

SALMON FISHING IN ICELAND

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BY THÓR GUDJÓNSSON*

Introduction

Iceland is an island in the North Atlantic northwest of Scotland. The shortest distance between the two countries is 440 nautical miles. Iceland covers an area of 103,000 km² and is thus about one fourth larger than Scotland. It is a mountainous country with lowland areas in the southern and western parts extending inland from fjords. Lowlands are also found along the shores. The climate is an island climate with cool summers and comparatively mild winters.

Rivers

There are about 250 rivers and streams in Iceland and Atlantic salmon occur in 80 of them. The rivers are classified into three main groups, direct run-off-rivers, spring-fed rivers and glacial rivers which are muddy in the summer. Most of the rivers are short, less than 50 km in length. The longer rivers are most often of glacier origin with clear water tributaries joining the main stem in the lower reaches. Salmon ascend many of the small

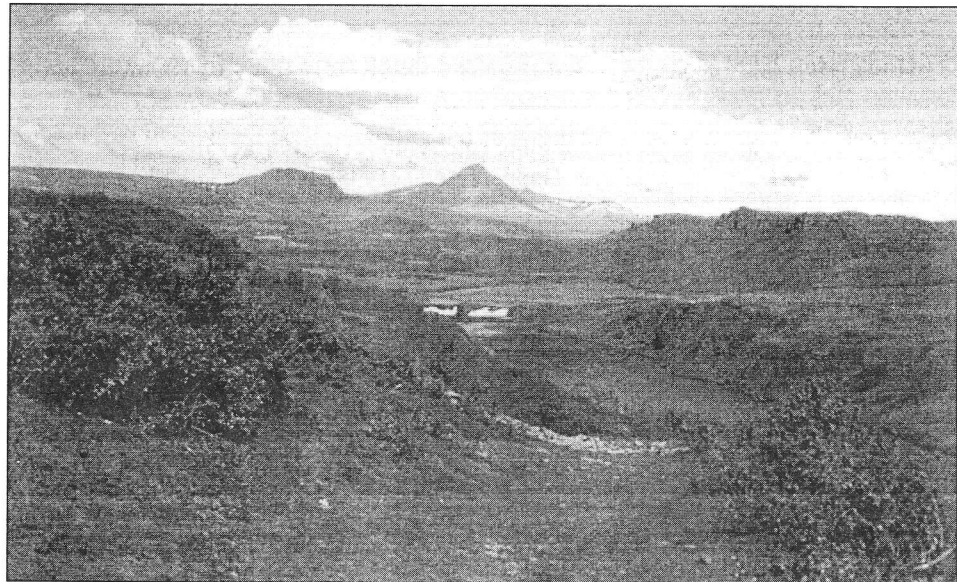


Plate 1. A stretch of the productive River Nordura with a glimpse of the waterfall Laxfoss and the surroundings. (*Photo by Thór Gudjónsson*).

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rivers and the lower stretches of glacier rivers and their tributaries. Most salmon rivers are found in the western-half of the country and the most productive are located in the southern and western parts (Figure 1).

