6	37.6	13.6	20.1	15.5	15.4		
	II		14.6			25.5	13.3	13.2	10.1	9.4	11.3	9	
	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.

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
I	1					10							
	2		15	7					9				
	3												
	4									13			
	5												
II	1					0							
	2					13	88	63	39				
	3		17	24		48							
	4		293		23	24				50			
	5	137											
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. 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- 19/9	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
I	1					0	0						
	2					0	0	0	0				
	3					0	0	0	0				
	4					0	0						
	5					0	0			0	0		
II	1												
	2												
	3		0		0	1(14)	0	0			0		
	4		0		0	0	0	0	0	0	0	0	
	5									0	0	0	
III	1												
	2	3(4)		0	<1(5)	1(9)		1(1)			0		
	3	0	<1(3)	2(27)	1(5)			0	0		0		
	4	0	0	0	0			0			0		
	5	0	0	0	0			0	0		0		
IV	1					0							
	2	0		0	4(38)			4(2)					
	3	0		34(37)	13(25)								
	4	0											
	5	0	<1(1)										
V	1		6(35)					0					
	2		65(725)	78(978)	128(1195)			0	1(7)	<1(2)		0	0
	3		45(1)	54(596)									
	4		247(403)	11(25)	1(1)			0	0				
	5			75(6)					0				
VI	1	0	0										
	2		39(73)		5(1)								
	3			0									
	4												
	5												
I					0	0	0	0	0	0	0		
II		0		0	0.21	0	0	0	0	0	0	0	
III	0.07	0.05	0.36	0.21	0.31			0.04	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	
VI	0	6.55	0	0.33								0	

Table 5. Lump sucker: 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
I	1					<1(3)	0						
	2					<1(1)	<1(7)	0	0				
	3					0	<1(4)	0					
	4					<1(4)	<1(2)						
	5												
II	1									0			
	2							0		0	0		
	3		0		0	1(8)	0	1(2)	0	0	0	0	
	4		1(2)					1(3)		0	0	0	
	5									0	0	0	
III	1									0			
	2					<1(5)				0	0		
	3	1(4)	<1(2)	<1(5)	0			3(3)	<1(3)		0		
	4	<1(1)	2(7)					0		<1(1)			
	5									<1(1)			
IV	1												
	2			0	<1(6)	<1(1)		2(1)					
	3	5(3)			<1(1)								
	4	5(2)											
	5	2(4)	<1(1)										
V	1		<1(1)		0			<1(1)					
	2		0	<1(1)	<1(1)			0	7(50)	0		0	0
	3		0	0	0			0					
	4		<1(1)	0	0			0	16(12)				
	5			0	0				8(16)				
VI	1	0	3(1)										
	2		0		0								
	3			0									
	4												
	5												

Davis Str.

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Table 6. Great 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
I	1					<1(2)	0	0	0				
	2					0	0	0	0				
	3					0	0	0	0				
	4					0	0	0	0				
	5					0	0	0	0				
II	1							0			0		
	2							0			0		
	3		0		0	2(15)		0			0		
	4		0			1(6)	0	0	0	0	0	0	
	5							0			0		
III	1							0			0		
	2	0	2(4)	2(8)	0	1(8)		0			0		
	3	0	15(106)	1(11)	0			0	0		0		
	4	0	15(57)					0			0		
	5							0			0		
IV	1							0					
	2					3(12)	3(8)						
	3	<1(2)				0							
	4	0											
	5	0											
V	1							0					
	2		7(41)					0	<1(2)	0		0	0
	3		3(37)	9(114)	23(217)			0					
	4		45(1)	5(56)				0	0				
	5		22(68)	6(15)	84(75)			0	0				
VI	1	4(6)	3(1)										
	2		0		0								
	3			8(4)									
	4												
	5												
Number caught per 100 mile-hours of nets (in bracket, number reported by observer vessels)													
I						0.02	0	0	0	0	0	0	0
II						0.33	0	0	0	0	0	0	0
III		0	3.43	0.33	0	0.27		0	0	0	0	0	0
IV		0.10	0	0	0.29	0.63		0	0	0	0	0	0
V			1.79	2.08	5.06			0	0.03	0		0	0
VI		0.92	0.09	1.82	0								

