

ESTONIAN FISHERY

2017



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Estonian Fishery 2017

Content

| | |
|---|-----------|
| Foreword | 6 |
| Abbreviations | 8 |
| Distant-water fishery | 9 |
| <hr/> | |
| Fleet | 9 |
| State of fish stocks and fishing opportunities | 10 |
| Catches | 13 |
| Outlook | 16 |
| Baltic Sea fisheries | 17 |
| <hr/> | |
| COASTAL FISHERY IN THE BALTIC SEA | 17 |
| Dynamics of coastal fishing catches in different parts of the Baltic Sea | 22 |
| Gulf of Finland | 22 |
| High seas | 23 |
| Väinameri Sea | 24 |
| Gulf of Riga | 25 |
| Pärnu Bay | 26 |
| <i>European Maritime and Fisheries Fund supports coastal fishermen</i> | 38 |
| TRAWL FISHERY IN THE BALTIC SEA | 40 |
| Stocks and catches of herring, sprat and cod, and future outlooks | 40 |
| Herring | 40 |
| Central Baltic herring (subdivisions 25-27, 28.2, 29 and 32) | 40 |
| Gulf of Riga herring | 45 |
| Sprat | 48 |
| Cod in subdivisions 25-32 (Eastern Baltic) | 52 |
| ESTONIA'S TRAWL FLEET IN THE BALTIC SEA | 54 |
| General overview of sector | 54 |
| Basic indicators of 12-18 m length class trawlers | 57 |
| Basic and economic indicators of 24-40 m length class trawlers | 57 |
| <i>Estonia's Baltic Sea trawling sector was waiting for changes in 2017</i> | 59 |
| Inland fisheries | 60 |
| <hr/> | |
| LAKE VÖRTSJÄRV FISHERY | 60 |
| Eel | 63 |
| Pikeperch | 65 |
| Pike | 67 |
| Bream | 68 |

| | |
|--|------------|
| LAKE PEIPSI FISHERY | 70 |
| State of fish stocks and changes | 70 |
| Fishery management | 72 |
| Catches | 73 |
| Problems and possible solutions | 75 |
| LAMPREY FISHING ON ESTONIAN RIVERS | 76 |
| Recreational fishing | 80 |
| Changes introduced in the Fishing Rules | 80 |
| Recreational fishing in figures | 81 |
| Aquaculture | 85 |
| Overview of sector | 85 |
| Rainbow trout | 85 |
| Crayfish farming | 86 |
| Algae and mussel cultivation | 86 |
| Fish restocking | 87 |
| Research and development | 88 |
| Grants | 88 |
| <i>Concerns in the area of aquaculture in 2017</i> | 89 |
| Estonian fish processing industry | 90 |
| General overview of sector | 90 |
| Basic and economic indicators and trends of companies whose main business is fish processing | 91 |
| Production and sales | 93 |
| <i>Management and development of companies in the fisheries sector in 2017</i> | 95 |
| Grants | 97 |
| Measures in 2017 | 98 |
| References | 101 |
| List of figures and tables | 102 |

Foreword

Dear reader,

The Fisheries Information Centre continues the tradition of publishing yearbooks. This time, data characterising the year 2017 are presented. In the forewords to the previous yearbooks, I have occasionally noted that there were no significant changes in the sector. This is the case with the year 2017, too. Perhaps it is even good that we can talk about stability. On the other hand, it would certainly be a great pleasure to report about a huge leap in development in one or another area.

In 2017, the cornerstone of a component plant, which has already issued the first batches of production, was laid. Hopefully, that plant, set up as a result of joint efforts and adding value to production, will further strengthen the Estonian trawling sector. It is pleasant to note that we can still call ourselves masters of the Baltic Sea in trawl fishing as in addition to our country's quotas Estonians also own a substantial share of our northern neighbours' quotas.

In coastal fisheries, the number of fishermen remains relatively stable in both coastal and inland waters. Perch, herring and pikeperch continue to be the main sources of income. Companies operating in the fisheries sector that manage to sell their catches in Europe face the task to eco-label their production. This is simply the market situation and quite a few companies have either completed or are going through this process. As fishing is largely a seasonal field of activity, eight coastal action groups devote a lot of attention and EMFF funds to the diversification of, and adding value to, production. Support measures also help coastal villages to remain a viable and attractive living environment for younger people. It is common knowledge that fishermen are getting older and there are not many young men willing to take up this tough job.

With the exception of the bankruptcy of one big company, 2017 was quite successful for the Estonian fish processing industry. Investments and profits increased. The fish processing industry is still a branch of the economy where exports play an important role, but it is a pleasure to report that the share of the domestic market has also increased.

In fish farming, unfortunately, no positive changes have occurred. There was no significant increase in production volume. However, knowing what hellish heat hit fish farmers the next summer, the year 2017 can still be considered to be satisfactory and the bad news can be left to the next yearbook.

Dear Reader, I believe that this yearbook gives you sufficient information about the year 2017 for Estonian fisheries – a branch of the economy the absence of which is unimaginable in our homeland, with its long coastline. Let me also remind you that the dry numbers and facts set out here actually represent the hard and necessary everyday work of many of our compatriots.

Eat fish!

Toomas Armulik
Head of Fisheries Information Centre

Abbreviations

| | |
|---------------|---|
| B_{lim} | The biomass limit, reaching which should be prevented by fisheries management, as below this level the risk of stock collapse increases significantly |
| $B_{trigger}$ | The minimum spawning stock biomass that ensures the maximum possible yield in a long run at the FMSY fishing mortality |
| CPUE | Catch per unit effort, i.e. yield; for example kg/h or kg/net |
| EFF | European Fisheries Fund |
| EIER | Estonian Institute of Economic Research |
| EU | European Union |
| EULS | Estonian University of Life Sciences |
| EULS IAE | Institute of Agricultural and Environmental Sciences at the Estonian University of Life Sciences |
| EULS IVA | Institute of Veterinary Medicine and Animal Sciences at the Estonian University of Life Sciences |
| F | Fishing mortality |
| F_{med} | The fishing mortality rate which secures a balanced ratio of spawning stock and recruitment |
| F_{MGT} | International management plan-based fishing mortality rate target level |
| F_{MSY} | Maximum fishing mortality for sustainable yield |
| F_{PA} | Sustainable mortality rate, i.e. maximum sustainable exploitation intensity (fishing mortality precautionary approach) |
| F_{sq} | Fishing mortality status quo |
| GT | Combined gross tonnage |
| ICES | International Council for the Exploration of the Sea |
| EIC | Environmental Investment Centre |
| EI | Environmental Inspectorate |
| MoE | Ministry of the Environment |
| M | Natural mortality |
| MoRA | Ministry of Rural Affairs |
| MSC | Marine Stewardship Council |
| NAFO | Northwest Atlantic Fisheries Organization |
| NEAFC | North East Atlantic Fisheries Commission |
| NIPAG | Joint NAFO/ICES Pandalus Assessment Working Group |
| NPUE | Number per unit effort |
| ARIB | Estonian Agricultural Registers and Information Board |
| RFMO | Regional Fisheries Management Organisation |
| SE | Statistics Estonia |
| SL | Standard length; the length of a fish measured from the tip of the snout to the end of scale cover |
| SSB | Spawning stock biomass |
| STECF | European Commission's Scientific, Technical and Economic Committee for Fisheries |
| TAC | Total allowable catch |
| TL | Total length; the length of a fish measured from the tip of the snout to the end of the caudal fin |
| TW | Total weight of a fish |
| UT EMI | Estonian Marine Institute of the University of Tartu |
| WPUE | Weight per unit effort |
| Z | Total mortality |

Table 1. Main characteristics of Estonian distant-water fishing fleet, 2005-2016

| Year | Number of vessels | Combined power of main engines (kW) | Combined gross tonnage (GT) |
|------|-------------------|-------------------------------------|-----------------------------|
| 2005 | 10 | 18,605 | 11,520 |
| 2006 | 11 | 21,413 | 12,923 |
| 2007 | 10 | 19,923 | 12,215 |
| 2008 | 8 | 15,634 | 10,331 |
| 2009 | 6 | 12,670 | 8281 |
| 2010 | 6 | 12,670 | 8281 |
| 2011 | 6 | 12,670 | 8281 |
| 2012 | 6 | 15,982 | 9100 |
| 2013 | 5 | 13,174 | 7697 |
| 2014 | 5 | 13,174 | 7697 |
| 2015 | 5 | 13,174 | 7697 |
| 2016 | 5 | 13,941 | 8472 |
| 2017 | 5 | 13,941 | 8472 |

Source: MoRA

average length of the vessels was 64 metres; the average age in 2017 was 26 years; the combined power of the vessels' main engines was 13,941 kW (2788 kW on average) and the combined gross tonnage (GT) was 8472 tonnes (1694 tonnes on average; Table 1). All the vessels were actually engaged in fishing in 2017.

State of fish stocks and fishing opportunities

The state of fish stocks in the **NAFO area** is assessed by the Scientific Council of NAFO on the basis of exploratory trips and/or commercial fishing data. NAFO observers on board vessels help collect information on Estonia's commercial fishing. Fishing opportunities depend above all on the state of fish stocks: in the determination of the total allowable catch (TAC), the precautionary approach is applied in the NAFO area, which should ensure the preservation of stocks and the ecosystem.

The interaction between environmental conditions and species is increasingly taken into account in the assessment of stocks, i.e. the ecosystem approach to fisheries management is used and vulnerable marine ecosystems are protected. Therefore, 18 fishing grounds in the NAFO area have been closed to commercial fishing with demersal trawlers since 2010, either because of an abundance of coral and sponges which exceed the established reference levels or because of seamounts regarding which more information on the operation of ecosystems is needed (NAFO, 2011). In 2013 a decision was taken to expand the closed fishing grounds, adding one ground (NAFO, 2014a). In 2014 it was decided to keep those grounds closed for fishing until 2020 and two more grounds were added (NAFO, 2015a). In 2015 a decision was taken to prohibit exploratory bottom trawling in protected marine areas, thereby making all 21 NAFO protected areas closed to all kinds of bottom fishing activity (NAFO, 2016a and 2018).

Fishing quotas are agreed between member states at the annual meetings of NAFO and NEAFC. The current moratoria on the fishing of certain stocks (Atlantic cod (*Gadus morhua*) in divisions 3L and 3NO; American plaice (*Hippo-*

glossoides platessoides) in divisions 3LNO and 3M; witch flounder (*Glyptocephalus cynoglossus*) in division 3L; capelin (*Mallotus villosus*) in division 3NO; and shrimp (*Pandalus borealis*) in divisions 3NO and 3M were continued in NAFO fishing grounds in 2016. A moratorium on fishing for shrimp in division 3L was established in 2015 and extended in 2016 (NAFO, 2015a, 2016a, 2017). All the existing moratoria were extended in 2017 (NAFO, 2018).

As the stocks of many species are in a poor state, recovery plans have been established for certain stocks that determine the conditions for the opening of the stocks for commercial fishing and for the careful management of reopened stocks. A 15-year recovery plan for **Greenland halibut** (*Reinhardtius hippoglossoides*) was implemented during the period 2003-2018 and a new plan was adopted in 2017. The plan will be in force from 2018 to 2023 and the TAC for this stock will be adjusted annually under the plan depending on the agreed Harvest Control Rule (NAFO, 2018). The Greenland halibut recovery plan has been successful and fishing quotas were stable during the period 2013-2017 (NAFO, 2014a, 2015a, 2017, 2018). A plan for recovery of **cod** stocks in division 3NO has been implemented since 2007 (NAFO, 2011). In 2013 the quota for 3M cod was increased by 52%. Quotas for the period 2014-2017 remained on the same level, but the TAC for 2018 was reduced by around 20% (NAFO, 2015a, 2015b, 2016, 2018). Fishing for **witch flounder** in division 3NO was prohibited in 1994. However, as its biomass has been increasing and the fishing mortality has been low since 2010, limited fishing activity is allowed again from 2015 (NAFO, 2014b, 2017). Fishing for this stock in division 3L was under a moratorium also in 2017 and 2018 (NAFO, 2018). After a 12-year moratorium (1998-2009), the biomass of **redfish** in division 3LN has recovered and the fishing mortality is below the critical limit (NAFO, 2014b, 2015b, 2017). Quotas for fishing for redfish in this division have therefore been increased every two years since 2014. In 2017, the quota increased by 37% (Table 2) and the TAC for 2018 remained on the same level (NAFO, 2018). The population of **yellowtail flounder** (*Limanda ferruginea*) in division 3LNO is in a good state, the fishing mortality rate is below the critical level and fishing quotas have been stable in recent years (NAFO, 2015b and 2018). A stock recovery plan has also been developed for **American plaice** in division 3LNO (NAFO, 2016b).

Species are interrelated through dietary relationships. As the biomass of shrimp-eating fish has increased and environmental conditions have probably become less favourable for shrimp, the stock of shrimp in NAFO division 3M is in a poor state. Recent studies suggest that predation by cod and redfish, in conjunction with commercial fishing, are the main factors leading to the collapse of shrimp stock (Perez-Rodriguez et al., 2016). Shrimp biomass has increased in division 3M in recent years to some extent, probably due to a slight decrease in the biomass of cod and redfish, but it is still below the critical limit. Fishing for shrimp is therefore prohibited in division 3M in 2018 and 2019 (NIPAG, 2017; NAFO, 2018). In 2015 a moratorium was also established on fishing for shrimp in division 3L (NAFO, 2015a). Shrimp fishing in division 3NO has been prohibited for a long time, as well (NAFO, 2017). Thus, shrimp fishing is under a moratorium in the entire third division since 2015 and it has been proposed to extend the moratorium until at least 2019 (NAFO, 2018).

The state of fish stocks in the **NEAFC** fishing grounds is assessed by the ICES. Shrimp is the most important species for Estonia in the North East Atlantic, as it is an unregulated species in the Barents Sea. The largest quotas have been allocated for mackerel and redfish. Estonian distant-water fishers generally seek to exchange North East Atlantic fish quotas for North West Atlantic fish quotas, while the shrimp quotas are retained. The shrimp stock continues to be in good condition in the North East Atlantic fishing grounds and is not threatened by current catches. However, some vessels find fishing for this stock unattractive due to area closures intended to protect young fish and due the movement of shrimp away from the traditional fishing grounds, forcing the vessels to sail long distances without fishing. Stock indicators have not changed a great deal – the fishing mortality rate is low and stable and the biomass index also stays close to the historical mean value (NIPAG, 2017).

Assessment and scientific advice concerning stocks in NAFO fishing grounds are available on the website of NAFO (www.nafo.int). Materials on NEAFC fishing grounds can be found on the websites of NEAFC (www.neafc.org) and ICES (www.ices.dk).

Estonian vessels can fish for unregulated species in international waters outside of the closed areas. Thus it is possible to fish in, e.g. the South West Atlantic, where there is no regional fisheries management organisation (RFMO) and where no quotas have been allocated to Estonia. Estonian vessels used this opportunity in 2005, 2006, 2010, 2011 and 2012, but not since 2013.

Catches

From 2005-2017, distant-water fishing vessels flying the flag of Estonia only fished in the Atlantic Ocean, with shrimp and various fish being the target species. In 2017, shrimp produced the biggest catch (49% of the total catch), followed by cod and redfish (17% and 15%, respectively; [Figure 2](#), [Table 3](#)). The cod catch taken in the North West Atlantic, which amounted to 1315 tonnes in 2017, was twice as high as in 2015 (681 tonnes) and more than ten times better

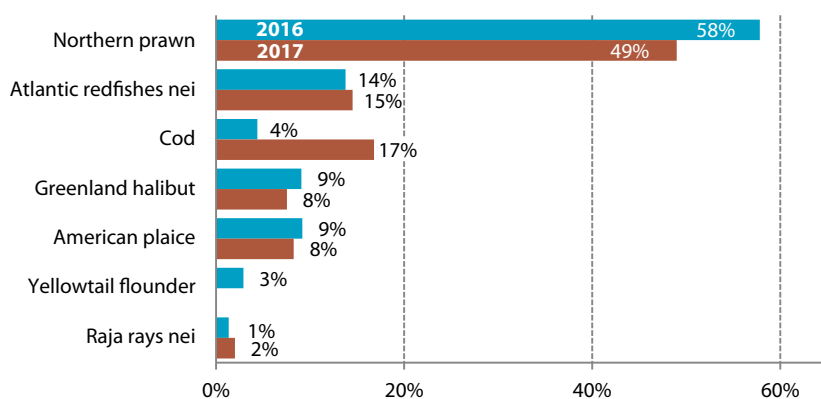


Figure 2. Proportion (%) of catch by main species in distant-water fishery sector in 2016 and 2017
Source: MoRA

Table 3. Estonia's distant-water fishery catches (t) by species, 2005-2017

| Species and scientific name | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|--|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Aesop shrimp, <i>Pandalus montagui</i> | | | | | | | 858 | | | | | | |
| American anglerfish, <i>Lophius americanus</i> | | | | | | | | | <1 | 27 | 2 | 7 | <1 |
| Blue antimora, <i>Antimora rostrata</i> | | | 3 | | | | | | | | | | |
| Argentine shortfin squid, <i>Illex argentinus</i> | 581 | 499 | | | | 42 | 329 | 1248 | | | | | |
| Argentine hake, <i>Merluccius hubbsi</i> | | 700 | | | | 1125 | 1395 | 1571 | | | | | |
| Patagonian grenadier, <i>Macruronus magellanicus</i> | | 73 | | | | 135 | 92 | <1 | | | | | |
| Greenland shark, <i>Somniosus microcephalus</i> | 9 | | | | | | | | | | | | |
| Baird's slickhead, <i>Alepocephalus bairdii</i> | 64 | 158 | 9 | | | | | | | | | | |
| Rabbit fish, <i>Chimaera monstrosa</i> | 4 | 2 | | | | | | | | | | | |
| Atlantic halibut, <i>Hippoglossus hippoglossus</i> | | | | 3 | | 3 | 3 | 10 | 11 | 25 | 22 | 30 | 41 |
| American plaice, <i>Hippoglossoides platessoides</i> | 47 | 34 | 33 | 77 | 29 | 9 | 36 | 37 | 226 | 1177 | 537 | 1105 | 1249 |
| Splendid alfonso, <i>Beryx splendens</i> | | 4 | | | | | | | | | | | |
| Atlantic mackerel, <i>Scomber scombrus</i> | | | | | | | | | 1 367 | | | | |
| Atlantic wolffish, <i>Anarhichas lupus</i> | | | | 12 | 5 | | | | | | | | |
| Northern prawn, <i>Pandalus borealis</i> | 12,381 | 9242 | 12,076 | 12,742 | 8587 | 9037 | 9919 | 7576 | 6653 | 5665 | 6740 | 6 954 | 7413 |
| Silver hake, <i>Merluccius bilinearis</i> | | | | | | | | <1 | | 151 | 114 | 57 | 55 |
| Roundnose grenadier, <i>Coryphaenoides rupestris</i> | 154 | 104 | 140 | | | | | | | 4 | | | |
| Mediterranean slimehead, <i>Hoplostethus mediterraneus</i> | | 1 | | | | | | | | | | | |
| Haddock, <i>Melanogrammus aeglefinus</i> | <1 | | | | | | | 8 | 19 | 79 | 30 | 24 | 30 |
| Cusk-eels nei, <i>Genypterus spp</i> | 17 | 1 | | | | | | | | | | | |
| Golden redfish, <i>Sebastes marinus</i> | | 104 | | | | | | | | | | | |
| Alfonso nei, <i>Beryx spp</i> | | | 1 | | | | | | | | | | |
| Pink cusk-eel, <i>Genypterus blacodes</i> | | 22 | | | | | 127 | 90 | | | | | |
| Southern blue whiting, <i>Micromesistius australis</i> | | | | | | | <1 | <1 | | | | | |
| Northern shortfin squid, <i>Illex illecebrosus</i> | | 24 | | | 5 | 1 | | <1 | | | | | <1 |
| Atlantic redfishes nei, <i>Sebastes spp</i> | 1111 | 1156 | 1040 | 1003 | 1748 | 1340 | 1075 | 368 | 1573 | 1300 | 1512 | 1656 | 2198 |
| Wolffishes nei, <i>Anarhichas spp</i> | 74 | 63 | 10 | 2 | | | | | 1 | 14 | 1 | | |
| Lumpfish, <i>Cyclopterus lumpus</i> | | | | | | | | | <1 | | | | |
| Hakes nei, <i>Merluccius spp</i> | 700 | 6 | | | | | | | | | | | |
| Black cardinal fish, <i>Epigonus telescopus</i> | | <1 | | | | | | | | | | | |
| Black dogfish, <i>Centroscyllium fabricii</i> | | 4 | 6 | | | | | | | | | | |
| Beaked redfish, <i>Sebastes mentella</i> | | 396 | 684 | | | | | | | | | | |
| Antarctic rockcods, noties nei, <i>Nototheniidae</i> | 56 | 127 | | | | 58 | 76 | 57 | | | | | |
| Dogfish sharks nei, <i>Squalidae</i> | 6 | | 3 | 3 | | <1 | | | | | | | |
| Patagonian squid, <i>Loligo gahi</i> | | | | | | 44 | 69 | 175 | | | | | |
| Patagonian toothfish, <i>Dissostichus eleginoides</i> | | <1 | | | | | | | | | | | |
| Tadpole codling, <i>Salilota australis</i> | | 32 | | | | 1 | 2 | 1 | | | | | |
| Longnose velvet dogfish, <i>Centroscymnus crepidater</i> | | | 3 | | | | | | | | | | |
| Witch flounder, <i>Glyptocephalus cynoglossus</i> | 31 | 28 | 24 | 38 | 8 | 11 | 14 | 33 | 16 | 40 | 22 | 40 | 66 |
| Portuguese dogfish, <i>Centroscymnus coelopsis</i> | 7 | 7 | | | | | | | | | | | |
| Red hake, <i>Urophycis chuss</i> | 47 | 26 | 2 | | | 19 | | | | | | | |
| Roughhead grenadier, <i>Macrourus berglax</i> | 103 | 95 | 69 | 132 | 41 | 93 | 116 | 72 | 110 | 136 | 26 | 13 | 23 |
| Raja rays nei, <i>Raja spp</i> | 62 | 258 | 366 | 123 | 29 | 228 | 82 | 161 | 155 | 246 | 47 | 162 | 304 |
| Rays, stingrays, mantas nei, <i>Rajiformes</i> | 479 | | | | | | | | | | | | |
| Yellowtail flounder, <i>Limanda ferruginea</i> | 20 | 6 | 25 | 33 | | 4 | 13 | 31 | 350 | 24 | 342 | 351 | 39 |
| Blue ling, <i>Molva dypterygia</i> | 5 | 3 | 7 | | | | | | | | | | |
| Black scabbardfish, <i>Aphanopus carbo</i> | 11 | 6 | 7 | | | | | | | | | | |
| Greenland halibut, <i>Reinhardtius hippoglossoides</i> | 534 | 373 | 365 | 299 | 300 | 441 | 279 | 266 | 727 | 1 037 | 694 | 1 092 | 1141 |
| Threebearded rockling, <i>Gaidropsarus ensis</i> | | | | | 1 | 3 | | | | | | | |
| Lanternsharks, <i>Etmopterus spp</i> | | | | | | | | | | 2 | | | |
| Atlantic cod, <i>Gadus morhua</i> | 33 | 52 | 25 | 73 | 128 | 93 | 105 | 285 | 730 | 907 | 989 | 529 | 2544 |
| Spotted wolffish, <i>Anarhichas minor</i> | | | | | | 12 | | | 16 | 14 | 7 | 8 | 30 |
| White hake, <i>Urophycis tenuis</i> | 1 | | 32 | 19 | | | | <1 | <1 | 2 | | | <1 |
| Sharks, rays, skates, etc. nei, <i>Elasmobranchii</i> | | 11 | | | | | | | | | | | |
| Total | 16,539 | 13,617 | 14,930 | 14,559 | 10,881 | 12,699 | 14,590 | 11,990 | 11,956 | 10,850 | 11,084 | 12,027 | 15,135 |

Source: MoRA, MoE

than in 2016 (113 tonnes). Most of the cod was caught in division 3M. The catch of cod taken in the North East Atlantic also continued to grow, rising from 416 tonnes in 2016 to 1228 tonnes in 2017. According to preliminary data, the entire official cod catch (all countries) taken in the North East Atlantic in 2017 amounted to 868,276 tonnes (ICES, 2018a).

In the North East Atlantic, Estonia generally only uses shrimp, cod and American plaice quotas, the latter two species being caught as by-catches in shrimp fishing. In 2017, 523 tonnes of Greenland halibut were landed, as well (Table 4). The North East Atlantic shrimp catches have steadily increased and most of the shrimp is caught in division 1a.

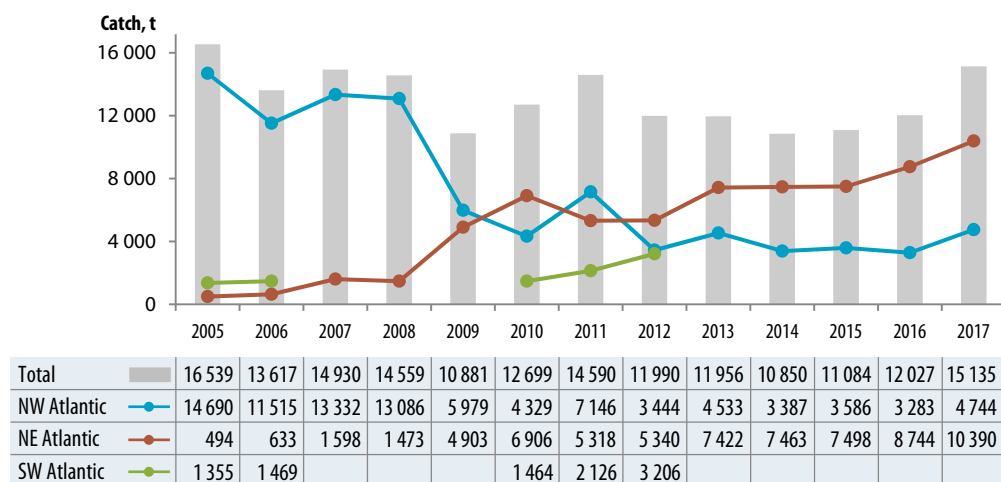


Figure 3. Estonia's total distant-water fishery catches (t) by fishing ground, 2005-2017
Source: MoRA

Table 4. Estonia's distant-water fishery catches (t) by fishing ground and species, 2017

| Species, scientific name and code | North West Atlantic | North East Atlantic | Total |
|--|---------------------|---------------------|-------------------|
| American anglerfish, <i>Lophius americanus</i> , ANG | 0.811 | | 0.811 |
| Spotted wolffish, <i>Anarhichas minor</i> , CAS | | 30.083 | 30.083 |
| Atlantic cod, <i>Gadus morhua</i> , COD | 1315.381 | 1228.275 | 2543.655 |
| Greenland halibut, <i>Reinhardtius hippoglossoides</i> , GHL | 618.313 | 523.206 | 1141.519 |
| Haddock, <i>Melanogrammus aeglefinus</i> , HAD | 7.275 | 22.628 | 29.903 |
| Atlantic halibut, <i>Hippoglossus hippoglossus</i> , HAL | 41.348 | | 41.348 |
| Silver hake, <i>Merluccius bilinearis</i> , HKS | 54.539 | | 54.539 |
| White hake, <i>Urophycis tenuis</i> , HKW | 0.187 | | 0.187 |
| American plaice, <i>Hippoglossoides platessoides</i> , PLA | 79.946 | 1169.534 | 1249.480 |
| Northern prawn, <i>Pandalus borealis</i> , PRA | | 7412.938 | 7412.938 |
| Atlantic redfishes nei, <i>Sebastes</i> spp, RED | 2194.725 | 3.602 | 2198.327 |
| Roughhead grenadier, <i>Macrourus berglax</i> , RHG | 22.987 | | 22.987 |
| Raja rays nei, <i>Raja</i> spp, SKA | 303.812 | | 303.812 |
| Northern shortfin squid, <i>Illex illecebrosus</i> , SQI | 0.089 | | 0.089 |
| Witch flounder, <i>Glyptocephalus cynoglossus</i> , WIT | 66.344 | | 66.344 |
| Yellowtail flounder, <i>Limanda ferruginea</i> , YEL | 38.510 | | 38.510 |
| TOTAL | 4744.267 | 10,390.265 | 15,134.532 |

Source: MoRA

Catches from the North West Atlantic area decreased considerably during the period 2005-2017, being around 15,000 tonnes in 2005, relatively persistently around 5100 tonnes from 2009 to 2013, but only around 3500 tonnes during the period 2014-2016. The total catch increased slightly in 2017, amounting to 4744 tonnes (Figure 3, Table 4). The quantities caught in the North East Atlantic, on the other hand, increased continuously from 2005 to 2017, reaching more or less the same levels as in the North West Atlantic in the period 2009-2011, but were more than twice as high in the period 2014-2016. The total catch landed in 2017 was record high, reaching 10,390 tonnes. The North East Atlantic fishing grounds are thus currently increasingly important for Estonian distant-water fishery. Catches taken in the South West Atlantic grew from 2010-2012, but our vessels have not been fishing there since 2013. Estonian vessels' total catch for 2017 (15,135 tonnes) exceeded the average level of the period 2010-2016 and was comparable to the total catches taken from 2005 to 2008. Catches are usually landed in ports of Canada, Iceland, Spain and Norway.

Outlook

By 2015, the state of the shrimp stock in the third division of the North West Atlantic warranted a moratorium, and shrimp fishing is prohibited in that fishing ground from said year due to the recession of the shrimp stock. Estonian shrimp-fishers are increasingly shifting their fishing efforts to the Barents Sea where the shrimp stock is in good condition and total annual catches amount to less than a half of the recommended quantity. This is also demonstrated by the fact that in 2013 Estonian distant-water fishers obtained a certificate for shrimp fishing in the Barents Sea from the Marine Stewardship Council, having successfully completed a full assessment that lasted around ten months. From 2017, the certificate covers cod taken as a by-catch in shrimp fishing. This certificate will probably be needed for other species as well, and it enhances the competitiveness of the sector on the global market. In the North West Atlantic fishing grounds some of the fish stocks are showing signs of recovery, which will allow the relevant quotas to be increased. The South West Atlantic fishing grounds will offer fishing opportunities should these opportunities shrink in the North West and North East Atlantic.

Baltic Sea fisheries

COASTAL FISHERY IN THE BALTIC SEA

In the last decade, the number of coastal fishermen fishing in the Baltic Sea has remained relatively stable, showing a slight growth trend (Figure 4). The number of fishermen entered on permits for fishing in Estonian coastal waters in 2017 was 1950, or almost the same as in 2016 (1952). The number of fishermen is the highest in Saare County, followed by Pärnu, Hiiu and Harju counties (Table 5). While in 2009 there were 17 women among the coastal fishermen and inland fishermen entered on fishing permits, by 2016 their number had grown to 49. In 2017, the number of women fell slightly and amounted to 46 (around 2% of the total). The average age of fishermen has also shown a general upward trend, being 51 years in 2009 and 53 years in 2017. In 2017, the oldest fisherman entered on a fishing permit was 91 years old and the youngest was 18 years old. For many fishermen, fishing is only a seasonal source of income; thus, it is estimated that fishing is the main source of income for no more than 10% of coastal fishermen.

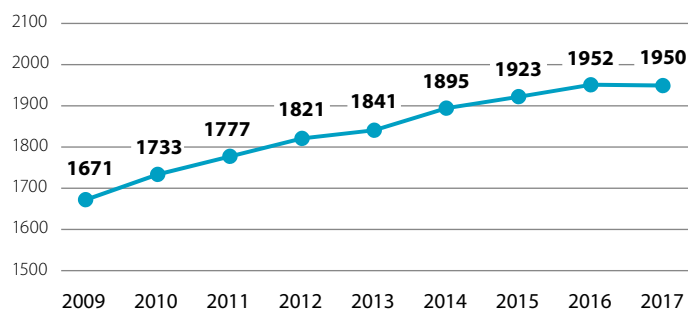


Figure 4. Number of coastal fishermen fishing in Baltic Sea, 2009-2017

Sources: MoE, MoRA

Table 5. Number of coastal fishermen entered on fishing permits, by county, 2009-2017

| County | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Harju County | 265 | 286 | 285 | 298 | 303 | 307 | 314 | 316 | 309 |
| Hiiu County | 242 | 253 | 273 | 288 | 294 | 311 | 319 | 329 | 333 |
| Ida-Viru County | 99 | 100 | 91 | 87 | 91 | 92 | 97 | 100 | 98 |
| Lääne County (incl. Vormsi) | 225 | 239 | 251 | 261 | 267 | 282 | 274 | 288 | 279 |
| Lääne-Viru County | 118 | 120 | 129 | 134 | 135 | 133 | 140 | 147 | 141 |
| Pärnu County (incl. Kihnu and Manija) | 393 | 390 | 394 | 395 | 393 | 401 | 399 | 402 | 413 |
| Saare County (incl. Ruhnu) | 368 | 385 | 396 | 403 | 415 | 431 | 445 | 442 | 448 |
| Total | 1671 | 1733 | 1777 | 1821 | 1841 | 1895 | 1923 | 1952 | 1950 |

Source: MoRA

According to the Fisheries Information System of the MoRA, the number of vessels with a length of less than 12 metres used by our coastal fishermen in the Baltic Sea amounted to 1557 in 2017 (1516 in 2016). The number of registered vessels has thus grown steadily in the past five years. For inland water bodies, that figure was 489 in 2017.

As in previous years, the biggest catches taken in 2017 in Estonian coastal fishery were those of herring (around 8372 tonnes), followed by perch (around 1291 tonnes), flounder (around 187 tonnes), garfish (around 177 tonnes), smelt (around 172 tonnes) and round goby (around 139 tonnes) (Table 6, Figure 5).

Based on first-sale prices, perch was the most lucrative species (producing around 2.4 million euros in 2015 and around 2.5 million euros in 2016 and 2017). In terms of profitability, perch was followed by herring (around 1.8 million euros in 2015, around 1.7 million euros in 2016 and around 1.6 million euros in 2017) and pikeperch (around 0.36, 0.31 and 0.19 million euros, respectively). Garfish also produced a relatively high catch value in 2017 (around 0.13 million euros, Table 7, Figure 5).

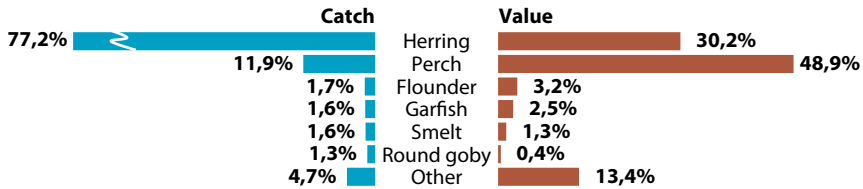


Figure 5. Proportions (%) of catches and revenues in coastal fishing, by species, 2017
Source: MoRA

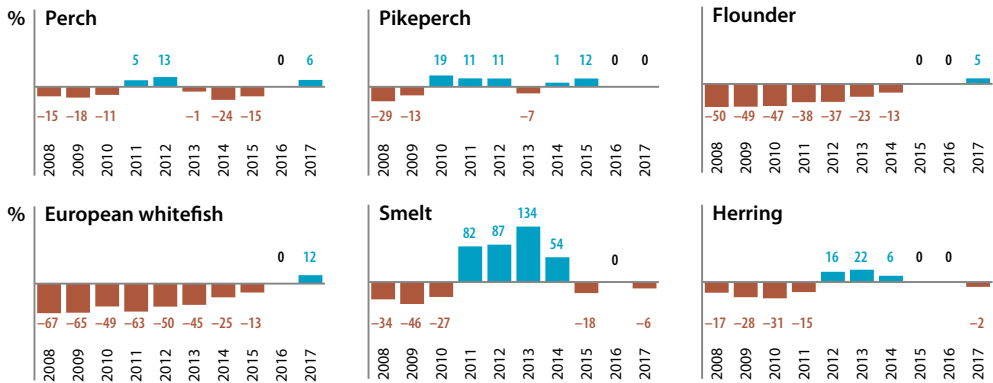


Figure 6. Change (%) in average first-sale prices of fish species most important to coastal fishery compared to prices in 2016, 2008-2017
Source: MoRA

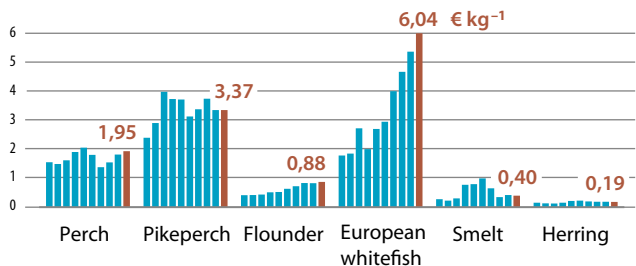


Table 6. Coastal fishing catches (t) and proportions (%) of total catch from the Baltic Sea, 2012-2017, by species

| Species | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | |
|----------------------|----------------|--------------|----------------|--------------|------------------|--------------|------------------|--------------|------------------|--------------|------------------|--------------|
| | Catch | % | Catch | % | Catch | % | Catch | % | Catch | % | Catch | % |
| Perch | 549.85 | 6.3 | 1216.99 | 12.6 | 1566.68 | 15.3 | 1522.82 | 12.6 | 1373.57 | 11.9 | 1290.55 | 11.9 |
| Eel | 1.91 | <0.1 | 1.65 | <0.1 | 1.06 | <0.1 | 0.84 | <0.1 | 0.79 | <0.1 | 0.69 | <0.1 |
| Atlantic sturgeon | | | | | <0.01 | <0.1 | | | | | <0.01 | <0.1 |
| Eelpout | 0.39 | <0.0 | 1.15 | <0.1 | 0.18 | <0.1 | 0.77 | <0.1 | 0.06 | <0.1 | 0.27 | <0.1 |
| Turbot | 0.08 | <0.1 | 0.04 | <0.1 | 0.10 | <0.1 | 0.05 | <0.1 | 0.19 | <0.1 | 0.39 | <0.1 |
| Atlantic mackerel | <0.01 | <0.1 | <0.01 | <0.1 | | | <0.01 | <0.1 | | | <0.01 | <0.1 |
| Pike | 35.38 | 0.4 | 65.90 | 0.7 | 65.44 | 0.6 | 51.79 | 0.4 | 41.61 | 0.4 | 40.36 | 0.4 |
| Gibel carp | 59.66 | 0.7 | 56.54 | 0.6 | 87.75 | 0.9 | 70.00 | 0.6 | 60.84 | 0.5 | 64.74 | 0.6 |
| Lamprey | 0.36 | <0.1 | 1.00 | <0.1 | 0.31 | <0.1 | 0.21 | <0.1 | 0.09 | <0.1 | 0.12 | <0.1 |
| Carp | 0.12 | <0.1 | 0.30 | <0.1 | 0.20 | <0.1 | 0.38 | <0.1 | 0.20 | <0.1 | 0.10 | <0.1 |
| Ruff | 51.18 | 0.6 | 38.76 | 0.4 | 35.30 | 0.3 | 24.17 | 0.2 | 37.36 | 0.3 | 42.46 | 0.4 |
| Sprat | 0.14 | <0.1 | 1.18 | <0.1 | 0.58 | <0.1 | 0.01 | <0.1 | 0.36 | <0.1 | 0.14 | <0.1 |
| Bighead carp | | | | | | | 0.01 | <0.1 | <0.01 | <0.1 | | <0.1 |
| Crucian carp | | | | | | | | | | | <0.01 | <0.1 |
| Pikeperch | 146.83 | 1.7 | 122.16 | 1.3 | 173.27 | 1.7 | 83.02 | 0.7 | 106.71 | 0.9 | 56.08 | 0.5 |
| Bream | 11.10 | 0.1 | 8.77 | 0.1 | 12.93 | 0.1 | 8.23 | 0.1 | 6.61 | 0.1 | 7.63 | 0.1 |
| Flounder | 212.93 | 2.4 | 250.03 | 2.6 | 204.10 | 2.0 | 198.38 | 1.6 | 200.61 | 1.7 | 186.53 | 1.7 |
| Tench | 3.32 | <0.1 | 4.00 | <0.1 | 6.88 | 0.1 | 5.02 | <0.1 | 3.51 | <0.1 | 2.46 | <0.1 |
| Burbot | 1.66 | <0.1 | 2.80 | <0.1 | 4.95 | <0.1 | 5.09 | <0.1 | 3.82 | <0.1 | 3.16 | <0.1 |
| Salmon | 5.31 | 0.1 | 6.82 | 0.1 | 5.22 | 0.1 | 5.59 | <0.1 | 6.83 | 0.1 | 8.89 | 0.1 |
| Baltic prawn | | | | | | | | | | | | |
| Sea trout | 17.14 | 0.2 | 14.67 | 0.2 | 14.59 | 0.1 | 16.14 | 0.1 | 19.93 | 0.2 | 17.29 | 0.2 |
| Four-horned sculpin | 0.07 | <0.1 | 0.03 | <0.1 | 0.04 | <0.1 | 0.29 | <0.1 | 0.02 | <0.1 | 0.02 | <0.1 |
| European whitefish | 20.60 | 0.2 | 25.76 | 0.3 | 25.86 | 0.3 | 19.49 | 0.2 | 18.27 | 0.2 | 16.20 | 0.1 |
| Sea lamprey | <0.01 | <0.1 | | | | | | | | | | |
| Smelt | 298.34 | 3.4 | 506.41 | 5.2 | 228.68 | 2.2 | 346.82 | 2.9 | 357.83 | 3.1 | 171.57 | 1.6 |
| Lumpfish | <0.01 | <0.1 | <0.01 | <0.1 | | | | | | | | |
| Sabre carp | <0.01 | <0.1 | | | | | | | <0.01 | <0.1 | <0.01 | <0.1 |
| Silver bream | 33.25 | 0.4 | 30.91 | 0.4 | 30.44 | 0.3 | 29.77 | 0.2 | 29.26 | 0.3 | 31.96 | 0.3 |
| Thicklip grey mullet | | | <0.01 | <0.1 | | | | | | | | |
| Stickleback | <0.01 | <0.1 | | | | | | | | | | |
| Rudd | 1.62 | <0.1 | 1.76 | <0.1 | 2.67 | <0.1 | 2.22 | <0.1 | 2.45 | <0.1 | 1.55 | <0.1 |
| Herring | 7088.92 | 81.2 | 7087.77 | 73.7 | 7535.63 | 73.4 | 9290.67 | 77.2 | 8864.49 | 77.0 | 8372.12 | 77.2 |
| Ide | 4.47 | 0.1 | 7.05 | 0.1 | 11.96 | 0.1 | 15.97 | 0.1 | 26.95 | 0.2 | 35.76 | 0.3 |
| Roach | 77.80 | 0.9 | 71.08 | 0.7 | 93.30 | 0.9 | 95.06 | 0.8 | 110.78 | 1.0 | 86.07 | 0.8 |
| Dwarf mud crab | | | | | | | 0.01 | <0.1 | | | | |
| Dace | <0.01 | <0.0 | <0.01 | <0.1 | | | 0.06 | <0.1 | <0.01 | <0.1 | 0.01 | <0.1 |
| European chub | | | | | | | 0.05 | <0.1 | <0.01 | <0.1 | <0.01 | <0.1 |
| Cod (Atlantic cod) | 3.41 | <0.1 | 5.26 | 0.1 | 7.02 | 0.1 | 3.92 | <0.1 | 1.87 | <0.1 | 0.75 | <0.1 |
| Garfish | 25.04 | 0.3 | 19.14 | 0.2 | 43.84 | 0.4 | 115.94 | 1.0 | 70.00 | 0.6 | 176.76 | 1.6 |
| Bleak | 0.34 | <0.1 | 0.10 | <0.1 | 0.15 | <0.1 | 1.36 | <0.1 | 0.11 | <0.1 | 0.03 | <0.1 |
| Rainbow trout | 0.07 | <0.1 | 0.19 | <0.1 | 0.16 | <0.1 | 0.06 | <0.1 | 0.14 | <0.1 | 0.18 | <0.1 |
| Vimba bream | 53.26 | 0.6 | 56.41 | 0.6 | 83.97 | 0.8 | 92.93 | 0.8 | 73.43 | 0.6 | 88.01 | 0.8 |
| Twaite shad | 0.01 | <0.1 | | | <0.01 | <0.1 | <0.01 | <0.1 | | | | |
| Lesser sand eel | | | 0.74 | <0.1 | 0.04 | <0.1 | 0.33 | <0.1 | 0.15 | <0.1 | 0.03 | <0.1 |
| Round goby | 16.91 | 0.2 | 9.08 | 0.1 | 19.18 | 0.2 | 30.63 | 0.3 | 89.41 | 0.8 | 139.32 | 1.3 |
| Total | 8721.48 | 100.0 | 9614.47 | 100.0 | 10,262.46 | 100.0 | 12,038.26 | 100.0 | 11,508.22 | 100.0 | 10,842.21 | 100.0 |

