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SALMON EXPLOITATION IN ICELAND

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### Climate

The climate of Iceland is cool, temperate, and oceanic, with rapid changes. The summers are cool and the winters are relatively warm. The average temperature in the capital city of Reykjavík, in the southwestern part of the country, is 11.2°C in July and -0.4°C in January. The average air temperature is highest in southern and southwestern Iceland. It decreases north- and northeastward in lower areas diminishing still further on the central plateau, being at its lowest over the glaciers.

The mean precipitation recorded at several weather stations 1931-1960 varied from 353 mm in northern Iceland to 2,256 mm in the southernmost part.

### Species of fish

Five species of fish living partly or wholly in fresh water are native to Iceland. These are the Atlantic salmon (Salmon salar), the sea trout (Salmon trutta) as well as a land locked variety, the brown trout, the sea char (Salvelinus alpinus) and a landlocked variety, the lake char, the European eel (Anguilla anguilla) and the three spined stickleback (Gasterosteus aculeatus). There have been strays of pink salmon (Oncorhynchus gorbuscha) since 1960 presumably from the Soviet Union. Then rainbow trout (Salmo gairdneri) has been introduced into the country from Denmark about 30 years ago and is now found in rearing stations at two locations.

### Rivers

There are about 250 rivers in Iceland of which about 80 rivers and river systems hold salmon (Fig. 3). There are three types of rivers with respect to their origin. These are spring-fed rivers, direct run-off rivers and glacial rivers. In some cases the rivers are mixtures of all three types. They vary with respect to types of riverbeds, discharge, changing amount of flow, temperature of the water, ice cover, and anchor ice. Since Iceland is a mountainous country there are many hindrances in the rivers for migratory fishes. Salmon is found mostly in short streams and the lowland parts of the rivers and are generally most abundant in rivers which have their origin in lakes or flow through lakes.

The best salmon rivers with one exception are located in the western half of the country, see Figure 3. The river system Ölfusá-Hvítá in the south and the river system of Hvítá in the west produce the largest catches which amount to about 40% of the total yield in the country. The salmon rivers in the south and the west yield about 75% of the catch and the rivers of the north and the east about the remaining 25%.

On the eastern half of the country there are a few salmon rivers. These are located in the north and northeast districts. The Laxá in Thingeyjarsýsla district is by far the most productive river in these parts and one of the best salmon rivers in the country with respect to the number of salmon caught annually by anglers. It is also a one of three rivers in the country yielding salmon with largest average weight and the one where most often the largest salmon are caught each year.

Northeast Iceland is the coldest part of the country and the sea off the coast there colder than elsewhere around the island. The fluctuation in salmon catch in rivers in these parts can be great, the ratio between the catches during the best years and the poorest ones being 10:1.

#### Fishing methods

According to law only two methods of catching salmon are allowed at present i.e. gillnetting and angling. Earlier, salmon were also caught by seines, in traps, and by spears. Salmon fishing is allowed for maximal three months in each salmon river during the period 20th May to 20th September. Netting is permitted only for half of the week from Tuesday morning to Friday night and angling in each river for 12 hours each day during the period 7 a.m. and 10 p.m. with a limited number of rods in each river.

Netting for salmon takes place mainly in three glacial rivers: the Thjórsá and the Ölfusá-Hvítá in the south and the Hvítá in the west. In most of the other rivers the salmon fishing is leased to anglers exclusively. The nets take annually about 30-40% of the total river catches.

#### Salmon catch

Official records of salmon catch in Iceland are available since 1897. During the years 1897-1909 the average annual catch was 5.168 fish. After that period the catch started to increase. In Fig. 4 the number

of salmon caught from 1910-1980 has been plotted based on 5 years averages. From 1910-1950 the average catch was about 15,000 fish. After that the catch began to increase reaching about 64,000 fish during the years 1971-1980, the average total weight being about 240 metric tons. During the years 1981-1982 the number of fish decreased. Included in these figures since 1966 are salmon returns to ocean ranching sites, which have contributed up to 14% to the annual catch. The ratio between grilse and salmon varies between 50 and 60%. There are very few salmon that have spent more than two years in the sea.

#### Administration

Since the earliest time of inhabitation of Iceland (about 900 A.D.) there have been certain measures of conservation for salmon in Icelandic law. About a century ago the conservation measures were extended, but it was first in 1932 that a comprehensive legislation about salmon and other species living partly or wholly in fresh water was passed including administration for the fishing of these species. Additional protective measures have been added since that time, as well as other relevant matters concerning new developments in related fields. In the fresh-water fisheries law from 1932 there were many important provisions among other about fishing restrictions. One of the most important provisions was the ban against salmon fishing in the sea with a few minor exceptions. A very important addition to the law was passed in 1934 with a provision for the forming of fishing associations on each river or river system and on lakes. Fishing rights are privately owned and go with the land adjoining rivers and lakes. The owners are most often the local farmers since almost all rivers and lakes are in agricultural areas, the members of each fishing association being the owners or the tenants of farms on respective rivers. The duties of the fishing associations were to manage the fishery and, later, to carry out enhancement programmes as well. The fishing associations have functioned effectively. They play an important part in the administration of the salmon fishery in the country.

