

Salmon resources and management in Northern Norway, Finland and Russian Barents and White Seas

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Abstract

In Kolarctic salmon project we made an overview of the salmon resources in terms of total salmon catches caught within the project area. Catches caught in Kolarctic area are compared to the total salmon catches caught in northern areas in the Northeast Atlantic. An overview of the salmon fisheries restrictions and general management policies is presented. The total confirmed salmon catches at sea and in the rivers have been around 2300 tons in 1972-1986 within the Northern North East Atlantic Commission area (NEAC North; Sweden, Iceland, Norway, Finland, Russia). The annual proportions of salmon caught in Kolarctic salmon project area have been significant when comparing them to the total salmon catches caught in NEAC North area. Before the year 1990 the proportions of salmon caught in Kolarctic salmon project area were even 60% of the total NEAC North catches. In the recent years salmon catches in Kolarctic area have made 40-50% of the total NEAC North catches. Total salmon catches in the Kolarctic salmon project area were as high as c. 1500 tons in 1970s and 1980s. In the end of 1980s new restrictions were introduced for the salmon fishery like the prohibition of salmon fishing with drift nets in Northern Norway. This new management regime caused a clear decline in the Norwegian catches. Also new strategies in Russia to exploit salmon stocks in rivers declined clearly Russian salmon catches. From the early 1990s onwards the proportions of salmon catches between Norway, Finland and Russia have been quite stable. The Norwegian salmon catch has made c. 70% in the recent years from the total catch caught in Kolarctic salmon project area. Since the year 2000 salmon catches in Kolarctic salmon project area have fluctuated between 400 and 800 tons.

1. Introduction

In the Kolarctic salmon project application it was stated that the final beneficiaries and/or target groups of all the data collected and reported within this project are ministries, management authorities, national and regional and local authorities (Counties and Municipalities), research institutions, fishers organizations, fishermen (recreational/ professional), international governmental organization (like NASCO, ICES), indigenous peoples, tourism operators, tourists, local people, NGOs and politicians. Therefore in this project it was decided to collect basic data also on the reported salmon catches to describe the salmon resources and make an overview of the fisheries management.

In the Kolarctic salmon project application it has mentioned *in the "ACTION 2 – BIOLOGICAL AND GENETIC ANALYSES OF COASTAL AND RIVERINE SAMPLES"* and *in the Activity 7: Enter data into existing databases*, and therefore FGFRI and FMFI received catch statistics from SSB (Statistics Norway) for further analysis. Also to fulfill the *Activity 12: Salmon and global climate change* SSB catch data was needed in the evaluation, comparison and description of possible signs on global climate change in relation between historical and new data regarding the salmon catches, abundance and environmental parameters. And to fulfill the *Activity 13: Salmon ecology and different management regimes*, SSB catch data was needed in the description of the salmon ecology (size groups) and salmon resource in project area and also in the description of the development in the salmon fisheries management measures over time.

2. Material and methods

Salmon catch data used in this report is collected from the annual official reports ((Statistisk Sentralbyrå (SSB), Laks-og Sjøaurefiske; Central Bureau of Statistics of Norway, Salmon and Sea Trout Fisheries)). Salmon catch data from the year 1993 onwards is delivered from SSB (Statistics Norway). Finnish Game and Fisheries Research Institute delivered catch data of the rivers Tana and Neiden and PINRO institute delivered salmon catch data from Russia.

3. Results

3.1 Salmon catches within Kolarctic salmon project area

The total confirmed salmon catches at sea and in the rivers have been around 2300 tons in 1972-1986 within the Northern North East Atlantic Commission area (NEAC North; Sweden, Iceland, Norway, Finland, Russia). Some years after the establishment of NASCO organization, which prohibited the high seas salmon fishery outside the economic zones, in the year 1984 salmon catches started to decline. These catch declines were affected by the new restrictions in the fisheries mainly at sea but also in rivers. In Norway the drift net fishery operated until the year 1988 and thereafter it was completely prohibited. Figure 1 illustrates the development in the catches within the Kolarctic salmon project area in Northern Norway, Finland and Russia (figure in the bottom), development in the catches in Norway outside the Kolarctic salmon project area (figure in the middle) and development in the catches in NEAC North areas (figure on the top). Catches for NEAC North area increased clearly early 1990s and then declined to more or less normal levels in mid-1990s. The big increase in the catches was caused by the ranching program in Iceland where reared salmon smolts were released into some rivers and into the estuaries and then one and two years later those matured salmon were caught effectively in the estuaries. The annual proportions of salmon caught in Kolarctic salmon project area have been significant when comparing them to the total salmon catches caught in NEAC North area. Before the year 1990 the proportions of salmon caught in Kolarctic salmon project area were even 60% of the total NEAC North catches. In the recent years salmon catches in Kolarctic area have made 40-50% of the total NEAC North catches.

Total salmon catches in the Kolarctic salmon project area were as high as c. 1500 tons in 1970s and 1980s. In the end of 1980s new restrictions were introduced for the salmon fishery like the total moratorium of salmon fishing with drift nets in Northern Norway. This new management regime caused a clear decline in the Norwegian catches. Also new strategies in Russia to exploit salmon stocks in rivers declined clearly Russian salmon catches. From the early 1990s onwards the proportions of salmon catches between Norway, Finland and Russia have been quite stable. The Norwegian salmon catch has made c. 70% in the recent years from the total catch caught in Kolarctic salmon project area. Since the year 2000 salmon catches in Kolarctic salmon project area have fluctuated between 400 and 800 tons.

Salmon catches in the year 2012 within Kolarctic salmon project area were in Norway, Finland and Russia 293.9, 64.4 and 82.4 tons, respectively. From the Norwegian salmon catch in Kolarctic project area in the year 2012 139.8 tons was caught at sea and 154.1 tons in the rivers. In Norway outside Kolarctic salmon project area salmon catch was 401.7 tons out of which 115.5 tons was caught at sea and 286.2 tons in the rivers. Salmon catch in NEAC North area was 98.6 tons.

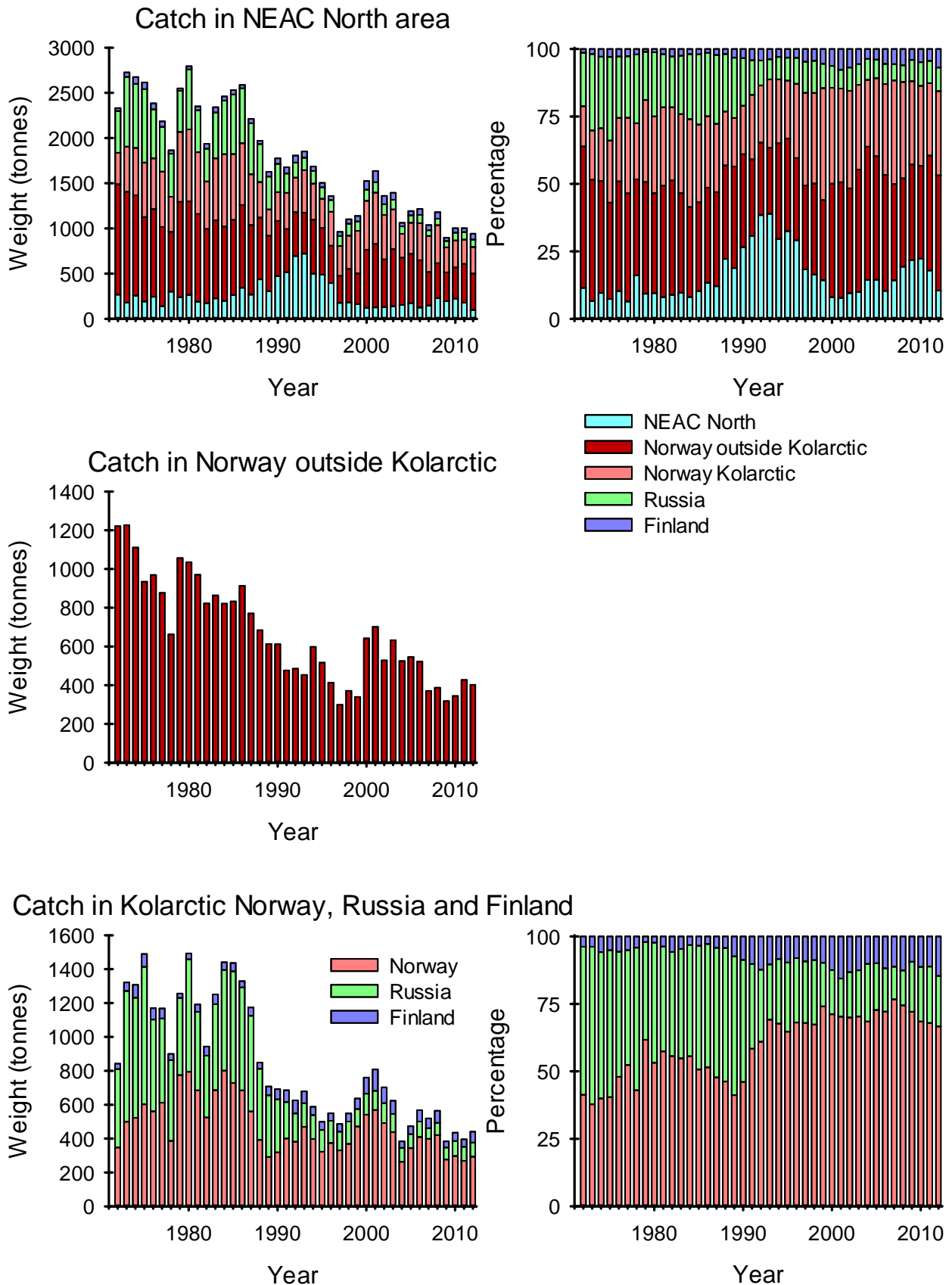


Figure 1. Total salmon catches at sea and in the rivers in the Kolarctic salmon project area. NEAC North (NEAC = North East Atlantic Commission area in NASCO, NASCO=North Atlantic Salmon Conservation Organization) includes salmon catches at sea and in the rivers in Sweden, Denmark and Iceland.

Figure 2 indicates that the long-term salmon catch fluctuations in three countries in Kolarctic salmon project area. The catches in each country show remarkable annual fluctuations. The fluctuations can be caused by normal long-term changes in the stock sizes like in the Finnish salmon catches which are representing fluctuations in two rivers (rivers Tana and Neiden). The same kind of fluctuations that was in Finnish salmon catches can be observed in the Norwegian salmon catches especially from the year 1990 onwards. Fluctuations in the Russian catches is impossible to observe in the past twenty years because from the 1990s onwards salmon fishery has been quota based and it has been strictly limited the numbers of salmon taken by recreational fishermen in rivers.

