Advisory Committee on Fishery Management **ICES CM 2003/ACFM:16**

REPORT OF THE

REPORT OF THE PLANNING GROUP ON COMMERCIAL CATCH, DISCARDS AND BIOLOGICAL SAMPLING (PGCCDBS)

Rome, Italy
4 - 7 March 2003

International Council for the Exploration of the Sea

Conseil International pour l'Exploration de la Mer

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1 INTRODUCTION

1.1 Terms of reference

During the Annual Science Conference (90th Statutory Meeting) in Copenhagen September 2002 it was decided that an ICES Planning Group on Commercial Catch, Discards and Biological Sampling [PGCCDBS] should meet in Rome, 4-7 March to:

a) review the commercial catch (landings), discard and biological sampling programmes being implemented in 2002 in the Baltic Sea, North Sea, Western and Southern waters and in the Mediterranean;

b) assess whether this data monitoring fulfils the ICES Fish Stock Assessment Groups data requirements;

c) assess whether this data monitoring fulfils the ICES needs for information in an ecosystem context;

d) commence co-ordination of sampling for securing adequate basic assessment data to ensure adequate spatial and temporal sampling coverage;

e) commence manual for standardizing of sampling methodology and calculation methodology;

f) identify on a regional basis the candidate stocks and species requiring improving ageing;

g) examine the possibilities of sharing / transferring otoliths across laboratories.

1.2 List of participants

The meeting was attended by:

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1.3 Background

The ICES fisheries advice critically depends on the quality of data from the commercial fisheries. The quality of these data has not in all cases been satisfactory and ICES has raised this point repeatedly. In 2002, new guidelines for sampling of landings, discards and biological parameters were implemented for all EU member countries. Prior to 2002 a major part of sampling was achieved through co-operative programmes involving different countries and co-financed by the EU Commission. Through these international projects coordination of the sampling activities was done.

Nowadays, EU members countries sampling schemes are established and operate on a national basis, and there is therefore no internal mechanism to ensure sampling is internationally coordination. Most of the research vessel surveys are coordinated through planning groups such as ICES PGHERS, WGBIFS and IBTSWG. The PGCCDBS was established in 2002 in order to facilitate international coordination of the sampling schemes for commercial landings, discards and biological parameters.

1.4 General introductory remarks

The majority of PGCCDBS participants represent EU member countries. Therefore, this report may have more EU focused contents, as from 2002 all the EU countries, had to comply with EU Commission regulation 1639/2001 (referred to in this report as the Data Directive) on fisheries data collection. 'The Data Directive prescribes two levels of sampling – sampling according to the Minimum Programme (MP), for information which is considered strictly necessary for scientific assessments and sampling according to the Extended Programme (EP), for the collection of other information which is likely to improve evaluation in a decisive way.

It was considered important to focus on the requirements of the Data Directive as it has the potential to have a significant impact on the quality of the ICES stock assessment input data. In addition, it should be noted that in the Baltic region, four countries presently not members of the EU will probably join in 2004 and will therefore have to comply with the requirements in the Data Directive in the future.

2 TOR ITEM A

- *review the commercial catch (landings), discard and biological sampling programmes being implemented in 2002 in the Baltic Sea, North Sea, Western and Southern waters and in the Mediterranean;*

During the meeting it was decided that to address Tor Item a, the PG would to split into three sub-groups to consider data collection programmes in the Baltic Sea, the North Sea group and Western and Southern waters. Unfortunately none of the PG participants are involved in data collection in the Mediterranean area. It was therefore not possible for the PG to assess or comment on the programmes operated in this area.

The three sub-group adopted different approaches to the task, their reports reflected this and differed with respect to detail. For the Baltic region, several PG participants are also members of the Baltic Fisheries Assessment WG. Furthermore, there are relatively few stocks in the Baltic Sea area. It was therefore, possible to present more detailed information for sampling this area. Because of the number of stocks reports from the two other areas were presented in more general terms.

2.1 Baltic Sea area

General Comments

The sub-group provided:

- An overview of sampling of commercial catches in relation to the requirements of the Data Directive;
- A description of national problems on implementation and possible changes in sampling strategy in 2002 compared with 2001.

The situation in the Baltic is somewhat complex because only 4 out of 9 nations fishing in the area are EU members and required to comply with the Data Directive.

In general, the sampling of stocks in the Baltic in 2002 maintained levels achieved in 2001.

However, the following general problems and deficiencies were noted:

- A decrease in sampling at sea, due to a decrease in discard sampling in non EU-countries, which can have an affect on the assessment quality;
- sampling of Lithuanian catches is poorly documented;

- there is still insufficient sampling of mixed pelagic fishery.

Cod in Kattegat

This stock of cod is only exploited by Denmark and Sweden. As the cod stock in Kattegat has decreased the sampling effort from Denmark and Sweden also decreased accordingly compared with the level in 2001. In general, no changes in sampling strategy were observed. However, in both countries the sampling at sea was complemented with market sampling in 2002. In order to optimize the sea sampling programme and reduce costs, effort was concentrated on sampling trawlers and Danish seiners. These fisheries are known to have the highest discards rates and the highest variability.

It was pointed out that it is important to measure individual fish weights during when sampling discards.

Cod in the Sub-Divisions 22-24 and Cod Sub-Divisions 25-32

All EU countries have maintained the same sampling level in 2002 as in 2001. For non-EU countries sampling intensity has decreased because of the decrease in funding. The main change in the 2002 sampling schemes compared to 2001 is the effort reallocation of the Danish discard sampling schemes towards fisheries using towed gears, as sampling of the gill net fisheries have demonstrated only small discards rates (~2%) and small variability when the fishery is conducted according to the fishery rules. The level of sampling activity by Poland was thought to be inadequate compared to its share of the TAC, (although the actual 2002 level is unknown).

Herring in Sub-Division 25-29+32 (incl. Gulf of Riga)

The sampling level of herring landings more than exceeds the levels required by the MP in the Data Directive, because the need to sample all fisheries directed on herring (trap-net fishery, pelagic trawl fishery etc.). In some cases (Sweden) the sampling activity increased in 2002 compared to 2001. However, the main problem is sampling of industrial fishery for some countries. Lack of sampling for estimating species composition in the mixed clupeoid fishery in some countries makes it impossible to provide reliable catch data for herring and sprat.

Herring in Sub-Division 30 and 31

Most of the fishery and sampling is performed by Finland. The number of samples exceeds requirements of the MP in the Data Directive because all three fleets operating in both areas are sampled quarterly. The age sampling is conducted using a length stratified scheme and therefore is less intense than Data Directive MP requirements, which are based on random sampling scheme. However, this does not affect the quality of the data available for the assessment.

Sprat in Sub-Divisions 22-32

In 2001 the Swedish and Polish sampling intensity was below the MP of the Data Directive. However, increase was observed in 2002 (Sweden, Denmark). As for herring, the main problem for some countries is sampling for estimating the species composition of the mixed pelagic (industrial) fishery landings.

Sole in Division IIIA

Sampling of sole landings is only carried out by Denmark because Swedish landings do not exceed 5% of the total international landings. Sampling intensity in 2002 increased compared to the 2001 level because Skagerrak in 2001 by mistake was not sampled. The sampling level in Kattegat is unchanged. There have been some problems in carrying out discard sampling programmes in some period, mainly due to reluctance of fishermen to carry scientific observers in period where they try to catch sole with Nephrops gears. This fishery practice, which is carried out in one to two months in the autumn, may result in discarding of undersized sole.

An overview showing significant changes of the Baltic countries national sampling programmes for 2002 from the previous year and any problems anticipated is presented in Table 1. Not all countries fishing in the Baltic were represented at the PG. Data from countries absent were not available to the PG.

Table 1 Overview showing changes in sampling for 2002 compared with 2001 and any anticipated sampling problems.

Questionnaire for the Baltic area					
Country	Denmark	Estonia	Finland	Latvia	Sweden
Laboratory	DIFRES	EMI	FGFRI	LATFRI	IMR
Area	Baltic and kattegat	Baltic	Baltic	Baltic	Baltic and Kattegat
Age & Length					
Ageing Problems					
Reading problems	no	no	no	no	no
Insufficient samples	*no*	*no*	*no*	*no*	*no*
Low expertise	no	no	no	no	no
Sampling Level Changes					
Up	*no*	*no*	*no*	*no*	*no*
Down	no	no	no	no	no
Stable	*yes*	*yes*	*yes*	*yes*	*yes*
Sampling Strategy Changes	no	Market sampling has increased, sea-sampling has decreased	Sea-sampling has decreased and been replaced by more intensive harbour sampling	Mainly market sampling for herring and sprat. Sampling intensity of cod has decreased (2xquarter)	no
What are the new stocks?	*No (except recreational fisheries, now sampled on routine basis)*	*no*	*no*	*no*	*turbot*
Discards					
Do you sample?	Yes	no	no	yes	yes
What is the expected quality?	*satisfying*	*na*	*na*	*unknown*	*Good in most cases*
Is sampling done by:					
Fleet?	yes	na	na	yes	yes
Species?	*no*	*na*	*na*	*yes*	*no*
Biological Sampling					
Do you sample?	yes	yes	yes	yes	yes
Sampling Level Changes	*stable*	*stable*	*stable*	*stable*	*Stable*
What is the expected precision?	unknown	unknown	unknown	unknown	unknown

General comments

Estonia	So far no EU member. After the end of EC-funded sampling programs, Estonia has retumed to its previous national sampling scheme and levels. These are higher than the minimum sampling level according to theCommission Regulation 1639. Reducing the sampling to that minimum level would lead to insufficient data for the assessments.
Finland	Following the Data Directive does not provide sufficient data for stock assessments, especially in case of herring: There are three separate stocks and three fleets per stock that need to be sampled quarterly. Therefore the sampling level is higher than minimum sampling level according to the Data Directive. No discards in herring and sprat fisheries. Derogation applied for discard sampling of Finnish cod fishery in Southern Baltic.
Latvia	So far, Latvia is not a EU member and regulation 1639 is not implemented. Sampling is based on national funding and after finilization of the EU IBSSP project Latvia returned to the former sampling scheme.
Denmark	no comments
Sweden	Sweden is sampling according to the extended program for cod and turbot in IIIb-d

2.2 North Sea

(includes: The Skagerrak (div. IIIa north), ICES area I & II, North Sea and Eastern Channel ICES areas IV, VIId)

The sub-group reviewing data collection in the North Sea, ICES areas I & II, Skagerrak and Eastern Channel, considered it was not in a position to carry out a comprehensive, (stock by stock) review of sampling levels (market, discard, and biological sampling) carried out in 2002, because data are currently being assembled. Members of the PG could, however, provide an overview of their respective national programmes for 2002, identifying significant changes from the previous year and any problems anticipated. These are summarised in Table 2.

