



Management of Pink Salmon in the North Atlantic and Their Potential Threats to Wild Atlantic Salmon

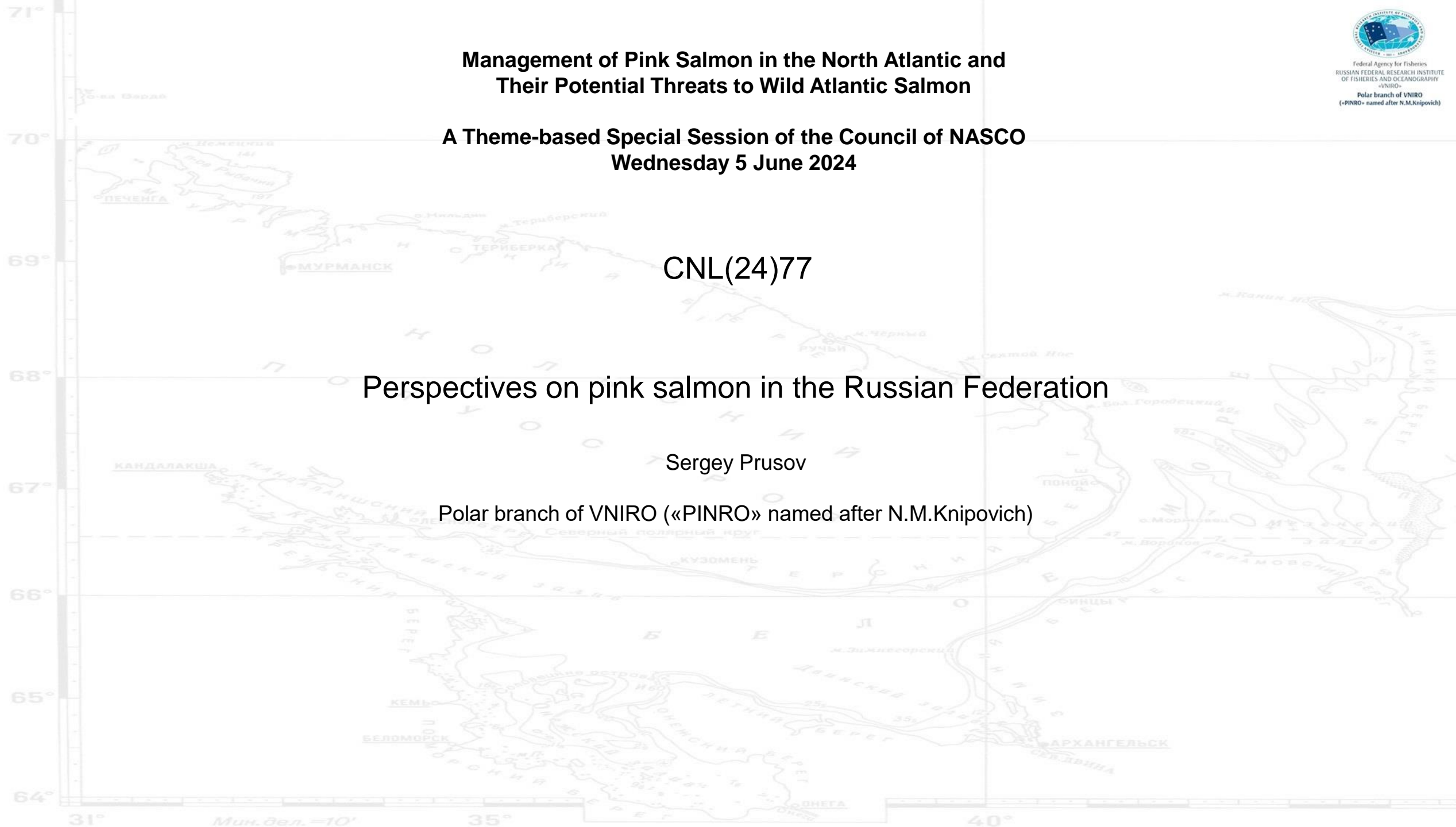
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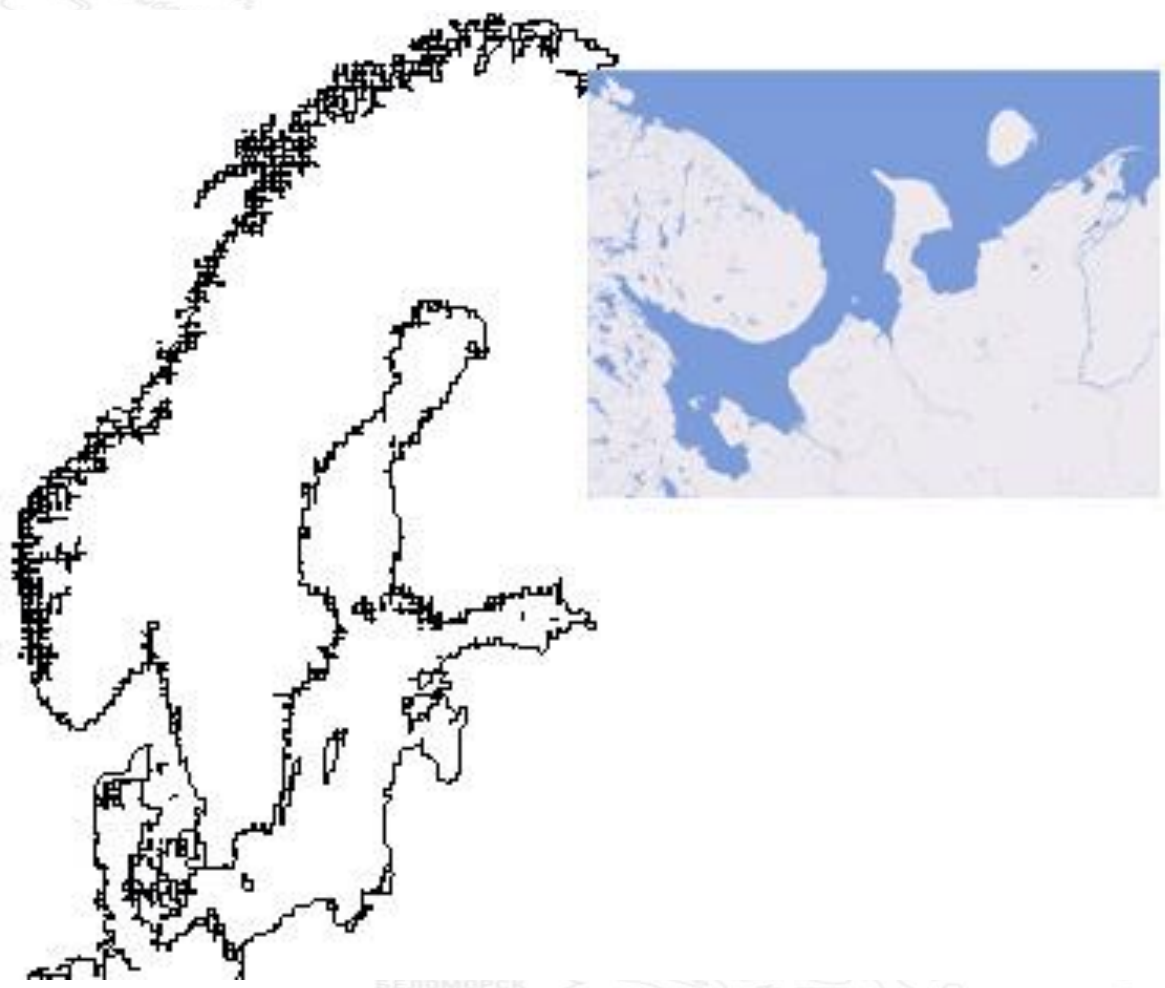
Perspectives on pink salmon in the Russian Federation