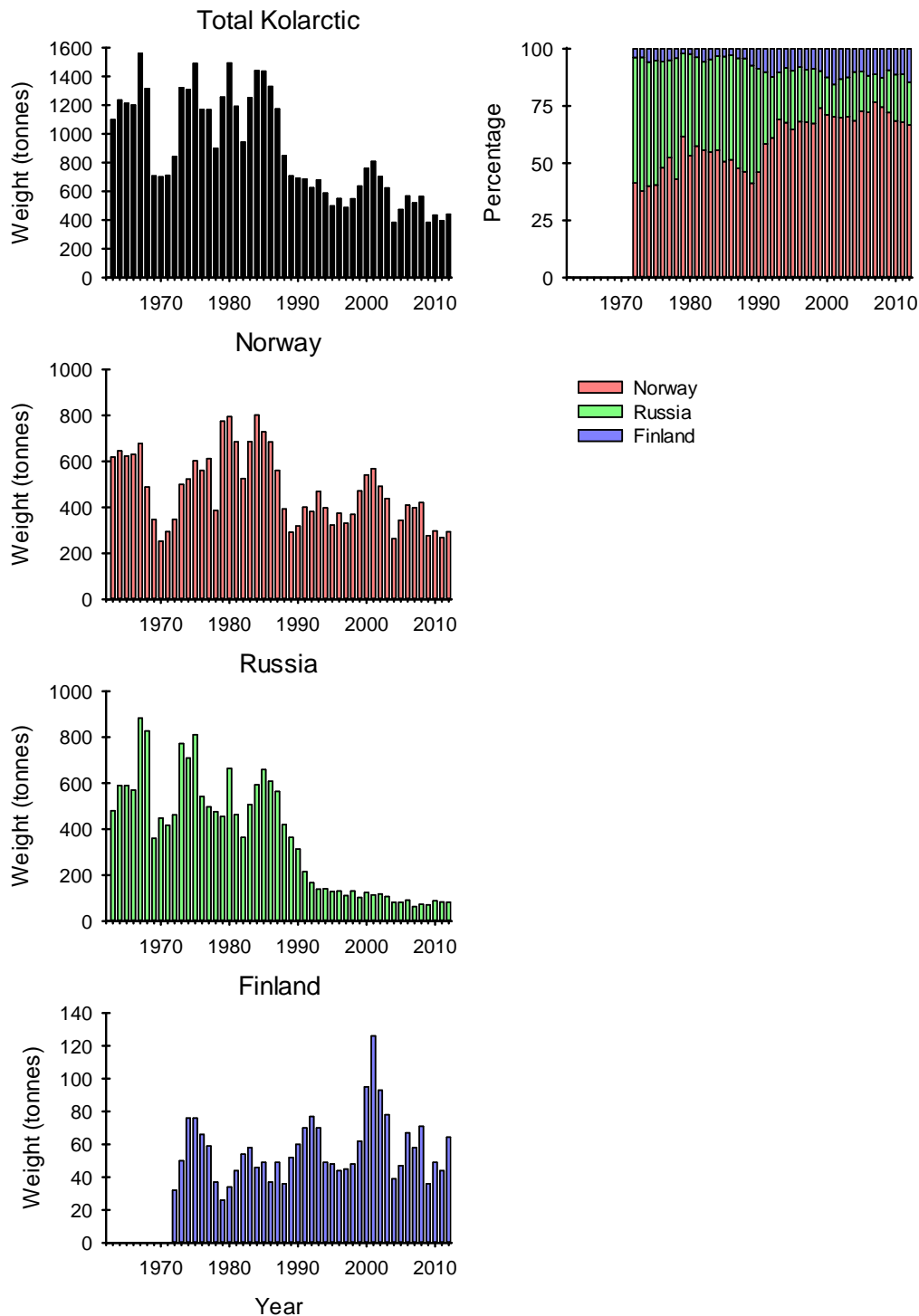


Figure 2. Long-term salmon catches in Norway, Russia and Finland in the Kolarctic salmon project area. Catches from the sea fishery and river fishery are combined. In Finland salmon catches from both of the border rivers Tana and Neiden are included.

In the entire Norway salmon catches have declined clearly from more than 2000 tons in 1960s to 600-700 tons in 2010s. According to the catch statistics river catches made 15-30% of the catches until the drift net fishery was prohibited in the year 1988 and thereafter salmon catches in rivers have increased and in recent years they have been c. 60% (Figure 3). Catches at sea and in the rivers have developed to opposite directions in that catches in rivers have clearly increased and catches at sea have significantly declined. Catches in both areas have also fluctuated. In the year 2012 catch at sea was 255 tons and in the rivers 440 tons.

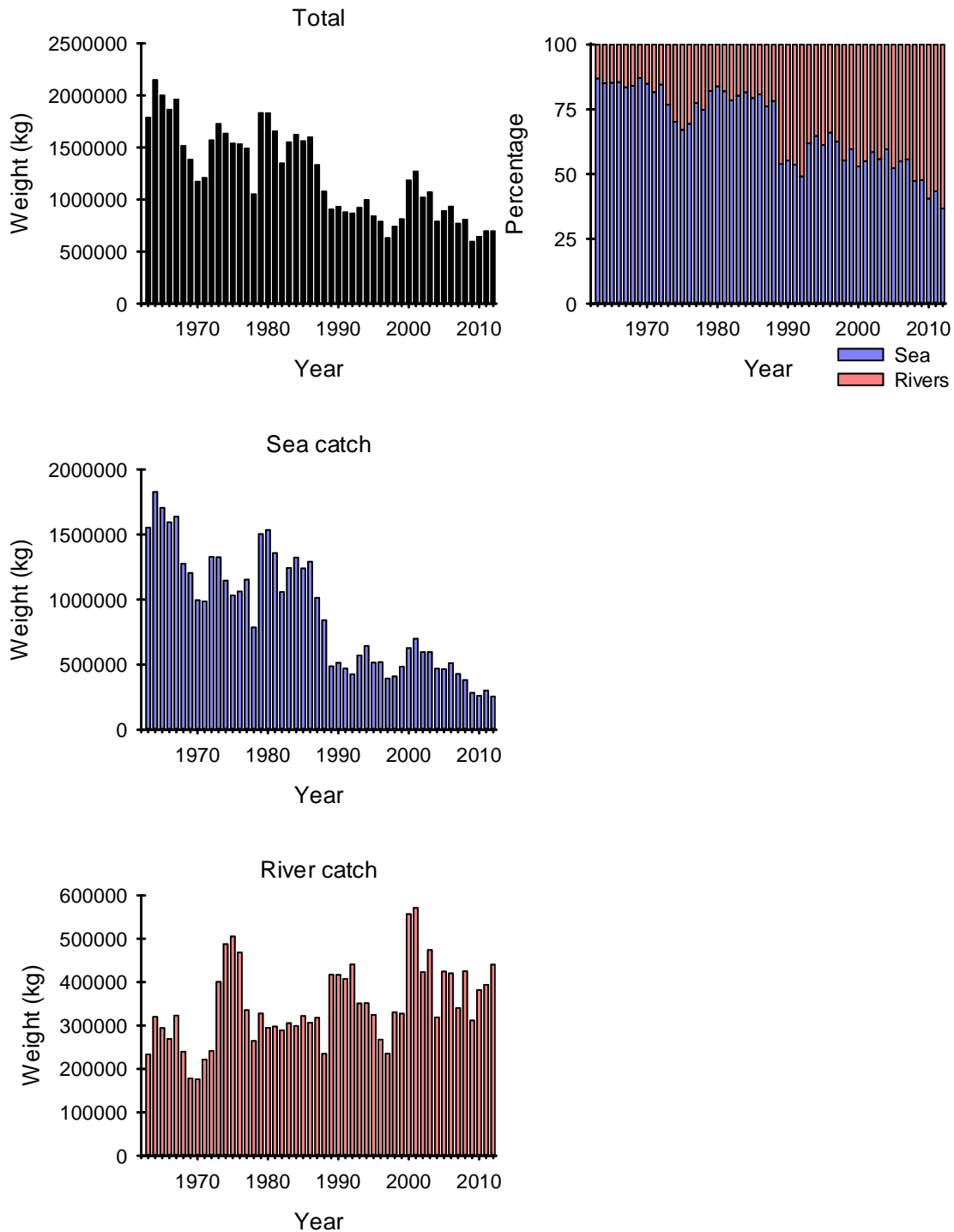


Figure 3. Total salmon catches in Norway.

River catches from the Finnish side of the border rivers Neiden (Näätämö) and Tana (Teno) in the figure 4 are also included to better understand the relations between catches at sea and in the rivers in Kolarctic area in Norway and Finland. Salmon catches caught in the rivers in Finnmark have made earlier a little more than 50% of the total catches caught in all rivers in Norway but in recent years the proportions have been 30-40%. The proportions of river catches caught in Troms and Nordland counties out of the total river catches in Norway have not been more than 10% in general. Salmon catches caught at sea in Kolarctic area have made increasing proportions out of the total sea catches in Norway and especially the catch in Finnmark has made all the time increasing proportions. In recent years salmon catches caught at sea in Finnmark have made more than 50% of the total Norwegian catches caught at sea. Salmon catches caught in Nordland and Troms at sea have had in recent years declining proportion.

