# Technical report
# on the
# Danish National Programme for
# collection of fisheries data in 2002

## by

**Danish Directorate of Fisheries**
**Danish Institute for Fisheries Research**
**Danish Research Institute of Food Economics**

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# Table of contents:

# Technical report
## on the
## Danish National Programme for collection of fisheries data in 2002.

## 1. Introduction.

This report constitutes the technical report for the Danish Programme for collection of data in the fisheries sector during the period 1/1 – 31/12 2002. The structure of the report follows the structure of the contract "**Danish National Programme for collection of fisheries data**" of 27th of August 2001 in order to facilitate an easy comparison.

The programme has been carried out in accordance with the rules laid down in the *"Commission Regulation (EC) N$^0$ 1639/2001.*

The programme is carried out in close cooperation between:

- **Danish Directorate of Fisheries**
  Danish Directorate of Fisheries (FD) performs control and authority exercises at the commercial fisheries and the recreational and game fisheries.
- **Danish Research Institute of Food Economics**
  The Danish Research Institute of Food Economics (FOI) is a Public Research Institute. The researchers and academic staff of the Institute have backgrounds and experience in economics, agricultural and resource economics, agronomy, as well as a wide range of statistical methods and applied research tools.
- **Danish Institute for Fisheries Research**
  Danish Institute for Fisheries Research (DIFRES) is a Public Research Institution which carries out research, investigations and provides advice concerning sustainable exploitation of live marine and fresh water resources. Moreover, processing and improvement of fish products as well as quality assurance in the fish industry are important parts of the research areas of the institution.

DIFRES has acted as coordinator for the Danish Programme

Primary data collected under the Danish programme is 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. (DIFRES)
- Economic data. (FOI)

In addition to the above-mentioned databases containing primary data a database, the Danish Fisheries Analyses Database (DFAD) contains information from all databases merged and aggregated by segments. This database contains most of the information requested in research projects and in relation to fisheries management.

All data collected under the programme are dealt with in confidence. Data, which are collected under the program, will only be provided on aggregated levels in order to prevent that individual units are identified. Accesses to the data are limited to authorised staff member from the three institutes and no one outside the institutes has access to the data without permission.

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

Collection of information on fishing capacity, fishing effort, economic and landings statistics has been carried out entirely on a national basis. Biological information on catches, information collected by research vessels 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 FOI constitutes the Danish 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

Fisheries Adviser Jørgen Dalskov has acted as the National Correspondent.

## 1.3 Appreciation of the level of precision

Commercial landings statistics:
All commercial landings made in Denmark are recorded by the first hand buyer on individual basis and stored in a central database hosted by the Danish Directorate of Fishery. These data has been combined with the logbook data provided by the fishermen. Together these data give an exhaustive description of the amount of landings by species, commercial sorting, season, fishery and area.

Biological information of the landings:

All species, which are landed in an amount, which requiring a sampling scheme according to the minimum program, has been aimed to be sampled on the sampling level specified by the minimum program The precision levels are define by the sampling levels defined in the minimum program.

Discard information:
It has been the aim to include standard estimates of precision of all central biological parameters obtained from the discard sampling. Unfortunately, it has not been possible to develop those procedures to an extent that permit the calculation of the precision level as specified in the contract "**Danish National Programme for collection of fisheries data"** of 27. August 2001.

The work is ongoing but is still not developed beyond the theoretical state and hence not in an applicable state. International work is going on for developing agreed and standardised methods.

As no formal calculation of the level of precision has been made, it is not possible to decide if the discard sampling in 2002 fulfils the levels of precision agreed in the contract. In 2002 the discard sampling has therefore been accomplished on an effort level which equals the level of previous years and which has demonstrated results which are in agreement with the general understandings of the discard structure, volume and quality. In order to make the investigations most cost effective, the sampling effort has been concentrated on fisheries where an "a priori" knowledge points out a significant discard of commercial important species. This means, that e.g. the gillnet fishery only has been sampled to a very limited extent in 2002, while other fisheries has been samples more intensified.

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

## 2.1  C. Collection of data concerning fishing capacity

**Minimum programme:**

The collection of data concerning fishing capacity has been carried out according to the specification given in the contract "**Danish National Programme for collection of fisheries data"** of 27. August 2001.

**Extended Programme:**

According to the program no data collection has been carried out.

## 2.2  D. Collection of data related to fishing effort

**Minimum programme:**

The collection of data related to fishing effort has been carried out according to the specification given in the contract "**Danish National Programme for collection of fisheries data"** of 27. August 2001.

**Extended Programme:**

According to the program no data collection has been carried out.

# 3. Module of evaluation of catches and landings

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

**Minimum programme:**

The collection of data related to landings has been carried out exhaustively and in accordance with the specification given in the contract "**Danish National Programme for collection of fisheries data"** of 27. August 2001.

The Danish fishery can be divided into two categories: A fishery with landings only for human consumption purposes and the so-called "Industrial fishery", where all the landings are made for reduction purposes (fish meal and oil). The landings of the two categories are sampled according to separate samplings schemes.

### 3.1.1 Status on the collecting of data on landings designated human consumption.

Enforcement of the national legislation has guarantied a exhausive coverage of the landings and sampling has been carried out in accordance with the contract "**Danish National Programme for collection of fisheries data"** of 27. August 2001.
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### 3.1.2 Status on the collecting of data on landings designated reduction purposes.

As only the target species are recorded in these fisheries, by-catches of other species, which occurs in the industrial fisheries, the Sales Notes database does not contain reliable information on landings by species in these fisheries. Therefore, additional information has been collected to provide estimates of the landings of by-catch by species. The sampling level has

The information on landings is merged with other fishery dependent data and store in the DFAD.

A priory knowledge on the industrial fishery has verified that discard in this fishery is negligible and therefore no discard sampling has been carried out.

## 3.2 Danish discard sampling

### 3.2.1 Danish sampling effort of relevant species and areas

The discard sampling in 2002 has been performed according to the policy laid down in the contract "**Danish National Programme for collection of fisheries data"** of 27. August 2001.

Disseminations of data:
Baltic Fisheries Assessment Working Group (ICES).
In October 2003 the data from the North Sea will be submitted to the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).

### 3.2.2 Quality assurance

The discard data has been collected in agreement and in cooperation with the Danish Fishermen's Association. A formal agreement on cooperation between DIFRES ant the Danish Fishermen's Association has been signed. Two Working Groups, one for the North Sea and the Skagerrak and one for the Kattegat and the Baltic Sea have been established with members from DIFRES and the Danish Fishermen's Association. The Working Groups develop the sampling plans and performs a very detailed quality check of the sampled data.

**Extended Programme:**

According to the program no data collection has been carried out.

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

**Minimum programme:**

The data concerning the catches per unit of effort and/or effective effort of specific commercial fleets has been collected following the guidelines in the Minimum Programme as described in the contract "**Danish National Programme for collection of fisheries data"** of 27. August 2001.

A review of the Danish CPUE time series used in stock assessment work in ICES was sent 9th of January 2003 to the Commission.

**Extended Programme:**

According to the program no data collection has been carried out.

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

Seven surveys have been carried out during 2002 by Danish research vessels in the North Sea, the Skagerrak, the Kattegat and the Baltic Sea. All surveys are in accordance with the contract "**Danish National Programme for collection of fisheries data"** of 27th of August 2001.

The surveys described below are all of priority 1 and are thus a part of the minimal program.

The surveys have been internationally co-ordinated and the planning and co-ordination of the surveys has been made in the ICES working groups connected with these surveys (IBTS Working Group, BITS Working Group, Herring Survey Planning Working Group).

**Minimum programme:**

**3.4.1 International Bottom Trawl Survey (IBTS)**

The purpose is to estimate abundance of commercial and non-commercial fish species by means of bottom trawling and to collect otoliths of commercial species (cod, haddock, whiting, Norway pout, saithe, herring, sprat, and mackerel) to assess abundance by age, in particular for the recruiting year classes in the North Sea, the Skagerrak and the Kattegat.

As planed two surveys have been carried out during 2002:

**First quarter:**

R/V DANA

          Cruise period:           29/1-15/2 2002

          Status:       Carried out according to the contract "**Danish National Programme for collection of fisheries data"** of 27th of August 2001.

          Disseminations of data:

                The International Bottom Trawl Survey Working Group (ICES)

                Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES). Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy (ICES)

                Herring Assessment Working Group for the Area South of 62º N (ICES)

                Baltic International Fish Survey Working Group (ICES)

                Data uploaded to DATRES database (ICES)

**Third quarter:**

R/V DANA

          Cruise period:           27/8-13/9 2002

          Status:       Carried out in agreement to the contract "**Danish National Programme for collection of fisheries data"** of 27th of August 2001.