Sergey Prusov

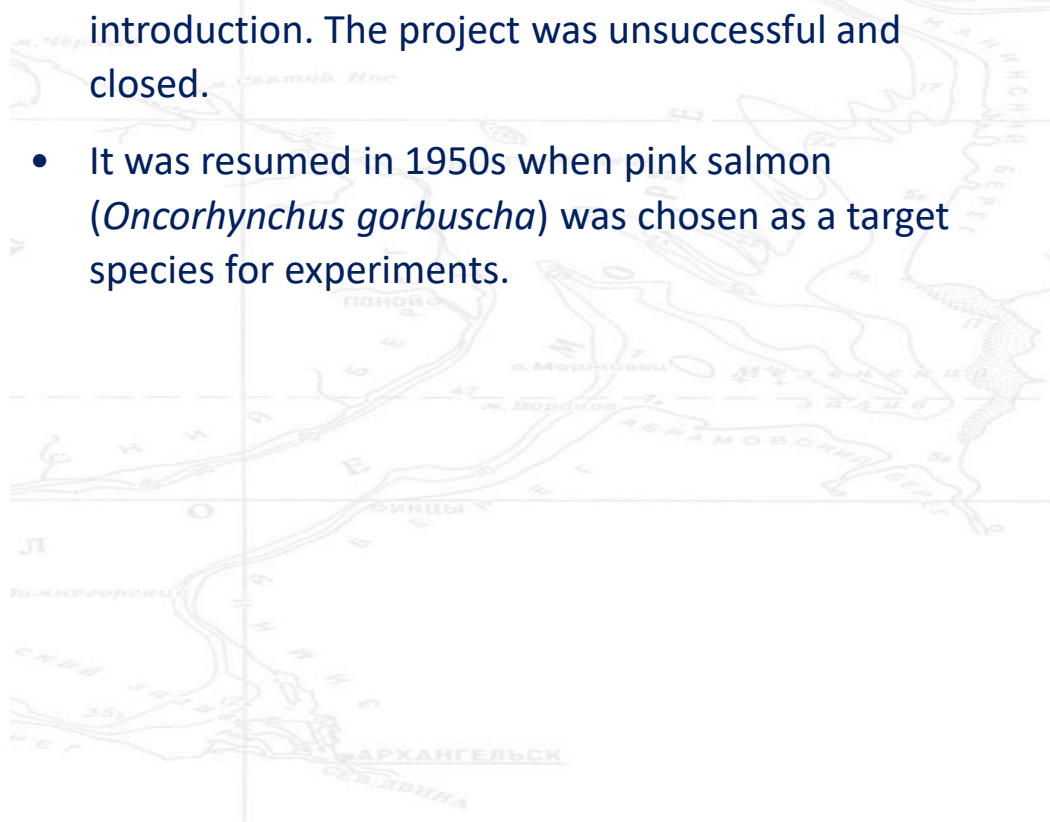
Polar branch of VNIRO («PINRO» named after N.M.Knipovich)



