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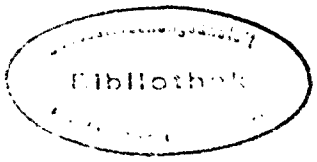

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ATLANTIC SALMON FROM RUSSIAN RIVERS. FISHERIES AND STATE OF THE STOCKS IN 1995

by

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It has already been noted before (Zubchenko et.al., 1995) that from early 90s onward a declining trend in Atlantic salmon numbers caused by overfishing, deterioration of habitat and illegal fishing has been identified in many Russian rivers. It relates to such big rivers as Pechora, Mezen, Onega (the Archangel Region), to all Karelian rivers and some small rivers in the Kola Peninsula (Chapoma, Pjalitsa, Luvenga, Kovda and others). Simultaneously, on rivers where recreational fishing for salmon based on catch-and-release is being exercised (primarily rivers in the Kola Peninsula) Atlantic salmon stocks are in a satisfactory state and the majority of those rivers (Kharlovka, Varzina, East Litsa, Sidorovka,

Drozdovka, Ponoi, Varzuga and others) have favourable conditions for enhanced production of salmon.

In 1995 commercial fishery in the Kola Peninsula was conducted on rivers Kola, Tuloma, Pechenga, Great West Litsa, Ura, Jokanga, Kitsa, Varzuga, Umba, Kolvitsa, Niva, where counting fences were used, and at 29 coastal stations located between rivers Kachkovka and Kovda (trap nets). In the Archangel Region the fishery was conducted at 239 stations located in the main river and major tributaries to Severnaya Dvina river (bag nets, gill nets, drift nets and trap nets), and at 55 stations located between the Mezen river and Severnaya Dvina river (gill nets and trap nets). There was no commercial salmon netting on Karelian rivers in the last two years. Adult fish were fished on rivers Keret and Kem for rearing purposes only.

Recreational fishing was conducted on 73 rivers over the Kola Peninsula, of which on 13 rivers catch-and-release was exercised as well as on rivers Vonga and Suma in Karelia and on the Pechora river.

CONDITIONS DURING THE FISHERY

In 1994-1995 water temperature in the Norwegian Sea during salmon feeding season was 0.4-0.7°C above the long-term mean. During spawning run in spring and summer of 1995 the heat content of waters in the Norwegian current was typical of cold years and negative water temperature anomalies were 0.5-0.9°C, and in the main branch of the Murman current it was normal (it was 3.9°C in the period from 1951 to 1990). In all Barents Sea and White Sea rivers, except Pechora river, water level and discharges during spring flood were close to long-term means. Water temperature in rivers during spawning run varied considerably, and the mean yearly temperature was 1-2°C below the norm. Nevertheless, this did not affect the timing of spawning run, and in general it was close to the long-term mean. In the Pechora river the water level in June-July fluctuated much, while in August-September it was

unusually high, water heat content was optimal throughout the whole vegetation period, however, as in other rivers the spawning run took place within usual times.

In the autumn season the water temperature in the White Sea rivers was slightly higher than normal, however, unfavourable weather conditions in August and September (stormy western winds) as in 1994 caused a delay of 10-15 days in the autumn spawning run to the White Sea rivers.

In 1995 the fishing season in the Kola Peninsula lasted from 2 June to 14 December, in the Archangel Region from 15 June to 20 October. The fishing was conducted based on regulations updated annually. In rivers Pechenga, Great West Litsa, Ura, Tuloma at least 67% of adult salmon were let pass through counting fences for spawning before 25 June and 50% after 25 June. In the Varzuga river during the entire fishing season at least 63% were spawning escapees and at least 75% in rivers Jokanga and Umba. On the Kola river 100% of adult fish were fished and retained at the counting fence. On the Pechora river a ban on fishing persisted, and fishing with drift nets was only undertaken for assessment purposes. On other rivers catch:spawning escapement ratio was 1:1. Sea fishing quota was set at 95 t.

In recreational fishing by foreign anglers catch and release technique was exercised, while domestic anglers were let retain captured fish. Fly rod and spin rod were used.

RESULTS OF FISHERY AND DESCRIPTION OF CATCH

Total commercial catch in 1995 was estimated at 129.2 t, including 44 t taken at sea fishing stations and 11.6 t (control fishing) on the Pechora river. Table 1 shows catch dynamics during 1976 to 1995.

