	<p>Council</p> <p><i>Perspectives on Pink Salmon in the Russian Federation</i></p>	<p>CNL(24)47</p> <p>Agenda item: 7a)</p>
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Perspectives on Pink Salmon in the Russian Federation

Sergey Prusov¹

Introduction

In the Northern fisheries basin pink salmon (*Oncorhynchus gorbuscha*) is an introduced species of Pacific salmon. First experiments to introduce salmon from the Far East into waters of the Kola Peninsula were carried out in the 1930s, when chum salmon (*Oncorhynchus keta*) was chosen as a species for introduction. The experiments, were, however, unsuccessful and the project was closed. It was resumed in 1956 when pink salmon was chosen as a target species for experiments. This species was considered most suitable for introduction since its juveniles do not stay for a long time in rivers, they feed poorly during the migration period and adult fish return to spawn after only 13-15 months of their sea migrations. It was suggested that the White Sea rivers had many spawning grounds suitable for pink salmon and that the fish would make use of food availability in the White Sea and would not undertake extensive migrations. The goal of the project was acclimatization of pink salmon in the area. With abundant enough fishable stocks established the Northern basin fishing industry would get additional resources for the fishery.

From 1956 to 1980 over 200 million artificially fertilized eggs were transferred to the Kola Peninsula, mostly from South Sakhalin. During that period, significant year-to-year variations in returns of adult fish were observed in the area of introductions as well as a rapid decline of abundance of developing stock in the absence of additional transfers of eggs from the native area. As the temperature conditions in the White Sea rivers were found to be the only constraint for the natural pink salmon reproduction, it was decided to use the northern pink salmon populations from the Magadan region as donors. For introductions fertilized eggs of pink salmon from the Ola River were used, which at the stage of eyed egg were transferred to the Murmansk region hatcheries for artificial incubation (Gordeeva *et al.* 2015).

The 1985 introduction using eggs from the Magadan pink salmon of odd-year spawning line laid the foundation for the growth of its natural production in the new area. In 1989 a massive run of pink salmon from natural spawning was observed in rivers of the Kola Peninsula. In the same year, odd-year spawning pink salmon eggs from the Far East were transferred for the last time. There were no transfers of eggs until 1998, when even-year spawning pink salmon eggs from the Ola River were incubated for the last time (Alekseev *et al.* 2019).

In the new area pink salmon have spread widely in rivers of the White and Barents Seas. To the east of the Kola Peninsula they come into rivers flowing into the Kara Sea - Ob', Taz, Yenisey. Now, the Pyasina River, which estuary is located in the south-west of the Taymyr Peninsula, is the eastern most point of pink salmon distribution in the Kara Sea basin (Bogdanov, Kizhevatov. 2007, 2015), while the Tymyr Peninsula is considered a natural border between native and new area of pink salmon distribution.

Regulation

There are at present two anadromous species in the Northern fishery basin, Atlantic salmon (*Salmo salar*) and pink salmon, whose life cycles include extensive periods in marine and freshwater habitats. Both are included in the List of Anadromous Fish (Rosrybolovstvo's Order 147 of 26 Feb 2009). Their fisheries in the Russian Federation's internal waters and territorial sea are carried out in

¹ Polar branch of VNIRO («PINRO» named after N.M.Knipovich), 6 Academician Knipovitch Street, 183038, Murmansk, Russian Federation

accordance with Article 29.1 of Federal Law 166-FZ of 20 Dec 2004 “On fisheries and conservation of aquatic biological resources”.

Management of anadromous fish fisheries in the Russian Federation is based on decisions of a commission for regulation of fishery of anadromous fish (hereinafter referred to as Commission). The Commissions are established by the relevant subjects of the Russian Federation. They are headed by the highest rank official of the subject. Annually, the Commissions decide on the catch limits, times, locations of harvesting as well as other conditions of fisheries for anadromous fish.

Fishing for anadromous species in commercial, coastal, traditional and recreational fishery is only allowed on the basis of contract for use of fishing site and within its limits, except for recreational fishing for pink salmon outside the limits of fishing sites, in waters which are not Atlantic salmon spawning grounds, within the boundaries of the Murmansk and Archangelsk regions, Nenets Autonomous Okrug, Republic of Karelia and Komi Republic.