Table 7. Blac guillemots. 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
I	1					<1(2)	0						
	2					2(18)	1(16)	2(9)	2(14)				
	3					1(8)	<1(15)	6(4)					
	4					<1(5)	<1(1)						
	5												
II	1							<1(2)			0		
	2							4(5)			9(15)		
	3		0		4(2)	5(52)		3(4)	0	0	0	0	
	4		0			4(26)	6(2)	0	0	0	0	0	
	5												
III	1							1(1)		1(4)	0		
	2	0	7(14)	0	12(63)	7(44)		0	0	0	0		
	3	0	<1(3)	5(45)	<1(3)			0	0	0	0		
	4	0	0					0	0	0	0		
	5												
IV	1							0					
	2			<1(1)	2(22)	2(4)		0					
	3	0			0								
	4	0											
	5	0	0										
V	1							0					
	2		<1(5)	<1(7)	1(12)			3(8)	2(16)	0		<1(5)	<1(1)
	3			0				0	0				
	4		<1(1)	0	0			0	0				
	5			0									
VI	1	0	0										
	2		0		5(1)								
	3			0									
	4												
	5												
Number caught per 100 mile-hours of nets (in bracket, number reported by observer vessels)													
I						0.34	0.19	0.67	0.64				
II					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

Table 8. Little auk: 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
I	1					83(259)	45(62)						
	2					43(346)	12(196)						
	3					11(85)	86(169)	8(40)		104(200)			
	4		0			23(204)	4(21)	0		0	68(50)		
	5									99(50)	86(80)		
II	1							0					
	2				0	0		0			0		
	3		0										
	4		0				10(3)					0	
	5							28(75)		10(60)			
III	1												
	2	0	0	0	0	0				3(10)	0		
	3	0	0	0	0	0					0		
	4	0	0										
	5	0	0						32(388)	31(125)			
IV	1			0	0	0		0					
	2	0			0	0							
	3	0			0	0							
	4	0			0	0							
	5	0	0										
V	1		0					0					
	2		0		0			0	<1(2)	0	0	0	6(16)
	3	0	0		0								
	4		0		0								
	5		0		0				1(1)				
VI	1	0	0		0								
	2		0										
	3		0										
	4												
	5												
Number caught per 100 nets						7.88	10.26	0.88	0	11.74	16.25		
I			0			0	1.50	1.84	0	1.85	0	0	
II			0		0	0		0	8.08	4.16	0		
III		0	0	0	0	0		0					
IV		0	0	0	0	0		0	0.05	0	0	0	1.45
V		0	0	0	0	0		0					
VI		0	0	0	0	0		0					

Table 9. Guillemots: 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
I	1					142(444)	318(435)						
	2					314(3157)	299(6796)	240(870)	153(860)				
	3					263(978)	710(1487)	215(1100)		784(1500)			
	4					165(4516)	146(970)	75(50)		393(600)	411(300)		
	5						304(200)			594(300)	432(400)		
II	1							305(115)				712(1500)	
	2							156(1210)				1803(3035)	
	3		<1(1)		52(26)	49(493)	81(240)	322(450)	2842(806)	37(150)		359(500)	
	4		<1(1)		0	102(843)	80(25)	40(105)		122(766)			
	5										775(500)		
III	1									56(25)			
	2	13(20)	21(40)	31(590)	38(300)	86(805)		4(4)		86(277)		89(110)	
	3	9(39)	8(73)	25(289)	8(44)	2740(2000)		99(249)	125(175)				
	4	30(111)	6(21)	0				129(40)		113(460)			
	5	8(39)	5(25)						127(1542)	85(515)			
IV	1												
	2	11(7)		108(278)	147(1341)	85(205)		206(110)					
	3	55(22)		0	202(755)								
	4	33(72)			19(40)								
	5	73(57)	27(109)										
V	1		118(658)					84(94)					
	2		20(226)	131(1395)	13(122)			315(757)	366(851)	277(2143)	404(890)	79(407)	68(190)
	3	51(67)	91(2)	107(1174)									
	4		83(259)	34(61)	1518(1359)			416(451)	63(47)				
	5			13(1)					89(173)				
VI	1	44(64)											
	2		<1(1)		5(1)								
	3			145(75)									
	4												
	5												
Number caught per 100 nets						57.12	102.60	36.01	18.40	112.68	87.50	83.33	
I						16.29	17.21	45.50	649.21	28.19	227.74		
II			0.04		7.43			12.74	35.77	24.32	15.71		
III		3.73	2.12	7.12	5.47	61.65		36.67					
IV		9.29	7.52	22.69	36.26	16.27							
V		7.98	13.68	27.91	25.68			51.14	47.53	69.13	57.05	13.57	17.27
VI		0.85	0.00	21.00	0.00								