### Rate of exploitation

Iceland is in an unusual position to study the exploitation rate of the salmon stocks in individual rivers, since salmon fishing, with a minor exception, takes place in the rivers. There are, however, catches of unknown magnitude made of Icelandic salmon off West Greenland and in the Faroe Islands area as indicated by a few Carlin tags which have been retrieved from these areas and by a salmon tagged off West Greenland in 1972 which was caught in a West Iceland river the following year (Fig. 5). Seven Carlin tags have been returned from West Greenland, three from the Faroes and one from West Norway.

A few attempts have been made to assess the exploitation rate of salmon in Icelandic rivers with different methods. In the Ellidaár direct counts were carried out at first and later a mechanical fish counter was installed. In the Grímsá a resistivity fish counter has been in use. In the Nordurá a tube resistivity counter is located in a fish pass. In the Blanda and the Ölfusá-Hvítá the tag and recapture method was used.

### The Ellidaár

The river Ellidaár is located in the City of Reykjavík in Southwest Iceland. It is 6 km long and is the outlet of Lake Ellidavatn which is 74 m above sea level. There is a hydro-electric power station on the river about 0.8 km above the river mouth and a power dam about 1.5 km above the power station. Salmon have been counted at a trap which was taken into operation in 1931. It is located below the power station. At the trap, fish were counted manually until 1960 when a mechanical fish counter was installed. There have been many changes made in the river bed and the amount of flow after the construction of the power station and the power dam started in 1920, causing degradation of natural condition for salmon in the river system.

A study was made of the rate of exploitation of salmon in the Ellidaár from 1935 to 1976 based on total rod catch and total run see Table 1 (Mathisen and Gudjónsson, 1978) Data were missing for a few years. Estimates were made for these years by methods discussed by Mundy et.al. (1978). From 1935 to 1955 about 40% of the total

run was caught by anglers, the range being from 20 to 58%. During the next decade the average rate fell to 27%, ranging from 20 to 37%, but from 1966 to 1976 it rose again to 37% on the average, ranging from 25 to 54%. The average rate of exploitation of rod catch for the period of 42 years, which is covered by the study, was near to 34%.

#### The Grímsá

Counting of salmon in the Grímsá, a tributary to the Hvítá in West Iceland, has been carried out during the years 1977 to 1982, using a resistivity fish counter designed by Professor Björn Kristinsson. The counter sensor is a mat made of five parallel uninsulated steel ropes placed directly on the river bottom about 6 km from the confluence of the Grímsá with the Hvítá. Counting of salmon took place during major part of the fishing season each year with some unexpected interruptions of 10 to 20 days. Estimates were made for possible number of salmon that would have migrated past the counter during the breaks. Table 2 shows salmon counts, corrected counts, catches and escapement. The actual annual counts for the six year period were on the average 1,137 fish, the corrected counts were 1,562-1,678 fish. The average catch was 1,169 fish and the escapement 392-509 fish. Thus the exploitation rates of the rod catch amounted to 70-75% of the corrected counts.

This is not the total catch of salmon originating in the Grímsá, since the Grímsá salmon is also netted in the Hvítá. The nets in the Hvítá have for the last 6 years taken 47.2% of the total salmon catch of the Hvítá river system. Practically all the netting in the Hvítá takes place below its confluence with the Grímsá. Assuming that 47% of the Grímsá salmon have been netted in the Hvítá on the average, the annual catch of Grímsá stock for the six years period would have been 2,206 fish and the total run 2,598-2,715 salmon. Thus the total exploitation rate is estimated 81-85% and the escapement 15-19%. More salmon than the figures show have, however, been left in the Grímsá to spawn since anglers have released many of the salmon that they have caught on fly mainly during the month of July in 1978, 1979, and 1980. In 1978 353 salmon thus caught were released, 246 of which were tagged with "spaghetti" tags. Thirty of these were recaptured or 12% and 8 of them

were released a second time. It is estimated that about 300 of the released salmon have possibly survived to spawn, which is an addition to the escapement of 348-1,048 salmon (Table 2). In 1979 260 fly caught salmon were released by anglers, 175 of which were tagged and 27 or 15.4% were caught again. In 1980 a small number of salmon caught on fly was released.

#### The Nordurá

In the waterfall Laxfoss in the Nordurá, which is another tributary to the Hvítá, a tube resistivity fish counter was installed in a fish pass, and has been in operation since 1972. The Laxfoss waterfall is located at a distance of about 16 km upstream from the confluence of the Nordurá with the Hvítá. About 3 km upstream from the Laxfoss is another waterfall, the Glanni, which salmon can leap when the water level is low. Above the Glanni, salmon occupy about 27 km of river, with good spawning grounds.

Table 3 shows the number of salmon counted at the Laxfoss for the years 1972-1982 with the exemption of the year 1979 which registered an unbelievably high count, which must be considered unreliable. In the Table there is also listed the number of fish caught by rod and line above the fish counter as well as the total rod catch for the river.

