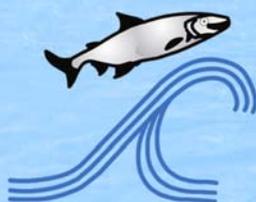


ATLANTIC SALMON IN RIVERS OF BELARUS

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Belarus is a land-locked country with no direct access to the sea. However, locally caught fish originating from the sea, particularly the Atlantic (Baltic) salmon (*Salmo salar*) and the Brown (Sea) trout (*Salmo trutta*), were part of the local diet until the middle of the 20th century. These fish species migrated seasonally from the Baltic Sea upstream the river West Dvina/Daugava and the river Neman/Nemunas to reach their natural spawning grounds in their numerous tributaries.

Dams built on the Western Dvina and Neman in 1950-60s blocked the mass migration of Atlantic salmon species upstream to Belarus. Since the early 1960s these salmon species are not longer listed among the fish species recorded in Belarus. Environmental research done recently discovers that these species still migrate annually, albeit in small numbers, upstream the Neris/Vilia river to the upper part of the Neman River basin in Belarus to spawn in the Vilia river tributaries upstream the Lithuanian border.

This fact emphasizes the international importance of conservation measures, which need to be taken to protect the Atlantic salmon species population and their habitats in Belarus.

HISTORY

In the past, Baltic salmon and Sea trout were common commercial fish species in Belarus. They were routinely found in substantial numbers in fish catches in the river West Dvina/Daugava near the cities of Vitebsk and Polotsk. More abundant sources of both salmon and trout were the river Neman and its tributaries including Black Guncha, Lososna, Svislotch, Schara and West Berezina (fig.1)

Dr. Kljuk wrote in his “Natural History of the Polish Kingdom” (Warsaw, 1799) that landlords in the Grand Duchy of Lithuania commonly kept in fishponds

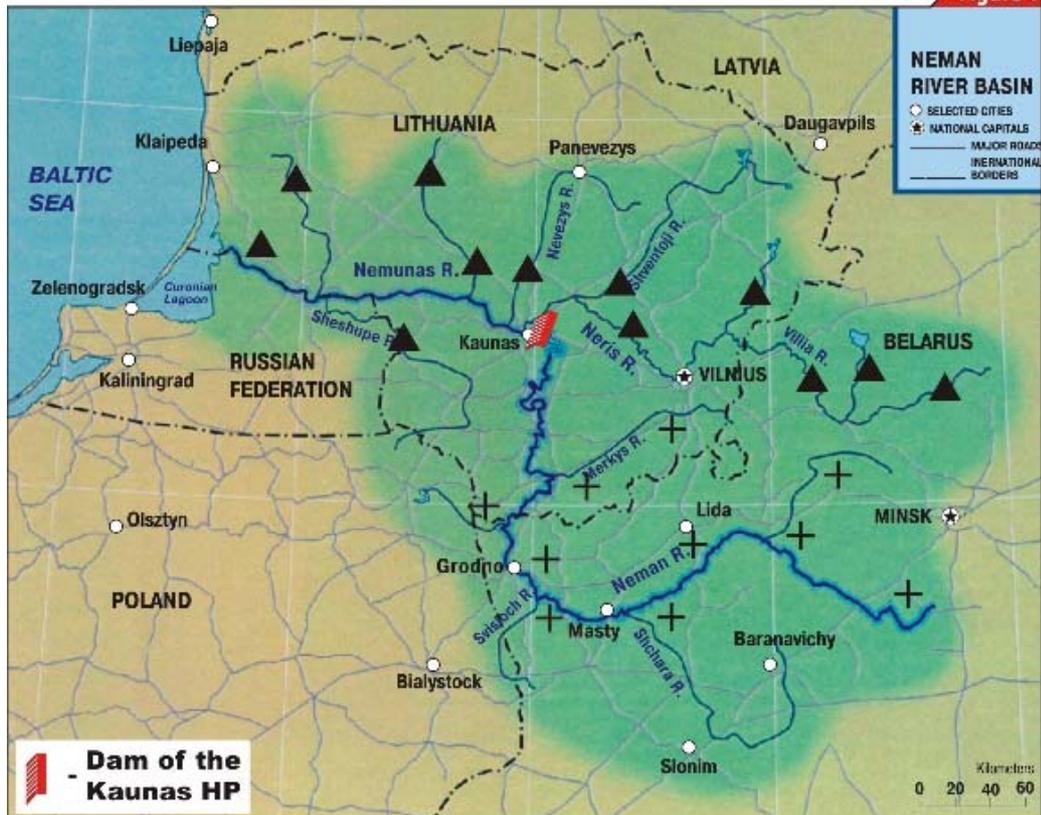
Brown trout and Baltic salmon caught on their way back to the sea and that the largest and the testiest salmon were from the Lososna River near Grodno.