Source: MoRA

Based on first-sale prices, the total catch value in coastal fishery is estimated to have amounted to around 5.2 million euros in 2017, which is the average level of the last four years (around 5.0 million euros in 2014, around 5.2 million euros in 2015 and around 5.4 million euros in 2016). Looking at the most profitable target species, the first-sale price of perch rose in 2017 (1.56 €/kg in 2015, 1.83 €/kg in 2016, 1.95 €/kg in 2017), while that of both herring (0.19 €/kg) and pikeperch (3.77 €/kg in 2015, 3.37 €/kg in 2016 and 2017, Table 8) remained unchanged. The average first-sale prices of other key target species, as published in the official publication *Ametlikud Teadaanded*, changed from 2016 as follows: the price of smelt decreased from 43 cents to 40 cents, the price of floun-

Table 7. Values (€10³) of coastal fishing catches from the Baltic Sea and proportions (%) of the total value from 2012-2017, by species

| Species | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | |
|---------------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|
| | Value | % | Value | % | Value | % | Value | % | Value | % | Value | % |
| Perch | 1 138.04 | 29.0 | 2 214.93 | 41.8 | 2 177.68 | 43.1 | 2 375.59 | 45.3 | 2 516.61 | 46.4 | 2 515.20 | 48.9 |
| Eel | 14.02 | 0.4 | 0.19 | <0.1 | 7.82 | 0.2 | 6.18 | 0.1 | 5.65 | 0.1 | 5.73 | 0.1 |
| Eelpout | 0.08 | <0.1 | 4.84 | 0.1 | 0.09 | <0.1 | 0.09 | <0.1 | <0.01 | <0.1 | 0.05 | <0.1 |
| Turbot | 0.04 | <0.1 | | | 0.07 | <0.1 | 0.03 | <0.1 | 0.16 | <0.1 | 0.53 | <0.1 |
| Pike | 50.63 | 1.3 | 7.35 | 0.1 | 78.53 | 1.6 | 77.17 | 1.5 | 63.39 | 1.2 | 65.28 | 1.3 |
| Gibel carp | 8.03 | 0.2 | 28.21 | 0.5 | 14.04 | 0.3 | 16.10 | 0.3 | 15.58 | 0.3 | 16.46 | 0.3 |
| Lamprey | 1.32 | <0.1 | | | 1.41 | <0.1 | 1.16 | <0.1 | 0.43 | <0.1 | 0.60 | <0.1 |
| Carp | 0.10 | <0.1 | 0.26 | <0.1 | 0.28 | <0.1 | 0.34 | <0.1 | 0.21 | <0.1 | 0.17 | <0.1 |
| Ruff | 10.24 | 0.3 | 81.06 | 1.5 | 4.59 | 0.1 | 4.59 | 0.1 | 5.69 | 0.1 | 9.14 | 0.2 |
| Sprat | 0.03 | <0.1 | 0.53 | <0.1 | 0.12 | <0.1 | 0.06 | <0.1 | 0.07 | <0.1 | 0.02 | <0.1 |
| Crucian carp | | | | | | | | | | | <0.01 | <0.1 |
| Pikeperch | 549.10 | 14.0 | 384.79 | 7.3 | 589.13 | 11.7 | 312.98 | 6.0 | 360.11 | 6.6 | 189.18 | 3.7 |
| Bream | 6.44 | 0.2 | 4.82 | 0.1 | 9.44 | 0.2 | 5.68 | 0.1 | 3.50 | 0.1 | 3.62 | 0.1 |
| Flounder | 112.83 | 2.9 | 160.02 | 3.0 | 148.99 | 3.0 | 166.64 | 3.2 | 167.74 | 3.1 | 163.79 | 3.2 |
| Tench | 3.35 | 0.1 | 5.53 | 0.1 | 8.81 | 0.2 | 7.23 | 0.1 | 5.14 | 0.1 | 3.46 | 0.1 |
| Burbot | 1.28 | <0.1 | 13.83 | 0.3 | 4.31 | 0.1 | 4.89 | 0.1 | 2.84 | 0.1 | 2.37 | <0.1 |
| Salmon | 21.82 | 0.6 | 4.37 | 0.1 | 22.96 | 0.5 | 27.77 | 0.5 | 40.45 | 0.7 | 60.34 | 1.2 |
| Sea trout | 61.18 | 1.6 | 58.52 | 1.1 | 41.88 | 0.8 | 79.73 | 1.5 | 96.46 | 1.8 | 120.00 | 2.3 |
| Four-horned sculpin | | | <0.01 | <0.1 | | | | | | | <0.01 | <0.1 |
| European whitefish | 55.56 | 1.4 | 27.36 | 0.5 | 104.20 | 2.1 | 91.60 | 1.7 | 98.71 | 1.8 | 97.82 | 1.9 |
| Smelt | 238.63 | 6.1 | 506.41 | 9.6 | 150.93 | 3.0 | 121.39 | 2.3 | 152.98 | 2.8 | 68.97 | 1.3 |
| Silver bream | 3.66 | 0.1 | 3.09 | 0.1 | 3.96 | 0.1 | 3.28 | 0.1 | 2.24 | <0.1 | 3.04 | 0.1 |
| Stickleback | | | <0.01 | <0.1 | | | | | | | <0.01 | <0.1 |
| Rudd | 0.10 | <0.1 | 2.55 | <0.1 | 0.29 | <0.1 | 0.22 | <0.1 | 0.28 | <0.1 | 0.26 | <0.1 |
| Herring | 1559.56 | 39.7 | 1630.19 | 30.8 | 1507.13 | 29.8 | 1765.23 | 33.6 | 1677.36 | 30.9 | 1552.21 | 30.2 |
| Ide | 2.14 | 0.1 | 30.03 | 0.6 | 7.89 | 0.2 | 7.35 | 0.1 | 14.99 | 0.3 | 20.90 | 0.4 |
| Roach | 38.90 | 1.0 | 39.09 | 0.7 | 56.91 | 1.1 | 49.43 | 0.9 | 67.31 | 1.2 | 47.69 | 0.9 |
| European chub | | | | | | | 0.03 | <0.1 | <0.01 | <0.1 | <0.01 | <0.1 |
| Cod | 3.24 | 0.1 | 5.41 | 0.1 | 8.77 | 0.2 | 2.67 | 0.1 | 1.83 | <0.1 | 1.13 | <0.1 |
| Garfish | 22.28 | 0.6 | 76.50 | 1.4 | 50.86 | 1.0 | 78.84 | 1.5 | 74.33 | 1.4 | 127.93 | 2.5 |
| Bleak | 0.03 | <0.1 | | | | | 0.14 | <0.1 | 0.01 | <0.1 | <0.01 | <0.1 |
| Rainbow trout | | | | | | | | | 0.68 | <0.1 | <0.01 | <0.1 |
| Vimba bream | 22.90 | 0.6 | 7.36 | 0.1 | 44.50 | 0.9 | 39.96 | 0.8 | 33.94 | 0.6 | 41.97 | 0.8 |
| Twaite shad | | | | | <0.01 | <0.1 | <0.01 | <0.1 | | | <0.01 | <0.1 |
| Round goby | 3.38 | 0.1 | 1.27 | <0.1 | 3.84 | 0.1 | 1.84 | <0.1 | 13.31 | 0.2 | 22.27 | 0.4 |
| Total | 3928.91 | 100.0 | 5298.78 | 100.0 | 5049.43 | 100.0 | 5248.18 | 100.0 | 5421.98 | 100.0 | 5140.14 | 100.0 |

Source: MoRA

der increased from 84 cents to 88 cents and the price of European whitefish rose from 5.4 euros to 6.04 euros (Figure 6).

Fishing efforts decline in years when the abundance of fish is low, as well as when fishermen find better-paid jobs. However, an increase in the cost-effectiveness or relative cost-effectiveness of fishing is immediately followed by an increase in fishing efforts because the maximum amount of permitted fishing gear is high. The maximum amount of permitted fishing gear could be reduced, but opposition from fishermen makes it difficult to achieve this. As a way of addressing this situation, the state could buy from fishermen their historic fishing rights or link an aid measure to a reduction of the maximum amount of fishing gear.

Table 8. Average first-sale prices of fish (€ kg⁻¹), 2006-2017, and changes (%)

| Species | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | Change |
|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|--------|
| Perch | 1.58 | 2.05 | 1.56 | 1.50 | 1.63 | 1.92 | 2.07 | 1.82 | 1.39 | 1.56 | 1.83 | 1.95 | 6% |
| Eel | 5.92 | 5.68 | 5.58 | 5.14 | 5.72 | 6.56 | 7.35 | 8.36 | 7.41 | 7.34 | 7.20 | 8.35 | 16% |
| Eelpout | 0.06 | | 0.13 | | 0.36 | 0.14 | 0.21 | 0.46 | 0.50 | 0.12 | 0.04 | 0.18 | 335% |
| Turbot | | | | | | | | | | | | 1.35 | |
| Pike | 0.84 | 0.92 | 0.98 | 1.05 | 1.05 | 1.33 | 1.43 | 1.23 | 1.20 | 1.49 | 1.52 | 1.62 | 6% |
| Gibel carp | 0.14 | 0.12 | 0.14 | 0.12 | 0.11 | 0.11 | 0.12 | 0.13 | 0.16 | 0.23 | 0.26 | 0.25 | -1% |
| Brown trout | | | | | | | | | | | | | |
| Lamprey | 1.95 | 1.96 | 1.88 | 1.76 | 1.68 | 2.96 | 3.64 | 4.86 | 4.63 | 5.39 | 4.94 | 4.98 | 1% |
| Carp | 0.40 | 0.31 | 0.27 | 0.74 | 0.94 | 1.11 | 0.78 | 0.84 | 1.38 | 0.89 | 1.05 | 1.66 | 57% |
| Ruff | 0.06 | 0.10 | 0.08 | 0.09 | 0.13 | 0.16 | 0.20 | 0.19 | 0.13 | 0.19 | 0.15 | 0.22 | 41% |
| Sprat | 0.12 | 0.15 | 0.17 | 0.15 | 0.13 | 0.17 | 0.20 | 0.22 | 0.21 | 0.33 | 0.18 | 0.18 | -3% |
| Crucian carp | 0.11 | 0.04 | | 0.32 | 0.30 | 0.25 | 0.21 | 0.24 | 0.27 | 0.33 | 0.49 | 0.38 | -22% |
| Pikeperch | 2.10 | 2.99 | 2.41 | 2.92 | 4.01 | 3.76 | 3.74 | 3.15 | 3.40 | 3.77 | 3.37 | 3.37 | 0% |
| Bream | 0.35 | 0.38 | 0.40 | 0.49 | 0.45 | 0.56 | 0.58 | 0.55 | 0.73 | 0.69 | 0.53 | 0.47 | -10% |
| Flounder | 0.45 | 0.47 | 0.42 | 0.42 | 0.44 | 0.52 | 0.53 | 0.64 | 0.73 | 0.84 | 0.84 | 0.88 | 5% |
| Tench | 0.73 | 0.76 | 0.95 | 0.80 | 0.86 | 1.09 | 1.01 | 1.38 | 1.28 | 1.44 | 1.46 | 1.40 | -4% |
| Burbot | 0.55 | 0.52 | 0.56 | 0.61 | 0.63 | 0.76 | 0.77 | 0.91 | 0.87 | 0.96 | 0.74 | 0.75 | 1% |
| Salmon | 2.79 | 1.35 | 3.29 | 1.64 | 2.63 | 3.95 | 4.09 | 4.40 | 4.40 | 4.97 | 5.93 | 6.79 | 15% |
| Baltic prawn | | | | 2.36 | | | | | | | | | |
| Sea trout | 1.87 | 2.55 | 2.05 | 1.47 | 1.68 | 3.00 | 3.54 | 3.99 | 2.87 | 4.94 | 4.84 | 6.94 | 43% |
| Four-horned sculpin | | | | | | | | 0.25 | | | | | |
| European whitefish | 1.67 | 1.73 | 1.79 | 1.87 | 2.74 | 2.02 | 2.72 | 2.97 | 4.03 | 4.70 | 5.40 | 6.04 | 12% |
| Smelt | 0.19 | 0.20 | 0.28 | 0.23 | 0.31 | 0.78 | 0.80 | 1.00 | 0.66 | 0.35 | 0.43 | 0.40 | -6% |
| Silver bream | 0.07 | 0.07 | 0.07 | 0.07 | 0.09 | 0.12 | 0.11 | 0.10 | 0.13 | 0.11 | 0.08 | 0.10 | 24% |
| Stickleback | | | | | | | | 0.24 | | | | | |
| Lake Peipsi whitefish | 1.31 | 0.81 | 0.99 | 1.04 | 0.94 | 1.00 | 1.92 | 2.12 | 1.29 | 1.00 | | 1.00 | |
| Lake Peipsi (dwarf) smelt | 0.41 | | | | | | | | 0.40 | | 0.24 | 0.25 | 2% |
| Rudd | 0.11 | 0.03 | 0.13 | 0.07 | 0.04 | 0.06 | 0.06 | 0.11 | 0.11 | 0.10 | 0.12 | 0.17 | 46% |
| Herring | 0.12 | 0.14 | 0.16 | 0.14 | 0.13 | 0.16 | 0.22 | 0.23 | 0.20 | 0.19 | 0.19 | 0.19 | -2% |
| Vendace | | 1.04 | 1.01 | 1.43 | 2.88 | | 3.44 | 3.32 | 3.33 | 3.42 | 3.15 | 2.43 | -23% |
| Ide | 0.28 | 0.40 | 0.39 | 0.42 | 0.46 | 0.64 | 0.48 | 0.62 | 0.66 | 0.46 | 0.56 | 0.58 | 5% |
| Roach | 0.16 | 0.28 | 0.39 | 0.39 | 0.44 | 0.48 | 0.50 | 0.55 | 0.61 | 0.52 | 0.61 | 0.55 | -9% |
| European chub | | | | 0.19 | | | | 0.30 | | 0.50 | 0.23 | 0.10 | -56% |
| Cod | 1.43 | 0.80 | 0.55 | 1.10 | 0.92 | 1.03 | 0.95 | 1.03 | 1.25 | 0.68 | 0.98 | 1.50 | 53% |
| Garfish | 0.28 | 0.37 | 0.38 | 0.43 | 0.47 | 0.71 | 0.89 | 1.43 | 1.16 | 0.68 | 1.06 | 0.72 | -32% |
| Bleak | | | 0.13 | 0.03 | 0.13 | | 0.10 | | | 0.10 | | 0.10 | |
| Rainbow trout | | | | 1.92 | | | | | | | 5.00 | | -100% |
| Vimba bream | 0.20 | 0.28 | 0.23 | 0.23 | 0.38 | 0.43 | 0.43 | 0.50 | 0.53 | 0.43 | 0.46 | 0.48 | 3% |
| Round goby | | 0.20 | 0.25 | 0.34 | 0.32 | 0.39 | 0.20 | 0.14 | 0.20 | 0.06 | 0.15 | 0.16 | 7% |

Source: Official publication *Ametlikud Teadaanded*

Dynamics of coastal fishing catches in different parts of the Baltic Sea

◀ Gulf of Finland

Gill nets and trap nets are the main fishing gear in coastal fishing. The biggest catches taken from the Gulf of Finland with these nets are those of herring, but also of flounder, perch, smelt, European whitefish, sea trout, round goby, gibel carp, garfish and salmon. Among key species, the catches of herring and salmon grew, while the catches of flounder and smelt declined considerably in 2017 in comparison with the preceding year (Table 9).

As in previous years, herring catch generated the highest value in 2017 (around 226,000 euros), which increased somewhat in comparison with 2016 (around 211,500 euros). In terms of catch value, herring was followed by sea trout (around 89,500 euros), European whitefish (around 38,500 euros), perch (around 30,000 euros) and flounder (around 29,000 euros).

Herring is caught in the Gulf of Finland mainly using trap nets. Herring catches were bigger from 2009-2017 than in 2007 and 2008. The highest catch of the period (2007-2017) was taken in 2015 (1657 tonnes), while the catch of 2017 was 1189 tonnes. **Flounder** is usually caught using gill nets in the western part of the gulf. The catch of flounder taken in 2017 was the lowest of the period observed (33 tonnes) and flounder stock is not expected to grow in the coming years. Perch is mostly caught using gill nets, with the proportion of trap net catches varying from year to year. Perch catches have been declining since 2013, and the catch landed in 2017 was the lowest of the data series (15 tonnes). **European whitefish** is caught in the Gulf of Finland mainly with gill nets. The catch of whitefish has exceeded the 20-tonne limit in two years (2007 and 2008), but the catch of 2017 (6 tonnes) was the lowest of the data series. **Smelt** is generally also caught using gill nets. Catches increased in four consecutive years (2012-2015) and, following the recession of 2010-2012, exceeded the average of the period 2007-2017 for three consecutive years. In 2017, 7 tonnes of smelt were landed. Only the catch of 2011 was lower than that. **Sea trout** and **salmon** are mainly caught with gill nets as well. Compared to the catch figures of 2016, when the record high sea trout catch of 13.5 tonnes was at the top of the data series, while the catch of salmon amounted to 4.7 tonnes, in 2017 the catch of the former valuable fish was a little lower (12.9 tonnes), but that of the latter was significantly higher (7.1 tonnes) and also the best result of the period observed. The catch of round goby, an invasive alien species, decreased for the first time in 2013 almost two-fold after a consistent and rapid increase in preceding years, and has thereafter both declined and increased, while still not exceeding the record catch of 2012. Whereas in 2012 round goby held the fourth position in terms of catch volume in the Gulf of Finland, it rose to the third place in the catch statistics of 2017. Then again, the catch statistics of round goby is not indicative of its abundance in the sea, because (due to the low sales value of round goby) fishermen have learned how to reduce the quantity that is caught in fishing gear. However, if a market is found for this fish species, its catch will certainly increase considerably.

In summary, the total catch of 2017 amounted to 1307 tonnes, exceeding the catch landed in the preceding year. This quantity also exceeded the average catch of the period 2007-2017. However, excluding herring as the mass fish, it was the lowest of the period as far as all the other species go.

High seas

Fishing gear used in coastal regions towards the Central Baltic near the Saaremaa and Hiiumaa islands includes gill nets, trap nets and seine nets. Previously, longlines were also used (mainly for eel fishing), but catches taken with this gear were not declared in 2016 and 2017 according to official fishing statistics. Since the eel stock is in a recession, it is clear why the importance of longlines has declined. The catch landed in 2017 was dominated by flounder, followed by round goby, garfish, perch, ide, herring, roach, gibel carp, European whitefish and sea trout (Table 10). The catch of flounder was the highest in each year during the period 2007-2017, but the ranking of other species has varied. While in 2015 round goby held the twelfth place in terms of catch volume, this invasive alien species rose to the second place in 2016 and 2017, following flounder.

Flounder generated the highest catch value for coastal fishermen fishing in high seas (around 106,000 euros), followed by perch (around 22,000 euros) and garfish (around 11,000 euros).

In **flounder** fishing the main fishing gear included gill nets (63% of the catch), seine nets (30%) and trap nets (7%) over the last eleven years. Overall, flounder catches have declined, with the catch landed in 2015 being the lowest of the period (101 tonnes). After that year, flounder catches started to increase slowly: the catch of 2017 was higher than in the three preceding years (121 tonnes), but still lower than the average of the period observed.

Until 2010, the second and third positions in terms of catch volume were held by **garfish** and herring in this area, which are caught mostly using trap nets. The garfish catch taken in 2017 was almost twice as high as the average for the period observed (15 and 8 tonnes, respectively). **Herring** is mainly caught with trap nets, but gill nets are also used and their share is higher in the high seas than in coastal waters. The herring catch was the largest in 2014 (18 tonnes), but the catch of 2017 (9 tonnes) was below the average of the years observed. In terms of catch volume, herring held the third place during the period 2013-2016, but dropped to the sixth position in 2017. Among freshwater fish, **perch** remained the most important species in terms of catch volume in 2017 (not counting round goby as an alien species), but its catch (11 tonnes) decreased compared to 2016 (16 tonnes). The catch of **roach** taken in 2017 (7 tonnes) declined as well, but was still higher than the average of the period. The catch of **ide** was higher in 2017 than in all preceding eleven years (10 tonnes). The catch of **round goby** decreased from 21 tonnes in 2016 to 17 tonnes in 2017. Catches of **European whitefish** have declined since 2014, and the three-tonne catch of 2017 was just above the average for the period observed. Catches of **sea trout** and **salmon** taken in 2017 were below the average level of the data series (2.7 and 0.6 tonnes, respectively).

In summary, the total catch taken in 2017 from coastal regions towards the Central Baltic near Saaremaa and Hiiumaa was above the average of the period observed.

● Väinameri Sea

Fishing gear used in the Väinameri Sea includes mostly gill nets and trap nets. The relative importance of longlines in fishery is small; in 2013 and 2014, seine nets were also used to some extent. Catches taken from the Väinameri Sea are dominated by freshwater fish species. In 2016 the biggest catch was produced by perch, followed by herring, pike, roach and gibel carp. In 2017, the positions of perch and herring were the same, but the third position was held by silver bream, followed by pike, roach, garfish, ide, vimba bream and gibel carp (Table 11). The sequence of species in terms of catch volumes has varied during the years observed.

As in previous years, perch catch generated the highest value in 2017 (around 535,000 euros); this figure did not change much in comparison with the preceding year. Like in 2016 (around 40,800 euros), pike held the second place (around 43,000 euros), followed by herring (around 23,000 euros).

Perch as the most important species to coastal fishermen has produced the biggest catches during the last five years, i.e. 2013-2017, in the Väinameri Sea. Perch is fished mainly using gill nets, but from 2014-2017 almost equivalent quantities were taken with trap nets. Catches fluctuated strongly from 2007-2017, as fishing for perch relied on just a few year classes. In 2013, the perch catch taken from the Väinameri Sea grew several times. Fishermen were not able to respond that year, but in 2014 they re-employed the trap nets that had been set aside during the intervening years when the abundance of fish was low. As a result, the proportion of fish caught in trap nets increased. While the perch catch of 2016 (292 tonnes) was the largest since the perch stock crisis of the early 1990s, the catch landed in 2017 (274 tonnes) was the second best of the period. **Pike** is caught using both trap nets and gill nets, with the proportion of the latter in the catch accounting for around two-thirds. Although pike catches taken in the Väinameri Sea have been declining since 2015, the catch of 2017 (27 tonnes) was above the average of the period observed. **Herring** is mostly caught using trap nets. Herring catches were big in 2009 and 2010, but then declined for five consecutive years. While the catch of 2017 (123 tonnes) exceeded the quantity landed in the preceding year, it remained below the average of the period 2007-2017. **Gibel carp** is caught mostly using gill nets. The record catch of the period 2007-2017 was taken in 2014, but catches have declined in subsequent years. The quantity caught in 2017 (19 tonnes) was below the average of the years observed. The catch of **garfish** (24 tonnes), which is mostly taken using trap nets, was more than twice as high as in 2016 and exceeded the average of the data series. Catches of **ide** have been growing since 2013, and the catch landed in 2017 (21 tonnes) was the largest of the period observed. The 20-tonne catch of **vimba bream** was also record high. For both of these species, and especially as regards vimba bream, the quantities caught using gill nets are higher than the quantities caught with the help of trap nets. Gill nets also prevail over trap nets in **roach** fishing. The roach catch of 2015 (28 tonnes) was the best during the years under review, but catches have declined since then. However, the roach catch of 2017 (25 tonnes) was much higher than average. The **eel** catch, which had not increased since 2007, grew from 39 kg in 2016 to 42 kg in 2017.

The catch of **smelt** increased dramatically – from 62 kg in 2016 to 0.6 tonnes in 2017, with only the catch of 2007 being better than that. The catch of **pike-perch** (4 tonnes) declined in 2017 for the third consecutive year and was below the average of the data series.

In summary, catches taken in the Väinameri Sea were much lower in 2007 and 2008 than during the period 2009-2017. Improved catches of herring and later also of perch and some other species contributed to the increase. The best total catch of the period 2007-2017 was taken in 2017, which is the highest even if the catch of herring is not taken into account. A record high catch was taken in the Väinameri Sea for the second consecutive year.

📍 Gulf of Riga

The most common fishing gear used in the Gulf of Riga (except Pärnu Bay) include gill nets and trap nets, with seine nets and longlines being used to a lesser extent. The biggest catches taken in the Gulf of Riga during the period 2007-2017 were those of herring, followed by perch, garfish, roach and flounder. From 2016 onwards, round goby has been holding the fourth position after garfish. The catch of flounder fell short of the catch of gibel carp in 2017 (Table 12).

In 2017, the perch catch produced the highest value for fishermen fishing in the Gulf of Riga (around 303,000 euros), but was still considerably lower than in the preceding year (around 364,000 euros). In terms of profitability, perch was followed by herring, but the sales revenue generated by it (around 124,000 euros) was lower than in 2016 (around 146,000 euros). By contrast, the value of the garfish catch (around 63,000 euros) increased significantly in 2017 (from around 35,300 euros in 2016). The value of the roach catch was nearly half the value achieved a year ago (around 18,000 euros in 2017 and around 35,200 euros in 2016).

Herring is caught in the Gulf of Riga mostly with trap nets and less so with gill nets. The herring catch of 2017 (654 tonnes) was poorer than the average for 2007-2017 (1053 tonnes) and smaller than in the preceding three years. **Garfish** is caught using the same fishing gear as in the case of herring. The catch landed in 2017 (87 tonnes) was the highest of the data series. In addition to stocks, garfish catches taken in coastal waters also depend to a very large extent on herring quotas and on the weather conditions prevailing during the fishing period. Gill nets are preferred in **perch** fishing, but considerable quantities are also caught using trap nets. The perch catch of 2017 (155 tonnes) was the lowest of the past five years and smaller than the average for the period observed (190 tonnes). The **roach** catch taken in 2017 (33 tonnes) fell short of the record catch landed in 2016 (58 tonnes) and of the average level. While gill nets were preferred over trap nets in roach fishery from 2012-2015 and in 2017, trap nets prevailed in other years of the period. **Flounder** is mostly caught with trap nets and less so with gill nets in the Gulf of Riga, but considerable quantities were also taken with seine nets in some years. The catch of flounder (17 tonnes) decreased in 2017 compared to the preceding year (18 tonnes) and was just below the average level of the last eleven years. According to official statistics, **ruff** has mainly been caught with gill nets and mostly near the island of Kihnu in the past few years. In 2016 and 2017, most of the ruff catch was declared to have been taken

with trap nets (five out of nearly six tonnes in 2017). The ruff catch of 2015 was meagre (5 tonnes), but even this quantity is probably too high for nets with the permitted mesh size. The by-catch of ruff in gill net fishing for perch indicates that gill nets with a smaller than permitted mesh size are used in perch fishery. The catch of **gibel carp** was record high in this part of the sea for the second year in a row (16 tonnes in 2016 and 19 tonnes in 2017). The proportions of gill nets and trap nets are more or less equal in **pike** fishery. The pike catch grew slightly in 2017 (8 tonnes), remaining more or less the same as in 2016. **Vimba bream** is caught mainly with gill nets and on a considerably smaller scale also with trap nets. While the catch of vimba bream was record high in 2013, the catch figures have declined since then and the catch landed in 2017 reached 4 tonnes. **European whitefish** is caught in the Gulf of Riga mostly with gill nets. The catches taken in the recent years and the average of the data series amount to around 2 tonnes, but the catch landed in 2017 was less than 1.5 tonnes. The catch of round goby, which is caught mainly using trap nets, increased from 49 tonnes to 69 tonnes compared to the previous year.

In summary, the total catch taken in the Gulf of Riga in 2017 was lower than the average of the period under review, but fell short of only the catch of the preceding year, decreasing from 1177 tonnes to 1063 tonnes (excluding herring as the mass fish).

◀ Pärnu Bay

Fishing gear used in Pärnu Bay includes gill nets, trap nets, seine nets and longlines. From 2011-2017 the biggest catches were produced by herring, followed by perch, smelt, pikeperch, vimba bream and ruff (Table 13). In terms of the volume and value of catches, Pärnu Bay is undeniably the most important coastal fishing area in Estonia.

As in previous years, the perch catch generated the highest value in 2017 (around 1,623,000 euros) and it increased from 2016 (around 1,552,000 euros). Herring was the second best species in terms of catch value (around 1,216,000 euros), producing somewhat less revenue than in 2016 (around 1,301,700 euros). Perch and herring were followed by pikeperch (around 175,000 euros) whose catch value has been declining in recent years (around 525,900 euros in 2014, around 270,300 euros in 2015 and around 333,200 euros in 2016). The value of the smelt catch declined sharply – from around 147,800 euros in 2016 to around 66,000 euros in 2017.

A significant change was introduced in the management of the fisheries of Pärnu Bay in 2015. Namely, competitive fishing was replaced by gear-based quotas in herring fishery with pound nets. Until that year, the entire county (excluding the islands of Kihnu and Manilaid) used a common herring quota, which was used up rather quickly – and before herring shoals had reached the historic fishing grounds of all the coastal fishermen. Then a large quantity of catches was placed on the raw fish market during a limited period of time, which lowered first-sale prices and degraded the quality of fish. As garfish is caught in the same pound nets that are used for catching herring, it happened in several years that fishery ended – due to the herring quota having been exhausted – before

garfish, whose price is much higher, had even reached Pärnu Bay. With the new management arrangements, the quota is distributed between fishermen on the basis of fishing gear and areas. A fisherman can use smaller number of fishing gear, until his personal quota is used up.

Herring is caught mainly using trap nets and its catches fluctuated to a great extent in the period 2007-2017. The catch landed in 2017 (6397 tonnes) was lower than the catch taken a year ago (6851 tonnes) and also lower than the average for the last eleven years. Catches depend on coastal fishing quotas as well as on the weather prevailing in the fishing period and the price of fish. **Perch** is caught mainly with gill nets and trap nets, with the proportions of the fishing gear in catch differing from year to year. A record high catch of perch (1055 tonnes) was landed in 2014; it was the first year when perch catch exceeded a thousand tonnes during the period under review. Catches declined in the subsequent years: 1043 tonnes of perch were caught in 2015, 848 tonnes in 2016 and 832 tonnes in 2017. The perch stock can be considered sustainable and the catch of 2017 remained above the average of the data series. Perch and pikeperch reproduce more frequently in Pärnu Bay than elsewhere in coastal waters, and this situation should be further improved by intensifying verification of adherence to fishing restrictions (especially as regards landing undersized fish). The **smelt** catch of 2017 (164 tonnes) was more than twice lower than the result for 2016 (344 tonnes). During the period observed, only the result for 2011 was lower than that (116 tonnes). Unlike the Gulf of Finland, where gill nets represent the main fishing gear, in Pärnu Bay almost all of the smelt catch is taken using trap nets. Smelt stocks showed a growing trend until 2009, but changes in the age structure of the spawning stock observed in recent years refer clearly to overfishing, which has led to a decline in the stocks. A reduction in fishing pressure and lower by-catches of juveniles in herring trawling would probably cause stocks to recover relatively quickly. **Garfish** is mostly caught using trap nets. The largest garfish catch in the period 2007-2017 was taken in Pärnu Bay in 2011 (49 tonnes). The catch figure for 2017 (46 tonnes) was the second best of the data series. The **pikeperch** catch of 2017 was just 52 tonnes. Only the catch landed in 2008 was lower than that (51 tonnes). The state of pikeperch stock in Pärnu Bay remains poor, and there are a lot of undersized or recently matured individuals in pikeperch catches. The meagre catch taken in 2017 was also caused by the fishing restrictions applied during the spawning period, the increase of the minimum size and the unfavourable conditions prevailing during winter fishing. A temporary reduction of catches is inevitable in order to restore the normal composition of the pikeperch population and then stabilise catches at a higher level. The stock of **vimba bream** depends mainly on the situation in spawning rivers, most of which are probably Latvian rivers flowing into the Gulf of Riga. Vimba bream catches amounted to 54 tonnes in 2016 and 63 tonnes in 2017, with both of the figures exceeding the average of the data series.

In summary, catches taken from Pärnu Bay fluctuate greatly. The total catch landed in 2017 was close to the average for the period 2007-2017. The total catch is most affected by mass species – herring and smelt. If these species are not taken into account, the total catch of all other fish species was the highest of the period in 2014, but exceeded the average of the data series also in 2017.

Table 9. Species composition and catches (kg) of commercial fishing in Gulf of Finland (ICES subdivision 32) by coastal fishing gear type, 2007-2017

| Species | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | | | Total |
|----------------------|----------------|----------------|------------------|------------------|----------------|----------------|------------------|------------------|------------------|-----------|------------------|
| | Total | Total | Total | Total | Total | Total | Total | Trap net | Gill net | Long-line | |
| Perch | 36 000 | 77 005 | 72 473 | 50 066 | 37 153 | 24 392 | 68 438 | 15 395 | 27 646 | | 43 041 |
| Eel | 2 444 | 2 113 | 1 721 | 1 373 | 772 | 660 | 609 | 342 | 46 | 1 | 388 |
| Eelpout | 48 | 1 | 18 | 9 | 11 | 16 | 49 | 7 | 2 | | 9 |
| Grayling | | | 1 | | | | | | | | |
| Pike | 1 664 | 1 564 | 1 337 | 1 766 | 2 043 | 2 332 | 2 972 | 448 | 2 434 | | 2 882 |
| Gibel carp | 5 260 | 5 926 | 4 688 | 5 614 | 4 665 | 8 284 | 6 933 | 1 367 | 6 881 | | 8 249 |
| Brown trout | | | | | | 5 | | | | | |
| Lamprey | 46 | | | | 14 | 3 | | | 2 | | 2 |
| Turbot | 12 | 32 | 53 | 73 | 11 | 35 | 16 | 2 | 20 | | 22 |
| Carp | | 1 | 8 | 16 | 11 | 23 | 13 | | 16 | | 16 |
| Ruff | 97 | 157 | 182 | 41 | 129 | 220 | 185 | 117 | 3 | | 121 |
| Sprat | | 213 | 81 | 2 | 599 | 34 | 802 | 390 | 44 | | 434 |
| Pikeperch | 2 420 | 11 222 | 973 | 1 025 | 4 622 | 697 | 2 127 | 63 | 222 | | 285 |
| Bream | 2 970 | 3 032 | 1 831 | 918 | 855 | 914 | 952 | 368 | 129 | | 497 |
| Flounder | 104 294 | 86 139 | 101 557 | 95 867 | 83 390 | 67 538 | 75 213 | 2 181 | 63 473 | 2 | 65 655 |
| Tench | 5 | 4 | 79 | 144 | 112 | 62 | 13 | 18 | 19 | | 37 |
| Burbot | 92 | 48 | 22 | 10 | 12 | 26 | 39 | 7 | 38 | | 44 |
| Salmon | 3 822 | 4 108 | 3 611 | 2 493 | 2 701 | 3 504 | 5 281 | 501 | 3 219 | | 3 720 |
| Mackerel | | | | 1 | 1 | | 0 | | | | |
| Sea trout | 13 189 | 8 271 | 9 055 | 9 182 | 9 854 | 10 698 | 8 968 | 893 | 8 877 | | 9 769 |
| Four-horned sculpin | | 9 | | 31 | 11 | 67 | 26 | | 27 | | 27 |
| Longspined bullhead | | | | | 2 | | | | | | |
| European whitefish | 21 758 | 23 112 | 14 973 | 10 791 | 8 852 | 11 404 | 14 007 | 392 | 10 635 | | 11 027 |
| Smelt | 15 527 | 21 777 | 20 838 | 9 831 | 3 639 | 12 090 | 15 255 | 218 | 17 531 | | 17 749 |
| Lumpfish | | | | 1 | | | | | | | |
| Sabre carp | | | | 1 | | | | | | | |
| Silver bream | 855 | 786 | 1 000 | 482 | 506 | 527 | 1 061 | | 226 | | 226 |
| Thicklip grey mullet | | | | | | 2 | | | | | |
| Rudd | 24 | 68 | 24 | 239 | 507 | 287 | 82 | 33 | 243 | | 276 |
| Herring | 613 002 | 555 992 | 1 139 971 | 1 098 454 | 801 101 | 698 486 | 982 538 | 1 243 166 | 10 378 | | 1 253 544 |
| Ide | 213 | 403 | 310 | 208 | 127 | 64 | 94 | 4 | 257 | | 261 |
| Roach | 2 662 | 2 817 | 4 771 | 2 828 | 4 024 | 3 112 | 2 243 | 660 | 1 978 | | 2 638 |
| Dace | | 1 | | | | | | | | | |
| European chub | | | | | | | | | | | |
| Cod | 86 | 854 | 1 882 | 2 124 | 2 065 | 1 451 | 2 404 | 12 | 3 317 | | 3 329 |
| Garfish | 9 567 | 1 349 | 6 729 | 13 160 | 11 194 | 5 134 | 665 | 838 | 133 | | 971 |
| Bleak | 44 | 62 | 27 | 31 | 27 | 127 | 52 | | 1 | | 1 |
| Rainbow trout | 110 | 224 | 181 | 76 | 85 | 38 | 42 | 3 | 29 | | 32 |
| Vimba bream | 4 000 | 2 991 | 1 823 | 1 613 | 1 347 | 1 277 | 1 312 | 72 | 825 | | 896 |
| Twaite shad | | | | 13 | | 6 | | | | | |
| Round goby | 89 | 364 | 492 | 1 121 | 4 051 | 16 809 | 8 565 | 7 505 | 3 663 | | 11 169 |
| Total | 840 300 | 810 644 | 1 390 708 | 1 309 600 | 984 490 | 870 321 | 1 200 955 | 1 275 000 | 1 623 312 | 3 | 1 437 314 |