Table 1. Catch of salmon in various regions of Russia during 1976 to 1995 (t)

Year	Kola Peninsula			Archangel region	Pechora river	Karelia	Grand total
	Barents Sea	White Sea	total				
1976	83,3	362,9	446,2	90,8	230	4,9	771,9
1977	67	237,4	304,4	65,6	123	4,3	497,3
1978	44,9	187,5	232,4	68	172	3,1	475,5
1979	27	245,9	272,9	86,4	92,3	3,4	455
1980	42,8	232	274,8	121	261,6	6,3	663,7
1981	46	183,5	229,5	52,3	178,6	2,7	463,1
1982	37,2	172,7	209,9	57,3	93,9	3	364,1
1983	73,3	237,4	3107	74,9	110,7	10,2	506,5
1984	97,4	256,9	354,3	74,8	156,5	7,6	593,2
1985	60,1	314,8	374,9	66,8	207	10	658,7
1986	44,8	256,5	301,3	75,2	225,2	6	607,7
1987	50	289,5	339,5	55,3	164,6	5	564,4
1988	32,1	201,4	233,5	65,6	115	5,8	419,9
1989	68,1	199,4	267,5	52,9	28,8	14,5	363,7
1990	81,5	171,9	253,4	52,3	0	6,9	312,6
1991	47,3	112,9	160,2	48	4,7	2,3	215,2
1992	59,4	78,1	137,5	23,2	3,8	2,2	166,7
1993	34,1	70,8	104,9	28,2	5,3	0,7	139,1
1994	28,6	76,4	102,3	33,5	2,2	0,5	138,5
1995	26,4	50,8	87,2	30,4	11,6	0,4	129,6

In recreational fishing 12 490 salmon were caught in 1995, including 12 056 by catch-and-release. In 1991 4 869 salmon were caught, including 3 221 by catch-and-release, in 1992 - 12 277 and 10 120 correspondingly, in 1993 - 12 724 and 11 246 and in 1994 - 13 286 and 12 056. Ratio between foreign and domestic anglers' catch is demonstrated in Fig.1.

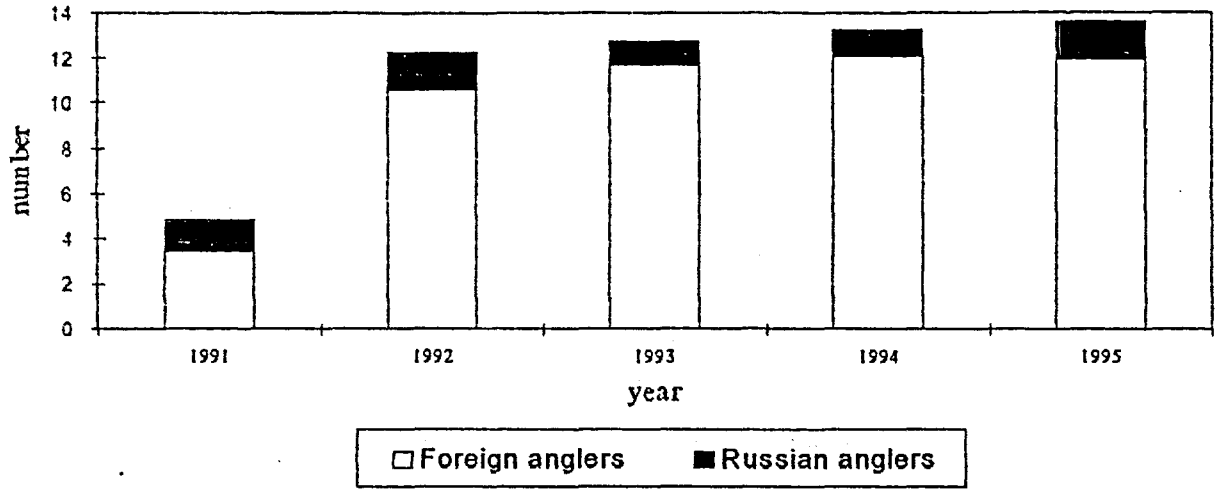

Fig. 1. Anglers catch dynamics in 1991-1995

Catch from the Kola Peninsula rivers was dominated by grilse (75.8%). That was approximately 5% more than the long-term mean and was likely to be related to unfavourable hydrologic conditions in feeding grounds in winter of 1995.

On the Barents Sea rivers mean length and weight of spawners turned out to be less that in row of previous years, which was likely to be due to unfavourable conditions during feeding of 2SW, 3SW fish in 1993-1995 (mean yearly water temperature in various areas of the Norwegian Sea was 0.6-1.0°C below the long-term mean (6.7°C), while those years were ranked as moderately cold years). This was confirmed by the fact, that in the Varzuga river where grilse prevailed mean length and weight of spawners were bigger than in the preceeding two years.

