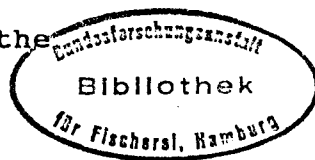


This paper not to be cited without prior reference to the author

International Council for the
Exploration of the Sea



ANACAT Fish Committee
CM 1995/M:40

FISHERY FOR AND STATUS STOCKS OF ATLANTIC SALMON IN NORTH-WEST RUSSIA IN 1994

by

A.V.Zubchenko

Knipovich Polar Research Institute of Marine Fisheries and
Oceanography (PINRO), Murmansk, Russia

A.A.Loenko, N.G.Popov

Murmansk Regional Directorate of Fish Conservation and
Enhancement, Murmansk, Russia

V.P.Antonova

Northern Branch of Knipovich Polar Research Institute of
Marine Fisheries and Oceanography (SevPINRO), Arkhangelsk, Russia

V.A.Valetov

Karelian Regional Directorate of Conservation and Enhancement
of Fish Resources, Petrozavodsk, Russia

Licensed sport fishing has been in a speedy progress in many salmon rivers in the recent four years. Associated with this development the number of rivers and stations where commercial fishing for salmon has been conducted is declining as well as its total commercial catch. For example, in 1994 the commercial fishing for salmon in the Ponoy river - the biggest salmon river in the Kola Peninsula - was completely stopped, besides catch quotas in rivers Varzuga, Umba, Jokanga were set at a lower level. In addition, salmon stocks in some areas continue to exhibit a dramatically declining trend which has led to a complete cessation of commercial fishing for salmon in Karelian rivers, still has not been resumed fishing in rivers Pechora, Mezen, Onega.

In 1994 commercial fishing was conducted in only 10 river on the Kola Peninsula (Kola, Tuloma, Pechenga, Bolshaya Zapadnaya Litsa, Ura, Jokanga, Kitsa, Varzuga, Umba, Niva) and one river in the Archangel Region (Severnaya Dvina). In the Kola Peninsula the fishing was conducted at counting fences established close to river mouth. In the Severnaya Dvina river it was conducted at 230 fishing stations located in the main river bed and its major tributaries. As fishing gears gill nets, drift nets, bag nets and trap nets were used.

During the 1994 season sea fishing for salmon over the Kola Peninsula was conducted at 11 coastal fishing stations located between rivers Ponoï and Olenitsa, and in the Archangel Region at 60 fishing stations located between rivers Mezen and Severnaya Dvina. Trap nets and gill nets were used as fishing gears.

Licensed fishing was conducted on 65 rivers over the Kola Peninsula, on rivers Keret and Pechora.

Conditions of fishery

In 1994 the fishing season on the Kola Peninsula continued from 31 May to 20 December, in the Archangel Region it was from 6 June to 19 October. The fishing was conducted in accordance with the regulations revised on a yearly basis. In rivers Pechenga, Bolshaya Zapadnaya Litsa, Ura, Tuloma spawning escapees amounted to not less than 67% of the total number of adults ascending the river before 25 June and 50% after 25 June. In the Varzuga river during the whole season of fishery the spawning escapement was not less than 63% and in rivers Jokanga and Umba - 75% In the Kola river 100% of all adults were taken as catch at the counting fence. In the Pechora river a ban on fishing still continued, and check fishing with drift nets was conducted to count adult salmon. In other rivers the catch/escapement ratio was 1:1. Sea catch was limited to 95 t.

In licensed fishing by foreign tourists "catch-release" method using fly rod with one or two hooks and a rod with spoon was exercised. Local residents were allowed to use the like fishing equipment and keep the catch.

In 1994 in all Barents Sea and White Sea rivers the water discharge and level during spring flood were slightly higher than the long-term means (Figs.1,2). Mean yearly water temperature in all feeding areas was within the norm (3.8 C for 1961-1990). However, because of lower water temperatures in rivers about two-week delay in massive spawning migration to rivers of a summer biological group was observed.

