

RUSSIAN FISHERIES CATCHES IN THE BALTIC SEA FROM 1950 – 2007¹

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ABSTRACT

The total marine and brackish-water fisheries catches in the Baltic Sea taken by the Russian Federation (or the equivalent entity pre-1991) were estimated for the time period 1950–2007 using an approach called ‘catch reconstruction’. Although there are reported data available elsewhere (e.g., ICES), they generally describe commercial landings rather than total catches. The reconstructed catch from 1950–2007 was approximately 3.7 million tonnes, attributing an additional 3 million tonnes to Russia’s catches above what is reported by ICES for this time period; the largest contributors to the total reconstructed catch were herring (*Clupea harengus*) and sprat (*Sprattus sprattus*). From 1992–2007 when ICES landing statistics were reported for Russia independently, our reconstructed catch was 950,000 tonnes, or 28% higher than reported landings. We used ICES landings statistics as the reported data baseline to which estimates of IUU catches were added, including: data source adjustments to reported landings; estimates of unreported landings; estimates of discards; and estimates of recreational catches. We believe that our reconstruction represents a conservative estimate.

INTRODUCTION

The Russian Federation (Russia) was formed in 1991 after the collapse of the Soviet Union (USSR), and is the only Baltic country that is not a member of the European Union. Russia stretches from the Pacific Ocean to the Baltic Sea, and two administrative regions of Russia, Leningrad and the Russian exclave Kaliningrad oblasts, have direct access to the Baltic Sea (Figure 1).

Leningrad oblast borders Finland to the north and Estonia to the west. Within the Baltic Sea, 15,470 km² of the Gulf of Finland is controlled by Leningrad oblast (Anon., 2007c). Kaliningrad oblast borders Lithuania on the east and Poland on the west. It is a Russian exclave, and thus shares no land border with Russia, but it has direct access to the Baltic Sea. Kaliningrad oblast controls approximately 1,203 km² of Curonian lagoon, 495 km² of Vistula lagoon, and 10,000 km² of the Baltic Sea (Anon., 2006b). Approximately 90% of Russian catches taken from the Baltic Sea are from ICES statistical subdivision 26, which borders the Kaliningrad oblast (Figure 1).

Russian fisheries statistics for the exclave of Kaliningrad are collected separately for Curonian lagoon, Vistula lagoon and the Baltic Sea (ICES subdivision 26, Figure 1). In Curonian lagoon, 7–10 species are commercially important out of 31 species available. They are mostly brackish water species, with common bream (*Abramis brama*) constituting 52.2% of reported landings, pikeperch (*Stizostedion lucioperca*) 10.6%, roach (*Rutilus rutilus*) 14.9%, and European smelt (*Osmerus eperlanus*) 2.1% (Anon., 2007c). In 2006, the landings for bream, pikeperch and roach were 99.2%, 80.1%, and 72.2% of the allocated quota, respectively. In Vistula lagoon, Baltic herring (*Clupea harengus membras*) constitutes 85% of total landings out of 28 species available. Bream and pikeperch constitute 8% and 5% of total landings, respectively. Due to proximity of coastal waters and comparatively inexpensive fishing gear, such as

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gillnets and traps, catch quotas in Vistula lagoon were almost completely filled in recent years (Anon., 2006b).

Major commercial species caught in the waters near Leningrad oblast (ICES subdivision 32, Figure 1) are herring (*Clupea harengus*) and sprat, which constituted approximately 76% of total landings in 2007 (Anon., 2006b). European smelt and brackish water fish, such as pikeperch, bream and northern pike (*Esox lucius*) are also commercially important. In 2007, the majority of herring (97%) was caught by trawl, while gillnets accounted for approximately 3%. Sprat is mostly caught as bycatch during herring trawls. In 2007, 48% of the quota for herring was caught, and pikeperch and bream had landings that were 29% and 38% of their quotas, respectively (Anon., 2007c).

In ICES subdivision 26, major commercial fish species include sprat, herring, and cod (*Gadus morhua*). In recent years, fisheries landings in subdivision 26 were significantly below the allocated quota, with 53.8%, 55%, and 60% of the quota being caught in 2004, 2005, and 2006, respectively (Shibaev, 2004). The only species for which the quota was routinely met was cod, which had 97% of its quota caught in 2006. Pelagic and bottom trawling are the most common fishing techniques in the Baltic Sea proper (ICES subdivision 26), and gillnets are used less frequently. Catches in Vistula lagoon are taken by gillnets and traps, and 80% of catches in Curonian lagoon are taken with gillnets (Shibaev, 2004).

Starting in the 1990s, Russia's fisheries landings began to decline. After the dissolution of the USSR, Russia lost fisheries access to ICES sub-divisions 28 and 29, which are partly within the waters of the now independent Baltic states of Estonia, Latvia, and Lithuania. However, the main reason for declining landings was stated to be inefficient distribution of quotas and new requirements to obtain separate paperwork for fishing either within 12 nautical miles or Russian exclusive economic zone (Shibaev, 2004). Furthermore, often quotas were distributed very late in the fishing season and fishers had less time to catch their assigned quota. Another reason for the decline in catches was the deterioration of fishing vessels and equipment since the dissolution of the USSR. Fishers could rarely afford new vessels, and combined with increases in fuel prices, and the requirement to sell all catches in the territory of Russia, led to increased operating costs and low landings (Anon., 2006b).

The Russian fisheries can be divided into three categories: 1) state-owned fisheries; 2) fisheries-collective farms; and 3) small, private fishing enterprises. Recently, 35-40 private fishing businesses were registered to fish in the waters surrounding Kaliningrad with a total of approximately 300 small boats. Of these small, private fishing businesses, 78% were local, 17% were registered in other regions of Russia, and 5% were foreign-owned (Shibaev, 2004). In 2000, approximately half of the catch quotas in Kaliningrad were received by small, private firms, and half were assigned to collective farms (Shibaev, 2004). State-owned fisheries operate the larger vessels remaining from the Soviet era, whereas the small, private firms use a variety of vessel types. The collective farms are still assigned a large portion of the catch quota in comparison to the small, private enterprises (Shibaev, 2004).

Currently, fisheries statistics in these two administrative divisions of Russia are obtained from reports collected every 15 days from registered fisheries, and information from log books, collected at the time of



Figure 1. Map of the Baltic Sea with ICES subdivisions and surrounding countries. Russia's coastline borders ICES subdivisions 26 (Kaliningrad) and 32 (Leningrad).

landing. Logbook data provides information on fishing location, landings by taxa, gear types used, and effort. This procedure is similar to that of European Union countries.

Prior to 2005, fisheries statistics were collected and reported by separate organizations for the Kaliningrad and the Leningrad oblast. From 2005–2007 the Federal Agriculture Civil Service became responsible for collecting data for both areas. This is now the responsibility of the Federal Fishery Agency. Recreational and subsistence (household use) fishing has traditionally represented a challenge for governmental organizations due to its massive character and poor organization of license distribution. However, there are some recreational catch data, including the number of recreational fishers and catch rates that enabled estimates of recreational catches to be made (Shibaev, 2004).

The purpose of this study is to provide an estimate of total marine and brackish water fisheries catches in the Baltic Sea by the Russian Federation or its equivalent entity (1950–2007) utilizing an approach called ‘catch reconstruction’ described by Zeller *et al.* (2007) and Zeller and Pauly (2007). The resultant reconstructed total catch estimates are then compared to the official fisheries landings data that represent the publicly reported data.

METHODS

ICES landings statistics (ICES, 2009) were used as the reported landings data baseline for our reconstruction of Russia’s fisheries catches in the Baltic Sea for the period 1950–2007. Thus, the ICES landings statistics are taken as the *reported* data, as they are the only data source that is readily publicly available (via the ICES website), and covers all taxa landed, countries, years (since at least 1950), and areas of the Baltic Sea for the time period considered here. However, ICES landing statistics were only available for the Russian Federation (Russia) from 1993–2007. Prior to 1990, Russia’s landings were reported as part of the overall ‘USSR’ landings, which combined the landings of Russia, Estonia, Latvia, and Lithuania. The Latvian Fish Resource Agency (LATFRA) during the USSR period was the central office for data collection for the Baltic States and Russia. Landings data provided by Maris Plikshs, the director of LATFRA, allowed for the separation of Russia’s catches from USSR landings from 1950–1989. The sum of these disaggregated USSR landings data (LATFRA source) was virtually identical to the ICES reported landings for the ‘former’ USSR during the same time period.

National landings data for Russia’s fisheries in the Baltic Sea were collected from the Leningrad oblast and the Kaliningrad oblast, the exclave located between Poland and Lithuania, from reports published by the Federal Agency on Fisheries in the Northwestern Baltic (Sevzaprybvod) and the Federal Agency on Fisheries in the Western Baltic (Zapbaltrybvod; Anon., 2006b; 2007c). Here, landings data from these two districts were combined to form the total landings for Russia (for separate data see Appendix C and D).

For the period 1950–1989, the disaggregated USSR landings data supplied by LATFRA were used as the sole estimate of reported landings and are presented here as an adjustment to the reported data (i.e., ICES landings statistics) as they were not supplied by ICES directly. Thus, USSR data provided by ICES were not used. For the 1990–2007 period, adjustments to the ICES landings statistics were made using ICES stock assessment working group data (ICES, 2007; 2008b) and national data provided by Russia (Anon., 2006b; 2007c). In addition to these adjustments, estimates of unreported landings (ICES terminology: ‘unallocated’ catches) were added to the adjusted ICES landings, discards were then applied to this total as a means of estimating discarded catch, and recreational catches were also estimated. The resulting sum of ICES landings statistics, adjustments, unreported landings, total discards and recreational catches represented the total reconstructed catch for Russia from 1950–2007.

The reconstruction illustrated in this report is presented specifically for the main commercially targeted species including cod; herring; sprat; salmon (*Salmo salar*); the flatfish group, which includes European flounder (*Platichthys flesus*) and turbot (*Psetta maxima*); and another 25 taxa grouped here as ‘others’.

Illegal, Unreported and Unregulated (IUU) catches

Illegal, Unreported and Unregulated (IUU) fishing are a major source of underreporting in fisheries catch data, globally (Zeller and Pauly, 2007) and are also of concern in the Baltic Sea (Menn, 2006; Anon., 2007b; ICES, 2008a). Here, we considered all catches not included in the ICES landings statistics as IUU catches, comprising of: a) ‘adjustments’ to ICES landings statistics based on reliable sources for reported landings data such as ICES stock assessment working group data and national data sources; b)

'unreported' landings (defined by ICES as 'unallocated' catches) being all other landings that are not specifically reported by country and year; c) 'discards', which consisted of four categories; and d) 'recreational' catches.

Adjustments to ICES landings statistics

Adjustments were made to the ICES landings statistics using a range of available sources (Table 1). Russia's landings data for the 1950-1989 time period were provided by LATFRA. ICES stock assessment working group data were used to make adjustments to ICES landings statistics for cod, herring and flatfishes for the 1991-2007 period (Table 1). Additional landings data for the group 'others' were obtained from national reports (Anon., 2000b; 2007c).

The adjustment data sources (Table 1) showed that no landings data were reported for sprat between 1950 and 1953. To estimate these likely missing sprat landings, we used the average landings from the first three years of reported data (1953-1955) as the estimated value in each year from 1950-1952. Missing values from 1990 onward were derived through linear interpolation between anchor points of known values or through default methods.

Unreported landings

In the Baltic Sea, unreported landings are considered the most significant component of IUU catches (Anon., 2007a). However, here we assumed that from 1950-1990, unreported landings for Russia were 0%, in line with the conservative assumption we applied to all former eastern bloc countries (Zeller *et al.*, this volume). The rationale for this was that there was little incentive not to land all that was caught, as the centralized, non-market economic system paid the same prices for all species. For the period 1993-2007, unreported landings estimates were based on what ICES refers to as 'unallocated catches'. Rates of unreported landings for all species were derived from ICES stock assessment working group data (Zeller *et al.*, this volume) which reports the tonnage of unallocated catches as a single annual value for all the Baltic Sea (i.e., non-transparent with regards to country, even though only a small subset of countries are known to provide unallocated catch data). The resulting rates for unreported landings (Table 2) were applied to landings (ICES landings statistics + adjustments) to derive tonnage of unreported landings. To estimate unreported landings for 1991 and 1992, the years which reflect the transition from a state-controlled economy to a market-based economy, values were interpolated from 0% in 1990 to the first anchor points in 1993 (Table 2).

Discards

Here, we separated discards into four categories, which combined gave us total discard amounts for each taxon: a) 'ghostfishing' as a result of lost fishing gear; b) 'underwater discards' accounting for the mortality of fish lost from actively fishing gear prior to being brought on board; c) 'boat-based discards' usually based on fishers' catch retention behavior; and d) 'seal-damaged discards' representing the fraction of catch discarded because of seal damage. To remain conservative, and to avoid double accounting, seal-damaged discard rates were used in place of boat-based discards for some taxa in years

Table 1. Sources of adjustments to ICES landings statistics for Russia from 1950-2007.

Common name	Years	Source
Cod	1950-1989	LATFRA
	1991-2007	ICES (2007, 2008a)
Herring	1950-1989	LATFRA
	1991	ICES 2008a
Sprat	1953-1989	LATFRA
Salmon	1950-1989	LATFRA
Flatfishes	1950-1989	LATFRA
	1991-1993; 1995;	ICES (2008a)
	1998; 2001-2004	
'Others'	1950-1989	LATFRA
	1997-2000	Anon. (2006b, 2007c)

Table 2. Anchor points (%) used for estimating unreported landings for cod, salmon and other taxa from 1950-2007 based on sources (Tables 2.3.1 and 2.4.1 in ICES, 2007; Tables 2.1.2 in ICES, 2008a). Dashed lines (-) indicate years when linear interpolations were used.