Length/age

Following the introduction of the Data Directive, national programmes have been adapted or modified sampling in a number of ways. Most countries have maintained previous sampling intensities for those stocks/species important to their national fishing industries. This has ensured that most relevant fleet sectors are adequately sampled, even though this may involve sampling above the level specified in the MP. In some stocks sampling has been reduced to the level prescribed by the MP as a result of the decrease in funding. Several countries are sampling new species, and some are encountering difficulties with ageing (Table 2). In the case of *Nephrops* and *Pandalus,* there have been large increases in catch sampling levels in some countries to meet requirements of the MP.

Discarding

Since 2002, discard sampling programmes have been established or extended to meet the requirements of the Data Directive. No discard sampling has been carried out by Norway, as Norway has implemented a discard ban in their waters. Data are collected mainly by on board observers but fisher self-sampling schemes are also being piloted. All programmes are based on fisheries sampling rather than directed at sampling individual species as indicated in the Directive. There has been no international collaboration to ensure that all relevant fisheries are covered. Discards of all finfish species, not just target species are sampled. In the North Sea and adjacent areas, fishing industry co-operation in 2002 was generally good. However, several fishing industry organisations have indicated that their members may not be prepared to carry observers in 2003. This was mainly as a result of a lack of confidence by the industry in the outcome of the December EU Council meeting and management advice. This may result in sampling bias, if it prevents random sampling of vessels or reduces the spatial and temporal coverage of discard sampling. It was suggested that if in the future it becomes, impossible to ensure adequate coverage, it might be necessary to consider introduction of a legal requirement for vessels to carry observers, possibly linked to licensing.

Biological sampling

Collection of biological data (length, weight, maturity) has been considerably expanded in all countries fishing in the North Sea and adjacent areas. Sampling is carried out both on research vessels and at markets. Since there is no requirement for all countries involved in the fishery to sample each stock, it would be desirable to establish mechanisms to co-ordinate sampling and analysis of data collected by countries represented on the PG (see comments in section 5). It was considered that all stocks subject to analytical assessments should have the relevant biological data collected annually rather than on a tri-annual basis.

Table 2 Overview showing changes in sampling for 2002 compared with 2001 and any anticipated sampling problems.

Questionnaire for the North Sea area									
Country	Belgium	Denmark	France	Germany	Netherlands	Norway	Sweden	UK (E&W)	UK (Scotland)
Laboratory	CLO-DvZ	DIFRES	IFREMER		RIVO	IMR	IMR	CEFAS	FRS
Area	IV, VIId	IV	IV, VIId	IV	IV	IV, II, I	IV, IIIa	IV, VIId	IV
Age & Length									
Ageing Problems									
Reading problems	no	blue whiting, monkfish, sprat	no	blue whiting	no	no	no	hake, monk,lemon sole	no
Insufficient samples	*rays, sole, plaice, turbot and brill in IV*	*monkfish, cod*	*no*	*no*	*herring*	*no*	*plaice*	*no*	*no*
Low expertise	no	no	no	no	no	sprat	no	no	no
Sampling Level Changes									
Up	*no*	*yes*	*yes*	*no*	*yes*	*no*	*no*	*yes*	*yes (new species)*
Down	IV	no	no	no	no	no	no	no	no
Stable	*VIId*	*no*	*no*	*yes*	*no*	*yes*	*yes*	*no*	*no*
Sampling Strategy Changes	no	no	yes	no	Sampling increase due to sampling of foreign fleets	no	no	no	no
What are the new stocks?	*Rajidae, Microstomus kitt*	*Hake, blue whiting, lemon sole and monkfish*	*Saithe, sea bass, scallops, red mullet*	*Blue whiting*	*Nephrops, brill, turbot, dab, lemon sole, rays*	*No new stocks*	*no new stocks*	*turbot, brill, lemon sole, red mullet, rays*	*Hake, plaice, lemon sole, rays, sharks*
Discards									
Do you sample?	no	yes	yes	yes	yes	no	yes	yes	yes
What is the expected quality?	*na*	*unknown*	*poor*	*good*	*unknown*	*na*	*good*	*good*	*good*
Is sampling done by:									
Fleet?	na	yes	yes	yes	yes	na	yes	yes	yes
Species?	*na*	*yes*	*no*	*no*	*yes*	*na*	*no*	*no*	*no*
Biological Sampling									
Do you sample?	yes	yes	yes	yes	yes	yes	yes	yes	yes
Sampling Level Changes	*stable*	*up*	*stable*	*up*	*up*	*stable*	*stable*	*up*	*up*
Expected precision?	unknown	unknown	good	unknown	unknown	unknown	unknown	unknown	good
General comments									
Belgium	In general, the sampling levels in IV are too low. Sampling levels for Nephrops in FU 5 are too low according to the levels in the MP, but have been maintained at historical levels at national expenses. Discard sampling in VIId by fleet from 2003 onwards (low level in 2003, to be increased from 2004 onwards). No maturity sampling in 2002 (will start from 2004 onwards)								
Denmark	Age reading of new species causes problems. For some of the speceis the sampling level is so low that it is difficult build and maintain age reading expertise.								
France	Age - length : Sampling stratification has converged through all laboratories (Quarter and commercial category stratification) Discards : The number of trips have been maximised within a numerous number of fleets and a fixed cost sampling. then all fleets are under-sampled, it is a first seeing sampling. Biological sampling : Low expertise in staging maturity. Quarterly samples from ALK bought fish (Pb with gutted whiting and saithe).								
Germany	Sampling should be on fleet basis. Derogation rules should refer to management units (Quota units). Species to be sampled in Reg. 1639/2000 should be in conformity with species mandatory to be reported in relevant Regs. for the fishery statistics. Sampling level should be appropriate to spatial and temporal distribution of the fishery by fleet								
Netherlands	Brill & Turbot sampling levels are higher than set in MP because need for data to enable assessment.								
Norway	Norway has a sampling programme addapted to fishery, fleet, season and area								
Sweden	Sweden is sampling according to the EP for Nephrops in IIIa								
UK(E&W)	Discards very dependent on cooperation with industry; precision variable Biological sampling involving new programme for maturity & wt								
UK(Scotland)	No comments								

2.3 Western and Southern waters

An evaluation by stock and institute in the Western and Southern areas was done of the implementation of 2002 sampling programmes for age/length, discards, and biological Sampling. An overview, showing significant changes of the countries national sampling programmes for 2002 from the previous year and any problems anticipated, is presented in Table 3.

Age and Length

Ageing problems: All institutes involved in ageing hake, anglerfish and horse mackerel experienced some difficulties. Those institutes that had experience in ageing these species had methodological difficulties (poor estimation of age of older hake, inconsistency between institutes in choice of ageing structure for anglerfish). Other institutes that are now required to commence ageing these species are also experiencing these difficulties. These problems are exacerbated by a lack of expertise in ageing the species. It was clearly identified that co-ordination of ageing methodologies and the development of expertise are a high priority for hake and anglerfish (see section 7).

Sampling levels: Sampling levels were increased for new species and, with few exceptions, were maintained for others. Whilst sampling of deepwater species by some Institutes has decreased, direction is needed from WGDEEP as to whether age and length sampling will improve opportunities for assessing deepwater species. Sampling of foreign landings remains very difficult for all countries due to problems in accessing the catch.

Most institutes experienced difficulty with the low level of sampling indicated by the MP for some species. This was a major problem particularly for stocks in a critical state and with very low TACs. The sampling intensities proposed under the Data Directive are related to the level of the TAC and are considered grossly inadequate for meaningful analytical assessment. The PG recommends that sampling intensities for such species should exceed minimum thresholds that will yield useful data for analytical assessment.

Sampling Strategies: Sampling Strategies were better standardised between Institutes (Spain – AZTI, and Ireland) in 2002 and will allow aggregation to occur at levels of resolution more appropriate to expected data needs. The PG recommends that the impact on the assessment be checked to assure that these changes do not have a negative impact on assessment.

Discards

Establishment of sampling programs: Several institutes either did not establish a sampling programme or had difficulties in starting up discard sampling programmes. The major problems were:

(i) Many Institutes faced heavy costs when implementing this aspect of their sampling programme. The delay in receiving funding meant that some Institutes did not implement, or delayed the implementation of their discard sampling programmes.

(ii) Non co-operation from the industry on carrying scientific discard observers. Some fleet operators view with suspicion the discard programme and refuse observers access to their vessels. For some Institutes this refusal has reached a critical level where the ability to conduct a properly designed sampling programme is compromised. In addition if sampling can only occur on a few vessels the level of precision achieved may be poor and with increased bias.

Expected quality: Whilst some Institutes felt that the quality of their sampling was good few had completed an evaluation of the quality of their sampling. It became clear that there is a need to standardise and disseminate methods to enable Institutes to complete such an evaluation. The PG notes that the ICES Study Group on Discards, Bycatch Information (SGDBI) has listed three different methods of estimating discards but has not endorsed any one method in particular – the method used is left to the individual nation.

Sampling stratification: As in the North Sea, all the Institutes engaged in discard sampling, in Western and Southern waters have implemented their programs by fleet not by species. The PG notes that this is not in accordance with the Data Directive. It was considered that conducting discard programmes by species would be sensible only in the few fisheries where the catch is targeted on individual species.

Whilst the sampling programs target particular fleets, the PG noted that there has not been any co-ordination to ensure that all important fleets are sampled for their discards. The PG considers that ensuring coverage is of the utmost

importance and that international co-ordination must be undertaken to identify all significant fleets and metiers and then to distribute sampling amongst those fleets/metiers.

