POLAND

Annual report on Poland's efforts to achieve a balance between fishing capacity and fishing opportunities for the period 1 January to 31 December 2021

Introduction

Pursuant to Article 22(2) of Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009 and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004 and Council Decision 2004/585/EC ('Regulation (EU) No 1380/2013'), EU Member States are required to send to the European Commission, by 31 May each year, a report on the balance between the fishing capacity of their fleets and their fishing opportunities.

I. SUMMARY

As at 31 December 2021, the Polish fishing fleet comprised 823 fishing vessels (including vessels fishing in the Vistula Lagoon and Szczecin Lagoon). The total fishing capacity of those vessels was 35 175.25 GT and 84 220.24 kW. In general terms, Polish fishing activity can be broken down into two basic sectors: Baltic Sea fishing (in which the lion's share of the fleet is involved) and deep-sea fishing.

The main fish species caught by Polish fishermen in the Baltic Sea are cod, sprat, herring, salmon, sea trout and flatfish. The main species caught by Polish deep-sea vessels are blue whiting, mackerel, horse mackerel, cod and herring.

Since its accession to the European Union, Poland has strictly complied with the capacity entry/exit scheme for fishing vessels as currently provided for in Article 23(1) of Regulation (EU) No 1380/2013.

II. Opinion on the balance between fleet capacity and resources

The latest assessments of the biological (2019-2021), technical (2019-2021) and economic (2018-2020) indicators relating to the Baltic fishing fleet, which are presented in Chapter VIII, Section F: 'Estimation and discussion of balance indicators' of this report show that no segments of the Baltic fleet are effectively balanced with available fishing opportunities.

- **VL0010PG –** vessels up to 10 m in overall length using nets and other passive gear – **imbalanced,**
- **VL1012PG –** vessels between 10 m and 12 m in overall length using nets and other passive gear – **imbalanced,**
- **VL1218DFN –** vessels between 12 m and 18 m in overall length using nets – **imbalanced,**
- **VL1218DTS –** bottom trawlers between 12 m and 18 m in overall length – **imbalanced,**
- **VL1218TM –** pelagic trawlers between 12 m and 18 m in overall length – **imbalanced/partially balanced**,
- **VL1824DTS –** bottom trawlers between 18 m and 24 m in overall length – **imbalanced,**
- **VL1824TM –** pelagic trawlers between 18 m and 24 m in overall length – **imbalanced/partially balanced**,
- **VL2440TM –** pelagic trawlers between 24 m and 40 m in overall length – **imbalanced/partially balanced**.

Pursuant to Article 22(4) of Regulation (EU) No 1380/2013, an action plan has been prepared for the segments of the Baltic fleet with identified structural overcapacity. The action plan forms an

integral part of this report and is contained in Chapter IX.

III. SECTION A

Description of the fishing fleet

In general terms, Polish fishing activity can be broken down into two basic sectors:

- **Baltic Sea fishing** (in which the lion's share of the fleet is involved),
- **deep-sea fishing**.

As at 31 December 2021, the Polish Baltic fishing fleet comprised 821 fishing vessels. The total fishing capacity of those vessels was 16 021.25 GT and 63 220.24 kW. The fleet is made up of fishing vessels operating in the Baltic Sea and in internal maritime waters, including the Vistula Lagoon and Szczecin Lagoon.

As at 31 December 2021, the Polish deep-sea fishing fleet comprised 2 fishing vessels. The total fishing capacity of those vessels was 19 154.00 GT and 21 000.00 kW. The deep-sea fleet is made up of fishing vessels operating exclusively outside the Baltic Sea and Polish internal waters.

Types of fishing operations

Baltic Sea fisheries

The main fish species caught by Polish fishermen in the Baltic Sea are cod, sprat, herring, salmon, sea trout and flatfish. Cod is a key Baltic Sea species for Polish fishermen (in particular for the coastal fleet). Cod catch is subject to restrictions for various reasons, including as a result of the cod recovery plan (significant annual reductions in fishing quotas, biological recovery periods, restricted use of certain fishing gear and a ban on directed fishing of eastern cod in 2020 and 2021). Catches of pelagic fish (sprat and herring) make up a significant share of the income of Polish fishermen. Polish fishermen also fish for sea trout and flatfish, considered equally valuable in economic terms. Baltic Sea catches in 2021, broken down by species, were as follows: cod (sub-areas 22-32): 285.7 tonnes, salmon: 11 184 units, sprat: 66 562.7 tonnes, plaice: 319.3 tonnes, western herring (sub-areas 22-24): 226.7 tonnes, central herring (sub-areas 25-27, 28.2, 29 and 32): 27 083.8 tonnes, sea trout: 15 024 units and flounder: 14 649 tonnes.

Deep-sea fisheries

Deep-sea vessels mainly operate in areas managed by the North-East Atlantic Fisheries Commission (NEAFC), the waters of the United Kingdom, the Svalbard archipelago and international waters managed by the South Pacific Regional Fisheries Management Organisation (SPRFMO). The main species caught by Polish deep-sea vessels are blue whiting, mackerel, Chilean jack mackerel, cod from area 1.2b and herring. The deep-sea quotas allocated to Poland were utilised either through fishing activity or by exchanging quotas. The Polish deep-sea sector has been taking advantage of the possibility to acquire additional catch quota for its particular target pelagic species, by exchanging quotas internationally. Species catch quotas are exchanged internationally where they are too low and do not allow economic fishing activity targeting those species. The main countries which Poland exchanged catch quota with in 2021 were the Netherlands, France, Spain and Germany. The Polish deep-sea fleet's growth prospects depend on fishing opportunities in the deep-sea fisheries where Poland has fishing rights, and on potential new fishing zones or new fishing opportunities. In 2021, deep-sea catches totalled approximately 62 500 tonnes.

Changes in the fishing fleet

Changes in the Polish fishing fleet, broken down between the Baltic and deep-sea fleet, are presented in the table below.

Changes in the fishing fleet as at 31 December 2021

	As at 31.12.2020			As at 31.12.2021			Change		
	GT	kW	No of vessels	GT	kW	No of vessels	GT	kW	No of vessels
Total	**32 384.63**	**80 371.51**	**823**	**35 175.25**	**84 220.24**	**823**	**+ 2 790.62**	**+ 3 848.73**	**No change**
Deep-sea fleet	16 403.00	17 400.00	2	19 154.00	21 000.00	2	+ 2 751	+ 3 600	No change
Baltic fleet	15 981.63	62 971.51	821	16 021.25	63 220.24	821	+ 39.62	+ 248.73	No change

The Baltic and deep-sea fishing fleet had the same number of vessels at the end of 2021 as at the end of 2020, with capacity increasing in the Baltic fleet by 39.62 GT and 248.73 kW, and in the deep-sea fleet by 2 751 GT and 3 600 kW.

This was due to modernisation measures taken by vessel owners to improve safety, working conditions, and the hygiene and quality of fishery products. Modernisation measures involved replacing and converting fishing vessels (i.e. increasing or decreasing gross tonnage), and replacing engines or adjusting their power (i.e. increasing or decreasing power). These measures were carried out by vessel owners at their own expense, using the individual fishing capacity (GT and kW) available to them.

IV. SECTION B

Impact on fishing capacity of effort reduction schemes

During the reporting period, no measures for permanent cessation of fishing activity under Article 34 of Regulation (EU) No 508/2014[1] were carried out, including measures for permanent cessation of fishing activity in relation to fleet segments with fishing vessels targeting Eastern Baltic cod, Western Baltic cod or Western Baltic herring as referred to in Article 8a of Regulation (EU) 2016/1139[2]. The fishing capacity ceiling for the Polish fishing fleet therefore was not reduced between 1 January and 31 December 2021.

In accordance with Article 34(5) of Regulation (EU) No 508/2013, decrease in capacity as a result of the permanent cessation of fishing activities with public aid must result in the permanent equivalent reduction of the fishing capacity ceilings set out in Annex II to Regulation (EU) No 1380/2013.

The fishing capacity of the vessels permanently removed from the EU fishing fleet register due to permanent cessation of fishing activities and by which the fishing capacity ceiling of the Polish fishing fleet – as set out in Annex II to the aforementioned Regulation – was reduced, is shown in the table below.

Changes in the fishing capacity ceiling of the Polish fleet

Fishing capacity permanently removed from the EU fishing fleet register due to permanent cessation of fishing activities in accordance with Article 34 of Regulation (EU) No 508/2014			
Year	No of vessels	GT	kW
2016	33	865.24	2 643.20
2017	8	166.78	505.00
2018	5	37.63	150.80
Total	**46**	**1 069.65**	**3 299.00**

Fishing capacity ceiling of the Polish fleet as set out in Annex II to Regulation (EU) No 1380/2013		
	GT	kW
	38 270.00	**90 650.00**

Fishing capacity ceiling of the Polish fleet minus capacity permanently removed from the EU fishing fleet register		
	GT	kW
	37 200.35	**87 351.00**

Between 2016 and 2018, as a result of permanent cessation measures in accordance with Article 34(4) of Regulation (EU) No 508/2014, 46 fishing vessels were permanently withdrawn from commercial fishing, corresponding to a total fishing capacity of 1 069.65 GT and 3 299.00 kW. This fishing capacity was therefore also permanently removed from the EU fishing fleet register, leading to a reduction – in accordance with Article 34(5) of Regulation (EU) No 508/2014 – in the fishing capacity ceiling of the Polish fleet under Annex II to Regulation (EU) No 1380/2013 corresponding to 1 069.65 GT and 3 299.00 kW.

[1] Regulation (EU) No 508/2014 of the European Parliament and of the Council of 15 May 2014 on the European Maritime and Fisheries Fund and repealing Council Regulations (EC) No 2328/2003, (EC) No 861/2006, (EC) No 1198/2006 and (EC) No 791/2007 and Regulation (EU) No 1255/2011 of the European Parliament and of the Council (OJ L 149, 20.5.2014, p. 1).
2 Regulation (EU) 2016/1139 of the European Parliament and of the Council of 6 July 2016 establishing a multiannual plan for the stocks of cod, herring and sprat in the Baltic Sea and the fisheries exploiting those stocks, amending Council Regulation (EC) No 2187/2005 and repealing Council Regulation (EC) No 1098/2007 (OJ L 191, 15.7.2016, p. 1).

V. SECTION C

Compliance with the entry/exit scheme and with the fishing capacity ceiling

During the reporting period, Poland strictly complied with the capacity entry/exit scheme as set out in Article 23(1) of Regulation (EU) No 1380/2013.

As at 31 December 2021, the fishing capacity of the Polish fleet entered in the fleet register was **35 175.25 GT** and **84 220.24 kW**.

Pursuant to Article 22(7) of Regulation (EU) No 1380/2013, the fishing capacity of the Polish fleet, as specified in the fleet register, did not at any time exceed the fishing capacity ceiling set out for Poland in Annex II to that Regulation or the ceiling minus fishing capacity permanently removed from the EU fleet register due to permanent cessation of fishing activities under Article 34 of Regulation (EU) No 508/2014.

VI. SECTION D

Summary of weaknesses and strengths of the fleet management system
Plan for improvements in the fleet management system
Information on the level of compliance with fleet policy instruments

Poland has fully complied with the fleet capacity restrictions provided for in EU law on balancing capacity entry and exit. The fishing capacity of the Polish fleet, as specified in the fleet register, did not at any time exceed the fishing capacity ceiling laid down for Poland in Annex II to Regulation (EU) No 1380/2013.

A key feature of the Polish fleet management system is that it incorporates a complex IT system. The IT system consists of a central database containing information necessary for the fisheries administration system to function properly and for it to be used to monitor fishing activity. The system takes into account links between vessel registration procedures, procedures for granting fishing licences and permits, and catch registration and accounting procedures. It has a statistical mechanism which enables a comprehensive set of reports to be generated. In addition, the system has a module for entering electronic reports into the database, which are submitted in accordance with Council Regulation (EC) No 1224/2009[3] and Commission Implementing Regulation (EU) No 404/2011[4]. The system was designed using the latest IT technology which, among other things, means it is able to operate more functionally, faster and can be accessed by all authorised users via the internet. A new 'infringements module' was added to the existing system in 2015 to allow users to record any infringements committed by Polish fishing vessels and to document all stages of relevant administrative procedures.

Vtrack – a modern satellite fishing vessel monitoring system – became fully operational in 2009 and was functioning normally in 2021.

ERS-Vcatch, an electronic recording and reporting system allowing fishing and landing documents under Council Regulation (EC) No 1224/2009 and Commission Implementing

[3] Council Regulation (EC) No 1224/2009 of 20 November 2009 establishing a Community control system for ensuring compliance with the rules of the common fisheries policy, amending Regulations (EC) No 847/96, (EC) No 2371/2002, (EC) No 811/2004, (EC) No 768/2005, (EC) No 2115/2005, (EC) No 2166/2005, (EC) No 388/2006, (EC) No 509/2007, (EC) No 676/2007, (EC) No 1098/2007, (EC) No 1300/2008, (EC) No 1342/2008 and repealing Regulations (EEC) No 2847/93, (EC) No 1627/94 and (EC) No 1966/2006 (OJ L 343, 22.12.2009, p. 1, as amended).

[4] Commission Implementing Regulation (EU) No 404/2011 of 8 April 2011 laying down detailed rules for the implementation of Council Regulation (EC) No 1224/2009 establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy (OJ L 112, 30.4.2011, p. 1-153).

Regulation (EU) No 404/2011 to be filed electronically, was deployed in January 2011. All Polish vessels over 12 metres in overall length have been equipped so that fishing activity and landing/transshipment declarations can be recorded and reported electronically. In 2021, all catch taken by those vessels was recorded using electronic logbooks.

The automatic SMS-based system for advance registration deployed in 2011 was functioning normally in 2021. Data transmitted from fishing vessels were automatically – in real time – recorded in a single database, which could be accessed by inspectors via the internet.

A balance between fishing capacity and available marine biological resources must be achieved in order to ensure effective fleet management. Adapting the size and structure of the fleet to the fishing opportunities available to Poland will therefore be crucial in the near term. The management rules for both areas which have so far been based on provisions resulting directly from EU law and the 2004 Act have been modified and enhanced in the new Sea Fisheries Act of 19 December 2014, in force since 4 March 2015.

Under those rules, the minister responsible for fisheries is empowered to manage fishing capacity, enabling efficient use to be made of the fishing capacity ceiling allocated to Poland (GT/kW) which, due to its gradual reduction, should be linked whenever possible to vessels actively engaged in commercial fishing. The provisions set out the following:

- three fleet segments will be designated by area of operation (fleet segments comprising vessels used in commercial fishing in the Baltic Sea, Vistula Lagoon, Szczecin Lagoon and deep sea areas;
- the minister responsible for fisheries will establish how spare fishing capacity is managed, including through support measures for fleet modernisation;
- measures will be taken to prevent excessive fragmentation of fishing capacity due to ‘duplication’ (such as refusing to register more than one fishing vessel in the fleet register to replace a previously withdrawn vessel).

VII. SECTION E

Information on changes to fleet management administrative procedures

In 2021, legislative work was completed on the following in the area of sea fisheries:

- Regulation of the Minister for Agriculture and Rural Development of 12 February 2021 amending the Regulation on conservation sizes and recovery periods for marine organisms and specific conditions applicable to commercial fishing (Journal of Laws 2021, item 310);

- Regulation of the Minister for Agriculture and Rural Development of 26 July 2021 amending the Regulation on conservation sizes and recovery periods for marine organisms and specific conditions applicable to commercial fishing (Journal of Laws 2021, item 1417);

- Regulation of the Minister for Agriculture and Rural Development of 20 August 2021 amending the Regulation on conservation sizes and recovery periods for marine organisms and specific conditions applicable to commercial fishing (Journal of Laws 2021, item 1546);

- Regulation of the Minister for Agriculture and Rural Development of 12 March 2021 establishing conversion factors for 2021 applicable to the quantity of marine organisms belonging to species for which individual fishing quotas are exchanged between vessel owners and laying down detailed conditions for the exchange of such quotas (Journal of Laws 2021, item 476);

- Regulation of the Minister for Agriculture and Rural Development of 14 December 2021 amending the Regulation on the detailed method for allocating overall and additional fishing quotas (Journal of Laws 2021, item 2339).