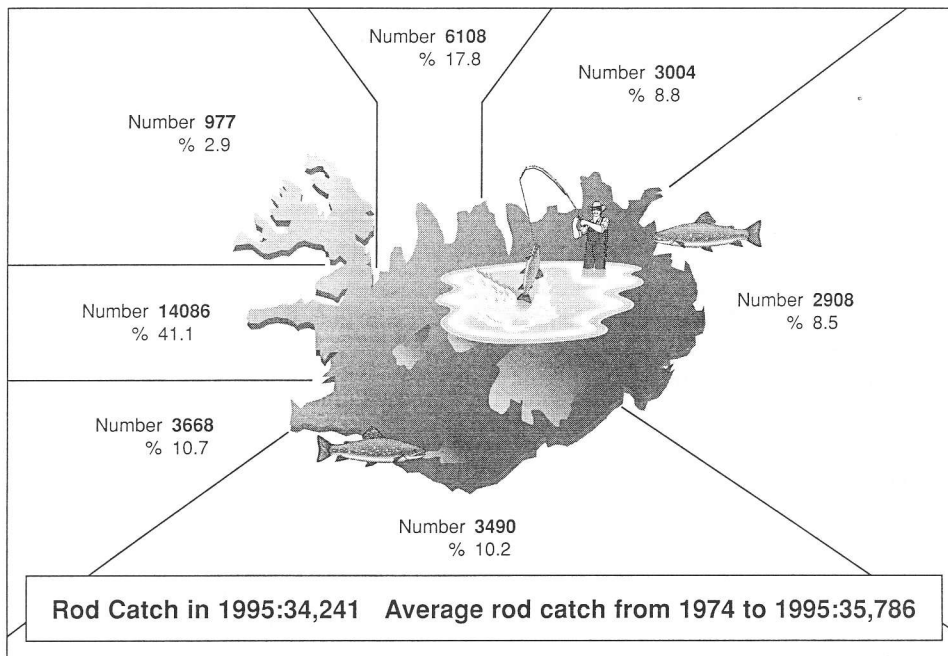


Figure 1. Salmon angling catches in Iceland in 1995.
Source: Gudbergsson (1996).

The Salmon

The Atlantic salmon in Iceland stay from 2 to 5 years, most often 3 or 4 years, in fresh water, followed by 1 or 2 years in the sea. A few remain for 3 years or more in salt water. The one sea-winter fish, the grilse, weigh from 1.5 to 3.5 kg, the two sea-winter fish 4 to 6 kg and the three or more sea-winter fish more than 6 kg. The largest salmon caught in the rivers weigh almost 20 kg. Between 1987 and 1995, the annual rod catch for the whole of the country contained on average 70.8% grilse and 29.2% salmon. From 1974 to 1995, the annual salmon catch by rod and by net averaged 51,400 fish.

Icelandic salmon migrate long distances in the sea. A few salmon tagged as smolts have been caught off West and East Greenland and in the Faroe area. In addition, single fish have been caught off west Norway, in the Northumbrian fishery and in 1995 in the River Don. Three salmon tagged abroad have been recaptured in Iceland. One of those, possibly originating in a river in northern Russia, was caught in 1972 in the River Svarta, a tributary of the River Blanda in north Iceland, another, tagged off West Greenland in 1972 was caught the following year in the River Laxa in Dolum in west Iceland, and the remaining one which was caught in 1992 at the Ranching Station at Vogar, southwest Iceland, had been released in 1991 into the River Screebe, Ireland.

Native species of fish other than salmon which spend part of their life in fresh water in Iceland are brown trout and arctic char, both sea-run and landlocked, the European eel and the three-spined stickleback. Rainbow trout have been introduced into the country and pink salmon have occasionally strayed to Iceland and entered some rivers.

Salmon Fishing Rules

The rules for salmon fishing are stated in the 1970 Salmon, Trout and Char Fishing Act with some additions and amendments from 1994. One of its most important statements is that the fishing rights belong to the owners of the land adjoining the rivers and the lakes and they cannot be separated from the river banks or the lake shores. Another very significant clause in the Act is that salmon fishing in the sea is prohibited with a few exceptions allowing the use of coastal gill nets. Until 1994, when it was extended to three and a half months within the period from May 20 to September 30, the annual fishing season lasted three months. Rod and line fishing is permitted 12 hours each day seven days a week, but not between 0300-0700 hours. Netting is permitted for 84 hours each week, from 1000 hours on Tuesday to 2200 hours on Friday. Fixed engines are not permitted to extend out from river banks further than one third of the width of the river and not further than one fourth of the width of an estuary. The minimal distance between fixed engines along a river whether located on the same or opposite bank shall be at least 100m. The minimum mesh size for salmon nets is 90 mm stretched mesh. The existing provision in the Act for determining the maximum number of rods fishing simultaneously in a river or in a lake has applied since 1958. For most rivers in the country it is by rule of thumb on the basis of a catch of one salmon, on average, for each allowed fishing day, or in other words, a catch of about 100 salmon per rod per season. This rule has worked very well when checked against the catch statistics collected for a number of years. Angling on the salmon rivers carrying the largest runs may yield daily catches of more than one salmon on average. Studies in several rivers of the exploitation rates have shown that with few exceptions catches vary in the range from about 30 to 80% of the runs.