In the 19th and the early 20th century Belarus peasants commonly fished for Sea trout and Baltic salmon in local rivers during the spawning season. Ethnographic studies of the time reported that night fishing using torch and harpoon was the most common technique. Local people tell stories about the Polish Army Generals coming from Warsaw to fish for salmon in the Black Gancha River (near Grodno) before the WWII.

In 1959 a hydropower plant was built on the river Neman/Nemunas near Kaunas. No fish way was installed at the Kaunas Dam with the result that the dam completely blocks migration of salmon species to their natural spawning grounds upstream Neman/Nemunas in southern Lithuania and in Belarus. Since then the salmon species in Belarus have been considered extinct and have not been listed in the Belarus official fisheries records.

In Lithuania the dam has not affected the Atlantic salmon fisheries as badly as in Belarus. Seasonal salmon migration continues in the river Neris/Vilia, which enters Neman/Nemunas downstream the dam. Lithuanian records trace salmon migration upstream to the Belarus border where the Neris River is changing its name to Vilia. Until recently there were no observations of salmon migration further upstream the river Vilia into Belarus. But, recent site visits to the area, assisted by local fishermen and Dr Vadim Ermolaev of the Institute of Zoology and the Belarus Academy of Sciences, discovered salmon spawning places and confirmed Atlantic salmon migration into Belarus rivers.