Regulation of the Minister for Agriculture and Rural Development of 12 February 2021 amending the Regulation on conservation sizes and recovery periods for marine organisms and specific conditions applicable to commercial fishing (Journal of Laws 2021, item 310)

The aim of the amendment to the Regulation was to supplement the list of fishing gear used in commercial fishing in Poland, simplify conditions for ice fishing and amend the technical specification for set gillnets, one of the types of fishing gear used in eastern internal waters. In particular, the draft Regulation amends the exhaustive list of fishing gear that may be used in commercial fishing, including towed or trawl gear, snaring or entangling gear, traps and hooks. The amendment to the Regulation was justified by changes to fisheries statistics referred to in the European Commission's guidelines. On 1 January 2019, the codes and types of fishing gear were renamed. The most significant change was to traps.

Regulation of the Minister for Agriculture and Rural Development of 26 July 2021 amending the Regulation on conservation sizes and recovery periods for marine organisms and specific conditions applicable to commercial fishing (Journal of Laws 2021, item 1417)

This amendment added dragnets to the list of fishing gear, these having previously been entered in the fleet register under code SB (beach seines). In accordance with the gear codes and names in force in the European Union from 1 January 2019, dragnets were assigned to code MIS (miscellaneous gear).

Regulation of the Minister for Agriculture and Rural Development of 20 August 2021 amending the Regulation on conservation sizes and recovery periods for marine organisms and specific conditions applicable to commercial fishing (Journal of Laws 2021, item 1546)

This amendment extended the period in which directed fishing for sprat is possible.

Previously, sprat could be targeted from 11 September to 9 June. By extending this period the aim was to reduce the impact of the ban on fishing with any type of fishing gear in subdivisions 25 and 26 from 1 May to 31 August, introduced by Council Regulation (EU) 2020/1579 of 29 October 2020 fixing for 2021 the fishing opportunities for certain fish stocks and groups of fish stocks applicable in the Baltic Sea and amending Regulation (EU) 2020/123 as regards certain fishing opportunities in other waters (OJ L 362, 30.10.2020, p. 3, as amended).

Regulation of the Minister for Agriculture and Rural Development of 12 March 2021 establishing conversion factors for 2021 applicable to the quantity of marine organisms belonging to species for which individual fishing quotas are exchanged between vessel owners and laying down detailed conditions for the exchange of such quotas (Journal of Laws 2021, item 476)

This Regulation implements the authorisation set out in Article 53a(7) of the Sea Fisheries Act of 19 December 2014 (Journal of Laws 2020, items 277 and 285), under which the minister responsible for fisheries is to establish, by way of a regulation, conversion factors for each year applicable to the quantity of marine organisms belonging to species for which individual fishing quotas are exchanged between vessel owners, and to lay down detailed conditions for the exchange of such quotas, taking into account overall catch quotas and the market value of individual species of marine organisms.

When adopting the conversion factors laid down in the aforementioned Regulation, account was taken of Council Regulation (EU) 2020/1579 of 29 October 2020 fixing for 2021 the fishing opportunities for certain fish stocks and groups of fish stocks applicable in the Baltic Sea and amending Regulation (EU) 2020/123 as regards certain fishing opportunities in other waters (OJ L 362, 30.10.2020, p. 3). This Regulation establishes the overall catch quotas for individual species of marine organisms subject to restrictions. Suggestions from the fishing community and the current market value of individual species of marine organisms were also taken into account when determining the conversion factors.

Regulation of the Minister for Agriculture and Rural Development of 31 December 2020 amending the Regulation on the detailed method for allocating overall and additional fishing quotas (Journal of Laws 2021, item 6).

This amendment to the Regulation on the detailed method for allocating overall and additional fishing quotas was required in order to adapt it to Council Regulation (EU) 2021/1888 of 27 October 2021 fixing for 2021 the fishing opportunities for certain fish stocks and groups of fish stocks applicable in the Baltic Sea and amending Regulation (EU) 2021/92 as regards certain fishing opportunities in other waters (OJ L 384, 29.10.2021, p. 1).

Council Regulation (EU) 2021/1888 significantly changed the way fishing quotas were managed for 2022 in the Baltic Sea. In accordance with the Annex to Council Regulation (EU) 2021/1888, quota for eastern cod, western cod, western herring and salmon may only be used for by-catch and no directed fishing of those species is permitted under the quota. At the same time, a ban on directed fishing for eastern cod has been in force since 2020.

In the light of the above, a modified method for allocating overall fishing quotas for western cod, western herring and salmon was proposed. This is directly related to the arrangements laid down in Council Regulation (EU) 2021/1888 and is intended to enable the minister responsible for fisheries to effectively implement the requirement to allocate quotas among Polish fishermen.

VIII. SECTION F

Estimation and discussion of balance indicators

At the request of the Fisheries Department at the Ministry of Agriculture and Rural Development, the National Marine Fisheries Research Institute (Morski Instytut Rybacki-Państwowy Instytut Badawczy) in Gdynia prepared the following indicators to assess the balance between fishing capacity and fishing opportunities.

The methodology used to calculate these indicators is consistent with the European Commission's 'Guidelines for the analysis of the balance between fishing capacity and fishing opportunities according to Article 22 of Regulation (EU) No 1380/2013 of the European Parliament and the Council on the Common Fisheries Policy'.

The National Marine Fisheries Research Institute calculated the indicators below for each segment of the Polish Baltic fleet. It also analysed and evaluated the results of these indicators, which served as a basis for it to assess the balance between fishing capacity and fishing opportunities in each segment of the Polish Baltic fleet over 3 consecutive years:

1. **Biological indicators, 2019-2021:**
   - ***Sustainable harvest indicator,***
   - ***Stocks at risk indicator.***
2. **Economic indicators, 2018-2020:**
   - ***Return on investment (ROI) vs next best alternative,***
   - ***Ratio between current revenue and break-even revenue (CR/BER) indicator.***
3. **Technical indicators, 2019-2021:**
   - ***Vessel utilisation indicator,***
   - ***Inactive fleet indicator.***

The indicators were analysed for the following segments of the Polish Baltic fleet[5]:

- **VL0010PG –** vessels up to 10 m in overall length using nets and other passive gear,
- **VL1012PG –** vessels between 10 m and 12 m in overall length using nets and other passive gear,
- **VL1218DFN –** vessels between 12 m and 18 m in overall length using nets,
- **VL1218DTS –** bottom trawlers between 12 m and 18 m in overall length,
- **VL1218TM –** pelagic trawlers between 12 m and 18 m in overall length (segment specified in 2020),
- **VL1824DTS –** bottom trawlers between 18 m and 24 m in overall length,
- **VL1824TM –** pelagic trawlers between 18 m and 24 m in overall length,
- **VL2440TM –** pelagic trawlers between 24 m and 40 m in overall length.

Data sources for biological indicators have not changed in terms of the assumptions upon which previous reports were based. Data are taken from ICES advisory documents for Baltic stocks for 2021 and 2022, and catch data from 2018-2021.

The economic data used for 2018-2020 were collected and approved under the EU Data Collection Framework (DCF EU). The catch and landing data used for the report were taken from the ERS system of the Fisheries Monitoring Centre (Centrum Monitorowania Rybołóstwa).

[5] Fleet segmentation in line with Commission Delegated Decision (EU) 2019/910 of 13 March 2019 establishing the multiannual Union programme for the collection and management of biological, environmental, technical and socioeconomic data in the fisheries and aquaculture sectors (Table 5B).
For reasons of data confidentiality, deep-sea vessels were excluded from the analysis. As there are few such vessels (two vessels) and their technical parameters and catch composition differ considerably from Baltic vessels, it would not be justified to cluster them with any Baltic fleet segment.

1. Analysis and assessment of the balance between fishing capacity and fishing opportunities for fleet segments over the period 2019-2021.

The biological indicators (i.e. sustainable harvest indicator and stocks at risk indicator) and technical indicators (i.e. inactive fleet indicator and vessel utilisation indicator) were prepared for the period 2019-2021. Following the cycle for collecting economic data which is determined by the dates for submitting form RRW-19 to the National Marine Fisheries Research Institute (report on the economic performance of fishing vessels for the year), economic indicators can be calculated up to the year 2020.

Table 1 provides a summary of the values of certain parameters which are important for analysing the balance of fleet activity.

Table 1. List of indicator values for individual segments of the Polish fishing fleet over three consecutive years (2018-2020 or 2019-2021 respectively)

Segment	Number of fishing vessels	Sustainable harvest indicator (SHI)	Stocks at risk indicator (SRI)	CR/BER	ROI	Vessel utilisation indicator	
						kWdays	GTdays
VL0010PG	**518** in 2021	**1.43*** in 2021	**1** in 2021	**-5** in 2020	**-19.4%** in 2020	**40%** in 2021	**40%** in 2021
	519 in 2020	**1.41*** in 2020	**1** in 2020	**-0.6** in 2019	**-7.1%** in 2019	**16%** in 2020	**16%** in 2020
	517 in 2019	**1.59*** in 2019	**1** in 2019	**-3.5** in 2018	**-16.4%** in 2018	**42%** in 2019	**39%** in 2019
VL1012PG	**122** in 2021	**1.32*** in 2021	**1** in 2021	**-2.9** in 2020	**-16.8%** in 2020	**41%** in 2021	**40%** in 2021
	120 in 2020	**1.14*** in 2020	**1** in 2020	**0.3** in 2019	**-3.2%** in 2019	**35%** in 2020	**35%** in 2020
	106 in 2019	**1.28** in 2019	**2** in 2019	**1.35** in 2018	**1.9%** in 2018	**47%** in 2019	**47%** in 2019
VL1218DFN	**21** in 2021	**1.21** in 2021	**0** in 2021	**-3** in 2020	**-13.9%** in 2020	**51%** in 2021	**52%** in 2021
	20 in 2020	**0.32*** in 2020	**0** in 2020	**-3.8** in 2019	**-18.0%** in 2019	**46%** in 2020	**44%** in 2020
	13 in 2019	**1.27** in 2019	**1** in 2019	**0.04** in 2018	**-3.5%** in 2018	**31%** in 2019	**31%** in 2019
VL1218DTS	**22** in 2021	**1.2** in 2021	**2** in 2021	**-0.4** in 2020	**-10.9%** in 2020	**63%** in 2021	**64%** in 2021
	34 in 2020	**0.88*** in 2020	**3** in 2020	**0.8** in 2019	**-1.6%** in 2019	**53%** in 2020	**55%** in 2020
	48 in 2019	**1.42** in 2019	**3** in 2019	**2** in 2018	**7.7%** in 2018	**53%** in 2019	**53%** in 2019
VL1218TM	**14** in 2021	**1.13** in 2021	**1** in 2021	**5.2** in 2020	**30.3%** in 2020	**62%** in 2021	**56%** in 2021
	11 in 2020	**1.22** in 2020	**0** in 2020	in 2019	in 2019	**68%** in 2020	**59%** in 2020
	in 2019	in 2019	in 2019	in 2018	in 2018	in 2019	in 2019
VL1824DTS	**10** in 2021	**1.2** in 2021	**1** in 2021	**0** in 2020	**-6.9%** in 2020	**34%** in 2021	**39%** in 2021
	9 in 2020	**0.71** in 2020	**1** in 2020	**1.8** in 2019	**5.9%** in 2019	**41%** in 2020	**40%** in 2020
	25 in 2019	**1.36** in 2019	**2** in 2019	**0.7** in 2018	**-5.3%** in 2018	**64%** in 2019	**65%** in 2019
VL1824TM	**45** in 2021	**1.17** in 2021	**1** in 2021	**2.3** in 2020	**8.5%** in 2020	**44%** in 2021	**45%** in 2021
	44 in 2020	**1.24** in 2020	**1** in 2020	**1.7** in 2019	**4.4%** in 2019	**51%** in 2020	**53%** in 2020
	30 in 2019	**1.31** in 2019	**1** in 2019	**4.1** in 2018	**16.8%** in 2018	**54%** in 2019	**58%** in 2019
VL2440TM	**44** in 2021	**1.19** in 2021	**1** in 2021	**2.5** in 2020	**11.2%** in 2020	**67%** in 2021	**69%** in 2021
	43 in 2020	**1.26** in 2020	**1** in 2020	**3** in 2019	**16.2%** in 2019	**64%** in 2020	**67%** in 2020
	43 in 2019	**1.34** in 2019	**1** in 2019	**2.7** in 2018	**12.5%** in 2018	**60%** in 2019	**60%** in 2019

N.B.: the biological indicators for 2019-2021 have been updated compared to the previous report.

* the indicator for this year and segment is considered unavailable as fewer than 40% of the landings of the segment during this period were based on stocks for which there was an F/F_{msy} ratio.

Detailed definitions for each of the indicators are presented in the following chapters. For the reader's convenience, a basic interpretation is provided below:

Biological indicators:

- **Sustainable harvest indicator (SHI)** is a measure of how much a segment relies on stocks that are 'overfished' (meaning catch is above MSY). If the indicator is greater than 1, this corresponds to 'overfishing' and means the situation is negative. The higher above 1 the indicator is, the greater the fishing imbalance. The indicator should ideally be at around 1. However, where less than 40% of the catch value comes from stocks for which there are data available to identify possible 'overfishing', that indicator is considered unavailable.
- **Stocks at risk indicator (SRI)** is a measure of how many stocks fished by the segment have significantly reduced biomass (usually below the threshold necessary to replenish successfully; such stocks are identified as 'at risk'). Stocks at risk which are exploited by the

segment are taken into account if catch from such stocks make up more than 10% of the segment's catch, or if the segment takes more than 10% of the catches of the stock. If, for example, the value of the indicator is 2, this means that the segment catches two stocks at risk (taking into account the condition of more than 10%). If the value is 0, this means that no stocks at risk are caught by the segment (taking into account the condition of more than 10%).

Technical and economic indicators:

- **ROI** – the return on investment indicator assesses the efficiency of the assets (capital) bound to the economic activity. If the value of the indicator is greater than 0, this means that the assets generate income. Where this is the case, the indicator is interpreted according to the opportunity cost of capital and interest rate (0.25% in 2019). If the value of the indicator is above zero but below the interest rate, this means that there are better alternatives in which to invest capital. If the ROI indicator is below 0, this means that the activity is not profitable.
- **CR/BER** – a profitability threshold which indicates if revenue is equal to the fixed and variable costs of a segment. If the ratio between current revenue and break-even revenue is less than one, this is an indication of short-term economic inefficiency which may suggest an imbalance.
- **Vessel utilisation indicator –** the ratio between the effort of a given fleet segment and the observed maximum effort actually expended by a segment (in kWdays or GTdays). Values below 70% could mean significant under-utilisation, which may indicate technical overcapacity.
- **Inactive fleet indicator –** the ratio between the number, GT and kW of inactive vessels, and the number, GT and kW of the entire fleet. Under normal conditions, up to 10% of vessels in a fleet segment can be expected to be inactive.
  If more than 20% of the fleet segment is recurrently inactive or if the average activity level of vessels in a fleet segment is consistently less than 70% of the potential workable activity of comparable vessels, this could indicate technical inefficiency, which may suggest an imbalance.

Summary assessment of the balance in the individual segments of the Baltic fishing fleet.

