Report on the Salmon By-catch in Miscellaneous Marine Fishing Gear 1976, Newfoundland and Labrador

Dave Reddin

Research and Resource Services Branch
Fisheries and Marine Service
Department of Fisheries and the Environment
P.O. Box 5667
St. John's, Newfoundland A1C 5X1

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Dave Reddin

Research and Resource Services Branch
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Department of Fisheries and the Environment
P.O. Box 5667
St. John's, Newfoundland A1C 5X1

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ABSTRACT

Reddin, Dave. 1978. Report on the salmon by-catch in miscellaneous marine fishing gear, 1976, Newfoundland and Labrador. Fish. Mar. Serv. MS Rep. 1461: 23 p.

The legal commercial Atlantic salmon fisheries, conducted around the coast of Newfoundland and Labrador, utilize salmon traps and set gillnets. However, there is a purposeful "by-catch" of salmon in herring and mackerel gear, cod traps and gillnets, and trout gillnets that takes a substantial proportion of total Atlantic salmon landings. In Newfoundland, this amounted to 29% of landings in 1976 while in Labrador it was only 3%. Both the people and gear involved are identified in this report. Suggestions are presented for the elimination of the problem. Japanese cod traps are identified as an increasing problem and one that will be difficult to solve in light of present plans for expanding the inshore cod fishery.

Key words: commercial Atlantic salmon, by-catch, Japanese cod traps, inshore cod fishery, salmon.

RÉSUMÉ

Reddin, Dave. 1978. Report on the salmon by-catch in miscellaneous marine fishing gear, 1976, Newfoundland and Labrador. Fish. Mar. Serv. MS Rep. 1461: 23 p.

La pêche commerciale autorisée du saumon atlantique, le long des côtes de Terre-Neuve et du Labrador, se fait au moyen de trappes à saumon et de filets maillants ancrés. Toutefois, il existe une pêche "accessoire" et préméditée du saumon, effectuée à l'aide d'engins de pêche normalement destinés au hareng et au maquereau, de trappes et de filets maillants à morue et de filets maillants à truite, qui représente une partie substantielle du total des prises de saumons atlantiques. En 1976, ce type de pêche était à l'origine de 29% des prises à Terre-Neuve, et de 3% au Labrador. Le présent rapport identifie les responsables de cette pêche et les engins qu'ils utilisent. Nous présentons des solutions à ce problème. Nous traitons du problème causé par l'utilisation des trappes japonaises à morue, lequel risque de s'amplifier avec l'expansion prévue de la pêche côtière de la morue.

Mots clés: saumon atlantique de pêche commerciale, pêche accessoire, trappe japonaise à morue, pêche côtière de la morue, saumon.

INTRODUCTION

In 1975, Mr. G. H. Rendell of the Conservation and Protection Branch reported that significant amounts of salmon were caught as incidental catches or "by-catches" in gear other than salmon nets. His report indicated these by-catches may be increasing. For the following reasons, it was considered desirable to expand the basis of Mr. Rendell's report.

1. Fishery Officers have reported problems rationalizing fishery policy to licensed salmon fishermen who are trying to compete with other fishermen able to catch more salmon than they;

2. The salmon fishery in Newfoundland is presently in a healthy state (except for a few localized river stocks) but may not remain so in the future; development of future regulations will have to incorporate our best knowledge of by-catches.

Field staff of the Conservation and Protection Branch were requested to estimate percentages of salmon landed by various types of non-salmon gear. Admittedly, the problem was most complex and the difficulties presented by fishermen who are reluctant to give accurate figures on catch by type of gear, and the extremely diverse nature of the problem made factual recording almost impossible. Thus, specific figures were not requested and Conservation and Protection staff were asked to provide a best estimate of the percentage breakdown of the salmon by-catch by gear type. By-catch (in pounds) was calculated using these percentages and the provisional landings provided by Economics and Intelligence Branch for 1976. Other important questions were asked regarding means to eliminate the problem, whether the gear was purposely set for salmon, and if moonlighters or "bona fide" fishermen were mainly responsible.

A copy of the questionnaire follows. All landings are by section and are for round weights in pounds.

SALMON BY-CATCH QUESTIONNAIRE

1. *Please fill in the total* by-catch below as percentage of the total salmon catch in a particular statistical section. Use the enclosed map of the statistical sections as a reference to whatever section you are individually familiar. Next, subdivide this total for each section into the percentage for each gear type (the sum of the percentages for each gear type should be equal to the total at the top of each column).*

Section →							
*Total	%	%	%	%	%	%	%
Nfld. cod traps	%	%	%	%	%	%	%
Japanese trap	%	%	%	%	%	%	%
Modified Nfld. trap	%	%	%	%	%	%	%
Herring or mackerel gillnets	%	%	%	%	%	%	%
Herring or mackerel traps	%	%	%	%	%	%	%
Other (Please specify type) _____	%	%	%	%	%	%	%

2. What are your feelings on the amount of non-salmon gear set purposely for salmon and how much of the catch is truly incidental in the statistical sections with which you dealt?

3. Mr. Rendell's 1975 report mentioned that many of the people setting cod gear, etc. for salmon were not "bona fide" fishermen but were on welfare, old-age pensions, etc. Do you feel this assessment to be still valid?

4. What proportion (%) of the salmon caught in each of the sections in your area is consumed locally and not recorded?

5. Do you feel that the by-catch of salmon in gear other than salmon nets is an increasing problem that could possibly worsen in the future?

6. Do you feel that licensed salmon fishermen and others are accurately reporting their salmon catches?

7. Please feel free to use this space for whatever general comments you would like to make. Also, we would appreciate any ideas you have regarding methods (regulations) to alleviate problems identified.

VALIDITY OF THE QUESTIONNAIRE

The Fisheries Officers did a good job in responding to the questionnaire; unfortunately, a few sections (50, 01, 02, 03 and 12) did not respond, or

responses were too late arriving for inclusion in this report. Question four was the only part that presented any difficulties as it was misinterpreted by quite a number of officers.

Two obvious questions regarding the timing of the by-catch and size of salmon caught were left out. However, Jack Marshall (District Protection Officer, District 3) indicated that the catch generally occurred in late June and consisted mostly of grilse, indicating that Newfoundland-origin fish were predominantly being caught. A few officers in other areas who mentioned this timing in the salmon fishery generally confirmed these impressions. Caution must be used when interpreting these figures as most Fishery Officers reported that their data represent minimum estimates. As well, these figures only apply to the 1976 salmon fishery.