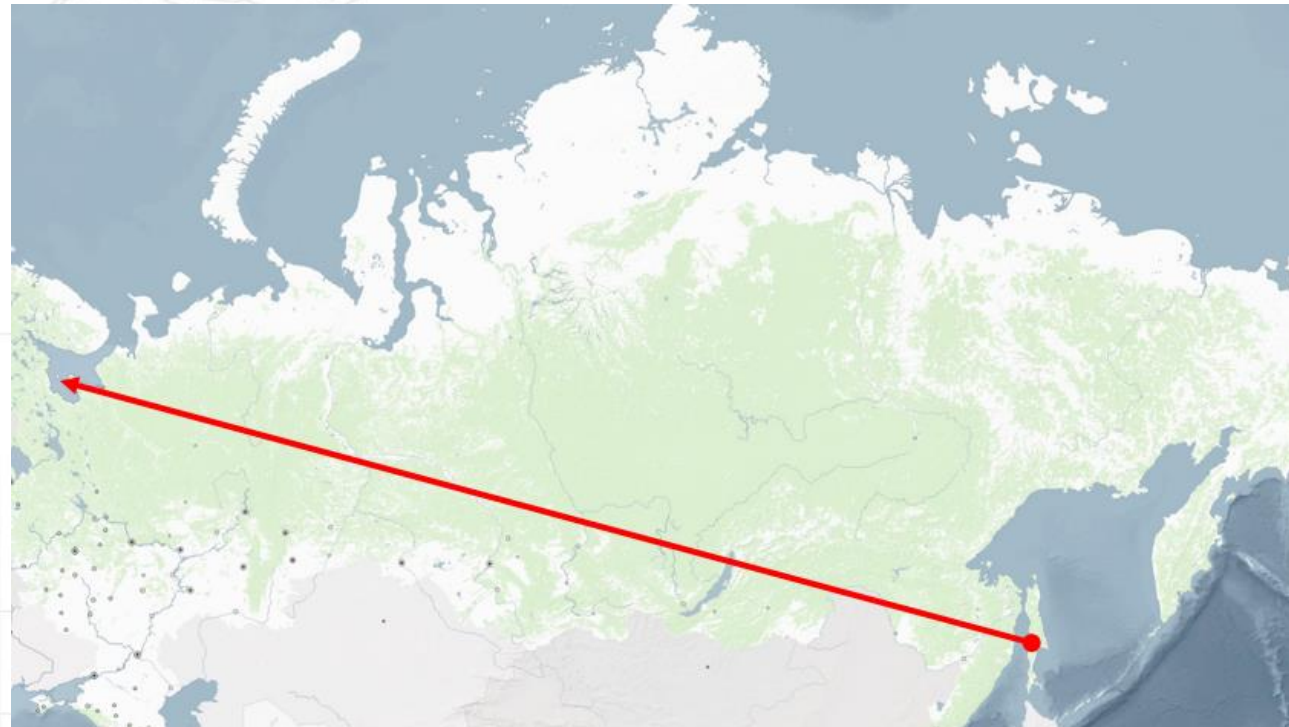
Introduction



- First experiments to introduce pacific 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 project was unsuccessful and closed.
- It was resumed in 1950s when pink salmon (*Oncorhynchus gorbuscha*) was chosen as a target species for experiments.



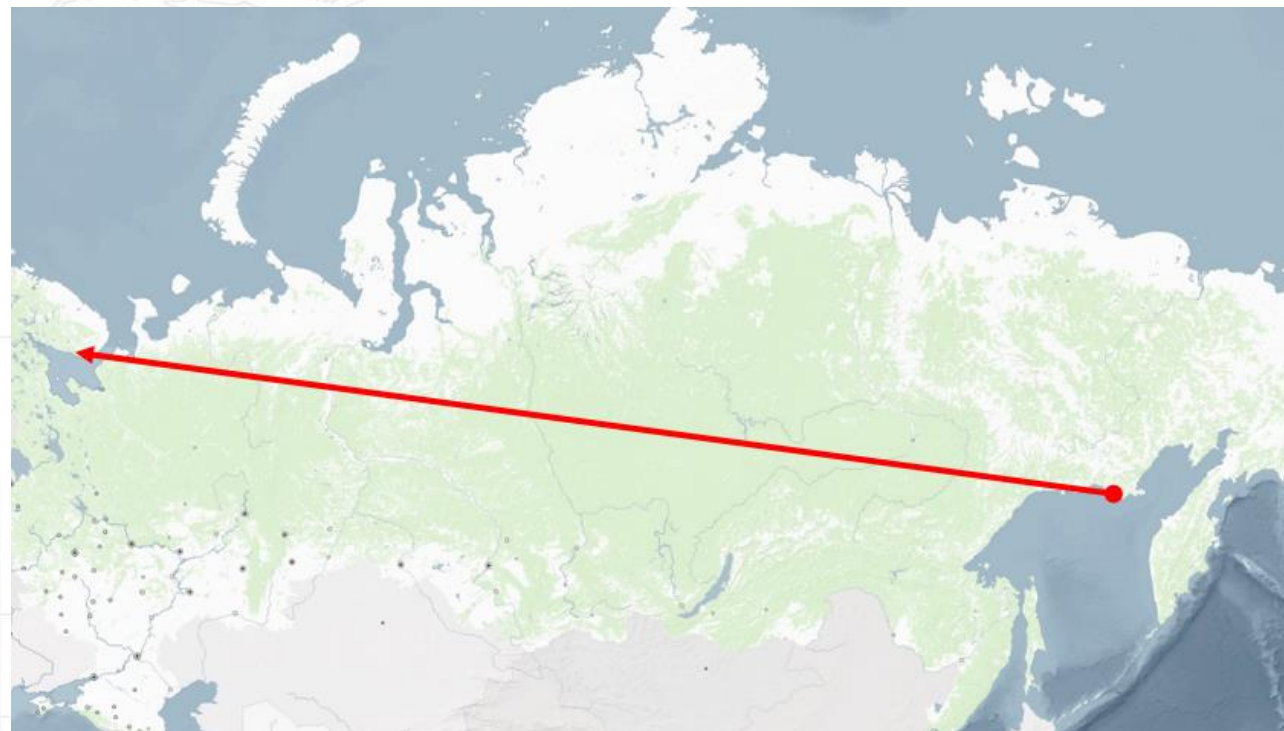
Introduction



- From 1956 to 1980 over 200 million artificially fertilized eggs were transferred, mostly from South Sakhalin.
- Significant year-to-year variations in returns of adult fish were observed in the area of introduction.
- Rapid decline of abundance of pink salmon in the absence of additional transfers of eggs from the native area.



Introduction



- It was decided to use the northern pink salmon population from the Magadan region (the Ola River) as a donor.
- The 1985 introduction 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.
- There were only four transfers of pink salmon eggs from the Ola River in 1985, 1986, 1989 and 1998.

Introduction



- In the new area pink salmon have spread widely in rivers of the White and Barents Seas.
- To the east of the Kola Peninsula adult fish were observed in rivers flowing into the Kara Sea - Ob', Taz, Yenisey.
- Now, the Pyasina River is the eastern most point of introduced pink salmon distribution in the Kara Sea basin, while the Taymyr Peninsula is considered a natural border between native and new area of pink salmon distribution.

Regulation



- Atlantic salmon and pink salmon are in the List of Anadromous Fish (Rosrybolovstvo's Order 147 of 26 Feb 2009).
- Fisheries for anadromous fish in the Russian Federation's internal waters and territorial sea are carried out in 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 regional commissions for regulation of fishery of anadromous fish.