The PG considered that achieving a good discard sampling coverage of the fisheries is more important than obtaining a high level of precision in a fleet that only covers part of a stock. Furthermore, achieving a high level of precision with extensive coverage will be cost prohibitive. The PG considered that there has been little international co-ordination:

- to ensure good discard sampling coverage of the fisheries,
- to standardise sampling methods, and,
- to standardise data raising and analysis procedures.

Biological sampling

Sampling levels: Sampling programmes were established in all except one Institute. Sampling levels were increased for new species and, with few exceptions, were maintained for others.

Expected precision: All institutes engaged in sampling expected a high level of precision to result from their sampling. However, the PG considered that a high level of precision from any one laboratory may not necessarily indicate a good representation of the population. Achieving representative sampling requires a proper spatial and temporal sampling coverage of the fisheries.

The PG also noted that there has not been sufficient international standardisation of methodologies (particularly maturity staging). The PG recommends that a workshop to address these shortcomings is convened in 2004.

Table 3 Overview showing changes in sampling for 2002 compared with 2001 and any anticipated sampling problems.

Questionnaire for the Western and Southern area

Country	Belgium	Netherlands	Spain	Spain	UK (Scotland)	Ireland	Portugal	Portugal	France	UK (E&W)
Laboratory	CLO-DvZ	RIVO	IEO	AZTI	FRS	Marine Institute	IPIMAR	DOP/UAç	IFREMER	CEFAS
Area	VIIa, VIIfg, VIIIab	Western	Western	Western	Western	Western	Western	Western	Westen	Westen
Age & Length										
Ageing Problems										
Reading problems	no	no	Hake (older ages)	Hake, anglerfish	no	Northern hake, anglerfish	Hake, Anglerfish	Blue ling, conger eel, Spanish mackerel	Hake, roundnose grenadier, monkfish, anchovy	new species
Insufficient samples	*Rajidae, Lophiidae*	*samples from freezer trawlers*	*Monk stocks*	*anchovy, horse mackerel, L. whiffiagonis, anglerfish, pilchard*	*whiting*	*whiting (VIIa), cod (VI & VIIa), haddock (VI), saithe*	*hake, anglerfish*	*black scabbardfish, blue ling, conger eel, spanish mackerel*	*sole 7e*	*no*
Low expertise	no	no	Non target species	Bib	no	Whiting, herring, mackerel, lemon sole, albacore tuna	no	no	sardine, anchovy	no
Sampling Level Changes										
Up	*no*	*yes*	*no*	*no*	*no*		*no*	*no*	*yes*	*yes*
Down	no	no	no	no	no		no	no	no	no
Stable	*yes*	*no*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*no*	*no*
Sampling Strategy Changes	no	Increase in sampling due to sampling of foreign fleets	no	Yes. Sampling unit boat instead of commercial category	hake, lemon sole, plaice, round nosed grenadier, blue whiting, skates, rays, sharks	Targets were set by ICES Division and quarter, they are now distributed by landing port and month	No. Some pilot studies are being implemented (plaice, rays, swordfish).	No	Some	no
What are the new stocks?	*Rajidae, Lophiidae*	*No new stocks*	*No new stocks*	*Bib VIIIabd*	*rays and hake*	*Saithe, lemon sole, hake, anglerfish*	*rays, sole & plaice, cod in I & II, swordfish,(pilot studies)*	*Most of the new species are not frequently landed.*	*Lobster, Crab, Sardine, Haddock, Albacore, Seabass*	*Haddock, Whiting, Rays*
Discards										
Do you sample?	yes (only VIIa)	Yes	no	yes	yes	yes	no	no	yes	yes
What is the expected quality?	*poor*	*Unknown*		*Poor*	*good*	*poor*			*variable*	*Good*
Is sampling done by:										
Fleet?	yes	yes		yes	demersal	yes			yes	yes
Species?	*no*	*yes*			*pelagic&shellfish*	*No*			*No*	*No*
Biological Sampling										
Do you sample?	yes (no maturity)	yes	target sp	yes	yes	yes	yes	Yes (maturity)	yes	yes
Sampling Level Changes	*no*	*up*	*non target sp*	*stable*	*stable*	*N/A*	*stable*	*stable*	*up*	*up*
What is the expected precision?	unknown	unknown	good (pelagics) poor (monks) unknown (non-target)	good	good	N/A	good	good	good	unknown
General comments										
Belgium	Sampling levels of sole and plaice have decreased since the EU regulation (in general stronger for plaice than for sole). Sampling of turbot and brill has stopped since the regulation. Pilot study of discard sampling in VIIa for 2002 (extended to other areas from 2003 onwards). Maturity sampling for sole and plaice from 2004 onwards									
Netherlands	Obtaining the required number of samples from the pelagic fleet is a problem, because catch is landed frozen and sampling vessels then go fishing in Mauritanian waters. A TAC reduction of 50% in 2002 for horse mackerel compared to planned sampling according NP, which was based on 1999 catch level caused problems.									
Spain (IEO)	In case of IEO, the sampling schemes and coverage has generally been quite stable. The discard sampling in yearly basis will be an improvement. It should be necessary update the levels required, eg: ages for mackerel and horse mackerel. Non target species are now included in the monitoring process. For 2002, some problems in the program's implementation due to delay in payments.									
Spain (AZTI)	Discard observers have difficulty in getting onboard. It is suspected that skippers don't work in the same way with the observer as they do without an observer.									
UK (Scotland)	All the species are sampled in excess of the MP with the exception of some deep water species. We expect difficulties in 2003 due to Scottish fleet having huge cuts in their TACs and now adopting a policy of non co-operation with scientists - sampling and discard.									
Ireland	Low levels of discard sampling due to difficulties in getting vessels to take samplers on board, and delays in appointing staff due to funding delays. Sampling program changed to now focus on particular metiers. Low levels of sampling of some gear types has therefore stopped. Studies of the cost and variance resulting from historic sampling levels are underway. No program was submitted by Ireland in 2002.									
Portugal (IPIMAR)	Most of the species are sampled in excess of the MP to assure a good data quality.									
Portugal (DOP/UAç)	Most of the species are sampled in excess of the MP to assure a good data quality and due to geographical conditions									
France	Age - length : Sampling stratification tended to converge through all laboratories (no harbour levels). Discards : The number of trips have been maximised within a fixed cost sampling. Some fleets (>40 m.) are then under-sampled. Biological sampling : Low expertise in staging maturity and none in fecondity, bias in seasonal coverage (survey sampling)									
UK (E&W)	Discards very dependent on cooperation with industry; precision variable. Biological sampling involving new programme for maturity & wt									

3 TOR ITEM B

- *Assess whether this data monitoring fulfils the ICES Fish Stock Assessment Groups data requirements.*

3.1 Baltic Sea area

The sampling schemes carried out in the countries fishing in the Baltic Sea area are in general at a sufficient level and expect to fulfil the data needs for the ICES fish stock assessment work. Most fisheries are monitored in most subdivisions and in most quarters. See section 2.1 and Table 1. No information on the sampling schemes for Poland, Lithuania and Russia was available to the PG.

3.2 North Sea

Given that sampling levels of landings at age have, for the most part been maintained or increased, the PG considered that monitoring in 2002 will maintain the data at the same levels for ICES fish stock assessment and meet WG's requirements for assessments at the single stock level, as in previous years. In relation to discards, it was recognised that for some stocks, the time series for new programmes are not yet long enough for data to be used in analytical assessments but it was recommended that the data should be provided to WGs to enable them to investigate its utility.

For many stocks in the North Sea and elsewhere, age compositions are provided on a fleet basis or aggregated by sampling area. North Sea roundfish data, for instance, are collected by roundfish area which results in a substantially higher sampling level than specified under the MP. The PG considered that if sampling was reduced to the level specified in the MP, this would severely degrade the data available to the ICES NSSK WG for some important stocks including cod, which is subject to a recovery programme. Assessment WGs should be asked to consider whether these higher sampling levels should be specified under the MP.

In addition, the recently established ICES SG on Development of Fishery-Based Forecasts (ICES CM 2003/ACFM:08) is advocating a metier /fishery approach for the analysis of mixed fisheries data. This SG noted that:

- *The focus should be on the métier and fishery approach, ……. to make sure that the groupings reflect as closely as possible the true nature of fishing activities.*

The PG consider that the sampling levels specified under the MP are likely to be inadequate to provide data with the required spatial and temporal resolution to adopt this approach and this adds to the case for maintaining current sampling levels.

Since sampling levels prescribed in the Data Directive have been interpreted to be based on the average landings/ quota in the preceding three years, there may be problems in the current year if TACs are changed substantially. For example, in North Sea herring an increase in the TAC in 2002, has required additional sampling which is not adequately funded. On the other hand if TACs are substantially reduced, as in the case of North Sea cod, insufficient fish may be sampled. It is unclear how such issues are to be dealt within the Data Directive.

3.3 Western and Southern waters

In Western and Southern waters there are eight major assessment working groups. The PGs comments on the adequacy of data collection in relation to areas addressed by these WG TORs are as follows:

Assess and catch options for the respective stocks dealt by the WGs

No further problems are expected in 2003 assessment as the sampling levels have been maintained or increased. However, there still some stocks that were not sampled in the past and were not included in national programmes in 2002.

The sampling levels are in excess of the MP specified in the Data Directive. This is necessary to maintain the quality of the data required for stock assessment.

Stock structures and their dynamics (new species, compositions, vertical and horizontal distributions, migrations …)

Most of this information comes from surveys which are not relevant to this PG. However, there is more information in 2002 as new species have been included in the sampling programmes. With the expansion of sampling onboard with observers, more direct information is expected, although there is not yet a good analysis of the quality of this information.

Provide fishery information (descriptions, structures, new relevant fisheries, technical interactions …)

No further problems are expected in 2003 on this subject. The increase of discard sampling programmes should improve knowledge of the fleet activities, although the quality of this information is at present unknown.

Mixed fisheries (species/fishery/fleet compositions, interactions, forecast considerations …)

The 2002 sampling programmes are not expected to provide enough information to carry out a mixed fisheries assessment.

