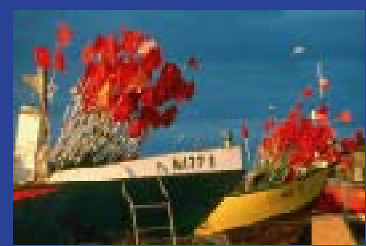
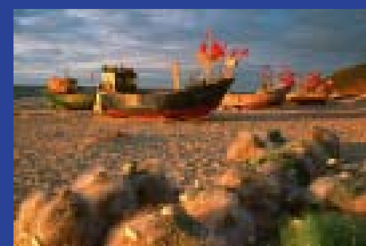
IMPACT OF THE EU STRUCTURAL FUNDS ON THE FLEET AND FISH RESOURCES IN THE BALTIC FISHERIES SECTOR





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Impact of the EU Structural Funds on the fleet and fish resources in the Baltic fisheries sector

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At the time of writing, the proposed European Fisheries Fund (EFF) is due to be agreed by the EU Council of Fisheries Ministers imminently. To ensure the finally agreed EFF is environmentally sound, and for Member States to make best use of the EFF, it is important to draw on lessons from the previous and current funding programmes, the Financial Instrument for Fisheries Guidance (FIFG). This publication analyses the impact of the FIFG on the fishing capacity of EU fishing fleets operating in the Baltic Sea and attempts to assess the impacts of these changes on Baltic fish stocks. A general analysis is provided of changes in the size of Baltic fishing fleets prior to the FIFG then subsequently during the first (1994-1999) and the second (2000-2006) FIFG periods.

The FIFG was established in 1993 to support restructuring of the EU fisheries sector to support social and economic development of fisheries dependent coastal regions. One of the objectives of the FIFG is to facilitate sustainable development of the fisheries sector through improving economic competitiveness while preserving rational fisheries, exploitation levels and protecting the environment. Despite these noble objectives, stock decline and overcapacity persist in EU waters, including in the Baltic Sea, with negative implications for the broader environment and fishing incomes.

Several years on from the 2002 reform of the Common Fisheries Policy (CFP), the EU continues to grapple with the challenge of working towards sustainable fishing. This includes the development of the 2007-2013 EFF, which will replace the FIFG. The proposed EFF is structured around five key areas:

- Priority Axis 1 – Measures for the adaptation of the Community fishing fleet
- Priority Axis 2 – Aquaculture, inland fishing, processing and marketing of fishery and aquaculture products
- Priority Axis 3 – Measures of common interest
- Priority Axis 4 – Sustainable development of fishing areas and
- Priority Axis 5 – Technical assistance

Between the years 1994 and 2005, the FIFG co-financed withdrawal of vessels in eight EU Member States fishing on the Baltic Sea (Germany, Denmark, Sweden, Finland, Poland, Lithuania, Latvia and Estonia). The total tonnage of those vessels amounted to 58 thousand GT, whilst the total power to 204 thousand kW. At the same time, the FIFG supported construction of vessels totaling 25 thousand GT and 72 thousand kW. There was thus a net reduction of fleet capacity of 33 thousand GT and 132 thousand kW, approximately equal to the size of the Polish Baltic fleet at the end of 2004.

While the net reduction in fleet tonnage and power will have reduced the rate at which fish stocks have been depleted, the extent of this varies between fish stocks. Comparing the size of the fleet with changes in fishing mortality of Baltic fish stocks in the period between 1995 and 2004, there is evidence that:

1. fleet reductions appeared to not have a clear impact on reducing cod fishing mortality; it may be expected however that without such a reduction fishing mortality of cod would have increased, decreasing their biomass potentially to levels 25% lower than the 2005 biomass;
2. fleet reductions were accompanied by a decrease in fishing mortality of the majority of herring stocks;
3. fleet reductions did not impact the fishing mortality of fish stocks that have large biomass and that are exploited sustainably i.e. sprat and the Gulf of Riga herring.

These conclusions relate to changes that occurred for the total fleet of the Baltic states, half of which is considered to be attributable to the FIFG.

The biggest problems facing the Baltic fisheries include the depleted state of cod stocks, with excessively high fishing mortality and the failure to rebuild stocks. Reduction of the fishing fleet should significantly help improve this situation, especially in the Polish fleet given that it accounts for 1/3 of cod catch. To help predict how different rates of capacity reduction may support stock recovery, a simulation is run for several rates of reduction of the EU Baltic fleet fishing for the eastern Baltic cod during next five years (2006 – 2010). This is modeled so that reductions are higher in the new Member States than for the old Member States, which have initiated this process much earlier.

Maintaining the current fishing mortality level, i.e. no fleet reduction, should result in a 3% further decrease of spawning stock biomass until 2010 in comparison to the 2005 level. If fleet reduction level is set at 5% annually (reduction of Danish and Swedish fleets was not much lower in the period of FIFG operation), the biomass of the stock should increase by 2010 by 15% when compared to the current level. Clearly, the highest increase in the biomass would be achieved for the largest fleet reduction of 10% annually. Under such circumstances the biomass would increase by 37% in 5 years. These results are based on an optimistic assumption that the reduction of fishing mortality is equal to the reduction in fleet size. Assuming, more conservatively, that changes in fishing mortality equal only half of changes in fleet capacity, stock biomass should increase by almost 20% if the annual decrease of the fleet reaches 10%.

Fishing quotas have failed to achieve a reduction in fishing mortality. One of the reasons for this is that the actual catch frequently exceeds the allowable quotas. Furthermore, these landings typically go unreported. It is therefore necessary to regulate fishing effort, either with or in addition to the quota management system.

It is important to note however that effort regulation alone, such as days-at-sea limits, may prove ineffective for several reasons, including non-compliance. It is therefore necessary to bring fishing capacity into line with the state of fish resources. This requires the further withdrawal of some of the fishing fleet, while maintaining it to a level proportionate to the state of the resources.

Predicting how much fishing capacity will be withdrawn over the coming years is difficult as it is determined by several factors, including the use of FIFG and economic factors. Further capacity reductions should improve the sectors profitability. Quotas would be shared between fewer vessels, and could themselves be increased as stocks recover. This in turn would make it less attractive for the remaining operators to leave the sector, requiring increasing levels of compensation. As was the case with the FIFG, the final text of the EFF, and how the funds are used by the Member States, will therefore play a central role in influencing the rate of capacity reductions. While it is important that provisions remain for reducing fishing capacity on the one hand, if stocks are to be rebuilt and fishing capacity bought back into line with available resources, it is essential that these efforts are not undermined by provisions for building new vessels or modernizing existing vessels.

Prof Jan Horbowy, Dr. Emil Kuzebski

1.1. Objective and scope of the publication

The Financial Instrument for Fisheries Guidance (FIFG) is one of the four EU structural funds. It was established in 1993 in order to assist in fulfilling the objectives of the common fisheries policy related to restructuring of the fisheries sector and eliminating the differences in social and economic development of coastal regions that are dependent on fisheries. One of the important objectives of the Fund is to facilitate sustainable development of the fisheries sector through supporting activities that boost its economic competitiveness and at the same time preserve a rational level of fish resources exploitation as well as activities for protection of the natural environment.

This publication analyses the impact of the FIFG on the changes in the fishing capacity of the fleets of those EU member states that conduct fishing activities in the Baltic Sea and assesses potential impact of such activities on the state of Baltic fish resources.

The first part of the study provides a general analysis of changes in the size of fishing fleets of those member states that used to fish in the Baltic Sea directly prior to establishing the FIFG and during the first (1994-1999) and the second (2000-2006) period of the Fund's operation. For these purposes the researchers used the data of Eurostat (New Cronos Database) and FAO as well as data provided by the European Commission on e.g. the size of fishing vessels that were either withdrawn or newly built in the period of 1994 – 2005. The analysis was conducted for four "old" EU member states, i.e. Germany, Denmark, Sweden and Finland and for four "new" EU member states, i.e. Poland, Lithuania, Latvia and Estonia. As the statistical data were not detailed enough to identify from among the fleets of the analysed countries those vessels that were fishing solely in the Baltic Sea, it was assumed that all the vessels with tonnage smaller than 500 GT would be treated as Baltic vessels. This should be considered as a simplification that leads to overestimation rather than to underestimation of the Baltic fleet. Any mistakes that ensue from this simplification should not, however, have a significant impact on the quality of the research results. The tables and data descriptions provide information on fleet's tonnage in GT (Gross Tonnage). Some data, however, may be provided in GRT (Gross Register Tonnage), which results from the fact that data sources used in the research use different units for specifying vessel tonnage, i.e. GT, GRT or a combination of the two. This problem has been tackled so far neither by Eurostat nor by the European Commission.

The next part of the research characterises the state of resources of the most important Baltic fish species, describes stock dynamics and intensity of exploitation and provides a forecast of the catch volume for subsequent years, assuming that the intensity of exploitation remains on the same level (usually as in the period between 2002 – 2004).

The final sections of the study summarise the results of FIFG operation for the years 1994 – 2005, in relation to fishing capacity management, discuss the impact of the changes in fleet size on the state

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of fish resources and forecast future results of further reduction in fishing capacity for the state of fish resources, based on the information presented in the former sections that describe the changes in fishing fleet size and Baltic fish resources.

1.2. Fish resources management

Fishing has always constituted an important source of food for people, providing at the same time employment and profits for individuals engaged in fishing activities. As fishing was developing and people were gaining knowledge about fish resources and fish habitats, it became clear that fish resources, despite being renewable, were not unlimited. Therefore, they required proper management, if their share in human nutrition and their role in providing social and economic profits were to be durable.

Stability of the fishing sector and its share in providing human food were threatened by clear signs of overfishing of the most important fish stocks, changes in marine ecosystems, significant economic losses and international conflicts related to too intensive exploitation of resources. In response to this situation, the 19th Session of the FAO Committee on Fisheries (COFI) proposed in March 1991 a new approach towards resource management that included environmental factors as well as economic and social ones. FAO was asked to develop the concept of responsible fisheries and prepare a proper Code of Conduct. The Code was adopted by the 28th United Nations Session in 1995. General provisions and Article 6.5 of the Code recommend applying in fisheries the principle of "precautionary approach". The principle, as defined by the UN Conference on Environment and Development (Rio, 1992) stipulates that In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation." (Principle 15). One of the objectives, and at the same time results, of the precautionary approach is sustainable development defined as the management and conservation of the natural resources base, and the orientation of technological and institutional change in such a manner as to ensue the attainment and continued satisfaction of human needs for present and future generations. Such development conserves land, water, plant genetic resources, is environmentally non-degrading, technologically appropriate, economically viable and socially acceptable.

The International Baltic Sea Fisheries Commission (IBSFC), established as a result of the Gdansk Convention of 1973, is responsible for managing the Baltic fish resources. The Commission includes representatives of all of the Baltic states. Due to the EU enlargement with Central and Eastern Europe countries, the Commission will be probably soon replaced with a bilateral agreement between the EU and Russia. The Commission establishes rules for resource management and implements them. Instruments for resource protection include inter alia fishing quotas specified for more important species as well as technical regulatory measures, such as mesh size, minimum landing size, acceptable volume of by-catch, periods and areas closed for fishing. The IBSFC has its advisory body – International Council for Exploration of the Sea, which assesses the state of Baltic fish resources and proposes the levels of total allowable catch. The Council includes representatives of the majority of sea countries from Europe (including Poland) as well as the United States and Canada. ICES structures comprise of research committees and working groups that include researchers from all member countries. The Council states its opinion also on the technical regulatory measures, either on its own initiative or in response to the questions posed by the Baltic Commission. When advising the Baltic Commission, the Council has been applying for several years now the principle of precautionary approach. ICES constitutes one of the most advanced advisory bodies in implementing this principle into advice on fishery management. For the purposes of the precautionary approach principle, the Council has developed a concept of 'biological reference points,' with which the current biomass and intensity of stock exploitation are compared in order to evaluate the effects of exploitation in the light of the precautionary approach. If a current stock exploitation does not exceed these points, then it is highly probable that the stocks will not be overfished. Results of activities undertaken by ICES are predetermined by the scope and intensity of research conducted by member countries, as ICES acts only as a coordinator of a part of the research and provides logistic support for its working groups.

High quality of information for the decision-making process constitutes a basic precondition for any type of management. Low quality fishing statistics is a problem not only in Baltic fishing but also in fishing at other water regions. The phenomenon of incomplete catch reporting became much more widespread in the 1990s. In the Baltic region this relates mainly to cod and salmon. If resource estimates are based on erroneous data, the assessment is also incorrect, which in turn results in distorted fishing quotas. Underestimated fishing quotas lead to further extension of incomplete catch reporting. Fisheries administrative authorities in the Baltic states were forced to introduce corrections to the reported catch, whilst ICES has even developed procedures for specifying the actual level of the catch, based on the results of research cruises. Despite certain successes in enforcing full catch reporting, the aforementioned phenomenon is still existing in Baltic fishing. Therefore, further activities for ensuring proper and effective control of fishing in this region are indispensable.

1.3. The problem of excessive fishing capacity

It is generally believed that fish resources constitute a common good and that all the interested parties should have access to them. Due to their limited character, however, each new party exploiting the resources reduces the volume of fish available for other fishermen, and therefore, reduces their profits. Such a situation takes place when access to resources is not limited by any restrictions. Management of the fisheries sector was based for a long time on an unlimited access to resources, known as 'open access', which led to the problem of excessive fishing capacity, and therefore, to overfishing of fish stocks at almost all fishing areas in the world.

According to the FAO data from 1998, in order to restore the balance between the existing fishing capacity and the resources available, it would be necessary to reduce the number of fishing vessels (tonnage, power) by at least 30%[1], and according to other sources even by 50%. In order to counteract against an excessive increase in the fishing capacity, countries all over the world apply a number of technical regulatory measures to reduce operation of too many vessels in the fisheries sector.

The EU member states did not manage to avoid the problem of excessive fishing capacity, on the contrary, they were extensively affected by it. Therefore, in 1983, the European Union decided to adopt a new structural policy that among other things included the programme for withdrawing of fishing vessels from operation and measures for reducing the fishing effort (number of days at the sea). These solutions were aimed at reducing fishing mortality. 1993 saw a reform of structural funds and all of the measures from different funds that were available for the fisheries sector were integrated in one financial instrument, i.e. FIFG. Objectives of the FIFG include: support for measures aimed at securing stable balance between the size of the fleet and the state of the resources, improvement of competitiveness and support for economically sustainable activities.

Withdrawal of fishing vessels became the main measure for adjusting the number of vessels to the state of available resources. Between 1994 and 1999, 30% of the Fund was allocated for this measure, i.e. 542 million Euro, and it was the largest financial item from all of the measures under structural assistance. Funds for limiting the fishing capacity between 2000 and 2006 accounted for 663 million Euro, i.e. 20% of the whole FIFG (3.7 billion Euro)

This measure consists in providing owners of fishing vessels with a financial compensation in exchange of voluntary withdrawing of their vessels from fishing (by means of scrapping, exporting the vessel or establishing a joint venture company). Such a vessel is deleted from the register and cannot be replaced by any other unit, and therefore, the number of vessels is permanently reduced. Theoretically, a smaller size of the fleet should increase the economic efficiency of vessels that remain in the fisheries sector, mainly due to reduced fixed costs, increased catch volume and increased competitiveness. When FIFG was established, the programme supplemented multiannual guidance programmes (MAGP) that had been introduced earlier (from 1983 to 2002) and that specified the necessary reduction levels for respective segments of the fleet (vessels focused on fishing for a particular or several fish species).

1.4. Basic factors influencing living resource dynamics

Changes in fish stock biomass depend on three main factors:
- abundance (biomass) of generations that replenish the stock,
- growth rate of fish,
- mortality of fish .

These relations may be expressed by Russel’s equation (1931)

$$\Delta B = R + G - D,$$

where ΔB stands for changes in biomass over a particular year, R – biomass of the new generation that replenished the stock, G – biomass increase due to growth of fish, whilst D – loss of biomass due to mortality. Two first factors contribute to biomass increase, whilst the third one to its decrease. It is possible to distinguish between mortality due to natural causes and fishing mortality, i.e. mortality due to human exploitation of the stock. Each of the aforementioned elements that contribute to fish stock dynamics depends on a number of factors, both biotic and abiotic.

The number of fish for stock replenishment depends on the number of eggs and on many other factors determining survival of eggs and larvae, e.g. food availability, occurrence and abundance of species preying on eggs and larvae, temperature, water salinity and oxygenation, storms, wind strength and pollution.

Fish growth may depend on population density, food availability and volume, water temperature. The level of natural mortality of fish may be influenced by their age, environmental pollution, diseases as well as abundance and food demand of potential predators preying on a given stock. The level of fishing mortality is determined by the number of fishing units that exploit the stock, their quality and equipment (tonnage, power, electronic systems for location of fish shoals, type of fishing equipment), the time spent on fishing as well as by fishermen’s skills and experience.

Therefore, biomass dynamics of a fish population that is not being exploited depends on numerous factors that are frequently difficult to specify and quantify. People have direct impact on the state of resources by regulating fishing mortality, usually by means of reducing catch volume or reducing the number of fishing units and fishing time, i.e. reducing fishing effort.

Technical protection measures constitute another possibility for regulating the catch, e.g. specifying the age of fish to be caught by defining the size of mesh (and other net parameters) so that as much fish below minimum size as possible could avoid being caught. Apart from that, certain periods and regions may be closed for fishing if necessary. Such a solution allows for e.g. spawning that is undisturbed by fishing activities or for reducing fishing effort by limiting the number of days when it is allowed to fish. The aforementioned examples of human-instigated activities fall within the category of ‘resource management’.

The management process is usually aimed at maintaining sustainable and effective fisheries through preserving a good state of resources, which in turn allows for their renewal and availability now and in future.

1.5. Fishing resources of the Baltic Sea and factors determining their state

The Baltic Sea is a shelf sea, separated from the North Sea with Danish Straits. The average depth of the Baltic Sea is 56 m, whilst its salinity is much lower than that of oceanic waters, and on average equals ca. 8 per mille. It is the highest in the western part and decreases towards the eastern direction. This low salinity is one of the causes of the relatively low diversity of Baltic's biological resources. This relates to both fauna and flora. The Baltic Sea is a habitat for both marine and freshwater fish. The number of species decreases from the west to the east, according to the decreasing level of water salinity. The number of freshwater species increases in the same direction. The fauna and flora is much more diversified in the neighbouring North Sea.

There are few species in the Baltic Sea that are useful for fisheries. Cod, herring and sprat are the basic ones. Their catch accounts for around 95% of the whole catch in the Baltic Sea. Moreover, flatfish are caught in lower quantities (mainly flounder, and to a lesser extent turbot and plaice), salmonids (salmon, sea trout, rainbow trout) and, mainly in coastal area and gulfs, freshwater fish (e.g. pike perch, perch, roach, whitefish, vendace).

Cod is usually fished by means of bottom trawls, pelagic trawl and gillnets. Hooks are more and more often used for fishing. The shares of respective fishing gear depends on the country, period, region and may change even within one country. As cod resources were decreasing in the 1990s, the share of gillnets in fishing for this species was increasing. Very intensive fishing led to changes in the size structure of cod stocks, namely, there was less larger fish, which in turn resulted in the decreased share of gillnets and the increased share of trawls. Trawls with mesh of 110 mm with a BACOMA-type escape window are popular. Trawls with codends made of 90° turned netting compared with that of traditional netting will be probably soon introduced to fishing. It has been proved that these codends have very good characteristics as far as fishing selectivity is concerned. Recreational cod fishing is becoming more and more significant – in Poland it is still marginal but as experience of other countries shows, it may considerably develop in future.

Flatfish is mainly caught as by-catch in cod fishing, but some countries fish specifically for flatfish, usually for flounder. In such a case trawls and set-nets are used.

Herring is caught by means of pelagic trawls, bottom trawls, pair nets, herring gillnets, trap gears. Trawls with mesh not smaller than 32 mm are used for fishing for human consumption. Part of the catch, especially herrings caught as by-catch in sprat fishing, is used for production of fish meal. Such equipment as herring gillnet or trapnet is used mainly during the spawning season of herrings on coastal fishing grounds. Fishing with this equipment usually accounts only for over 10% of the total catch, however, this type of equipment is very important for coastal fishing.

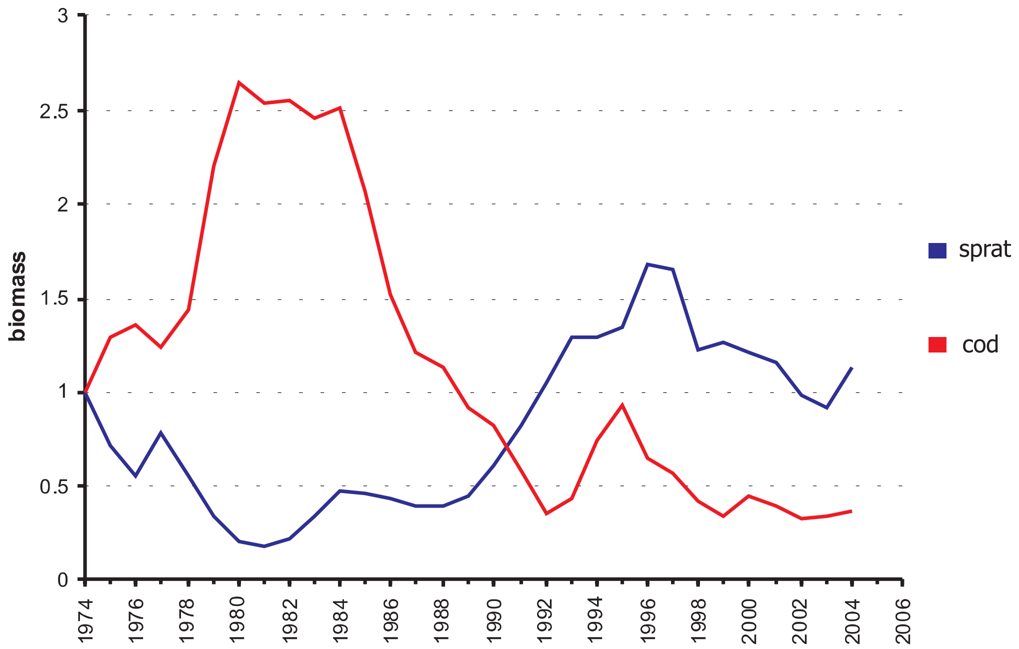
Sprat is caught both for human consumption and for fish meal or animal fodder. Mainly pelagic trawls with mesh of 16 mm minimum are used, as well as pair trawls. Fishing for human consumption is of great significance in Polish, Latvian and Russian fisheries, although also in these countries a lot is fished to be processed into fish meal (even up to 50%). Sprat catches in Denmark and Sweden are mainly processed into fish meal. This type of fishing was developed in the 1990s and it greatly contributed to a very large increase in sprat catches.

Due to Baltic's low salinity, the dynamics of fish resources in this sea is largely influenced by inflows into this sea of more salty, and therefore heavier, more oxygenated waters from the North Sea. These inflows depend on strong winds from western direction and usually occur once every several years.

There were large inflows in the 1970s, especially in winter of 1972/73 and of 1976/77. They resulted in an unprecedented increase of cod biomass. In 1980s and 1990s there were either no inflows or they were very small, except for 1993, when the inflow was quite considerable. In the current century quite strong inflow occurred at the beginning of 2003. Inflows result in mixing of waters, better oxygenation of waters in the demersal stratum, increasing of their density and rising of biogenic salts. As numerous analyses show, inflows have very significant impact on the abundance of newly born cod generations. They help cod eggs in floating and surviving, as these eggs are quite heavy and in less dense water they drop closer to the bottom into a stratum with a lower or zero oxygen level and in consequence they die. Inflows also have positive impact on the replenishing process of such species as herring, sprat and flatfish. As for herring, water temperature is also of significance here.

The relation of predator-prey type constitutes yet another factor that shapes changes in Baltic fish resources. In Baltic environment it is clearly visible in interaction between cod and sprat and to a lesser extent between cod and herring.

Cod – a predatory fish – intensively preys on sprat resources. Due to its larger size, herring does not suffer so much as sprat from cods – mortality among four-years-old or older herrings due to cod's predatory behaviour is low. On the other hand, a small sprat tries to pay cods back – research shows that sprats intensively prey on cod eggs. As a result, biomasses of cod and sprat in the Baltic Sea frequently remain in opposition – large cod biomass leads to low sprat biomass, whilst a decrease in cod biomass favours an increase in sprat biomass (Graph 1.1).



Graph 1.1. Relative biomass size for cod and sprat in 1974 – 2004 (biomass of both stocks in 1974 scaled to 1)

FIFG – Financial Instrument for Fisheries Guidance – one of structural funds, established in 1993, aimed at financing of activities in the fisheries sector in EU member states.

IBSFC – International Baltic Sea Fisheries Commission – an international organisation established in 1974 in order to manage living resources of the Baltic Sea; as a result of EU enlargement, it will be probably replaced with an agreement EU – Russia.

ICES – International Council for Exploration of the Sea – an international research organisation with over 100-years-long history, it comprises of a majority of European countries with access to sea (including Poland) as well as USA and Canada; it was established in order to explore seas and oceans, it advises many fisheries commissions and governments of its member countries on resource management.

Intensity of exploitation – fishing effort for a given unit of area, in traditional fisheries models it is proportional to fishing mortality, here it is used interchangeably with fishing mortality.

MAGP – multiannual guidance programmes – multiannual programmes for fleet guidance specifying a target level of fishing capacity in a given period of time for given groups of vessels and EU member states.

Fishing effort – product of fishing capacity and activity of a fishing vessel (usually calculated in fishing days); for a group of vessels it stands for a sum of fishing effort of all the vessels in the group.

Overfishing – the state of a significantly decreased biomass of a stock due to too intensive fishing.

By-catch – accidental catch of a given species during fishing for another species.

Stock – a biological unit established by a group of individuals of a given species, inhabiting a given area, usually isolated in terms of breeding from other stocks of the same species; sometimes this term is used to describe a geographical unit that comprises of several different, but mixing with each other, biological components of the same species.

Natural mortality – fish mortality due to natural causes (e.g. old age, diseases, consumption by predators).

Fishing mortality – fish mortality due to fishing; the fishing mortality coefficient (usually marked with F) provides an approximate ratio of the number of fish caught to the abundance of the stock for a small time unit; e.g. a coefficient of 0.2 per year means that approximately 20% of fish is caught, provided there is no natural mortality. For larger F values this relation is more complicated, as a year is not a small time unit here and the percentage of fish caught (when there is no natural mortality) is specified by the formula $100*(1-e^{-F})$.

TAC – Total Allowable Catch, i.e. a fishing quota or limit, specified by a body that is responsible for resource management; a maximum size of catch in a given period, usually a year.

Tonnage – one of measures for specifying fishing capacity of fishing vessels, calculated either in Gross Register Tonnage (GRT) according to the Oslo Convention of 1947 or in Gross Tonnage (GT) according to the International Convention on Tonnage Measurement of Ships of 1969. Due to differences between both manners of tonnage measurement, the European Commission in 1994 introduced an obligation to measure vessels longer than 24 metre in GT, in 1998 this obligation was extended on vessels from 15 metre long, and in 2003 on the remaining vessels.

Replenishment (recruitment) – a newly born fish generation or generation that enters into exploitation in the stock, it constitutes one of the basic factors that specify population dynamics.

Resource management – the process of introducing and applying measures that regulate exploitation of fishing resources in terms of their quality and quantity, e.g. by means of specifying maximum allowable catch, minimum size of fish for fishing, allowing only gear with certain characteristics.

Fishing capacity – stands for a vessel's tonnage in GT and its power in kW, as specified in Article 4 and 5 of the Regulation of the Council 2930/86/EEC. For certain types of fishing activities this capacity may be specified be means of e.g. quantity and/or size of fishing gear used.

3 The Common Fisheries Policy – its basic elements and 2002 reform

Marcin Ruciński

This section provides a comprehensive overview of the development of the EU Common Fisheries Policy (CFP) and its components and analyses the decision-making processes that have shaped the CFP, with special focus on changes introduced by the reform of December 2002. Although this study is focused mainly at development of the fleet and fish resources of the Baltic Sea in the context of the CFP structural component, it is also important to view this detailed analysis in a broader political[1] and institutional context, i.e. against the background for establishing, functioning and changing the basic assumptions for management of the EU fisheries sector and for supporting the sector's development on the Community level.

3.1. The beginnings

The beginning of the CFP can be traced back to the Treaty of Rome of 1957, which establishes the European Economic Community. Its Article 38 specifies the scope of the Common Agricultural Policy and defines fishery products as its integral part. This is why agriculture and fisheries appear later together in the EU context (e.g. a common committee in the EU Council of Ministers). This link is also visible in the way administration is organised in many EU member states. An interesting fact is that directly after the Treaty of Rome entered into force, within the whole European Commission only one section in the Directorate General (DG) Agriculture was dealing with fisheries. An independent DG for fisheries was established in 1976.

Despite quite weak basis in the Treaty (some claim that if fish products had not been included in the list of agricultural products to be regulated by the common market, the current CFP would not exist) the EU policy regarding fisheries started to develop quite fast. There were two main reasons behind this: increasing import competition for fishery products in six member states that established the EU and the plans to extend the Union by four countries with well developed fisheries sectors: Denmark, Ireland, Great Britain and Norway, which did not join the EU after the negative outcome of the first accession referendum in 1972.

In 1967 the Commission published a communication "*Basic rules for the Common Fisheries Policy*". The main aim of the document was to search for solutions to commercial, structural and social problems significant at that time for the six founding countries. The discussion initiated at that time continued for around 3 years and resulted in establishing a basis for market support[2] and structural policy in the fisheries sector[3] (this issue will be further discussed later in this section). The next external component of the current CFP came into force in 1977, when many countries started to delimit 200 – mile exclusive economic zones (EEZ). As distant-water vessels belonging to EU member states were fishing at the coasts of these countries, it became necessary to secure that these vessels would be able to continue their activities in the EEZs of the third countries. Only the Commission was authorised to negotiate on behalf of the EU, as otherwise member states could act against each other in negotiations with the same third country.

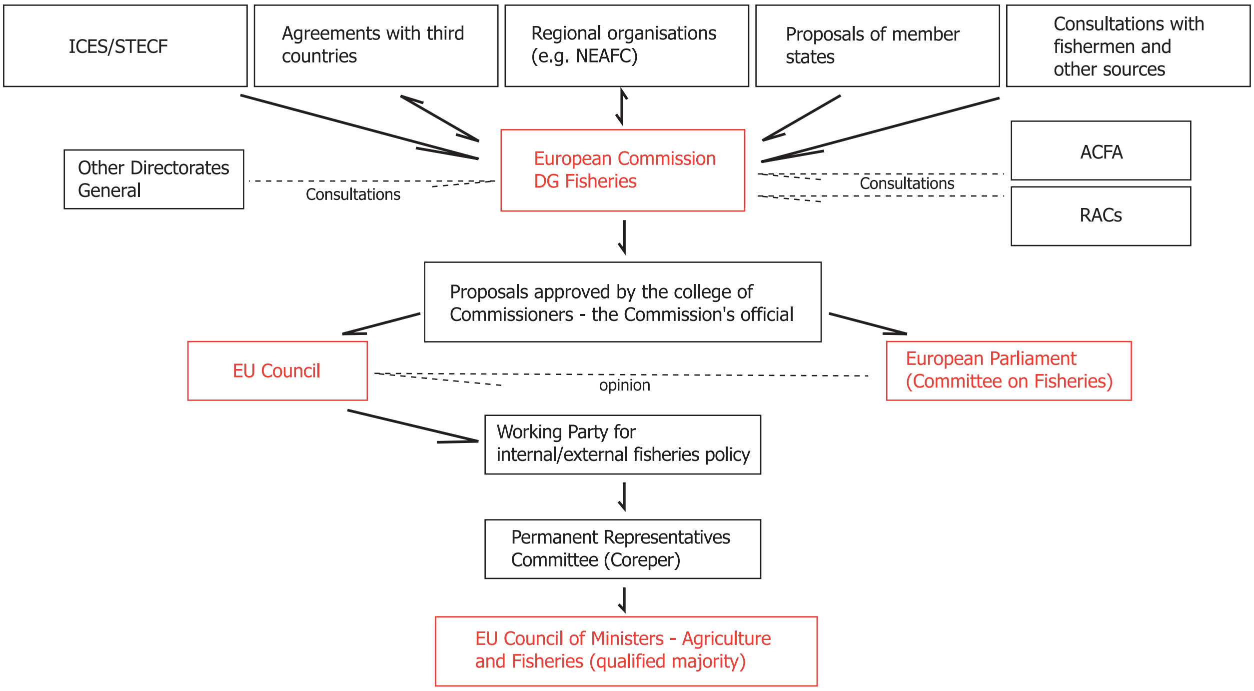
Resource protection was not considered at that time as a large problem and the Commission did not pay much attention in its communication to this issue. The problem was addressed by the Commission again only in 1976, when it initiated discussion on a more comprehensive fisheries management system that among others would include: resource protection and the principle of their sustainable exploitation, TAC limits, scientific advisory on biological state of respective fish stocks, allocation of fishing quotas among the member states, regulation of access to respective marine areas, as well as supervision over state fisheries control services. Agreeing on details of the aforementioned measures took seven years of complicated, laborious negotiations that were many times interrupted by different deadlocks. The agreement was reached at the beginning of January

[1] The term 'policy', here and in the whole section, stands for activities agreed and implemented by the EU institutions, and should be differentiated from policies implemented by respective Member States.
[2] Council Regulation (EEC) 2142/70 on the common organization of the market in fishery products
[3] Council Regulation (EEC) 2141/70 laying down a common structural policy for the fishing industry

1983[4] and this date is commonly considered as the beginning of the Common Fisheries Policy of the European Union.

3.2. The decision-making process

The CFP is one of the Community policies belonging to the first EU pillar, i.e. the area of Community exclusive competence. In practical terms this means that the European Commission holds a strong position in the decision-making process – with an exclusive right to a legislative initiative as the main prerogative. If decision-makers consider a particular decision to be of political character – such a decision has to be passed with a qualified majority of votes in the EU Council of Ministers. For the majority of draft legal acts, the European Parliament holds an advisory function, with a telling exception of regulations on annual TAC limits and fishing quotas, where it is not included in the decision-making process at all. Decisions of technical character are made under a 'comitology procedure', i.e. by the Commission after obtaining an opinion of a relative committee of experts delegated by the EU Member States. Such an opinion, depending on the character of Community competences, may be either binding or not[5]. It has to be stressed that from a formal-legal point of view these are typical decision-making procedures within Community exclusive competence. The figure below presents the decision-making process in the EU Council.



The crucial role of scientific advisory bodies undoubtedly differentiates the decision-making process on the CFP from the remaining EU policies. In practice a majority of legal acts relating to resource protection, and especially to TAC limits, are adopted by the Commission based on such advice.

[4] During the historic EU Council of Ministers of 25 January 1983, a set of 12 regulations regarding fisheries was adopted. The most important one was the Council Regulation (EEC) 170/83 establishing a Community system for the conservation and management of fishery resources

[5] For example for issues related to providing state assistance in fisheries, the Advisory Committee provides its opinions on the Commission's proposals, but the opinion is not binding. The opinion is approved by an ordinary majority of votes and each of the Member States has one vote. In case of the majority of issues related to the fisheries sector (e.g. control of the fishing) the Managing Committee provides an opinion on the Commission's proposal. The opinion is binding and is approved by a qualified majority of votes, similar as in the EU Council. Each of the member states has the same number of votes as in the Council.

The negotiations are particularly intensive, complicated and difficult prior to annual December meetings of the EU Council of Ministers, when the TAC limits are adopted. Adopting a bulky document (over 200 pages) that is of key importance for functioning of the European fisheries constitutes a real 'test' for the commonly judged as slow EU decision-making procedures. The Commission adopts a draft three weeks prior to the meeting of the EU Council of Ministers. The CFP reform6 (discussed below) constitutes a result of one of such tests that took place in December 2002 (it was particularly difficult, the meeting lasted for five days).

Further attention should be also given to the increasing role7 of direct consultations between the Commission and representatives of fisheries communities, i.e. groups to which respective draft legal acts refer to, as well as the increasing role of advisory bodies comprised of sector representatives. The main institution of the official dialogue between the European Commission and the representatives of the fisheries sector is the Advisory Committee on Fisheries and Aquaculture 8 (ACFA). It includes representatives of European associations of fisheries, fish processors, fish farmers, fish importers and exporters, as well as representatives of trade union federations, consumer federations and environmental non-governmental organisations. The task of the Committee is to provide opinion on legal acts prepared by the Commission. It is also authorised to ask the Commission about the CFP rules as well as social and economic aspects of the fisheries.

One of the main objectives of the CFP reform of 2002 was significant strengthening of participation of fisheries sector representatives in the decision-making process by appointing Regional Advisory Councils (RACs)[9].

They include representatives of non-governmental organisations dealing with fisheries (majority of places in the Council), aquaculture, processing, environmental protection, consumers and other interested parties. Representatives of the Commission, governmental administration and scientists can also participate in RACs' meetings in the role of observers. The main role of RACs is to formulate proposals for legal solutions and presenting them to the European Commission and member states – the Commission has to provide a written opinion on them.

The first experiences from the functioning of the Councils are positive: a proposal for various provisions that was accepted during the first session of the RAC for the Northern Sea became an important input to the December meeting of the EU Council of Ministers of 2004. Part of the proposals was incorporated to the EU legislation. This example shows that the role of the Committees in the decision-making process on the CFP has positive 'value added', especially when the proposals that they put forward are well thought out and constructive.

3.3. Components of the Common Fisheries Policy and changes introduced by the 2002 reform

3.3.1. Resource protection and fisheries management

It is understandable that the component of resource protection and fisheries management (apart from structural funds) enjoys the largest interest on the part of the fisheries sector. After all, it includes specification of TAC limits, fishing quotas and technical resource protection measures[10], as well as

[6] The main part of the package: Council Regulation (EC) 2371/2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy

[7] The following quotation from a high level European Commission's official illustrates the change in the EC's approach that used to be sharply criticised: "first listen, then talk"

[8] More information on the website: http://www.europa.eu.int/comm/fisheries/dialogue/acfa_en.htm

[9] Compare: the Council Decision No 2004/585/EC establishing Regional Advisory Councils under the Common Fisheries Policy. Seven Committees are to be established for the following fleets and/or marine areas: the North Sea, pelagic stocks, the Baltic Sea, the Mediterranean Sea, north-western waters, south-western waters, high-seas/ long distance fleet. Two first RACs have been established so far.

[10] Among others: characteristics of fishing gear, areas and periods closed for fishing, minimum landing size for fish.

management of the fishing capacity of the EU fleet and environmental aspects of the fisheries sector. Development of common rules for collection of data on fisheries constitutes another important element, as they constitute a basis for rational management of living marine resources. In practical terms, the success of activities for sustainable fisheries largely depends on the quality of statistical data provided. It should be stressed that prior to the 2002 reform this component was aimed at securing the best fishing possibilities for the fleet rather than at limiting them in order to ensure the good state of the fish resources in the EU waters for future generations.

The CFP reform of 2002 introduced far-reaching changes to the majority of activities connected with resource protection. The concept of multi-annual fish resources management became the basis for the Commission's activities. Multi-annual recovery plans constituted one of the novelties – they tightened the criteria for establishing the TAC limits as well as control provisions and measures that force reduction of the excessive fishing effort for those stocks that have been scientifically proven to be under a threat of overfishing.

The Commission's rights were extended as it was authorised to make decisions on immediate emergency measures if the situation of a particular stock worsened significantly over a short period of time.

Another key part of the reform consisted in elimination of possibilities for further increase in the fishing capacity of the EU fleet by providing for reference levels for member states and introducing the entry/exit regime for fishing fleet units with less advantageous conditions specified for a majority of cutters (over 400 GT). Moreover, the reform provided for greater greening of the CFP rules.

