

Lithuanian National Report on Salmon and Sea Trout

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3. Catches of Salmon.

Lithuanian catch statistics are based on logbooks. In 2010 Lithuanian fishermen caught 408 salmon (1,223 t) less than the last year. Part 178 (0,532 t) salmon caught from coastal fishery and also 229 (0,688 t) salmon were caught in Curonian lagoon. In addition, for scientific purposes 8 salmon individuals were caught in Curonian lagoon, at migration period. 19 salmon individuals were caught in the rivers for artificial rearing. Sport fishing is allowed (together with sea trout) only in designated rivers on license basis. In 2010 more than 1200 licenses were sold to catch salmon and sea trout, but there is no information about catches. Dynamics of salmon catches and utilization of quota in Lithuanian economic zone are presented in Figures 1.

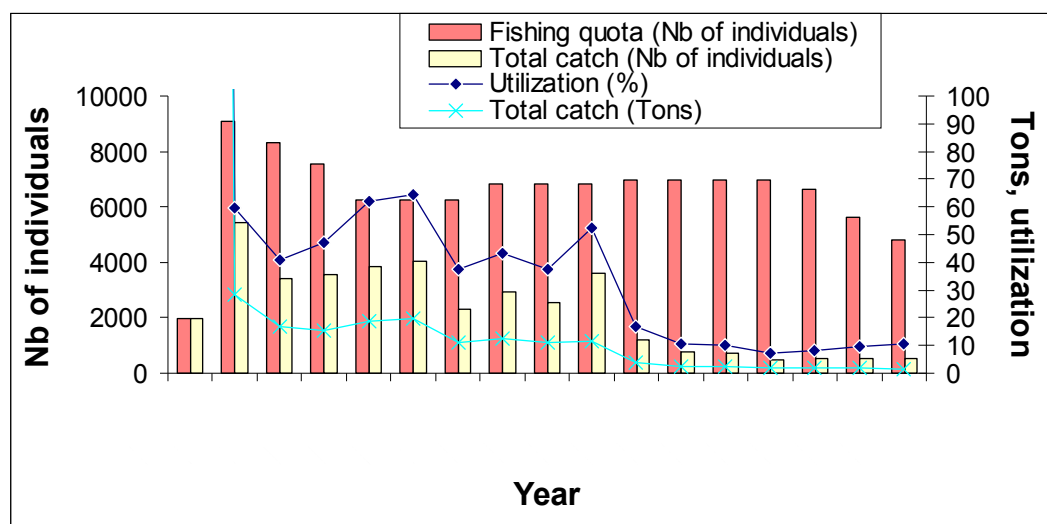


Fig. 1. Dynamics of salmon fishing quota, allocated to Lithuanian fishermen and its utilization.

3.4. Fishing effort

Lithuanian fishermen did not carry out specialized salmon fishing. The largest share of salmon was caught in coastal zone while fishing for other fish species, sometimes using wide mesh size driftnets and seine nets designed for salmon, though. Since specialized fishing was not conducted, fishing effort has not been estimated.

3.6. Age and Length Composition and Mean Weight of the Catches

Data of 83 migrating adult salmon caught in the Curonian lagoon has been analyzed. Total length of salmon varied from 45-120 cm, weight - 838-18000 g (Table 3.1). Majority of analyzed salmon spent 2 years in the fresh water. Salmon sea life ranged from few months up to 6 years and majority of salmon spent 1-2 years in the sea. Male consisted only 12 % of all caught salmon. Data of 8 salmon caught during migration season in year 2010 in the Curonian lagoon are given in the table 3.2 and figure 3.2.

Table 3.1. Biological data of migrating salmon caught in the Curonian lagoon in 1999-2010 (Repečka, 2010).

Biological Indices	Females		Males		Total catch	
	Range	mean	range	mean	range	mean
Body length L, cm	45,0-120	65,5	55,7-75	65,7	45-120	65,5
Body length l, cm	43,7-119	64,6	55,3-73,5	64,9	43,7-119	64,7
Body length lc, cm	40,7-113	60,1	52-68,5	60,2	40,7-113	601
Weight, g	838-18000	36091	1930-4827	3397,2	838-18000	3585,6
Age, years	A.0+-A.5+	A.1,6+	A.1+-A.2+	A.1,5+	A.0+-A.6+	A.1,6+
No of individuals	73		10		83	

Table 3.2. Biological data of migrating salmon caught in the Curonian lagoon in 2010 (Repečka, 2010).