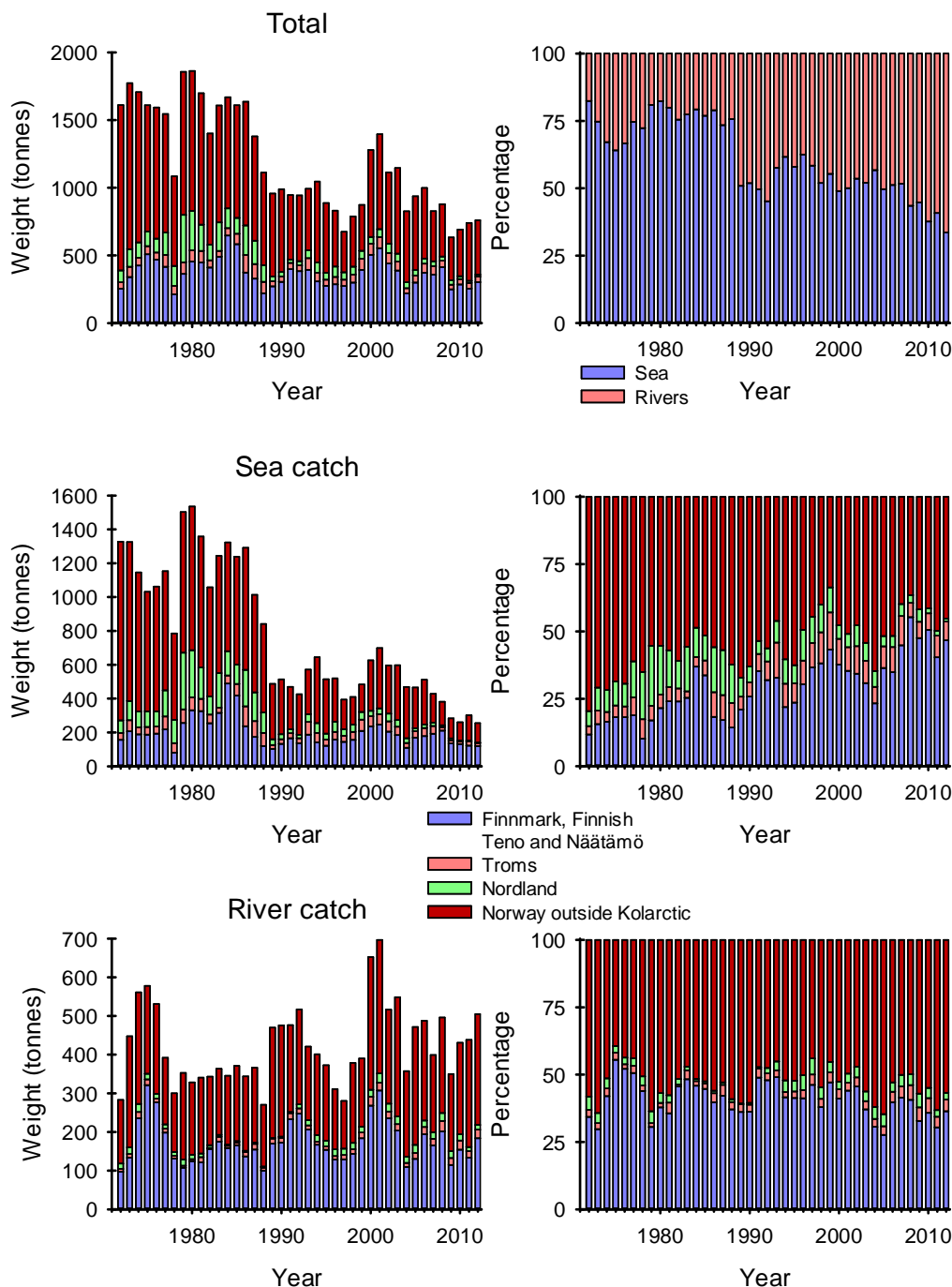


Figure 4. Salmon catches in Norway in the rivers, at sea and the total catches. Finnish catches from the border rivers Neiden (Näätämö) and Tana (Teno) are included into the Finnmark river catches.

River catches in the year 2012 were in Finnmark (Finnish Tana and Neiden are included) 183.7 tons, in Troms 22.4 tons, in Nordland 12.4 tons and in Norway outside Kolarctic area 286.2 tons. Salmon catches at sea were in the year 2012 in Finnmark 119.2 tons, in Troms 17.8 tons, in Nordland 2.7 tons and in Norway outside Kolarctic area 115.5 tons.

Figure 5 illustrates weights and proportions of three size groups of salmon in the annual catches in the rivers and at sea in the Kolarctic salmon project area in Norway. At sea the proportions of median-size salmon are clearly larger than in the catches in the rivers. The proportions of small-sized salmon at sea have declined since the end of 1980s and at the same time the proportions of median-sized and large-sized salmon have increased. In the rivers the proportions of small-sized salmon increased from the end of 1980s to the beginning of 2000s.

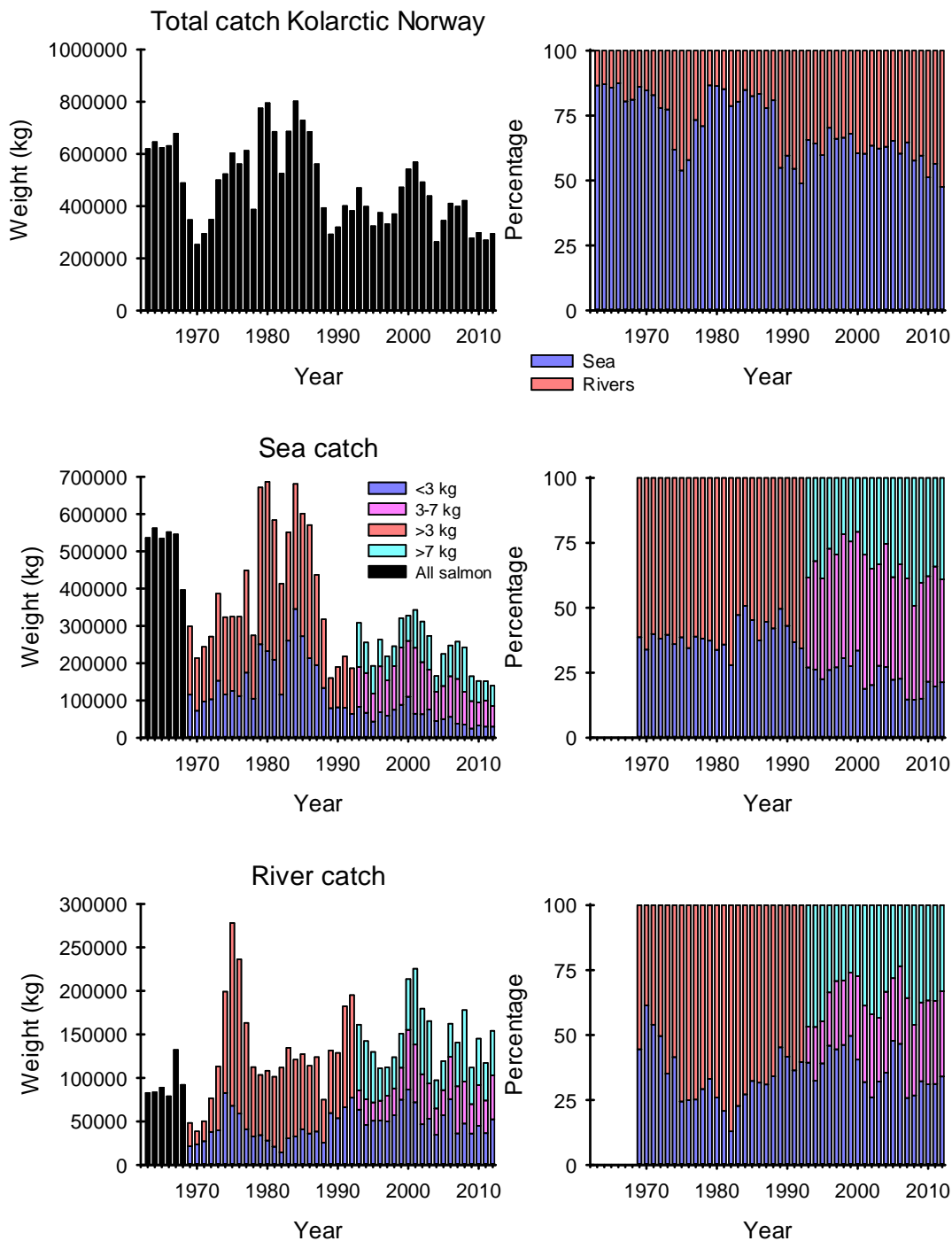


Figure 5. Total salmon catches in Kolarctic area in Norway (Nordland, Troms, Finnmark combined)

In the year 2012 salmon catch in Kolarctic project area in Norway at sea was for salmon smaller than 3 kilos 29.8 tons, for median-sized salmon 55.3 tons and for salmon larger than 7 kilos 54.6 tons. In the year 2012 salmon catch in Kolarctic project area in Norway in the rivers was for salmon smaller than 3 kilos 52.4 tons, for median-sized salmon 50.6 tons and for salmon larger than 7 kilos 51.1 tons.

Figure 6 presents an overview from the long-term catch development separately for Finnmark, Troms and Nordland counties and counties combined. Catches declined in all the counties in the end of 1980s and main reason for that was the total prohibition of the drift net fishery at sea. Salmon catches have fluctuated simultaneously in Finnmark and Troms and in both counties the proportions of salmon smaller than three kilos have declined in the past twenty years. Nowadays median-sized and large salmon are making c. 75% in the catches in terms of weight when catches at sea and in the rivers are combined. Total catches in the Kolarctic project area in Norway were up to 800 tons in early 1980s and in the recent year's c. 300 tons.