3.3.2. Fisheries control

Although control of fisheries lies within the competence of the member states, it is based on provisions prepared by the Commission and adopted at the Community level. They regulate such things as: requirements for reporting of catch, landing and first sale by fishermen, monitoring rules for vessels' activities when at sea (e.g. a requirement to be incorporated into the satellite vessel monitoring system), proper use of fishing gear or proper application of market and structural provisions.

It is also clear that the Commission wants the EU member states to unify their control standards (as sometimes they are completely different), including the level of penalties for the most significant violations and more effective measures for enforcement of the EU legislation regarding control of the fisheries. A possibility for directing the most serious violations of the control provisions to the European Court of Justice (ECJ) constitutes a very strong incentive for proper application of the rules. Currently, the ETS is analysing around 80 cases from the fisheries sector, a majority of them relate to violation of control provisions, and the largest fine so far amounted to over Euro 57 million[11].

The CFP reform resulted in strengthening EU jurisdiction in supervision over enforcement of relative legislation by the member states as well as in better propagation of some electronic control systems (e.g. extension of the VMS on smaller units). The member states also initiated a unification process for control standards and inspections – among others the Community Fisheries Control Agency[12], which was established at the beginning of 2005. Its main task is to implement the plans for common distribution of control and inspection measures by the member states.

[11] Compare: Case No C-304/02, European Commission/France; http://www.curia.eu.int

[12] Compare: Council Regulation (EC) 768/2005 establishing a Community Fisheries Control Agency and amending Regulation (EEC) No 2847/93 establishing a control system applicable to the common fisheries policy

3.3.3. Fish market

The system for community organisation of the fish market[13] is very similar to the organisation of numerous agricultural markets within the Common Agricultural Policy. The system of minimum prices for basic fish resources constitutes the main instrument here. Below such a price, the products are withdrawn from the market and stored or processes. Guide prices are established on an annual basis by the EU Council of Ministers. State and multinational producer organisations constitute an important element for market organisation and stabilisation. Only such organisations can make use of market instruments.

As the Community's market of fishery products is becoming more and more dependent on the import from outside of the EU (as much as nearly 60% of fishery products on the current EU market is made from imported raw materials), connecting this aspect of the CFP with the EU trade and customs policy is becoming more and more important. Fishery products play a significant role in trade relations with numerous third countries. Autonomous tariff quotas (ATQ) constitute a key instrument for EU processing, as they allow for importing many fish species (in different stages of processing) under very advantageous conditions. Unlike TAC and guide prices, their levels are specified every three years.

The reform of 2002 did not introduce any significant changes in this area of the CFP.

3.3.4. External fisheries policy

Measures for representing the wide community interest in external relations at the international and regional levels as well as in bilateral relations with third countries constitutes an important element of the CFP. Within the United Nations and its organisation specialised among others in fisheries – Food and Agriculture Organisation – the European Commission tries to secure widely understood EU fisheries interests, trying to act as a leader in various initiatives for reversing the decreasing trend in global fish resources, sustainable fisheries, fighting illegal fishing or protection of marine biodiversity. Similar activities are conducted within regional international organisations for resource management, as their decisions sometimes have significant impact on the situation of the EU fleet.

Current bilateral relations include 22 agreements with third countries. EU fishing possibilities are compensated by providing quotas in Community waters based on mutual exchange (with Norway, Iceland and Faroe Islands) or by providing monetary compensation on a pre-defined level (with African countries and island countries of the Pacific). The total value of all the currently binding agreements amounts to almost Euro 170 million annually.

The main change introduced by the CFP reform is transition from bilateral agreements of solely fisheries character[14] to partner agreements of a wider character. They contain commitments of third countries to use part of the compensation for improvement or in fact developing from the scratch of a fisheries management system, with special focus on scientific information on the state of the resources and establishment of effective fisheries control.

3.3.5. Fisheries structural policy

The main objective of the structural component of the CFP is to support sustainable economic development of the fisheries sector in all the aspects of its activities. It is quite well reflected in the names of the main directions of activities (so called priority axis) of the future European Fisheries Funds for 2007 – 2013:

[13] Council Regulation 104/2000 on the common organization of the markets in fishery and aquaculture products

[14] The impact of bilateral agreements on the state of resources in the waters of third countries was commonly considered as negative and frequently criticised as an example of pillage economy. The Commission recognises this negative impact for some of the agreements prior to the CFP, which is reflected in the remark made by one of the high level EC officials when describing the issue as „payer, pêcher, partir" („catch, fish, and go away").

- Measures for the adaptation of the fishing fleet, including social and economic measures,
- Aquaculture, processing and marketing of fishery and aquaculture products,
- Measures of collective interest[15],
- Development of subregions with important economic role of fisheries,
- Technical assistance for administration managing the structural funds.

The rules for utilising this financial support do not differ much from management systems for the remaining EU structural funds.

It took around 35 years to gradually develop the current, holistic shape of the structural policy in the fisheries sector. At the beginning of the 1970s, it comprised almost solely of measures for fleets, whilst social and economic issues belonged to other structural funds. The key assumptions adopted by the decision-makers of that times differed significantly from the current ones – the main objective was to secure that EU societies have access to full nutrition (as in the case of the EU agricultural policy) and make EU as little dependent on import from third countries as possible.

For the aforementioned reasons, increasing the fishing capacity of the fleets of the EU member states was given a priority. Implementation of this objective was effective: between 1970 and 1987 the tonnage of the fleet increased over twofold, whilst engine power – over threefold. It should be stressed that the data that the Commission has in this subject are incomplete due to very lenient legislation on fishing capacity reporting. Among others due to this reason, some of the member states did not provide the Commission with such data at all. The sudden increase in the fishing capacity is, however, unquestionable, and only a part of it can be contributed to statistical reasons resulting from three stages of EU enlargement between 1970 and 1983[16] with countries that possessed large fishing fleets.

Even a quick analysis of the initial stages of the structural policy reveals one fundamental and obvious mistake – lack of any assessment of its consequences for the state of fish resources and volume of the future catch, and therefore, an assessment of profits for fishermen as well.

The reason why such an assessment was lacking is on the one hand surprising, whilst one the other simple. Prior to 1978 the European Commission had not employed any scientist, and the problem of overfishing of the most economically important species was identified only several years later. At that time, however, changes in the policy were opposed, as before the end of the first half of the 1980s it was considered as a 'political success,' mainly due to lack of opposition on the part of groups engaged in the fisheries sector, which willingly and extensively used the subsidies for construction and modernisation of their ships. Despite numerous attempts and several ineffective preventive measures, significant changes in this aspect of the EU structural fisheries policy occurred only after the CFP reform of 2002.

3.4. The FIFG and the reform of the Common Fisheries Policy of 2002

Adjustment of the EU fishing fleet to the state of the available resources constitutes the basic objective of the reform under analysis and one of the two conditions necessary for the reform to succeed. The second condition consists in ensuring that the stocks that are overfished or that are under such a threat are restored to a biologically safe state that allows for sustainable exploitation in the long-term perspective[17].

[15] The most important ones include: measures for improvement of the state of ichthyofauna and its habitats, development of harbour infrastructure, promotion activities and pilot projects.
[16] 1973: Denmark, Ireland and Great Britain; 1981: Greece; 1986r.: Spain and Portugal
[17] According to the terminology adopted by the World Summit on Sustainable Development in Johannesburg in 2002 it also referred to as the Maximum Sustainable Yield.

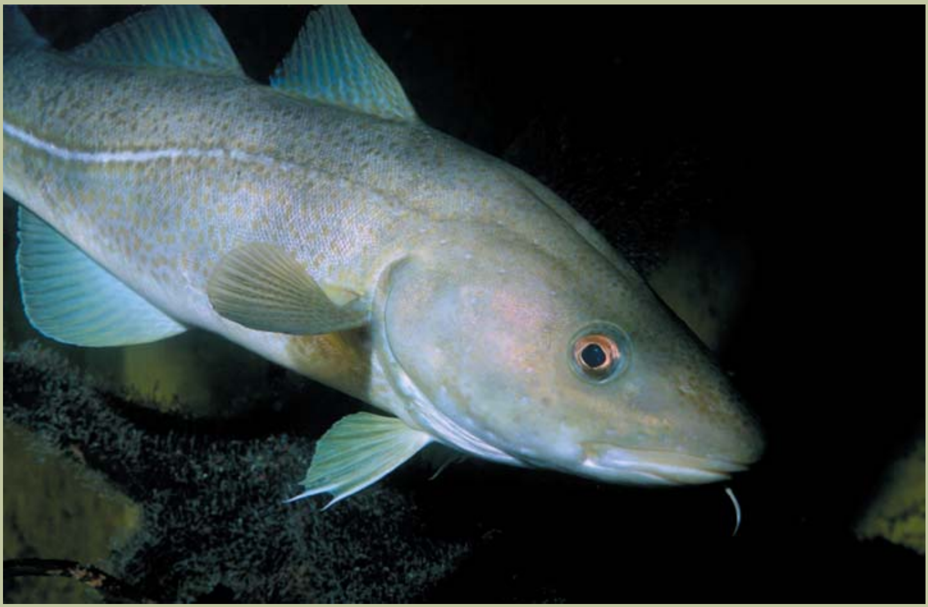
For this reason, the comparison of measures presented below was limited to this component of the FIFG that directly relates to the fishing fleet.

Final cancelling of possibilities for financing of the construction of new fishing vessels by the end of 2004 constituted one of the most important and most controversial elements of the reform. The reform maintained only the possibility for purchasing of a used vessel by young fishermen (less than 35 years old). Possibilities for vessel modernisation were significantly limited, excluding all types of modernisation that can lead to an increase in fishing capacity and all types of upgrading under the deck.

In order to increase the attractiveness of measures for permanent withdrawal of fishing vessels (scrapping) and to focus such measures on the fleet fishing for the most threatened stocks, the maximum rate for scrapping was increased by 20%. Moreover, with the end of 2004 it became impossible to withdraw an EU vessel by transferring it to countries not belonging to the EU under joint venture companies with a significant or majority share of the EU capital.

The reform modified possibilities for temporary suspension of fishing, providing more advantageous solutions for fishermen affected by consequences of reduced fishing possibilities under resource reconstruction or management plans. At the same time it excluded a possibility for compensations for the processing industry that depends on the raw material under the reduction programme.

As for social and economic measures, the reform introduced a possibility for 'partial' withdrawal from fisheries and for training in order to diversify the activities undertaken. The maximum of Euro 20 thousand can be obtained for this purpose. In order to have access to this support, it is necessary to prove that the fishing effort of vessels where crews undertake such activities will decrease.



The table below present the aforementioned changes in greater detail:

	FIFG – the most important rules for activities regarding fishing fleet	
	Prior to the 2002 reform	**After the 2002 reform**
Construction of new vessels	– Pursuant to the MAGP objectives[18] – Vessels over 12 metres and trawlers shorter than 12 metres that had been withdrawn could not be replaced with new ones	– Forbidden after December 2004. Prior to this date it was forbidden for vessels with tonnage over 400 GT
Modernisation of the existing vessels	– In order to rationalise fishing operations – Ban on replacement of fishing gear, except for more selective one	– Only on the deck and for the following purposes: to improve the industrial safety conditions on the deck, improve products' quality, introduce more selective fishing methods. – It cannot result in an increase of fishing capacity.
Scrapping	– For vessels older than 10 years, with the tonnage over 22 GT – Open for joint-venture companies	– For vessels affected by resuscitation plans the premium can be increased by 20% – Forbidden for joint-venture companies after 31 December 2004
Temporary suspension of fishing activities	– In case of unforeseen consequences (e.g. ecological disasters) – maximum 2 months a year, and maximum 6 months during the whole programming period – If a bilateral agreement with a third country is not renewed – If resource resuscitation is necessary – maximum 3 years	– In case of unforeseen consequences (e.g. ecological disasters) – maximum 3 months a year, and maximum 6 months during the whole programming period – If a bilateral agreement with a third country is not renewed – For vessels affected by resource resuscitation or management plans – maximum 3 years
Social and economic activities	– Earlier retirement for fishermen over 55 years old. One-off payment for fishermen from scrapped vessels – maximum Euro 10 000 – Costs of training for reskilling or diversification of activities – maximum Euro 50 000 – Purchasing of a used vessel by young fishermen (up to 35 years old) – maximum Euro 50 000.	– Change: costs of training for diversification – maximum Euro 20 000, provided that the fishing effort of the primary vessel is reduced

3.5. The European Fisheries Fund for 2007 – 2013 as the final part of the reform

The changes presented above were restated in the proposal for the new European Fisheries Fund (EFF) for 2007 – 2013 that was published in July 2004. In some points the Commission proposed even to tighten the provisions introduced by the reform. Due to the ongoing negotiations on the multi-annual EU budget it is difficult to foresee the amount of funds accessible under the EFF. It has to be stressed, however, that a part of proposals for measures regarding fishing fleet belong to the most controversial ones in the still unfinished negotiations. Therefore, an answer to the question whether and to what extent the EFF will confirm the CFP reform of 2002 still remains open.

[18] Multi-annual Guidance Programmes – applied in 1973 – 2004 and judged as an ineffective measure for controlling and reducing the fishing capacity of the fleet. They were replaced by reference levels for member states and the entry/exit system.

4.1. The size of fishing fleet in the Baltic countries

In the first half of the 1990s, over 11 thousand of fishing vessels were registered in the Baltic countries (without Russia), and their tonnage exceeded 1.4. million GT (in 1990). This accounted for around 6% of the total tonnage of the global fishing fleet and for around 35% of the fishing capacity of the fleets in the European countries (without Russia). After the collapse of the Soviet Union, distant-water vessels became a property of the former Baltic republics. Due to this fact, at the beginning of the 1990s, these countries, similar to Poland, had a dominating share in the total tonnage of the fishing fleet of all the countries located around the Baltic Sea. In 1990 the fishing capacity of the Polish fleet amounted to 325.9 thousand GT, which accounted for 1/5 of the total fishing fleet's tonnage registered in Baltic countries. Together with Lithuania, Latvia and Estonia, former communist states owned 80% of the fishing fleet tonnage in the countries located in the Baltic Sea basin.

In 1994, after several years of functioning of the new political and economic system, the fishing capacity of the former communist states was considerably reduced. On the one hand it resulted from new economic conditions and withdrawal of subsidies for distant-water fisheries, and on the other from loss of possibilities for fishing by those vessels on the majority of fishing grounds that had been earlier exploited under agreements between USSR and third countries.

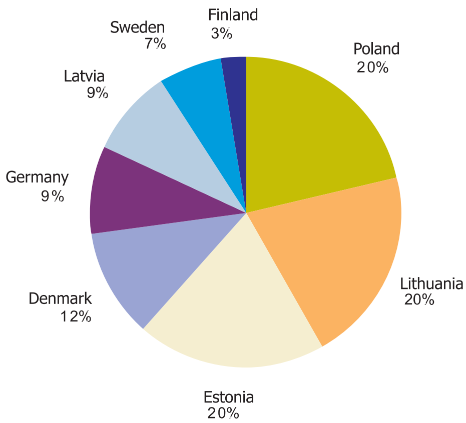
In 1994 the tonnage of fishing vessels in the Baltic countries decreased by around 40% - for Latvia this percentage amounted to 80%, for Poland to 44% and for Lithuania to 25%. Fishing fleet in Germany was also reduced by 25% and, as in the case of the former Soviet Union states as well as Poland, it resulted from withdrawing of large distant-water vessels (that used to belong to the German Democratic Republic).

Table 4.1. State of the fishing fleet of the Baltic countries between 1990 and 1994

Country	1990*			1994			change 1994/1990	
	No of vessels	GT	tonnage %	No of vessels	GT	tonnage %	No of vessels	tonnage
Poland	1 321	325 905	23%	1 341	183 600	21%	1.50%	-43.70%
Lithuania	162	236 268	17%	115	176 185	20%	-29.00%	-25.40%
Estonia	249	180 921	13%	271	168 242	20%	8.80%	-7.00%
Denmark	3 686	122 046	9%	4 397	99 347	12%	19.30%	-18.60%
Germany	1 236	106 401	7%	2 458	79 139	9%	98.90%	-25.60%
Latvia	311	382 777	27%	344	75 893	9%	10.60%	-80.20%
Sweden	1 150	50 400	4%	1 220	56 500	7%	6.10%	12.10%
Finland	3 557	16 798	1%	3 798	22 510	3%	6.80%	34.0%
Total	11 672	1 421 516	100%	13 944	861 416	100%	19.50%	-39.40%

* Data for Lithuania, Latvia and Estonia come from 1992, they do not cover information on fishing boats. It is estimated that there were 200 boats in Lithuania, 800 in Estonia and 600 in Latvia.

Source: FAO, Bulletin of fishery statistics. Fishery fleet statistics, Rome, 1998. Eurostat New Cronos databes, own estimations.



Graph 4.1. Geographic structure of the fishing fleet in the Baltic countries, division by countries in 1994 (without Russia)

Due to these changes, the number and the tonnage of vessels in segments over 500 GT were significantly reduced (Table 4.2). In the group of vessels between 500 GT and 999 GT, 26 vessels (i.e. 27%) ceased to operate, with the tonnage of 20 000 GT (30%), whilst the number and tonnage of the largest vessels from the group over 2000 GT decreased by half. A considerable increase in the number and tonnage of the fishing fleet in the Baltic states occurred only in the group of the smallest tonnage, i.e. up to 25 GT – by 32% in terms of quantity and by 12% in terms of tonnage as well as in the group of vessels between 250 to 499 GT – by 30% in terms of number and 28% in terms of tonnage.

Table 4.2. State of the fishing fleet of the Baltic countries between 1990 and 1994, division by tonnage groups

Tonnage group	1990*			1994			change 1994/1990	
	No of vessels	GT	tonnage %	No of vessels	GT	tonnage %	No of vessels	GT
0-24	8 645	51 102	4%	11 452	57 093	7%	32.50%	11.70%
25-49	1 105	41 667	3%	905	33 335	4%	-18.10%	-20.00%
50-99	768	60 463	4%	681	52 517	6%	-11.30%	-13.10%
100-149	422	50 831	4%	315	36 212	4%	-25.40%	-28.80%
150-249	227	42 695	3%	209	39 115	5%	-7.90%	-8.40%
250-499	115	38 449	3%	149	49 367	6%	29.60%	28.40%
500-999	95	66 115	5%	69	46 005	5%	-27.40%	-30.40%
1000-1999	55	93 532	7%	36	61 453	7%	-34.50%	-34.30%
2000 and more	240	976 662	69%	128	486 319	56%	-46.70%	-50.2%
Total	11 672	1 421 516	100%	13 944	861 416	100%	19.50%	-39.40%

* Source as in table 4.1

Due to lack of sufficiently detailed statistics it is impossible to precisely specify the state of the fleet fishing only on the Baltic Sea. German, Swedish and Danish fleets also fish in other regions, e.g. the North Sea, Kattegat, Skagerrak, and there is lack of sufficiently detailed information on the number and tonnage of these vessels. Moreover, certain groups of vessels, depending on the season, fish both on the Baltic Sea as well as on the North Sea[19]. Furthermore, fleets of such countries as Poland, Germany, Lithuania, Latvia and Estonia include also large oceanic trawlers fishing only on distant-water fishing grounds.

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[19] FAO (1999): Managing Fishing Capacity: Selected Papers on Underlying Concepts and Issues, Fisheries technical paper 386. Food and Agriculture Organization of the United Nations.

[20] According to data of 1996, Danish vessels registered in the harbours of Holstebro and Skivs at the North Sea, were also fishing on the Baltic Sea – over 20% of the catch of these vessels came from the Baltic, whilst 80% from the North Sea. In 1996 these vessels caught 57 000 ton of fish in the Baltic Sea, which accounted for around 1/3 of the total volume of Danish Baltic catch.

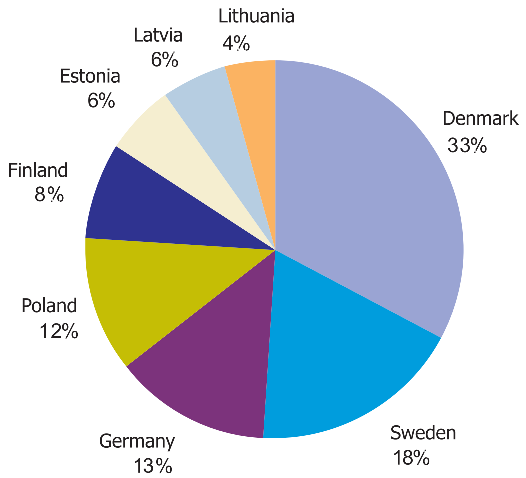
In order to calculate approximate capacity of the fishing fleet that was fishing on the Baltic Sea in the first part of the 1990s, the total number of fishing vessels registered in the Baltic countries was decreased by fishing vessels with tonnage larger than 500 GT (which constituted the largest tonnage group), i.e. mainly distant-water trawlers. In 1994, there were 233 of such vessels in eight countries located around the Baltic Sea. It is, however, possible that (e.g. in Lithuania and Estonia) some of them could have fished also on the Baltic Sea.[20]

Table 4.3. State of the fleet fishing on the Baltic Sea between 1990 and 1994.

	1990*			1994			change 1994/1990	
	No of vessels	GT	GT %	No of vessels	GT	GT %	No of vessels	GT
Denmark	3 672	109 570	38%	4 381	87 421	33%	19.30%	-20.20%
Sweden	1 145	47 250	17%	1 208	48 750	18%	5.50%	3.20%
Germany	1 204	35 803	13%	2 440	35 567	13%	102.70%	-0.70%
Poland	1 228	33 060	12%	1 294	31 235	12%	5.40%	-5.50%
Finland	3 557	16 798	6%	3 798	22 510	8%	6.80%	34.00%
Estonia	201	11 969	4%	220	15 909	6%	9.50%	32.90%
Latvia	190	14 965	5%	315	15 209	6%	65.80%	1.60%
Lithuania	85	15 792	6%	55	11 038	4%	-35.30%	-30.1%
Total	11 282	285 207	100%	13 711	267 639	100%	21.50%	-6.20%

* Data includes vessels that may be also involved in North Sea fisheries (Denmark, Sweden and Germany vessels). This may cause that the number of vessels and capacity in the table is higher than the actual engaged on Baltic fisheries one (see remarks made in the text)

See remarks made below table 4.2.



Graph 4.2. Tonnage of the fleet fishing on the Baltic Sea, division by countries (1994)

In 1994, the size of the fleet fishing in the Baltic Sea (without Russia) was estimated at 13 700 units with the tonnage of around 270 thousand GT. The share of Denmark, Sweden and Germany in the total fleet capacity accounted for over 50%.

The decrease in the fleet's tonnage in those countries (especially in Denmark and Germany), with a simultaneous increase in the number of vessels, resulted rather from changes in the register of EU fishing vessels (that had been developed since 1989) and from changes in the tonnage measurement system rather than from the actual changes of these values between 1990 and 1994.

[21] World Fishing Fleets, An Analysis of Distant-water Fleet Operations, Vol. V The Baltic States, The Commonwealth of Independent States, Eastern Europe, NOAA, NMFS U.S. Department of Commerce, 1993, p. 50, 73.

In the majority of the countries fishing in the Baltic Sea, small boats and fish cutters below 100 GT had the largest share in the tonnage structure. This resulted from the traditional fleet structure, which reflected the characteristics of fishing on the shallow and small Baltic Sea. In case of the former Soviet Union countries and Poland, the dominating position of one tonnage group resulted also from a practice of constructing vessels in long shipyard series according to one construction project. In the Polish fleet these were e.g. cutters B-25, from 100 to 107 GT, in Latvian, Lithuanian and Estonian fleets – cutters of the Baltika type.

Table 4.4. State of the fleet fishing on the Baltic Sea between, 1994, division by tonnage groups and countries.

Tonnage group	Data	Denmark	Sweden	Germany	Poland	Finland	Estonia	Latvia	Lithuania
0-24	No of vessels GT	3 799 24 469	793 7 650	2 066 6 503	875 81	3 701 15 510	68 714	150 2 166	No data No data
25-49	No of vessels GT	252 9 796	131 4 800	230 8 030	205 8 210	33 1 109	16 430	37 930	1 30
50-99	No of vessels GT	133 8 494	165 12 350	53 3 785	42 3 256	43 3 042	103 8 769	123 11 046	19 1 775
100-149	No of vessels GT	46 5 853	36 4 500	35 4 357	156 16 833	19 2 329	19 2 223		4 117
150-249	No of vessels GT	79 14 657	53 10 200	38 7 031	16 2 855	1 197	8 1 642	4 733	10 1 800
250-499	No of vessels GT	72 24 152	30 9 250	18 5 861	0 0	1 323	6 2 131	1 334	21 7 316
No of vessels, Total		**4 381**	**1 208**	**2 440**	**1 294**	**3 798**	**220**	**315**	**55**
Tonnage, Total		**87 421**	**48 750**	**35 567**	**31 235**	**22 510**	**15 909**	**15 209**	**11 038**

Source: FAO, Bulletin of fishery statistics. Fishery fleet statistics, Rome, 1998.

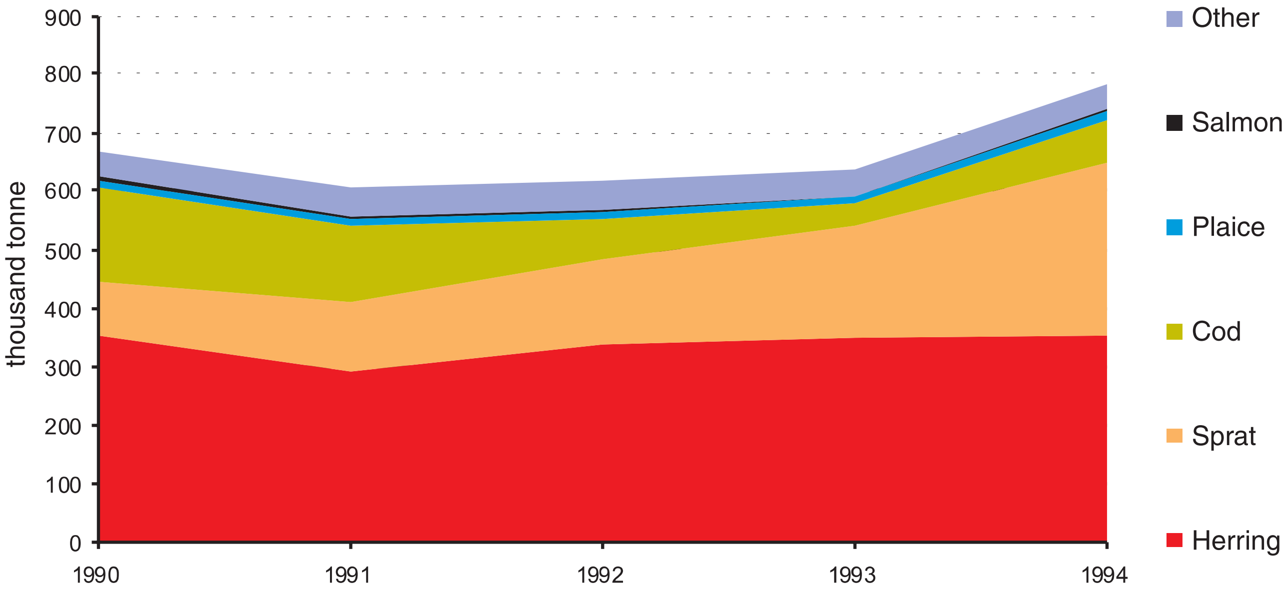
4.2. Volume and geographic/species structure of Baltic fishing

Compared to other fishing regions, the Baltic Sea is characterised by very small diversity of fish species. For example, there are ten times fewer species in the Baltic Sea than in the Mediterranean Sea, which is a habitat of about 500 fish species, out of which 120 is fished at industrial scale. There are also much fewer species than in the near fishing grounds of the North Sea.

Only a few species living in the Baltic Sea are of economic significance, mainly: cod, herring, sprat, flatfish (flounder, plaice) and to a lesser extent salmon and sea trout. IBSFC each year specifies fishing limits for most of these species.

Between 1990 and 1994, fishing on the Baltic Sea remained on a stable level of ca 600 – 700 thousand tonnes, with a dominating share of sprats (45 – 55%). Fishing for sprats clearly increased after 1991, and it resulted mainly from high dynamics of fishing for the purposes of fish meal production by Danish and Swedish fleets. At the same time fishing for cod decreased from 160 thousand tonnes in 1990 to 70 thousand tonnes in 1994, whilst the share of this species in total Baltic fishing decreased from 24% to 9%. This large decrease in cod catch resulted from a very poor condition of this species and therefore a considerable lowering of the fishing quota by IBSFC. In 1993, the TAC for cod was set at 40 thousand tonnes. This was the lowest fishing limit established for this species by IBSFC ever.

In the first half of the 1990s, Finland had the largest catch of herrings, and it fluctuated from 51 thousand tonnes (in 1991) to 97 thousand tonnes (in 1994), which accounted for around 30% of the total herring catch in the whole Baltic Sea. Herrings constituted at that time, and still constitute, the basic fish species fished for by this country. In 1994 herring accounted for over 90% of the total catch in Finland. Around 1/5 of the Baltic herring catch in 1994 was fished for in Sweden (70 thousand tonnes), 14% in Poland and 13% in Denmark. The share of the remaining countries in the catch of this species did not exceed 10%.



Source: Fishstat Plus Database, ICES catch statistics 1973-2004.

Graph 4.3. Structure of Baltic fishing between 1990 and 1994

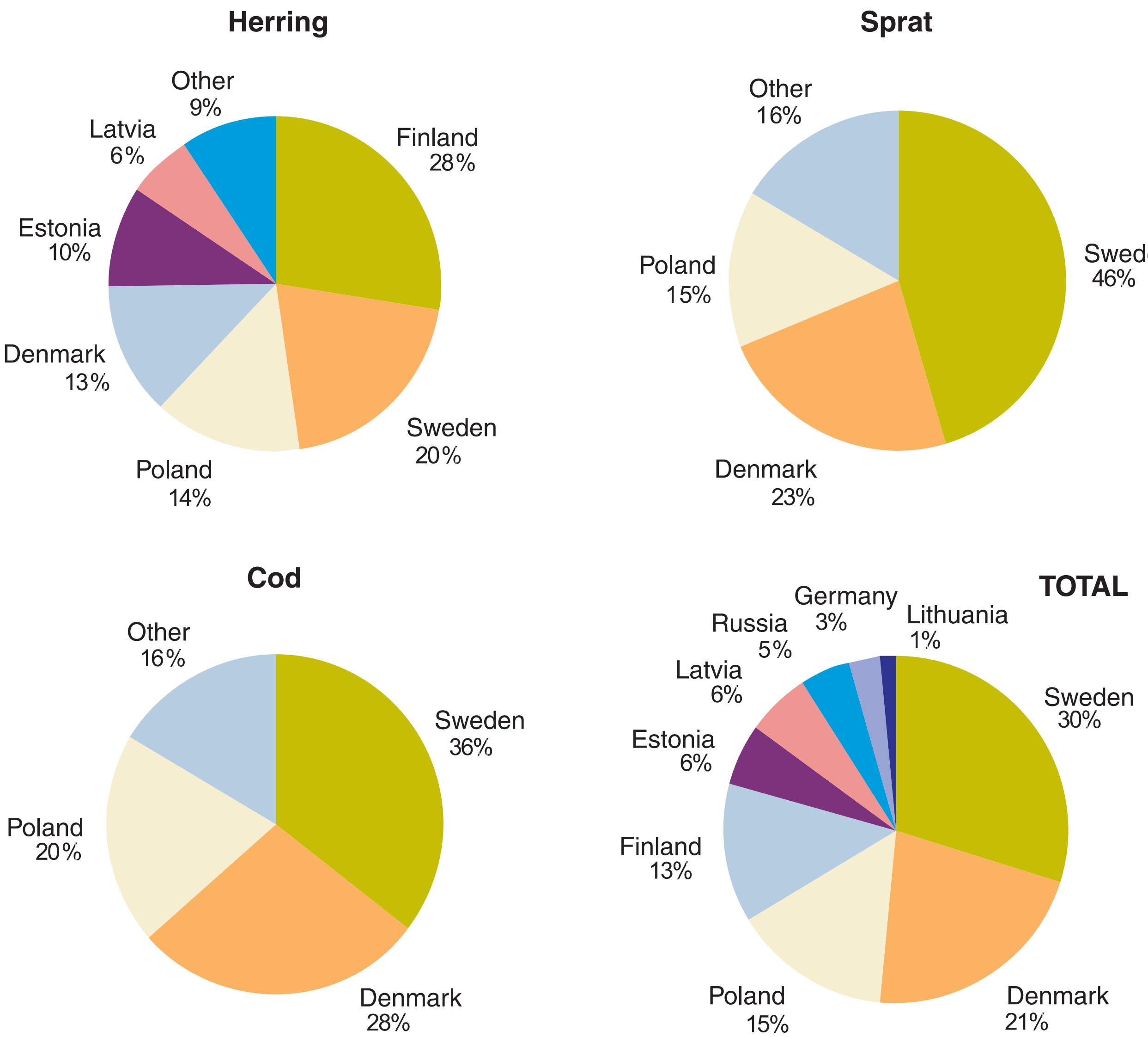
Table 4.5. Volume of Baltic catch between 1990 and 1994, division by more important fish species

Species	1990	1991	1992	1993	1994
Herring	354 997	294 607	338 118	349 832	351 493
Sprat	91 059	113 336	146 712	193 357	299 206
Cod	161 689	133 758	69 741	37 164	71 325
Plaice	9 690	11 214	9 454	9 580	14 335
Salmon	5 550	4 493	4 399	3 350	2 890
Other	44 897	48 174	50 325	46 147	43 709
Total	667 882	605 582	618 749	639 430	782 958

Source: ICES, FISHSTAT, FAO Fisheries Department, Fisheries Information, Data and Statistical Unit

Denmark and Sweden dominated fishing for sprat between 1990 and 1994. This resulted from the fishing capacity of these countries, which included large pelagic trawlers that specialised in fishing for fish meal and fish oil production. In 1994, the Swedish fleet caught 135 thousand tonnes of sprats, which accounted for 45%of the total catch for this species on the Baltic Sea. Danish pelagic trawlers caught 70 thousand tonnes, i.e. 23% of the total sprat catch on the Baltic Sea. The share of the Polish fleet in the total catch of sprat in 1994 amounted to 15% (44.5 thousand tonnes). Catches of the remaining countries fishing on the Baltic Sea were considerably lower.

The volume of cod catch in the first half of the 1990s varied considerably, from 37 thousand tonnes to 160 thousand tonnes. Due to the species economic profitability (it is 4 times more expensive than herring and 8 times more expensive than sprat), TAC for this fish is usually used in 100%. Therefore, the official volume of catch for respective countries for many years was been tantamount to the levels of allowable catch. It is, however, generally known that the catches reported by respective countries are underestimated (due to the unreported landings they may be even a few times higher). In 1994, the share of Sweden in the general volume of cod catch amounted to 35% (25.3 thousand tonnes), of Denmark – 28% (19.8 thousand tonnes) and of Poland – 20% (14.4 thousand tonnes). The share of the remaining countries in the total cod catch on the Baltic Sea was small and equalled – 7% for Germany, 3% for Latvia, 3% for Lithuania, 1.5% for Russia, and around 1% for Estonia and Finland.



Source: as in Graph 4.3.

Graph 4.4. Catch of the more important fish species, division by countries, 1994

One of characteristic traits is that all of the countries located around the Baltic Sea (except for Finland) exploit also other fishing regions, frequently using the same fishing vessels. For example, Denmark, which has a fleet specialised in fishing for fish meal purposes, mainly sandeels and sprats, both on the North Sea and the Baltic Sea. The table 4.6 presents the share of catch from the Baltic Sea in the total catch of countries located around the Baltic Sea. Without Russia, this share amounted in 1994 to 23% on average and differed from 9% (Denmark) to 100% (Finland). This diversified geographic catch structure results from the fact that some of the countries (Denmark, Germany and Sweden) boarder with several fishing regions, i.e. the Baltic Sea, the North Sea, Skagerrak and Kattegat. In the case of the countries from the former communist block: Lithuania, Latvia, Estonia, Poland and Germany (the fleet of the former GDR), the large share of catch from outside of the Baltic Sea in the general catch of these countries resulted from possessing by those countries large oceanic vessels for distant-water fishing in fishing regions remote from national harbours (this issue has been discussed in the earlier part of the section).

Table 4.6. Share of catch from the Baltic Sea in the total catch for respective Baltic countries, 1994

Country	Baltic	Total	Baltic/Total
Sweden	235 606	386 814	61%
Denmark	164 880	1 873 316	9%
Poland	116 500	410 532	28%
Finland	103 417	103 417	100%
Estonia	46 076	121 771	38%
Latvia	46 056	137 610	33%
Germany	22 709	219 253	10%
Lithuania	9 975	47 975	21%
Total	**745 219**	**3 300 688**	**23%**
Russia	37 739	3 486 116	1%

Source: ICES, FISHSTAT, FAO Fisheries Department, Fisheries Information, Data and Statistical Unit

As the table 4.7 shows, fishing for herring was concentrated in three neighbouring Sub-divisions: 28, 29 and 30, and was conducted mainly by the fleets of Finland, Sweden and Latvia. Around 1/3 of the total herring catch came from this area in 1996.

Table 4.7. Geographic structure of Baltic catch, division by ICES statistical Sub-divisions and more important fish species (based on data from 1996)

Sub-division	tonne					share				
	Herring	Sprat	Cod	Other	Total	Herring	Sprat	Cod	Other	Total
26	28 621	177 786	31 626	8 290	246 323	8.80%	38.30%	20.30%	11.60%	24.30%
25	35 621	78 019	61 109	9 421	184 170	11.00%	16.80%	39.10%	13.20%	18.10%
28	48 893	96 715	3 363	2 740	151 711	15.10%	20.90%	2.20%	3.80%	14.90%
24	32 401	1 785	31 036	7 721	72 943	10.00%	0.40%	19.90%	10.80%	7.20%
22	12 216	14 553	15 385	30 717	72 871	3.80%	3.10%	9.90%	43.10%	7.20%
30	56 816	1 397	3	3 133	61 349	17.50%	0.30%	0.00%	4.40%	6.00%
32	29 502	21 112	0	1 027	51 641	9.10%	4.60%	0.00%	1.40%	5.10%
29	32 363	14 275	15	1 767	48 420	10.00%	3.10%	0.00%	2.50%	4.80%
27	6 754	36 507	3 800	1 083	48 144	2.10%	7.90%	2.40%	1.50%	4.70%
23	5 649	0	3 941	1 200	10 790	1.70%	0.00%	2.50%	1.70%	1.10%
31	5 194	0	0	2 876	8 070	1.60%	0.00%	0.00%	4.00%	0.80%
unknown	30 615	21 475	5 817	1 242	59 149	9.40%	4.60%	3.70%	1.70%	5.8%
Total	324 645	463 624	156 095	71 217	1 015 581	100.00%	100.00%	100.00%	100.00%	100.00%

Source: ICES, FISHSTAT, FAO Fisheries Department, Fisheries Information, Data and Statistical Unit

Graph 4.1 presents geographic distribution of Baltic catch by ICES Sub-divisions. In 1996, a great majority of the catch was concentrated in the eastern part of the Southern Basin (Sub-divisions from 22 to 24 and the western part of the Sub-division 25) and in the southern part of the Central Basin (the eastern part of the Sub-division 25 and Sub-divisions from 26 to 29). Over 40% of the total Baltic catch volume came from two statistical Sub-divisions 25 and 26. 15% of the catch was located in the Sub-division 28 (including the Gulf of Riga), whilst the share of the remaining fishing regions did not exceed 10%.