Source: MoRA

| | 2015 | | | | 2016 | | | | 2017 | | | | 2007-2017 average |
|--|------------------|-----------------|-----------|------------------|------------------|----------------|-----------|------------------|------------------|---------------|-----------|------------------|-------------------|
| | Trap net | Gill net | Long-line | Total | Trap net | Gill net | Long-line | Total | Trap net | Gill net | Long-line | Total | |
| | 5 070 | 13 036 | | 18 106 | 5 135 | 12 961 | 2 | 18 098 | 2 446 | 13 024 | 1 | 15 471 | 41 840 |
| | 325 | 6 | | 330 | 316 | 14 | | 330 | 112 | 20 | | 132 | 988 |
| | 10 | | | 10 | | 2 | | 2 | 0.4 | 6 | | 6 | 16 |
| | | | | | | | | | | | | | 0.1 |
| | 284 | 2 268 | | 2 552 | 159 | 1 878 | | 2 036 | 120 | 1 247 | | 1 367 | 2 047 |
| | 970 | 7 201 | | 8 171 | 712 | 6 901 | | 7 612 | 514 | 5 700 | | 6 213 | 6 510 |
| | | | | | | | | | | | | | 0.4 |
| | | 14 | | 14 | | | | | | | | | 7 |
| | | 18 | | 18 | 1 | 78 | | 79 | 2 | 136 | | 138 | 44 |
| | 4 | 5 | | 9 | | 9 | | 9 | | | | | 9 |
| | 35 | 8 | | 43 | 26 | 25 | | 51 | 2 | 17 | | 19 | 113 |
| | 19 | 5 | | 24 | 81 | 10 | | 91 | 7 | 42 | | 49 | 212 |
| | 7 | 279 | | 286 | 73 | 115 | | 188 | 9 | 57 | | 66 | 2174 |
| | 185 | 377 | | 562 | 238 | 356 | | 595 | 51 | 121 | | 172 | 1 209 |
| | 2 147 | 61 669 | 7 | 63 823 | 1 608 | 50 303 | 15 | 51 926 | 1 261 | 31 702 | 10 | 32 973 | 75 307 |
| | 3 | 35 | | 38 | 5 | 32 | | 37 | 4 | 29 | | 33 | 51 |
| | 6 | 42 | | 48 | 1 | 23 | | 24 | | 27 | | 27 | 35 |
| | 563 | 3 385 | | 3 948 | 1 091 | 3 612 | | 4 703 | 2 942 | 4 120 | | 7 062 | 4 087 |
| | | | | | | | | | | | | | 0.2 |
| | 1 335 | 10 079 | | 11 414 | 889 | 12 572 | | 13 461 | 1 357 | 11 512 | 4 | 12 872 | 10 612 |
| | | 264 | | 264 | | 10 | | 10 | | 15 | | 15 | 42 |
| | | | | | | | | | | | | | 0.2 |
| | 424 | 6 610 | | 7 034 | 269 | 7 028 | | 7 297 | 370 | 5 997 | | 6 367 | 12 420 |
| | 35 | 20 014 | | 20 049 | 160 | 13 941 | | 14 101 | 475 | 6 540 | | 7 015 | 14 352 |
| | | | | | | | | | | | | | 0.05 |
| | | | | | 1 | | | 1 | | | | | 0.2 |
| | | 209 | | 209 | 10 | 104 | | 114 | | 506 | | 506 | 570 |
| | | | | | | | | | | | | | 0.2 |
| | 20 | 147 | | 167 | 27 | 23 | | 50 | 79 | 103 | | 182 | 173 |
| | 1 654 298 | 2 233 | | 1 656 531 | 1 110 568 | 2 431 | | 1 112 999 | 1 187 466 | 1 540 | | 1 189 006 | 1 009 239 |
| | 27 | 520 | | 547 | 56 | 714 | 3 | 774 | 73 | 1 310 | | 1 384 | 399 |
| | 342 | 1 837 | | 2 179 | 372 | 2 279 | | 2 651 | 383 | 1 878 | | 2 261 | 2 926 |
| | | 55 | | 55 | | | | | | 8 | | 8 | 6 |
| | | 50 | | 50 | | | | | | | | | 5 |
| | 6 | 1 782 | | 1 787 | | 854 | | 854 | | 315 | | 315 | 1 559 |
| | 6 167 | 214 | | 6 381 | 2 533 | 94 | | 2 626 | 5 081 | 317 | | 5 398 | 5 743 |
| | | | | | 31 | | | 31 | | | | | 37 |
| | 2 | 24 | | 26 | 2 | 68 | | 70 | | 65 | | 65 | 86 |
| | 148 | 886 | | 1 034 | 254 | 1 787 | | 2 041 | 148 | 1 736 | | 1 883 | 1 838 |
| | | | | | | | | | | | | | 2 |
| | 7 254 | 1 648 | | 8 902 | 9 596 | 2 293 | | 11 888 | 1 3331 | 2 635 | | 15 965 | 7 219 |
| | 1 679 684 | 1 34 918 | 7 | 1 814 609 | 1 134 212 | 120 514 | 20 | 1 254 746 | 1 216 231 | 90 721 | 15 | 1 306 967 | 1 201 878 |

Table 10. Species composition and catches (kg) of commercial fishing in Central Baltic (ICES subdivisions 28.2 and 29.2) by coastal fishing gear type, 2007-2017

| Species | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | | | | Total |
|----------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|-----------|----------------|
| | Total | Total | Total | Total | Total | Total | Total | Trap net | Seine net | Gill net | Long-line | |
| Perch | 2 540 | 1 974 | 5 123 | 3 875 | 11 052 | 5 911 | 22 691 | 5 005 | 1 420 | 16 782 | 1 | 23 208 |
| Eel | 687 | 456 | 560 | 391 | 259 | 347 | 251 | 143 | | 1 | | 144 |
| Atlantic sturgeon | | | | | | | | | | 1 | | 1 |
| Eelpout | 19 | 6 | 24 | 19 | 1 | 3 | 23 | 28 | | | | 28 |
| Pike | 1 079 | 1 470 | 1 169 | 2 242 | 2 661 | 1 353 | 3 703 | 1 782 | 6 | 1 511 | | 3 299 |
| Gibel carp | 1 260 | 1 008 | 1 643 | 1 580 | 2 963 | 3 116 | 2 412 | 884 | 5 | 2 095 | | 2 984 |
| Turbot | | | 1 | 109 | 91 | 47 | 20 | | | 67 | | 67 |
| Carp | 13 | | | | 15 | | | | | | | |
| Ruff | 41 | 25 | 43 | 23 | 142 | 135 | 703 | 403 | | 28 | | 431 |
| Sprat | 0 | | 15 | | 23 | | 5 | | | | | |
| Pikeperch | | 2 | | | 1 | | 5 | 2 | | 2 | | 4 |
| Bream | 7 | 1 | 4 | 2 | 127 | 1 | 5 | 3 | | 6 | | 9 |
| Flounder | 181 146 | 160 621 | 161 291 | 143 877 | 136 275 | 122 831 | 145 620 | 11 580 | 29 350 | 70 600 | | 111 530 |
| Tench | 8 | 3 | 10 | 31 | 220 | 29 | 45 | 23 | | 12 | | 35 |
| Burbot | 1 176 | 536 | 660 | 674 | 1 012 | 504 | 567 | 361 | | 107 | | 468 |
| Salmon | 900 | 781 | 971 | 381 | 366 | 527 | 458 | 18 | | 471 | | 488 |
| Mackerel | | | | | | | | | | | | |
| Sea trout | 3 193 | 2 831 | 3 900 | 1 979 | 2 378 | 4 557 | 3 630 | 77 | | 3 210 | | 3 287 |
| Four-horned sculpin | 7 | 4 | 5 | | 1 | | 5 | | | 10 | | 10 |
| European whitefish | 2 563 | 2 203 | 1 396 | 1 208 | 2 036 | 2 658 | 4 658 | 33 | | 4 542 | | 4 575 |
| Smelt | 2 | 30 | 3 | 7 | 14 | 2 | | | | | | |
| Lumpfish | 1 | 2 | | | 1 | | 1 | | | | | |
| Sabre carp | | | | 1 | | | | | | | | |
| Silver bream | 1 | | 1 | | 5 | 190 | 3 | | 2 | | | 2 |
| Thicklip grey mullet | 3 | | | | | | 2 | | | | | |
| Rudd | 22 | 29 | 21 | 39 | 181 | 283 | 79 | 56 | | 17 | | 72 |
| Herring | 6 226 | 7 351 | 14 638 | 7 645 | 5 264 | 9 591 | 13 267 | 17 133 | | 1 209 | | 18 341 |
| Gudgeon | | | | | 1 | | | | | | | |
| Ide | 1 850 | 3 614 | 2 557 | 2 629 | 3 646 | 2 253 | 3 768 | 1 022 | | 3 225 | | 4 247 |
| Roach | 4 345 | 5 085 | 5 192 | 5 729 | 6 897 | 5 269 | 4 824 | 6 284 | | 1 974 | | 8 258 |
| Dace | 0 | | | | | | | | | | | |
| Cod | 579 | 1 028 | 1 679 | 1 108 | 1 089 | 1 460 | 1 913 | 605 | | 2 098 | | 2 704 |
| Garfish | 16 359 | 9 325 | 6 592 | 8 090 | 4 986 | 2 190 | 2 204 | 2 121 | | 1 036 | 5 | 3 162 |
| Bleak | 17 | 30 | 13 | 45 | 7 | 10 | 13 | 7 | | 2 | | 9 |
| Rainbow trout | 77 | 85 | 61 | 18 | 35 | 31 | 120 | 6 | | 103 | | 109 |
| Vimba bream | 4 | 4 | 4 | 12 | 55 | 7 | 36 | 36 | | 35 | | 71 |
| Twaite shad | 1 | | | 12 | | | | | 1 | | | 1 |
| Round goby | | | | | | 1 | 10 | 75 | | 28 | | 103 |
| Total | 224 123 | 198 504 | 207 576 | 181 725 | 181 802 | 163 304 | 211 041 | 47 686 | 30 783 | 109 173 | 6 | 187 647 |

Source: MoRA

| | 2015 | | | | | 2016 | | | | 2017 | | | | 2007–2016 average |
|--|-------------|--------------|-------------|---------------|---------|-------------|--------------|-------------|---------|-------------|--------------|-------------|---------|----------------------|
| | Trap net | Seine net | Gill net | Long- line | Total | Trap net | Seine net | Gill net | Total | Trap net | Seine net | Gill net | Total | |
| | 2 532 | 315 | 9 224 | | 12 072 | 3 580 | 407 | 12 332 | 16 319 | 3 534 | | 7 912 | 11 447 | 10 565 |
| | 130 | | | | 130 | 96 | | | 96 | 53 | | | 53 | 307 |
| | | | | | | | | | | | | | | 0.1 |
| | 13 | | | | 13 | 1 | | | 1 | 7 | | | 7 | 13 |
| | 644 | | 1 937 | | 2 581 | 1 244 | 3 | 1 053 | 2 300 | 789 | | 1 052 | 1 841 | 2 154 |
| | 555 | | 2 799 | | 3 354 | 992 | 2 | 2 331 | 3 325 | 854 | | 2 842 | 3 697 | 2 486 |
| | | | 25 | | 25 | | | 80 | 80 | | | 169 | 169 | 55 |
| | | | | | | | | | | | | | | 3 |
| | 379 | | 24 | | 403 | 325 | | 25 | 349 | 288 | | 14 | 301 | 236 |
| | 1 | | | | 1 | 86 | | | 86 | | | 1 | 1 | 12 |
| | | | | | | 1 | | 4 | 5 | | | | | 2 |
| | 1 | | | | 1 | | | | | 3 | | 10 | 13 | 15 |
| | 6 312 | 19 435 | 75 703 | | 101 450 | 6 738 | 36 323 | 76 087 | 119 147 | 11 363 | 21 595 | 87 772 | 120 730 | 136 775 |
| | 10 | | 14 | | 24 | 17 | | 305 | 322 | 6 | | 17 | 23 | 68 |
| | 290 | | 149 | | 439 | 224 | | 146 | 369 | 307 | | 69 | 377 | 616 |
| | 9 | | 629 | | 638 | 19 | | 1 228 | 1 246 | 14 | | 596 | 610 | 670 |
| | | | 0 | | 0 | | | | | | | 1 | 1 | 0.1 |
| | 33 | 2 | 2 942 | | 2 977 | 53 | | 4 373 | 4 426 | 74 | | 2 674 | 2 749 | 3 264 |
| | | | 10 | | 10 | | | 1 | 1 | | | 1 | 1 | 4 |
| | 12 | | 3 753 | | 3 765 | 17 | | 3 379 | 3 396 | 3 | | 2 893 | 2 896 | 2 850 |
| | | | | | | | | 1 | 1 | 23 | | 1 | 24 | 7 |
| | | | | | | | | | | | | | | 0.5 |
| | | | | | | | | | | 1 | | | 1 | 0.1 |
| | | | | | | 25 | | 70 | 95 | 1 | | 4 | 5 | 27 |
| | | | | | | | | | | | | | | 0.4 |
| | 6 | | 2 | | 8 | 1 | | 5 | 6 | 2 | | 4 | 6 | 68 |
| | 8 356 | | 1 310 | | 9 666 | 11 942 | | 837 | 12 779 | 8 110 | | 936 | 9 045 | 10 347 |
| | | | | | | | | | | | | | | 0.1 |
| | 810 | | 3 747 | | 4 557 | 1 990 | | 4 856 | 6 846 | 3 113 | | 6 823 | 9 936 | 4 173 |
| | 3 258 | | 1 712 | | 4 970 | 6 633 | | 1 574 | 8 206 | 4 063 | | 2 516 | 6 579 | 5 941 |
| | | | | | | | | | | | | | | 0.003 |
| | 269 | | 1 146 | | 1 415 | 91 | | 527 | 619 | 53 | | 241 | 294 | 1 263 |
| | 6 092 | | 1 165 | 6 | 7 263 | 9 214 | | 2 738 | 11 952 | 10 932 | | 3 831 | 14 763 | 7 899 |
| | 5 | | | | 5 | 13 | | | 13 | 13 | | 3 | 16 | 16 |
| | 4 | | 20 | | 24 | 8 | | 41 | 49 | 6 | | 51 | 57 | 60 |
| | 9 | | 37 | | 46 | 37 | | 88 | 125 | 4 | | 22 | 25 | 35 |
| | 1 | | | | 1 | | | | | | | | | 1 |
| | 720 | | 57 | | 778 | 20 894 | | 245 | 21 140 | 16 400 | | 113 | 16 514 | 3 504 |
| | 30 448 | 19 752 | 106 408 | 6 | 156 614 | 64 241 | 36 735 | 112 323 | 213 300 | 60 015 | 21 595 | 120 568 | 202 179 | 193 438 |

Table 11. Species composition and catches (kg) of commercial fishing in Väinameri Sea (ICES subdivision 29.4) by coastal fishing gear type, 2007-2017

| Species | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | | | | Total |
|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------|----------------|------------|----------------|
| | Total | Total | Total | Total | Total | Total | Total | Trap net | Seine net | Gill net | Long-line | |
| Perch | 20 673 | 11 608 | 14 577 | 23 655 | 17 208 | 32 555 | 152 074 | 114 614 | 70 | 132 006 | 48 | 246 738 |
| Eel | 662 | 662 | 447 | 384 | 293 | 171 | 123 | 115 | | 8 | | 123 |
| Atlantic sturgeon | | | | | | | | | | | | |
| Eelpout | 10 | 14 | | 19 | | 2 | | 4 | | | | 4 |
| Pike | 7 787 | 8 449 | 7 840 | 12 251 | 19 196 | 24 211 | 43 292 | 14 842 | | 30 051 | 62 | 44 955 |
| Gibel carp | 17 115 | 24 922 | 19 337 | 21 990 | 23 847 | 25 647 | 23 138 | 9 990 | | 30 726 | | 40 716 |
| Turbot | | | | | | | 4 | | | 8 | | 8 |
| Carp | 19 | 38 | 40 | 24 | 1 | 23 | 26 | 23 | | 6 | | 29 |
| Ruff | 4 497 | 4 433 | 1 228 | 811 | 1 469 | 3 994 | 4 676 | 13 348 | | 217 | | 13 565 |
| Sprat | 25 | 21 | 7 | 68 | 11 | 2 | 32 | 3 | | 1 | | 4 |
| Pikeperch | 132 | 128 | 139 | 388 | 477 | 395 | 8 044 | 8 691 | | 7 983 | | 16 674 |
| Bream | 418 | 244 | 193 | 316 | 794 | 483 | 1 031 | 1 506 | | 2 014 | | 3 520 |
| Flounder | 8 667 | 8 358 | 10 215 | 11 260 | 8 805 | 9 080 | 8 131 | 1 521 | | 4 230 | | 5 751 |
| Tench | 1 819 | 1 682 | 1 751 | 1 282 | 1 470 | 2 321 | 2 686 | 2 915 | | 1 275 | | 4 189 |
| Burbot | 1 253 | 503 | 496 | 424 | 347 | 880 | 1 769 | 1 286 | | 1 861 | | 3 146 |
| Salmon | 100 | 106 | 132 | 121 | 56 | 229 | 127 | 9 | | 129 | | 138 |
| Sea trout | 313 | 212 | 295 | 246 | 436 | 734 | 698 | 29 | | 304 | | 334 |
| European whitefish | 3 227 | 1 998 | 1 933 | 1 408 | 2 011 | 2 714 | 2 850 | 74 | | 4 123 | | 4 197 |
| Smelt | 1 057 | 497 | 305 | 167 | 36 | 81 | 60 | 17 | | | | 17 |
| Silver bream | 9 449 | 8 888 | 8 192 | 7 804 | 10 121 | 14 902 | 17 548 | 6 152 | | 16 830 | | 22 982 |
| Stickleback | 213 | 8 | | | | | | | | | | |
| Rudd | 1 988 | 1 365 | 991 | 914 | 1 743 | 1 054 | 1 590 | 994 | | 1 330 | | 2 324 |
| Herring | 42 896 | 38 191 | 219 552 | 231 432 | 181 703 | 142 635 | 133 157 | 120 794 | | 1 666 | | 122 460 |
| Ide | 6 747 | 6 696 | 5 447 | 3 241 | 2 267 | 2 107 | 3 086 | 2 662 | | 4 395 | 4 | 7 061 |
| Roach | 14 639 | 13 781 | 13 716 | 13 699 | 19 034 | 19 359 | 23 339 | 10 076 | 20 | 16 438 | 2 | 26 536 |
| Dace | | 3 | | | | | 3 | | | | | |
| European chub | | 15 | 20 | | | | 14 | | | | | |
| Cod | 6 | 7 | 42 | 56 | 59 | 58 | 78 | 20 | | 87 | | 107 |
| Garfish | 38 570 | 21 353 | 20 485 | 19 601 | 31 004 | 8 705 | 4 088 | 4 851 | | 1 562 | 75 | 6 488 |
| Bleak | 116 | 55 | 31 | 33 | 27 | 182 | | 54 | | | | 54 |
| Rainbow trout | 10 | | 6 | | 8 | | | 1 | | | | 1 |
| Vimba bream | 1 255 | 827 | 1 938 | 3 063 | 3 777 | 3 921 | 5 773 | 2 568 | | 7 044 | | 9 612 |
| Twaite shad | | | | | 1 | | | | | | | |
| Round goby | | | | | | 13 | 0 | | | | | |
| Total | 183 659 | 155 061 | 329 351 | 354 656 | 326 201 | 296 454 | 437 437 | 317 158 | 90 | 264 292 | 191 | 581 732 |

Source: MoRA

| | 2015 | | | | 2016 | | | | 2017 | | | | 2007–2016 average |
|--|----------------|----------------|---------------|----------------|----------------|----------------|---------------|----------------|----------------|----------------|---------------|----------------|----------------------|
| | Trap net | Gill net | Long- line | Total | Trap net | Gill net | Long- line | Total | Trap net | Gill net | Long- line | Total | |
| | 105 762 | 120 921 | 106 | 226 789 | 145 893 | 146 199 | 55 | 292 148 | 101 342 | 173 019 | 135 | 274 496 | 119 320 |
| | 80 | | | 80 | 38 | 1 | | 39 | 42 | | | 42 | 275 |
| | | | | | | | | | | 2 | | 2 | 0.2 |
| | 149 | | | 149 | 2 | | | 2 | 1 | | | 1 | 18 |
| | 11 264 | 25 771 | 25 | 37 059 | 10 224 | 16 559 | 27 | 26 810 | 7 918 | 18 654 | 50 | 26 622 | 23 497 |
| | 9 479 | 20 062 | | 29 541 | 9 038 | 16 657 | | 25 694 | 5 308 | 13 553 | 12 | 18 873 | 24 620 |
| | | 3 | | 3 | 25 | 2 | | 27 | 42 | 40 | | 82 | 11 |
| | 9 | 3 | | 12 | 14 | 5 | | 19 | | 6 | | 6 | 22 |
| | 7 928 | 232 | | 8 160 | 14 323 | 406 | | 14 728 | 10 937 | 567 | | 11 504 | 6 279 |
| | | | | | 5 | 10 | | 15 | | 20 | | 20 | 19 |
| | 3 974 | 6 334 | | 10 308 | 2 233 | 4 750 | | 6 983 | 566 | 3 366 | | 3 932 | 4 327 |
| | 656 | 1 960 | | 2 615 | 501 | 800 | | 1 301 | 405 | 1 581 | | 1 986 | 1 173 |
| | 1 443 | 3 178 | | 4 620 | 1 195 | 3 011 | | 4 206 | 1 431 | 3 642 | | 5 073 | 7 651 |
| | 1 530 | 519 | | 2 049 | 1 138 | 263 | | 1 401 | 952 | 148 | | 1 100 | 1 977 |
| | 1 086 | 2 387 | | 3 473 | 974 | 1 995 | | 2 969 | 501 | 1 995 | | 2 496 | 1 614 |
| | 2 | 54 | | 57 | 10 | 81 | | 91 | 6 | 77 | | 83 | 113 |
| | 62 | 241 | | 303 | 36 | 341 | | 377 | 33 | 212 | | 245 | 381 |
| | 189 | 4 573 | | 4 762 | 118 | 3 509 | | 3 626 | 155 | 4 563 | | 4 718 | 3 040 |
| | 27 | 2 | | 29 | 62 | | | 62 | 72 | 539 | | 611 | 265 |
| | 4 871 | 18 943 | | 23 814 | 3 304 | 16 000 | | 19 304 | 5 021 | 22 147 | | 27 168 | 15 470 |
| | | | | | | | | | | | | | 20 |
| | 547 | 1 452 | | 1 999 | 799 | 1 035 | | 1 833 | 273 | 922 | | 1 195 | 1 545 |
| | 95 557 | 1 772 | | 97 329 | 118 901 | 1 059 | | 119 960 | 121 401 | 1 377 | | 122 778 | 132 008 |
| | 3 844 | 6 372 | 38 | 10 253 | 6 514 | 11 056 | 20 | 17 590 | 7 858 | 13 463 | 66 | 21 387 | 7 807 |
| | 12 461 | 15 508 | 11 | 27 980 | 8 573 | 17 657 | 21 | 26 251 | 10 254 | 15 170 | 14 | 25 438 | 20 343 |
| | | | | | | | | | | | | | 1 |
| | | 1 | | 1 | | | | | 1 | | | 1 | 5 |
| | 66 | 100 | | 166 | 6 | 11 | | 17 | | 9 | | 9 | 55 |
| | 22 042 | 1 393 | 52 | 23 486 | 8 511 | 2 199 | 17 | 10 726 | 18 907 | 4 555 | 65 | 23 527 | 18 912 |
| | 818 | 1 | | 819 | 60 | | | 60 | 15 | | | 15 | 126 |
| | 7 | 7 | | 14 | 2 | 2 | | 4 | 5 | 43 | | 48 | 8 |
| | 6 177 | 11 026 | | 17 203 | 3 953 | 9 044 | | 12 997 | 3 234 | 15 710 | | 18 944 | 7 210 |
| | | | | | | | | | | | | | 0.1 |
| | 49 | | | 49 | 73 | 20 | | 93 | 4 556 | 472 | | 5 028 | 471 |
| | 290 077 | 242 812 | 231 | 533 120 | 336 520 | 252 671 | 140 | 589 331 | 301 234 | 295 852 | 342 | 597 428 | 398 584 |

Table 12. Species composition and catches (kg) of commercial fishing in Gulf of Riga (ICES subdivision 28.1, except Pärnu Bay) by coastal fishing gear type, 2007-2017

| Species | 2007 Total | 2008 Total | 2009 Total | 2010 Total | 2011 Total | 2012 Total | 2013 Total | 2014 | | | | Total |
|---------------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------|----------------|--------------|----------------|---------------|------------------|
| | | | | | | | | Trap net | Seine net | Gill net | Long- line | |
| Perch | 211 359 | 183 475 | 214 290 | 187 959 | 166 484 | 148 083 | 212 042 | 29 078 | | 169 642 | 1 | 198 721 |
| Eel | 2 116 | 1 703 | 1 459 | 1 230 | 797 | 603 | 539 | 334 | | | 1 | 335 |
| Atlantic sturgeon | | | | | | | | | | 1 | | 1 |
| Eelpout | 73 | 92 | 29 | 2 | 30 | 2 | 10 | 3 | | | | 3 |
| Pike | 2 640 | 2 874 | 2 542 | 4 834 | 6 440 | 6 454 | 9 964 | 6 133 | | 4 446 | 1 | 10 579 |
| Gibel carp | 9 755 | 9 187 | 10 980 | 8 618 | 8 889 | 10 316 | 10 428 | 5 902 | | 8 177 | 5 | 14 083 |
| Lamprey | | | 2 | 4 | | | 10 | | | | | |
| Turbot | | | | | | | | | | | | |
| Carp | 144 | 30 | 17 | 6 | 9 | | 11 | 3 | | 6 | | 9 |
| Ruff | 4 278 | 6 721 | 11 737 | 10 335 | 7 476 | 7 976 | 4 711 | 2 292 | | 1 789 | | 4 081 |
| Sprat | 42 | | 8 | 80 | 10 | 105 | 336 | | | 138 | | 138 |
| Bighead carp | | | | | | | | | | | | |
| Pikeperch | 1 963 | 1 585 | 683 | 1 011 | 4 217 | 2 600 | 2 652 | 253 | | 1 378 | | 1 631 |
| Bream | 22 | 205 | 75 | 49 | 214 | 250 | 172 | 78 | | 98 | | 176 |
| Flounder | 20 404 | 20 222 | 13 089 | 17 204 | 15 282 | 12 403 | 18 637 | 9 899 | 2 650 | 5 307 | | 17 856 |
| Tench | 186 | 292 | 494 | 796 | 1 103 | 901 | 1 192 | 1 595 | | 1 024 | | 2 619 |
| Burbot | 521 | 164 | 159 | 171 | 230 | 216 | 327 | 936 | | 99 | | 1 035 |
| Salmon | 609 | 453 | 611 | 741 | 520 | 799 | 257 | 58 | | 323 | | 382 |
| Sea trout | 399 | 605 | 688 | 784 | 743 | 1 140 | 1 107 | 72 | | 940 | | 1 011 |
| Four-horned sculpin | | 1 | 1 | | 12 | 1 | | | | | | |
| European whitefish | 2 115 | 2 142 | 3 615 | 1 286 | 953 | 1 625 | 1 827 | 12 | | 2 141 | | 2 153 |
| Sea lamprey | 1 | | | | | | | | | | | |
| Smelt | 773 | 1 413 | 5 424 | 1 098 | 554 | 396 | 902 | 15 | | 8 | | 23 |
| Lumpfish | | 1 | | | | | | | | | | |
| Silver bream | 448 | 380 | 218 | 439 | 483 | 421 | 331 | 316 | | 521 | | 837 |
| Stickleback | | 9 | 40 | | 42 | | | | | | | |
| Rudd | 145 | 21 | | | | | 2 | | | | | |
| Herring | 1 174 901 | 1 636 331 | 1 356 769 | 1 570 761 | 1 326 441 | 793 359 | 580 137 | 836 955 | | 14 806 | | 851 761 |
| Ide | 316 | 292 | 417 | 219 | 89 | 44 | 97 | 103 | | 252 | | 355 |
| Roach | 22 313 | 18 372 | 23 857 | 31 645 | 25 933 | 26 501 | 19 895 | 12 239 | | 15 774 | | 28 013 |
| Dace | 12 | | | 2 | 1 | | | | | | | |
| European chub | | | | | | | | | | | | |
| Cod | 163 | 502 | 324 | 391 | 272 | 443 | 804 | 308 | | 548 | | 856 |
| Garfish | 26 729 | 39 721 | 22 527 | 24 007 | 21 208 | 8 882 | 11 521 | 24 432 | | 474 | | 24 906 |
| Bleak | 12 | 6 | 38 | | | 21 | 30 | | | | | |
| Rainbow trout | 12 | 14 | 6 | | 11 | | 32 | | | 18 | | 18 |
| Vimba bream | 4 267 | 3 113 | 3 023 | 3 188 | 2 976 | 3 587 | 6 074 | 359 | | 5 225 | | 5 584 |
| Twaite shad | 1 | | | | | | | | | | | |
| Round goby | | | 0 | | | 88 | 506 | 7 876 | | 28 | 3 | 7 906 |
| Total | 1 486 716 | 1 929 922 | 1 673 118 | 1 866 859 | 1 591 418 | 1 027 223 | 884 542 | 939 249 | 2 650 | 233 160 | 11 | 1 175 069 |

Source: MoRA

| | 2015 | | | | | 2016 | | | | | 2017 | | | | | 2007-2017 average |
|--|-----------|-----------|----------|-----------|-----------|----------|-----------|----------|-----------|-----------|----------|-----------|----------|-----------|-----------|-------------------|
| | Trap net | Seine net | Gill net | Long-line | Total | Trap net | Seine net | Gill net | Long-line | Total | Trap net | Seine net | Gill net | Long-line | Total | |
| | 44 158 | 1 530 | 176 506 | 233 | 222 426 | 38 747 | 3 388 | 156 738 | 54 | 198 927 | 40 743 | 1 695 | 112 872 | 68 | 155 377 | 190 831 |
| | 204 | | | 1 | 205 | 213 | | | 5 | 218 | 222 | | | | 222 | 857 |
| | | | | | | | | | | | | | | | | 0.1 |
| | | | | | | 9 | | | | 9 | | | | | | 23 |
| | 3 392 | 59 | 3 934 | | 7 385 | 3 751 | 9 | 3 972 | | 7 732 | 3 119 | | 4 794 | | 7 913 | 6 305 |
| | 4 524 | 8 | 8 306 | | 12 838 | 3 695 | 104 | 12 674 | | 16 473 | 6 003 | | 12 734 | | 18 736 | 11 846 |
| | | | | | | 2 | | | | 2 | | | | | | 2 |
| | | | | | | | | 1 | | 1 | | | | | | 0.1 |
| | 24 | | 33 | | 57 | 2 | | 1 | | 3 | | | 33 | | 33 | 29 |
| | 1 849 | | 2 915 | | 4 764 | 4 108 | 120 | 1 506 | | 5 734 | 5 239 | | 407 | | 5 646 | 6 678 |
| | 3 | | 151 | | 154 | | | 168 | | 168 | | | 71 | | 71 | 101 |
| | | | | | | 4 | | | | 4 | | | | | | 0.4 |
| | 188 | | 532 | | 720 | 52 | | 612 | | 664 | 14 | | 287 | | 301 | 1 639 |
| | 136 | | 65 | | 201 | 282 | | 50 | | 332 | 257 | | 11 | | 268 | 178 |
| | 13 222 | 1 168 | 6 332 | 8 | 20 730 | 11 127 | 1 914 | 5 325 | 22 | 18 388 | 8 607 | | 8 732 | 9 | 17 348 | 17 415 |
| | 2 322 | | 534 | | 2 855 | 1 449 | | 286 | | 1 735 | 477 | | 833 | | 1 310 | 1 226 |
| | 653 | | 127 | | 780 | 237 | | 50 | | 286 | 88 | | 62 | | 150 | 367 |
| | 46 | | 427 | | 473 | 69 | | 420 | | 489 | 43 | | 347 | | 390 | 520 |
| | 86 | | 1 153 | | 1 239 | 59 | | 1 488 | | 1 548 | 65 | | 1 118 | | 1 183 | 950 |
| | | | 15 | | 15 | | | 6 | | 6 | | | 2 | | 2 | 3 |
| | 22 | | 2 107 | | 2 129 | 14 | | 2 196 | | 2 209 | 30 | | 1 301 | | 1 331 | 1 944 |
| | | | | | | | | | | | | | | | | 0.1 |
| | 1 | | 880 | | 881 | 16 | | 6 | | 22 | 1 | | 11 | | 12 | 1 045 |
| | | | | | | | | | | | | | | | | 0.1 |
| | 1 504 | 135 | 799 | | 2 438 | 5 644 | | 1 409 | | 7 053 | 1 523 | | 693 | | 2 216 | 1 387 |
| | | | | | | | | | | | | | | | | 8 |
| | 40 | | 1 | | 41 | 256 | | 301 | | 557 | 49 | | 116 | | 164 | 85 |
| | 862 883 | | 12 672 | | 875 555 | 758 790 | | 9 327 | | 768 117 | 643 166 | | 10 648 | | 653 815 | 1 053 450 |
| | 345 | | 265 | | 610 | 878 | 30 | 807 | | 1 715 | 1 678 | | 1 323 | | 3 001 | 650 |
| | 17 586 | 5 352 | 19 324 | 1 | 42 263 | 32 767 | 1 419 | 23 465 | | 57 650 | 16 051 | 567 | 16 571 | | 33 188 | 29 966 |
| | | | | | | | | | | | | | | | | 1 |
| | | | 1 | | 1 | | | | | | | | | | | 0.1 |
| | 280 | | 253 | | 533 | 186 | | 163 | | 349 | 15 | | 108 | | 123 | 432 |
| | 32 486 | | 873 | | 33 359 | 32 453 | | 796 | | 33 249 | 84 193 | | 2 839 | 28 | 87 059 | 30 288 |
| | 21 | | | | 21 | 7 | | | | 7 | | | | | | 12 |
| | | | | | | 4 | | 9 | | 13 | 3 | | | | 5 | 10 |
| | 805 | | 4 585 | | 5 390 | 372 | | 3 961 | | 4 332 | 311 | | 3 742 | | 4 053 | 4 144 |
| | | | | | | | | | | | | | | | | 0.1 |
| | 20 417 | | 442 | | 20 859 | 47 832 | | 1 430 | | 49 262 | 64 161 | | 4 699 | | 68 860 | 13 407 |
| | 1 007 195 | 8 252 | 243 230 | 243 | 1 258 919 | 943 023 | 6 984 | 227 165 | 81 | 1 177 252 | 876 056 | 2 262 | 184 352 | 105 | 1 062 775 | 1 375 801 |

Table 13. Species composition and catches (kg) of commercial fishing in Pärnu Bay (fishing squares 178-180) by coastal fishing gear type, 2007-2017

| Species | 2007 Total | 2008 Total | 2009 Total | 2010 Total | 2011 Total | 2012 Total | 2013 Total | 2014 | | | | Total |
|---------------------|------------------|------------------|-------------------|------------------|------------------|------------------|------------------|------------------|--------------|----------------|---------------|------------------|
| | | | | | | | | Trap net | Seine net | Gill net | Long- line | |
| Perch | 506 183 | 429 190 | 505 998 | 613 732 | 564 317 | 338 967 | 761 605 | 690 453 | | 364 404 | 111 | 1 054 968 |
| Eel | 198 | 148 | 115 | 74 | 86 | 128 | 132 | 66 | | | | 66 |
| Eelpout | 4 | 60 | 47 | 765 | 50 | 372 | 1 072 | 136 | | | | 136 |
| Pike | 531 | 1 436 | 466 | 1 702 | 1 722 | 1 057 | 5 969 | 2 871 | | 856 | | 3 726 |
| Gibel carp | 23 217 | 18 576 | 13 235 | 13 516 | 12 776 | 19 796 | 13 634 | 13 828 | | 7 895 | | 21 722 |
| Lamprey | 505 | 17 | 148 | 567 | 871 | 349 | 996 | 303 | | 1 | | 304 |
| Carp | 60 | 272 | 134 | 93 | 46 | 78 | 246 | 75 | | 76 | | 151 |
| Ruff | 7 967 | 8 715 | 13 268 | 21 137 | 51 582 | 38 855 | 28 488 | 12 678 | | 4 424 | | 17 102 |
| Bighead carp | | | | | | | | | | | | |
| Pikeperch | 94 666 | 51 084 | 64 969 | 70 946 | 101 200 | 143 140 | 109 327 | 82 236 | | 72 242 | 206 | 154 683 |
| Bream | 5 609 | 3 740 | 2 411 | 2 291 | 5 564 | 9 450 | 6 612 | 8 361 | | 367 | | 8 728 |
| Flounder | 1 327 | 1 186 | 1 783 | 1 587 | 1 191 | 1 232 | 2 405 | 2 457 | | 864 | | 3 320 |
| Tench | | 13 | 14 | 38 | 57 | 8 | 68 | | | | | |
| Burbot | 23 | 8 | 13 | 21 | 19 | 36 | 101 | 249 | | 10 | | 259 |
| Salmon | 18 | 141 | 76 | 59 | 134 | 322 | 700 | 355 | | 137 | | 492 |
| Sea trout | 8 | 8 | 20 | 13 | 3 | 132 | 264 | 177 | | 14 | | 191 |
| Four-horned sculpin | | 1 | | | | | | | | | | |
| European whitefish | 1 090 | 391 | 727 | 853 | 784 | 2 053 | 2 414 | 538 | | 3 366 | | 3 904 |
| Sea lamprey | | | | 31 | | | | | | | | |
| Smelt | 463 585 | 625 661 | 745 601 | 404 077 | 116 121 | 285 721 | 490 197 | 210 655 | | 234 | | 210 889 |
| Silver bream | 28 015 | 23 081 | 13 570 | 12 874 | 11 410 | 17 215 | 11 967 | 5 159 | | 1 234 | | 6 393 |
| Stickleback | | | | 16 | | | | | | | | |
| Rudd | 3 | | 7 | | | | 8 | | | | | |
| Herring | 4 627 555 | 8 339 085 | 9 030 968 | 6 328 372 | 6 282 757 | 5 444 876 | 5 378 670 | 5 289 471 | | 51 | | 5 289 522 |
| Ide | 48 | 8 | 5 | 8 | | | 1 | 8 | | 30 | | 38 |
| Roach | 18 900 | 11 017 | 10 700 | 12 664 | 27 356 | 23 556 | 20 781 | 26 643 | | 1 214 | | 27 857 |
| Dace | | | | | 21 | | | | | | | |
| European chub | | | | | | | | | | | | |
| Cod | 1 | 9 | 3 | 15 | 10 | 9 | 57 | 17 | | 5 | | 22 |
| Garfish | 18 308 | 10 190 | 14 804 | 21 188 | 49 349 | 127 | 658 | 8 123 | | 194 | | 8 317 |
| Bleak | | 10 | | | | | | 85 | | | | 85 |
| Vimba bream | 25 801 | 25 214 | 16 405 | 21 942 | 41 927 | 44 468 | 43 219 | 58 627 | | 9 180 | | 67 807 |
| Lesser sand eel | | 80 | | | 52 | 192 | 735 | | | 37 | | 37 |
| Round goby | | | | | | | | | | | | |
| Total | 5 823 620 | 9 549 339 | 10 435 484 | 7 528 579 | 7 269 403 | 6 372 136 | 6 880 325 | 6 413 568 | 37 | 466 795 | 317 | 6 880 717 |

Source: MoRA

| | 2015 | | | | | 2016 | | | | | 2017 | | | | | 2007–2017 average |
|--|------------------|------------|----------------|--------------|------------------|------------------|------------|----------------|------------|------------------|------------------|-----------|----------------|------------|------------------|-------------------|
| | Trap net | Seine net | Gill net | Long-line | Total | Trap net | Seine net | Gill net | Long-line | Total | Trap net | Seine net | Gill net | Long-line | Total | |
| | 775 516 | | 267 408 | 499 | 1 043 423 | 598 633 | | 249 050 | 219 | 847 901 | 594 004 | | 238 375 | 94 | 832 473 | 681 705 |
| | 97 | | | 1 | 98 | 102 | | | | 102 | 235 | | | | 235 | 126 |
| | 598 | | | | 598 | 41 | | | | 41 | 253 | | | | 253 | 309 |
| | 1 286 | | 926 | | 2 212 | 1 653 | | 1 066 | | 2 719 | 1 726 | | 889 | | 2 614 | 2 196 |
| | 10 459 | | 5 634 | | 16 093 | 3 350 | | 4 215 | | 7 565 | 92 27 | | 7 999 | | 17 226 | 16 123 |
| | 201 | | | | 201 | 85 | | | | 85 | 120 | | | | 120 | 378 |
| | 107 | | 193 | | 300 | 164 | | | | 164 | 35 | | 30 | | 65 | 146 |
| | 9 686 | | 1 112 | | 10 798 | 14 472 | | 2 001 | | 16 473 | 22 903 | | 2 083 | | 24 986 | 21 761 |
| | 9 | | | | 9 | | | | | | | | | | | 1 |
| | 35 721 | | 35 401 | 584 | 71 705 | 13 761 | | 84 950 | 159 | 98 870 | 7 025 | | 44 743 | 15 | 51 783 | 92 034 |
| | 4 697 | | 157 | | 4 854 | 4 112 | | 262 | | 4 374 | 5 095 | | 93 | | 5 188 | 5 347 |
| | 6 318 | | 1 434 | 4 | 7 756 | 5 917 | | 977 | 7 | 6 901 | 8 351 | | 2 056 | 1 | 10 408 | 3 554 |
| | 2 | | 53 | | 55 | 7 | | 10 | | 17 | | | | | | 25 |
| | 344 | | 10 | | 354 | 141 | | 32 | | 173 | 97 | | 17 | | 114 | 102 |
| | 415 | | 57 | | 471 | 265 | | 32 | | 297 | 661 | | 87 | | 748 | 314 |
| | 145 | | 62 | | 207 | 26 | | 85 | | 111 | 149 | | 87 | | 235 | 108 |
| | 1 | | | | 1 | | | | | | | | | | | 0.2 |
| | 116 | | 1 684 | | 1 800 | 115 | | 1 623 | 1 | 1 739 | 17 | | 861 | | 878 | 1 512 |
| | | | | | | | | | | | | | | | | 3 |
| | 325 577 | | 288 | | 325 865 | 343 327 | | 318 | | 343 645 | 163 436 | | 478 | | 163 914 | 379 570 |
| | 2 196 | | 1 117 | | 3 313 | 2 144 | | 532 | | 2 676 | 1 766 | | 302 | | 2 068 | 12 053 |
| | | | | | | | | | | | | | | | | 1 |
| | 5 | | | | 5 | | | | | | | | | | | 2 |
| | 6 651 498 | | 90 | | 6 651 588 | 6 850 884 | | 220 | | 6 851 104 | 6 397 216 | | 251 | | 63 97 467 | 6 420 178 |
| | 3 | | | | 3 | 1 | | 19 | | 20 | 2 | | 52 | | 54 | 17 |
| | 16 888 | | 785 | | 17 673 | 14 453 | | 1 542 | | 15 995 | 15 708 | | 2 902 | | 18 610 | 18 646 |
| | | | | | | 6 | | | | 6 | | | 1 | | 1 | 3 |
| | | | | | | 1 | | | | 1 | | | | | | 0.1 |
| | 17 | | 6 | | 23 | 23 | | 4 | | 27 | 6 | | 5 | | 11 | 17 |
| | 45 447 | | 5 | | 45 452 | 11 484 | | 26 | | 11 510 | 45 918 | | 96 | | 46 014 | 20 538 |
| | 513 | | | | 513 | | | | | | | | | | | 55 |
| | 59 923 | | 9 337 | | 69 260 | 40 405 | | 13 534 | | 53 938 | 49 172 | | 13 937 | | 63 109 | 43 008 |
| | | | 325 | | 325 | | | 145 | | 145 | | | 32 | | 32 | 145 |
| | 34 | | 4 | | 38 | 6 554 | | 472 | | 7 026 | 26 878 | | 6 071 | | 32 949 | 3 638 |
| | 7 947 816 | 325 | 325 761 | 1 088 | 8 274 990 | 7 912 125 | 145 | 360 969 | 386 | 8 273 624 | 7 349 998 | 32 | 321 413 | 110 | 7 671 553 | 7 723 616 |

European Maritime and Fisheries Fund supports coastal fishermen

Kaido Vagiström, Harju County Fishing Association

When I was browsing old fishery year-books an overview caught my eye. In fact, the heading of my article has been borrowed from that overview written eight years ago by Tiiu Kupp, the executive manager of MTÜ Saarte Kalandus. Some things have changed for better and some for worse over time, but some things have remained almost unchanged.