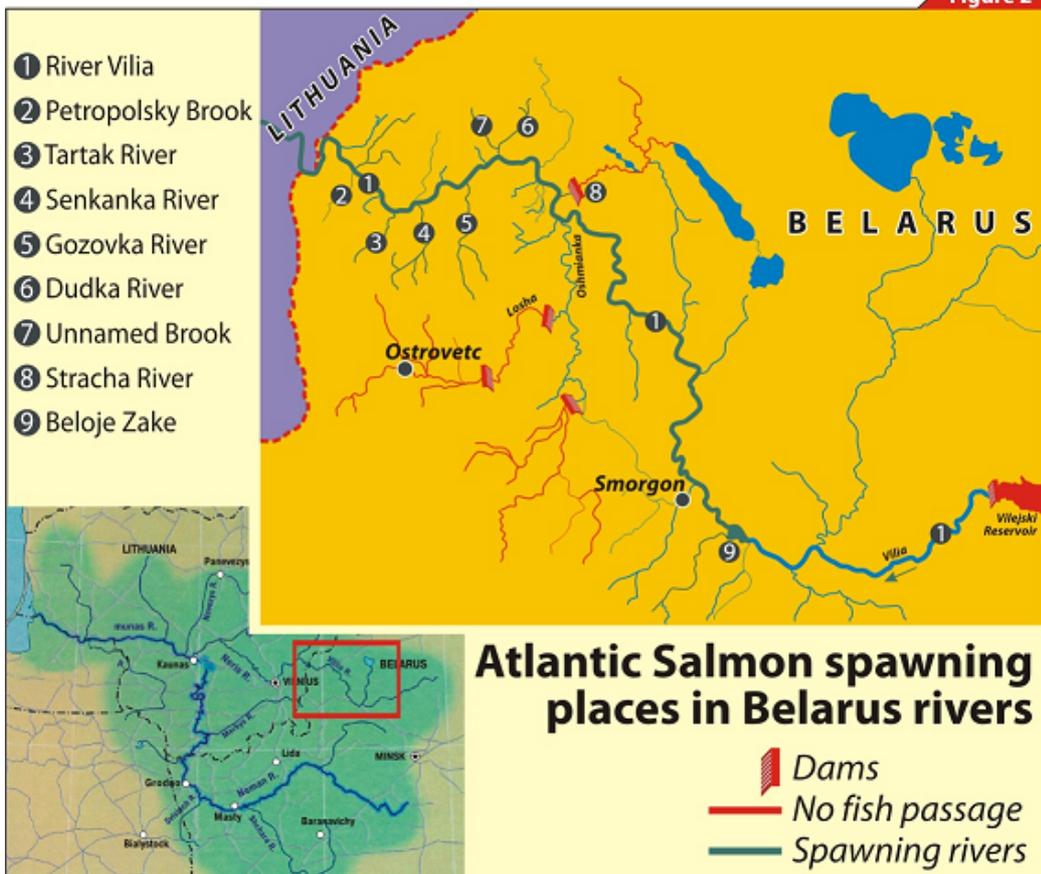
Figure 1



Salmon Spawning waterways in the Neman River basin

- ▲ – spawning rivers existing
- + – spawning rivers lost after the Kaunas dam has been built

Figure 2



SITE DESCRIPTION AND METHODOLOGY

In Belarus, Brown trout and Baltic salmon spawn in the tributaries to the river Vilia – Gozovka, Senkanka, Dudka, Tartak, Petropolsky Brook and Unnamed brook. All of them are in the Ostrovets District of the Grodno oblast. Salmon spawning places have been discovered in the Vilia River as well. Salmon species may also be found in the lower Stracha River. But they cannot reach their natural spawning ground upstream because of the dam constructed on Stracha (fig.2).

An estimate of the number of fish reaching the spawning ground is not a straightforward task. Although the rivers are very clean, the visual fish-count is not always practicably possible as the fish naturally enters the spawning ground at night. That is why the assessment of the number of fish is based on the number of spawning nests found. A salmon female cleans the spawning place first. Then it makes a shallow pit and releases eggs, which are fertilized by males. Finally, the female covers the fertilised eggs with a layer of small pebbles forming a nest where the fertilised eggs will develop until hatched in spring. A nest often looks like a flat rise of clean pebbles on a sandy riverbed. One female normally makes 2 to 3 nests with 2 to 4 males involved in fertilizing the eggs. Based on that, an estimate of the numbers of fish can be made.

SPAWNING SEASON

The first groups of Sea trout going upstream usually reach spawning grounds in Belarus in the middle of October. The spawning lasts until approximately the end of November when the water temperature is 2 to 6 degrees centigrade. The Baltic salmon usually arrives in November and the spawning may last until the end of December. Compared to Sea trout, Baltic salmon is a much more rare fish in Belarus and it doesn't show up in the same rivers every year. In December 2004, for example, there were no spawning salmon recorded in the rivers Senkanka (3

km long river) and Tartak (750 m), or in the Unnamed Brook (800 m), due to unusually warm weather for this time of the year.

The estimate of the number of individuals for Sea trout in the year 2004 is given in Table 1 below. It is based on the number of nests found and on interviews with local fishermen.

Table 1: Sea trout observations in tributaries to river Vilia

River	Number of Nests	Number of Fish
Tartak	20	32
Senkanka	9	15
Unnamed Brook	8	13
TOTAL	37	60

Although the observations for Baltic salmon are not as regular as for Sea trout, they indicate a significant annual variation in salmon numbers in the same rivers. For example, in the year 1999 the number of nests found in the Senkanka River was greater than in the Tartak River, in the year 2004 it was the other way around. The total number of salmon in these rivers in 1999 and in 2004 was estimated by a local wildlife inspector to be about 30, about one tenth of the total number of Sea trout. The Baltic salmon spawning nests are more likely to be found in the river Senkanka. Salmon spawning may however also take place in the main river Vilia.

IMPACTS

The current population of Atlantic salmon species in Belarus is critically low. The most dramatic drop in population was during the 1950s and 1960s. It was mainly caused by dams built without fish passages and by poaching.

Dams

The river Stracha, tributary to Vilia (see Fig 2), used to be a good salmon river to which Atlantic salmon migrated in large numbers to spawn. This is a fast-flowing river with cold and clean water and a riverbed made of sand and pebbles – the most suitable ground for spawning. In the year of 1951 a 3 m high dam was built near the river mouth to create a reservoir. The dam constructed without a fish ladder cut off migrating salmon from their natural spawning grounds upstream. For several years afterwards until it stopped completely, the local fishermen told, salmon migration continued up to the dam where poor fish gathered in large numbers every late autumn just to get caught by the local people.