75% of the sprat catch came from three Sub-divisions: 25, 26 and 28 (Central Baltic). These were mainly fleets from Sweden and Poland and to a lesser extent from Denmark (after Sweden and Finland joined the EU in 1995) and from Latvia that were fishing for sprat in the region of Central Baltic.

The Sub-division 25 was the most intensively exploited Sub-division as far as fishing for cod is concerned – almost 40% of the cod catch came from this region. 80% of the total cod catch was fished for in this Sub-division and the two neighbouring Sub-divisions 24 and 26.

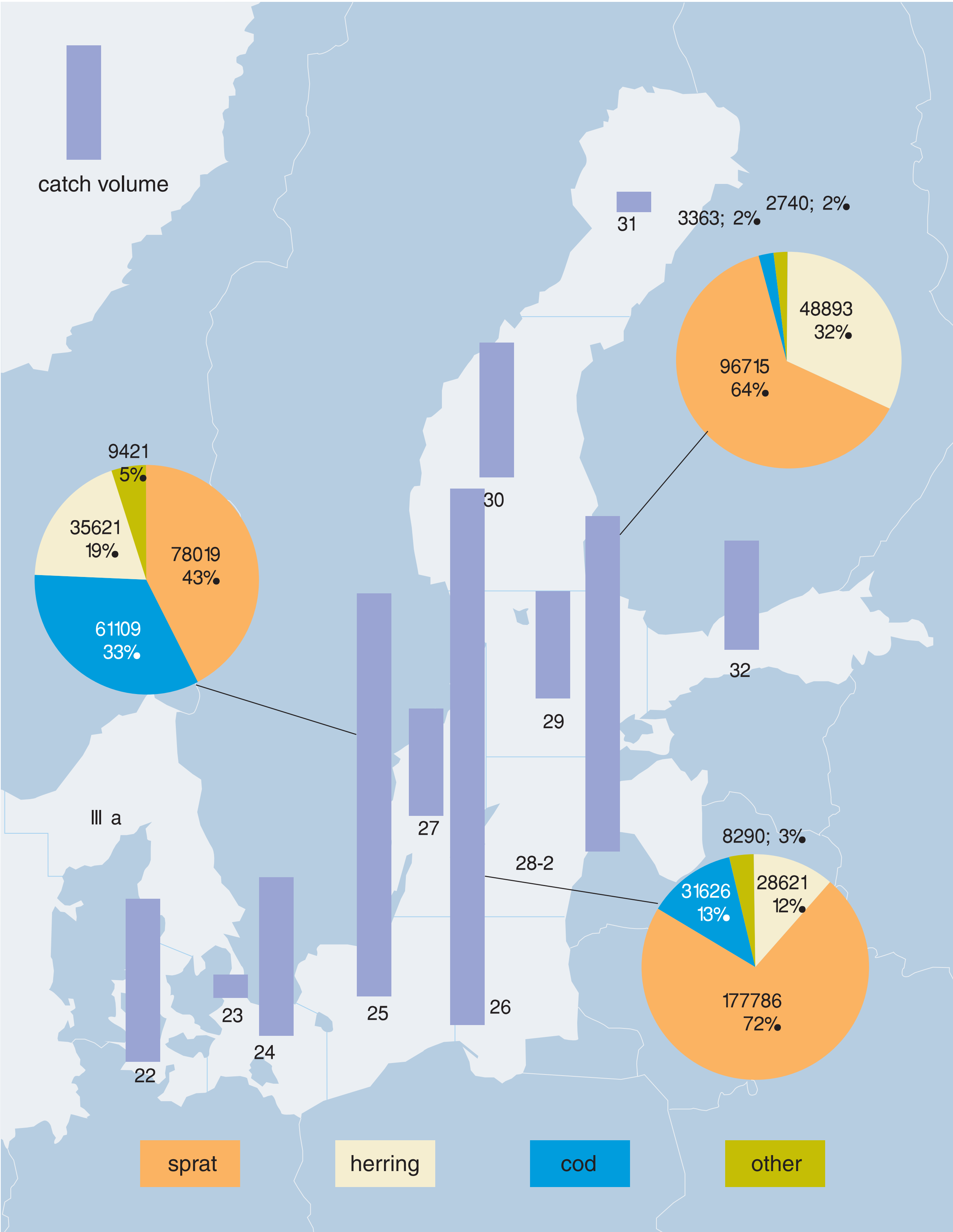


Figure 4.1. Geographic distribution of the Baltic catch and species structure, division by the more important statistical regions (1996)

Dr. Emil Kuzebski

5.1. Fishing fleet management under the MAGP

In 1994, when the Financial Instrument for Fisheries Guidance was established, the third multiannual guidance programme (MAGP III) had already been in place. The first programme of such type (MAGP I) had been initiated ten years earlier in 1983 and lasted until 1986. It was aimed at adjusting the EU fishing fleet potential to the state of the available resources.[1] The programme did not specify, as later programmes did, concrete objectives for reduction of tonnage or fishing fleet power and was not obligatory for member countries. Nevertheless, it secured financial support for scrapping or temporary suspension of fishing activities. The fishing capacity of the EU member states' fleet remained unchanged during the programme's operation.

The second multiannual guidance programme (MAGP II), which was established for the period from 1987 to 1991, among its objectives included reduction of the tonnage and power of the EU's fishing fleet. The programme resulted in a slight reduction of the fishing capacity (by 2%), due to technical problems with enforcement of the planned reduction (ensuing from lack of sufficiently detailed fishing fleet records).

In the second half of the 1990s the third stage of multiannual guidance programmes (MAGP III) finished (it lasted from 1992 to 1996). Unlike the former programmes, MAGP III provided for reduction of not only fishing capacity (i.e. tonnage and engine power) but also fishing effort that was defined as a product of fishing days and GT or kW. Most of the member countries, however, decided to implement the objectives of the programme only by reducing tonnage and power of vessels, claiming that reduction of fishing effort was too difficult to implement. MAGP III provided for reduction of the fishing effort by 20% for groundfish and by 15% for benthic stocks.[2] In general, the tonnage in the EU member states was reduced at that time by 18%, from 2 010 thousand GT to 1 644 thousand GT, whilst engine power was at the same time reduced by 12%, from 8 347 thousand kW to 7 328 thousand kW.[3]

MAGP III, unlike the former programmes, specified reduction levels for fishing fleets for respective segments. The Baltic fishing fleet was divided into 10 segments for Germany and 6 segments for Denmark. Vessels were grouped into respective segments based on the fishing gear they used, fish species and the size of the unit. Reduction of the fishing capacity of the German fleet for the end of 1996 varied, depending on the segment, from 0 to 13%. In general the tonnage of German vessels

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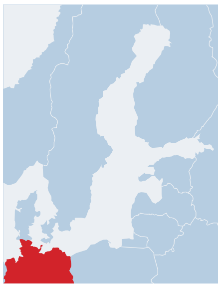
[1] Council Directive 83/515/EEC
[2] Council Regulation 3760/1992
[3] Erik Lindebo, Fishing Capacity and EU Fleet Adjustment, FAO Technical Consultation on the Measurement of Fishing Capacity Mexico City, 29 November - 3 December 1999

decreased by around 10%. It was planned that the tonnage of Danish vessels would be reduced by 6% between 1992 and 1996. The actual reduction was twice as high, and amounted to around 13%.

The next multiannual programme for EU fleet restructuring was adopted in 1997 (MAGP IV). The programme specified objectives and detailed rules for adjusting the fleet's capacity to the state of resources during the period of 1997 – 2001 (the programme was extended on 2002). MAGP IV, as MAGP III, defined reduction in terms of fishing effort, at the level of 20% for fleets fishing for overfished species and 30% for segments fishing for stocks that were under threat of depletion. These limits were tightened in 2002 to 24% and 36% respectively.[4] As for the Baltic Sea, the 24% reduction level was binding for vessels fishing for cod, whilst the 36% reduction for segments fishing for salmon.[5] Due to the fact that the fishing capacity in respective segments was considerably lower than the objectives adopted under the MAGP IV already when the planned reduction level was being defined, the programme did not contribute to decreasing of the fleet. It could only prevent an increase in vessels tonnage and power. In case of four EU countries fishing on the Baltic Sea (Germany, Denmark, Sweden and Finland), the tonnage of the fishing fleet for the end of 2002 was on average by 15% higher than the initial level from January 1997. Only for Finland, the tonnage level in 2002 was lower than the initial tonnage (by 1%), whilst in other countries the tonnage increased by: 25% for Denmark, 2% for Sweden and 15% for German fleet.

5.2. State of the fishing fleet in the context of structural funds



GERMANY

In the first period of FIFG operation (1994-1999), the tonnage of the German fleet decreased by over 9 thousand GT (-12%), out of which less than 3 thousand GT in the group of vessels below 500 GT (-8%). The extent of this reduction varied for different tonnage groups. As for vessels smaller than 500 GT, the largest decrease was achieved in the tonnage group 100-149 GT and in the group 250-499 GT (23% each). A considerable reduction, by 1/3, also occurred in the group of vessels over 1000 GT (these vessels did not, however, fish on the Baltic Sea).

In the period 1994 – 1999, 6.1 million Euro was earmarked for adjustment of the fishing effort of the German fleet, out of which 3.5 million Euro from the FIFG and the remaining 2.6 million Euro from state financial resources.[6] Much larger funds, the total of 30 million Euro, were allocated for modernisation and construction of new vessels. Financial support for scrapping as well as for construction of vessels was not fully utilised. For 3.5 million Euro, only 23 vessels, with 4.7 thousand GT tonnage and 8.1 thousand kW engine power were withdrawn between 1994 and 1999. 42 new vessels with 8.4 thousand GT tonnage and 6.9 thousand kW engine power were constructed at the same time for 12 million Euro (out of which 8.2 million Euro from FIFG). Average tonnage of withdrawn vessels equalled around 200 GT, whilst average power – 350 kW. Newly constructed vessels were a bit smaller, with average tonnage of 200 GT and average power of 166 kW. Additionally, EU financial assistance under the programming period of 1994 – 1999 was used for modernisation of over 500 vessels, which cost 18 million Euro.[7]

Comparison of data on tonnage of German vessels withdrawn and constructed with public financial support shows that structural funds did not contribute to reduction of fishing capacity, on the contrary, the tonnage of newly constructed vessels was larger than the tonnage of withdrawn vessels. Therefore, the reduction of the number and tonnage of German vessels between 1994 and 1999 that

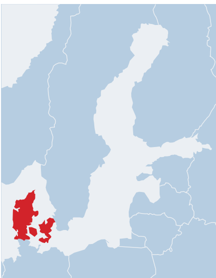
[4] Council Decision 2002/70/EC
[5] Council Decision 97/413/EC
[6] Facts and figures on the CFP. Basic data on the Common Fisheries Policy, European Communities, 2001
[7] Rapports annuels d'exécution et le registre de la flotte de pêche communautaire, DG FISH, 2003.

is shown in the Table 5.1 most probably resulted to a larger extent from a natural process of withdrawing vessels from fishing (e.g. due to quitting the trade, bankruptcy, sinking) than from the programme for fleet scrapping.

Table 5.1. The number of vessels and tonnage of the German fishing fleet between 1994 and 1999 (data for the end of the year).

GT groups	1994		1995		1996		1997		1998		1999		1999/1994	
	No	GT	No	GT	No	GT	No	GT	No	GT	No	GT	No	GT
0-24	2 066	6 503	2 039	7 920	2 011	7 255	1 967	5 996	1 939	5 859	1 948	5 889	-6%	-9%
25-49	230	8 030	200	7 157	201	7 173	219	7 655	215	7 523	212	7 419	-8%	-8%
50-99	53	3 785	43	3 121	53	3 739	56	3 941	56	3 932	57	3 930	8%	4%
100-149	35	4 357	35	4 191	32	3 856	29	3 465	28	3 346	28	3 351	-20%	-23%
150-249	38	7 031	43	8 043	43	7 922	40	7 277	41	7 378	41	7 445	8%	6%
250-499	18	5 861	15	4 864	15	4 798	14	4 542	14	4 537	14	4 537	-22%	-23%
Total	**2 440**	**35 567**	**2 375**	**35 296**	**2 355**	**34 743**	**2 325**	**32 876**	**2 293**	**32 575**	**2 300**	**32 571**	**-6%**	**-8%**
500-999	2	1 344	2	1 344	2	1 344	0	0	0	0	0	0	-	-
1000-1999	8	14 952	7	13 009	7	12 871	5	9 123	6	10 720	6	10 654	-25%	-29%
2000+	8	27 276	8	27 276	6	24 406	7	26 578	6	24 406	7	26 578	-13%	-3%
Total	**2 458**	**79 139**	**2 392**	**76 925**	**2 370**	**73 364**	**2 337**	**68 577**	**2 305**	**67 701**	**2 313**	**69 803**	**-6%**	**-12%**

Source: New Cronos Database, Eurostat.



DENMARK

Intensive reduction of the Danish fishing capacity took place in the period directly before introduction of the FIFG. Between 1987 and 1993, with state and EU financial support, almost 800 fishing vessels with tonnage of around 40 thousand GT were withdrawn, which accounted for almost 1/3 of the total potential of the Danish fleet for 1987.[8] For this reason, reduction of the Danish fleet in the first period of FIFG operation (1994 – 1999) was practically negligible. The total tonnage decreased from 99.3 thousand GT to 99.2 thousand GT.[9] Only vessels smaller than 150 GT were withdrawn, whilst the number and the tonnage of vessels significantly increased in the group over 250 GT (Table 5.2).

Table 5.2. The number of vessels and tonnage of the Danish fishing fleet between 1994 and 1999 (data for the end of the year).

GT groups	1994		1995		1996		1997		1998		1999		1999/1994	
	No	GT	No	GT	No	GT	No	GT	No	GT	No	GT	No	GT
0-24	4 706	24 469	4 592	23 190	4 279	22 140	4 054	20 371	3 844	19 539	3 663	18 311	-22%	-25%
25-49	252	9 796	277	10 959	249	9 885	230	9 128	229	9 115	248	9 568	-2%	-2%
50-99	133	8 494	106	7 249	100	6 835	95	6 369	96	6 423	100	6 640	-25%	-22%
100-149	46	5 853	47	6 048	37	4 615	31	3 679	28	3 309	30	3 570	-35%	-39%
150-249	79	14 657	70	13 628	73	14 634	69	13 839	72	14 521	76	15 360	-4%	5%
250-499	72	24 152	76	25 726	80	27 476	88	30 198	88	30 412	88	30 679	22%	27%
Total	**5 288**	**87 421**	**5 168**	**86 800**	**4 818**	**85 585**	**4 567**	**83 584**	**4 357**	**83 319**	**4 205**	**84 128**	**-20%**	**-4%**
500-999	14	9 815	14	9 743	15	10 279	14	9 480	15	10 104	16	10 806	14%	10%
1000-1999	2	2 111	2	2 111	2	2 111	3	3 161	3	3 161	2	2 066	0%	-2%
2000+	0	0	0	0	0	0	1	2 223	1	2 223	1	2 223	-	-
Total	**5 304**	**99 347**	**5 184**	**98 654**	**4 835**	**97 975**	**4 585**	**98 448**	**4 376**	**98 807**	**4 224**	**99 223**	**-20%**	**0%**

Source: New Cronos Database, Eurostat.

[8] Frost H., Lanters R., Smit J. & Sparre P., "An Appraisal of the Effects of the Decommissioning Scheme in the Case of Denmark and the Netherlands, DIFRES/SUC, 16/95.
[9] Eurostat data. According to data by the Danish Fisheries Department, the tonnage of the Danish fishing fleet in 1994 equalled 112 thousand GT, whilst in 1999 – 108 thousand GT. The differences result from a different methodology for calculating the tonnage in GT and GRT.

Between 1994 and 1999, FIFG allocation for adjustment of the Danish fleet's fishing effort equalled 21.8 million Euro. Together with state co-financing, support for the vessel scrapping programme amounted to 42 million Euro. Financial resources for construction and modernisation were much smaller and together with state co-financing amounted to 27.3 million Euro. With this financial support, 319 vessels with tonnage of 8.8 thousand GT were withdrawn until 2000, which means that almost 100% of available funds were utilised. At the same time, 10 vessels were constructed with the total tonnage of 0.8 thousand GT. Owners of almost 1.5 thousand vessels decided to make use of the opportunity for modernisation of gear and equipment, utilising the available financial assistance (25 million euro) inter alia for replacement of engines, improvement of conditions for fish deck storing.

The average tonnage of Danish fishing vessels that were withdrawn with support from structural funds equalled 30 GT, whilst the average engine power – 170 kW. This shows that these were usually smaller vessels that were withdrawn. Vessels registered at the western and northern coast of Denmark (fishing mainly on the North Sea but also on the Baltic Sea) constituted the largest group among units that were scrapped – they accounted for over 50% of the total number of vessels that were withdrawn in the period 1994 – 1999. The share of vessels registered on Bornholm (such vessels fish almost solely on the Baltic Sea) in the total number of withdrawn units was small and equalled around 10%.

According to the Eurostat data, the total tonnage of Danish fishing vessels decreased between 1994 and 1999 by around 100 GT. The data from the Danish Fisheries Department (FD) reveal that the reduction was larger, as the fishing capacity during that period was reduced by around 4 thousand GT, i.e. 3%. Reduction in terms of power engine amounted to 12% (Eurostat) or 6% (FD). Despite these data differences, it can be undoubtedly stated that the programme for reducing the Danish fishing fleet between 1994 and 1999 did not result in a significant reduction of tonnage and power of vessels, however, it certainly contributed to stabilisation of the situation and prevented from further increase.

SWEDEN

When Sweden was joining the EU (1995), it had 2 545 vessels with the tonnage of 49.9 thousand GT and engine power of 271.4 thousand kW. Reduction levels for fishing capacity of fleets of new EU member states (Sweden and Finland), for the first year of membership, differed for respective segments of the fleet and equalled 6% for trawlers fishing for groundfish and 8% for vessels fishing for flatfish with dredges.[10]

For first two years, since MAGP III was finalised (in December 1996), the Swedish fleet decreased by over 100 vessels, whilst its tonnage remained almost at an unchanged level. Between 1995 and 1999, under the FIFG Sweden provided for 4.5 million Euro for scrapping of fishing vessels (half to be financed from state financial resources) and 13 million Euro for construction and modernisation (out of which 3 million Euro from state resources). With support of these funds, 72 vessels with the total tonnage of 3.3 thousand GT and engine power of 14.9 thousand kW were withdrawn from fishing before 1999, for around 4 million Euro. At the same time, 39 vessels with the total tonnage of 4.1 thousand GT and power of 17.2 thousand kW were constructed with support from the FIFG, which cost 3.9 million Euro.[11] Around 350 vessels made use of the modernisation possibility with FIFG co-financing.

Despite the disadvantageous ratio of withdrawn vessels to constructed ones, according to Eurostat data, the Swedish fishing fleet decreased between 1995 and the end of 1999 by 8% in terms

[10] Council Decision 95/577/EC

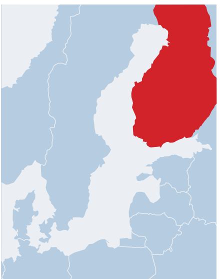
[11] All in all, under the FIFG 1994-1999, Sweden constructed 53 vessels with tonnage of 7.9 thousand GT, allocating for this objective 7.2 million Euro. Construction of some of them was finalised in the next programming period – in 2000 and 2001 (according to the rule n+2).

of tonnage and by 21% in terms of number (Table 5.3). The number and tonnage of vessels were decreased first and foremost in the group below 250 GT. The number and tonnage in the remaining groups increased significantly, mainly due to replacement of smaller units with larger and more modern vessels. The average tonnage of a vessel withdrawn with public financial assistance equalled 46 GT, whilst its engine power – 207 kW. For a newly constructed vessels these parameters were 106 GT and 440 kW respectively. This situation resulted from setting the 8% reduction limit for fishing capacity between 1995 – 1996 only for one segment of vessels, which included smaller units (multi-purpose vessels), whilst the remaining groups were not covered in the fleet reduction programme. Also in the next guidance programme (covering the period between 1997 and 2002) the smallest capacity reduction was defined for the segment which included the largest fishing vessels. This ensued from the fact vessels of that type were directed at fishing for stocks that were the least threatened by overfishing (sprat, herring).

Table 5.3. The number of vessels and tonnage of the Swedish fishing fleet between 1995 and 1999 (data for the end of the year).

GT group	1995		1996		1997		1998		1999		1999/1995	
	No	GT	No	GT	No	GT	No	GT	No	GT	No	GT
0-24	2 144	10 077	2 089	9 786	1 938	9 299	1 831	8 813	1 683	8 265	-22%	-18%
25-49	114	3 997	110	3 816	111	3 878	102	3 516	95	3 302	-17%	-17%
50-99	125	9 233	107	7 784	91	6 560	83	6 022	77	5 503	-38%	-40%
100-149	40	4 852	40	4 841	39	4 824	36	4 515	36	4 507	-10%	-7%
150-249	53	10 513	50	9 978	40	7 905	34	6 833	33	6 569	-38%	-38%
250-499	30	9 679	31	10 089	38	12 582	40	13 396	42	14 209	40%	47%
Total	2 506	48 351	2 427	46 294	2 257	45 048	2 126	43 095	1 966	42 355	-22%	-12%
500-999	6	3 707	6	3 708	6	3 768	7	4 987	8	5 513	33%	49%
Total	2 512	52 058	2 433	50 002	2 263	48 816	2 133	48 082	1 974	47 868	-21%	-8%

Source: New Cronos Database, Eurostat.



FINLAND

According to the European Commission data, the Finnish fishing fleet at the beginning of 1995 comprised of 3 798 vessels with the total tonnage of 22 523 GT and the total power of 213 179 kW.[12] As Finland did not exploit fish stocks threatened with overfishing, none of the segments of the Finnish fleet was covered in the programme for reduction of fishing capacity under the MAGP III. When MAGP IV (1997 – 2001) was introduced, it provided for reduction by 24% and 36% in two groups of vessels, i.e. trawlers fishing for cod and vessels fishing for salmon. Between 1995 and 1999, the Finnish fishing fleet was reduced by over 300 vessels with the total tonnage of 3.1 thousand GT, i.e. by 8% and 13% respectively. As in Sweden, these were smaller units, not exceeding 150 GT, that were reduced (Table 5.4). Around half of the reduced capacity of the fishing fleet was withdrawn with support of public financial assistance.

38 vessels with the total tonnage of 1.4 thousand GT and total power of 7.8 thousand kW were withdrawn in such a manner between 1995 – 1999, which cost 4.3 million Euro (50% FIFG co-financing). This was tantamount to the level of financial assistance planned for this measure. At the same time, construction of 52 vessels with the total tonnage of 760 GT and power 6 thousand kW was financed from public funds for 1.6 million Euro (out of which 0.5 million Euro came from state resources). Over 200 vessels made use of the modernisation fund; 0.8 million Euro was spent on this measure.

A comparison of data on fishing vessels withdrawn and constructed with FIFG support in Finland between 1995 – 1999 shows that the fund contributed to reduction of the fleet solely by 600 GT and less than 500 kW.

[12] Commission Decision 96/73/EC

Table 5.4. The number of vessels and tonnage of the Finnish fishing fleet between 1995 and 1999 (data for the end of the year).

	1995		1996		1997		1998		1999		1999/1995	
	No	GT	No	GT	No	GT	No	GT	No	GT	No	GT
0-24	3 922	13 102	3 849	12 854	3 820	12 700	3 724	12 004	3 618	11 287	-8%	-14%
25-49	102	3 552	95	3 300	91	3 102	84	2 843	78	2 612	-24%	-26%
50-99	56	4 061	50	3 605	47	3 433	44	3 240	41	2 997	-27%	-26%
100-149	17	1 973	16	1 812	17	1 957	16	1 855	16	1 855	-6%	-6%
150-249	6	1 037	6	1 037	10	1 950	9	1 720	7	1 300	17%	25%
250-499	3	921	3	921	4	1 205	4	1 088	3	804	0%	-13%
500-999	0	0	0	0	0	0	0	0	1	644	-	-
Total	4 106	24 646	4 019	23 529	3 989	24 347	3 881	22 750	3 764	21 499	-8%	-13%

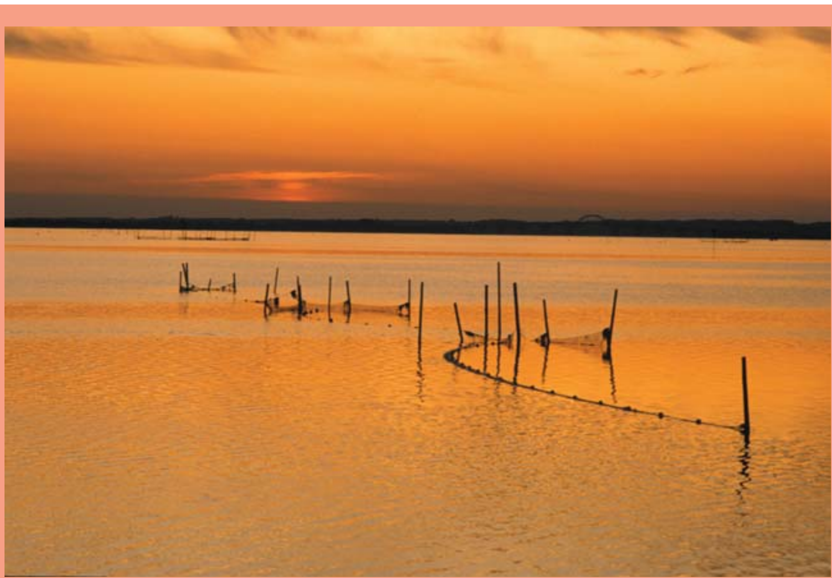
Source: New Cronos Database, Eurostat.

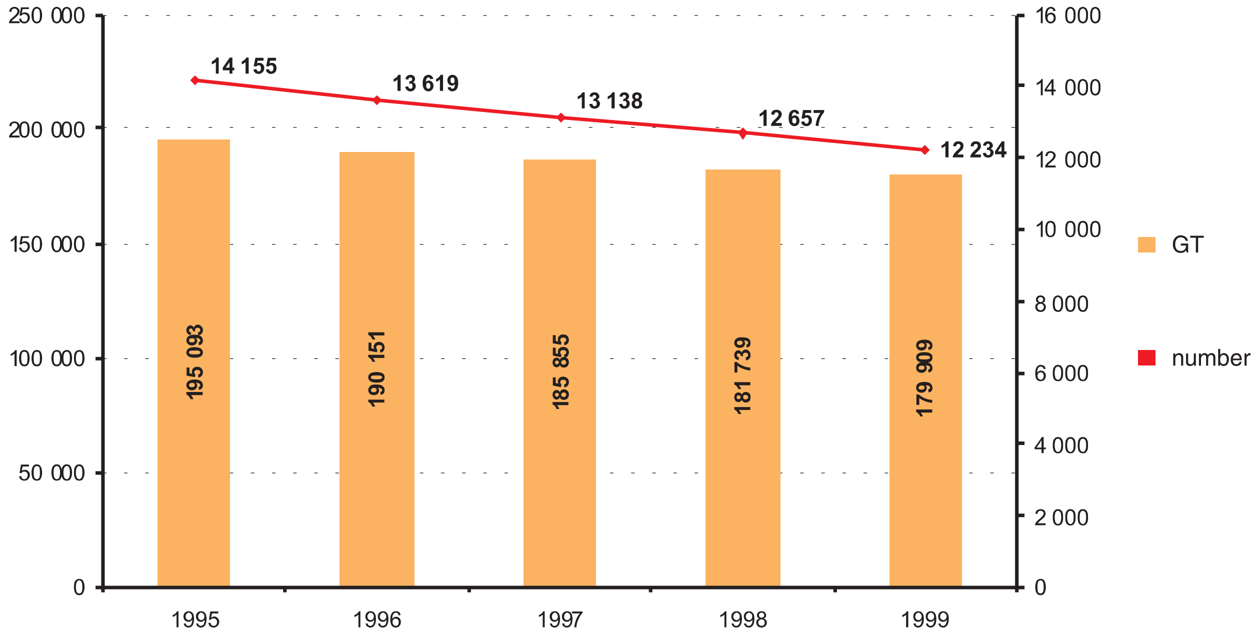
The table 5.5. and the graph 5.1. compare changes in the number and tonnage of vessels in the fleets of the four analysed EU member states (Germany, Denmark, Sweden and Finland) that were fishing on the Baltic Sea. In general, the number of vessels in these countries decreased between 1995 and 1999 by 14%, whilst their tonnage by 6%. When vessels over 500 GT (in principle they do not fish on the Baltic Sea) are excluded from the analysis, the reduction of the tonnage of the Baltic fleet in those countries amounted to less than 14 thousand GT (8%).

Table 5.5. The state of the fishing fleet of EU member states fishing on the Baltic Sea between 1995 and 1999.

	1995		1996		1997		1998		1999		1999/1995	
Class	No	GT	No	GT	No	GT	No	GT	No	GT	No	GT
0-24	12 697	54 289	12 228	52 035	11 779	48 366	11 338	46 215	10 912	43 752	-14%	-19%
25-49	693	25 665	655	24 174	651	23 763	630	22 997	633	22 901	-9%	-11%
50-99	330	23 664	310	21 963	289	20 303	279	19 617	275	19 070	-17%	-19%
100-149	139	17 064	125	15 124	116	13 925	108	13 025	110	13 283	-21%	-22%
150-249	172	33 221	172	33 571	159	30 971	156	30 452	157	30 674	-9%	-8%
250-499	124	41 190	129	43 284	144	48 527	146	49 433	147	50 229	19%	22%
Total	14 155	195 093	13 619	190 151	13 138	185 855	12 657	181 739	12 234	179 909	-14%	-8%
500-999	22	14 794	23	15 331	20	13 248	22	15 091	25	16 963	14%	15%
1000-1999	9	15 120	9	14 982	8	12 284	9	13 881	8	12 720	-11%	-16%
2000+	8	27 276	6	24 406	8	28 801	7	26 629	8	28 801	0%	6%
Total	14 194	252 283	13 657	244 870	13 174	240 188	12 695	237 340	12 275	238 393	-14%	-6%

Source: New Cronos Database, Eurostat.





Graph 5.1. Changes in the tonnage and number of vessels of the German, Danish, Swedish and Finnish fleets between 1995 and 1999 (vessels below 500 GT)

Between 1995 and 1999, with FIFG support, 452 fishing vessels were withdrawn with the total tonnage of 18.3 thousand GT and the total power 71.6 thousand kW. At the same time 142 vessels were constructed with EU assistance, with the total tonnage of 14.1 thousand GT and power 31.9 thousand kW. Balancing of the data reveals that structural funds contributed to reducing the tonnage of the vessels solely by 4.2 thousand GT and the power by 39.7 thousand kW, which accounted for 1.7% of the total tonnage and less than 4% of the power of the fleet in the Baltic countries for 1995 (Table 5.6).

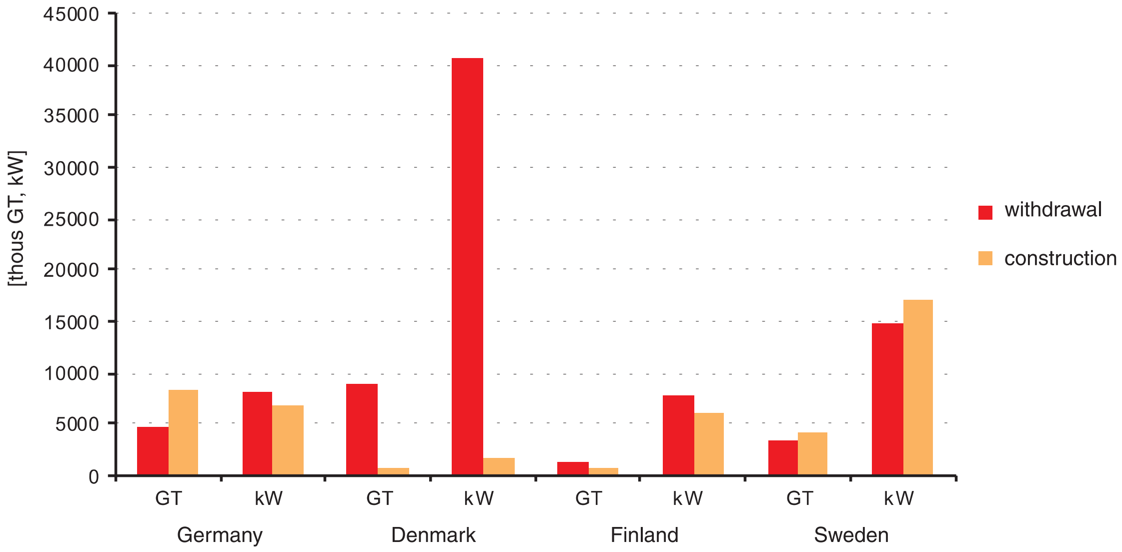
Table 5.6. FIFG results for the period 1995-1999, EU Baltic States.

Data	withdrawal	construction	balance
No of vessels	452	142	-310
GT	18 291	14 102	-4 189
kW	71 585	31 924	-39 661
average kW	158,4	224,8	
average GT	40,5	99,3	
cost (million €)	46 163	19 522	
FIFG co-financing (€)	23 138	14 097	

Source: DG Fisheries and Maritime Affairs, 2005 (not published)

The Graph 5.2 presents a comparison of the tonnage and power of vessels withdrawn and constructed between 1994 and 1999 with FIFG co-financing. Only in Denmark the capacity of withdrawn vessels was clearly larger than that of newly constructed ones. In the remaining countries, except for Germany, where there were more vessels constructed than withdrawn, the surplus of the withdrawn capacity over the constructed one was very small.

It is impossible to identify in detail how much of the scrapped vessels were fishing on the Baltic Sea. Even if we assume that the whole withdrawn fleet was fishing on the Baltic, the extent of the reduction of the fishing capacity should be considered as modest, and as such it could not contribute to lowering the pressure on the Baltic fish resources, especially given the fact that the withdrawn vessels were frequently replaced with larger and more modern ones.



Graph 5.2. The tonnage and power of withdrawn and constructed vessels with EU financial assistance between 1994 and 1999.

5.3. General state of the Baltic fishing fleet

In 1995 EU member states had 70% share in the total capacity of the fleet fishing on the Baltic Sea, which consisted of 16 thousand vessels with the total tonnage of 268 thousand GT. Danish and Swedish fleets were the largest and had respectively 32% and 18% share in the total tonnage of the fleets in the Baltic countries. It should be remembered that some vessels belonging to these countries, as in the case of the German fleet, were fishing not only on the Baltic Sea but also in other fishing regions (e.g. the North Sea).

Between 1994 and 1999 the total tonnage of the fleet from all the Baltic countries decreased by 7%, whilst the number of vessels by 11%. This resulted mainly from the reduction of the fleet in EU member states (by 8%). The tonnage of the remaining countries fishing on the Baltic decreased solely by 4% (Table 5.7).

Table 5.7. The state of the fishing fleet of the Baltic countries between 1995 and 1999, division by countries (vessels below 500 GT)

Country	1995		1999		1999/1995	
	No	GT	No	GT	No	GT
Germany	2 375	35 296	2 300	32 571	-3%	-8%
Denmark	5 168	86 800	4 205	84 128	-19%	-3%
Sweden	2 506	48 351	1 966	42 355	-22%	-12%
Finland	4 106	24 646	3 763	20 855	-8%	-15%
Total -UE	14 155	195 093	12 234	179 909	-14%	-8%
Poland	1 273	29 985	1 459	32 000	15%	7%
Estonia[1]	149	14 985	206	13 760	38%	-8%
Latvia[1]	325	15 718	203	17 400	-38%	11%
Lithuania	140	12 430	135	7 100	-4%	-43%
Total-other	1 887	73 118	2 003	70 260	6%	-4%
Total	16 042	268 211	14 237	250 169	-11%	-7%

Source: New Cronos Database, Eurostat; FAO, Bulletin of fishery statistics. Fishery fleet statistics, Rome, 1998; Economic Performance of selected European Fishing Fleet, Annual Report 2002, own estimation

[1] without fishing boats

In the countries not belonging to the EU the largest increase in tonnage could be observed for Poland and Latvia, respectively by 7% and 11%. The Polish fishing fleet increased mainly by large fishing trawlers longer than 24 m. Also in the Latvian fleet the largest increase occurred for the group of trawlers with the overall length over 20 m.[13] It is highly probable that some of these vessels had been earlier withdrawn under FIFG assistance from Denmark, Sweden and Germany and then sold to Poland and Latvia. Provisions of that time allowed for export of vessels to third countries as one of measures under the scheme for permanent vessel withdrawal.

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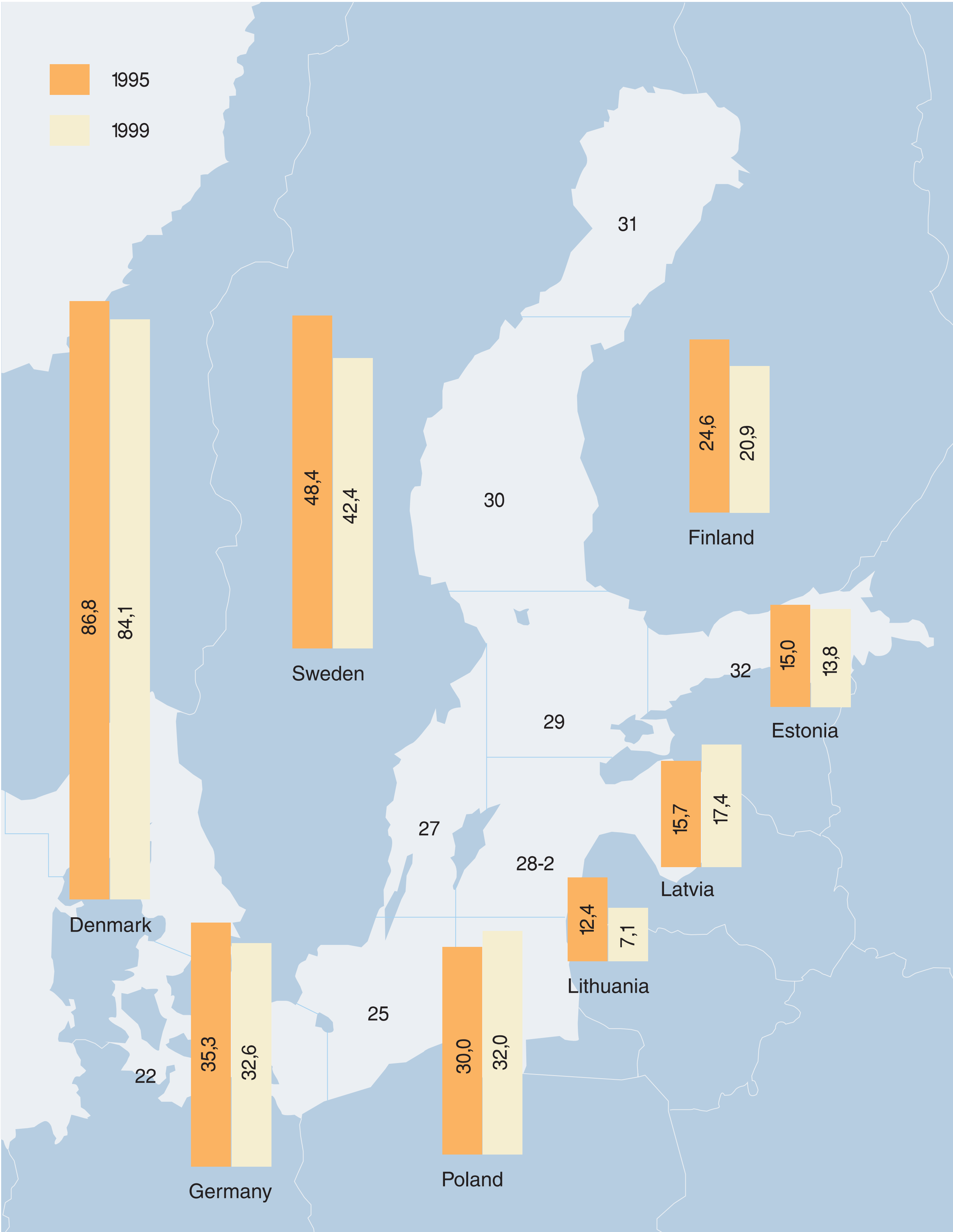
[13] Economic Performance of selected European Fishing Fleet, Annual Report 2002. Economic Assessment of European Fisheries. December 2002.