1. Performance of segment VL0010PG (vessels up to 10 m in overall length, fishing with nets and other passive gear):

- Biological indicators (2021):
  - ✓ sustainable harvest indicator: 1.43
  - ✓ stocks at risk indicator: 1
- Technical indicators (2021):
  - ✓ vessel utilisation indicator: 40% kWdays and GTdays
  - ✓ inactive fleet indicator: 3% of the total number of vessels, 2% GT and 1% kW in the segment comprising vessels up to 10 m in length
- Economic indicators (2020):
  - ✓ return on investment (ROI) indicator: -19.4%
  - ✓ current revenue/break-even revenue (CR/BER) indicator: -5

During the period under review, the SHI indicator for segment VL0010PG was significantly over 1, although it decreased slightly over the period 2020-2021. Catches by segment VL0010PG are therefore somewhat dependent on overfished stocks according to the MSY principle. Nevertheless, the segment fails to meet the condition whereby a minimum of 40% of the value of landings comes from stocks for which possible 'overfishing' may be identified. According to the guidelines, the SHI indicator is therefore deemed to be unavailable. Consequently, the indicator value for those vessels (as shown in Table 3b) should be treated as supplementary and not be taken into account when assessing the segment's balance.
In addition, the segment exploits one stock at risk (stocks at risk indicator of 1).

After a significant deterioration in 2020, the technical indicators improved in 2021 under both parameters (kWdays and GTdays), by 24 percentage points respectively.

Following a 1-year improvement in 2019 (-0.62), the CR/BER indicator for segment VL0010PG deteriorated significantly in 2020, falling to -5, i.e. well below the reference value. This shows that each year there continues to be a significant imbalance in the segment.

Based on its performance, segment VL0010PG has a long-term economic imbalance. Its imbalance may be structural (recurring negative indicator values in recent years). Between 2019 and 2021, the technical indicators were below the recommended value (70%) which, according to the guidelines, suggests technical overcapacity.

The segment's SHI indicator over the period 2019-2021 was significantly over 1, fluctuating between approximately 1.4 and 1.6. However, between 2020 and 2021, the segment relied on only around 10-20% of 'overfished' stocks, meaning that the indicator is considered unavailable according to the Commission's guidelines. During the period 2019-2021, the segment also fished one stock at risk. In conclusion, the values of the SHI indicator (if considered available) point to a biological imbalance in the segment.

When considering the segment as a whole, the negative biological, economic and technical indicators suggest there is an imbalance in the segment.

2. Performance of segment VL1012PG (vessels between 10 m and 12 m in overall length, fishing with nets and other passive gear):

- Biological indicators (2021):

- ✓ sustainable harvest indicator: 1.32
- ✓ stocks at risk indicator: 1

❖ Technical indicators (2021):

- ✓ vessel utilisation indicator: 41% kWdays and 40% GTdays
- ✓ inactive fleet indicator for the segment comprising vessels of between 10 m and 12 m in length: 2% of the total number of fishing vessels and in terms of GT and kW of vessels from this length category

❖ Economic indicators (2020):

- ✓ return on investment (ROI) indicator: -16.8%
- ✓ current revenue/break-even revenue (CR/BER) indicator: -2.9% (i.e. below the reference value)

In 2018, the segment's indicators improved, changing from negative to positive. This was brought about by an increase in income from landings (increased catches of cod, flounder and sea trout). In 2019, income from landings decreased considerably (-31%) in the segment, as a result of which the segment generated a loss (EUR -0.5 million). In 2020, catches collapsed by a further 43%, leading to a significant deterioration in both economic indicators under analysis. Similarly, the values for the technical indicators were significantly below the recommended levels.

During the period 2019-2021, the SHI indicator exceeded 1, ranging from 1.14 to 1.32. However, between 2020 and 2021, the value of landings of overfished stocks caught by the segment fell below 40% (to approximately 25-30%), meaning that the indicator can be considered unavailable for the period 2020-2021. However, the stocks at risk indicator decreased from 2 in 2019 to 1 in 2020 and 2021, and concerns small catches of eastern Baltic cod.

There was a far greater economic imbalance in segment VL1012PG than in previous years. The trend in the indicator value points to structural economic overcapacity. Between 2018 and 2020, the technical indicators were below the recommended value (70%) which, according to the guidelines, suggests technical overcapacity.

The SHI indicator over the period 2019-2021 was well above the reference value of 1, which therefore points to an imbalance. However, between 2020 and 2021, the segment relied on only around 25-30% of 'overfished' stocks, meaning that the indicator can be considered unavailable. The SRI indicator decreased from 2 in 2019 to 1 in 2020-2021.

When considering the segment as a whole, the SHI indicator which significantly exceeded the reference value, and the technical and economic indicators point to an imbalance in the segment.

3. Performance of segment VL1218DFN (vessels between 12 m and 18 m in overall length, fishing with nets):

❖ Biological indicators (2021):

- ✓ sustainable harvest indicator: 1.21
- ✓ stocks at risk indicator: 0

❖ Technical indicators (2021):

- ✓ vessel utilisation indicator: 51% kWdays and 52% GTdays
- ✓ inactive fleet indicator for vessels between 12 m and 18 m in length (fleet segments DFN and DTS): 8% of the total number of fishing vessels (4% the previous year), meaning that 4% GT and 4% kW of vessels from this length category were unused

❖ Economic indicators (2020):

- ✓ return on investment (ROI) indicator: -13.9%
- ✓ current revenue/break-even revenue (CR/BER) indicator: -3.0

In 2021, the sustainable harvest indicator for the segment under review was slightly lower than in 2019. However, other than in 2020, it was still above 1. Nevertheless, in 2020, the value of landings of overfished stocks caught by the segment was 18%. Consequently, the indicator can be considered unavailable for that year. The stocks at risk indicator decreased from 1 (in 2019) to 0 in 2020 and 2021.

In 2020, the loss generated by the segment increased to EUR 0.7 million, which had an adverse impact on the economic indicators. The negative profitability of the segment was due to a decrease in income from landings.

In terms of the economic indicators, the CR/BER indicator for segment VL1218DFN was below the reference level ('1') in 2020 (for the third consecutive year). The ROI indicator was 13.9% and therefore below the level of the next best alternative (-2.2%). There is therefore an economic imbalance in the segment. Between 2019 and 2021, the technical indicators were below the recommended value (70%) which, according to the guidelines, suggests technical overcapacity. The low levels registered for these indicators between 2018 and 2020 suggest there is structural overcapacity.

The SHI indicator in 2019 and 2021 was moderately above the reference level of 1, indicating a certain imbalance in the segment. In accordance with the guidelines, the indicator is considered unavailable for 2020 as the threshold of 40% was not exceeded in terms of the value of landings from 'overfished' stocks. The SRI indicator decreased from 1 to 0 over the period 2019-2021.

When considering the segment as a whole, the SHI indicator which moderately exceeded the reference value, and the technical and economic indicators point to an imbalance in the segment.

4. Performance of segment VL1218DTS (bottom trawlers between 12 m and 18 m in overall length):

- ❖ Biological indicators (2021):
  - ✓ sustainable harvest indicator: 1.20
  - ✓ stocks at risk indicator: 2
- ❖ Technical indicators (2021):
  - ✓ vessel utilisation indicator: 63% kWdays and 64% GTdays
  - ✓ inactive fleet indicator: 8% of the total number of fishing vessels, meaning that 4% GT and 4% kW of vessels from this length category were unused
- ❖ Economic indicators (2020):
  - ✓ return on investment (ROI) indicator: -10.9%
  - ✓ current revenue/break-even revenue (CR/BER) indicator: -0.4

The sustainable harvest indicator decreased from 1.42 in 2019 to 1.2 in 2021 (in 2020, the value of landings from 'overfished' stocks caught by the segment was 35%, meaning that the indicator can be considered unavailable for that year). The stocks at risk indicator for segment VL1218DTS decreased from 3 in 2019 and 2020, to 2 in 2021.

In 2020, for another consecutive year, the economic and technical indicators for the segment deteriorated considerably, registering values below the reference levels. This fall in profitability was mainly due to a decline in income from landings. Segment VL1218DTS was heavily reliant on cod.

In 2020, the economic indicators for segment VL1218DTS were below the reference values, which points to an economic imbalance. There is structural (economic) overcapacity based on the indicators for the period 2018-2020 and the decline in landing value in 2021. Between 2019 and 2021, the technical indicators were below the recommended value (70%) which, according to the guidelines, suggests technical overcapacity.

In conclusion, there is a biological imbalance in the segment on the basis of the SHI and SRI indicators over the period 2019-2021.

When considering the segment as a whole, the negative biological, economic and technical indicators point to an imbalance in the segment.

5. Performance of segment VL1218TM (pelagic trawlers between 12 m and 18 m in overall length):

- Biological indicators (2021):
  - ✓ sustainable harvest indicator: 1.13
  - ✓ stocks at risk indicator: 1
- Technical indicators (2021):
  - ✓ vessel utilisation indicator: 62% kWdays and 56% GTdays
  - ✓ inactive fleet indicator: 8% of the total number of fishing vessels, meaning that 4% GT and 4% kW of vessels from this length category were unused
- Economic indicators (2020):
  - ✓ return on investment (ROI) indicator: 30.3%
  - ✓ current revenue/break-even revenue (CR/BER) indicator: 5.2

During the period under review, the SHI index for segment VL1218TM decreased from 1.22 to 1.13, exceeding 1 by a relatively small amount. The SRI indicator was 1, i.e. one stock at risk was caught.

Segment **VL1218TM** is a new segment which did not exist prior to 2020. It mainly comprises vessels formerly part of segment VL1218DTS. This newly formed segment is characterised by its very high return on investment (ROI of 30.3%) and high CR/BER indicator (5.2). Both indicators were significantly above the reference values.

On the basis of its SHI and SRI indicators, segment VL1218TM is close to reaching a biological balance and the closest of all segments under review to reaching this balance.

The economic indicators point to high profitability in the segment. The number of vessels in the segment increased from 11 in 2020 to 14 in 2021. Less efficient vessels transferring to the segment may cause the economic parameters to deteriorate in future. Between 2020 and 2021, the technical indicators deteriorated, falling below the recommended value (70%). This points to unused capacity.

When considering the segment as a whole, the biological indicators show that the segment is almost balanced. The segment is characterised by positive economic indicators, their high values showing that vessels in the segment are economically safe.

6. Performance of segment VL1824DTS (bottom trawlers between 18 m and 24 m in overall length):

- Biological indicators (2021):
  - ✓ sustainable harvest indicator: 1.20
  - ✓ stocks at risk indicator: 1
- Technical indicators (2021):

- ✓ vessel utilisation indicator: 34% kWdays and 39% GTdays
- ✓ inactive fleet indicator for the segment comprising vessels of between 18 m and 24 m in length: 6% of the total number of fishing vessels and in terms of GT and kW of vessels from this length category

❖ Economic indicators (2020):

- ✓ return on investment (ROI) indicator: -6.9%
- ✓ current revenue/break-even revenue (CR/BER) indicator: 0.02

The SHI indicator fell from 1.36 in 2019 to 1.2 in 2021. The stocks at risk indicator for the segment decreased from 2 to 1 during the period under review. The segment is moderately reliant on overfished stocks, with levels of overfishing having clearly decreased.

In 2019, the segment was characterised by a positive ROI. The CR/BER indicator was similarly above the desired level ('1') in 2019. Both parameters deteriorated in 2020, registering values below reference levels. As cod accounts for a large share of income from landings, the segment is registering a decline. Since 2020, the number of vessels in the segment has decreased due to vessels switching to pelagic fishing and moving to segment VL1824TM.

During the period under review, the biological indicators for segment VL1824DTS pointed to moderate reliance on overfished stocks and stocks at risk, with reliance falling in 2021. In conclusion, there is a moderate biological imbalance in the segment on the basis of the SHI and SRI indicators over the period 2019-2021.

In 2020, the economic indicators were below the reference value. There was therefore an economic imbalance in the segment. In 2021, the value of the catch taken by the segment increased by over 20% following an increase both in sprat and flounder landings. The increasing share of pelagic fish in the catch will cause vessels to transfer from the DTS segment to the TM segment. Data are required from successive years to establish the extent to which the segment is able to operate economically catching predominantly flounder. Between 2019 and 2021, the technical indicators were below the recommended value (70%) which, according to the guidelines, suggests technical overcapacity.

When considering the segment as a whole, the negative biological, economic and technical indicators in 2020 point to an imbalance in the segment.

7. Performance of segment VL1824TM (pelagic trawlers between 18 m and 24 m in overall length):

❖ Biological indicators (2021):

- ✓ sustainable harvest indicator: 1.17
- ✓ stocks at risk indicator: 1

❖ Technical indicators (2021):

- ✓ vessel utilisation indicator: 44% kWdays and 45% GTdays
- ✓ inactive fleet indicator: 6% of the total number of vessels and in terms of GT and kW of vessels from this length category

❖ Economic indicators (2020):

- ✓ return on investment (ROI) indicator: 8.5%
- ✓ current revenue/break-even revenue (CR/BER) indicator: 2.3

Over the period under review, the SHI indicator for segment VL1824TM decreased from 1.31 to 1.17, while the stocks at risk indicator remained stable at 1. There is a relatively small imbalance in the segment.

In 2020, the economic indicators improved, with the ROI indicator for segment VL1824TM reaching 8.5%, i.e. better than in 2019 (4.4%) and above the next best alternative (0.25%). Similarly, the ratio between current revenue and break-even revenue (CR/BER) was 2.3, i.e. above the recommended value of 1 and exceeding its 2019 value of 1.7.

There is a small biological imbalance in segment VL1824TM due to its moderate SHI and SRI indicators. The economic indicators remain satisfactory. Between 2019 and 2021, the technical indicators were below the recommended value (70%) which points to unused capacity.

When considering the segment as a whole, the negative biological and technical indicators point to a small imbalance in the segment, whereas the economic indicators point to a balance.

8. Performance of segment VL2440TM (pelagic trawlers between 24 m and 40 m in overall length):

- Biological indicators (2021):
  - ✓ sustainable harvest indicator: 1.19
  - ✓ stocks at risk indicator: 1
- Technical indicators (2021):
  - ✓ vessel utilisation indicator: 67% kWdays and 69% GTdays
  - ✓ Inactive fleet indicator: 2% (one vessel)
- Economic indicators (2020):
  - ✓ return on investment (ROI) indicator: 11.2%
  - ✓ current revenue/break-even revenue (CR/BER) indicator: 2.5

Over the period under review, the SHI indicator for segment VL2440TM decreased from 1.34 to 1.19, while the stocks at risk indicator remained stable at 1. There is a relatively small biological imbalance in the segment. The biological indicators are similar to those of segment VL1824TM.

The financial performance of the segment has been stable in recent years, translating into high ROI values. The ROI indicator decreased from 16.2% in 2019 to 11.2% in 2020. This decrease was primarily due to a drop in income from landings (-9%) alongside an increase in wages (+4%). The indicator for segment VL2440TM regarding the coverage of variable, fixed and capital costs through income was 2.5 in 2020 (3.0 in 2019), i.e. far higher than the reference value, showing that the segment is balanced.

There is a small biological imbalance in segment VL2440TM due to its moderate SHI and SRI indicators. The segment is economically very stable (economically balanced). After deteriorating in 2020, the vessel utilisation indicator improved in 2021, nearly reaching the recommended value of 70%.

In conclusion, the segment's biological indicators point to a small imbalance, whereas its technical and economic indicators continue to point to a balance.

2. Catch by fleet segment

In 2021, as in 2020, Polish catch volumes in the Baltic Sea were lower than the previous year. The restrictions on cod fishing introduced in 2019 remained in place in 2021, adversely affecting not only the performance of vessels specialising in cod fishing, but also vessels catching cod in directed fisheries for other species. In 2021, the available catch quota for herring was reduced by 1/3, a second factor which adversely affected the performance of the Baltic fleet.