Meteorological and hydrological conditions in autumn were observed to be unfavourable. Low water temperatures, strong stormy southern and eastern winds caused a 10-15-day delay in the start of spawning run of the autumn group salmon to the White Sea rivers compared to the long-term mean situation. However, massive spawning migration occurred within the same times as usually (Fig.2). In the river Severnaya Dvina the spawning run ceased when the water temperature dropped to 6 C, while in the Varzuga river it continued under the ice as late as the second ten-days of December.

Results of fishery and description of catch

Total commercial catch of salmon in 1994 was 138.2 t, including 55 t taken at sea fishing stations and 2.2 t in the Pechora river (check fishing). Revised catch for 1993 is 140 t. Figure 3 shows the dynamics of catch.

In 1994 13 286 salmon were caught in recreational fishing, including 12 056 using "catch and release" method. 4 869 salmon were caught in 1991, of them 3 221 in "catch and release". In 1992 12 277 and 10 120, respectively, and in 1993 12 724 and 11 246 salmon, respectively. Fig.4 compares foreign and home fishermen's catch.

Certain stabilization of commercial catch was observed in 1993-1994, however, at a lower level compared to the 80s, which was related to a modified pattern of quota allocation between the commercial and licensed sport fisheries. In addition, salmon stocks in the Barents Sea and White Sea rivers demonstrate a declining trend (Figs.5,6), resulting first of all from dramatically increased pressure from poaching.

The catch was dominated by grilse, 69.3%. This corresponds to the long-term mean level, however 8% higher than last year, which may probably be associated with the resumption of salmon fishery in the Faroese economic zone and result from hydrographic conditions in feeding areas.

Check fishing showed a higher number of grilse in the Pechora river (7.5%). In 1992 and 1993 their proportion was 1% and 0.1% respectively, i.e. below the long-term mean of 3.2%. The highest at record number of grilse was observed in 1989 - 47.3%. In 1988 and 1991 the proportion of grilse also exceeded the normal level, 19.9% and 14.5%, respectively. In river Severnaya Dvina the proportion of grilse in 1994 was estimated at 2.9%, corresponding to the long-term mean level. In rivers over the Kola Peninsula the number of grilse was also at the long-term mean level.

In general, older age classes of salmon (2SW, 3SW, 4SW) showed retarded growth, mean length and weight of spawners were lower than in previous years, which can probably be caused by unfavourable conditions in feeding areas, especially in 1993 (mean yearly water temperature in different areas of the Norwegian Sea was 0.3- 0.5 C below the long-term mean (6.7 C), while the year was classified as a moderately warm one).

As it has already been mentioned above, the stocks of salmon in the north-west of Russia show in general a declining trend. In rivers over the Kola Peninsula along with a fairly steady stock status in the majority of rivers in the region, there has been observed a significant increase of illegal fishing pressure on some rivers located in the vicinity of big communities. Research data (fry density estimates) and local public-opinion poll have shown that in 1994 about 25% of adult fish escaped for spawning in the Uмба river were taken as catch by poachers. In the Tuloma river - about 50% and about 35% in the Kola river, which would significantly affect salmon stocks in coming years.

In rivers of the Archangel Region and Karelia a dramatic decline of salmon stocks is being observed caused by heavy impact from unregulated sea fishery, poaching and pollution. In particular, the

Pechora river continues to be polluted by oil products, heavy metals, organic matter, and about 94-97% of spawners have been estimated to be taken as poachers' catch. Nursery and spawning grounds in the river are heavily damaged by river-bed dredging and production of sand and gravel for construction.

Exploitation rate on the stocks

Exploitation rates on salmon stocks in rivers and coastal areas in the north-west Russia in 1994 (commercial fishery only) are presented in Table 2. In 1990 the exploitation rate on the Barents Sea rivers populations was 36% and 52.2% 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%.

Lower exploitation rate on salmon stocks in the White Sea basin resulted from modification of the fishing regime in rivers of the Kola Peninsula, in general, and depressed status of salmon stocks in rivers of the Archangel Region and Karelia. In the Barents Sea basin this is in the first place related to the cessation of fishery in the Pechora river.