Fishing Methods

Today, salmon are either caught by rod and line or by gill net. Gill nets are either set from the river bank or fastened to the outer ends of man-made obstructions such as piers made of rocks (Plate 2) or, on sandy substrates, to fences constructed of poles (stakes or steel pipes) with coarse netting stretched between them (Plate 3). Nets fastened to piers are allowed to either swing with the current for their full length or are made to bend towards the bank by fastening the free end of the net to the same bank with a length of string. Gill nets are also used to form a pocket of netting by folding back a portion of the free end and tying it to the net proper top and bottom. A string is then tied to the inner section of net and fastened to the pier or fence to keep the pocket open. The sides of the pocket are kept apart by a horizontally placed stick fastened to either side. Leaders are attached to the apex of the pocket. A net of this type is called a "kroknet" in Icelandic, and is set in shallow water with little current. It was first introduced in 1857 and is only used in the glacial River Hvita in Borgarfjordur (Plate 4).

Between 1920 and 1950 stake-nets were sometimes used in the estuary of the River Olfusa. They consisted of stakes or steel pipes with wire netting stretched between them

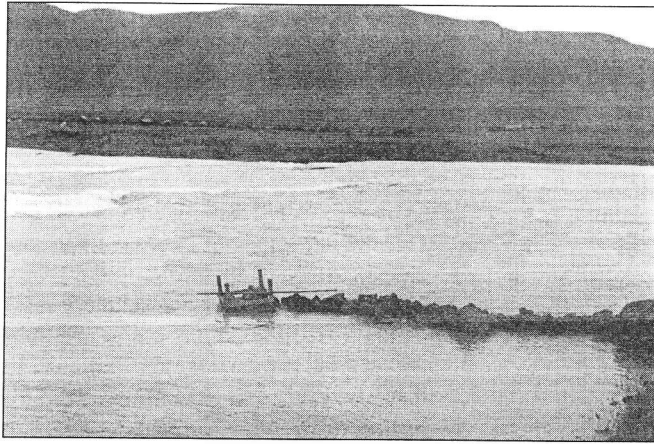


Plate 2. A pier for setting a gill net in the River Olfusa, South Iceland (Photo by Þór Gudjónsson).

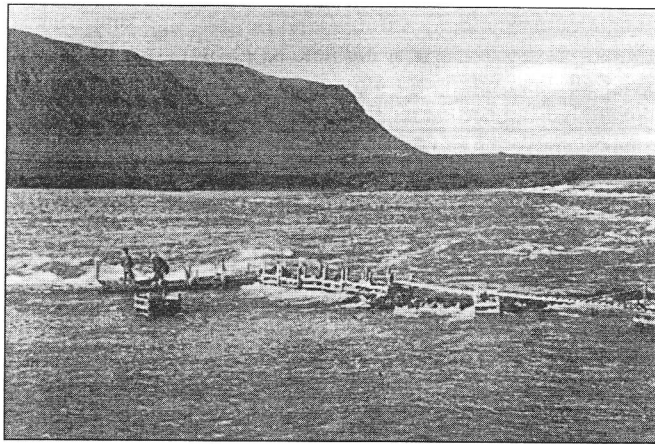


Plate 3. Another type of pier for setting a gill net in the River Olfusa, South Iceland (Photo by Þór Gudjónsson).

and traps and leaders set at intervals. Formerly, seines were also used and it is still permissible by law to grant dispensation for seining for special purposes, such as when legal gear cannot be applied successfully or when stock fish are required for hatcheries. In earlier times, seines were much used in smaller rivers and spears and gaffs in small streams and on rocky river-beds to catch any salmon retained in the water course. Fishing gear specifically designed to catch salmon in the glacial rivers did not come into general use until about the middle of the 19th Century. For some time earlier in that century bag nets were used at two locations on the coast. It is now illegal to operate this type of net (Figure 2).

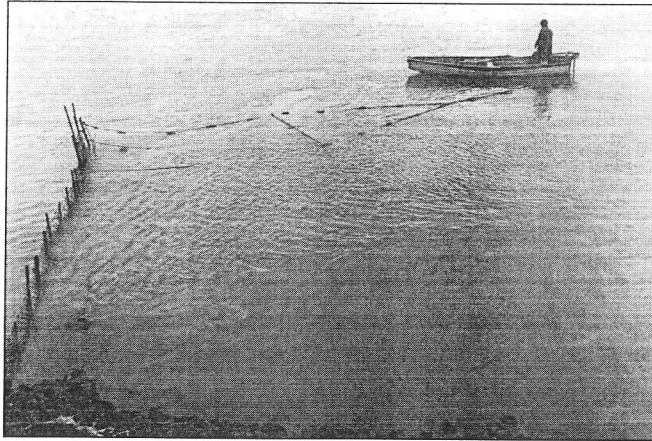


Plate 4. A type of gill net, called “Kroknet”, in the River Hvita in Borgarfjordur, West Iceland (*Photo by Thór Gudjónsson*).