Year	Cod ^a	Salmon	Others ^b
1993	87.7	19.4	24.6
1994	123.6	18.7	30.3
1995	29.7	19.5	-
1996	13.1	20.4	-
1997	-	20.8	-
1998	-	20.1	-
1999	-	20.4	-
2000	46.0	19.9	-
2001	47.6	20.4	-
2002	47.5	20.5	-
2003	59.8	20.1	-
2004	52.9	20.6	12.3
2005	46.4	20.7	11.2
2006	46.9	22.2	11.2 ^c
2007	87.7	21.4	11.2 ^c

^a eastern stock only; ^b includes all taxa other than cod and salmon; ^c 2005 rate carried forward.

when the seal-damaged discard rate was higher than the boat-based discard rate (Zeller *et al.*, this volume).

‘Ghostfishing’ is a worldwide problem highlighted in recent work by Macfadyen *et al.* (2009). The ghostfishing rate for Russia, as for the rest of the Baltic countries, was based on a Swedish study by Tschernij and Larsson (2003) that estimated the amount of cod caught in Sweden by lost gear and related it to commercial catches in Sweden. Using these data, Brown *et al.* (2005) estimated the range of ghostfishing rates by lost gear to be between 0.01% and 3.2%. Here, we used the average of 1.65% applied to all other taxa, except herring and sprat, for all years.

‘Underwater’ discards were only estimated for herring and sprat. These pelagic species are caught by the same fleet as their distribution and areas where they are fished overlap. Inaccurate data on catch composition due to the mixed nature of this fishery, and the fact that these two species are targeted by the same fleet, led us to apply the same underwater discard rate to both species (ICES, 2008a)

Our estimate of underwater discards for herring and sprat were derived from a trawl study by Rahikainen *et al.* (2004) who related underwater discard amounts to the observed herring catches brought on board. We translated this into a rate of approximately 9% for underwater discards of herring caught by trawl (Zeller *et al.*, this volume). Since herring and sprat landings for Russia are not reported by gear type, the trawl-based rate of 9% was reduced to a more conservative estimate of 5% applied to all herring and sprat landings.

‘Boat-based’ discards were assumed to be minimal prior to 1990, as discarding was considered illegal during the USSR period, and all fisheries catches were to be landed (S.V. Shibaev, unpubl. data). However, it is likely that there were some discards of unmarketable, unpalatable or inedible species. Therefore, the assumed default rate of 2% was applied to all species, except herring and sprat for the period from 1950–1990. This rate compares conservatively to a Norwegian study that suggested a boat-based discard rate of 6% occurred in Norway’s fisheries where discarding is illegal (Jensen, 2004). From 1990–1993, estimates of boat-based discards were derived through linear interpolation between the 1990 rate of 2% and the first anchor point in 1993 (Table 3). From 1993–2007, boat-based discards for salmon and cod were estimated using ICES stock assessment working group data (Zeller *et al.*, this volume). For all other species, discards were derived from a Danish study (Anon., 2006a).

‘Seal-damaged’ discards, associated with fixed-gear fisheries, have been a concern in the Baltic Sea since the 1980s when seal populations increased dramatically from a previously depleted state (Österblom *et al.*, 2007). Data on seal-discards for Russia were not available, but Russia borders Finland in subdivision 32. Since both Russia and Finland employ stationary gear vulnerable to seal discard within this area, the magnitude of the seal discards and the species affected by seal-damage is likely to be very similar between these two countries. Therefore, we applied our estimated Finnish seal-damaged discard rate to Russia’s catches within subdivision 32 for salmon, herring, pike perch and European perch for the period 1980–2007 (Rossing *et al.*, this volume). We substituted the seal-damaged discard rate for the boat-based discard rate for subdivision 32 only in instances when the seal-damaged discard rate was higher than the boat-based discard rate. This approach was used to avoid double accounting and to apply a conservative estimate, as boat-based discard values may already include some seal-damaged discards. For all other subdivisions we used the boat-based discard rate.

Table 3. Boat-based salmon discard rates as a % (derived from Table 2.1.2 in ICES, 2008b) for Russia were used except for ICES subdivision 32 when our seal-damaged discard rates, derived from Finnish Game and Fisheries Research Institute (FGFRI) data, were greater (1981–2007). Values in *italics* indicate an interpolated rate.

Year	Discards	
	Boat-based	Seal-damaged
1980	2.00	0.00
1981	2.00	<i>6.89</i>
1982	2.00	<i>13.78</i>
1983	2.00	<i>20.66</i>
1984	2.00	<i>27.55</i>
1985	2.00	<i>34.44</i>
1986	2.00	<i>41.33</i>
1987	2.00	<i>48.22</i>
1988	2.00	<i>55.10</i>
1989	2.00	<i>61.99</i>
1990	2.00	<i>68.88</i>
1991	<i>6.00</i>	<i>75.77</i>
1992	<i>10.00</i>	<i>82.66</i>
1993	14.00	<i>89.54</i>
1994	13.00	<i>96.43</i>
1995	14.00	<i>103.32</i>
1996	15.00	<i>110.21</i>
1997	15.00	<i>117.10</i>
1998	14.00	<i>123.98</i>
1999	15.00	<i>130.87</i>
2000	10.33	137.76
2001	14.98	203.44
2002	15.75	255.80
2003	15.43	337.31
2004	15.62	380.54
2005	15.21	113.18
2006	17.38	149.26
2007	14.22	102.66

Seal-damaged discard rates for salmon in subdivision 32 were compared to the default boat-based discard rates, and the higher rates between the two categories were used to estimate discards in subdivision 32 only (Table 3). For all other subdivisions and years prior to 1980, the default boat-based discard rates were used.

For herring, seal-damaged discard rates from subdivision 32 were compared to the default boat-based discards for the period 1980-2007 (Table 4). As boat-based discards for herring were assumed to be zero for the entire study period, the seal-damaged discard rate was used from 1981-2007 as it was the higher rate.

Seal-damaged discard data for pikeperch and European perch, derived from FGFRI, were applied to Russia's landings of these species in subdivision 32 when the seal-discard rate was higher than the default boat-based discard rate. Seal-damaged discard rates were higher than the default boat-based discard rates from 2005-2007 for both species (see Appendix Table A1 and A2).

Recreational catches

Reports of recreational catches for Russia were mostly lacking throughout the time period considered. Reported recreational catch totals were available for Vistula lagoon in Leningrad oblast and Curonian lagoon in Kaliningrad oblast for 2005/2006 (Anon., 2006b; 2007c). Catches in these two recreational fishing areas were presented as the total number of recreational fishers and the total tonnage of fish caught, for all species combined. Anchor points were established for the number of fishers in 1980 and 1950 using an assumption-based approach. We assumed that in 1980 there were half the numbers of recreational fishers as in 2005, and in 1950 there were a quarter of the fishers as in 2005. To obtain a complete time series of number of fishers from 1950-2007, a linear interpolation was done between anchor points. We derived a catch rate of 5 kg·fisher⁻¹·year⁻¹ from the number of fishers and the total recreational catch for 2005/2006. This catch rate was held constant back in time to 1950 and combined with the number of fishers to estimate the total recreational catch. The same methodology was applied to Vistula lagoon and Curonian lagoon to estimate total recreational catch.

To estimate the catch by taxon for each of the two recreational fishing areas, information was obtained regarding the recreational catch composition of the nearest neighboring country that reported recreational catches. For recreational catches in Vistula lagoon, the species composition of recreational catches was assumed to be similar to that of Finland, which is the nearest neighboring country that reported recreational catches (Rossing *et al.*, this volume). The catch composition included 17 taxonomic groups. For each of these taxonomic groups, the average proportion of the Finnish recreational catches from 1980-2007 were applied to the estimated recreational catches for Vistula lagoon.

For Curonian lagoon, recreational catch composition was based on Germany's recreational catch composition (Rossing *et al.*, this volume). Germany is the nearest neighboring country to Kaliningrad that provides detailed data on its recreational catches. The average proportion of cod, herring and flounder that were caught in Germany's recreational fisheries were applied to the estimated recreational catches for Curonian lagoon.

Overall, total reconstructed catches were obtained as the sum of ICES landings statistics, adjustments, and estimates of unreported landings, discards and recreational catches. The estimated total reconstructed catch was then compared to the officially reported data, defined here as the ICES landings statistics.

RESULTS

ICES landings statistics only exist for the Russian Federation (Russia) from 1992 onward. Prior to 1990, Russia was part of the Union of Soviet Socialist Republics (USSR) and landings for Russia were reported to ICES as part of the overall USSR landings, which also included landings for Estonia, Latvia and Lithuania. For the period between 1990 and 2007, ICES landings statistics reported a total of 739,288 t for Russia

Table 4. Seal-damaged discard rates for herring in Subdivision 32, derived from Finnish Game and Fisheries Research Institute (FGFRI) data, were used in place of boat-based discards from 1981-2007. Boat-based discards were assumed to be zero from 1950-2007. Dashed (-) line indicates an interpolated rate.

Year	Seal-damaged
1980	0.00
1981-1999	-
2000	0.00
2001	0.00
2002	0.02
2003	0.01
2004	0.00
2005	0.12
2006	0.00 ^a
2007	0.38

^a less than 0.01.

(Figure 2). The time series of ICES landings showed a decrease in landings from 50,000 t in 1992 to around 37,000 t in 1994. Landings increased again around 1998, reaching a high of almost 60,000 t in 2001. Landings decreased to an average of approximately 44,000 t·year⁻¹ in the period from 2004-2007 (Figure 2). Here, we treat the ICES landings statistics as the officially reported data foundation, as it is the only readily available and publicly accessible fisheries data source that covers all countries, all years, all taxa and all statistical areas.

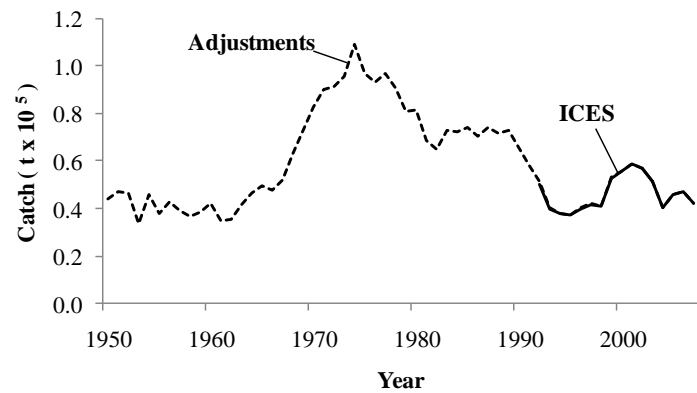


Figure 2. ICES landings statistics and adjustments to ICES landings statistics for Russia, 1950-2007.

Illegal, Unreported and Unregulated (IUU) catches

All catches (and landings) that are not reported in the ICES landings statistics were considered here as IUU catches and were added to the ICES landings statistics to form our estimate of total reconstructed catch. These IUU components included: a) ‘adjustments’ to ICES landings statistics from other reliable data sources of reported landings, including ICES stock assessment working group data and national data sources; b), ‘unreported’ (‘unallocated’) landings; c) ‘discards’; and d) ‘recreational’ catches. Combining the estimated IUU components with the ICES landings statistics formed the total catch reconstruction for 1950-2007. See Appendix Tables B1-B7 for complete time series data on all additions to taxonomic catch data, by catch component

Table 5. Total adjustments (tonnes) to ICES landings of commercially targeted species in Russia from 1950-2007.

Common name	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2007
Cod ^a	142,250	35,730	45,114	159,770	8,274	-489
Herring	184,400	214,250	353,267	351,244	66,342	0
Sprat	16,040	158,430	411,235	96,654	27,184	0
Flatfishes	1,710	1,770	1,615	3,242	772	4
Salmon	660	40	54	827	211	27
‘Others’	67,130	76,000	116,782	112,544	11,068	436

^a eastern stock only.

Adjustments to ICES landings statistics

Additional landings data for Russia were obtained from the Latvian Fish Resources Agency (LATFRA), from ICES stock assessment working group reports and from national sources (see methods for source details). These provided the information to make adjustments to the ICES landings statistics. Landings for the period 1950-1989 were adjusted from zero using the obtained from the LATFRA, as there were no officially reported ICES landings for Russia during this period (which were part of the ‘former USSR’ ICES category). Thus, adjustments were quite substantial for the early period from 1950-1990, after which only minor adjustments were made to the reported landings (Figure 2, Table 5). Cod, herring and sprat were the largest contributors to these adjustments (Table 5). The total tonnage of adjustments to ICES landings was approximately 2,660,000 t over the study period (1950-2007), with the majority from 1950-1990.

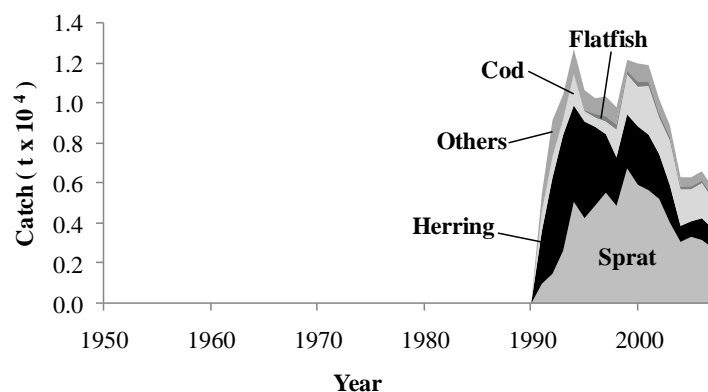


Figure 3. Russia’s unreported landings by taxa, 1950-2007.

Unreported landings

Unreported landings from 1950-1990 were assumed to be zero (see methods). For the 1991-2007 period, total estimated unreported landings for all species combined were approximately 145,900 t (Figure 3, Appendix Table B1). Unreported landings increased dramatically from zero in 1990 to just over 11,000 t·year⁻¹ in 1999, before declining to around 6,000 t·year⁻¹ by 2007.

Over the study period, the majority of unreported landings were of herring and sprat, with estimated totals of about 43,400 t and 64,600 t, respectively (Appendix Table B3 and B4). Unreported landings of herring and sprat were quite substantial during the 1990s, each averaging approximately 3,500 t·year⁻¹ (Figure 3). Cod represented 16% of the total unreported catch and 'others' represented 8% (Figure 3, Appendix Table B2). Flatfish and salmon contributed less to the overall unreported landings with estimated totals of approximately 2,600 t and 120 t, respectively (Appendix Table B6 and B5). Unreported landings of flatfishes were most substantial during the 2000s with a total of about 1,560 t, while the highest levels of unreported landings for salmon occurred in the 1990s, totaling just over 80 t (Table 6).

