

*Proposal including detailed description of the budget  
for 2005 (Annex 1).*

# **Estonian National Programme for collection of fisheries data for 2005**

by

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# Estonian National Programme for collection of fisheries data

## 1. Introduction

This document describes the Estonian National Programme for collection of data in the fisheries sector in 2005. The programme has been developed in accordance with the rules laid down in the “*Commission Regulation (EC) N<sup>o</sup> 1639/2001 of establishing the Minimum and Extended Community Programmes for the collection of data in the fisheries sector and laying down detailed rules for the application of Council Regulation (EC) N<sup>o</sup> 1543/2000*”, hereafter in this programme called the “Data Directive”.

The programme will be conducted in close cooperation between:

- **Estonian Marine Institute (EMI)**  
Estonian Marine Institute, University of Tartu, is a Public Research Institution that carries out research, investigations and provides advice concerning sustainable exploitation of live marine and fresh water resources. It has experience in fisheries management and economics, as well as in mathematical modelling. Institute has an agreement for 2003-2005 with the Ministry of the Environment to conduct applied fisheries research in Estonia.
- **Estonian Ministry of the Environment (EME)**  
Estonian Ministry of the Environment is responsible for regulating the questions concerning the protection of marine nature and environment, as well as for solving the tasks concerning the use of marine resources. The Fish Resources Department, established in 2001 to replace the Fisheries Board and the Fisheries Department, manages and coordinates research, assessment, exploitation, reproduction and protection of fish resources.
- **Estonian Ministry of Agriculture (EMA)**  
As of March 2001, the fisheries matters are divided between two ministries: the Ministry of the Environment and Ministry of Agriculture. Fishing Industry Department of the latter deals with issues of aquaculture, production, processing and marketing of fish and fish products, structural fishing policy excluding the fishing fleet.

Estonian Ministry of the Environment is acting as coordinator for the Estonian Programme. A Steering Group will be established including members from institutions involved in the programme. The main objective of the Steering Group is to coordinate of the work under the programme.

Primary data collected under the Estonian programme will be stored in the following computerised databases:

- Fishing Vessel Register. Data on fishing capacity. (EME)

- Logbook database. Data on origin of catches and on effort. (EME)
- Fishermen's diaries database. Data on catches and effort by gear type and area of coastal fishery (EME)
- Landings declaration database, data on quantities landed by species. (EME)
- Sales notes database. Data on quantities landed and prices. (EME)
- Biological database. Data on biological parameters, CPUEs etc. (EMI)
- Economic data. (EME, EMI)

### **Biological database**

Biological data aggregated by the ICES sub-divisions and quarters have been presented for the Baltic stock assessment working groups of ICES to assess stock size, project biomass development and advise total allowable catches (TAC).

At present Estonian biological data are stored in several databases; usually data for one species are stored in a separate database. These databases were developed in dBaseIV, ACCESS, BASIC or as an Excel or ASCII files. They contain biological data for herring, sprat, flounder and other species, including main coastal fish species exploited by the Estonian fishing fleet in the eastern Baltic Sea. There is a need to develop unified database, which will be done in 2005.

Some of the Estonian data have also been stored in the international databases managed within ICES. These are

- **BALTCOM** - international database from commercial fishery of main Baltic species (excluding salmonids) containing biological parameters of fish (length, weight, age, sex, maturity) from landings and discards.
- **BALTDAT** - international database from acoustic surveys. The database contains acoustic measurements and biological data on Baltic herring and sprat.

Coastal fish survey data for the reference area are stored in the **HELCOM COBRA** database (since 1992).

### **Economic databases**

Primary data for economic analyses such as catch volumes by enterprises (boats) and raw fish prices will be collected by EME and stored in a database. Cost data will be collected by EMI (using surveys) and managed by the institute; these data are surrounded by strict confidentiality and will not in any circumstance be passed on to other persons or authorities. EMI has access to the data stored EME databases. Each year EMI produces a statistical file on the costs and earnings of the fishing fleet (divided into three segments: coastal fishery, trawlers below 24 m, and trawlers above 24 m). This file does not contain individual data on separate fishing enterprises and can therefore be made available for external users.

All data collected under the programme are dealt with in confidence. Accesses to the data are limited to authorised staff members from the participating institutions and no one outside the institutions has access to the data without permission.

Estonian biological and economic databases will be fully developed in 2005.

### ***1.1 Co-operation and task sharing between Estonia and other Member States***

Collection of information on fishing capacity, fishing effort, economic and landings statistics are carried out entirely on a national basis. Biological information on catches, information collected by surveys and information on discards are in most cases coordinated internationally and carried out in close cooperation with research institutes in Member States and third countries.

In the economic field EMI constitutes the Estonian representative in the project "Economic Assessment of European Fisheries" organized under the Concerted Actions and Thematic Networks which is committed to develop a common method or standard for evaluation of the economic situation in the Community fisheries.

### ***1.2 National Correspondent***

Estonia has assigned the Estonian Ministry of the Environment as the National Correspondent. Contact person is until further notice:

Senior officer Leelo Kukk  
Estonian Ministry of the Environment  
Toompuiestee 24  
15172 Tallinn, Estonia  
Phone: +372 6604 567  
Fax: +372 6604 599  
E-mail: leelo.kukk@ekm.envir.ee

### ***1.3 Appreciation of the level of precision***

The information on landings by species, catch areas, fishing effort and fishing capacity will be given on level 3. All information concerning landing figures (tonnes by species) will be given as census data, with potentially 100% coverage as all commercial landings in Estonia have to be reported to EME. Data on capacity and effort can be given for all Estonian fishing vessels above 12 m (i.e. trawlers).

In 2005, the biological sampling will generally be carried out with intensity adopted for 2004, which corresponds or for some species is higher than indicated in EC Regulation No 1639/2000 (Annex, Appendixes XII and XV).

For the collection of economic data on the fishing fleet the objective is to reach a precision level  $\pm 25\%$  for a 95% confidence interval using a stratified simple random sampling method. The final level of precision will be calculated on the basis of the data provided by the sampled companies according to standard statistical methods.

## **2. Module of evaluation of inputs: fishing capacity and fishing effort**

### ***2.1 Collection of data concerning fishing capacity***

#### **Minimum programme:**

All Estonian fishing vessels with the right to undertake commercial fishery are registered in the Fishing Vessel Register in EME. The Fishing Vessels Register is a computerised database and includes among others the following information:

- Vessel type e.g. trawler, seiner
- Age of the hull
- Dimensions of the vessel; GRT or GT, length.
- Engine power.
- Vessel owner.
- IRCS
- Internal and external registry number of vessel.

The information in the Vessels Register is registered according to Regulation (EC) N° N° 2090/98 and No 2006/2004.

The Fishing Vessel Register is updated regularly.

Data on fishing capacity on an aggregated level by segments as described in Appendix III of the Data Directive can at any time be delivered on a precision level of 3 concerning vessels > 12 m, as all such vessels are registered. For smaller vessels the data can be delivered on a precision level of 1.

#### **Extended Programme:**

No data collection will be carried out within the framework of the extended programme.

### ***2.2 Collection of data related to fishing effort***

#### **Minimum programme:**

Member States are required to collect data for estimating the fishing effort and fuel consumption in accordance with Commission Regulation (EC) No. 1639/2001, Appendix V to X. Estonia will adhere to the minimum programme.

#### *Fuel consumption*

Calculations of the average annual fuel consumption expressed in volume units for vessels in the respective segments (as defined in Appendix III) and the average cost will be dealt with in the collection of economic data on the fishing fleet.

*Fishing effort by type of fishing method*

Fishing effort defined as the sum of weighted (as defined in Appendix V) fishing days (as defined in D.1.a) with a particular fishing method (as defined in Appendix VIII) must be reported by specific area (Level 3 as defined in Appendix I).

In addition, the effort defined as the sum of weighted (as defined in Appendix V) fishing days (as defined in D.1.a) with a particular fishing method (as defined in Appendix III) must be reported by area (Level 3 as defined in Appendix I) and vessel length category (as defined in Appendix IV).

*Specific fishing effort*

Effort defined as the sum of weighted (as defined in Appendix V) fishing days (as defined in D.1a) with a particular fishing method (as defined in Appendix VIII) must be reported by division (as defined in Appendix I) and species (as defined in D.1a (iii) and as defined in Appendix VI).

The following data are collected:

<b>DATA</b>	<b>SOURCE</b>
Fuel consumption	Vessel register Questionnaires
Fuel prices	See Chapter 4.1
Number of fishing days with a particular type of gear (as defined in Appendix III+IV)	Log books and fishermen's diaries
Catching area (as defined in Appendix I)	Log books and fishermen's diaries
Period	Log books and fishermen's diaries
Quantity by species (as defined in Appendix VIII)	Log books and fishermen's diaries, sales notes and/or sampling)
Vessel length (as defined in Appendix III)	Vessel register

The fishing effort is estimated for every quarter by mechanical processing of reported data in the log base (log books, sales notes, sampling, vessel register, etc.). The result will be reported annually.

**Extended Programme:**

No data collection will be carried out within the framework of the extended programme.

### **3. Module of evaluation of catches and landings**

#### ***3.1 E. Collection of data related to catches and landings***

##### **Minimum programme:**

Member States are required to report commercial landings of all stocks. The data must relate to the total landed quantity and must be reported by species sub-divided by catching area and by year. For the fish stocks specified in Appendix XII to Commission Regulation (EC) No. 1639/2001, details of discards and the total catch must also be reported. The catch of salmon in recreational and game fisheries in the Baltic Sea must also be reported.