Source: Own analysis based on the Table 5.7.

Figure 5.1. Changes in the tonnage of the fishing fleet in the Baltic countries between 1995 and 1999 (vessels below 500 GT)

6.1. State of the fishing fleet in the context of structural funds – 'old EU member states'

In the period 2000 – 2006 the fourth multi-annual guidance programme finished to operate (MAGP 1997 – 2002). Due to this programme, the tonnage and engine power of fleets in EU-15 decreased by 107 thousand GT (5.3%) and 929 thousand kW (11.8%) respectively. The reduction objectives provided for in the MAGP IV were fulfilled by almost all EU member states. As already mentioned in the previous section, that did not prove difficult due to a much larger than planned reduction under the former stage of the programme. In consequence, a majority of EU states was in 1997 on a much lower level than the reduction objectives provided for in the MAGP IV. Already on 31.12.1997 the total tonnage of the fleets of the EU member states was almost by 350 thousand GT lower than the tonnage planned for the end of 2002.[14]

In 2003 a new system for fishing capacity management was introduced. It consisted in defining reference levels and adopting the entry/exit regime.

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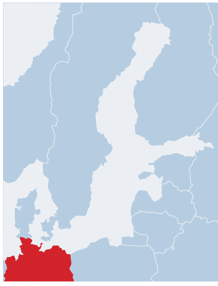
In reality, the reference level froze the state of fishing vessels in the EU member states at the level of MAGP IV objectives, i.e. unfortunately larger by over 450 thousand GT than the actual state of the fleet from the end of 2002. The entry/exit regime was established to prevent any increase in the fishing capacity of the fleet. According to this regime, EU member states were forbidden to register new vessels before other vessels with similar or larger fishing capacity (in GT and kW) had been withdrawn from fishing. If a new vessel was to be constructed with public financial assistance and if its tonnage was between 100 and 400 GT (it was forbidden to subsidise construction of vessels larger than 400 GT) it was necessary to withdraw a vessel or vessels with tonnage by 35% larger than the newly built unit.[15] Moreover, as of 01.01.2005 it became impossible to co-finance construction of new vessels from the FIFG and modernisation investments on vessels were limited only to those that were directly aimed at improvement of safety conditions, fish quality on deck or introduction of more selective fishing methods.

[14] ANNUAL REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT on the results of the multiannual guidance programmes for the fishing fleets at the end of 2002. COM (2003) 508 final.
[15] Council Regulation 2792/1999 and 2369/2002

During the MAGP IV period, the potential of the fishing fleet in the four Baltic countries decreased by 10 thousand GT (4%) and 114 thousand kW (11%). The decrease/increase of the fishing potential in terms of GT varied for respective countries: –4.5% for Germany, +1.3% for Denmark, –9.1% for Sweden and –15,5% for Finland.



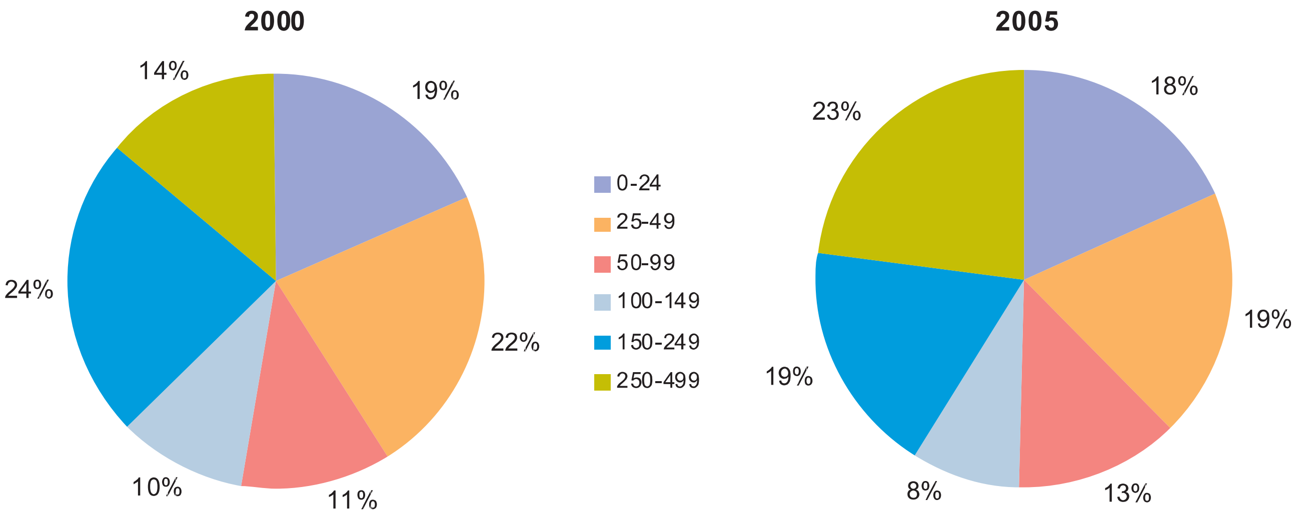
GERMANY

In June 2005, the German fishing fleet comprised of 2 145 fishing vessels with the tonnage of 66.5 thousand GT and power 162 thousand kW. When compared with data for 2000, it decreased by 7% in terms of the number of vessels and their tonnage and by 3% in terms of power. In the group of vessels below 500 GT there was a slight decrease in tonnage and power, by 3% and 2% respectively. This decrease could be observed mainly for small and medium units, below 250 GT. In the group of larger vessels, i.e. 250 – 499 GT, (with the overall length from 30 to 45 m) there was a considerable increase of both the number and the tonnage (Table 6.1). The share of these vessels in the total tonnage of the German fleet <500GT increased from 14% in 2000 to 23% in 2005 (Graph 6.1). The number and tonnage of vessels fishing in distant-water regions (>500 GT) decreased by 15% and 10% respectively.

Table 6.1. The number of vessels and tonnage of the German fishing fleet between 2000 and 2005.

	2000		2001		2002		2003		2004		2005		2005/2000	
Class	No.	GT	No.	GT	No.	GT	No.	GT	No.	GT	No.	GT	No.	GT
0-24	1 960	6 037	1 934	6 028	1 910	5 873	1 895	6 019	1 846	5 854	1 832	5 768	-7%	-4%
25-49	205	7 273	199	7 065	195	6 956	177	6 370	175	6 297	167	5 947	-19%	-18%
50-99	54	3 718	56	3 841	51	3 459	53	3 577	54	3 602	61	4 016	13%	8%
100-149	27	3 261	26	3 146	25	3 025	23	2 833	21	2 598	21	2 598	-22%	-20%
150-249	42	7 610	41	7 366	38	6 794	35	6 194	33	5 831	33	5 830	-21%	-23%
250-499	14	4 537	13	4 271	16	5 299	18	6 259	20	7 146	20	7 146	43%	58%
Total	2 302	32 436	2 269	31 717	2 235	31 406	2 201	31 252	2 149	31 328	2 134	31 305	-7%	-3%
>500	13	39 016	13	39 556	12	37 821	11	34 750	11	35 192	11	35 192	-15%	-10%
Total	2 315	71 452	2 282	71 273	2 247	69 227	2 212	66 002	2 160	66 520	2 145	66 497	-7%	-7%

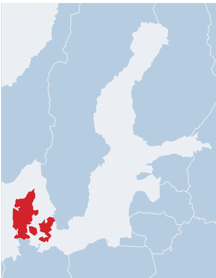
Source: 2000-2004 New Cronos Database, Eurostat, 2005 – Fishing Fleet Register, Fisheries and Maritime Affairs



Graph 6.1. The tonnage structure of the German fleet (vessels < 500 GT)

The German FIFG anticipated 7.9 million Euro for fleet reduction, out of which 6.7 million Euro for scrapping of fishing vessels. Allocation for construction and modernisation of vessels is much larger – 32 million Euro, out of which 16.2 million Euro for construction and 15.8 million Euro for modernisation. Until the end of 2004, only 8 vessels were scrapped with this assistance, with the total tonnage of 330 GT and power slightly over 1 thousand kW. This cost 840 thousand Euro (out of which 430 thousand from the FIFG). At the same time, 3.8 million Euro (2 million from the FIFG) was spent on construction of 28 new fishing vessels (out of which 13 vessels from the funds under the former programming period 1994 – 1999) with tonnage of 400 GT and power of 2.8 thousand kW. Small vessels (with average tonnage of 40 GT) were most frequent in both groups: withdrawn and constructed vessels.

The data presented here show that between 2000 and 2004 the FIFG contributed to reducing the fishing potential of the German fleet to a very small extent. At the same time, the dynamics of utilisation of funds for vessel scrapping does not justify a statement that the number of withdrawn vessels would significantly increase until the end of 2006.



DENMARK

The Danish fishing fleet decreased between 2000 and 2005 by almost 1/5 as regards the number of vessels, but only by 10% as regards tonnage and by 12% as regards power. The tonnage of the largest vessels >500 GT increased considerably – by over 20%. For vessels smaller than 500 GT, the decrease in number and tonnage occurred mainly for the smallest vessels (less than 50 GT) and the largest vessels from the tonnage groups from 150 to 499 GT. The capacity increased considerably in the group of vessels of medium size – from 50 to 99 GT, as both the number and the tonnage of these vessels increased by over 50% (Table 6.2). In consequence, their share in the total tonnage of the Danish fleet increased in 2005 to 15% from 8% in 2000 (Graph 6.2).

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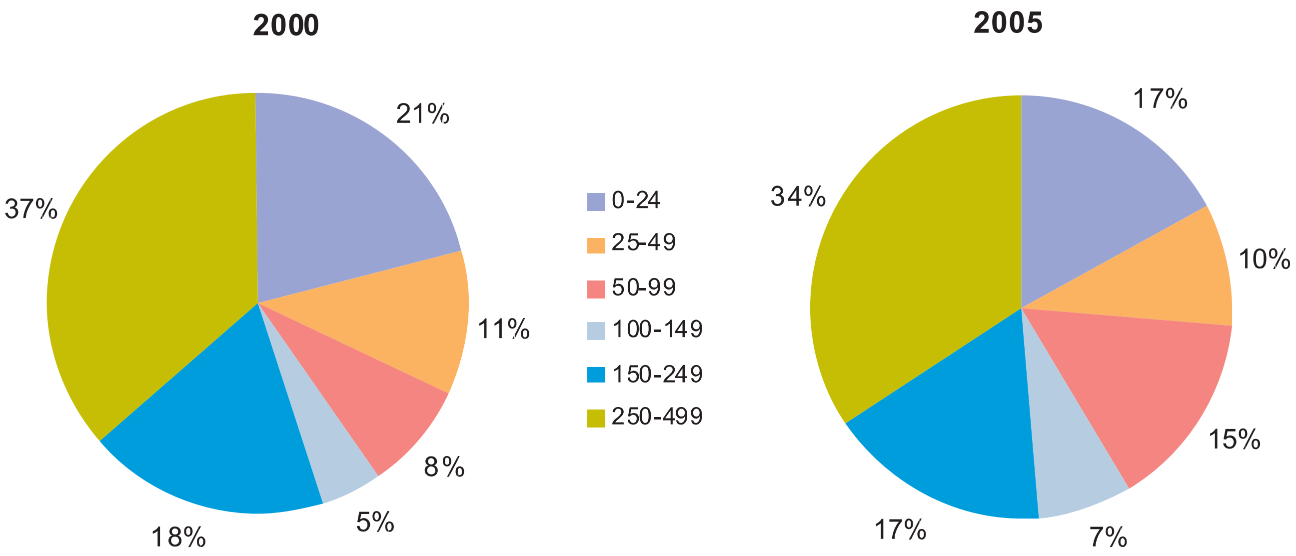
Table 6.2. The number of vessels and tonnage of the Danish fishing fleet between 2000 and 2005.

	2000		2001		2002		2003		2004		2005		2005/2000	
	No.	GT	No.	GT	No.	GT	No.	GT	No.	GT	No.	GT	No.	GT
0-24	3 572	17 916	3 444	17 250	3 270	15 366	3 036	13 494	2 854	12 052	2 812	11 984	-21%	-33%
25-49	248	9 580	254	9 708	220	8 356	193	7 152	198	7 368	186	6 748	-25%	-30%
50-99	104	6 920	109	7 367	116	7 877	137	9 426	149	10 146	160	10 650	54%	54%
100-149	33	3 934	34	4 069	33	4 023	39	4 787	42	5 169	41	5 028	24%	28%
150-249	76	15 568	72	14 739	72	14 783	70	14 451	63	12 886	59	12 046	-22%	-23%
250-499	90	31 101	88	30 434	91	31 529	86	29 714	73	25 575	69	24 313	-23%	-22%
Total	4 123	85 019	4 001	83 567	3 802	81 934	3 561	79 024	3 379	73 196	3 327	70 768	-19%	-17%
500-999	21	17 559	20	17 023	21	17 780	20	17 198	25	21 628	25	21 628	19%	23%
Total	4 144	102 578	4 021	100 590	3 823	99 714	3 581	96 222	3 404	94 824	3 352	92 396	-19%	-10%

Source: 2000-2004 New Cronos Database, Eurostat, 2005 – Fishing Fleet Register, Fisheries and Maritime Affairs



Graph 6.2. The tonnage structure of the Danish fleet (vessels < 500 GT)

Between 2000 and 2005 FIFG supported withdrawal from the Danish fishing fleet of 237 vessels with the total tonnage of around 10 thousand GT and power of 46 thousand kW. Over 80% of the total number of scrapped units were withdrawn in 2002 and 2003. The amount of compensation for vessel owners for withdrawing their vessels equalled 44 million Euro, out of which 22 million Euro from the FIFG. This is much more than the planned allocation for this measure, i.e. 16.8 million Euro.[16] At the same time, FIFG co-financed construction of 54 fishing vessels with the tonnage of 6 thousand GT and power of 14 thousand kW. The cost amounted to 30 million Euro (with 7 million Euro from the FIFG). The general Danish allocation under the FIFG for construction of fishing vessels between 2000 and 2006 equals 30 million Euro and additional 40 million Euro for modernisation.

Between 2000 and 2005, as in the former period of FIFG operation in Denmark, these were usually smaller units that were scrapped (with the average tonnage of around 40 GT). Financing was granted for construction of mostly medium-sized vessels with the average tonnage of over 100 GT. The balance of vessels withdrawn and constructed between 2000 and 2005 was positive, as the withdrawn potential was by 4 thousand GT and 32 thousand kW larger than the newly constructed one. Having

[16] Structural funds for vessel withdrawal that are available for Denmark and other countries fishing on the northern Atlantic were increased due to the possibility that was introduced by the Council Regulation 2370/2002 of additional compensation for vessels affected by fish resources reconstruction plans. This did not relate to vessels fishing on the Baltic Sea.

in mind that the total reduction of the Danish fleet's capacity in the period 2000 – 2005 amounted to 14 thousand GT and 57 thousand kW, it may be stated that financing under the FIFG for withdrawal of vessels has significantly contributed to reducing this capacity.

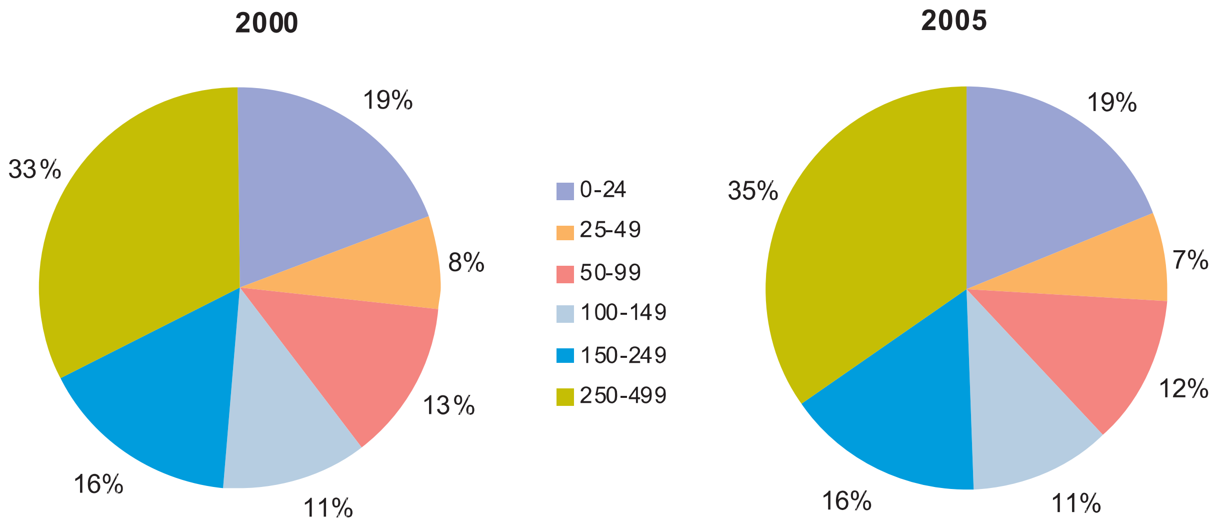
SWEDEN

In the middle of 2005 the Swedish fleet comprised of 1620 vessels with the total tonnage of 44.2 thousand GT and the total power of 218.2 thousand kW. When compared with the year 2000, the number of vessels has decreased by 17%, the tonnage by 10% and the power of installed engines by 9%. The level of capacity reduction was similar for all the groups of vessels, with the exception of trawlers over 500 GT, as for this group the tonnage increased by 8%. In 2005, as in 2000, vessels from 250 to 499 GT constituted the largest group (35%) in the total tonnage of the Swedish fleet (Graph 6.3). This group and the group 150-249 GT include large vessels (over 24 metres long) that specialise in fishing for pelagic fish (sprats and herrings). They fish mainly on the Baltic Sea – 80% of the total weight of fish caught by these vessels come from the Baltic Sea.[17]

Table 6.3. The number of vessels and tonnage of the Swedish fishing fleet between 2000 and 2005.

	2000		2001		2002		2003		2004		2005		2005/2000	
	No	GT	No	GT	No	GT	No	GT	No	GT	No	GT	No	GT
0-24	1 663	8 100	1 585	7 671	1 565	7 566	1 467	7 252	1 355	6 894	1 372	6 932	-17%	-14%
25-49	92	3 185	86	2 935	83	2 857	80	2 796	78	2 717	75	2 570	-18%	-19%
50-99	76	5 392	70	4 906	65	4 555	63	4 394	60	4 177	64	4 418	-16%	-18%
100-149	38	4 736	31	3 878	29	3 592	28	3 468	34	4 217	33	4 098	-13%	-13%
150-249	34	6 761	28	5 565	30	5 868	30	5 880	29	5 605	30	5 790	-12%	-14%
250-499	40	13 664	38	13 419	36	12 684	35	12 443	35	12 766	35	12 727	-13%	-7%
Total	1 943	41 838	1 838	38 374	1 808	37 122	1 703	36 233	1 591	36 376	1 609	36 536	-17%	-13%
500-999	10	7 088	11	7 685	11	7 685	11	7 685	11	7 685	11	7 685	10%	8%
Total	1 953	48 926	1 849	46 059	1 819	44 807	1 714	43 918	1 602	44 061	1 620	44 221	-17%	-10%

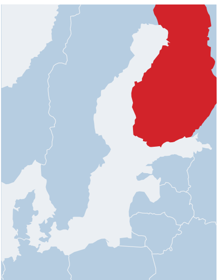
Source: 2000-2004 New Cronos Database, Eurostat, 2005 – Fishing Fleet Register, Fisheries and Maritime Affairs



Graph 6.3. The tonnage structure of the Swedish fleet (vessels < 500 GT

[17] AER 2002, Economic Performance of Selected European Fishing Fleet, 2002.

Under FIFG 2000 – 2006 Sweden allocated for scrapping a rather small amount of funds – around 6 million Euro. However, as in Denmark, due to introduction of exceptional measures for scrapping of vessels affected by programmes for fish stock renovation, these funds were increased. Considerable funds were provided for construction of new vessels (8.3 million Euro) and modernisation (8.7 million Euro). Between 2000 and 2005, 51 vessels were withdrawn in Sweden, with the total tonnage of 4.5 thousand GT. 93 million Euro (out of which 47 million Euro from the FIFG) were paid as compensation for the withdrawn vessels. The average tonnage of withdrawn vessels was twice as large as in the previous programming period (1994 – 1999) and amounted to almost 90 GT. During the same period, structural funds provided support for construction of 32 fishing vessels with the tonnage of 4 thousand tonnes and power of 17 thousand kW. Out of this number as much as 14 vessels with the tonnage of 3.8 thousand GT were constructed with financing from the 1994 – 99 Fund. The average tonnage of vessels constructed in 2000 and 2001 exceeded 200 GT. During next years it was much lower and equalled around 10 GT. This change resulted from a ban introduced by the Swedish administration on financing construction of new vessels with the overall length larger than 18 metres. The pace of vessel withdrawal also decreased, which resulted from introduction of the entry/exit regime in Sweden. In consequence, it was more profitable for owners of fishing vessels to sell the possibility of replacing an old vessel with a new one on a secondary market rather than take the compensation under the FIFG. [18]



FINLAND

In June 2005 the Finnish fleet comprised of 3 283 vessels (out of which 3000 were boats shorter than 12 m) with the tonnage of 17.6 thousand GT and power of 174 thousand kW. When compared with 2000, the number of vessels decreased by 380 (-10%), the tonnage by 2.5 thousand GT (-15%) and the power by 23.5 thousand kW (-12%). The fleet was reduced almost in all segments, with the only exception of the group 250 – 499 GT, where the tonnage and power increased more than threefold (Table 6.4). The largest decrease in the number and tonnage of vessels, almost 50%, occurred in the group 100 – 149 GT, which includes trawlers fishing with pelagic trawls, and in the group of small pelagic trawlers with the tonnage 25 – 49 GT.

Table 6.4. The number of vessels and tonnage of the Finnish fishing fleet between 2000 and 2005.

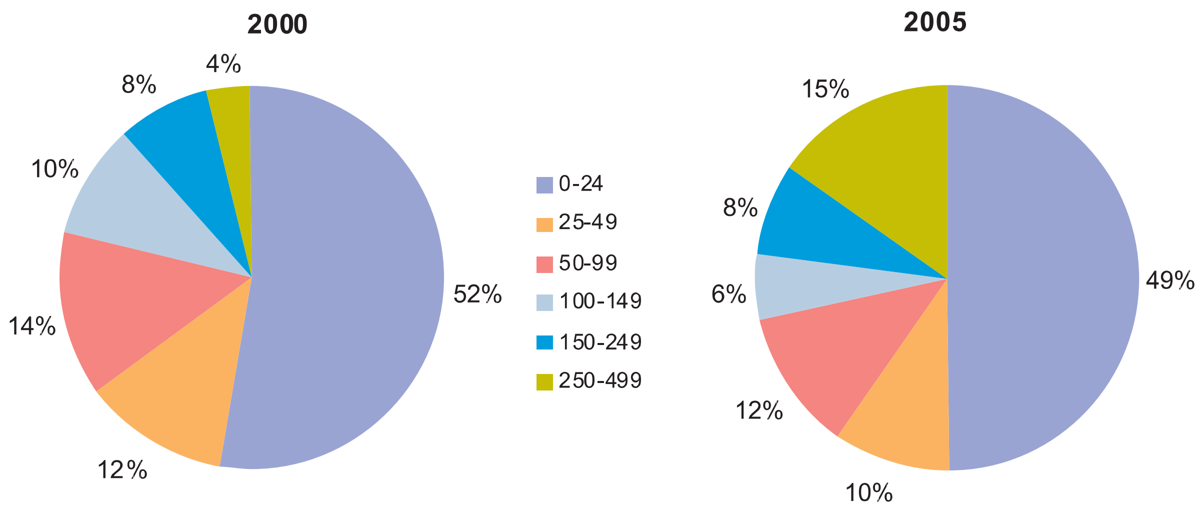
	2000		2001		2002		2003		2004		2005		2005/2000	
	No	GT	No	GT	No	GT	No	GT	No	GT	No	GT	No	GT
0-24	3 523	10 602	3 482	10 143	3 449	9 934	3 374	9 666	3 245	9 130	3 183	8 771	-10%	-17%
25-49	72	2 418	65	2 218	60	2 074	58	2 001	51	1 781	49	1 676	-32%	-31%
50-99	38	2 803	35	2 598	33	2 479	33	2 479	25	1 915	29	2 113	-24%	-25%
100-149	17	1 978	17	2 001	15	1 746	15	1 746	10	1 188	9	1 053	-47%	-47%
150-249	8	1 547	8	1 547	9	1 806	9	1 806	6	1 329	6	1 329	-25%	-14%
250-499	3	804	3	804	4	1 189	4	1 189	7	2 455	7	2 669	133%	232%
500-999	1	644	1	644	1	644	1	644					-	-
Total	**3 662**	**20 796**	**3 611**	**19 955**	**3 571**	**19 872**	**3 494**	**19 531**	**3 344**	**17 798**	**3 283**	**17 610**	**-10%**	**-15%**

Source: 2000-2004 New Cronos Database, Eurostat, 2005 – Fishing Fleet Register, Fisheries and Maritime Affairs

Due to the aforementioned changes, the share of large vessels (250-499 GT) in the total tonnage of the Finnish fleet considerably increased (from 4% to 15%), whilst the share of almost all the remaining groups of vessels decreased (Graph 6.4).

Between 2000 and 2005, public financial assistance contributed to withdrawing of solely 5 Finnish vessels with the tonnage of 0.5 thousand GT and power of 2.2 thousand kW and to construction of 74 vessels with the tonnage of 177 GT and power of 5.5 thousand kW. The average tonnage and power of a withdrawn vessel equalled 100 GT and 435 kW. The same parameters for the newly constructed

[18] Johannesson J., Gustavsson T, Fuelling fishing fleet inefficiency. The development of a Swedish pelagic segment in the context of EU structural support schemes 1995-2002. Fiskeriverket, 2005.



Graph 6.4. The tonnage structure of the Finnish fleet (vessels < 500 GT

units were 2.4 GT and 75 kW respectively, which means that these were mainly small coastal boats. Due to the small capacity of withdrawn and constructed vessels, the cost of public aid amounted only to 1.7 million Euro for scrapping and 1.6 million Euro for construction of new vessels. FIFG share in financing of the two measures equalled 840 thousand Euro and 330 thousand Euro, whilst the planned allocation for 2000 – 2006 provided for 2.5 million Euro (scrapping) and 1 million Euro (construction of new vessels). Small interest in scrapping under the FIFG could have resulted inter alia from introducing the entry/exit regime, due to which a part of the withdrawn capacity (without public assistance) in the group of small vessels was replaced with larger units (over 250 GT).

Between 2000 – 2005, the fishing fleet of the 4 old EU member states that were fishing on the Baltic Sea was reduced by 14% in terms of quantity and by 9% in terms of tonnage. As far as vessels <500GT are concerned, the extent of tonnage reduction was a bit higher and amounted to 13%. In absolute numbers, the tonnage of vessels, when compared to the tonnage from 2000, decreased by 23 thousand GT, whilst their engine power by 95 thousand kW.

Table 6.5. The state of the fishing fleet of EU member states fishing on the Baltic Sea between 2000 and 2005.

	2000		2001		2002		2003		2004		2005		2005/2000	
Class	No.	GT	No.	GT	No.	GT	No.	GT	No.	GT	No.	GT	No.	GT
0-24	10 718	42 655	10 445	41 092	10 194	38 739	9 772	36 431	9 300	33 930	9 199	33 455	-14%	-22%
25-49	617	22 456	604	21 926	558	20 243	508	18 319	502	18 163	477	16 941	-23%	-25%
50-99	272	18 833	270	18 712	265	18 370	286	19 876	288	19 840	314	21 197	15%	13%
100-149	115	13 909	108	13 094	102	12 386	105	12 834	107	13 172	104	12 778	-10%	-8%
150-249	160	31 486	149	29 217	149	29 251	144	28 331	131	25 651	128	24 994	-20%	-21%
250-499	147	50 106	142	48 928	147	50 701	143	49 605	135	47 942	131	46 855	-11%	-6%
Total	12 029	179 445	11 718	172 969	11 415	169 690	10 958	165 396	10 463	158 698	10 353	156 219	-14%	-13%
>500	45	64 307	45	64 908	45	63 930	43	60 277	47	64 505	47	64 505	4%	0%
Total	12 074	243 752	11 763	237 877	11 460	233 620	11 001	225 673	10 510	223 203	10 400	220 724	-14%	-9%

Source: 2000-2004 New Cronos Database, Eurostat, 2005 – Fishing Fleet Register, Fisheries and Maritime Affairs

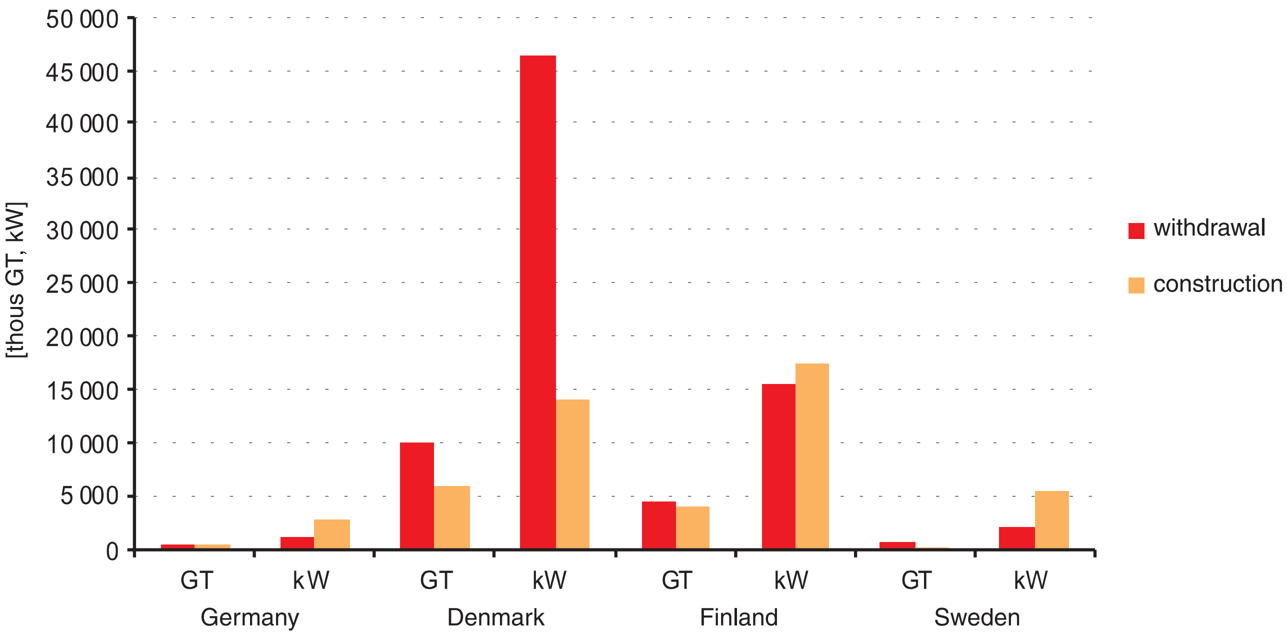
As in the previous FIFG programming period (1994 – 1999), the largest reduction in fishing capacity due to scrapping of vessels occurred in Denmark, where vessels with the total tonnage of around 10 thousand GT and the total power of over 45 thousand kW were withdrawn. When compared with the total capacity of the Danish fleet from 2000, this gives a reduction of 10% in terms of tonnage and of 12% in terms of power of all the vessels below 500 GT. In the remaining countries this reduction was considerably lower (Graph 6.5).

The data presented in the table 6.6 show that the tonnage and power of vessels withdrawn with support of public funds were by 4.8 thousand GT and 25.3 thousand kW larger than that of newly constructed vessels. A comparison with the total reduction that was achieved between 2000 and 2005 (23 thousand GT and 95 thousand kW) reveals that the FIFG only to a small extent contributed to reducing the fishing capacity (by 20% and 27%) and that a majority of vessels were withdrawn without support of public funds. To a certain extent this resulted from the aforementioned entry/exit regime, which made it impossible to register new vessels without prior withdrawal of a similar vessel, whilst for units larger than 100GT of a vessel with a 35% larger tonnage. On the other hand, poor state of resources, low quotas and low or zero profitability of fishing forced those owners of vessels that for various reasons could not make use of public aid (e.g. due to failing to fulfil requirements specified in EU regulations) to withdraw from fishing without any compensation whatsoever.

Table 6.6. FIFG results for the period 2000-2005 (Germany, Denmark, Sweden, Finland)

Data	withdrawal	construction	balance
No of vessels	301	188	-113
GT	15 318	10 512	-4 805
kW	65 131	39 826	-25 305
average kW	50,9	55,9	
average GT	216,4	211,8	
cost (million €)	139 764	58 143	
FIFG co-financing (€)	69 908	15 161	

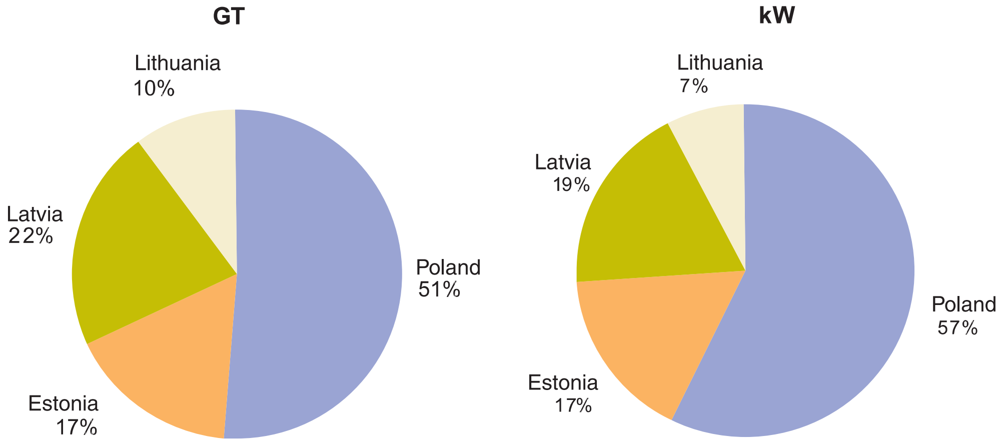
Sources: Fisheries and Maritime Affairs, 2005 (unpublished)



Graph 6.5. The tonnage and power of withdrawn and constructed vessels with EU financial assistance between 2000 and 2005.

6.2. State of the fishing fleet in the context of structural funds - "new EU member states"

In May 2004, the EU enlarged by 10 new member states. Four of the new member states are fishing on the Baltic Sea – Poland, Lithuania, Latvia and Estonia. When these countries joined the EU, the Community's fishing fleet increased by around 3.5 thousand fishing vessels with the tonnage of almost 190 thousand GT and the power of around 360 thousand kW, out of which vessels fishing on the Baltic Sea (below 500 GT) accounted for 72 thousand GT and 243 thousand kW. This was tantamount to around 30% of the total tonnage and 24% of the power of the EU fleet fishing on the Baltic Sea in 2004. Among the 'new EU countries', Poland had by far the largest fleet (over 50% of the tonnage and power), the share of the remaining countries was much lower and amounted to 10% - 22% (Graph 6.6).



Graph 6.6. The tonnage and power of the Baltic fleet (<500 GT) of the new EU states, 2004

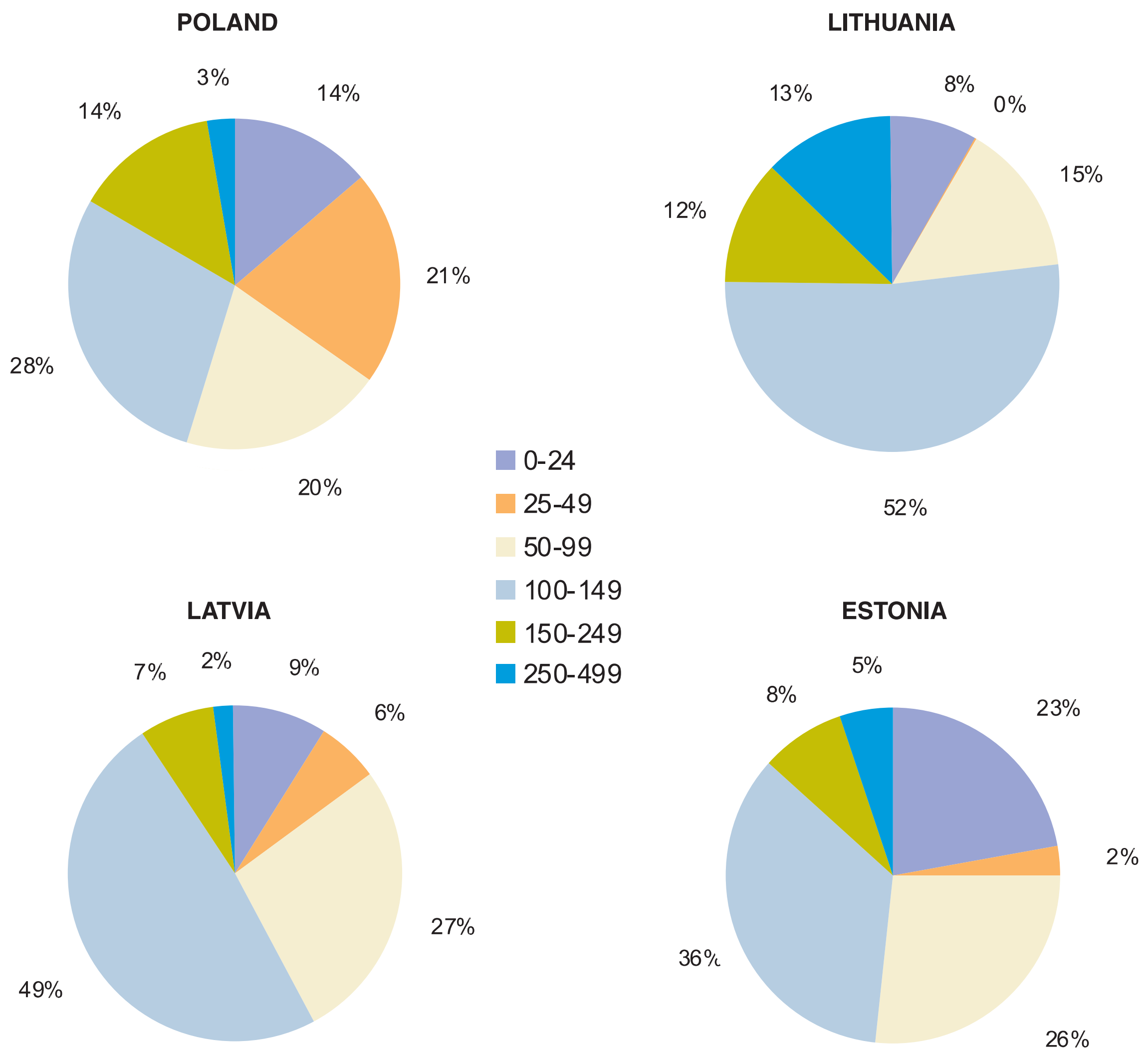
The table 6.7 presents data on the number, tonnage and power of the fishing vessels in 'new EU member states' between 2000 and 2005. Until 2004 the capacity of the fishing fleet in those countries had been steadily increasing, both in terms of tonnage and in terms of power of installed engines. A visible increase in tonnage and in power occurred between 2002 and 2004, it resulted, however, rather from supplementing missing information into fishing vessels registers, which was required prior to the EU accession, than from the actual increase in the number of vessels. The changes introduced related mainly to small boats that had not been earlier accounted for in statistical data.