Discards

From 1950-2007, estimated discards for all species totaled approximately 178,700 t (Figure 4). Unlike unreported catches, discards were of concern throughout the study period. Total discards peaked during the 1970s, with a total of over 44,000 t summed over the decade, while discards of cod over the entire study period were around 18,800 t (Figure 4). Cod discards fluctuated considerably, ranging from approximately 20 t·year⁻¹ to 1,000 t·year⁻¹. Herring discards averaged 1,700 t·year⁻¹ during the 1970s and 1980s, which was much higher than during other periods (Figure 4). The highest levels of discards for sprat were also during the 1970s with over 20,500 t in that decade. Total flatfish discards were estimated at over 9,500 t for the 1950-2007 period, with peaks in the 1990s and 2000s (Figure 4, Table 7) and a total of approximately 9,000 t for these two decades. Salmon discards totaled approximately 580 t over the entire study period, and peaked during the early to mid-1990s (Figure 4). Estimated discards of 'others' totaled about 21,000 t over the study period.

Table 6. Total (tonnes) unreported landings of commercially targeted species for Russia from 1950-2007.

Common name	1950-1989	1990-1999	2000-2007
Cod ^a	0	7,850	14,978
Herring	0	30,381	13,016
Sprat	0	32,517	32,108
Flatfishes	0	1,084	1,560
Salmon	0	81	35
'Others'	0	7,582	4,791

^a eastern stock only.

Table 7. Total discards (tonnes) of commercially targeted species for Russia from 1950-2007.

Common name	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2007
Cod ^a	5,192	1,304	1,647	5,832	1,535	3,208
Herring	9,020	10,713	17,663	17,562	11,614	5,192
Sprat	802	7,922	20,562	4,833	10,220	13,197
Flatfishes	62	65	59	118	3,005	6,173
Salmon	24	1	2	296	194	58
'Others'	2,450	2,774	4,263	4,105	3,693	3,295

^a eastern stock only.

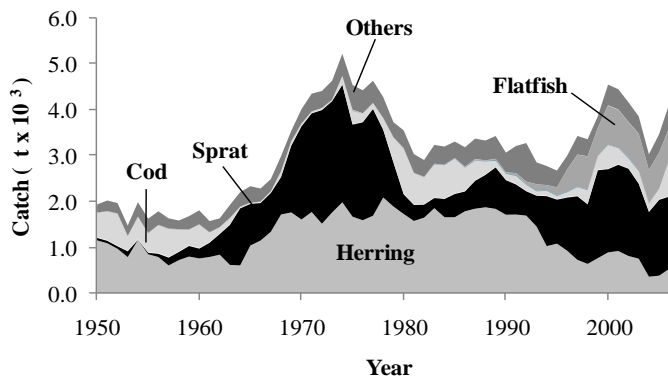


Figure 4. Russia's discards by taxa, 1950-2007.

Recreational catches

Total catches by Russia's recreational fisheries in the Baltic Sea from 1950-2007 were estimated at approximately 14,800 t (Figure 5). Recreational catches increased gradually from about 100 t-year⁻¹ in 1950 to around 225 t-year⁻¹ by 1980. From 1980 to 2007, recreational catches continued to increase steadily, with the highest levels estimated for 2005 through 2007 at 450 t-year⁻¹. Recreational fisheries are dominated by cod, which represents nearly 70% of the total recreational catch, while 'others' represented 20%, herring represented 8% and flatfishes represented 2% of the total recreational catch (Figure 5, Table 8). Recreational catches of cod increased steadily over the study period from 77 t-year⁻¹ in 1950 to 310 t-year⁻¹ in 2007 (Figure 5), and totaled 10,000 t during the study period. Recreational catches of herring were minimal, adding only about 1,200 t to the total catch over the study period, while recreational catches of sprat were even lower, totaling only about 20 t from 1950-2007 (Figure 5; Appendix Table B5). Recreational catches of flatfishes increased from 3 t-year⁻¹ in 1950 to 11 t-year⁻¹ in 2007, totaling almost 350 t over the 1950-2007 time period. Recreational catches of salmon were also low, totaling 52 t over the study period.

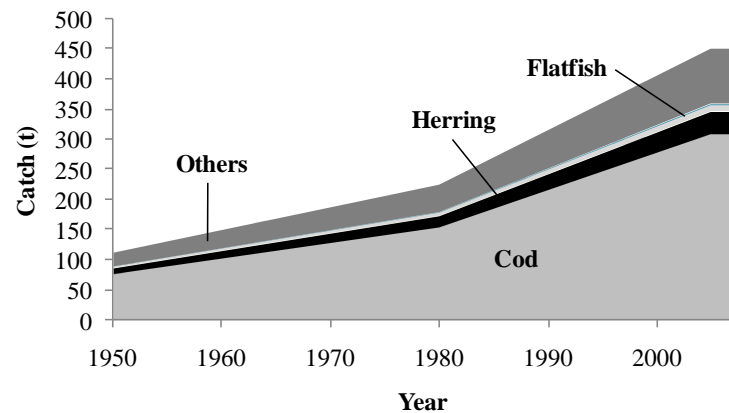


Figure 5. Russia's recreational catches by taxa from 1950-2007.

Table 8. Total recreational catches (t) for Russia from 1950-2007.

Common name	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2007
Cod ^a	890	1,148	1,406	1,827	2,446	2,384
Herring	106	137	168	218	292	285
Sprat	2	2	3	4	5	5
Flatfishes	31	39	48	63	84	82
Salmon	5	6	7	10	13	12
'Others'	259	339	411	535	780	785

^a eastern stock only.

Total reconstructed catch

The total reconstructed catch for Russia, which combined ICES landings statistics with IUU estimates (reporting adjustments, unreported landings, discards and recreational catches), was estimated to be 3,739,244 t for the 1950-2007 time period (Figure 6). Overall, adjustments to landings, unreported landings, discards and recreational catches added over 3 million t to the ICES landings statistics, which were reported to be about 740,000 t over the study period (Figure 7). However, these landings were only for the period 1992-2007, as ICES did not report landings for Russia as a separate entity prior to this period. As ICES landings statistics data for Russia, specifically, were only available from 1992 onward, the total reconstructed catch was compared to the ICES landings statistics for the period from 1992-2007. During this period, the total reconstructed catch was 28% higher than the ICES landings statistics data (Figure 7, Appendix Table B1).

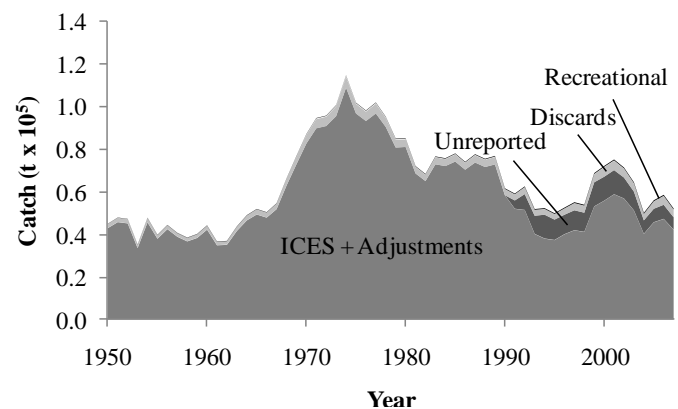


Figure 6. Total reconstructed catch by component for Russia from 1950-2007.

Adjustments to ICES landings contributed the majority of additional landings, representing 71% of the total reconstructed catch. Other contributions to the total reconstructed catch were discards and unreported landings representing 5% and 4%, respectively (Appendix Table B1). Recreational catches were relatively low and contributed only a minor amount (0.4%) to the total reconstructed catch. Discards were

most substantial in the 1970s and 1980s, and unreported landings were largest in the 1990s and 2000s (Table 9). Recreational catches increased steadily over the study period, but were low compared to other IUU components.

Over the study period, Russia's fisheries in the Baltic Sea were dominated by herring and sprat, which together represented 73% of the total reconstructed catch (Table 10). Herring and sprat catches, including reported landings (ICES landings statistics) and unreported catches (adjustments, unreported landings, discards, and recreational catches) were highest during the 1970s, but were significant throughout the study period in comparison to catches of other taxa (Table 10).

DISCUSSION

This study presents separate catch data for Russia, which has been disaggregated from the former USSR landings. This is probably the first time that such a comprehensive time series of Baltic Sea fisheries data for Russia has been made publicly available in the English literature for Russia's fisheries.

The present study substitutes, at least for the Baltic Sea, the USSR disaggregation efforts of Zeller and Rizzo (2007), which were based entirely on FAO data. Our reconstruction of Russia's total fisheries catches in the Baltic Sea for the period 1950-2007 were estimated to be approximately 3.7 million tonnes. As ICES has not retroactively adjusted its landings data to reflect the dismantling of

the USSR, here we compare the ICES landings data to our reconstructed catch for the period 1992-2007 (as this is the only period when data were presented for Russia separately in the publicly accessible ICES landings statistics database), and over the time period 1950-2007. ICES landings statistics reported total landings of approximately 739,000 t for Russia over the period 1992-2007. Our reconstruction of Russia's total catches in the Baltic Sea for the same period (1992-2007) was approximately 946,800 t, and was therefore 28% higher than the ICES landings statistics over the same time period. However, when making the comparison between Russia's landings statistics as presented in ICES (1992-2007), and our catch reconstruction (1950-2007), our estimated total catches were approximately 500% higher. The large discrepancy between the total ICES landings and our reconstructed catch when considering the entire study period (1950-2007) was predominantly due to the adjustments made to ICES landings statistics using the disaggregated USSR landings data provided by LATFRA.

Our disaggregation of Russian catches into the two oblasts, suggested that for the entire 1950-2007 time period, both regions caught approximately equal amounts of fish (St. Petersburg 50.1%, Kaliningrad 49.9%, Appendix tables C, D). However, by the 2000s, this pattern had changed drastically, with

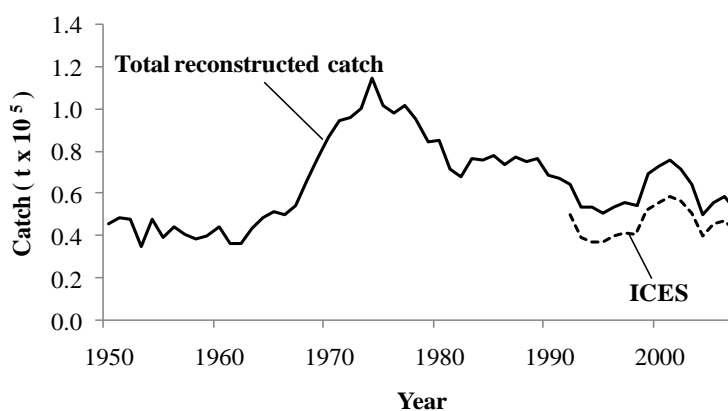


Figure 7. Russia's total reconstructed catch from 1950-2007 and ICES landings statistics from 1991-2007.

Table 9. Total Reconstructed catch (tonnes) by component for all taxa for Russia from 1950-2007.

Component	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2007
ICES	0	0	0	0	340,568	398,719
Adjustments	408,190	486,220	928,090	724,190	113,851	-23
Unreported	0	0	0	0	79,494	68,198
Discards	17,551	22,778	44,196	32,746	30,261	31,124
Recreational	1,292	1,671	2,043	2,656	3,619	3,552

Table 10. Total (tonnes) reconstructed catch for commercially targeted species in Russia from 1950-2007.

Common name	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2007
Cod ^a	148,332	38,182	48,167	167,428	40,115	51,256
Herring	189,526	225,100	371,098	369,025	244,180	109,036
Sprat	16,844	166,354	431,800	101,490	214,621	277,145
Flatfishes	1,803	1,874	1,722	3,423	9,726	18,745
Salmon	689	47	63	1,133	901	279
'Others'	69,839	79,113	121,480	117,093	58,258	43,341

^a eastern stock only.

Kaliningrad accounting for 90% of fisheries catches, and St. Petersburg for 10% (Appendix tables C, D). Fisheries out of St. Petersburg appear to have declined substantially by the 2000s.

Unreported landings are a serious concern for fisheries worldwide and are considered to be the most significant component of IUU in the Baltic Sea (Anon., 2007b). Unreported landings for Russia were only considered from the early 1990s onward and represented 15% of the total reconstructed catch for the period 1992-2007. Discards have been identified as a major contributor in underestimating the impacts of global fisheries on the marine ecosystems (Alverson, 1994). Discarded catches were considered for Russia throughout the entire study period, and represented 4% of the total reconstructed catch from 1950-2007. Both unreported landings and discards were dominated by herring and sprat, which were also the most significant fisheries in Russia throughout the study period.

Recreational fisheries were a minor contributor to the total reconstructed catch; however, our estimates were very rudimentary for this catch component. Recreational fisheries data were lacking for most of the time-period considered, with reports only for a few years during the most recent decade. While the magnitude of recreational fisheries is likely much less than commercial fisheries, improved data collection is necessary in order to build a more complete picture of total fisheries catches from the Baltic Sea, particularly as these two fisheries often target different taxa. Recreational fisheries in Russia were dominated by cod and 'others' while commercial fisheries were dominated by herring and sprat. In order to improve recreational fisheries data, Russia should conduct creel surveys on a regular basis (e.g., every few years) used to expand to Russia Baltic Sea-wide catches, and use estimation methods between survey years.

Illegal, Unreported and Unregulated (IUU) fisheries are a problem worldwide, and have also been identified as a concern in the Baltic Sea, but information on IUU fisheries in Russia was sparse. A study on fishing activities in Russia's Far East estimated IUU to be 20-60% of reported catches for the area, and anecdotal evidence suggests that it might be even higher (Burnett *et al.*, 2008). The same report stated that a substantial quantity of fish caught by Russian vessels in the Barents Sea were landed in foreign ports or transferred to foreign cargo vessels before being landed and therefore unreported (Burnett *et al.*, 2008). This type of IUU activity that is known to occur in the Barents Sea is likely to occur also in other areas of Russia. However, we were unable to find similar accounts of IUU fishing activities for Russia in the Baltic Sea. To quantify the IUU components considered in this study, we had to rely on Baltic-wide estimates, which are likely to be conservative, for IUU components of Russia's Baltic Sea fisheries.