Biological Indices	Females		Males		Total catch	
	Range	mean	range	mean	range	mean
Body length L, cm	56,5-74,0	63,8	-	-	56,5-74,0	63,8
Body length l, cm	54,5-72,5	61,9	-	-	54,5-72,5	61,9
Body length lc, cm	50,0-67,5	57,4	-	-	50,0-67,5	57,4
Weight, g	1956-3730	2977,1	-	-	1956-3730	2977,1
Age, years	A.0+-A.4+	A.1,6+	-	-	A.0+-A.4+	A.1,6+
No of individuals	8		-		8	

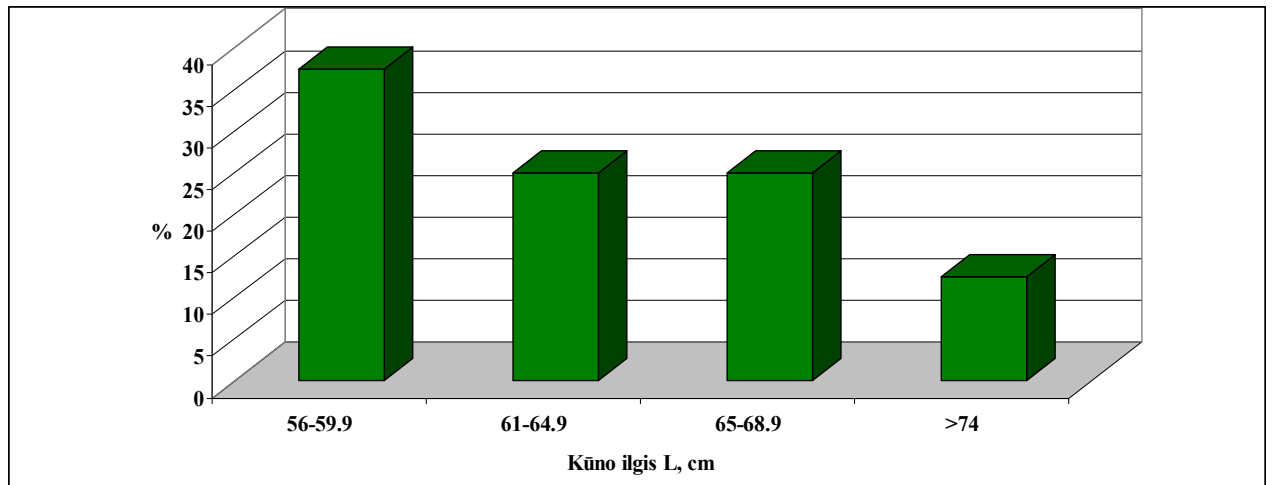


Fig. 3.2. Length classes of migrating salmon caught in the Curonian lagoon in the autumn of 2010.

Fishery regulation

During salmon and sea-trout migration, commercial fishery is under regulation in Klaipėda strait and Curonian lagoon. Fishery is prohibited the whole year round in the Klaipėda strait – from northern breakwater to the northern border of the 15-th fishing bay. From September 1 till October 31, during salmon and sea-trout migration, fishing with nets is prohibited in the eastern stretch of Curonian lagoon between Klaipėda and Skirvytė, in 2 km distance from the eastern shore. From September 15 till October 31 amateur fishing is prohibited in 0,5 km radius from Šventoji and Rėkstyne river mouths and from southern and northern breakwaters of Klaipėda strait. During the same period commercial fishing is prohibited in 0,5 km radius from Šventoji River mouth and 3 km from Curonian lagoon and Baltic sea confluence.