The geographical origin of catches and landings will be reported at level 2, Appendix I, in Commission Regulation (EC) No. 1639/2001. For stocks included in appendix XII of the regulation, the aggregation level will meet the terms specified for the different areas.

The aggregated data meet the requirements in respect of accuracy stipulated in Chapter 3.E.1.c of the Commission Regulation.

A pilot study relating to the catch thrown overboard, and the catch of salmon and cod in game and recreational fisheries will be carried out in 2005.

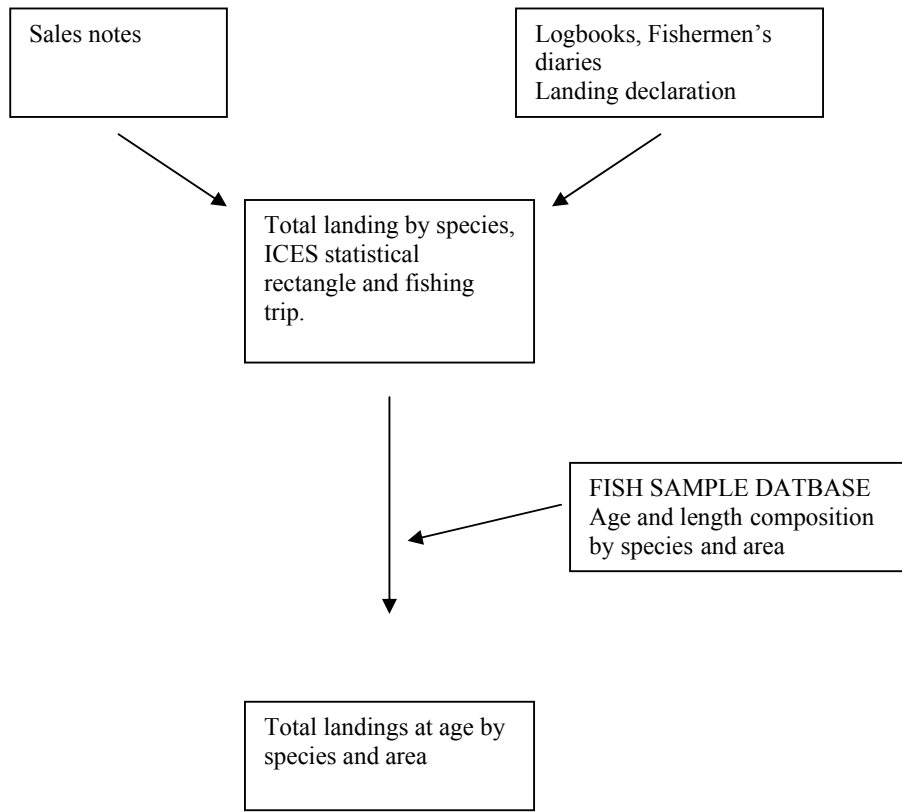
The information in the Sales Notes database is registered according to the provisions of Council Regulation (EC) No 2847/93 and No 104/2000.

It should be mentioned that all landings are recorded and there is no derogation for vessels less than 10 m. This means 100% coverage for all landings.

Details of the landed quantity are collected from fishermen and first-hand buyers in accordance with Council Regulation (EC) No. 2847/93. Data will reflect Estonian landings in Estonia and abroad and transshipment to third country vessels as well as other countries' landings in Estonia.

Details in respect of the value of the landed quantities sub-divided by species are provided in the context of the economic data in accordance with Chapter 4.J.

The applicable conversion factors for landings in Estonia are shown in Appendix I. When landing in other countries, their factors normally have effect when calculating live weight from product weight. The estimation procedure is illustrated by the flow diagram below.



For all stocks, the quantities landed in Estonia will be reported annually. The reported quantities will relate to the adjusted catch after having conducted a cross-checking of data from the log books, landing declarations, sales notes and sampling.

The Estonian fishery is targeting fish for human consumption purposes. The so-called “industrial fishery”, where all the landings are made for reduction purposes (fish meal and oil), is not developed, but the situation may change in the near future. Nevertheless, these landings will probably not be made in Estonia due to the lack of processing industry.

Herring and sprat trawl fishery is often a mixed fishery. Proportion of herring and sprat in landings will be determined in every sampling of herring and sprat (see 3.5). Additional sampling will be performed in areas of mixed fishery if needed.

### 3.1.1 Game and recreational fisheries

#### Minimum programme:

Estonia has no recreational fisheries for bluefin tuna.

Catches of recreational fishery are almost unknown. A pilot study of cod, salmon and sea trout catches in recreational fisheries will be conducted. This study will be based on questionnaires and interviews (on-site and postage/phone).

Catch species composition, weight of catches per species will be recorded by area, quarter, fishing method. Where possible, data on length, weight and age composition of recreational catches are recorded.

Further actions will be decided on the basis of the results of this pilot study.

### **Extended programme:**

#### **Recreational catches of other species than salmon, and salmon catches in rivers**

Recreational fishery is developing in Estonia but still much less important than in the Nordic countries. The most important recreational fishery is under-ice recreational fishery (angling) for perch in 28-5, probably taking hundreds of tons of perch. Data collection of catches of perch and of other species than salmon in the Baltic Sea, and salmon catches in rivers will be enforced with the same survey and method as presented for the minimum program. This pilot study will be started already in 2004 using national funds.

Catch species composition, weight of catches per species will be recorded by area, quarter, fishing method. Where possible, data on length, weight and age composition of recreational catches are recorded.

Further actions will be decided on the basis of the results of this pilot study.

## ***3.2 Estonian discard sampling***

### **3.2.1 Introduction**

According to the Data Directive chapter 3.E.1.b Estonia must collect discard data in order to be able to present estimates of discard rates for selected species (Appendix II). Until now, only sporadic discard sampling has been carried out as the Estonian legislation does not allow discards (in case of catching species or age/length groups of fish exceeding the allowed proportion, the Environmental Inspectorate should be informed, catch retained on board, and the fishing area should be changed). The real situation with discards remains therefore largely unknown, and the current situation may change due to possible changes in the legislation, as well as due to extending of fishing operations outside the Estonian EEZ. Therefore, pilot study on sampling of discards will be initiated in 2005 (trawl fishery and coastal trap-net fishery for herring) and completed in 2006 (other coastal fisheries). Conclusions from the 2005 study will show if there is a need for regular sampling, and the National Program for 2006 and subsequent years will be adjusted accordingly.

Data will be collected by staff from EMI, primarily by sampling on board of commercial fishing vessels. Also, selected and appropriately trained fishermen will be engaged in data collection. In such cases, the part of the catch, which normally will be

discarded, will be landed separately from the normal landing part of the catch and analysed by EMI.

The information to be recorded is:

- Vessel and gear characteristics
- Place, date, time and duration of fishing operation
- Total weight of discard and landing by all species caught
- Separate length distributions of discard and landings by all relevant species caught.
- Otoliths per cm group of undersized fish (discard part of the catch) of selected species.

All collected discard data will be recorded in national database at EMI and made available internationally (IBSSP database: BALTCOM).

**Extended Programme:**

No data collection will be carried out within the framework of the extended programme in 2005.

***3.3 F. Collection of data concerning the catches per unit effort and/or effective effort of specific commercial fleets***

**Minimum programme:**

Catch per unit of effort (CPUE) data from Estonian commercial fleets are not used by international scientific assessment working groups.

Catch and effort data collected in the National Programme are used internally within the EMI in some fish stock assessments. In Estonian fisheries CPUE data are obtained from the log-books and fishermen's diaries. For stock assessments, CPUE is usually calculated according to effective fishing time of the gear, and weighting by engine power is normally not used in the Baltic Sea area as proposed in Annex, Chapter III in Council Regulation.

No financing is requested.

**Extended Programme:**

No data collection will be carried out within the framework of the extended programme.