In river Severnaya Dvina (Archangel Region) grilse accounted for 7.8%, 2SW salmon for 81.3% and 3SW - 10.0%. Mean length of spawners was 81.4 cm and mean weight 5.5 kg which was in line with long-term means. Based on evidence from control fishing in the Pechora river in 1995 grilse accounted for 11.6% (7.5% in 1994, 2.6% on the average during 1959 to 1988). Nevertheless as before 2SW salmon prevailed (80.4%). Salmon with 3SW and 4SW accounted for 7.9% and 0.11%, respectively. Mean length and weight in 1994-1995 were less than in previous years

and corresponded to 76.3 cm, 5.4 kg and 78.1 cm, 5.9 kg, respectively, that was probably due to increased representation of grilse in stocks (for example, in 1992 mean length and weight were 83.6 cm and 8.8 kg). In Karelian rivers (long-term data from the Keret river) a declining trend in variation of length and weight of spawners compared to the 80s (in 1986-1990 71.4 cm and 3.0 kg) was also noted in recent years (in 1994 they were 58.1 cm and 2.6 kg, in 1995 62.8 cm and 2.8 kg). On the whole in all regions in Russia the age composition of salmon catch in 1995 was at the level of the 1990-1994 average (Fig.2).

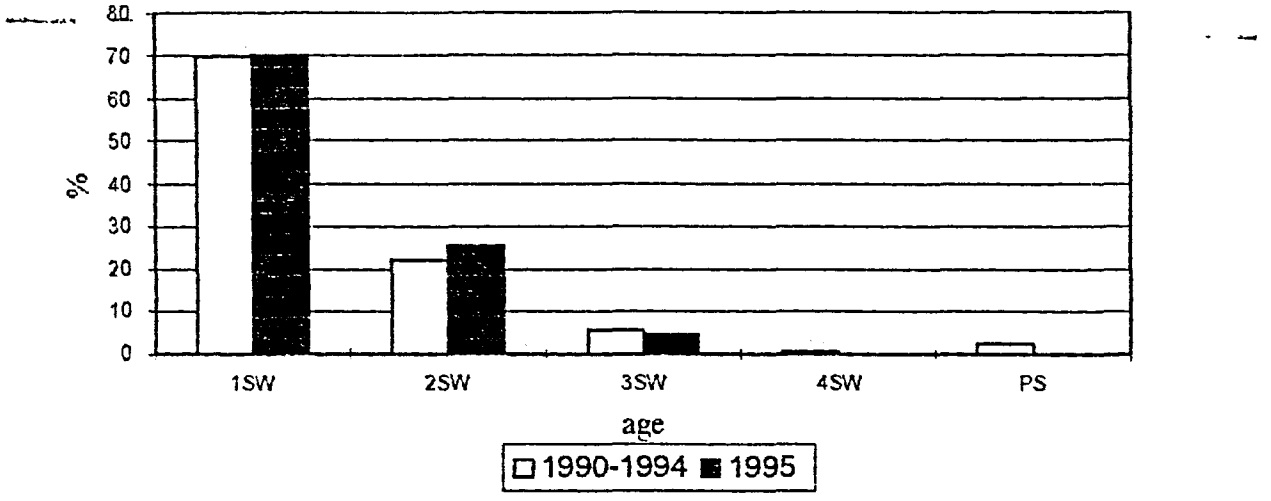

Fig. 2. Age composition of salmon in Russian catches for 1990-1995

EXPLOITATION RATE

Table 2 shows exploitation rates on salmon stocks in rivers and coastal areas in the northwest Russia in 1995 (permanent number of commercially important rivers on which industrial fishery was or has been conducted in recent years is considered). In 1990 the exploitation rate on salmon stocks in the Barents Sea rivers was 36%, it was 52.5% in the White Sea rivers, in 1991 it was 18.3% and 37%, respectively, in 1992 - 21.5% and 27.34%, in 1993 - 16.5% and 28.3%, in 1994 - 12/0% and 33.6%, respectively.

In 1995 a declining trend in the exploitation rate on the stocks noted before persisted

Table 2. Exploitation rate on salmon stocks in Russian rivers in 1995

	Stock	Fishery	1SW	2SW	3SW	4SW	PS
General	181900	39610	21,8	21,7	21,7	21,8	21,8
Varsuga'R.	42290	18385	43,5	43,4	43,4	-	43,4
Umba	7200	616	8,6	8,6	-	-	8,6
Kola'R.	7540	5776	76,6	76,6	76,5	-	76,5
Tuloma'R.	4737	2299	48,4	48,4	48,5	-	48,4

(Zubchenko, 1995) which was in the first place associated with the modification of fishing regime on rivers in the Kola Peninsula related to the development of recreational fishing, depressive state of stocks in rivers of the Archangel Region and Karelia, suspension of fishery on the Pechora river. Along with this it must be mentioned that for a long time (about 30 years) the catch/spawning escapement ratio was maintained at the level of 1:1 at the expense of fishing being concentrated at counting fences .