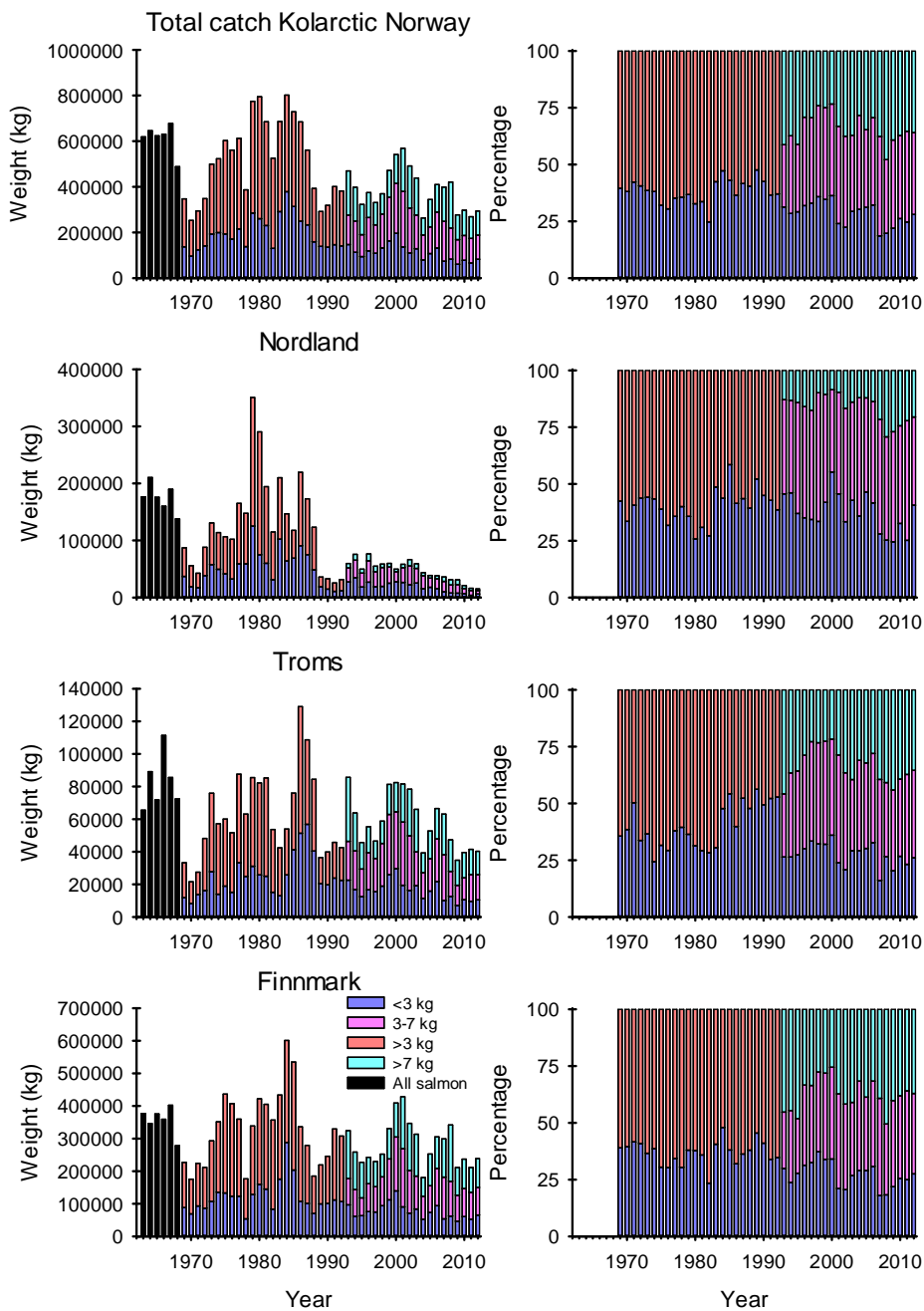


Figure 6. Salmon catches in Kolarctic area by counties in Norway sea and river catches combined.

Figures 7, 8 and 9 illustrate the long-term developments of salmon catches at sea and in the rivers for Nordland, Troms and Finnmark. In Nordland and Troms the proportions of salmon caught from the rivers have increased since the prohibition of drift net fishery at sea combined to the ban of bend net fishery at sea in the end of 1990s. In Finnmark catches at sea and in the river have fluctuated but in the past twenty years it is not possible to observe trends in the catch developments.

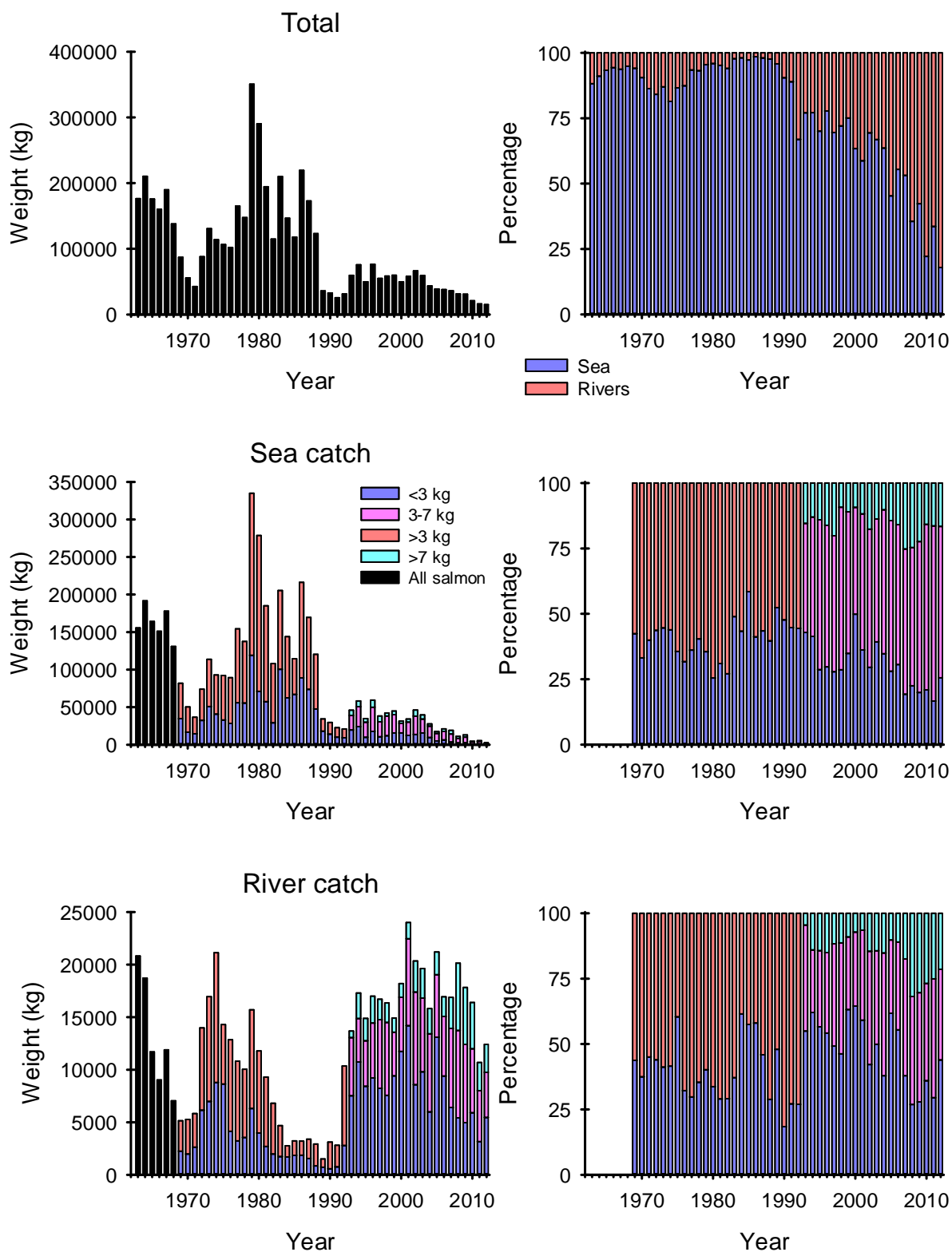


Figure 7. Salmon catches in Nordland County in Norway

In the year 2012 salmon catch in Nordland at sea was for salmon smaller than 3 kilos 0.7 tons, for median-sized salmon 1.6 tons and for salmon larger than 7 kilos 0.4 tons. In the year 2012 salmon catch in Nordland in the rivers was for salmon smaller than 3 kilos 5.4 tons, for median-sized salmon 4.3 tons and for salmon larger than 7 kilos 2.7 tons.

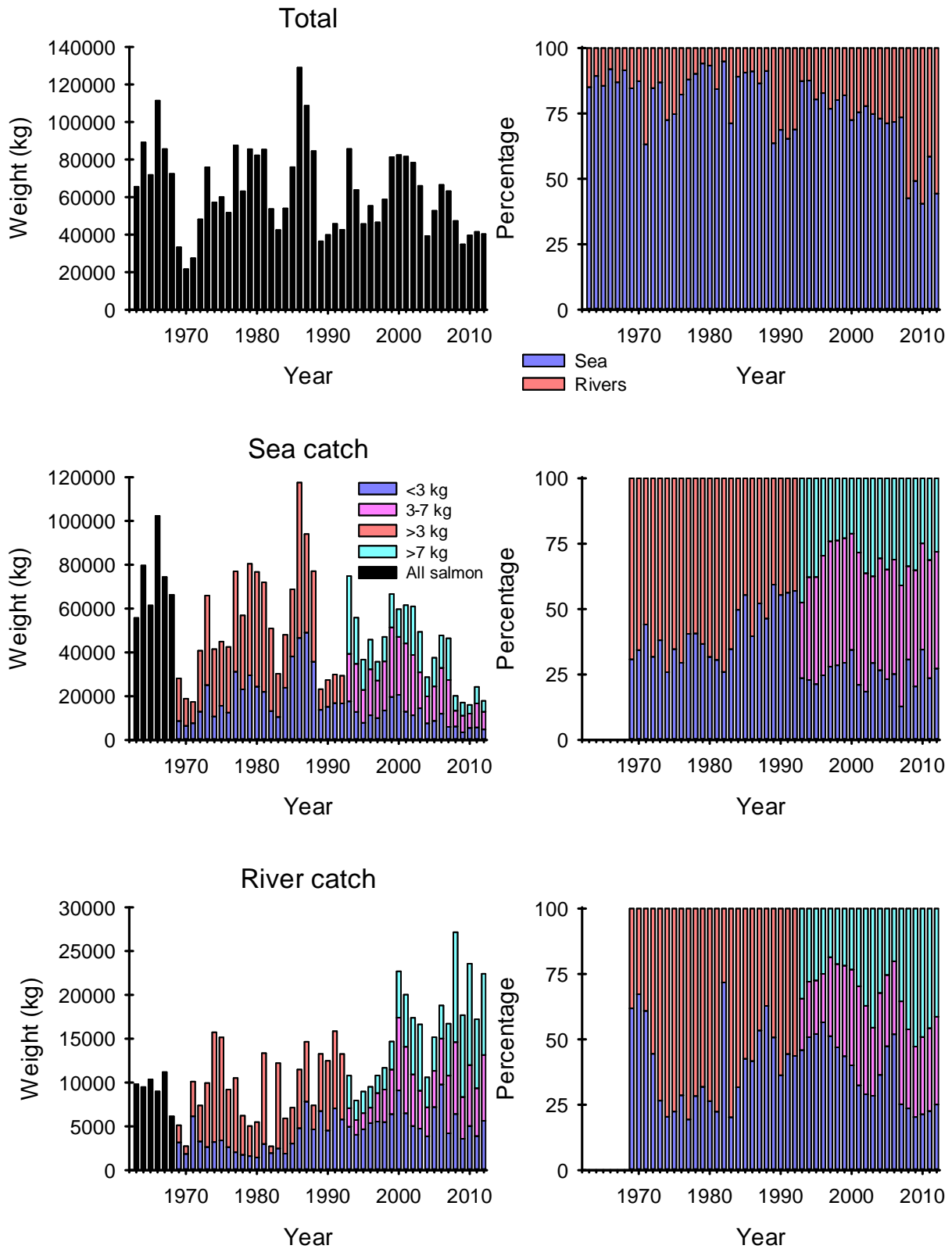


Figure 8. Salmon catches in Troms County in Norway

In the year 2012 salmon catch in Troms at sea was for salmon smaller than 3 kilos 4.8 tons, for median-sized salmon 7.9 tons and for salmon larger than 7 kilos 5.0 tons. In the year 2012 salmon catch in Troms in the rivers was for salmon smaller than 3 kilos 5.6 tons, for median-sized salmon 7.5 tons and for salmon larger than 7 kilos 9.2 tons.