Where IUU fisheries data for Russia were not available, estimates were made based on assumptions and/or Baltic-wide approximations of unreported (IUU) catch components. ICES, in their stock assessment working group reports, presents some Baltic-wide estimates of catch components such as unreported ('unallocated') catches and discards, but do not identify which (or how many) countries have contributed to these data, even though it is known that only some countries present these components. ICES maintains confidentiality agreements with its members which generally prevents the disclosure of data. This lack of transparency in reporting by ICES means that the Baltic-wide estimates used here are likely lower than what could have been determined if ICES (and by extension, its member states) were more forthcoming with their data.

The estimates used for unreported landings should be considered minimal estimates and are therefore conservative. This is because we used reported amounts of unreported landings as a ratio to Baltic-wide landings. Although, corrections were made to the Baltic-wide landings for countries which are known to not report amounts of unreported landings (e.g., Sweden, Persson, this volume), it is likely that other countries do not report these details either. Thus, the ratio of unreported landings used would have been greater if corrections had been made to account for all non-reporting countries landings. As long as we have not overestimated any IUU catches, the assumptions used to generate our estimates are justified given the alternative assumption that non-reported or missing data are approximated as zero catch (Zeller and Pauly, 2007).

Russia is the only Baltic country that is not a member of the European Union (EU). While Russia is not bound by the same EU fisheries rules and regulations as the other Baltic countries, Russia does have a fisheries agreement with the EU that follows similar guiding principles. Baltic fisheries were regulated through the International Baltic Sea Fisheries Commission (IBSFC) until 2005 (Anon., 2007b). With all the Baltic countries except Russia joining the EU, a bilateral agreement between the European Union and the Russian Federation on "co-operation in fisheries and the conservation of the living marine resources in

the Baltic Sea” was adopted in 2006 to replace the IBSFC (Anon., 2009). Russia continues to report landings to ICES, as is the case for all the Baltic countries. Total allowable catches (TAC’s) are set based on ICES recommendations but are then sanctioned by the EU in accordance with its agreement with Russia. The EU is planning a revision of its Common Fisheries Policy (CFP) in 2012, and although Russia is not bound by the CFP, the recommendations for the revised policy would hopefully also apply to the management of Russia’s fisheries in the Baltic Sea. Russia should aim to align its fisheries objectives with these upcoming revisions to the CFP in order to work toward harmonizing fisheries management in an effort to facilitate movement towards ecosystem-based management. An important recommendation for the revised CFP, which also pertains to Russia, is increased transparency in fisheries data collection, decision-making and dissemination of information to all stakeholders, including the general public.

Russia has a history of nondisclosure with nationally held data, particularly with respect to fisheries catches during the Soviet era. During the Cold War, fisheries data in Russia were considered a “state secret” (V. Spirodonov, pers. comm., P.P. Shirshov Institute of Oceanology). A major concern for Russian fisheries in the Baltic Sea is a lack of consistent data made readily available to the Baltic and global community (ICES, 2005; 2007). Also, records that could have shed some light on Russia’s historical catches were lost during the collapse of the USSR (S. Shibaev, unpubl. data). The time series of commercial catches is therefore incomplete and information on unreported catches, discards and recreational catches is even poorer. Russia should reduce discarding and unreported landings. Complete (100%) observer cover, video surveillance and satellite Vessel Monitoring Systems would substantially increase the accuracy of total (including IUU) catches which would in turn properly inform regulatory and policy decisions. Improved monitoring and enforcement are important, but increased transparency is even more crucial as it can enhance the quality of fisheries data and improve fisheries management and policy decisions. For an ecosystem-based management approach to be effective in the Baltic Sea, countries such as Russia need to improve the collection of data and make these widely available for the purpose of improving fisheries management and accountability in maintaining a publicly owned resource.

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APPENDIX A

Table A1. Boat-based perch (*Perca fluviatilis*) discard rates (%) for Russia used in all subdivisions except in subdivision 32 when seal-damaged discard rates derived from FGFRI data were greater (1980-2007). Values in *italics* indicate an interpolated rate.

Years	Boat-based	Seal-damaged
1980	2.00	0.00
1981	2.00	<i>0.00</i>
1982	2.00	<i>0.00</i>
1983	2.00	<i>0.00</i>
1984	2.00	<i>0.00</i>
1985	2.00	<i>0.00</i>
1986	2.00	<i>0.00</i>
1987	2.00	<i>0.00</i>
1988	2.00	<i>0.00</i>
1989	2.00	<i>0.00</i>
1990	2.00	<i>0.00</i>
1991	<i>3.4</i>	<i>0.00</i>
1992	<i>4.8</i>	<i>0.00</i>
1993	6.24	<i>0.00</i>
1994	6.24	<i>0.00</i>
1995	6.24	<i>0.00</i>
1996	6.24	<i>0.00</i>
1997	6.24	<i>0.00</i>
1998	6.24	<i>0.00</i>
1999	6.24	<i>0.00</i>
2000	6.24	<i>0.00</i>
2001	6.24	<i>0.00</i>
2002	6.24	<i>0.00</i>
2003	6.24	0.21
2004	6.24	0.20
2005	6.24	28.45
2006	6.24	75.79
2007	6.24	7.29

Table A2. Boat-based pikeperch (*Sander lucioperca*) discard rates (%) for Russia used in all subdivisions except in subdivision 32 when seal-damaged discard rates derived from FGFRI data were greater (1980-2007). Values in *italics* indicate an interpolated rate.

Years	Boat-based	Seal-damaged
1980	2.00	0.00
1981	2.00	<i>0.00</i>
1982	2.00	<i>0.00</i>
1983	2.00	<i>0.00</i>
1984	2.00	<i>0.00</i>
1985	2.00	<i>0.00</i>
1986	2.00	<i>0.00</i>
1987	2.00	<i>0.00</i>
1988	2.00	<i>0.00</i>
1989	2.00	<i>0.00</i>
1990	2.00	<i>0.00</i>
1991	<i>3.4</i>	<i>0.00</i>
1992	<i>4.8</i>	<i>0.00</i>
1993	6.24	<i>0.00</i>
1994	6.24	<i>0.00</i>
1995	6.24	<i>0.00</i>
1996	6.24	<i>0.00</i>
1997	6.24	<i>0.00</i>
1998	6.24	<i>0.00</i>
1999	6.24	<i>0.00</i>
2000	6.24	0.09
2001	6.24	0.94
2002	6.24	0.51
2003	6.24	6.22
2004	6.24	4.71
2005	6.24	17.37
2006	6.24	44.10
2007	6.24	51.94

APPENDIX B

Appendix Table B1. ICES landing statistics, adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for Russia (t). N/A: part of ICES category 'former USSR'.

Year	ICES landing statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	43,030	0	1,884	112	45,027
1951	N/A	45,840	0	1,970	116	47,926
1952	N/A	45,250	0	1,916	120	47,286
1953	N/A	33,630	0	1,476	124	35,230
1954	N/A	45,720	0	1,985	128	47,833
1955	N/A	38,030	0	1,628	131	39,790
1956	N/A	42,540	0	1,787	135	44,462
1957	N/A	38,970	0	1,634	138	40,743
1958	N/A	36,780	0	1,587	142	38,509
1959	N/A	38,400	0	1,682	146	40,228
1960	N/A	42,310	0	1,809	150	44,270
1961	N/A	34,940	0	1,574	154	36,668
1962	N/A	35,180	0	1,635	158	36,973
1963	N/A	41,680	0	1,926	162	43,767
1964	N/A	46,650	0	2,205	165	49,020
1965	N/A	49,440	0	2,333	169	51,942
1966	N/A	47,970	0	2,284	173	50,427
1967	N/A	51,940	0	2,488	176	54,604
1968	N/A	63,040	0	2,987	180	66,207
1969	N/A	73,070	0	3,538	184	76,791
1970	N/A	82,850	0	4,009	187	87,047
1971	N/A	90,030	0	4,348	191	94,569
1972	N/A	91,110	0	4,407	195	95,712
1973	N/A	95,770	0	4,629	199	100,598
1974	N/A	109,169	0	5,215	202	114,586
1975	N/A	97,016	0	4,537	206	101,758
1976	N/A	93,484	0	4,421	210	98,116
1977	N/A	97,021	0	4,629	214	101,864
1978	N/A	90,666	0	4,274	218	95,158
1979	N/A	80,974	0	3,728	221	84,923
1980	N/A	81,240	0	3,550	225	85,015
1981	N/A	68,771	0	3,035	234	72,040
1982	N/A	65,188	0	2,909	243	68,339
1983	N/A	73,076	0	3,246	252	76,574
1984	N/A	72,246	0	3,215	261	75,722
1985	N/A	74,379	0	3,328	271	77,978
1986	N/A	70,547	0	3,206	280	74,032
1987	N/A	73,905	0	3,410	288	77,603
1988	N/A	71,810	0	3,364	297	75,471
1989	N/A	73,028	0	3,483	306	76,816
1990	N/A	58,469	0	2,845	315	61,629
1991	N/A	52,100	3,908	2,821	323	59,153
1992	50,149	1,392	7,458	3,184	341	62,527
1993	39,790	475	8,531	2,741	350	51,887
1994	37,739	352	11,187	2,686	359	52,323
1995	37,390	3	9,574	2,606	368	49,941
1996	40,115	2	9,150	2,927	377	52,571
1997	41,684	316	9,358	3,356	386	55,100
1998	40,920	301	9,000	3,296	395	53,912
1999	52,785	441	11,328	3,799	405	68,757
2000	55,884	-2	11,302	4,492	414	72,089
2001	58,903	31	11,371	4,401	423	75,129
2002	56,938	0	9,845	4,137	432	71,352
2003	51,322	0	8,819	3,847	441	64,429
2004	40,289	0	6,329	3,029	450	50,098
2005	45,779	-23	6,328	3,470	460	56,014
2006	47,359	-28	6,630	4,135	460	58,557
2007	42,243	0	5,816	3,613	460	52,132

Appendix Table B2. ICES landing statistics, adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for cod (*Gadus morhua*) for Russia (t). N/A: part of ICES category 'former USSR' reconstructed total for Russia (t). N/A: part of ICES category 'former USSR'.

Year	ICES landing statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	14,850	0	542	77	15,469
1951	N/A	17,430	0	636	80	18,146
1952	N/A	19,310	0	705	83	20,097
1953	N/A	9,000	0	329	85	9,414
1954	N/A	13,520	0	493	88	14,101
1955	N/A	11,450	0	418	90	11,958
1956	N/A	16,960	0	619	93	17,672
1957	N/A	16,900	0	617	96	17,612
1958	N/A	13,270	0	484	98	13,852
1959	N/A	9,560	0	349	101	10,010
1960	N/A	14,100	0	515	103	14,718
1961	N/A	6,010	0	219	106	6,335
1962	N/A	3,890	0	142	108	4,140
1963	N/A	3,900	0	142	111	4,153
1964	N/A	650	0	24	114	787
1965	N/A	440	0	16	116	572
1966	N/A	540	0	20	119	678
1967	N/A	780	0	28	121	930
1968	N/A	3,120	0	114	124	3,358
1969	N/A	2,300	0	84	126	2,510
1970	N/A	1,150	0	42	129	1,321
1971	N/A	670	0	24	132	826
1972	N/A	810	0	30	134	974
1973	N/A	470	0	17	137	624
1974	N/A	4,741	0	173	139	5,053
1975	N/A	7,930	0	289	142	8,361
1976	N/A	4,922	0	180	144	5,246
1977	N/A	3,140	0	115	147	3,402
1978	N/A	6,640	0	242	150	7,032
1979	N/A	14,641	0	534	152	15,328
1980	N/A	27,088	0	989	155	28,232
1981	N/A	18,822	0	687	161	19,670
1982	N/A	16,120	0	588	167	16,876
1983	N/A	19,754	0	721	173	20,648
1984	N/A	19,929	0	727	180	20,836
1985	N/A	20,830	0	760	186	21,776
1986	N/A	13,962	0	510	192	14,664
1987	N/A	11,740	0	429	198	12,367
1988	N/A	7,783	0	284	204	8,271
1989	N/A	3,742	0	137	211	4,089
1990	N/A	3,521	0	129	217	3,866
1991	N/A	3,299	684	165	223	4,370
1992	884	909	743	117	229	2,882
1993	483	409	553	74	235	1,754
1994	1,114	143	1,295	95	242	2,889
1995	1,612	0	484	71	248	2,414
1996	3,304	2	331	103	254	3,993
1997	2,803	0	539	186	260	3,788
1998	4,599	0	1,295	298	266	6,458
1999	5,211	-9	1,928	297	272	7,700
2000	4,669	-438	1,946	519	279	6,975
2001	5,032	0	2,393	358	285	8,067
2002	3,793	0	1,768	212	291	6,064
2003	3,707	0	2,278	269	297	6,551
2004	3,410	0	1,804	178	303	5,696
2005	3,434	-23	1,583	233	310	5,537
2006	3,747	-28	1,745	809	310	6,582
2007	3,383	0	1,460	630	310	5,783

Appendix Table B3. ICES landing statistics, adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for herring (*Clupea harengus*) for Russia (t). N/A: part of ICES category 'former USSR'.

