ANADROMOUS AND CATADROMOUS FISH COMMITTEE

Report of activities

Iceland

(Árni Ísaksson)

1986

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Report of Activities

ANADROMOUS AND CATADROMOUS FISH COMMITTEE

Addendum to

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Iceland

(Árni Ísaksson)

ATLANTIC SALMON (Salmo salar)

The salmon fishery

The total catch of salmon in 1985 was just over 66000 salmon or 220 tons. The average weight was 3.3 kg which is just below average. Approximately 50% of the salmon were caught by rod,20% in gill nets in the larger glacial streams and 30% returned to ranching stations.

There was a clear upward trend from previous 4 years with a 60% increase from the 1984 catch. This could be predicted from an increased juvenile production in the 1980 year class in most streams compared to the 1979 recruitment.

A total of 20.000 salmon returned to the salmon ranching stations,with over 90% returning to the four largest stations located in southwestern Iceland.

Investigations

1.Tagging and marking

A total of 77.000 salmon smolts were microtagged in Iceland in 1985(table 1).Most of these were of hatchery origin(96%),but wild smolts were tagged in Elliðaár and Bugða in western Iceland as well as in Vesturdalsá in north-eastern part of the country.Just over 44% of the total were released in southwestern Iceland,about 40% in the northern part and the remainder in the north-east.This distribution should give representative sample of microtagged salmon among the natural

stocks migrating to various areas in the north Atlantic.

Microtags have entirely replaced external tags in smolt tagging projects in Iceland. Their use for over ten years has shown that the return rates are comparable with those of untagged smolts and tag loss is minimal(1-2%).Reporting rates are still poor among sport fishermen,who fail to recognize a missing adipose fin,the only external sign of tagging.Strays are thus underestimated.

Return-rates of grilse to salmon ranching stations in 1985 ranged from 5 to 9%. This was a considerable increase from the previous year which was a very poor grilse year. Greater variation between years in stations located in inshore areas seems to indicate that early feeding of smolts in the sea might have been exceptionally poor in those areas in 1983 compared with 1984.

2.Salmon enhancement

Releases of microtagged smolts into salmon streams for enhancement purposes have been performed in several streams in Iceland(table 1). Returns in 1985 did not seem to be viable in economic terms,but it should be borne in mind that return rates are both affected by the magnitude of untagged salmon entering the stream and the reporting rate from the fishermen,which has been shown to be poor. Return rates,however,were up from the 1984 season.

Considerable quantities of fed and unfed fry are released into nursing areas above unpassable waterfalls in the salmon streams each year. These are monitored by electrofishing in the late summer for several years,in order to estimate the smolt production potential. Scales are collected,when these fish are supposed to return,which may be 4-6 years later.The analysis of the scales is based on the knowledge that the hatchery fry have a head-start in early feeding up to 4-5 months and thus have a different scale pattern close to the nucleus than the natural fry. In 1985 there was evidence that the releases of fed fry had stabelized the salmon runs in several north coast streams.

3.Juvenile studies

Each year studies of salmon juveniles are conducted in many rivers with electro-fishing. These studies reveal the density and the growth of the juveniles and also the relative strength of each year-class.

If a weak year-class is detected in time, stocking of fry can be used to prevent failures in fisheries. In recent years fry of the native salmon stock of each river have in most cases been used for such stocking.

Juvenile studies give also a rough estimate of the size of the smolt-run one or more years later. Such estimates along with measurements of spring ocean conditions (ocean temperature, upwelling, etc, when the smolts are entering the sea) give a fairly good ground to predict the grilse run the year after. The grilse-salmon ratio is fairly constant for each river system, so the size of the salmon run can be predicted from the size of the grilse run the year before.

Juvenile studies are, therefore, important tool for salmon fisheries management in Iceland.

4.Migratory pattern

Iceland has cooperated with other ICES countries on a research project concentrating on retrieval of tags from high seas fisheries for salmon,especially around the Faroes.This project has indicated that salmon from northern and eastern Iceland are more abundant in this fishery than salmon from southern and western Iceland (ICES working paper 1985).A research cruise of the Icelandic Marine Institute into some east Greenland fjords demonstrated a considerable quantity of salmon,both of European and Icelandic origin,primarily from Icelands north and east coasts(ICES M: 25 1986).

5.Stock assessment

The fish stocks of River Blanda a large glacial river system in North Iceland, have now been studied for 5 years. The size of the adult run of salmon and sea-run arctic char has

been measured every year throgh a fish trap where fish entering the river are tagged measured and the sex determined.