          Disseminations of data:

The International Bottom Trawl Survey Working Group (ICES)
Working Group on the Assessment of Demersal Stocks in the North Sea
and Skagerrak (ICES). Working Group on the Assessment of Mackerel,
Horse Mackerel, Sardine and Anchovy (ICES)
Herring Assessment Working Group for the Area South of 62º N (ICES)
Baltic International Fish Survey Working Group (ICES)
Data uploaded to DATRES database (ICES)

## 3.4.2 Baltic International Trawl Survey (BITS)

The primary purpose of the part undertaken by R/V DANA is to develop indices for recruitment and stock abundance of the Baltic cod stocks. The second part undertaken by R/V HAVFISKEN provides in addition to cod also abundance indices for flatfish.

The survey was carried out twice during 2002 and in both quarters both the research vessel R/V DANA and the smaller research vessel R/V HAVFISKEN did participate

As planed four surveys have been carried out during 2002:

**First quarter:**

R/V DANA
        Cruise period:                1/3-22/3 2002
        Status:        Carried out according to the contract "**Danish National Programme for collection of fisheries data"** of 27th of August 2001.
        Disseminations of data:
                Baltic Fisheries Assessment Working Group (ICES)
                Baltic International Fish Survey Working Group (ICES)
                Data uploaded to DATRES database (ICES)

R/V Havfisken.
        Cruise period:                7/3-23/3 2002
        Status:        Carried out according to the contract "**Danish National Programme for collection of fisheries data"** of 27th of August 2001.
        Disseminations of data:
                Baltic Fisheries Assessment Working Group (ICES)
                Baltic International Fish Survey Working Group (ICES)
                Data uploaded to DATRES database (ICES)

**Forth quarter:**

R/V DANA
        Cruise period:                1/11-17/11 2002

Status:         Carried out according to the contract "**Danish National Programme for collection of fisheries data"** of 27th of August 2001.
Disseminations of data:
Baltic Fisheries Assessment Working Group (ICES)
Baltic International Fish Survey Working Group (ICES)
Data uploaded to DATRES database (ICES)

R/V Havfisken.
Cruise period:          16/10-9/11 2002
Status:         Carried out according to the contract "**Danish National Programme for collection of fisheries data"** of 27th of August 2001.
Disseminations of data:
Baltic Fisheries Assessment Working Group (ICES)
Baltic International Fish Survey Working Group (ICES)
Data uploaded to DATRES database (ICES)

### 3.4.3 HERSUR (International acoustic herring survey)

The purpose is to provide acoustic abundance estimates of herring and sprat in the North Sea (eastern part), the Skagerrak, and the Kattegat.

R/V DANA
Cruise period:          25/6-8/7 2002
Status:         Carried out according to the contract "**Danish National Programme for collection of fisheries data"** of 27th of August 2001.
Disseminations of data:
Herring Assessment Working Group for the Area South of 62º N
Data uploaded to BAD I and BAD II databases (ICES)

**Extended Programme:**

No data collection has been carried out within the framework of the extended programme.

## 3. 5  H. Biological sampling of catches: composition by age and by length and I other biological sampling

Biological samplings have in general been performed according to the instructions given in the Implementation Regulation 1639/2001. As the sampling level of each stock is based on the amount of landing in 2000, the actual sampling level has been adjusted according to changes in the 2002 landing compared to 2000.

The sampling of biological information in the Bornholm area (sub-div. 24 and 25) has been reorganised compared to the description in the contract. In order to be able to stay in touch with the fishery and in order to make the sampling significantly more cost efficient, the sampling program on Bornholm has been subcontracted to a local contractor: "Bornholms Lakseklækkeri". They are situated in the largest fishing port of Bornholm and have daily contact with the fishing industry. Therefore they are better able to arrange sampling and in particularly, the discard sampling.

### 3.5.1 The Danish standard sampling scheme

The sampling has been carried out following the procedure described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001. The status of the sampling carried out in 2002 is given in section 3.5.2-5.

In all cases sampling has been carried out following the level fulfilling the minimum programme.

### 3.5.2 The Baltic Sea. ICES Area IIIb-d

**Sprat**

Status:
The stock has been sampled according to the procedure and the level described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001.
The landings from other EU-member states (Sweden) are in the beginning of the period did not meet the minimum requirements due to structural problems with the sampling scheme. Therefore, as all foreign landings took place in 1st quarter exclusively, it was not possible to overcome the problems in due time to obtain the correct sampling level for these landings. Actions have been taken to avoid the same problem next year.

Disseminations of data:
Baltic Fisheries Assessment Working Group (ICES)

**Plaice**

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001.

The stock has not been sampled for biological information prior to the program. Therefore, new sampling logistics had to be implemented. Due to some misunderstandings the stock sampling level has not meet the minimum requirements in sub-div. 22 during the first half of 2002. This was corrected from 3rd quarter and on. In division IIId the stock has been sampled slightly in excess of the minimum program.

Disseminations of data:

Baltic Fisheries Assessment Working Group (ICES)

### Herring.

Status:
The stock has been sampled according to the procedure and the level described in "**Danish National Programme for collection of fisheries data"** of 27th of August 2001.

Disseminations of data:
Baltic Fisheries Assessment Working Group (ICES)
Herring Assessment Working Group for the Area South of 62º N (ICES)

### Cod

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data"** of 27th of August 2001. The sampling level has been carried out on a level which more than fulfils the minimum program requirements due to the critical stock situation and the implementation of the recovery plan of the eastern cod stock. The increased sampling level is an attempt to remedy the general poor data quality for the stock.

Disseminations of data:
Baltic Fisheries Assessment Working Group (ICES)

### Salmon

Status:
Commercial catches:
The stock has been sampled according to the procedure and the level described in "**Danish National Programme for collection of fisheries data"** of 27th of August 2001.

Recreational fishery:
Sport fishing for salmon in the sea, in Denmark, is only possible by offshore trolling at the East coast of Bornholm in ICES sub division 25. The sport fishing catches of salmon in the sea was earlier extremely scarce, but the trolling has developed in the last 5-10 years. In year 2002 approximately 3000 individuals of salmon were caught by trolling boats in the area east and north east of Bornholm. The estimates of recreational catches are calculated from inquiries sent to sport fishing clubs, recreational fishing magazines, and boat hiring firms. The estimate is believed to be close to the actual number.

DIFRES has during 2002 established good contacts to the different organisations which has interests in the salmon trolling fishery, and regularly receive information from this fishery.

Disseminations of data:
Baltic Salmon and Trout Assessment Working Group (ICES).


### 3.5.3 ICES AREA IIIA North and South


### Blue whiting

Status:
Even though, the landings has decreased the stock has been sampled according to the procedure and the level described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001.

Disseminations of data:
Northern Pelagic and Blue Whiting Fisheries Working Group (ICES).


### Sprat

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001. The stock has been sampled in excess of the requirements given in the minimum program even though the landings have decreased in 2002 compared to 2000.

Disseminations of data:
Herring Assessment Working Group for the Area South of 62° N


### Hake

Status:
The stock has been sampled according to the procedure and the level described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001.

Disseminations of data:
Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).


### Haddock

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001. The sampling level has been

significantly increased compared to the contract due to increased landings in 2002 compared to the landings in 2000.

Disseminations of data:
Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).
Report of the Subgroup on Resource Status (SGRST) of the STECF (Mixed Fisheries)
Study Group on the Development of Fishery-based Forecasts (ICES)
Meeting on Cod Assessment and Technical Measures (STECF-Subgroup)

## Mackerel

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001. The landings have decreased in 2002 compared to 2000 and consisted only of a few very large landings. When the total landings are made up by only few landings in a short time span, it is essential to know where and when these landings take place in order to obtain samples. The establishment of such a logistic system was not possible in due time in 2002. Therefore, the sampling level did not meet the minimum program requirements

Disseminations of data:
Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).
Based on North Sea biological information.

## Saithe

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001. The sampling level has been significantly increased in order to match the increased landings in 2002 compared to 2000.

Disseminations of data:
Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).
Report of the Subgroup on Resource Status (SGRST) of the STECF (Mixed Fisheries)
Study Group on the Development of Fishery-based Forecasts (ICES)
Meeting on Cod Assessment and Technical Measures (STECF-Subgroup)

## Plaice

Status:
The stock has been sampled according to the procedure and the level described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001.