After a poor catch performance in 2020, the segment of vessels up to 10 m (**VL0010PG**) increased its catch in 2021 by 64% to 4 800 tonnes, primarily through an increased herring catch (mostly in the Vistula Lagoon). Despite a significant increase, catch volumes were unable to match 2019 (i.e. before the closure of the directed fishery for cod). In 2021, catch volumes remained 30% lower than in 2019. In addition to a significant increase in the herring catch (+166%), the catch performance for freshwater fish also improved, including for bream (+ 70%), roach (two-fold increase), and perch (+ 16%). The flounder catch increased by 12%.

In 2021, the catch volume of segment **VL1012PG** (which, like the segment described previously, fishes with static gear) decreased once again (by 34% compared to 2020). The decrease in catch was caused by far lower landings of flounder (-43%) and may have been negatively affected by the restrictions on cod which is a by-catch species in directed fisheries for flatfish. In 2021, vessels between 10 m and 12 m in length caught only 21 tonnes of cod, compared to 555 tonnes in 2019.

In 2020, vessels between 12 m and 18 m in length predominantly fishing with gillnets (**VL1218DFN**) caught half the volume of 2019. The reduction in landings mainly concerned cod, which accounted for 58% of the segment's total catch in 2018, and 48% in 2019. 2021 saw cod landings fall to 6 tonnes, but a several-fold increase in catches of pelagic fish (sprat and herring). Next year it is expected that vessels which started fishing for pelagic fish will transfer to segment VL1218TM and that segment VL1218DFN may disappear due to the very small number of vessels (less than 10).

In 2021, segment **VL1218DTS** caught 5 900 tonnes of fish, which corresponded to a decrease of 25% compared to 2020. Vessels in the segment rely mainly on bottom trawling for flounder, for which catch levels in 2021 were similar to 2020, amounting to 3 300 tonnes, i.e. far lower than in 2019 (5 300 tonnes). Vessels in the segment, like in the segment described previously, are increasingly targeting sprat and herring.

Segment **VL1218TM** was formed in 2020. It mainly comprises vessels which in previous years targeted cod and which, due to the restrictions on cod fishing, decided to switch to pelagic trawls. The vessels in the segment mainly catch sprat and sand lance. Flounder, i.e. the main species caught before 2019 besides cod, also represents a significant proportion of the catch composition of the segment.

Segment **VL1824DTS** is another segment which is gradually changing its catch composition in favour of predominantly pelagic fish. In 2021, vessels in the segment landed 1 800 tonnes of fish, i.e. 22% more than the previous year, but significantly less than in 2019 (-84%).

Segment **VL1824TM** caught 5% fewer fish in 2021 compared to 2020. This was due to lower landings of herring (-33%) caused by a reduction in the catch quota for herring in 2021. However, the catch volume of sprat increased (+ 17%) on a similar scale to flounder, mainly as a result of the segment containing vessels which had previously specialised in catching cod and flatfish.

The final segment under review comprises the largest vessels which mainly fish with pelagic trawls (**VL2440TM**). In 2021, the catch volume taken by the segment decreased by 8%, caused by

a reduction in catches of herring (-31%). Vessels in this segment depend almost entirely on pelagic fish (sprat and herring), which in 2021 accounted for 85% of the catch volume. Vessels in segment VL2440TM also reported a significant catch of flounder (4 100 tonnes in 2021, i.e. 5% more than in 2020) and other non-quota species such as whiting (1 800 tonnes), sand lance (1 700 tonnes), sand eel (1 200 tonnes) and other marine fish (1 700 tonnes).

Table 2. Landings of key fish species by segment, 2019-2021 (in tonnes)

Segment	Species	2019	2020	2021	2021/2020
VL0010PG	Sprat	0	0	0	-
	Herring	1 577	603	1 607	166%
	Flounder	1 131	617	689	12%
	Other	4 269	1 726	2 527	46%
Total VL0010PG		**6 977**	**2 946**	**4 824**	**64%**
VL1012PG	Sprat				-
	Herring	609	498	508	2%
	Flounder	2 307	1 943	1 115	-43%
	Other	1 067	326	190	-42%
Total VL1012PG		**3 983**	**2 767**	**1 813**	**-34%**
VL1218DFN	Sprat		1	390	-
	Herring	7	0	238	-
	Flounder	113	152	53	-65%
	Other	186	35	40	15%
Total VL1218DFN		**306**	**188**	**721**	**283%**
VL1218DTS	Sprat	1 912	1 354	1 516	12%
	Herring	1 136	606	474	-22%
	Flounder	5 304	3 327	3 267	-2%
	Other	2 650	2 567	650	-75%
Total VL1218DTS		**11 002**	**7 854**	**5 906**	**-25%**
VL1218TM	Sprat		1 885	2 677	42%
	Herring		1 021	649	-36%
	Flounder		1 882	2 047	9%
	Other		2 424	1 639	-32%
Total VL1218TM			**7 213**	**7 012**	**-3%**
VL1824DTS	Sprat	3 878	609	739	21%
	Herring	2 470	170	131	-23%
	Flounder	3 147	577	654	13%
	Other	2 021	165	325	97%
Total VL1824DTS		**11 515**	**1 521**	**1 849**	**22%**
VL1824TM	Sprat	11 951	15 313	17 978	17%
	Herring	5 806	9 069	6 059	-33%
	Flounder	296	2 248	2 641	17%
	Other	437	3 327	1 927	-42%
Total VL1824TM		**18 490**	**29 957**	**28 605**	**-5%**
VL2440TM	Sprat	56 751	41 412	43 232	4%
	Herring	29 065	25 634	17 621	-31%
	Flounder	4 422	3 933	4 115	5%
	Other	3 451	6 968	6 597	-5%
Total VL2440TM		**93 690**	**77 946**	**71 565**	**-8%**
Grand total		**145 963**	**130 391**	**122 295**	**-6%**

3. Sustainable harvest indicator

The sustainable harvest indicator (SHI) is a measure of how much a fleet segment relies on stocks that are overfished. 'Overfished' means that a stock is fished with a fishing mortality (F) above the reference value. In line with the European Commission's guidelines, the Fmsy fishing mortality rate, i.e. the mortality rate leading to the maximum sustainable yield (MSY) over a multi-year period or, if defined, the upper range of the mortality rate, was adopted as a reference fishing mortality.

The sustainable harvest indicator for a fleet segment is determined on the basis of all stocks exploited by the segment and for which data are available to calculate the F/Fmsy ratio. The sustainable harvest indicator is an average of the F/Fmsy ratio for individual stocks (i) weighted by the value of the landings of that stock by the segment concerned (Vi):

$$SHI=\frac{\sum_{i=1}^{i=n} V_i \frac{F_i}{Fmsy_i}}{\sum_{i=1}^{i=n} V_i},$$

where 'n' represents the number of stocks taken into account.

The lower the value of the indicator, the less dependent the given fleet segment is on overfished stocks. The optimal situation is where all $F_i/Fmsy_i$ values are close to 1, meaning the value of the SHI indicator is also close to 1 and stocks are exploited close to MSY. According to guidelines from the Scientific, Technical and Economic Committee for Fisheries (STECF), the indicator is deemed unavailable if more than 60% of the value landed by the segment is made up of stocks for which the fishing mortality rate and Fmsy are lacking.

The SHI was calculated taking into account stocks for which the F/Fmsy ratio could be established based on ICES assessments and analyses. Those stocks are:

a) Western Baltic cod (sub-areas 22-24),
b) Eastern Baltic cod (sub-areas 24-32)*,
c) Western Baltic herring (sub-areas 20-24)**,
d) Central Baltic herring (sub-areas 25-29 and 32),
e) Baltic Sea sprat (sub-areas 22-32),
f) Plaice in sub-areas 24-32.

*No Fmsy values have been determined for Eastern Baltic cod. However F/Fmsy assessments based on the stock-production model (SPiCT) are available. These estimates and the fishing mortality rates obtained from the cod stock analytical assessment (SS3 model) were used to calculate the Fmsy and consequently the SHI.

** The ICES working group assessing this stock (HAWG) will be delayed in 2022 due to the Russian aggression in Ukraine. The stock assessment for the previous year and the 2021 fishing mortality forecast from the previous year's assessment were therefore used in order to determine the F/Fmsy for 2021.

For the period 2019-2021, the value of landings of the aforementioned stocks (listed under points a to f) was less than 40% of the total value of landings for the most part in segment VL0010PG and, with the exception of 2019, in segment VL1012PG. In 2020, the value of those landings was also less than 40% in segments VL1218DFN and VL1218DTS (Table 3a). For those years and segments, the SHI indicator can be considered unavailable, although it has been calculated and is presented in this report. Overall, F and Fmsy values enabling the SHI indicator to be determined were available for approximately 68% of the value of landings in each of the years over the period 2019-2021.

Table 3a. Value of total landings of cod, herring, sprat and plaice as a percentage of the value of total landings by segment, 2019-2021 (values below 40% are shown in red)

Segment	Year		
	2019	2020	2021
VL0010PG	13	10	18
VL1012PG	44	26	29
VL1218DFN	72	18	41
VL1218DTS	56	35	48
VL1824DTS	66	58	53
VL1824TM	96	80	83
VL2440TM	92	87	86
VL1218TM		43	50

The SHI indicators are presented in Table 3b. The values calculated for 2021 are presented alongside updated calculations for 2019-2020 resulting from changes in the F/Fmsy level in subsequent stock assessments by ICES.

Table 3b. Sustainable harvest indicators (SHI) for the Polish fleet segments under review, 2019-2021.

Segment	Year		
	2019	2020	2021
VL0010PG	1.59*	1.41*	1.43*
VL1012PG	1.28	1.14*	1.32*
VL1218DFN	1.27	0.32*	1.21
VL1218DTS	1.42	0.88*	1.20
VL1824DTS	1.36	0.71	1.20
VL1824TM	1.31	1.24	1.17
VL2440TM	1.34	1.26	1.19
VL1218TM		1.22	1.13

* the indicator for this year and segment can be considered unavailable as fewer than 40% of the landings of the segment during this period were based on stocks for which there was an F/Fmsy ratio.

During the years under review, all fleet segments were reliant to a certain degree on 'overfished' stocks. Most years the SHI was greater than 1. The indicator generally decreased from year to year, and in 2021 it exceeded 1 by less than 20% in segments VL1824TM, VL2440TM and VL1218TM. Those segments mainly catch herring and sprat and are the closest to reaching a balance under the biological indicators. The SHI indicators were slightly higher in 2021 for segments VL1824DTS, VL1218DTS and VL1218DFN (SHI = 1.20-1.21) which targeted cod prior to the introduction of the fishing ban. The highest indicator values were for segments VL0010PG and VL1012PG (Table 3b). Formally speaking, the SHI indicators for those segments can be considered unavailable (more than 60% of their catch was based on stocks for which the F/Fmsy ratio had not been determined). Moreover, the high value of the indicator mainly comes from catches of central Baltic herring.

4. Stocks at risk indicator

The stocks at risk indicator (SRI) aims to determine how much of the catch taken by a given fleet segment is based on stocks with heavily reduced biomass and in a condition such that stock productivity may be greatly diminished. In accordance with the Commission's guidelines, a stock at risk is a stock:

a. with reproductive biomass which is less than the threshold below which the stock's renewal significantly decreases. This threshold biomass is usually referred to as B_{lim},
b. for which there is advice to close the fishery, prohibit directed fishing, reduce fishing to the lowest possible level, etc.,
c. subject to regulations on returning fish unharmed to the sea or prohibiting landings,
d. on the 'red list' or listed by CITES.

The indicator is calculated as the number of stocks exploited by a given segment which meet the following conditions:

Condition 1: landings from stocks considered to be at risk make up more than 10% of the fleet segment's landings

or

Condition 2: more than 10% of the fleet segment's landings are from stocks considered to be at risk.

The calculation formula is as follows:

$$\text{SRI}=\sum_{i=1}^{i=n}(1\ where\ (C_i > 0.1C_t)\ or (C_i > 0.1T_i);\ otherwise\ 0),$$

where

C_i – landings of stock i,

C_t – total landings of all stocks taken by the fleet segment,

T_i – total landings of stock i taken by all segments.

Of the stocks which were analysed, the following met the 'at risk' criteria over the period 2019-2021:

a) Western Baltic herring,
b) Western Baltic cod,
c) Eastern Baltic cod,

as the stock biomass for each of those stocks was lower than the corresponding B_{lim} during that period.

If, for example, the value of the SRI indicator is 2, this means that the segment catches two stocks at risk. If the value is 0, this means that no stocks at risk are caught by the segment (taking into account the condition of over 10%). The SRI values calculated for the segments of the Polish fleet which were analysed are presented in Table 4.

Table 4. Stocks at risk indicator (SRI) and landings of stocks at risk for Polish fleet segments under review, 2019-2021

2019

Segment	Herring landings 20-24	Cod landings 22-24	Cod landings 24-32	Segment landings	SRI indicator
VL0010PG	0.21	0.03	0.22	6.98	1
VL1012PG	0.10	0.16	0.39	3.98	2
VL1218DFN	0.00	0.03	0.12	0.31	1
VL1218DTS	0.11	0.55	1.07	11.00	3
VL1824DTS	0.03	0.24	0.91	11.52	2
VL1824TM	0.00	0.00	0.41	18.49	1
VL2440TM	0.63	0.00	0.19	93.69	1
Total	1.08	1.01	3.31	145.96	

2020

Segment	Herring landings 20-24	Cod landings 22-24	Cod landings 24-32	Segment landings	SRI indicator
VL0010PG	0.08	0.00	0.02	2.95	1
VL1012PG	0.02	0.01	0.02	2.77	1
VL1218DFN	0.00	0.00	0.01	0.19	0
VL1218DTS	0.06	0.04	0.20	7.85	3
VL1824DTS	0.00	0.00	0.10	1.52	1
VL1824TM	0.02	0.01	0.02	29.96	1
VL2440TM	0.37	0.00	0.01	77.95	1
VL1218TM	0.01	0.00	0.02	7.21	0
Total	0.57	0.08	0.40	130.39	

2021

Segment	Herring landings 20-24	Cod landings 22-24	Cod landings 24-32	Segment landings	SRI indicator
VL0010PG	0.05	0.00	0.00	4.82	1
VL1012PG	0.02	0.01	0.01	1.81	1
VL1218DFN	0.00	0.00	0.01	0.72	0
VL1218DTS	0.01	0.14	0.02	5.91	2
VL1824DTS	0.02	0.03	0.00	1.85	1
VL1824TM	0.01	0.02	0.01	28.61	1
VL2440TM	0.11	0.00	0.01	71.57	1
VL1218TM	0.01	0.01	0.01	7.01	1
Total	0.23	0.21	0.07	122.30	

In 2019-2021, there were no fleet segments in which western Baltic cod and herring landings exceeded 10% of the segment's landings (condition 1 regarding reliance on catch from stocks at risk). Landings of western Baltic cod are limited and represented less than 1% of the Polish fleet's total landings. Similarly, landings of western Baltic herring were relatively small, accounting for no more than 1% of the fleet's landings during the period under review. However, in some cases, landings of stocks at risk by a given segment represented over 10% of the landings of that stock by all segments (condition 2 regarding reliance on catch from stocks at risk). In the case of eastern Baltic cod, condition 1 regarding reliance on catch from stocks at risk was met in 2019 by segment VL1218DFN.

Over the period 2019-2021, the SRI indicator in the majority of segments was most commonly 1, occasionally 2 or 3 (and never 0). The stocks at risk indicator decreased in 2020 and 2021, and in most segments had a value of 0 or 1 (Table 4).

Segment VL1218DTS was most reliant on stocks at risk with an SRI of 2, i.e. the segment exploited two stocks at risk while fulfilling condition 2. The segment's share of the exploitation of each of the cod stocks accounted for over 10% of the total catch of all segments. However, those catches were limited and did not significantly affect the status of the stocks at risk.