Year	ICES landing statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	23,240	0	1,162	9	24,411
1951	N/A	21,970	0	1,099	10	23,078
1952	N/A	19,580	0	979	10	20,569
1953	N/A	15,950	0	798	10	16,758
1954	N/A	23,430	0	1,172	11	24,612
1955	N/A	17,180	0	859	11	18,050
1956	N/A	15,970	0	799	11	16,780
1957	N/A	12,280	0	614	11	12,905
1958	N/A	14,630	0	732	12	15,373
1959	N/A	16,170	0	809	12	16,991
1960	N/A	15,360	0	768	12	16,140
1961	N/A	15,980	0	799	13	16,792
1962	N/A	16,980	0	849	13	17,842
1963	N/A	12,520	0	626	13	13,159
1964	N/A	12,310	0	616	14	12,939
1965	N/A	21,000	0	1,050	14	22,064
1966	N/A	23,170	0	1,159	14	24,343
1967	N/A	26,960	0	1,348	15	28,323
1968	N/A	34,530	0	1,727	15	36,271
1969	N/A	35,440	0	1,772	15	37,227
1970	N/A	32,350	0	1,618	15	33,983
1971	N/A	35,620	0	1,781	16	37,417
1972	N/A	30,500	0	1,525	16	32,041
1973	N/A	35,410	0	1,771	16	37,197
1974	N/A	39,858	0	1,993	17	41,868
1975	N/A	33,555	0	1,678	17	35,250
1976	N/A	32,007	0	1,600	17	33,625
1977	N/A	33,996	0	1,700	18	35,713
1978	N/A	41,944	0	2,097	18	44,059
1979	N/A	38,027	0	1,901	18	39,946
1980	N/A	34,770	0	1,739	19	36,527
1981	N/A	31,717	0	1,586	19	33,322
1982	N/A	33,140	0	1,657	20	34,817
1983	N/A	37,295	0	1,865	21	39,181
1984	N/A	33,331	0	1,667	21	35,019
1985	N/A	33,333	0	1,667	22	35,022
1986	N/A	35,936	0	1,797	23	37,756
1987	N/A	37,063	0	1,853	24	38,940
1988	N/A	37,675	0	1,884	24	39,583
1989	N/A	36,984	0	1,849	25	38,858
1990	N/A	34,442	0	1,722	26	36,190
1991	N/A	31,900	2,155	1,703	27	35,785
1992	29,251	0	3,953	1,660	27	34,891
1993	23,545	0	4,773	1,416	28	29,762
1994	15,904	0	4,275	1,009	29	21,217
1995	16,970	0	4,314	1,064	30	22,377
1996	14,780	0	3,541	916	30	19,268
1997	11,801	0	2,655	723	31	15,210
1998	10,544	0	2,218	638	32	13,432
1999	12,756	0	2,496	763	33	16,047
2000	15,063	0	2,728	890	33	18,714
2001	15,797	0	2,630	921	34	19,383
2002	14,168	0	2,152	817	35	17,172
2003	13,363	0	1,835	760	36	15,994
2004	6,585	0	807	370	36	7,798
2005	7,016	0	786	392	37	8,230
2006	9,780	0	1,095	544	37	11,456
2007	8,771	0	982	499	37	10,289

Appendix Table B4. ICES landing statistics, adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for sprat (*Sprattus sprattus*) for Russia (t). N/A: part of ICES category 'former USSR'.

Year	ICES landing statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	0	0	0	0	0
1951	N/A	0	0	0	0	0
1952	N/A	0	0	0	0	0
1953	N/A	2,490	0	125	0	2,615
1954	N/A	30	0	2	0	32
1955	N/A	620	0	31	0	651
1956	N/A	1,380	0	69	0	1,449
1957	N/A	3,410	0	171	0	3,581
1958	N/A	3,510	0	176	0	3,686
1959	N/A	4,600	0	230	0	4,830
1960	N/A	4,260	0	213	0	4,473
1961	N/A	6,170	0	309	0	6,479
1962	N/A	8,990	0	450	0	9,440
1963	N/A	17,440	0	872	0	18,312
1964	N/A	24,860	0	1,243	0	26,103
1965	N/A	18,130	0	907	0	19,037
1966	N/A	16,330	0	817	0	17,147
1967	N/A	16,900	0	845	0	17,745
1968	N/A	16,290	0	815	0	17,105
1969	N/A	29,060	0	1,453	0	30,513
1970	N/A	40,640	0	2,032	0	42,672
1971	N/A	43,030	0	2,152	0	45,182
1972	N/A	49,580	0	2,479	0	52,059
1973	N/A	48,570	0	2,429	0	50,999
1974	N/A	51,267	0	2,563	0	53,831
1975	N/A	40,180	0	2,009	0	42,189
1976	N/A	42,751	0	2,138	0	44,889
1977	N/A	46,561	0	2,328	0	48,889
1978	N/A	29,497	0	1,475	0	30,972
1979	N/A	19,159	0	958	0	20,117
1980	N/A	8,536	0	427	0	8,963
1981	N/A	6,980	0	349	0	7,329
1982	N/A	5,660	0	283	0	5,943
1983	N/A	4,413	0	221	0	4,634
1984	N/A	7,966	0	398	0	8,365
1985	N/A	10,128	0	506	0	10,635
1986	N/A	8,619	0	431	0	9,050
1987	N/A	12,168	0	608	0	12,777
1988	N/A	14,112	0	706	0	14,818
1989	N/A	18,072	0	904	0	18,976
1990	N/A	15,085	0	754	0	15,840
1991	N/A	12,099	817	646	0	13,562
1992	9,112	0	1,231	517	0	10,861
1993	10,745	0	2,178	646	1	13,570
1994	16,719	0	4,494	1,061	1	22,274
1995	14,934	0	3,796	937	1	19,667
1996	18,287	0	4,382	1,133	1	23,802
1997	22,194	0	4,994	1,359	1	28,548
1998	21,078	0	4,435	1,276	1	26,789
1999	31,627	0	6,189	1,891	1	39,708
2000	30,369	0	5,500	1,793	1	37,663
2001	31,959	0	5,321	1,864	1	39,145
2002	32,854	0	4,991	1,892	1	39,737
2003	28,663	0	3,935	1,630	1	34,229
2004	25,109	0	3,078	1,409	1	29,597
2005	29,749	0	3,332	1,654	1	34,736
2006	28,324	0	3,172	1,575	1	33,072
2007	24,808	0	2,778	1,379	1	28,966

Appendix table B5. ICES landing statistics, adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for salmon (*Salmo salar*) for Russia (t). N/A: part of ICES category 'former USSR'.

Year	ICES landing statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	50	0	2	0	52
1951	N/A	80	0	3	0	83
1952	N/A	80	0	3	0	83
1953	N/A	80	0	3	0	83
1954	N/A	100	0	4	1	104
1955	N/A	90	0	3	1	94
1956	N/A	70	0	3	1	73
1957	N/A	50	0	2	1	52
1958	N/A	40	0	1	1	42
1959	N/A	20	0	1	1	21
1960	N/A	10	0	0	1	11
1961	N/A	10	0	0	1	11
1962	N/A	10	0	0	1	11
1963	N/A	0	0	0	1	1
1964	N/A	10	0	0	1	11
1965	N/A	0	0	0	1	1
1966	N/A	0	0	0	1	1
1967	N/A	0	0	0	1	1
1968	N/A	0	0	0	1	1
1969	N/A	0	0	0	1	1
1970	N/A	20	0	1	1	21
1971	N/A	10	0	0	1	11
1972	N/A	0	0	0	1	1
1973	N/A	0	0	0	1	1
1974	N/A	4	0	0	1	5
1975	N/A	6	0	0	1	7
1976	N/A	1	0	0	1	2
1977	N/A	0	0	0	1	1
1978	N/A	2	0	0	1	3
1979	N/A	11	0	0	1	12
1980	N/A	34	0	1	1	36
1981	N/A	62	0	5	1	68
1982	N/A	57	0	7	1	65
1983	N/A	93	0	19	1	113
1984	N/A	88	0	24	1	113
1985	N/A	84	0	29	1	114
1986	N/A	75	0	32	1	108
1987	N/A	104	0	52	1	157
1988	N/A	89	0	47	1	137
1989	N/A	141	0	79	1	221
1990	N/A	117	0	60	1	178
1991	N/A	94	6	40	1	141
1992	70	0	9	12	1	93
1993	71	0	14	17	1	103
1994	63	0	12	14	1	90
1995	61	0	12	15	1	89
1996	45	0	9	12	1	67
1997	36	0	7	10	1	54
1998	34	0	7	9	1	51
1999	22	0	4	6	1	34
2000	24	0	5	5	1	36
2001	0	27	5	9	2	42
2002	29	0	6	11	2	47
2003	22	0	4	12	2	40
2004	26	0	5	10	2	43
2005	13	0	3	4	2	21
2006	4	0	1	3	2	9
2007	28	0	6	5	2	41

Appendix table B6. ICES landing statistics, adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for the category 'flatfish' for Russia (t). N/A: part of ICES category 'former USSR'.

Year	ICES landing statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	60	0	2	3	65
1951	N/A	100	0	4	3	106
1952	N/A	160	0	6	3	169
1953	N/A	50	0	2	3	55
1954	N/A	170	0	6	3	179
1955	N/A	280	0	10	3	293
1956	N/A	130	0	5	3	138
1957	N/A	340	0	12	3	356
1958	N/A	170	0	6	3	180
1959	N/A	250	0	9	3	263
1960	N/A	340	0	12	4	356
1961	N/A	220	0	8	4	232
1962	N/A	130	0	5	4	138
1963	N/A	170	0	6	4	180
1964	N/A	230	0	8	4	242
1965	N/A	130	0	5	4	139
1966	N/A	130	0	5	4	139
1967	N/A	60	0	2	4	66
1968	N/A	150	0	5	4	160
1969	N/A	210	0	8	4	222
1970	N/A	150	0	5	4	160
1971	N/A	150	0	5	5	160
1972	N/A	50	0	2	5	56
1973	N/A	20	0	1	5	25
1974	N/A	121	0	4	5	130
1975	N/A	565	0	21	5	591
1976	N/A	145	0	5	5	155
1977	N/A	66	0	2	5	73
1978	N/A	162	0	6	5	173
1979	N/A	186	0	7	5	198
1980	N/A	227	0	8	5	241
1981	N/A	115	0	4	6	125
1982	N/A	218	0	8	6	232
1983	N/A	301	0	11	6	318
1984	N/A	157	0	6	6	169
1985	N/A	232	0	8	6	247
1986	N/A	399	0	15	7	420
1987	N/A	672	0	25	7	703
1988	N/A	335	0	12	7	354
1989	N/A	586	0	21	7	615
1990	N/A	406	0	15	8	428
1991	N/A	226	15	46	8	295
1992	75	71	20	57	8	230
1993	159	66	46	134	8	413
1994	173	0	47	109	8	337
1995	268	3	69	169	9	517
1996	774	0	185	477	9	1,445
1997	1,131	0	254	688	9	2,083
1998	1,188	0	250	714	9	2,161
1999	1,013	0	198	596	9	1,817
2000	1,445	0	262	842	10	2,558
2001	1,420	4	237	817	10	2,488
2002	1,364	0	207	775	10	2,356
2003	1,430	0	196	805	10	2,441
2004	1,292	0	158	719	10	2,180
2005	1,428	0	160	786	11	2,384
2006	1,237	0	139	683	11	2,069
2007	1,358	0	152	747	11	2,268

Appendix Table B7. ICES landing statistics, adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for the category 'others' for Russia (t). N/A: part of ICES category 'former USSR'.

Year	ICES landing statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	4,830	0	176	23	5,029
1951	N/A	6,260	0	228	24	6,512
1952	N/A	6,120	0	223	24	6,368
1953	N/A	6,060	0	221	25	6,306
1954	N/A	8,470	0	309	26	8,805
1955	N/A	8,410	0	307	26	8,743
1956	N/A	8,030	0	293	27	8,350
1957	N/A	5,990	0	219	28	6,236
1958	N/A	5,160	0	188	28	5,377
1959	N/A	7,800	0	285	29	8,114
1960	N/A	8,240	0	301	31	8,571
1961	N/A	6,550	0	239	31	6,820
1962	N/A	5,180	0	189	32	5,401
1963	N/A	7,650	0	279	33	7,962
1964	N/A	8,590	0	314	34	8,937
1965	N/A	9,740	0	356	34	10,130
1966	N/A	7,800	0	285	35	8,120
1967	N/A	7,240	0	264	36	7,540
1968	N/A	8,950	0	327	36	9,313
1969	N/A	6,060	0	221	37	6,318
1970	N/A	8,540	0	312	38	8,889
1971	N/A	10,550	0	385	38	10,973
1972	N/A	10,170	0	371	39	10,580
1973	N/A	11,300	0	412	40	11,752
1974	N/A	13,178	0	481	40	13,699
1975	N/A	14,780	0	539	41	15,361
1976	N/A	13,658	0	499	43	14,199
1977	N/A	13,258	0	484	44	13,785
1978	N/A	12,421	0	453	44	12,919
1979	N/A	8,950	0	327	45	9,321
1980	N/A	10,585	0	386	46	11,017
1981	N/A	8,366	0	305	47	8,718
1982	N/A	6,581	0	240	49	6,870
1983	N/A	6,977	0	255	51	7,282
1984	N/A	7,000	0	256	52	7,308
1985	N/A	6,199	0	226	55	6,480
1986	N/A	7,480	0	273	57	7,810
1987	N/A	7,729	0	282	58	8,069
1988	N/A	7,606	0	278	60	7,944
1989	N/A	8,391	0	306	62	8,759
1990	N/A	4,898	0	165	63	5,126
1991	N/A	4,483	230	222	65	5,000
1992	10,757	412	1,502	821	75	13,570
1993	4,787	0	968	454	77	6,286
1994	3,766	209	1,065	398	79	5,517
1995	3,545	0	899	351	80	4,875
1996	2,925	0	702	286	82	3,995
1997	3,719	316	909	390	84	5,418
1998	3,477	301	796	361	86	5,020
1999	2,156	450	510	246	89	3,451
2000	4,314	436	861	443	91	6,144
2001	4,695	0	784	432	93	6,004
2002	4,730	0	721	430	95	5,975
2003	4,137	0	570	371	96	5,174
2004	3,867	0	476	343	98	4,784
2005	4,139	0	465	401	101	5,106
2006	4,267	0	478	522	101	5,368
2007	3,895	0	436	353	101	4,785

APPENDIX C

Appendix Table C1. Modified ICES statistics (official ICES data apportioned to Kaliningrad oblast), adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for Kaliningrad oblast (t). N/A: part of ICES category 'former USSR'.