### ***3.4 G. Eligibility of the scientific evaluation surveys of stocks***

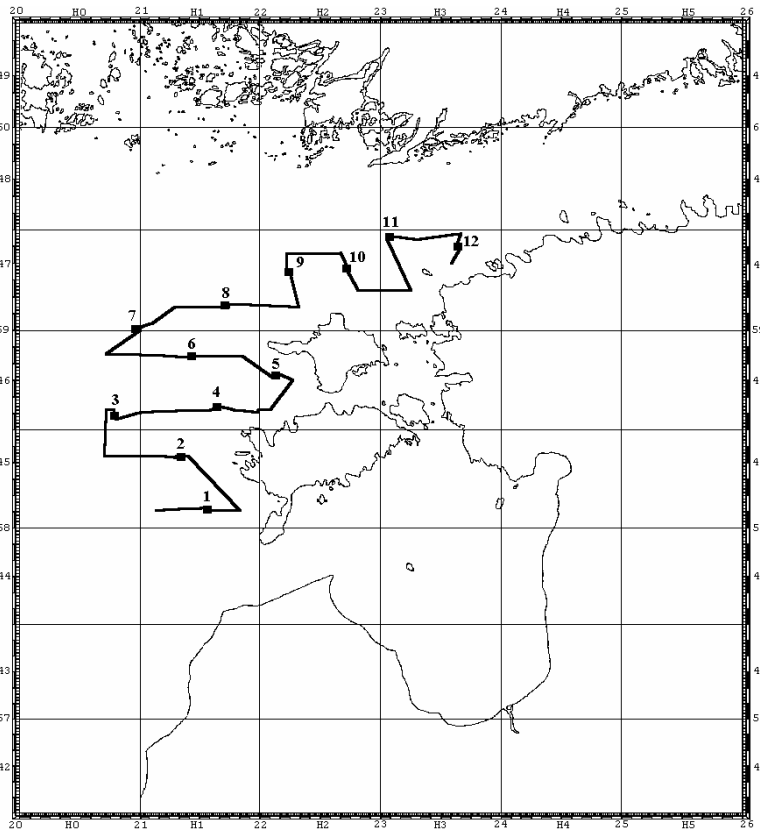
All member states are obligated to undertake scientific research at sea to evaluate the abundance and distribution of stock independently of the data provided by the commercial fisheries in the case of stocks mentioned in of the Data Directive. Estonia will participate, as in earlier years, in the **Herring acoustic survey** in the Baltic Sea (IIIId) (priority 1 survey according to Data Directive Appendix XIV). Also, Estonia can perform in 2005 bottom trawling in the Estonian zone (SD 28, 29 and 32) within **Baltic International Trawl Survey (BITS)** (priority 1 survey). This survey, as well as herring acoustic survey, will be performed using rented commercial fishing vessels which make surveys relatively cheap. In addition to these two surveys, Estonia will perform two annual surveys which were initiated several years ago: **salmon and sea trout river survey**, and **coastal fish survey** (since 1992).

According to Commission Regulation (EC) N° 1639/2001, Appendix XIV, sprat acoustic survey is to be conducted in the 2<sup>nd</sup> quarter and it has priority 1. However, it is conducted sporadically in the Baltic. For tuning the sprat assessment ICES uses results from Herring Acoustic Survey which provides acoustic estimates of both herring and sprat stocks. Estonia asks for derogation from conducting that survey.

#### **Minimum programme:**

##### **3.4.1 HERRING ACOUSTIC SURVEY**

The survey is conducted in two parts: in the Gulf of Riga (SD 28-5) jointly with Latvia (since 1999) during the 3<sup>rd</sup> quarter (when the amount of open-sea herring in the Gulf is minimal) (8 days at sea, 18 trawl stations in the whole Gulf including the Latvian waters; 50% of days and stations in the Estonian waters) and 2) in the open sea (SD 28, 29 and western part of 32 (Figure), carried out since 2001 during the 4<sup>th</sup> quarter (8 days at sea, 12 stations).



The purpose is to provide acoustic abundance estimates of herring and sprat in the Baltic Sea.

In both cases, rented fishing vessels will be used, which makes these surveys relatively cheap. There is a need to extend the open-sea survey, including central and eastern parts of the Gulf of Finland (SD 32), which will be possible in 2006. The Gulf of Finland survey has to be coordinated and preferably carried out jointly with Finland and the Russian Federation.

The sampling procedure and the level of precision are defined in the Manual for the Baltic International Acoustic surveys (ICES CM 1994/H: 3). The acoustic abundance estimate is done in collaboration between Estonia, Germany, Poland, Russian Federation and Latvia. The herring and sprat are length measured on board and sent to EMI for further examinations such as age, weight, sex and maturity. Age determination takes place in accordance with standardised methods (Anon. 2000a), age readers are participating in regular international intercalibrations.

Primary survey data are stored in a fish sample database administered by EMI. Aggregated data are reported and used annually by relevant ICES Working Groups.

### 3.4.2. BALTIC INTERNATIONAL TRAWL SURVEY (BITS)

The survey is conducted regularly twice a year (ICES 2000b). Estonia will participate both in 1<sup>st</sup> quarter (in February - up to 7 days at sea, at least 15 trawl stations if ice

conditions allow) and in the 4<sup>th</sup> quarter (in November – up to 7 days at sea, at least 15 trawl stations). The surveys cover part of the eastern Baltic, within the Estonian EEZ (SD 28, 29, 32).

The primary purpose of the survey is to produce indices of recruitment and stock abundance of Baltic cod and flounder. Sampling of these species includes records of individual fish length, age, weight, sex, stage of gonad maturation and stomach fullness and is carried out on board of the vessel. Data on sexual maturation and individual weight are obtained to establish sex specific maturity ogives and mean weight at age for cod and flounder. The otoliths are used for fish age determination. Ageing is made in EMI. Age determination takes place in accordance with standardized methods (Anon. 2000a, ICES 1997, 2001). In addition to cod and flounder, herring and sprat from the samples are also examined and their standard biological parameters (length, weight, age, sex, gonads development) are recorded.

The survey design, sampling procedure and the level of precision are defined in the Manual for the Baltic International Trawl Surveys (ICES 2000). Since 2000 the surveys has been conducted using new standard procedure internationally. Estonian bottom trawl surveys will be conducted and samples collected in accordance with BITS Manual.

The survey is ICES coordinated and performed in collaboration with research vessels from Denmark, Germany, Latvia, Russia, Poland and Sweden. However, not all countries around the Baltic are involved in every survey. Since 2000 during the BITS survey a TV-3 cod bottom trawl is used at daytime. This gear is used as a standard fishing gear by the countries involved.

Primary survey data are stored in EMI. Aggregated data are reported and used annually by relevant ICES Working Groups. Data are also stored in an international coordinated database at ICES Secretariat in Copenhagen.

### **3.4.3. SALMON AND SEA TROUT RIVER SURVEY**

The minimum programme in Commission Regulation (EC) No. 1639/2001 prescribes market sampling of catches as the only monitoring of the salmon and sea trout stocks. SGRN noted as a general comment that the absence of river surveys made the MP inadequate to assess if the agreed management objectives are achieved (SEC 200, Brussels 9-13 December 2002). Therefore, in 2005, the Estonia (EMI) will continue current river surveys in all salmon rivers and in selected sea trout rivers and they will run with an even sampling intensity in 2005-06.

There are 10 Baltic salmon rivers in Estonia (9 in the Gulf of Finland basin and 1 in the Gulf of Riga basin) and 6 rivers in the Gulf of Finland basin where salmon is re-introduced in accordance with the agreed management plan. Natural stocks in these rivers are rather small, and in most of them juveniles appear not every year. The status of the stocks in these rivers will be monitored by surveys which include surveys of juveniles by electrofishing and (as a new element since 2005) smolt trapping in salmon rivers. There are over 45 rivers and streams used by wild sea trout for reproduction, but in most of them populations are very small.

Electrofishing surveys of juvenile densities will take place in all salmon rivers (which are also sea trout rivers) and selected sea trout rivers (altogether 30 rivers every year). The surveys will be carried out in accordance with the established standard procedure.

The smolt production is the ultimate measure of success of the management plan. Smolt traps will be used to monitor the number of emigrating fish in spring. Equipment will be bought in 2005 and traps will be deployed in 2005-06. Smolt production will be monitored in at least one important salmon river each year.

All surveys are in line with ICES advice and planning is carried out in cooperation with Finnish and Swedish scientists to improve co-ordination with the Finnish NP programme as suggested by SGRN (SEC 200, Brussels 9-13 December 2002).

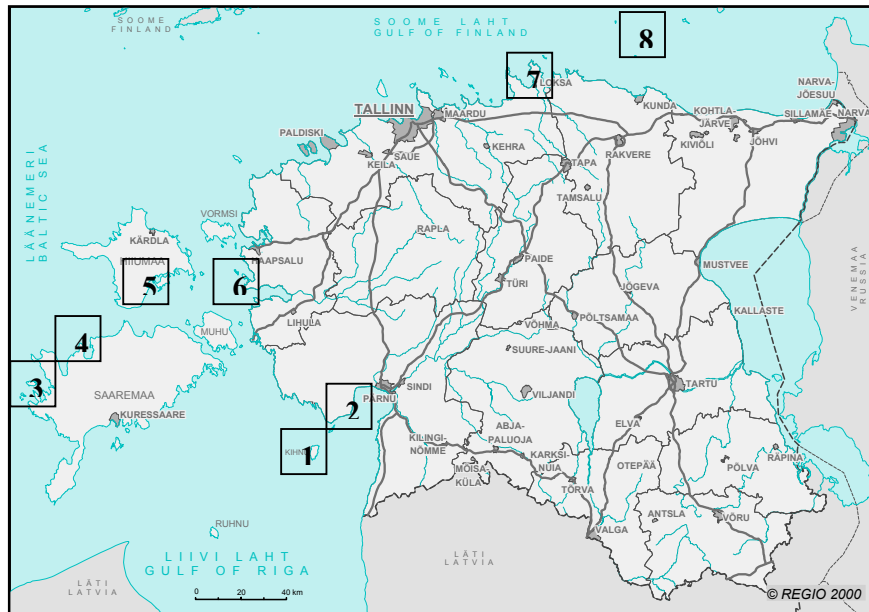
Aggregated data are reported annually to the ICES Working Group (WGBAST).

### **Extended programme**

#### **3.4.4. COASTAL FISH SURVEY**

Annual gill-net sampling of coastal fish assemblages is conducted since 1992 (two research areas, including HELCOM COBRA coastal fish monitoring reference area southeast to Hiiumaa Island (ICES 29-4). Later, the number of research areas has been increased to 8 (Figure) covering SD 28, 29 and 32. In general, methods described in Thoreson (1993) are followed, with some modifications (most importantly, adding bigger mesh size gill nets to the stations; ICES CM 2003/R: 14).