Comments on the analysis of biological indicators

The Polish fleet exploits resources in the Baltic Sea in accordance with EU fishing quotas. F/Fmsy ratios are only above 1 for central Baltic herring and western Baltic cod stocks. For the remaining stocks, F/Fmsy ratios are close to 1 (e.g. sprat) or clearly below 1 (western Baltic herring, plaice, eastern Baltic cod). In the case of western Baltic cod, Polish catches are marginal (at the level of parts per thousand of the Polish catch) and do not present a risk to the stock. Where Polish segments have an SHI above 1, this is mainly due to the F/Fmsy which is clearly above 1 for central Baltic herring (ranging from 1.9-1.5 over the period 2019-2021).

This higher SHI for herring has been caused by a slightly higher catch than advised by ICES (e.g. Russia sets TACs independently and without consulting the EU) and by the ICES biomass forecasts (in terms of Fmsy) and catch forecasts for herring which were possibly too optimistic. Every year, ICES issues advice on MSY fishing. However, in the years which follow, actual fishing mortality has proven to be much higher than advised, despite the total Baltic herring catch slightly exceeding catch limits. During the period 2022-2023, the methodology for assessing and forecasting Baltic herring and sprat stocks ('benchmark assessment') will be revised. If this resolves the issue of the overly optimistic catch forecasts for central Baltic herring, F/Fmsy ratios will fall to approximately 1 and Polish TM segments will become fully balanced.

F/Fmsy ratios for eastern Baltic cod are below 1 due to the fishing ban applicable to this stock (values above 0 are the result of allowable by-catch). On account of the ban on cod fishing, fleet segments which previously fished that stock have been placed in a difficult situation and should be covered by the action plan. Formally speaking, however, there was a relatively small imbalance under the biological indicators during the period 2020-2021.

5. Return on investment (ROI) vs next best alternative

The return on investment indicator is a measure of the efficiency of an undertaking's operations, enabling the efficiency of the assets (capital) bound to the economic activity to be assessed. If the value of the indicator is greater than 0, this means that the assets generate income. In this scenario, the interpretation of the indicator depends on the opportunity cost of capital. If the ROI indicator is below 0, this means that the activity is not profitable and that capital would be better used elsewhere (e.g. in the form of long-term risk-free securities or other revenue sources). The differences in indicator values for individual fleet segments show which group of vessels (vessel segment) operates making the most efficient use of assets. The indicator is calculated in terms of the profitability of an undertaking relative to the value of its fixed assets (value of the vessel).

Table 5 presents the value of the ROI indicator and the data used to calculate it (N.B.: in the table, subsidies, however, were not taken into account when calculating the indicator).

Table 5. Return on investment indicator for Polish Baltic fleet segments in 2020 (in '000 EUR)

No	Specification	VL0010 PG	VL1012 PG	VL1218 DFN	VL1218 DTS	VL1218 TM	VL1824 DTS	VL1824 TM	VL2440 TM	Total
1	**Total revenue, of which:**	**23 532**	**6 668**	**1 133**	**4 152**	**2 429**	**1 167**	**9 418**	**21 415**	**69 674**
1.1	income from landings	3 701	1 787	173	2 494	1 682	571	6 435	17 880	34 723
1.2	other income	320	60	0	0	92	0	42	44	558
1.3	subsidies*	19 512	4 821	960	1 658	654	596	2 941	3 491	34 393
2	**Total costs, of which:**	**8 720**	**4 426**	**872**	**3 336**	**892**	**831**	**4 970**	**13 283**	**37 330**
2.1	wages	2 280	1 495	300	802	276	167	1 456	4 506	11 282
2.2	unpaid work	3 996	1 314	212	313	61	26	602	568	7 092
2.3	energy consumption	475	276	44	732	153	128	632	2 885	5 325
2.4	repair and maintenance	375	230	94	490	109	162	741	1 300	3 501
2.5	other variable costs	807	446	48	398	84	83	411	953	3 230
2.6	fixed costs	601	401	124	415	99	89	648	1 653	4 030
2.7	depreciation	186	265	50	184	110	178	480	1 416	2 869
3	Profit/loss (revenue minus subsidies – total costs)	-4 699	-2 579	-699	-842	882	-260	1 507	4 640	-2 049
4	Fixed assets (value)	24 180	15 365	5 031	7 721	2 908	3 774	17 802	41 573	118 354
5	**ROI (profit/fixed assets)**	**-19.4%**	**-16.8%**	**-13.9%**	**-10.9%**	**30.3%**	**-6.9%**	**8.5%**	**11.2%**	**-1.7%**

*not included in ROI calculations

Terms and definitions:

Income from landings –estimate based on data from first-sale documents. In the absence of such documents – this applies to sales of vessels of less than 8 m in length and cases where certain data relating to vessels over 8 m are incomplete – the value of fish sales was calculated with reference to average annual prices of individual fish species by vessels which submitted first-sale documents, and to data relating to the value of catch taken by the entire fleet.

Other income – additional income from accompanying activities such as tourism or ad-hoc activities.

Subsidies– mostly includes public support granted to fishing vessel owners under the FISH OP, mainly in the form of compensation payments for temporary cessation of fishing activity and subsidies for vessel modernisation.

Wages – includes gross wages plus benefits.

Unpaid work – estimated value of unpaid work (e.g. owners and their families).

Energy consumption – covers fuel and lubricants used by vessels.

Repair and maintenance – technical support services for fishing vessels and equipment. Mostly provided as external services (e.g. bookkeeping). This includes costs incurred by vessel owners for the purchase of materials and services for ongoing vessel repairs and renovation. Data are determined on the basis of the RRW-19 statistics form.

Other variable costs – includes expenditure on fishing gear, ice, fish boxes, protective clothing, other materials, crew catering services, port and landing fees.

Fixed costs – costs not related to catch, incurred in respect of applicable fees, property insurance, protection measures, external services (except for renovation), financial costs, other costs, etc.

Depreciation – annual depreciation calculated on the basis of accounts, declared by fishing enterprises in RRW-19 forms.

Value of fixed assets – specified separately for each fishing vessel on the basis of a compensation rate obtainable by vessel owners where vessels are withdrawn with public support.

Profit or loss – calculated on the basis of the above data as the difference between income from landings plus other income and total costs; does not include subsidies.

ROI – indicates profit or loss relative to the value of fixed assets.

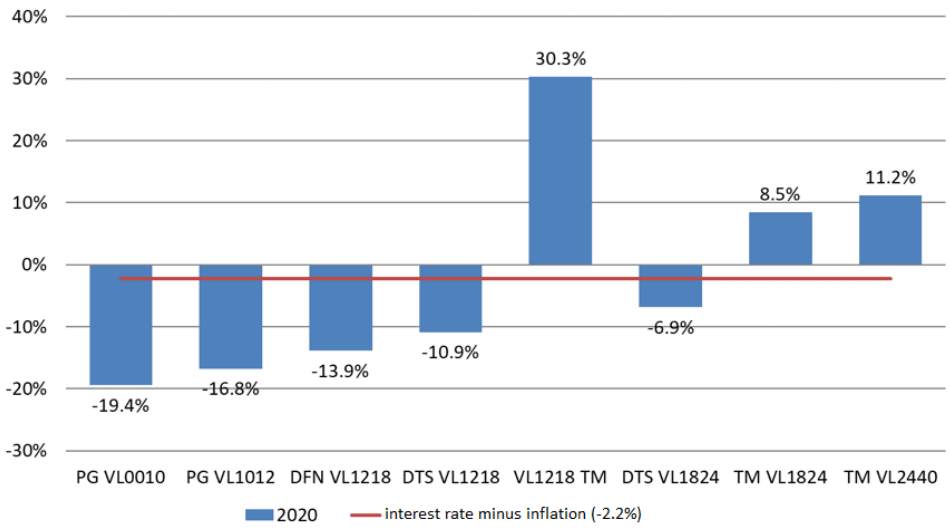

Figure 1. Return on investment (ROI) indicator for Polish Baltic fleet segments (2020)

Interpretation of ROI indicators

In 2020, the return on investment indicator for Baltic fisheries was negative (-1.7%, compared to 4.1% in 2019). Despite its negative value, the indicator remained above the next best alternative which, due to inflation increasing above the long-term interest rate, was also negative (-2.2%)[6]. The deterioration in the indicator was caused by a significant increase in losses in the two segments comprising the smallest fishing vessels (VL0010PG and VL1012PG) and a decrease in the profitability of the largest vessels targeting pelagic fish (VL2440TM).

The ROI indicator varied across individual vessel segments. Segments made up of smaller vessels continued to have a visibly lower ROI than segments comprising large vessels. Five segments had a negative indicator (VL0010PG, VL1012PG, VL1218DFN, VL1218DTS and VL1824DTS), while all three segments targeting pelagic fish had a positive return on investment indicator (above the next best alternative).

The ROI indicator for segment **VL0010PG** was negative (-19.4%) after a somewhat better year (in 2019 the indicator was -7.1%). This marked a return to a heavy deficit, caused mainly by a collapse in income from landings. The value of landings in the segment in 2020 was half that of the previous year. A fall in costs (by just 11%) did not offset the decline in income. In 2020, the economic existence of the segment and its future survival were guaranteed by heavy subsidisation, exceeding many times over the value of the fish caught. With ROI indicators continually lower than expected in recent years, the segment can be characterised as overcapitalised.

As with the segment analysed above, the ROI indicator deteriorated in segment **VL1012PG** which, like segment VL0010PG, fishes with static gear. The ROI indicator in 2019 (-3.2%) was slightly lower than the next best alternative (0.25%) of investing in fishing capital. This suggested that an alternative capital investment may be more profitable, indicating overcapitalisation of the segment. The high negative return on investment in 2020 (-16.8%) indicates a high deficit on invested capital, and therefore an imbalance against available fishing opportunities in the segment.

A clear decline in the ROI for segment **VL1218DFN** was previously observed in 2019 (decrease from -3.5% to -18%). In 2020, it improved slightly but continued to show a high deficit (-

[6]Long-term interest rate for convergence purposes, https://ec.europa.eu/eurostat/databrowser/view/tec00118/default/table?lang=en, price index (inflation) - https://ec.europa.eu/eurostat/databrowser/view/irt_lt_mcby_a/default/table?lang=en

13.9%). As with the segments analysed previously, a negative indicator points to overcapitalisation of the segment. The deteriorating economic situation is a consequence of the poor status of Baltic cod, which in 2017 was the main source of income from landings for segment VL1218DFN. In 2020, vessels in that segment incurred losses of EUR 700 000 (an increase of 25%). Despite the high losses, the segment was able to operate in 2020 thanks to heavy subsidisation (EUR 960 000 compared to EUR 173 000 of own income). As a consequence of the growing share of herring and sprat in the segment's catch, part of the invested capital is expected to transfer to segment VL1218TM, worsening its economic situation.

Segment VL1218DTS registered a negative financial performance in 2020 (- EUR 800 000), as a result of which the ROI indicator for the segment deteriorated, reaching a negative value of -10.9% (-1.6% in 2019). In the years prior to this, the segment's performance had been satisfactory, albeit worsening. As with segment VL1218DFN, vessels belonging to segment VL1218DTS were heavily reliant on cod fishing prior to 2020. The restrictions introduced in mid-2019 led to the segment's income from landings falling by half in 2020 compared to the previous year, while costs fell considerably less (by 36%). As a result, losses were four times higher than in 2019. A negative ROI indicator points to overcapitalisation of the segment and economic inefficiency.

Segment **VL1218TM** is a new segment which did not exist prior to 2020. It mainly comprises vessels formerly part of segment VL1218DTS. This new segment is characterised by a very high return on investment (ROI indicator of 30.3%). The strong indicator is a consequence of the relatively low value of invested capital (due to the small size of the segment) and a high degree of profitability due to the broad range of species caught. The return on investment in the segment significantly exceeds the next best alternative. However, this may deteriorate as further vessels transfer from segment VL1218DTS.

In 2020, the return on investment indicator for segment **VL1824DTS**, i.e. bottom trawlers, was -6.9% and thus below the next best alternative (-2.2%). In accordance with the guidelines this should be interpreted as overcapitalisation. The restrictions on cod fishing introduced in 2019 resulted in a sharp decline in the value of landings by the segment (-86%). Fixed assets also decreased in value (-56%) which, as a result, cushioned the deterioration in the segment's return on investment. The reduction in the number of vessels in the segment showed that the segment is able to adapt by itself to negative changes. Capital investment in the segment fell mainly as a result of some of the vessels transferring to the neighbouring segment of pelagic vessels. This, in turn, may adversely affect the performance of that segment in future.

Segment **VL1824TM** comprises vessels for which pelagic trawls or midwater pair trawls were the primary gear for that year. In 2020, the value of invested capital in the segment increased by as much as 54%, resulting from an increase in the number of vessels in the segment due to vessels transferring from segment VL1824DTS. On the positive side, an increase in asset value accompanied an increase in income from landings, which was almost 80% higher than the previous year. In 2020, total costs in the segment were 58% higher than in 2019. Consequently, the return on investment indicator increased from 4.4% to 8.5%. The indicator therefore remained above the value of the next best alternative. However, it was much lower than in previous years (17%-26% between 2016 and 2018).

The financial performance of segment **VL2440TM** has been stable in recent years, translating into high ROI values. The ROI indicator decreased from 16.2% in 2019 to 11.2% in 2020. This decrease was primarily due to a drop in income from landings (-9%) alongside an increase in wages (+4%), the most important factor in the segment's cost structure. As a result, vessels in the segment

generated 26% less profit in 2020 compared to 2019, while the value of its fixed assets increased by 8%. Despite the fall in profitability, the segment's return on investment remained much higher than the next best alternative, which means the indicator does not point to overcapitalisation.

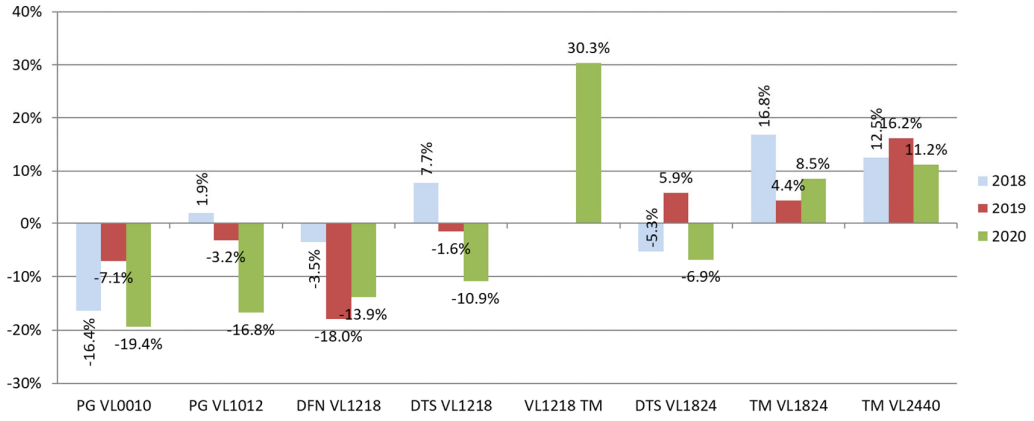

Figure 2. Changes in the ROI indicator, 2018-2020

6. Ratio between current revenue and break-even revenue (CR/BER) indicator

The CR/BER indicator constitutes a profitability threshold which indicates if revenue is equal to the fixed and variable costs of a segment. Break-even revenue (BER) is the amount of revenue equivalent to all costs, whereas current revenue (CR) is the total operating revenue of a vessel or segment. The CR/BER indicator shows how close a fishing vessel is to becoming financially viable in the short-term. If the ratio is greater than 1, revenue is greater than or equal to fixed and variable costs, meaning that the segment is profitable. If the ratio is less than 1, the fleet/segment does not generate sufficient revenue to cover its costs. A negative CR/BER indicator means core activity is unprofitable and fixed costs cannot be covered (variable costs are higher than the income of the segment).