Year	ICES modified statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	34,050	0	1,475	84	35,609
1951	N/A	37,240	0	1,579	87	38,906
1952	N/A	33,940	0	1,411	89	35,440
1953	N/A	21,630	0	902	92	22,624
1954	N/A	30,190	0	1,283	95	31,568
1955	N/A	21,580	0	879	98	22,556
1956	N/A	23,320	0	921	101	24,342
1957	N/A	18,800	0	751	103	19,655
1958	N/A	16,450	0	674	106	17,230
1959	N/A	11,800	0	482	109	12,391
1960	N/A	17,090	0	661	112	17,863
1961	N/A	10,730	0	440	114	11,285
1962	N/A	10,360	0	445	117	10,922
1963	N/A	17,040	0	765	120	17,925
1964	N/A	18,780	0	865	123	19,768
1965	N/A	16,940	0	770	126	17,836
1966	N/A	13,570	0	625	128	14,323
1967	N/A	16,840	0	795	131	17,766
1968	N/A	23,630	0	1,075	134	24,839
1969	N/A	29,790	0	1,424	137	31,351
1970	N/A	36,900	0	1,777	140	38,817
1971	N/A	34,180	0	1,632	142	35,954
1972	N/A	32,440	0	1,564	145	34,149
1973	N/A	27,680	0	1,326	148	29,154
1974	N/A	39,620	0	1,871	151	41,642
1975	N/A	34,459	0	1,563	154	36,176
1976	N/A	27,834	0	1,281	156	29,272
1977	N/A	25,566	0	1,193	159	26,918
1978	N/A	25,399	0	1,160	162	26,720
1979	N/A	24,396	0	1,094	165	25,655
1980	N/A	26,644	0	1,137	168	27,948
1981	N/A	21,164	0	907	174	22,245
1982	N/A	19,651	0	857	181	20,689
1983	N/A	22,664	0	991	188	23,843
1984	N/A	21,421	0	938	194	22,553
1985	N/A	21,121	0	925	201	22,247
1986	N/A	21,018	0	934	208	22,159
1987	N/A	22,632	0	1,020	215	23,867
1988	N/A	22,763	0	1,045	221	24,030
1989	N/A	22,198	0	1,009	228	23,435
1990	N/A	21,172	0	977	235	22,384
1991	N/A	22,388	1,901	1,192	241	25,722
1992	33,163	1,096	5,123	2,025	253	41,661
1993	30,108	461	6,565	2,004	260	39,398
1994	31,083	222	9,363	2,141	267	43,077
1995	30,486	2	7,819	2,052	274	40,634
1996	34,082	2	7,705	2,394	281	44,463
1997	35,710	316	8,014	2,773	288	47,101
1998	35,397	301	7,838	2,745	294	46,576
1999	47,367	441	10,267	3,310	301	61,686
2000	49,912	-2	10,220	3,930	308	64,368
2001	52,741	28	10,344	3,837	315	67,266
2002	51,059	0	8,951	3,597	322	63,928
2003	43,737	0	7,777	2,645	329	54,488
2004	37,652	0	6,006	2,848	336	46,841
2005	43,240	-23	6,044	3,246	342	52,849
2006	43,701	-28	6,220	3,744	342	53,979
2007	37,789	0	5,317	3,314	342	46,762

Appendix Table C2. Modified ICES statistics (official ICES data apportioned to Kaliningrad oblast), adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for cod (*Gadus morhua*) for Kaliningrad oblast (t). N/A: part of ICES category 'former USSR'.

Year	ICES modified statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	14,250	0	520	76	14,846
1951	N/A	17,050	0	622	79	17,751
1952	N/A	17,270	0	630	81	17,982
1953	N/A	8,940	0	326	84	9,350
1954	N/A	10,620	0	388	86	11,094
1955	N/A	8,400	0	307	89	8,796
1956	N/A	12,330	0	450	91	12,871
1957	N/A	9,770	0	357	94	10,221
1958	N/A	7,900	0	288	97	8,285
1959	N/A	4,380	0	160	99	4,639
1960	N/A	9,970	0	364	102	10,436
1961	N/A	3,750	0	137	104	3,991
1962	N/A	2,310	0	84	107	2,501
1963	N/A	3,000	0	110	109	3,219
1964	N/A	550	0	20	112	682
1965	N/A	300	0	11	114	425
1966	N/A	80	0	3	117	200
1967	N/A	480	0	18	119	617
1968	N/A	2,460	0	90	122	2,672
1969	N/A	1,750	0	64	125	1,938
1970	N/A	690	0	25	127	842
1971	N/A	270	0	10	130	409
1972	N/A	360	0	13	132	505
1973	N/A	360	0	13	135	508
1974	N/A	3,060	0	112	137	3,309
1975	N/A	5,899	0	215	140	6,254
1976	N/A	3,825	0	140	142	4,107
1977	N/A	2,079	0	76	145	2,300
1978	N/A	4,074	0	149	147	4,370
1979	N/A	5,536	0	202	150	5,888
1980	N/A	8,988	0	328	152	9,468
1981	N/A	5,770	0	211	159	6,139
1982	N/A	4,854	0	177	165	5,196
1983	N/A	6,523	0	238	171	6,932
1984	N/A	6,475	0	236	177	6,888
1985	N/A	7,000	0	256	183	7,438
1986	N/A	5,417	0	198	189	5,804
1987	N/A	4,250	0	155	195	4,600
1988	N/A	2,182	0	80	201	2,463
1989	N/A	1,830	0	67	207	2,104
1990	N/A	3,521	0	129	213	3,863
1991	N/A	3,299	684	165	220	4,367
1992	884	909	743	117	226	2,879
1993	483	409	553	74	232	1,750
1994	1,114	143	1,295	95	238	2,885
1995	1,612	0	484	71	244	2,410
1996	3,304	2	331	103	250	3,989
1997	2,803	0	539	186	256	3,784
1998	4,599	0	1,295	298	262	6,454
1999	5,211	-9	1,928	297	268	7,696
2000	4,669	-438	1,946	519	274	6,970
2001	5,032	0	2,393	358	280	8,063
2002	3,793	0	1,768	212	287	6,060
2003	3,707	0	2,278	269	293	6,547
2004	3,410	0	1,804	178	299	5,691
2005	3,434	-23	1,583	233	305	5,532
2006	3,747	-28	1,745	809	305	6,578
2007	3,383	0	1,460	630	305	5,778

Appendix Table C3. Modified ICES statistics (official ICES data apportioned to Kaliningrad oblast), adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for herring (*Clupea harengus*) for Kaliningrad oblast (t). N/A: part of ICES category 'former USSR'.

Year	ICES modified statistics	Ad-justments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	17,230	0	862	6	18,097
1951	N/A	16,310	0	816	6	17,132
1952	N/A	12,750	0	638	6	13,394
1953	N/A	8,350	0	418	7	8,774
1954	N/A	13,410	0	671	7	14,087
1955	N/A	6,360	0	318	7	6,685
1956	N/A	4,290	0	215	7	4,512
1957	N/A	1,940	0	97	7	2,044
1958	N/A	3,280	0	164	8	3,452
1959	N/A	1,210	0	61	8	1,278
1960	N/A	1,000	0	50	8	1,058
1961	N/A	710	0	36	8	754
1962	N/A	960	0	48	8	1,016
1963	N/A	1,230	0	62	9	1,300
1964	N/A	1,070	0	54	9	1,132
1965	N/A	1,660	0	83	9	1,752
1966	N/A	2,260	0	113	9	2,382
1967	N/A	4,060	0	203	9	4,272
1968	N/A	5,230	0	262	10	5,501
1969	N/A	6,640	0	332	10	6,982
1970	N/A	4,440	0	222	10	4,672
1971	N/A	9,800	0	490	10	10,300
1972	N/A	9,270	0	464	10	9,744
1973	N/A	13,120	0	656	11	13,787
1974	N/A	16,970	0	849	11	17,829
1975	N/A	15,916	0	796	11	16,723
1976	N/A	17,087	0	854	11	17,952
1977	N/A	16,641	0	832	11	17,484
1978	N/A	13,740	0	687	11	14,438
1979	N/A	13,992	0	700	12	14,703
1980	N/A	11,474	0	574	12	12,060
1981	N/A	9,625	0	481	12	10,119
1982	N/A	9,715	0	486	13	10,214
1983	N/A	11,974	0	599	13	12,586
1984	N/A	10,220	0	511	14	10,745
1985	N/A	10,022	0	501	14	10,537
1986	N/A	11,126	0	556	15	11,697
1987	N/A	11,900	0	595	15	12,510
1988	N/A	13,420	0	671	16	14,107
1989	N/A	12,738	0	637	16	13,391
1990	N/A	11,862	0	593	17	12,472
1991	N/A	10,987	742	586	17	12,333
1992	21,988	0	2,971	1,248	18	26,225
1993	17,699	0	3,588	1,064	18	22,369
1994	11,955	0	3,214	758	19	15,946
1995	12,756	0	3,243	800	19	16,818
1996	11,110	0	2,662	689	19	14,480
1997	8,871	0	1,996	543	20	11,430
1998	7,926	0	1,668	480	20	10,094
1999	9,589	0	1,877	573	21	12,059
2000	11,323	0	2,051	669	21	14,064
2001	11,875	0	1,977	693	22	14,566
2002	10,650	0	1,618	613	22	12,904
2003	9,087	0	1,248	517	23	10,874
2004	5,470	0	671	307	23	6,471
2005	5,848	0	655	325	24	6,852
2006	7,717	0	864	429	24	9,034
2007	6,092	0	682	339	24	7,137

Appendix Table C4. Modified ICES statistics (official ICES data apportioned to Kaliningrad oblast), adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for sprat (*Sprattus sprattus*) for Kaliningrad oblast (t). N/A: part of ICES category 'former USSR'. Dashes (—) indicate no reported statistics.

Year	ICES modified statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	0	0	0	—	0
1951	N/A	0	0	0	—	0
1952	N/A	0	0	0	—	0
1953	N/A	0	0	0	—	0
1954	N/A	0	0	0	—	0
1955	N/A	390	0	20	—	410
1956	N/A	910	0	46	—	956
1957	N/A	2,890	0	145	—	3,035
1958	N/A	2,190	0	110	—	2,300
1959	N/A	2,600	0	130	—	2,730
1960	N/A	1,760	0	88	—	1,848
1961	N/A	2,900	0	145	—	3,045
1962	N/A	3,990	0	200	—	4,190
1963	N/A	9,380	0	469	—	9,849
1964	N/A	12,200	0	610	—	12,810
1965	N/A	9,580	0	479	—	10,059
1966	N/A	7,340	0	367	—	7,707
1967	N/A	9,300	0	465	—	9,765
1968	N/A	10,510	0	526	—	11,036
1969	N/A	18,280	0	914	—	19,194
1970	N/A	27,430	0	1,372	—	28,802
1971	N/A	18,660	0	933	—	19,593
1972	N/A	18,850	0	943	—	19,793
1973	N/A	10,230	0	512	—	10,742
1974	N/A	14,500	0	725	—	15,225
1975	N/A	6,705	0	335	—	7,040
1976	N/A	2,580	0	129	—	2,709
1977	N/A	2,590	0	130	—	2,720
1978	N/A	3,481	0	174	—	3,655
1979	N/A	1,096	0	55	—	1,151
1980	N/A	710	0	36	—	746
1981	N/A	310	0	16	—	326
1982	N/A	658	0	33	—	691
1983	N/A	157	0	8	—	165
1984	N/A	1,350	0	68	—	1,418
1985	N/A	1,410	0	71	—	1,481
1986	N/A	1,200	0	60	—	1,260
1987	N/A	2,500	0	125	—	2,625
1988	N/A	2,480	0	124	—	2,604
1989	N/A	1,965	0	98	—	2,063
1990	N/A	4,288	0	214	—	4,503
1991	N/A	6,612	447	353	—	7,411
1992	8,935	0	1,207	507	—	10,649
1993	10,536	0	2,136	634	—	13,305
1994	16,394	0	4,407	1,040	—	21,841
1995	14,644	0	3,722	918	—	19,284
1996	17,931	0	4,296	1,111	—	23,339
1997	21,762	0	4,897	1,333	—	27,992
1998	20,668	0	4,349	1,251	—	26,268
1999	31,012	0	6,069	1,854	—	38,935
2000	29,779	0	5,393	1,759	—	36,930
2001	31,338	0	5,218	1,828	—	38,383
2002	32,215	0	4,893	1,855	—	38,964
2003	27,985	0	3,842	1,591	—	33,419
2004	24,467	0	3,000	1,373	—	28,840
2005	29,669	0	3,323	1,650	—	34,642
2006	27,950	0	3,130	1,554	—	32,634
2007	23,925	0	2,680	1,330	—	27,935

Appendix table C5. Modified ICES statistics (official ICES data apportioned to Kaliningrad oblast), adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for salmon (*Salmo salar*) for Kaliningrad oblast (t). N/A: part of ICES category 'former USSR'. Dashes (—) indicate no reported statistics.