Fishery of aquatic biological resources in the Northern fisheries basin is regulated by the Fisheries Regulations for the Northern fisheries basin (current version is approved by Order N 292 of 13 May 2021 by the Ministry of Agriculture of Russia (hereinafter referred to as the Fisheries Regulations)).

The Fisheries Regulations stipulate some restrictions in relation to pink salmon and most of them are similar to those established for Atlantic salmon and aimed, in the first place, at conserving the native species. For instance, fishing for Atlantic salmon and pink salmon is prohibited:

- in the Barents Sea from the Varanger Fjord in the west to Cape Svyatoy Nos in the east;
- outside the fishing sites in rivers and creeks, which are Atlantic salmon spawning grounds;
- on days (periods), as established by the Commission, to allow spawners migrate to spawning grounds;
- in estuaries of Atlantic salmon rivers and creeks in the Murmansk region, at the distance less than 500 m from each side of the estuary and at the same distance offshore where the rivers enter the sea;
- in commercial fisheries in Atlantic salmon rivers and creeks of the Murmansk region where net gears are used, except for counting fences deployed in accordance with the decision of the Commission;
- in recreational fishery in the Murmansk region with stationary pound nets of different types and with gill nets both drift and fixed.

Catches

Similarly to its native area, pink salmon introduced into waters of the North West of Russia have two genetically distinct lines (odd-year and even-year). In the new area, however, the species forms commercial fish stocks only in odd years in the White Sea basin where it has been harvested in coastal areas and at counting fences in some rivers since 1960s. The largest catches were recorded in the Murmansk region, where before 2000s they exceeded 100 t four times – in 1973, 1975, 1977 and 1997. In 2001 the catch for the first time was as big as 300 t, but later, until 2015, the catch in odd years varied from 45 to 118 t. Since 2015, the catch of pink salmon in odd years was increasing and reached 382 t in 2019 and in 2021 exceeded 600 t, with 400 t taken at the counting fence in the Varzuga River. In 2023, the pink salmon catch in the Murmansk region was 155 t, with 137 t of it taken in commercial fisheries and 17 t in recreational fishery on fishing sites. There are no estimates of recreational catches by anglers catching pink salmon outside the fishing sites, in waters that are not Atlantic salmon spawning grounds. In 2023, the total nominal catch of pink salmon in the European North of Russia amounted to 206 t which was 71% less than in 2021 and 47% and 21% less than the average catch of pink salmon in previous 5 and 10 odd years, respectively (Table).

Table. Total reported nominal catches of pink salmon by Northwestern regions of Russia (in tonnes round fresh weight), 1993-2023.							
Year	Murmansk Region			Arkhangelsk region	Nenets AO	Karelia Republic	Total catch
	Barents Sea	White Sea	Total				
1993	0,0	32,5	32,5	28,0	0,0	3,0	63,5
1994	0,0	0,0	0,0	0,0	0,0	0,0	0,0
1995	0,0	19,4	19,4	15,0	0,0	8,2	42,6
1996	0,0	0,0	0,0	0,0	0,0	0,0	0,0
1997	0,0	110,9	110,9	23,9	0,0	3,9	138,7
1998	0,0	0,0	0,0	0,0	0,0	0,0	0,0
1999	0,0	27,6	27,6	16,5	0,0	6,6	50,7
2000	0,0	8,6	8,6	0,7	0,0	1,7	11,0
2001	0,0	296,5	296,5	35,0	0,0	8,1	339,6
2002	0,0	0,8	0,8	0,4	0,0	0,2	1,4
2003	0,0	71,6	71,6	33,3	0,0	46,5	151,4
2004	0,0	0,2	0,2	0,9	0,0	0,1	1,2
2005	0,0	45,4	45,4	46,4	0,0	33,8	125,6
2006	0,0	0,5	0,5	0,3	0,0	0,0	0,8
2007	0,0	84,4	84,4	34,2	0,0	44,3	162,9
2008	0,0	0,0	0,0	0,5	0,0	0,0	0,5
2009	0,0	113,0	113,0	19,5	0,0	6,0	138,5
2010	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2011	0,0	64,0	64,0	34,2	0,1	0,0	98,3
2012	0,0	0,0	0,0	0,1	0,1	0,0	0,2
2013	0,0	117,7	117,7	82,8	0,5	0,0	201,0
2014	0,0	2,8	2,8	7,3	1,0	0,0	11,1
2015	0,1	160,7	160,8	58,7	1,0	0,0	220,5
2016	0,0	3,9	3,9	4,3	0,1	0,0	8,3
2017	0,5	277,1	277,6	92,8	3,1	0,0	373,5
2018	0,0	1,4	1,4	2,9	0,0	0,0	4,3
2019	0,2	381,5	381,7	30,6	2,9	2,6	417,8
2020	0,0	0,3	0,3	0,4	0,2	0,0	0,9
2021	1,1	603,0	604,1	105,8	1,3	4,3	715,5
2022	0,0	2,0	2,0	2,1	0,9	0,1	5,0
2023	6,5	148,1	154,6	44,8	5,8	0,5	205,7
Means (odd years only)							
5YM (2013-2021)	0,4	308,0	308,4	74,1	1,8	1,4	385,7
10YM (2003-2021)	0,2	191,8	192,0	53,8	0,9	13,8	260,5