The CR/BER parameter is assessed in order to consider the financial viability of a given segment and the ratio between operating revenue and costs according to their degree of variability. The break-even point can serve as a comparison against revenue obtained. Segments which demonstrate that they can at least fully break even receive a positive assessment ('1').

A long-term downward trend in the BER indicator is a sign of an improved ratio between these key economic parameters (revenue/variable costs/fixed costs) and the increased profit-making potential of the segment.

The CR/BER indicator by fleet segment in 2020 is presented in Table 6.

Table 6. CR/BER (current revenue/break-even revenue) indicator in 2020 (in '000 EUR)

Specification	VL0010 PG	VL1012 PG	VL1218 DFN	VL1218 DTS	VL1218 TM	VL1824 DTS	VL1824 TM	VL2440 TM	Total
Total revenue (CR), of which:	**23 532**	**6 668**	**1 133**	**4 152**	**2 429**	**1 167**	**9 418**	**21 415**	**69 674**
income from landings	3 701	1 787	173	2 494	1 682	571	6 435	17 880	34 723
other income	320	60	0	0	92	0	42	44	558
subsidies	19 512	4 821	960	1 658	654	596	2 941	3 491	34 393
Variable costs, of which:	**7 933**	**3 760**	**699**	**2 736**	**683**	**565**	**3 843**	**10 213**	**30 431**
wages	6 276	2 809	512	1 115	337	193	2 058	5 074	18 374
energy consumption	475	276	44	732	153	128	632	2 885	5 325
repair and maintenance	375	230	94	490	109	162	741	1 300	3 501

other variable costs	807	446	48	398	84	83	411	953	3 230
Fixed costs, of which:	**787**	**666**	**173**	**600**	**209**	**266**	**1 128**	**3 070**	**6 899**
non-variable costs	601	401	124	415	99	89	648	1 653	4 030
depreciation	186	265	50	184	110	178	480	1 416	2 869
opportunity cost (not included)*	-532	-338	-111	-170	-64	-83	-392	-915	-2 604
Revenue minus subsidies to ensure profitability (BER)	-809	-643	-57	-6 182	340	23 382	2 772	7 136	50 182
CR/BER	**-5.0**	**-2.9**	**-3.0**	**-0.4**	**5.2**	**0.0**	**2.3**	**2.5**	**0.7**

*As in previous years, the calculation method includes a short-term analysis, meaning that the opportunity cost, although shown in the table, is not taken into account in the calculations.

Terms and definitions:
Fixed costs – costs calculated independently of the catch volume associated with the activities of fishing enterprises.
Variable costs – costs determined on the basis of the catch levels (effects) or fishing effort of fishing enterprises.
Other fixed costs – costs not directly associated with fishing vessel catch volumes (including port fees, external services, insurance, financial and other costs).
Opportunity cost – should only be included in long-term assessments. This is the cost of using capital for the next best alternative.
CR (current revenue) – total current revenue.
BER (break-even revenue) – revenue which would cover all (fixed and variable) costs and mean a normal profit is generated (0).

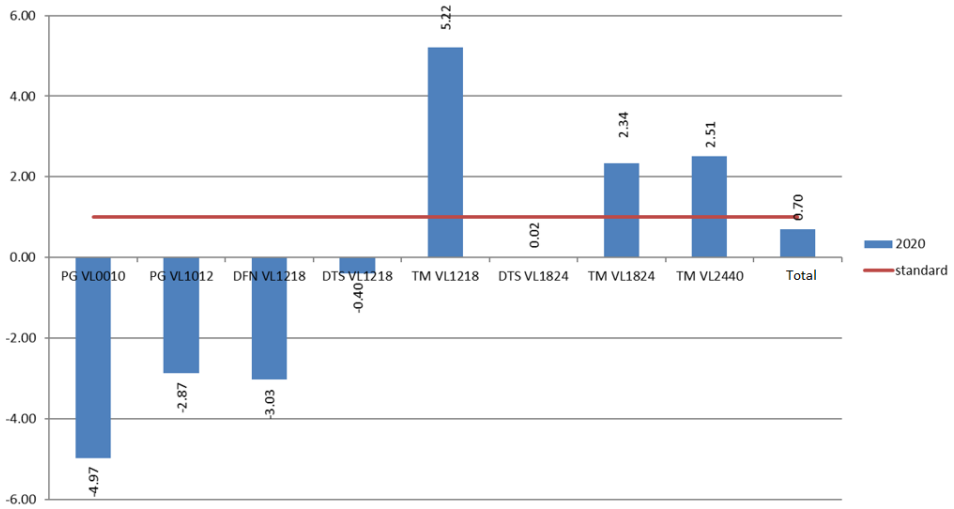

Figure 3. CR/BER indicators by fleet segment, 2020 (public subsidies excluded from calculations).

Interpretation of CR/BER indicators

Following a decrease in the value of the CR/BER indicator between 2016 and 2018, from 2.2 in 2016 to 1.7 in 2017 to 1.5 in 2018, the indicator increased to 1.6 in 2019. In 2020, the indicator deteriorated to 0.7, meaning that for the first time in many years, the CR/BER indicator for the Baltic fishing fleet as a whole was below the expected level of '1'. The deterioration in the indicator is mainly the result of a decrease in income from landings (-21%), with a much smaller decrease in total costs (-6%).

Following a 1-year improvement in 2019 (-0.6) in segment **VL0010PG**, the CR/BER indicator deteriorated significantly in 2020, falling to -5, i.e. well below the reference value. This shows that each year there continues to be a significant imbalance in the segment. In 2020, the loss generated by the segment (- EUR 4.7 million) exceeded income from landings (EUR 3.7 million), which indicates that costs in the segment were over twice as high as income. Wages, including unpaid work, are the primary cost factor for the segment. Registered wages decreased by 13% in 2020 (from EUR 2.6 million to EUR 2.3 million), whereas the cost of unpaid work increased by 9% (from EUR 3.6 million to EUR 4 million). The segment was able to operate under such poor economic

parameters thanks to heavy subsidisation ensuring over 80% of total income in 2020. If subsidies were included in the income of the segment, the CR/BER indicator would be 3.4, i.e. above the expected level.

The indicator for segment **VL1012PG** was much lower than the recommended value. Its decrease from 0.3 to -2.9 was the result of a collapse in the catch volume and value (by 30% and 43% respectively). The indicator was much lower than expected for a second year in a row and has shown a deteriorating trend for the past 3 years, thus the conclusion that the segment is imbalanced. In 2020, flounder was the primary source of income from landings for vessels in segment VL1012PG (47% share). In 2018, it was cod (37% share) which, in 2020 accounted for a mere 4% of income from landings. Despite a significant reduction in the value of landings, total costs in the segment increased by 20%, primarily as a result of an increase in wage costs by over 50%. This increase concerned registered wages and unpaid work. As with segment VL0010PG, wages were financed by subsidies, which accounted for over 70% of total income in 2020. Taking subsidies into account would raise the CR/BER indicator above the recommended value (1.2).

In 2019, a considerable reduction in operating income and, in relative terms, a much lower reduction in costs in segment **VL1218DFN**, resulted in a significant increase in operational losses and, consequently, a negative CR/BER indicator of -3.8, which is therefore below the reference value. In 2020, the indicator was also negative (-3.0). This was caused by another significant decline in the value of landings, while costs remained at 2019 levels. Segment VL1218DFN specialises in catching demersal fish with gillnets and salmonids with hooks. The restrictions introduced on cod fishing (reduction and restriction of fishing quota to only by-catch) and the conservation measures introduced on salmonid fishing (ban on catching sea trout beyond 4 miles) therefore had a particularly negative impact on the economic performance of the segment.

In 2019, the CR/BER indicator for segment **VL1218DTS** was 0.8, i.e. slightly below the reference value. In 2020, it fell to -0.4. An indicator value of less than 1 means that the segment is unable to generate income to cover its variable, fixed or capital costs, which therefore indicates that the segment is imbalanced. During the previous 3 years, the value of the indicator had far exceeded the desired level (2-2.6), meaning that the segment was generating sufficient revenue to cover its costs. The fall in profitability in the segment in 2020 was mainly due to a decline in income from landings (-50%) caused by the restrictions on cod fishing. In 2018, cod accounted for 44% of the value of landings (14% in 2020). The economic performance over the period 2019-2020 shows that the segment's reliance primarily on flounder (accounting for as much as 40% of the value of landings in 2020) fails to provide a profitable alternative in the face of the ban on cod fishing.

In 2020, the CR/BER indicator for the newly formed segment **VL1218TM** was high (5.2), like its ROI indicator, and far above the reference value, confirming that vessels in the segment are economically sound. As mentioned above, the segment was formed of vessels which were formerly part of segment VL1218DTS, a consequence of those vessels increasingly targeting pelagic fish (sprat and herring). In view of the very high value of the indicator, even in the event of less efficient vessels progressively transferring from the neighbouring segment, there would not seem to be a risk that variable, fixed and capital costs will not be covered by income from landings (decrease in CR/BER below 1).

The situation in segment **VL1824DTS** is close to neighbouring segment VL1218DTS which comprises smaller vessels. Both segments are in the process of adapting their fishing strategies due to the need to find alternatives to fishing for cod. In addition to fishing for flounder (similar technique to cod fishing), the only choice is for vessels to catch sprat and herring, which results in

them transferring to the neighbouring segment comprising pelagic vessels. In 2020, the CR/BER indicator for segment VL1824DTS was close to 0 (1.8 in 2019), i.e. it dropped below the desired level of 1, therefore pointing to an imbalance in the segment.

The CR/BER indicator for segment **VL1824TM** improved, increasing from 1.7 to 2.3. In other words, it was above the level expected, indicating that the segment is balanced. As mentioned in the previous paragraph, in recent years vessels have transferred to this segment from segment VL1824DTS due to the expected improvement in profitability for vessels forced to give up cod fishing. This process started in 2019, causing the CR/BER indicator to deteriorate slightly. Its improvement in 2020 may indicate that the segment had the opportunity to increase fishing capacity without negative consequences leading to a reduction in profitability.

For segment **VL2440TM**, the indicator in relation to covering variable, fixed and capital costs through income was 2.5 in 2020 (3.0 in 2019), i.e. far higher than the reference value, showing that the segment is balanced. The situation for pelagic trawlers between 24 m and 40 m in length has remained sound for many years and is a consequence of a fishing strategy which is based on pelagic species, the fishing quotas for which have not been subject to negative changes as considerable as for cod.

Figure 4 shows the long-term trend in the CR/BER indicator.

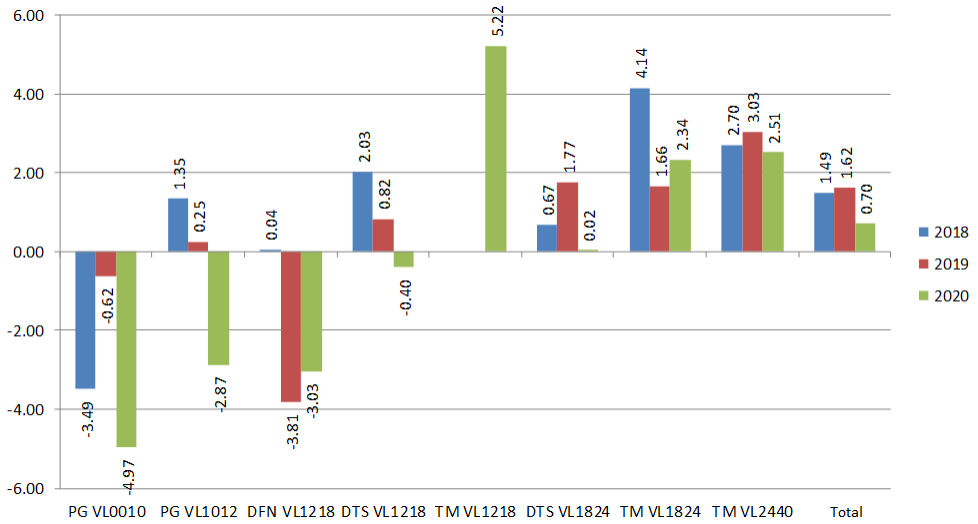

Figure 4. CR/BER indicators by fleet segment, 2018-2020

7. Vessel utilisation indicator[7]

Data on fleet activity in the Baltic Sea are set out in Table 7.

Table 7. Vessel utilisation statistics by fleet segment, 2019-2021

Year	Segment	No of vessels, power and capacity			Current effort			Maximum theoretical effort (observation data)				INDICATOR	
		No	kW	GT	Days	kWdays	GTdays	Days per vessel[1]	Total days	kWdays	GTdays	kWdays	GTdays
2019	VL0010PG	517	14 411	1 558	44 622	1 315 079	132 953	217	112 189	3 127 187	338 086	42%	39%
	VL1012PG	106	7 077	1 157	8 266	561 736	92 773	169	17 914	1 196 013	195 533	47%	47%
	VL1218DFN	13	1 441	390	688	70 043	19 164	157	2 041	226 237	61 230	31%	31%
	VL1218DTS	52	6 364	1 414	4 491	573 940	126 282	169	8 788	1 075 516	238 966	53%	53%
	VL1824DTS	25	5 676	1 631	2 466	566 887	163 426	155	3 875	879 780	252 805	64%	65%
	VL1824TM	30	7 320	1 689	2 075	513 894	128 966	131	3 930	958 920	221 259	54%	58%
	VL2440TM	43	17 573	7 255	4 871	2 015 167	836 769	192	8 256	3 374 016	1 392 960	60%	60%
Total 2019		**786**	**59 862**	**15 095**	**67 479**	**5 616 747**	**1 500 333**	**200**	**156 993**	**10 837 669**	**2 700 839**	**52%**	**56%**
2020	VL0010PG	519	14 413	1 551	23 934	635 471	68 807	270	140 130	3 891 494	418 664	16%	16%
	VL1012PG	120	7 838	1 250	5 511	368 354	58 855	135	16 200	1 058 090	168 715	35%	35%
	VL1218DFN	20	2 468	610	709	88 152	20 880	77	1 540	190 028	46 976	46%	44%
	VL1218DTS	34	4 168	888	2 382	308 523	67 836	139	4 726	579 387	123 403	53%	55%
	VL1218TM	11	1 460	360	927	128 895	27 524	129	1 419	188 340	46 391	68%	59%
	VL1824DTS	9	1 845	567	438	93 076	27 584	123	1 107	226 984	69 741	41%	40%
	VL1824TM	44	10 303	2 643	3 213	750 021	197 792	142	6 248	1 463 057	375 294	51%	53%
	VL2440TM	43	17 730	7 341	4 288	1 806 070	772 831	158	6 794	2 801 327	1 159 878	64%	67%
Total 2020		**800**	**60 225**	**15 209**	**41 402**	**4 178 563**	**1 242 110**	**223**	**178 164**	**10 398 707**	**2 409 062**	**40%**	**52%**
2021	VL0010PG	518	14 671	1 571	35 496	1 016 802	107 122	172	89 096	2 523 495	270 275	40%	40%
	VL1012PG	122	8 120	1 284	6 471	439 253	68 089	133	16 226	1 079 920	170 797	41%	40%
	VL1218DFN	21	2 635	660	1 107	135 138	34 516	101	2 121	266 125	66 618	51%	52%
	VL1218DTS	22	2 716	579	1 827	235 890	51 376	138	3 036	374 828	79 932	63%	64%
	VL1218TM	14	1 959	424	1 065	170 457	33 663	141	1 974	276 252	59 829	62%	56%
	VL1824DTS	10	1 930	573	483	80 883	27 877	124	1 240	239 295	71 052	34%	39%
	VL1824TM	45	10 683	2 699	3 105	737 576	188 981	157	7 065	1 677 154	423 679	44%	45%
	VL2440TM	44	18 060	7 486	4 102	1 715 822	725 793	141	6 204	2 546 525	1 055 526	67%	69%
Total 2021		**796**	**60 774**	**15 276**	**53 656**	**4 531 821**	**1 237 417**	**223**	**126 962**	**8 983 593**	**2 197 708**	**50%**	**56%**

[1]The number of days at sea by the most active vessel in the segment.