Status of stocks

Table 3 shows numbers of adult salmon in major rivers with salmon fishery in 1987-1994. Following natural fluctuations of numbers, having a 9-11-year recurrence (Berg, 1935, 1948), salmon stocks in north-western Russian rivers were at a low level in 1990-1991. In 1992-1994 the spawning migrants which ascended rivers were dominated by progeny from strong 1985-1987 year-classes and average 1988-1989 year-classes. However, this contributed to only a slight increase in numbers of adult fish (Fig.7), and on the whole the numbers of salmon were notably lower than the long-term mean.

In the majority of rivers over the Kola Peninsula the stocks of salmon are at a fairly stable level, which has been also confirmed by assessments based on a correlation between salmon numbers and mean yearly water temperature in the 0-200 m depth interval along the "Kola

Meridian" hydrographic transect (Zubchenko, Kuzmin, 1989), as well as by counts of adult fish during commercial fishery at counting fences, data on biological, age, sex, length-weight structure of individual populations and estimates of fecundity and survival rate of salmon at different life stages. In particular, for 1995 abundance of the commercial stock in this area (only numbers of adult fish in rivers where commercial fishery is conducted) has been estimated at about 183 000 fish.

In this light, a decline of salmon stocks in Russian rivers is in the first place related to a dramatic decrease of its numbers in such rivers as Mezen, Onega, Severnaya Dvina, Pechora. For example, in the Pechora river 1989-1990 year-classes will prevail in the spawning population in 1995 (about 92%), and the assessment made using return rates for individual year-classes has provided an estimate of the total salmon abundance in this river of 54 000 - 62 000 fish (cf. 80 000 - 100 000 salmon in 1923-1968).

It is forecasted that in 1995 average 1988-1990 year-classes will prevail in the spawning run, and the total abundance of salmon will be close to the long-term mean. However, it could well decline subject to the intensity of the Faroese fishery.

REFERENCES

- BERG L.S. 1935. Materials on the biology of Atlantic salmon.
Izvestija Press/VNIORKH, vol.20, p.3-113 (in Russian).
- BERG L.S., 1948. Fishes of freshwaters in the USSR and
neighbouring countries. Moscow, USSR Academy of Science
Press, vol.1, p.446 (in Russian).

Table 1. Proportion of salmon of different sea age in commercial catch

Year	1SW		2SW		3SW		4SW		PS		Total	
	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt
1990	70595	-	20633	-	2919	-	101	-	2010	-	96258	315
1991	40603	-	12458	-	3060	-	650	-	1375	-	58146	215
1992	34021	-	8880	-	3547	-	180	-	824	-	47452	166
1993	28100	-	11780	-	4280	-	377	-	1470	-	46007	140
1994	30877	-	10879	-	2183	-	51	-	555	-	44545	138

Table 2. Exploitation rates on some Atlantic salmon populations in Russia Rivers

	Stock	Fishery	1SW	2SW	3SW	4SW	PS
General	194500	44545	22.9	22.9	22.9	26.2	22.0
Varsuga'R.	77800	23853	30.7	30.7	30.8	-	30.7
Umba	6500	1003	15.4	15.4	15.0	-	-
Kola'R.	9730	7071	72.7	72.7	72.7	73.5	73.7
Tuloma'R.	3320	1408	42.4	42.4	42.1	-	41.9

Table 3. Numbers of Atlantic salmon in major commercial Russian rivers in 1987-1994

Stock	Survey method	1987	1988	1989	1990	1991	1992	1993	1994
Varsuga'R.	direct counting	137420	72530	65520	56000	63000	61300	68300	77800
Tuloma'R.	---	5470	8070	8410	11590	7170	5480	4520	3320
Umba'R.	---	10040	8460	12030	9040	6400	8400	8500	6500
Ponoy'R.	---	21210	20620	19220	37710	21000	26600	26800	20500
Kola'R.	---	6300	5200	10930	13380	8500	14670	11400	9730
Yokanga'R.	---	3470	2270	2850	3380	1700	5530	3200	2850
Z.Liza'R.	---	1500	580	2610	1190	2080	2760	2270	2100