Pink salmon fishery in the White Sea is conducted both in “traditional” fishing sites used mostly for Atlantic salmon fishery and in “new” sites allocated for pink salmon fishery, e.g. in sites in the Kandalaksha Bay where Atlantic salmon fishery is prohibited by the Fisheries Regulations. In the Murmansk region, at one fishing site, as a rule, one stationary pound net of a design typical for the White Sea is used (Fig. 1).

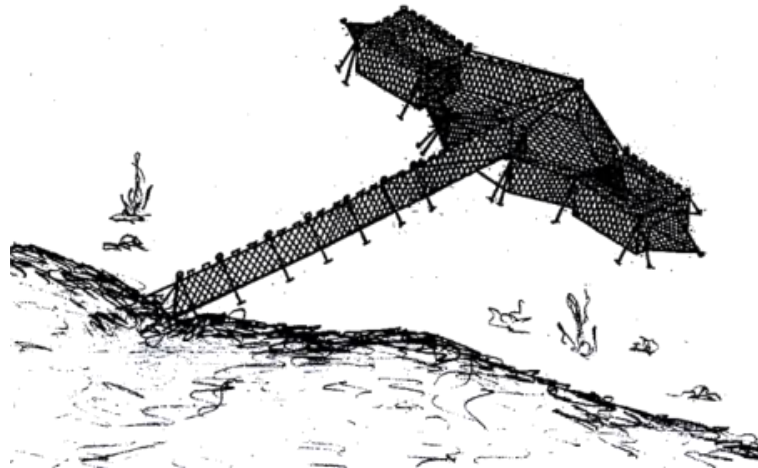


Figure 1. A stationary pound net used in coastal fisheries in the White Sea.

The number of fishing sites for harvesting pink salmon in the Kandalksha Bay in the Murmansk Region increased from 15-16 in 2011-2021 to 41 in 2023, while the number of fishing sites for harvesting Atlantic salmon and pink salmon on the Tersky bereg remained unchanged, annually during pink salmon migration season nets there were deployed at 9-11 “traditional” sites. In odd years of 2011-2021 the total catch of pink salmon and the average catch per fishing site (CPUE) in the Kandalaksha Bay over the season showed notable upward trend. Total catch increased from 13-20 t to 182 t, CPUE from 0.8 t to 11.4 t (Fig. 2A). On the Tersky bereg the total catch of pink salmon varied from 23 t to 93 t, CPUE from 2.3 t to 9.3 t (Fig. 2B). There was no fishery for pink salmon there in 2021 due to administrative reasons. In 2023 both the catch and CPUE in the pink salmon fishery declined sharply in both areas.