RESPONSE TO QUESTIONS

2. *What are your feelings on the amount of non-salmon gear set purposely for salmon and how much of the catch is truly incidental in the statistical sections with which you dealt?*

Generally, indications were that little of the salmon by-catch was incidental. Reports indicated definite difficulties with mackerel, herring, cod, and trout gear that were being set specifically to take salmon. The trout nets were a problem mostly in Labrador whereas mackerel and herring gillnets and cod gear were a problem for insular Newfoundland. Cod gear set in estuaries were, in some cases, set purposely to catch salmon, but for others, a good cod berth was also a good salmon berth. Mackerel and herring do not run in most areas until August, but the gear was set out as soon as the "capelin run" of grilse began. Some people discarded whatever herring or mackerel they caught and kept only the salmon. The gear was removed when the herring fishery began. This gear would catch very little salmon and still be effective for herring if set properly, i.e. sink the net instead of having it afloat.

3. *Mr. Rendell's 1975 report mentioned that many of the people setting cod gear, etc., for salmon were not "bona fide" fishermen, but were on welfare, old age pensions, etc. Do you feel this assessment to be still valid?*

Yes, this assessment is still true. Most of the people involved are not qualified to hold a salmon licence and have little association with any fishery other than this illegal approach. The problem is especially true for communities adjacent to estuarial waters, it being of diminishing importance in headland areas. Herring and mackerel gillnets are the gear utilized, although to a lesser extent cod fishermen set cod gear for salmon within estuaries. These conclusions are valid for the island of Newfoundland and, as Mr. Rendell pointed out, do not apply to Labrador.

4. *What proportions (%) of the salmon caught in each of the sections in your area is consumed locally and not recorded?*

A great deal of confusion regarding this question arose over misconceptions of local sales. As used by the Economics and Intelligence Branch, it includes all salmon not sold to fish plants or buyers and not recorded on a sales slip. This includes: salmon sold locally by the fishermen, the amount he eats himself or gives away. However, the answers indicated there are problems involved in gathering this information. As the incidental catch is technically illegal, there was some resistance on the part of the pursuants to report the true catch to Fishery Officers. Because of this, all Fishery Officers consistently suggested their estimates fall short of the true value.

5. *Do you feel that the by-catch of salmon in gear other than salmon nets is an increasing problem that could possibly worsen in the future?*

Without the implementation of regulations to control the use of herring and mackerel nets, this problem will be an increasing one. It is a direct result of a stricter licensing policy and probably began soon after restrictions were imposed on the Port aux Basques drift net fishery. The Fishery Officers report more people enquiring into the legalities of fishing herring nets, etc., and some even wanted to know if they could drift a mackerel net! In the future, Japanese cod traps will be an increasing problem. They are extremely efficient for catching salmon because once inside, a salmon cannot escape.

6. *Do you feel that licensed salmon fishermen and others are accurately reporting their salmon catches?*

Licensed salmon fishermen do accurately report their catches, however, it is with the collection of the community statistics (local sales) that problems arise. Fishery Officers do not have time to interview every salmon fisherman and so estimate local sales landings through several sources in the community. The people, however, who incidentally catch salmon are understandably very reluctant to accurately report catches for fear of being prosecuted. They either deny any incidental catch at all or report ridiculously low figures.

Question No. 1 with comments on tables and figures.

Tables 1 and 2 show the by-catch for each section and area broken down by gear. Also the percentage of the by-catch of the total landings by section, area and for total Newfoundland and/or Labrador are given. The by-catch for insular Newfoundland was 691,811 lb or 29% of the total landings while for Labrador it was only 40,952 or 3%. In relation to total catch, the important areas were A, B, D, J, and O where the by-catch represented more than 1%. The breakdown of by-catch by gear varies greatly from area to area or section to section (Tables 1 and 2). For some areas or sections, the by-catch represented only a small portion of the Newfoundland total catch, but was a large part of the catch for that area, e.g. the by-catch in Area M was only 1% of the Newfoundland catch, but it was 51% of the area landings. Thus, while it may appear rather insignificant in an overall sense, it may be important locally. This occurred in Sections A, B, C, D, G, H, I, J, M, and N. These proportions indicate that it is more than incidental catch and that steps could be taken to prevent it.

Tables 3 and 4 show the percentage breakdown by gear of the total by-catch. For insular Newfoundland the cod trap catches were 32% of the by-catch and herring-mackerel gillnets 64%. The other gear was relatively less important. However, with an expanding inshore cod fishery, the Japanese cod traps will likely take a much increased proportion in the future. While the by-catch in the Japanese trap was only 2%, this probably reflects the small numbers in use rather than its effectiveness. Many Fishery Officers mentioned in their reports that the Japanese cod trap is very efficient (because of its structure, i.e. roof). Again, note that A, B, D, and J caught 17, 20, 7, and 38% (Table 4) respectively of the by-catch and are the real problem areas. In Labrador, the highest by-catch was in trout gillnets which took 74%.

The more important values are depicted on Fig. 1-4. Newfoundland cod traps and mackerel-herring gillnets were the most important gear used to net salmon as a by-catch and are represented in Fig. 3 and 4.

Table 5 is a summary table, in which the by-catch has been extrapolated to the total salmon catch during 1976. The total by-catch for insular Newfoundland was in the order of 795,300 lb for 1976. This figure is 295,300 lb more than the 500,000 lb estimated by Mr. G. Rendell in 1975. Unfortunately, due to the different methods used to collect the information, other comparisons are impossible. However, the above indicates an increasing problem. In Labrador, the by-catch was only 49,920 lb and is relatively unimportant.

REGULATORY OPTIONS

The following is a summary of the most mentioned or seemingly more practical options suggested by Conservation and Protection staff.

1. Herring and mackerel gillnets and traps cannot be set at less than 1½ fathoms below the surface of the water. (This option is supported by data in Appendix II provided by H. Lear.)

OR

1. A closed season be placed on the gillnet fishery for herring and mackerel from mid-June until the end of July. There would have to be a provision for issuing special permits to bona fide fishermen who require herring for bait.

OR (less preferable)

1. Regulate the setting of herring and mackerel gear in the following manner: Gillnets and trap leaders must be set parallel to and not perpendicular to the nearest shoreline and not set shorefast. Traps must be set with not less than 5" mesh in the leaders and the leader must be no longer than 50 fathoms. The drifting of herring or mackerel gillnets is not to be allowed.

* * * * * * * * * *

2. Move the caution notices farther out of the estuaries to seaward.

OR

2. Limit fishing in areas within bays and estuaries to small-mesh gear.

OR

2. Change Section 39, 1-a of the Fishery Regulations to read "from midnight Saturday to midnight Sunday all fishing gear shall be taken out of the water". This restriction only to apply from May 15 to August 15.