The average count of salmon for the mentioned ten years period amounted to 2,676 fish, the range being from 1,075 in 1978 to 3,993 in 1975. The average catch above the fishpass was 653 fish varying from 497 in 1981 to 838 in 1980. The average catch rate of fish above the counter was 24.4% varying from 16.1 in 1981 to 64.4 in 1978.

The counts presented above will not give accurate information about the run of salmon up the Laxfoss all the years since salmon are able to leap the waterfall to some extent when the water level is low, as was the case during the summers of 1974 and 1978. The counts for those two summers were the lowest ones of the group.

The annual average total rod catch in the river during the same period was 1,788 salmon. The net catch of Nordurá salmon in the Hvítá during the period should have been close to 1,586 fish. The total catch amounted thus to about 3,374 salmon. If the number of salmon left in the river below the Laxfoss is estimated to have been about 1000 fish the exploitation rate of the Nordurá stock would thus be a little over 50% and the rod catch of salmon entering the Nordurá close to 37%.

#### The Blanda

In 1982 salmon in the glacial river Blanda in North Iceland were caught in a trap in a fish pass about 3 km above the estuary and tagged with "spaghetti" tags before being released up above. Out of 226 salmon tagged, 202 have assumingly migrated upstream. Of these, 72 were caught together with 21 untagged salmon which either swam up through the fish pass before the trap was put in or possibly ascended the cascade on one side of the fish pass. Thus assumingly 261 tagged and untagged salmon entered the river above the fish pass. Of these 93 were caught, leaving 168 fish to spawn. The total run is estimated 1,122 fish and the catch amounted to 954, or 85.0%.

Attention should be called to the fact that the catch for 1982 was low compared to the average catch for the ten years period from 1973-1982 which was 1604 fish.

#### The Ölfusá-Hvítá

In the estuary of Ölfusá-Hvítá 1,070 clean salmon were trapped and tagged on their upstream migration during the years 1969-1972 (Table 5). Tagging of 146 of these were unsuccessful, so these have been left out when analysing the data. Tags of 333 salmon were returned, or 36% of the fish tagged, the percentages varying from 18.3 in 1961 to 49.1 in 1969. These figures do not represent the total catch since tags are lost from the fish and presumably some of the tags retrieved by the fishermen were not reported.

### Discussion

The methods of assessing the exploitation rate of salmon, which has been in use in Icelandic rivers, have certain shortcomings which render them inaccurate. The results indicate, however, a great variation in individual rivers and from year to year. The exploitation rate for the rod catch in the Ellidaár was close to 34% on the average for a period of 42 years varying from 18 to 47% with exception of three years when it reached 54% twice and 58% once. During the 42 year period the stock size has varied greatly, whereas the rod catch has not followed it closely. The largest stock size was 9.6 times the smallest one, whereas the largest rod catch was 3.2 times the smallest one or one third of the variation in the stock size. There are certain factors that have not been taken into account. One of them is the opening up of spawning and rearing areas above an impassable dam on Lake Ellidavatn through building of a fish pass in the dam in 1965. The result of this has had influence on the numbers of salmon entering the Ellidaár, but on the other hand there is no record of salmon catches being made in this comparatively recently added spawning and rearing areas above the dam in the Hólmsá and the Ellidavatn.

The count figures for the salmon in the Grímsá and the Nordurá cannot be looked upon as being accurate, since the counting has been interrupted at times and corrections have been made to fill in for the gaps. Then in the Laxfoss in the Nordurá the salmon can bypass the fish pass at low water levels. It is noteworthy, however, that the exploitation rate seems to be much higher in the Grímsá (81-85%) than in Nordurá (just over 50%). This, in part, can be due to the difference in the topography of the rivers as well as in the amount of flow, the Nordurá being the longer one and having a bigger flow as well as a larger gradient. Then there are the two waterfalls in the Nordurá mentioned before, the Laxfoss and the Glanni, which delay the upstream migration of salmon, with the salmon waiting to ascend the waterfalls not being willing to take bait. Thus, the salmon in the river below the Laxfoss is available to angling for all through the three months of the fishing season, between the waterfalls for about two months and above the upper waterfall, the Glanni, for about a month. Greatest catch in the river



during the ten years period of counting was made below the Laxfoss or about 64%, about 21% on the 3 km stretch between the waterfalls and about 15% above the Glanni waterfall. It is also of importance in this context that the lowest third of the length of the Nordurá is much less accessible to anglers than the Grímsá, and it is in this part of the Nordurá that the main fishing effort takes place.

The exploitation rate of salmon in the Blanda in 1982 was very high or about 85%. The angling catch was mostly made at two locations in the river, the largest catch about 92% of the total being made below a gorge, which is about 3 km above the estuary, and the rest above the gorge at the junction of the Blanda and its tributary the Svartá. The gorge and a cascade at the top of it cause a delay to migrating salmon when the water level in the river is over 55-60 m<sup>3</sup>/sec. The water level was below this during the latter half of June and the first week in July when it went over 60 m<sup>3</sup>/sec. and stayed that way for a month. Very good catch was made below the gorge until the water level went down about a week off August.