Data on the species composition of fish assemblages, CPUE of various species, age, length and sex distribution, relative strength of year-classes, mortality and growth rate have been used to manage the stocks of several species, first of all, perch, pikeperch, several cyprinids. Also, data for flounder, herring and cod are obtained during coastal fish surveys, and these data are used as a supplement to landings sampling data. Gathering fisheries-independent data has been useful as there were problems with misreporting catches in the 1990s, and several species (perch, pike, and some cyprinids) have several local stocks with different population dynamics. Furthermore, surveying of fish assemblages is more consistent with the ecosystem approach to fisheries management.



**Figure.** Location of coastal fish survey areas. 1, Kihnu Island; 2, Pärnu Bay; 3, Vilsandi; 4, Küdemaa Bay; 5, Hiiumaa; 6, Matsalu; 7, Käsmu; 8, Vaandloo Island.

Since 2000, in most areas special additional gill-net stations for whitefish are also used, and fyke nets are used for eel sampling.

Fisheries-independent data gathered during coastal fish survey have proved to be reliable basis for management decisions for perch and some other species, and therefore this survey is included in the national data collection programme.

### 3.4.5 Coordination and quality assurance

The Herring acoustic survey and the Baltic International Trawl Survey in the Baltic Sea are internationally coordinated surveys, which endeavour a high level of consistency in sampling procedure among participants. As a part of this, exchange of staff onboard research vessels between countries will be conducted. It is believed that this is an important contribution to the quality assurance of the survey data.

Salmon and sea trout river surveys are in line with ICES advice and planning is carried out, as also earlier, in cooperation with Finnish and Swedish scientists.

Coastal fish gill-net surveys in reference areas are coordinated by HELCOM COBRA, and the Estonian data are regularly submitted to the common database.

### ***3.5 H. Biological sampling of catches: composition by age and by length and I. Other biological sampling***

Member States are required to collect biological random samples in order to evaluate the composition in length and where appropriate in age of landings for all stocks specified in Appendix XV in Commission Regulation (EC) No. 1639/2001. For some species also other biological sampling is required.

Biological sampling must be performed if the Estonian TAC or total landing of a certain species exceeds thresholds defined in 1639/2001 Chapter H.1(d). Appendix IIIa to this programme shows the landings made in Estonia by Estonian flagged vessels and by other Member States flagged vessels. Information on Estonian and total EU and accessing states TAC is given for each stock for 2004.

The purpose of the biological sampling of catches is to estimate the number of fish and their mean weight at age of the landings made in Estonian harbours. The sampling will be performed by segments and the data will ultimately together with data on landings made by other nations flagged fishing vessels give the basic input data when analysing the historical exploitation of the stocks and further be the foundation when carrying out assessments on the stocks.

All biological sampling will be performed, and corresponding data will be stored in databases of EMI. In 2005, a unified database at EMI will be created. Data security is ensured by common standards. Data entry is conducted at the three laboratories in Tallinn, Tartu and Pärnu to a closed network. To maintain data integrity and performance of the database a data manager will maintain the database.

The tasks of the data manager are:

- Merge data sampled to the unified database
- Compact and tune the database at regular intervals
- Perform backup of data
- Act as help-deck for user of the base
- Maintain look-up tables
- Make error checking and consistency tests on the database
- Maintain a security system, that grant users and outside partners access to data at an appropriate level

#### **3.5.1 The Estonian standard sampling scheme**

The standard sampling procedure will be to carry out sampling on a quarterly basis by ICES division in all the main harbours where landings take place. Usually proportional sampling will be applied. Samples will be collected randomly and the number of samples will reflect the fishery activity. For each stock the minimum sampling level is given for landings in Estonia in Appendix III. The sampling level is based on the established sampling level and on the average landings for 2001-2003 and as outlined in the Data Directive for landings made by both Estonian - and other

Member States flagged vessels landing in Estonia. It should also be stressed that for some species, especially species for which recovery plans are implemented, such as for cod, the sampling levels need to be increased and sampled with a higher intensity than prescribed in the Data Directive.

The samples are either analysed in the harbour or sent to EMI, where all biological measures are performed. The standard measures are:

- Length
- Weight
- Age

First the sample for length is collected, and the sub-sample for age is taken next. The size of the samples will be at least as specified in Appendix XV. The age sample is usually collected by length strata, taking approximately constant number of fish from a stratum. The fish sampled for age are weighed and their sex and maturity is recorded. As mostly stratified sampling for age is applied, the age composition of the catches is obtained using age-length key. Age determination of sampled fish species always takes place at EMI according to standardized methods (ICES 2000a etc).

The intention of ‘Other biological sampling’ is to estimate for stock indicated in Annex to the Regulation (EC) No 1639/2001 (Appendix XVI)

- sex composition of the catches,
- maturity at age and length,
- length and weight at age (i.e. growth curves).

These parameters will be sampled both during surveys and from the commercial landings.

The aggregated data are stored in the Biological database in EMI.

The ‘Other biological sampling’ outlined in the Data Directive Chapter III I. (1) (a) (i), (ii) and (iii) will be fully completed for the relevant stocks.

The total number of samples collected during a year for a stock will not be lower than prescribed by the sampling rules based on annual landings which are outlined in Appendix XV in Commission Regulation (EC) No 1639/2001. With sampling rules outlined in Appendix XV, a precision level is set. With reference to Appendix III, a description of the stocks that will be a part of the Estonian sampling programme is given below. Each stock is described by the following structure: The Estonian landings made in Estonia and the Estonian TAC is given and the fishery for the stock is shortly described. If the biological sampling of catches deviates from the standard described above, the sampling is described. If any other biological analysis is conducted, this is described.

The precision level of Estonian present sampling has not been evaluated yet, although a lot of effort is put to collect representative and extensive biological data. After 1<sup>st</sup> year of National Program the re-sampling techniques will be applied and the precision levels in Estonian biological sampling estimated.

### **3.5.2. Minimum programme**

#### **3.5.2.1 The Baltic Sea. ICES Area IIIId**

##### **Sprat *Sprattus sprattus***

The average Estonian landings in 2001-2003 were 36524 tonnes and the quota for 2004 is 43 260 tonnes which correspond to >10 % of the EC shared TAC. This obliges Estonia to sample this stock.

The Estonian sprat fishery in ICES area IIIId has traditionally been landed for human consumption purposes. The catches are the highest during the IV (49% in 2003) and I quarter (35%). 40% of landings originate from SD 29, 38% from SD 28 and 22% from SD 32 (2003 data). Pelagic trawl fishery is often a mixed sprat-herring fishery.

In 2003, EMI obtained 35 samples of sprat; 6163 fish were measured and aged. The same sampling intensity will be maintained for 2005. In 2005, Estonia will take at least 37 samples, and measure at least 3700 and age at least 1850 fish. Standard sampling procedure as described in 3.5.1 will be used.

Sampling of other biological parameters such as sex and sexual maturity are performed routinely when samples for age are collected from both commercial landings/catches and survey catches.

Sex and maturity stage is obtained from the individuals randomly selected for ageing in each sample. The maturity estimates (after aggregation) have a CV, which does not exceed 5% for the interval of 20-90% of the mature fish.

Collected data are stored in the fish sample database in EMI. The results are reported annually to the ICES Working Group (WGBFAS).

##### **Herring *Clupea harengus membras***

The average Estonian landings of herring in 2001-2003 were 35762 tonnes and the quota for 2004 is 20 800 tonnes (divided between the Gulf of Riga, SD 28-5 and SD 25-29+32) corresponding to >10% of the EC shared TAC, obliging Estonia to sample this stock.

A major part of the herring catches (77% in 2003) is nowadays taken in Sub-division 28-5 (mostly in the Gulf of Riga). Both pelagic trawlers (57% of landings in 2003) and spawning-time trap-net fishery (43%) target this species. The herring fishery takes place in all seasons, however, more intensively during the spawning period in spring. In 2003, 63% of landings were made in the II quarter, and 25% in the IV quarter. The catches are only landed for human consumption purposes. Landings by other EU member state (Finnish) vessels have been declining since 2001, and were only 265 tonnes in 2003.

In 2003, altogether 88 samples from commercial landings were obtained, 8607 fish were measured and 8183 aged. Quotas (and correspondingly, landings) are declining

in SD 25-29+32, but due to the separate management of the Gulf of Riga stock, complex stock structure (“bay” and “open sea” herrings, spring- and autumn spawning herrings) and the great importance of this species for the Estonian fisheries, sampling can not be decreased accordingly. In 2005, Estonia will take at least 72 samples, and measure and age at least 7200 fish. Standard sampling procedure as described in 3.5.1 will be used.

Sampling of other biological parameters such as sex and sexual maturity are performed routinely when samples for age are collected from both commercial landings/catches and survey catches.

Sex and maturity stage is obtained from the individuals randomly selected for ageing in each sample. The maturity estimates (after aggregation) have a CV, which does not exceed 5% for the interval of 20-90% of the mature fish.

Collected data are stored in the fish sample database in EMI. The results are reported annually to the ICES Working Group (WGBFAS).

### **Cod *Gadus morhua***

Estonian TAC for cod is 1299 tonnes in 2004. However, due to the low abundance of cod in the Estonian EEZ, landings have been lower than TAC, and majority of landings are done not in Estonia. Annual landings in the Estonian ports have been only 3 tonnes as an average for 2001-2003. The situation will probably not change in 2005.