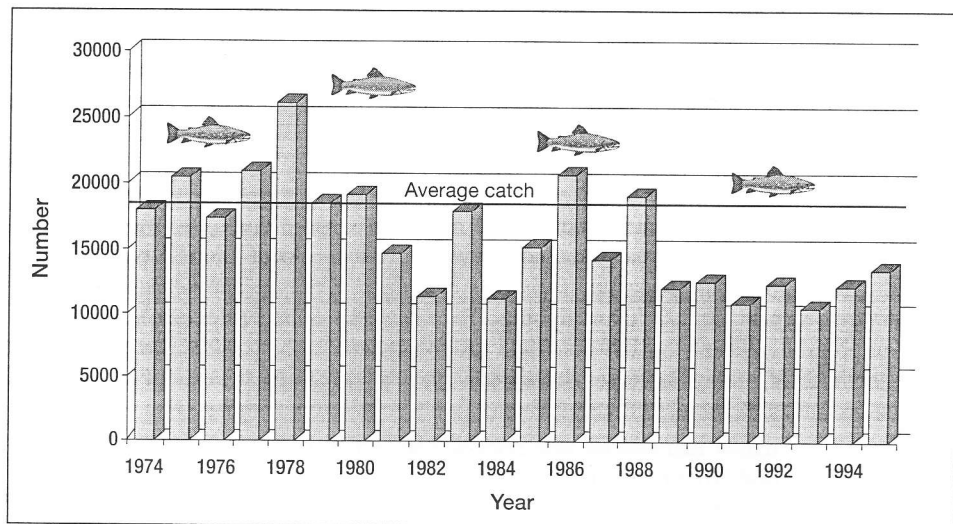


Figure 2. Total number of salmon in net fishery in Iceland 1974-1995.
Source: Gudbergsson (1996).

In Icelandic rivers, fishing with rod and line began in the 19th Century. Some of the English and Scottish tourists visiting Iceland brought rods with them and fished in the rivers. A tourist named Mr John Barrows Jr., for instance, describes in his book, “Visit to Iceland” published in 1835, the angling attempts made by his fellow visitors on the River Ellidaar near Reykjavik in 1834. Icelanders have learned from the visitors how to fish with rod and line.

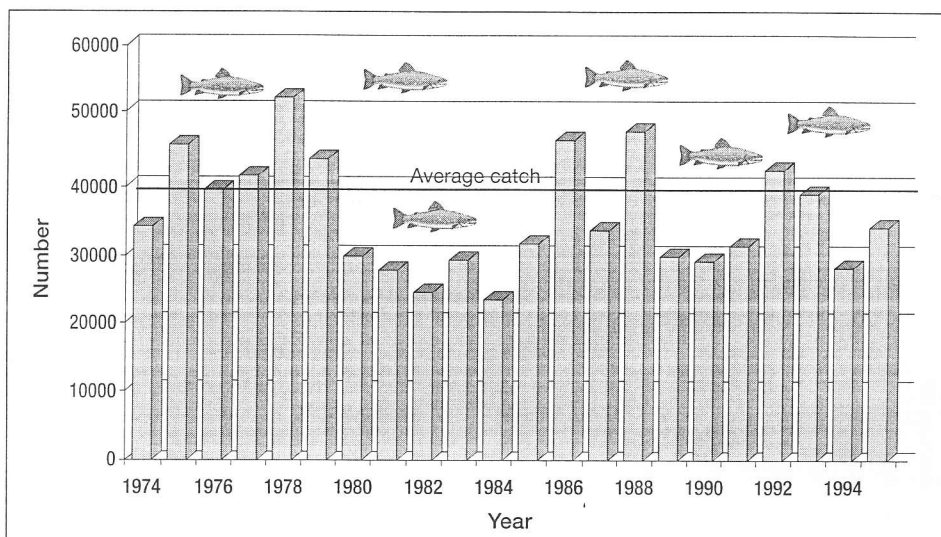


Figure 3. Total number of salmon in rod fishery in Iceland 1974-1995.
Source: Gudbergsson (1996).

In the latter half of the 19th century some of the visitors leased the angling rights for several years at a time on parts or on whole rivers. One angler, Mr H A Payne from England, bought fishing rights in the River Ellidaar in 1890 and fished there until 1906 when he sold them to the town of Reykjavik.