Fig.1. Water level and dynamics of salmon run to the Kola river

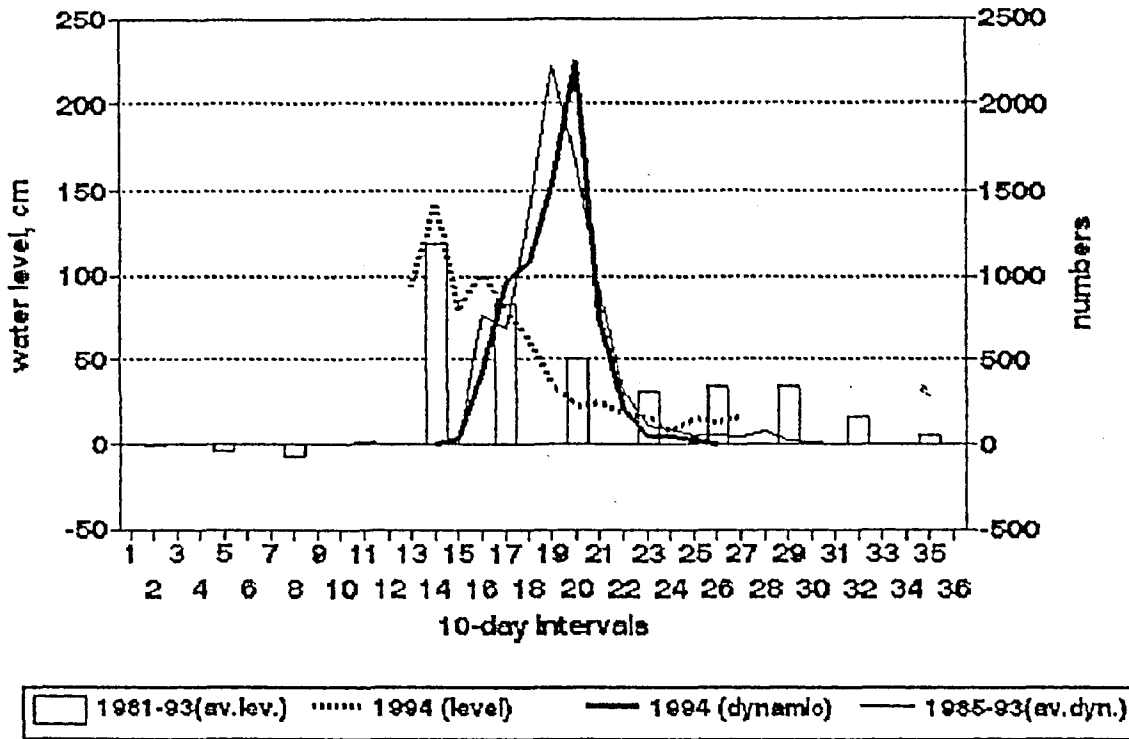


Fig.2. Water level and dynamics of salmon run to the Varsuga river