The European Fisheries Fund has become the European Maritime and Fisheries Fund, measure 4.1 “Sustainable development of fisheries areas” has been replaced by measure 3.3 “Implementation of local development strategies of fisheries areas”, fisheries action groups have become local action groups, the Ministry of Agriculture is now the Ministry of Rural Affairs, and the regulations under which the fishery industry operates have changed.

Regardless of the new names, the goal is still the same: to support coastal regions. However, the content has changed. The regulation under which we now operate is definitely much better than the previous one. All those involved seem to have learned from their mistakes and cooperation with ministries has certainly improved.

There have been times when no attention was paid to fisheries areas. Now we are a considerable force and the ministry seeks our opinion on all major issues. The press often covers the activities of fisheries areas. However, the press has also changed – unfortunately, it has become yellower. Scandals sell and the number of clicks is everything. Objective opinions on the implementation of strategies for fisheries areas can rarely be found. But perhaps there is something that we could have done better? Or are coastal fishermen too modest and should make more efforts to pro-

mote their achievements in which fisheries aid has played a role?

Certainly, the investments made with the help of EU funds have considerably increased the potential of coastal fishery in the region. This was also demonstrated by a study conducted by Ernst & Young Baltic AS during the last programming period. The study revealed that although the volume of measure 4.1 is small compared to other regional development measures, it has had an impact on the improvement of the living environment of fisheries areas.

Unfortunately, a large proportion of coastal fishermen are still in a rather hopeless situation. While it is possible to make investments with the help of fisheries aid, fishermen do not have enough money for self-financing. The entire amount must be available beforehand, as the aid is received from the ARIB only after the investment has been made. The Rural Development Foundation and the disbursement of rural development aid before spending are of great help, but all this is rocket science for an ordinary coastal fisherman. While a fisherman is good at fishing and can even find his traps in the fog, he is quite lost in the area of finance. Local action groups are trying to support fishermen, but the latter try to cope on their own the same way they have to cope alone at sea. And so they often give up on applying for aid.

Eight years ago, fishermen expressed discontent over the abundance of seals and cormorants. By now, seals and cormorants have become a huge problem. Seals destroy tremendous amounts of fishing gear, as a result of which fishing gains have to be spent on the repairs of the gear. Our fishermen have learned to deal with seals to some extent. They build selective and

seal-proof traps and equip them with seal deterrents. Fishing for salmon has been so successful that our salmon quota was exhausted for the first time in 2017 and the state had to stop fishing. Unfortunately, however, the state does not provide support for the acquisition of seal deterrents, which are used in highly selective fishing.

Cormorant studies have been terminated in Estonia. Danish studies show that cormorants have eaten all fish in coastal waters and are after the fish of inland water bodies now. Our situation is not that bad, and we can still get some flounder. But for how long?

Eight years ago, the average age of coastal fishermen was 63 years. Fortunately, it is currently not 71, but almost the same as back then. However, there is nothing to rejoice about, because such an average age is too high. There is a tendency (at least around the capital) of historical fishing rights being bought by companies engaged in hobby fishery under the label of commercial fishing. This has led to a situation where young people and newcomers from coastal villages cannot enter the sector due to high prices and high initial investment.

Overregulation is a new concern. A fisherman needs to buy an excessively pricey device to measure the mesh size of his traps. The standard methodology that has been used for centuries is no good anymore, as the measurement must be performed to the accuracy of a micrometre. The aim is to regulate fishing gear so that only similar gear can be used on the entire coast, while the rest of the fishing gear is banned. The state is forgetting that commercial fishery is an economic activity whose success depends on efficiency. No fisherman is looking to overfish because he will want to fish in the future, too. However, fishermen should not be forced to return to the Stone Age in order to limit overfishing. The adoption of fishery-related regulations is not accompanied

by calculations on the economic impact of restrictions. From the point of view of the conservation of fish stocks, does the efficiency of fishing gear make a difference? Why does a fisherman have to fish for 30 days if he could catch the same quantity in one day and then stop fishing?

The new programming period has seen the introduction of a new measure, "Collaborative activities of action groups". Cooperation between fisheries areas, as well as cooperation with Leader groups and international cooperation has undoubtedly increased. Our fishery network, which has set an example for a similar network of Finnish fishermen, is of great help. Our fishermen who fish in the Gulf of Finland are engaged in close cooperation with the colleagues across the Gulf, which is only natural, because we are joined by the sea and the distance to Finnish fishermen is often shorter, as the crow flies, than the distance to fishermen in our own fisheries area. Joint projects with fishermen from other countries have become quite common.

Our local action groups are often set as an example at international fisheries forums and in debates on the implementation of EMFF measures. Overall, we can be pleased, as the implementation of our strategies has been successful. However, we still have many bottlenecks that need to be addressed.

The summary is almost the same as in the overview of MTÜ Saarte Kalandus written eight years ago: in order to be on the right track in implementing the local development strategy for the fisheries area, we are constantly working with officials from the Ministry of Rural Affairs, ARIB and the fishery network, and we communicate with our local members as well as with other fisheries areas, contribute to the development of the maritime policy, and rejoice at the activities and successes of coastal fishermen.

TRAWL FISHERY IN THE BALTIC SEA

Stocks and catches of herring, sprat and cod, and future outlooks

Herring, sprat and cod are internationally regulated/managed fish species regarding which the International Council for the Exploration of the Sea (ICES) issues annual stock assessments and management recommendations for different fishing grounds and stock units. The location of these stocks in the fourth quarter of 2017 is shown in [Figure 7](#).

■ Herring

Herring (*Clupea harengus membras* L.) is a subspecies of Atlantic herring that inhabits the whole of the Baltic Sea, forming local populations. Based on the time of spawning, a distinction is made between spring-spawning herring, which spawn from March to June, and autumn-spawning herring, which spawn in August and September and whose proportion has been less than 5% since 1970s in all areas. During the last decade, however, the share of autumn-spawning herring has slightly increased, e.g. on the south coast of the island of Saaremaa and in spawning grounds in the north-east part of the Gulf of Riga.

Herring and sprat stocks are assessed in accordance with the methodology of the ICES, while biological material is collected under Implementing Decisions (EU) 2016/1701¹ and 2016/1251² of the European Commission.

Unlike sprat, which is treated as a single stock unit, i.e. population, across the Baltic Sea, in the case of herring the state of stocks is assessed and advice for exploitation is given for four stock units, as shown in [Figure 8](#). The Gulf of Riga and the Bothnian Sea (and possibly also the Bothnian Bay) are inhabited by local natural herring populations, but Central Baltic herring (in subdivisions 25-27, 28.2, 29 and 32) comprises different populations (for example, Gulf of Finland herring, Swedish coast herring et al.).

The following overview primarily discusses the first two stock units, as these are of more interest to Estonian fishermen.

Central Baltic herring (subdivisions 25-27, 28.2, 29 and 32)

In 2005, the herring catch taken from the Central Baltic was at a low of 92,000 tonnes. The catch grew to 137,000 tonnes in 2010 but then decreased to 101,000 tonnes in 2012 and 2013 according to official data. The decline in the catch was due to the reduction of the total allowable catch. Both fishing opportunities and catches improved during the period 2014-2017, with the herring catch of 2017 amounting to 202,517 tonnes. As in previous years, Sweden (25%), Finland (20%) and Poland (18%) landed the largest herring catches in 2017. Estonia's

¹ https://eur-lex.europa.eu/eli/dec_impl/2016/1701/oj.

² https://eur-lex.europa.eu/eli/dec_impl/2016/1251/oj.

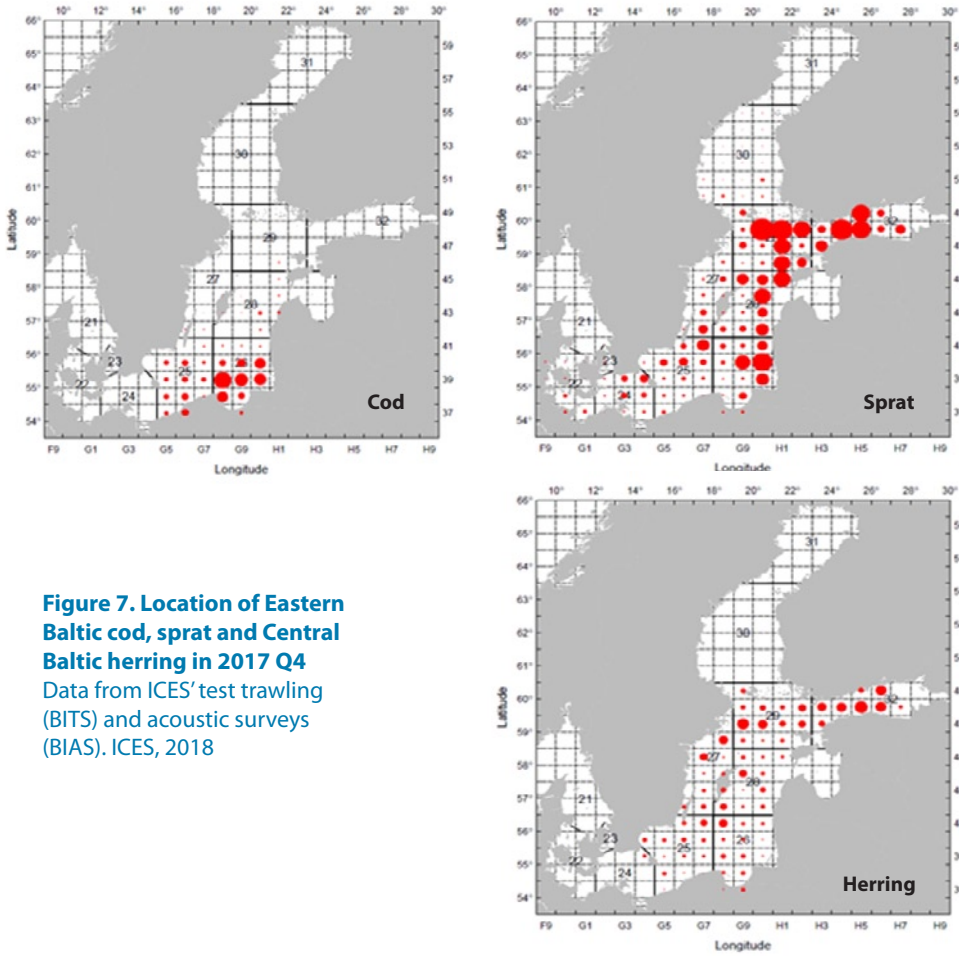


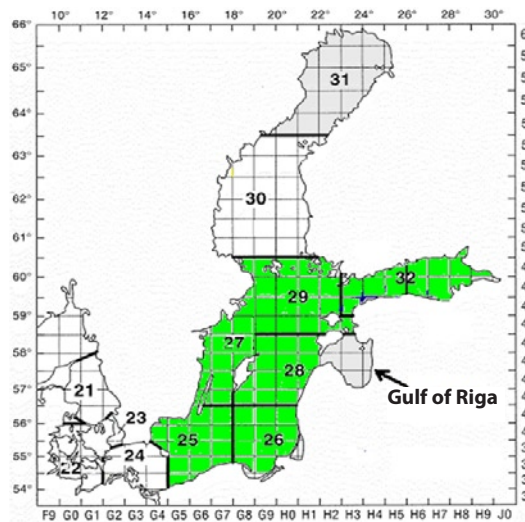
Figure 7. Location of Eastern Baltic cod, sprat and Central Baltic herring in 2017 Q4

Data from ICES' test trawling (BITS) and acoustic surveys (BIAS). ICES, 2018

Figure 8. Agreed stock and management units for herring in Baltic Sea:

- Central Baltic herring (also referred to as open sea herring) (ICES subdivisions 25-27, 28.2, 29 and 32)
- Gulf of Riga herring (subdivision 28.1)
- Bothnian Sea herring (subdivision 30)
- Bothnian Bay herring (subdivision 31)

Source: ICES, 2018



catch was 23,000 tonnes, which accounted for 12% of the total catch (Table 14). In terms of catch weight, the most of herring was caught in subdivisions 25, 26, 28.2 and 29, while subdivisions 29 and 32 dominated in terms of numbers. This can be explained by geographical differences in the mean body weight of herring (Figure 9).

The average age composition of herring catches has been relatively similar over time: age groups 1-3 prevail, representing around 60% of catches. This can be explained by the domination of pelagic cohorts mainly composed of younger

Table 14. Central Baltic herring: catches by country (10³ t), 1977-2017

| Year | Denmark | Estonia | Finland | Germany | Latvia | Lithuania | Poland | Russia | Sweden | Total |
|-------|---------|---------|---------|---------|--------|-----------|--------|--------|--------|-------|
| 1977 | 11.9 | | 33.7 | 0.0 | | | 57.2 | 112.8 | 48.7 | 264.3 |
| 1978 | 13.9 | | 38.3 | 0.1 | | | 61.3 | 113.9 | 55.4 | 282.9 |
| 1979 | 19.4 | | 40.4 | 0.0 | | | 70.4 | 101.0 | 71.3 | 302.5 |
| 1980 | 10.6 | | 44.0 | 0.0 | | | 58.3 | 103.0 | 72.5 | 288.4 |
| 1981 | 14.1 | | 42.5 | 1.0 | | | 51.2 | 93.4 | 72.9 | 275.1 |
| 1982 | 15.3 | | 47.5 | 1.3 | | | 63.0 | 86.4 | 83.8 | 297.3 |
| 1983 | 10.5 | | 59.1 | 1.0 | | | 67.1 | 69.1 | 78.6 | 285.4 |
| 1984 | 6.5 | | 54.1 | 0.0 | | | 65.8 | 89.8 | 56.9 | 273.1 |
| 1985 | 7.6 | | 54.2 | 0.0 | | | 72.8 | 95.2 | 42.5 | 272.3 |
| 1986 | 3.9 | | 49.4 | 0.0 | | | 67.8 | 98.8 | 29.7 | 249.6 |
| 1987 | 4.2 | | 50.4 | 0.0 | | | 55.5 | 100.9 | 25.4 | 236.4 |
| 1988 | 10.8 | | 58.1 | 0.0 | | | 57.2 | 106.0 | 33.4 | 265.5 |
| 1989 | 7.3 | | 50.0 | 0.0 | | | 51.8 | 105.0 | 55.4 | 269.5 |
| 1990 | 4.6 | | 26.9 | 0.0 | | | 52.3 | 101.3 | 44.2 | 229.3 |
| 1991 | 6.8 | 27.0 | 18.1 | 0.0 | 20.7 | 6.5 | 47.1 | 31.9 | 36.5 | 194.6 |
| 1992 | 8.1 | 22.3 | 30.0 | 0.0 | 12.5 | 4.6 | 39.2 | 29.5 | 43.0 | 189.2 |
| 1993 | 8.9 | 25.4 | 32.3 | 0.0 | 9.6 | 3.0 | 41.1 | 21.6 | 66.4 | 208.3 |
| 1994 | 11.3 | 26.3 | 38.2 | 3.7 | 9.8 | 4.9 | 46.1 | 16.7 | 61.6 | 218.6 |
| 1995 | 11.4 | 30.7 | 31.4 | 0.0 | 9.3 | 3.6 | 38.7 | 17.0 | 47.2 | 189.3 |
| 1996 | 12.1 | 35.9 | 31.5 | 0.0 | 11.6 | 4.2 | 30.7 | 14.6 | 25.9 | 166.7 |
| 1997 | 9.4 | 42.6 | 23.7 | 0.0 | 10.1 | 3.3 | 26.2 | 12.5 | 44.1 | 172.0 |
| 1998 | 13.9 | 34.0 | 24.8 | 0.0 | 10.0 | 2.4 | 19.3 | 10.5 | 71.0 | 185.9 |
| 1999 | 6.2 | 35.4 | 17.9 | 0.0 | 8.3 | 1.3 | 18.1 | 12.7 | 48.9 | 148.7 |
| 2000 | 15.8 | 30.1 | 23.3 | 0.0 | 6.7 | 1.1 | 23.1 | 14.8 | 60.2 | 175.1 |
| 2001 | 15.8 | 27.4 | 26.1 | 0.0 | 5.2 | 1.6 | 28.4 | 15.8 | 29.8 | 150.2 |
| 2002 | 4.6 | 21.0 | 25.7 | 0.3 | 3.9 | 1.5 | 28.5 | 14.2 | 29.4 | 129.1 |
| 2003 | 5.3 | 13.3 | 14.7 | 3.9 | 3.1 | 2.1 | 26.3 | 13.4 | 31.8 | 113.8 |
| 2004 | 0.2 | 10.9 | 14.5 | 4.3 | 2.7 | 1.8 | 22.8 | 6.5 | 29.3 | 93.0 |
| 2005 | 3.1 | 10.8 | 6.4 | 3.7 | 2.0 | 0.7 | 18.5 | 7.0 | 39.4 | 91.6 |
| 2006 | 0.1 | 13.4 | 9.6 | 3.2 | 3.0 | 1.2 | 16.8 | 7.6 | 55.3 | 110.4 |
| 2007 | 1.4 | 14.0 | 13.9 | 1.7 | 3.2 | 3.5 | 19.8 | 8.8 | 49.9 | 116.0 |
| 2008 | 1.2 | 21.6 | 19.1 | 3.4 | 3.5 | 1.7 | 13.3 | 8.6 | 53.7 | 126.2 |
| 2009 | 1.5 | 19.9 | 23.3 | 1.3 | 4.1 | 3.6 | 18.4 | 12 | 50.2 | 134.1 |
| 2010 | 5.4 | 17.9 | 21.6 | 2.2 | 3.9 | 1.5 | 25.0 | 9.1 | 50.0 | 136.7 |
| 2011 | 1.8 | 14.9 | 19.2 | 2.7 | 3.4 | 2.0 | 28.0 | 8.5 | 36.2 | 116.8 |
| 2012 | 1.4 | 11.4 | 18.0 | 0.9 | 2.6 | 1.8 | 25.5 | 13.0 | 26.2 | 100.8 |
| 2013 | 3.4 | 12.6 | 18.2 | 1.4 | 3.5 | 1.7 | 20.6 | 10.0 | 29.5 | 100.9 |
| 2014 | 2.7 | 15.3 | 27.9 | 1.7 | 4.9 | 2.1 | 27.3 | 15.9 | 34.9 | 132.7 |
| 2015 | 0.3 | 18.8 | 31.6 | 2.9 | 5.7 | 4.7 | 39.0 | 20.9 | 50.6 | 174.5 |
| 2016 | 4.0 | 20.1 | 28.9 | 4.3 | 8.4 | 5.2 | 41.0 | 24.2 | 56.0 | 192.1 |
| 2017* | 9.3 | 23.3 | 40.7 | 3.6 | 7.9 | 4.0 | 40.1 | 22.3 | 51.2 | 202.5 |

* Data for 2017 are preliminary and subject to change.

herring in trawl catches (Figure 10). Unlike sprat, greater stability of age composition has been observed in herring catches, which is due to a smaller variation in the abundance of herring year classes.

The mean body weight of herring has decreased considerably over the past 20-30 years throughout the Baltic Sea, accounting for just 40-50% of the common weight level of the 1970s and 1980s in the age groups that are more abundant today. The mean body weight of age groups has stabilised at a low level since 2006 (Figure 11).

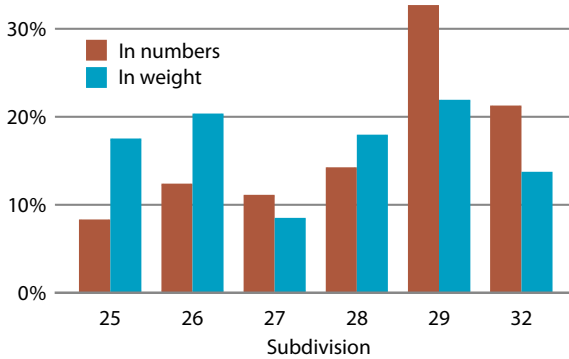


Figure 9. Central Baltic herring: proportion of catch in weight and numbers by subdivision in 2017
Source: ICES, 2018

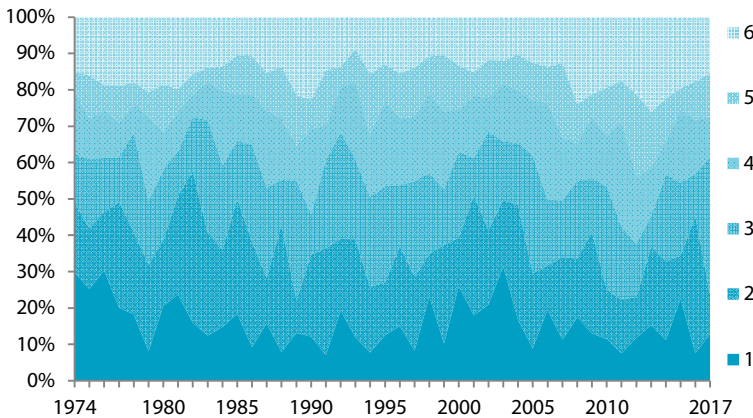


Figure 10. Central Baltic herring: average age composition of catches, 1974-2017
1: age 1
2: age 2 etc.
6+: age 6 and older
Source: ICES, 2018

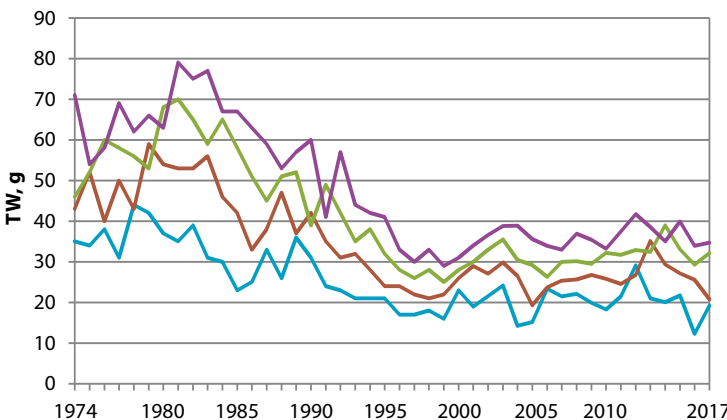


Figure 11. Central Baltic herring: dynamics of mean body weight of herring aged 2-5, 1974-2017
Source: ICES, 2018

At the beginning of 2018, the spawning stock biomass of the Central Baltic herring amounted to 840,000 tonnes, which was nearly 8% less than the 1974-2017 average (912,893 tonnes) and roughly equal to the level of 2013 (Figure 12). The recent increase in herring stock can be explained by two reasons. On the one hand, more abundant year classes have appeared, and on the other hand, the fishing mortality rate has been relatively low due to the active implementation of the fisheries legislation. From 2002 to today, four year classes have been observed whose abundance considerably exceeded the long-term average, with the most recent such year class being that of 2014 (Figure 13). The outlook for the coming years depends on the abundance of cohorts of 2013-2017, which will account for most of the catch in 2018 and 2019, when they will be 2-6 years of age.

The stock status of the Central Baltic herring is mostly assessed against the reference levels of fishing mortality and biomass. The most important of these are the following:

- 1) precautionary fishing mortality rate $F_{PA} = 0.41$: the maximum fishing mortality rate that can be implemented without directly endangering stock reproduction potential, but which should be avoided in accordance with responsible fishing principles; and
- 2) maximum fishing mortality for sustainable yield $F_{MSY} = 0.22$: enables maximum catches to be taken in the long run without endangering stocks;
- 3) $B_{trigger}$: the minimum spawning stock biomass that ensures the maximum possible yield in a long run at the F_{MSY} fishing mortality.

Figure 12. Central Baltic herring: spawning stock biomass (SSB) and fishing mortality in age groups 3-6 (F_{3-6}), 1974-2017

The horizontal line represents the level of $F_{MSY} = 0.22$ and the dotted line indicates the sustainable fishing mortality rate $F_{PA} = 0.41$.
Source: ICES, 2018

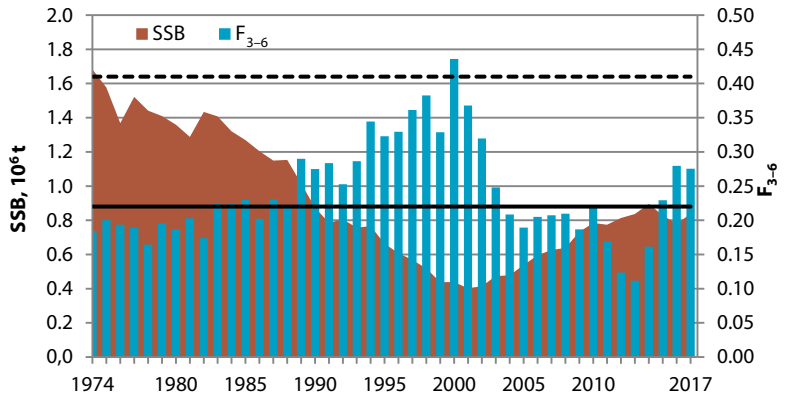
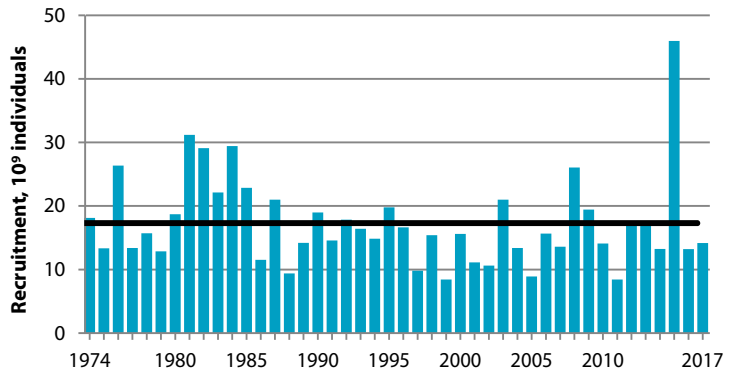


Figure 13. Central Baltic herring: dynamics of abundance of recruitment (age 1), 1974-2017

The horizontal line marks the long-term average.
Source: ICES, 2018



The actual fishing mortality has been lower than F_{MSY} since 2004. Looking at herring fishing mortality in the Central Baltic since 1974, there appears to be a period of particularly high mortality (1994-2002) when the actual mortality rate significantly exceeded the recommended level. This was one of the reasons for the decline in stocks (Figure 12).

According to the EU's multi-annual management plan (MAP), the total catch for 2019 should be in the range of 115,591-192,787 tonnes. A total catch exceeding the level that corresponds to F_{MSY} (0.22), i.e. 155,333 tonnes, can be taken subject to the specific conditions set out in the MAP. For 2018, the ICES recommended a total catch of up to 267,745 tonnes, and the EU total allowable catch TAC_{2018} was 258,855 tonnes.

The ICES gives recommendations for the stock unit, which means that catches of the Central Baltic herring traditionally taken from the Gulf of Riga should be deducted from, and catches of gulf herring caught in the Central Baltic should be added to, the quantity recommended by the ICES. As a result, the total allowable catch of herring in subdivisions 25-27, 28.2, 29 and 32 is expected to amount to 151,223 tonnes in 2019.

Gulf of Riga herring

Gulf of Riga herring are only fished by Estonian and Latvian fishermen. The proportion of Latvia's catches has been 60-70% in the last couple of decades. According to Latvian researchers, a significant part of Latvian herring catches (around 10-20%) was not reflected in official statistics until 2010 (Table 15).

In addition to local gulf herring, catches also include Central Baltic herring that spawns in the Gulf of Riga. Both varieties come under a single catch quota. The proportion of Central Baltic herring in the total herring catch taken from the Gulf of Riga has been less than 5% in recent years.

The long-term age structure of herring catches from the Gulf of Riga is generally similar to that of Central Baltic herring catches. The only difference is the greater variation in the abundance of the Gulf of Riga year classes, especially since the 1990s (Figure 14).

Similar to Central Baltic herring, the mean body weight of different age groups of herring caught in the Gulf of Riga has decreased significantly compared to the early 1980s. A relatively significant change in body weight could also be observed during the 1990s and 2000s. The mean body weight of Gulf of Riga herring has stabilised at a low level during the last couple of decades (Figure 15).

Since the 1990s, the spawning stock biomass of Gulf of Riga herring is up to twice the level of the 1970s (Figure 16). The good condition of the stock is mostly due to the abundance of the year classes 1990-2006. Only the cohorts that were born after the cold winters of 1996, 2003 and 2006 were of medium or smaller size in the Gulf of Riga (Figure 17). The year-class strength of Gulf of Riga herring seems to depend on the severity of the winter and the abundance of zooplankton in spring which determines the feeding conditions of juveniles in spring and thus their survival. The mild winters in the last couple of decades have apparently been favourable for the reproduction of the Gulf of Riga herring. However, looking separately at the past decade, it appears that the abundance of

Table 15. Gulf of Riga herring: Estonian, Latvian and unreported landings (10³ t), 1991-2017

| Year | Estonia | Latvia | Unreported (Latvia) | Total |
|------|---------|--------|---------------------|-------|
| 1991 | 7.4 | 13.5 | – | 20.9 |
| 1992 | 9.7 | 14.2 | – | 23.9 |
| 1993 | 9.5 | 13.6 | 3.4 | 26.5 |
| 1994 | 9.6 | 14.1 | 3.5 | 27.2 |
| 1995 | 16.0 | 17.0 | 3.4 | 36.4 |
| 1996 | 11.8 | 17.4 | 3.5 | 32.6 |
| 1997 | 15.8 | 21.1 | 4.2 | 41.2 |
| 1998 | 11.3 | 16.1 | 3.2 | 30.7 |
| 1999 | 10.2 | 20.5 | 3.1 | 33.8 |
| 2000 | 12.5 | 21.6 | 3.2 | 37.4 |
| 2001 | 14.3 | 22.8 | 3.4 | 40.5 |
| 2002 | 17.0 | 22.4 | 3.4 | 42.8 |
| 2003 | 19.6 | 21.8 | 3.3 | 44.7 |
| 2004 | 18.2 | 20.9 | 3.1 | 42.3 |
| 2005 | 11.2 | 19.7 | 3.0 | 33.9 |
| 2006 | 11.9 | 19.2 | 2.9 | 34.0 |
| 2007 | 12.8 | 19.4 | 2.9 | 35.1 |
| 2008 | 15.9 | 19.3 | 1.9 | 37.1 |
| 2009 | 17.2 | 18.3 | 1.8 | 37.3 |
| 2010 | 15.4 | 17.8 | 1.8 | 34.9 |
| 2011 | 14.7 | 20.2 | – | 35.0 |
| 2012 | 13.8 | 17.9 | – | 31.7 |
| 2013 | 11.9 | 18.5 | – | 30.4 |
| 2014 | 10.6 | 20.1 | – | 30.6 |
| 2015 | 16.5 | 21.0 | – | 37.5 |
| 2016 | 15.8 | 19.1 | – | 34.9 |
| 2017 | 17.9 | 13.8 | – | 31.7 |

Source: ICES, 2018

the year classes of 2007, 2011, 2012 and 2015 exceeded the average, while these of 2010, 2013, 2014 and 2016 have proved weak. This will definitely affect the prospects of fishing in the near future (Figure 17).

The spawning stock biomass of herring in the Gulf of Riga decreased slightly from 2004-2006. However, the SSB stabilised thanks to the abundant year classes of 2005 and 2007. In early 2016, the biomass exceeded the long-term average by 26% ($SSB_{2015} = 102,850$ tonnes). At the beginning of 2018, the spawning stock biomass of Gulf of Riga herring amounted to 96,906 tonnes, which is 16% higher than the long-term average (83,326 tonnes). The dynamics of herring catches in the Gulf of Riga have been similar to changes in spawning stock biomass: catches have ranged from 30,000-40,000 tonnes since the second half of the 1990s, which is two times higher than in the 1970s and 1980s (ICES, 2018). It should be remembered that catches of Gulf of Riga herring are currently mainly dependent on the TAC. Although management of the stock has generally been sustainable in the Gulf of Riga in the recent past, high fishing mortality is a concern. This phenomenon can probably be explained by the low body weight of the herring (Table 15).

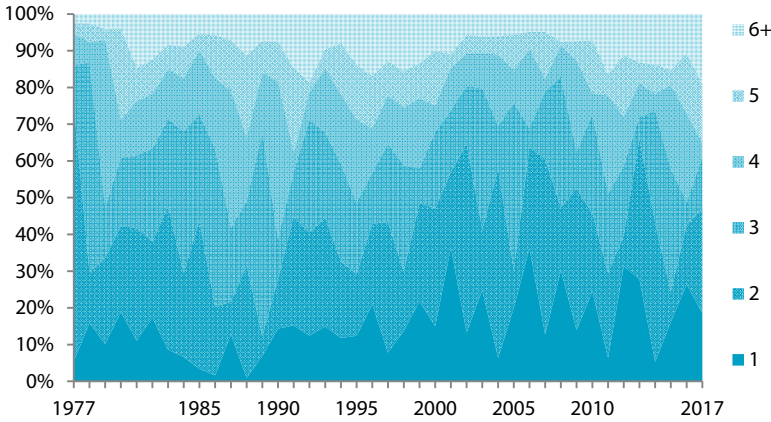


Figure 14. Gulf of Riga herring: average age composition of catches, 1977-2017
 1: age 1
 2: age 2, etc.
 6+: age 6 and older
 Source: ICES, 2018

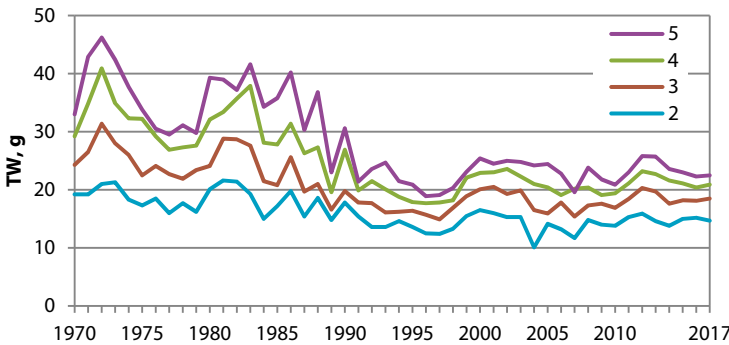


Figure 15. Gulf of Riga herring: dynamics of mean body weight of herring aged 2-5, 1970-2017
 Source: ICES, 2018

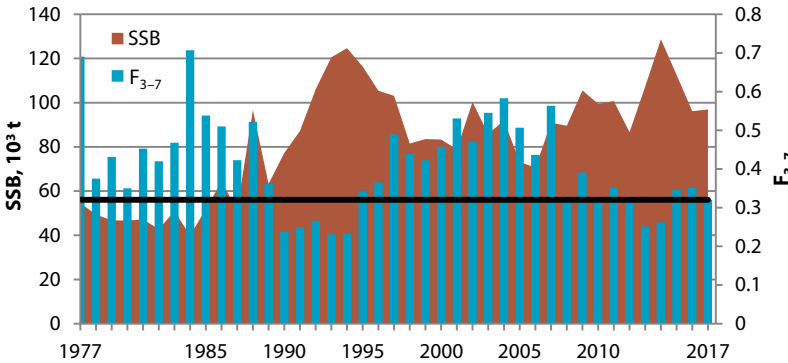


Figure 16. Gulf of Riga herring: spawning stock biomass (SSB) and fishing mortality in age groups 3-7 (F_{3-7}), 1977-2017
 The horizontal line represents the maximum fishing mortality if the maximum fishing mortality for sustainable yield $F_{MSY} = 0.32$.
 Source: ICES, 2018

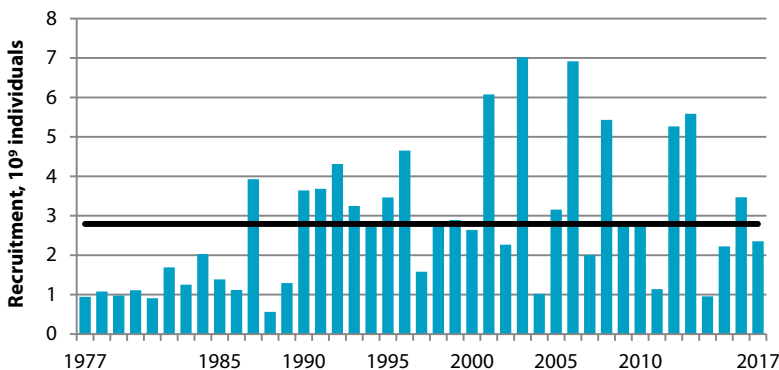


Figure 17. Gulf of Riga herring: dynamics of abundance of recruitment (age 1), 1977-2017
 The horizontal line marks the long-term average.
 Source: ICES, 2018

The status of Gulf of Riga herring stock is assessed against the reference levels of fishing mortality mentioned above. According to the current estimations, the sustainable fishing mortality F_{PA} is 0.4, the maximum fishing mortality for sustainable yield F_{MSY} is 0.32 and $B_{trigger}$ is 60,000 tonnes for Gulf of Riga herring.

According to the EU's multi-annual management plan (MAP), the total catch for 2019 should be in the range of 20,664-31,237 tonnes. A total catch exceeding the level that corresponds to F_{MSY} (0.32), i.e. 24,919 tonnes, can be taken subject to the specific conditions set out in the MAP. For 2018, the ICES recommended a total catch of up to 24,919 tonnes.

Since the recommendation of the ICES only concerns gulf herring, the total allowable catch (TAC) for the Gulf of Riga is to be calculated by deducting the catch of gulf herring assumed to be taken in the Central Baltic from, and adding the average catch of herring from the Central Baltic taken in the Gulf of Riga to, the recommendation for 2019. As a result, the total allowable catch for the Gulf of Riga can be expected to amount to 31,044 tonnes in 2019.

The condition of Central Baltic herring and, to a lesser extent, possibly also of the Gulf of Riga herring may improve if sprat stocks decrease, as this would reduce food competition between sprat and herring and lead to an increase in the mean body weight of herring. This would contribute to a reduction in the fishing mortality of both stock units, which in turn would create preconditions for increased fishing opportunities – provided, of course, that the recommended fishing mortality level is respected. Long-term dynamics indicate, however, that despite the high biomass of the Gulf of Riga herring the fishing mortality of this stock unit was below the F_{MSY} level in nine years only (Figure 16).

■ Sprat

Sprat (*Sprattus sprattus balticus*) is a pelagic fish, like herring. The main biological difference lies in the high fecundity and pelagic spawning of sprat: its spawn roe develops while floating in water, whereas herring mostly spawns on benthic vegetation. Also, sprat is a so-called batch spawner, which means that unlike herring it spawns over a longer period of time. These characteristics cause a remarkable variation in the reproduction of sprat which depends on whether the environmental conditions prevailing in a particular year are favourable for embryonic development.

The main spawning grounds of sprat in the Baltic Sea are located on the slopes of the Bornholm and Gotland Deeps, as well as in the Gdansk Deep, partly overlapping with the spawning grounds of cod. In periods when sprat abundance is high, sprat move out of these reproduction centres, which are characterised by the best environmental conditions, and spread throughout the Baltic Sea, except in freshwater areas in the northern part of the Bothnian Bay and the eastern part of the Gulf of Finland. Sprat are also present in the Gulf of Riga in relatively low numbers. The state of sprat stocks is primarily influenced by the abundance of its main natural enemy - the cod. During periods when cod abundance is high there are few sprat in the Baltic Sea, and vice versa. Some researchers believe, however, that sprat may also act as a “predatory fish” for cod, feeding on its pelagic roe. Of course, this situation only occurs on the spawning grounds of cod.