STATE OF STOCKS

In the northwest Russia the efficiency of enhancement of salmon stocks through hatchery releases is very insignificant (less than 1% recaptured by the fishery), although, for example in the Kola river representation of hatchery salmon in catch has grown to 25%, and in the Keret river to 39.2% (1988) and 93.4% (1994). In this light maintenance of good habitat for natural production of salmon in Russian rivers plays not less important, if not a major role. As said before, in general the stocks in the northwest Russia are declining.

On the majority of rivers in the Kola Peninsula, especially those flowing in difficult for access areas the stocks are at a rather stable level. At the same time as already

noted before (Zubchenko et al., 1995) a considerably increased pressure from illegal fishing can be noted on rivers located in the vicinity of big communities. The 1995 evidence (fry densities) shows that illegal fishing on the Umba river remained at the level of 25% in 1994. The pressure from poaching is especially heavy in headwaters and mid-flow of the river. On the Tuloma river poachers fished out about 50% of spawners during 1993-1994. Major tributaries like Pecha, Konja, Shovna suffer especially heavy pressure. On the Kola river about 85-90% of spawners were caught through illegal fishing on a downstream 25 km-beat of the river located before the counting fence. In addition on rivers Umba and Kola salmon habitat is much deteriorated because of discharges of industrial wastes, which would most likely affect adversely salmon abundance in the coming years.

On the Pechora river the extent of illegal fishing during a row of recent years is already as much as 95-97%. Control fishing evidence from 1989-1995 showed the the number of adult fish returned to the river veried between 45 and 80 thou.fish while only 3-7 of them participated in the spawning. During recent years the level of Atlantic salmon production in this river dropped to a critical minimum. The spawning grounds were filled 10 times less, and juvenile density in 1989-1995 was 0.019 individual per sq.m (0.111 individual per sq.m in 1959-1968). It is quite obvious, that after the 1989 and subsequent yearclasses have become spawners the Pechora river stock of Atlantic salmon will face a heavy and lengthy depression.

The situation has not changed in the majority rivers of the Archangel Region as well, where due to unregulated fishery on the feeding grounds, overfishing in home waters and pollution the stocks have declined dramatically, many of them have not only lost their importance for the fishery, but are also on a brink of extinction. For example, on the Keret river the assessed numbers of salmon declined more than three times during 1991-1995 against the previous decade level (750 and 3 000 fish, correspondingly).

Numbers of spawners of Atlantic salmon in major rivers where the fishery was conducted in 1987-1995 are given in Table 3.

Table 3. Numbers of Atlantic salmon in major commercially significant Russian rivers

Stock	1987	1988	1989	1990	1991	1992	1993	1994	1995
Pechora'R.	54100	40000	52000	32000	50000	60000	70100	52000	80000
Varsuga'R.	137420	72530	65520	56000	63000	61300	68300	77800	42290
Tuloma'R.	5470	8070	8410	11590	7170	5480	4520	3320	4740
Umba'R.	10040	8460	12030	9040	6400	8400	8500	6500	7200
Ponoy'R.	21210	20620	19220	37710	21000	26600	26800	20500	23000
Kola'R.	6300	5200	10930	13380	8500	14670	11400	9730	7540
Yokanga'R.	3470	2270	2850	3380	1700	5530	3200	2850	2600
Z.Liza'R.	1500	580	2610	1190	2080	2760	2270	2100	1920

On the whole, in 1995 the spawning run to Russian rivers was composed primarily of fish from the rich 1987 yearclass and average 1988-1989 yearclasses. Commercial stock this year was estimated at 179.5 thou.fish. It was less than in the previous year (194.5 thou.fish) and notably less than the average for 1966-1994 (236.5 thou.fish).

In 1996 the spawning run will be dominated by the average 1988-1990 yearclasses and weak 1991 yearclass. The assessment based on correlative relationship between salmon abundance and mean yearly water temperature in the 0-200 m interval on the Kola Meridian transect, counts of adult fish during fishing at counting fences, data on biological, age, sex and size-weight structures of individual stocks as well as information on fecundity and survival of salmon at various stages of the life history projects that in 1996 the commercial stock of salmon in Russian rivers would be around 167 000 fish. The lowest at record abundance in a 50-year series has been forecasted for the Pechora river (20 thou.fish), which is the reason why the commercial stock in Russian rivers shows the lowest abundance since 1982.

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