* * * * * * * * * *

3. Each individual piece of gear in use be identified by a licence so that Fishery Officers can easily tell what is licensed and what is not. Any gear without a licence (in use) is confiscated.

* * * * * * * * * *

4. All "bona fide" commercial cod trap fishermen be granted a salmon licence if requested and only commercial fishermen be allowed to sell salmon (provided Nos. 8 and 9 are ridgidly enforced; serious consideration should be given before this is implemented).

* * * * * * * * * *

5. Non-commercial fishermen should be restricted to only hooks and jiggers.

* * * * * * * * * *

6. All salmon gillnets used in the Bay St. George area should have a mesh size of not less than 5 inches.

7. Continue with the ban on trout nets for the island and issue licences for trout fishermen in Labrador to eliminate moonlighters after salmon.

* * * * * * * * * *

The following are suggestions to eliminate the cod gear by-catch. This should be implemented with extreme caution and only after research into the effects on the cod fishery.

8. All cod gillnets should be set so that the head rope is sunk to a depth of not less than 2 fathoms.

OR

8. Cod gillnets cannot be set so that the foot rope is on the bottom and head rope on the surface.

* * * * * * * * * *

9. All cod trap head ropes and head ropes of leaders thereof should be sunk to $1\frac{1}{2}$-2 fathoms below the surface.

OR

9. The upper (2 fathoms) mesh of the trap, except for the drying twine and the leader, cannot be less than 7-8" mesh, and restrict the length of the leaders to 50 fathoms. This would have to be done as a phase-out of present gear.

CONCLUSIONS

General

1. A by-catch questionnaire was sent out and the responses analyzed.

2. This by-catch is not "incidental" but is a purposeful catch by people who are setting cod, herring or mackerel gear in such a manner to catch salmon.

3. The people involved in this by-catch are, for the most part, non-commercial fishermen with little investment in any fishery.

4. Fishery Officers have been meeting resistance from these people who are reluctant to report landings. This causes inaccuracies in our study and the landing reports of Economics and Intelligence.

5. The by-catch problem will be an increasing one.

6. A set of proposals has been compiled which would partially eliminate the problem. It is not possible to totally end it because there will always be a by-catch in the inshore cod fishery; however, it is possible to eliminate the moonlighters.

7. The areas of greatest concern are A, B, D, and J, as they have much higher than normal incidental catches.

8. The gear most involved were the Newfoundland cod trap and herring-mackerel gillnets which together accounted for 96% of the by-catch. If projected to the Newfoundland total catch, then they accounted for 29% of the total salmon catch.

9. Insular Newfoundland was the problem area; the by-catch in Labrador accounted for only 3% of the total catch.

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The author gratefully acknowledges the assistance and cooperation of Conservation and Protection staff, especially those Fishery Officers and Wardens who assisted us in collection of the data. Biologists Brian Dempson and Vern Pepper read the manuscript and Mrs. T. Hutchings typed it. Dave Scott compiled the data for the tables and figures.

Table 1. By-catch landings of Atlantic salmon by gear for the Newfoundland statistical sections (in pounds).

Section	Nfld. cod traps	Japanese traps	Modified cod trap	Herring-mackerel gillnet	Herring-mackerel trap	Trout gillnet	Cod gillnet	Total	% of total landing for section	% of total landing for Nfld.
04	105,390	-	-	-	-	-	-	105,390	25	4
05	13,109	-	-	-	-	-	-	13,109	20	1
06	-	-	-	103,064	-	-	-	103,064	80	4
07	-	-	-	31,755	-	-	-	31,755	75	1
09	1,227	3,271	-	-	-	-	-	4,498	11	.1
10	1,031	-	-	619	-	-	-	1,650	8	<.1
11	1,386	-	1,320	10,562	-	-	-	13,268	50	1
13	2,405	2,405	-	3,367	-	-	-	8,177	17	.3
14	1,016	-	152	356	-	-	-	1,525	30	<.1
15	6,883	-	344	516	-	-	-	7,744	45	.3
16	4,353	-	-	3,482	870	-	-	8,705	30	.3
17	10,479	-	4,366	2,620	-	-	-	17,465	40	1
18	710	-	3,550	-	-	-	-	4,259	60	.1
19	2,199	-	3,299	-	-	-	-	5,498	25	.2
20	2,137	-	1,069	-	-	-	-	3,206	15	.1
21	485	-	485	-	-	-	-	970	10	<.1
22	1,542	-	-	-	-	-	-	1,542	5	<.1
23	4,444	-	-	889	-	-	-	5,333	12	.2
24	1,282	-	-	1,282	-	-	-	2,564	4	.1
25	955	-	-	477	-	-	-	1,432	3	<.1
26	1,831	732	732	732	-	-	-	4,027	11	.1
27	25	-	-	-	-	-	-	25	1	<.1
28	118	1,183	-	947	-	-	-	2,248	19	<.1
29	3,585	2,788	-	598	-	-	-	6,971	35	.2
30	3,225	2,419	-	1,613	-	-	-	7,257	45	.3
31	4,307	646	-	215	215	-	-	5,384	25	.2
32	6,557	262	-	524	-	-	524	7,868	30	.3
33	2,766	-	-	369	-	-	553	3,688	20	.1
34	2,187	146	-	7,730	146	-	-	10,208	25	.4
35	-	-	-	2,042	-	-	-	2,042	5	<.1
36	-	-	-	83,029	-	-	-	83,029	56	3
37	-	-	-	18,527	-	-	-	18,527	10	1
38	-	-	-	42,219	-	-	-	42,219	20	2
39	-	-	-	118,737	-	-	-	118,737	35	5
40	728	-	-	485	-	-	-	1,213	5	<.1
41	-	-	11	35	21	25	-	92	5	<.1
42	-	-	6	6	-	10	-	22	1	<.1
43	-	21	9	6	-	-	-	36	2	<.1
44	300	-	-	1,200	-	-	-	1,500	15	<.1
45	6,625	-	-	-	-	-	-	6,625	25	.2
46	23,557	-	-	-	-	-	-	23,557	75	1
47	905	-	-	-	-	-	-	905	25	<.1
48	805	-	-	-	-	-	-	805	10	<.1
49	3,672	-	-	-	-	-	-	3,672	30	.1
										% of total landing for Lab.
51	6,534	-	-	-	-	13,067	-	19,600	3	1
52	4,270	-	-	-	-	17,082	-	21,352	5	1
53	0	-	-	-	-	0	0	0	0	0

Table 2. By-catch landings of Atlantic salmon by gear for the Newfoundland statistical areas (aggregated from Table 1 in pounds).