As cod stock in the Estonian waters is at a low level, and there is almost no directed fishery for cod in the Estonian EEZ. The intention is to collect at least two samples from commercial gill-net fishery. Due to unpredicted landings, sampling of cod is mostly done in cooperation with commercial fishermen who are asked to collect cod from their catches. Fishes will be purchased and analysed by EMI. If cod appears as by-catch in samples collected from other fisheries all individuals are sampled, length measured and aged.

Cod occurs regularly in the Küdema coastal fish survey area (NW Saaremaa Island). CPUE data indicate increase of abundance, with a maximum in autumn 2003. Data collection on cod CPUE, length and age distribution will be continued within coastal fish survey in Küdema and other areas.

Additional data on the state of cod stock will be obtained during planned bottom trawl survey in 2005, and during the pilot study of recreational fisheries.

Collected data are stored in databases in EMI. The results are reported annually to the ICES Working Group (WGBFAS).

### **Salmon *Salmo salar***

The average Estonian landings for 2001-2003 were 13 tonnes (approximately 2600 individuals), and the Estonian TAC (main basin + the Gulf of Finland) in 2004 is 2555 individuals (approximately 13 tonnes) corresponding to < 5 % of the EC shared TAC, not obliging Estonia to sample this stock. However, due to the alarming situation with natural stocks in the Estonian waters (salmon is targeted in Estonia in coastal fisheries), and the Estonian participation in the Salmon Action Plan, data collection will be continued. In the EU waters of the Gulf of Finland, salmon reproduces naturally only in some Estonian rivers. Effectiveness of natural reproduction will be assessed during the salmon and trout river surveys.

Open-sea driftnet or longline fishery has not occurred in 2001-2003, and all landings of this period originate from coastal (mostly gill-net) fishery. The total catch of 10 t in 2003 was mostly taken in ICES SD 32 (67%) followed by ICES SD 29 (19% t) and 28 (14%). Catches are highest from September to November (70% of annual landings).

The intention is collect at least 2 samples in 2004 (one – gill-net fishery, another – trap-net fishery in spring). Due to unpredicted landings, sampling of salmon will be mostly done in cooperation with commercial fishermen usually themselves registering the presence of adipose fin (in hatchery-reared juveniles adipose fin is clipped before release), length of fish and collecting scales for age-reading. All salmon registered in samplings or surveys conducted by EMI are also analysed. The scales are analysed in EMI.

The purpose of the other biological sampling is to estimate on a yearly basis the distribution of wild and reared salmon in the total landings of salmon.

In addition, the scales of wild and reared salmon will be compared in order to determine whether this feature is a method for routine distinction between the two types of salmon.

### **Sea trout *Salmo trutta***

The average Estonian landings for 2001-2003 were 13 tonnes. Sea trout is captured in coastal waters using mostly gill-nets, but it is taken also using traps, especially in spring. In 2003, 63% of annual landings were in September-November and 12% in May; 74% of landings originated from SD 32 (Gulf of Finland).

The intention is collect at least 2 samples in 2004 (one – gill-net fishery in autumn, another – trap-net fishery in spring). Due to unpredicted landings, sampling of sea trout is mostly done in cooperation with commercial fishermen usually themselves registering the presence of adipose fin (in hatchery-reared juveniles adipose fin is clipped before release), length of fish and collecting scales for age-reading. All sea trouts registered in samplings or surveys conducted by EMI are also analysed. The scales are analysed in EMI.

The purpose of the other biological sampling is to estimate on a yearly basis the distribution of wild and reared sea trout in the total landings of sea trout.

Effectiveness of natural reproduction will be assessed during the salmon and trout river surveys.

### **3.5.2.2 Other areas**

Estonia has a significant pandalid shrimp quota in the NAFO area 3M (1667 fishing days; landings in 2002 were 13681 tonnes, in 2003 – 12849 tonnes). Also, Estonia has a quota for redfish in the same area of 1571 tonnes for 2004. In addition, Estonia has smaller quotas for some other species, and in some cases, Estonia can fish “others” or “cooperative” quotas for certain species in NAFO, NEAFC areas. In the Svalbard area, Estonia has a quota for shrimp (377 fishing days).

Total landings of the Estonian distant fleet were 16108 tonnes in 2003 (including 12966 tonnes of shrimp, 882 tonnes of rays, and 1693 tonnes of Greenland halibut). However, none of these landings have been made in Estonia.

Basic fishery data (locality, trawling depth, duration, catch composition and volume, discards) are registered by observers. Observers’ data are stored in EXCEL database in the Environmental Inspectorate, Ministry of the Environment, and are accessible to EMI.

Observers’ data will be analysed in EMI and the results will be forwarded to NAFO SC.

### **3.5.3. Extended Programme**

Collection of data according to Chapter H. Biological sampling of catches: composition by age and length, and Chapter I. Other biological samplings will be carried out within the framework of the extended programme for the stocks:

- Flounder IIIb-d
- Turbot IIIb-d
- European whitefish IIIId
- Pikeperch IIIId
- Pike IIIId
- Perch IIIId
- Eel IIIId
- Smelt IIIId
- Garfish IIIId
- Vimba bream IIIId

These stocks (especially pike, pikeperch and eel) are of high commercial interest in Estonia, and some of them are subjected to over fishing. In some cases (e.g. perch, pike, whitefish) stock structure is complex (many local stocks) and analytical stock assessment will not be used; for these species, fishery-independent data collected

within the coastal fish survey programme form the main basis for management decisions. Landings sampling of these species will be kept at a relatively low level.

In addition to coastal stocks listed above, Estonia samples some other stocks (e.g. bream, ide, burbot) but due to low landings no sampling plan can be proposed. No financing is asked for data collection on these stocks.

Sampling procedure for the species in the Baltic is explained below.

### **Flounder (*Platichthys flesus*)**

In 2001-2003, the total commercial flounder landings (including by-catch of turbot) were 480 tonnes in average; 92% of landings originate from the coastal gill-net and trap-net fisheries (in SD 29 mainly seine catches). Data from coastal fish survey indicate increased CPUE values for flounder in most of coastal areas since the mid-1990s. Directed fishery is closed from February to June, and the minimum legal size for landings is 21 cm.

Most of flounder in coastal fishery is landed from ICES SD 32 (74% in 2003), and the landings are the biggest in the IV quarter (55%) followed by III, II and I quarter (21, 18 and 5%, respectively).

Sampling is weighted according to fishing method and expected landings in each subdivision. The number of samples based on the extended program D3 (50 specimens per 200 tonnes, which corresponds to two samples, 100 individuals) is not adequate to cover sampling of all gear types and catch areas. In recent years, the total number of flounder aged from commercial landings in Estonia has been > 1000. The annual sampling schedule for 2005 consists of 28 samples (1400 fish) in ICES subdivisions 28, 29, and 32. Simple random sampling is applied. Each individual will be measured for length and aged. The sampling scheme will be modified annually, depending on catch rates and fishing activities.

The number of flounder samples to be collected by ICES Sub-division, gear type and year quarter weighted by catch rates in 2003 (one sample corresponds to 50 individuals):

Gear type	Year quarter	ICES Sub-division			Sampling per gear and year quarter
		28	29	32	
Gill-net	1	0	0	0	0
	2	0	1	1	2
	3	1	1	2	4
	4	1	1	5	7
	<b>Total</b>	<b>2</b>	<b>3</b>	<b>8</b>	<b>13</b>
Trap net	1	0	0	0	0
	2	1	1	2	4
	3	1	1	2	4
	4	1	1	3	5

	<b>Total</b>	<b>3</b>	<b>3</b>	<b>7</b>	<b>13</b>
Seine	1	0	0	0	0
	2	0	0	0	0
	3	0	1	0	1
	4	0	1	0	1
	<b>Total</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>2</b>
	<b>Grand total</b>	<b>5</b>	<b>6</b>	<b>15</b>	<b>28</b>

Additional data will be gathered during the coastal fish gill-net survey.

### **Turbot *Psetta maxima***

Until now, catches of turbot are usually registered together with flounder. Normally, by-catch of turbot is less than 10% in the flounder fishery, but may be periodically in some places up to 50%. It is more abundant in the open-sea areas, e.g. western coast of islands Saaremaa and Hiiumaa (ICES 28-2, 29-2) and 32-1. Recent annual landings of turbot have probably been between 10 and 50 tonnes. Fishery for turbot is closed from 15 February to 15 June (in ICES 32 until 30 June).

Sporadic directed gill-net fishery for turbot has been occurred in ICES 29-2.

A pilot study on turbot will be done in 2005 to reveal actual landings and length/age composition of the catches. Turbot by-catch will be recorded and analyzed in every sampling of flounder landings. In addition, a limited number of fishermen (mostly those who have cooperated with EMI earlier) from different coastal areas are asked to collect all specimens from their catches and storage them for future analyses in the laboratory. The fishermen keep a detailed log of the fishing effort, the mesh size in their gear, fishing grounds and catches.

Also, earlier data on catches of turbot during coastal fish survey will be analysed in frames of this pilot project. These data are used to elaborate a sampling programme for 2006 and subsequent years.

Based on this pilot study, a sampling program will be elaborated for 2006.

### **European whitefish, *Coregonus lavaretus sensu lato***

European whitefish has a complex stock structure. Recent data indicate that there are at least three species of whitefish in the Estonian waters (sea-spawning whitefish with a low number of gill rakers, anadromous whitefishes with low and high gill raker count) and (probably) a hybrid form of whitefish. The abundance of this hybrid form has increased, but the stocks of native species have declined and several local spawning populations have disappeared (ICES CM 2003/R: 15).