During brown trout and sea trout spawning (from 1st of October till 31st of December) any kind of fishing is prohibited in 161 streams. In other larger rivers as Neris, Šventoji (12 river total) special zones are selected there shoaling of salmon and sea trout occurs. In these selected places only licensed fishing permitted from 16th of September till 15th of October, and from 16th of October till 31st of December any kind of fishing is prohibited. From 1st of January licensed salmon and sea trout kelts fishing is permitted in Miniija, Veiviržas, Skirvytė, Jūra, Atmata, Nemunas, Neris, Dubysa, Siesartis, Šventoji rivers. License fishing is allowed from 1st January of 2010 till 1st of October in designated stretches of the listed rivers. In 2010 were sold more than 1200 licenses for salmon and sea trout, but numbers of caught fishes were unknown. Because of salmon were allowed to fish on license basis, their protection

status was changed and salmon was removed from Lithuanian Red book data. The minimum size of salmon and sea-trout for commercial fishery is L – 60 cm.

4.2 STATUS OF WILD SALMON POPULATIONS

There are 12 rivers in Lithuania inhabited by salmon populations of different abundance. The status of these rivers differs. Purely natural salmon population inhabits Žeimena River and its tributary – Mera, Saria. Mixed, i.e. natural and reared populations are in the rivers Neris, Šventoji, Vilnia, B. Šventoji, Dubysa, Siesartis, Širvinta, Vokė. Populations formed of reared salmon inhabit Virinta, Jūra, Minija rivers and some smaller their tributaries. In the latter rivers artificially reared salmon juveniles are being released for several years already. Data of salmon parr density by electrofishing surveys in the Lithuanian wild salmon rivers in 2010 are presented in Table 4.2.5.2

Table 4.2.5.2 Densities of salmon parr by electrofishing surveys in the Lithuanian wild salmon rivers (Baltic Sea Main Basin).

River year	Number of parr /100 m ² by age group		Number of sampling sites
	0+	>0+	
Neris			
2000	0,19	0,06	10
2001	2,51	0	10
2002	0,9	0	11
2003	0,27	0	11
2004	0,41	0,05	10
2005	0,1	0,03	9
2006	0,06	0,02	9
2007	1,68	0,36	9
2008	7,44	0,32	9
2009	7,31	0,27	9
2010	0,1	0,16	9
Žeimena			
2000	4,1	0,46	7

2001	1,4	0,1	7
2002	0,66	0	6
2003	0,72	0	6
2004	3,1	0,3	6
2005	1,33	0,47	5
2006	2,52	0,06	5
2007	4,2	0,8	5
2008	2,8	0,08	7
2009	3,5	0,4	7
2010	0,2	0	7
Mera			
2000	0,13	0	3
2001	0,27	0	3
2002	0,08	0	4
2003	0	0	4
2004	0	0	3
2005	0	0	2
2006	0	0,05	2
2007	0,22	0,22	2
2008	0	0,5	2
2009	0	0,25	3
2010	0	0	3
Saria			
2000	2,5	0	1
2001	0,7	0	1
2002	0	0	1
2003	0,4	0	1
2004	3,0	0	1
2005	0	0,4	1
2006	n.i.*	n.i.	
2007	0	0	1
2008	n.i.*	n.i.	
2009	1,96	0	1
2010	n.i.*	n.i.	

* n.i. not investigated

Abundance of salmon parr depends on hydrological conditions, spawning efficiency, protection of spawning grounds and migration ways. In 2010 the average density of salmon parr 0+ in the index river Žeimena decreased to 0,2 ind./100 m²; and >0+ parr were absent. Salmon parr was caught only in 2 sites of 7 and salmon were absent in River Mera – tributary of Žeimena river. Very low abundance was registered in Neris river too. Wild salmon parr were caught in 4 sites out of 9 in Neris River and their density varied within 0,4 – 0,8 ind./100 m² (mean density was relatively low during study season compare to the previous year and was 0,26 ind./100 m²). Abundance of 0+ parr in the Neris river decreased to 0,1 ind./100 m²; and >0+ amounted to 0,16 ind./100 m²

Main reason for population decrease were climatic conditions. In spring 2010 unusually very strong ice-drift destroyed majority of redds. Also summer in Lithuania were exceptionally hot with water temperatures reaching 22-26 °C which was lethal for some salmon and sea trout parr. These two extreme condition were main cause for population decrease.