Biological aspects (standardization, species interactions, quality …)

There is an increase of species collected by country, which leads to a need for methods and technical standardization (see section on biological sampling above). Some problems can arise when assessing the stocks due to heterogeneity in ageing, maturity staging, etc.

Spatial and seasonal issues in relation to stock and fishery (intra and inter variation …)

With the expansion of sampling onboard with observers more information is expected, although there is not yet a good analysis of the quality of this information.

Quality control on input data and assessments (landings, discards, biological parameters, tuning fleets, tuning discrepancies, current model problems, application of alternative methods …)

Up to now, the quality control on input data has been delegated to each institute. It is necessary to develop efficient methods and procedures to analyse the quality of the data provided at an international level (see section 6).

As a part of assessment and management advice and the above mentioned comments it seems that the input data provided to the stock assessment WGs, at least for western and southern waters, there is a need to know the quality of information used. As a first step we can focus on standardization, through coordination, cooperation, and variability, i.e.: sampling schemes, precisions, sensitivities, inter and intra variability etc. These two main aspects, in principle, should be taken into account on: stock structure, fishery information and biological aspects.

For some of the new species, which are included in the MP, but not currently assessed, the collection of length data is useful. However, the sampling level for these species may not sufficient or appropriately stratified (by quarter, sub area etc) to build up a time series required to run analytical assessments in the future.

4 TOR ITEM C

- *Assess whether this data monitoring fulfils the ICES needs for information in an ecosystem context*

ICES has not to date defined its needs for information in an ecosystem context or requirements for data to develop an 'ecosystem approach'. It is therefore difficult for the PG to assess whether the data monitoring in 2002 has fulfil ICES' requirements. The PGCCDBS recommends that ICES defines the needs in data sampling in accordance with an ecosystem approach.

Whilst surveys are not within the scope of this PG, the PG considers that surveys relevant to data monitoring in an ecosystem context, because certain surveys might provide information on all fish species as well as the benthic species. Discard sampling is within the scope of PG, and might be relevant in an ecosystem context, if data on all fish and benthic species caught and discarded were recorded. It should though be mentioned that trawl gears unlikely will provide good quantitative data on benthic species. The PG suggests that sampling protocols for survey and discard sampling could be revised to address ecosystem data needs. Further standardisation on how record information on incidental by-catch of seabirds and marine mammals needs to be developed. However, the PG considers that such revisions should not compromise the existing objectives of surveys and discard sampling.

Table 4.1. List of "daily national sampling coordinators".

Baltic (IIIa south, IIIb-d)

Type of sampling	Country	Stocks	Contact-person		
Harbour sampling	Denmark	All stocks	Frank I. Hansen	fih@dfu.min.dk	+45 33 96 33 74
	Estonia	Marine species	Tiit Raid	raid@sea.ee	+372 6529 714
		Freshwater species	Redik Eschbaum	eschbaum@ut.ee	+372 7375 095
	Finland	All stocks	Timo Myllylä	timo.myllyla@rktl.fi	+358 20 57 51 686
	Germany	All stocks	Dr. Peter Ernst	peter.ernst@ior.bfa-fisch.de	+49 381 810 352
	Latvia	Marine species	Maris Plikshs	maris@latfri.lv	+371 7610766
		Freshwater species	Atis Minde	atis@latfri.lv	+371 7610766
	Poland	No information available			
	Russia	No information available			
	Sweden	All stocks	Lars Hernroth	lars.hernroth@fiskeriverket.se	+46 523 187 45
At sea sampling	Denmark	All stocks	Henrik Degel	hd@dfu.min.dk	+45 33 96 33 86
	Estonia	Marine species	Tiit Raid	raid@sea.ee	+372 6529 714
		Freshwater species	Redik Eschbaum	eschbaum@ut.ee	+372 7375 095
	Finland	All stocks	Jukka Pönni	jukka.ponni@rktl.fi	+358 20 57 51 894
	Germany	All stocks	Dr. Peter Ernst	peter.ernst@ior.bfa-fisch.de	+49 381 810 352
	Latvia	Marine species	Maris Plikshs	maris@latfri.lv	+371 7610766
		Freshwater species	Atis Minde	atis@latfri.lv	+371 7610766
	Poland	No information available			
	Russia	No information available			
	Sweden	All stocks	Katja Ringdahl	katja.ringdahl@fiskeriverket.s	+46 523 187 53

Table 4.2. List of "daily national sampling coordinators". (continued)

North Sea (I, II, IIIa north, IV, VIId-e)

Type of sampling	Country	Stocks	Contact-person		
Harbour sampling	Belgium	Demersal	Wim Demaré	wim.demare@dvz.be	+32 59 34 22 58
		Nephrops	Frank Redant	frank.redant@dvz.be	+32 59 34 22 61
	Denmark	All stocks	Aage Thaarup	at@dfu.min.dk	+45 33 96 32 48
	France	All stocks	Joël Vigneau	joel.vigneau@ifremer.fr	+33 (0) 2 31 51 13 00
	Germany	All stocks	Hans-Peter Cornus	peter.cornus@ish.bfa-fisch.de	+49 40 38905 194
	Netherlands	All stocks	Guus Eltink	A.T.G.W.Eltink@rivo.dlo.nl	+31 255 564691
	Norway	Norway have a system where the age reader also is responsible for the sampling. Therefore, see the age readers network list.			
	Sweden	All stocks	Lars Hernroth	lars.hernroth@fiskeriverket.se	+46 523 187 45
	UK-England	All stocks	Steve Warnes	s.warnes@cefas.co.uk	+44 1502 524450
		All stocks	Jon Elson	j.m.elson@cefas.co.uk	+44 1502 524243
	UK-Scotland	Pelagic	Jane Mills	J.Mills@marlab.ac.uk	+44 1224 295422
		Demersal	Ken Coull	K.A.Coull@marlab.ac.uk	+44 1224 295399
At sea sampling	Belgium	Demersal	Wim Demaré	wim.demare@dvz.be	+32 59 34 22 58
		Nephrops	Frank Redant	frank.redant@dvz.be	+32 59 34 22 61
	Denmark	All stocks	Henrik Degel	hd@dfu.min.dk	+45 33 96 33 86
	France	All stocks	Joël Vigneau	joel.vigneau@ifremer.fr	+33 (0) 2 31 51 13 00
	Germany	All stocks	Hans-Peter Cornus	peter.cornus@ish.bfa-fisch.de	+49 40 38905 194
	Netherlands	All stocks	Guus Eltink	A.T.G.W.Eltink@rivo.dlo.nl	+31 255 564692
	Norway	No discard samling in Norway			
	Spain	All stocks	Hilario Murua	hmurua@pas.azti.es	+34 943 00 48 00
	Sweden	All stocks	Katja Ringdahl	katja.ringdahl@fiskeriverket.s	+46 523 187 53
	UK-England	All stocks	Grant Course	g.p.course@cefas.co.uk	+44 1502 524409
	UK-Scotland	Pelagic	Sandy Robb	A.Robb@marlab.ac.uk	+44 1224 295410
		Demersal	Ken Coull	K.A.Coull@marlab.ac.uk	+44 1224 295399

Table 4.3. List of "daily national sampling coordinators". (continued)
Western and southern waters (VIId-e - XIV)

Type of sampling	Country	Stocks	Contact-person		
Harbour sampling	Belgium	Demersal	Willy Vanhee	willy.vanhee@dvz.be	+32 59 34 22 55
	Denmark	All stocks	Aage Thaarup	at@dfu.min.dk	+45 33 96 32 48
	France	All stocks	Joël Vigneau	joel.vigneau@ifremer.fr	+33 (0) 2 31 51 13 00
	Germany	All stocks	Hans-Peter Cornus	peter.cornus@ish.bfa-fisch.de	+49 40 38905 194
	Ireland	All Stocks	Gráinne Ní Chonchúir	grainne.nichonchuir@marine.ie	353 91 730480
	Netherlands	All stocks	Guus Eltink	A.T.G.W.Eltink@rivo.dlo.nl	+31 255 564692
	Norway	Norway have a system where the age reader also is responsible for the sampling. Therefore, see the age readers network list.			
	Portugal	All stocks	Graça Pestana	gpestana@ipimar.pt	+351 21 3027000
	Portugal (Azores)	All stocks	Dália Reis	dreis@notes.horta.uac.pt	+351 292 200 435
	Spain (AZTI)	All stocks	Iñaki Artetxe	iartetxe@suk.azti.es	+34 94 602 94 00
	Spain (IEO)	All stocks	Valentin Trujillo	valentin.trujillo@vi.ieo.es	+34 986 49 21 11
	UK-England	All stocks	Steve Warnes	s.warnes@cefas.co.uk	+44 1502 524450
		All stocks	Jon Elson	j.m.elson@cefas.co.uk	+44 1502 524243
	UK-Scotland	Pelagic	Jane Mills	J.Mills@marlab.ac.uk	+44 1224 295422
		Demersal	Ken Coull	K.A.Coull@marlab.ac.uk	+44 1224 295399
At sea sampling	Belgium	Demersal	Wim Demaré	wim.demare@dvz.be	+32 59 34 22 58
	Denmark	All stocks	Henrik Degel	hd@dfu.min.dk	+45 33 96 33 86
	France	All stocks	Joël Vigneau	joel.vigneau@ifremer.fr	+33 (0) 2 31 51 13 00
	Germany	All stocks	Hans-Peter Cornus	peter.cornus@ish.bfa-fisch.de	+49 40 38905 194
	Ireland	All Stocks	Gráinne Ní Chonchúir	grainne.nichonchuir@marine.ie	+353 91 730480
	Netherlands	All Stocks	Guus Eltink	A.T.G.W.Eltink@rivo.dlo.nl	+31 255 564692
	Norway	No discard samling in Norway			
	Portugal	Pelagic	Alexandra Silva	asilva@ipimar.pt	+351 21 3027000
		Demersal	Fátima Cardador	cardador@ipimar.pt	+351 21 3027097
	Spain (AZTI)	All stocks	Marina Santurtun	msanturtun@suk.azti.es	+34 94 602 94 00
	Spain (IEO)	All stocks	Nelida Perez	nelida.perez@vi.ieo.es	+34 986 49 21 11
	UK-England	All stocks	Grant Course	g.p.course@cefas.co.uk	+44 1502 524409
	UK-Scotland	Pelagic	Sandy Robb	A.Robb@marlab.ac.uk	+44 1224 295410
		Demersal	Ken Coull	K.A.Coull@marlab.ac.uk	+44 1224 295399

Table 4.4. List of "daily national sampling coordinators". (continued)

Mediterranean

Type of sampling	Country	Stocks	Contact-person		
Harbour sampling	France	All stocks	Joël Vigneau	joel.vigneau@ifremer.fr	+33 (0) 2 31 51 13 00
	Greece	No information available			
	Italy	No information available			
	Spain	No information available			
At sea sampling	France	All stocks	Joël Vigneau	joel.vigneau@ifremer.fr	+33 (0) 2 31 51 13 00
	Greece	No information available			
	Italy	No information available			
	Spain	No information available			

5 TOR ITEM D

- *commence co-ordination of sampling for securing adequate basic assessment data to ensure adequate spatial and temporal sampling coverage*

The PG considers that the co-ordination of sampling to ensure adequate spatial / temporal coverage and sampling of all relevant metiers should be initiated as soon as possible. To proceed with precision analysis of sampling programs, it is important to ensure that no gaps exist in spatial / temporal coverage, otherwise good precision (low CVs) may be achieved but not necessarily coupled with good estimation quality.