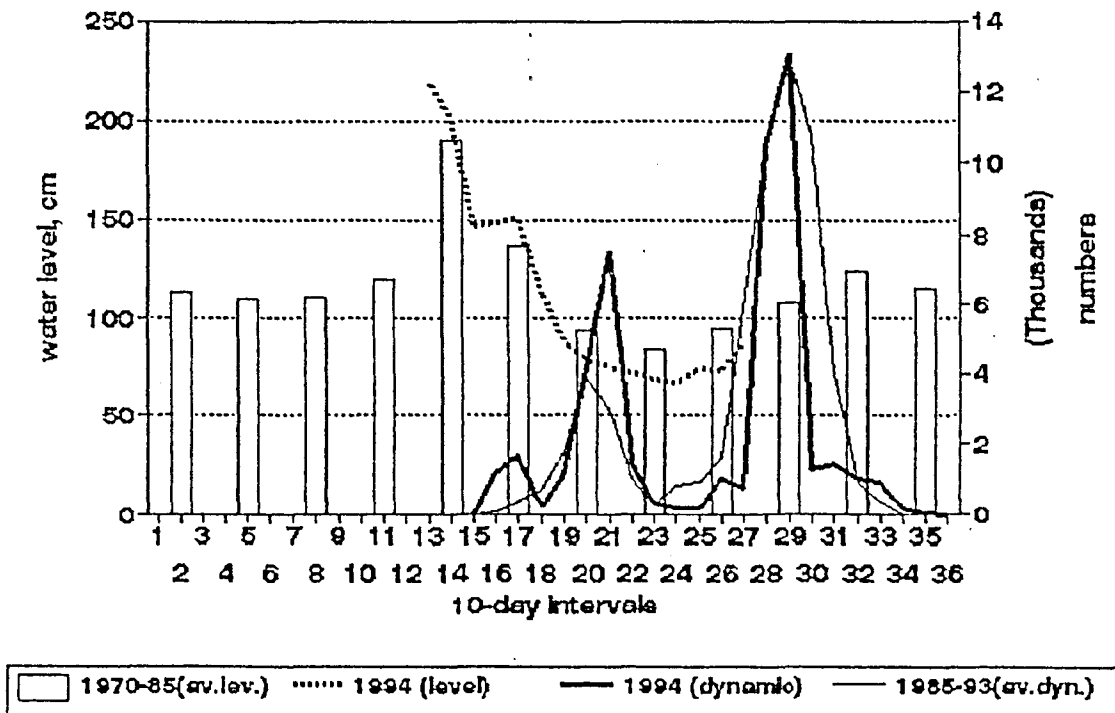


Fig.3. Catch of salmon in different regions of Russia in 1976-1994

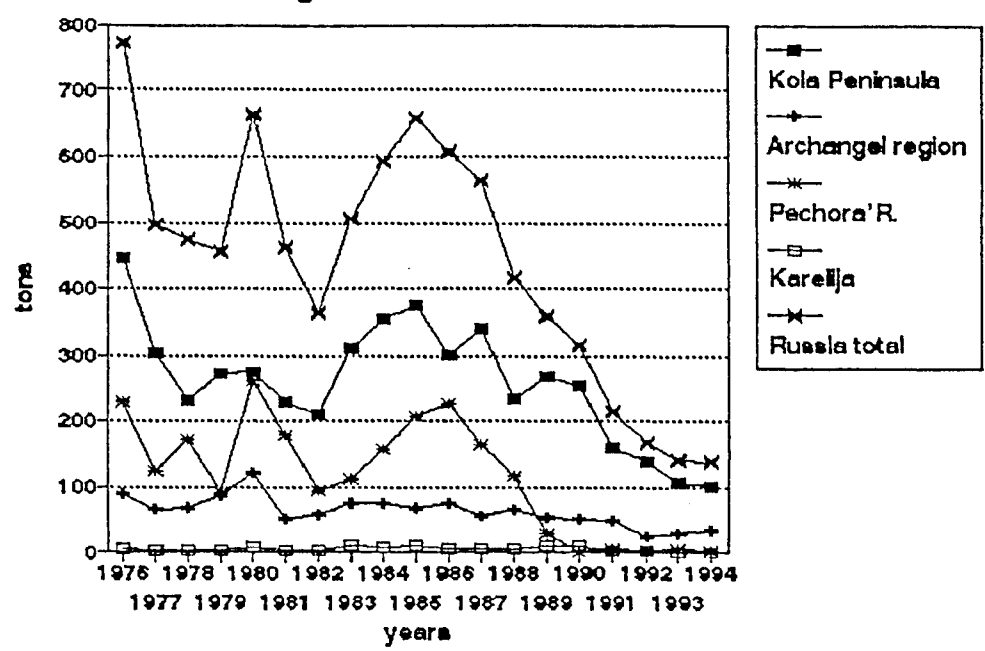


Fig.4. Salmon catch by sport anglers in 1991-1994