In 2021, as in previous years, the kWdays and GTdays indicators were lower than the reference indicator (70%) in all segments. In accordance with the guidelines for interpreting the technical indicators, this means there is **potential technical overcapacity throughout the entire Polish Baltic fleet**. After deteriorating significantly in 2020 (due to the collapse in cod stocks and large-

[7]As in previous years, the vessel utilisation indicator was calculated on the basis of data on Baltic fleet activity provided by the Fisheries Monitoring Centre (Centrum Monitorowania Rybołóstwa) from the ERS database and analyses of those data by the National Fisheries Data Collection Programme (NPZDR).

The term 'fishing day' was defined as any continuous period of 24 hours (or part thereof) during which a vessel is present in a given zone and absent from port. For vessels submitting monthly fishing reports, a fishing day was a calendar day. Engine power (kW) and vessel capacity (GT) were determined on the basis of the ERS database for a given day of vessel fishing activity. Consequently, both values are calculated taking into account any changes in vessel parameters during the year. An exception applied to technical data for vessels not found in the ERS database. Where this was the case, values were based on the technical parameters in the fishing vessel register. Furthermore, in contrast to the methodology used to calculate the inactive fleet indicator (which only takes into account the vessels included in the register as at 31 December of the year concerned), the fleet capacity utilisation indicator was calculated taking into account all vessels active during the year (including those which began commercial fishing after 1 January of the year concerned, even if withdrawn from fishing before 31 December). In accordance with the methodology adopted, the actual maximum number of fishing days for the segment concerned was determined taking into account the number of such days reported for the most active vessel in that segment. As in previous years, the theoretical number of fishing days was not calculated.

scale aid measures in the form of compensation for temporary cessation of fishing activity), the indicator improved in 2021. The indicator for segment **VL0010PG** registered a particularly clear improvement in respect of both parameters (kWdays and GTdays), by 24 percentage points. Nevertheless, this segment which comprises the smallest vessels had the weakest indicators in terms of utilisation of technical capacity. Alongside factors relating to the crisis in cod stocks, this may have been caused by the range of vessels found within the segment, fishing both in internal waters (the Szczecin Lagoon and Vistula Lagoon) and in the open waters of the Baltic Sea. It is important to take this into account when assessing the balance. The neighbouring segment **VL1012PG** also has a comparatively low vessel utilisation indicator. In 2021, both indicators improved. However, this improvement was so minor (5-6 percentage points) that these vessels, besides those already mentioned, registered the least use of technical capacity.

There was a slight improvement in the indicators for segment **VL1218DFN**, by 5 and 8 percentage points respectively. Nevertheless, the indicator remained well below the reference level (51%-52%), pointing to technical overcapacity in the segment. A noticeable improvement (by 10 and 9 percentage points) was registered in the indicator for segment **VL1218DTS**. However, it remained well below the reference value, which indicates that technical capacity is not being fully utilised despite a further significant decrease in the number of vessels (from 34 to 22).

The pelagic trawl segment (**VL1218TM**), newly formed in 2020, had the highest kWdays indicator of all segments in 2020 which, at 68%, was close to the reference level. The GTdays indicator was significantly lower at 59%. In 2021, both indicators deteriorated, falling to 62% and 56% respectively. In 2021, due to vessels transferring from the neighbouring DTS segment, the number of vessels in segment VL1218DTS increased from 11 to 14. This may have contributed to the deterioration in the technical indicators. Further transfers of such vessels could reduce efficiency and increase the imbalance in fishing capacity in the segment.

In segment **VL1824DTS**, utilisation of technical capacity has been declining year on year. In 2020, the kWdays and GTdays indicators decreased by 23 and 25 percentage points respectively, to 41% and 40% and in 2021, to 34% and 39%. This was a natural consequence of restrictions on cod fishing being maintained, as introduced in mid-2019. With indicators at roughly half the reference value, this points to very low technical efficiency in the segment and an imbalance.

In segment **VL1824TM**, the kWdays and GTdays indicators deteriorated for another consecutive year, falling by 7 and 8 percentage points to 44% and 45%, i.e. well below the reference level (70%). As with the neighbouring segment comprising slightly smaller vessels specialising in pelagic fishing (VL1218TM), this deterioration in the technical indicators may be linked to vessels transferring from the DTS segment.

In 2021, the kWdays and GTdays indicators for segment **VL2440TM** were close to the reference level (67% and 69%). This points to satisfactory technical efficiency in the segment. Nevertheless, in 2021, the maximum theoretical number of days based on the performance of the most efficient vessel in the segment, was 141 days, i.e. significantly lower than 2 years ago (192).

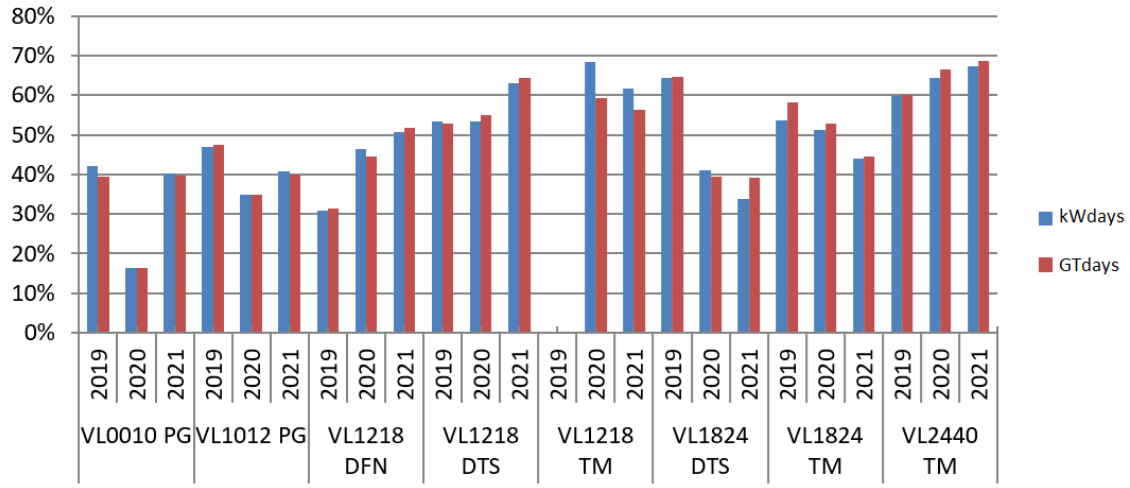

Figure 5. Fleet capacity utilisation in kWdays and GTdays, 2019-2021

8. Inactive fleet indicator

Inactive fleet indicators were calculated on the basis of data for all active and inactive Baltic vessels recorded in the EU fishing fleet register by 31 December of the reporting year, pursuant to Commission Implementing Regulation (EU) 2017/218 of 6 February 2017 on the Union fishing fleet register. 'Active vessel' means any vessel fishing on at least one day of the reporting year.

Data analysis was carried out by vessel length (VL) in accordance with the Data Collection Framework (DCF) methodology.

In accordance with the guidelines, inactive vessels constitute unused capacity and as such reduce the technical efficiency and capacity utilisation indicators for the entire fleet.

In 2021, the number of inactive vessels in the Polish fishing fleet increased from 22 to 27. They accounted for only 3% of all fishing vessels entered in the register (as in 2020). Vessels in the 12 m-18 m category had the highest percentage of inactive vessels (8% in number), followed by vessels in the 18 m-24 m category (6%).

Table 8. Baltic fleet activity statistics, 2019-2021

Year	DCF length	Active			Inactive			Inactive/total		
		No	GT	kW	No	GT	kW	No	GT	kW
2019	VL0010	517	1 560	14 420	19	37	201	4%	2%	1%
	VL1012	117	1 306	7 963	14	107	732	11%	8%	8%
	VL1218	54	1 637	6 919	2	41	193	4%	2%	3%
	VL1824	53	3 125	12 325	5	298	988	9%	9%	7%
	VL2440	45	7 450	18 244	1	145	420	2%	2%	2%
Total 2019		**786**	**15 078**	**59 871**	**41**	**628**	**2 534**	**5%**	**4%**	**4%**
2020	VL0010	519	1 559	14 445	13	29	239	2%	2%	2%
	VL1012	130	1 385	8 624	1	8	20	1%	1%	0%
	VL1218	51	1 549	6 636	2	28	140	4%	2%	2%
	VL1824	56	3 285	12 583	4	168	940	7%	5%	7%
	VL2440	44	7 441	17 988	2	290	840	4%	4%	4%
Total 2020		**800**	**15 219**	**60 276**	**22**	**523**	**2 179**	**3%**	**3%**	**3%**
2021	VL0010	518	1 577	14 714	15	31	195	3%	2%	1%
	VL1012	129	1 383	8 619	3	34	200	2%	2%	2%
	VL1218	46	1 419	6 235	4	63	245	8%	4%	4%
	VL1824	58	3 315	12 954	4	216	841	6%	6%	6%
	VL2440	45	7 586	18 304	1	145	420	2%	2%	2%
Total 2021		**796**	**15 280**	**60 826**	**27**	**488**	**1 901**	**3%**	**3%**	**3%**

The data on the inactive fleet indicator for the last 3 years (2019-2021) are presented below in the form of a graph. In line with the interpretation of the indicator under the guidelines, according to which a fleet which is 90% active is positive, the indicator did not go below this level in any of the length categories in 2021.

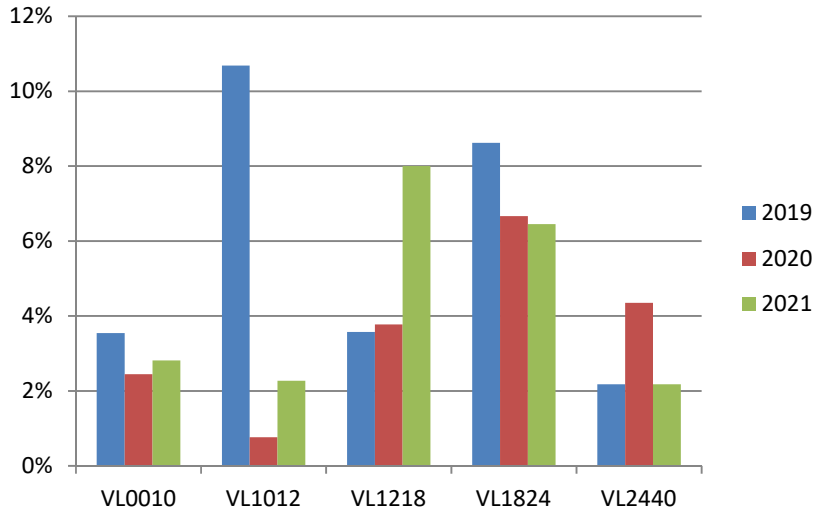

Figure 6. Relative share of inactive vessels by vessel length category, 2019-2021

Action plan

Introduction

In accordance with Article 22(4) of Regulation (EU) No 1380/2013, if the assessment (annual report) clearly demonstrates that fishing capacity is not effectively balanced with fishing opportunities, the Member State is to prepare and include in its report an action plan for the fleet segments with identified structural overcapacity. The action plan must set out the adjustment targets and tools to achieve a balance and a clear time-frame for its implementation.

The results of the biological, technical and economic indicators relating to the Polish Baltic fleet and the analysis and evaluation of those results are presented in Chapter VIII, Section F: 'Estimation and discussion of balance indicators'. In this regard, it should be noted that the individual segments of the Polish Baltic fleet are not effectively balanced with available fishing opportunities.

As a result, an action plan has been drawn up pursuant to Article 22(4) of Regulation (EU) No 1380/2013 for all segments of the Baltic fleet, namely:

- **VL0010PG –** vessels up to 10 m in overall length using nets and other passive gear,
- **VL1012PG** – vessels between 10 m and 12 m in overall length using nets and other passive gear,
- **VL1218DFN** – vessels between 12 m and 18 m in overall length using nets,
- **VL1218TM** – pelagic trawlers between 12 m and 18 m in overall length,
- **VL1218DTS** – bottom trawlers between 12 m and 18 m in overall length,
- **VL1824DTS** – bottom trawlers between 18 m and 24 m in overall length,
- **VL1824TM –** pelagic trawlers between 18 m and 24 m in overall length,
- **VL2440TM** – pelagic trawlers between 24 m and 40 m in overall length.

Identification of imbalanced segments and their causes on the basis of calculated indicators

The period under review coincides with dynamic changes in the operating conditions of the sea fishing industry. Environmental changes have been heavily influencing stock conditions, while the COVID-19 pandemic and regulatory restrictions have limited opportunities for business growth. In terms of economic performance, 2020 was also the first year with no cod fishing. Without this species, the economic performance of segments up to 18 m deteriorated. Despite improvements or a lack of available biological indicators (as explained in the comments on biological indicators under Chapter 4), the F/Fmsy ratios for Baltic Sea species subject to restrictions remained imbalanced, albeit the majority only slightly.

Balance levels and causes of imbalance were identified by examining the biological, economic and technical indicators and are presented in Table 9.

Table 9. Overall segment balance

Segment	3-year assessment of indicator	Balance	Cause of imbalance
VL0010PG	Sustained economic deficit. Variable costs not covered by income. Sustainable harvest assessment partially unavailable. Low fleet capacity utilisation.	Imbalanced	Too many vessels relative to stocks. No cod fishing.
VL1012PG	Sustained economic deficit. Variable costs not covered by income. Sustainable harvest assessment unavailable. Low fleet capacity utilisation.	Imbalanced	Too many vessels relative to stocks. No cod fishing.
VL1218DFN	Deteriorating economic inefficiency. Variable costs not covered by income. Catch imbalance. Improving fleet capacity utilisation.	Imbalanced	Too many vessels relative to stocks. No cod fishing. Low reorientation potential.
VL1218TS	Transfer of certain vessels to segment VL1218TM. Deteriorating economic situation. Catch imbalance. Average but improving fleet capacity utilisation.	Imbalanced	Too many vessels relative to stocks. No cod fishing.
VL1218TM	New segment selected on basis of 2020 data from segment VL1218DTS. Record economic performance.	Imbalanced/partially balanced	Imbalance due to fishing mortality of central Baltic herring exceeding Fmsy.
VL1824DTS	Deteriorating economic situation (level corresponding to coverage of variable costs). Catch imbalance. Very low and deteriorating fleet capacity utilisation.	Imbalanced	Catch imbalance. Deteriorating economic performance.
VL1824TM	Very good, stable economic situation. Systematic improvement in catch but still a catch imbalance. Deteriorating fleet capacity utilisation.	Imbalanced/partially balanced	Imbalance due to fishing mortality of central Baltic herring exceeding Fmsy.
VL2440TM	Very good, stable economic situation. Systematic improvement in catch but still a catch imbalance. Good fleet capacity utilisation.	Imbalanced/partially balanced	Imbalance due to fishing mortality of central Baltic herring exceeding Fmsy.

Upon analysis, the causes of the imbalances were found to relate to two main factors: an excessive number of vessels in the fleet (with the economic consequences this entails) and an imbalance in the exploitation of central Baltic herring (for more information, see comments on biological indicators in Chapter 4).