Regulation



The barrier fence in the Varzuga River

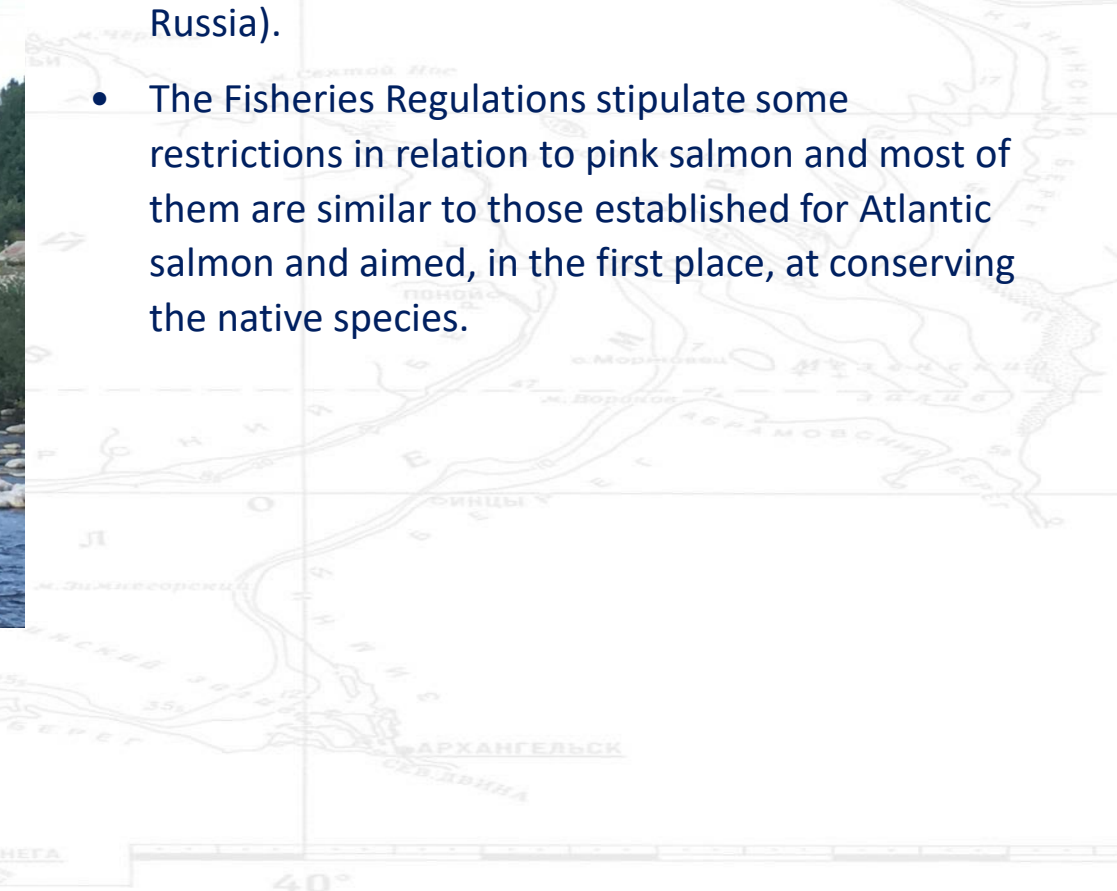
- The Commissions are established by the relevant subjects of the Russian Federation. The Commission is headed by the highest rank official of the subject.
- Annually, the Commissions decide on the catch limits, times, locations of harvesting as well as other conditions of fisheries for anadromous fish.
- Fishing for anadromous fish in commercial, coastal, traditional and recreational fisheries 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.

Regulation



Recreational fishing for pink salmon in the Niva River
(the river lost Atlantic salmon due to hydropower development).

- Fisheries in the Northwest Russia are 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).
- 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.



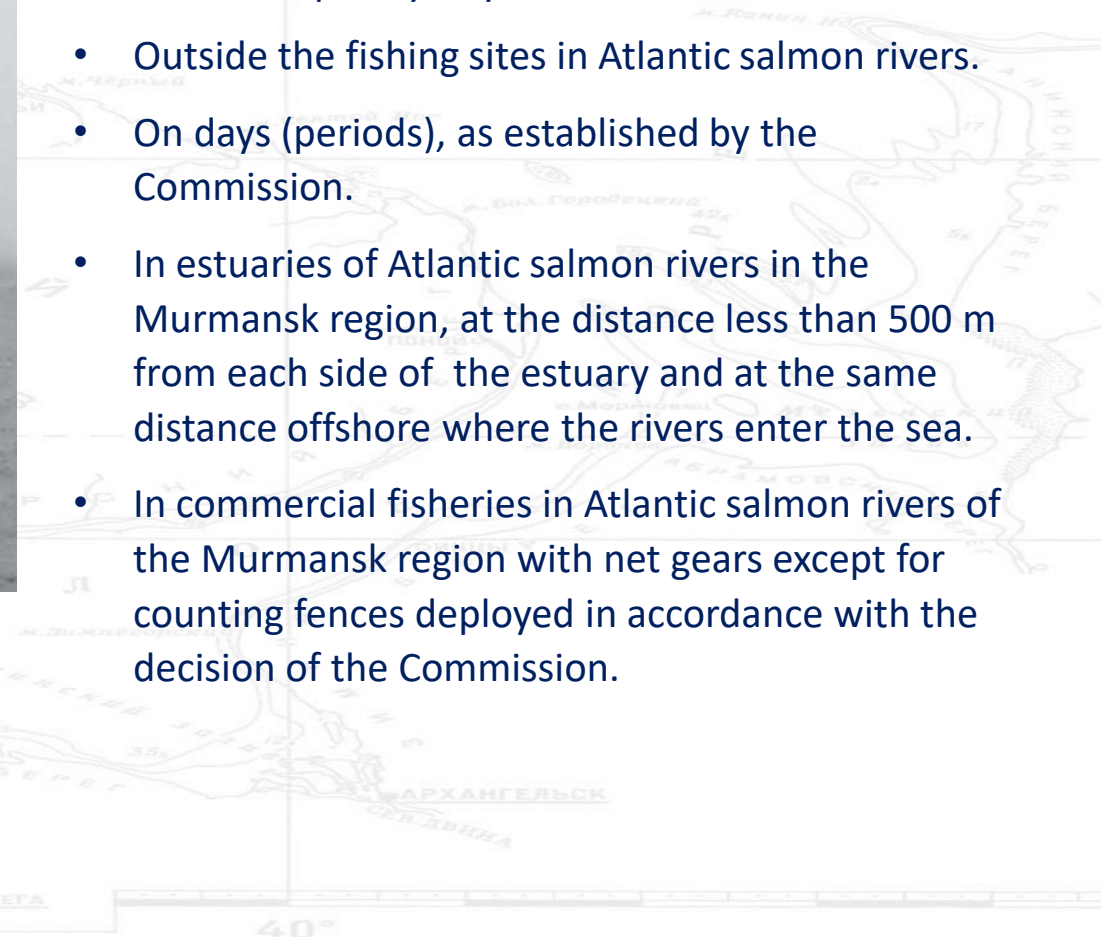
Regulation



Recreational fishing for pink salmon in the Terskiy bereg of the White Sea

Fishing for anadromous fish 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 Atlantic salmon rivers.
- On days (periods), as established by the Commission.
- In estuaries of Atlantic salmon rivers 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 of the Murmansk region with net gears except for counting fences deployed in accordance with the decision of the Commission.