When considering how such co-ordination might be achieved, two issues arise: the organisation/operational implementation of coordination networks and the definition of methods.

The implementation of coordination networks can be approached in two ways: based on regions or based on subjects. Using regions to implement this coordination is relatively easy as the areas are already defined and most institutes have been involved in sampling projects. However, this can result in a loss of expertise and repetition of tasks e.g. scientists working in different areas developing similar methods and tools without co-operating. If we use a subjects-based approach, networks can be quite difficult because all typology must be defined and in the end a lot of small networks may be proposed e.g. an informal network to ensure sampling coverage and to eliminate unnecessary duplication. This would result in a more co-operative regime. However, it is important to bear in mind that scientists are already involved in several international meetings and the implementation of networks which would increase the number of meetings is expensive and is not generally considered desirable. An alternative would be to use PGCCDBS as the forum for the setting up of networks – to identify and prioritise the areas where networking is necessary. The PG consider it is unrealistic to tackle all sampling issues at once.

The definition of methods must take into consideration both the volume of data and the data quality checks and also the large amount of work involved. Also bearing in mind that analyses will have to be performed annually, the PG consider desirable that methods are relatively simple, easy to apply and implemented in software tools available to all participants.

General comments

It is obvious, that the quality and quantity of information required to assess stocks in the ICES framework is generally speaking of a high demand, which has directly implication on perception and recommendations made by ICES. Therefore, any external support to maintain the procedures carried out is considered fundamental in this context for ICES (countries/institutes), EU (member countries), RFOs and other stakeholders affected, although considering the specific and extensive WG requirements to assess properly the stocks, we can split into:

- For “major” stocks the level and coverage of monitoring is very high and implies significant effort on human and economic resources. If institutes present involved in sampling maintain this effort and sampling quality, the current system can be considered acceptable.

- For “minor” stocks it can be summarised that the new data monitoring frame has been a relevant starting point for these stocks (typically, deepwater species) and also for new areas and fisheries coming into the system.

In order to facilitate better co-ordination between countries/institutes the PG has established a network of the sampling co-ordinaters (personnel who are responsible for co-ordination of sampling on a day to day basis) from the various institutes and per area. The network list for the Baltic area is shown in Table 4.1, the North Sea area in Table 4.2, Western and Southern area in Table 4.3 and the Mediterranean in Table 4.4. By setting up this network there is a hope for a better bilateral contact between the “daily sampling co-ordinaters”. Therefore, the PG recommends that all “daily sampling co-ordinator” participate actively in bilateral contacts in order to improve international coordination of the sampling activities.

Table 5. Countries responsible for organising otolith exchanges in 2004, 2005 or 2006 and age determination workshops in 2004. Information on the latest otolith exchange and latest workshop is provided based in the information available to the PG. The species listed are the species that require age reading according Appendix XV of the Data Directive.

SPECIES		Latest otol. exch.	Latest Workshop	RESPONSIBLE COUNTRY 2004	2005	2006
Sandeel	*Ammodytidae*				Denmark	
Scabbardfishes	*Aphanopus* spp.	1999	2000			
Alfonsinos	*Beryx* spp.					
Atlanto-Scandian Herring	*Clupea harengus*		1999			
Herring	*Clupea harengus*	2001-03	2001-02		Finland	
Conger	*Conger conger*					
Roundnose Grenadier	*Coryphaenoides rupestris*			France		
Seabass	*Dicentrarchus labrax*					
Anchovy	*Engraulis encrasicolus*	2001	2002		Spain	
Cod	*Gadus morhua*	2000-01	2001			Ireland
Witch	*Glyptocephalus cynoglossus*					
Bluemouth rockfish	*Helicolenus dactylopterus*					
Four-spot Megrim	*Lepidorhombus boscii*					
Megrim	*Lepidorhombus whiffiagonis*			Spain		
Black-bellied Angler	*Lophius budegassa*	2001	2002	Workshop in 2004 in Portugal		
Anglerfish	*Lophius piscatorious*					
Haddock	*Melanogrammus aeglefinus*					
Whiting	*Merlangius merlangus*	1999	2000	Scotland	Workshop in 2004 in England	
Hake	*Merluccius merluccius*	2001	1999	Workshop in 2004 in Spain		
Blue whiting	*Micromesistius poutassou*					
Lemon sole	*Microstomus kitt*					
Blue ling	*Molva dypterygia*					
Forkbeard	*Phycis phycis*					
Plaice	*Pleuronectes platessa*	2003	2003			
Saithe	*Pollachius virens*				France	
Turbot	*Psetta maxima*			Netherlands		
Salmon	*Salmo salar*	2002-03	2002-03			
Sea trout	*Salmo trutta*					
Sardine	*Sardina pilchardus*			Portugal		
Spanish mackerel	*Scomber japonicus*					
Mackerel	*Scomber scombrus*	2001	1995			
Brill	*Scophthalmus rhombus*			Netherlands		
Redfishes	*Sebastes* spp.		1997	Spain		
Sole	*Solea solea*	2001	2002		England	
Seabreams	*Sparidae*					
Sprat	*Sprattus sprattus*	2001	1992	Workshop in 2004 in Norway		
Blue jack mackerel	*Trachurus picturatus*					
Horse mackerel	*Trachurus trachurus*		1999		Netherlands	
Pouting	*Trisopterus luscus*					
Norway pout	*Trisopterus esmarki*					

6 TOR ITEM E

- *commence manual for standardizing of sampling methodology and calculation methodology*

The Data Directive requires EU member countries to estimate precision levels for various types of data. Different methods can be implemented to determine precision of a sampling plan. Using Coefficient of Variation or confidence intervals will give different results. The assumption on the nature of the distribution is easy when dealing with the mean but can be much more difficult for variables like the sum or function's parameters.

The standardisation of sampling methodology is linked to the notion of precision level. The beginning of this standardisation must be a complete statistical analysis of the different national programmes. A number of methods can be applied to raise samples to obtain statistical population estimates. This heterogeneity becomes a problem when data are merged. In the last decade there have been a number of EU projects dealing with this issue, projects such as e.g. "FIEFA" and "IBSSP".

The Data Directive does not require a precision level for the numbers-at-length and numbers-at-age but the PG assumes that this information would be helpful to:

- provide an objective means of comparing national programmes,
- assist people involved in sampling to (if necessary) improve sampling plans,
- provide information to the assessment WGs about strengths and weaknesses of their input data.

In order to achieve a certain level of precision, it is important to consider both biological and statistical perspectives. The former will define the aims and will address the need to sample fleets to ensure adequate spatial and temporal coverage. The latter will define a function with parameters for optimization. The optimization in term of number of units to sample is only a part of the problem. A comprehensive analysis should enable users to:

- adapt number of strata in function in relation to the information wanted (operational or statistical stratification).
- adapt sampling intensity within the strata with regard to the internal contribution to the variance or the relative importance of the variable of interest (example of the length sampling figure 1).
- adapt sampling intensity within a sampling unit with regard to the gain in information obtained from varying sample size.
- adapt number of sample units with regard to the targeting precision

After this first round of analysis, the precision obtained can be calculated in different ways (figure 2) and the analyses can be different depending on the objective (figure 3). Finally, it can be very informative to construct a draw contour plot (figure 4) derived from a set of simulations to evaluate the sampling plan, the best overall number to sample being a compromise between the cost and the benefit.

Concerning the discard sampling, literature (Rochet et al. 2002) and past experience of some countries, indicates that the variability in discards between fishing trips is much higher than the variability within trips (or between hauls). This type of information is very important to take into account when designing a discard sampling programme.

The PG proposes to organize a workshop on sampling and calculation methodology for fisheries data, to be held in Nantes (Fr) in January 2004.

The Terms of Reference should be to:

a) Identify data requirements and appropriate sampling strategies and methods (eg stratification, mandatory and optional variables, selection of vessels, gears, etc.)) to collect fisheries data which fulfils requirements related to stock assessment.

b) Compile and review statistical procedure implemented within the National programs (length, age and other biological parameters)

c) Based on point b) identify appropriate sampling stratification in order to minimise bias and maximise precision

d) Based on point c) propose methods to estimate precision

e) consider the implementation of software tools

The workshop should report to the PGCCDBS at its meeting in 2004.

(EU member countries are reminded, where possible, to include the costs of attendance at such a workshop as part of bids for funding for their national programs in 2004).

Many countries are about to start or have recently started discard-sampling programmes in order to fulfil the data requirements in the Data Directive, and some are encountering problems. In view of this, and the EU Commission's action plan on discards (COM (2002) 656), it is very important to review existing programmes and data series and evaluate procedures, in order to ensure that discard programmes are designed in a way to provide robust estimates which can be used in stock assessments.