Year	ICES modified statistics	Adjustments	Un-reported	Discards	Re-creational	Total
1950	N/A	0	0	0	—	0
1951	N/A	0	0	0	—	0
1952	N/A	0	0	0	—	0
1953	N/A	0	0	0	—	0
1954	N/A	0	0	0	—	0
1955	N/A	0	0	0	—	0
1956	N/A	0	0	0	—	0
1957	N/A	0	0	0	—	0
1958	N/A	0	0	0	—	0
1959	N/A	0	0	0	—	0
1960	N/A	0	0	0	—	0
1961	N/A	0	0	0	—	0
1962	N/A	0	0	0	—	0
1963	N/A	0	0	0	—	0
1964	N/A	0	0	0	—	0
1965	N/A	0	0	0	—	0
1966	N/A	0	0	0	—	0
1967	N/A	0	0	0	—	0
1968	N/A	0	0	0	—	0
1969	N/A	0	0	0	—	0
1970	N/A	20	0	1	—	21
1971	N/A	0	0	0	—	0
1972	N/A	0	0	0	—	0
1973	N/A	0	0	0	—	0
1974	N/A	0	0	0	—	0
1975	N/A	0	0	0	—	0
1976	N/A	0	0	0	—	0
1977	N/A	0	0	0	—	0
1978	N/A	1	0	0	—	1
1979	N/A	6	0	0	—	6
1980	N/A	13	0	0	—	13
1981	N/A	7	0	0	—	7
1982	N/A	11	0	0	—	11
1983	N/A	10	0	0	—	10
1984	N/A	7	0	0	—	7
1985	N/A	3	0	0	—	3
1986	N/A	0	0	0	—	0
1987	N/A	0	0	0	—	0
1988	N/A	6	0	0	—	6
1989	N/A	18	0	1	—	19
1990	N/A	34	0	1	—	35
1991	N/A	50	3	4	—	57
1992	66	0	9	9	—	84
1993	67	0	13	13	—	93
1994	60	0	11	10	—	81
1995	58	0	11	11	—	80
1996	43	0	9	9	—	60
1997	34	0	7	7	—	48
1998	32	0	6	6	—	45
1999	21	0	4	4	—	29
2000	23	0	5	3	—	30
2001	0	25	5	5	—	35
2002	27	0	6	6	—	39
2003	20	0	4	4	—	28
2004	25	0	5	5	—	35
2005	12	0	2	2	—	17
2006	3	0	1	1	—	4
2007	28	0	6	5	—	39

Appendix table C6. Modified ICES statistics (official ICES data apportioned to Kaliningrad oblast), adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for the category 'flatfish' for Kaliningrad oblast (t). N/A: part of ICES category 'former USSR'.

Year	ICES modified statistics	Adjustments	Un-reported	Discards	Re-creational	Total
1950	N/A	60	0	2	2	64
1951	N/A	100	0	4	2	105
1952	N/A	80	0	3	2	85
1953	N/A	50	0	2	2	54
1954	N/A	110	0	4	2	116
1955	N/A	170	0	6	2	178
1956	N/A	70	0	3	2	75
1957	N/A	90	0	3	2	95
1958	N/A	50	0	2	2	54
1959	N/A	50	0	2	2	54
1960	N/A	130	0	5	2	137
1961	N/A	0	0	0	2	2
1962	N/A	60	0	2	2	64
1963	N/A	50	0	2	2	54
1964	N/A	20	0	1	2	23
1965	N/A	20	0	1	2	23
1966	N/A	10	0	0	3	13
1967	N/A	0	0	0	3	3
1968	N/A	0	0	0	3	3
1969	N/A	0	0	0	3	3
1970	N/A	0	0	0	3	3
1971	N/A	0	0	0	3	3
1972	N/A	0	0	0	3	3
1973	N/A	20	0	1	3	24
1974	N/A	120	0	4	3	127
1975	N/A	488	0	18	3	509
1976	N/A	103	0	4	3	110
1977	N/A	22	0	1	3	26
1978	N/A	43	0	2	3	48
1979	N/A	5	0	0	3	8
1980	N/A	0	0	0	3	3
1981	N/A	6	0	0	3	10
1982	N/A	2	0	0	4	6
1983	N/A	92	0	3	4	99
1984	N/A	50	0	2	4	56
1985	N/A	136	0	5	4	145
1986	N/A	230	0	8	4	242
1987	N/A	340	0	12	4	357
1988	N/A	81	0	3	4	88
1989	N/A	429	0	16	4	449
1990	N/A	304	0	11	5	319
1991	N/A	178	12	36	5	231
1992	59	56	16	45	5	180
1993	125	52	36	106	5	324
1994	136	0	37	86	5	264
1995	211	2	54	133	5	407
1996	611	0	146	376	5	1,138
1997	892	0	201	543	6	1,642
1998	937	0	197	564	6	1,704
1999	796	0	156	469	6	1,426
2000	1,137	0	206	662	6	2,011
2001	1,116	3	186	643	6	1,954
2002	1,073	0	163	610	6	1,852
2003	0	0	0	0	6	6
2004	1,292	0	158	719	6	2,176
2005	1,428	0	160	786	7	2,380
2006	1,237	0	139	683	7	2,065
2007	1,358	0	152	747	7	2,263

Appendix Table C7. Modified ICES statistics (official ICES data apportioned to Kaliningrad oblast), adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for the category 'others' for Kaliningrad oblast (t). N/A: part of ICES category 'former USSR'. Dashes (—) indicate no reported statistics.

Year	ICES modified statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	2,510	0	92	—	2,602
1951	N/A	3,780	0	138	—	3,918
1952	N/A	3,840	0	140	—	3,980
1953	N/A	4,290	0	157	—	4,447
1954	N/A	6,050	0	221	—	6,271
1955	N/A	6,260	0	228	—	6,488
1956	N/A	5,720	0	209	—	5,929
1957	N/A	4,110	0	150	—	4,260
1958	N/A	3,030	0	111	—	3,141
1959	N/A	3,560	0	130	—	3,690
1960	N/A	4,230	0	154	—	4,384
1961	N/A	3,370	0	123	—	3,493
1962	N/A	3,040	0	111	—	3,151
1963	N/A	3,380	0	123	—	3,503
1964	N/A	4,940	0	180	—	5,120
1965	N/A	5,380	0	196	—	5,576
1966	N/A	3,880	0	142	—	4,022
1967	N/A	3,000	0	110	—	3,110
1968	N/A	5,430	0	198	—	5,628
1969	N/A	3,120	0	114	—	3,234
1970	N/A	4,320	0	158	—	4,478
1971	N/A	5,450	0	199	—	5,649
1972	N/A	3,960	0	145	—	4,105
1973	N/A	3,950	0	144	—	4,094
1974	N/A	4,970	0	181	—	5,151
1975	N/A	5,451	0	199	—	5,650
1976	N/A	4,239	0	155	—	4,394
1977	N/A	4,234	0	155	—	4,389
1978	N/A	4,060	0	148	—	4,208
1979	N/A	3,761	0	137	—	3,898
1980	N/A	5,459	0	199	—	5,658
1981	N/A	5,446	0	199	—	5,645
1982	N/A	4,411	0	161	—	4,572
1983	N/A	3,908	0	143	—	4,051
1984	N/A	3,319	0	121	—	3,440
1985	N/A	2,550	0	93	—	2,643
1986	N/A	3,045	0	111	—	3,156
1987	N/A	3,642	0	133	—	3,775
1988	N/A	4,594	0	168	—	4,762
1989	N/A	5,218	0	190	—	5,408
1990	N/A	1,163	0	29	—	1,191
1991	N/A	1,262	13	48	—	1,323
1992	1,231	131	177	100	5	1,644
1993	1,197	0	240	113	6	1,556
1994	1,424	79	401	150	6	2,060
1995	1,205	0	305	119	6	1,635
1996	1,083	0	261	106	6	1,456
1997	1,347	316	375	161	6	2,205
1998	1,235	301	324	147	6	2,012
1999	738	450	233	112	7	1,540
2000	2,982	436	620	319	7	4,363
2001	3,381	0	565	311	7	4,264
2002	3,300	0	503	300	7	4,110
2003	2,938	0	405	264	7	3,614
2004	2,988	0	368	265	7	3,628
2005	2,849	0	320	250	7	3,427
2006	3,047	0	342	267	7	3,664
2007	3,003	0	336	263	7	3,610

APPENDIX D

Appendix Table D1. Modified ICES statistics (official ICES data apportioned to Leningrad oblast), adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for Leningrad oblast (t). N/A: part of ICES category 'former USSR'.

Year	ICES modified statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	8,980	0	409	29	9,418
1951	N/A	8,600	0	390	30	9,020
1952	N/A	11,310	0	505	31	11,846
1953	N/A	12,000	0	574	32	12,606
1954	N/A	15,530	0	703	33	16,265
1955	N/A	16,450	0	750	34	17,233
1956	N/A	19,220	0	866	34	20,120
1957	N/A	20,170	0	883	35	21,088
1958	N/A	20,330	0	913	36	21,279
1959	N/A	26,600	0	1,200	37	27,837
1960	N/A	25,220	0	1,148	39	26,407
1961	N/A	24,210	0	1,134	40	25,384
1962	N/A	24,820	0	1,190	41	26,051
1963	N/A	24,640	0	1,161	42	25,842
1964	N/A	27,870	0	1,340	42	29,252
1965	N/A	32,500	0	1,563	43	34,106
1966	N/A	34,400	0	1,659	44	36,104
1967	N/A	35,100	0	1,693	45	36,838
1968	N/A	39,410	0	1,912	46	41,368
1969	N/A	43,280	0	2,114	47	45,441
1970	N/A	45,950	0	2,232	48	48,230
1971	N/A	55,850	0	2,716	49	58,615
1972	N/A	58,670	0	2,843	50	61,563
1973	N/A	68,090	0	3,304	51	71,444
1974	N/A	69,549	0	3,344	51	72,944
1975	N/A	62,557	0	2,973	52	65,583
1976	N/A	65,650	0	3,140	54	68,844
1977	N/A	71,455	0	3,436	55	74,946
1978	N/A	65,267	0	3,114	56	68,437
1979	N/A	56,578	0	2,633	57	59,268
1980	N/A	54,596	0	2,413	58	57,067
1981	N/A	47,607	0	2,129	60	49,795
1982	N/A	45,537	0	2,051	62	47,650
1983	N/A	50,412	0	2,255	64	52,731
1984	N/A	50,825	0	2,277	66	53,168
1985	N/A	53,258	0	2,403	70	55,730
1986	N/A	49,529	0	2,272	72	51,873
1987	N/A	51,273	0	2,390	74	53,736
1988	N/A	49,047	0	2,319	76	51,442
1989	N/A	50,830	0	2,474	78	53,382
1990	N/A	37,297	0	1,868	80	39,245
1991	N/A	29,712	2,007	1,629	82	33,431
1992	16,986	296	2,335	1,159	87	20,866
1993	9,682	14	1,965	737	90	12,489
1994	6,656	130	1,824	546	92	9,247
1995	6,904	1	1,755	554	94	9,307
1996	6,033	0	1,445	533	96	8,108
1997	5,974	0	1,344	583	98	8,000
1998	5,523	0	1,162	551	101	7,336
1999	5,418	0	1,061	489	104	7,072
2000	5,972	0	1,082	561	106	7,721
2001	6,162	2	1,027	564	108	7,863
2002	5,879	0	894	540	111	7,424
2003	7,585	0	1,042	1,203	113	9,942
2004	2,637	0	323	181	115	3,256
2005	2,539	0	284	223	118	3,165
2006	3,658	0	410	392	118	4,578
2007	4,454	0	499	299	118	5,370

Appendix Table D2. Modified ICES statistics (official ICES data apportioned to Leningrad oblast), adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for cod (*Gadus morhua*) for Leningrad oblast (t). N/A: part of ICES category 'former USSR'. Dashes (—) indicate no reported ICES landing statistics.

Year	ICES modified statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	600	0	22	1	623
1951	N/A	380	0	14	1	395
1952	N/A	2,040	0	74	1	2,116
1953	N/A	60	0	2	1	63
1954	N/A	2,900	0	106	1	3,007
1955	N/A	3,050	0	111	1	3,163
1956	N/A	4,630	0	169	1	4,800
1957	N/A	7,130	0	260	2	7,392
1958	N/A	5,370	0	196	2	5,568
1959	N/A	5,180	0	189	2	5,371
1960	N/A	4,130	0	151	2	4,282
1961	N/A	2,260	0	82	2	2,344
1962	N/A	1,580	0	58	2	1,639
1963	N/A	900	0	33	2	935
1964	N/A	100	0	4	2	105
1965	N/A	140	0	5	2	147
1966	N/A	460	0	17	2	479
1967	N/A	300	0	11	2	313
1968	N/A	660	0	24	2	686
1969	N/A	550	0	20	2	572
1970	N/A	460	0	17	2	479
1971	N/A	400	0	15	2	417
1972	N/A	450	0	16	2	469
1973	N/A	110	0	4	2	116
1974	N/A	1,681	0	61	2	1,744
1975	N/A	2,031	0	74	2	2,107
1976	N/A	1,097	0	40	2	1,139
1977	N/A	1,061	0	39	2	1,102
1978	N/A	2,566	0	94	2	2,662
1979	N/A	9,105	0	332	2	9,440
1980	N/A	18,100	0	661	2	18,763
1981	N/A	13,052	0	476	3	13,531
1982	N/A	11,266	0	411	3	11,680
1983	N/A	13,231	0	483	3	13,717
1984	N/A	13,454	0	491	3	13,948
1985	N/A	13,830	0	505	3	14,338
1986	N/A	8,545	0	312	3	8,860
1987	N/A	7,490	0	273	3	7,766
1988	N/A	5,601	0	204	3	5,809
1989	N/A	1,912	0	70	3	1,985
1990	N/A	0	0	0	3	3
1991	N/A	0	0	0	3	3
1992	—	0	0	0	4	4
1993	—	0	0	0	4	4
1994	—	0	0	0	4	4
1995	—	0	0	0	4	4
1996	—	0	0	0	4	4
1997	—	0	0	0	4	4
1998	—	0	0	0	4	4
1999	—	0	0	0	4	4
2000	—	0	0	0	4	4
2001	—	0	0	0	4	4
2002	—	0	0	0	5	5
2003	—	0	0	0	5	5
2004	—	0	0	0	5	5
2005	—	0	0	0	5	5
2006	—	0	0	0	5	5
2007	—	0	0	0	5	5

Appendix Table D3. Modified ICES statistics (official ICES data apportioned to Leningrad oblast), adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for herring (*Clupea harengus*) for Leningrad oblast (t). N/A: part of ICES category 'former USSR'.