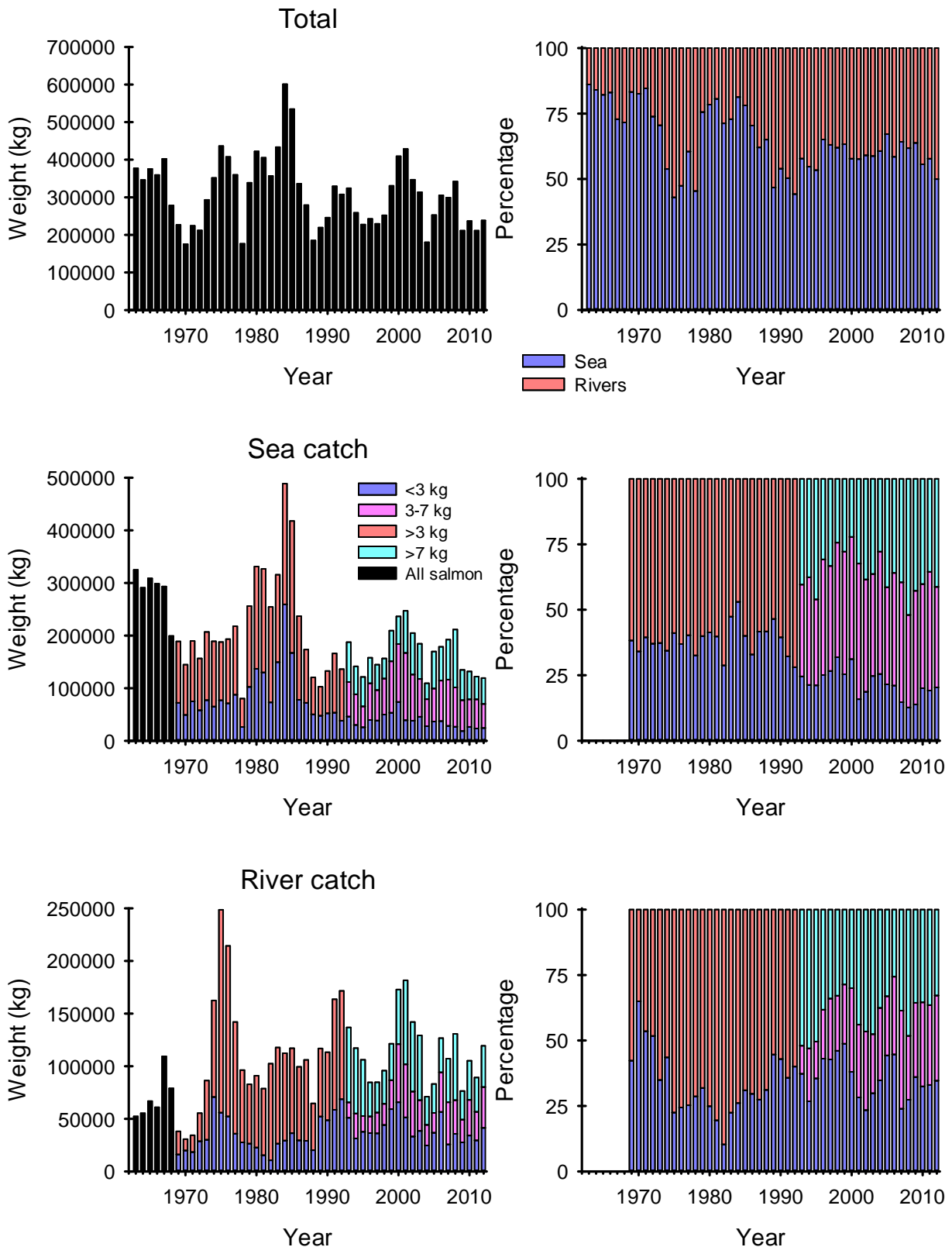


Figure 9. Salmon catches in Finnmark County in Norway

In the year 2012 salmon catch in Finnmark at sea was for salmon smaller than 3 kilos 24.2 tons, for median-sized salmon 45.7 tons and for salmon larger than 7 kilos 49.1 tons. In the year 2012 salmon catch in Finnmark in the rivers was for salmon smaller than 3 kilos 41.3 tons, for median-sized salmon 38.8 tons and for salmon larger than 7 kilos 39.1 tons.

Salmon catches in Finnmark show clear fluctuations with peaks in each 6-8 years (Figure 10). The maximum catches have been 650 tons and minimum 200 tons. In the past 20 years the proportion of salmon caught at sea has been c. 50% and in recent years the proportions caught from the rivers has increased to 60%. In 1980s during the effective drift net fishing period at sea the proportions of salmon caught from the rivers were c. 25%.

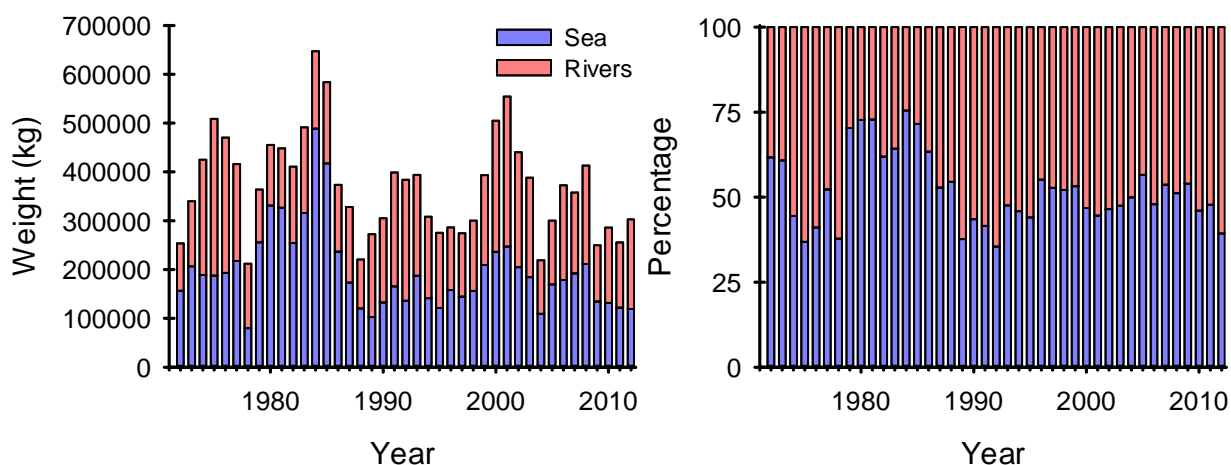


Figure 10. Salmon catches in Finnmark at sea and in the rivers. River catches include the Finnish salmon catches from the border rivers Tana and Neiden.

In the year 2012 salmon catch at sea in Finnmark was 119.2 tons, river catches in Finnmark was 119.3 tons (without Finnish catches) and the Finnish catches from the border rivers Tana and Neiden was 64.3 tons.

3.2 Atlantic salmon fisheries regulation in Norway

During the Kolarctic salmon project there has been new and more modern regulations for salmon fishery at sea following the guidelines and recommendations from NASCO with intension to minimize fishery towards mixed stocks. Regulations have been introduced for outer coastal areas and for specific fjords /inner coastal areas. In the figures 11 and 12 it is presented the spatial and temporal salmon fishing regulations which have been valid also in the year 2013. In the table I the main regulations in the salmon fishery at sea in Northern Norway during the past decades are presented.



Photo 1. Fisherman Leif Ingilæ in Finnmark (Bugøynes) at his bend net in 2011 (Photo: Eero Niemelä)