Table 6.7. The state of the Baltic fishing fleet (<500GT) of the new EU member states in the period 2000-2005.

	2000			2001			2002		
Country	No.	GT	KW	No.	GT	KW	No.	GT	KW
Poland	1 391	32.8	132	1 405	33.3	132.8	1 413	34.3	135.9
Estonia	152	10	26.1	142	9.6	25	136	9.3	24
Latvia	202	17	36.9	192	15.9	34.6	191	15.7	34.6
Lithuania	135	7.1	14.2	133	6.5	14.1	131	6.7	14.2
Total	1 880	66.9	209.2	1 872	65.3	206.5	1 871	66	208.7
	2003			2004			2005		
Country	No.	GT	KW	No.	GT	KW	No.	GT	KW
Poland	1 400	37.2	136.9	1 281	37	138.2	1 234	30.3	118.2
Estonia	128	9.1	23.6	1 033	12	41.4	1 027	11.5	40.3
Latvia	191	15.7	34.6	922	16	45.2	920	15.4	43.5
Lithuania	132	7.3	14.7	262	7.2	17.9	262	6.5	16.6
Total	1 851	69.3	209.8	3 498	72.3	242.7	3 443	63.7	218.5

Source: New Cronos Database, Eurostat; FAO, Bulletin of fishery statistics. Fishery fleet statistics, Rome, 1998; Economic Performance of selected European Fishing Fleet, Annual Report 2002. Fishing Fleet Register, Fisheries and Maritime Affairs, own estimation if lack of appropriate data.

In 2005, fishing vessels with the tonnage from 100 to 149 GT had a dominating position in the tonnage of fleets of all the four new EU member states. Trawlers with the overall length over 24 metres fishing by means of bottom and pelagic trawls accounted for a greater part of this group of vessels. For Lithuania and Latvia the share of these vessels in the total tonnage exceeded 50%, for Poland – 28% and for Estonia – 36% (Graph 6.7).



Graph 6.7. The tonnage structure of the fleets in the new EU states in 2005.

As in the case of 'old EU states', fishing boats with the overall length shorter than 12 metres had a dominating share in the total number of vessels in the fishing fleets of new member states. In 2005, 2.8 thousand of fishing boats were registered in the new EU member states, which accounted for over 80% of the total number of vessels in those countries, but only for 14% of the total tonnage and 31% of the total power of the fishing fleet.

Between 2004 and 2005 the state of the fleet of the new EU countries decreased by 55 vessels with the tonnage of 9 thousand GT and power of 24 thousand kW, which should be directly connected with initiating the scrapping programme under the FIFG. The reduction was the largest in the Polish fishing fleet, where tonnage decreased by 7 thousand GT (-18%) whilst power by 20 thousand kW (-15%). The Lithuanian fleet decreased by 0.7 thousand GT (-10%) in terms of tonnage and by 1.3 thousand kW (-7%) in terms of power. The tonnage of the Estonian and Latvian fleets decreased by 600 GT, i.e. by 5% and 4%.

Table 6.8. The tonnage structure of fishing fleets in the new EU member states in 2005.

GT Class	Poland		Lithuania		Latvia		Estonia		Total	
	No.	GT	No.	GT	No.	GT	No.	GT	No.	GT
0-24	897	4 189	213	544	757	1 401	937	2 589	2 804	8 723
25-49	175	6 323	1	25	33	933	10	278	219	7 559
50-99	71	6 092	13	949	56	4 191	39	3 023	179	14 255
100-149	64	8 693	29	3 377	67	7 490	34	4 039	194	23 599
150-249	24	4 255	4	787	6	1 112	5	951	39	7 105
250-499	3	768	2	835	1	296	2	570	8	2 469
Total	1 234	30 320	262	6 517	920	15 422	1 027	11 450	3 443	63 710

Source: Fishing Fleet Register, Fisheries and Maritime Affairs,2005

The table 6.9 presents data on the number, tonnage and power of vessels submitted for scrapping the in new member states in 2004 and 2005. The table accounts for both vessels that have already been withdrawn and vessels that in future will be destroyed (not deleted from the register yet). Therefore, the number of vessels is larger than it would result from changes presented in the table 6.7.

Vessels registered in Poland account for over 70% of the withdrawn fishing potential in the new member states. Over 20% of the Baltic fleet's tonnage was withdrawn or submitted for withdrawal in Poland.

In the Latvian fleet, over 60 vessels with the tonnage of 4 thousand GT and power of 10 thousand kW were destined for scrapping, which is tantamount to over 20% of the fleet's 2004 capacity. Both in Poland and in Latvia the number of withdrawn vessels considerably exceeded the planned reduction level already in the first year of membership. The reduction level was set for Poland at 10 thousand GT and 30 thousand kW, whilst for Latvia at 2 thousand GT and 4.5 thousand kW.[19]

Table 6.9. The number, tonnage and power of vessels to be withdrawn under the FIFG

Country	Number		GT		kW		Total		
	2004	2005	2004	2005	2004	2005	No.	GT	kW
Poland	180	93	8 966	7 154	28 567	15 373	273	16 119	43 940
Lithuania	11	9	826	750	1 712	1 392	20	1 576	3 104
Latvia	46	18	2 872	1 322	6 565	3 356	64	4 194	9 921
Total	237	120	12 664	9 225	36 844	20 121	357	21 889	56 965

Source: Fisheries and Maritime Affairs, Ministry of Agriculture and Rural Development, Warsaw (unpublished data)

The cost so far of withdrawing of Polish vessels amounted to 58 million Euro (out of which 44 million Euro from the FIFG). The overall allocation for this measure has been established at 111 million Euro, with FIFG contribution of 84 million Euro.[20] The cost of compensation for withdrawal of Latvian vessels amounted to 17.8 million Euro (with 14.2 million Euro from the FIFG), which significantly exceeds the allocation planned by the Latvian administration (9.3 million Euro, out of which 7.4 million Euro from the FIFG). Estonia has planned to withdraw with FIFG support only 3 vessels with the tonnage of 1 thousand GT and power of 550 thousand kW, spending on this 2.5 million Euro.[21]

According to the European Commission data, none of the new member states made use of resources for construction of fishing vessels, which was possible only until the end of 2004.

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[19] Latvian Programme Complement, 2004. Riga

[20] Sectoral Operational Programme – Fisheries and Fish Processing 2004 – 2006. Programme Complement. Warsaw 2004

[21] Estonian National Development Plan for the Implementation of the EU Structural Funds Single Programming Document 2004–2006 Programme Complement, 2004.[29] Dane Eurostat. Według danych duńskiego Departamentu Rybołówstwa tonaż floty rybackiej Danii wynosił w 1994 r. – 112 tys. GT, a w 1999 r. – 108 tys. GT. Występujące różnice wynikają z odmiennej metodologii obliczania tonażu w GT i GRT.

6.3. General state of the Baltic fishing fleet

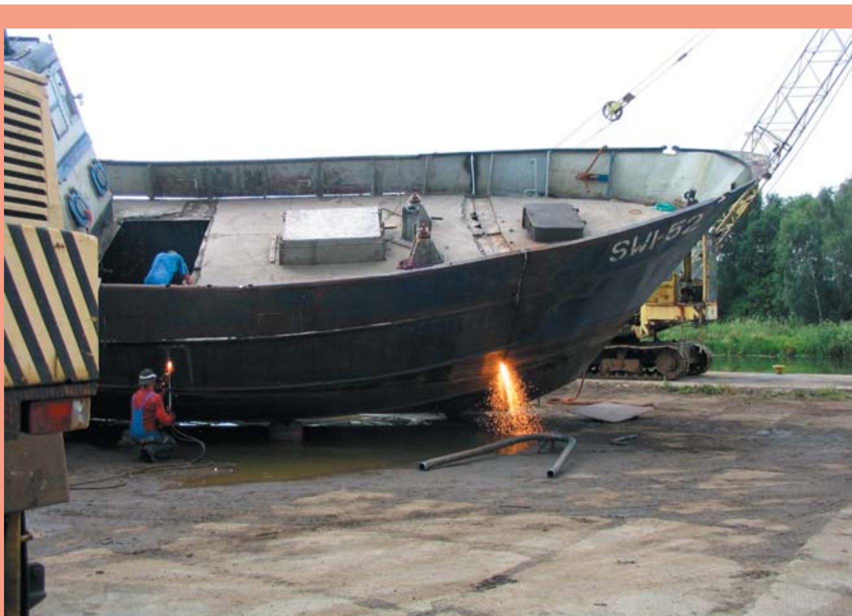
Between 2000 and 2005 the capacity of the Baltic fleet (without Russia) decreased by around 10% in terms of tonnage and engine capacity. A much larger reduction was achieved in the 'old EU member states', where the tonnage and power decreased by 12 – 13%. In the new EU member states the tonnage of vessels decreased by 5%, whilst the power increased by 4% (Table 6.10). As it has been already stated, the increase resulted first and foremost from supplementing missing information to state registers of fishing vessels made by the new member states prior to the EU enlargement and related mainly to small fishing boats. There is no information on operations of these vessels, however, to a large extent these may be vessels that fish seasonally (or that do not fish at all), due to which their significance in the fishing capacity is small. The share of small fishing boats (up to 25 GT) in the total number of Baltic fishing vessels amounted to as much as 87%, but in terms of tonnage only to 19%.

Table 6.10. The state of fishing fleets in the Baltic countries between 2000 and 2005, division by states (vessels smaller than 500 GT).

		2000			2005			2005/2000		
EU	Country	No.	GT	KW	No.	GT	KW	No.	GT	KW
EU-"old"	Germany	2 302	32 436	130 364	2 134	31 305	128 392	-7%	-3%	-2%
	Denmark	4 123	85 019	342 488	3 327	70 768	285 167	-19%	-17%	-17%
	Sweden	1 943	41 838	217 984	1 609	36 536	193 746	-17%	-13%	-11%
	Finland	3 661	20 152	195 059	3 283	17 610	174 016	-10%	-13%	-11%
EU-"old" Total		**12 029**	**179 445**	**885 895**	**10 353**	**156 219**	**781 321**	**-14%**	**-13%**	**-12%**
EU-"new"	Poland	1 391	32 800	132 000	1 234	30 320	118 161	-11%	-8%	-10%
	Estonia	152	10 000	26 100	1 027	11 450	40 262	.	15%	54%
	Latvia	202	17 000	36 900	920	15 422	43 484	.	-9%	18%
	Lithuania	135	7 100	14 200	262	6 517	16 585	.	-8%	17%
EU-"new" Total		**1 880**	**66 900**	**209 200**	**3 443**	**63 710**	**218 492**	**.**	**-5%**	**4%**
Total		**13 909**	**246 345**	**1 095 095**	**13 796**	**219 929**	**999 813**	**.**	**-11%**	**-9%**

Source: New Cronos Database, Eurostat; FAO, Bulletin of fishery statistics. Fishery fleet statistics, Rome, 1998; Economic Performance of selected European Fishing Fleet, Annual Report 2002. Fishing Fleet Register, Fisheries and Maritime Affairs

There is no detailed statistical data on the Russian Baltic fleet. According to the IBSFC data, in 2005 the fleet of Russian vessels authorised to fish for cod on the Baltic Sea comprised of 59 units (in 2003 – 56 vessels), which compared to the remaining countries that fish on the Baltic Sea constitutes a small number.



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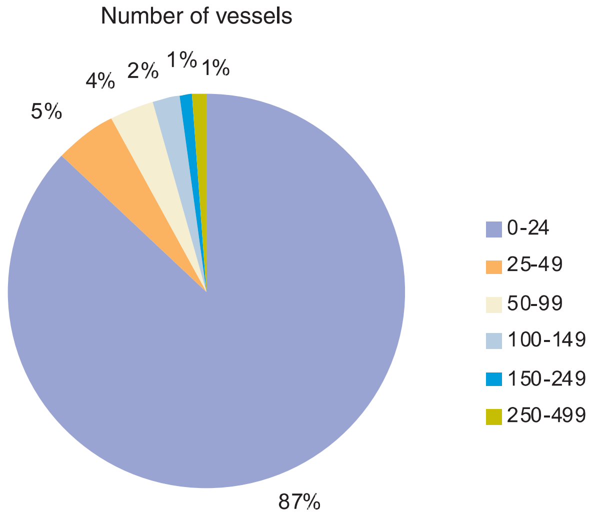
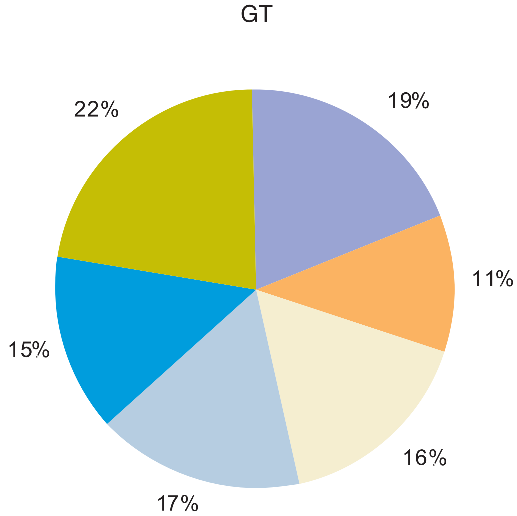
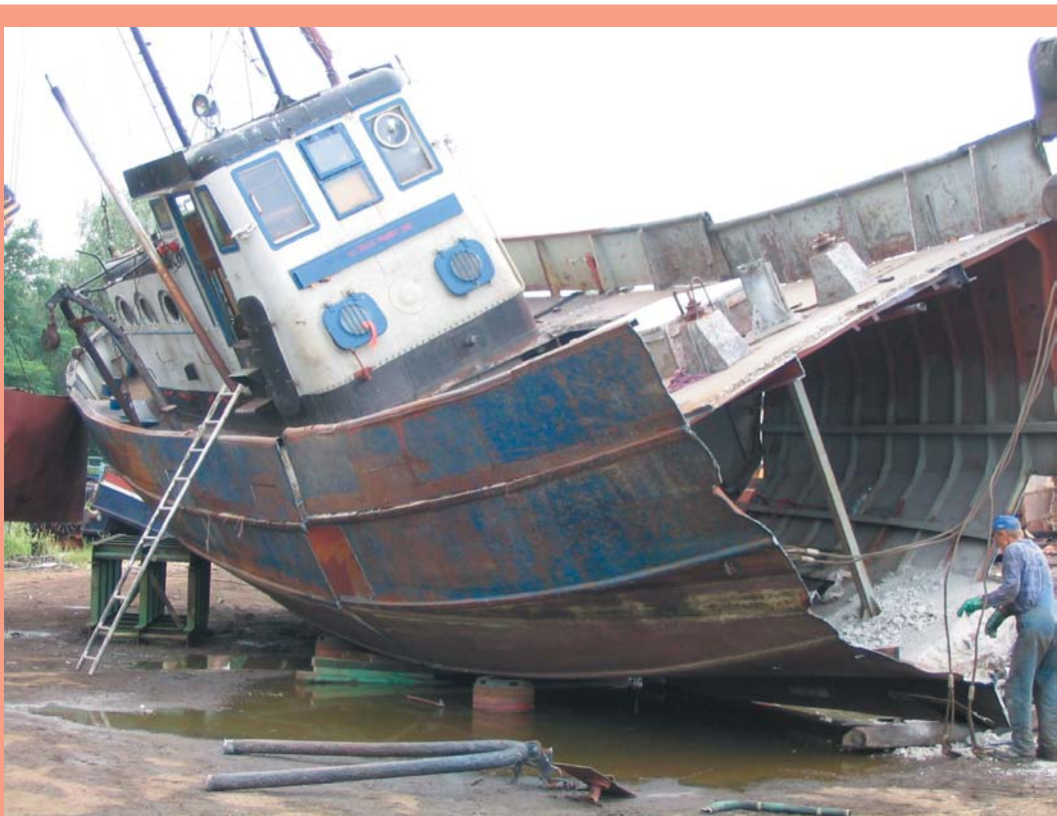




Graph 6.8. The quantitative and tonnage structure of the Baltic fleet in 2005, division by tonnage groups.

The Graph 6.1 presents changes in the tonnage of the fishing fleets of the remaining countries fishing on the Baltic Sea between 2000 and 2005.



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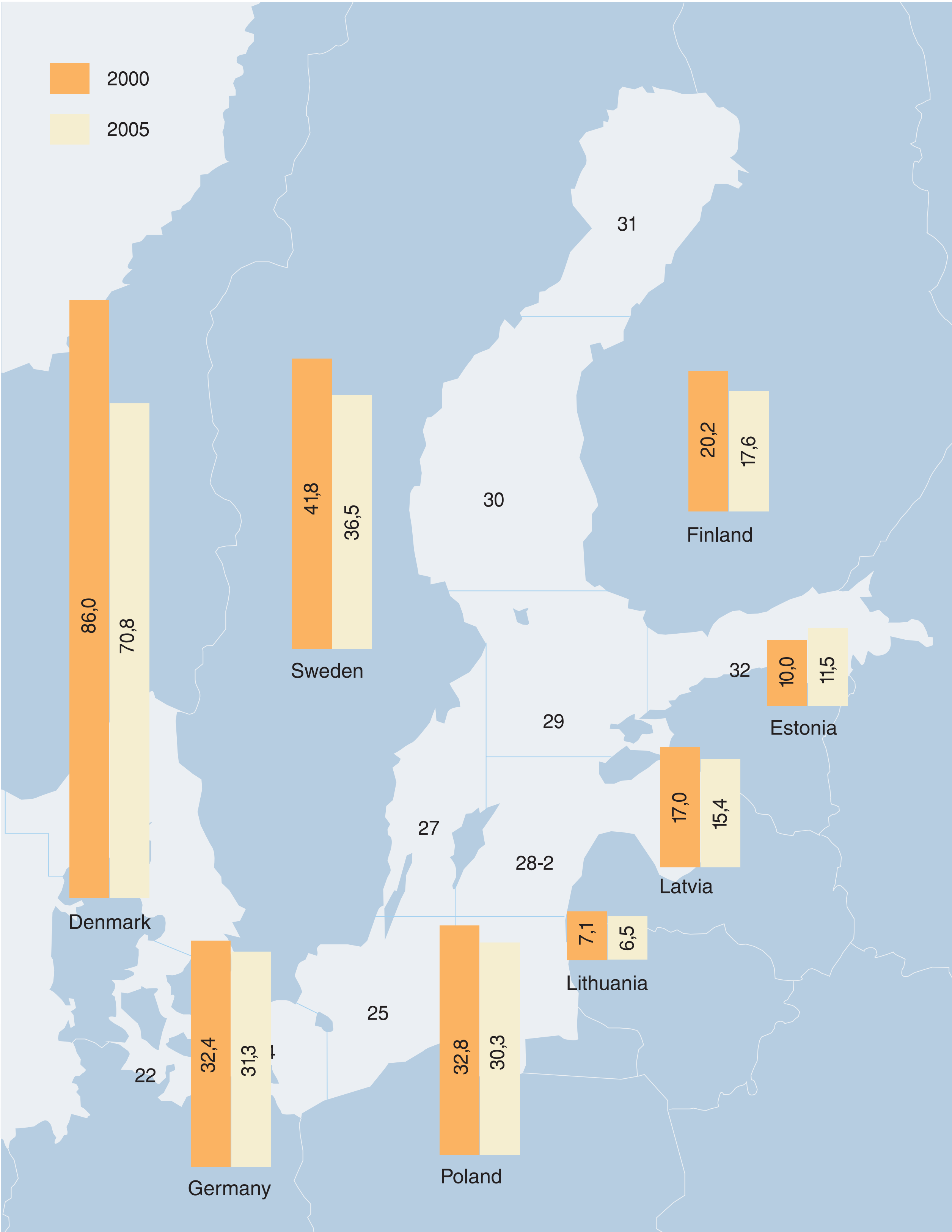


Source: Own analysis based on data from the Table 6.10.

Figure 6.1. Changes in the tonnage of the fishing fleet in the Baltic countries between 2000 and 2005 (vessels below 500 GT)

7 State of resources of basic Baltic fish stocks

Prof Jan Horbowy

Specification of biomass dynamics for fish stocks and forecasting its changes constitute basic elements indispensable for rational fish resources management, including estimation of allowable catch volume.

Fish stock dynamics can be estimated by means of:

– direct methods (experimental), usually applied during research cruises (e.g. stock biomass assessment through hydroacoustic estimates, through standard research hauls, through examination of the number of eggs),

– mathematical methods, i.e. models that assess fish biomass based on biological characteristics of stocks, indices of stock size calculated by means of experimental methods and information on fishing and exploitation statistics.

Currently, mathematical methods are judged as the most credible approach for stock assessment – direct methods provide relative estimates of stock size and their results are frequently used as data for mathematical methods.

Since the beginning of 1980s, more and more attention has been put to interspecies interactions and their impact on biomass dynamics. Such interactions are of particular importance if stock exploitation is high. In such a situation biological balance in a particular ecosystem may be disturbed and interspecies interactions increase to such an extent that excluding them from simulations may lead to large errors in biomass dynamics estimated by assessment models. To address this issue, multispecies models that account for interactions between fish species have been developed.

Baltic fish resources are currently assessed by means of both VPA-type methods (Gulland, 1965; Pope, 1972; Shepherd, 1999) as well as 'integrated' methods (e.g. Patterson, 1998). Moreover multispecies models are applied (e.g. Helgason and Gislason, 1979; Horbowy, 1996). Baltic fish stocks are well suited for such models. This results from a relatively simple structure of trophic levels when compared with other seas (this, however, does not imply that the Baltic ecosystem is fully known and understood). For main exploited species (cod, herring and sprat) interspecies interactions consist mainly in cod preying on fish from the Clupeidae family and in potential impact of the Clupeidae fish on cod growth rate.

The section below presents dynamics of the Baltic cod, herring and sprat stocks and analyses information on harvesting dynamics, spawning stock biomass, stock recruitment and intensity of exploitation. The calculations were conducted under international cooperation within the International Council for Exploration of the Sea (ICES, 2005).

The following section compares the state of stocks to the biological reference points, which were defined by the ICES based on the precautionary approach. The precautionary approach was adopted during the UN Conference on Environment and Development in Rio de Janeiro in 1992. It is based on the assumption that the fact that our knowledge on exploited stocks is incomplete should be accounted for in resource management. In practice this frequently translates into verification of resource assessment results in order to account for a sampling error in biostatistical data and errors inherent for applied models.

As a result, four biological reference points are usually established for stocks. The first two points are 'limit reference points', as they define limits for stock exploitation. In the ICES terminology they are marked with lim and are defined in the following manner:

– B_{lim} stands for such a spawning stock biomass below which the biomass of a particular stock should not decrease due to exploitation,

– F_{lim} stands for such a fishing mortality that should not be exceeded in stock exploitation.

If values for both points and stock biomass and fishing mortality were estimated correctly, they would be sufficient for specifying the state of stocks and establishing principles for rational exploitation. However, values calculated for the two points as well as for current biomasses and fishing mortality are always distorted by certain errors, which result not only from a sampling error in collected data but also from the fact that models applied for calculations constitute only an approximation of the complex processes that determine fish resources dynamics.

Therefore, two additional points have to be defined in order to account for the errors:

– $B_{pa} = B_{lim}$ + potential error, resource management should be conducted in such a manner that our biomass estimates are not lower than B_{pa},

– $F_{pa} = F_{lim}$ - potential error, resource management should be conducted in such a manner that our fishing mortality estimates are not higher than F_{pa}.

Therefore, the two aforementioned points are defined in such a way that if a particular stock and its exploitation do not exceed these points, it is highly likely that the spawning stock biomass (SSB) is larger than B_{lim}, whilst its fishing mortality is lower than F_{lim}. If such conditions are fulfilled it is considered that a particular stock has full reproductive capacity and that it is harvested sustainably.

According to the precautionary approach, it is recommended that intensity of exploitation or fishing quotas for respective stocks should be (and usually are) more restrictive than recommendations from years prior to introduction of the precautionary principle. Recommendations under the precautionary approach account for a possibility of overestimation of resources and stock reproduction potential as well as underestimation of intensity of exploitation, as otherwise fishing quotas could be set at a too high level, which could, in turn, lead to overfishing of a particular stock. The table below presents a classification of the state of stocks according to the aforementioned four biological reference points.

Table 7.1.

Spawning stock biomass (SSB) and fishing mortality (F) in relation to biological reference points	Specification of the stock's state and exploitation
$SSB > B_{pa}$	Full reproductive capacity
$B_{pa} > SSB > B_{lim}$	Risk of reduced reproductive capacity
$SSB < B_{lim}$	Reduced reproductive capacity
$F < F_{pa}$	Harvested sustainably
$F_{pa} < F < F_{lim}$	Risk of unsustainable harvesting
$F > F_{lim}$	Harvested unsustainably

Estimates of biological reference points may change along with changes in fish stocks and their environment as well as due to development of human knowledge on dynamics of the analysed resources.

7.1. Western Baltic cod (Sub-divisions 22-24)

Catch

An average catch volume between 1970 and 2004 equalled 37 thousand tonnes (Graph 7.1). The highest catch occurred in the first fifteen years of the analysed period – 47 thousand tonnes on average. In the second half of the 1980s and the first half of the 1990s the catch decreased to 17 – 30 thousand tonnes, and next it increased to 50 thousand tonnes in 1996. Since that time, the catch was systematically decreasing to reach 21 thousand tonnes in 2004.

Denmark had the highest share in the catch – 57% on average, next were Germany – 32% and Sweden – 10%. The remaining countries, including Poland, caught less than 1% of the total catch from the stock. On average, the highest catch occurred in the Sub-division 22 (54%). The average catch in the Sub-division 24 was lower (41%), whilst the share of the Sub-division 23 in the catches was low (5%). Before the beginning of the 1980s, the catch in the Sub-division 22 had been twice as high as in the Sub-division 24, but in the following years harvesting in the two sub-divisions was on a similar level.

Stock dynamics and catch forecast

The average spawning stock biomass during the analysed period equalled 33 thousand tonnes. The biomass decreased from around 45 thousand tonnes between 1970 and 1986 to around 25 thousand tonnes in the following years (Graph 7.1). The highest biomass (almost 60 thousand tonnes) was observed in 1980, the lowest (around 9 thousand tonnes) in 1992, whilst in 2005 the biomass has been estimated at 16 thousand tonnes. During last 10 years the biomass has been decreasing.

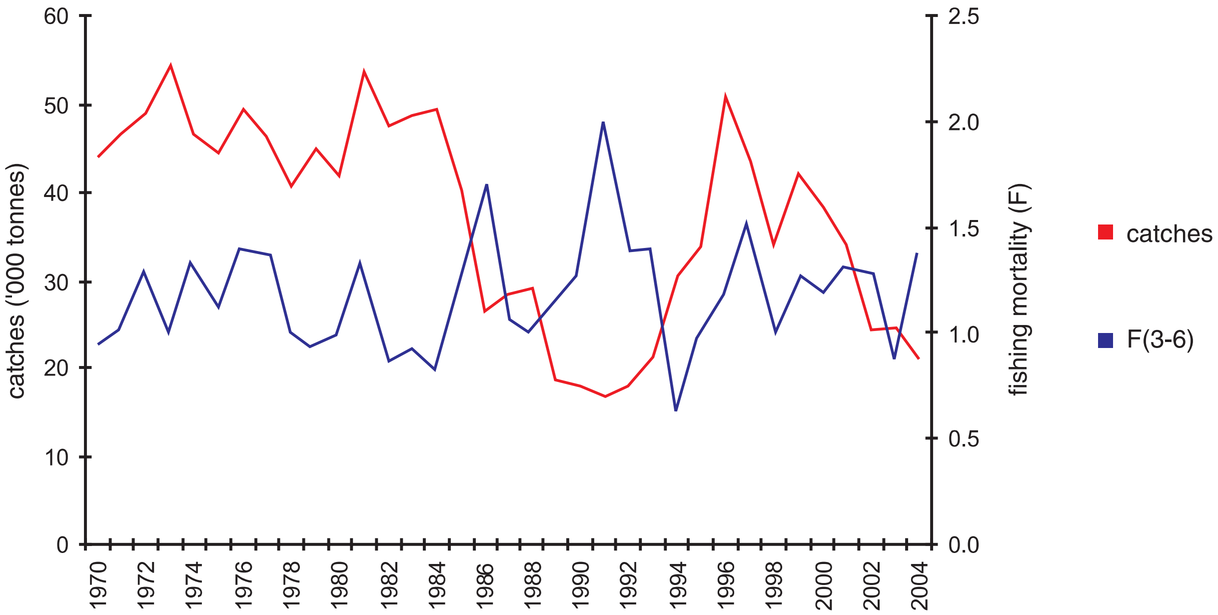
Changes in biomass result from two factors: decreasing recruitment to the stock and very high intensity of exploitation.

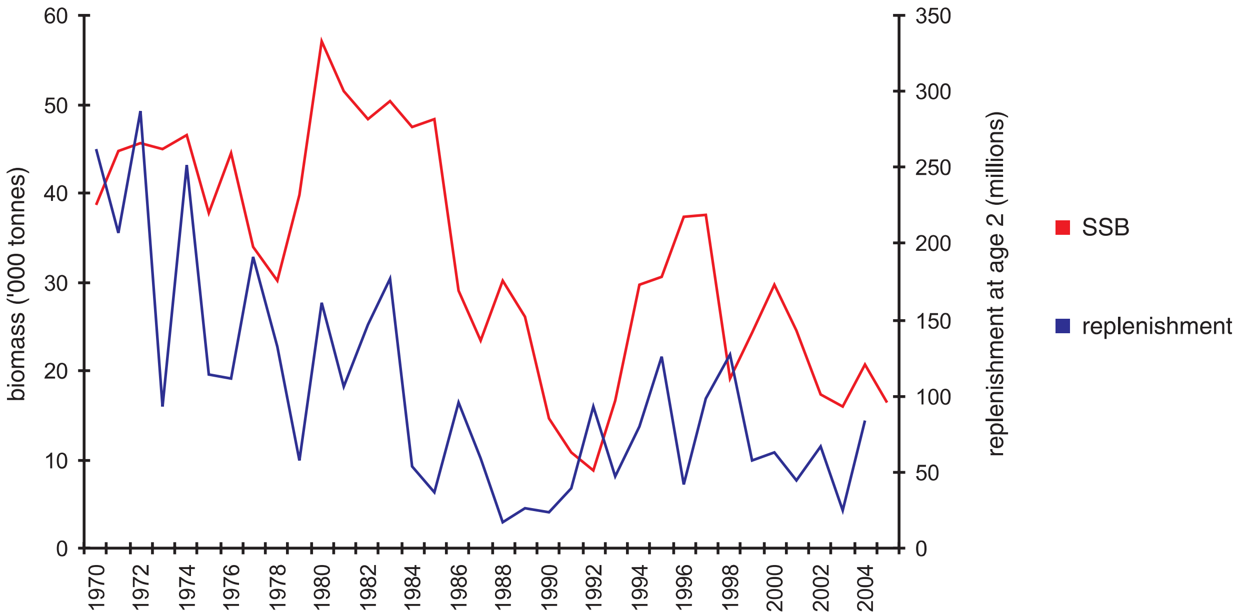
Stock replenishment had been high until the beginning of the 1980s. In subsequent years it decreased to slightly more than 1/3 of values from the previous period (Graph 7.1). The stock's fishing mortality remained very high during the whole analysed period and on average amounted to 1.2, most frequently varying between 0.9 – 1.4. The catch is mainly based on young fish, two and three years old, mostly not mature for spawning.

If the current intensity of exploitation is maintained, the catch will amount to 34 thousand tonnes in 2006 and the biomass will remain on the low level of 25 thousand tonnes in 2007.

The stock's state is assessed as under a risk of reduced reproduction capacity. The stock is overfished – if the intensity of exploitation is reduced, in a long-term perspective the catch may increase.

Biological reference points for this stock equal: B_{pa} = 23 thousand tonnes, whilst B_{lim}, F_{lim} and F_{pa} have not been yet specified.





Graph 7.1. Catch, fishing mortality (F), spawning stock biomass (SSB) and stock replenishment for western Baltic cod (Sub-divisions 22 – 24) in 1970 -2005 (ICES, 2005)

7.2. Eastern Baltic cod (Sub-divisions 25-32)

Catch

The average catch volume between 1970 and 2004 equalled 167 thousand tonnes (Graph 7.2). The highest catch – over 300 thousand tonnes – was observed in the first half of the 1980s, with the maximum value of almost 400 thousand tonnes in 1984. Next, the catch volume was systematically decreasing, to 45 thousand tonnes in 1993. This decrease resulted from a lower biomass of the stock. After the catch had increased to around 110 – 120 thousand tonnes between 1995 – 1996, it diminished to around 70 thousand tonnes in the last three years.

The cod catch after 1990 can be specified only in approximate values due to the widespread problem of incomplete catch reporting (misreporting or underreporting) by fishermen. Therefore, unregistered cod catch has to be estimated based among others on results of inspections, analysis of fish and fish products turnover or on results of research catches. The highest unregistered catch could be observed in 1993 and 1994 (40 – 60% of the registered catch). In 1995 – 1996 the share of such catch diminished (10 – 20%), as some of the Baltic countries initiated measures to limit this reprehensible practice. The problem of incomplete catch records has not been, however, solved and still exists on both sides of the Baltic, East and West. It is estimated that between 2000 and 2004, the unregistered catch amounted to 35 – 45% of the official catch. The catch volume presented here accounts for the unregistered catch.

The average Polish official catch between 1970 – 2004 amounted to almost 50 thousand tonnes. It varied similar to the general catch. It was the largest in the first half of the 1980 – between 90 and 120 tonnes, and next it started to decrease to reach 15 – 20 thousand tonnes between 2000 and 2004. The last numbers refer to registered catch only.

The following countries had the largest share in the (official) catch: Poland – 30%, Denmark – 22% and Sweden – 19%. Poland's share in the total catch varied – it was the highest at the beginning of the analysed period and the lowest in the middle of the 1980s. Denmark's share in that period was high, whilst the share of Sweden was systematically increasing in the 1980s and after 1990 it exceeded the share of Denmark.

Two sub-divisions played a dominating role between 1997 and 2004: Sub-division 25, where 64% of cod was caught and the Sub-division 26 – with 32% of the catch. Sub-divisions 27 and 28 accounted for merely 2% of the catch each. This results from poor resources of cod – when cod was abundant in the Baltic, the share of sub-divisions from the Northern Baltic was higher.

Stock dynamics and catch forecast

The average spawning stock biomass during the analysed period equalled almost 290 thousand tonnes. During the 1970s the spawning stock biomass varied between 200 and 400 thousand tonnes. At the end of this period the biomass was rapidly increasing and in the first half of the 1980s it amounted to the highest value ever observed – 700 thousand tonnes (Graph 7.2). Since 1985 the spawning stock biomass started to decrease, to fall in 1992 to the very low value of 90 thousand tonnes, i.e. 7 – 8 times less than the maximum values from the beginning of the 1980s. Between 1994 and 1995 the biomass increased to around 195 – 245 thousand tonnes, and next rapidly decreased to 95 – 85 thousand tonnes between 2002 and 2005. These are the lowest values ever for biomass of this stock.

Such a large decrease results from the fact that the stock was replenished with less and less numerous generations and from too intensive exploitation.

Stock recruitment was the highest at the end of 1970s and at the beginning of the 1980s, which resulted in the record biomass of the stock. Next it was systematically decreasing – the abundance of generations from the 1990s and the beginning of the current century was 3 – 5 times lower than the abundance of generations from the turn of the 1970s and 1980s. Only the generation of 2003 is most probably the most numerous from last 10 years – this is indicated by all the latest research cruises. This generation, if it is not overfished at its young age, may contribute to increasing the spawning stock biomass in next years (2007-2008).

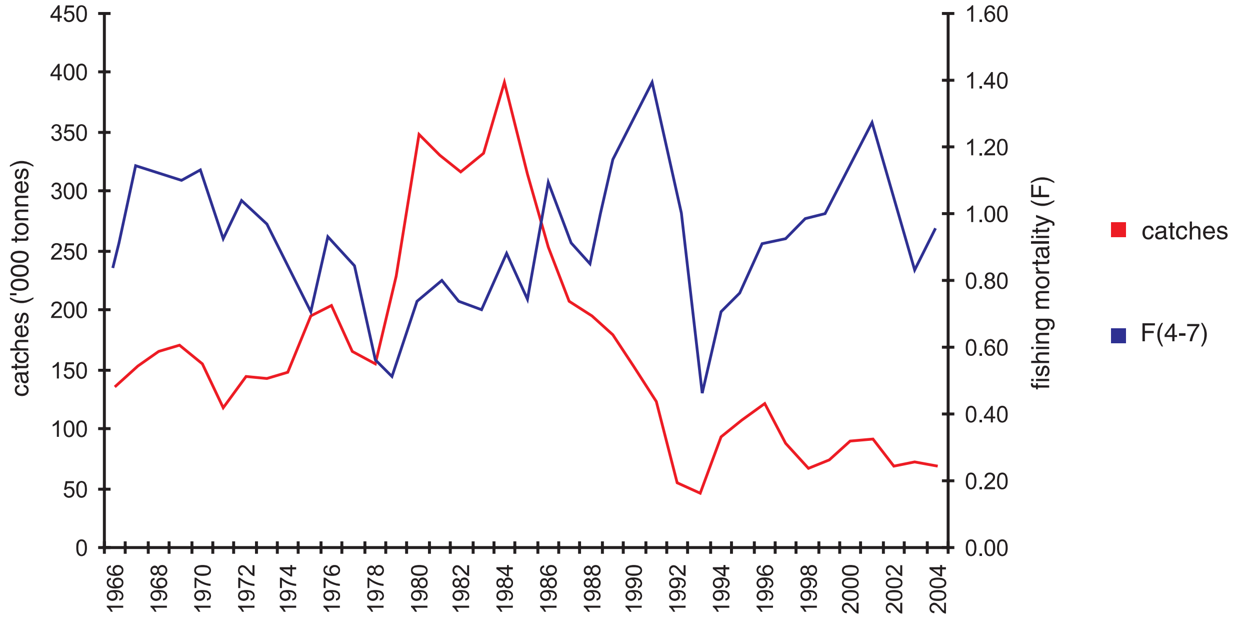
The stock was very intensively exploited during the analysed period, which is reflected in fishing mortality, which usually varied for these years between 0.7 – 1.1. Between 1993 – 1995 the intensity of exploitation had somehow decreased but next it increased significantly and in the following years it frequently exceeded 1 or was close to 1.