Table 10. Guillemots. Bycatches in research 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
I	1					2(1)							
	2							9(2)					
	3		0	0									
	4												
	5								4(2)				
II	1					0							
	2					0							
	3		0	0		0	66(37)	0	111(82)				
	4		0		7(1)	0							
	5	0				0			19(5)				
III	1												
	2												
	3	0		0	0				44(18)				
	4		0						6(3)				
	5	0				22(2)							
IV	1						0	0	8(2)			0	0
	2		0	0	23(3)	0			39(21)				
	3		0			22(8)		60(35)	71(13)				
	4				2(3)								
	5				0	0							
V	1			0	0								
	2			13(2)	0						29(4)		
	3		0	0	10(1)		759(227)		21(1)				
	4						20(2)						
	5		0			4(1)							
VI	1			0	0							3(1)	
	2			0									
	3					3(1)	0						
	4												
	5		0			10(3)	4(1)						
Davis Str.		0											
Labrador Sea			0		0								

Table 11. 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
I	1					<1(1)	0						
	2					0	0	0					
	3					<1(3)	<1(6)	0	1(10)	0			
	4		8(5)			<1(6)	<1(2)	0		0			
	5						0			0	<1(1)		
II	1					<1(10)	<1(2)	0			<1(1)		
	2					<1(14)	0	<1(1)			<1(1)		
	3		2(8)		0				<1(2)	0			
	4		2(24)		2(1)				0	0		<1(1)	
	5								0	0	0		
III	1									4(2)			
	2	1(2)	2(4)	2(38)	<1(7)	2(18)		0	0	0	0		
	3	5(30)	2(22)	2(33)	1(8)	0		0	0	0	0		
	4	2(15)	2(9)	1(4)	0			0	0	0	0		
	5	2(8)	2(10)						<1(6)	<1(3)			
IV	1												
	2	5(3)		2(4)	1(9)	1(3)		6(3)					
	3	12(5)		<1(1)	<1(1)								
	4	<1(2)			<1(1)								
	5	0	2(9)										
V	1		<1(4)					2(2)					
	2		3(36)	1(15)	4(31)			6(15)	3(23)	3(22)	<1(6)	2(12)	3(7)
	3	<1(1)	0	1(14)									
	4		1(4)	0	3(3)			3(3)	0				
	5			0					1(2)				
VI	1	0	0										
	2		0		0								
	3			0									
	4												
	5												
Number caught per 100 mile-hours of nets (in bracket, number reported by observer vessels)			1.00		0.08	0.04	0	0.17	0	0.06			
I			0.45		0.09	0.21	0.06	0.02	0.24	0	0.08	0.17	
II		0.77	0.54	0.50	0.20	0.40		1.00	0.13	0.15	0		
III		0.48	0.62	0.31	0.19	0.24		0.80	0.43	0.71	0.38	0.40	0.64
IV		0.12	0.54	0.30	0.58								
V		0	0	0	0								
VI													

Table 12. Seals. Bycatches in commercial salmon drift-nets per unit effort.