Area	Nfld. cod traps	Japanese trap	Modified cod trap	Herring-mackerel gillnet	Herring-mackerel trap	Trout gillnet	Cod gillnet	Total	% of total landing for area	% of total landing for Nfld. or Lab.
* A	118,499	-	-	-	-	-	-	118,499	16	5
* B	1,227	3,271	-	134,819	-	-	-	139,317	55	6
* C	4,822	2,405	1,320	14,548	-	-	-	23,095	19	1
D	25,640	-	11,711	6,974	871	-	-	45,196	39	2
E	8,608	-	1,554	889	-	-	-	11,051	10	.4
F	4,068	732	732	2,491	-	-	-	8,023	5	.3
G	143	1,183	-	947	-	-	-	2,273	16	<.1
H	17,674	6,115	-	2,950	215	-	524	27,480	33	1
I	4,953	146	-	10,141	146	-	553	15,938	22	1
J	-	-	-	262,512	-	-	-	262,512	30	11
K	728	-	11	520	21	25	-	1,305	2	<.1
L	300	21	15	1,212	-	10	-	1,558	10	<.1
M	31,087	-	-	-	-	-	-	31,087	51	1
N	4,477	-	-	-	-	-	-	4,477	22	.1
Labrador										
* O	10,804	-	-	-	-	30,149	-	40,952	2	3
Nfld.	222,226	13,873	15,343	438,003	1,253	35	1,077	691,811		29
Prov.	233,030	13,873	15,343	438,003	1,253	30,184	1,077	732,763		19

*These areas have a section(s) missing.

Table 3. Percentage of by-catch landings by gear for Newfoundland statistical sections.

Section	Nfld. cod trap	Japanese cod trap	Modified cod trap	Herring-mackerel gillnet	Herring-mackerel trap	Trout gillnet	Cod gillnet	Total
04	15	-	-	-	-	-	-	15
05	2	-	-	-	-	-	-	2
06	-	-	-	15	-	-	-	15
07	-	-	-	5	-	-	-	5
09	.1	.4	-	-	-	-	-	1
10	.1	-	-	.08	-	-	-	.2
11	.2	-	.1	2	-	-	-	2
13	.3	.3	-	.4	-	-	-	1
14	.1	-	.02	.05	-	-	-	.2
15	1	-	.04	.07	-	-	-	1
16	1	-	-	1	.1	-	-	1
17	2	-	1	.3	-	-	-	3
18	.1	-	1	-	-	-	-	1
19	.3	-	.4	-	-	-	-	1
20	.3	-	.1	-	-	-	-	.4
21	.07	-	.07	-	-	-	-	.1
22	.2	-	-	-	-	-	-	.2
23	1	-	-	.1	-	-	-	1
24	.1	-	-	.1	-	-	-	.3
25	.1	-	-	.06	-	-	-	.2
26	.2	.1	.1	.1	-	-	-	1
27	.003	-	-	-	-	-	-	<.1
28	.01	.1	-	.1	-	-	-	.3
29	1	.4	-	.08	-	-	-	1
30	.4	.3	-	.2	-	-	-	1
31	1	.09	-	.03	.03	-	-	1
32	1	.03	-	.07	-	-	.07	1
33	.4	-	-	.05	-	-	.08	1
34	.3	.02	-	1	.02	-	-	1
35	-	-	-	.2	-	-	-	.2
36	-	-	-	12	-	-	-	12
37	-	-	-	3	-	-	-	3
38	-	-	-	6	-	-	-	6
39	-	-	-	17	-	-	-	17
40	.1	-	-	.07	-	-	-	.1
41	-		.001	.005	.003	.003	-	<.1
42	-		.0008	.0008	-	.001	-	<.1
43	-	.003	.001	.0008	-	-	-	<.1
44	.04	-	-	.1	-	-	-	.2
45	1	-	-	-	-	-	-	1
46	3	-	-	-	-	-	-	3
47	.1	-	-	-	-	-	-	.1
48	.1	-	-	-	-	-	-	.1
49	1	-	-	-	-	-	-	1
Total	32	2	2	64	.1	.005	.1	100
51	16	-	-	-	-	32	-	48
52	10	-	-	-	-	42	-	52
53	-	-	-	-	-	-	-	-
Total	26	-	-	-	-	74	-	100

Table 4. Percentage of by-catch landings by gear for Newfoundland statistical areas**

Area	Nfld. cod trap	Japanese trap	Modified cod trap	Herring-mackerel gillnet	Herring-mackerel trap	Trout gillnet	Cod gillnet	Total
* A	17	-	-	-	-	-	-	17
* B	.1	.4	-	20	-	-	-	20
* C	1	.3	.1	2	-	-	-	3
D	4	-	2	1	.1	-	-	7
E	1	-	.2	.1	-	-	-	2
F	1	.1	.1	.3	-	-	-	1
G	.02	.1	-	.1	-	-	-	.3
H	3	1	-	.4	.03	-	.07	4
I	1	.02	-	1	.02	-	.08	2
J	-	-	-	38	-	-	-	38
K	.1	-	.001	.07	.003	.003	-	.1
L	.04	.003	.002	.1	-	.001	-	.2
M	5	-	-	-	-	-	-	5
N	1	-	-	-	-	-	-	1
Total	32	2	2	64	.1	.005	.1	100
Labrador								
* O	26	-	-	-	-	74	-	100

*These areas have a section(s) missing.

**Readers should note that percentages in Tables 3 and 4 were calculated from the original data and because of rounding errors, columns may not add horizontally.

Table 5. By-catch landings of Atlantic salmon projected to total catch in 1976.