Catches have been somewhat increased in recent years; average annual landings were 37 tonnes in 2001-2003. Whitefish is mainly captured using gill-nets; some catches

(especially in spring) are taken using trap-nets. In 2003, 80% of landings were from ICES SD 32, followed by SD 29 (15%) and 28 (5%). Landings are almost equally distributed in II, III and IV quarters (32, 28 and 28% of the annual landing).

Estonia is funding a study (2004-2005) to reveal the species composition (using morphometric and genetic analyses), relative abundance of different species (forms) and their distribution along the Estonian coast. Landings sampling scheme must take into account the real species composition of landings. It can be proposed after the completion of this study.

The number of samples predicted by the EP (1 sample of 50 specimens per 100 tonnes of landings, C3) is definitively too low to get any meaningful data about whitefish stocks. Landings sampling will be done in cooperation with fishermen, and in addition to standard data, the number of gill rakers will be registered (to distinguish between forms), and samples for DNA analysis are collected where possible. Additional data on whitefish stocks will be gathered in 2005 within the coastal fish survey.

The number of whitefish samples to be collected by ICES Sub-division, gear type and quarter weighted by catch rates in 2003 (one sample corresponds to 50 individuals):

Gear type	Year quarter	ICES Sub-division			Sampling per gear and year quarter
		28	29	32	
Gill-net	1	0	0	0	0
	2	0	0	1	1
	3	0	1	2	3
	4	1	1	3	5
	<b>Total</b>	<b>1</b>	<b>2</b>	<b>6</b>	<b>9</b>
Trap net	1	0	0	0	0
	2	0	1	1	2
	3	0	0	1	1
	4	0	0	0	0
	<b>Total</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
	<b>Grand total</b>	<b>1</b>	<b>3</b>	<b>8</b>	<b>12</b>

### **Pikeperch *Sander lucioperca***

Pikeperch stock in the main distribution area, Pärnu Bay (ICES 28-5) was over fished in the 1990s. Subsequent to severe catch restrictions, this stock is recovering, and 2003 landings were 78 tonnes, or 82% of the total Estonian landings (96 tonnes). Landings are expected to increase in 2004. The remaining part was landed in ICES 32; stock in SD 29 has declined substantially and landings are negligible. Pikeperch is mostly captured by gill-nets and trap-nets, and to a much lesser extent – by longlines. In 2003, 40% of fish were landed in the II quarter followed by III (30%), IV (21%) and I quarters (9%).

The number of samples predicted by the EP (1 sample of 50 specimens per 100 tonnes of landings, C3) is definitively too low to get any meaningful data about pikeperch stocks. Sampling is weighted according to fishing method and expected landings in each subdivision. The annual sampling schedule consists of 15 samples and 750 individuals. Simple random sampling is applied. Each individual will be measured for length and aged. To improve the accuracy of age readings, both scales and gill covers (*operculum*) are used in age readings. The sampling scheme will be modified annually, depending on catch rates and fishing activities.

Number of pikeperch samples to be collected by ICES Sub-division, gear type and quarter weighted by catch rates in 2003 (one sample corresponds to 50 individuals):

Gear type	Year quarter	ICES Sub-division			Sampling per gear and year quarter
		28	29	32	
Gill-net	1	2	0	0	2
	2	3	0	0	3
	3	2	0	1	3
	4	2	0	0	2
	<b>Total</b>	<b>9</b>	<b>0</b>	<b>1</b>	<b>10</b>
Trap net	1	0	0	0	0
	2	2	0	1	3
	3	1	0	0	1
	4	1	0	0	1
	<b>Total</b>	<b>4</b>	<b>0</b>	<b>1</b>	<b>5</b>
	<b>Grand total</b>	<b>13</b>	<b>0</b>	<b>2</b>	<b>15</b>

Additional data will be gathered during the coastal fish gill-net survey.

### **Pike *Esox lucius***

The total commercial pike catches exceeded 400 t in the 1930s but declined to the historical low levels in the 1990s, due to both excessive fishery and natural conditions. The stock is recovering during the most recent years as indicated by coastal fish survey CPUE data. Landings in 2003 were 31 tonnes (68% from SD 29, 25% from SD 28) and they were the highest in August-November (63%) and May (15%). Pike is targeted mostly by gill-nets, also (especially in spring) by trap nets.

Sampling is weighted according to fishing method and expected landings in each subdivision. The annual sampling schedule consists of 12 samples (600 fish) in ICES subdivisions 28, 29 and 32. Simple random sampling is applied. Each individual will be measured for length and aged. The sampling scheme will be modified annually, depending on catch rates and fishing activities.

The number of pike samples to be collected by ICES Sub-division, gear type and year quarter weighted by catch rates in 2003 (one sample corresponds to 50 individuals):

Gear type	Year quarter	ICES Sub-division			Sampling per gear and year quarter
		28	29	32	
Gill-net	1	0	1	0	1
	2	0	1	0	1
	3	1	1	0	1
	4	1	2	1	3
	<b>Total</b>	<b>2</b>	<b>5</b>	<b>1</b>	<b>8</b>
Trap net	1	0	0	0	0
	2	0	1	0	1
	3	0	1	0	1
	4	1	1	0	2
	<b>Total</b>	<b>1</b>	<b>3</b>	<b>0</b>	<b>4</b>
	<b>Grand total</b>	<b>3</b>	<b>8</b>	<b>1</b>	<b>12</b>

Additional data will be gathered during the coastal fish gill-net survey.

### **Perch *Perca fluviatilis***

The total commercial perch catch in the Estonian coastal waters has been up to 2130 t, but catches declined (especially in ICES SD 29) in the 1990s due to over-fishing and poor recruitment. In recent years, due to strong year-classes and fishery limitations, the stock is recovering also in SD 29. Landings in 2003 were 826 tonnes (81% in SD 28, 13% in SD 32). The share of SD 29 will probably increase as most of catch restrictions were abandoned in 2003. 52% were landed in the II quarter (mainly trap net catches), 25% in the III quarter and 21% in the IV quarter (mostly gill-net catches).

Basic data on perch populations in SD 28, 29 and 32 are obtained during the coastal fish survey. For this reason, sampling of commercial landings is kept at reasonably low level. Furthermore, detailed age-length keys for both sexes are available for these areas (with different growth rate) from coastal fish survey. Therefore there is no need to age the fish sampled from commercial landings.

Nevertheless, the number of samples based on the extended program C3 (8 samples, 400 individuals) is not adequate to cover sampling of all gear types and catch areas. Gill- and trap net catches of perch differ from each other in terms of size selectivity, and therefore both gear types must be covered in the sampling programme.

Sampling is weighted according to fishing method and expected landings in each subdivision. The annual sampling schedule consists of 26 samples (1300 fish) in ICES subdivisions 28, 29 and 32. Simple random sampling is applied. Each individual will be measured for length and, if possible, sexed. The sampling scheme will be modified annually, depending on catch rates and fishing activities.

The number of perch samples to be collected by ICES Sub-division, gear type and quarter weighted by catch rates in 2003 (one sample corresponds to 50 individuals):

Gear type	Year quarter	ICES Sub-division			Sampling per gear and year quarter
		28	29	32	
Gill-net	1	1	0	0	1
	2	1	0	0	1
	3	3	1	2	6
	4	3	0	2	5
	<b>Total</b>	<b>8</b>	<b>1</b>	<b>4</b>	<b>13</b>
Trap net	1	0	0	0	0
	2	6	2	2	10
	3	1	0	1	2
	4	1	0	0	1
	<b>Total</b>	<b>8</b>	<b>2</b>	<b>3</b>	<b>13</b>
	<b>Grand total</b>	<b>16</b>	<b>3</b>	<b>7</b>	<b>26</b>

### Eel *Anguilla anguilla*

Landings of eel are declining and were only 19 tonnes in 2003 (56% in SD 28, 30% in SD 29, 14% in SD 32). 38% of landings were made in August and 24% in July. Eel is fished mostly using trap-nets, but there is also some long-line fishery.

The intention is to collect 10 samples (500 fish). All fish will be measured and their otoliths will be collected for age determination when possible. The proportion of white and yellow eels will be determined in catches.

The number of eel samples to be collected by ICES Sub-division, gear type and quarter weighted by catch rates in 2003 (one sample corresponds to 50 individuals):

Gear type	Year quarter	ICES Sub-division			Sampling per gear and year quarter
		28	29	32	
Trap nets	1	0	0	0	0
	2	1	1	0	2
	3	3	1	1	5
	4	0	0	0	0
	<b>Total</b>	<b>4</b>	<b>2</b>	<b>1</b>	<b>7</b>

Longline	1	0	0	0	0
	2	0	0	0	0
	3	1	1	1	3
	4	0	0	0	0
	<b>Total</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>
	<b>Grand total</b>	<b>5</b>	<b>3</b>	<b>2</b>	<b>10</b>

Additional data will be gathered during the coastal fish survey using fyke nets.

### **Smelt *Osmerus eperlanus***

Landings of smelt were 207 tonnes in 2003, from which 200 tonnes (97%) originated from coastal fisheries. In coastal fisheries, smelt is captured in spawning time: 72% of landings are made in April and 12 % in March. Most of smelt is landed in 28-5 (83%).