4.3. POTENTIAL SALMON RIVERS

Salmon density was significantly lower in some larger tributaries of Neris and Šventoji River. Salmon parr densities in Šventoji river basin equally decreased. Average densities in this river decreased 4,2 times to 1,78 (0+ –0,94; >0+ - 0,84) ind./100 m². In Siesartis river average density of salmon juveniles decreased to 3,55 (0+ - 0,15, >0+ - 3,4), but Širvinta and Virinta rivers this year were not investigated. In Vilnia river density of juvenile salmonids were 4,6 (0+ –3,6; >0+ - 1,0) and Vokė river was not investigated. In other potential salmon rivers parr density in B. Šventoji decreased 0,59 ind/100 m² , Dubysa increased to 0+ 2,8 ind/100 m². and in Minija river increased to 2,4 ind/100 m² (Table 4.3.2.2.)

Table.4.3.2.2 Densities of salmon parr (number/100 m²) in electrofishing surveys in potential salmon rivers of Lithuania (Baltic Sea Main Basin).

River Year	Number of parr /100 m ² by age group		Number of sampling sites
	0+	>0+	
Šventoji			
2000	1,9	0	6
2001	0,25	0	6
2002	2,0	0,1	6
2003	0,1	0	6
2004	0,62	0,28	6
2005	0,5	0,46	4
2006	3,15	1,35	4
2008	5,8	0,3	5
2009	6,1	1,4	5
2010	0,94	0,84	5
Siesartis			
2000	1,84	0	2
2001	3,35	0,35	2
2002	2,5	0	2
2003	0,45	0	2
2004	3,4	0	3
2005	7,3	3,0	2
2006	0,27	0,94	2
2007	6,3	1,2	2
2008	18,9	17,5	2
2009	44,1	4,0	2
2010	0,15	3,4	2
Virinta			
2003	0,95	0	2
2004	0,17	0	2
2005	0,55	0,49	2
2006	0,14	0	2
2007	0	0	2
2008	0	0	2
2009	6,8	3,6	2
2010	n.i.*	n.i.	

Širvinta			
2004	1,0	0	2
2005	1,0	0	2
2006	0	0	2
2007	6,35	0,35	2
2008	10,9	0	2
2009	11,2	0	2
2010	n.i.*	n.i.	
Vilnia			
2000	0	0	3
2001	0,7	0	3
2002	1,3	0	4
2003	0	0	3
2004	0,36	0,15	3
2005	4,48	0,13	3
2006	0,49	2,63	3
2007	0,58	0	3
2008	1,53	0,28	3
2009	3,1	2,14	3
2010	3,6	1	5
Vokė			
2001	4,3	0	2
2002	0,16	0	2
2003	0	0	2
2004	9,5	0	2
2005	0,77	0	2
2006	0	0,8	2
2007	4,1	0	2
2008	4,5	0	2
2009	3,4	0,5	2
2010	n.i.*	n.i.	
B. Šventoji			
2003	1,12	0	8
2004	2,52	0	8
2005	0	0,22	9
2006	0	0	0
2007	0,02	0	5
2008	0,02	0	3
2009	2,6	0	4

2010	0,59	0	4
Dubysa			
2003	2,12	0	9
2004	0,75	0	9
2005	1,47	0	8
2006	0	0,06	9
2007	0,02	0	8
2008	0,53	0,09	10
2009	0,79	0	7
2010	2,79	0	5
Minija			
2009	0	0,01	7
2010	2,38	0	4