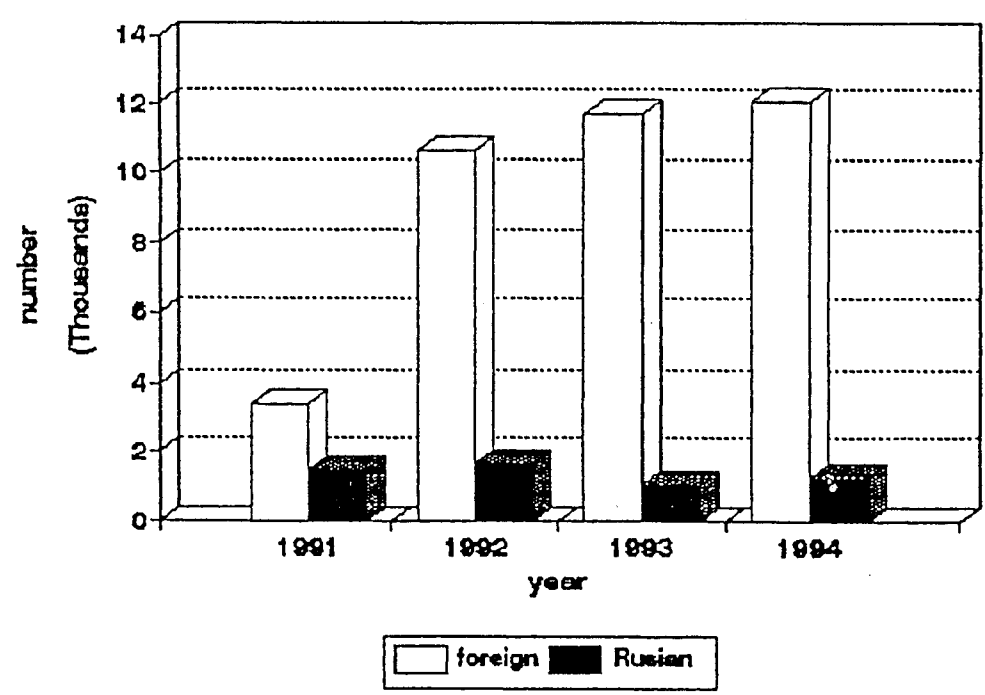


Fig.5. Trend-analysis of Atlantic salmon abundance in the Barents Sea

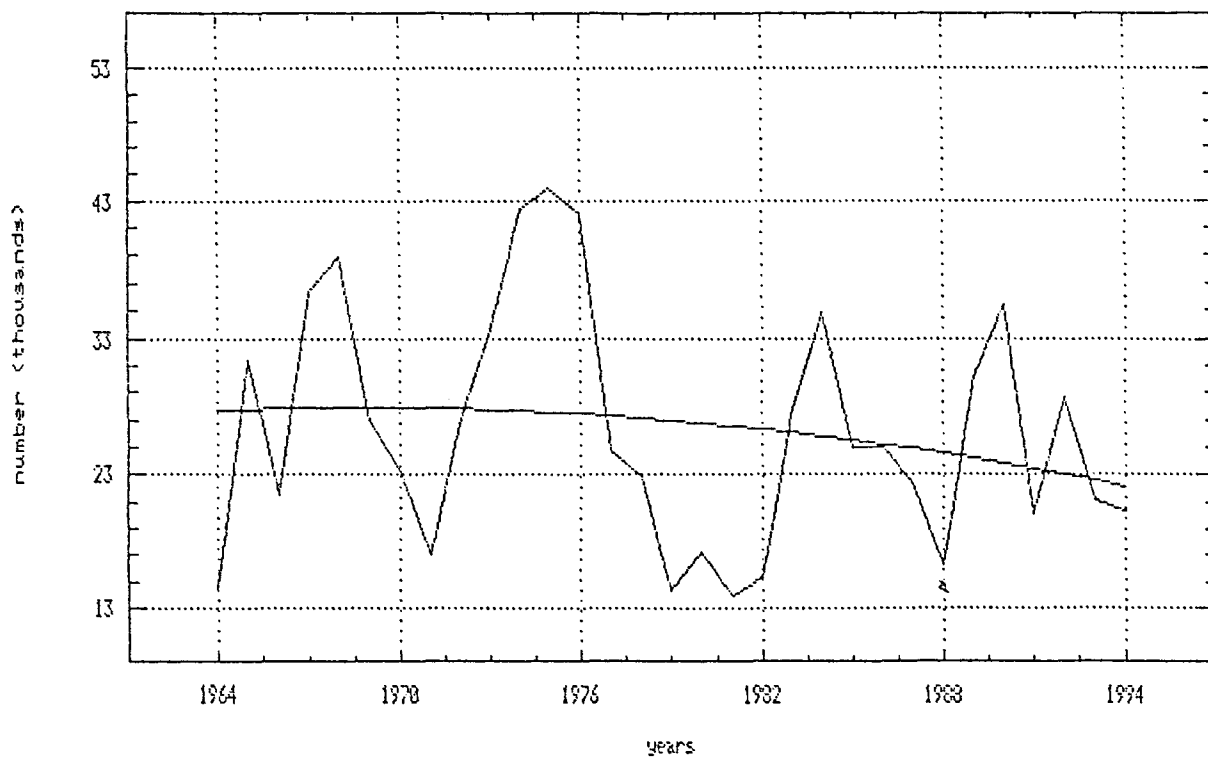