In the year 1950 a dam was built on the Oshmianka River (see Fig. 2), which used to be another good salmon river. The dam is more than 3 m high and has no fish ladder. There is a similar dam on the river Losha, Osmianka's tributary.

Vatslav Blazhevich, local resident who has been living in the area since he was born 58 years ago, told that up until the mid 1960s there were mills and weirs on local rivers, including the Tartak River. The weirs, he told, were constructed in a way not to block the river channels completely leaving free passage for the fish to go upstream to the spawning grounds.

The biggest dam in the area was built on the Vilia River in 1975 near the town of Vileika. The purpose for the dam was to create a large reservoir to supply water to the City of Minsk, the capital of Belarus. This dam was also constructed without any fish passages and completely blocked the salmon migration. The environmental problems associated with the reservoir, as water resources engineers in Belarus are now beginning to recognise, include deterioration of water quality (due to eutrophication, siltation and rotting vegetation) and the negative effects on the river itself (decreased water levels and water flow due to growing demand for

water in Minsk). These problems are becoming a trans-boundary issue as the Vilia River basin is shared between Belarus upstream and Lithuania downstream.

Poaching

Besides the dams, poaching is the second most important reason why the population of Atlantic salmon is almost extinct in Belarus. Historically, poaching activities in the Vilia basin peaked during the 50s and 60s of the last century. Local people still tell stories about widespread illegal fishing with explosives. Under the circumstances the regulations were difficult to enforce and more often than not, police officers as well as fish inspectors were involved in the poaching. No one can make an assessment of the environmental damages done at the time. According to local people, poaching using harpoon and electro-fishing is still going on in the area especially during salmon migration season. It is extremely difficult, they say, to catch poachers in this distant corner of Belarus as many places are impassable and not accessible by road. Inspectors do not have adequate telecommunication equipment and most of the area is still not covered by the mobile network.

Vladimir Marchenko, local environmental inspector says that the environmental enforcement system in Belarus is in need of improvement. According to him, regulatory and enforcement agencies are more interested in the number of notices issued, not in real prevention and enforcement on the ground. That is why, he says, inspectors are not always focused on the real issues of wildlife protection. Environmental regulation is another part of the problem. Atlantic salmon species have not even been officially listed among the fish species recorded in Belarus until recently. Although, both Sea trout and Baltic salmon are now protected species listed in the Belarus National Red Data book, there are no legally defined enforcement measures (e.g. fines, penalties and so forth) for poaching. According to official statistics, only one person has been caught electro-fishing for salmon in the Vilia basin in 2005.

MEASURES, WHICH NEED TO BE TAKEN TO SAVE THE ATLANTIC SALMON

In recognition of the international and European importance the Sea trout and the Baltic salmon are listed in Belarus National Red Data Book of 2004 under the highest national protection category - category 1 (CR). According to IUCN (The World Conservation Union), category 1 (CR) is defined as species with extremely low and dwindling populations, which require complex conservation measures to be restored urgently.

Considering the very low population of Atlantic salmon species in Belarus, it is extremely important to protect the existing salmon spawning rivers and to stop poaching. This can be effectively achieved through:

1. Targeted environmental awareness programme for school children and young adults, living in the Vilia basin both in Belarus and Lithuania. The programme can be both national and international (trans-boundary) including production and dissemination of educational materials, site visits, open lessons and, a special focus on protection of the salmon rivers and on Sea trout and Baltic salmon migration and spawning. Such project would be best led by an experienced NGO supported by Atlantic salmon ecology specialists and local people;
2. Facilitation of trans-boundary cooperation and information exchange between wildlife inspections of Smorgon and Ostrovets Districts of Belarus and the wildlife inspections of the bordering districts of Lithuania.

P.S. The preparation of this report included data collection, interviews and site visits to the Vilia river basin in December 2004 and December 2005. The last visit in December 2005 discovered newly built spawning nests in the river Tartak (see photographs). About 30 nests have been found within the 400-500 m long river stretch, which is about 30 % more than in 2004.



Spawning nest in Tartak River



Part of Tartak River

Acknowledgements

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