* **n.i.** not investigated

4.4. Status of reared population

Summarizing, the results of restocking efficiency of salmon and sea-trout this year were moderate and somewhat lower, than in previous one. However, they significantly differed. Salmon juveniles stocking efficiency were relatively average in Vilnia river – 18,2 % and Kena river - 10,4 %, low in Neris river – 8,0 % and Šventoji river – 5,9 %. It was established, that restocking efficiency in smaller rivers is much greater than in larger ones. The survey indicates that in the larger rivers mortality of juveniles is greater, the estimation error being greater, though. In May 2010 35,5 thousand individuals of salmon smolts were released into the 3 rivers: **Neris**, **Šventoji (Neris)** and **Minija** basins. 35 thousand individuals of salmon fry were released in the **Neris basin** – Vilnia, Muse, Vokė, Dūkšta, Kena, 35 thou. ind. in the **Šventoji basin** – Šventoji, Širvinta, Virinta, 5 thousand ind. in the **Žeimena basin** – Lakaja, 15 thousand ind. in the **Dubysa basin** – Dubysa, Lapišė, 30 thousand ind. in the **Minija basin** – Minija, Žvelsa and 20 thousand ind. in the **Jūra basin** – Jūra. Data on releases of artificially reared salmon are presented in Table 4. 4

Table 4.4 Releases of artificially reared salmon into the rivers of Lithuania in the year of 2010.

	River	Numbers X 1000			Donor
		Fry	Parr	Smolt	Population
1	Neris basin	35		20	Nemunas
2	Šventoji (Neris)	35		10,5	Nemunas
3	Žeimena basin	5			
4	Dubysa	15			Nemunas
5	Minija basin	30		5	Nemunas
6	Jūra	20			Nemunas
	Total	140		35,5	

Stocking strategy were the key to high efficiency as in spring time salmon of different ontogenetic stages (fry, parr, smolts) were released in salmonid rivers.

4.6. Smolt production

Salmon smolt production estimation was based on electric fishing survey. Salmon smolt downstream migration survey was performed in several small rivers – Mera, Siesartis and Veiviržas. No smolts were caught in Mera and Veiviržas rivers in year 2010, but in Siesartis river total catch was 28 ind., with CPUE of 2,8 ind. Estimated salmon smolt production in Lithuania amounts to 47843 individuals. Compare with the last year (2009, 42 113 ind.) smolt production increased 1,1 times. Biggest survive index registered in Siesartis, Vilnia, Neris, Šventoji, Žeimena. 90 % of total smolt production originated from these rivers. Smolt production in other salmon rivers is significantly lower and ranges from 0 to 3563 individuals. Salmon smolt production during the last period is presented in Table 4.5 and Figures 4. 3; 4. 4.

Table 4. 5. Salmon smolt production in Lithuanian rivers during 2000-2010.

River	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
\year												
Žeimena	3500	3054	962	406	432	2530	1221	1575	2336	1842	2316	20174
Neris	3000	538	4819	1728	518	931	278	153	4263	15207	14813	46248
Šventoji		532	70	602	291	30	333	1449	1715	1750	2296	9068

Siesartis	883	1066	600	108	936	2825	403	3888	21672	23088	55469
Vilnia	0	828	642	0	282	1356	1243	162	546	1767	6826
Other	0	344	13	1133	1352	728	129	747	1096	3563	9105
Total	6500	5007	8089	3991	2482	6061	6741	4952	13111	42113	146890