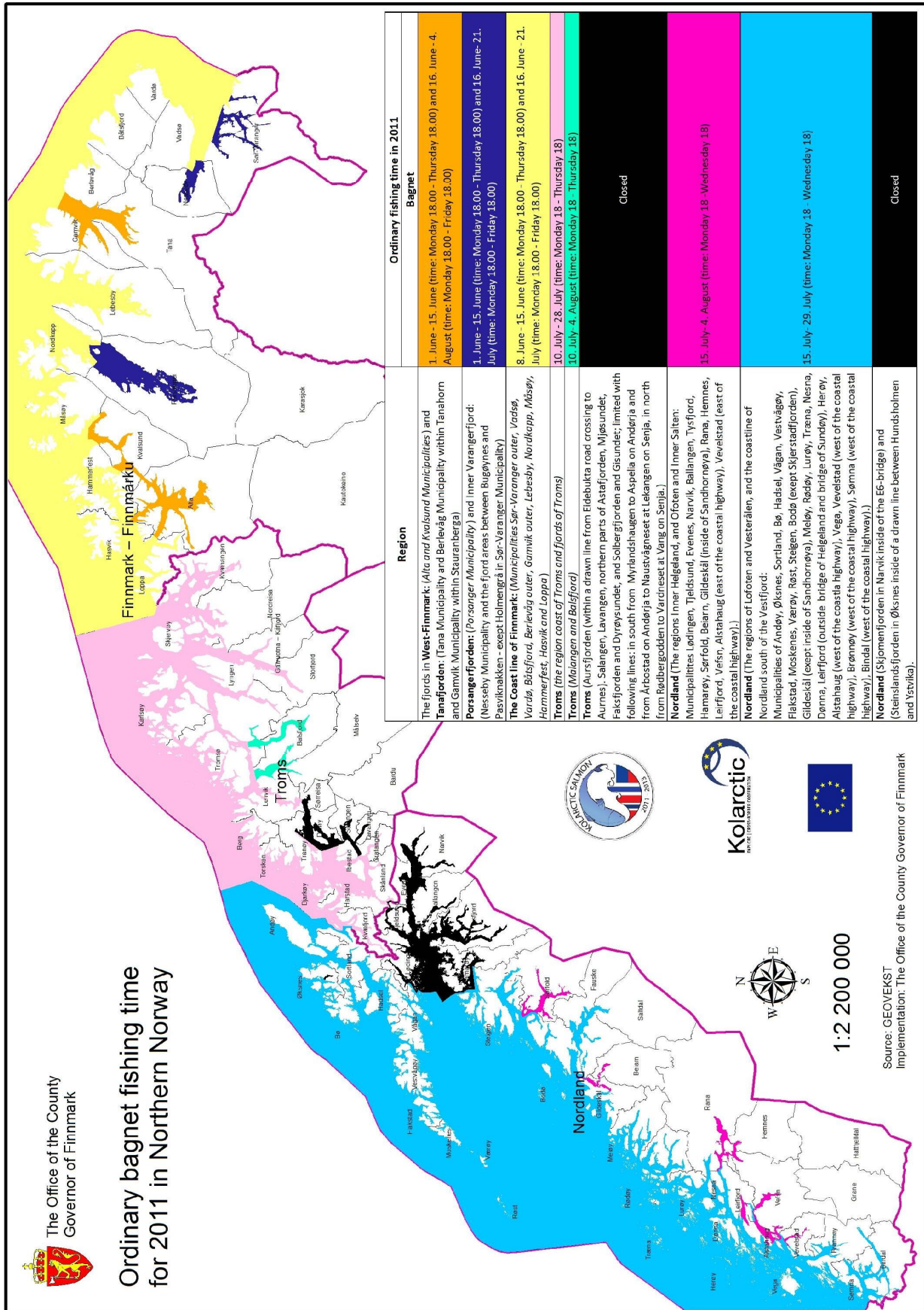


Figure 11. Spatial and temporal restrictions for salmon fishing with bag nets in Kolarctic salmon project area. These restrictions have been valid during the Kolarctic salmon project period in the years 2011-2013.

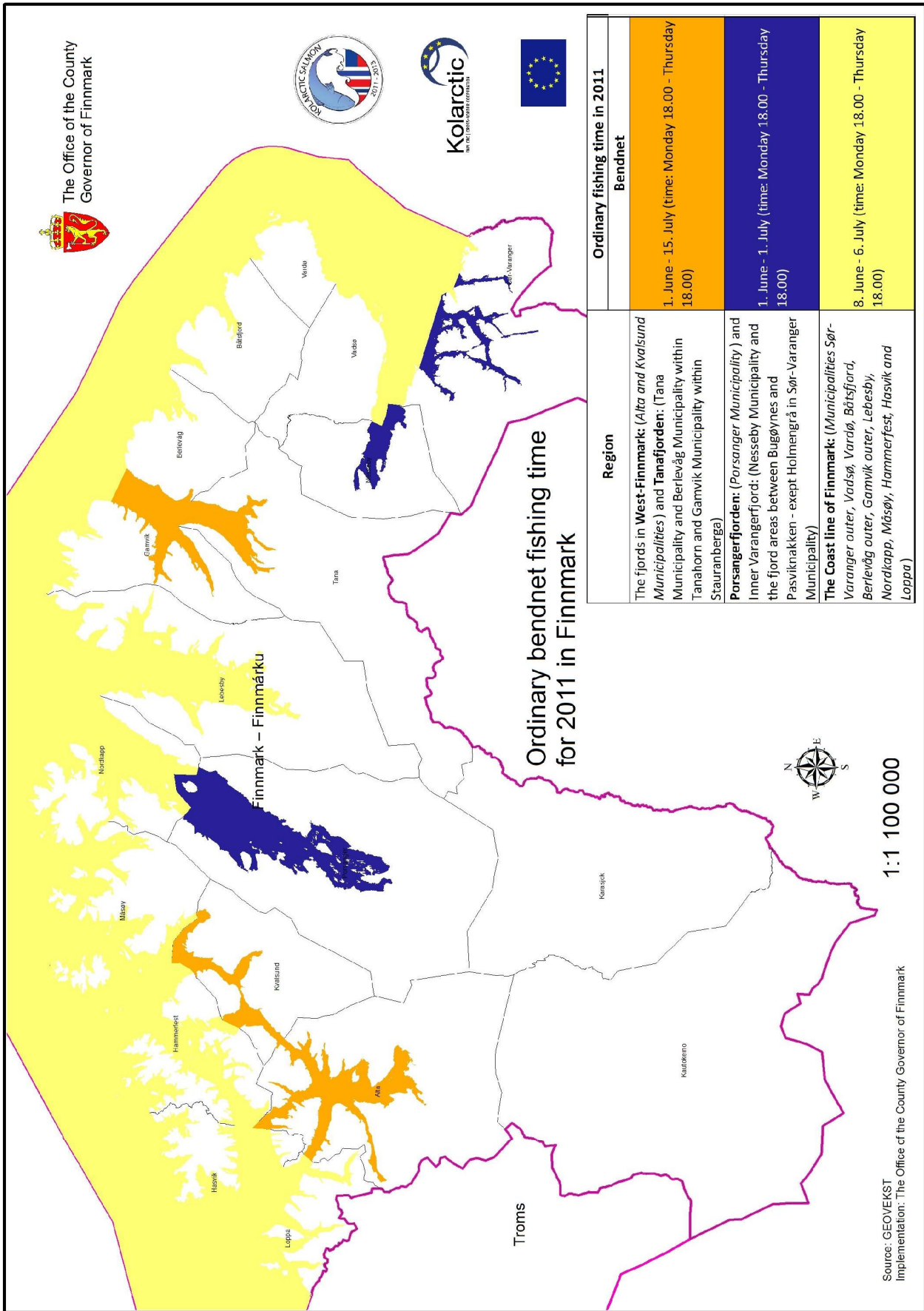


Figure 12. Spatial and temporal restrictions for salmon fishing with bend nets in Kolarctic salmon project area. These restrictions have been valid during the Kolarctic salmon project period in the years 2011-2013.

Table 1. Main regulations in salmon fishery at sea during the last 40 years with emphasis on regulations in northern Norway (Troms and Finnmark counties, year 2010 and onwards also regulation in Northern Nordland County is highlighted in the table). The table is based on: Berg (1986), Hansen (1988), Heggberget (1978), Kristoffersen (1991), Windsor and Hutchinson (1994), NOU (1999), Johansson, S. Norwegian directorate of nature management (personal information). Yearly rules for salmon fishing in Norway adopted by the Norwegian directorate of nature management

Year	Regulation
1969	Drift net fishery was banned inside the ground line; however dispensation was given for the Lofoten area north in Nordland county.
1971	Salmon fishery in international waters was restricted, including some banned areas outside Norway. Fishing time was limited to the period May 6th to June 30th and a size limit of 60 cm was adopted.
1974	The special salmon fishery in October to December that had been allowed only in the Tana and Varanger areas in Finnmark County was forbidden. In Varangerfjord east in Finnmark the number of fishing days per week in the ordinary salmon season was also reduced from five to the national norm of four days per week.
1976	All countries around the North Atlantic, except for Denmark, agree to stop fishery in international waters.
1977	A maximum limit of number of drift nets per boat (25 – 50 – 60 – 70, depending on boat size) was adopted.
1979	The number of boats in drift net fishery in Norway was regulated by concession (total of 708 concessions). Maximum number of drift nets per boat was reduced (20 – 40 – 60 depending on boat size) and drift net fishery was forbidden from Nordkapp (North Cape) to the Russian border. Throw seine fishery and set net fishery were prohibited.
1980	Opening date for salmon fishing at sea was delayed from May 1st to June 1st with the exception of bag nets. Monofilament materials were forbidden in guiding nets being part of all salmon fishing equipment.
1981	Opening date for bag net fishery was delayed from May 1st to May 15th. The number of drift nets per boat was further reduced (20 – 35 – 50, depending on boat size).
1983	The number of boats in drift net fishery was reduced (total of 633 concessions). An international salmon convention was adopted, banning salmon fishery outside the 12 mile boundary, with the exception of Greenland and Faroe Islands.
1987	Opening date for bag net fishery was delayed from May 15th to June 1st, except for Finnmark County.
1989	Drift nets were completely forbidden. The number of fishing days per week with bend nets was reduced from four to two days per week, except for Finnmark County, and the fishing season for bend nets was reduced to the period July 1st to August 4th. In Finnmark County, however, the bend net season was June 1st to July 15th. To avoid by-catches when fishing for non-anadromous species nets with mesh size above 35

	mm were allowed only to be used a minimum of 3 meters below sea surface from May 1st to September 30th, except for commercial fishing.
1991	Monofilament materials were forbidden in all gear used for fishing anadromous salmonids.
1996	The number of fishing days per week for bag nets in Troms county was reduced from four to three.
1997	<p>Bend nets were forbidden in wild salmon fishery from Rogaland County to Troms County included.</p> <p>Opening day for bag net fishery in Troms County was delayed from June 1st to June 15th.</p> <p>New and more restrictive regulations for all fishing (not only anadromous species) were adopted near salmon rivers in Finnmark County (usually for the sea area out to about 2 km from the river outlets).</p> <p>To avoid by-catches when fishing for non-anadromous species for Finnmark County all nets independent of mesh size were only allowed to be used a minimum of 3 meters below sea surface in the period May 1st to September 30th, but still with the exception for commercial fishing.</p> <p>Fishing escaped farm salmon was allowed with bag nets and bend nets from Hordaland County to Troms County included in the period August 20th (some counties October 1st) to February 28th (i.e. after the wild salmon run is finished).</p>
2000	New and more restrictive regulations of all fishing (not only anadromous species) were adopted near salmon rivers in Troms County (usually for the sea area out to about 2 km from the river outlets).
2003	<p>Opening date for bag net fishery in two areas in Troms County (one area at the border of Finnmark county) was delayed from June 15th to July 15th.</p> <p>The general national rules for avoiding by-catches when fishing for non-anadromous species were restricted by reducing mesh size limit to 32 mm and extending the period when nets have to be used a minimum of 3 meters below sea surface to March 1st to September 30th, but still with exception for commercial fishing. In Finnmark County, however, this rule is applied independent of mesh size for the period of May 1st to September 30th (see year 1997, above).</p>
2008	On the coast and fjords in Finnmark, the use of bag nets and bend nets was further reduced in 2008 and 2009. Start time of fishing with bag nets was postponed from the previous May 15th to June 1st. Bag net fishery ended on August 4th. In the period of June 1st to 15th the bag net fishery was allowed only three days a week, from Monday to Thursday, after June 15th four days a week, from Monday to Friday evening. Bend net fishery was still allowed from June 1st to July 15th, but the weekly fishing time was reduced from four to three days. In the fjords in Troms bag net fishing was permitted in 2008 and 2009 from July 15th to August 4th, and on the coast from the July 10th to August 4th three days a week.
2010	In the regions of Lofoten, Vesterålen, and the coast of Nordland south of Vestfjorden in Nordland County, fishing with bag nets was permitted from July 15th to July 29th, unlike the previous from July 15th to August 4th. Weekly fishing time was from Monday to Wednesday, unlike the previous Monday to Friday. In Vefsnfjorden the regulation of fishing with bag nets was continued with fishing from June 1st to August 4th. In Ranafjorden the regulation of

fishing with bag nets was continued with fishing from July 15th to August 4th.