The Ölfusá-Hvítá river system is one of the largest in the country. The main river is of glacial origin where netting for salmon is carried out, whereas the tributaries are clear water streams with rod fishing only. Salmon may migrate as far as 90 km upstream in the main river as well as into the tributaries. The exploitation rate for salmon in the river system can be expected to be higher than 36% as the returned tags indicate, since tags are lost in nets and all tags from caught salmon have presumably not been returned. Very little was done to contact net fishermen and anglers directly in order to recover tags. A small reward for returning tags was paid, but it probably was not high enough to encourage fishermen to return tags.

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References

- Agústsson, I. 1973-1983. Laxatalningar í Laxfossi. Nordurá 1972-1982. Manuscripts, n.p. Reykjavík.
- Antonsson, Th. 1982. Rannsóknir á fiskistofnum Blöndu 1982. Manuscript, 32 pp. Reykjavík.
- Eythórsson, J. and H. Sigtryggsson. 1971. The climate and weather of Iceland. The Zoology of Iceland. 1(3). 62 pp.
- Gudjónsson, Th. 1977. Recaptures of Atlantic salmon tagged at the estuary of the river Ölfusá-Hvítá, Iceland. ICES, C.M. M:40, 6 pp.
- Gudjónsson, Th. 1978. The Atlantic salmon in Iceland. In O.A. Mathisen, ed. Salmon and trout in Iceland. J. Agric. Res., Iceland 10(2): 11-39.
- Gudjónsson, Th. and D. Mills. 1982. Salmon in Iceland. The Atlantic Salmon Trust, Farnham, England. 22 pp.
- Hermann, F., and H. Thomsen. 1946. Drift-bottle experiments in the northern North Atlantic. Medd. for Komm. for Havundersögelse. Hydrografi 3,4.
- Mathisen, O.A. and Th. Gudjónsson, 1978. Salmon management and ocean ranching in Iceland. In O.A. Mathisen, ed. Salmon and trout in Iceland. J. Agric. Res., Iceland. 10(2): 156-174.
- Mundy, P.R., M. Alexandersdóttir, and G. Eiríksdóttir. 1978. Spawner-recruit relationship in Ellidaár. In O.A. Mathisen, ed. Salmon and trout in Iceland. J. Agric. Res., Iceland. 10(2): 47-56.
- Kristinsson, B. 1979-1983. Laxateljari í Grímsá 1978-1982. Manuscripts, n.p. Reykjavík.
- Kristinsson, B. and M. Alexandersdóttir. 1978. Design and calibration of a salmon counter. In O.A. Mathisen, ed. Salmon and trout in Iceland. J. Agric. Res., Iceland. 10(2): 40-46.
- Stefánsson, U. 1962. North Icelandic waters. Rit Fiskideildar, Vol. 3. 269 pp. Mar. Res. Inst., Reykjavík.
- Thorsteinsson, Th. 1979. Slepping og endurveidi laxa í Grímsá sumarid 1978. Veldimadurinn. No. 101: 10-11.

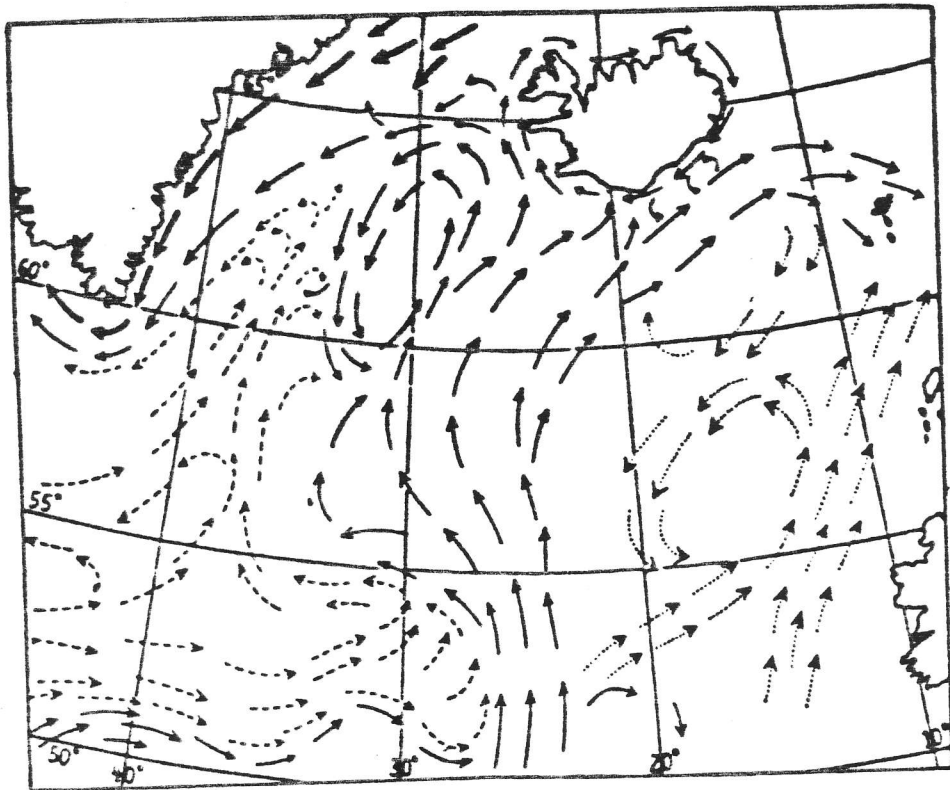


Fig. 1. Currents in the Irminger Sea and south of Iceland. Reproduced after Hermann and Thomsen 1946.