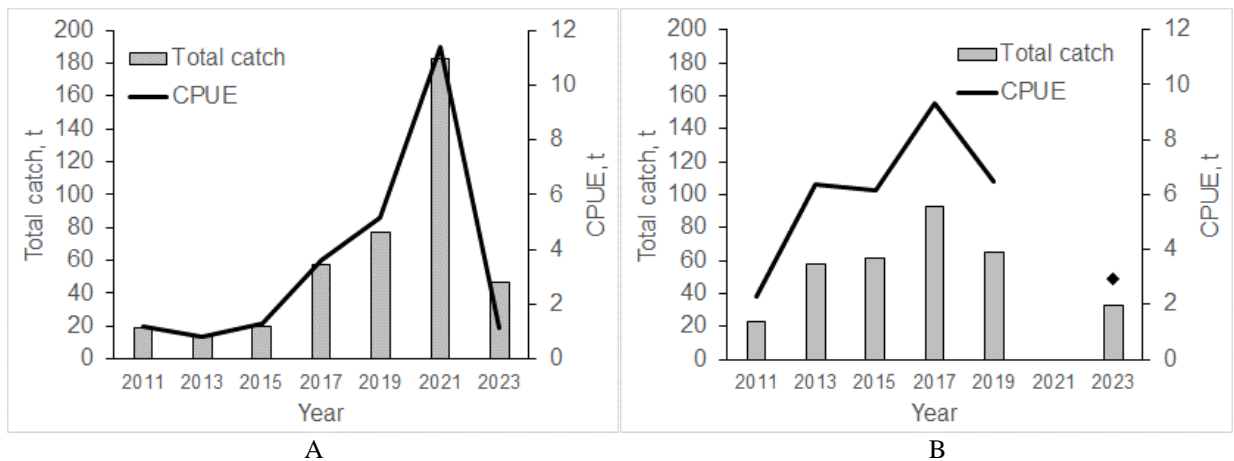


Figure 2. Total reported nominal catch of pink salmon and seasonal mean catch per fishing site (CPUE) in coastal fisheries for anadromous fish in the Kandalaksha Bay (A) and on Tersky bereg (B), 2011-2023.

The catch of pink salmon at barrier fences on the Varzuga and Kitsa (tributary to Varzuga) rivers showed similar dynamics – upward trend before 2021 and sharp decline in 2023 (Fig. 3).

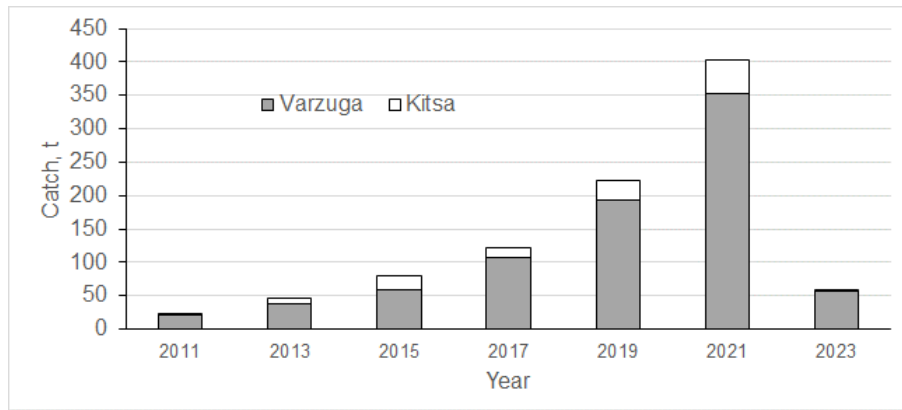


Figure 3. Catch of pink salmon in in-river commercial fisheries for anadromous fish at barrier fences on the Varzuga River and its tributary Kitsa River, 2011-2023.

Pink salmon fishery at counting fences is considered the most efficient way of harvesting the fish that run to spawn. However, for example, in the Murmansk region, where there are more than 27 fishing sites designated for recreational fishery in 23 rivers of the Barents Sea basin and 44 fishing sites in 24 rivers of the White Sea basin, the deployment of counting fences on sites for recreational fishery is prohibited by the Fisheries Regulations. Over the last 20 years, there have only been two counting fences annually deployed for anadromous fish commercial fishery – in the Varzuga River and its tributary Kitsa River (the White Sea basin), whereas in 1958-1997, when Atlantic salmon was exploited commercially on a large scale, the total number of rivers where counting fences were deployed in different years was 36, with the largest number of fences deployed in one year in 1978 – in 23 rivers (Prusov *et al.* 2021).