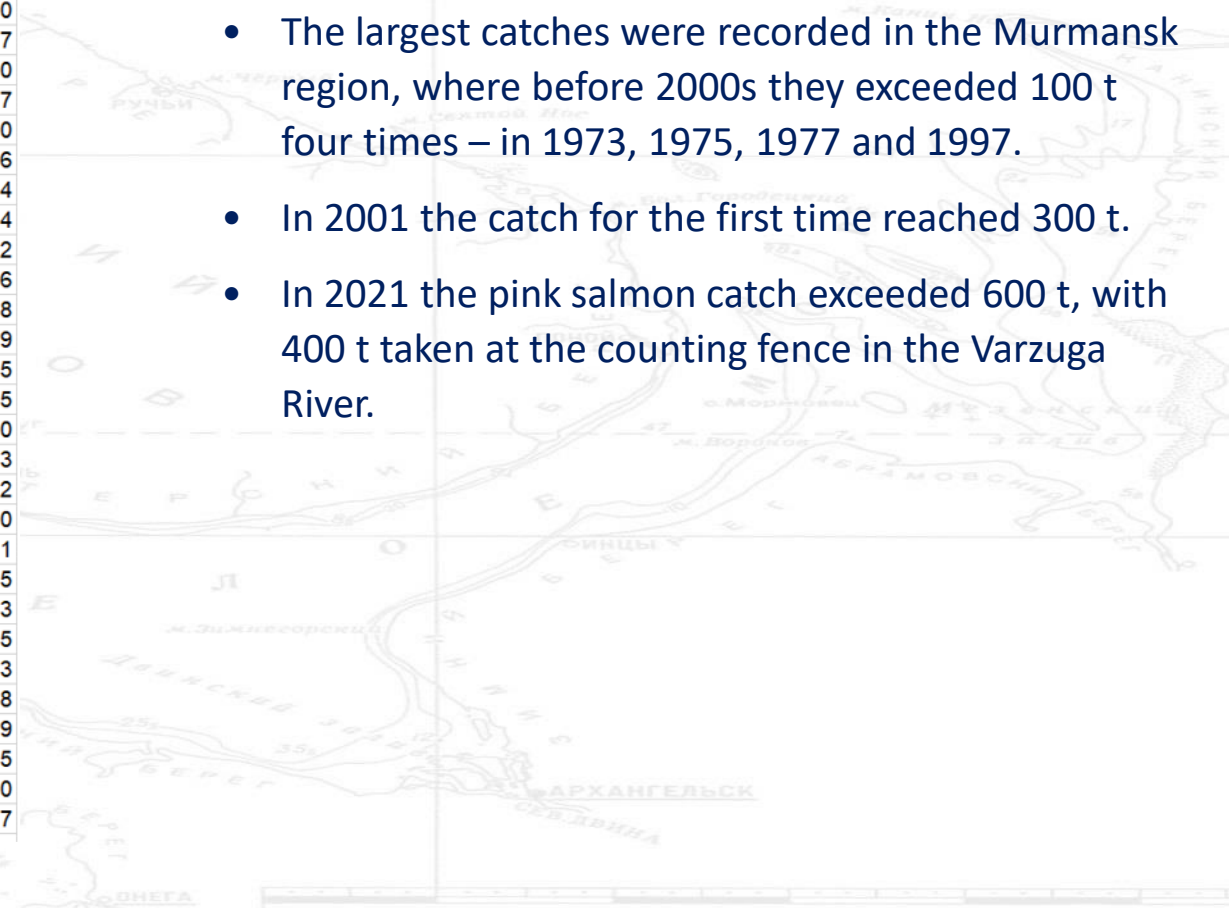


Catches

Total reported nominal catches of pink salmon by the 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

- In the new area pink salmon is a fishery-targeted species harvested in coastal areas of the White Sea 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 reached 300 t.
- In 2021 the pink salmon catch exceeded 600 t, with 400 t taken at the counting fence in the Varzuga River.