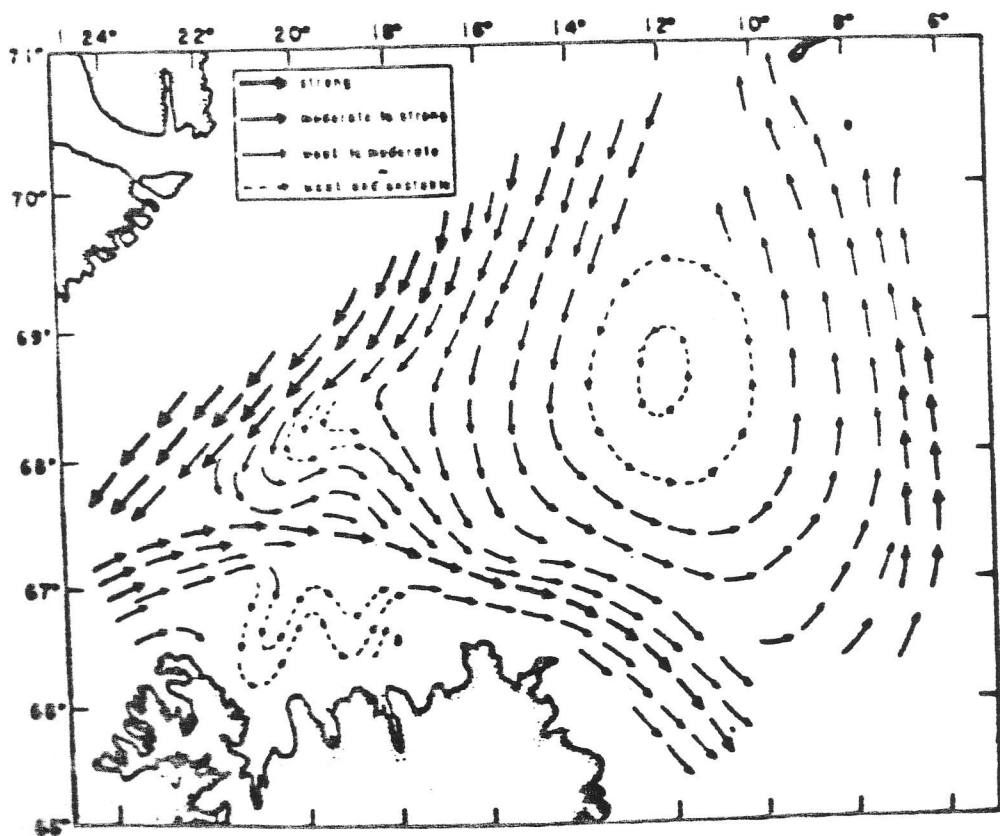


Fig. 2. The surface currents of the Iceland Sea. Reproduced after Stefánsson, 1962.