Sampling is weighted according to fishing method and expected landings in each subdivision. The annual sampling schedule consists of 14 samples (700 fish) in ICES subdivisions 28, 29 and 32. Simple random sampling is applied. Each individual will be measured for length and aged. The sampling scheme will be modified annually, depending on catch rates and fishing activities.

The number of smelt samples to be collected by ICES Sub-division, gear type and quarter weighted by catch rates in 2003 (one sample corresponds to 50 individuals):

Gear type	Year quarter	ICES Sub-division			Sampling per gear and year quarter
		28	29	32	
Trap net	1	0	0	0	0
	2	7	1	2	10
	3	0	0	0	0
	4	0	0	0	0
	<b>Total</b>	<b>7</b>	<b>1</b>	<b>2</b>	<b>10</b>
Gill net	1	0	0	0	0
	2	1	0	0	1
	3	0	0	1	1
	4	0	0	0	0
	<b>Total</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2</b>
Trawl	1	0	0	0	0
	2	0	0	0	0
	3	1	0	1	2
	4	0	0	0	0
	<b>Total</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2</b>
	<b>Grand total</b>	<b>9</b>	<b>1</b>	<b>4</b>	<b>14</b>

### **Garfish *Belone belone***

Landings of garfish vary periodically and were 96 tonnes in 2003. This species occurs in the Estonian waters in the spawning period, and it is captured using trap-nets mainly in May (54% of landings in 2003) and June (43%). 44% of garfish were landed in SD 28, 49% in SD 29.

Sampling is weighted according to fishing method and expected landings in each subdivision. The annual sampling schedule consists of 7 samples (350 fish) in ICES subdivisions 28, 29 and 32. Simple random sampling is applied. Each individual will be measured for length and aged. The sampling scheme will be modified annually, depending on catch rates and fishing activities.

The number of garfish samples to be collected by ICES Sub-division, gear type and quarter weighted by catch rates in 2003 (one sample corresponds to 50 individuals):

Gear type	Year quarter	ICES Sub-division			Sampling per gear and year quarter
		28	29	32	
Trap net	1	0	0	0	0
	2	3	3	1	7
	3	0	0	0	0
	4	0	0	0	0
	<b>Total</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>7</b>
	<b>Grand total</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>7</b>

### **Vimba bream *Vimba vimba***

Landings of vimba bream were only 72 tonnes in 2003 (catches are declining), and 92% of vimba was landed in ICES SD 28, 5% in SD 32 and 3 % in SD 29. Vimba bream is captured mostly by gill nets but it occurs also in trap nets. In 2003, 50% of landings were made in the IV quarter, followed by the II and III quarters (23 and 22%).

Sampling is weighted according to fishing method and expected landings in each subdivision. The annual sampling schedule consists of 12 samples (600 fish) in ICES subdivisions 28, 29 and 32. Simple random sampling is applied. Each individual will be measured for length and aged. The sampling scheme will be modified annually, depending on catch rates and fishing activities.

The number of vimba bream samples to be collected by ICES Sub-division, gear type and quarter weighted by catch rates in 2003 (one sample corresponds to 50 individuals):

Gear type	Year quarter	ICES Sub-division			Sampling per gear and year quarter
		28	29	32	
Gill net	1	1	0	0	1
	2	1	0	0	1
	3	2	0	1	3
	4	4	1	0	5
	<b>Total</b>	<b>8</b>	<b>1</b>	<b>1</b>	<b>10</b>
Trap net	1	0	0	0	0
	2	2	0	0	2
	3	0	0	0	0
	4	0	0	0	0
	<b>Total</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>
	<b>Grand total</b>	<b>10</b>	<b>1</b>	<b>1</b>	<b>12</b>

Additional data will be gathered during the coastal fish gill-net survey.

### 3.6 Other EC-members states landing in Estonia

Sampling of landings in Estonian harbours by other EC-members will be conducted by Estonia. The sampling principles and frequency will be as for national landings. An overview of foreign landings for 2001-2003 is given in Appendix III, and current (2003) foreign landings are very small to take any actions. However, the situation may change due to the joining EU on 1 May 2004.

## 4. Module of evaluation of the economic situation of the sector

### 4.1 J. Collection of economic data by groups of vessels

#### 4.1.1 Data sources

The Estonian programme for section J covering the information for the Community Programme, as defined in appendix XVII and XVIII, will be completed by two main sources of data.

- 1) The central administrative and statistical register of the Fish Resources Department, Estonian Ministry of the Environment: The Estonian Fisheries Database (EFD). This database contains all relevant data: logbooks (trawling fisheries), fishermen's diaries (passive gears), effort landings, sales notes, average monthly first buyer prices, issued licenses etc.
- 2) Sample statistics compiled at the Estonian Marine Institute (MEI) on the base of questionnaires and interviews with the representatives of the fishing

enterprises from a selected sample groups. Some data will be obtained also from Statistical Office of Estonia (e.g. price statistics on fuel).

Earnings of the fishing enterprises will be calculated using the landings data, sales notes and first buyer prices registered in the Estonian Fisheries Database. For cost data, which is not subject to administrative control by the fisheries authorities, there is no need to build a comprehensive register or database. Instead it is more cost efficient to use a statistical sample, which will be compiled in MEI. When selecting trawlers to be included into the sample group of a certain segment (see chapter 4.1.2), all vessels in these segments will be divided into three subgroups based on the total catch per vessel. From all groups (high, average and small catch per vessel) at least three vessels will be randomly selected for the sample. Gill-netters will be treated in one group due to the secrecy (only 6 vessels).

Evaluation of the economic situation of the main two Estonian fleet segments (Baltic trawlers <24m and >24 m) has been carried on in MEI for years 2001-2003 in the framework of Concerted Action (FAIR PL97-3541; Economic Performance of Selected European Fishing Fleets) using abovementioned scheme.

#### 4.1.2 Segmentation

The population comprises all commercial fishermen and fishing firms. According to the national legislation the sale of fish is not allowed for recreational fishermen. So, all legal fish sale is recorded in the Estonian Fisheries Database. Before drawing the sample the population is stratified according to vessel segment, fishing technique, and fishing region.

The fishing fleet will be divided into the data collection segments as defined in annex III of the regulation. In 2001-2003 two separate economic segments were identified:

1. Trawl (both demersal and pelagic) 12-<24m
2. Trawl (both demersal and pelagic) >=24 m)

Only the vessels operating in Estonian Economic Zone (targeting sprat and herring) were analysed.

Basic segmentation and number of vessels in the Estonian fishing fleet in 2004

	< 12 m	12-23.9 m	24-40 m	> 40 m
Passive gears (fixed net/traps)	965*			
Gill-netters			6	
Trawlers		72	80	11

\* not all vessels are registered in the Fishing Vessel Register

#### 4.1.3 Data for basic economic evaluation

##### Minimum programme

Description	Parameter	Source
Income	Total and per species	- Sales notes (EFD in EME) - Logbooks (EFD in EME)

Production costs	Crew Fuel Repair and maintenance Other operational costs	- Questionnaires (vessel owners, fishing enterprises) - Price statistics on fuel
Fixed costs	Average cost	- Calculated costs on replacement value
Financial position	Share of own / foreign capital	- Questionnaire (vessel owners)
Investment	Value	- Calculated replacement value
Prices/species	Value/quantities	- Logbooks (EFD in EME) - Sales notes (EFD in EME)
Employment	Number	- Questionnaire (vessel owners) - Calculated according to the average crew number per vessel (Estonian 12-40 m fleet consists of 6 distinct types of vessels)
Fleet	Number GT KW Age Gear used	- vessel register (EFD in EME) - Logbooks
Effort		- Vessel register (EFD in EME) - Logbooks (EFD in EME)

### Extended programme

None.

#### 4.1.4 Time schedule for collecting and processing of economic data

The yearly routine for producing the statistics for evaluation of the economic situation of the fishery is scheduled at completing the data by the end of October.

The Estonian Fisheries Database is updated constantly (daily). Earnings of fishing enterprises of year 2004 will be finalised (in MEI) by June 2005. Financial statements for 2004 of fishing enterprises belonging to the samples of the segments will be available from July 2005. After that this information will be analysed by MEI. Information on economic situation of fishing enterprises in 2004 is available by October 2005.

## 4.2. K. Collection of data concerning the processing industry.

### Minimum programme

The Estonian programme for section K covering the information for the Community Programme, as defined in appendix XIX, will include the following:

1. General information concerning the processing industry will be gathered from Statistical Office of Estonia.
2. Financial statements are based on data of Estonian enterprises register.
3. Additional information will be gathered from the Estonian Institute of Economic Research, from the Estonian Fisheries Database and through the survey (questionnaire).

The information from Statistical Office of Estonia has to be processed in order to be in line with data collection programmes. As the adjusted data from Statistical Office of Estonia database are available with a time lag of two years, the short-term data are used. The short-term data were not expanded to the population of enterprises.

According to the revised data of 2001, the output of the enterprises made up 85% of the total industrial output in 2001.

In Estonia all enterprises are obliged to submit companies' financial statements of year 2004 by 30 June 2005 to Enterprises register.