Some institutes felt that the quality of their discard sampling programmes is good. However, only few had completed an evaluation of the quality of their sampling. The PG considered that there is a need to standardise and disseminate methods to enable institutes to complete such an evaluation. The PG notes that the ICES Study Group on Discards, Bycatch Information (SGDBI) has listed three different methods of estimating discards but did not endorse any one method in particular – the method used is left to the individual nation. A Working Document (Appendix 1) on a Proposal for estimating UK confidence limits on fisheries data collection was presented.

Therefore, the PG recommends conducting a workshop on Discard sampling methodology and raising procedures/techniques. This will be organised in cooperation with the EU Commission (DG FISH). It is planned to hold such a workshop in Brussels in the autumn of 2003.

The Terms of Reference should be:

a) Identify data requirements and appropriate discards sampling strategies and methods (eg stratification, mandatory and optional variables, selection of vessels, gears, etc.)) to collect fisheries data which fulfils requirements related to stock assessment.

b) Review the sampling strategy and methods in established discard sampling programmes and develop guidelines in order to minimise bias and maximise precision.

c) Identify raising procedures which minimise the bias and maximise the precision of estimates taking into account the sampling procedure and the use of the data.

The workshop should report to the PGCCDBS at its meeting in 2004.

Table 6.

Country	Age-reader coordinator	Country	Age-reader		
Belgium	Bart Maertens +32 59 34 22 62 bart.maertens@dvz.be	Sole	Ilse Maertens Martine Moerman	ilse.maertens@dvz.be martine.moerman@dvz.be	+32 59 34 22 65 +32 59 34 22 50
		Plaice			
		Cod			
		Haddock			
		Whiting			
Denmark	Lotte Worsøe Clausen +45 33 96 33 64 law@dfu.min.dk	Cod (IIIc-d)	Carl Broberg	col@dfu.min.dk	+45 33 96 33 72
		Herring	Stina Bilstrup	sb@dfu.min.dk	+45 33 96 33 85
		Sprat	Stina Bilstrup	sb@dfu.min.dk	+45 33 96 33 85
		Salmon	Frank I. Hansen	fih@dfu.min.dk	+45 33 96 33 74
		Cod (IIIa south)	Niels Jørgen Pihl	njp@dfu.min.dk	+45 33 96 33 65
		Cod	Helle Rasmussen	njp@dfu.min.dk	+45 33 96 33 65
		Cod (Baltic)	Carl Broberg	cob@dfu.min.dk	+45 33 96 33 72
		Norway pout	Lise Sindahl	ls@dfu.min.dk	+45 33 96 32 46
		Haddock	Kurt Jensen	kj@dfu.min.dk	+45 33 96 32 09
		Plaice	Aage Thaarup	at@dfu.min.dk	+45 33 96 32 48
		Sandeel	Susanne Hansen	sh@dfu.min.dk	+45 33 96 34 71
		Saithe	Helle Rasmusen	hr@dfu.min.dk	+45 33 96 32 08
		Sole	Peter Vingaard Larsen	pvl@dfu.min.dk	+45 33 96 33 62
		Other species	Helle Rasmusen	hr@dfu.min.dk	+45 33 96 32 08
		Flounder, Baltic	Carl Broberg	col@dfu.min.dk	+45 33 96 33 72
		Plaice	Helle Rasmusen	hr@dfu.min.dk	+45 33 96 32 08
		Sole	Peter Vingaard Larsen	pvl@dfu.min.dk	+45 33 96 33 62
Estonia	Toomas Saat tsaat@sea.ee +372 6267 402	Herring	Tiit Raid	raid@sea.ee	+372 6529 714
		Sprat	Olavi Kaljuste	olavik@sea.ee	+372 6529 714
		Salmon, trout	Mart Kangur	mart@ness.sea.ee	+372 6529 714
		Whitefish	Aare Verliin	kldvn@ut.ee	+372 7375 092
		Smelt	Heli Shpilev	heli@solo.delfi.ee	+372 4433 800
		Flounder, turbot	Tenno Drevs	haugas@ness.sea.ee	+372 6529 714
		Cod	Tenno Drevs	haugas@ness.sea.ee	+372 6529 714
		Perch	Redik Eschbaum	eschbaum@ut.ee	+372 7375 095
		Pike-perch	Redik Eschbaum	eschbaum@ut.ee	+372 7375 095
		Pike	Redik Eschbaum	eschbaum@ut.ee	+372 7375 095
		Cyprinids	Leili Järv	leili@ness.sea.ee	+372 6529 714

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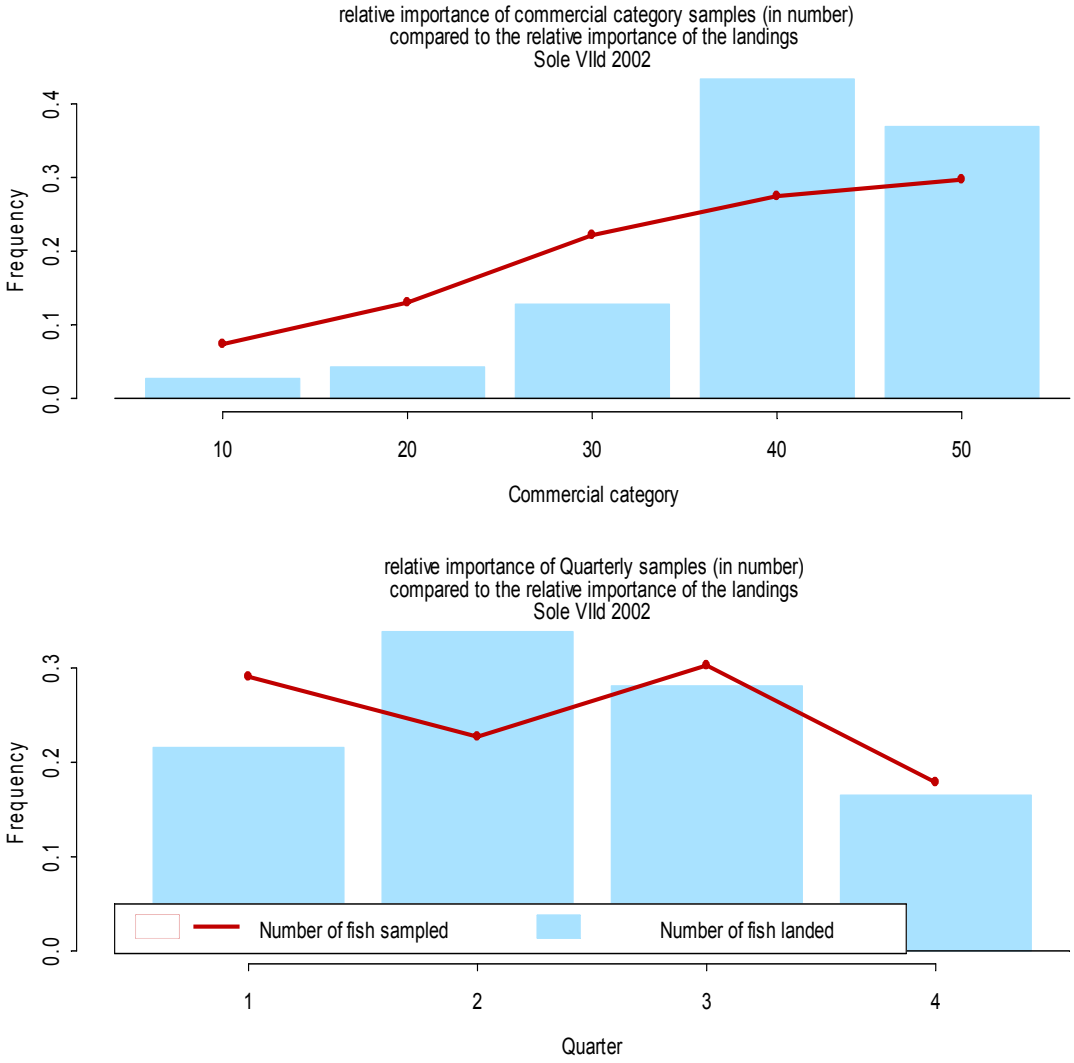