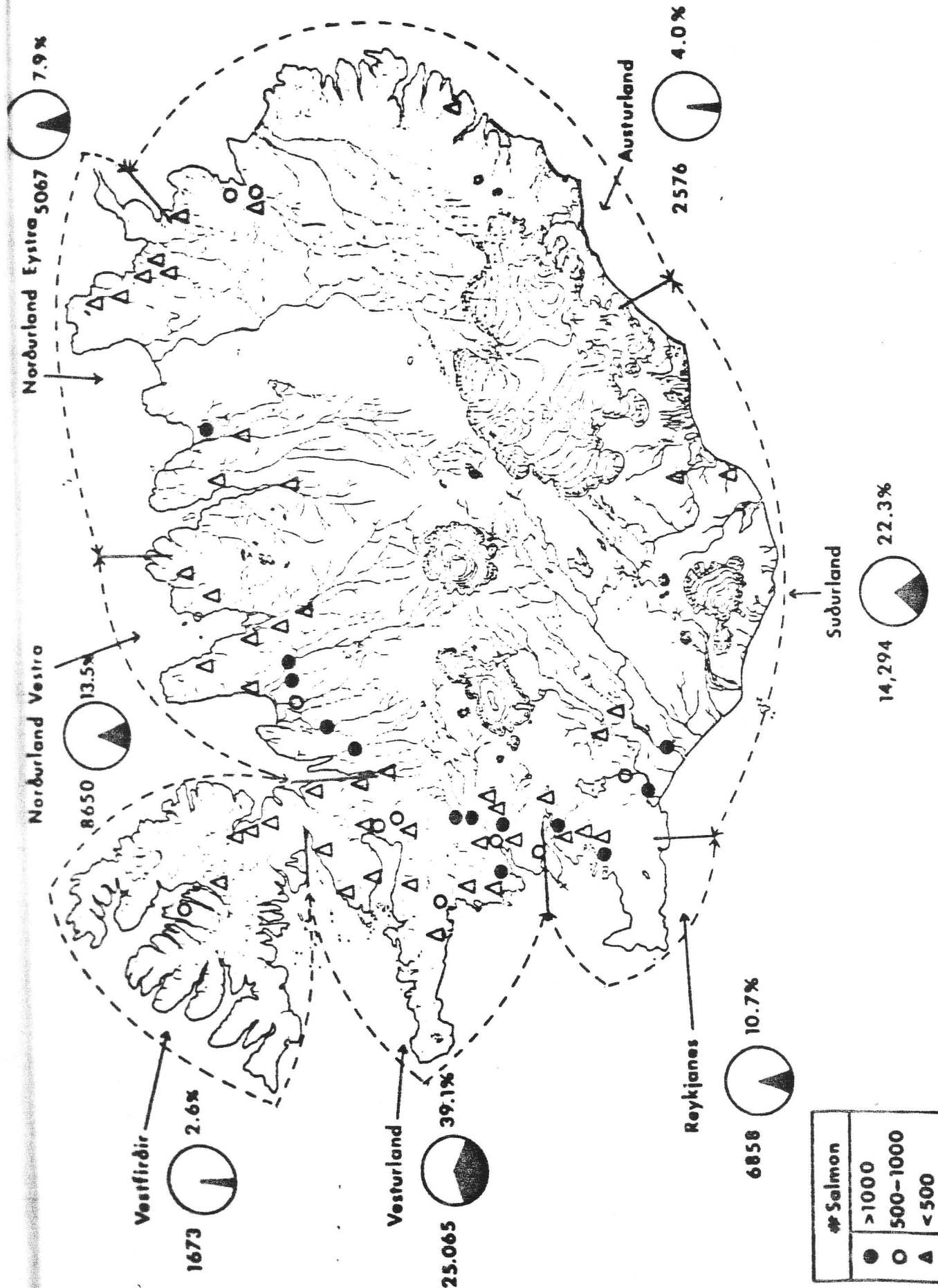


Fig. 3 Distribution of salmon producing streams in Iceland and the average catch 1971-1980 summarized for each of the seven districts.

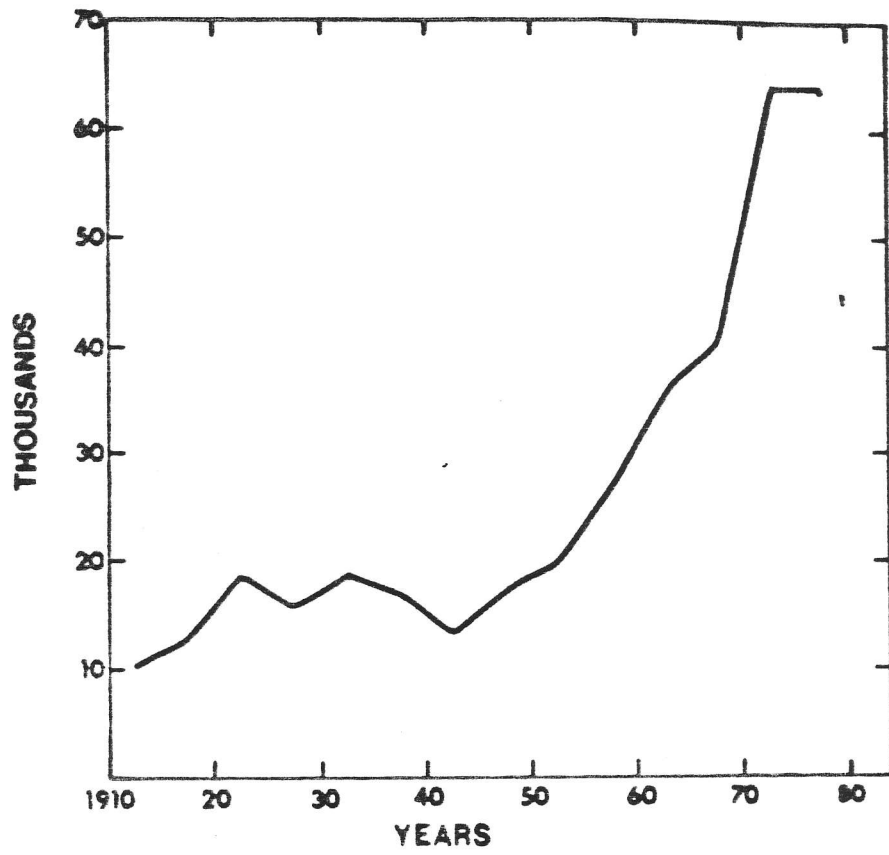


Fig. 4 Number of Atlantic salmon caught in Iceland from 1910-1950 plotted by average catches for five-year periods.