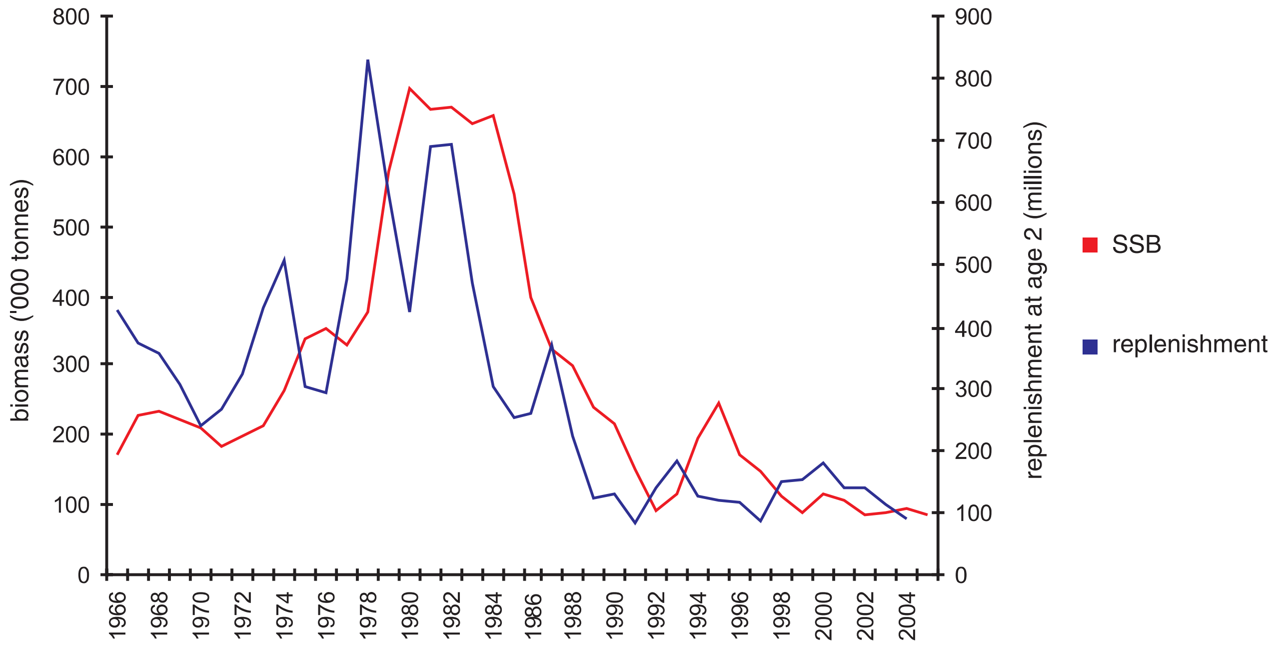
Assessment of the state of cod stock may be questioned due to the problem of incomplete catch reporting, as the volume of catch constitutes one of the significant parameters for calculations. As already mentioned, the calculations are based on official catch, supplemented in certain years with estimated values for unregistered catch. Despite these adjustments, assessment of the stock's volume in recent years is uncertain, as the unregistered catch may be higher than it is assumed here. Nevertheless, the calculations undoubtedly reflect the direction of changes in cod biomass and lead to a conclusion that the state of cod resources is bad. This is proven by the survey indices of stock size, which are well correlated with model calculations.

If the current intensity of exploitation is maintained in 2006, the spawning stock biomass will increase in 2006 and 2007 to 84 and 100 thousand tonnes respectively, whilst the catch will equal around 72 thousand tonnes of cod.

The state of the stock falls within the category "reduced reproduction capacity". The stock is harvested unsustainably and overfished – if the intensity of exploitation is reduced, in a long-term perspective the catch may increase.

Biological reference points for this stock equal: B_{lim}= 160 thousand ton, B_{pa}= 240 thousand ton, F_{lim}= 0.96, F_{pa}= 0.6.





Graph 7.2. Catch, fishing mortality (F), spawning stock biomass (SSB) and stock replenishment for eastern Baltic cod (Sub-divisions 25 – 32) in 1966 -2005 (ICES, 2005)

7.3. Spring herring from the Western Baltic and Danish Straits (Sub-divisions 22 – 24 and Division IIIa)

The stock, as a biological unit, inhabits the Western Baltic (Sub-divisions 22 – 24) as well as Kattegat and Skagerrak. In this region, the stock is mixed with autumn herrings of the North Sea (mainly with juveniles). The analysis of the stock biomass refers to the whole biological unit, whilst the description of the catch focuses on the part of the region that belongs to the Baltic, i.e. Sub-divisions 22 – 24. A credible assessment of the stock's biomass is limited to the period 1991 – 2005, as the share of spring and autumn herring in the catch from the region has been determined only for this period.

Catch

In the period 1974 – 2004 the catch in Sub-divisions 22 – 24 amounted on average to 79 thousand tonnes (Graph 7.3). The largest catch, between 95 and 120 thousand tonnes, was observed in the 1980s. Next the catch was decreasing from the level of 80 thousand tonnes at the beginning of 1990s to slightly over 40 thousand in 2003 – 2004. The Polish catch between 1974 and 2004 amounted on average to 10 thousand tonnes. During the analysed period it decreased from the level of 10 – 15 thousand tonnes in the 1980s to 5 – 7 thousand tonnes in the last 10 years.

The following countries had the largest share in the catch: Germany – on average 43%, next Denmark – 32%, whilst the share of Sweden and Poland were similar – 13% and 12% respectively. Until 1990, Germany played the dominating role, with 50 – 70% of the catch. In the 1990s, Denmark took over the leading role, and its share in the catch amounted to 50 – 60%, whilst German catch rapidly dropped to 10 – 20%. In the last 3 years the share of German fleet has significantly increased again (to over 40%), whilst the share of the Danish fleet has decreased (to around 20%).

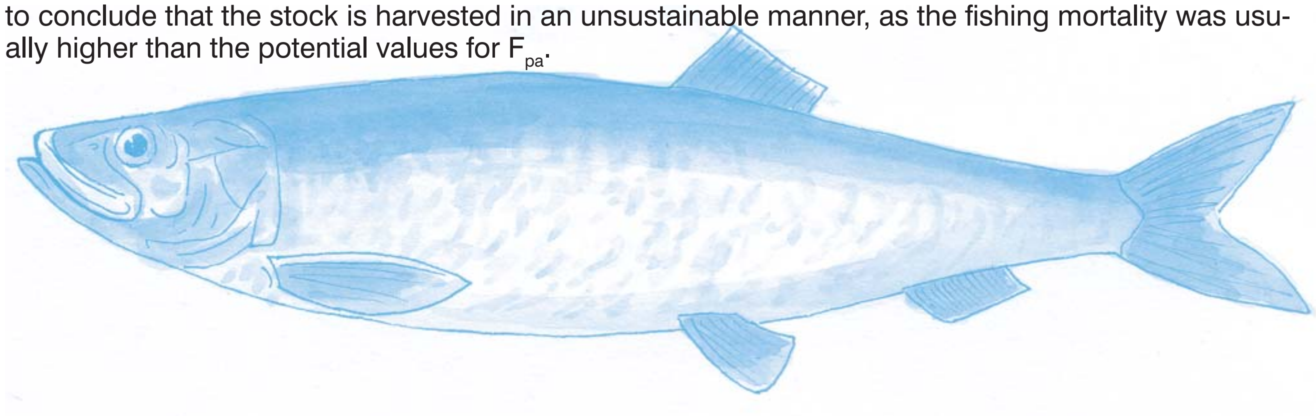
Stock dynamics and catch forecast

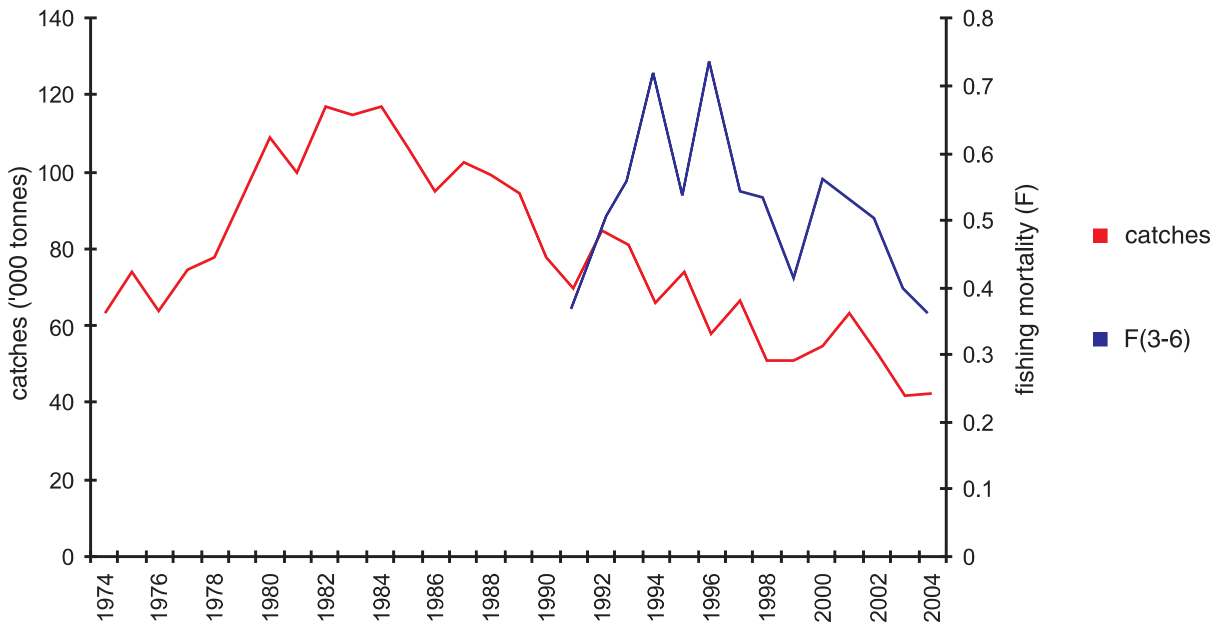
Between 1991 – 2005, the average spawning stock biomass amounted to over 190 thousand tonnes. The largest spawning stock biomass for spring herring could be observed at the beginning of the 1990s: 300 – 310 thousand tonnes (Graph 7.3). Next, the biomass started to decrease until it reached the level of 120 – 130 thousand tonnes in 1998 – 2000, and increased again to 185 thousand tonnes in 2002. Since that time it has been relatively stable and in 2005 it was assessed at the level of 195 thousand tonnes.

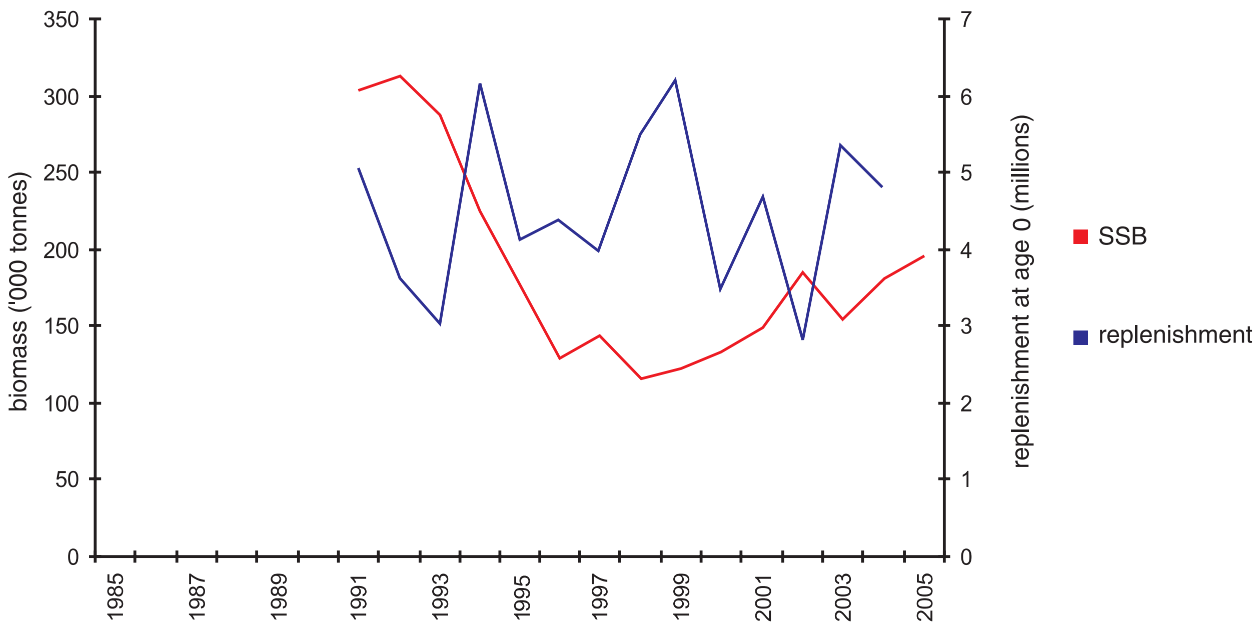
Stock replenishment during the analysed period was rather stable and varied from 3 to 6 billion of individuals, with relatively numerous generation of 2003. Fishing mortality usually varied between 0.4 – 0.7: the higher values occurred in the middle of the 1990s, whilst lately they have been decreasing. The average value was 0.5 (Graph 7.3).

If the fishing mortality in 2005 and 2006 remains on the 2004 level and population replenishment remains on the average level, 95 thousand tonnes of herring will be caught in 2006, whilst stock biomass will exceed 230 thousand tonnes. Approximately half of this volume could be caught in the Sub-divisions 22 – 24.

Biological reference points have not been established so far for this stock. It is possible, however, to conclude that the stock is harvested in an unsustainable manner, as the fishing mortality was usually higher than the potential values for F_{pa}.







Graph 7.3. Catch, fishing mortality (F), spawning stock biomass (SSB) and stock replenishment for the herring stock in Sub-divisions 22 – 24 and in Kattegat and Skagerrak in 1974-2005 (catch refers to Sub-divisions 22-24 only) (ICES, 2005)

7.4. Central Baltic herring (Sub-divisions 25 – 29 and 32 without the Gulf of Riga)

Herrings inhabiting this region belong to many populations, among others to the coastal population of spring spawning herring, which constitutes the basis for the Polish catch at the first half of the year. For the purposes of resource assessment and management they are treated as one stock, as usually there is lack of data that would allow to differentiate between respective populations and to assess them individually. Such an approach constitutes a compromise between a complex population structure of the herrings inhabiting this region and mixed populations on fishing grounds on the one hand and the possibility to obtain data indispensable for individual assessment of larger populations on the other. Therefore, it is possible that the dynamics of some populations, stock components, differ from the one described below.

Catch

The average catch level between 1974 and 2004 amounted to 230 thousand tonnes (Graph 7.4). The highest catch, between 300 and 370 thousand tonnes, was achieved in 1974 – 1977. In the 1980s, the catch was relatively stable and fluctuated around 270 thousand tonnes. Next, the catch was systematically decreasing – to 93 thousand tonnes in 2004, which accounts for only 25% of the high catch from the beginning of the analysed period.

The Polish catch varied similar to the total catch. It decreased from the level of 60 – 70 thousand tonnes at the end of the 1970s to 20 – 30 thousand tonnes in the second half of the 1990s and in the current century.

Countries of the former USSR had the largest share in the catch – 33% on average. Next were Sweden – 23% and Poland – 21%. From among the former USSR countries, Estonia holds the leading position (17% on average after 1990) and Russia ranks as second (10% after 1990), whilst Latvian and Lithuanian catches are small. The share of Poland in the catch decreased in the second half of the 1990s to the level of 10 -15% and increased again close to the average value. Between 1997 and 2004, the largest catches were from the Sub-divisions 25 and 29 (on average 23% and 20% respectively). The share of Sub-divisions 26 and 32 was similar (16 – 17% each), whilst that of Sub-divisions 27 and 28 was lower (10% and 14% respectively).

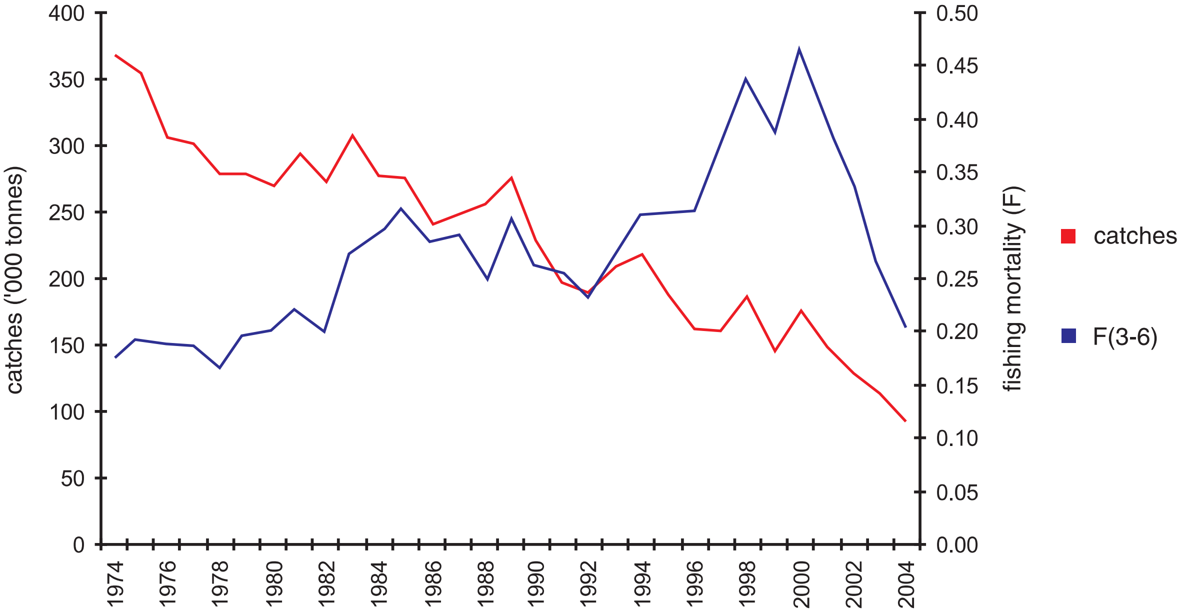
Stock dynamics and catch forecast

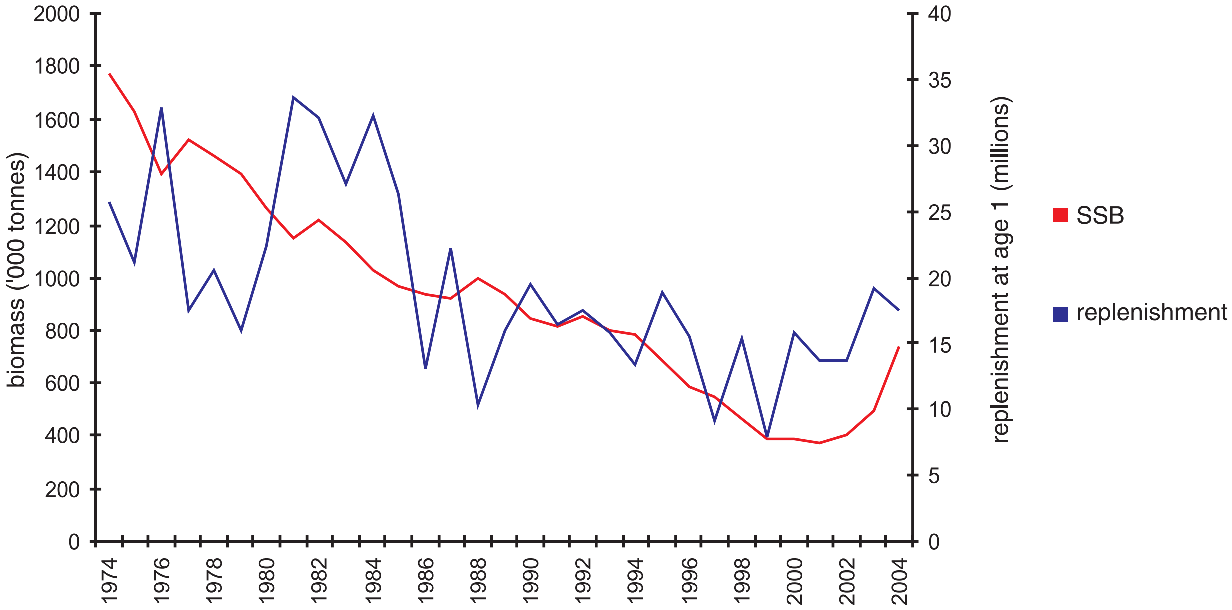
The average spawning stock biomass during the analysed period equalled 915 thousand tonnes. The biomass was clearly decreasing from the beginning of the 1970s to the turn of the centuries, from almost 1.8 million tonnes in 1974 to much less than 400 thousand tonnes in 1999 – 2001 (Graph 7.4). The decrease was relatively small between 1985 and 1994 – biomass amounted to around 800 – 1000 thousand tonnes. The latest estimates show that in 2004 – 2005 the biomass has increased to over 600 thousand tonnes.

The main cause behind the biomass decrease for herrings in Sub-divisions 25 – 29 + 32 was the diminishing mass of individual fish. This process started at the beginning of the 1980s and between 1980 – 1997 the mass decreased in respective age groups by around 50 – 60%. Moreover, in the second half of the 1990s, some decline in recruitment was observed. The mass of individual fish was decreasing due to such factors as diminishing food resources, changes in food composition, decline in cod biomass.

This issue is discussed in greater detail among others by Hrobowy (1997) and Cardinale and Arrhenius (2000). In 1998, for the first time over more than ten years, the mass of individual fish increased as compared to the previous year and a further increase was observed until 2003, in total by 20%. In 2004, however, the individual mass decreased by 10% relative to 2003 value.

Replenishment abundance, after having varied considerably between 1974 and 1988, stabilised at the beginning of the 1990s at the level of 15 billion individuals. It was much lower only in the years





Graph 7.4. Catch, fishing mortality (F), spawning stock biomass (SSB) and stock replenishment for the Central-Baltic herring stock (Sub-divisions 25 – 29, 32) in 1974-2005 (ICES, 2005)

1996 and 1998. Generally, abundance of generations from the 1990s was lower than that of generations from the 1970s and 1980s. Before 1982, the fishing mortality of the stock was very stable and remained at the level of 0.2. In next years the intensity of exploitation significantly increased and the fishing mortality reached the level 0.3 in the middle of 1990s and 0.4 at the end of the 1990s. In recent years the fishing mortality was declining to reach 0.2 in 2004.

If fishing mortality remains at the 2004 level, whilst stock replenishment in 2005 and 2006 at the average level, the spawning stock biomass in 2006 – 2007 will amount to 660 – 680 thousand tonnes, whilst the catch in 2006 will reach almost 130 thousand tonnes.

Threshold biomass values have not been defined for the stock so far, therefore, it is impossible to specify its state in relation to these reference points. F_{pa} has been, however, specified, and equals 0.19.

As the fishing mortality of the stock slightly exceeds the threshold value, the stock can be considered as under a threat of unsustainable harvesting.

7.5. Herring from the Gulf of Riga

Catch

The average level of the catch between 1970 and 2004 amounted to 25 thousand tonnes (Graph 7.5). In the first part of the analysed period the catch decreased from over 30 thousand tonnes at the beginning of 1970s to 13 – 17 thousand tonnes in the 1980s. Next, the catch was systematically increasing, to reach in 1997 the value of nearly 40 thousand tonnes. The catch between 2001 and 2004 was also at maximum values.

Since 1991 the stock has been harvested by two countries: Estonia and Latvia. In this period Latvia had a higher average share in catch (60%). During the last two years the shares of the both countries were similar and equalled 53% and 47%.

Stock dynamics and catch forecast

The average spawning stock biomass in the period 1970 – 2004 equalled 76 thousand tonnes. The biomass was relatively low in the 1970s and 1980s, 50 thousand tonnes on average. In the 1990s, the biomass significantly increased, reaching the level of 110 – 120 thousand tonnes. A very high level of the biomass was maintained after 2000, with the maximum value in 2002 – 126 thousand tonnes.

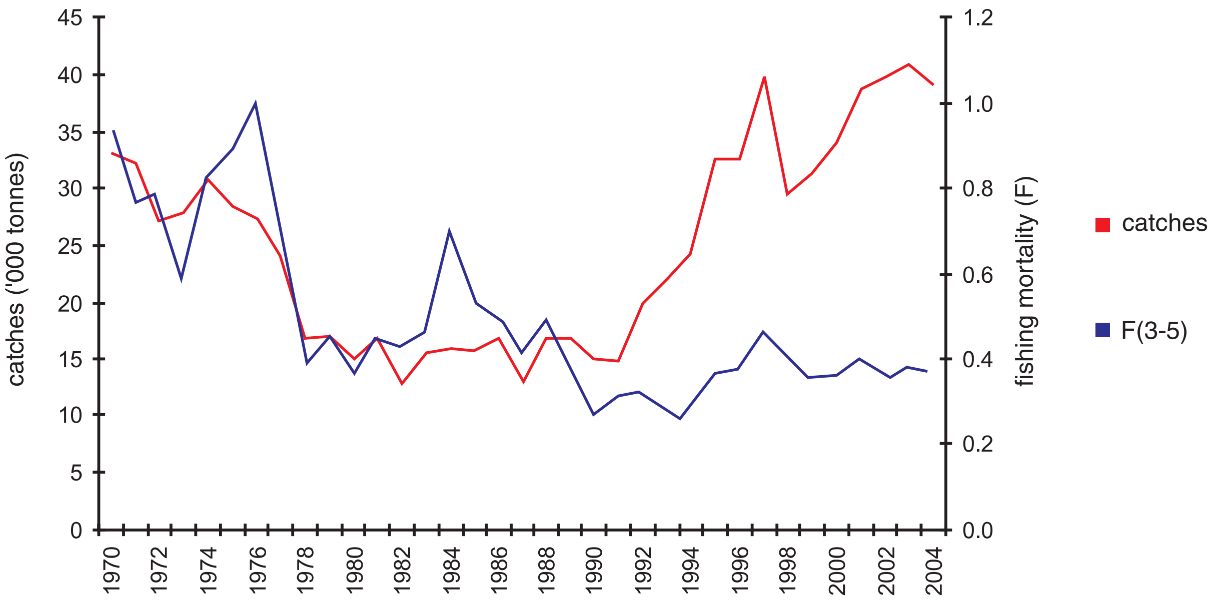
The increase and stabilisation of the biomass at high level resulted from the fact that after 1990 a number of very abundant generations were born. Environmental conditions facilitated this process, especially increased water temperature.

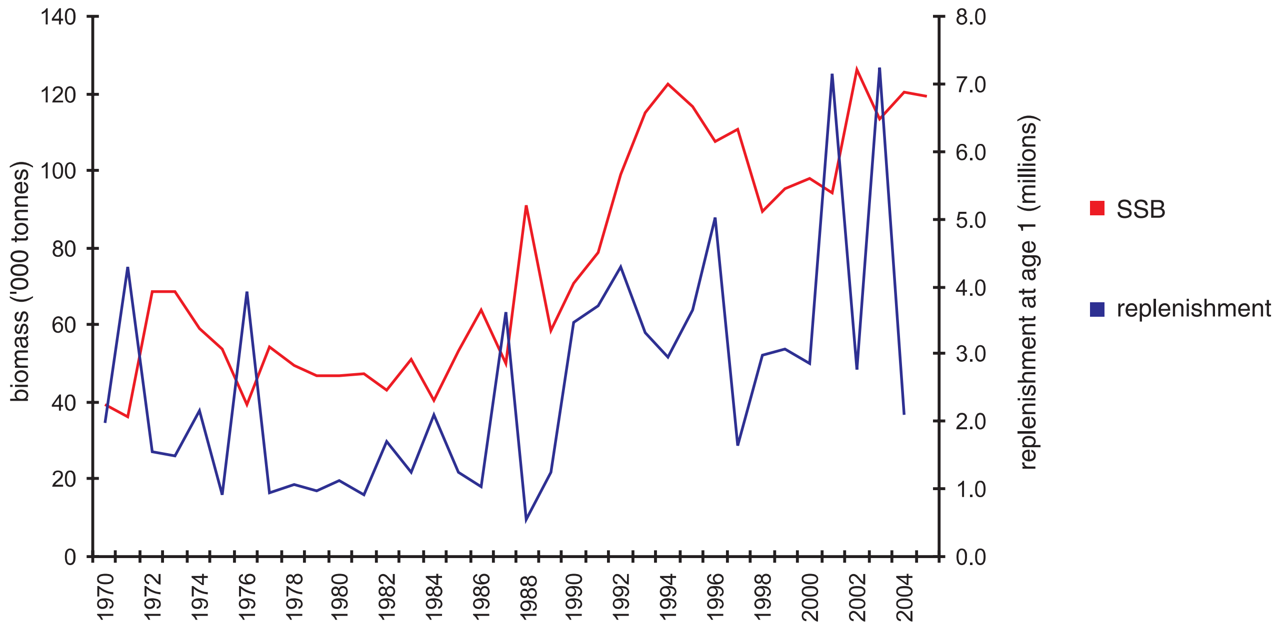
As a result, stock replenishment increased from the average level of 1.7 billion individuals in the 1970s and 1980s to the average level of 3.7 billion in subsequent years (Graph 7.5). Fishing mortality of the stock was decreasing from the level of 0.8 – 0.9 at the beginning of the 1970s to 0.25 – 0.3 in the first half of the 1990s. Next, fishing mortality increased to 0.35 – 0.40 in the current century.

If the current intensity of exploitation is maintained, the catch in 2006 will amount to around 37 thousand tonnes, whilst the biomass will remain on the high level of 100 – 110 thousand tonnes in 2006 – 2007.

The state of the stock can be evaluated as having full reproductive capacity. The stock is harvested in a sustainable manner.

Biological reference points for this stock equal: B_{lim}= 36.5 thousand tonnes, B_{pa}= 50 thousand tonnes, F_{pa}= 0.4, whilst F_{lim} has not been specified yet.





Graph 7.5. Catch, fishing mortality (F), spawning stock biomass (SSB) and stock replenishment for the herring stock in the Gulf of Riga in 1970-2005 (ICES, 2005)

7.6. Herring from the Sub-division 30

Catch

The average level of the catch between 1973 and 2004 equalled 36 thousand tonnes (Graph 7.6). At the beginning of the 1990s the catch was small, varying between 20 – 30 thousand tonnes. Next, it started to increase rapidly and from 1994 to 2004 it remained between 50 and 65 thousand tonnes. The highest catch was observed in 1997 – almost 66 thousand tonnes.

Only two fleets harvest this stock: Finnish and Swedish. Finland clearly holds a dominating position – almost 90% of the catch – thus Swedish catch accounts merely for slightly over 10% of the total catch from the stock. In the initial years of the analysed period, the share of Sweden was higher: 20 – 30% of the catch. It decreased at the end of the 1970s, and in 1994 – 2001 it accounted for only 2 – 5% of the overall catch.

Stock dynamics and catch forecast

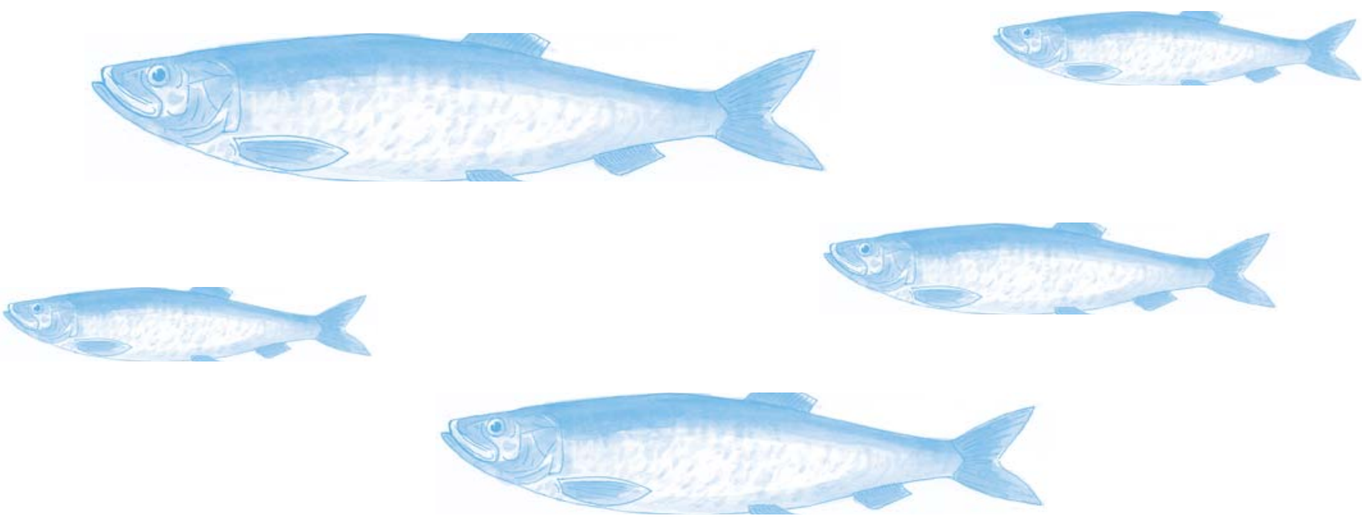
The average spawning stock biomass in the period 1973 – 2005 equalled 250 thousand tonnes. Low stock biomass was observed until the middle of the 1980s: 100 – 150 thousand tonnes (Graph 7.6). Next the biomass increased rapidly and at the beginning of the 1990s it exceeded the level of 300 thousand tonnes. In subsequent years the biomass varied between 300 and 400 thousand tonnes, whilst the assessment of the biomass for 2005 shows record values of 500 thousand tonnes.

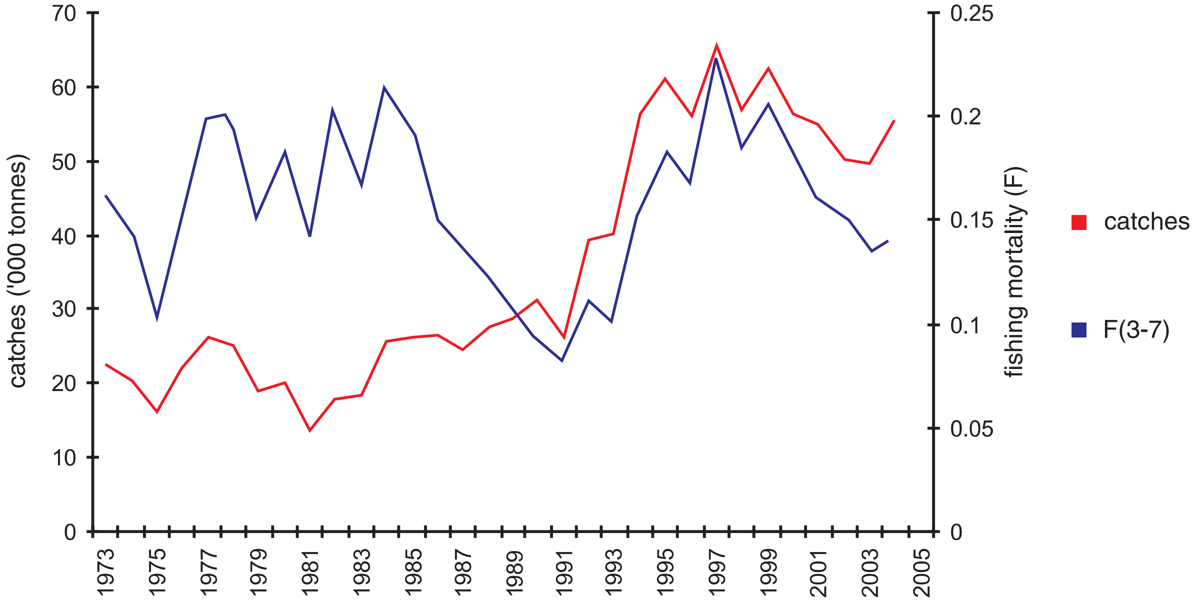
The main factor behind the significant increase of the biomass is the growing abundance of the recruitment to the stock – it increased from the average level of 2.3 billion individuals in 1973 – 1988 to the average level of 6.2 billion in subsequent years (Graph 7.6). The stocks fishing mortality during the analysed period most frequently varied between 0.1 – 0.2, with the average value of 0.16. In recent years the fishing mortality has been close to the average.

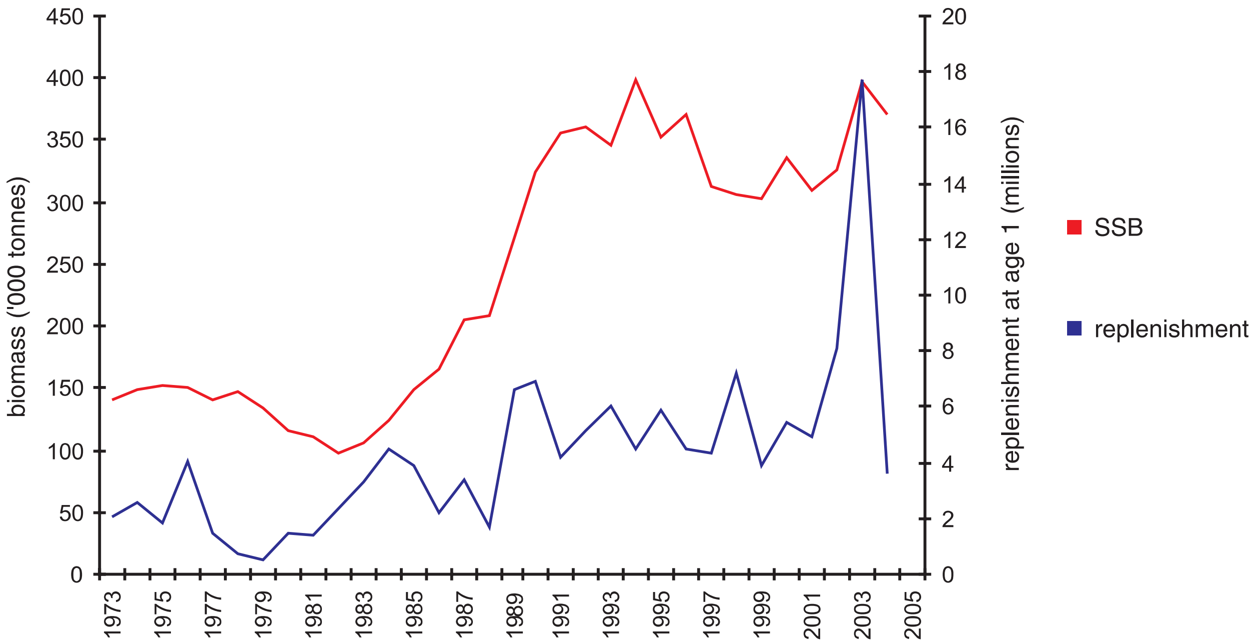
If the current intensity of exploitation is maintained, the catch will be high: 65 thousand tonnes in 2006 and the biomass will amount to 490 - 480 thousand tonnes in 2006 - 2007.

The state of the stock can be evaluated as having full reproductive capacity. The stock is harvested in a sustainable manner.

Biological reference points for this stock equal: B_{lim}= 145 thousand tonnes, B_{pa}= 200 thousand tonnes, F_{lim}= 0.3, F_{pa}= 0.21.







Graph 7.6. Catch, fishing mortality (F), spawning stock biomass (SSB) and stock replenishment for the herring stock in the Sub-division 30 in 1973-2005 (ICES, 2005)

7.7. Herring from the Sub-division 31

Catch

Catch from this stock is small – its average value for the period 1971 – 2004 equalled 6.5 thousand tonnes (Graph 7.7). Until 1993 the catch was quite stable, usually varying between 6 – 9 thousand tonnes, with the average of slightly over 8 thousand tonnes. Next the catch decreased to the average value of over 5 thousand tonnes. The lowest catch – less than 3 thousand tonnes – occurred for the years 2000 – 2001.