Salmon entering the largest tributary river are also counted. Catch statistics are held each year and juvenile and scale studies made. This gives a good opportunity to study the spawner-recruit relationship as well as the effect of climatic and oceanic conditions on the adult run.

6. Lake rearing of juveniles.

The importance of lakes as rearing habitat for juvenile Atlantic salmon has been studied for some time. Juvenile salmon have a widespread distribution in the shallow littoral areas of L. Medalfellsvatn and have been found to spend most of their life cycle in the lake environment. Smolts migrating from the lake are highly influenced by both water flow and temperature. In 1985 due to low water level, large number of smolts stayed on in the lake and did not migrate, possibly lacking a stimulus to migrate. This difference in time spent in the lake resulted in more than 2 cm increase in mean length of smolts the year after.

7. River classification and life history of salmon stocks

A project with an aim to classify Icelandic rivers into ecological classes in order to understand the life history strategies of Icelandic salmon stocks in relation to their habitat was initiated in 1984 and was continued in 1985.

8.Rearing and ranching

The number of registered salmon- and trout farming sites in 1985 has increased from 47 to 70 since 1984. Most new sites aim at smolt production.

The production in 1985 did not increase markedly from previous year as most new producers will have their first marketable product in 1986-1987. The major statistics for Icelandic salmon and trout farms in 1985 are:

Type of production	no. sites in 1985	increase from 1984	production in 1985
Salmon			
Smolt production	36	16 (80%)	821.700 smolts
On-growning of salmon	18	18 (0%)	91.1 tonnes
Ocean ranching	10	10 (0%)	24.0 tonnes
Trout and Char			
Smolt production	2		474.800 smolts
On-growning of trout	3		14.8 tonnes *

* Primarily rainbow trout (Salmo gairdneri) which were introduced to Iceland in the 1950's.

9.Fish diseases

Infectious diseases have not yet been reported from wild salmon populations but continue to be a nuisance in Icelandic rearing stations,in particular after the smolt stage.In 1985 there were two serious outbreaks of BKD(Renibacterium salmoninarum)in land-based operations using temperate brackish water. Both these incidences could be traced to smolts from Kollafjörður Experimental Fish Farm.Inspection of brood fish at Kollafjörður revealed visible signs of the disease in a few fish after stripping but presmolts turned out to be low-level healthy carriers of the disease.Icelandic authorities ordered total liquidation of the 1985 year-class but allowed a release of the 1984 year-class for sea ranching.BKD is considered a major threat in fish farming operations since outbreaks can not be prevented by conventional egg-disinfection techniques and the bacterium can not be properly eradicated with antibiotics.

A mild variety of furunculosis(Aromonas salmonicida acromogens) is fairly common in Icelandic salmon farms.Several outbreaks occurred in 1985 but all could be contained using antibiotics.

Viral diseases have not been observed in Iceland in spite

of routine checks of brood fish in fish farms.

Other species

The Institute of Freshwater Fisheries has carried out considerable research on sea-run and stationary varieties of brown trout(Salmo trutta) and char(Salvelinus alpinus) in Icelandic streams and lakes.Eel(Anguilla anguilla)are fairly abundant,especially in southern Iceland.They have a slow growth rate in Icelandic freshwater and have not supported a sizable fishery.The only remaining freshwater species,the three-spine stickleback(Gasterosteus aculeatus)is of no commercial importance.

The fishery

Sea-run brown trout are a fairly important angling species in southern Iceland but resident brown trout are caught on rod in upper-Laxá,a run-off from Lake Mývatn in north-eastern Iceland and Veiðivötn,a complex of lakes in southern Iceland,as well as in many other small lakes.Sea-run char are a favorite sports fish in many north coast streams but resident lake stocks support a sports and commercial fishery in all parts of Iceland,although most successful in the vicinity of the larger markets in south-western Iceland.There was a relative increase in commercial char fishing operations in 1985 as well as marketing efforts.

Investigations

Very few long term research projects have been set up to study trout populations.Most of the studies are short term,providing information for immediate exploitation of the fish by sport or commercial gear.The following long-term projects have,however,been initiated:

1. The River Blanda project.

A study of the life history and general ecology of a sea

run arctic char is now under way in the river Blanda system in North Iceland.

2. The Lake Mývatn project

The study on the Lake Mývatn is focused on the possible effects of mining operation on fish populations in the lake, both in relation to biotic and abiotic factors. The bottom sediments of the lake are currently being mined for the production of diatomite. The mining operation in the N-basin of the lake is slowly changing the morphological characteristics of this basin and about 25% of the botton area has been stripped of sediments. This study is a part of a bigger project that is focused on the effects of the mining operation on benthos in the lake.