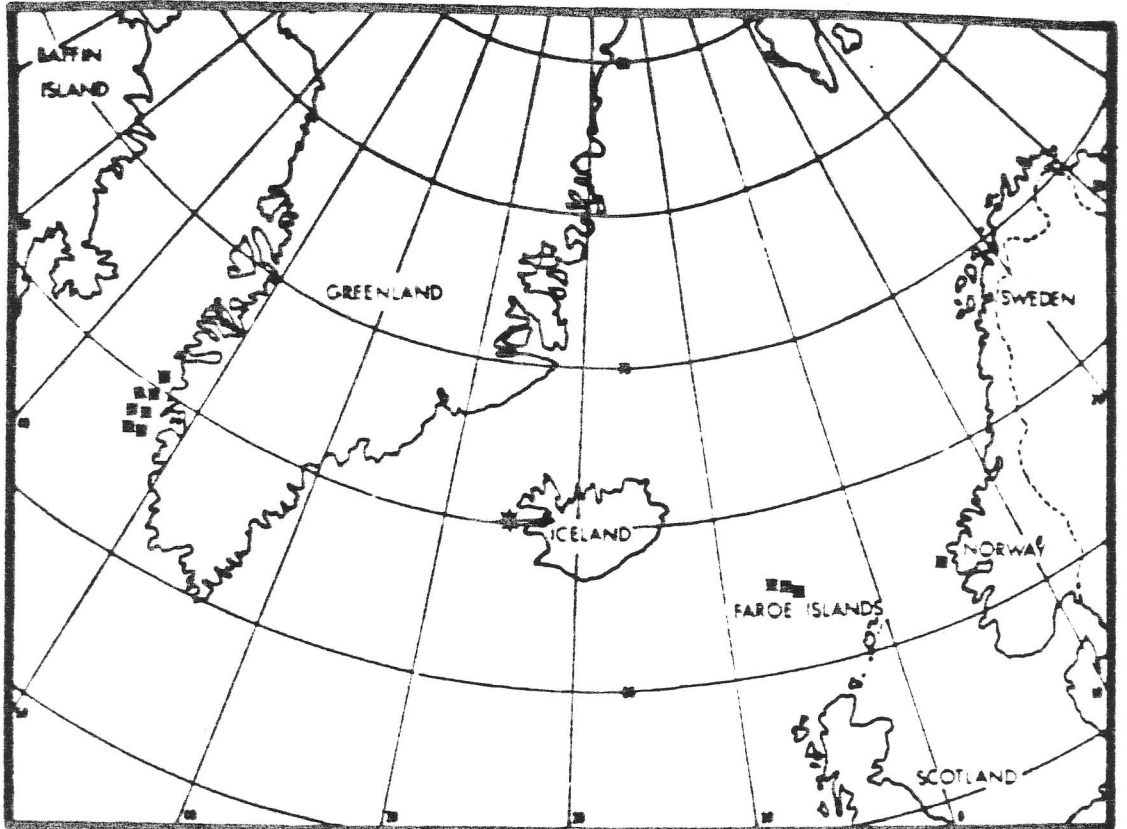


Fig. 5 Recoveries abroad of Atlantic salmon tagged and released as smolts in Iceland, and recovery of a salmon tagged at West Greenland and caught in Iceland.

TABLE 1.  
Elfdalir: Rate of exploitation, 1935-1976

Year	Total run	Total rod catch	Exploitation rate	
			Total	Above trap
1935	4,403	1,844		
1936	2,205	1,020	.42	.31
1937	830	485	.46	.40
1938	1,189	486	.38	.48
1939	2,278	1,033	.41	.30
1940			.45	.41
1941	1,740	818	.47	.34
1942	2,184	898	.41	.37
1943	3,682	1,116	.30	.26
1944	4,162	1,599	.38	.30
1945	2,259	1,022	.45	.30
1946	2,155	729	.34	.26
1947	3,059	922	.30	.22
1948	5,978	1,643	.27	.16
1949	5,764	1,759	.31	.18
1950	2,825	1,157	.41	.24
1951	2,042	960	.47	.28
1952	2,132	792	.37	.26
1953	3,792	1,511	.40	.30
1954	2,526	919	.36	.26
1955	2,794	1,265	.45	.25
1956	4,118	1,755	.43	.25
1957	2,911	929	.32	.17
1958	2,965	1,083	.37	.23
1959	3,057	958	.31	.21
1960	4,773	1,205	.25	.16
1961	4,815	1,258	.26	.16
1962	3,779	748	.20	.10
1963	3,126	856	.27	.19
1964	4,031	943	.23	.17
1965	4,526	1,077	.24	.21
1966	3,249	830	.26	.22
1967	4,274	1,292	.30	.27
1968	4,839	1,357	.28	.24
1969	3,024	1,648	.54	.45
1970	3,588	1,333	.37	.29
1971	2,187	1,022	.47	
1972	2,590	1,218	.47	.39
1973	4,627	1,733	.37	
1974	6,014	2,276	.38	.30
1975	7,100	2,035	.29	
1976	7,359	2,071	.28	
1976	3,499	1,692	.48	

From Mathisen Ole A. and Thór Gudjónsson, 1978.