Gear	Newfoundland	%	Labrador	%	Province	%
Nfld. cod traps	254,000	9	12,980	1	266,980	6
Japanese cod traps	15,800	1	-	-	15,800	<1
Modified cod traps	15,800	1	-	-	15,800	<1
Herring gillnets	508,000	19	-	-	508,000	12
Herring traps	800	<1	-	-	800	<1
Trout gillnets	< 100	<1	36,940	2	37,000	1
Cod gillnets	800	<1	-	-	800	<1
	795,300	29	49,920	3	845,180	19
*1976 Total salmon landings	2,738,000		1,664,000		4,402,000	

* Preliminary landings

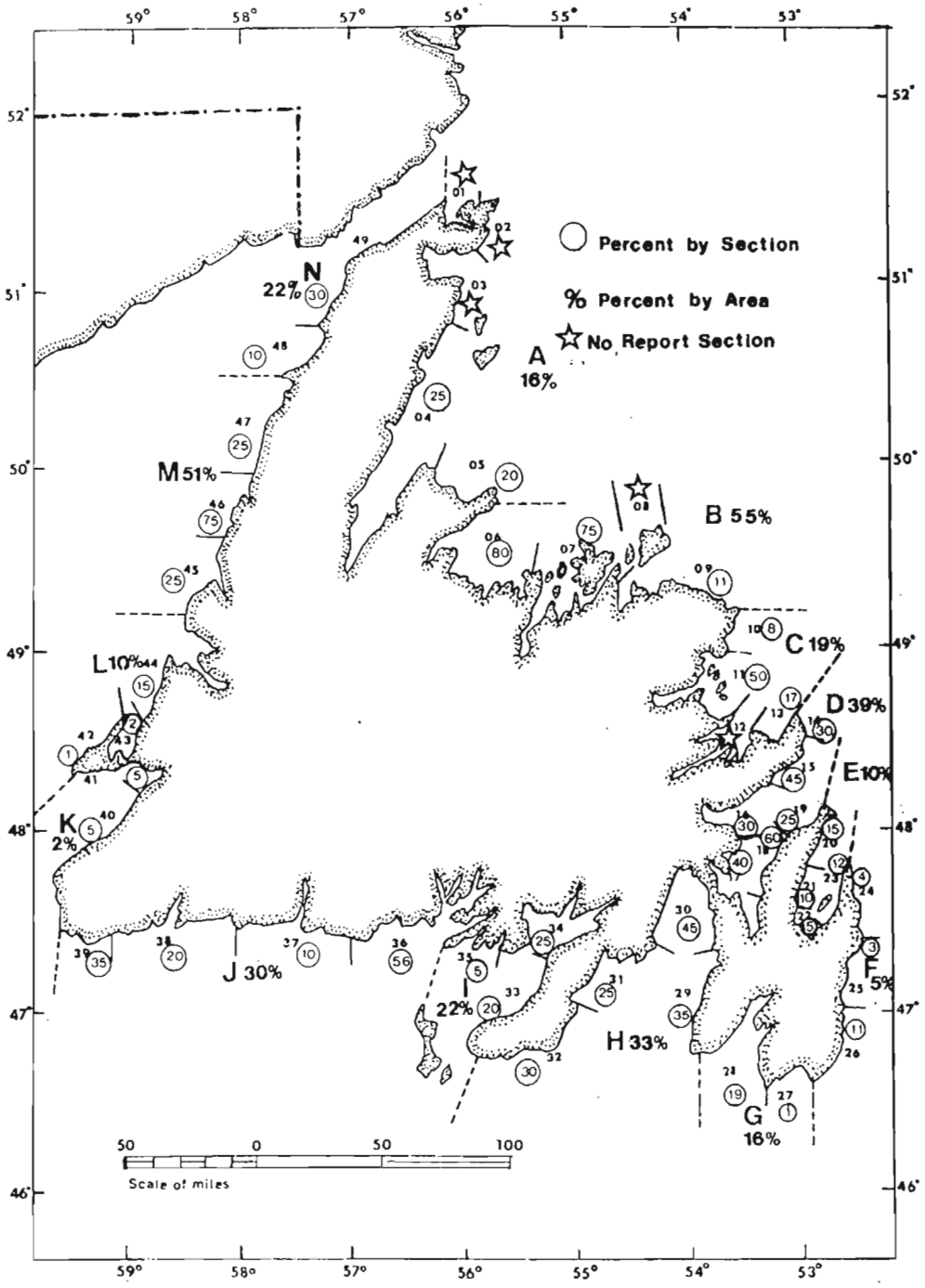

Fig. 1(a). Percentage by-catch of total landings by section and by area.