In 1997, the total nominal catch of odd-year line pink salmon in the Northern fisheries basin for the first time exceeded Atlantic salmon nominal catch (does not include fish caught and released in recreational rod fisheries) and in 2001 it exceeded the nominal catch of the native species by three times (Figure 4).

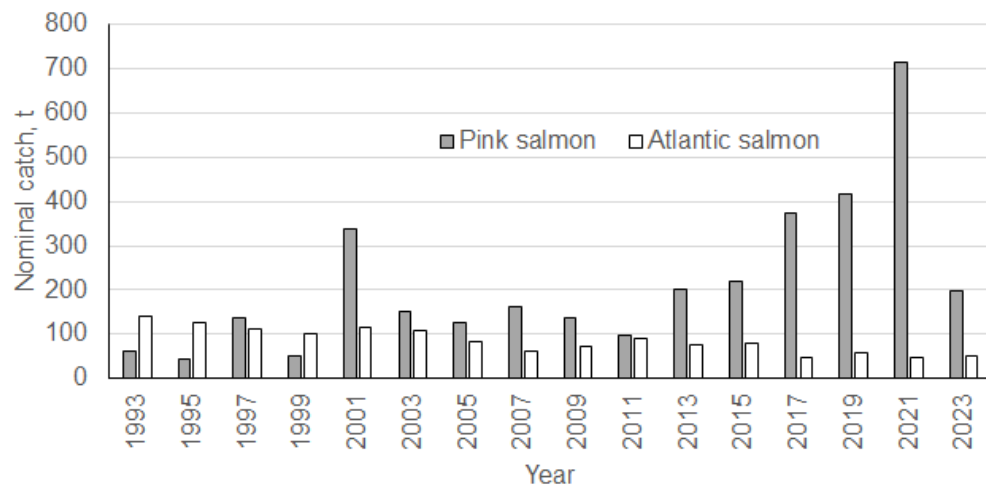


Figure 4. Total reported nominal catches of pink salmon and Atlantic salmon (do not include fish caught and released in recreational rod fisheries) in the Northern Fisheries basin of Russia, 1993-2023.

Conclusions

Pink salmon in the Northern fisheries basin is a fisheries-targeted species harvested in commercial and recreational fisheries since the 1960s, with numbers of pink salmon of even-year line being quite small in its new area, therefore there is practically no targeted fishery of this group. Since the 2000s the nominal catch of pink salmon of odd-year line has consistently exceeded the catch of the native species, Atlantic salmon. However, in contrast to the Far East where pink salmon is one of the main fisheries-targeted species providing the basis for salmon fisheries (Somov et al., 2023), the abundance of pink salmon in the Northern fisheries basin is significantly smaller.

Pink salmon is a short-cycle species of anadromous fish having the life cycle of about two years. It spends only one year in feeding migrations in the sea before spawning, it then migrates into rivers and dies massively after spawning. Because of this specific life pattern the fishery of pink salmon is supported by only one year-class whose abundance is significantly influenced by various environmental factors both in its river habitat and in the sea. That makes it difficult to forecast the abundance of its spawning run and raises considerably the risks for fisheries as commercial fishery with low catch per unit effort may be economically unjustified.

In the light of high level of involvement of local communities in the fishery, small size of fishing sites and catch, short fishing season close to the shore, the fishery for pink salmon in the White Sea can at present be viewed only as artisanal (small-scale), with relatively small investment of funds and energy, small fishing vessels (if there are any) and mainly for local consumption.

In years of high abundance of pink salmon it also becomes quite attractive species in recreational fishery. However, negative attitudes have been noted among users of fishing sites on some rivers where high numbers of pink salmon may have adverse effects on the quality of exclusive Atlantic salmon catch-and-release fishing, while, on the contrary, attitude towards massive run of pink salmon is more tolerant and even positive on salmon rivers where catch-and-retain fishing also takes place.

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