Table 2. Counts of resistivity fish counter in the Grímsá, and rod catch of salmon.

Year	Counts	Corrected counts	Rod catch	Rod catch %	Escapement	% of corrected counts
1977	722	1753	1106	63.1	647	36.9
1978	1170	2300- 3000	1952	84.9- 65.1	348- 1048	15.1- 34.9
1979	2209	2209	1527	69.1	682	30.9
1980	811	1100	869	79.0	231	21.0
1981	1141	1141	845	74.1	296	25.9
1982	<u>770</u>	<u>866</u>	<u>717</u>	82.8	<u>149</u>	17.2
	6823	9369- 10069	7016		2353- 3053	
Averages						
1977-1982						
	1137	1562- 1678	1169		392- 509	

Table 3. Counts of a tube resistivity fish counter in the fish pass at the Laxfoss waterfall in the Nordurá and rod catch of salmon

Year	Counts	Rod catch above counter	Total rod catch in the river
1972	2993	782	2537
1973	3189	816	2377
1974	1418	537	1426
1975	3993	632	2132
1976	1858	613	1675
1977	1894	532	1470
1978	1075	692	2049
1980	3722	838	1583
1981	3096	497	1185
1982	3524	592	1455
	<u>26762</u>	<u>6531</u>	<u>17676</u>

**Table 4. Clean Salmon Tagged in the Estuary of the River Ölfusá-Hvítá and Tag Returns.**

From Gudjónsson, 1977.

Year	Number of fish tagged	Tag returns		Total	Per cent	Remarks
		Ölfusá-Hvítá	Other places Number Place			
1960	48	15		15	31.2	
1961	71	12	1 Pverá in Borgarf.	13	18.3	
1962	44	16		16	36.4	
1963	92	30		30	32.6	
1964	44	13		13	29.6	
1965	42	16		16	38.1	
1966	59	23	1 Norðurá in Borgarf.	24	40.7	
1967	249	95*	1 Tag found in Straumf. at Mýrar Hvítá in Borgarf.	97	39.0	* 6 caught 1968 and 1 1969
1968	25	12		12	48.0	
1969	53	26		26	49.1	
1970	163	56*	1 Pverá in Borgarf.	57	35.0	* 1 caught 1971
1971	18	7		7	39.0	
1972	16	6*	1 Pjórsá, Urríðafoss	7	43.8	* 1 caught 1974
	924	327	6	333	36.0	
1965	146	8			5.5	

References

- Ágústsson, I. 1973-1983. Laxatalningar í Laxfossi. Nordurá 1972-1982. Manuscripts, n.p. Reykjavík.
- Antonsson, Th. 1982. Rannsóknir á fiskistofnum Blöndu 1982. Manuscript, 32 pp. Reykjavík.
- Eythórsson, J. and H. Sigtryggsson. 1971. The climate and weather of Iceland. The Zoology of Iceland. 1(3). 62 pp.
- Gudjónsson, Th. 1977. Recaptures of Atlantic salmon tagged at the estuary of the river Ölfusá-Hvítá, Iceland. ICES, C.M. M:40, 6 pp.
- Gudjónsson, Th. 1978. The Atlantic salmon in Iceland. In O.A. Mathisen, ed. Salmon and trout in Iceland. J. Agric. Res., Iceland 10(2): 11-39.
- Gudjónsson, Th. and D. Mills. 1982. Salmon in Iceland. The Atlantic Salmon Trust, Farnham, England. 22 pp.
- Hermann, F., and H. Thomsen. 1946. Drift-bottle experiments in the northern North Atlantic. Medd. for Komm. for Havundersögelse. Hydrografi 3,4.
- Mathisen, O.A. and Th. Gudjónsson, 1978. Salmon management and ocean ranching in Iceland. In O.A. Mathisen, ed. Salmon and trout in Iceland. J. Agric. Res., Iceland. 10(2): 156-174.
- Mundy, P.R., M. Alexandersdóttir, and G. Eiríksdóttir. 1978. Spawner-recruit relationship in Ellidaár. In O.A. Mathisen, ed. Salmon and trout in Iceland. J. Agric. Res., Iceland. 10(2): 47-56.
- Kristinsson, B. 1979-1983. Laxateljari í Grímsá 1978-1982. Manuscripts, n.p. Reykjavík.
- Kristinsson, B. and M. Alexandersdóttir. 1978. Design and calibration of a salmon counter. In O.A. Mathisen, ed. Salmon and trout in Iceland. J. Agric. Res., Iceland. 10(2): 40-46.
- Stefánsson, U. 1962. North Icelandic waters. Rit Fiskideildar, Vol. 3. 269 pp. Mar. Res. Inst., Reykjavík.
- Thorsteinsson, Th. 1979. Slepping og endurveidi laxa í Grímsá sumarid 1978. Veldimadurinn. No. 101: 10-11.