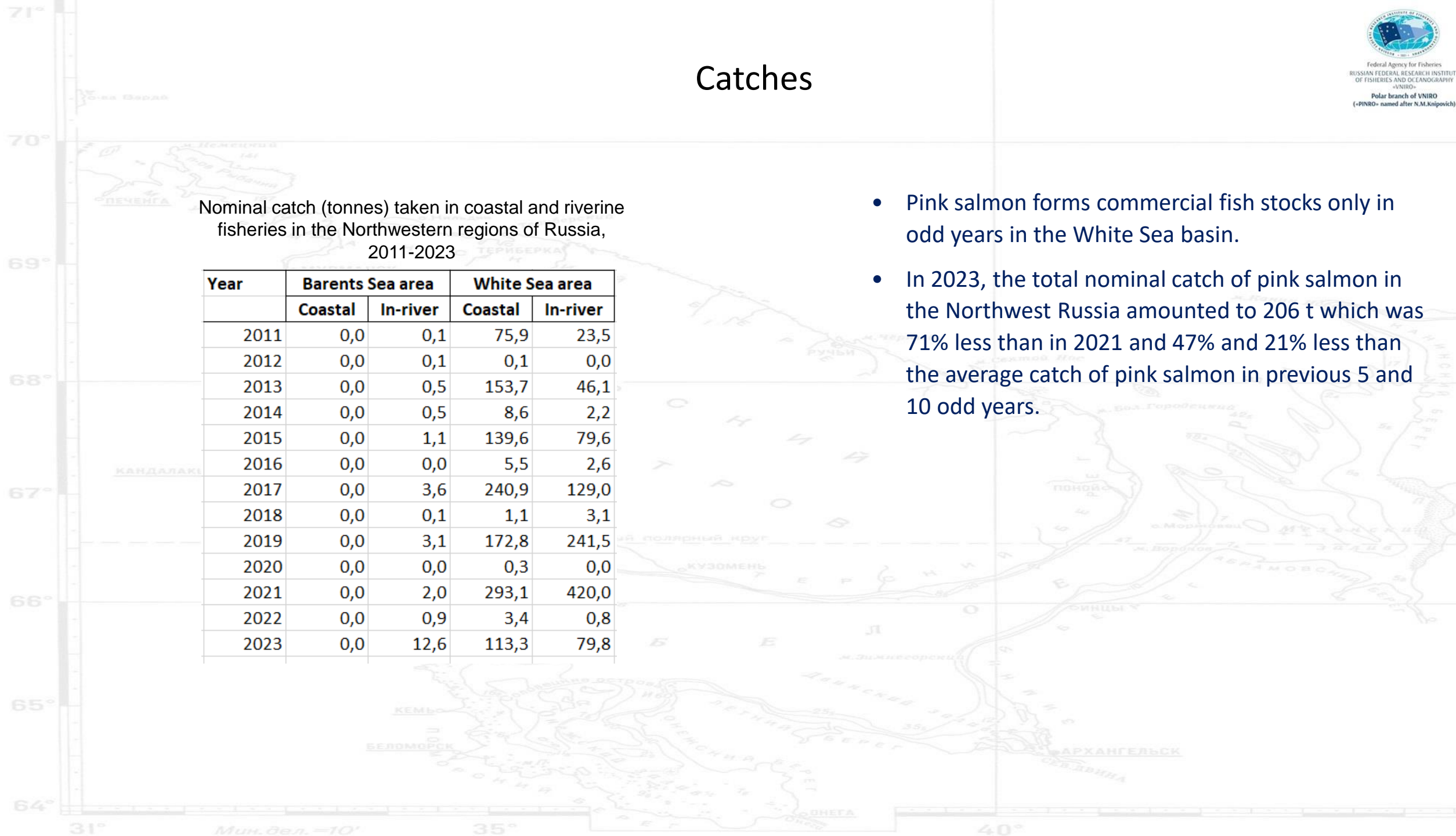


Catches

Nominal catch (tonnes) taken in coastal and riverine fisheries in the Northwestern regions of Russia, 2011-2023

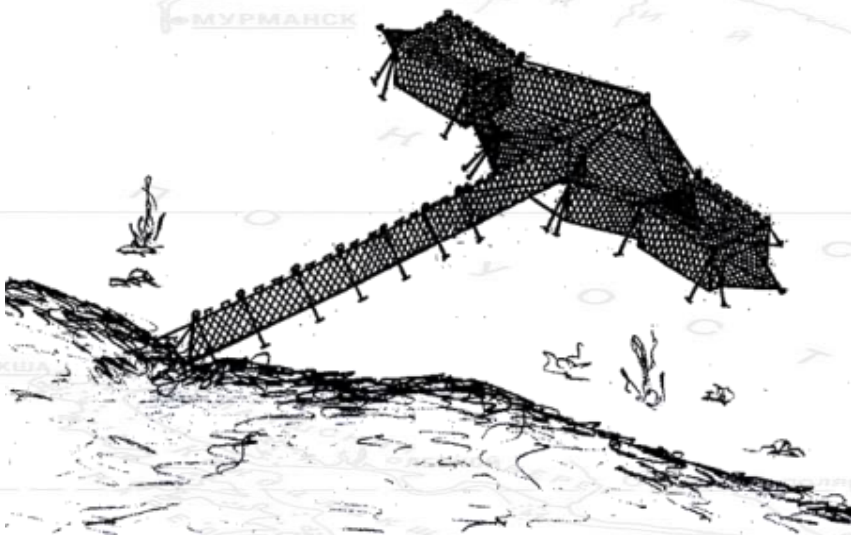
Year	Barents Sea area		White Sea area	
	Coastal	In-river	Coastal	In-river
2011	0,0	0,1	75,9	23,5
2012	0,0	0,1	0,1	0,0
2013	0,0	0,5	153,7	46,1
2014	0,0	0,5	8,6	2,2
2015	0,0	1,1	139,6	79,6
2016	0,0	0,0	5,5	2,6
2017	0,0	3,6	240,9	129,0
2018	0,0	0,1	1,1	3,1
2019	0,0	3,1	172,8	241,5
2020	0,0	0,0	0,3	0,0
2021	0,0	2,0	293,1	420,0
2022	0,0	0,9	3,4	0,8
2023	0,0	12,6	113,3	79,8

- Pink salmon forms commercial fish stocks only in odd years in the White Sea basin.
- In 2023, the total nominal catch of pink salmon in the Northwest 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.



Catches

- Pink salmon fishery in the White Sea is conducted both in “traditional” fishing sites used for Atlantic salmon fishery and in “new” sites allocated for pink salmon fishery only, e.g. 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.



A “traditional” stationary pound net used in coastal fisheries in the White Sea

Catches

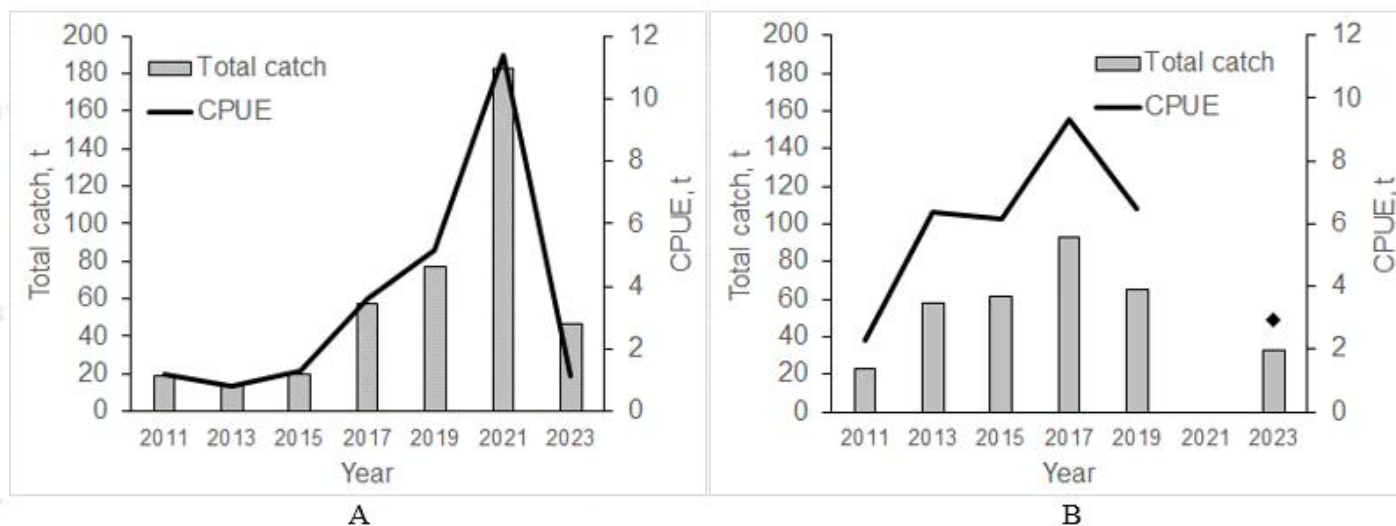


A set of pound nets of the Far East design used for the first time in 2023 in the White Sea in coastal pink salmon fishery

- 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.
- 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 2023, in one fishing site on the Tersky bereg, there was an attempt to use a new type of gear for the White Sea (a set of pound nets of the Far East design).

