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The salmon stocks in Estonia: past present and future

by
Mart Kangur
Estonian Marine Institute
32 Lai Str. , EE 0001 Tallinn, Estonia

Abstract

In Estonia natural Baltic salmon stocks decreased severely during the second half of the 20th century. The salmon reproduction occurred in 11 rivers in 1930s and in 6-7 at present. Most of the recent salmon rivers discharge into the Gulf of Finland. Parr densities varied between 0.4-20.3 per 100 sq. m of rapids in 1990s and a current potential production of wild smolt is assumed to be 15,000 against 200,000 in the past. The smolt production was lost due to damming and/or industrial discharges. The river Narva salmon stock is reared, in other rivers mostly wild though some enhancement stockings were carried out starting from 1930s. The annual coastal and river catches of salmon (sea trout incl.) were up to 150 t in 1930s and only 10 t in 1995. To conserve stocks, besides of the international IBSFC rules of salmon fishery in the Baltic Sea, some national regulations are implemented e.g. all-year-round closed area of 1000 m radius at the outlets of the rivers carrying salmon. The fish-rearing activities have been also more intensive in last decade. Further status of the salmon stocks seems to be influenced by developments in M 74 syndrome, rearing and conservation measures.

Key words: conservation, fisheries, rearing, salmon, stocks.

Estonian Marine Institute, 32 Lai Str., EE 0001 Tallinn, Estonia [tel: + 3722 442212, fax:+ 372 6313004].

Introduction

Estonia is in transition period from earlier administrative planning economy to the market economy. Such transition embraces also the fisheries, salmon business included. Parallel to the fall in industrial and agricultural production a lot of attention is given to pollution control, which have a positive impact also on the salmonids rivers habitat. Many changes are done in legislation. In 1992 forced the fishing law, in 1996 the amended version. The national fisheries rules have been amended twice during last five years. Many attention is paid to fish rearing. General rules for financial support of stockings are established and construction of the governmental fish rearing station for cold water fishes was started. These developments are the reason for establishing the general guidelines for further national strategies to enhance the abundance of salmon. The aim of present paper is to revise the status of salmon in Estonia.

Status of salmon stocks

In Estonia 11 rivers contributed to salmon smolt production up to 1940s (Figure 1, Table 1).

The R. Purtse salmon stock was lost due to pollution of oil-shale industry. The rivers, bottom sediments included, is heavily polluted at present, and so some fishes (sticklebacks, gudgeon) can only be found near the river mouth. Restoration of salmon stock in river is unreal in nearest decades.

The R. Jägala is dammed 1.3 km from the river mouth and polluted by pulp and paper mill effluents. A parr were never observed there during electrofishing surveys from 1978 to 1994. In the same time small scale adult salmon run occurred, probably strays. It seems the extinction of salmon (and sea trout) stock is related to pollution. The dam used to have the fish ladder until the destruction of power plant in war time. Suitable for salmon spawning and nursery areas situates in the R. Jägala tributary R. Jõelähtme.

The R. Valgejõgi stock was lost in late 1970s and have been extinct since then. The salmon parr were last observed in 1976. The river was polluted severely by wastewaters from military installations and industry in 1970-1980s, but situation is probably somewhat improved at present. In the river sea trout stock does still exist and not pollution but poaching seems to be the main reason for salmon extinction here. About 30,000 salmon (Neva stock) parrs and smolts were released in lower reaches in 1996.

The R. Narva is transboundary watercourse between Estonia and Russia. Wild salmon stock was lost in 1950s after construction of the power plant. Before the dam construction salmon run was up to Narva waterfall just below that the spawning grounds were situated. In the river reared stock of Neva salmon exists. Rearing station is situated on Russian side.

The R. Selja was severely polluted by effluents of food industry and salmon parr were not observed in 1970-1980s. After completing of the purification plant of Rakvere establishment salmon parr were found again in 1995. The river was the one which provided hatcheries with salmon eggs in 1960s.

Table 1

Salmon rivers of Estonia. Hydrographical and hydrological indices.

| River | Length km | Drainage area km ² | Drop m | Mean annual discharge m ³ /s | First barrier from river mouth, km |
|-----------|--------------|-------------------------------------|-----------|---|--|
| Narva | 77 | 56 200 | 30 | 350-410 | 17 |
| Purtse | 51 | 816 | 77 | 5-7 | |
| Kunda | 66 | 519 | 90 | 5-6 | 2 |
| Selja | 44 | 434 | 76 | 2.5-3.0 | 12 |
| Loobu | 59 | 308 | 100 | 2.0-2.5 | 10 |
| Valgejõgi | 77 | 454 | 107 | 3.5-4.0 | 8 |
| Jägala | 103 | 1 580 | 82 | 10-12 | 1.3 |
| Pirita | 100 | 731 | 75 | 5-7 | 14 |
| Keila | 107 | 706 | 75 | 5.5-6.5 | 1.7 |
| Vasalemma | 46 | 406 | 50 | 3.0-4.0 | 7.5 |
| Pärnu | 144 | 6 910 | 78 | 50-65 | 14 |

The R. Pirita is part of the system providing Tallinn with water and most of its flow is abstracted. The salmon parr were observed in 1992 and earlier but not in 1994-1995. The R. Pirita was formerly a good river for salmon recreational fishing.