Disseminations of data:

Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).

## **Herring**

Status:
The sampling procedure of the stock has not followed the procedure described in "**Danish National Programme for collection of fisheries data"** of 27th of August 2001. The sampling of herring in dev IIIaN has been hampered by the uncertainty of the catch area. Precise catch area information are essential as the landings consists of a mix of two different stocks.

Therefore, the sampling level has not meet the minimum program requirements. Action has been taken to improve the sampling in 2003.

Disseminations of data:
Herring Assessment Working Group for the Area South of 62º N

## **Sandeel**

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data"** of 27th of August 2001. The sampling level has been significantly increased in order to match the increased landings in 2002 compared to 2000.

Disseminations of data:
Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).

## **Sole**

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data"** of 27th of August 2001. The sampling level has been reduced in order to match the decreased landings in 2002 compared to 2000.

Disseminations of data:
Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).

## **Cod**

Status:
Both stocks (IIIaN and IIIaS) have been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data"** of 27th of August 2001. The sampling level in IIIaN has been slightly reduced in order to match the decreased landings in 2002 compared to 2000. In IIIaS the landings have decreased significantly and the sampling level has been adjusted proportionally.

Some thoughts should be given the fact that a stock (like the IIIaS) in a very critical condition resulting in reduced catches and there for is sampled with reduced intensity. The stock is therefore sampled very incomplete in a situation where the assessment of the stock might call for very specific and accurate input data.

Disseminations of data:
Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).
Report of the Subgroup on Resource Status (SGRST) of the STECF (Mixed Fisheries)
Study Group on the Development of Fishery-based Forecasts (ICES)
Meeting on Cod Assessment and Technical Measures (STECF-Subgroup)

## 3.5.4 ICES AREA II.

### Atlanto-Scandian Herring

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001. The sampling level has been reduced in order to match the decreased landings in 2002 compared to 2000. The Danish landings in third countries have been difficult to sample.

Disseminations of data:
Northern Pelagic and Blue Whiting Fisheries Working Group (ICES).

### Blue whiting

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001. The sampling level has been decreased in order to match the decreased landings in 2002 compared to 2000.

Disseminations of data:
Northern Pelagic and Blue Whiting Fisheries Working Group (ICES).

## 3.5.5 ICES AREA IV

### Sandeel

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001. The sampling level has been

on the level matching the catches in 2000 but does not meet the minimum program requirements due to increased landings in 2002.

Disseminations of data:
Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).

## Anglerfish

Status:
The stock has been sampled according to the procedure and the level described in "**Danish National Programme for collection of fisheries data**" of 27<sup>th</sup> of August 2001.

Disseminations of data:
Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).

## Blue whiting

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data**" of 27<sup>th</sup> of August 2001. The sampling level has been decreased in order to match the decreased landings in 2002 compared to 2000.

Disseminations of data:
Northern Pelagic and Blue Whiting Fisheries Working Group (ICES).

## Sprat

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data**" of 27<sup>th</sup> of August 2001. The sampling level has been slightly increased compared to the contract even though the landings in 2002 have decreased a little compared to 2000.

Disseminations of data:
Herring Assessment Working Group for the Area South of 62º N

## Horse mackerel

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data**" of 27<sup>th</sup> of August 2001. The stock has not met the minimum program requirements even though the landings are on the same level in 2002 compared to 2000. Horse mackerel is only caught as by-catch in the small mesh fishery and therefore, the species appears only sporadic in the samples making adequate sampling difficult.

Disseminations of data:
Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy (ICES)


## Hake

Status:
The stock has been sampled according to the procedure and the level described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001 even though the landings in 2002 have decreased compared to 2000.

Disseminations of data:
Working Group on the Assessment of Southern Shelf Demersal Stocks (ICES).

## Mackerel

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001. The sampling level has been decreased in order to match the decreased landings in 2002 compared to 2000.

Disseminations of data:
Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy (ICES)

## Turbot

Due to initial logistic problems in sampling this species, no sampling has been made in 2002 despite the increased landings in 2002 compared with 2000 (from 430 t (prescripts 2 samples) in 2000 to 609 t in 2002 t (prescripts 3 samples)).

## Whiting

Status:
The stock has been sampled according to the procedure and the level described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001.

Disseminations of data:
Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).
Report of the Subgroup on Resource Status (SGRST) of the STECF (Mixed Fisheries)
Study Group on the Development of Fishery-based Forecasts (ICES)
Meeting on Cod Assessment and Technical Measures (STECF-Subgroup)


## Haddock

Status:

The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001. The sampling level has been significantly increased compared to the contract due to increased landings in 2002 compared to the landings in 2000.

Disseminations of data:
Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).
Report of the Subgroup on Resource Status (SGRST) of the STECF (Mixed Fisheries)
Study Group on the Development of Fishery-based Forecasts (ICES)
Meeting on Cod Assessment and Technical Measures (STECF-Subgroup)

## Plaice.

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001. The stock has been sampled in excess of the requirements given in the minimum program even though the landing in 2002 is about the same compared to 2000.

Disseminations of data:
Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).
Report of the Subgroup on Resource Status (SGRST) of the STECF (Mixed Fisheries)
Study Group on the Development of Fishery-based Forecasts (ICES)
Meeting on Cod Assessment and Technical Measures (STECF-Subgroup)

## Lemon sole

Status:
The stock has been sampled according to the procedure described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001. The sampling level has been sampled in excess of the requirements given in the minimum program even though the landings have been stable.

Disseminations of data:
Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).

## Herring

The stock has been sampled according to the procedure and on the level described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001.

Disseminations of data:
Herring Assessment Working Group for the Area South of 62° N (ICES).

**Norway pout**

The stock has been sampled according to the procedure and on the level described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001. Because the landings have decreased with app. 50% the sampling is correspondently lower in 2002 compared to 2000.

Disseminations of data:
Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).

**Cod**

The stock has been sampled according to the procedure and on the level described in "**Danish National Programme for collection of fisheries data**" of 27th of August 2001.
Some thoughts should be given the fact that a stock (like the IV) in a very critical condition resulting in reduced catches and there for is sampled with reduced intensity. The stock is therefore sampled very incomplete in a situation where the assessment of the stock might call for very specific and accurate input data.

Disseminations of data:
Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).
Report of the Subgroup on Resource Status (SGRST) of the STECF (Mixed Fisheries)
Study Group on the Development of Fishery-based Forecasts (ICES)
Meeting on Cod Assessment and Technical Measures (STECF-Subgroup)

**Extended Programme:**

No data collection has been carried out within the framework of the extended programme.

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

## 4.1 Collection of economic data by groups of vessels

### 4.1.1 Data sources
The Danish programme for section J covering the information for the Community Programme, as defined in appendix XVII and XVIII of Regulation (EC) No 1639/2001, will be completed by two sources of data. The first being register data from the administrative and statistical registers of the Danish Directorate of Fisheries (FD) and secondly by sample statistics compiled at the Danish Research Institute of Food Economics (FOI).

The administrative and statistical registers in FD are the basic source to information about the Danish fishery. The registers relevant to the collection of economic information for groups of vessels are: the Register of Fishing Vessels, the Register of Fishermen/Vessel Owners, the Sales Note Register and the Logbook Register. These registers are fully comprehensive in the sense that all fishery related activities are registered for all individuals, which means that statistical analysis

based on the registers can cover all activities in the fishery and on the first-hand market for fish, when that is required (e.g. the official catch statistics).

For economic data like cost and earnings, which are not subject to administrative control by the authorities there is no need to build a comprehensive register. Instead it is more cost efficient to use a statistical sample. FOI obtains each year an extract from the FD registers containing information on all active vessels for the year before. This extract is used to analyse and stratify the population of fishing units before the sample for the year is drawn.

### 4.1.2 Stratifying the population
The information used to build a database containing the population for a year is extracted from the FD registers. The information is delivered on 3 files containing:

> Identification of a vessel owner
> Vessel characteristics including starting and finishing date for a vessel version
> Catch in live weight quantities and value per species for each vessel version

All 3 files include a decisive owner identification number, which is used to merge the data. Thus the population database has information on the production per species for each fishing unit.

After identification of all marketed fish by fishing unit (fisherman/fishing firm/fishing vessel) the population of fishing units is limited to all commercial fishermen and fishing firms, who had owned an active registered fishing vessel for at least 6 month of the year, and had a total sale of fish above a fixed minimum measured as SCV (see below). The threshold value, which is updated every year proportional to changes in the price of fish, was EUR 29,450 in 2002. The aggregated value of the neglected (small-scale) fishery is only about 1% of the total fishery, whereupon the remaining population in the statistics covers about 99% of the total output in the Danish fishery.