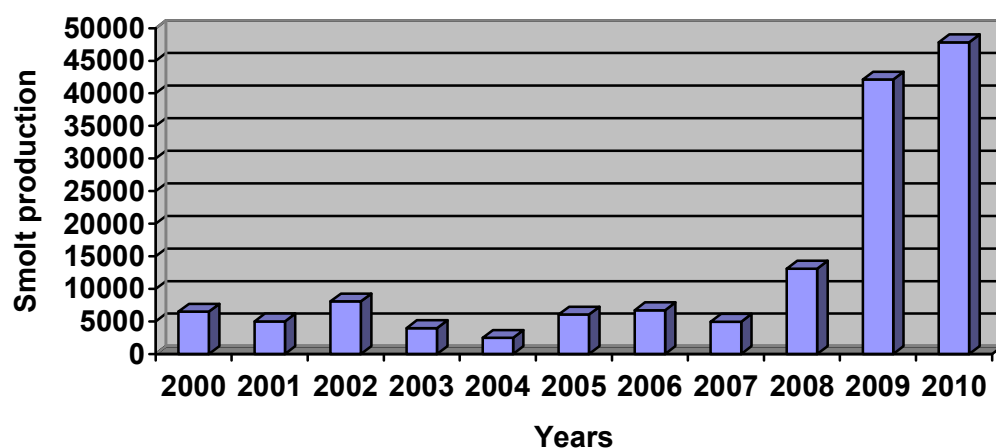


Fig. 4. 3. Total salmon smolt production in Lithuania in 2000-2010

Comment on salmon parr and smolt production in Lithuanian rivers

Salmon restocking program in Lithuania started in 1998 and expiration in 2010 year. There are lots of measures implemented every year to increase salmon population, including artificial rearing, construction of fish ladders, protection of spawning ground, stock monitoring, and scientific projects. Despite the measures taken, according to the data of salmon monitoring, smolt production in Nemunas basin increased very slowly. Strong increase in production was observed only during the recent years. Smolt production increased substantially during last 3 years from 13 111 ind. in 2007 to 42113 ind. in 2009 and in 2010 smolt production get 47843 ind. (Fig. 4.3). Small number of electrofishing sites may lead to large random variation in the annual estimates of average parr density. The resulting density estimates may therefore not display the true variation of average densities in the whole river. Sometimes this leads to implausible smolt production estimates, as may be the case in the river Siesartis where very high 0+ parr densities were observed in 2009 on the two annually monitored sites. According to the standard calculation procedure in which parr densities are converted to smolt abundance the 2010 smolt production from the river would have been over

20,000 smolts. On the other hand, smolt production may as well be sometimes grossly underestimated due to the same reasons.

Salmon parr abundance increased in many sites of Neris river (Fig. 4.4). Efforts to increase area of salmon in Lithuania were successful with salmon restored in Šventoji, Siesartis, Vilnia, Vokė, Dubysa rivers. Also salmon present in many smaller river lower reaches of Mera, Kena, Musė, Širvinta, Virinta, Dūkšta, Žalesa, Saria. In recent years salmon parr first time recorded also in western part of Lithuania - Minija basin. In Index River Žeimena there is only natural population. This river never was stocked with artificially reared salmonids. Due to successful stocking salmon smolts production increased in Siesartis river. Salmonids stocking in this river was ceased two years ago, however smolt production still increasing indicating successful reestablishment. All artificially reared smolts were not included in statistics.

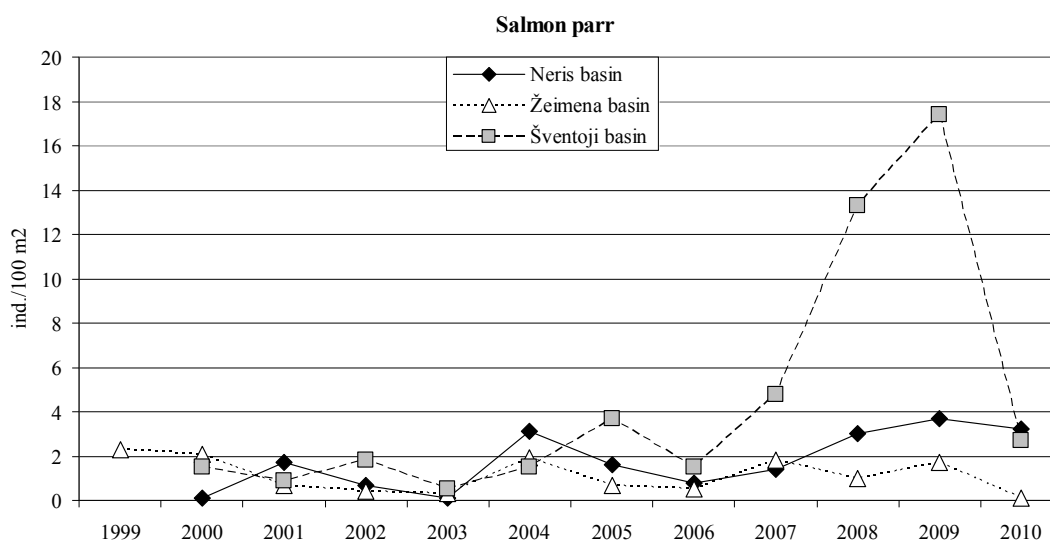


Fig. 4.4. Dynamic of salmon parr (ind./100 m²) in main Lithuanian river basins.