Figure 1. Relative importance of the sampling against the landings by strata

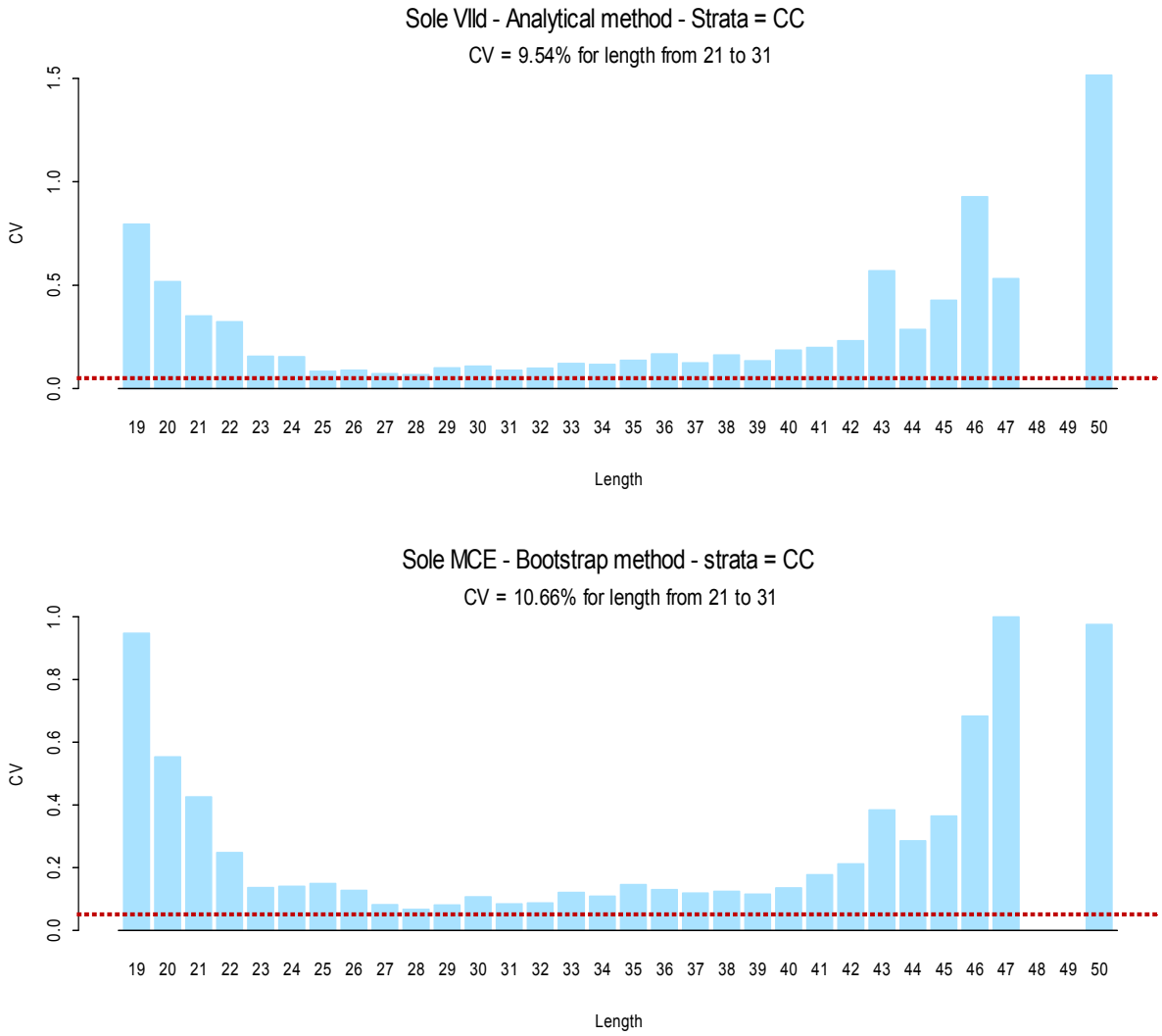

Figure 2. Coefficients of variation of the numbers-at-length estimated from the sampling plan

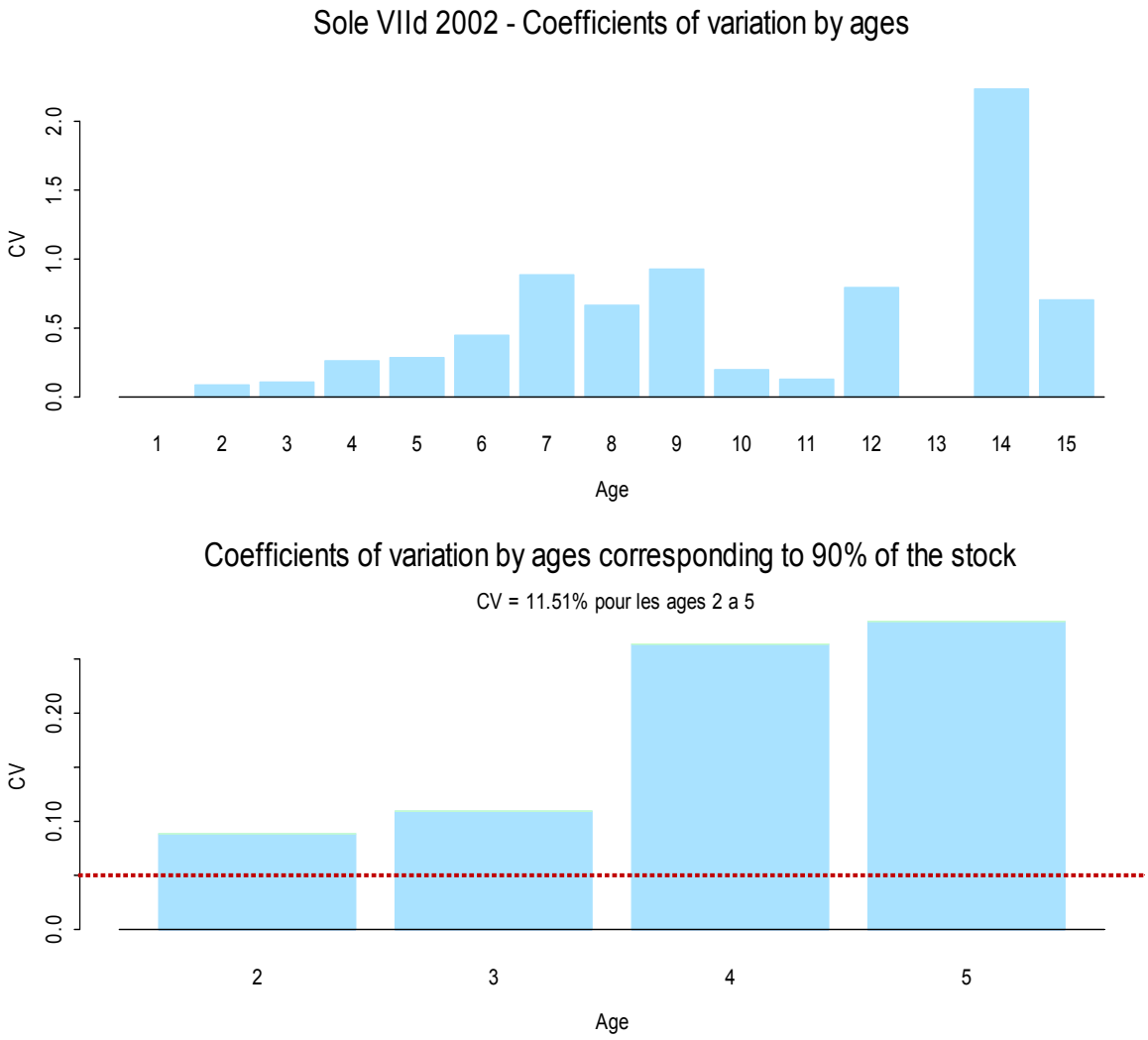

Figure 3. Coefficients of variation of the numbers-at-age estimated from the sampling plan

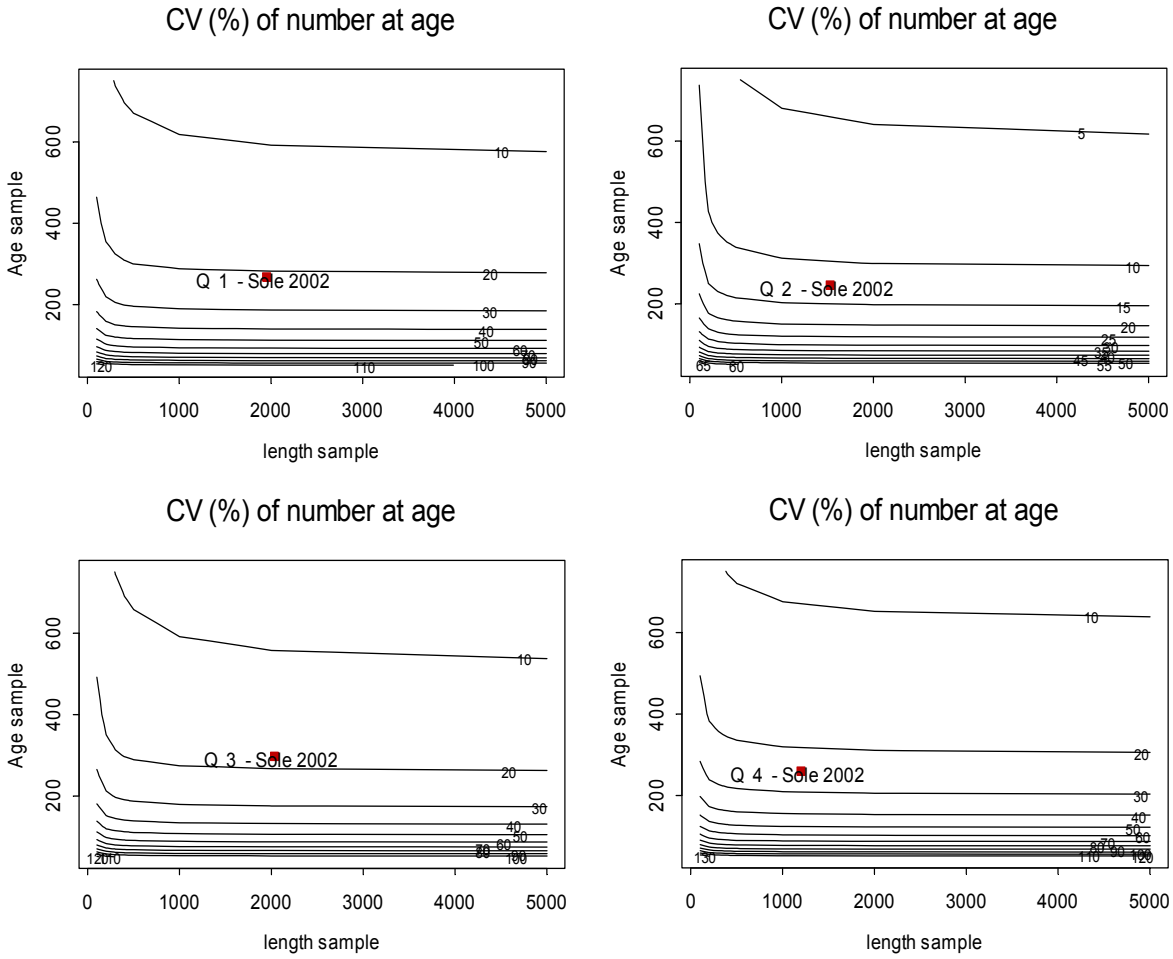

Figure 4. Contour plot of the CVs corresponding to different length sampling intensity and different age sampling intensity

7 TOR ITEM F

- *Identify on a regional basis the candidate stocks and species requiring improving ageing*

Age determination is an essential feature of fish stock assessment, as it provides information required to estimate growth and morality rates. In order to arrive at appropriate management advice ageing procedures must be reliable. Otolith processing methods and age reading methods might differ considerably between countries (in this text "otoliths" include otoliths and other calcified structures such as scales, bones). Therefore, otolith exchanges should be carried out on a regular basis and if serious problems exist, age reading workshops should be organised to address these observed problems. Otolith exchanges can not be carried out for all species at the same time. Therefore the PG at this meeting a planning is made for 2004-2006 in which 2005 and 2006 are preliminary. At PGCCDBS meeting in 2001 it was decided to organise otolith exchanges and age reading workshops on a regional basis. However, it now appears to be more appropriate to extend these to the whole ICES area and, if necessary include the Mediterranean area. The advantage of this will be that the age reading methods of all experts on age reading for specific species would be compared, although difficulties in age determination might differ by area.