Before drawing the sample the population is stratified according to economic size, vessel segment, product combination, and region. The stratification by economic size is based on the total Standard Catch Value (SCV) for the fishing firm/vessel, which is the weighted sum of the production of that vessel, where the catch of each species (live weight quantities) has been weighted by the average live weight price of that species. The population is divided into 11 economic size groups.

From the year 2001 the categorisation of the population by vessel segments has been according to the length groups and type of fishing technique stipulated in appendix III of Regulation (EC) No 1639/2001. For national purposes the length group 12 to 24 metres has been divided into 3 subgroups. The total number of segments used for categorising the Danish fishery is then 25, which means that the resulting stratification matrix has 25*11 cells.

**Basic segmentation of vessels in the Danish fishing fleet into 25 groups** (minimum programme)

| Fishing technique | < 12m | 12-14.9m | 15-17.9m | 18-23.9m | 24-39.9m | >= 40m | All vessels |
|---|---|---|---|---|---|---|---|
| Fixed net/traps | 84 | | | | | | 84 |
| Gill netters | 314 | 90 | 52 | 34 | | | 490 |
| Trawlers  * | 37 | 180 | 129 | 113 | *   137 | *    33 | 629 |
| Purse seiners | | | | | | 11 | 11 |
| Danish seiners | | 22 | 27 | 48 | | | 97 |
| Beamtrawlers | | | | | 11 | | 11 |

| Polyvalent | 44 | 42 | 8 | 9 | 4 | | 107 |
| Shrimpers | | | | | | | 23 |
| Musseldredgers | | | | | | | 65 |
| All vessel categories | 479 | 334 | 216 | 204 | 152 | 44 | 1517 |

Note: Shrimpers and Musseldredgers are not divided among length groups.
* Trawlers 24-39.9m and trawlers >=40m are split up into two groups (industrial fishery and other fishery).

The categorisation of vessels by length include identification of vessels less than 10 metres to make allowance for the more detailed disaggregating of vessels in the extended programme (appendix IV of Regulation (EC) No 1639/2001), but this subgroup has not yet been installed in the stratification procedure.

### 4.1.3 Selection of the sample
In a stratified random sampling the precision of the estimate for the population depends on the allocation of the sample on the strata. The optimal allocation is reached when the size of the sample in a stratum is proportional with the dispersion of the variable in that stratum. This means that the bigger fraction should be selected from the strata of big size firms.

The process of selecting the sample for the account statistics is initiated by calculating the optimal selection fraction when estimating total SCV for the economic size groups. Then the selection percentages are set for the column total (all vessel segments) and the number of units to be drawn in each cell to give the best possible fit for total SCV for each vessel segment is calculated.

The number of fishing firms to be drawn in each cell is then randomly selected among the firms available for selection. In 2001 the population numbered 1515 fishing units, but only 521 of these units were available for selection as it is voluntary to participate in the statistics. 333 units were selected for the sample in 2001. The selection cannot be considered a genuine random selection, when a part of the stratum is not open for selection. But it gives a far better sample than it would, having selected a sample from the total population and maybe due to voluntary participation only getting a respond from 50% of the sample.

Even though participating in the sampling programmes is voluntary, this applies only to the situation before the sample is drawn. After the sample has been drawn, the accountants must report the account for those of their clients, who have been selected for that year. Every year before the sample is drawn, each accountant signs a contract with the institute in which their clients available for selection that year are listed. Nevertheless due to specific reasons (death, accident, retirement, or excessive delay by the accountant), it is necessary to find substitutes for about 4% of the selected accounts. The substitutes are of course chosen to match the categorisation criteria of the cancelled accounts.

The 11 economic size groups are used to fine tune the sample selection process. Subsequent only 5 groups are used in the weighting procedure and in the final statistics. The table below shows the number of accounts selected, but here aggregated from vessel segments to length groups.

**Population and sample by length groups and economic size class 2001**

| Vessel-Length groups | | Under 0.35 | 0.35-0.79 | 0.80-1.49 | 1.5-2.99 | 3.00 and more | All vessels |
|---|---|---|---|---|---|---|---|
| | | ------- Yearly landings measured as SCV, Mio. DKK --------- | | | | | |
| Vessels less Than 12 metre | Number in population | 270 | 170 | 42 | 1 | - | 483 |
| | Number in sample | 26 | 25 | 7 | 1 | - | 59 |
| Vessels 12 to 14,9 metre | Number in population | 35 | 135 | 149 | 14 | - | 333 |
| | Number in sample | 4 | 21 | 23 | 4 | - | 52 |
| Vessels 15 to 17,9 metre | Number in population | 2 | 25 | 121 | 67 | 2 | 217 |
| | Number in sample | - | 3 | 24 | 22 | 2 | 51 |
| Vessels 18 to 23,9 metre | Number in population | 2 | 9 | 58 | 109 | 22 | 200 |
| | Number in sample | - | 1 | 12 | 38 | 11 | 62 |
| Vessels 24 to 39,9 metre | Number in population | - | - | 3 | 28 | 122 | 153 |
| | Number in sample | - | - | 1 | 10 | 49 | 60 |
| Vessels Over 40 metre | Number in population | - | - | - | - | 43 | 43 |
| | Number in sample | - | - | - | - | 26 | 26 |
| Special fisheries | Number in population | - | 8 | 65 | 7 | 6 | 86 |
| | Number in sample | - | 2 | 17 | 2 | 2 | 23 |
| All length groups | Number in population | 309 | 347 | 438 | 226 | 195 | 1,515 |
| | Number in sample | 30 | 52 | 84 | 77 | 90 | 333 |
| | Sample size | 10% | 15% | 19% | 34% | 46% | 22% |

## 4.1.4 Statistical calculation, weighing the sample

Based on the population database it is relatively straightforward to calculate the total SCV as well as the average SCV per firm for each cell in the stratification matrix. These results are used as restrictions in a quadratic goal-programming model when calculating the statistical weight for each individual account in the sample.

Both the units in the population as well as the structure of the weighting procedure have now been rebuilt to enable calculation of statistics by vessel units.

## 4.1.5 Data in the Account statistics for Fishery

In order to ensure an adequate data quality the institute does not rely on a simple questionnaire. The coherent structure of economic data makes it necessary to be able to validate all variables for an individual economic agent both in detail and consistently combined with other variables. The best way to do that is by setting up a balanced account. Therefore FOI has constructed a harmonized accounting form for fishery, which ensures that the data is broken down to meet the requirements of the Account Statistic for Fishery as well as the specifications in Regulation (EC) No 1639/2001.

As a key factor to ensure data quality the accounts are made by professional accountants, who are paid for the work. The remuneration is EUR 376 per account. The accounting form set up by the institute has been build in an excel spreadsheet, which is used for reporting the data. The tables have the following number of entries:

      46 entries for production *2(quantity and value per species)

      10 entries for other income

      47 entries for costs

       7 entries for physical assets*5(value at the beginning of the year,

        changes due to market conditions, investments, depreciation,

value at the end of the year)
  2 entries for physical stocks
  7 entries for financial assets*2(beginning of year, end of year)
13 entries for liabilities*2(beginning of year, end of year)
10 entries for capital regulation
20 entries for private income consumption and savings
10 entries for private assets and liabilities

Both quantity and cost data are collected for fuel and labour inputs. Furthermore vessel insurance value is included as a supplement to the book value (replacement value) of the vessel. Finally vessel activity is recorded as well as the owner's share of the vessel in case of shared ownership. The owner's share is used when allocating the rent of capital between the shareholders.

The reported accounts are entered into a database, where the data in each individual account is thoroughly tested for a vast number of properties and relevant comparisons. Any inconsistence disclosed by the test programme has to be addressed in collaboration with the reporting accountant and solved before the account is approved for statistical use.

The economic information collected and processed for account statistics forms together with the extract from the FD registers the basis for reporting data on the economic situation for the vessel groups.

**4.1.6 Data for basic economic evaluation**

*1. Statistics based on register data:*

- Vessel data. The physical data for the vessels are verified according to the FD register of fishing vessels, that is the Number in population, gross tonnage (GT), engine power (kW), and age of vessel.
- Effort. Vessel activity measured as days at sea according to the FD register of logbooks.
- Prices. Quarterly data on prices will be prepared using statistical files produced by FD based on the sales note register.