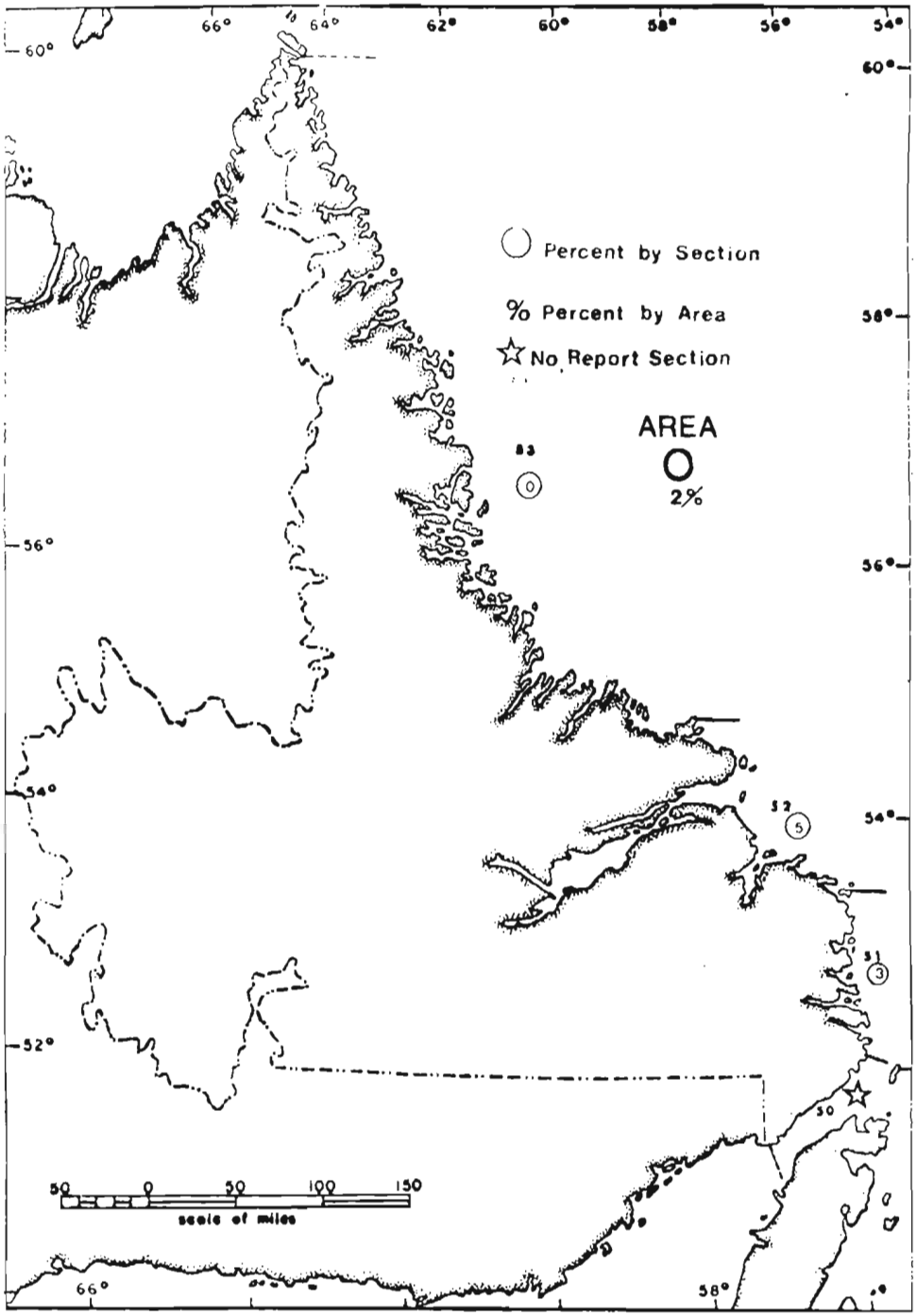

Fig. 1(b). Percentage by-catch of total landings by section and by area.

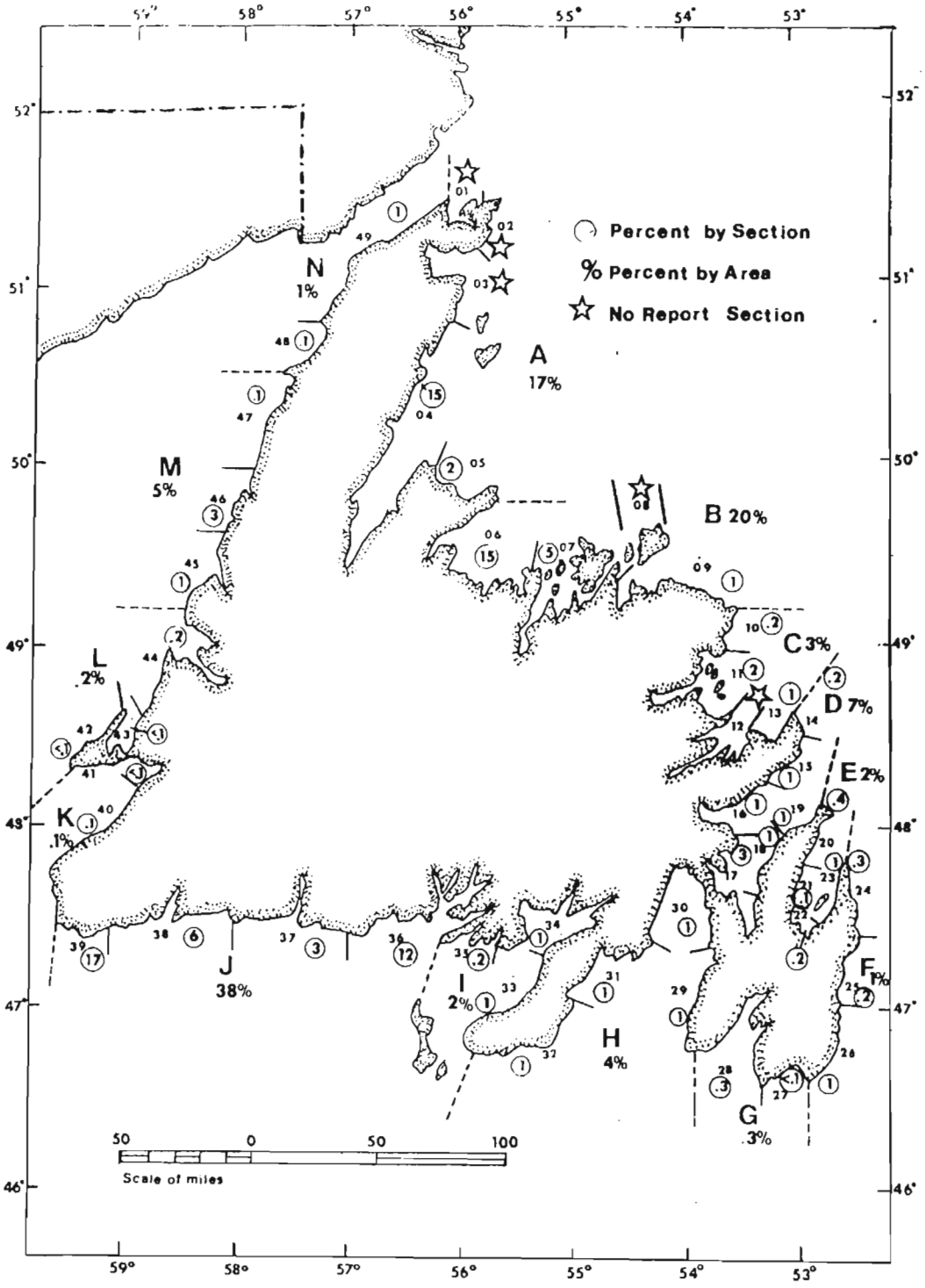

Fig. 2(a). By-catch expressed as a percentage of total by-catch of insular Nfld. by section and by area.