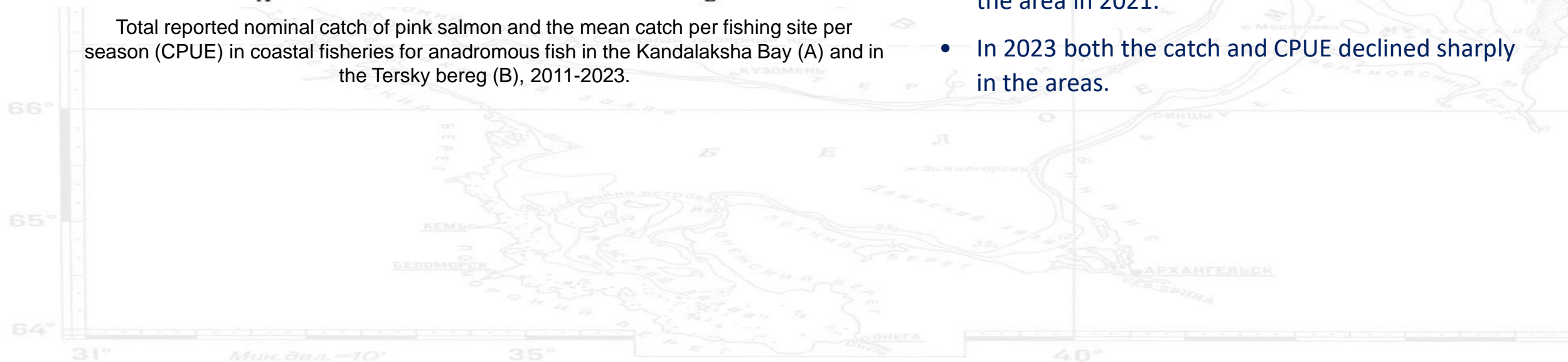


Catches

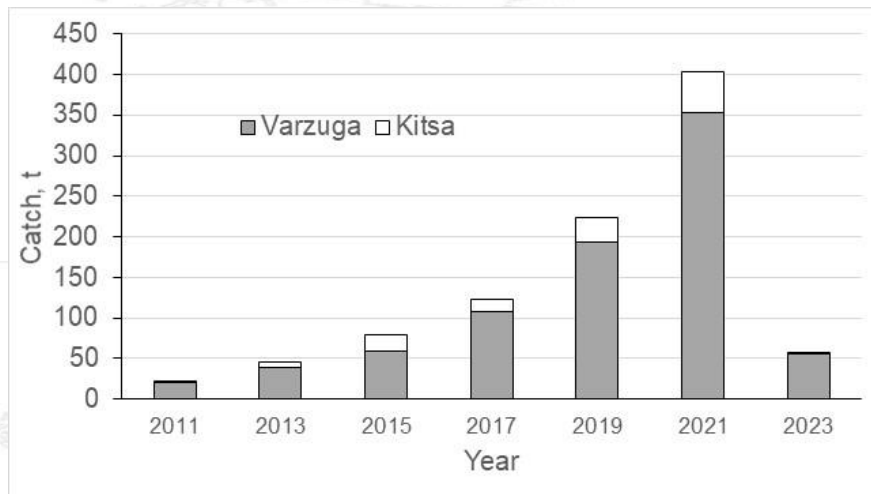


- In odd years of 2011-2021 the total catch of pink salmon and the average catch per fishing site per season (CPUE) in the Kandalaksha Bay showed notable upward trend. Total catch increased from 13-20 t to 182 t, CPUE rose from 0.8 t to 11.4 t (Fig. 2A).
- In the Tersky bereg the total catch of pink salmon varied from 23 t to 93 t, CPUE from 2.3 t to 9.3 t (Fig. 2B). No pink salmon coastal fishery occurred in the area in 2021.
- In 2023 both the catch and CPUE declined sharply in the areas.

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



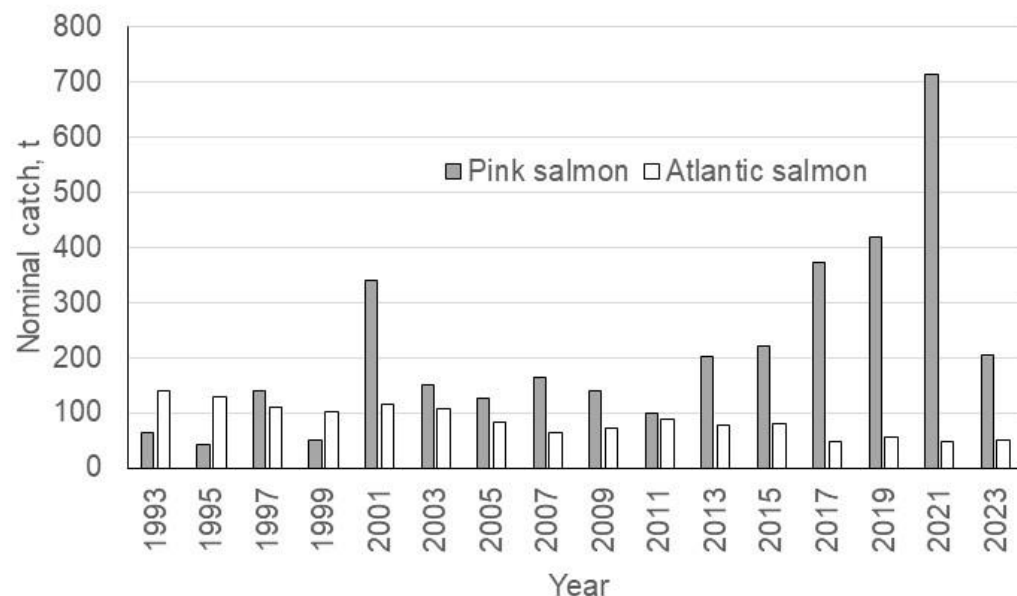
Catches



Pink salmon catches in riverine commercial fishery for anadromous fish at barrier fences in the Varzuga River and its tributary Kitsa River, 2011-2023.