In the R. Pärnu electrofishing surveys were not done. A few data about adult salmon in 1980-1990s originates from test fishing on the Sindi fish ladder, whitefish breeding fishery below the dam and personal communications of fishermen.

In the rivers Kunda, Loobu, Keila and Vasalemma most successful wild reproduction exists at present. The parr densities were between 0.4-20.3/100 sq. m of rapids (Table 2). A current potential smolt production is estimated to be 15,000.

This estimation is based on assumed parr density level of 12 older parr /100 sq. m and a 50% survival from parr stage to smolt stage. The smolt production in 1995-1996 was estimated to be 7,000. The estimations are on rough level and are considered as provisional.

Abundance of salmon

Some general picture about the abundance of salmon and sea trout in Estonian waters is available from catch statistics. The coastal and river catches (Figure 2) were up to 145 tons in the middle of 1930s and further decreased rather rapidly remaining on the level below 10 t in late 1960s. Small peak in 1990s is due to improved data reporting and reflects mainly the abundance of sea trout.

Table 2

Densities of wild salmon parr in electrofishing surveys at permanent stations

| River | Year | Number of parr 0+ | /100 sq. m 1+ and older | Number of parr |
|-----------|------|----------------------|----------------------------|----------------|
| Kunda | 1992 | 7.4 | 12.9 | 118 |
| | 1993 | 0 | 5 | 26 |
| | 1994 | 2.3 | 0 | 7 |
| | 1995 | 15.4 | 3.1 | 60 |
| Vasalemma | 1992 | 3.4 | 2.6 | 23 |
| | 1994 | 1.9 | 0 | 7 |
| | 1995 | 17.9 | 0.4 | 49 |
| Pirita | 1992 | 1.9 | 0.7 | 11 |
| | 1994 | 0 | 0 | 0 |
| | 1995 | 0 | 0 | 0 |
| Loobu | 1994 | 1.2 | 2.8 | 23 |
| | 1995 | 0.2 | 0.2 | 2 |
| Keila | 1994 | 1.1 | 0.9 | 11 |
| | 1995 | 14 | 0.6 | 65 |
| Selja | 1995 | 0.9 | 7 | 18 |

Mixing of stocks

The artificial rearing of salmonids started in Estonia in 1920s. Keila-Joa rearing station was established in 1923, Narva station in 1928, Sindi and Pidula stations in 1935 (Reinvaldt, 1937a). The salmon production from the hatcheries was rather large e.g. 850,000-1 200,000 in 1936 - 1938 (Reinvaldt, 1936, 1937b, 1938). Releases consisted mostly of alevins. In hatcheries in this time the eggs collected from different rivers were pooled together and releases carried out neglecting the origin of salmon. Such a practise continued in 1940-1970s (Sirak, 1969). As a result the salmon stocks of Estonian rivers were mixed. Into the R. Pärnu a lot of salmon originateing from Latvian rivers was also released. A mixing seems to be one reason why the salmon stocks of southern coast of the Gulf of Finland are by data of M-L. Koljonen (1995) so close genetically.

Further developments

The fate of salmon in Estonian waters is related to:

- habitat conservation measures,
- fisheries regulations,
- stocking activities.

Conclusions

1. In Estonia salmon reproduce naturally in the 6-7 rivers.
2. The salmon stocks were mixed starting from 1920s.
3. The abundance of salmon is low and for maintaining of stocks conservation measures are needed.