Table 16. Sprat catches from the Baltic Sea by country (10³ t), 1977-2017

| Year | Denmark | Estonia | Finland | GDR | FRG | Latvia | Lithuania | Poland | Russia* | Sweden | Total |
|------|---------|---------|---------|------|------|--------|-----------|--------|---------|--------|-------|
| 1977 | 7.2 | | 6.7 | 17.2 | 0.8 | | | 38.8 | 109.7 | 0.4 | 180.8 |
| 1978 | 10.8 | | 6.1 | 13.7 | 0.8 | | | 24.7 | 75.5 | 0.8 | 132.4 |
| 1979 | 5.5 | | 7.1 | 4.0 | 0.7 | | | 12.4 | 45.1 | 2.2 | 77.0 |
| 1980 | 4.7 | | 6.2 | 0.1 | 0.5 | | | 12.7 | 31.4 | 2.8 | 58.4 |
| 1981 | 8.4 | | 6.0 | 0.1 | 0.6 | | | 8.9 | 23.9 | 1.6 | 49.5 |
| 1982 | 6.7 | | 4.5 | 1.0 | 0.6 | | | 14.2 | 18.9 | 2.8 | 48.7 |
| 1983 | 6.2 | | 3.4 | 2.7 | 0.6 | | | 7.1 | 13.7 | 3.6 | 37.3 |
| 1984 | 3.2 | | 2.4 | 2.8 | 0.7 | | | 9.3 | 25.9 | 8.4 | 52.7 |
| 1985 | 4.1 | | 3.0 | 2.0 | 0.9 | | | 18.5 | 34.0 | 7.1 | 69.6 |
| 1986 | 6.0 | | 3.2 | 2.5 | 0.5 | | | 23.7 | 36.5 | 3.5 | 75.9 |
| 1987 | 2.6 | | 2.8 | 1.3 | 1.1 | | | 32.0 | 44.9 | 3.5 | 88.2 |
| 1988 | 2.0 | | 3.0 | 1.2 | 0.3 | | | 22.2 | 44.2 | 7.3 | 80.2 |
| 1989 | 5.2 | | 2.8 | 1.2 | 0.6 | | | 18.6 | 54.0 | 3.5 | 85.9 |
| 1990 | 0.8 | | 2.7 | 0.5 | 0.8 | | | 13.3 | 60.0 | 7.5 | 85.6 |
| 1991 | 10.0 | | 1.6 | | 0.7 | | | 22.5 | 59.7 | 8.7 | 103.2 |
| 1992 | 24.3 | 4.1 | 1.8 | | 0.6 | 17.4 | 3.3 | 28.3 | 8.1 | 54.2 | 142.1 |
| 1993 | 18.4 | 5.8 | 1.7 | | 0.6 | 12.6 | 3.3 | 31.8 | 11.2 | 92.7 | 178.1 |
| 1994 | 60.6 | 9.6 | 1.9 | | 0.3 | 20.1 | 2.3 | 41.2 | 17.6 | 135.2 | 288.8 |
| 1995 | 64.1 | 13.1 | 5.2 | | 0.2 | 24.4 | 2.9 | 44.2 | 14.8 | 143.7 | 312.6 |
| 1996 | 109.1 | 21.1 | 17.4 | | 0.2 | 34.2 | 10.2 | 72.4 | 18.2 | 158.2 | 441.0 |
| 1997 | 137.4 | 38.9 | 24.4 | | 0.4 | 49.3 | 4.8 | 99.9 | 22.4 | 151.9 | 529.4 |
| 1998 | 91.8 | 32.3 | 25.7 | | 4.6 | 44.9 | 4.5 | 55.1 | 20.9 | 191.1 | 470.9 |
| 1999 | 90.2 | 33.2 | 18.9 | | 0.2 | 42.8 | 2.3 | 66.3 | 31.5 | 137.3 | 422.7 |
| 2000 | 51.5 | 39.4 | 20.2 | | 0.0 | 46.2 | 1.7 | 79.2 | 30.4 | 120.6 | 389.2 |
| 2001 | 39.7 | 37.5 | 15.4 | | 0.8 | 42.8 | 3.0 | 85.8 | 32.0 | 85.4 | 342.4 |
| 2002 | 42.0 | 41.3 | 17.2 | | 1.0 | 47.5 | 2.8 | 81.2 | 32.9 | 77.3 | 343.2 |
| 2003 | 32.0 | 29.2 | 9.0 | | 18.0 | 41.7 | 2.2 | 84.1 | 28.7 | 63.4 | 308.3 |
| 2004 | 44.3 | 30.2 | 16.6 | | 28.5 | 52.4 | 1.6 | 96.7 | 25.1 | 78.3 | 373.7 |
| 2005 | 46.5 | 49.8 | 17.9 | | 29.0 | 64.7 | 8.6 | 71.4 | 29.7 | 87.8 | 405.2 |
| 2006 | 42.1 | 46.8 | 19.0 | | 30.8 | 54.6 | 7.5 | 54.3 | 28.2 | 68.7 | 352.1 |
| 2007 | 37.6 | 51.0 | 24.6 | | 30.8 | 60.5 | 20.3 | 58.7 | 24.8 | 80.7 | 388.9 |
| 2008 | 45.9 | 48.6 | 24.3 | | 30.4 | 57.2 | 18.7 | 53.3 | 21.0 | 81.1 | 380.5 |
| 2009 | 59.7 | 47.3 | 23.1 | | 26.3 | 49.5 | 18.8 | 81.9 | 25.2 | 75.3 | 407.1 |
| 2010 | 43.6 | 47.9 | 24.4 | | 17.8 | 45.9 | 0.2 | 56.7 | 56.2 | 19.5 | 312.1 |
| 2011 | 31.4 | 35.0 | 15.8 | | 7.7 | 33.1 | 9.9 | 55.3 | 19.5 | 56.2 | 263.8 |
| 2012 | 11.4 | 27.7 | 9.0 | | 7.2 | 30.7 | 11.3 | 62.1 | 25.0 | 46.5 | 230.8 |
| 2013 | 25.6 | 29.8 | 11.10 | | 10.3 | 33.3 | 10.4 | 79.7 | 49.7 | 22.6 | 272.4 |
| 2014 | 66.6 | 28.5 | 11.7 | | 10.2 | 30.8 | 9.6 | 56.9 | 23.4 | 46.0 | 243.8 |
| 2015 | 22.5 | 24.0 | 12.0 | | 10.3 | 30.5 | 11.0 | 62.2 | 30.7 | 44.1 | 247.2 |
| 2016 | 19.1 | 23.7 | 16.9 | | 10.9 | 28.1 | 11.6 | 59.3 | 34.6 | 42.4 | 246.5 |
| 2017 | 27.1 | 25.3 | 16.1 | | 13.6 | 35.7 | 12.5 | 38.4 | 38.7 | 48.3 | 285.7 |

* Until 1991, the Soviet Union.

Source: ICES, 2018

The large variability in the abundance and biomass of sprat is also reflected in its total catch, which has varied over the last 40 years from just 37,000 tonnes in 1983 to 529,000 tonnes in 1997 (Table 16). In recent years the catches of Baltic sprat have ranged from 240,000 to 270,000 tonnes depending on the total allowable catch. In 2017, the sprat catch reached 286,000 tonnes. Poland (24%), Rus-

Figure 18. Average age composition of sprat catches, 1974-2017

1: age 1
2: age 2, etc.
6+: age 6 and older
Source: ICES, 2018

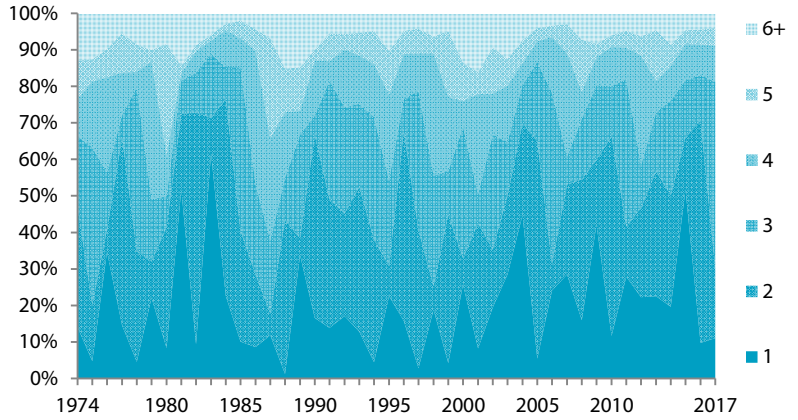


Figure 19. Dynamics of mean body weight of sprats aged 2-5, 1974-2017

Source: ICES, 2018

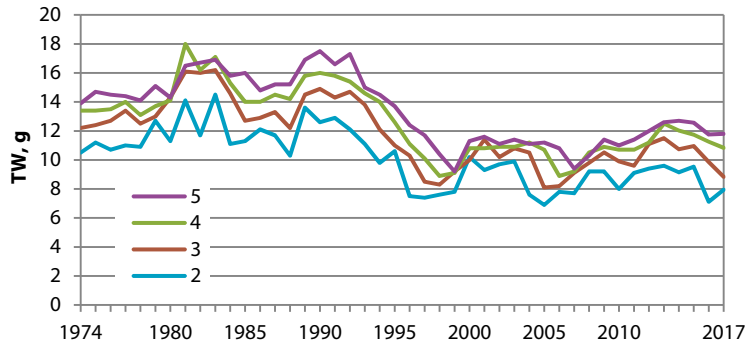


Figure 20. Sprat spawning stock biomass (SSB) and fishing mortality in age groups 3-5 (F_{3-5}), 1974-2017

The horizontal line represents fishing mortality $F_{MSY} = 0.26$ and the dotted line indicates $F_{PA} = 0.32$.
Source: ICES, 2018

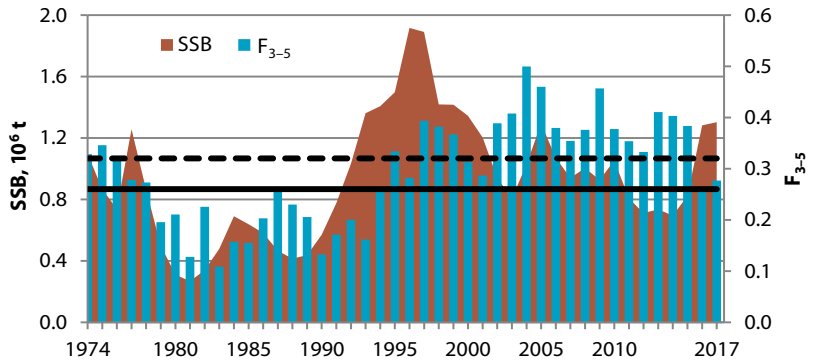
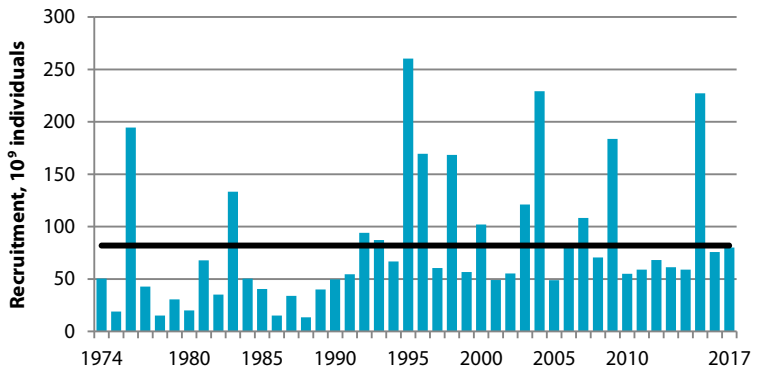


Figure 21. Dynamics of sprat recruitment (age 1), 1974-2017

The horizontal line marks the long-term average.
Source: ICES, 2018



sia (17%) and Sweden (14%) landed the largest catches of sprat in 2017. Estonia's catch was 25,300 tonnes, which accounted for 9% of the total catch.

The stock and age composition of sprat is characterised by the dominance of younger age groups: the 1-2 age groups account for up to 80% of catches, depending on the abundance of cohorts (Figure 18).

Changes in the body weight of sprat generally followed the corresponding trend of herring in the 1990s and 2000s. However, the decline in the mean body weight of sprat was significantly slower compared to that of herring in the 1990s, and the mean body weight of sprats of the same age currently amounts to 70-75% of the figure from the first half of the 1980s. The mean body weight increased somewhat in 2012 and 2013, but declined again in 2014 and 2015 (Figure 19).

Sprat in the Baltic Sea is treated as a single stock unit and therefore a single total allowable catch (TAC) is specified for sprat which covers the entire Baltic Sea.

The abundance and biomass of sprat started to increase rapidly in the second half of the 1980s when the abundance of cod declined significantly. In 1995, the total biomass of sprat exceeded 2.6 million tonnes (the spawning stock biomass amounted to 1.49 million tonnes). On account of the strong year classes of 1994 and 1995, the spawning stock biomass of sprat reached a record level of 1.9 million tonnes in 1996 and 1997. From 2004, the SSB has ranged between 0.8 and 1.3 million tonnes. The biomass declined from 2010-2012 because of the weak year classes of 2004, 2007 and 2009 and due to high fishing mortality from 2002-2010 (Figures 20 and 21). Fishing mortality remained high during the period 2013-2015, as well. At the beginning of 2018, the ICES estimated the SSB of sprat to amount to 1,303,000 tonnes, which is 39% higher than the long-term average (Figure 21).

International acoustic surveys of pelagic fish stocks conducted in the Baltic Sea in recent years show that the lion's share of the sprat stock is currently located in the central and north-eastern parts of the sea (Figure 7; ICES, 2018). Thus, the current status of the sprat stock in the economic zone of Estonia can currently be regarded as relatively satisfactory. However, it should be noted that fishing prospects still depend on the overall status of the stock in the Baltic Sea, i.e. the relatively better situation in our waters does not automatically mean better fishing opportunities for our fishermen.

As regards the prospects of the sprat stock, it is important to bear in mind that the very strong year class of 2014 considerably increased the spawning stock biomass in 2016 and 2017. Fishing effort will rely on that year class during the next couple of years. However, as the sprat stock is extremely dependent on recruitment, any assessment of the prospects of the stock is plagued by considerable uncertainties. In its advice of 2018 the ICES classified the current level of exploitation of the Baltic sprat stock as unsustainable, given that the fishing mortality rate for 2017 exceeded F_{MSY} (0.26) (Figure 20).

Since 1994 the total mortality of sprat has mostly been influenced by fishing mortality (Figure 22). Natural mortality prevailed, in particular, from 1978-1986, when the spawning stock biomass of cod was high (from over 250,000 to 300,000 tonnes). This shows that with current low cod stock levels the key to the management of sprat stock still mainly lies in influencing the fishing mortality

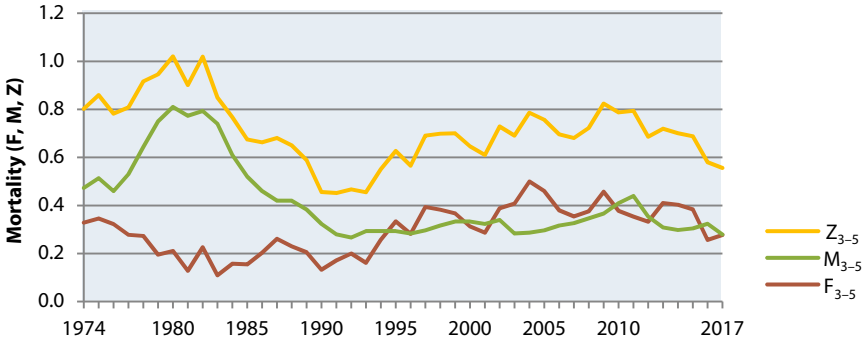


Figure 22. Fishing mortality (F_{3-5}), natural mortality (M_{3-5}) and total mortality (Z_{3-5}) of sprat, 1974-2017 Source: ICES, 2018

of sprat; all the more so as the spatial overlap between cod and sprat stocks has greatly decreased in recent years (Figure 7).

According to the EU's multi-annual management plan (MAP), the total catch of sprat for 2019 should be in the range of 225,752-311,523 tonnes. A total catch exceeding the level that corresponds to F_{MSY} (0.26), i.e. 301,125 tonnes, can be taken subject to the specific conditions set out in the MAP. For 2018, the ICES recommended a total catch of up to 291,715 tonnes.

◀ Cod in subdivisions 25-32 (Eastern Baltic)

The low salinity of the Baltic Sea generally does not favour widespread distribution of cod; the main spawning grounds of cod are located on the slopes of the Bornholm, Gdansk and Gotland Deep. Being a marine fish species, the distribution and abundance of cod (*Gadus morhua callarias*) in the Baltic Sea depend on suitable reproduction conditions. Like in the case of sprat, subject to the availability of favourable salinity, oxygen and temperature conditions, the high fecundity of cod may rapidly increase its abundance. This last occurred in the late 1970s when the spawning stock biomass of cod tripled in less than a decade. However, a lack of suitable reproduction conditions (no inflow of saline water from the North Sea) and intense and at times uncontrollable fishing, especially in the early 1990s, led to the depletion of the biomass at the same pace. Cod stocks have remained at low levels in the eastern part of the Baltic Sea since the 1990s. Catches of cod declined sharply in 2013 and 2014 – from around 50,000 tonnes during the years 2010-2012 to 31,400 tonnes in 2013 and just 29,000 tonnes in 2014. The last two catch figures are the lowest since 1987. Total catches increased somewhat in 2015 and 2016, amounting to 37,341 and 29,312 tonnes, respectively (including discards).

The catch for 2017 amounted to 25,497 tonnes, divided mainly between Polish, Danish, Swedish and Russian fishermen, and accounted for 25%, 24%, 17% and 17% of the total catch, respectively (Table 17). The total catch represented just around 69% of the total allowable catch of Eastern Baltic cod (EU and Russia), which amounted to 36,957 tonnes in 2017.

Table 17. Catches of Eastern Baltic cod by country (t), 1992-2017

| Year | Denmark | Estonia | Finland | Germany | Latvia | Lithuania | Poland | Russia | Sweden | Unreported | Total |
|------|---------|---------|---------|---------|--------|-----------|--------|--------|--------|------------|---------|
| 1992 | 18,025 | 1 368 | 485 | 2793 | 1250 | 1266 | 13,314 | 1793 | 13,995 | 0 | 54,882 |
| 1993 | 8000 | 70 | 225 | 1042 | 1333 | 605 | 8909 | 892 | 10,099 | 18,978 | 50,711 |
| 1994 | 9901 | 952 | 594 | 3056 | 2831 | 1887 | 14,335 | 1257 | 21,264 | 44,000 | 100,856 |
| 1995 | 16,895 | 1049 | 1729 | 5496 | 6638 | 4513 | 25,000 | 1612 | 24,723 | 18,993 | 107,718 |
| 1996 | 17,549 | 1338 | 3089 | 7340 | 8709 | 5524 | 34,855 | 3306 | 30,669 | 10,815 | 124,189 |
| 1997 | 9776 | 1414 | 1536 | 5215 | 6187 | 4601 | 31,396 | 2803 | 25,072 | 0 | 88,600 |
| 1998 | 7818 | 1188 | 1026 | 1270 | 7765 | 4176 | 25,155 | 4599 | 14,431 | 0 | 67,428 |
| 1999 | 12,170 | 1052 | 1456 | 2215 | 6889 | 4371 | 25,920 | 5202 | 13,720 | 0 | 72,995 |
| 2000 | 9 715 | 604 | 1648 | 1508 | 6196 | 5165 | 21,194 | 4231 | 15,910 | 23,118 | 89,289 |
| 2001 | 9 580 | 765 | 1526 | 2159 | 6252 | 3137 | 21,346 | 5032 | 17,854 | 23,677 | 91,328 |
| 2002 | 7 831 | 37 | 1526 | 1445 | 4796 | 3137 | 15,106 | 3793 | 12,507 | 17,562 | 67,740 |
| 2003 | 7 655 | 591 | 1092 | 1354 | 3493 | 2767 | 15,374 | 3707 | 11,297 | 22,147 | 69,476 |
| 2004 | 7 394 | 1192 | 859 | 2659 | 4835 | 2041 | 14,582 | 3410 | 12,043 | 19,563 | 68,578 |
| 2005 | 7 270 | 833 | 278 | 2339 | 3513 | 2988 | 11,669 | 3411 | 7740 | 14,991 | 55,032 |
| 2006 | 9 766 | 616 | 427 | 2025 | 3980 | 3200 | 14,290 | 3719 | 9672 | 17,836 | 65,532 |
| 2007 | 7 280 | 877 | 615 | 1529 | 3996 | 2486 | 8599 | 3383 | 9660 | 12,418 | 50,843 |
| 2008 | 7 374 | 841 | 670 | 2341 | 3990 | 2835 | 8721 | 3888 | 8901 | 2673 | 42,235 |
| 2009 | 8 295 | 623 | | 3665 | 4588 | 2789 | 10,625 | 4482 | 10,182 | 3189 | 48,439 |
| 2010 | 10,739 | 796 | 826 | 3908 | 5001 | 3140 | 11,433 | 4264 | 10,169 | 0 | 50,277 |
| 2011 | 10,842 | 1180 | 958 | 3054 | 4916 | 3017 | 11,348 | 5022 | 10,031 | 0 | 50,368 |
| 2012 | 12,102 | 686 | 1201 | 2432 | 4269 | 2212 | 14,007 | 3954 | 10,109 | 0 | 50,972 |
| 2013 | 6 052 | 247 | 399 | 540 | 2442 | 1744 | 11,761 | 2870 | 5299 | 0 | 31,354 |
| 2014 | 6 035 | 165 | 349 | 676 | 2000 | 1088 | 11,026 | 3444 | 4125 | 0 | 28,908 |
| 2015 | 9 652 | 188 | 387 | 1477 | 2586 | 1974 | 12,937 | 3512 | 4628 | 0 | 37,341 |
| 2016 | 6 756 | 2 | 57 | 918 | 2717 | 1698 | 9583 | 3392 | 4189 | 0 | 29,312 |
| 2017 | 6 140 | 1 | 191 | 347 | 2079 | 1726 | 6484 | 4124 | 4405 | 0 | 25,497 |

Source: ICES, 2018

In previous years the ICES' advice for exploitation of Eastern Baltic cod was based on the EU Multi-annual Management Plan for Cod Stocks in the Baltic Sea, according to which the recommended fishing mortality of cod (F_{MGT}) is 0.3. Implementation of the Management Plan requires an analytical assessment of stocks (fishing mortality rate). Unfortunately, the ICES has not been able to provide an analytical assessment for cod in recent years. There are several reasons for this, the main ones being as follows.

An international bottom trawl survey (BITS) conducted by the ICES indicated that there has been strong recruitment of cod in some places in recent years. However, this recruitment does not end up in commercial fishing catches as adult fish. In addition, the mean body weight and growth rate of cod have shrunk dramatically in recent years. This means that a large proportion of cod no longer reaches the minimum catch length i.e. 35 cm (TL). From 2015, in the absence of an analytical assessment of stocks, the ICES has been giving its advice for exploitation of Eastern Baltic cod on the basis of its approach to Data-Limited Stocks (DLS), i.e. the rules that the ICES applies when no realistic scientific information on a stock unit is available. According to the DLS approach, advice is given on the basis of the dynamics of an index describing the size of biomass.

In the case of cod it has been decided to use the average CPUE (kg/h) of individuals longer than 30 cm in BITS test trawling catches as the index. In order to formulate the advice for exploitation, the average yield of the last two years is compared with that of the preceding three years. The resulting advice is then either proportionately increased or reduced, as appropriate. For example, the average yield index of 2017 and 2018 was around 45% lower than the average of the preceding three years (2014-2016).

The exploitation advice of ICES for 2019 is a catch of up to 16,685 tonnes (up to 26,994 tonnes for 2017 and up to 26,071 tonnes for 2018). This advice applies to the stock of Eastern Baltic cod, including the portion caught in subdivision 24 (approximately 4714 tonnes).

There is still no commercial cod resource in Estonian waters, and directed fishing for this species is not economically reasonable. However, Estonian vessels fish for cod in the Southern Baltic in small quantities. In 2016 and 2017, total (EU and Russia) allowable catches of Eastern Baltic cod amounted to 46,900 and 36,957 tonnes, respectively.

ESTONIA'S TRAWL FLEET IN THE BALTIC SEA

General overview of sector

In 2017, catches were reported for a total of 30 trawlers with a combined main engine power of 8814 kW and a combined gross tonnage (GT) of 3495. The average age of the vessels was 31 years, and a total of 152 people were employed on them. Compared to 2016, the number of trawlers engaged in fishing decreased by one in 2017 (Figure 23).

In 2017 the Estonian trawl fleet's final sprat and herring quotas (after exchanges and transfers) were 29,631 and 28,466 tonnes, respectively (Figure 24). In 2016, the sprat catch quota dropped to the lowest level of the last decade, but was increased by 19% in 2017. The herring quota increased by 3% year-on-year, reaching the highest level of the last decade. Considering the increase in sprat and herring quotas and the loss of the Russian market a few years ago, quota uptake rates remained high, amounting to 94% for herring and 90% for sprat.

Like in the preceding year, targeted fishing for cod was non-existent in 2017. The cod quota uptake rate, which was 98% in 2011, declined significantly in subsequent years and was below 1% in 2016. Trawling companies explained the termination of cod fishing by the scarcity of fish, which makes fishing economically unviable.

In 2017 the rights to catch sprat, herring and cod in the Baltic Sea on the basis of fishing vessels' fishing permits were distributed between 20, 22 and 5 companies respectively. The total catch of Estonian trawlers in the Baltic Sea amounted to 53,634 tonnes in 2017. Based on average first-sale prices, the value of the catch was 9.7 million euros. In terms of species, sprat and herring prevailed in catches (accounting for 50% and 49% of the total catch, respectively), but small amounts of smelt, eelpout, ruff, four-horned sculpin and cod were also

caught. The proportion of trawlers in Estonian fishers' commercial fishing in the Baltic Sea amounted to 83% in 2017.

Sprat and herring were mainly landed at Estonian ports, where the catch was sold to fish freezing or processing companies, unless the fishing company itself was engaged in the processing and marketing of fish. Fish was also landed at ports in Finland, Latvia and Sweden (Table 18). The proportion of fish landed at foreign ports remained at roughly the same level as in 2016, representing 12% of the catch in 2017. The quantities of fish landed at foreign ports increased in Finland and Latvia, but decreased in Sweden. No fish was landed in Denmark. Estonian trawlers landed fish at 17 Estonian ports (Table 19). The largest quantities were landed at Dirhami and Veere, where nearly a half (47%) of the fish caught by Estonian trawlers was brought ashore.

2017 can be regarded as a relatively good year for the trawling sector. The total catch of sprat and herring was the largest of the past seven years, accounting

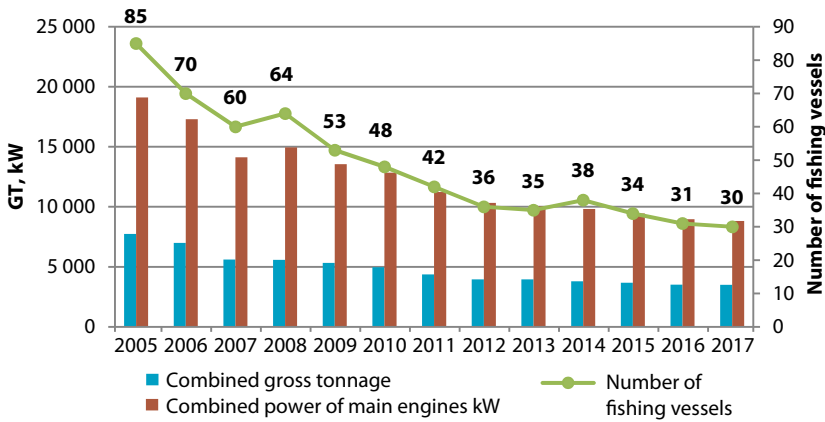


Figure 23. Number, combined gross tonnage (GT) and combined power of main engines (kW) of fishing vessels engaged in fishing, 2005-2017

Source: MoRA

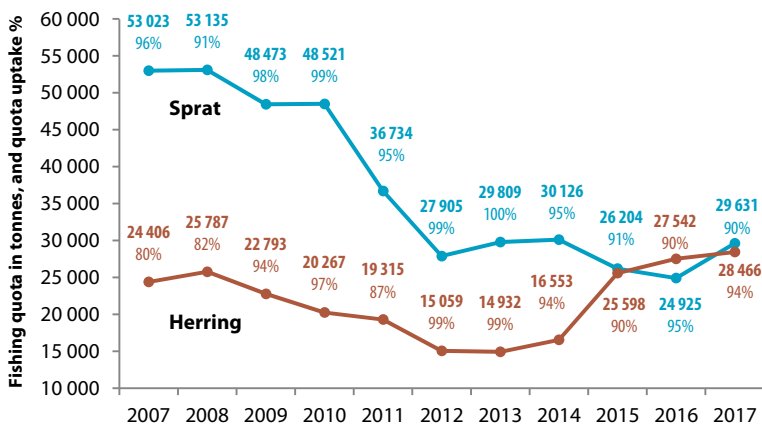


Figure 24. Estonian trawl fleet's final sprat and herring quotas (after exchanges and transfers) and quota uptake (%), 2007-2017

Source: MoRA

for 92% of the total quota. According to Statistics Estonia's foreign trade data, the export volume of frozen fish (sprat and herring) of Estonian origin has started to recover after the loss of the Russian market. While in 2016 the volume of frozen fish exports was nearly 41,000 tonnes, in 2017 it was 34% higher, or just over 54,000 tonnes, which is equal to the total catch of the Estonian trawl fleet in the Baltic Sea in the same year. Frozen fish of Estonian origin were exported to 34 countries, but mainly to Ukraine and Denmark.

Table 18. Landings (t) in different countries of fish caught from the Baltic Sea by Estonian trawlers in 2016 and 2017

| Species | Year | Estonia | Finland | Latvia | Sweden | Denmark |
|---------------------|------|---------|---------|--------|--------|---------|
| Sprat | 2016 | 21,261 | 506 | 70 | 1361 | 488 |
| | 2017 | 24,053 | 1392 | 115 | 986 | |
| Herring | 2016 | 21,394 | 738 | 1179 | 1171 | 423 |
| | 2017 | 22,949 | 1142 | 1897 | 792 | |
| Smelt | 2016 | 302 | | 39 | | |
| | 2017 | 174 | | 65 | | |
| Eelpout | 2016 | <1 | | | | |
| | 2017 | 43 | | 25 | | |
| Ruff | 2016 | | | | | |
| | 2017 | <1 | | | | |
| Four-horned sculpin | 2016 | | | | | |
| | 2017 | <1 | | | | |
| Cod | 2016 | <1 | | | | |
| | 2017 | <1 | | | | |
| Total | 2016 | 42,958 | 1244 | 1288 | 2531 | 911 |
| | 2017 | 47,220 | 2534 | 2102 | 1779 | 0 |

Source: MoRA

Table 19. Landings in Estonian ports of fish caught from the Baltic Sea by Estonian trawlers in 2017

| County | Place of landing | Landings, t | Proportion (%) of total landings of trawlers |
|------------|------------------------|-------------|--|
| Lääne | Dirhami | 15,642 | 33.13 |
| Saare | Veere | 6760 | 14.32 |
| Harju | Meeruse | 3852 | 8.16 |
| Harju | Miiduranna | 3267 | 9.92 |
| Lääne | Virtsu | 2767 | 5.86 |
| Saare | Saaremaa | 2549 | 5.40 |
| Harju | Paldiski South Harbour | 2161 | 4.58 |
| Saare | Roomassaare | 2075 | 4.39 |
| Lääne | Westmeri | 2011 | 4.26 |
| Lääne-Viru | Kunda | 1882 | 3.99 |
| Hiiu | Lehtma | 1861 | 3.94 |
| Saare | Mõntu | 1430 | 3.03 |
| Harju | Leppneeme fish port | 748 | 1.59 |
| Harju | Loksa | 88 | 0.19 |
| Lääne | Virtsu fish port | 60 | 0.13 |
| Pärnu | Pärnu | 35 | 0.07 |
| Lääne | Rohuküla | 29 | 0.06 |

Source: MoRA

Despite the recovery of exports, the loss of the Russian market still affected the first-sale prices of herring and sprat. In 2013, before Russia's embargo, the average first-sale prices of these species had been 23 and 22 cents per kilogram, respectively, but in 2017 an average of 18 cents per kilogram was paid for both herring and sprat.

On 6 November 2008, Decision 2008/949/EC of the European Commission took effect by which a multiannual programme for establishing a community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the common fisheries policy was adopted. According to the Commission Decision, Estonia's Baltic trawlers can generally be divided into two length classes: 12-18 m and 24-40 m¹. In 2017, large trawlers prevailed. The preference for large trawlers in fishing can be explained by their efficiency. Greater efficiency enables e.g. higher wages to be paid to the crew.

Basic indicators of 12-18 m length class trawlers

In 2017, five companies were engaged in fishing with small trawlers. Five vessels were used for fishing, i.e. one fewer than the year before (Table 20). These trawlers caught a total of 799 tonnes of fish (sprat and herring), which represented just 1.5% of the total catch of the Estonian trawl fleet in the Baltic Sea. The volume of the fish catch decreased by 7% over the year. The first-sale value of the catch declined by 9% and amounted to 143,784 euros. While in 2016 herring accounted for 46% of the total catch of small trawlers, in 2017 this species represented more than a half of the total catch (52%) (Figure 25). On average,² 10 fishermen were employed on small trawlers in 2017.

Basic and economic indicators of 24-40 m length class trawlers

In 2017, 15 companies were engaged in fishing with a total of 25 large trawlers; thus, both figures remained the same as in 2016 (Table 21). These trawlers caught a total of 52,836 tonnes of fish, whose estimated total value amounted to around 9.5 million euros based on average first-sale prices. The total catch increased by 10% and the first-sale value of the catch increased by 7% compared to 2016. Sprat and herring accounted for 49.5% and 49.9% of the total catch in 2017, respectively (Figure 26).

Due to the increase in sprat and herring quotas, the average number of trawling hours per vessel grew. The average annual wage cost per employee was 18,919 euros in 2017, or 6% more than in 2016. The gross value added of the segment of large trawlers amounted to 6.6 million euros. Fishing-related operating costs of trawlers in the 24-40 m length class totalled 6.5 million euros in 2017, with labour costs accounting for the largest part (55%) of these costs (Figure 27). Compared to 2016, fishing-related operating costs increased by 12% per vessel in 2017. This increase was caused by higher labour costs and an increase in the average fuel price per litre in 2017.

¹ In order to facilitate the analysis of the fleet, this length class also includes the few 18-24 m vessels that should belong to the group of large trawlers in terms of their engine power and gross tonnage.

² Average number of employees during the year.

Figure 25. Catches of sprat, herring and other species (t) of 12-18 m length class trawlers, 2008-2017
Source: MoRA

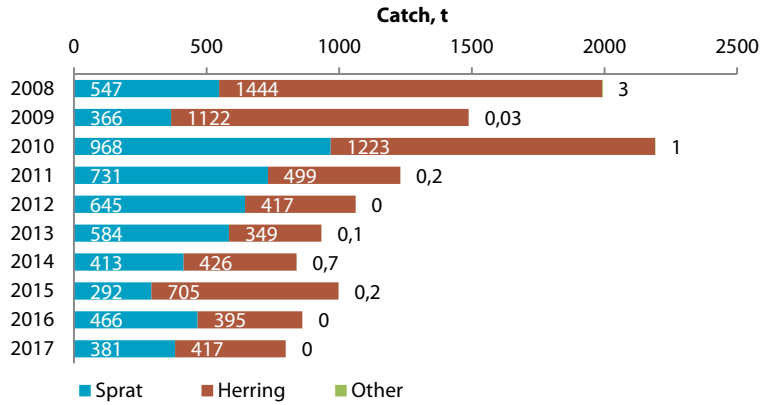


Figure 26. atches of sprat, herring and other species (t) of 24-40 m length class trawlers, 2008-2017
Source: MoRA

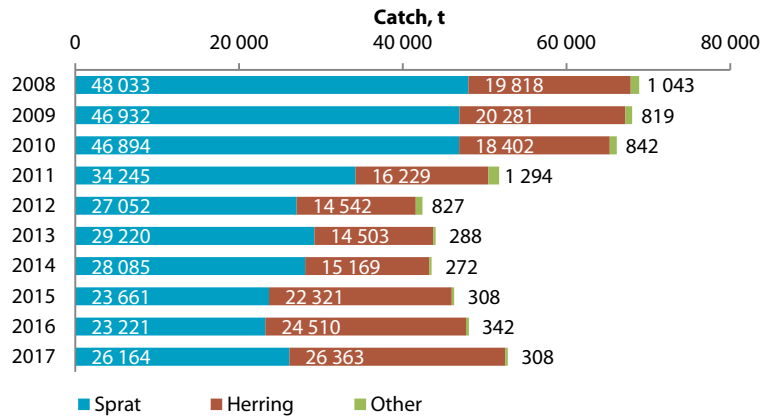


Table 20. Basic indicators related to fishing operations of 12-18 m length class trawlers, 2008-2017

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|------|------|------|------|------|
| Number of fishing vessels | 23 | 14 | 12 | 10 | 7 | 6 | 10 | 8 | 6 | 5 |
| Catch, 10 ³ t | 2 | 1.5 | 2.2 | 1.2 | 1.1 | 0.9 | 0.8 | 1.0 | 0.9 | 0.8 |
| Value of catch based on first-sale prices, €10 ³ | 322 | 207 | 285 | 204 | 208 | 198 | 177 | 190 | 159 | 144 |
| Average number of employees | 37 | 22 | 20 | 17 | 14 | 13 | 15 | 14 | 12 | 10 |
| Average number of trawling hours per vessel | 154 | 163 | 178 | 118 | 162 | 153 | 63 | 87 | 103 | 139 |

Sources: MoRA, UT EMI

Table 21. Basic and economic indicators related to fishing operations of 24-40 m length class trawlers, 2008-2017

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Number of fishing vessels | 41 | 39 | 36 | 32 | 29 | 29 | 28 | 26 | 25 | 25 |
| Catch, 10 ³ t | 68.9 | 68.0 | 66.1 | 51.8 | 42.4 | 44.0 | 43.5 | 46.3 | 48.1 | 52.8 |
| Value of catch based on first-sale prices, €10 ⁶ | 11.9 | 10.7 | 9.2 | 9.9 | 9.0 | 9.6 | 9.3 | 9.0 | 8.9 | 9.5 |
| Average number of employees | 236 | 227 | 207 | 199 | 174 | 170 | 160 | 158 | 143 | 142 |
| Average annual wage cost per employee, € | 12,057 | 12,129 | 12,510 | 12,368 | 15,083 | 14,793 | 16,959 | 18,130 | 17,881 | 18,919 |
| Average number of trawling hours per vessel | 1 152 | 1 025 | 812 | 1 080 | 1 174 | 725 | 779 | 824 | 714 | 941 |
| Average fuel price per litre, € | 0.503 | 0.377 | 0.486 | 0.709 | 0.770 | 0.684 | 0.601 | 0.460 | 0.429 | 0.465 |
| Gross value added, €10 ⁶ | 7.3 | 6.7 | 5.2 | 5.2 | 4.5 | 5.9 | 6.6 | 6.1 | 6.4 | 6.6 |

Sources: MoRA, UT EMI

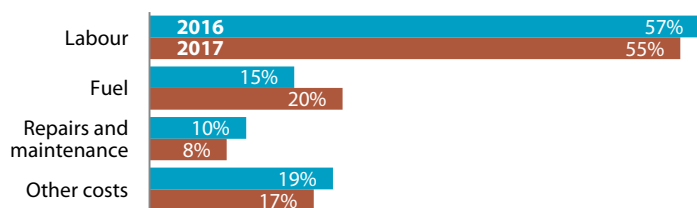


Figure 27. Proportions of various operating costs related to fishing operations of trawlers of 24-40 m length class in 2016 and 2017

Source: UT EMI

Estonia's Baltic Sea trawling sector was waiting for changes in 2017

Mart Undrest, Estonian Fishing Association

It may be noted that no major structural change has taken place in the Baltic Sea trawling sector in recent years. The membership and structure of producer organisations have been stable and these organisations represent around 95% of all Estonian sprat and herring fishery.

However, the trawling sector needs changes. The following changes are awaited, in particular:

The launch of the Paldiski component plant, which will hopefully lead to positive changes in the trawling sector. The plant would increase the demand of the market and industry for sprat and herring, which in turn would hopefully result in an increase of first-sale prices.

Renewal of the trawler fleet – it is no secret that the Estonian Baltic fleet is old and worn out. Over the years, some newer trawlers have been brought under the Estonian flag, but even these mostly originate from the 1980s. What we need is a trawler project with modern technologies that takes account of Estonia's fishing grounds, seasons and port infrastructure.

Solutions for the engine limitation in the Gulf of Riga, regarding which various studies are currently being conducted. Hopefully, they will prove that vessels with a higher main engine power do not pose a threat to the fish stocks or ecosystem of the Gulf of Riga. The use of larger vessels would help to further reduce the number of active vessels in the Estonian fleet, which would make it possible to catch the same permitted quantity as that caught now, but with fewer fishing trips.

Inland fisheries

LAKE VÖRTSJÄRV FISHERY

60

Stocks of the key fish species of Lake Võrtsjärv have been at a good level over the last decade and no decline in catches is foreseen for the near future. Catches of eel directly depend on the quantities restocked 6–14 years ago.

Commercial fishing catches from Lake Võrtsjärv totalled 198.9 tonnes in 2017 (Table 22). Compared to the result of 2016 (173.7 tonnes), the total catch increased somewhat (by 13%), but was nearly 35% lower than the average for the last ten years (307.5 ± 104 tonnes). The sharp decline in recent years is due, in particular, to the absence of second-rate fish of little value in the catch statistics.