All register-based data are by definition exact. That is the precision level should be perfect. The only possible deviation should be if defective data were entered. The registers are continuously updated, as they are used for administrative purposes.

*2. Sample statistics:*

- Income / turnover: Value of production by species.
- Production costs: Labour costs, fuel, repair and maintenance, other operational costs.
- Fixed costs: Depreciation calculated individually by a fixed percentage for each type of fishery asset based on expected lifetime.
- Financial position: Own capital / borrowed capital.
- Invested capital: Replacement value of fishery assets at the beginning of the year. Insured values could also be included, but must be considered second best to the book value (replacement value).
- Employment: Calculated number of employed (part time / full time).

The precision level or the uncertainty on the results cannot be calculated by approximation to a distribution function, because it is not possible to carry out a random sampling. The element of voluntary participation has the result, that only a part of each stratum is available for selection. The most important task for improving the precision level is to increase the willingness among the fishermen to participate in the selection population. The institute will follow up on last year's achievement on increasing the number of fishermen to participate in the statistics, by selective enquiries to recruit fishermen in the strata where the participation needs improvement.

The institute will work on establishing an approximate measure for precision derived from ad hoc methods. At present the number of firms in the sample is about 330 and the remuneration to the fisherman's accountant is 376 EUR per reported account. It may be necessary to increase the number of accounts in order to meet the required precision for all fleet segments.

**4.1.7 Supplementary data for improving the economic evaluation (extended programme)**

Some of the entries in appendix XVIII of the Commission Regulation may call for specific pilot studies in order to access the possibilities to fulfil the requirements. For instance regional differentiation of costs by ICES subdivisions is not easily accomplished when many vessels have fishing trips in several subdivisions.

Another area where it may be necessary to carry out a more elaborate distinction is in the detailed disaggregating of vessels (appendix IV), where calculations based on number of days performing a specific type of fishing technique may be implemented. The type of fishing technique is not fully

identical with the vessel type based grouping in fleet segments, though there may be a high degree of correlation between fleet segment and use of gear type.

*1. Statistics based on register data:*
- Prices. Monthly data on prices prepared using statistical files produced by FD based on the sales note register.
- Production. Nominal catch in tonnes per species. Seasonal (monthly) data and by stock (ICES area) information could possible be prepared using the statistical files from FD.

*2. Sample statistics:*
- Production. Nominal catch in tonnes per species. Seasonal (monthly) data and by stock (ICES area) data is not considered to be comprehensive for the account forms. But the register-based statistics could complement the account statistics in this respect.
- Income/revenue/turnover. Subsidies separated from other income from fishery.
- Production costs. Further break down of operational costs into subgroups.
- Invested capital. Break down into type of fishery assets, for instance vessel (hull), engines and winches, electronic equipment, fishing gear, sheds/gear house, trucks or vans etc.
- Effort. The data for vessel activity are verified according to the FD register of logbooks. That is the number of days at sea and use of gear for each vessel.
- Employment: Separately calculated for the owner, partners, hired skippers and crew.


**4.1.8 Completion of the aims in the programme for 2002**
In the programme for 2002 we set out the objective to restructure the system for Account Statistics to fulfil the requirement in the appendix XVII and XVIII of Regulation (EC) No 1639/2001. These objectives has now been fulfilled:

1. Changing the account form by separating the private (family) economy from the fishery economy.
2. Changing the basis for the statistical unit in the procedure for collection of economic data from fisherman/fishing firm to a vessel unit approach.
3. Extend the categorisation variables to include further physical measures of the vessel.
4. Implement a new stratification model for sample selection and the procedure for calculation of individual weights for each account.

Re. 1. The accounting form has now been restructured in a way that the fishery economy is completely separated form the private/family economy. All test are made consistent to balance the economy for the fishing firm before linking to the family economy. Furthermore all information required in the minimum programme is specified in the FOI accounting forms for fishery.

Re. 2. In preparation of the population for the fishery account statistics all registered Danish fishermen or fishing firms with more than one fishing vessel are now individually assessed to determine whether the vessels owned by that fishing firm should be separate units. Bigger vessels (above 10 metres) are always set up as individual units. Fishermen, who fish alone in the small-scale fishery using a number of small boats for, which it does not make sense to set up accounts, are still treated as a single unit. But small vessels (less than 10 metres) that are operated independently with separate crews are now set up as separate units.

Though a fishing vessel not is an economic agent, it is usually conceived as so in fishery economics and fishery management. Therefore the institute has planned to implement the vessel-unit approach for the years 1996-2001 during 2003/2004, when a project aimed at harmonising the account statistics in order to build time series will be undertaken.

Re. 3. The transfer of variables from the vessel register in FD to the Fishery population file at the institute has been extended to include the necessary physical measures e.g. engine power, age of vessel.

Re. 4. The new model for stratification has now been implemented and was used for the first time in the procedure for selecting the sample for the accounting year 2002. For 2001 the statistics were also calculated for the fleet segments, although the selection of the sample had been the previous model with stratification by economic size and main production categories.

## 4.2 Collection of data concerning the processing industry

Data on the fishery-product processing industry will be obtained from a specific pilot study as described in the "Danish National Program for collection of Fisheries Data 2002". Results and conclusions will be presented by 31st of October 2003.

The aim for the pilot study is to analyse the possibilities for collecting and processing of data for the processing industry. The pilot study should provide the foundation for collection of yearly data that makes it possible to evaluate the economic situation in the processing industry as a whole, as well as for special lines of business of the sector compiled at both different products and geographical regions.

### 4.2.1 Analysis of data collection strategies

In the fist phase of the pilot study it was taking into consideration, what method should be used regarding to the collection of data, so that the data collection program for the processing industry could comply with the demands that are listed in the Commission regulation (EC) No 1639/2001 of 25 July 2001 appendix XIX (Annex 1).

The chosen method for collection of data for the processing industry is based on collaboration between the official statistical bureau Statistics Denmark and FOI as described in the "Danish National Program for collection of Fisheries Data 2002".

Statistics Denmark is already collecting data for the Danish industry including data for the Danish fishery-product processing industry.

This analysis will include data from NACE groups
- NACE 15.20.10 – Fish processing and preservation
- NACE 15.20.20 – Smoking, curing and salting of fish etc.
- NACE 15.20.30 – Fish meal factories

The data analysis will concentrate on examining data from Statistics Denmark's
- Industrial Commodity Statistics
- Account Statistics (cost and earnings statistics)
- Raw Materiel Statistics
- Foreign Trade Statistics, EU-countries
- Foreign Trade Statistics, Non EU-countries

The existing data collected by Statistics Denmark is being analysed, and from the results of this analysis it will be considered, if the present collection of data could comply with the demands that are listed in appendix XIX (Annex 1). In collaboration with Statistics Denmark the need for collection of complementary data will be analysed. Parallel with the analysis of data from Statistics Denmark other data sources will be analysed for control or improvement of the existing data.

The background for using data collected by Statistics Denmark is, that FOI consider this solution to give the best and most qualified data and therefore the best foundation for the analysis of the processing industry. One of the advantages of a co-operation between Statistics Denmark and FOI is that it will give the best control of the collected data, as well as a good evaluation of the need for collection of complementary data, and this will in the end give the most qualified statistics for the processing industry. Another advantage of using the existing data is, that it will be possible to compare the line of business in the fishery product processing industry with other lines of business, where data also is collected by Statistics Denmark. In addition to this it will probably be possible to get data for the fish processing industry (NACE 15.20.10-30) distributed on geographical region level 3 (nomenclature of territorial units for statistical purposes, NUTS 3), which is part of the extended program. Statistics Denmark has many years of experience with collecting and managing of data, and will therefore be a valuable partner and secure high quality of data.

The selected method will furthermore secure, that the processing industry only will have to fill in one questionnaire and report to one authority. By choosing a method, that will not provide an extra workload for the processing industry, it will hopefully be easier to achieve a good working relationship with the processing industry, and thereby getting an even better evaluation of the data collected.

It would be difficult to start up a whole new collection of data for an account statistics for the processing industry. One of the tings that would make it difficult is, that the test sample probably will have to involve all firms in the processing industry, because the population is very small, and therefore even a large test sample will have a high level of uncertainty. Furthermore the collection of data carried out by FOI is based on voluntarily participation, and if the processing industry considers another questionnaire an extra workload, it will probably influence the collection of data negatively, against which reporting to Statistics Denmark is fixed by law, which will secure the best possible collection of data.