Also salmon smolt production is affected by other factors as well. Water temperature in Lithuania Rivers was well above average during the last few years and water levels were below average. Also one of main concerns in salmon rivers remains pollution. Another important factor is the fact that Lithuanian rivers are lowland type and there is a lack of habitats for salmon as only some stretches are suitable for smolts. Quite high mortality rate caused by predators is another

problem. Predators' density is significantly higher in Lithuanian rivers compared with typical salmon rivers in north Baltic.

Salmon parr density strongly depends on climatic, hydrological conditions and water temperature, as was proved by very adverse conditions in 2010. All these factor influence salmon parr abundance therefore natural changes in abundance occurs. As mentioned before year 2010 were particularly bad for salmon population and in many places salmon parr densities significantly decreased.

8. SEA TROUT

8.1 Nominal Catch

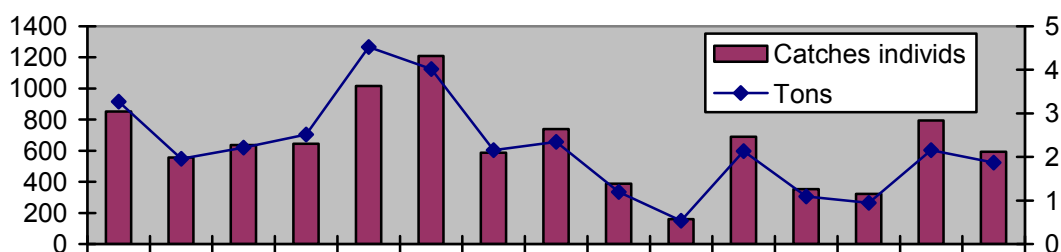


Fig. 8. 5. Commercial catches of sea trout in the Baltic Sea and Curonian lagoon

A specialized fishery of sea trout in Lithuania is not carried out. Most often sea trout are caught in the coastal area and Curonian lagoon as a by-catch in the fishery of other species. Mean catches of Lithuanian fishermen there are 644 ind. of Sea trout (more than the last year), which weight approx. 1,738 tones. In 2010 Lithuanian fishermen caught only 66 (0,177 t) sea trout in coastal fishery, majority of sea trout were caught together with salmon. The biggest share of sea trout was caught in Curonian lagoon - 578 (1,561) individuals. 104 ind. (0,278) were caught in the rivers for artificial rearing (Fig. 5). Angling is allowed based on licenses. Fishing terms, allowed numbers and water bodies are established.

8.2 Status of sea trout populations

Population of sea-trout in Lithuania is greater than that of salmon. Wild sea-trout populations are known in 10 rivers basins. Abundance of sea trout were bigger in small tributaries. Survey were done in 75 sites (last year 95 sites), mean density of

juveniles varied from 0,4 to 26,4 (mean – 6,2 ind./100 m²). Sea-trout smolt production is 23 900 individuals and it was 1,3 time less then the last year. Due to certain circumstances salmonids monitoring were not performed in many smaller rivers, therefore productivity was assessed using data of previous years. Sea-trout population is particularly numerous in the Western Lithuania – Minija River catchment. Average density of sea-trout parr in Minija catchment was 6,3 ind/100m², smolt production – 8 200 individuals (less was last year 12 500 ind.) (Table 8.6). Smolt production was significantly lower in the other river catchments. Monitoring of salmonids in small streams and rivers are every 3 years, so together with smolt production of all streams and small rivers estimated smolt production could be larger by 10-15 thousand ind.

Table 8.6. Electrofishing survey of wild sea trout in 2010 (Kesminas & Kontautas, 2010).