While **breem** and **pike** catches decreased by 11% and 24%, respectively, in comparison with the catches landed in 2016, the catch of **pikeperch** taken in Lake Võrtsjärv was record high, amounting to 81.6 tonnes in 2017. Together with the catch of 3.5 tonnes landed by recreational fishermen, the total catch of pikeperch was 85 tonnes. This catch was more than twice as high as the long-term average (40.9 tonnes). In the case of pikeperch, the size of the catch depends on wintertime fishing, when ice conditions determine the success of fishing. January was the most successful fishing month, in which a total of 21.2 tonnes of pikeperch, or 26% of the annual catch, were caught with gill nets. The total catch of breem – 54.6 tonnes – was considerably lower than the average of the last five years (71 tonnes). One of the reasons for the decline in the breem catch is a change in consumer demand – there are increasingly fewer buyers of smaller breem. In April and May, when the largest breem catches are taken, breems weighing less than one kilogram are often discarded. The official pike catch of 34.4 tonnes in 2017 is just below the long-term average (35.8 tonnes) and is comparable to the catches landed at the end of the first decade of the 2000s (Table 22). Pike catches are directly related to the water level of Lake Võrtsjärv – everything depends on whether floodplains suitable for spawning are sufficiently flooded. The **eel** catch of 13.8 tonnes was almost equal to the average of the last ten years (13.4 tonnes). The largest quantity of eel was caught in September (3.2 tonnes). **Perch** catches have grown during the past few years, with the catch of 2017 amounting to 7.6 tonnes (Table 22). Compared to many of our other water bodies, the abundance of perch in Lake Võrtsjärv is relatively low and its share in the total catch was only 3.8% in 2017. Other species producing considerable catches included **gibel carp** (2.8 tonnes), **tench** (1.5 tonnes), **roach** (1.4 tonnes) and **burbot** (1.3 tonnes). Fishermen usually record gibel carp as crucian carp (*Carassius carassius*) in their fishing logs.

Trap nets were the most productive fishing gear in 2017, providing 118.7 tonnes or 60% of the total catch taken in Lake Võrtsjärv (Figure 28). The biggest catches taken with the help of trap nets were those of breem (42%), pike (22%),

Table 22. Catches (t) from Lake Vörtsjärv, 1971-2017

| Year | Eel | Pike-perch | Pike | Bream | Burbot | Perch | Other | Second-rate fish | Total |
|----------------|-------------|-------------|-------------|-------------|------------|------------|------------|------------------|--------------|
| 1971 | 6.5 | 28.1 | 12.9 | 20.1 | 2.7 | 4.5 | 0.5 | 75.3 | 150.6 |
| 1972 | 16.4 | 32.3 | 14.0 | 21.4 | 2.4 | 3.3 | 0.8 | 80.7 | 161.4 |
| 1973 | 21.3 | 43.0 | 11.5 | 16.0 | 1.2 | 3.8 | 0.4 | 92.3 | 184.6 |
| 1974 | 18.7 | 50.7 | 17.6 | 25.9 | 2.7 | 0.9 | 0.2 | 42.6 | 161.9 |
| 1975 | 36.9 | 51.8 | 12.3 | 23.8 | 1.3 | 1.6 | 0.3 | 41.3 | 151.1 |
| 1976 | 41.6 | 46.3 | 9.0 | 27.1 | 1.6 | 1.0 | 0.1 | 33.1 | 155.1 |
| 1977 | 50.0 | 45.3 | 12.8 | 33.2 | 1.7 | 0.6 | 0.3 | 20.8 | 156.3 |
| 1978 | 45.0 | 62.0 | 17.8 | 31.7 | 2.6 | 2.7 | 0.3 | 42.1 | 209.2 |
| 1979 | 19.0 | 73.0 | 19.0 | 26.1 | 3.0 | 3.0 | 0.8 | 40.3 | 210.2 |
| 1980 | 17.8 | 50.9 | 24.8 | 42.0 | 11.2 | 9.1 | 0.6 | 53.1 | 210.7 |
| 1981 | 16.4 | 42.4 | 29.3 | 63.0 | 17.9 | 7.9 | 0.4 | 68.4 | 247.1 |
| 1982 | 10.8 | 55.2 | 34.5 | 45.8 | 8.8 | 9.2 | 0.3 | 72.0 | 242.2 |
| 1983 | 24.6 | 50.5 | 51.4 | 60.0 | 7.4 | 8.8 | 0.6 | 85.3 | 274.8 |
| 1984 | 66.7 | 36.9 | 50.4 | 59.9 | 8.9 | 7.2 | 0.3 | 104.0 | 292.2 |
| 1985 | 71.9 | 59.0 | 39.0 | 100.1 | 7.4 | 5.4 | 0.3 | 168.4 | 446.3 |
| 1986 | 55.6 | 68.2 | 61.4 | 74.7 | 6.9 | 9.4 | 0.6 | 205.4 | 498.5 |
| 1987 | 61.2 | 45.5 | 35.0 | 76.9 | 6.6 | 7.0 | 1.2 | 163.3 | 391.1 |
| 1988 | 103.7 | 53.4 | 48.7 | 127.0 | 6.6 | 6.3 | 1.2 | 330.4 | 634.8 |
| 1989 | 47.6 | 44.5 | 56.4 | 196.7 | 5.9 | 7.4 | 1.4 | 303.6 | 719.6 |
| 1990 | 56.1 | 18.8 | 45.8 | 194.4 | 2.5 | 4.4 | 1.0 | 147.8 | 414.7 |
| 1991 | 48.5 | 26.7 | 30.5 | 139.4 | 4.8 | 3.7 | 1.4 | 212.5 | 419.0 |
| 1992 | 31.0 | 14.0 | 25.0 | 100.0 | 3.3 | 6.2 | 0.3 | 97.7 | 246.5 |
| 1993 | 49.0 | 36.0 | 32.0 | 81.0 | 7.0 | 8.0 | 0.8 | 107.0 | 271.8 |
| 1994 | 36.9 | 25.5 | 23.4 | 87.8 | 4.2 | 5.4 | 1.4 | 79.1 | 226.8 |
| 1995 | 38.8 | 28.3 | 19.4 | 68.7 | 1.4 | 5.2 | 0.1 | 112.8 | 235.9 |
| 1996 | 34.1 | 22.3 | 28.1 | 69.1 | 3.0 | 2.1 | 0 | 88.2 | 212.8 |
| 1997 | 40.3 | 20.7 | 19.3 | 92.3 | 3.4 | 2.4 | 0.1 | 98.0 | 236.2 |
| 1998 | 21.8 | 43.7 | 16.1 | 70.5 | 3.8 | 2.9 | 0.1 | 81.9 | 219.0 |
| 1999 | 37.4 | 34.5 | 24.9 | 47.8 | 2.6 | 12.1 | | 116.7 | 275.9 |
| 2000 | 38.8 | 29.5 | 40.7 | 54.4 | 3.8 | 18.3 | 2.0 | 150.1 | 337.6 |
| 2001 | 37.6 | 32.8 | 50.8 | 56.8 | 4.0 | 12.6 | 0.2 | 191.7 | 376.5 |
| 2002 | 20.4 | 25.2 | 44.8 | 30.5 | 3.5 | 9.7 | 0.1 | 184.3 | 318.8 |
| 2003 | 26.4 | 19.2 | 49.8 | 42.3 | 6.0 | 14.2 | 0.1 | 157.9 | 315.9 |
| 2004 | 20.1 | 27.3 | 55.5 | 59.1 | 4.1 | 10.1 | 0.1 | 176.9 | 353.2 |
| 2005 | 17.6 | 46.7 | 52.6 | 57.3 | 2.5 | 15.4 | | 192.5 | 379.1 |
| 2006 | 19.9 | 42.3 | 79.5 | 65.5 | 2.8 | 44.1 | 0.1 | 127.9 | 381.7 |
| 2007 | 21.5 | 29.7 | 57.0 | 105.2 | 3.6 | 17.1 | 0.1 | 174.6 | 407.3 |
| 2008 | 20.5 | 48.3 | 31.6 | 158.2 | 7.8 | 10.8 | 1.7 | 229.0 | 507.9 |
| 2009 | 13.6 | 74.1 | 33.0 | 81.5 | 2.9 | 9.0 | 1.6 | 131.9 | 347.6 |
| 2010 | 10.3 | 29.1 | 34.3 | 56.9 | 2.3 | 13.7 | 0.8 | 119.2 | 266.6 |
| 2011 | 11.2 | 40.7 | 32.2 | 77.9 | 2.3 | 16.9 | 1.2 | | 182.4 |
| 2012 | 12.2 | 37.8 | 46.6 | 87.2 | 3.8 | 13.4 | 7.7 | | 208.7 |
| 2013 | 12.7 | 40.5 | 70.1 | 79.3 | 5.2 | 9.7 | 47.8* | | 264.9 |
| 2014 | 13.3 | 60.1 | 64.2 | 79.1 | 2.7 | 5.5 | 12.6 | | 237.5 |
| 2015 | 12.3 | 44.1 | 44.2 | 80.8 | 2.4 | 2.8 | 13.1 | | 199.7 |
| 2016 | 13.0 | 42.3 | 45.3 | 61.2 | 1.5 | 5.0 | 5.2 | | 173.7 |
| 2017 | 13.8 | 81.6 | 34.4 | 54.6 | 1.3 | 7.6 | 6.0 | | 198.8 |
| Average | 31.5 | 40.9 | 35.8 | 71.0 | 4.4 | 8.3 | 2.6 | 125 | 269.5 |

* Mostly gibel carp

Source: EULS

Comment: the figures for 2000-2010 also include catches from restricted and recreational fishing in addition to commercial fishing.

Figure 28. Species composition of commercial fishing catches from Lake Võrtsjärv in 2017 by fishing gear type

Source: EULS

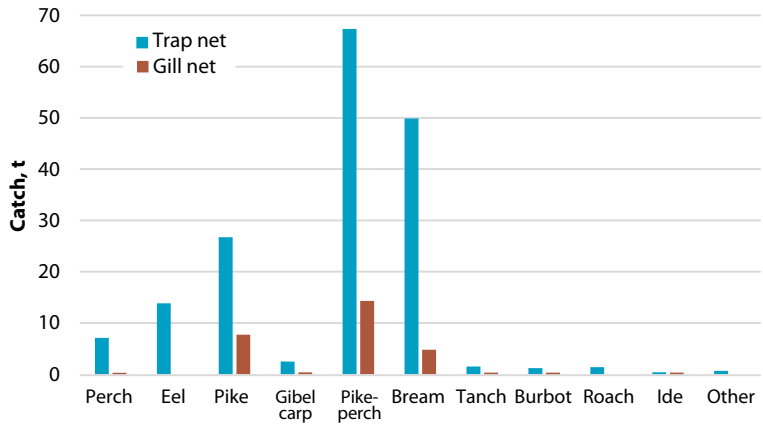
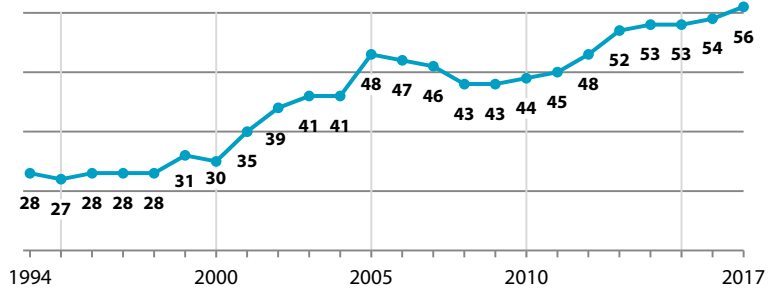


Figure 29. Number of commercial fishing permits issued for Lake Võrtsjärv, 1994-2017

Sources: Fisheries Information System of the MoRA; EULS



pikeperch (12%) and eel (12%). Second-rate fish caught as by-catch of trap net fishing is discarded and is not recorded in catch statistics. The total catch taken using gill nets increased compared to the preceding year primarily due to the record catch of pikeperch. A total of 67.3 tonnes of pikeperch was caught using gill nets, which accounted for as much as 84% of the total catch of gill nets. The catches of pike and bream taken using gill nets amounted to 7.7 and 4.8 tonnes, respectively. The gill net catches of other species were negligible.

In 2017, a total of 323 trap nets and 321 gill nets were permitted to be used in Lake Võrtsjärv. In addition, 40 gill net permits were issued for recreational fishing. Trap net fishing usually begins in late April and lasts until mid-October. Gill net fishing is allowed in Lake Võrtsjärv from 1 September until the break-up of ice in early spring next year.

For more than a decade, the amount of fishing gear and the resulting catches have remained at the same level in Lake Võrtsjärv. Commercial fishing permits were issued to a total of 56 fishing companies and sole proprietors. The number of permit holders has grown steadily in connection with the sale of fishing rights (Figure 29). The fishermen who mainly focus on processing and marketing of fish give up part or all of their historic fishing rights. To some extent, this development is also linked to the aging of fishermen, i.e. fishermen give up some of the fishing gear for health reasons. Based on registered home ports, the number of fishing vessels used on Lake Võrtsjärv was 70 in 2017.

Eel

Lake Võrtsjärv has been restocked with eel since 1956. From 2002, eels have also been regularly released into the small lakes in the Narva River basin (Lakes Saadjärv, Kuremaa, Kaiavere and Vagula). In addition to contributing to the reproduction of the species, eel restocking adds value to the fisheries sector. As the dam of the Narva hydroelectric power station prevents eels from naturally migrating to Lake Võrtsjärv and the small lakes of the Narva River basin, restocking is the only way to maintain the eel population in these water bodies. Figure 30 shows eel restocking volumes (glass eels and pre-farmed eels) and catches in Lake Võrtsjärv.

Annual eel catches have amounted to 10-14 tonnes since 2009, when the catch declined significantly. The catch figures for 2016 and 2017 were 13 tonnes and 13.8 tonnes, respectively, which represented just over a third of the long-term average (31.5 tonnes) (Table 22; Figure 30). However, based on the long-term restocking volume and catch ratio and the data obtained using various methods of assessing abundance, it is estimated that eel catches from Lake Võrtsjärv could actually amount to 25-30 tonnes per year.

The main reason for the decrease in the catches is the sharp decline in the number of eels introduced into the lake since the beginning of the 2000s when the price of restocking material rose dramatically on the world market. The price levels of glass eels were in the range of 500-700 €/kg for ten or so years, until 2013. The increasing abundance of glass eels reaching the coast of Europe in recent years and the ban on exports from the EU have significantly lowered the market price of glass eels. The price directly determines the restocking volume. The sharp drop in the price in 2014 (168 €/kg) enabled 2.7 million glass eels, plus another approximately 200,000 pre-farmed individuals, to be introduced in Lake Võrtsjärv (Figure 30).

An international procurement procedure was announced for the purchase of glass eels in 2017. Four bids were received. However, as the French company that had made the best bid was unable to procure the required quantity of glass eels, it was decided to go for restocking with pre-farmed eels. The price of pre-farmed eels purchased from a Dutch farm was 86.8 euros per kilogram, i.e. 87 cents per individual.

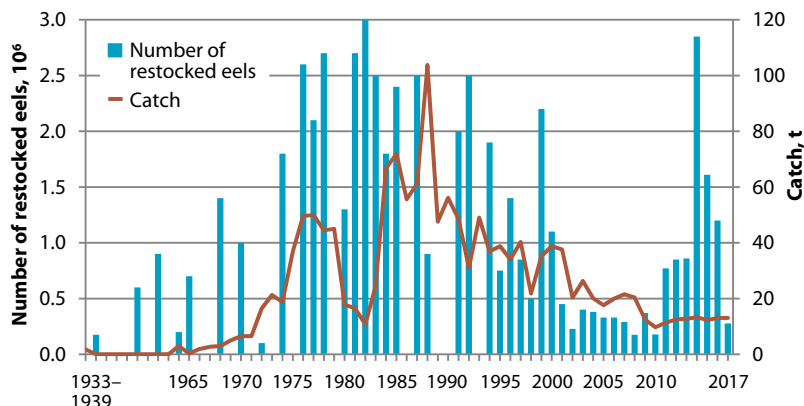


Figure 30.
Eel restocking
(number of in-
dividuals) and
catches (t) in
Lake Võrtsjärv,
1933-2017
Source: EULS

An amount of nearly 136,000 euros was envisaged for eel restocking in 2017, for which a total of 1567 kg or nearly 313,000 glass eels (with an average weight of 5 g) were released into Estonian lakes. Of that amount, 88% or 1388 kg (277,600 individuals) were introduced in Lake Võrtsjärv and 179 kg were introduced in small lakes.

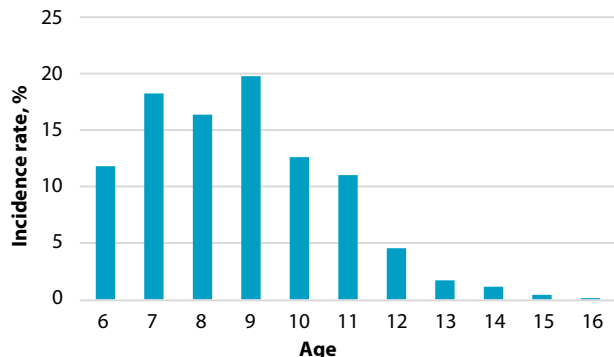
In 2016, too, the plan was to release only glass eels in lakes, but since the successful bidder failed to supply the required quantity of eel fry, a little more than half of the amount intended for glass eels was used to buy pre-farmed eels with an average weight of 9.6 g from a Dutch farm. The time of procurement has been the main reason for the failure to supply the tendered quantity of glass eels in the last few years. Namely, the quantity of glass eels to be caught during the season and the final purchase (market) price of the eels are not known when bids are made.

The restocking of Lake Võrtsjärv and small lakes with eels was organised by MTÜ Võrtsjärve Kalanduspiirkond. The project is financed by the Environmental Investment Centre, which also collects fishing fees. In 2017, the fishing fee per trap net used in Lake Võrtsjärv was 108.6 euros.

Eel catches primarily depend on the quantities restocked 6-14 years ago, and to some extent also on the weather conditions and, in the case of Lake Võrtsjärv, on the water level. Eel catches are usually highest in May and September and their bulk comprises 6-12 year-old pre-farmed eels. Glass eels released into the lake reach the fishing size during their seventh year in the lake, while pre-farmed eels (average weight 5-10 g) can be fished during their sixth year in the lake. Generally, a year class appears in catches during 7-8 years. Intensive emigration from Lake Võrtsjärv begins in the tenth year since restocking (TL 65-68 cm), after which the abundance of the year class in the lake begins to decline rapidly and older fish get caught in traps less frequently. The impact of fishing on eel abundance is several times lower than the impact of emigration, as described in Figure 31. From the seventh year, when most female eels have reached the fishing size, fishing has a similar impact on all age groups (minimum size 55 cm, permitted mesh size in the pot from 18 mm knot to knot). Catches are expected to increase significantly in the coming years, as strong year classes will reach the fishing size (Figure 30).

Apart from eel's fishery-related importance, the reproduction of this endangered species also implies a need to assess how many eels grown up in Lake Võrtsjärv are able to migrate from the river basin to the Sargasso Sea to spawn. With

Figure 31. Average incidence (%) of eel age groups in trap net catches taken from Lake Võrtsjärv, 2011-2017
Source: EULS



the support of the Environmental Investment Centre, a study was carried out in 2016 and 2017, using a 1 ha square trap system. According to the study, there were approximately half a million eels of fishing size in Lake Vörtsjärv. Official figures suggest, however, that 26,000 eels with an average weight of 500 g were caught. The study results showed that, given the average annual restocking volume of 380,000 individuals from 2002-2009 (with an average weight of 9 g at the time of restocking) and the fishing mortality rate $F = 0.05$, around 62 tonnes of silver eel emigrate from Lake Vörtsjärv per year. It should be noted that 12% of these 380,000 individuals are male eels that emigrate from Lake Vörtsjärv before reaching the established minimum size ($TL \geq 55$ cm). Test fishing showed that 46% or nearly half of the pre-farmed eels released into the lake reach the fishing size.

Pikeperch

Pikeperch is one of the most important fish species in Lake Vörtsjärv and its stocks largely determine the livelihood of fishermen. Pikeperch stock and catches have been very strong in Lake Vörtsjärv for years. Thanks to a great demand and a relatively high first-sale price (the average price was 3.37 €/kg in 2017), pikeperch has provided a considerable share of fishermen's income in recent years.

In 2017, a total of 81.6 tonnes of pikeperch was caught from Lake Vörtsjärv, incl. 82.4% (67.3 tonnes) with gill nets. The largest catches of pikeperch are usually recorded in the winter, immediately after the lake freezes over, and in the autumn. In 2017, too, the largest pikeperch catch was landed in January (21.2 tonnes), followed by September (16.6 tonnes) and October (12.6 tonnes). Due to the volatile ice conditions, only a modest catch was landed in December (1.4 tonnes). The annual catch of pikeperch per net permit was 254 kg in commercial fishing. Recreational fishermen caught only 87.5 kg of pikeperch per gill net. The catch of pikeperch taken with trap nets was almost twice as high as in 2016 (14.3 and 8.3 tonnes, respectively). A lot of undersized pikeperch of different year classes was caught in trap nets, which points to the strength of the generations to be targeted in the coming years.

The first month of under-ice gill net fishing is crucial in pikeperch fishery, regardless of when the lake freezes over. In some years, nearly 50% of the annual catch is taken during that period. As the winter progresses, fish become less mobile and increasingly fewer of them get caught in traps (Figures 32 and 33).

The size of a pikeperch cohort is determined by numerous factors, with two of them being more relevant to the survival of juveniles. First, the summer water temperature affects directly the growth rate of fry and thus the transition of juvenile pikeperch from zooplankton diet to feeding on fry, i.e. predation. The abundance of the pikeperch cohort under one year of age was much higher in 2017 (159 individuals per trawling hour) than the long-term average (104 individuals per trawling hour), but the average length of pikeperch juveniles, measured up to the end of scale cover (SL), was only 4.8 cm and their average weight was 1.1 g in October. Notwithstanding the ample food base (Lake Peipsi (dwarf) smelt as the primary object of predation), pikeperch juveniles under the age of one year had not transferred to predation by the autumn. This can be explained in particular by the long and cold spring, which significantly delayed the spawning

Figure 32. Pike-perch catches by month and fishing gear in 2017
Source: EULS

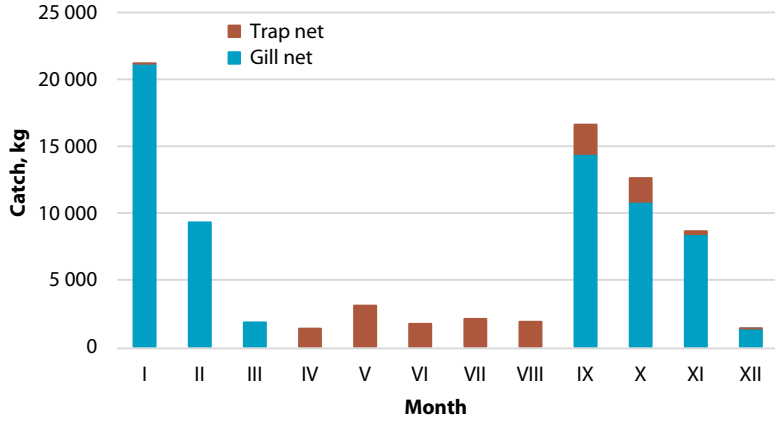


Figure 33. Average gill net catches per day in under-ice pikeperch fishing in Lake Võrtsjärv in January 2017
Source: EULS

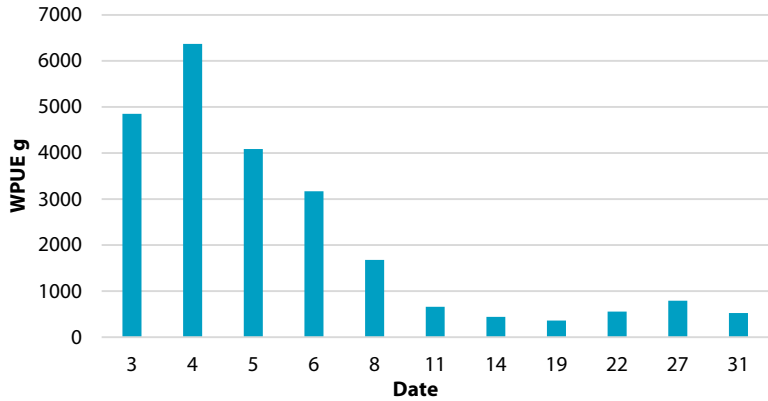
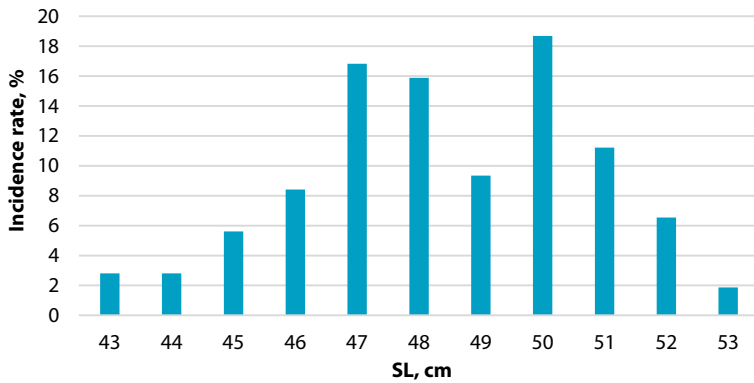


Figure 34. Length of pikeperch, measured up to the end of scale cover (SL), in gill net fishing in autumn 2017
Source: EULS



period of pikeperch. As a result, smelt managed to grow too big to be predated by young pikeperch. For comparison, 82% of the analysed pikeperch born in the summer of 2016, whose average length to the end of scale cover (SL) was 10 cm, had transferred to predation by the autumn.

During autumn gill net fishing in 2017, the average length of pikeperch, measured up to the end of scale cover (SL), was 48.4 cm and the weight was 1909 g (Figure 34). The bulk of the catch consisted of the strong cohorts of 2012 and 2013. The proportion of undersized pikeperch was 5.6% based on the data

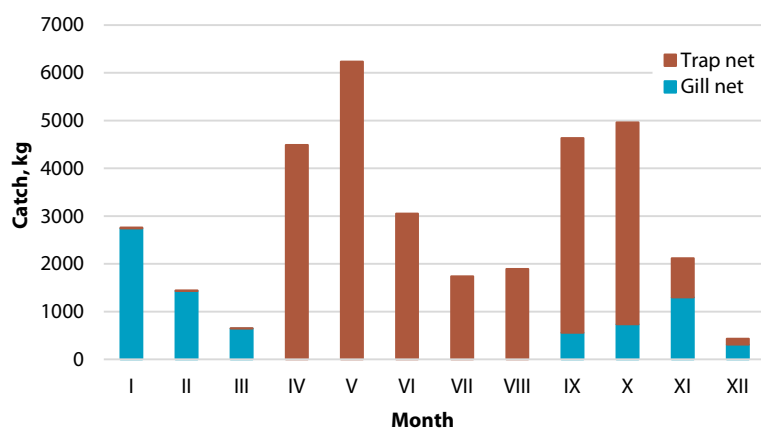


Figure 35. Pike catches by month and fishing gear in 2017
Source: EULS

of test fishing. The smallest permitted mesh size in Lake Vörtsjärv is 130 mm, or 65 mm from knot to knot.

Unlike in other lakes, the minimum size of pikeperch is 45 cm (SL) in Lake Vörtsjärv, which enables pikeperch to reproduce for at least a couple of years before being caught. As the natural mortality rate of this predatory fish at the top of the food chain is low, each pikeperch puts on 300-500 g in weight each year. This ultimately means higher catches of each year class.

Pike

Pike is the most abundant in the coastal (littoral) zone of Lake Vörtsjärv where nearly 80% of the trap net catches are taken, as well as in the shallow southern part of the lake, which is rich in vegetation. May and October are the most productive months. Gill nets are used for pike fishery in the late autumn and for under-ice fishing in the winter, when pike holds the second place after pikeperch in terms of importance to fishermen. The minimum size of pike (SL) permitted for commercial fishing in Lake Vörtsjärv is 40 cm. Since pikes tend to spawn earlier every year, a proposal was made in 2016 to allow fishing for pike to be started on 15 April instead of 1 May, starting from 2017, in order to prevent the repeated discarding of pikes immediately after the spawning period, when they are massively caught in trap nets. The proposal was approved, and nearly 4.5 tonnes of pike were caught during two weeks in April (Figure 35).

In 2017 the total pike catch taken from Lake Vörtsjärv amounted to 34.4 tonnes (Table 22), which was slightly below the long-term average (35.8 tonnes).

The length of pike caught in the test trap net in 2017 was in the range of 29-92 cm (SL) and the average weight of the pike was 1162 g. The catch was dominated by pike with the length of 40-56 cm (SL) from age groups 4+ to 6+, i.e. year classes 2011-2013. The spring water level had been significantly above the long-term average in these years, creating suitable conditions for pike spawning. The average length of pike (SL = 47.9 cm) in 2017 was more or less the same as the year before (SL = 46.2 cm).

Bream

Bream definitely accounts for the bulk of the biomass of fish fauna in Lake Võrtsjärv. In 2017, the total bream catch of commercial fishermen was somewhat smaller (54.6 tonnes) than the average of the last 10 years (71 tonnes). 87% of the catch was taken with trap nets. Spawning-time migration of large and well-fed breams into the lake through the Emajõgi River is observed in almost every spring. After this period, which lasts for 2-3 weeks, the fish return to the Emajõgi River. In a longer-term comparison, the abundance of large bream is currently moderate in Lake Võrtsjärv, catches are strong and the size and mean weight of fish are above the long-term average.

Test trawling, which has been carried out on Lake Võrtsjärv since 1978 with the same methodology, also provides important information on changes in the abundance and biomass of other fish in addition to the key commercial species. Throughout this period, bream has accounted for the largest proportion – over half in terms of weight – in trawl catches (40-68%). In 2017, this figure was 56% (Table 23). Bream was followed by roach and ruff. Pikeperch is the most abundant predatory fish in Lake Võrtsjärv.

Second-rate fish taken as by-catch in trap net fishing, of which small bream accounts for 70-80%, is no longer registered since 2011. For bream, therefore, the catch figures do not represent actual statistics that could be compared with the figures from previous years. The fishermen who have found an opportunity to sell small bream have registered all the second-rate fish as bream in their log-books. However, most fishermen do not register second-rate fish at all, because it is discarded.

Like in 2016, 0.8 kg of second-rate fish was caught per kilogram of commercial fish in test trap net fishing in 2017. Based on this ratio, the total trap net catch of commercial fish of 119 tonnes should have been accompanied by 95-100 tonnes of second-rate fish as by-catch, but it was no longer reflected in official catch statistics.

The fast growth in the abundance of second-rate fish of little value in Lake Võrtsjärv (Figure 36) is a consequence of discarding second-rate fish for several consecutive years. The sharp rise in the proportion of second-rate fish threatens the health of Lake Võrtsjärv, resulting in a deterioration of the quality of water and impairing food competition among fish. The food competition is becoming tighter in particular among benthivorous fish (eel, bream, ruff, silver bream). Therefore, it is imperative to find ways of adding value to second-rate fish in order to generate the interest of all fishermen to bring it ashore. A special project was initiated to this end in 2017. The decline in the weight of second-rate fish in the last three years is a positive trend.

The prospects of catches from Lake Võrtsjärv for the next few years continue to be good or moderate for most key species (Table 24).

Table 23. Species composition, abundance and weight (number of individuals and proportion per trawling hour and weight in grams) of trawling catches from Lake Vörtsjärv in 2017

| Species | WPUE (g/h) | | NPUE (ind./h) | | Average weight of fish, g |
|---------------------------|----------------|------------|---------------|------------|---------------------------|
| | TW, g | % | No. of ind. | % | |
| Lake Peipsi (dwarf) smelt | 1668 | 0.6 | 605 | 4.4 | 2.8 |
| Eel | 127 | 0.0 | 0.4 | 0.0 | 318 |
| Pike | 5625 | 1.9 | 3.2 | 0.0 | 1786 |
| Roach | 51,651 | 17.3 | 4035 | 29.3 | 12.8 |
| Bleak | 16,280 | 5.5 | 1839 | 13.4 | 8.9 |
| Bream | 168,479 | 56.5 | 2500 | 18.2 | 67.4 |
| Silver bream | 5967 | 2.0 | 242 | 1.8 | 24.7 |
| Gudgeon | 195 | 0.0 | 19 | 0.1 | 10.3 |
| Burbot | 93 | 0.1 | 0.1 | 0.0 | 930 |
| Perch | 216 | 0.1 | 20 | 0.1 | 10.8 |
| Pikeperch | 22,439 | 7.5 | 173 | 1.3 | 130 |
| Ruff | 25,575 | 8.6 | 4328 | 31.4 | 5,9 |
| Total | 298,330 | 100 | 13,765 | 100 | 22 |

Source: EULS

Table 24. General assessment of state of stocks and fishing mortality in Lake Vörtsjärv in 2017 and the near future, by key species

| Species | State of stocks | | | Fishing mortality |
|---------------------------|-----------------|------------|------------|-------------------|
| | 2016 | until 2017 | until 2019 | |
| Eel | 2 | 2 | 2 | A |
| Pikeperch | 1 | 1 | 1 | B |
| Pike | 2 | 2 | 2 | B |
| Bream | 1 | 1 | 1 | A |
| Perch | 3 | 3 | 3 | B |
| Burbot | 3 | 3 | 3 | A |
| Lake Peipsi (dwarf) smelt | 1 | 1 | 1 | – |

Comment: State of stocks – 1: good; 2: moderate; 3: poor; 4: depleted;
fishing mortality – A: low; B: moderate; C: high; D: insufficient data.

Source: EULS

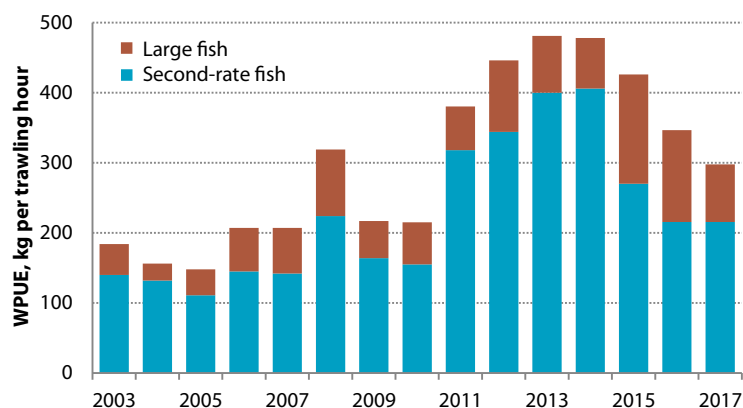


Figure 36. Trawling catches from Lake Vörtsjärv, kg per trawling hour, 2003-2017
Source: EULS

LAKE PEIPSI FISHERY

Based on the quotas and catches that reflect the condition of fish stocks, 2017 was more or less as good a year for fishery on Lakes Peipsi and Lämmijärv as 2016. Overall, both quotas (Table 25) and catches (Table 26) were high in 2017. In terms of the outlook of fish stocks, however, it was not a good year at all. The stocks of the more valuable fish of the lake – pikeperch and perch – were exhausted, as the strong year classes of 2009 and 2012 that had generated large catches were depleted, and the cool spring and summer resulted in modest reproduction. However, low water temperatures were favourable for Lake Peipsi (dwarf) smelt as the main food object of the predatory fish of the lake.

State of fish stocks and changes

The stock of **pikeperch** – the most important commercial species of the lake – was moderate, consisting mainly of fish representing year class 2012. In the second half of the year, fish born in 2015 and 2016 were added to the stock. The

Table 25. Estonian national quotas (t) on Lakes Peipsi and Lämmijärv from 2011-2017 and average quotas for the period

| Species | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | Average |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Pikeperch | 672 | 714 | 650 | 650 | 650 | 758 | 866 | 709 |
| Perch | 900 | 1400 | 1000 | 800 | 850 | 1032 | 1182 | 1023 |
| Pike | 110 | 160 | 165 | 120 | 125 | 121 | 131 | 133 |
| Bream | 600 | 614 | 650 | 750 | 710 | 761 | 836 | 703 |
| Roach | 305 | 300 | 280 | 350 | 275 | 300 | 350 | 309 |
| Whitefish | 5 | 3 | 2 | 1 | 1 | 1 | 1 | 2 |
| Smelt* | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Vendace | 10 | 15 | 15 | 25 | 15 | 15 | 45 | 20 |
| Burbot | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Ruff | 300 | 300 | 150 | 150 | 150 | 150 | 150 | 193 |
| Other species** | 50 | 50 | 25 | 25 | 25 | 25 | 1 | 29 |
| Total | 3007 | 3611 | 2992 | 2926 | 2856 | 3217 | 3618 | 3175 |

* The smelt quota is intended for test fishing.

Source: UT EMI

** Until 2016 – tench, ide, silver bream and eel; in 2017 – only eel.

Table 26. Estonian catches (t) from Lakes Peipsi and Lämmijärv from 2011-2017 (incl. research fishing), and average catches for the period

| Species | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | Average |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Pikeperch | 672 | 646 | 637 | 599 | 420 | 720 | 839 | 648 |
| Perch | 757 | 1061 | 914 | 787 | 818 | 1 000 | 661 | 857 |
| Pike | 100 | 153 | 143 | 120 | 94 | 94 | 97 | 114 |
| Bream | 578 | 577 | 604 | 748 | 676 | 665 | 758 | 658 |
| Roach | 225 | 207 | 185 | 217 | 211 | 194 | 191 | 204 |
| Smelt | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 1 |
| Whitefish | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Vendace | 1 | 3 | 10 | 22 | 13 | 15 | 45 | 15 |
| Burbot | 30 | 21 | 23 | 20 | 17 | 26 | 44 | 26 |
| Other species | 9 | 3 | 5 | 6 | 8 | 5 | 4 | 6 |
| Total | 2371 | 2671 | 2520 | 2521 | 2256 | 2723 | 2644 | 2529 |

Source: MoRA

new pikeperch cohort of 2017 is scarce. The stock of the other valuable target species – **perch** – did not reach the estimated level; the reason for this is the slow growth of the strong cohort of 2015. As a result, the catch was lower than expected and the bulk of it still consisted of the perch cohort of 2012. A new strong perch cohort is unlikely to have been born in 2017. The stock of **bream** continued to be in good condition, with the generations of fish born in the middle and late 2000s dominating the stock. The **pike** stock remained moderate, with year classes 2009-2012 accounting for its bulk. The **roach** stock also remained in good condition and the cohorts of 2009-2012 played the most significant role in it, too. The condition of the **vendace** stock of the lake was relatively good, but the opportunities of commercial fishing were increased only to a limited extent due to the dominance of juveniles of the cohorts of 2015 and 2016 (Figure 37), unpredictable weather conditions and possible pressure from predatory fish. The stock of **Lake Peipsi (dwarf) smelt** (Figure 38) was also in quite good shape, but the abundance of predatory fish did not allow commercial fishing to be started. Lake Peipsi whitefish and burbot, which also represent the lake’s cool-water fish fauna like smelt and vendace, have not shown an increase in stocks yet. These species were permitted to be caught in the same quantities as in earlier years and only as by-catches.

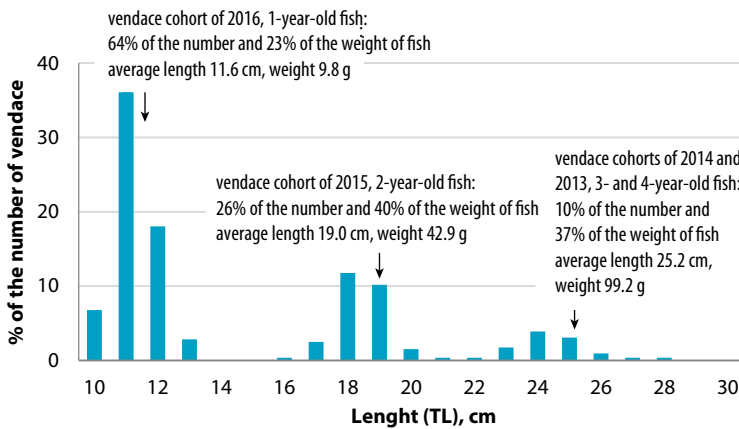


Figure 37. Composition of the vendace stock of the lake based on trawling in spring 2017
Source: UT EMI

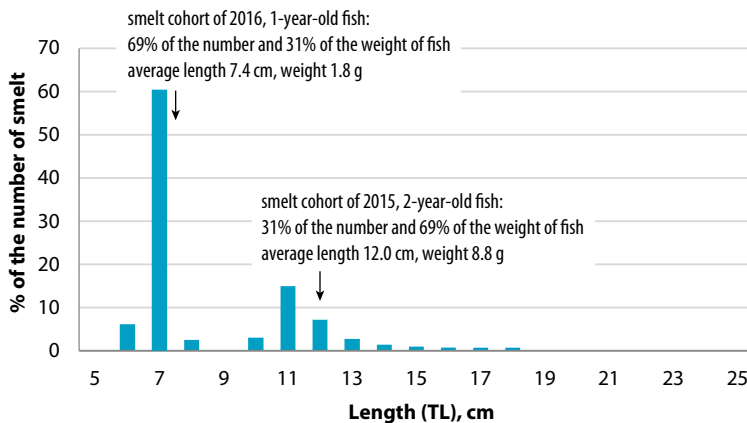


Figure 38. Composition of the smelt stock of the lake based on trap net fishing in spring 2017
Source: UT EMI

Fishery management

In 2017, the previous fishing regime continued without any major changes being made in it. Only a few new fishing restrictions were introduced during the year in addition to the traditional moratoria. The first was related to fishing for vendace (prohibition on fishing for the species and prohibition on using pound nets from 15 July, in addition to the area closed for fishing with “ordinary” trap nets in the deep-water parts of the lake) and resulted from the exhaustion of the quota due to overcapacity. The second, more extensive restriction concerned fishing for pikeperch and perch (increasing the smallest mesh size of the cod end of seines from 24 mm to 45 mm (measured from knot to knot) from 6 October, with the simultaneous increase of the minimum size of pikeperch from 25/30 cm to 40/46 cm as laid down in regulations) due to the need to protect pikeperch juveniles against overfishing. As the perch stock did not become mature by the autumn commercial fishing, this restriction was fully justified.