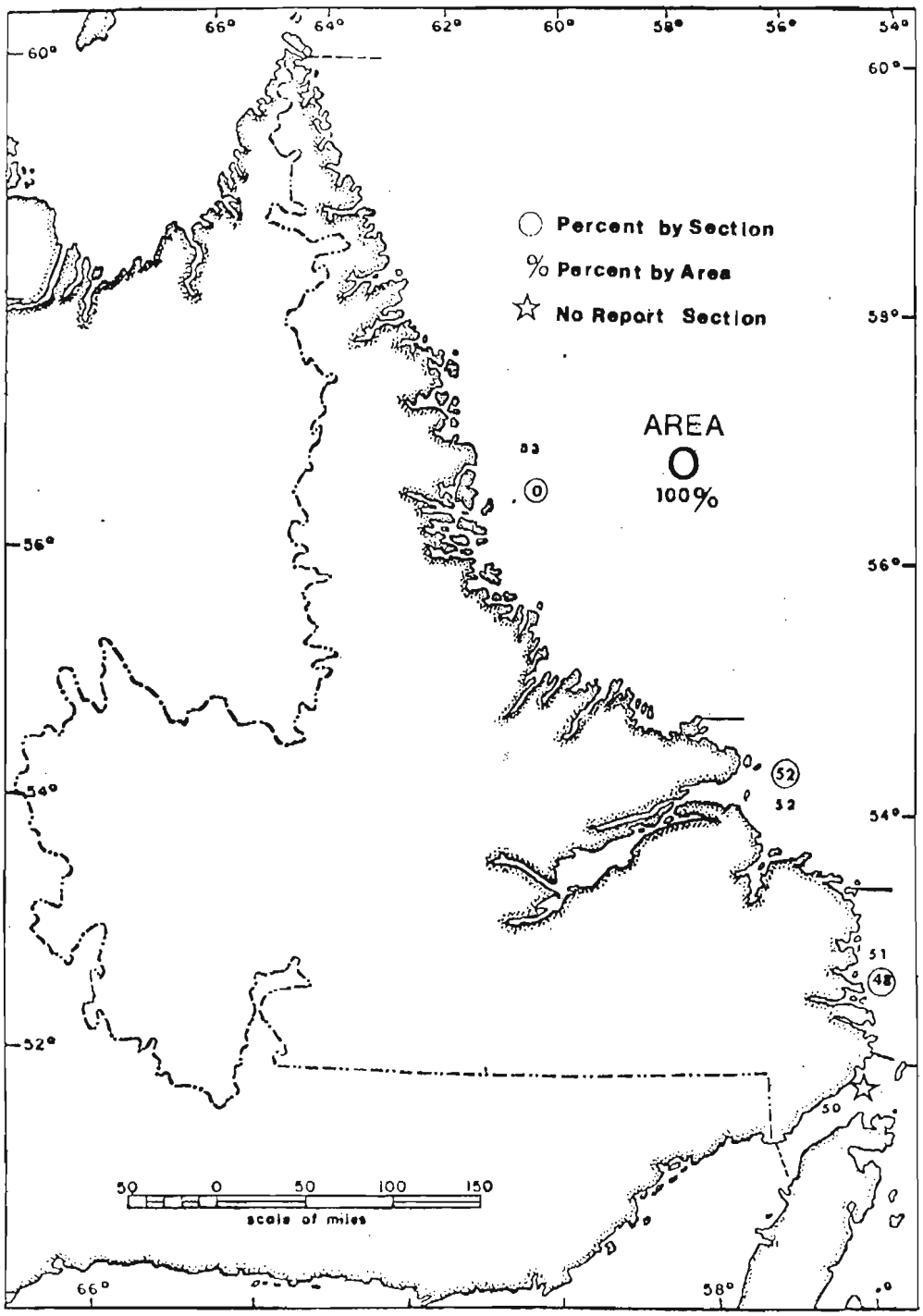

Fig. 2(b). By-catch expressed as a percentage of total by-catch of Labrador by section and by area.

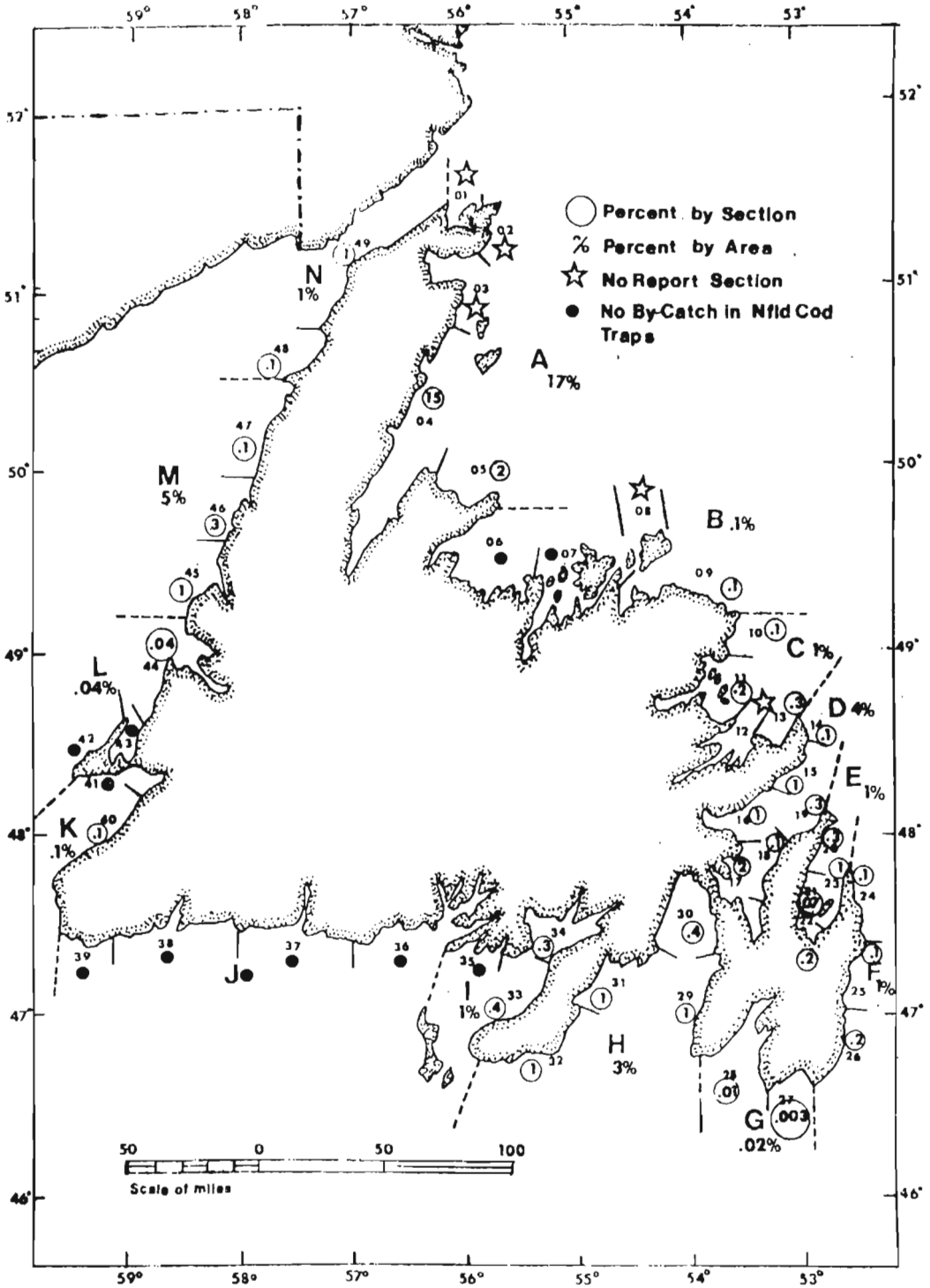

Fig. 3. Percentage of the by-catch caught in Nfld. cod traps.