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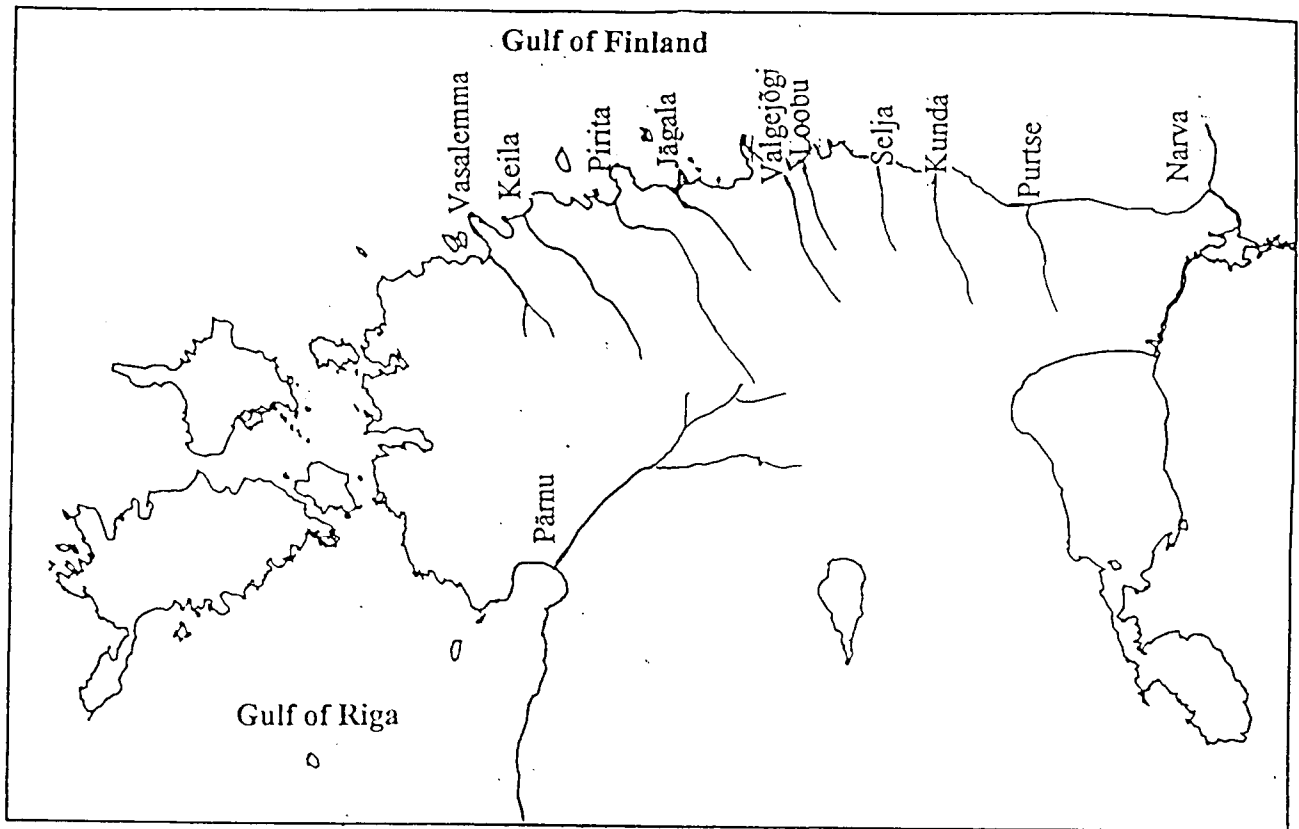


Figure 1. Present and past salmon rivers in Estonia.

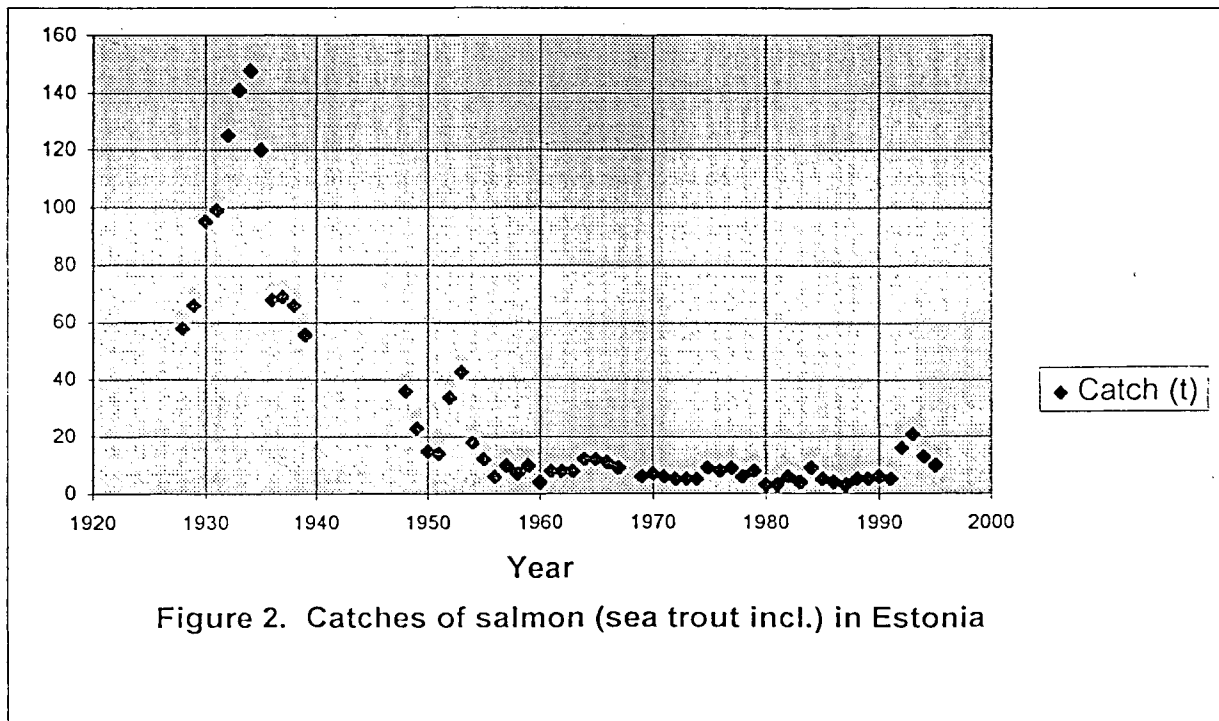


Figure 2. Catches of salmon (sea trout incl.) in Estonia