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

(In bracket, number reported by observer of vessels)

Number caught per 100 nets

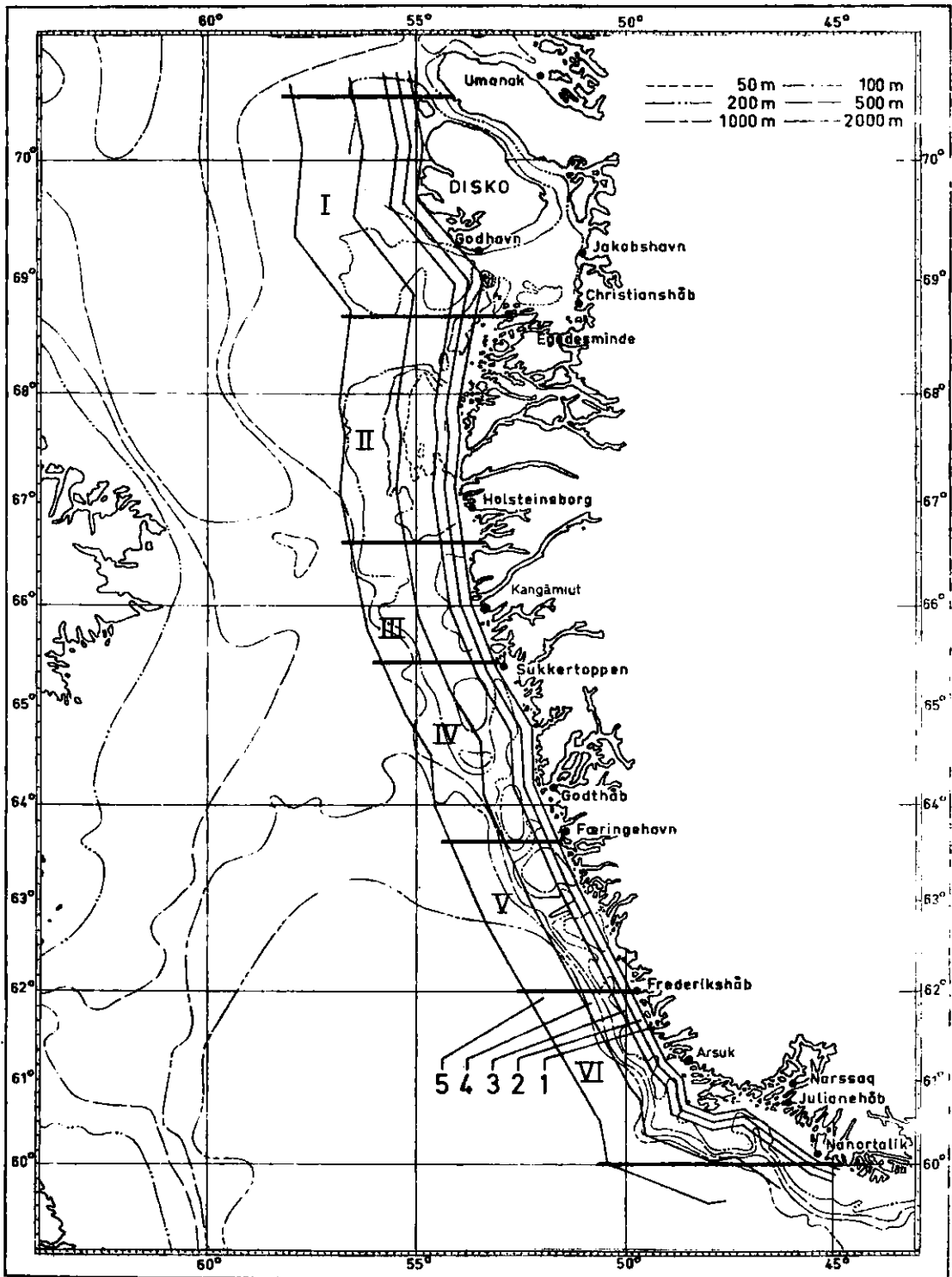


Fig. 1. Area map of West Greenland showing fishing areas (I - VI) and subareas (1 - 5).