- Fishery at counting fences is considered the most efficient way of harvesting pink salmon.
- However, due to the significant shift from commercial Atlantic salmon fishery to the recreational one in the early 1990s, only two barrier fences have been in use over last 20 years for commercial fishery of anadromous fish - in the Varzuga River and its tributary Kitsa River (White Sea basin).
- The installation of barrier fences in rivers in fishing sites designated for recreational fishing is prohibited by the Fishery Regulations.

Catches



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

- In 1997, the total nominal catch of odd-year line pink salmon in the Northwest Russia for the first time exceeded Atlantic salmon nominal catch (does not include fish caught and released in recreational rod fisheries).
- In 2001 pink salmon catch exceeded the nominal catch of Atlantic salmon by three times.
- Since 2001 the nominal catch of pink salmon of odd-year line has consistently exceeded the catch of Atlantic salmon.

Conclusions



- Pink salmon in the Northwest Russia is a fisheries-targeted species harvested in commercial and recreational fisheries since the 1960s.
- However, in contrast to the Far East where pink salmon is one of the main fish species providing the basis for salmon fisheries, the abundance of pink salmon in the Northern fisheries basin is significantly low.
- Because of its life cycle 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.

Conclusions



- In the light of high level of involvement of local communities in the fishery, small size of fishing sites and catches, 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) fishery, with relatively small investment of funds and energy, small fishing vessels (if there are any) and mainly for local consumption.

Conclusions



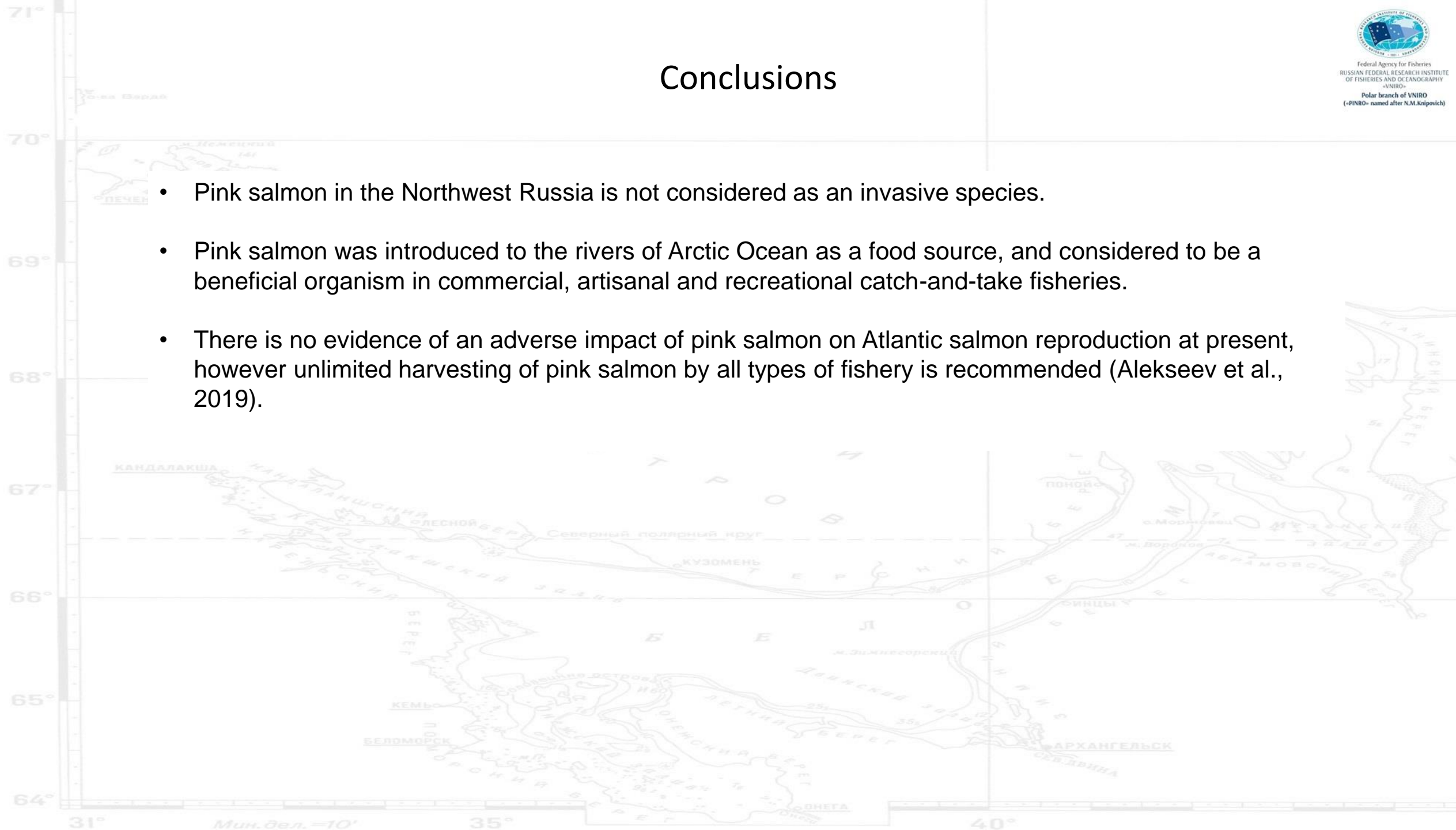
Фото: Лев Федосеев

<https://www.mvestnik.ru/fishmans/kak-podarkom-rasporjaditsya/>

- In years of high abundance of pink salmon it also becomes quite attractive species in recreational fisheries.
- 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 expensive Atlantic salmon catch-and-release fly fishing.
- 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.

Conclusions

- Pink salmon in the Northwest Russia is not considered as an invasive species.
- Pink salmon was introduced to the rivers of Arctic Ocean as a food source, and considered to be a beneficial organism in commercial, artisanal and recreational catch-and-take fisheries.
- There is no evidence of an adverse impact of pink salmon on Atlantic salmon reproduction at present, however unlimited harvesting of pink salmon by all types of fishery is recommended (Alekseev et al., 2019).





If it looks good, eat it!