In general, however, fishing continued under agreed conditions (except for gill net fishing that started on the Estonian side on 15 September, as was the case with fishing with seines) and until the end of the year, which is quite unusual in Lake Peipsi fishery on the Estonian side. Of the permitted 700 fishing days, 571 (82%) were used for fishing with Danish seines, including 273 days when large-mesh cod ends were used. Due to the long fishing period, the large fishing quotas for 2017 were used up without difficulty (Table 27). Lower quota uptakes resulted from either a lack of fishing interest (in the case of roach and ruff) or an unsuitable composition of the stock (in the case of perch). The balances of the

Table 27. Estonian catches (incl. research fishing), quotas and balances (t) and quota uptake levels (%) in Lakes Peipsi and Lämmijärv in 2017

| Species | Catch | Quota | Uptake | Balance |
|---------------|-------------|-------------|-----------|------------|
| Pikeperch | 839 | 866 | 97 | 27 |
| Perch | 661 | 1182 | 56 | 521 |
| Pike | 97 | 131 | 74 | 33 |
| Bream | 758 | 836 | 91 | 78 |
| Roach | 191 | 350 | 55 | 159 |
| Whitefish | 0 | 1 | 19 | 1 |
| Smelt | 4 | 5 | 81 | 1 |
| Vendace | 45 | 45 | 100 | 0 |
| Burbot | 44 | 50 | 88 | 6 |
| Ruff | 1 | 150 | 0 | 149 |
| Eel | 0 | 1 | 3 | 1 |
| Other species | 3 | – | – | – |
| Total | 2644 | 3618 | 73 | 973 |

Source: MoRA

Table 28. Number of companies and fishermen related to Lake Peipsi, 2011-2017

| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|------------|------|------|------|------|------|------|------|
| Companies* | 71 | 68 | 66 | 70 | 71 | 68 | 67 |
| Fishermen | 406 | 383 | 367 | 367 | 325 | 302 | 282 |

* The companies to which fishing permits have been issued.

Source: MoRA

quotas of key commercial species (pikeperch, perch, pike and bream) were permitted to be carried over to the next year to the extent of 5%.

Nearly 100 companies had the right to fish on the lake (89 at the beginning of the year, to which 10 companies were added during the year), but only 67 companies were actually engaged in fishing. The rest of the fishing rights have been leased to affiliated or outside companies. While the number of companies engaged in fishing on the lake has remained more or less the same in recent years, the number of fishermen has decreased by more than 100 people since 2011 (Table 28). Obviously, the income from fishing (which is moreover seasonal) does not motivate people to work in the sector anymore. In 2017 the number of fishing vessels registered according to their home ports was 374 on Lakes Peipsi and Lämmijärv.

Catches

In 2017, commercial fishermen caught 2644 tonnes of fish on the Estonian side of Lakes Peipsi and Lämmijärv, which is approximately 100 tonnes more than the average of the previous years, but also 100 tonnes less than a year ago. The decline was caused by a decrease in the perch catch, which was somewhat offset by increasing catches of pikeperch, bream, vendace and burbot (Table 26). Predatory fish (pikeperch, perch, pike and burbot) accounted for 62% of the total catch; this figure is approximately coincident with the proportion of species with a high export value (pikeperch, perch and partly pike) in the catch. Non-predatory fish (bream, roach, vendace and ruff) and fish of primarily local importance accounted for 38% of the total catch taken on the Estonian side. The proportion of fish feeding on plankton (vendace, whitefish and smelt) remained very low – less than 2% of the total catch taken in the lake.

Due to the fishing regime, stock composition, fishing interest and specific natural conditions, fishing in Lakes Peipsi and Lämmijärv depends on a particular season and on the uptake of annual and semi-annual quota. Under-ice fish-

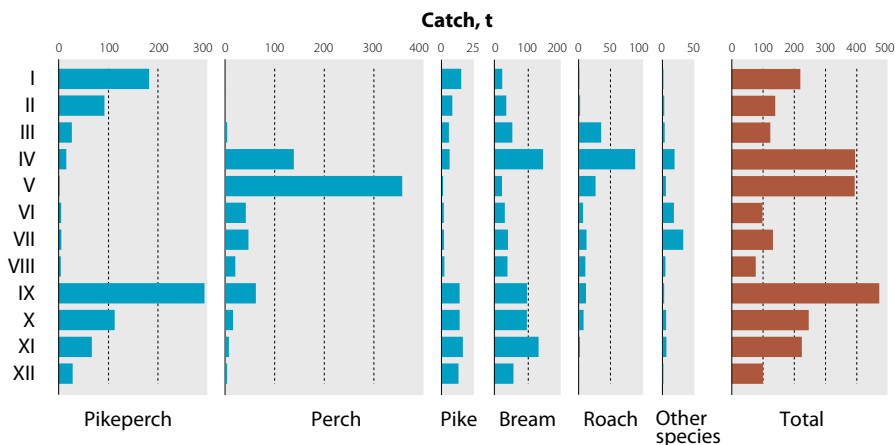


Figure 39. Dynamics of catches from Lakes Peipsi and Lämmijärv by species in 2017

Source: UT EMI

ing lasted for around two months – from mid-January to mid-March, spring fishing lasted until 5 May, fishing for vendace lasted only from 20 June to 14 July and more intense autumn fishing lasted from 15 September to 6 October. As usual, the largest catches were taken in September (Figure 39) when all the key types of fishing gear were used on the lake at the same time. The catch then amounted to 473 tonnes, which represented 18% of the annual catch. Large catches were also landed in April and May, 395 and 393 tonnes, respectively, which accounted for approximately 15% of the annual catch in both cases. The largest catch of pikeperch was taken in September and January, the perch catch was the highest in May, the catches of pike were the largest in autumn months and in January, bream catches were the strongest in April and November and the roach catch was the best in April (Figure 39). The largest catch of vendace was landed in July.

Considering the year as a whole, trap nets and lines of trap nets were the most productive fishing gear, which accounted for almost a half of the annual total catch and were followed by large-mesh gill nets and Danish seines (Table 29). Pikeperch and pike were mainly caught using large-mesh gill nets; trap nets were used in fishing for perch and vendace; bream was caught using large-mesh gill nets and lines of trap nets; roach was caught using trap nets, lines of trap nets, and small-mesh gill nets; and burbot was caught using both trap nets and lines of trap nets (Table 30).

The total value of the catches taken from the lake was almost as high as a year ago – around 5 million euros (Figure 40). Pikeperch accounted for over half

Table 29. Catches (t) from Lakes Peipsi and Lämmijärv (without research fishing), average per fishing gear and proportions (%), 2011-2017

| Fishing gear | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | Average | Proportion |
|--------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|
| Gill nets, LM | 673 | 553 | 779 | 798 | 617 | 719 | 814 | 708 | 28 |
| Gill nets, SM | 77 | 60 | 57 | 99 | 93 | 83 | 71 | 77 | 3 |
| Trap nets | 671 | 403 | 458 | 539 | 629 | 712 | 657 | 581 | 23 |
| Lines of trap nets | 635 | 564 | 664 | 733 | 657 | 671 | 609 | 648 | 26 |
| Danish seines | 287 | 1058 | 524 | 320 | 225 | 494 | 451 | 480 | 19 |
| Other fishing gear | 10 | 13 | 8 | 11 | 12 | 15 | 23 | 13 | 0 |
| Total | 2353 | 2651 | 2490 | 2500 | 2232 | 2695 | 2626 | 2507 | 100 |

Abbreviations: LM – large-mesh (mesh size from knot-to-knot at least 65 mm),
SM – small-mesh (mesh size from knot-to-knot 28–40 mm).

Source: MoRA

Table 30. Catches (t) from lakes Peipsi and Lämmijärv (without research fishing) by species and by fishing gear in 2017

| Fishing gear | Pikeperch | Perch | Pike | Bream | Roach | Vendace | Burbot | Other species | Total |
|--------------------|------------|------------|-----------|------------|------------|-----------|-----------|---------------|-------------|
| Gill nets, LM | 497 | 3 | 66 | 239 | 0 | 0 | 8 | 1 | 814 |
| Gill nets, SM | 0 | 2 | 1 | 0 | 67 | 0 | 0 | 1 | 71 |
| Trap nets | 44 | 417 | 6 | 85 | 51 | 35 | 19 | 0 | 657 |
| Lines of trap nets | 56 | 179 | 13 | 273 | 66 | 3 | 17 | 2 | 609 |
| Danish seines | 227 | 58 | 7 | 155 | 4 | 0 | 0 | 0 | 451 |
| Other fishing gear | 11 | 0 | 4 | 1 | 0 | 6 | 0 | 0 | 23 |
| Total | 836 | 660 | 97 | 753 | 188 | 45 | 44 | 4 | 2626 |

Abbreviations: LM – large-mesh (mesh size from knot-to-knot at least 65 mm),
SM – small-mesh (mesh size from knot-to-knot 28–40 mm).

Source: MoRA

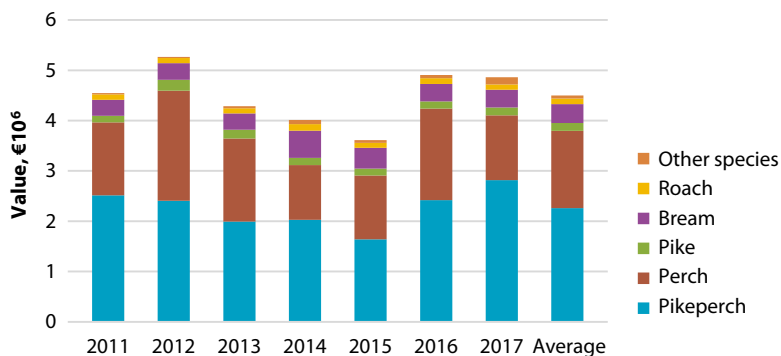


Figure 40. Values of catches taken from the lake in millions of euros and the average value, by species, 2011-2017
Source: UT EMI

(58%) of the value of the catches this time; the share of perch was around a quarter (26%). The value of catches taken with large-mesh gill nets amounted to 1.9 million euros, as was the case with catches taken with trap nets and lines of trap nets, and catches taken with Danish seines were worth around 1 million euros.

Fish caught from the lake was landed in 42 lakeside ports and in Kavastu port by the Emajõgi River. The largest fishing ports are located in Kallaste, Varinja and Lohusuu.

Problems and possible solutions

As was also demonstrated by the autumn fishing with seines in 2017, Estonian fishermen have made it a habit to use large-mesh seines whenever possible. Fishing for perch is not the only goal – bream, large pikeperch and pike constitute target species of equal importance. This attitude may in the future give the opportunity to stop reducing the minimum size of pikeperch, and perch would then mainly be fished with trap nets and lines of trap nets in late spring/early summer. Individual quotas would be of great help in this regard, enabling companies to use all of their fishing gear (trap nets, gill nets and seines) with the necessary flexibility, as opposed to the current situation in which all the permitted fishing gear must be used for fishing to the maximum extent.

LAMPREY FISHING ON ESTONIAN RIVERS

Traditionally, lamprey has been highly valued in Estonia and in our neighbouring countries. Recent development, such as price dynamics, point to the growing popularity of lamprey. The estimated first-sale price of lamprey has increased by 2.5 times over the last ten years (Table 8). From 2013 to 2015, eel was the only species in the catches of Estonian fishermen for which a higher price per kilogram was paid than for lamprey. In terms of price per kilogram, lamprey held the fifth place in 2017, outstripping both pikeperch and vendace.

According to official data, lamprey was caught in 28 watercourses in Estonia (Table 31), and in a negligible amount also in the coastal sea in 2017. Only commercial fishing is allowed. Official lamprey catches amounted to 30.8 and 40.9 tonnes in Estonia in 2016 and 2017, respectively (around 440,000 and 590,000

individuals). As always, the biggest catches continue to be taken from the Narva River, while the sequence of the other lamprey rivers in terms of catches varies from year to year.

In 2017, Reiu, Jägala, Pärnu and Pirita rivers stood out more clearly catch-wise: the annual catch taken in each of these rivers exceeded one tonne and represented 86% of the total lamprey catch in Estonia together with the catch taken in the Narva River. During the two years, steadily high catches were also taken in Rannametsa, Vääna and Kunda rivers. In more than two thirds of the lamprey rivers, the catch taken in 2017 exceeded the catch of 2016. Among the most important lam-

Table 31. Commercial lamprey catches (kg) taken in Estonian water bodies in 2016 and 2017 according to official data

| | 2016 | 2017 |
|----------------------------------|---------------|---------------|
| Narva river | 21,216 | 26,874 |
| Other inland water bodies | 9511 | 13,944 |
| Reiu River | 1 165 | 3168 |
| Jägala River | 1 505 | 2260 |
| Pärnu River | 2 306 | 1857 |
| Pirita River | 570 | 1058 |
| Kunda River | 457 | 684 |
| Rannametsa River | 650 | 626 |
| Vääna River | 623 | 572 |
| Pudisoo River | 143 | 528 |
| Lemme River | 200 | 469 |
| Keila River | 242 | 454 |
| Selja River | 290 | 335 |
| Lood Stream | 127 | 318 |
| Häädemeeste River | 154 | 312 |
| Valgejõgi River | 347 | 307 |
| Audru River | 98 | 278 |
| Mustoja River | 331 | 129 |
| Treimani Stream | 22 | 125 |
| Riguldi River | 82 | 105 |
| Nõva River | 61 | 88 |
| Pada River | 64 | 84 |
| Vainupea River | 15 | 57 |
| Uruste Stream | – | 41 |
| Kadaka Stream | 17 | 39 |
| Loobu River | 10 | 37 |
| Priivitsa Stream | 32 | 8 |
| Vasalemma River | – | 5 |
| Toolse River | 2 | 1 |
| Coastal sea | 87 | 120 |
| Gulf of Riga | 87 | 120 |
| Total | 30,814 | 40,938 |

Source: MoRA

Table 32. Official lamprey catches (t) in Estonia, 2008-2017

| Year | Total catch | Narva River | Other inland water bodies | Coastal sea |
|--------------|--------------|--------------|---------------------------|-------------|
| 2008 | 66.7 | 54.9 | 11.8 | <0.1 |
| 2009 | 59.1 | 46.2 | 12.8 | 0.2 |
| 2010 | 41.0 | 30.9 | 9.6 | 0.6 |
| 2011 | 39.6 | 23.1 | 15.6 | 0.9 |
| 2012 | 45.0 | 32.0 | 12.6 | 0.4 |
| 2013 | 41.2 | 30.5 | 9.6 | 1.0 |
| 2014 | 30.0 | 20.8 | 8.9 | 0.3 |
| 2015 | 46.7 | 34.5 | 12.0 | 0.2 |
| 2016 | 30.8 | 21.2 | 9.5 | 0.1 |
| 2017 | 40.9 | 26.9 | 13.9 | 0.1 |
| Total | 441.0 | 321.0 | 116.3 | 3.8 |

Source: MoRA

prey rivers, the catch taken in the Pärnu River declined to a considerable extent. By contrast, the catch taken in the Reiu River, which flows into the Pärnu River, reached the level that was last recorded in 2011.

Looking at the official lamprey catches over the last decade, one could argue that the catch of 2016 was weak and the figure for 2017 was average. Table 32 details lamprey catches taken in the Narva River, because this large river provides the bulk of Estonia's total catch each year and changes occurring there might overshadow the rest of the trends. The average proportion of lamprey catches from the Narva River has been 72% (58%-82%) during ten years. Only around 1% of the total catch is taken in coastal sea.

Annual lamprey catches have fluctuated between 3 tonnes and 68 tonnes in Estonia during the past fifty years. According to the available historical data, the highest catch has amounted to as much as 100 tonnes. This instability is due primarily to the fact that individuals of one year class are fished for and the catch depends on the abundance the particular year class. Against this backdrop, catches taken in the past decade have been relatively stable.

The estimated value of the lamprey catch, based on first-sale prices, amounted to around 152,000 euros in 2016 and around 204,000 euros in 2017. The catch value varied across regions. The lion's share of the catch value (around 137,000 euros in 2017) was earned by fishermen fishing on the Narva River and it has significant economic importance in the region.

Lamprey is caught using cone traps and lamprey fyke nets in Estonian rivers. The maximum number of fishing gear was the same in 2016 and 2017 (Table 33). The bulk of the maximum number of cone traps (15,000) was allocated to the Narva River, but lamprey fyke nets were not used in that river in these years.

Most of the catch is taken with cone traps in other inland water bodies, as well (Table 34). The proportion of lamprey fyke nets in the total catch is less than 10%.

The largest share of the lamprey catch taken with fyke nets (nearly 77% of the total lamprey fyke net catch) originates from three rivers – Jägala, Valgejõgi and Puidisoo rivers. In 2017, these rivers contributed to the lamprey fyke net

Table 33. Maximum number of lamprey fishing gear permitted to be used in inland water bodies in 2017 under commercial fishermen's permits

| | Cone trap | Lamprey fyke net |
|--------------|---------------|------------------|
| Ida-Viru | 15,000 | |
| Pärnu | 2000 | 15 |
| Harju | 700 | 45 |
| Lääne-Viru | 500 | 17 |
| Lääne | 100 | |
| Saare | | 4 |
| Total | 18,300 | 81 |

Source: MoRA

Table 34. Official commercial lamprey catches (kg) in 2016 and 2017, by fishing gear

| Fishing ground and gear | Year | |
|--|---------------|---------------|
| | 2016 | 2017 |
| Narva River | 21,216 | 26,874 |
| cone trap | 21,216 | 26,874 |
| Other inland water bodies | 9511 | 13,944 |
| cone trap | 7944 | 1962 |
| lamprey fyke net | 1567 | 11,982 |
| Coastal sea | 87 | 120 |
| trap/fyke net with mouth height of 1-3 m | 38 | 103 |
| trap/fyke net with mouth height of up to 1 m | 37 | 11 |
| pelagic trap/fyke net | 12 | 6 |
| Total | 30,814 | 40,938 |

Source: MoRA

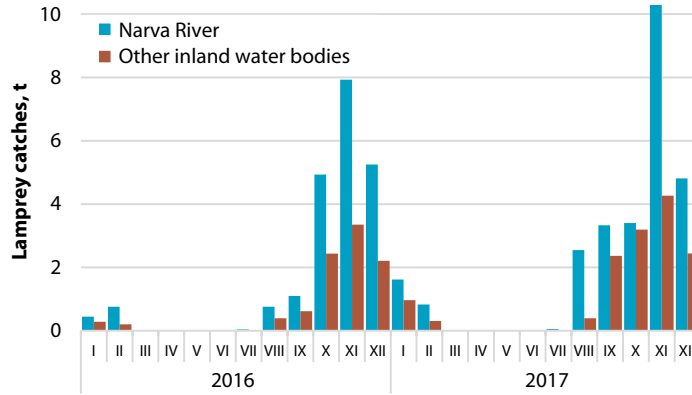


Figure 41. Dynamics of official commercial lamprey catches taken in Estonian inland water bodies in the different months of 2016 and 2017 Source: MoRA

catch as follows: Jägala River 39%, Pudisoo River 23% and Valgejõgi River 15%. Fyke nets accounted for over 80% of the lamprey caught in the Valgejõgi and Pudisoo rivers and 34% of the lamprey catch taken in the Jägala River.

The temporal distribution of lamprey fishery is described in [Figure 41](#). While 2016 was more favourable for lamprey fishing during a shorter period (mainly from October to December), in 2017 considerable catches were landed at the end of the summer already. This could be due to the abundance of precipitation that began in September and continued in the subsequent autumn months, which increased the flow in rivers and activated lamprey migration.

For consumers, lamprey is of the best quality in autumn. It has just finished eating and is migrating to wintering grounds at that time. Lamprey will spawn in the spring and it will not eat in the meantime; thus, its weight and body length begin to decline due to starvation and production of reproductive products. Its weight and length will decrease by approximately 20% and 15%, respectively, and its fat content will decline as well. In view of rational exploitation of stocks, therefore, the current temporal restriction on fishing serves its purpose (fishing in rivers is prohibited from 1 March to 30 June).

Most of the conclusions set out in this chapter are based on official catch statistics. However, as far as fishery goes, it is admittedly short-sighted to assume that official data reflect the actual situation precisely. This is a general problem which has been amply demonstrated by a number of significant cases in the lamprey fishery sector of Estonia. The difference between permitted and actual fishing gear used in the Narva River has been the most conspicuous problem.

From 2014-2017, it was permitted to use 15,000 cone traps in the Narva River, and this number was also reported in statistics. The fact that the Environmental Inspectorate removed 17,483 illegal cone traps from the Narva River in 2014 gives an idea of the amount of fishing gear actually used. It is to be concluded that the actual number of fishing gear used in the river was approximately twice the permitted number. In subsequent years, the Inspectorate has removed another 8000 illegal cone traps from the Narva River. How the illegal catch was reflected in official statistics is not known.

Violations of rules are not limited to non-compliance with the maximum amount of permitted fishing gear. For example, illegal transformation of the riverbed with a view to attaining higher catch efficiency is also a problem in small rivers. Excessive fishing efforts and impairment of the quality of habitats may cause significant damage to lamprey stocks.

For decades, shrinking spawning grounds have been the main factor behind the decrease in the abundance of lamprey in Estonia. Lamprey can spawn only in rapid sections of rivers, but access to these is severely limited due to dams. The situation has begun to improve in recent years, because the state has initiated the construction of fish passes in dams. The passes have been built on many rivers and are about to be completed on a number of larger rivers in the near future. The plan to open the Sindi dam for migration of fish on the Pärnu River, which is currently being implemented, is worth highlighting in this regard. Demolition work to improve migration conditions began in October 2018 and is planned to be completed within three years. When the plan is implemented, the lamprey stock of the region is expected to grow by an order of magnitude. Hopefully, the water supply problem of the currently dry Narva River canyon will also be solved in the coming years. This would enable the lamprey stock of the Narva River to be increased considerably.

Lamprey has a special conservation status in the European Union - while being one of the species in need of protection according to the Habitats Directive (92/43/EEC), it may be caught in a manner and volume that does not jeopardise the good conservation status of populations. Thus, overfishing of lamprey must be avoided and its habitats must be improved for stock management as well as conservation purposes.

In summary, fishing for lamprey is important in Estonia. Lamprey is still in good enough condition to provide fishing opportunities in Estonia. The situation is expected to improve further in the coming years thanks to the restoration of the quality of river habitats.

Recreational fishing

One of the major developments affecting both commercial and recreational fishing was the entry into force of the new Fishing Rules on 1 January 2017. Among other things, the use of recreational fishing gear in inland water bodies, the keeping of fish in the water body after fishing, the minimum sizes of fish and the periods and areas of moratoria on fishing were specified. A description and drawings of a new fishing gear – trap net (kadiska) – were also included in the Fishing Rules.

Changes introduced in the Fishing Rules

A new minimum size was set for **turbot** in order to increase the number of spawning individuals and thus ensure better conservation of the stock. Conversely, the minimum size for **smelt** was abolished. It is a delicate fish and the survival rate of its discarded undersized individuals, especially in commercial fishing, is rather low. Thus, setting a minimum size for this species is not the most effective measure – rather the opposite. Since discarded individuals incapable of surviving are not included in the quota, fishermen will have to continue fishing. This means that, in order to use up the quota, undersized fish are killed in vain to catch fishing-size individuals.

The geography of application of the minimum size was specified for **salmon** and **eel**. While no minimum size had been applied in fishing for eel in the sea, the new rules set the minimum size of 35 cm (TL). The minimum size is necessary to protect the species in the Baltic Sea, where eel stock has been rather scarce in recent years. For salmon, the minimum size that previously had been applied only in rivers flowing into the sea was extended to all water bodies. This measure allows more individuals to reach maturity and enhances natural reproduction.

The introduction of a minimum size for **burbot** in all water bodies caused the most resentment among recreational fishermen. Previously, it was applied only in Lakes Peipsi, Lämmijärv and Pihkva, where there are enough fishing-size individuals besides the undersized individuals, but the chance of catching a fishing-size burbot is much slimmer or even non-existent in smaller water bodies. However, according to researchers, the status of the burbot stock in the rest of the water bodies is not very good and the fact that non-mature individuals are being caught is considered to be a key hindering factor. This problem can only be solved by establishing a minimum size. The minimum size set for burbot remained in effect despite the requests of recreational fishermen.

Weekly gill net permits were introduced for recreational fishing. Until 2017, a recreational fisherman could buy a gill net fishing card for one or more calendar months. The only exception was Lake Peipsi, where periods of varying lengths have been used since 2006. For example, in 2016, gill net permits were

valid from 1 March to 4 May. It was not possible to buy a fishing card for gill net fishing for a shorter period than one calendar month.

Because of the persistently high demand for gill net permits in some of the counties bordering the sea (e.g. Harju County), the limit of permits set there is reached within minutes on the application day. Obviously, such an allocation system cannot satisfy the wishes of all applicants and has caused a lot of resentment for many years. As fishing efforts cannot be increased by raising the limits, the only option was to introduce shorter fishing periods.

Thus, it was decided to divide 25% of the limit of monthly permits for the sea into weekly permits¹. As a result, the number of permits issued in one month almost doubled. For example, while 400 monthly fishing cards for fishing with gill nets had been issued in Harju County in May 2016, 300 such cards plus 400 weekly fishing cards were issued in 2017. The fishing effort remained the same, but the number of people allowed to fish increased significantly. The condition that a fisherman who already had a monthly permit could not buy a weekly permit falling in the same period, and vice versa, was also set. The price of a monthly gill net fishing card was set at 13 euros and the price of a weekly permit was set at 7 euros.

In June 2017, the **ban on recreational gill net fishing** in inland water bodies was introduced as an important change. Previously, the ban had been in force from March to May. The introduction of the ban was due to the need to better protect pikeperch and tench in inland water bodies. Allowing gill net fishing during the spawning period of both of these species may result in higher mortality.

Recreational fishing in figures

The number of permits attesting to an effective recreational fishing right was 106,616 in 2017 (Figure 42)² or 16,268 more than in 2016. The sale of one-day fishing rights increased the most (around 25%). The number of fishermen with Estonian ID codes buying recreational fishing rights did not change much – foreign fishermen (mostly Latvians) accounted for the increase (Figure 43).

In 2017, 24,677 fishing cards were issued for recreational fishing (Table 35). Traditionally, the highest number of fishing cards was issued for fishing with gill nets, followed by permits for fishing with hook gear in nature reserves and permits for salmon and trout rivers. The number of fishing cards purchased for salmon rivers increased for the second consecutive year³. To some extent, this development probably reflects the improvement of salmon and sea trout stocks. The increase in the number of fishing cards issued for gill net fishing is directly linked to the introduction of weekly permits for fishing in the sea.

In 2015, the Ministry of the Environment commissioned a quantitative survey of recreational fishing in Estonia, which revealed that the number of recreational fishermen was around 150,000 in 2015⁴. However, this number is not

¹ A weekly or seven-day permit was valid for a calendar week (Monday to Sunday) and a separate limit was set for each week.

² The fee for the recreational fishing right is paid for fishing with hook gear. A person can buy several fishing rights with different validity periods (e.g. one-day permits) during the year.

³ In this context, salmon rivers include the Narva, Jägala, Selja, Pirita, Vääna, Purtse and Valgejõgi rivers.

⁴ https://www.envir.ee/sites/default/files/harrastuskalastajate_uuring_2016_euk_logodega.pdf.

realistic, as it exceeds, for example, twice the number of members of the Estonian Fishermen’s Society during Soviet times. Back then, membership in the society gave the right to fish with recreational fishing gear (other than a simple hand line) and that is why most fishermen were members of the society. However, there is no reason to believe that the popularity of fishing has increased so rapidly after the restoration of independence. The survey result might be due to an error in the assessment methodology.

If repeated personal ID codes (some fishermen held several permits during the season) are excluded, it appears that 42,135 Estonian citizens were engaged in fishing under the recreational fishing right in 2017. If we include in the calculation the people who fish without a charge (pupils, disabled persons, pensioners; around 30% of the above number), then the result for 2017 is 54,775. This figure reflects those fishing with hook gear. Fishing card holders with an Estonian ID code amounted to 9943. If we add up the holders of fishing rights and fishing cards and deduct the number of those fishing under both rights, the final result is 59,556 unique personal ID codes, each of which stands for a specific person. When adding to this result the people who fish with a simple hand line for free and the people who failed to pay for their fishing rights, it can be assumed that some 75,000–80,000 people engage in recreational fishing at least once a year (Table 36).

Figure 42. Number of persons with recreational fishing right by duration of the right, 2012-2017

Source: MoE

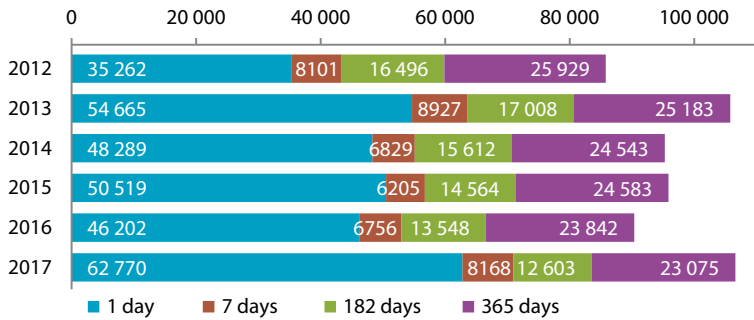
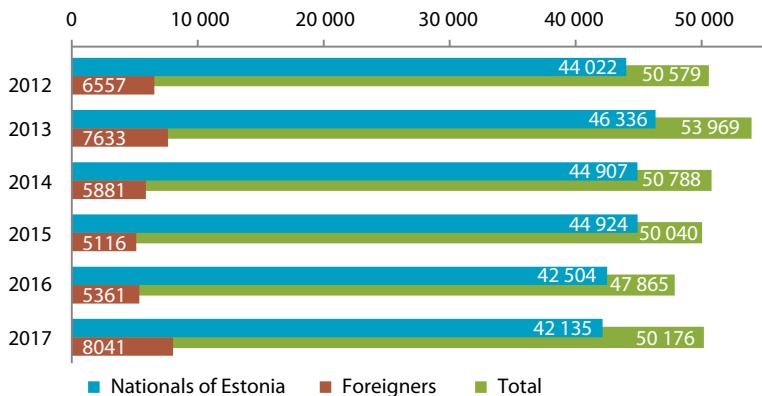


Figure 43. Number of persons with recreational fishing right, 2012-2017

Source: MoE



In 2017, 479,251.90 euros were received for recreational fishing rights and 309,928.01 euros for fishing cards, thus a total of 789,179.91 euros for recreational fishing (Table 37), or nearly 12,000 euros more than a year ago. For commercial fishing rights 840,026.08 euros were received in 2017. A total of 1,629,205.99 euros were received in 2017 as fishing fees.

Some of the proceeds from fishing rights are transferred to the state budget and the rest are allocated to the Environmental Investment Centre (EIC). In 2017, grants provided under the environmental programme of the EIC for 31 fisheries-related projects totalled 777,985 euros. A year earlier, that amount was 1,244,469 euros.

Table 35. Number of fishing cards issued, by fishing gear and ground, 2014-2017

| Fishing gear | Fishing ground | 2014 | 2015 | 2016 | 2017 |
|--|------------------------------------|---------------|---------------|---------------|---------------|
| Gill net | Total | 7673 | 7700 | 7538 | 11,385 |
| | Sea | 6204 | 6271 | 6320 | 9409 |
| | Lakes Peipsi, Pihkva and Lämmijärv | 864 | 820 | 815 | 771 |
| | Rivers and small lakes | 605 | 609 | 403 | 1205 |
| Hand line, simple hand line, spinning reel, fly hook, pulling device | Total | 3867 | 4629 | 3848 | 4273 |
| | Endla Nature Reserve | 755 | 1272 | 1055 | 1158 |
| | Matsalu National Park | 1347 | 1802 | 1811 | 1719 |
| | Silma Nature Reserve | 1765 | 1555 | 982 | 1396 |
| Spinning reel, fly hook | Total | 2982 | 2722 | 4587 | 6236 |
| | Trout fishing grounds | 1087 | 1069 | 980 | 1222 |
| | Salmon fishing grounds | 1895 | 1653 | 3607 | 5014 |
| Longline (100 hooks) | Total | 1159 | 1140 | 924 | 952 |
| | Sea | 263 | 288 | 155 | 155 |
| | Lakes Peipsi, Pihkva and Lämmijärv | 61 | 50 | 38 | 36 |
| | Lake Võrtsjärv | 225 | 291 | 188 | 197 |
| | Emajõgi River | 136 | 102 | 114 | 104 |
| | Other lakes and rivers | 474 | 409 | 429 | 460 |
| Crayfish trap, dip-net | Lakes , rivers | 946 | 906 | 997 | 1408 |
| Harpoon gun and harpoon | Lakes Kuremaa and Saadjärv | 409 | 401 | 451 | 318 |
| Hoopnet, dragnet | Small lakes | 42 | 73 | 51 | 43 |
| Trap net | Small lakes | – | – | 28 | 62 |
| Total number of fishing cards | | 17,078 | 17,571 | 18,424 | 24,677 |

Source: MoE

Table 36. Number of recreational fishermen, 2012-2017

| | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---------------|---------------|---------------|---------------|---------------|
| Fishing right holders with Estonian ID code | 44,029 | 46,339 | 44,916 | 44,924 | 42,504 |
| Holders of free fishing rights (30% of those fishing for a fee) | 13,209 | 13,902 | 13,475 | 13,477 | 12,751 |
| Fishing card holders with Estonian ID code | 7260 | 8341 | 8545 | 9093 | 9189 |
| Total | 64,498 | 68,582 | 66,936 | 67,494 | 64,444 |
| Number of both fishing right and fishing card holders | 3430 | 4072 | 3779 | 4593 | 4618 |
| Number of Estonian recreational fishermen | 61,068 | 64,510 | 63,157 | 62,901 | 59,826 |

Source: MoE, MoRA, Environmental Board

Table 37. Proceeds from commercial and recreational fishing fees (10⁶), 2010-2017

| | | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---------------------------------------|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Com- mercial fishing* | trawling fee | 0.290 | 0.197 | 0.188 | 0.204 | 0.226 | 0.217 | 0.195 | 0.218 |
| | coastal fishing fee | 0.318 | 0.373 | 0.282 | 0.318 | 0.346 | 0.356 | 0.366 | 0.404 |
| | distant-water fishing fee | 0.231 | 0.170 | 0.215 | 0.174 | 0.194 | 0.179 | 0.199 | 0.218 |
| | total commercial fishing fees | 0.839 | 0.740 | 0.685 | 0.696 | 0.766 | 0.751 | 0.761 | 0.840 |
| Rec- reational fishing | fishing card fee | 0.152 | 0.214 | 0.198 | 0.267 | 0.186 | 0.279 | 0.299 | 0.310 |
| | fishing fees | 0.364 | 0.360 | 0.502 | 0.514 | 0.513 | 0.495 | 0.477 | 0.479 |
| | total recreational fishing fees | 0.516 | 0.574 | 0.700 | 0.781 | 0.699 | 0.775 | 0.776 | 0.789 |
| Grand total | | 1.356 | 1.314 | 1.385 | 1.477 | 1.465 | 1.526 | 1.537 | 1.629 |

* Types of fees for commercial fishing: *trawling fee* – fishing fee payable by companies fishing in the Baltic Sea under the fishing permit of a fishing vessel; *coastal fishing fee* – fishing fee payable by companies fishing in the Baltic Sea (and inland bodies of water) under the fishing permit of a fisherman; *distant-water fishing fee* – fishing fee payable by companies fishing outside the jurisdiction of Estonia under the fishing permit of a fishing vessel.

Sources: MoE

Overview of sector

According to the data of the Veterinary and Food Board, 55 licensed (recognised) companies were engaged in fish farming in the aquaculture sector in 2017; 30 of them farmed fish and 25 were engaged in crayfish farming (Figures 44 and 45).

The production volume did not change much in 2017 compared to 2016 (Table 38). There were no significant changes in the structure of the farmed species either. Rainbow trout continued to account for the bulk (80%) of the production. Other species farmed in larger quantities include eel, carp, sturgeon and African catfish. Data on eel and carp are also collected by Statistics Estonia, but since there are only few companies that farm these species, their data cannot be published according to data protection requirements.

There were two representative organisations in the sector: the Estonian Association of Fish and Crayfish Farmers and the Estonian Aquaculture Association. The Ecofarm Fish Breeders Association acts as a union of five fish farmers. The objective of this producer organisation is to improve the marketing conditions for its members' production and to help promote aquaculture. Products are marketed under the Farmare trademark.

Rainbow trout

The production of rainbow trout as the most common farmed fish species amounted to 702 tonnes in 2017. In 2017 the average world market price of salmon, which affects the price of rainbow trout, was in the same order of magnitude as in 2016 (6.54 euros per kilogram according to the Fish Pool Index™). A good price also encourages the farming of rainbow trout in Estonia.

Among salmonids, Arctic char is also farmed in Estonia in small quantities.

Table 38. Sales volume of Estonian fish farms' raw fish (t), 2008-2017

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|--------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Eel | 46.0 | 30.0 | 20.3 | 2.0 | * | * | 127.0 | * | * | * |
| Crayfish | 0.7 | 2.0 | 0.4 | 0.6 | 0.1 | 0.4 | 0.2 | 0.6 | 0.7 | 0.8 |
| Carp | 52.3 | 45.4 | 39.4 | 37.5 | 38.2 | 43.7 | * | * | 33.8 | * |
| Rainbow trout | 333.8 | 549.0 | 487.5 | 333.8 | 455.3 | 465.5 | 569.6 | 559.0 | 680.4 | 702.21 |
| Other fish | 50.9 | 26.1 | 49.6 | 18.7 | 86.8 | 223.4 | 172.1 | 238.7 | 152.9 | 167.43 |
| Total | 483.7 | 652.5 | 597.2 | 392.6 | 580.4 | 733.0 | 868.9 | 798.3 | 867.8 | 870.5 |
| Fish roe for human consumption | 6.7 | 7.4 | 4.5 | 0.1 | 4.1 | 5.0 | 3.1 | 7.3 | 4.9 | 3.8 |

* Data cannot be published due to the data protection principle.

Source: Statistics Estonia

Crayfish farming

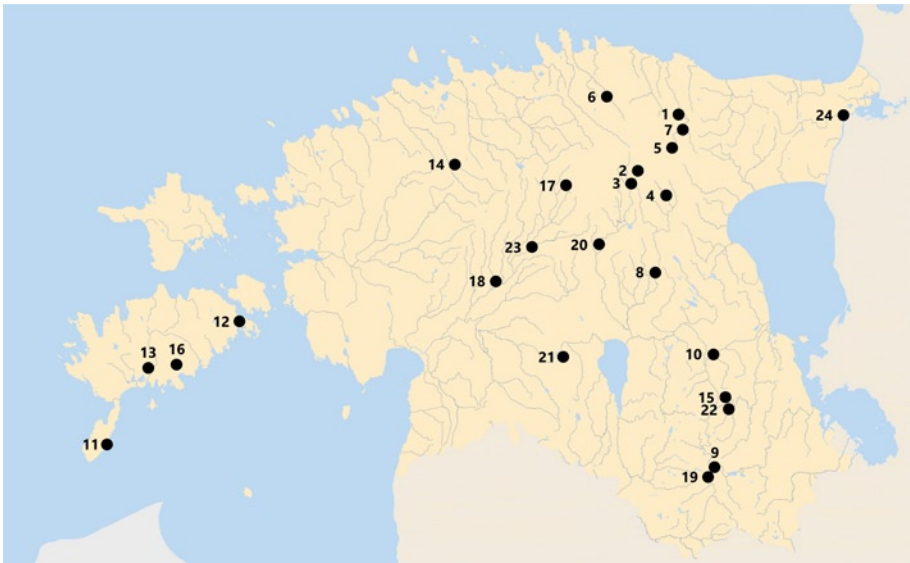
In 2017, the number of registered crayfish farms increased by two more licensed companies. Thus, there were a total of 25 crayfish farms recognised by the Veterinary and Food Board in Estonia.

The output of crayfish farms increased from around 0.7 tonnes in 2016 to 0.8 tonnes in 2017.

The Estonian University of Life Sciences completed the study on the effect of microchip tags (PITs) on the survival of crayfish in farms and in artificial conditions.

Algae and mussel cultivation

Search for the best algae and mussel cultivation technologies continues: the University of Tartu has started two studies. The aim of the study “Purification of wastewater from seawater-based fish farms through the cultivation of macroalgae” is to reduce the pollution load of seawater-based fish farms by cultivation of algae. The study “Development, testing and evaluation of an intensive cultivation technology for the non-attached growth form of agar *Furcellaria*



- | | | |
|---|--------------------------------------|---|
| 1 Põlula Fish Farm of the State Forest Management Centre Simuna Ivox OÜ: | 9 Leokitalu OÜ | 19 Paadi Talu OÜ |
| 2 Äntu Fish Farm | 10 Riina Kalda's fish holding CARPIO | 20 Lapavira OÜ |
| 3 Nõmmeveski Fish Farm | 11 Arowana OÜ | 21 BM Trade OÜ |
| 4 Kärveski Fish Farm | 12 AquaMyk OÜ | 22 Krei-Jõe OÜ |
| 5 Mõdriku Fish Farm | 13 Pähkla Vähi-ja Kalakasvatus OÜ | 23 Aquaculture training and testing base of Järva County Vocational Training Centre |
| 6 Aviiso OÜ | 14 SK Trade OÜ | 24 Joala Fish OÜ |
| 7 Aravuse Kalakasvandus OÜ | 15 Karilatsi Kalamajand OÜ | |
| 8 Härjanurme Fish Farm | 16 Ösel Harvest OÜ | |
| | 17 Neli Elementi OÜ | |
| | 18 For Angula OÜ | |

Figure 44. Recognised and operating fish farms in 2017

Sources: base map of the Land Board, 2016; Veterinary and Food Board

lumbricalis” aims to identify the best environmental conditions for cultivation of agar in land-based reservoirs using the flow of natural seawater.

In the Baltic Sea countries, a large-scale cooperative study “Baltic Blue Growth” is underway with a view to setting up mussel farms to support the Baltic Sea countries’ blue growth and to eliminate diffuse pollution. The initial results point to favourable conditions for mussel cultivation in the Swedish coastal waters, which are similar to these of Estonia.