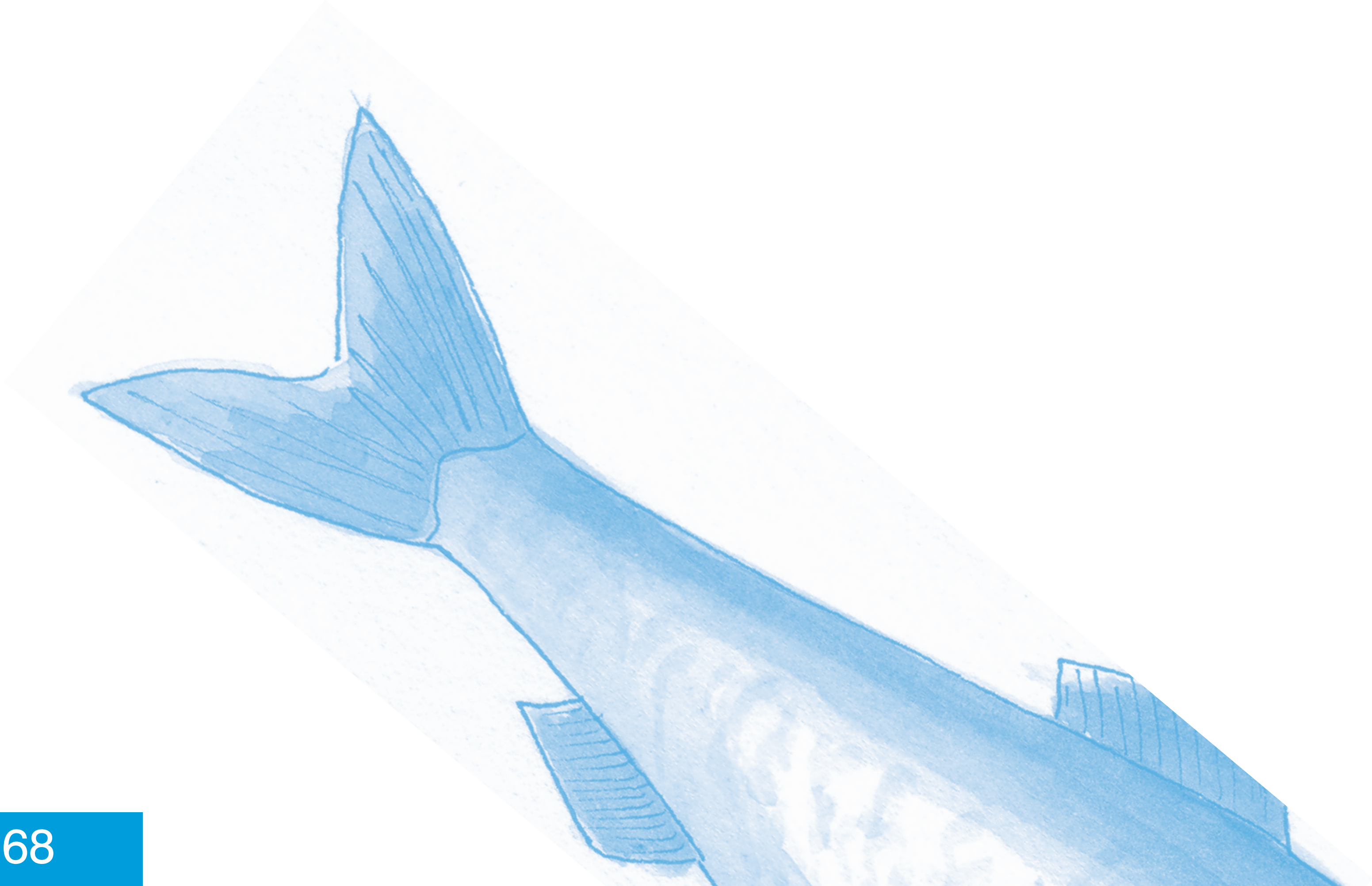
The stock is harvested solely by two fleets: Finnish and Swedish. As for the stock in the Sub-division 30, Finland holds a clearly dominating position, with almost 93% of the catch. Thus, the catch of Sweden equals only 7% of the total catch. During the initial stage of the analysed period, the share of Sweden was slightly larger and amounted to 10 – 20%. This share decreased significantly at the end of the 1970s, whilst after 1995 it most frequently amounted to 2 – 4% of the overall catch.

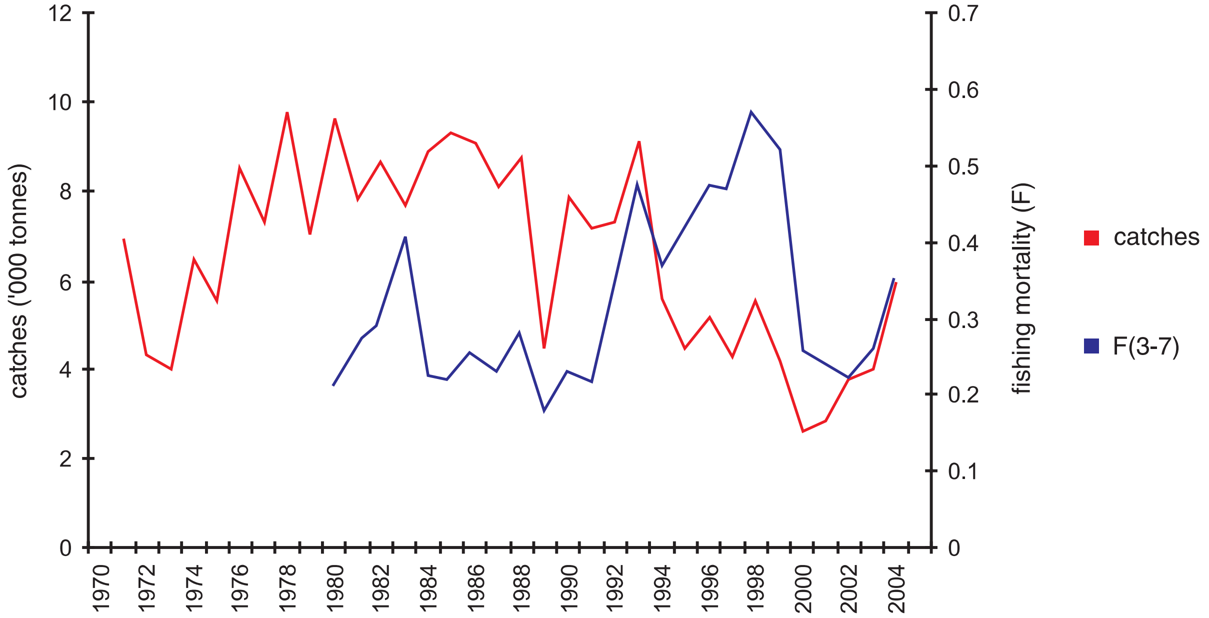
Stock dynamics and catch forecast

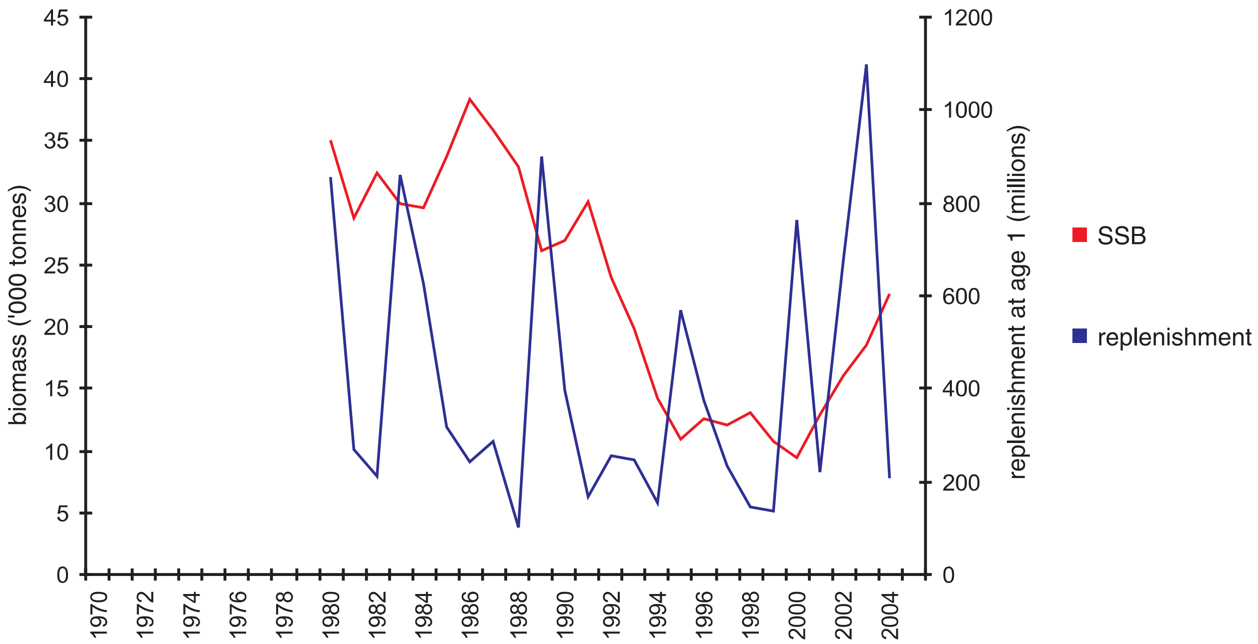
The average spawning stock biomass between 1980 and 2005 equalled 23 thousand tonnes. The biomass was decreasing from the level of around 30 thousand tonnes in the 1980s to as little as 12 thousand tonnes in the second half of the 1990s (Graph 7.7). In recent years the biomass increased and in 2004 exceeded 20 thousand tonnes.

The main factor behind the decrease in the biomass was a declining replenishment abundance in the 1990s – on average it decreased almost twice when compared to the replenishment from the 1980s (Graph 7.7). The stock's fishing mortality in the analysed period most frequently varied between 0.2 – 0.5 and on average equalled 0.31. The mortality at the beginning of the 1990s usually varied between 0.2 – 0.3. In the 1990s it increased to the level of 0.4 – 0.5 and next decreased to 0.25 – 0.35.

Assessment of the stock's dynamics is not very precise and the numbers presented should be treated as relative values. Biological reference points have not been specified for this stock, therefore, its state in relation to these points cannot be evaluated.







Graph 7.7. Catch, fishing mortality (F), spawning stock biomass (SSB) and stock replenishment for the herring stock in the Sub-division 31 in 1970-2005 (ICES, 2005)

7.8. Sprat

Catch

The average level of the catch between 1974 and 2004 equalled 207 thousand tonnes (Graph 7.8). The lowest catch – between 40 and 70 thousand tonnes – was observed in the first half of the 1980s. In the subsequent years the catch was increasing and the highest values, over 400 thousand tonnes, appeared in the second half of the 1990s. A record catch of nearly 530 thousand tonnes was achieved in 1997. Next, the catch decreased to 310 – 370 thousand tonnes after the year 2000, whilst in 2004, 374 thousand tonnes of sprat was caught. The decreasing trend after 1997 resulted both from lower fishing quotas as well as the declining stock biomass. The sharp increase in the catch after 1990 ensued from the development of the Scandinavian fish meal industry. Between 1992 and 1997 the Danish catch increased by fourteen times, whilst the Swedish catch by eighteen times relative to 1991.

The Polish average catch during the analysed period equalled 42 thousand tonnes and it underwent similar changes as the total catch. In 1991 – 1997 Poland increased its catch by almost five times, catching 100 thousand tonnes of sprat in 1997. This large volume of catch resulted to a large extent from the fishing activities of Danish cutters, chartered at that time by Polish companies. Nevertheless, the development of Polish fishing for the purposes of fish meal production allowed to maintain the Polish catch at a high level and in the subsequent years it increased to 80 – 97 thousand tonnes, after the drop to 55 – 65 thousand tonnes at the end of the 1990s.

USSR (until 1991) and next countries emerging from it had the largest share in the catch – on average 42%, next was Poland – 22% and Sweden – 17%. Latvia's share was the highest from among the countries of the former USSR – almost 11% after 1991. Finnish, German and Lithuanian catches were rather negligible. The share of Poland varied most frequently between 20 and 30%. In the 1990s the share of Denmark and Sweden increased – from 5 -7% to almost 20% for Denmark and 37% for Sweden.

On average, the highest catch came from the Sub-divisions 26, 25 and 28 – in the period 2000 – 2004: 28%, 22% and 21% respectively. The share of Sub-divisions 27 and 29 amounted to 9% each, whilst the share of each of the remaining sub-divisions was negligible.

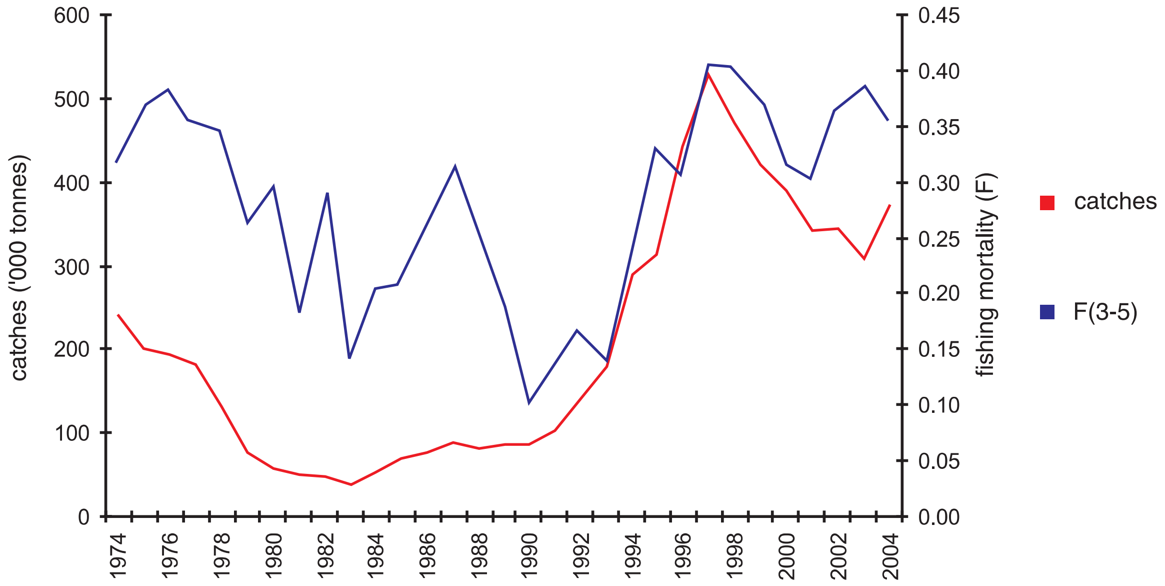
Stock dynamics and catch forecast

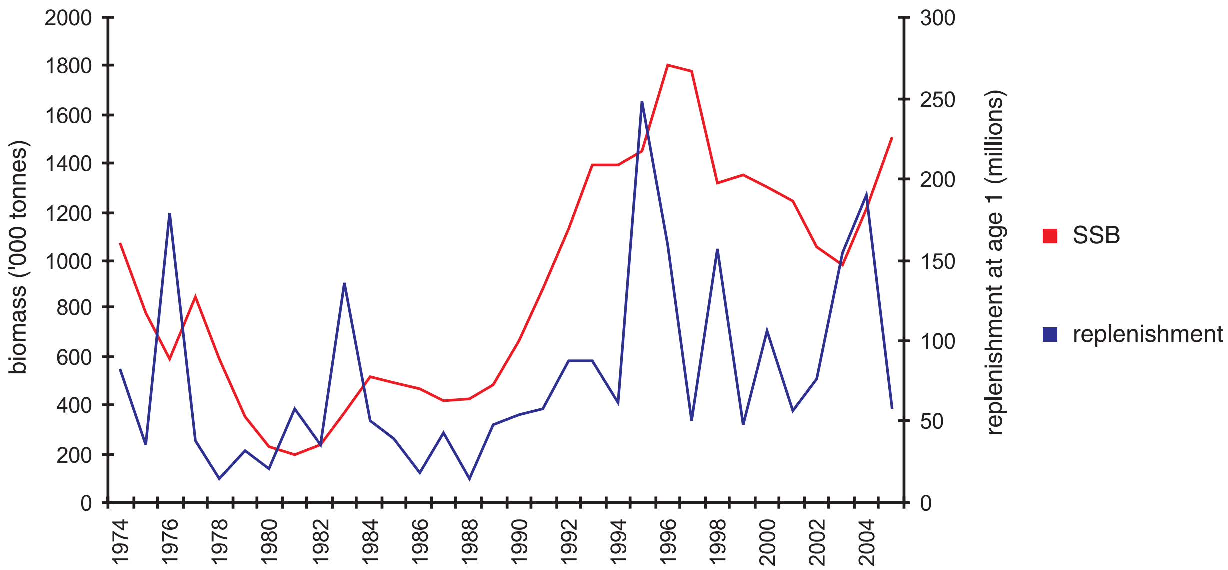
The average level of the spawning stock biomass between 1974 and 2005 equalled 870 thousand tonnes (Graph 7.8). At the beginning of the analysed period it was decreasing from almost a million tonnes to as little as 200 thousand tonnes in 1980 – 1982. Next the biomass increased and remained until the end of 1980s at the level of 400 – 500 thousand tonnes. At the beginning of the 1990s the biomass started to increase rapidly until it reached the highest value for last 30 years in 1996 – 1997: 1.8 million tonnes. In the subsequent years, due to rather intensive (but still within acceptable limits) exploitation of the stock and succession of strong and weak generations, the resources of sprat decreased to around 1 million tonnes in 2002 – 2003. On the other hand the abundant generations from 2002 and 2003 increased the biomass to 1.2 and 1.5 million tonnes in 2004 – 2005.

The significant increase in sprat biomass ensued from the fact that a number of abundant generations were born in the 1990s (Graph 7.8). Another factor that contributed to this increase was a significant reduction of cod biomass, as cods pray on Clupeidae fish – between 1992 and 2004 the spawning stock biomass for the eastern Baltic cod equalled only 20% of its state from the 1980s. In consequence of the diminishing cod resources, the natural mortality coefficient for sprat due to cod's predation decreased from 0.20 to 0.05 in 1987 – 1992.

The overall natural mortality decreased at that time from 0.40 to 0.25. This low level of natural mortality remained until 2004, with slight increasing trend (10 – 15%).

Until the beginning of the 1990s, the stock's fishing mortality was declining from 0.4 to below 0.2. Next, the mortality was increasing and in the period 1995 – 2004 varied between 0.3 and 0.4 (Graph 7.8).





Graph 7.8. Catch, fishing mortality (F), spawning stock biomass (SSB) and stock replenishment for the Baltic sprat stock in 1974-2005 (ICES, 2005)

If in 2005 – 2006 the fishing mortality remains at the level of the average from last three years and if the abundance of the 2005 generation remains at the average level, 410 thousand tonnes of sprat will be caught in 2006, whilst the spawning stock biomass will decrease to 1.2 million tonnes in 2006 and 1.1 million tonnes in 2007. This decrease will result from a very low abundance of the 2004 generation.

The state of the stock can be defined as having full reproductive capacity. The stock is harvested in a sustainable manner, in fact, its intensity of exploitation can be even slightly higher.

Biological reference points for this stock equal: B_{lim} = 200 thousand tonnes, B_{pa} = 275 thousand tonnes, F_{pa} = 0.4, whilst F_{lim} has not bee specified so far.

Prof Jan Horbowy, Dr. Emil Kuzebski

8.1. Dynamics of the fishing fleet

Changes in the state of the fishing fleet that occurred between 1994 and 2005 resulted not only from activities initiated under the FIFG but also from a natural process of withdrawing old or introducing new vessels due to economic reasons or force majeure (e.g. sinking, being destroyed). The table 8.1 presents data on the tonnage of fishing vessels that were withdrawn or constructed in the periods 1994 – 1999 and 2000 – 2005 with co-financing from public funds (FIFG) as well as the total change of the fishing capacity in that time. During the first period of FIFG operation (1994 – 1999), over 500 of fishing vessels with the tonnage of 21 thousand GT and the power of 82 thousand kW were withdrawn with support from public funds. At the same time, public financial resources were used for construction of around 150 vessels with the tonnage of 14 thousand GT and power of 32 thousand kW. A comparison of the tonnage and power of fishing vessels constructed and withdrawn with FIFG co-financing reveals that FIFG contributed to reducing the net fishing capacity of the fleet by 6.9 thousand GT and 49.4 thousand kW. When these numbers are compared with changes in the state of the fishing fleet (vessels <500 GT) for the beginning and end of the first period of FIFG operation, it turns out that almost half of the reduction in the fleet (43-44%) was supported from FIFG. The tonnage of vessels withdrawn with co-financing from public aid during the next programming period (2000 – 2005) was slightly lower and amounted to 15 thousand GT, with the power of 65 thousand kW. The tonnage of newly constructed vessels also decreased to 10 thousand GT with 40 thousand kW power, i.e. by around 8 thousand kW more than the power of vessels withdrawn during the first programming period. The total fleet of vessels <500 GT of the 'old' EU states between 2000 and 2005 decreased by 23 thousand tonnes and 106 thousand kW, and FIFG contributed to 20 – 24% of these results.

Table 8.1. Impact of the FIFG on the fishing capacity of the fleet in the 'old' EU Baltic states

Data	1994-1999		2000-2005		TOTAL 94-05	
	GT	kW	GT	kW	GT	kW
1. withdrawal	21 123	81 842	15 318	65 131	36 441	146 973
2. construction	14 243	32 461	10 512	39 826	24 755	72 287
3. balance (2-1)	-6 880	-49 381	-4 805	-25 305	-11 686	-74 686
4. change in vessel tonnage and power, vessels <500GT	-16 076	-112 831	-23 690	-106 568	-39 766	-219 399
5. FIFG 'share' in GT and kW change (3/4)	43%	44%	20%	24%	29%	34%

* for Sweden and Finland the data cover 1995-1999.

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The table 8.2 compares information on the changes in the fishing fleet resulting from the FIFG operation, taking into consideration the fleet reduction that occurred in the new member states between 2004 and 2005. The large reduction level that occurred in the last two years in those countries considerably increases the impact of FIFG on the general reduction of the fishing capacity in the EU member states.

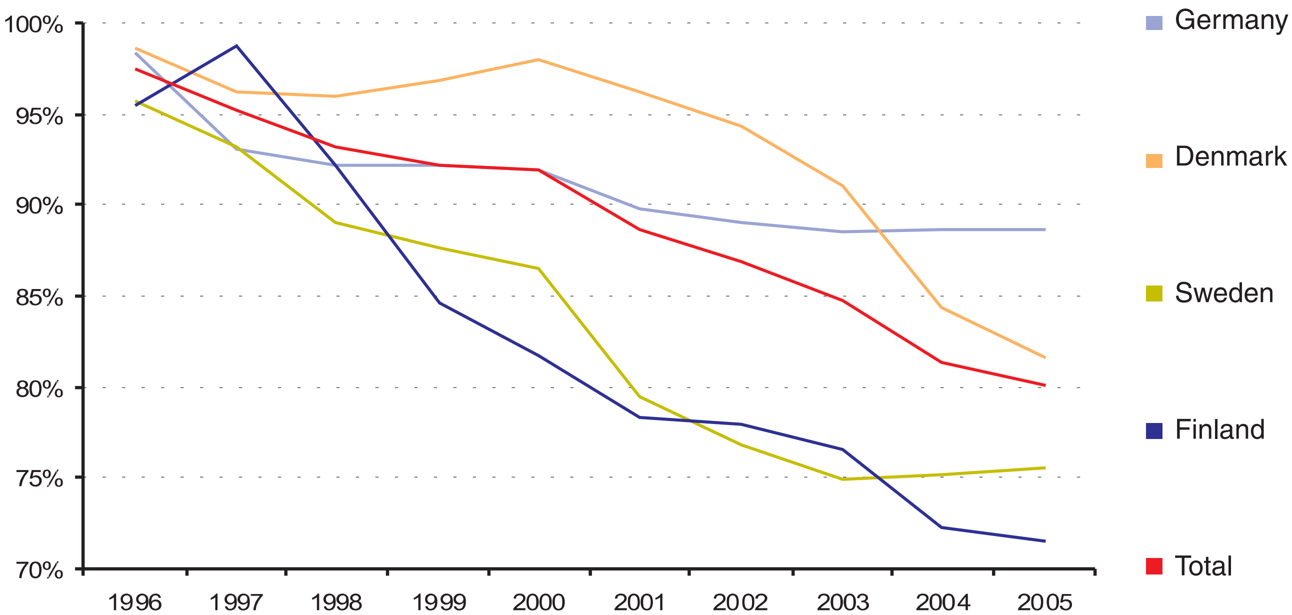
The total reduction in the tonnage of the EU Baltic countries that was achieved between 1999 and 2005 for the 'old' member states and between 2004 and 2005 for the 'new' members amounted to over 60 thousand GT, with reduction in power by 131 kW. At the same time, the balance of tonnage and power of vessels withdrawn and constructed with public funds support equalled -12 thousand GT and -75 thousand kW. In other words, the share of FIFG in reducing the fishing capacity of the EU Baltic fleet amounted to 54% in terms of tonnage and to 48% in terms of power.

Table 8.2. Impact of the FIFG on the fishing capacity of the fleet in 'old' and 'new' EU Baltic countries

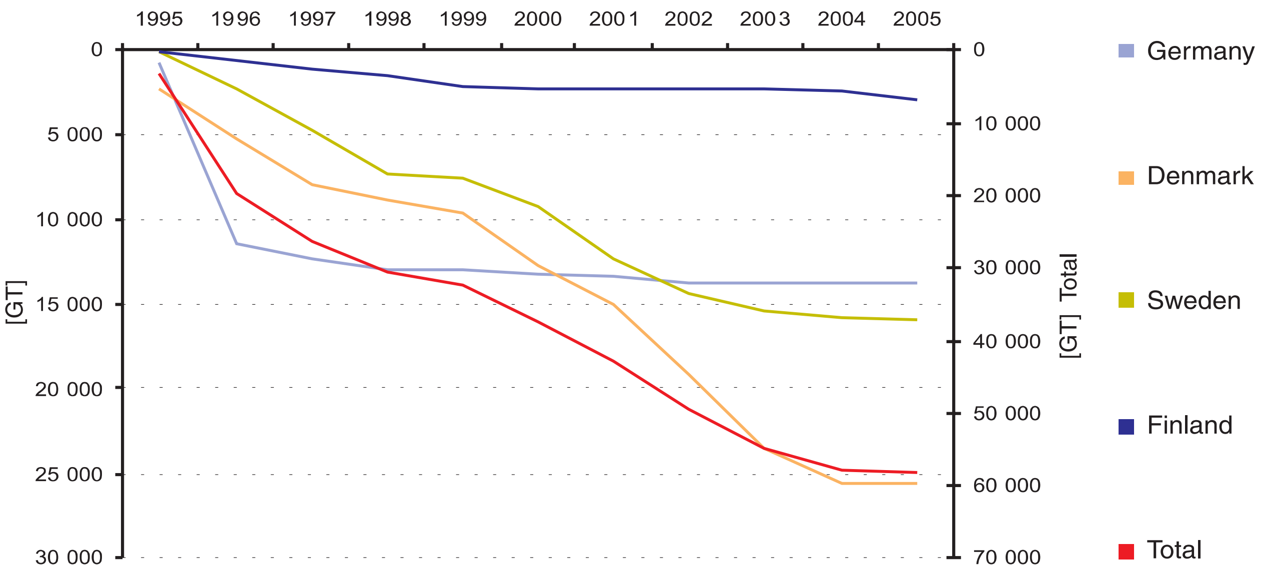
Data	1994-1999*		2000-2005**		TOTAL	
	GT	kW	GT	kW	GT	kW
1. withdrawal	21 123	81 842	37 207	122 096	58 330	203 939
2. construction	14 243	32 461	10 512	39 826	24 755	72 287
3. balance (2-1)	-6 880	-49 381	-26 695	-82 270	-33 575	-131 651
4. change in vessel tonnage and power, vessels <500GT	-16 076	-112 831	-45 579	-163 534	-61 655	-276 365
5. FIFG 'share' in GT and kW change (3/4)	43%	44%	59%	50%	54%	48%

* without new member states
** for new EU members the data cover 2004 and 2005

The graphs 8.1 and 8.2 present dynamics of changes in the tonnage of fleets in 'old' EU member states between 1995 and 2005 and the tonnage of vessels that were withdrawn with public aid. The general direction of changes in fishing capacity reduction is similar to the changes in the tonnage of withdrawn vessels. More significant differences occur practically only for the Finnish fleet, where, especially between 2000 and 2005, the fleet reduction dynamics under public aid was moderate, and the decrease in the total tonnage was considerably faster.

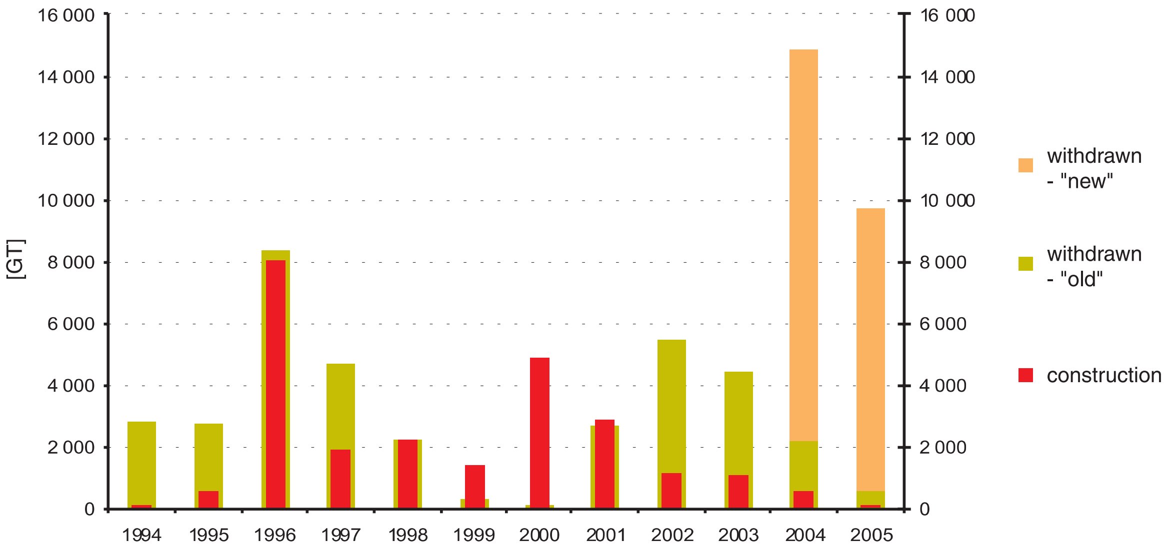


Graph 8.1. Dynamics of changes in the tonnage of the fleet in 'old' EU countries between 1995 and 2005 (1995=100%)



Graph 8.2. The tonnage of vessels withdrawn under public aid between 1995 and 2005 (accumulative)

The Graph 8.3 presents the tonnage of vessels withdrawn and constructed with support from public aid in 'old' and 'new' EU member states in respective years between 1994 and 2005. For the majority of years during the analysed period, the tonnage of scrapped vessels was much larger than the tonnage of vessels constructed with support from the FIFG. The end of the first FIFG programming period and the beginning of the second one (1998 – 2001) constitute an exception here. This is particularly visible for the first programming year of the new FIFG (2000), when vessels with the total tonnage of 5 thousand GT were constructed, and only very insignificant capacity was reduced. Most probably this resulted from more intensified investing prior to 2000, which finished in 2000 or 2001, resulting from a concern that conditions for financing vessel construction could change. A considerable increase in the volume of withdrawn fleet visible during last two years bears further attention. It results from extending the reduction programme on the new EU members. At the same time the tonnage of vessels withdrawn by the 'old' EU member states has been decreasing.



Graph 8.3. The tonnage of vessels withdrawn and constructed under public aid between 1995 and 2005.

There are no detailed data on the fishing structure of withdrawn vessels. It is justified to assume that a majority of such vessels belonged to segments fishing for species with threatened resources. In Poland and Latvia, cutters fishing for cod constituted by far the largest group of vessels that were scrapped since 2004 (this issue is discussed in the further section of the study). Between 1993 and 1997 (MAGP III), reduction of the fleets in the 'old EU member states' was focused on vessels fishing by means of trawl gear for groundfish and flatfish. During the next period, 1994-2002 (MAGP IV), it was assumed that the reduction would amount to 30% for stocks under depletion risk and to 20% for overfished species. In case of the Baltic Sea these reduction levels were set for salmon and cod. Therefore, it may be assumed that a majority of fleet withdrawn with FIFG co-financing comprises of vessels fishing for these two fish species.

8.2. Impact of changes in the state of the fleet on the resources during FIFG operation

One of the aims behind withdrawal of fishing vessels is to reduce the pressure of fisheries on the resources. It is by no means easy to assess the impact of fleet reduction on resources, as it is only one of the factors that may contribute to improvement of the state of resources. Simultaneously (or even at an earlier stage) other solutions are introduced such as resource management through limiting the catch (by means of establishing the total allowable catch limits) or through diminishing the fishing effort, or through technical measures for resource protection. It is difficult or even impossible to separate the impact of these different factors on resources. We will, however, try to compare the size of the fleet fishing on the Baltic Sea with fishing mortality of the fish. Changes in the fleet's size result among others from withdrawal of vessels, whilst fishing mortality reflects the pressure of fisheries on the resources.

As already stated in the previous section, the data on withdrawal of fishing vessels specify only their number and technical parameters (power, tonnage). They do not provide information on catch structure for a particular vessel nor the region the unit was fishing on. For example, in case of withdrawn Danish vessels, it is impossible to say whether a given unit was fishing on the Baltic Sea or on the North Sea, or maybe on both of them. The same holds true, although to a lesser extent, for Swedish vessels (they fish more frequently on the Baltic Sea) as well as for German units.

The eastern Baltic cod (Sub-divisions 25 – 32) is fished for mainly by Denmark, Sweden and Poland – these three fleets account for around 75% of the catch after 1995. The graph 8.4 presents the relative size of the Danish, Swedish and Polish fleet against stock's fishing mortality. Between 1995

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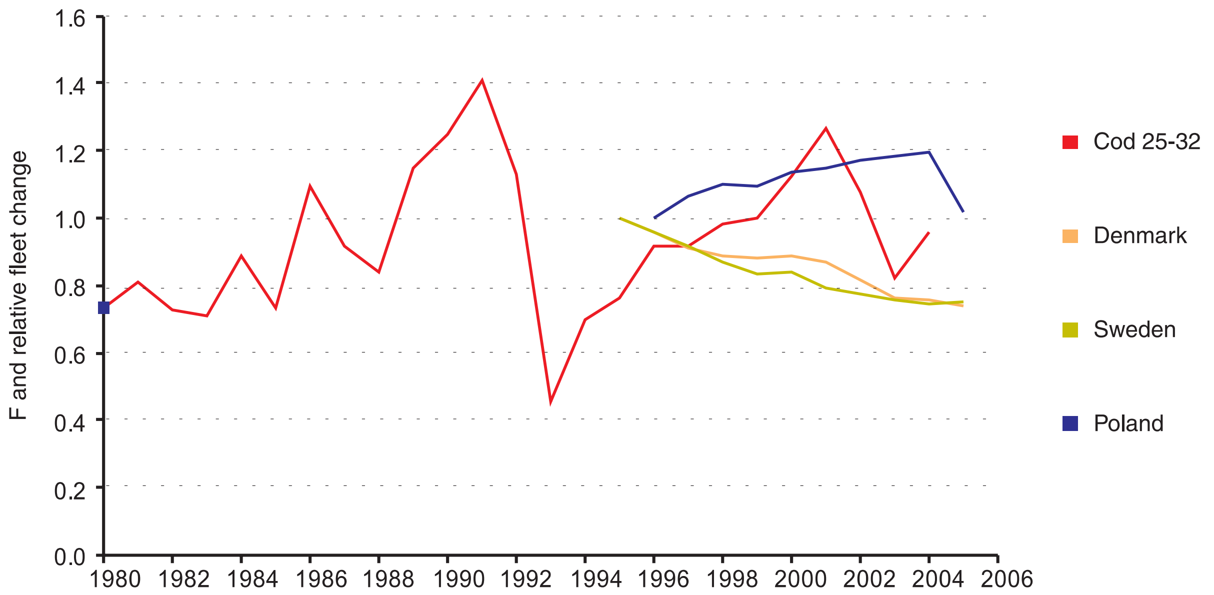
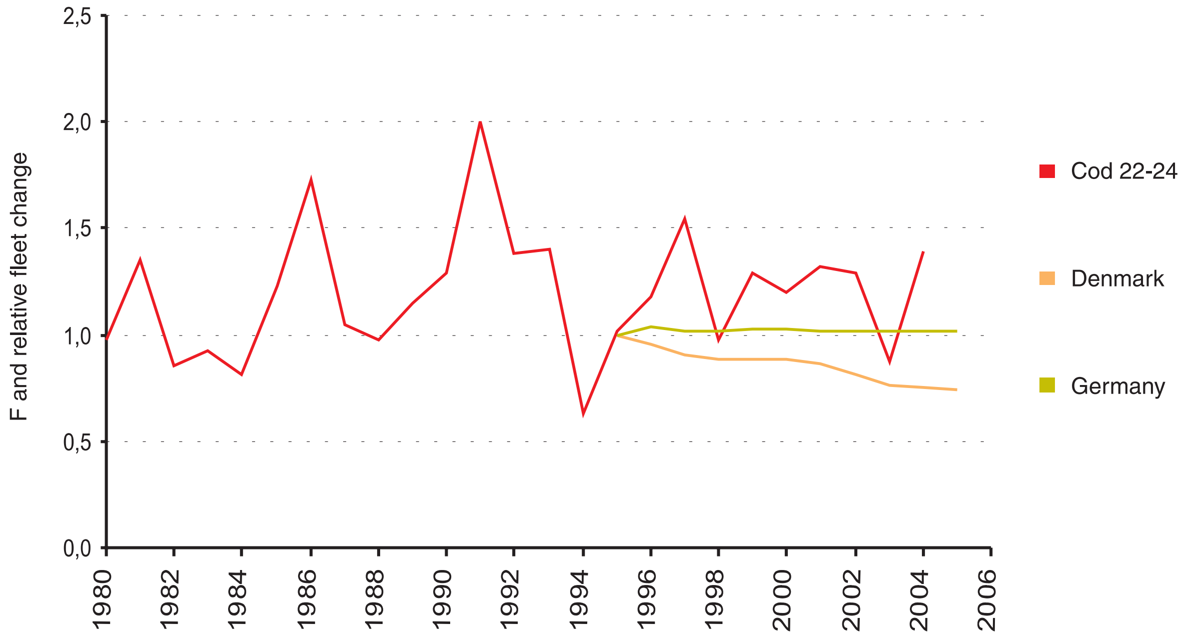
and 2005 the size of the Danish and Swedish fleet (in kW) decreased by 25%. In the Polish fleet, the withdrawal programme was launched in 2004, and only after this year its size started to decrease, as prior to withdrawals the fleet was increasing. The fishing mortality of cod had not been diminishing – it started to decrease only in 2003 and 2004. A question arises, however, about the pressure of fisheries on cod resources had the size of the fleet remained on the same level. Undoubtedly, there would be a large pressure of fisheries organisations on governments to maintain the high fishing quotas – higher than those that the Baltic Commission was establishing during last several years. Assuming that fishing mortality and fishing effort are proportional, it may be stated that in an extreme situation this could lead to an increase in fishing mortality (caused by the reduced fleet if it had not been withdrawn), proportional to the share of withdrawn vessels. Such an increase in fishing mortality between 1996 and 2004 was assumed for the purposes of the simulation of stock biomass for the eastern Baltic cod.

The calculations indicate that if the fleet had not been reduced, the biomass of the spawning stock in 2005 could have been by 25% smaller than the current biomass. Probably the biomass of the stock would decrease to a lesser extent, as there are other resource protection mechanisms in place. The estimated effect would take place in an extreme situation.