3. The Lakes Veidivötn project

The Lakes Veidivötn are situated in the volcanic area of central Iceland. These lakes were one of the few exception of trout lakes in Iceland that were not occupied by arctic char. After artic char were released into lakes further south of L. Veidivötn, the char has spread into the lakes. Presently, arctic charr is found in most of the lakes. The aim of the present project is to give account of the population dynamics of brown trout in the lakes, especially in connection with increasing population size of arctic char.

4. Lake Thorisvatn project.

This study deals with the effects of regulation upon the brown trout population found in the lake. Fluctuations in water level are expected to cause serious trouble for spawning and since 1973 the natural population of the lake has decreased drastically. Since 1982 juvenile trout has been released into L. Thórisvatn.

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1985 ANACAT Finclip/Microtag Report

Species Salmon

Country	Stock	Age	Stage	Finclips Number	Microtags Number	Microtags Codes used	Aux finclips	Release date	Place of release	Migration area suspected	Comments
Iceland	Blanda	1	Smolt		2511	14-1-6	adipose	June	Blanda		Hatchery stock
"	"	1	"		2513	9-13-2	"	"	Svartá		"
"	Miðfjarðará	1	"		2514	15-15-4	"	"	Miðfjarðará		"
"	"	1	"		2607	4-1-8	"	"	"		"
"	Bugða	1	"		1908	1-13-10	"	"	Bugða		"
"	Vatnsdalsá	1	"		5017	1-15-13	"	"	Vatnsdalsá		"
"	Víðidalsá	1	"		2011	3-63-33	"	"	Vesturdalsá		"
"	"	1	"		1005	2-63-39	"	"	Hofsá í Vopn.		"
"	"	1	"		1003	2-63-40	"	"	Selá í Vopn.		"
"	Fljótaá	1	"		3462	13-1-5	"	"	Fljótaá		"
"	Laxá á Ásum	1	"		1147	2-63-37	"	"	Reykjarhóll		Fljótalax, Hatchery stock
"	"	1	"		1291	2-63-35	"	"	Flókadalsá		Hatchery stock
"	Elliðaár	1	"		1741	2-63-38	"	"	Lárós		"
TOTAL					28730						

1985 ANACAT Finclip/Microtag Report

Species Salmon

Country	Stock	Age	Stage	Finclips Number	Microtags Number	Microtags Codes used	Aux finclips	Release date	Place of release	Migration area suspected	Comments
Iceland	Dalsá	1	Smolt		1837	2-63-33	apipose	June	Vogar		Hatchery stock
"	"	1	"		541	2-63-24	"	"	"		"
"	Litla-Laxá	1	"		823	2-63-23	"	"	"		"
"	"	1	"		471	2-63-26	"	"	"		"
"	Norðurá	2	"		1012	9-15-3	"	"	Langá		"
"	Haukadalsá	1	"		1002	2-63-29	"	"	"		"
"	Kollafjörður	1	"		2023	3-63-39	"	"	Kollafjörður		"
"	"	1	"		1048	2-63-22	"	"	"		"
"	"	1	"		1010	2-63-27	"	"	"		"
"	"	1	"		2012	3-63-38	"	"	"		"
"	"	1	"		2045	3-63-40	"	"	"		"
"	"	1	"		1067	2-63-44	"	"	"		"
"	"	1	"		1015	2-63-42	"	"	"		"
TOTAL					15906						

1985 ANACAT Finclip/Microtag Report

Species Salmon

Country	Stock	Age	Stage	Finclips Number	Microtags Number	Microtags Codes used	Microtags Aux finclips	Release date	Place of release	Migration area suspected	Comments
Iceland	Flókadalsá	1	Smolt		1435	2-63-34	adipose	June	Flókadalsá		Hatchery stock
"	Elliðaár	?	"		495	2-63-28	"	"	Elliðaár		Natural stock
"	"	?	"		237	8-15-13	"	"	"		"
"	"	?	"		108	8-15-11	"	"	Kaldakvísl		"
"	"	?	"		120	8-15-9	"	"	Kiðafellsá		"
"	"	?	"		110	8-15-15	"	"	Fróðá		"
"	Bugða	?	"		243	8-15-8	"	"	Kiðafellsá		"
"	Vesturdalsá	?	"		286	2-63-57	"	"	Bugða		"
"	"	?	"		556	2-63-49	"	25/6 85	Vesturdalsá		"
					443	2-63-48	"	"	"		"
											"
TOTAL					4035						