On the coast and fjords of Troms County fishing with bag nets was permitted from July 10th to July 28th, unlike previously when fishing time ended on August 4th. With the exception of Malangen and Balsfjord fishing with bag nets still was permitted until August 4th. In Lyngenfjorden, Rotsundet, Maursundet, Reisafjorden and inner parts of Kvænangen fishing with bag nets was permitted from July 10th to July 28th, unlike previously from July 15th to August 4th. Furthermore Salangen, Lavangen, northern part of Astafjorden, Mjøsund, Faksfjorden, Dyrøysundet and parts of Solbergfjorden and Gisundet and Aursfjorden were closed for fishing unlike previously were fishing with bag nets was permitted from July 15th to August 4th.

In the county of Finnmark the fishing regulations were divided into the following regions: "Fjords in West Finnmark", "Porsangerfjorden", "Tanafjorden" "Inner parts of Varangerfjorden" and "the coast of Finnmark".

In the regions "fjords in western Finnmark" and "Tanafjorden" the current fishing regulations for bag nets were continued, with fishing season from June 1st to August 4th. In the regions "Porsangerfjord" and "Inner Varanger Fjord" fishing season for bag nets were reduced by ending the fishery July 21st, unlike previously when fishing ended on August 4th. In the region "coast of Finnmark" fishing with bag nets was further reduced. Start time of fishing with bag net was postponed from the previous June 1st to June 8th, and fishery was closed July 21st unlike previously when fishing was closed August 4th. For all regions, the rules of three-day fishing week to June 15th and four-day fishing week after June 15th for bag net fishery were continued.

In the regions "fjords in western Finnmark" and "Tanafjorden" the current fishing regulations for bend nets were continued, with fishing season from June 1st to July 15th. In the regions "Porsangerfjord" and "Inner Varanger Fjord" fishing season for bend nets were reduced by closing the fishery July 1st, unlike previously when fishing ended on the 15th. July. In the region "coast of Finnmark" fishing with bend nets was further reduced. Start time of bag net fishery was postponed from the previous June 1st to June 8th, and fishery ended on July 6th unlike previously when fishing ended on the July 15th. For all regions, the rules of three-day fishing week for bend nets were continued.

2011	See figure 11 and 12 for Nordland, Troms and Finnmark.
2012	In Nordland the same regulations applied as in 2010. In Troms the same regulations applied as in 2010, except for Malangen where fishing was permitted from July 5th to August 4th, and the municipalities in Northern Troms where fishing was permitted from July 5th to July 31st. The ban on fishing in numerous fjords was continued / expanded and thus applied to the municipalities Kvæfjord, Bjarkøy, Harstad, Skånland, Gratangen, Lavangen, Salangen, Ibestad, Dyrøy, Tranøy, Sørreisa and the coastal waters in Lenvik between the mainland and the island of Senja. In Finnmark the same regulations applied as in 2010, except Porsangerfjorden where bag nets fishing time was expanded from three to four days a week in the period from June 1st to June 15th.

3.3 Atlantic salmon fisheries regulation in the Russian Federation

The Federal Law “On Fisheries and Conservation of Aquatic Biological Resources” (No. 166-FZ, 2004) prioritises the conservation of aquatic biological resources and their rational exploitation to their utilization as an object of the right of property or other rights.

The approach to management of Atlantic salmon fisheries in Russia is based on applying the Precautionary Approach, NASCO’s agreements and enforcing the adopted measures and existing fisheries regulations. The objectives are as follows:

- to preserve biodiversity and enhance the numbers of Atlantic salmon;
- to minimize the risk from management actions taken;
- to rationally utilize natural biological resource to ensure continuity of its reproduction;
- to preserve Atlantic salmon habitat;
- to resolve socio-economic issues by improving economic returns to local communities through salmon fishing.

3.3.1 Total Allowable Catch

In accordance with the Federal Law “On fisheries and conservation of aquatic biological resources” (No. 166-FZ, 2004) the Total Allowable Catch (TAC) for fisheries shall be established annually. TACs for anadromous and freshwater fishes are established on a region-by-region basis and based on advice from scientific research institutes. The advice to the government is provided according to the contract with the Federal Agency for Fisheries. PINRO is the only fisheries research institute in the northwest of the Russian Federation authorized to develop and provide advice for TAC for anadromous Atlantic salmon. TAC is estimated on the basis of reference points (e.g. conservation limits, management targets or other measures of abundance) and abundance forecast. Regional TACs are allocated to the subjects (regions) of the Russian Federation by the Federal Agency for Fisheries. There are five regions where Atlantic salmon occurs: Murmansk region, Archangelsk region, Republic of Komi, Republic of Karelia and Nenets Autonomous Okrug (NAO). TACs for these regions in 2000-2013 are shown in Figure 1. TAC is a threshold for catch-and-take fisheries and does not limit catch-and-release fisheries.

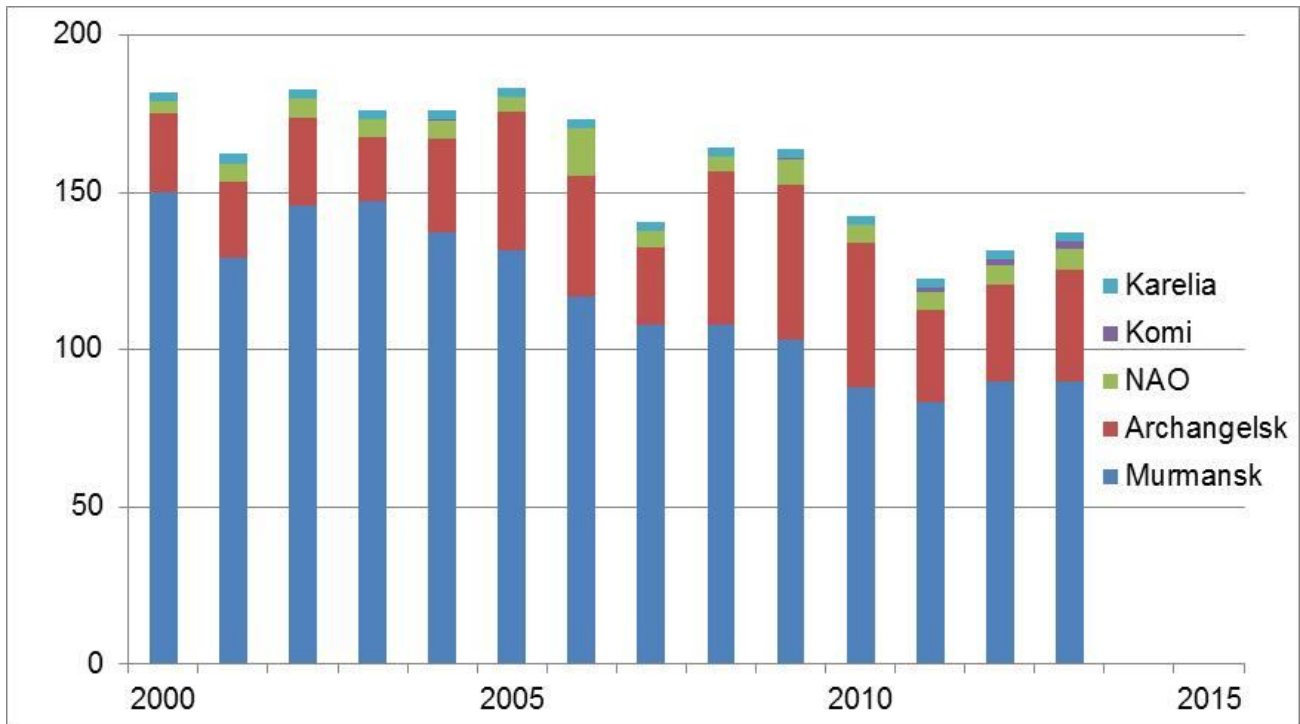


Figure 13. Regional TAC's for Atlantic salmon fisheries in the Russian Federation in 2000-2013, tons.

3.3.2 Quotas

Regional TAC is distributed as quotas among fisheries and allocated to users by the Federal Agency for Fisheries (Federal regulatory, control and enforcement authority), its Territorial Directorates (regional control and enforcement authority) and by Regional Commissions on Regulation of Harvesting the Anadromous Fish (regional regulatory authority). There are 6 types of fisheries that are legally allowed. They are listed below in the order of priority in terms of quota allocation:

- fishery to support traditional way of living of indigenous small nations of the North;
- scientific fishery;
- fishery for enhancement purposes;
- educational fishery;
- recreational fishery;
- commercial fishery.

Annual quotas for scientific fishery, educational fishery and fishery for enhancement purposes are established on the basis of applications from scientific research institutions (like PINRO), universities and regional directorates for enhancement of fish stocks (Murmanrybvod, Sevrybvod, Karelrybvod and Komirybvod). The quotas are allocated to users by the Federal Agency for Fisheries based on adopted scientific, educational and enhancement programs.

Quotas for fishery to support traditional way of living of indigenous nations of the North (Sami) are set by a Regional Commission on Regulation of Harvesting the Anadromous Fish. The information about applications for quantities required by Sami is provided by a Territorial Directorate of the Federal Agency

for Fisheries and to be taken into account when quotas are decided. Murmansk region is the only subject of the Russian Federation where Sami fishery for Atlantic salmon takes place.

Quotas for recreational and commercial fisheries are allocated to users by Regional Commissions on Regulation of Harvesting the Anadromous Fish on the basis of recommendations from a scientific research institute (PINRO). Commissions have the authority to regulate methods of fishing, fishing seasons and fishing areas. A Commission is chaired by the governor/head of the region. It consists of representatives of deferent authorities such as the Federal Security Service and Ministry of Defense, regional administrations such as Departments for Fisheries and Ecology, scientific research institute (PINRO) and from non-governmental organizations. Commission's decisions must be approved by the Head of the Territorial Directorate of the Federal Agency for Fisheries. Commissions are established in all five regions with Atlantic salmon stocks.