Fish restocking

In 2017, salmon, European eel, European whitefish, sea trout, crayfish and, to a lesser extent, grayling were released into water bodies in Estonia (Table 39). The largest quantities of salmon were released into the Valgejõgi and Purtse rivers, 72,000 and 41,000 individuals, respectively. In addition to 10,500 salmon, Pärnu River was also restocked with 32,800 whitefish born in the same summer. Unlike 2016, no glass eels were released in Estonian water bodies in 2017. Estonian lakes were restocked with 318,400 farmed eels, the bulk of which (277,600) were released in Lake Võrtsjärv. In addition, 3500 crayfish were released in Estonian water bodies.



- | | | |
|-----------------------------------|------------------------------------|------------------------|
| 1 Härjanurme Fish Farm | 9 Vähilakk OÜ | 17 Selimäe OÜ |
| 2 Astacus OÜ | 10 Vorites OÜ | 18 Põlde Vähk OÜ |
| 3 Pähkla Vähi- ja Kalakasvatus OÜ | 11 Jüri Lest FIE | 19 Nõmme Puhkebaas OÜ |
| 4 Peipus OÜ | 12 Kitse-Ado Farm | 20 Lümända Lihaveis OÜ |
| 5 Vana-Tooma talu OÜ | 13 Ülejõe Vähi- ja Kalakasvatus OÜ | 21 Ironfish OÜ |
| 6 Ösel Harvest OÜ | 14 Liki Mõis OÜ | 22 Arkadel Invest OÜ |
| 7 Metsa Johani Farm | 15 Palupera-Agro OÜ | 23 Vareste Invest OÜ |
| 8 TP Invest OÜ | 16 Maimar OÜ | 24 Peetri A-23 Farm |

Figure 45. Crayfish farms recognised by the Veterinary and Food Board, 2017
Sources: base map of the Land Board, 2016; Veterinary and Food Board

Table 39. Fish and crayfish juveniles released in water bodies in 2017

| Species | Age/size | Total (pcs) |
|--------------------|------------------------|-------------|
| European eel | two-summer-old | 313,400 |
| | two-year-old and older | 5000 |
| Crayfish | fighting-size | 3500 |
| Salmon | two-year-old | 42,795 |
| | two-summer-old | 21,186 |
| | one-summer-old | 54,682 |
| | one-year-old | 60,851 |
| Sea trout | two-year-old | 2467 |
| European whitefish | one-summer-old | 6885 |
| Grayling | one-year-old | 193 |

Source: Ministry of the Environment

Research and development

Formal education in fish farming is offered at two educational institutions: Estonian University of Life Sciences and Järva County Vocational Training Centre. While the University of Life Sciences focuses on research and studies and organising post-graduate training in fish farming (curriculum “Fishery and aquaculture”), Järva County Vocational Training Centre prepares qualified fish farm workers (qualification level 4).

2017 saw the completion of the study “Analysis of the implementation of the Estonian Aquaculture Development Strategy 2014-2020, and proposals for further development of the Action Plan” commissioned by the Fisheries Information Centre. The main objective of the study was to analyse, by interviewing key actors in the aquaculture sector, the aquaculture sector by reference to the main directions set out in the strategy and to make proposals to enhance the implementation of the strategy. The study concluded that, while the fish sales volume has increased steadily, the increase has not been sufficient to achieve the goals set in the vision, mainly due to the failure or slowdown of large-scale investments, as well as limited financial opportunities for further growth of successful companies.

The Estonian University of Life Sciences started two major studies in 2017: “Development of artificial reproduction and farming technologies and identification of the best performing strains of catfish (*Silurus glanis*) as a prospective new aquaculture species” and “Development of resource-efficient and eco-friendly feeding technologies for crayfish to ensure increased efficiency and production of crayfish in Estonia”. The idea of the latter study is to develop resource-efficient and eco-friendly feed with the best composition and structure for crayfish of different ages.

Grants

In 2017, the measure “Aid for aquaculture innovation” began to be implemented under the European Maritime and Fisheries Fund (EMFF). The measure is aimed at the development of various resource-efficient solutions and technologies for farming new and prospective species in cooperation between companies, researchers and development institutions. With the help of the EMFF funds, the Rural Development Foundation offers investment loans to companies starting or engaged in the production of aquaculture products.

Concerns in the area of aquaculture in 2017

Riina Kalda, *CARPIO fish holding*

According to Statistics Estonia, 2017 was a successful year for aquaculture companies – a record quantity of commercial fish was marketed for the second year in a row. Fish farmers have been struggling for their place in the Estonian market for years. The low price of imported Norwegian salmon, which affects the market the most, makes it difficult to obtain a sustainable price for fish farmed in Estonia. However, the price of salmon on the world market in 2017 was also favourable for the sales of fish farmed in Estonia, which even resulted in a shortage of large rainbow trout.

While produce from seeds sown in the spring can be harvested as early as in the autumn, the harvest of a fish farmer takes many years to ripe. A fish farm has to take care of several years of stock because fry develop into marketable fish in two to three years, depending on the species. During this time, the operation of the fish farm can be affected by fish diseases, weather conditions affecting the environment and, most importantly, water or its availability.

Fish that tolerate different temperatures are farmed in Estonia. Thus, the conditions that are suitable for one species may not be suitable for another species. The summer of 2017 was cool and rainy, which was not very favourable for carp farmers. The carp was smaller in size than expected because it needs warmer weather for solid growth. If the spring, too, is long and cool, the annual output will eventually be lower than hoped.

There is still a lot of uncertainty about the system of pollution charges and its planned alteration. Compared to agriculture, forestry or industry, pollution originating from aquaculture accounts for a very small part of the environmental load on water bodies – the pollution load of fish farms is close to zero. The current system of environmental charges in Estonia is therefore not applicable to fish farms and needs to be changed. The financial obligations of a company should not depend on random factors. An example is carp farming, where a water sample has to be taken at the same time from both the inlet and the outlet to assess the pollution load. However, as the ponds are large (5-10 ha), the water flowing into the pond reaches the outlet at best in a month, not earlier. Thus, simultaneous measurement of water indicators cannot provide an objective result. Moreover, water quality is influenced by waterfowl, weather and agriculture, independently of the activities of the fish farmer. However, no solution has been found so far despite the meetings and discussions that have been conducted. In our neighbouring countries, for example, environmental charges are not applied.

The good news, however, is that in 2017, the Estonian Aquaculture Association, which brings together several successful fish farmers, has started operating again alongside the Estonian Association of Fish and Crayfish Farmers.

Estonian fish processing industry

General overview of sector

According to the data entered in the Commercial Register, there were 72 companies in Estonia in 2017 whose main business comprised the processing and canning of fish, crustaceans and molluscs. Based on the classification given in Commission Recommendation 2003/361/EC¹, the majority of Estonian fish processing enterprises were small, as their average number of employees was less than 50. Compared with 2016, the number of micro and small enterprises increased in 2017. A more detailed overview of the groups of enterprises is presented in Figure 46.

An average² of 1641 people was employed by fish processing companies in 2017. Looking at the age structure of the companies, 48 (67%) of the 72 com-

Table 40. Number of processing facilities of fish processing companies in 2016 and 2017 by county

| County | Number of processing facilities | |
|--------------|---------------------------------|-----------|
| | 2016 | 2017 |
| Pärnu | 22 | 26 |
| Harju | 21 | 22 |
| Tartu | 10 | 10 |
| Saare | 8 | 8 |
| Lääne | 8 | 6 |
| Ida-Viru | 7 | 6 |
| Jõgeva | 4 | 4 |
| Põlva | 1 | 3 |
| Lääne-Viru | 1 | 2 |
| Viljandi | 2 | 1 |
| Hiiu | 1 | 1 |
| Total | 85 | 89 |

Sources: Commercial Register, Veterinary and Food Board

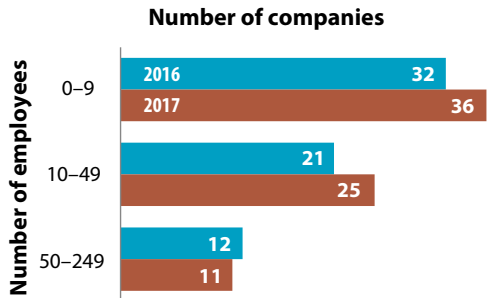


Figure 46. Number of companies whose main business comprised processing and canning of fish, crustaceans and molluscs based on average number of employees in 2016 and 2017

Source: Commercial Register

¹ Commission Recommendation 2003/361/EC divides enterprises into four groups based on the number of employees: 1) *microenterprises*: 0-9 employees; 2) *small enterprises*: 10-49 employees; 3) *medium-sized enterprises*: 50-249 employees; 4) *large enterprises*: 250 and more employees.

² Average number of full-time employees (full-time equivalent).

panies had been operating for more than ten years. In 2017, the total sales revenue of the companies amounted to 145 million euros, with processing and canning of fish, crustaceans and molluscs accounting for 90% of the revenue, i.e. 131 million euros. Compared to the previous year, the total sales revenue of companies decreased by 9%.

Processing and canning of fish, crustaceans and molluscs was an auxiliary activity for 14 companies in 2017. Their sales revenue from this segment amounted to 552,000 euros.

In 2016, this figure amounted to 275,000 euros. Most (more than a half) of the fish processing companies' processing facilities were located in Pärnu and Harju counties (Table 40).

Basic and economic indicators and trends of companies whose main business is fish processing

The year 2017 was characterised by tightening competition at the level of micro and small enterprises. One of the major fish processing companies in Estonia, which had been accused of tax fraud, was declared bankrupt. In 2015, the sales revenue of that company had accounted for as much as 30% of the total sales revenue of companies whose main business is fish processing. Thus, the bankrupt company had a significant impact on the economic indicators of the sector: compared to 2016, the total sales revenue of companies decreased by 9% in 2017 and the average number of employees declined by 97 (Table 41). However, when comparing the financial indicators of the fish processing sector in 2016 and 2017 without the bankrupt company, it appears that the total sales revenue of the sector and the average number of employees increased.

Of the 72 fish processing companies, 50 (69%) closed the financial year 2017 with a profit, and the fish processing industry as a whole earned a profit of 7 million euros (in 2016, 55% of companies closed the year with a profit and the industry suffered a loss of 0.7 million euros). Gross value added amounted to 28 million euros in 2017. The combined assets of fish processing companies were worth 139 million euros, with fixed assets accounting for 62% (85 million euros). Compared to 2016, investments in fixed assets tripled in 2017. The amount invested in fixed assets was nearly 3 million euros in 2016 and over 8 million euros in 2017. The debt ratio, which shows the share of debt (liabilities)

Table 41. Basic and economic indicators of companies whose main business is fish processing, 2010-2017

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|------|------|--------|
| Number of companies | 56 | 59 | 66 | 60 | 64 | 66 | 65 | 72 |
| Total sales revenue, €10 ⁶ | 111 | 137 | 156 | 175 | 187 | 187 | 161 | 145 |
| Average number of employees | 1891 | 1871 | 1907 | 1954 | 1972 | 1935 | 1763 | 1641 |
| Average annual wage cost per employee, € | 6300 | 6957 | 7568 | 8113 | 8701 | 9122 | 9545 | 10,004 |
| Gross value added, €10 ⁶ | 21 | 20 | 27 | 27 | 26 | 34 | 18 | 28 |
| Investments in fixed assets, €10 ⁶ | 11 | 11 | 6 | 6 | 10 | 11 | 3 | 8 |
| Debt ratio, % | 49 | 50 | 53 | 51 | 54 | 54 | 51 | 47 |

Sources: Statistics Estonia, Commercial Register

in the funding of the assets of companies, was 47% in 2017. The production-related operating costs of fish processing companies totalled 139.5 million euros in 2017. Raw materials and supplies accounted for the bulk of the costs (65%; Figure 47).

If we compare the basic and economic indicators in the different size classes of fish processing companies (Table 42), it appears that over a half (64%) of the total sales revenue of the fish processing industry in 2017 came from eleven medium-sized enterprises (50-249 employees), which accounted for just 15% of the total number of companies. This size class also employed the highest number of people (60% of the total number of employees) and produced 62% of the gross value added. Medium-sized enterprises also paid the highest average wage. Based on the debt ratio, medium-sized enterprises were characterised by a lower risk level than the other two size classes.

Figure 47. Proportions (%) of operating costs of companies whose main business is fish processing, 2016 and 2017

Source: Commercial Register

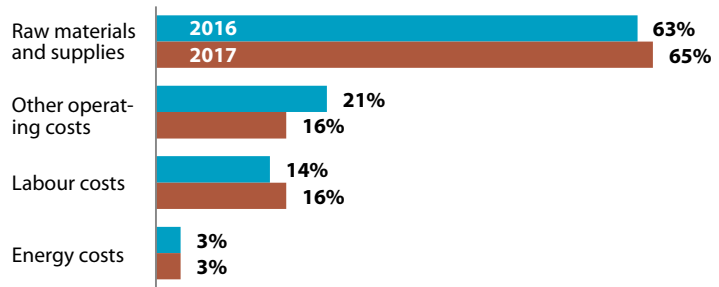


Figure 48. Proportions (%) of operating costs in different size classes of fish processing companies in 2017

Source: Commercial Register

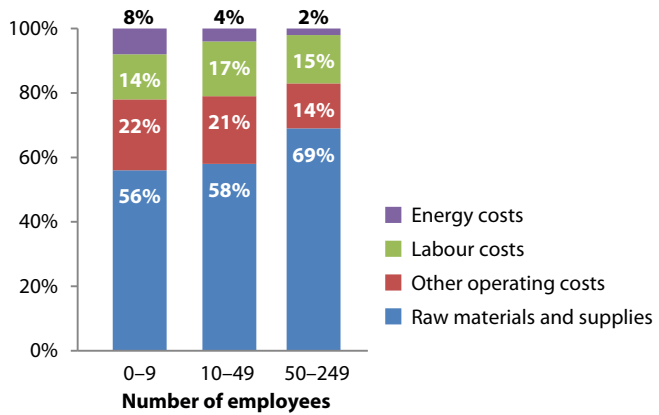


Table 42. Basic and economic indicators in different size classes of fish processing companies in 2017

| Size class | Number of companies | Sales revenue, €10 ⁶ | Average number of employees | Average annual wage cost per employee, € | Fixed assets, €10 ⁶ | Investments in fixed assets, €10 ⁶ | Gross value added, €10 ⁶ | Debt ratio, % |
|------------------|---------------------|---------------------------------|-----------------------------|--|--------------------------------|---|-------------------------------------|---------------|
| 0-9 employees | 36 | 10.6 | 122 | 8571 | 12.2 | 1 | 2.1 | 50 |
| 10-49 employees | 25 | 42.3 | 530 | 10,085 | 25.5 | 2.6 | 8.4 | 51 |
| 50-249 employees | 11 | 92.4 | 989 | 10,137 | 47.8 | 4.6 | 17.2 | 44 |

Source: Commercial Register

The total operating costs of fish processing companies (139.5 million euros) were divided as follows in 2017: microenterprises – 9.9 million euros; small enterprises – 41 million euros and medium-sized enterprises – 88.6 million euros. The distribution of operating costs was similar in these size classes (Figure 48), but a higher proportion of energy costs in micro enterprises, a higher proportion of labour costs in small enterprises and a higher proportion of costs of raw materials and supplies in medium-sized enterprises can be observed.

Production and sales

According to the data of Statistics Estonia, Estonian fish processing industry sold 51,847 tonnes of fishery products in 2017. Frozen, salted, spiced, dried, deep-frozen and breaded fish accounted for the bulk of production (Table 43). Compared to 2016, the quantity of production sold in 2017 grew by 9%. The growth can primarily be attributed to an increase in the sales of frozen fish (sprat and herring).

The proportion of exports in the total sales revenue of companies whose main business is fish processing accounted for 58% in 2017, which is lower than in previous years, but still indicates the high dependence of the Estonian fish processing industry on exports (Table 44). The decline in exports was due to the aforementioned bankruptcy of one of Estonia's largest companies engaged in fish processing and export of fishery products. Although total exports have been lower in the past few years, companies can be pleased with the growth of the domestic market. The total sales revenue of the companies whose main business is fish processing is twice the amount generated seven years ago, which indicates an increase in the purchasing power of Estonians.

Table 43. Sales of production (10³ t) of Estonian fish processing industry by product type, 2010-2017

| Fishery products | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Fresh and chilled fish meat, fish fillets, minced fish meat | 3.7 | 2.5 | 2.6 | 2.3 | 2.4 | 2.6 | 1.7 | 1.8 |
| Frozen fish | 35.5 | 32.8 | 44.2 | 41.3 | 34.0 | 35.7 | 30.6 | 33.4 |
| Smoked fish | 1.4 | 1.9 | 2.3 | 1.9 | 2.5 | 2.5 | 1.7 | 1.8 |
| Salted, spiced, dried, deep-frozen and breaded fish | 19.8 | 16.5 | 17.3 | 14.1 | 14.1 | 10.9 | 10.4 | 10.1 |
| Culinary fishery products in oils, marinades or sauces | 1.5 | 1.3 | 4.7 | 4.5 | 5.5 | 4.9 | 4.4 | 4.7 |
| Fish preserves | 5.1 | 3.8 | 3.7 | 3.9 | 2.6 | 2.8 | 0.6 | * |
| Total | 67.0 | 58.8 | 74.8 | 68.0 | 61.1 | 59.4 | 49.4 | 51.8 |

* Data cannot be published due to the data protection principle.

Source: Statistics Estonia

Table 44. Total sales on domestic market and exports of companies whose main business is fish processing, 2010-2017

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-----------------------------------|------|------|------|------|------|------|------|------|
| Total sales, €10 ⁶ | 111 | 137 | 156 | 175 | 187 | 187 | 161 | 145 |
| Domestic market, €10 ⁶ | 30 | 36 | 41 | 47 | 55 | 52 | 58 | 61 |
| Exports, €10 ⁶ | 81 | 101 | 115 | 128 | 132 | 135 | 103 | 84 |
| Proportion of exports (%) | 72 | 74 | 74 | 73 | 71 | 72 | 64 | 58 |

Source: Commercial Register

Table 45 lists the top ten countries in exports and imports of fish and fishery products in 2017 based on the quantities of fish and fishery products. While nearly 40,000 tonnes of fish and fishery products had been exported from Estonia to Russia before the latter imposed restrictions on imports of foodstuffs from the EU in 2014, no fish or fishery products were sold from Estonia to Russia in 2016 and 2017 according to the data of Statistics Estonia. Ukraine has become the major export market. Compared to 2016, exports to Ukraine increased by 10% and amounted to 35,180 tonnes in 2017 (32,118 tonnes in 2016). Large quantities of fish were also sold to Belarus, Denmark and Finland in 2017. Estonia imported fish and fishery products mainly from Finland, Lithuania, Latvia and Sweden.

Table 45. Top ten countries in exports and imports of fish and fishery products in 2017. In addition to local production, the table includes all the fish and fishery products that passed through Estonia

| Exports in tonnes | | Imports in tonnes | |
|-------------------|--------|--------------------------|--------|
| Ukraine | 35,180 | Finland | 10,490 |
| Belarus | 12,495 | Lithuania | 5534 |
| Denmark | 11,223 | Latvia | 5271 |
| Finland | 9459 | Sweden | 5103 |
| Latvia | 6142 | Denmark | 1872 |
| Lithuania | 5759 | Holland | 1133 |
| Moldova | 3394 | Great Britain | 1028 |
| Kazakhstan | 3143 | Faroe Islands | 917 |
| Sweden | 2914 | United States of America | 879 |
| Poland | 1947 | Norway | 804 |

Source: Statistics Estonia

Management and development of companies in the fisheries sector in 2017

Valdur Noormägi, *Estonian Association of Fishery*

Overall, the last year was difficult.

However, there is reason to rejoice that the Estonian fish processing industry is economically sustainable despite the very difficult conditions. The number of companies operating on the market is stable. Around 320-330 companies have designated fisheries as their main business. The market volume has remained unchanged compared to previous years, amounting to 520-530 million euros per year. Companies' profits have risen by around 2 million euros each year and the net profit for 2017 was nearly 15 million euros. On the other hand, this standstill is worrying. Sales volumes have remained the same as in previous years, as the rise in profits is due to companies' ancillary activities and sale of fixed assets rather than fish processing. There has been no decisive change in the export market.

The number of employees in the sector has dropped to 1300, but labour costs per employee have increased by almost 22% compared to the previous year. There are problems with the workforce: skilled workers are of high age, it is very difficult to find new young workers, there are shortages of skilled workers in the fishing season and staff turnover is high. This is due to difficult working conditions, seasonality and low wages. In fisheries, the average annual salary per employee is around 17,000 euros, which is approximately 70% of the Estonian average wage. Therefore, there is a shortage of labour in companies. Business owners lack good ideas on how to proceed.

The development of companies is strongly influenced by the rise in raw material prices on the world market. This increase significantly exceeds the appreciation of finished products. Companies' profit margins decline and are close to zero for some products. The lack of working capital hinders investment in processing. This results in a standstill, which is equivalent to going back.

The attempts of the government to prescribe, through laws and regulations, how an entrepreneur must operate his business are troublesome. The attempt to change the principles of historical fishing rights and to impose restrictions on these rights calls into question the achievements so far. This way of thinking sows confusion both within the sector itself and among the branches of the economy that serve the fisheries sector.

The sector has an excellent opportunity to use the funds of the European Maritime and Fisheries Fund to make investments. However, I believe that too much attention is paid to compliance with rules rather than the effectiveness of the use of EU aid. There is a risk that the fund will become a means of providing social assistance to fishermen. In my opinion, the purpose of the Fund is to make the fisheries sector in Estonia and other EU member states more sustainable and competitive. Wind instruments and apple orchards bought using the aid from the Fund hardly help to achieve this. More money should be invested in where it will generate added value.

What next?

President Lennart Meri once said, “The situation is shitty, but it is the manure for our future.” I think these words are also true in the fisheries sector, where there is potential for growth.

In Paldiski, a large plant is being built with the help of a joint investment, which will provide maximum added value to sprat and herring. In order to be competitive, micro and small enterprises are increasingly starting to look for opportunities to join with larger companies. I believe that the willingness

of foreign investors to invest in Estonian companies is growing. The use of innovative solutions and technologies will improve the competitiveness of companies, and new products will expand export geography.

Communication between the state and business is becoming more meaningful. The whole of society is sufficiently developed to trust more the ability of entrepreneurs to make choices independently and to enter into sensible agreements that will lead to the development of fisheries.

Aid has been granted under the European Fisheries Fund measures in Estonia since 2008 when 13 projects were supported. The number of supported projects has continued to grow since then (Table 46). In 2017, aid from the European Maritime and Fisheries Fund (EMFF) was granted in the amount of 34,939,897 euros and paid out in the amount of 14,066,362 euros. A total of 393 grant decisions were made and 221 applicants received payments.

The highest amounts of aid were granted to Viljandi, Tartu and Harju counties (Table 47). The highest number of aid applications was granted in Pärnu, Hiiu and Lääne counties. The most money went to Harju County, followed by Viljandi and Tartu counties. Lääne, Hiiu and Pärnu counties were the leaders in terms of the number of payments.

In 2015, the European Maritime and Fisheries Fund (EMFF) was set up for the 2014-2020 programming period. In 2015, the first applications for aid from the EMFF were received and the first payments were made.

In 2017, new aid measures were started, and grant decisions and payments were made.

Table 46. Number of projects supported by EFF and EMFF from 2008-2017, by year of payment

| Year of payment | No. of projects to which payments were made |
|-----------------|---|
| 2008 | 9 |
| 2009 | 61 |
| 2010 | 216 |
| 2011 | 269 |
| 2012 | 383 |
| 2013 | 443 |
| 2014 | 529 |
| 2015 | 335 |
| 2016 | 53 |
| 2017 | 221 |

Source: ARIB

Table 47. Aid granted (€), paid (€), number of aid applications granted and payments made in 2017, by county

| County | Number of aid applications granted | Granted | Number of payments made | Paid |
|-------------------|------------------------------------|-------------------|-------------------------|-------------------|
| Harju County | 39 | 9,494,134 | 20 | 6,770,138 |
| Viljandi County | 27 | 12,384,914 | 23 | 3,013,795 |
| Tartu County | 35 | 3,794,795 | 22 | 1,126,128 |
| Lääne County | 52 | 1,763,534 | 34 | 825,902 |
| Pärnu County | 89 | 2,867,811 | 28 | 619,182 |
| Hiiu County | 53 | 1,168,215 | 31 | 527,325 |
| Jõgeva County | 29 | 510,933 | 28 | 366,851 |
| Saare County | 27 | 1,174,063 | 13 | 315,798 |
| Ida-Viru County | 25 | 586,598 | 10 | 218,277 |
| Põlva County | 7 | 123,695 | 8 | 207,428 |
| Lääne-Viru County | 10 | 1,071,206 | 4 | 75,536 |
| Total | 393 | 34,939,897 | 221 | 14,066,362 |

Source: ARIB

Measures in 2017

Measure 1.1 Aid for fishing innovation

| | |
|---|-----------------|
| Budget of the call for applications: | 3,000,000 euros |
| Five applications were submitted and granted in the amount of | 1,676,505 euros |
| <i>No payments were made</i> | |

Measure 1.15 Aid for fishing gear improvement

| | |
|---|-----------------|
| Budget of the call for applications: | 3,630,000 euros |
| 69 applications were submitted for | 2,797,907 euros |
| of which 52 were granted in the amount of | 2,118,607 euros |
| One applicant was paid | 9360 euros |

Measure 1.18 Aid for protection and recovery of marine environmental biodiversity and ecosystems

| | |
|---|-----------------|
| Budget of the call for applications: | 200,000 euros |
| 15 applications were submitted and granted in the amount of | 1,103,907 euros |
| <i>No payments were made</i> | |

Measure 1.21 Aid for improving the energy efficiency of coastal fishing vessels

| | |
|---|---------------|
| Budget of the call for applications: | 200,000 euros |
| 17 applications were submitted for | 19,633 euros |
| of which 14 were granted in the amount of | 12,736 euros |
| Seven applicants were paid | 6006 euros |

EMFF measure 1.3 (aid for cooperation between researchers and fishermen)

| | |
|------------------------------|-----------------|
| Total budget for the period: | 5,833,013 euros |
| of which paid in 2017: | 452,659 euros |

Measure 2.1 Aid for aquaculture innovation

| | |
|---|-----------------|
| Budget of the call for applications: | 1,800,000 euros |
| Four applications were submitted and granted in the amount of | 1,639,932 euros |
| One applicant was paid | 5170 euros |

EMFF measure 2.2 (productive investments in aquaculture)

| | |
|---|-----------------|
| Budget of the call for applications: | 4,320,000 euros |
| One application was submitted and granted for | 4,320,000 euros |
| One applicant was paid | 1,000,000 euros |

EMFF measure 2.6 (aid for cooperation between researchers and aquaculture companies)

| | |
|------------------------------|-----------------|
| Total budget for the period: | 1,121,880 euros |
| of which paid: | 142,012 euros |

Measure 3.2 Aid for local action groups

| | |
|-------------------------------|--------------------|
| Total budget for the period: | 2,266,762.62 euros |
| Seven action groups were paid | 532,004 euros |

Measure 3.3 Implementation of local development strategies of fisheries areas

| | |
|------------------------------|---------------------|
| Total budget for the period: | 21,207,985.48 euros |
| 156 applicants were paid | 2,764,882 euros |

| | | |
|----------------------|--|-------------------|
| Measure 3.4 | Collaborative activities of action groups | |
| | Total budget for the period: | 2.5 million euros |
| | In 2017, 43 applications were submitted for | 390,807 euros |
| | of which 28 were granted in the amount of | 307,958 euros |
| | 21 applicants were paid | 170,089 euros |
| Measure 4.1 | Aid for production and marketing plans | |
| | Budget of the call for applications: | 300,000 euros |
| | Five applications were submitted for | 276,079 euros |
| | of which four were granted in the amount of | 254,479 euros |
| | Five applicants were paid | 320,554 euros |
| Measure 4.2 | Aid for storage of fishery products | |
| | Five applicants were paid | 187,702 euros |
| Measure 4.3 | Aid for finding new markets for fishery and aquaculture products and for promotion campaigns for fishery and aquaculture products | |
| | Budget of the call for applications: | 535,000 euros |
| | 11 applications were submitted for | 450,000 euros |
| | No applications were not granted | |
| | One applicant was paid | 84,047 euros |
| Measure 4.4.1 | Aid for collective investments in the processing of fishery and aquaculture products | |
| | No call for applications was announced in 2017, but one applicant was paid | 4,417,311 euros |
| Measure 4.4.2 | Productive investments in the processing of fishery and aquaculture products | |
| | Budget of the call for applications: | 7,776,000 euros |
| | Two applications were submitted and granted in the amount of | 7,776,000 euros |
| | Two applicants were paid | 1,800,000 euros |
| Measure 4.4.3 | Aid for energy and resource audits of fishery and aquaculture product handling companies | |
| | Budget of the call for applications: | 300,000 euros |
| | Nine applications were submitted for: | 53,695 euros |
| | of which five were granted in the amount of | 26,195 euros |
| | <i>No payments were made</i> | |
| Measure 4.4.4 | Aid for improving energy and resource efficiency in the processing of fishery and aquaculture products | |
| | Budget of the call for applications: | 9,000,000 euros |
| | One application was submitted for | 458,207 euros |
| | The application was not granted | |
| | <i>No payments were made</i> | |
| Measure 6.1 | Aid for fisheries inspection and surveillance | |
| | Budget of the call for applications: | 1,850,000 euros |
| | Two applications were submitted and granted in the amount of | 198,300 euros |
| | Five applicants were paid | 364,975 euros |

| | | |
|--|---|-----------------|
| Measure 6.2 | Aid for collection of fisheries data | |
| Budget of the call for applications: | | 3,120,000 euros |
| One application was submitted and granted in the amount of | | 3,120,000 euros |
| Two applicants were paid | | 1,030,452 euros |

| | | |
|---|-----------------------------|-----------------|
| Measure 7.1 | Technical assistance | |
| Budget of the call for applications: | | 1,258,297 euros |
| Three applications were submitted for | | 1,258,297 euros |
| of which one was granted in the amount of | | 18,235 euros |

| | | |
|--|---|-----------------|
| Measure 8.3 | Aid for improvement of knowledge of the marine environment | |
| Budget of the call for applications: | | 1,556,294 euros |
| Eight applications were submitted and granted in the amount of | | 1,556,286 euros |
| <i>No payments were made</i> | | |

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List of figures and tables

DISTANT-WATER FISHERY

- Figure 1.** North East Atlantic and North West Atlantic fishing grounds **9**
- Figure 2.** Proportion (%) of catch by main species in distant-water fishery sector in 2016 and 2017 **13**
- Figure 3.** Estonia's total distant-water fishery catches (t) by fishing ground, 2005-2017 **15**
- Table 1.** Main characteristics of Estonian distant-water fishing fleet, 2005-2017 **10**
- Table 2.** Estonia's distant-water fishing quotas for 2005-2017, before charter arrangements and quota transfers, in tonnes and fishing days, by fishing ground, and change (%) between 2016 and 2017 **12**
- Table 3.** Estonia's distant-water fishery catches (t) by species, 2005-2017 **14**
- Table 4.** Estonia's distant-water fishery catches (t) by fishing ground and species, 2017 **15**

BALTIC SEA FISHERIES

- Figure 4.** Number of coastal fishermen fishing in the Baltic Sea, 2009-2017 **17**
- Figure 5.** Proportions (%) of catches and revenues in coastal fishing, by species, 2017 **18**
- Figure 6.** Change (%) in average first-sale prices of fish species most important to coastal fishery compared to prices in 2016, 2008-2017 **18**
- Figure 7.** Location of Eastern Baltic cod, sprat and Central Baltic herring in 2017 Q4 **41**
- Figure 8.** Agreed stock and management units for herring in the Baltic Sea **41**
- Figure 9.** Central Baltic herring: proportion of catch in weight and numbers by subdivision in 2017 **43**
- Figure 10.** Central Baltic herring: average age composition of catches, 1974-2017 **43**
- Figure 11.** Central Baltic herring: dynamics of mean body weight of herring aged 2-5, 1974-2017 **43**
- Figure 12.** Central Baltic herring: spawning stock biomass (SSB) and fishing mortality in age groups 3-6 (F_{3-6}), 1974-2017 **44**
- Figure 13.** Central Baltic herring: dynamics of abundance of recruitment (age 1), 1974-2017 **44**
- Figure 14.** Gulf of Riga herring: average age composition of catches, 1977-2017 **47**
- Figure 15.** Gulf of Riga herring: dynamics of mean body weight of herring aged 2-5, 1970-2017 **47**
- Figure 16.** Gulf of Riga herring: spawning stock biomass (SSB) and fishing mortality in age groups 3-7 (F_{3-7}), 1977-2017 **47**
- Figure 17.** Gulf of Riga herring: dynamics of abundance of recruitment (age 1), 1977-2017 **47**
- Figure 18.** Average age composition of sprat catches, 1974-2017 **50**
- Figure 19.** Dynamics of mean body weight of sprats aged 2-5, 1974-2017 **50**
- Figure 20.** Sprat spawning stock biomass (SSB) and fishing mortality in age groups 3-5 (F_{3-5}), 1974-2017 **50**

- Figure 21.** Dynamics of sprat recruitment (age 1), 1974-2017 **50**
- Figure 22.** Fishing mortality (F_{3-5}), natural mortality (M_{3-5}) and total mortality (Z_{3-5}) of sprat, 1974-2017 **52**
- Figure 23.** Number, combined gross tonnage (GT) and combined power of main engines (kW) of fishing vessels engaged in fishing, 2005-2017 **55**
- Figure 24.** Estonian trawl fleet's final sprat and herring quotas (after exchanges and transfers) and quota uptake (%), 2007-2017 **55**
- Figure 25.** Catches of sprat, herring and other species (t) of 12-18 m length class trawlers, 2008-2017 **58**
- Figure 26.** Catches of sprat, herring and other species (t) of 24-40 m length class trawlers, 2008-2017 **58**
- Figure 27.** Proportions of various operating costs related to fishing operations of trawlers of 24-40 m length class in 2016 and 2017 **59**
- Table 5.** Number of coastal fishermen entered on fishing permits, by county, 2009-2017 **17**
- Table 6.** Coastal fishing catches (t) and proportions (%) of total catch from the Baltic Sea, 2012-2017, by species **19**
- Table 7.** Values ($\text{€}10^3$) of coastal fishing catches from the Baltic Sea and proportions (%) of the total value from 2012-2017, by species **20**
- Table 8.** Average first-sale prices of fish (€ kg^{-1}), 2006-2017, and changes (%) **21**
- Table 9.** Species composition and catches (kg) of commercial fishing in Gulf of Finland (ICES subdivision 32) by coastal fishing gear type, 2007-2017 **28**
- Table 10.** Species composition and catches (kg) of commercial fishing in Central Baltic (ICES subdivisions 28.2 and 29.2) by coastal fishing gear type, 2007-2017 **30**
- Table 11.** Species composition and catches (kg) of commercial fishing in Väinameri Sea (ICES subdivision 29.4) by coastal fishing gear type, 2007-2017 **32**
- Table 12.** Species composition and catches (kg) of commercial fishing in Gulf of Riga (ICES subdivision 28.1, except Pärnu Bay) by coastal fishing gear type, 2007-2017 **34**
- Table 13.** Species composition and catches (kg) of commercial fishing in Pärnu Bay (fishing squares 178-180) by coastal fishing gear type, 2007-2017 **36**
- Table 14.** Central Baltic herring: catches by country (10^3 t), 1977-2017 **42**
- Table 15.** Gulf of Riga herring: Estonian, Latvian and unreported landings (10^3 t), 1991-2017 **46**
- Table 16.** Sprat catches from the Baltic Sea by country (10^3 t), 1977-2017 **49**
- Table 17.** Catches of Eastern Baltic cod by country (t), 1992-2017 **53**
- Table 18.** Landings (t) in different countries of fish caught from the Baltic Sea by Estonian trawlers in 2016 and 2017 **56**
- Table 19.** Landings in Estonian ports of fish caught from the Baltic Sea by Estonian trawlers in 2017 **56**
- Table 20.** Basic indicators related to fishing operations of 12-18 m length class trawlers, 2008-2017 **58**
- Table 21.** Basic and economic indicators related to fishing operations of 24-40 m length class trawlers, 2008-2017 **58**

INLAND FISHERIES

- Figure 28.** Species composition of commercial fishing catches from Lake Võrtsjärv in 2017 by fishing gear type **62**
- Figure 29.** Number of commercial fishing permits issued for Lake Võrtsjärv, 1994-2017 **62**
- Figure 30.** Eel restocking (number of individuals) and catches (t) in Lake Võrtsjärv, 1933-2017 **63**
- Figure 31.** Average incidence (%) of eel age groups in trap net catches taken from Lake Võrtsjärv, 2011-2017 **64**
- Figure 32.** Pikeperch catches by month and fishing gear in 2017 **66**
- Figure 33.** Average gill net catches per day in under-ice pikeperch fishing in Lake Võrtsjärv in January 2017 **66**
- Figure 34.** Length of pikeperch, measured up to the end of scale cover (SL), in gill net fishing in autumn 2017 **66**
- Figure 35.** Pike catches by month and fishing gear in 2017 **67**
- Figure 36.** Trawling catches from Lake Võrtsjärv, kg per trawling hour, 2003-2017 **69**
- Figure 37.** Composition of the vendace stock of the lake based on trawling in spring 2017 **71**
- Figure 38.** Composition of the smelt stock of the lake based on trap net fishing in spring 2017 **71**
- Figure 39.** Dynamics of catches from Lakes Peipsi and Lämmijärv by species in 2017 **73**
- Figure 40.** Values of catches taken from the lake in millions of euros and the average value, by species, 2011-2017 **75**
- Figure 41.** Dynamics of official commercial lamprey catches taken in Estonian inland water bodies in the different months of 2016 and 2017 **78**
- Table 22.** Catches (t) from Lake Võrtsjärv, 1971-2017 **61**
- Table 23.** Species composition, abundance and weight (number of individuals and proportion per trawling hour and weight in grams) of trawling catches from Lake Võrtsjärv in 2017 **69**
- Table 24.** General assessment of state of stocks and fishing mortality in Lake Võrtsjärv in 2017 and the near future, by key species **69**
- Table 25.** Estonian national quotas (t) on Lakes Peipsi and Lämmijärv from 2011-2017 and average quotas for the period **70**
- Table 26.** Estonian catches (t) from Lakes Peipsi and Lämmijärv from 2011-2017 (incl. research fishing), and average catches for the period **70**
- Table 27.** Estonian catches (incl. research fishing), quotas and balances (t) and quota uptake levels (%) in Lakes Peipsi and Lämmijärv in 2017 **72**
- Table 28.** Number of companies and fishermen related to Lake Peipsi, 2011-2017 **72**
- Table 29.** Catches (t) from Lakes Peipsi and Lämmijärv (without research fishing), average per fishing gear and proportions (%), 2011-2017 **74**
- Table 30.** Catches (t) from Lakes Peipsi and Lämmijärv (without research fishing) by species and by fishing gear in 2017 **74**
- Table 31.** Commercial lamprey catches (kg) taken in Estonian water bodies in 2016 and 2017 according to official data **76**

- Table 32.** Official lamprey catches (t) in Estonia, 2008-2017 **76**
- Table 33.** Maximum number of lamprey fishing gear permitted to be used in inland water bodies in 2017 under commercial fishermen's permits **77**
- Table 34.** Official commercial lamprey catches (kg) in 2016 and 2017, by fishing gear **77**
- Table 33.** Maximum number of lamprey fishing gear permitted to be used in inland water bodies in 2017 under commercial fishermen's permits **77**

RECREATIONAL FISHING

- Figure 42.** Number of persons with recreational fishing right by duration of the right, 2012-2017 **82**
- Figure 43.** Number of persons with recreational fishing right, 2012-2017 **82**
- Table 35.** Number of fishing cards issued, by fishing gear and ground, 2014-2017 **83**
- Table 36.** Number of recreational fishermen, 2012-2017 **83**
- Table 37.** Proceeds from commercial and recreational fishing fees (106), 2010-2017 **84**

AQUACULTURE

- Figure 44.** Recognised and operating fish farms in 2017 **86**
- Figure 45.** Crayfish farms recognised by the Veterinary and Food Board, 2017 **87**
- Table 38.** Sales volume of Estonian fish farms' raw fish (t), 2008-2017 **85**
- Table 39.** Fish and crayfish juveniles released in water bodies in 2017 **88**

ESTONIAN FISH PROCESSING INDUSTRY

- Figure 46.** Number of companies whose main business comprised processing and canning of fish, crustaceans and molluscs based on average number of employees in 2016 and 2017 **90**
- Figure 47.** Proportions (%) of operating costs of companies whose main business is fish processing, 2016 and 2017 **92**
- Figure 48.** Proportions (%) of operating costs in different size classes of fish processing companies in 2017 **92**
- Table 40.** Number of processing facilities of fish processing companies in 2016 and 2017 by county **90**
- Table 41.** Basic and economic indicators of companies whose main business is fish processing, 2010-2017 **91**
- Table 42.** Basic and economic indicators in different size classes of fish processing companies in 2017 **92**
- Table 43.** Sales of the production (10³ t) of Estonian fish processing industry by product type, 2010-2017 **93**
- Table 44.** Total sales in the domestic market and exports of companies whose main business is fish processing, 2010-2017 **93**
- Table 45.** Top ten countries in exports and imports of fish and fishery products in 2017. In addition to local production, the table includes all the fish and fishery products that passed through Estonia **94**

GRANTS

- Table 46.** Number of projects supported by EFF and EMFF from 2008-2017, by year of payment **97**
- Table 47.** Aid granted (€), paid (€), number of aid applications granted and payments made in 2017, by county **97**