General description	Parameter	Source of data
Raw material	Total and per species	-Sales notes (EFD <sup>1</sup> ) -Trade statistics (TCB <sup>2</sup> ) -Consumption information (IER <sup>3</sup> ) -Questionnaire, processors
Income (turn-over)	Total and per product	-Industry statistics (SO <sup>4</sup> )
Production costs	Labour	-Industry statistics (SO) -Questionnaire, processors
	Energy	
	Raw material	
	Packaging	
	Other running costs	
Fixed costs	Average costs	-Industry statistics (SO)
Financial position	Share of own / borrowed capital	-Enterprises register data (EER <sup>5</sup> )
Investment		-Industry statistics (SO)
Prices/ product	Value, tonne	-Industry statistics (SO)
Employment	Number	-Industry statistics (SO)
Capacity utilisation	Annual average	-Questionnaire, processors

<sup>1</sup> EFD – Estonian Fisheries Database

<sup>2</sup> TCB – Estonian Tax and Customs Board

<sup>3</sup> IER – Estonian Institute of Economic Research

<sup>4</sup> SO – Statistical Office of Estonia

<sup>5</sup> EER – Estonian Enterprises Register

The yearly routine for producing the statistics for evaluation of the economic situation of the processing industry is scheduled at completing the data by the end of October.

## ***5. Estonian Fisheries Database***

As mentioned in Section 1 all data collected according to the provisions concerning logbooks, sales notes and registration of fishing vessels and the primary data collected under the Estonian programme will all be stored in the following computerised databases:

- Vessel register. Data on fishing capacity. (FD)
- Logbook database. Data on origin of catches and on effort. (FD)
- Sales notes database. Data on quantities landed and prices. (FD)
- Species composition database. Data on species composition in landings for industrial purposes. (FD)
- Biological database. Data on discards and biological parameters. (EMI)
- Economic data. (FOI)

In order, for the involved institutions, to use the same primary data on capacity, effort, and geographical distribution of the origin of the landings a common database (the Estonian Fisheries Analyses Database, EFAD) will be created and updated regularly. In this database, data from the Fishing Vessel Register, logbooks and catch area declarations together with data from the sales notes database are merged. It is therefore possible to gain the possibility of categorise each landing in one fleet segment, in one fishery etc. This database contains most of the information requested in research projects and in relation to fisheries management. The EFAD is quarterly and yearly updated.

It will, at a later stage, be possible to merge EFAD with information from the Biological database and the Economic database.

The design and maintenance of the database is made in a co-operation between the above mentioned institutes.

In 2005, biological databases of EMI will be joined into a common system, and this database will be made available for EME.

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## ***7. Addresses and contact persons***

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## ***8. Appendixes***

### **Appendix I. Conversion factors from gutted weight to live weight (adopted from the Danish National Programme).**

#### GUTTED, WITH HEAD:

COD	1.18
EUROPEAN FLOUNDER	1.05
TURBOT	1.05
SALMON	1.10

#### GUTTED, WITHOUT HEAD:

COD	1.60
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## Appendix II.

Provisional calculation of Estonian discard sampling effort by species and area. Sampling frequency as specified in 1639/2001

(Actual discard rate in all cases unknown, to be estimated in 2005-06 pilot study)

Species	Area	EE landings in EE 2003 tonnes	Discard % of landing (estimate)	Estimated discard in 2003 (tonnes)	Beforehand estimates		Yearly discard sampling required (Y/N)	Sampling frequency rules				Sampling frequency		
					Discard rates (weight)	Discard rates (numbers)		Length measurement t	Sampling Age reading	No of individuals length measured per sample	No of fish aged per sample	No of length samples to be sampled	No of individuals to be measured	No of samples to be aged

### MP

Cod	IIId	2	12	0	>10%	>20%	N	1:200	1:200	50	25			
Herring	IIId	29870	3	896	<10%	<20%	N	1:1000	1:1000	100	50	1	100	50
Sprat	IIId	29367	0	0	<10%	<20%	N	1:1000	1:1000	100	50			
Salmon	IIId	10	10	1	<10%	<20%	N	1:100	1:100	50	50			

### EP

Sea trout	IIId	9	10	1	<10%	<20%	N	1:50	1:50	100	100			
Flounder	IIId	457	10	46	<10%	<20%	N	1:200	1:200	50	50			
Perch	IIId	824	10	82	<10%	<20%	N	1:100	1:100	50	50			
Pikeperch	IIId	96	10	10	<10%	<20%	N	1:100	1:100	50	50			
Eel	IIId	19	10	2	<10%	<20%	N	1:100	1:100	50	50			
Pike	IIId	31	10	3	<10%	<20%	N	1:100	1:100	50	50			
Whitefish	IIId	30	10	3	<10%	<20%	N	1:100	1:100	50	50			
Garfish	IIId	96	10	10	<10%	<20%	N							
Smelt	IIId	207	10	21	<10%	<20%	N							
Vimba bream	IIId	73	10	7	<10%	<20%	N							
Ide	IIId	25	10	3	<10%	<20%	N							

Remark. All species listed in Table have a minimum legal size for landing. In some fisheries for flounder and freshwater species discarding rates will probably be higher

(> 10% by weight, > 20% by numbers) depending on area and year. Discard rates to be studied in 2005-06.

### Appendix III

#### Estonian sampling effort by species and area based on landings made in the Estonian ports. Minimum programme

Species	Area	EU TAC 2004 (tonnes)	EE TAC 2004 (tonnes)	EE TAC % of EU TAC	EE landings in Estonia 2001-2003 (tonnes)	EE landings in EE in 2003	Other member states landings in EE in 2003	Sampling required (Y/N) EE	Sampling frequency rules 1)			Minimum sampling 2005 1)			Estonian sampling 2005		
									No of samples per fished tonnes	No of fish measured per sample	No of fish aged per sample	Minimum no. of samples	Minimum No of measured fish	Minimum No of aged fish	Minimum no. of samples	Minimum No of measured fish	Minimum No of aged fish
Herring	IIIId	135080	20800	> 10	35762	29870	265	Y	1/1000	100	100	30	3000	3000	72	7200	7200
Sprat	IIIId	377665	43260	> 10	36524	29367	154	Y	1/2000	100	50	15	1500	750	37	3700	1850
Cod	IIIId	71250	1299	< 5	3	2		N	1/200	50	25	0	0	0	2	100	50
Salmon	IIIId	451260	2555 specimens	< 5	13	10		N	1/100	50	50	0	0	0	2	100	100
Sea trout	IIIId				19	9		N		50	50	0	0	0	2	100	100
Shrimp	NAFO 3M		1667 days	> 10	0	0		Y	1/200	100					observers		
Shrimp	NAFO 3L		145	> 10	0	0		N							observers		
Redfish	NAFO 3M		1571	< 10	0	0		Y	1/20	100	50/1000				observers		
Illex	Area 3, 4		128	< 10	0	0		N							observers		

EU TAC for 2004 includes new member states' TAC

1) As specified in Commission Regulation (EC) 1639/2001

## Appendix IIIa

### Appendix IIIa.1

Estonian landings made in Estonia in 2001, 2002 and 2003 (tonnes)  
(for calculation of average landings in Appendix III and IV)

Species	Area	2001	2002	2003	Average 2001- 2003
MP					
Herring	IIIId	41111	36306	29870	35762
Sprat	IIIId	39375	40830	29367	36524
Cod	IIIId	7,4	0,8	1,6	3
Salmon	IIIId	14	16	10	13
Sea trout	IIIId	13	16	9	13
EP					
Eel	IIIId	27	27	19	24
Whitefish	IIIId	33	47	30	37
Pike	IIIId	19	19	31	23
Perch	IIIId	386	578	824	596
Flounder	IIIId	482	501	457	480
Turbot	IIIId				Not known
Pikeperch	IIIId	33	39	96	56
Garfish	IIIId	111	148	96	118
Smelt	IIIId	151	118	207	159
Vimba bream	IIIId	83	115	73	90

Appendix IIIa.2

Other EU member states landings in Estonia in 2001, 2002 and 2003 (tonnes)  
(for calculation of average landings in Appendix III)

<b>Species</b>	<b>Area</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>Average 2001- 2003</b>
MP					
Herring	IIId	3080	1883	265	1743
Sprat	IIId	2626	935	154	1238

## Appendix IV

### Estonian sampling effort by species and area based on landings made in the Estonian ports. Extended programme

Species	Area	EU TAC 2004 (tonnes)	EE TAC 2004 (tonnes)	EE landings in Estonia 2001-2003 (tonnes)	EE landings in EE in 2003	Sampling required (Y/N) EE	Sampling frequency rules 1)			Minimum sampling 2005 1)			Estonian sampling 2005 2)		
							No of samples per fished tonnes	No of fish measured per sample	No of fish aged per sample	Minimum no. of samples	Minimum No of measured fish	Minimum No of aged fish	Minimum no. of samples	Minimum No of measured fish	Minimum No of aged fish
Eel	IIIId	---		24	19	Y	1/100	50	50				3	150	150
Whitefish	IIIId	---		37	30	Y	1/100	50	50				12	600	600
Pike	IIIId	---		23	31	Y	1/100	50	50				12	600	600
Perch	IIIId	---		596	824	Y	1/100	50	50				26	1300	
Flounder	IIIId	---		457	480	Y	1/200	50	50				26	1300	1300
Turbot	IIIId	---				Y	1/100	50	50				n.d.	n.d.	
Pikeperch	IIIId	---		56	96	Y	1/100	50	50				15	750	750
Smelt	IIIId	---		159	207	Y							14	700	700
Garfish	IIIId	---		118	96	Y							7	350	350
Vimba bream	IIIId	---		90	73	Y							12	600	600

1) As specified in Commission Regulation (EC) 1639/2001