River	No. sites sampled	Parr No of 0+ and >0+// 100 m²	Smolt production	Remarks
Neris basin	15	3,7	3600	Decreased 1,2 times
Žeimenos basin	10	1,3	2900	Increased 1,5 times
Šventosios basin	8	0,44	4900	Decreased
Minijos basin	15	6,3	8200	Decreased 1,5 times
Jūros basin	10	1,5	800	Unchanged
Dubysos basin	6	4,4	1100	Decreased 4,2 times
Bartuvos basin	3	11,5	400	Decreased 1,2 times
Akmenos - Danės basin	2	26,4	800	Increased 1,3 times
Šyšos basin	2	1,55	500	Increased 1,2 times
Baltijos - Šventoji basin	4	5,0	600	Increased 3,0 times
Total	75	6,2	23900	

8.3 Reared population

In 2010 year 75 thousand individuals of sea-trout fry, 20 thousand of summer old parr and 45 thousand of 1 year old smolts were released. Sea trout fry were released into 21 rivers, mainly in small salmon-type rivers. One summer old parr and smolts were released into the biggest rivers: Neris, Šventoji, Minija, Dubysa and Jūra.

8.4. Stocking efficiency

Stocking efficiency was average in Vilnia and Kena rivers – 15-17 %. In quite big rivers, according monitoring data stocking efficiency was relatively low: in Neris river – 0,2 % in Šventoji river - 0%.

9. TAGGINGS

Limited numbers of sea trout and salmon were also tagged with PIT tags and radio tags. No fin clipping was made in Lithuania.

Other information

Inventory of spawning places

Inventory of spawning places was conducted at the end November 2010 in 4 rivers of Neris catchment (Žeimena, Mera, Vilnia, Siesartis) and 5 rivers in Minija catchment (Minija, Sausdravas, Žvelsa, Veiviržas and Šalpė) and in Šventoji, Akmena – Dane, Jūra catchments. Spawning intensity in the Neris catchment was estimated based on number of spawning nests in 1 km length of river stretch and total area m². In the Western part of Lithuania density (Nb) and total area (m²) of nests per ha of river were recorded. Only redds greater than 0,3 m² were considered.

Data from South-eastern Lithuania and Western part of Lithuania are given in the Tables 7 and 8. Only in the river Žeimena the number of spawning nests was higher up to 1,2 times compare with year 2009. In the next rivers South-eastern part of Lithuania number of spawning nests decreased: Mera River - 2,1 times, Vilnia River – 5,2 times and in the Siesartis River – 1,5 times as in the last year.

Only in the Minija River the number of spawning nests was less (mean density for 1 km river stretch being 3,0 Nb/km). In the all Minija River tributaries spawning nests density increase and amount average is 11,08 Nb/km. In the Western part of Lithuania Salmonids spawning intensity was high enough and indicators (spawning nests density, spawning nests area) were 30-35% better compare with last year.

Table 7. Number of salmon and sea trout nests in the Neris and Šventoji River catchment, (Kesminas, 2010).

River	River stretch surveyed, km	Number of nests	Total area, m ²	Density of nests, Nb/km	Remarks
Žeimena	28	91	391,3	3,25	Density higher as in 2009
Mera	13	13	23,9	1,0	Density decreased as in 2009
Vilnia	10	24	86	2,4	Density is decreased as in 2008
Siesartis	5	30	99,6	5,5	Density is decreased as in 2009

Table 8. Number of sea-trout nests in the Minija, Šventoji, Akmena – Dane, Jūra Rivers catchment (Kontautas, 2010)

River	Density of nests (No./km)			Area of nests (m ² /km)		
	2008	2009	2010	2008	2009	2010
Minija	18,5	3,65	3,0	85,8	18,7	14,9
Sausdravas	10	6,9	12,0	18,3	20,8	50,6
Žvelsa	16,7	13,3	14,8	59,2	89,2	75,9
Veiviržas	17	9,9	13,5	85,9	41,8	56,8
Šalpė	16,5	3,5	12,1	2,0	20	35,3
Average for Minija catchment	15,7	7,45	11,08	50,24	38,1	46,7

Šventoji catchment (Baltic Sea)	24,7	18,3	21,3	70,7	22,45	51,75
Akmėna – Dane catchment	3,8	3,3	3,55	4,8	1,7	3,2
Jūra catchment	6,0	4,35	9,23	15,4	9,0	17,2
Average for the western part of Lithuania	12,55	7,5	11,3	35,3	17,8	29,71