Taken into account the cost of collecting data, the method where FOI collaborates with Statistics Denmark is the most cost-efficient method, because Statistics Denmark already collects some of the data listed in appendix XIX (Annex 1). A new collection of data headed by FOI would be very expensive and the cost would most likely exceed EUR 1 million, and the quality of the data would probably not be as good as the data collected by Statistics Denmark.

Based on FOI's experience with collecting and processing of data, and from a cost-benefit point of view, FOI have decided to enter into a co-operation with Statistics Denmark about the collection of data concerning the fish processing industry.

### 4.2.2 Data sources
On the basis of the conclusion from the analysis of data collection strategies, data from Statistics Denmark will be used as the foundation of the pilot study.

In this study data from Statistics Denmark's Industrial Commodity-, Account- and Raw Materiel Statistics, EU-Trade and Trade with non-EU countries will be used. The purpose of this study is to analyse data from these statistics, and find out if they can provide the needed data to comply with the demands, that are listed in the Commission regulation (EC) No 1639/2001 of 25 July 2001 appendix XIX (Annex 1).

### 4.2.3 Data analysis of existing data
The data from the Industrial Commodity Statistics have been analysed to examine the possibility to define homogenous lines of business from the existing line of business in the Danish fish processing industry (NACE 15.20.10-30). The purpose of creating these new groups of firms is to provide the fishery economist with yearly time series data of the processing industry, that reflect the physical and economic data from the primary sector.

FOI has analysed the composition of commodities from each firm in the processing industry for the years 2000 and 2001. This analysis has provided the background for dividing the firms into 11 lines of business on the basis of the firm's commodity production (Annex 2). From these 11 lines of business it will probably be possible to evaluate the supply of raw materiel going in to the processing industry from the Danish marked and from abroad. The 11 lines of business also reflect the most important species in the Danish primary sector, and if there is a change in the supply of raw material, it will probably reflect on these groups.

The analysis of the Industrial Commodity Statistics for 2000 represent 78 firms with a total turnover of approximately EUR 1.4 billion, which covers 99.8% of the total turnover for the Danish fish processing industry (NACE 15.20.10-30). The analysis of the Industrial Commodity Statistics for 2001 represent 74 firms with a total turnover of approximately EUR 1.6 billion, which covers 99.8% of the total turnover.

The Account Statistics for the year 2000 represent 135 firms, and had a total turnover of approximately EUR 1.5 billion.

For the present the analysis of the "purity" of the processing industry suggest, that the "purity" is very high, which means that most of the commodity, which contain fish or fish products are produced in the line of business defined by NACE 15.20.10-30.

### 4.2.4 Precision level
It is for the time being, probably possible to divide the firms in the processing industry (NACE 15.20.10-30) on geographical region level 3 (nomenclature of territorial units for statistical

purposes, NUTS 3), but it will probably not be possible for the new 11 lines of business, because the population is so small, that there can be problems referring to confidentiality of the data given by the industry. FOI will look into this problem, and analyse the possibilities for another slightly aggregated version of geographical subdivision, so the overall sensitivity of the sector, including the social and economic impact on the processing industry located in different regions, can be evaluated.

### 4.2.5 Collection and processing of existing data and complementary data
On the basis of the new 11 lines of business the data from the Industrial Commodity-, Account- and Raw Materiel Statistics, EU-Trade and Trade with non-EU countries is distributed as shown in annex 2.

The on going analysis of the 11 new lines of business will focus on the need for collection of complementary data.

From the previous analysis FOI expect, that the existing data provided by Statistics Denmark will cover most of the needed data to comply with the demands listed in appendix XIX (Annex 1).

Capacity utilisation is not estimated for the Danish processing industry at present. To estimate capacity utilisation FOI will have to look at the parameters, that describe the capacity in the Danish processing industry. The analysis of capacity utilisation will be accomplished in collaboration among the relevant institutions and organisations to give the best possible evaluation to measure the capacity, and which parameters that best can describe the capacity in the Danish processing industry.

### 4.2.6 Industrial Commodity Statistics
The statistics cover industrial enterprises with at least 10 fulltime-employees as well as sales of enterprises registered as non-industrial enterprises, but with workplaces within manufacturing and with at least 10 fulltime-employees, are included in the statistics. The population is selected on the basis of the registered number of employees, approximately 2 years before the actual period of the survey. The reporting unit is the Kind of Activity Unit, which is the total sum of workplaces engaged in the same economic activity (industry).

In the examined data from the year 2000, there was only one firm with more than one Kind of Activity Unit (the firm had 2 Kind of Activity Units), and in 2001 there was none. In the light of this analysis we will use the firm as the reporting unit.

### 4.2.7 Account Statistics
The Account Statistics (cost and earnings statistics) covers all firms. The statistics are essentially aggregations of items of the annual accounts of business enterprises, notably items of the profit and loss account, the balance sheet and the statement of fixed assets. Thus, a wide range of subjects is covered, e.g. turnover, purchases, expenses, profits, assets, liabilities and investment. Results are compiled at both form of ownership, size group and region.

### 4.2.8 Raw Material Statistics

The statistics cover industrial firms with at least 50 fulltime-employees. Enterprises with more than 20 but under 50 fulltime-employees are added to the population in industrial groups with only a few firms with at least 50 employees.

For the fishery-products processing industry (NACE 15.20.10-30) it will be analysed, if there is a need for collection of data from firms with more than 20 but under 50 fulltime-employees.

### 4.2.9 Foreign Trade Statistics, EU-countries

The statistics show Denmark's imports and exports of goods from/to the other European Union countries, distributed among partner countries and approx. 10,500 different goods recorded by value, net weight in kilograms and/or supplementary unit. The statistics are prepared on the basis of reports from Danish companies with total annual imports and/or exports of goods of approximately EUR 0.2 million and EUR 0.3 million, respectively. The duty to report is established for imports and exports separately.

### 4.2.10 Foreign Trade Statistics, non-EU countries

The statistics show Denmark's imports and exports of goods from/to non-European Union countries. The statistics are distributed among partner countries (country of origin, country of consignment for imports, country of destination for exports) and approx. 10,500 different goods recorded by value, net weight in kilograms, and any supplementary unit (e.g. litres, units, or square metres).

The statistics are prepared on the basis of reports to the Central Customs and Tax Administration in connection with imports and exports of goods to/from Denmark from/to non-European Union countries. All transactions must be declared which is the reason why the statistics provide complete coverage for small transactions under the statistical threshold (approximately EUR 875 and 1,000 kg for exports to Greenland and the Faeroe Islands, the statistical threshold is approximately EUR 404 and 1,000 kg) a simplified declaration can be used.

The examination of the trade with EU and non-EU countries will be used for an evaluation of the Danish processing industries interdependence on the Danish and foreign markets for fish and fish products.

### 4.2.11 Data from The Directorate of Fisheries

The Directorate of Fisheries is collecting and managing data from the primary sector of the fishery in Denmark.

### 4.2.12 Sales note register

It has been analysed if the Sales note register managed by The Directorate of Fisheries, which register all first hand sales of fish, could provide information about the raw materiel entering the processing industry.

In collaboration with The Directorate of Fisheries it has been analysed, if the first hand purchaser could indicate whether the fish was delivered to merchants, wholesale brokers or directly to the processing industry.

The analysis of the Sales note register showed, that it couldn't provide the needed information about the raw materiel entering the industry. This is due to the fact, that only firsthand buy is registered in the Sales note register, and the fish is often bought and sold several times, before it goes into the processing industry. It will therefore not be possible to use the Sales note register for an estimation of the raw material going into the processing industry.

### 4.2.13 Transport document

The transport document shall provide trace ability and control of the raw material going into the processing industry. The information required concerning the commercial designation, the production method and the catch area should be available at each stage of marketing of the species concerned. This information together with the scientific name of the species concerned shall be provided by means of the labelling or packaging of the product, or by means of a commercial document accompanying the goods, including the invoice, Commission regulation (EC) No 2065/2001 of 22. October 2001.

At present it is not possible to use the transport document for an analysis of the raw material going into the processing industry, because the document are registered only at the private firm and not in a central public register.

FOI will continue to investigate and evaluate new data sources, to provide the best possible basis for the data described in appendix XIX (Annex 1) for the Danish fish processing industry.

### 4.2.14 Completion of the aims in the program for 2002

The aim of the pilot study was to select the best method and strategy for collection of data concerning the Danish fish processing industry. Based on FOI's experience with collecting and processing of data, and from a cost-benefit point of view, FOI have decided to enter into a co-operation with Statistics Denmark to collect data for the Danish fish processing industry.