Year	ICES modified statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	6,010	0	301	3	6,314
1951	N/A	5,660	0	283	3	5,946
1952	N/A	6,830	0	342	4	7,175
1953	N/A	7,600	0	380	4	7,984
1954	N/A	10,020	0	501	4	10,525
1955	N/A	10,820	0	541	4	11,365
1956	N/A	11,680	0	584	4	12,268
1957	N/A	10,340	0	517	4	10,861
1958	N/A	11,350	0	568	4	11,922
1959	N/A	14,960	0	748	4	15,712
1960	N/A	14,360	0	718	4	15,082
1961	N/A	15,270	0	764	5	16,038
1962	N/A	16,020	0	801	5	16,826
1963	N/A	11,290	0	565	5	11,859
1964	N/A	11,240	0	562	5	11,807
1965	N/A	19,340	0	967	5	20,312
1966	N/A	20,910	0	1,046	5	21,961
1967	N/A	22,900	0	1,145	5	24,050
1968	N/A	29,300	0	1,465	5	30,770
1969	N/A	28,800	0	1,440	5	30,245
1970	N/A	27,910	0	1,396	6	29,311
1971	N/A	25,820	0	1,291	6	27,117
1972	N/A	21,230	0	1,062	6	22,297
1973	N/A	22,290	0	1,115	6	23,410
1974	N/A	22,888	0	1,144	6	24,038
1975	N/A	17,639	0	882	6	18,527
1976	N/A	14,920	0	746	6	15,672
1977	N/A	17,355	0	868	6	18,229
1978	N/A	28,204	0	1,410	6	29,621
1979	N/A	24,035	0	1,202	7	25,243
1980	N/A	23,296	0	1,165	7	24,468
1981	N/A	22,092	0	1,105	7	23,204
1982	N/A	23,425	0	1,171	7	24,603
1983	N/A	25,321	0	1,266	8	26,595
1984	N/A	23,111	0	1,156	8	24,274
1985	N/A	23,311	0	1,166	8	24,485
1986	N/A	24,810	0	1,241	8	26,059
1987	N/A	25,163	0	1,258	9	26,430
1988	N/A	24,255	0	1,213	9	25,477
1989	N/A	24,246	0	1,212	9	25,467
1990	N/A	22,580	0	1,129	9	23,718
1991	N/A	20,913	1,413	1,116	10	23,452
1992	7,263	0	981	412	10	8,666
1993	5,846	0	1,185	352	10	7,393
1994	3,949	0	1,061	251	10	5,271
1995	4,214	0	1,071	264	11	5,559
1996	3,670	0	879	227	11	4,787
1997	2,930	0	659	179	11	3,780
1998	2,618	0	551	158	11	3,339
1999	3,167	0	620	189	12	3,988
2000	3,740	0	677	221	12	4,650
2001	3,922	0	653	229	12	4,816
2002	3,518	0	534	203	13	4,268
2003	4,276	0	587	244	13	5,120
2004	1,115	0	137	63	13	1,327
2005	1,168	0	131	66	13	1,379
2006	2,063	0	231	115	13	2,422
2007	2,679	0	300	160	13	3,153

Appendix Table D4. Modified ICES statistics (official ICES data apportioned to Leningrad oblast), adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for sprat (*Sprattus sprattus*) for Leningrad oblast (t). N/A: part of ICES category 'former USSR'.

Year	ICES modified statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	0	0	0	0	0
1951	N/A	0	0	0	0	0
1952	N/A	0	0	0	0	0
1953	N/A	2,490	0	125	0	2,615
1954	N/A	30	0	2	0	32
1955	N/A	230	0	12	0	242
1956	N/A	470	0	24	0	494
1957	N/A	520	0	26	0	546
1958	N/A	1,320	0	66	0	1,386
1959	N/A	2,000	0	100	0	2,100
1960	N/A	2,500	0	125	0	2,625
1961	N/A	3,270	0	164	0	3,434
1962	N/A	5,000	0	250	0	5,250
1963	N/A	8,060	0	403	0	8,463
1964	N/A	12,660	0	633	0	13,293
1965	N/A	8,550	0	428	0	8,978
1966	N/A	8,990	0	450	0	9,440
1967	N/A	7,600	0	380	0	7,980
1968	N/A	5,780	0	289	0	6,069
1969	N/A	10,780	0	539	0	11,319
1970	N/A	13,210	0	661	0	13,871
1971	N/A	24,370	0	1,219	0	25,589
1972	N/A	30,730	0	1,537	0	32,267
1973	N/A	38,340	0	1,917	0	40,257
1974	N/A	36,767	0	1,838	0	38,606
1975	N/A	33,475	0	1,674	0	35,149
1976	N/A	40,171	0	2,009	0	42,180
1977	N/A	43,971	0	2,199	0	46,170
1978	N/A	26,016	0	1,301	0	27,317
1979	N/A	18,063	0	903	0	18,966
1980	N/A	7,826	0	391	0	8,218
1981	N/A	6,670	0	334	0	7,004
1982	N/A	5,002	0	250	0	5,252
1983	N/A	4,256	0	213	0	4,469
1984	N/A	6,616	0	331	0	6,947
1985	N/A	8,718	0	436	0	9,154
1986	N/A	7,419	0	371	0	7,790
1987	N/A	9,668	0	483	0	10,152
1988	N/A	11,632	0	582	0	12,214
1989	N/A	16,107	0	805	0	16,913
1990	N/A	10,797	0	540	0	11,337
1991	N/A	5,487	371	293	0	6,151
1992	177	0	24	10	0	212
1993	209	0	42	13	1	264
1994	325	0	87	21	1	434
1995	290	0	74	18	1	383
1996	356	0	85	22	1	463
1997	432	0	97	26	1	556
1998	410	0	86	25	1	521
1999	615	0	120	37	1	773
2000	590	0	107	35	1	733
2001	621	0	103	36	1	762
2002	639	0	97	37	1	773
2003	678	0	93	39	1	810
2004	642	0	79	36	1	757
2005	80	0	9	4	1	94
2006	374	0	42	21	1	437
2007	883	0	99	49	1	1,032

Appendix table D5. Modified ICES statistics (official ICES data apportioned to Leningrad oblast), adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for salmon (*Salmo salar*) for Leningrad oblast (t). N/A: part of ICES category 'former USSR'.

Year	ICES modified statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	50	0	2	0	52
1951	N/A	80	0	3	0	83
1952	N/A	80	0	3	0	83
1953	N/A	80	0	3	0	83
1954	N/A	100	0	4	1	104
1955	N/A	90	0	3	1	94
1956	N/A	70	0	3	1	73
1957	N/A	50	0	2	1	52
1958	N/A	40	0	1	1	42
1959	N/A	20	0	1	1	21
1960	N/A	10	0	0	1	11
1961	N/A	10	0	0	1	11
1962	N/A	10	0	0	1	11
1963	N/A	0	0	0	1	1
1964	N/A	10	0	0	1	11
1965	N/A	0	0	0	1	1
1966	N/A	0	0	0	1	1
1967	N/A	0	0	0	1	1
1968	N/A	0	0	0	1	1
1969	N/A	0	0	0	1	1
1970	N/A	0	0	0	1	1
1971	N/A	10	0	0	1	11
1972	N/A	0	0	0	1	1
1973	N/A	0	0	0	1	1
1974	N/A	4	0	0	1	5
1975	N/A	6	0	0	1	7
1976	N/A	1	0	0	1	2
1977	N/A	0	0	0	1	1
1978	N/A	1	0	0	1	2
1979	N/A	5	0	0	1	6
1980	N/A	21	0	1	1	23
1981	N/A	55	0	5	1	60
1982	N/A	46	0	7	1	54
1983	N/A	83	0	19	1	102
1984	N/A	81	0	24	1	106
1985	N/A	81	0	29	1	111
1986	N/A	75	0	32	1	108
1987	N/A	104	0	52	1	157
1988	N/A	83	0	47	1	131
1989	N/A	123	0	78	1	202
1990	N/A	83	0	59	1	143
1991	N/A	44	3	36	1	83
1992	4	0	0	4	1	9
1993	4	0	1	4	1	10
1994	3	0	1	4	1	9
1995	3	0	1	4	1	9
1996	2	0	0	3	1	7
1997	2	0	0	3	1	6
1998	2	0	0	3	1	6
1999	1	0	0	2	1	5
2000	1	0	0	2	1	5
2001	0	1	0	4	2	7
2002	2	0	0	5	2	8
2003	2	0	0	8	2	12
2004	1	0	0	5	2	7
2005	1	0	0	1	2	4
2006	1	0	0	2	2	5
2007	0	0	0	0	2	2

Appendix table D6. Modified ICES statistics (official ICES data apportioned to Leningrad oblast), adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for the category 'flatfish' for Leningrad oblast (t). N/A: part of ICES category 'former USSR'.

Year	ICES modified statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	0	0	0	1	1
1951	N/A	0	0	0	1	1
1952	N/A	80	0	3	1	84
1953	N/A	0	0	0	1	1
1954	N/A	60	0	2	1	63
1955	N/A	110	0	4	1	115
1956	N/A	60	0	2	1	63
1957	N/A	250	0	9	1	260
1958	N/A	120	0	4	1	126
1959	N/A	200	0	7	1	209
1960	N/A	210	0	8	1	219
1961	N/A	220	0	8	1	229
1962	N/A	70	0	3	1	74
1963	N/A	120	0	4	2	126
1964	N/A	210	0	8	2	219
1965	N/A	110	0	4	2	116
1966	N/A	120	0	4	2	126
1967	N/A	60	0	2	2	64
1968	N/A	150	0	5	2	157
1969	N/A	210	0	8	2	219
1970	N/A	150	0	5	2	157
1971	N/A	150	0	5	2	157
1972	N/A	50	0	2	2	54
1973	N/A	0	0	0	2	2
1974	N/A	1	0	0	2	3
1975	N/A	77	0	3	2	82
1976	N/A	42	0	2	2	45
1977	N/A	44	0	2	2	48
1978	N/A	119	0	4	2	125
1979	N/A	181	0	7	2	190
1980	N/A	227	0	8	2	237
1981	N/A	109	0	4	2	115
1982	N/A	216	0	8	2	226
1983	N/A	209	0	8	2	219
1984	N/A	107	0	4	2	113
1985	N/A	96	0	4	3	102
1986	N/A	169	0	6	3	178
1987	N/A	332	0	12	3	347
1988	N/A	254	0	9	3	266
1989	N/A	157	0	6	3	166
1990	N/A	102	0	4	3	109
1991	N/A	48	3	10	3	64
1992	16	15	4	12	3	50
1993	34	14	10	28	3	89
1994	37	0	10	23	3	73
1995	57	1	15	36	3	111
1996	163	0	39	101	3	306
1997	239	0	54	145	3	441
1998	251	0	53	151	4	458
1999	217	0	43	127	4	391
2000	308	0	56	179	4	547
2001	304	1	51	175	4	534
2002	291	0	44	165	4	504
2003	1,430	0	196	805	4	2,435
2004	0	0	0	0	4	4
2005	0	0	0	0	4	4
2006	0	0	0	0	4	4
2007	0	0	0	0	4	4

Appendix Table D7. Modified ICES statistics (official ICES data apportioned to Leningrad oblast), adjustments to ICES landing statistics, unreported landings, discards, recreational catch, and reconstructed total for the category 'others' for Leningrad oblast (t). N/A: part of ICES category 'former USSR'.

Year	ICES modified statistics	Adjustments	Un-reported	Dis-cards	Re-creational	Total
1950	N/A	2,320	0	85	23	2,427
1951	N/A	2,480	0	91	24	2,594
1952	N/A	2,280	0	83	24	2,387
1953	N/A	1,770	0	65	25	1,860
1954	N/A	2,420	0	88	26	2,534
1955	N/A	2,150	0	78	26	2,255
1956	N/A	2,310	0	84	27	2,421
1957	N/A	1,880	0	69	28	1,976
1958	N/A	2,130	0	78	28	2,236
1959	N/A	4,240	0	155	29	4,424
1960	N/A	4,010	0	146	31	4,187
1961	N/A	3,180	0	116	31	3,327
1962	N/A	2,140	0	78	32	2,250
1963	N/A	4,270	0	156	33	4,459
1964	N/A	3,650	0	133	34	3,817
1965	N/A	4,360	0	159	34	4,553
1966	N/A	3,920	0	143	35	4,098
1967	N/A	4,240	0	155	36	4,430
1968	N/A	3,520	0	128	36	3,685
1969	N/A	2,940	0	107	37	3,084
1970	N/A	4,220	0	154	38	4,412
1971	N/A	5,100	0	186	38	5,324
1972	N/A	6,210	0	227	39	6,476
1973	N/A	7,350	0	268	40	7,658
1974	N/A	8,208	0	300	40	8,548
1975	N/A	9,329	0	341	41	9,711
1976	N/A	9,419	0	344	43	9,805
1977	N/A	9,024	0	329	44	9,397
1978	N/A	8,361	0	305	44	8,710
1979	N/A	5,189	0	189	45	5,423
1980	N/A	5,126	0	187	46	5,359
1981	N/A	5,629	0	205	47	5,882
1982	N/A	5,582	0	204	49	5,835
1983	N/A	7,312	0	267	51	7,629
1984	N/A	7,456	0	272	52	7,780
1985	N/A	7,222	0	264	55	7,541
1986	N/A	8,511	0	311	57	8,878
1987	N/A	8,516	0	311	58	8,885
1988	N/A	7,222	0	264	60	7,546
1989	N/A	8,285	0	302	62	8,649
1990	N/A	3,735	0	136	63	3,935
1991	N/A	3,221	218	174	65	3,677
1992	9,526	281	1,325	721	69	11,926
1993	3,590	0	728	341	71	4,729
1994	2,342	130	664	247	73	3,457
1995	2,340	0	595	232	74	3,241
1996	1,842	0	441	180	76	2,539
1997	2,372	0	534	229	78	3,213
1998	2,242	0	472	214	80	3,008
1999	1,418	0	277	134	82	1,911
2000	1,332	0	241	124	84	1,781
2001	1,314	0	219	121	86	1,740
2002	1,430	0	218	130	88	1,865
2003	1,199	0	165	108	89	1,560
2004	879	0	108	78	91	1,155
2005	1,290	0	144	151	94	1,679
2006	1,220	0	137	254	94	1,705
2007	892	0	100	90	94	1,175