Graph 8.4. Fishing mortality F of eastern Baltic cod in 1980 - 2004 and relative change in size (in kW) of the Danish, Swedish and Polish fleets in 1995 - 2005 (1995 = 1)

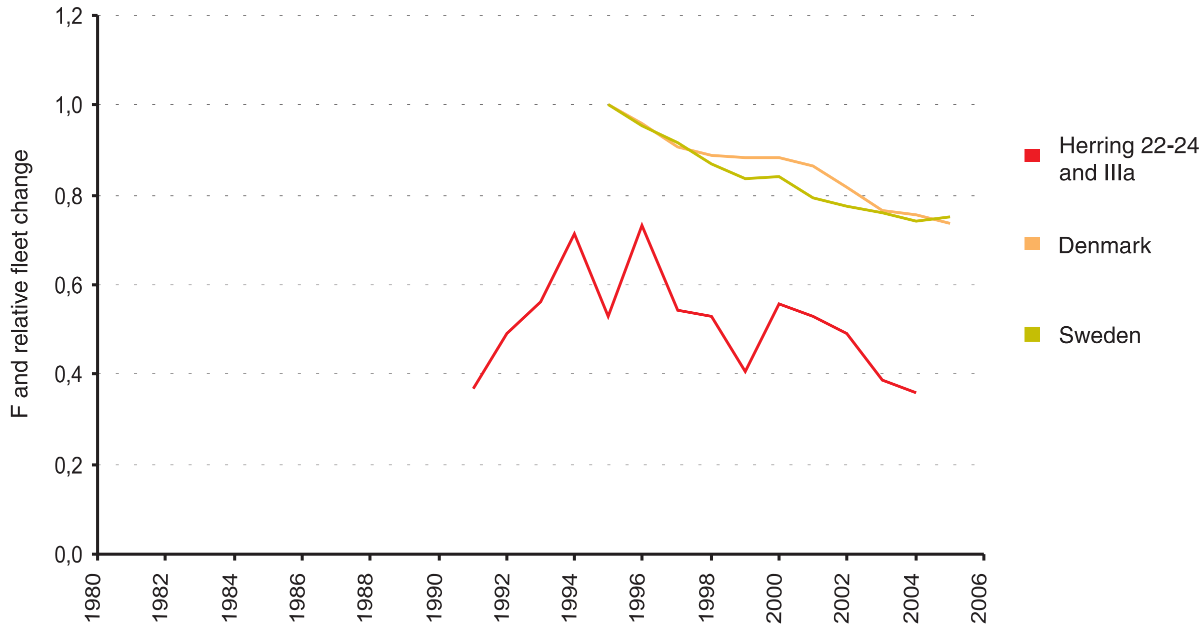
The western Baltic cod (Sub-divisions 22 – 24) is fished for mainly by Denmark and Germany – catch from these two countries after 1995 accounted for almost 90% of the total catch: with the average catch of 62% - Denmark and 27% - Germany. The Graph 8.5 presents a relative size of Danish and German fleets and the fishing mortality of the stock. The pressure on the stock did not decrease in the analysed period, despite the fact that the main fleet fishing for this stock diminished its power by around 25%.



Graph 8.5. Fishing mortality F of western Baltic cod in 1980 - 2004 and relative change in size (in kW) of the Danish and German fleets in 1995 - 2005 (1995 = 1)

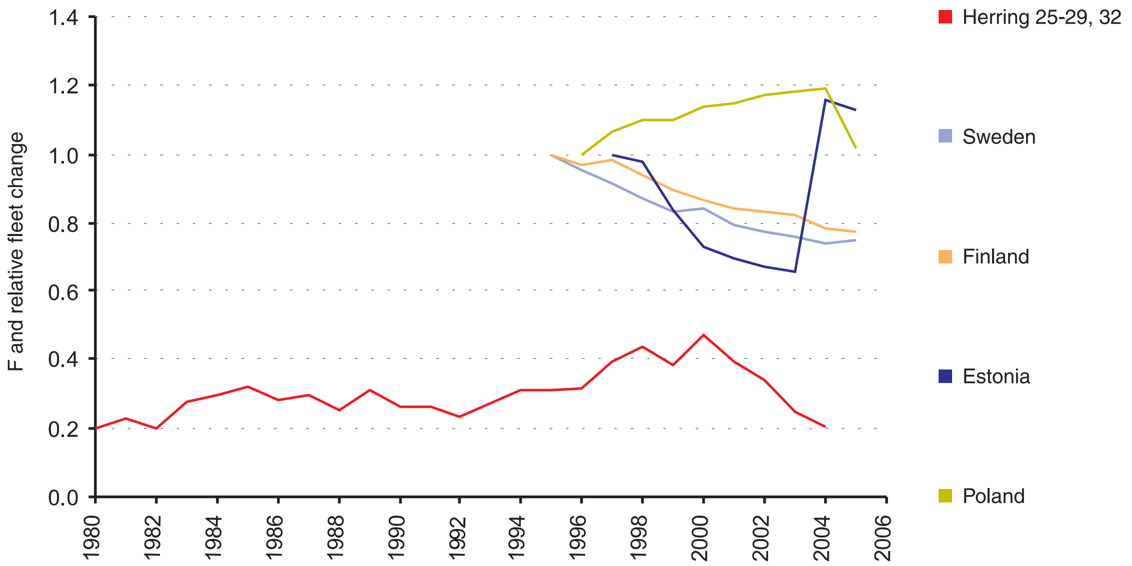
The stock of herrings from the Western Baltic is mainly fished for by Denmark and Sweden. The catch of those countries after 1995 accounted for 42% and 43% respectively of the total catch. The decrease in fishing mortality and in the size of the fleet for this stock is similar (Graph 8.6).

After 1995, almost 90% of herrings from the Central Baltic (Subdivisions 25 – 29, 32) were fished for by Sweden, Estonia, Poland and Finland. The average share of Sweden in the catch was 27%,



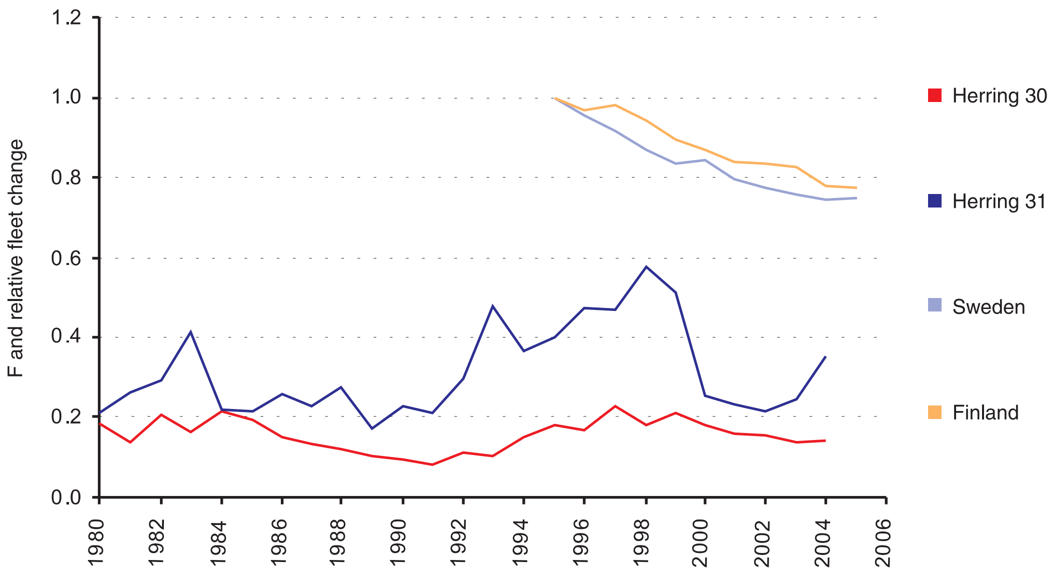
Graph 8.6. Fishing mortality F of herrings in the Western Baltic and Division IIIa in 1980 - 2004 and relative change in size (in kW) of the Danish and Swedish fleets in 1995 - 2005 (1995 = 1)

Poland and Estonia – 18% each, whilst Finland – 15%. The data presented on Graph 8.7 show that the decrease in the fishing capacity of Swedish, Finnish and Estonian fleets was simultaneous to the decrease in the fishing mortality of herrings. During last two years the Estonian fleet considerably increased, but its share in the catch of this stock diminished to 12%, and in consequence, the fleet was responsible only for a relatively small share of fishing mortality of herrings. The analysis of the impact that the fleet reduction could have on the stock is even more difficult due to the stock's complex population structure that has not been thoroughly researched yet. Different fleets may fish for different populations, whilst the populations may be subject to various rate of changes.



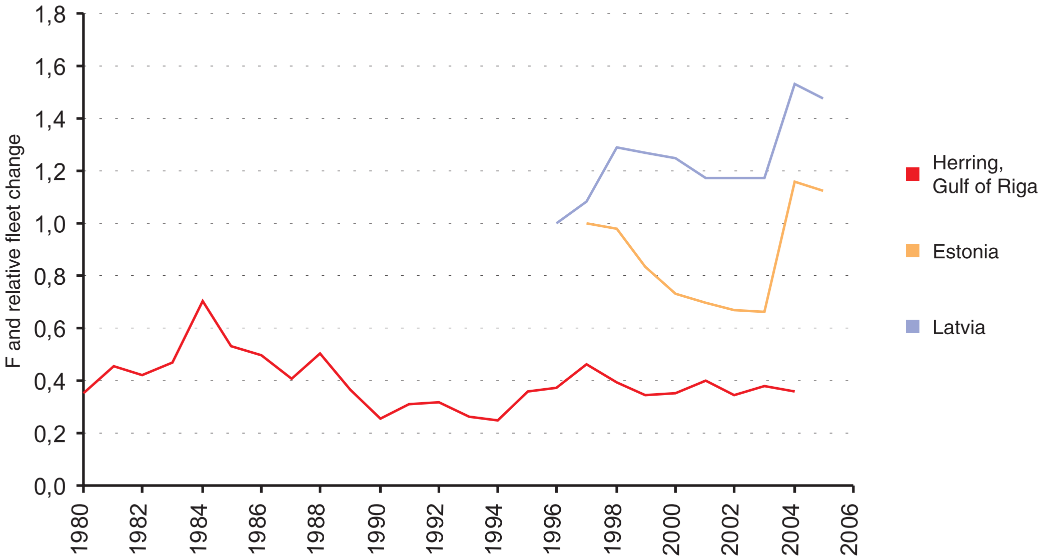
Graph 8.7. Fishing mortality F of herrings in the Central Baltic in 1980 - 2004 and relative change in size (in kW) of the Swedish, Finish, Estonian and Polish fleets in 1995 - 2005 (1995 = 1)

Herrings from the Gulf of Bothnia (Sub-divisions 30 and 31) are exploited only by Finland and Sweden, with Finland holding the dominating position – over 90% of the catch. Both fleets were considerably reduced after 1995 and fishing mortality in both stocks reflects this trend to a certain extent (Graph 8.8).



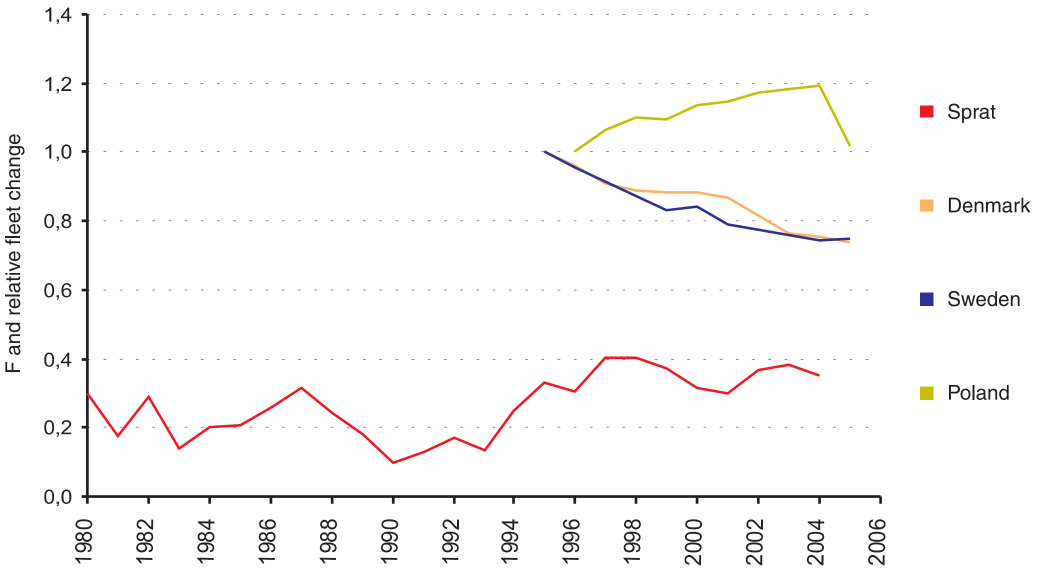
Graph 8.8. Fishing mortality F of herrings in the Gulf of Bothnia (Sub-divisions 30 and 31) in 1980 - 2004 and relative change in size (in kW) of the Finnish and Swedish fleets in 1995 - 2005 (1995 = 1)

To finish the discussion on herring stocks, let us turn to herrings from the Gulf of Riga, which are exploited by Latvia and Estonia. As Poland, these countries have had access to financial assistance for vessel withdrawal only from 2003. Since the 1990s, herring resources in the Gulf of Riga have been high, whilst for last ten years the stock's fishing mortality has stabilised and the stock is exploited sustainably. In 2004, both countries significantly increased their fishing fleets, but this did not affect the fishing mortality of herrings from the Gulf of Riga.



Graph 8.9. Fishing mortality F of herrings in the Gulf of Riga (Sub-division 28.5) in 1980 - 2004 and relative change in size (in kW) of the Latvian and Estonian fleets in 1995 - 2005

After 1995, Baltic sprat was most intensively fished for by Sweden (on average 30% of catch during this period), and next by Poland and Denmark (20% and 17% share in the catch from that period). The share of other countries in the total catch equalled around 33%. Graph 8.10 presents a comparison of fleet reduction and sprat fishing mortality. The graph does not show sprat fishing mortality to diminish. It should be stressed, however, that for many years now sprats have been exploited in a rational manner and it has not been necessary to reduce their fishing mortality. Moreover, the share of countries that did not reduce their fleets in the total sprat catch, and whose fleets actually increased (Poland, Latvia, Germany), equals over 30%.



Graph 8.10. Fishing mortality F of sprat in the whole Baltic in 1980 - 2004 and relative change in size (in kW) of the Danish, Swedish and Polish fleets in 1995 - 2005 (1995 = 1)

Let us finally compare a magnitude that would represent changes in fishing mortality in the whole Baltic with the size of the fleets of the majority of countries fishing here. The average fishing mortality of all the exploited stocks may serve as an index of changes in fishing mortality. Such an index may be, however, questionable, as large fishing mortality of a relatively small stock may have significant impact on the average. Therefore, as an alternative index we may adopt the ratio between the sum of catch for respective stocks and the sum of their biomasses, as fishing mortality should reflect the ratio of catch to biomass. Next we should calculate the total size of Baltic fleets in kW. Let us assume for the purposes of the analysis that Danish and German fleets use only half of their power for fishing on the Baltic, whilst the remaining countries, including Sweden, fish only on the Baltic Sea. The graph 8.11 presents these variables. Both values that approximate the fishing mortality on the Baltic Sea undergo similar changes. After 1997 they show a decreasing tendency, just as the size of the fleet fishing on the Baltic Sea (without Russian fleet, its share in the total power of the Baltic fleet is, however, negligible). The correlation coefficient between the size of the fleet and the average fishing mortality is high and equals 0.8. The correlation of changes in fleet size with the fishing mortality index approximated as the ratio of catch to biomass is lower and equals around 0.5.

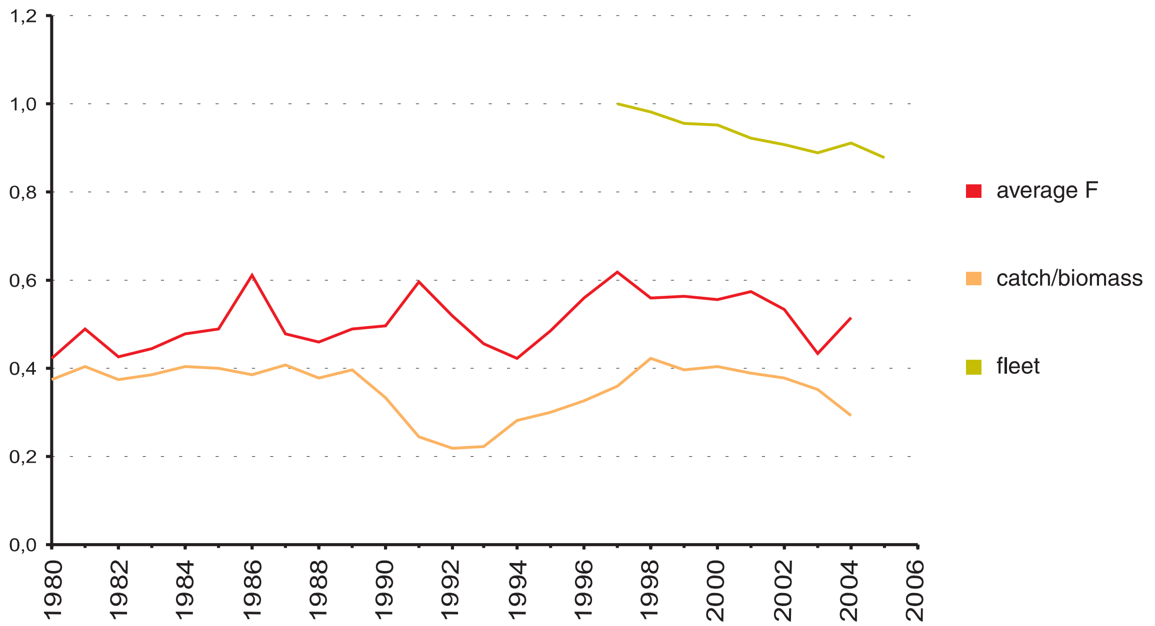
In order to summarise the comparative analysis described above it may be said that:

– reduction of fleet size did not have considerable impact on decreasing cod fishing mortality; it may be, however, assumed that lack of such a reduction would result in increasing the fishing mortality of this stock and decreasing its biomass,

– reduction of fleet size was accompanied by a decrease in fishing mortality of the majority of herring stocks,

– reduction of fleet size did not have impact on fishing mortality of fish stocks with large biomass and exploited sustainably, i.e. sprats and Gulf of Riga herrings.

The conclusions presented above relate to changes in the total size of fleets in the Baltic countries. It has to be born in mind, however, that fishing capacity reduction that occurred between 1994 and 2005 only to a certain extent resulted from FIFG operation (see Table 8.1). Therefore, the impact of FIFG on the state of fish resources is proportionally lower.



Graph 8.11. Indices of fishing mortality F for the whole Baltic (cod, herring and sprat) in 1980 - 2004 and relative change in size (in kW) of the EU fleets in 1997 - 2005 (1997 = 1)

8.3. Potential impact of further fleet reduction on the state of resources in subsequent years

It is extremely difficult to conduct a quantitative assessment of the impact of further fleet reduction on the state of resources. The reasons behind such difficulties have already been described in the previous section and they include simultaneous implementation of other measures regulating fishing activities, e.g. maximum fishing quotas, periodic or whole-year closure of certain regions for fisheries, allowing only fishing gear with good selectivity parameters and with proper mesh size. It is difficult to differentiate between effects of different measures and it would require data and specialist research that do not fall within the scope of this publication. Moreover, the structure of vessels to be withdrawn (their specialisation in certain catch and area) remains unknown.

A very bad state of cod resources and their unsuccessful, so far, rebuilding constitute the main problem of Baltic fisheries. Reduction of the fishing fleet should be of significant help here. Polish fleet should be considerably reduced in the nearest future, as its share of the catch of the eastern Baltic stock amounts to 1/3, whilst the pressure to maintain the high level of cod catch remains very high.

According to assumptions of the Polish “Sectoral Operational Programme – Fisheries and Fish Processing 2004 – 2006 (SOP), around 120 vessels with the tonnage of 10 thousand GT and power of 30 thousand kW should be withdrawn with FIFG financial assistance prior to 2006. It is planned that this reduction will result in decreasing the catch by 25 thousand tonnes. The Polish SOP does not provide priority segments for vessels to be first included in the scrapping programme (e.g. vessels fishing for cod, or for salmon or pelagic vessels). Nevertheless, the programme gives priority for withdrawal of Baltic vessels.

The current results of fishing effort reduction in Poland considerably exceed the aims planned. Until June 2005, 273 vessels, cutters and fishing boats were submitted to the scrapping programme. Their total tonnage amounted to 12.5 thousand tonnes and 40.6 thousand kW, which is much more than the planned reduction level. As until half of 2005 around 75% of available funds were utilised for this objective, it is all the time possible to reduce the potential even further.

It can be expected that the reduction rate will be much slower in future than the current one. The large interest of Polish fishermen in scrapping resulted from a possibility to receive maximum scrapping rates allowed by the EU, but also from a poor financial situation of the sector. The majority of withdrawn until mid of 2005 vessels fished for cod and flatfish – around 200 units, i.e. 70% of the general number of scrapped units. The total tonnage of these vessels amounted to 12.4 thousand GT, i.e. 77% of the total tonnage submitted so far for scrapping under public aid and around 35% of the total tonnage of the Polish Baltic fleet as for the end of 2004. In 2004 these vessels managed to catch almost 4 thousand tonnes of cod and 3 thousand tonnes of flounder, which accounted for over 1/4 of the total Polish catch of the Baltic cod and 1/3 of the catch of flatfish (Table 8.3). Apart from cod vessels, trawlers fishing for herring and sprat constituted a significant group of units submitted for withdrawal – over 100 units with the tonnage of around 5 thousand GT (some of them fished also for cod).

Table 8.3. The size of Baltic fish catch for Polish vessels submitted to the scrapping programme (based on catch data for 2004)

Species	Catch by scrapped vessels	Total Baltic catch	Scrapped/ total catch
Sprat	17 683	96 658	18%
Herring	7 674	28 410	27%
Cod	3 979	15 120	26%
Flounder	2 884	8 798	33%
Other	917	4 819	19%
Total	33 138	153 805	22%

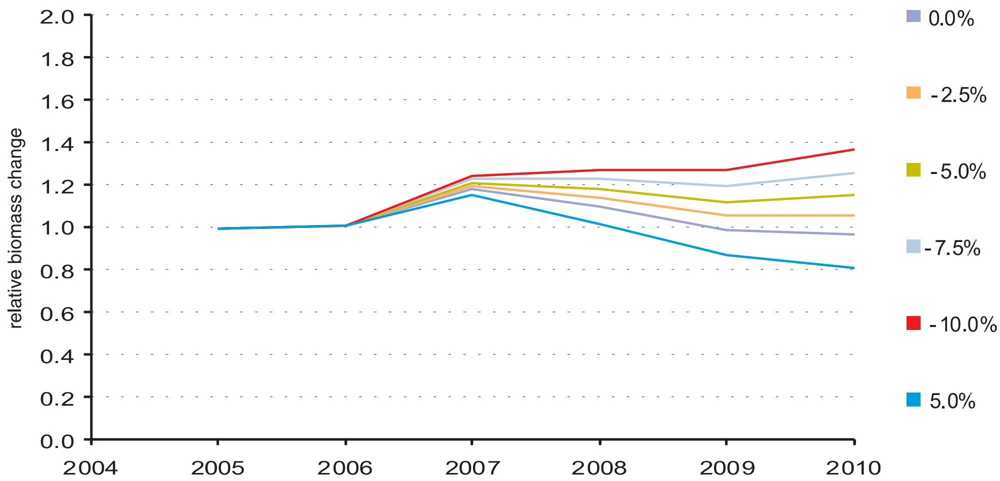
Source: Kuzebski E., Złomowanie floty rybackiej – 200% normy. Wiadomości Rybackie nr 7-8 (146) 2005 r.

According to the assumptions of the Latvian Single Programming Document, in the period of 2004 – 2006, 25 fishing vessels with the tonnage of 2 thousand GT and power of 4.5 thousand kW were to be withdrawn from operation under a compensation scheme. As in Poland, the pace so far for submitting applications for vessel scrapping is much faster than the objectives provided for in the programme. As already mentioned in the previous section, 64 vessels with the tonnage of 4.2 thousand GT and power of almost 10 thousand kW were submitted for the scrapping programme before May 2005, which is twice as much as the planned reduction objectives in terms of both the fishing capacity as well as utilisation of financial resources planned for this measure. Similar to Poland, Latvia decided to pay maximum compensation allowed by the EU. According to information of the Latvian Agency of Fish Resources, vessels of 24 of overall length and vessels using gillnets were the main group among the scrapped units. The first group of vessels fished mainly for sprat and herring – in 2003 they caught 51 tonnes of fish, i.e. 80% of the total Latvian catch of sprat and herring. Vessels using gillnets fish mainly for cod, in 2003 they caught 3.5 thousand tonnes, which accounts for around 77% of the Latvian cod catch. There is not enough detailed data on the structure of the catch of Lithuanian vessels that are being withdrawn from fisheries. Considering, however, the current reduction level of Lithuanian vessels, the small tonnage of the fleet and low catch of this country, reduction of the Lithuanian fleet will not have significant impact on decreasing the fishing effort on the Baltic Sea.

Considering the current trends in scrapping of fishing vessels, i.e. large share of vessels fishing for cod in recent years, and the economic significance of this fish species for further development of the sector, the analysis below presents a simulation for several rates of reduction of the European Union fleet fishing for the eastern Baltic cod during next five years (2006 – 2010). This reduction will comprise of larger reduction of fleets of the new European Union members and lower reduction in the remaining member states, which have initiated this process much earlier.

Respective variants provide for different rates of fleet reduction, which were set at the level from 2.5% to 10% annually. Next, it was assumed that fleet reduction will generate the same relative reduction in fishing mortality. Replenishment of stock was conditioned upon the biomass of the spawning stock, based on observation of this relation in the period after 1986, i.e. in the period when conditions for effective cod spawning were disadvantageous. The graph 8.12 presents results of the simulation in terms of biomass of the spawning stock as compared to the biomass observed in 2005, which means that 1 stands for the biomass in 2005. Given the aforementioned assumptions, maintaining the current fishing mortality level, which is tantamount in the simulations to zero fleet reduction, would result in a decrease of biomass of the spawning stock by 3% until 2010 when compared to the current level (2005). If fleet reduction level is set at 5% annually (reduction of Danish and Swedish fleets was not much lower in the period of FIFG operation), the biomass of the stock would increase by 2010 by 15% when compared to the current level. Clearly, the highest increase in the biomass would be achieved for the largest fleet reduction of 10% annually. Under such circumstances the biomass would increase by 37% during 5 years. The results presented above are based on an optimistic assumption that the reduction of fishing mortality will be identical as the reduction of the fleet's size. Assuming that a particular fleet reduction will imply only 50% of that reduction as reduction in fishing mortality, the biomass will increase almost by 20% if the annual decrease of the fleet reaches 10%.

The results presented above have positive impact not only on resources but also on the fisheries sector, as they increase its profitability. A better state of fish resources should have direct proportional impact on an increase of fishing quotas available for fishermen, and therefore, on an increase of profits from fisheries. The table 8.4 presents an increase in the volume and value of the catch of Polish vessels that obtained a fishing quota for cod in 2005. These calculations were made for respective groups of vessels, according to the methodology, adopted in Poland, for division of the 2005 fishing quota for cod between vessels with the overall length over 10 metres. The Polish 2005 TAC for cod in the eastern Baltic stock equals 10.1 thousand tonnes, out of which a little over 9 thousand tonnes is available for vessels over 10 metres long as individual fishing quotas. The remaining part of the TAC constitutes a common quota for fishing boats up to 10 metres. Until the end of the first half of 2005, 175 fishing vessels longer than 10m that were fishing for cod were submitted for scrapping. If we assume that no more cod vessels are withdrawn, the number of vessels that will in future use the fishing quotas for this species will decrease from the current 402 to 227. If the system for division of fishing



Graph 8.12. Simulation of changes in biomass of eastern Baltic cod stock between 2006 and 2010 with fleet reduction rate up to 10% annually. The graph also presents a simulation of changes in biomass with an assumed increase in fleet size by 5% annually (biomass values are relative to the 2005 biomass value = 1).

quotas does not change in the subsequent years and the TAC is kept at least at the 2005 level, the smaller number of vessels that will be authorised for cod fishing will result in an increase of individual fishing quotas by almost 90% in all vessel groups. Such an increase in the quota will have different impact on the increase of revenues in respective vessel groups, which will depend on share of cod catch value in the total catch value of these vessels. In 2004 this share varied between 7% for large vessels over 25 metres long (specialised in herring and sprat) to 80% for vessels between 10 and 15 metres long, where cod constitutes the main species in the catch. The calculations presented below show that due to larger fishing quotas revenues will increase the most in the group of vessels between 10 and 15 metres long (+70%), for vessels up to 25 metres revenues may increase by 50-60%, whilst a small increase of 6% may also occur in the segment of large vessels – over 25 metres.

Table 8.4. Simulation of increase in individual fishing quotas and catch value for vessels that would remain in the fisheries sector after withdrawal of a part of the Baltic fleet.

Vessel group	Number of vessels		Fishing quota per vessel (tonne)		Increase in the fishing quota (tonne)	Share of cod in the total catch value	Increase in the catch value
	Prior to reduction	After reduction	Prior to reduction	After reduction			
10-15 m	107	90	16,5	31,0	14,5	80%	70%
15-19,5 m	143	72	23,1	43,4	20,3	64%	56%
19,5-25 m	107	43	33	62,0	29,0	67%	59%
over 25 m	45	22	16,5	31,0	14,5	7%	6%
Total	402	227					

Source: REGULATION OF THE MINISTER OF AGRICULTURE AND RURAL DEVELOPMENT of 24 December 2004 on the manner and conditions for using the general fishing quota in 2005 (Dz. U. No 283, item 2837). Own calculations.

The calculations presented above are based on the assumption that the TAC for cod will remain at the same level. However, increase in stock biomass (resulting among other things from lower fishing pressure) should allow for increasing the available fishing quotas for this species in future and for boosting efficiency of fishing. In other words, an improved state of resources will make it possible for vessels that will remain in the fisheries sector to catch the same or even larger amount of fish with an unchanged labour effort, which will contribute to decreasing of unit costs of the catch.

Moreover, it may be expected that unreported catch, so called black landings', will be reduced in future (this issue is addressed also in the next chapter), as currently it results from too low fishing limits, which in turn are closely connected with fishermen's profits.

Commissions responsible for management of fish resources, including the Baltic Commission, usually regulate the catch of the more important fish species by means of fishing quotas (TAC) that are specified on the annual basis, depending on the current state of stock. Moreover, they frequently introduce technical measures that support resource protection activities (e.g. minimum mesh size, periods and areas closed for fishing, allowable by-catch level). Nevertheless, due to social and economic reasons as well as pressure exerted by fishermen the final fishing quotas are frequently higher than those recommended based on scientific research.

Long experience in resource management shows that the idea of maximum allowable catch as a basic measure for resource protection fails, mainly due to problems with its effective implementation.

A majority of gadoid and flatfish stocks in waters adjacent to Europe, including those managed by the European Union, are overfished despite yearly regulations of their catch and complex structures for resource management that are responsible for implementing and enforcing proper regulations.

For over-fished stocks, it is recommended by advisory bodies (experts, researchers) to aim for a certain reduction of fishing mortality. Experience shows, however, that for many stocks the international managing units failed to achieve this aim by means of fishing quotas. One of the reasons behind this situation is that the actual catch is frequently much larger than the allowable fishing quotas that have been defined earlier. At the same time fishermen most frequently do not register this catch.

It is estimated that in some cases the unreported catch may amount to as much as 100% of the allowable fishing quotas. This problem occurs both in Central and Eastern Europe countries, where fisheries administration and control units are still in the process of developing their capacities, as well as in the rich countries of the West, where administration and control bodies are theoretically stronger. The stock of the eastern Baltic cod constitutes a typical example of a stock with significant unreported catch. Research proves that during some of the years in the 1990s, the level of unreported catch amounted to 100%. After the year 2000, ICES assumed it to be at the level of 35 – 45%, certain data show, however, that it may reach 100%, just as in the extreme cases during the 1990s.

Given the above, it is necessary to introduce the concept of regulation of fishing effort into the resource management system as a supplement or an alternative for regulation by means of fishing quotas.

At the same time limiting this measure only to e.g. reduction of fishing days may prove ineffective, unless it is supported by fishermen. Reaction of Polish fishermen to prolongation of the period closed for eastern Baltic cod fishing from 2 to 4.5 months in 2005 constitutes just one of recent examples. The fishermen threatened that they would not respect prolongation of the period, unless they receive proper compensation. Therefore, it is necessary to adjust the fishing capacity of the fleet to the state of resources in such a way that activities of fishermen that remain in the sector are profitable. The sole solution for reaching this objective is to withdraw a certain part of the fishing fleet and maintain it on the level proportionate to the state of the resources.

Section 8 compares the size of the fleet with changes in fishing mortality of Baltic fish stocks in the period between 1995 and 2004. The comparison proves that:

1. reduction of the size of the fleet did not have clear impact on decreasing cod fishing mortality; it may be, however, expected that lack of such a reduction would result in increasing of the fishing mortality of this species and decreasing their biomass – simulations show that then the biomass could be about 25% lower than the biomass of 2005;
2. reduction of the size of the fleet was accompanied by a decrease in fishing mortality of the majority of herring stocks;
3. reduction of the size of the fleet did not have impact on the fishing mortality of fish stocks that have large biomass and that are exploited sustainably, i.e. sprat and the Gulf of Riga herring ;
4. further decreasing of the size of the fleet should significantly improve the state of cod resources – by almost 20% during 5 years, if the reduction reaches the level of 5% annually.

The above conclusions relate to changes that occurred for the total fleet of the Baltic states (FIFG contributed to approximately half of these changes).

Between the years 1994 and 2005, FIFG co-financed withdrawal from operation of vessels in eight EU states fishing on the Baltic Sea (Germany, Denmark, Sweden, Finland, Poland, Lithuania, Latvia and Estonia). The total tonnage of those vessels amounted to 58 thousand GT, whilst the total power to 204 thousand kW. At the same time, the Fund supported construction of vessels with the total tonnage of 25 thousand GT and power of 72 thousand kW. Therefore, the net balance of the reduction of the fleet capacity equalled – 33 thousand GT and -132 thousand kW, which is tantamount to more or less the size of the whole Polish Baltic fleet at the end of 2004. Such a reduction has undoubtedly contributed if not to improvement of the state of the resources then at least to halting of their further degradation.

It is difficult to predict how much of the fishing capacity of the fleet will be withdrawn in the up-coming years. The fast reduction rate in recent years results first and foremost from withdrawal of vessels in new members states, mainly in Poland, where owners of vessels accounting for 1/3 of the total tonnage of the Baltic fleet submitted applications to the scrapping programme during the first year after joining of the European Union. An improved economic situation of fishermen, resulting from higher quotas, which will be left by withdrawn vessels, will rather persuade them to remain in the fisheries sector, and it will be more and more difficult to encourage fishermen to withdraw their vessels, even for very large compensations. On the other hand, the current strict EU policy on construction of new vessels and the entry/exit regime will definitely contribute to further limiting of the fishing capacity of the Baltic fleets.

10.1. Assessment of the state of stocks

Assessment of the state of cod, herring and sprat stocks resources was conducted using mathematical models based on the age structure of catches. The Extended Survivors Analysis – XSA - was applied (Shepherd, 1999) as well as the Integrated Catch Analysis – ICA (Pattersson, 1998). The XSA belongs to advanced methods and its more detailed description can be found in the quoted study by Shepherd. Only a simplified description of the method is provided below.

The XSA method is based on standard equations applied in VPA methods (Gulland, 1965) and in cohort analysis (Pope, 1972). This is a method of 'reverse' calculations – based on the stock abundance in a particular year and catch for the previous year, the abundance of the stock at the beginning of the previous year is calculated. In the basic equation the stock's abundance at a given age a and at the beginning of the year y, $N_{a,y}$, equals

$$N_{a,y} = [N_{a+1,y+1} exp(M_{a,y} / 2) + C_{a,y}] exp(M_{a,y} / 2)$$

where C stands for catch in numbers, whilst M for the coefficient of natural mortality. The coefficient for fishing mortality F is calculated according to the following formula:

$$F_{a,y} = ln(N_{a,y} / N_{a+1,y+1}) - M_{a,y}$$

The formulas presented above are simple and calculations do not pose problems if we know the abundance of the stock for respective age groups in the initial year (i.e. most recent year) of calculations. However, it is precisely this value, i.e. stock abundance, that we want to arrive at and we calculate it by tuning the results to the observable indices for the stock's size. Usually complex iterations are applied: we assume a stock abundance in the initial year, conduct reverse calculations, compare with relative stock size indices, introduce corrections to the value assumed for the abundance in the initial year and repeat the process. The manner of introducing corrections is complex and this is what differentiates the XSA method from the other methods for stock assessment.

The ICA method belongs to the group of integrated or statistical methods. It is based on the assumption that during a period of several years back the fishing mortality coefficient $F_{a,y}$ can be presented as a product of selection at age, s_a, and fishing mortality at a reference age depending on the year, f_y:

$$F_{a,y} = s_a * f_y$$

The parameters of ICA are arrived at by minimising the sum squared differences between the size of stock calculated based on the model and its observable indices.

Calculation of a stock's biomass by means of the XSA or ICA methods requires the following data:

– size of the catch,
– age structure of the catch,
– mass of individual fish according to age,
– sexual maturity according to age,
– natural mortality coefficient,
– relative indices of biomass and stock abundance according to age – indices of stock abundance from survey or standardised catch per unit of effort may be used here.

For many years now, the Baltic countries have been conducting research in order to compile the aforementioned data that characterise fish stocks and their exploitation.

The state of the majority of stocks has been calculated by means of the XSA method. The ICA method was applied only for assessment of the stock of the western Baltic and Danish Straits herring. For the purpose of cod stock assessment, the method was tuned to stock size indices obtained from international research cruises (Denmark, Latvia, Germany, Poland, Russia and Sweden), based on standard research hauls and on fleet catch per unit of effort. For herring from the western and central Baltic and for sprat the method was tuned to stock size indices estimated during international hydroacoustic research cruises (Denmark, Latvia, Germany, Poland, Russia and Sweden). For herring from the Gulf of Riga and from Sub-divisions 30 and 31, catch per unit of effort was used for tuning the method. The credibility of stock assessment was verified by means of retrospective analysis.

The analysis applies variable values for natural mortality coefficients of central Baltic herring and sprat, depending on the biomass of cod stocks. For that purposes results of multispecies assessment of the Baltic stocks (ICES, 2003) were applied.

Due to the practice of incomplete reporting of cod catch, which has been widespread for several years now, the official catch has been corrected, so that the values for catch are closer to the reality. The size of unreported catch for some years has been calculated on the basis of the relation between the size of research catches and official catches. The Cook's method (1995) was used for these purposes in some years. Moreover, the official catch in 2000 – 2004 was increased by 35 – 45%.

The forecast for stock replenishment was calculated based on results of international research cruises carried out by a majority of the Baltic countries since the 1980s.

10.2. Simulations of stock dynamics resulting from changes in fleet size

The state of resources as defined by ICES (2005) constituted a point of departure for simulations of the changes in the state of resources relative to the changes in the fleet's size. It has been assumed that the fleet's reduction will directly translate into an analogous reduction of the fishing mortality. Next, the data was put into equations that specify the stock's abundance in a particular age group at the beginning of the next year, when the abundance of the previous year as well as natural mortality and fishing mortality coefficients are given.

$$N_{a+1,\,y+1} = N_{a,y}\, exp\,(-M_{a,y} - F_{a,y})$$

The size of the annual catch in numbers was specified according to Baranov's equation:

$$C_{a,y} = \frac{F_{a,y}}{M_{a,y} + F_{a,y}} N_{a,y}\,[1 - exp(-M_{a,y} - F_{a,y})]$$

The stock's biomass and catch volume were calculated by multiplying the number of individuals and the average mass of individual fish for respective age groups and summing. Calculations of the spawning stock biomass account for the percentage of fish mature for spawning in a given age group.

The simulation of the future state of eastern Baltic cod stock necessitated forecasting of stock replenishment. Stock replenishment was modelled depending on the spawning stock biomass, based on analysis of this relation after 1986, i.e. in the period of disadvantageous conditions for effective cod spawning. A double linear model was used for this purpose. The model, fitted to the observations from the period 1987 – 2004, assumes that for stock biomass lower than 99 thousand tonnes the replenishment increases linearly with the biomass, whilst for stock biomass equal or exceeding this value, the replenishment is constant.

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