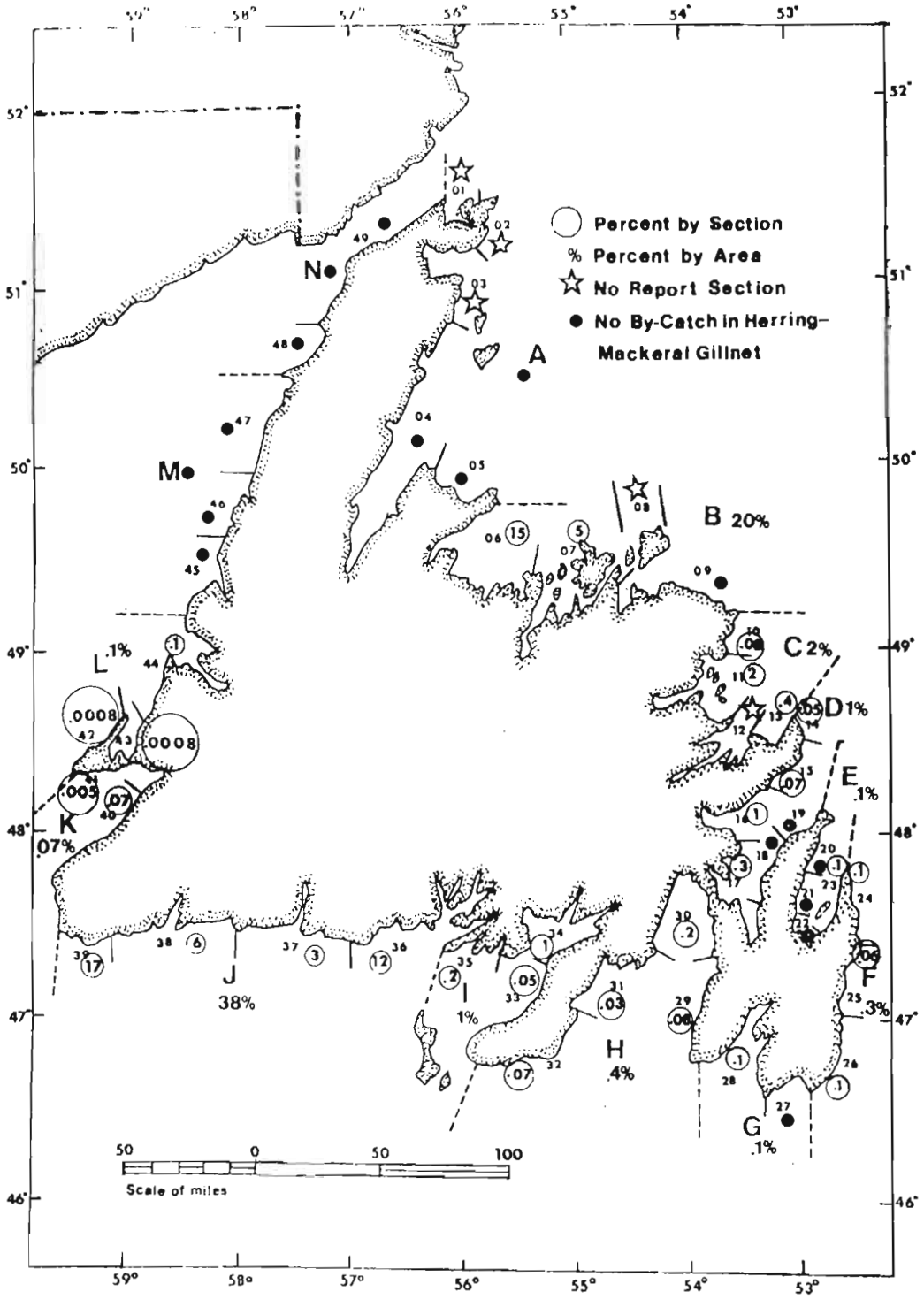

Fig. 4. Percentage of the by-catch caught in herring-mackerel gillnets.

APPENDIX I

Techniques of by-catching by gear type

A) Mackerel and herring gillnets

Mackerel and herring gillnet fishermen, by setting their nets attached and perpendicular to the shoreline, can quite successfully catch salmon. So successful are they that 438,000 lb of salmon were caught in this manner during 1976. This catch was 64% of the total by-catch. This situation can be rectified by declaring a season on herring from June 1 to August 15, except for those people who require bait.

B) Mackerel and herring traps

Mackerel and herring trap fishermen, by setting the head ropes afloat and with long leaders of fine mesh twine fastened to the shore and perpendicular to the shore, can catch salmon. In 1976, 1250 lb or 0.1% of the total by-catch were caught in this manner. The suggestions in (A) above would also alleviate this problem.

The following problems with cod gear must not be implemented without first studying the effects on the inshore cod fishery.

C) Cod traps

The gear included here are Newfoundland cod traps, Japanese cod traps and the modified cod trap which, if set with the head rope afloat at the surface and the leader fastened to the shore, will catch salmon. This can be corrected by setting all cod traps 1½ - 2 fathoms below the surface. Newfoundland cod traps, Japanese cod traps, and the modified cod trap caught 233,000, 13,870 and 15,340 lb of salmon in 1976. This represented 32%, 2% and 2% respectively of the total by-catch.

D) Cod gillnets

If set to the shore with the head rope floating and foot rope on the bottom (in shallow water), cod gillnets will catch salmon. One thousand and seventy pounds of salmon were caught this way in 1976. This represented 0.1% of the total by-catch. The problem can be solved by banning cod gillnets from shallow water where the foot rope can be set on the bottom and head rope afloat. Also, do not allow them to be set shorefast.

E) Trout gillnets

Trout gillnets are set similar to salmon gillnets; that is, with the leader fastened to the shore and head rope floating. They are illegal in Newfoundland but were set infrequently as herring nets. They caught 30,180 lb of salmon or 74% of the by-catch in Labrador. Trout nets should be illegal except for bona fide salmon fishermen.

APPENDIX II. Numbers of Atlantic salmon caught in each of 3 depth intervals by drift and set nets in various areas around Newfoundland and Labrador. Nets were set to a depth of 3 meters.

Area	N. Labrador	Conception Bay	NE Nfld. Coast SE Nfld. Coast	Placentia Bay	Port aux Basques	Total	%	
Year	1974	1974	1973	1975	1975	1973-75		
Depth interval (m)								
0 - 1	8	95	322	17	157	599	61	} 95
1 - 2	20	63	180	20	57	340	34	
2 - 3	2	8	12	1	24	47	5	
Total	30	166	514	38	238	986	100	