Following the improvement in rod catches after 1946, more emphasis was placed on collecting catch records. These were no longer sent to the local sheriffs but delivered instead to the Director of Freshwater Fisheries. In 1971 to 1980, the annual catch gradually rose to peak around 60,000 fish weighing 233 tonnes (t). Due to adverse climatic and hydrographical conditions in 1979 and 1983 and to a lesser extent in 1981, catches dropped from 1981 to 1985. Other decreases occurred in 1989 and in the 1990's except in 1992. The average annual catch from 1981 to 1995 was about 47,000 fish (Figure 3).

In 1981 to 1995, the annual average catch of ranched salmon was 60,000 fish which brought the total average annual harvest of salmon for the whole country up to 107,800 fish. The largest harvest of ranched salmon was 168,400 fish in 1993 weighing 496 t. In that year, the catches of wild salmon amounted to only 22.6% of the total harvest. Because of low market prices for salmon coupled with poor returns of salmon to the release sites during the last few years, salmon ranching activities are being significantly reduced (Figure 4).

Value Of The Salmon Fishery

Information describing the total value of the salmon fishery is not available. It has been estimated that the average rental value of a rod-caught salmon to the riparian owners is about £150. Therefore, based on an average yearly take of 36,000 salmon, the annual rented value of the rod fishery in 1974-1995 was £5.4M. Salmon anglers expenditure on

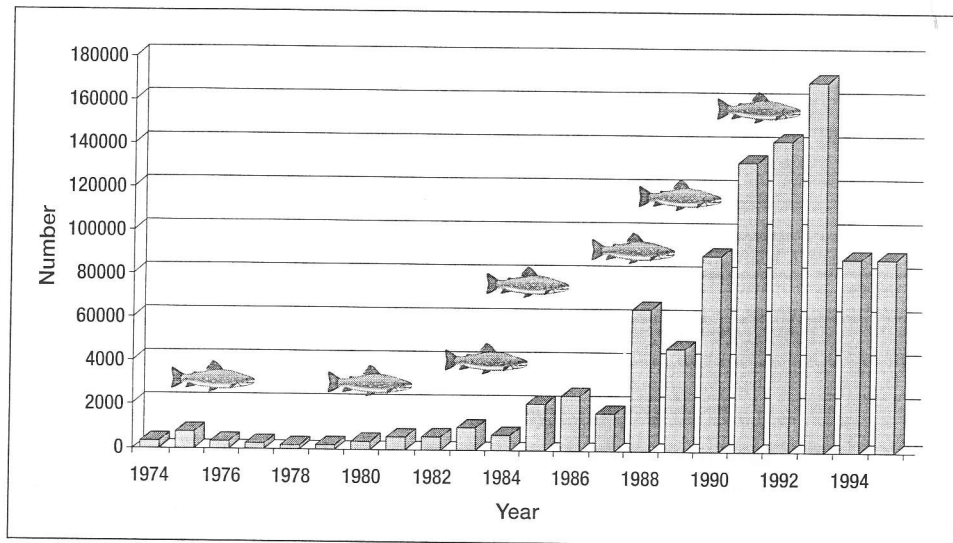


Figure 4. Total number of salmon in ocean ranching in Iceland 1974-1995.
Source: Gudbergsson (1996).

travel, goods and services has not been estimated in detail but informed guesses suggest that it could be three or four times the amount paid for fishing licences. In 1995, the gross value of net caught salmon was £942,000 and the market value of the salmon reared in land-based stations and in sea-cages was £845,000.

Administration

All freshwater fisheries including the salmon fishery come under the Ministry of Agriculture. The Director of Freshwater Fisheries administers these fisheries on a daily basis, advises on matters relating to the fisheries, supervises enhancement programmes and collects statistics. He is also head of the Institute of Freshwater Fisheries, which is responsible for the research on salmon and freshwater fish and their environment. Two consultative groups also function. One is the Committee for Freshwater Fisheries, (Veidimalanefnd), which advises the Ministry on some administrative matters and the other is the Council for Fish Diseases, (Fisksjukdomanefnd), which is concerned as the name implies with matters related to disease.