3.3.3 Fishing sites

Recreational and commercial fisheries, Sami net fisheries are allowed at fishing sites only. The fishing site boundaries are decided by a regional Commission on assigning the fishing sites on the basis of recommendations from a scientific research institute (PINRO). A regional inventory of fishing sites is to be approved by the Government of the region. The inventory specifies the boundaries and the intended use of fishing sites (e.g. recreational fishery, commercial fishery, Sami fishery, and aquaculture). Fishing sites are allotted to users on the basis of competitive tenders. The Territorial Directorate of the Federal Agency for Fisheries is the authority to organize tenders and a signatory of contracts for fisheries of marine species in coastal waters and anadromous fish fisheries at sea and in-river, whereas the Government of the region is the authority to organize tenders and a signatory of contracts for fishing sites for fisheries of freshwater species. A contract for the use of a fishing site can cover a period of up to 10-20 years.

3.3.4 Licenses and permits

Each salmon fishery is licensed by a Territorial Directorate of the Federal Agency for Fisheries. There are three Territorial Directorates responsible for Atlantic salmon fisheries control and enforcement:

- Barents-Belomorskiy (Murmansk) responsible for Murmansk region;
- Dvino-Pechorskiy (Archangelsk) responsible for Archangelsk region, Komi and NAO;
- Severo-Zapadny (St.-Petersburg) responsible for Karelia.

The Territorial Directorates issue licenses for users of the fishing sites in accordance with the quota allocation made by the Regional Commissions on Regulation of Harvesting the Anadromous Fish. The license gives legal rights to the user of the fishing site to organise salmon fisheries. The licenses are issued for no more than 1 calendar year. The user of the fishing site is obliged to report catches to the Territorial Directorates of the Federal Agency for Fisheries twice a month. Once the allocated quota is fished the fishery must be closed. A user of the recreational fishing site is authorized to issue permits (tickets) to local residents and tourists. Recreational fishing by local residents and tourists is allowed on a permit basis only. Therefore, it is not possible to fish for Atlantic salmon recreationally outside the fishing site as permits are not issued for such fishery. However, Atlantic salmon catch-and-release fishing is technically possible

outside the fishing site as there is no requirement to have a permit for fishing other species outside fishing sites in salmon rivers.

3.3.5 Fisheries Regulations

All fisheries are conducted in accordance with the Fisheries Regulations in force. They set rules for fisheries in respect of areas, periods, gear and other restrictions. The current Fisheries Regulations were adopted by the Order of the Federal Agency for Fisheries in 2009 (No. 13, 2009). New Fisheries Regulations were developed recently and due to be adopted by the Order of the Ministry of Agriculture in 2014. Existing Fisheries Regulations prohibit by-catching Atlantic salmon and contain no rules for coastal salmon fisheries in the Barents Sea, which could be interpreted as a ban for such fishery; however, there is no explicit reference to this in the Regulations. New Fisheries Regulations in addition to current rules contain stronger measures to explicitly prohibit coastal salmon fishery in the Barents Sea and to restrict it in some areas of the White Sea: in the Kandalaksha Bay and in the area along the Kola Peninsula coast between Cape Svyatoy Nos and Sosnovka village. Fisheries for all fish species with nets are prohibited in the estuaries of salmon rivers at a distance less than 0.5 km from the outlet into the river and 0.5 km out of the river mouth all year round, and from 15 June to 15 October in the area along the Kola Peninsula coast between Cape Svyatoy Nos and Ponoï river. Only trap nets are allowed for coastal salmon fisheries in the White Sea in the Murmansk region.



Photo 2. Coastal trap net fishery in the White Sea area of the Murmansk region (photo: PINRO)

3.4 Salmon management in Finland in the border rivers Tana (Teno) and Neiden (Näätämö)

The River Teno (Tana) system (70°N, 28°E, catchment area 16 386 km²) runs into the Barents Sea through Tanafjord on the north-eastern Norwegian coast. The main stream of the River Teno, and one of the three main headwater rivers, the River Inarijoki, form the border between Finland and Norway. The maximum distance salmon can migrate from the sea is more than 300 km along three main headwater branches, and c. 1200 km of different river stretches is accessible to anadromous Atlantic salmon. The River Teno is the most important and one of the largest salmon rivers in Finland and Norway.

The River Näätämöjoki system (69°N, 29°N, catchment area 2 962 km²), is a cross-border river system between northern Norway and Finland with the lower 20% of the river system belonging to Norway and the rest to Finland. The river discharges into the Barents Sea through Neidenfjorden in eastern Finnmark on the Norwegian coast. Distribution of salmon in the River Näätämöjoki covers 220 km along the main stream and two major tributaries. In most years during the past decades, the Näätämöjoki has been among the top ten Norwegian rivers in terms of yearly salmon catch.

The River Teno salmon stock complex consists of several sub-stocks in different parts of the large main stem and there are more than 30 tributaries with spawning stocks. The stock complex shows high level of heterozygosity allowing a large number of genetically distinct sub-populations.

The River Teno salmon stocks are exploited in the river with various fishing methods including weir, gill net, seine, drift net and rod and line. The most common form of rod fisheries is fishing from boat, using either flies or lures, but traditional fly-fishing from the shore has become more and more popular in recent years. The net fisheries are practiced by local people, mostly native Sami people. Net fishing is permitted by fishing rights based on land owning or inherited rights. Seine catches are typically negligible. In both Finland and Norway the proportion of rod catch has increased since 1980s.

In the River Näätämöjoki, the average proportion of the rod catch is 75 % and the remaining 25% is caught by net fisheries practiced by local people: gill net fishery on the Finnish side and seine net fishery on the Norwegian side.

Salmon fishing in the Teno river system has been regulated since 1873 by bilateral agreements between Finland and Norway. General fishery agreements for both river systems are concluded between the governments of Finland and Norway, primarily regulating the local fisheries and their fishing rights. These agreements have been negotiated between the relevant authorities in both countries, in particular Ministries of Foreign Affairs, Ministry of Forestry and Agriculture (Finland) and the Norwegian Ministry of the Environment (Norway). Agreements for the salmon fishing regulations for the River Neiden between Finland and Norway have been in force for c. 50 years

The latest general agreement for the River Teno, concluded in 1989, states e.g. that the fishing season commences on May 20th and terminates on August 31th. Net fishing is allowed for three days per week and drift net fishing can take place only from the beginning of the season until June 15th. All fishing is prohibited from Sunday night to Monday night every week of the fishing season.

Tourist angling is regulated by regional authorities in both countries (Department of Environmental Affairs, Office of the County Governor of Finnmark, Norway, and the Fishery Unit, Employment and Economic Development Centre in Lapland, Finland). These regulations can be amended on a yearly basis.

In both rivers the number of recreational fishermen is unlimited and no quota or bag limit policies are practiced either in sport fishing (only in the River Teno) or in different net fishing methods used by local fishermen. There are local organizations for the rivers Teno and Näätämöjoki, which can and have regulated the fishery on the private ground. Some voluntary actions have taken place to close fishery earlier in the season to protect spawning stocks. Effort of the various fishing methods can vary yearly, which can result in varying size-selective exploitation. Extreme flow in summer can prevent the use of weir and gill net. Similarly, late brake-up of ice followed by high and late spring flood can prevent effective drift net fishing, which is permitted from May 20th to June 15th. Nevertheless, there are significant correlations in the catch between fishing methods indicating that environmental circumstances in general are stable enough allowing undisturbed fishing for all fishing methods throughout the summer, and run size may generally drive the success of all fisheries.



Photo 3. Fisherman Olavi Guttorm - traditional salmon weir fishing in river Teno in the beginning of 20th century (Photo: Antti Kojo)

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Annex 1. Regulations in 2013 Finnmark County Norway (In Norwegian)

Oversikt over regler for sjølaksefiske

Tillatte redskaper

- Kilenot
- Kroggarn
- Lakseverp
- Patentnot (kombinasjon av en enkel kilenot og et enkelt kroggarn).

Fisketider

- Fisketid for kilenot og Lakseverp (vedlagt).
- Fisketid for kroggarn og Patentnot (vedlagt).
- Fortøyninger, flottører og lignende kan tidligst settes ut tre uker før fiskesesongens begynnelse. De må være tatt opp senest tre uker etter at fiskesesongen er avsluttet.

Plassering av redskapen

- Det er bare tillatt å fiske med faststående redskap på eller i direkte tilknytning til grunn som fiskeren eier eller leier.
- Det er forbudt å plassere noen del av redskapen nærmere enn 100 meter fra annen slik redskap.
- I fjord eller sund er det forbudt å sette faststående redskap lenger ut fra land enn en fjerdedel av fjordens eller sundets bredde ved vanlig fjære sjø.

Maskevidde og trådtyper

- I fangstdel og ledegarn er det kun tillatt å benytte maskevidde som er minst 58 mm målt fra knutes til knutes midtpunkt i våt tilstand.
- I fangstdel til kilenot og lakseverp er det kun tillatt å benytte tråd av spunnen nylon (tråd med tynnere enkeltfilamenter enn 10 denier) som er minst 0,95 med mer (210/7x3, norsk tråd nr. 7) tykk.
- I fangstdel til kroggarn er det tillatt å benytte tråd av spunnen nylon og multimono som er minst 0,70 mm (210/4x3, norsk tråd nr. 4, multimono 1,5x10) tykk.
- I ledegarn er det kun tillatt å benytte tråd av spunnen nylon (tråd med tynnere enkeltfilamenter enn 10 denier).
- I ledegarnet til kilenot og kroggarn, samt i ledeenheten til lakseverp, er det kun tillatt å bruke tråd som er minst 1,1 mm (210/8x3, norsk tråd nr. 8) tykk.

Merking av fiskeplass og redskap

- Redskapen skal være merket med registreringsnummer.
- Merkingen skal være tydelig og i avvikende farger på blåser eller lignende.
- Enkeltløter, doble løter og enkle og doble kroggarn skal merkes på krok- eller snytekaggen.
- Fiskeplassen skal merkes på land rett inn for redskapet og så nært dette som mulig. Registreringsnummeret skal fortrinnsvis males på fjell eller stor stein.

Fiskeravgift

- Alle som skal fiske etter laks, sjøørret og sjørøye med faststående redskap skal betale fiskeravgift.
- Under alt fiske må en av dem som deltar i fisket ha betalt avgift.
- Ved kontroll av fiskeoppsynet er fisker pliktig til å vise kvittering for betalt avgift.
- Fiskeravgiften for sjølaksefiske er personlig og kan ikke inkludere familiemedlemmer.