FOI have analysed data from the Industrial Commodity Statistics collected by Statistics Denmark and divided the 3 existing groups (NACE 15.20.10-30) into 11 new lines of business that reflect the raw material going into the industry and the commodities produced by the industry. The on going analysis of the 11 new lines of business will focus on the need for collection of complementary data.

## 5. *Danish Fisheries Analyses Database (DFAD)*

DFAD is developed as described in the "**Danish National Programme for collection of fisheries data"** of 27th of August 2001.
At present DFAD contains the following information:
- 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)

Data requests are prepared by merging DFAD and information from the following data groups hosted by separate databases

- Data on species composition in landings for industrial purposes. (FD) (Species composition database)
- Data on discards and biological parameters. (DIFRES) (Biological database).
- Economic data. (SJFI) (database of economical information).

The design and maintenance of the database will be made in a co-operation between the FD, FOI and DIFRES.

# 6. General remarks.

DIFRES has as other fisheries research institute, over the years gained some experience concerning both the theoretical and the practical aspects of data collection. We would like to pass on some of these and hope that they will be of some use in the planning process for future organization of international data collection

## *Discard sampling.*

- First of all one have to clarify for what purpose you collect the data. The optimal sampling strategy is theoretically different depending on if you want a total estimate of the discard rate of a given species in a stock as required for stock assessments or you want the discard rate in different fisheries as required in most initiatives made in connection with regulations of the fishery. If you chose to sample only by species the vessels sampled should be randomly sampled among all vessels doing trips where the actual species is caught. If you chose to sample by fishery and species you should select the vessels sampled randomly among the vessels in each fishery catching the species. As the real life has teach us that both purposes most often are the case, one have to go for the lowest sampling units and then aggregate data from there when requested. This means that the sampling results should be measured in discard unit by species and fishery.
  From a practical point of view this is an important issue as well. Carrying out discard data collections on board the vessels during regular fishery, you select a number of boats doing fishing trip for sampling. Each trip represents a fishery in its capacity of gear type used, the mesh size in the gear and the fishing area. A fishing trip does not represent a species even though the skipper might have a target species in mind when planning the trip but this might change based on experiences from previous hauls. Furthermore, the discard pattern to a wide extent is defined by the same parameters (gear type, mesh size and area), which also happens to define the fishery.

  A given species is typically discarded in many different fisheries each having its own discard rate for this species. Giving a full coverage of all fisheries where the species is discarded is extremely resource demanding and out of scope as the discard of most species typically only are concentrated in few fisheries and the rest of fisheries only contribute insignificantly to the total amount of discard of the species. Therefore, with limited resources the discard data collection administrator preferably concentrates the sampling effort available on the few fisheries where significant discard occurs.


- Considering the situation where only a part of the existing fisheries are sampled on routine basis, there are still a need to survey the remaining fisheries for possibly changes in the discard pattern. These fisheries could be samples on a much lower level on routine basis as well. This will result in a sampling scheme separated in two outlines:
  - Routine data collection in fisheries contributing significant to discard of a complex of species
  - Exploratory survey of fisheries where the discard rate are assumed to be insignificant in relation to a complex of species.
- **Selection of vessels to be sampled**. It should be considered, in order to ensure the best possible sampling result, that the vessels selected for sampling can be selected randomly in a

way that guaranty that they represent the whole fishery in relation to vessel size, trip duration, fishing area and any other aspect, which might influence the discard pattern.

### *Biological sampling in general.*

- **Cooperation with the fishermen's Associations**. A constructive cooperation with the fishermen is very important. The cooperation facilitates the direct contact between the sampling staff and the fishermen and is a prerequisite for the carrying out of the optimal sampling scheme and an appropriate quality assurance program.
- **Intensified sampling of stocks outside safe biological limits**. At present, the sampling level is basically dictated by the amount of landing. For fish stocks in a critical abundance situation with decreasing landings, this is not a desirable link. A stock in a critical condition calls for extraordinary attention concerning accuracy in knowledge about the condition of the stock. The criteria for extensive sampling level could be if the stock was defined as being well outside safe biological limits.
- **Member states landings in third countries**. At present, the national fraction of the total EU-quota decides if a country is obliged to carry out sampling of the actual species. In some cases this fraction constitutes a very limited percentage of the total TAC for the stock. It might be more adequate if the national percentage of the total TAC is considered as well.
- **Member states landings in other EU countries**. DIFRES has experienced that it is very difficult to obtain samples from landings from vessels from other EU countries. The problems are two-sided: It is logistically difficult to keep track on the landings and ensure that these landings actually are sampled because the usual network giving information on the landing patterns normally does not include landings other than national. Secondly, the burden of collecting the data is very uneven distributed among member states. Some kind encourage of the flag country to be more engaged in the sampling of these landings should be incorporated in the Data Directive 1639/2001.
- **Other biological samplings**. It should be considered to reduce the list of species which should be sampled for other biological information (Data Directive Appendix XVI). Sampling so many species is very resource consuming and in many cases species must be sampled for which there is no expertise available because the species not previously has been sampled because they are irrelevant for stock assessment.

### *Administrative comments.*

- Discrepancies between management areas (Data directive Appendix XII) and assessment areas (Data directive Appendix XV) definitions.

**Commission regulation (EC) No 1639/2001 of 25 July 2001.**
**Appendix XIX (Section K)**

| General description | Minimum programme 1. Priority (annual) |
|---|---|
| Raw material | Total and per species (tonne) |
| Income (turn-over) | Total and per product |
| Production costs: - Labour - Energy - Raw material (value) - Packaging - Other running costs | Total and per category cost |
| Fixed costs | Average costs, calculated from investment |
| Financial position | Share of own / borrowed capital |
| Investment (asset) | - Historical - Replacement - Insurance |
| Prices / product | Value, tonne |
| Employment | Numbers / FTE |
| Capacity utilisation | Annual average |

**Description of line of business in fish processing industries**

| Line of business | Industry group (NACE) | General description | |
|---|---|---|---|
| | 15.20.10 | Fish processing and preservation | |
| 1 | 15.20.11 | Manufacturing of Cod | Cod>50% |
| 2 | 15.20.12 | Manufacturing of Cod, flatfish etc. | |
| 3 | 15.20.13 | Manufacturing of Mackerel | Mackerel>50% |
| 4 | 15.20.14 | Manufacturing of Herring | Herring>50% |
| 5 | 15.20.15 | Manufacturing of molluscs | Molluscs>50% |
| 6 | 15.20.16 | Manufacturing of shrimps | Shrimps>50% |
| 7 | 15.20.17 | Manufacturing of mixed species / big firm | >50 employees |
| 8 | 15.20.18 | Manufacturing of mixed species /small firm | <50 employees |
| 9 | 15.20.19 | Manufacturing and trade of mixed species | Wholesale>50% |
| | 15.20.20 | Smoking curing and salting of fish etc. | |
| 10 | 15.20.21 | Manufacturing of Salmonoids | Salmonoid>50% |
| | 15.20.30 | Fish meal factories | |
| 11 | 15.20.31 | Manufacturing of industrial fish | |
| | 15.20.10 – 15.20.30 | All groups | Total |

**Table of data for the fish processing industry and the statistical sources.**

| Statistical sources | General description of data | Line of business (see annex 2) | 1 | 2 | … | 11 |
|---|---|---|---|---|---|---|
| Industrial Commodity Statistics | Number of firms | | | | | |
| Industrial Commodity Statistics | Product in ton | | | | | |
| CN: 03.02.11 | Product in ton | | | | | |
| CN: 03.02.12 | Product in ton | | | | | |
| ... | ... | | | | | |
| Industrial Commodity Statistics | Turn-over per product | | | | | |
| CN: 03.02.11 | Turn-over per product | | | | | |
| CN: 03.02.12 | Turn-over per product | | | | | |
| ... | ... | | | | | |
| Raw Material Statistics | Raw material in ton | | | | | |
| CN: 03.02.11 | Raw material in ton | | | | | |
| CN: 03.02.12 | Raw material in ton | | | | | |
| ... | ... | | | | | |
| Raw Material Statistics | Raw material turn-over | | | | | |
| CN: 03.02.11 | Raw material turn-over | | | | | |
| CN: 03.02.12 | Raw material turn-over | | | | | |
| ... | ... | | | | | |
| Account Statistics (cost end earnings) | Production costs:- Labour | | | | | |
| ... | Production costs:- Energy | | | | | |
| ... | Production costs:- Raw material (value) | | | | | |
| ... | Production costs:- Packaging | | | | | |
| ... | Production costs:- Other running costs | | | | | |
| ... | Fixed costs | | | | | |
| ... | Financial position | | | | | |
| ... | Investment (asset) | | | | | |
| | | | | | | |
| Account Statistics (cost and earnings) | Employment number | | | | | |
| ... | Employment FTE | | | | | |
| | | | | | | |
| | Import and Export | | | | | |
| Trade with EU and non-EU countries | EU | | | | | |
| ... | Norway | | | | | |
| ... | Iceland | | | | | |
| ... | The Faroe Islands | | | | | |
| ... | Greenland | | | | | |
| ... | Russia | | | | | |
| ... | New EU-memberstates | | | | | |
| ... | Other countries (excl. GSP-lande) | | | | | |
| ... | GSP-countries* (excl. ACP-lande) | | | | | |
| ... | ACP-countries** | | | | | |
| | | | | | | |

CN=Combined Nomenclature (Harmonized System Commodity Numbers)
* Generalised System of Preference
** African, Caribbean and Pacific- Countries

# *Addendum*

*to*

# *Technical report on the Danish National Programme for collection of fisheries data*

*August 2003*

This report should give the answer to the question raised by the Commission in the e-mail from Sandra Löhndorf of 16. June 2003.