Local Management

As mentioned previously, fishing rights are privately owned and go with the land adjoining the water in question. The fishable sections of rivers are usually in agricultural areas, where the land is most often owned by farmers. In the 1970 Salmon, Trout and Char Act, it is decreed that proprietors of fishing rights in each river or river system and on each lake or lake-group shall form fishing Associations in order to manage the fisheries and carry out enhancement programmes. There are now 170 fishing Associations in the country and most of them function effectively. The proprietors decide at each annual general meeting (AGM) which legal fishing method will be used on the waters under their jurisdiction. At these meetings each member has one vote. Most proprietors choose rod

fishing because it provides the highest income. They allocate fishing to members, or more frequently, lease fishing to anglers or angling clubs and they undertake enhancement projects including the building of fish passes, habitat improvements and the release of fry, parr and/or smolts. Many of the Associations have built and operate lodges or cabins for anglers and some have improved access to fishing sites by building roads. A few hold shares in salmon hatcheries. The larger owners hire bailiffs to guard their rivers.

The net profit from the lease of the fisheries is divided between the members of an Association according to the number of their allotted shares. These are based on the estimated value of their fishery. The proprietors of the net fisheries keep the income from their catches, but they have to pay an annual subscription to their fishing Associations based on their average catch over several years.

Government Programme

The first comprehensive Act covering all the important aspects of salmon and trout fisheries in Iceland and the related subjects was passed in 1932. An older Act, dated from 1886, mainly contained measures restricting gill netting and seining in the rivers in addition to banning the use of spears and hooks. In compliance with the 1932 Act, a Director of Freshwater Fisheries was appointed in 1946. Coinciding with his appointment, enhancement enterprises including fish culture and habitat improvement projects expanded. At that time only a few hatcheries producing fry for release into rivers and lakes were in operation. After the Government set up the Experimental Fish Farm at Kollafjordur in 1961, the rearing of salmon to the smolt stage began and the groundwork was laid for the ocean-ranching of salmon. Stations were built mainly for the rearing of salmon at various sites dispersed through the inhabited areas of the country. A few were started during the 1960s and 1970s, but in the late 1980s the building of fish culture stations suddenly increased. In 1983 there were about 40 hatcheries and/or rearing stations and sea-ranching stations in operation. This number had increased to 125 by 1988 but by 1995 it had fallen to 70. In the main, this reduction was due to inadequate experience, faulty planning, and high investment. The latter resulted in financial difficulties and, for some, bankruptcy. An important factor which caused difficulties for the fish culture industry was the drop in the market price of reared salmon soon after the big expansion had commenced. Although the main objective of the fish culture stations was to produce fry, parr and smolts to enhance native stocks and to supply sea-ranching stations with salmon smolts, a relatively small number reared mostly salmon to marketable size either in land-based sea water tanks or by cage-rearing in the sea.

The main thrust of the habitat improvement work was aimed at the immigration of fish towards their preferred spawning sites by making channels through shallow stretches in rivers, blasting minor obstacles and installing fish passes at impassable waterfalls. During the last 40 years about 50 fish passes have been built giving access to about 500 km of river for spawning, the production of juveniles and angling. Stream improvements have included the construction of holding pools by building dams and deflectors, or by placing big rocks into the river bed to alter the water velocity. River-flow has also been regulated for the benefit of the anadromous fish.

Benefits To The Salmon Fishery From Enhancement Activities

During the last thirty years, in particular, stocking Icelandic rivers with salmon fry, parr and smolts has been extensive. The benefits of this strategy to salmon fisheries are difficult to evaluate excepting the releases of tagged smolts and their subsequent recapture as adults mainly by the rod fisheries. On the other hand, the percentage of the smolts released returning to sea-ranching stations as adults is well known. Recapture rates of 1-2% have frequently been obtained. However, in order to be economically viable a minimum recapture rate of 1.5% by the rod and line fishery is required.

A success story which can be told, however, concerns the release of salmon smolts in the River Ranga in south Iceland. This river has a predominantly sandy bottom, is spring fed and the water temperature in summer rarely exceeds 10°C. Prior to the annual release of smolts from ponds sited along the river bank by a group of anglers, the rod catch varied from 10 to 100 salmon per annum. Following the release of smolts, the annual salmon rod catch in 1990-1995 has varied from 453 to 1622 fish and in three of these years it has exceeded 1500 fish. In 1990, a total of 1,622 fish was caught which was the record catch for any salmon river in the country. The mean recapture rate of the liberated smolts as adults by angling was 1.4%.

Stream improvements such as the building of fish passes should also be beneficial to the salmon fishery by increasing juvenile salmon production. No assessments have so far been made.

Acknowledgements

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