On the basis of the indicator analyses in this report for the period 2018-2021, two main fleet sectors can be distinguished, which differ in terms of technique, catch composition, catch levels, efficiency and economic performance. These are:

- Fishing vessels up to 18 m in length (with the exception of VL1218TM) relying on herring stocks and, to a lesser degree, on sprat, flounder and other species (bream, pike perch, salmon, sea trout, eel, roach, etc.). These groups of vessels have persistently registered a negative economic performance and their operations have also been biologically imbalanced. Most of these vessels traditionally operate in coastal and floodplain fisheries where in the past, cod was their primary source of income.

- Fishing vessels of 18 m and over in length and VL1218TM which have good seakeeping ability and can exploit pelagic stocks, flounder and, to a lesser degree, other species. These segments have registered a very good economic performance and, at the same time, their biological parameters have been systemically improving. The biological imbalance is small and is mainly due to the fishing mortality of central Baltic herring exceeding Fmsy.

Definition of adjustment targets, tools to achieve a balance and a clear time-frame for implementation

The first key parameter for all remedial actions is their time horizon. Given the biological situation in the Baltic Sea and the social and economic needs of the sector for a rational and prudent transformation, a horizon of at least 8 to 10 years is required.

The first phase of this period (5 years) will involve adjusting fleet capacity, optimising fishing rights and improving measurement and modelling tools in the fishing industry. The second phase, i.e. the next 3 to 5 years, will be for stabilising the sector and for making possible further adjustments.

Balance levels in individual segments can be determined after projecting the economic performance. The number of vessels ensuring the economic balance of a segment was calculated on the basis of historical data on landings of Baltic species, excluding cod. In 2020, the separation of segment VL1218DTS into a new pelagic segment (VL1218TM) created an additional difficulty for this analysis. Given the need to establish historical volumes, analyse long-term results and compare performance, segments VL1218DTS and VL1218TM were analysed together for the first stage of the projection (Table 10). For the subsequent stage intended to determine reduction levels, only data for 2020 were used and reduction analyses were carried out separately.

The second aspect to be taken into account is the assumption that there will be no cod catches (except by-catches) during the projection period. An analysis of landings of individual species over the period 2016-2020 (excluding cod) showed that the fleet caught the following average volumes of the main species or species groups:

- ~ 68 000 tonnes of sprat,
- ~ 44 000 tonnes of herring,
- ~ 15 000 tonnes of flounder,
- ~ 11 000 tonnes of other species.

Using average prices from 2021, the value of the fishing market is PLN 196 million or EUR 44 million. This value corresponds to the maximum possible landing volume of the Polish fishing industry in a year. Furthermore, according to biological forecasts by the National Marine Fisheries Research Institute, the status of the main species subject to restrictions (sprat and herring) could potentially be maintained under the assumed exploitation. EUR 44 million is therefore the value of the assumed production of the fishing industry.

The designated market for the catch was compared with the variable and fixed costs of the individual segments. Variable costs are proportionate to activity at sea and the volume (tonnes) of fish caught, while fixed costs are the objective which must be covered by the margin.

The assumption was to perform calculations at the level of an average vessel in the segment. On the basis of the historical catch distribution within segments over the period 2016-2020, a catch volume and composition per vessel was established. Income calculated in this way was compared against the historical variable and fixed costs of an average vessel (Table 10). As previously mentioned, segments VL1218DTS and VL1218TM were combined in 2020 for data comparability

purposes over the period under review. The comparison of income and costs at the level of an average fishing vessel in the segment is presented in Table 10. The degree of cost surplus over income indicates the level of economic imbalance.

Table 10. Level of economic imbalance from the perspective of an average vessel, by fleet segment

Parameter/segment	VL0010PG	VL1012PG	VL1218DFN	VL1218DTS+ VL1218TM	VL1824DTS	VL1824TM	VL2440TM
Assumed average income from landings [in '000 EUR]	14	17	17	164	138	202	590
Assumed average variable costs of the vessel [in '000 EUR]	17	26	44	72	91	80	267
Assumed average total costs of the vessel [in '000 EUR]	19	32	55	91	139	98	336
Total cost surplus including necessary profit of 5% [%] per vessel	27%	50%	70%	-73%*	5%	-95%	-67%

*surplus when examining segments VL1218DTS and VL1218TM in combination

The total cost surplus over income shows that during the period under review some segments had a sustained deficit (especially where they were unable to even cover their variable costs), while other segments (negative values) have a financial margin to perform even better. Therefore:

- The objective for reducing the surplus is to increase the catch allocation for the average vessel in the segment. By increasing the average catch per vessel, this will reduce the unit cost proportionately (effort will be spread over a greater number of tonnes).
- The positive values in the cost surplus row in Table 10 represent the percentage cost surplus for an average vessel in the segment and show by how much costs must be reduced in order to reach an economic balance. The positive cost surplus values represent the segment reduction or target cost required for the segment to achieve an economic balance with zero profit.
- The negative values in Table 10 indicate how much lower the costs of an average fishing vessel operating in the segment are compared to the average annual income which can be obtained in the segment.
- However, the long-term operation of an average vessel requires it to make a profit. For the purposes of determining the cost surplus reduction, a reasonable profit corresponding to a 5% mark-up on total costs was assumed. The inclusion of a profit mark-up increases the reduction. This factor (with the 5% profit mark-up) was applied as a target under the programme for permanent cessation of fishing activity.

For data comparability reasons, analyses have so far combined segments VL1218DTS and VL1218TM. These segments were also combined because the new segment VL1218TM is derived from segment VL1218DTS, its vessels in 2020 being those from segment VL1218DTS which specialised in pelagic fishing. The reduction for those segments was therefore not determined on the basis of the total historical performance (as in Table 10), but on the basis of the 2020 performance. During the period in question, a clear division in economic performance can be seen, conditioned by fishing gear, exploited species and activity (Table 11).

Table 11. Economic performance and reductions applicable to segments VL1218DTS and VL1218TM in 2020

2020 economic parameters	VL1218DTS	VL1218TM
Average vessel income [in '000 EUR]	73	153
Average other income [in '000 EUR]	0	8
Average variable costs [in '000 EUR]	80	62
Average fixed costs of vessel [in '000 EUR]	18	19
Profit per vessel [in '000 EUR]	-25	80
Return on sales (ROS) [in %]	-34%	50%
No of vessels in segment [in units]	34	11
Cost surplus		
2020	VL1218DTS	VL1218TM
Cost surplus including 5% profit mark-up	40%	-44%

The performance figures presented in Table 11 confirm the stark difference in economic efficiency between the two segments analysed. The TM pelagic segment generated record profits thanks to low costs and a huge catch, while the DTS segment was unable to cover variable costs through income and has a considerable deficit.

To summarise the foregoing considerations regarding the segments' economic balance, it should be assumed that the adjustment targets over the projection period for the Polish fishing fleet will involve three pathways of remedial and development measures, namely:

I. reducing the number of vessels in permanently inefficient and imbalanced segments to a level which ensures an increase in efficiency in segments operating at a deficit and stabilises the financial condition of those segments;
II. developing a system for distributing Polish catch quotas in a way which is geared towards achieving biological balance;
III. improving data collection methods and tools, analyses and modelling of the Baltic fleet's economic and biological performance.

Permanent cessation of fishing activity by certain vessels will be the main tool for achieving the first target. Its application will be aimed at reducing the number of fishing vessels in a way which ensures segments cover their total costs or generate a minimum profit (e.g. 5% ROS). This will be done primarily by reducing the unit cost for a catch of 1 tonne of fish (including the variable cost).

The other actions referred to are of a regulatory and research-related nature.

Indication of specific targets for fleets with an identified imbalance, i.e. measurable targets specific to identified fleet segments or fish stocks, justified by, e.g. estimating the impact of the proposed target.

Reductions in vessel numbers depend on the assumed profit a vessel should generate in a segment. It was therefore assumed that in each segment with an imbalance, vessels will generate an average profit corresponding to a 5% mark-up on total costs. Based on this assumption, the reductions amount to 230 vessels in segments comprising vessels between 0 m and 24 m in length (Table 12).

Table 12. Reduction in fleet size

Specification	VL0010PG	VL1012PG	VL1218DFN	VL1218DTS	VL1218TM	VL1824DTS	VL1824TM	VL2440TM	TOTAL
Number of active vessels [in units]	519	120	20	34	11	9	44	43	800
Reduction in number of vessels based on costs with 5% mark-up	**141**	**60**	**14**	**14**	**0**	**1**	**0**	**0**	**230**

The reductions in vessel numbers presented in Table 12 should ensure an increase in efficiency by raising income per vessel while keeping variable costs proportionate. Reductions should prioritise historical efficiency, i.e. the first vessels to be scrapped should be those in the segment fishing below the average catch (especially inactive vessels) and generating costs, thereby reducing the segment's efficiency. This prioritisation should improve the efficiency of the remaining vessels by increasing income per vessel. As with income per vessel, vessel efficiency and activity should also increase. Permanent cessation of activity should occur within 5 years, i.e. during the period 2023-2027.

The second area in which action is to be taken concerns the restoration of a biological balance in fleet segments.

Referring back to the comments on the biological indicators presented in Chapter 4, it is complicated to identify clear causes for an imbalance due to the simultaneous occurrence of the following:

- The Polish fleet exploits resources in the Baltic Sea in accordance with EU fishing quotas.
- F/Fmsy ratios are only above 1 for central Baltic herring and western Baltic cod stocks. For the remaining stocks, F/Fmsy ratios are close to 1 (e.g. sprat) or clearly below 1 (western Baltic herring, plaice, eastern Baltic cod).
- In the case of western Baltic cod, Polish catches are marginal (at the level of parts per thousand of the Polish catch) and do not present a risk to the stock.
- Where Polish segments have an SHI above 1, this is mainly due to the F/Fmsy which is clearly above 1 for central Baltic herring (ranging from 1.9-1.5 over the period 2019-2021).
- This higher SHI for herring has been caused by a slightly higher catch than advised by ICES (e.g. Russia sets TACs independently and without consulting the EU) and by the ICES biomass forecasts (in terms of Fmsy) and catch forecasts for herring which were possibly too optimistic.
- Every year, ICES issues advice on MSY fishing. However, in the years which follow, actual fishing mortality has proven to be much higher than advised, despite the total Baltic herring catch slightly exceeding catch limits. During the period 2022-2023, the methodology for

assessing and forecasting Baltic herring and sprat stocks ('benchmark assessment') will be revised. If this resolves the issue of the overly optimistic catch forecasts for central Baltic herring, F/Fmsy ratios will fall to approximately 1 and Polish TM segments will become fully balanced.

- F/Fmsy ratios for eastern Baltic cod are below 1 due to the fishing ban applicable to this stock (values above 0 are the result of allowable by-catch). On account of the ban on cod fishing, fleet segments which previously fished that stock have been placed in a difficult situation and should be covered by the action plan. Formally speaking, however, there was a relatively small imbalance under the biological indicators during the period 2020-2021.

These facts make remedial actions difficult. The focus should be on long-term monitoring, modelling and the development of a quota allocation system which is geared towards achieving a biological balance.

The third aspect of the remedial action plan is on action to improve data collection methods and tools, analyses and modelling of the Baltic fleet's economic and biological performance. As part of this action, the following two programmes are due to be implemented:

- **Holistic fleet management modelling** (balance point) involves developing mathematical models allowing scenarios to be comprehensively devised and modelled (i.e. taking into account biological, economic, social and technical aspects) for the development of production and fishing capacity based on environmental, social and economic forecasts. By producing such models, the optimal fishing capacity of the fleet in specific conditions can be determined and infrastructure investment needs can be estimated, etc. Development strategies can also be drawn up. The basic functions of such modelling are to build scenarios based on data and to perform optimisation, i.e. find the most appropriate production level based on biological and social conditions. Research institutes in other countries use this type of modelling. The development, testing and implementation of such modelling takes a minimum of between 3 and 5 years.
- The **typical vessel approach** is a data collection method which supplements the DCF (Data Collection Framework on Fisheries). The current system for collecting economic data focuses on traditional formal reporting systems, i.e. values recorded in the accounting systems of fisheries enterprises. Economic information is therefore delayed and of little help in decision-making processes. There is a lengthy cycle for registering and processing such data (companies must complete the financial year before producing financial statements), following which data are transferred and processed. The most recent economic data in 2022 are therefore data from 2020, a time when the management conditions differed from today, e.g. the fuel price in Poland was PLN 4 and there were no restrictions on cod fishing. In order to meet management needs, a supplementary data collection system would seem reasonable, consisting in an in-depth analysis of vessels typical of the segment. This idea is based on the 'agri benchmark' method which is trusted in agriculture, and consists in observing typical fishing vessels (small-scale vessels). Microeconomic models are produced for these vessels, enabling changes in a given factor (e.g. fuel prices, fish prices, labour costs, taxes, etc.) to be verified on an ongoing basis in terms of their impact on the performance of typical vessels in the segment. Modelling should be carried out for several dozen vessels and the data renewed every 2 to 3 years. The implementing period for the system is 3 years.

Indication of which measures are considered effective and appropriate for imbalanced fleet segments, e.g. by illustrating how the proposed measures will achieve the stated objectives and targets.

The approach to effective remedial action should be to reduce the fleet which is historically reliant on cod fishing and protect segments exploiting pelagic stocks. For the segment comprising the smallest vessels, measures should give consideration to reducing the number of vessels while ensuring that the vital role of coastal fisheries for local communities is maintained. The objectives of the measures and their expected outcomes are presented in Table 13.

Table 13. Expected measures and outcomes of the remedial action plan

Segment	Cause of imbalance	Remedial action/time period	Expected impact
VL0010PG	Too many vessels relative to stocks. No cod fishing.	Reduce fleet segment by 141 vessels over 5 years. Develop a system for distributing Polish catch quotas in a way which is geared towards achieving biological balance. Examine typical vessels and carry out modelling (3-5 years).	5% return on sales. Reduce fishing effort.
VL1012PG	Too many vessels relative to stocks. No cod fishing.	Reduce fleet segment by 60 vessels over 5 years. Develop a system for distributing Polish catch quotas in a way which is geared towards achieving biological balance. Examine typical vessels and carry out modelling (3-5 years).	5% return on sales. Reduce fishing effort.
VL1218DFN	Too many vessels relative to stocks. No cod fishing. Low reorientation potential.	Reduce fleet segment by 14 vessels over 5 years. Develop a system for distributing Polish catch quotas in a way which is geared towards achieving biological balance. Examine typical vessels and carry out modelling (3-5 years).	5% return on sales. Reduce fishing effort.
VL1218DTS	Too many vessels relative to stocks. No cod fishing.	Reduce fleet segment by 14 vessels over 5 years. Develop a system for distributing Polish catch quotas in a way which is geared towards achieving biological balance. Examine typical vessels and carry out modelling (3-5 years).	5% return on sales. Reduce fishing effort.
VL1218TM	Slight catch imbalance.	Develop a system for distributing Polish catch quotas in a way which is geared towards achieving biological balance. Examine typical vessels and carry out modelling (3-5 years).	Biological balance SHI<1, SRI =0.
VL1824DTS	Moderate catch imbalance. Deteriorating economic performance.	Reduce fleet segment by 1 vessel over 5 years. Develop a system for distributing Polish catch quotas in a way which is geared towards achieving biological balance. Examine typical vessels and carry out modelling (3-5 years).	Biological balance SHI<1, SRI =0.
VL1824TM	Slight catch imbalance.	Examine typical vessels and carry out modelling (3-5 years). Develop a system for distributing Polish catch quotas in a way which is geared towards achieving biological balance.	Biological balance SHI<1, SRI =0.

VL2440TM	Slight catch imbalance.	Examine typical vessels and carry out modelling (3-5 years). Develop a system for distributing Polish catch quotas in a way which is geared towards achieving biological balance.	Biological balance SHI<1, SRI =0.

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