## Concerning the appreciation of the level of precision

**Catch statistics:**

Commercial landings statistics:
All commercial landings made in Denmark are recorded by the first hand buyer on individual basis and stored in a central database hosted by the Danish Directorate of Fishery. These data has been combined with the logbook data provided by the fishermen. Together these data give an exhaustive description of the amount of landings by species, commercial sorting, season, fishery and area.

Discards:
No formal calculation of the level of precision has been made and it has not been possible to decide if the discard sampling in 2002 fulfils the levels of precision agreed in the contract. In 2002 the discard sampling has therefore been accomplished on an effort level which equals the level of previous years and which has demonstrated results which are in agreement with the general understandings of the discard structure, volume and quality. In order to make the investigations most cost effective, the sampling effort has been concentrated on fisheries where an "a priori" knowledge points out a significant discard of commercial important species. This means, that e.g. the gillnet fishery only has been sampled to a very limited extent in 2002, while other fisheries has been samples more intensified.

**Biological information:**

Landings:
All species, which are landed in an amount, which require a sampling scheme according to the Appendix XV in Com. Reg. 1639/2001, have been sampled on the sampling level specified by the minimum program. Deviations from this are commented under the specific stocks.

Discard:
All species, which a priori are known to be discarded in an amount that requires a sampling scheme according to the Appendix XV in Com. Reg. 1639/2001, have been sampled on the sampling level specified by the minimum program. Deviations from this are commented under the specific stocks.

**Other biological information:**

Landings:
No routine procedure has been applied in order to verify the precision level. See below.
In 2002 the sampling has therefore been accomplished on an effort level which equals the level of previous years and which has demonstrated results which are in agreement with the general understandings of the discard structure, volume and quality.

Discard:

No routine procedure has been applied in order to verify the precision level. See below.

In 2002 the discard sampling has therefore been accomplished on an effort level which equals the level of previous years and which has demonstrated results which are in agreement with the general understandings of the discard structure, volume and quality.

**Development of standard procedures for estimating of the precision levels:**

It is the aim to include standard estimates of precision of all central biological parameters obtained from the sampling. Unfortunately, it has not been possible yet to develop those procedures to an extent that permit the calculation of the precision level as specified Com. Reg. 1639/2001.

The work is ongoing but is still not developed beyond the theoretical state and hence not in an applicable state. International work is going on for developing agreed and standardised methods. The further development of the procedures awaits the outcome of this international work. As soon as the procedures are ready estimates as specified in the programme will be applied on all relevant data.

**Table 1. Summarizing table of the precision levels obtained by the Danish sampling program.**

| Description of parameter | Reference to annex in regulation (1639/2001) | Required level according to contract. | Level obtained in 2001. |
|---|---|---|---|
| Fishing capacity by segment | Chap. II section C | Minimum at level 3 | Census. No sub-sampling |
| Fuel consumption by segment | Chap. II section D (i) | Minimum at level 2 | Unknown (see text: Technical report sec. 4.1.6) |
| Fishing effort by technique. | Chap. II section D (ii) | Minimum at level 2 | Census. No sub-sampling |
| Landings by strata (weight) | Chap. III section E.1.(c) | Depending on species and strata (1, 2 or 3) | Census. No sub-sampling |
| Landings by strata (length and age distribution) | Chap. III section H.1.(b) | According to Appendix XV in Com. Reg. 1639/2001. | In agreement to Appendix XV in Com. Reg. 1639/2001. |
| Discard by strata (weight) | Chap. III section E.1.(c) | Minimum at level 1 | Unknown (see text abowe) |
| Discard by strata (length distribution) | Chap. III section H.1.(e) | According to Appendix XV in Com. Reg. 1639/2001. | In agreement to Appendix XV in Com. Reg. 1639/2001. |
| Other biological parameters (maturity, sex ratio). | Chap. III section I.1.(c). | Minimum at level 3 | Unknown (see text abowe) |

# Concerning the Danish discard sampling
## Danish sampling effort of relevant species and areas

The discard sampling in 2002 has been performed according to the policy laid down in the contract **"Danish National Programme for collection of fisheries data"** of 27. August 2001.

In total 878 hauls were monitored at 155 fishing trips during 2002 (Table 2). The trips are, due to difference in the fishing pattern, in general of longer duration in North Sea and Skagerrak (in average: 6.1 days) than in Kattegat and the Baltic Sea (in average: 1.5 days). The number of hauls (stations) by trip are correspondingly bigger in the North Sea (15.37 set/hauls per trip) compared to the Baltic Sea (2.7 set/hauls per trip).

Table 2. The number of sampling trips and hauls sampled on board commercial vessels in 2002 by sea area.

| Sea area | Numbers of trips | Numbers of hauls |
|---|---|---|
| Baltic and Kattegat | 118 | 313 |
| North Sea and Skagerrak | 37 | 565 |

In total 405 days at sea were sampled by observers distributed (Table 3) on 98 different fishing vessels. A listing of all trips is given in Appendix 1 indicating start and end dates.

Table 3 The number of days at sea in 2002 by area and quarter.

| ICES subarea | 1qtr | 2 qtr | 3 qtr | 4 qrt | Total |
|---|---|---|---|---|---|
| 4a | 25 | 29 | 18 | 25 | 97 |
| 4b | | 24 | 22 | | 46 |
| 20 | 7 | 28 | 18 | 29 | 82 |
| 21 | 9 | 23 | 17 | 8 | 57 |
| 22 | 18 | 7 | 8 | 12 | 45 |
| 24 | 15 | 12 | 5 | 9 | 41 |
| 25 | 10 | 17 | 5 | 5 | 37 |
| Total | 84 | 140 | 93 | 88 | 405 |

On each station all species were length measured separately for retained and discarded fish. A total of more than 160,000 individuals were measured. The number of individuals measured for length is given in table 4 by species, area and catch category. In order to be able to age determinate the discard, a sufficient number of otolits from discard individuals (approximately 100 otoliths per species, area and quarter) were read covering all assessment relevant species.

Table 4. The number of length measurements by species, area and catch category.

| Sea area | | Norvay Lobster | Whiting | Haddock | Saithe | Plaice | Sole | Cod | Other species |
|---|---|---|---|---|---|---|---|---|---|
| Baltic and Kattegat | Discard | 4320 | 2929 | 123 | 4 | 7581 | 1117 | 10522 | 16421 |
| | Landing | 5088 | 837 | 128 | 22 | 5740 | 456 | 10041 | 12358 |
| North Sea and Skagerrak | Discard | 5190 | 1997 | 3017 | 1415 | 3758 | 0 | 4583 | 20505 |
| | Landing | 6894 | 112 | 4460 | 2488 | 7157 | 58 | 5641 | 18341 |

Disseminations of data:
Baltic Fisheries Assessment Working Group (ICES).
In October 2003 the data from the North Sea will be submitted to the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (ICES).
**Quality assurance**

The discard data has been collected in agreement and in cooperation with the Danish Fishermen's Association. A formal agreement on cooperation between DIFRES and the Danish Fishermen's Association has been signed. Two Working Groups, one for the North Sea and the Skagerrak and one for the Kattegat and the Baltic Sea have been established with members from DIFRES and the Danish Fishermen's Association. The Working Groups develop sampling plans and performs a very detailed quality check of sampled data.