Fig.6. Trend-analysis of Atlantic salmon abundance in the White Sea

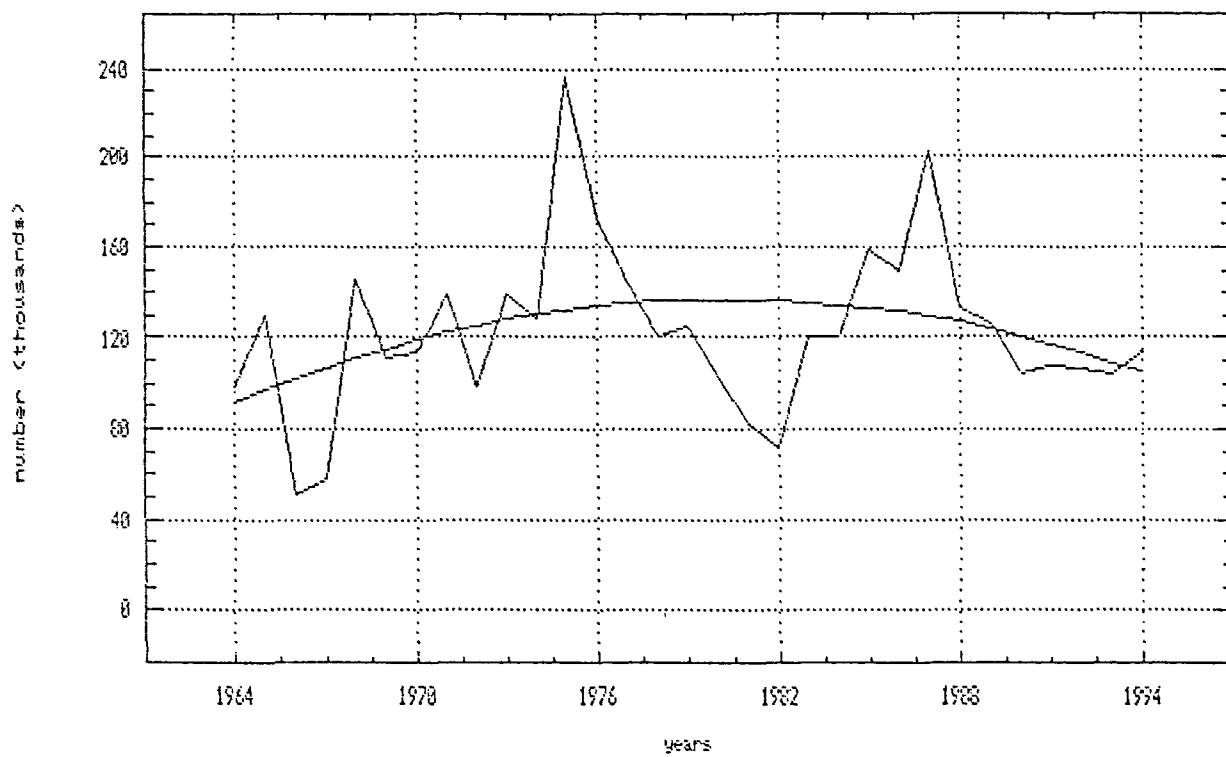


Fig. 7. Abundance of Atlantic salmon in Russian Rivers with commercial fishery