The PG agreed that as a first priority age reading workshops should be organised for those species which have been identified as being very difficult to age:

1. **Sprat**: for this species only winter rings have to be counted from otoliths. however, these winter rings can not be linked to a specific age or year class, since part of these fish can be born in the year before.

2. **Hake**: it appears to be very difficult to distinguish the annual rings from other rings.

3. **Monkfish**: different age readings result come from reading otoliths and illicia.

4. **Whiting**: it appears to be very difficult to distinguish the annual rings from other rings

The PG recommends that age reading workshops for sprat, hake, monkfish and whiting should be organised in 2004/05. The countries responsible for organising these workshops are respectively Norway, Spain, Portugal and England.

EU member countries are reminded that the budgets for workshops should be included in the National Programmes for Data Collection for 2004 (deadline end of May 2003). Organisers should take into account that age readers will not be able to validate and solve the age reading problems during workshops. It is therefore recommended that additional experts should assist by investigating special techniques for identifying/validating annual rings in advance of the workshops.

The European Fish Ageing Network (EFAN) provides on the internet guidelines on validation (www.efan.no under "Validation"). At these 2004 workshops the main aim should be to try to include techniques to validate the age reading methods and to discus if possible otolith processing techniques which might help to clarify the ring structures. Guidelines on how age reading workshops should be organised and how the analysis of the age readings should be carried out can be found on the EFAN internet website (www.efan.no under "Guidelines"). One can download both the guidelines together with the spreadsheet for the age reading comparisons.

The PG recommends that otolith exchanges for a number of fish species should be carried out in 2004, 2005 and 2006. The countries responsible for organising these otolith exchanges are listed in the Table 5.

EU member countries are reminded that budgets for organising exchanges should be included in the National Programmes for Data Collection for 2004 (deadline end of May 2003).

Guidelines on how otolith exchanges should be organised and how the analysis of the age readings should be carried out can be found on the EFAN internet website. A spreadsheet for a standardised analysis of the age reading comparisons can also be found on the EFAN website (www.efan.no under "Guidelines"). One can download both the guidelines together with the spreadsheet for the age reading comparisons. For these otolith exchanges it is recommended to make an otolith set for the exchange that consists of an equal number of otoliths from each participating institute in order to enable an analysis on the otolith processing method for each institute.

Results from the otolith exchanges and age reading workshops should be reported to the PG and to the relevant ICES assessment working groups.

The PG has considered the deep-sea species, but, before determining the needs for ageing workshops or exchanges, concluded that guidance is needed from WGDEEP on whether ageing would improve the opportunities for stock assessment of deepwater species.

8 TOR ITEM G

Examine the possibilities of sharing / transferring otoliths across laboratories

The Data Directive requires more species to be sampled. Therefore, some laboratories have only recently started to samples these species and to carrying out age reading. This has created several problems such as:

- When no local expertise (institute level) in ageing new species is present, data quality cannot be assured,
- The levels (number of fish) of ageing required are sometimes so low that it is difficult to establish and maintain sufficient age reading expertise in each institute.

EFAN data bases number 10 and 11 provide information on which otolith readers have expertise in age reading what particular fish species (www.efan.no under databases). A direct communication between laboratories is recommended to solve these problems.

In order to facilitate better co-ordination and better communication between countries/institutes the PG has established a network of the age readers from the various institutes. See Table 6. By setting up this network there is a hope for a better bilateral contact between the age readers.

9 RECOMMENDATIONS

PGCCDBS recommends that sampling intensities for stocks in a critical state must exceed a certain minimum thresholds that will yield useful data for analytical assessments.

PGCCDBS recommends that the impact of implementation of the new sampling regime on the assessment be checked to assure that these changes do not have a negative impact on assessment.

PGCCDBS recommends that all "daily sampling co-ordinator" participate actively in bilateral contacts in order to improve international coordination of sampling activities.

PGCCDBS recommends that a workshop on international standardisation of methodologies for maturity staging is convened in 2004. This workshop could be linked to the SGGROMAT.

PGCCDBS recommends that ICES defines the needs in data sampling in accordance with an ecosystem approach.

PGCCDBS recommends a workshop on sampling and calculation methodology to be held in Nantes (Fr) in January 2004 and chaired by Joël Vigneau, France

The Terms of Reference should be:

a) Identify data requirements and appropriate sampling strategies and methods (eg stratification, mandatory and optional variables, selection of vessels, gears, etc.) to collect fisheries data which fulfils requirements related to stock assessment.

b) compile and review statistical procedure implemented within the National programs (length, age and other biological parameters)

c) Based on point b) identify appropriate sampling stratification in order to minimise bias and maximise the precision.

Based on point c) propose methods to estimate precision consider the implementation of software tools

PGCCDBS recommends a workshop on Discard sampling methodology and raising procedures/techniques to be held. In cooperation with the EU Commission (DG FISH) it is planned to have the workshop in Brussels in the autumn of 2003.

The Terms of Reference should be:

a) Identify data requirements and appropriate discards sampling strategies and methods (eg stratification, mandatory and optional variables, selection of vessels, gears, etc.) to collect fisheries data which fulfils requirements related to stock assessment.

b) Review the sampling method and strategy practiced in already established discard samplings programmes and develop guidelines in order to minimise bias and maximise precision.

c) Identify raising procedures which are able to minimise the bias and maximise the precision of the results taking into account the sampling procedure and the use of the data.

PGCCDBS recommends that age reading workshops for sprat, hake, monkfish and whiting should be organised in 2004. The countries responsible for organising these workshops are respectively Norway, Spain, Portugal and England.

PGCCDBS recommends that otolith exchanges for a number of fish species should be carried out in 2004, 2005 and 2006.

PGCCDBS recommended for otolith exchange exercises to make an otolith set for the exchange that consists out an equal number of otoliths from each participating institute in order to enable an analysis on the otolith processing method per institute.

10 ACKNOWLEDGEMENT

The Planning Group participants thank the FAO for the invitation to meet in Rome. Alexis Bensch, FAO for help during the PG meeting. During the meeting a presentation on the progress of a FAO work on estimating the amount of global discard by Kieran Kelleher and Siebren Venema were given.

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APPENDIX 1

PROPOSAL FOR ESTIMATING UK CONFIDENCE LIMITS ON FISHERIES DATA COLLECTED UNDER EC REG 1639/2001

Introduction

Commission regulation 1639/2001 concerning collection of fisheries data requires the UK to estimate 95% confidence levels for various types of data including [para. references in square brackets]:

- commercial landings [E(1)c] by region, period, and gear [Appendix XII];
- discards [E(1)c] by region, period, and gear [Appendix XII];
- for growth curves, average weights and lengths for each age [I(1)c(i)];
- maturity and fecundity within certain age and/or length ranges [I(1)c(ii)];
- sex ratio [I(1)c(ii)];
- species compositions of catches of skates and rays in areas IV and VIId [I(1)c(iii)].

Note however that the Regulation has two approaches to 'precision', one of which is confidence levels, the other is sampling sizes/rates [B(2)]. Sampling sizes and rates alone are used to prescribe the precision for numbers-at-length and numbers-at-age of landings, i.e. as samples per tonne [Appendix XV]. The same rules apply to discards [H(1)e].

For the foreseeable future, England, Scotland, and Northern Ireland (referred to here as 'provinces') are likely to continue submitting their data to ICES and national departments independently as they have for years without special requirements for stating precision. The European Commission occasionally needs data for STECF but is unlikely to become a regular customer for UK bulk data. It appears therefore that the primary need for statements of precision on UK data is to permit the EC to audit the effectiveness of sampling carried out with their funds. Article 6(2) of the Regulation requires a "technical report of activity detailing the state of completion of the aims. . .of the minimum programme" by 31 May each year. This seems to be the occasion when we should routinely compile sampling rates and confidence limits for the UK as a whole.

Compilation of sampling rates for the UK in relation to numbers-at-age and -at-length is a relatively straightforward task. Quantities sampled and quantities landed (or discarded) need to be put together annually by each provincial lab for each stock sampled and the results added together by the UK data co-ordinator for reporting in May.

Compilation of confidence limits is less straightforward. The rest of this document puts forward some ideas.

Quantities landed

Para E(1)c states that 'assessment of commercial landings must be made on the basis of exhaustive data . . . in such a way that the estimates achieve a precision of level 3 for stocks subject to TAC and quota regulations, level 2 for stocks not subject to TACs and quotas listed within Appendix XII, and level 1 for the other cases.' This amounts to 95% confidence levels of +/- 5%, 10%, and 25% respectively [B(4)]. The confidence levels are applicable to quantities landed after disaggregation into time periods, regions, and gear categories as specified in Appendix XII and III.

Since all quantities landed are totaled completely from official log-books by the UK (and all other members of the CFP), 95% confidence levels should be zero and therefore in compliance with level 3, the highest requirement. Bias may be a problem but there is no way we can assess it, and in any case, bias is not included in the term 'precision'.

Conclusion: No new action. Archive and report landings as usual and state to the EC that level 3 precision is obtained in all cases (unless there is any estimation by sampling).

Quantities discarded

Para E(1)c states that 'data related to annual estimates of discards for stocks mentioned in Appendix XII must lead to a precision of level 1 (+/- 25%).' As for landings, the confidence levels are applicable to quantities after disaggregation into time periods, regions, and gear categories as specified in Appendix XII and III.

Since the variance of the sum of independently sampled estimates is the sum of their individual variances, a UK variance for discarded quantities can be obtained by adding the variances estimated by sampling independently in each province. Provincial variances could be estimated by treating each trip as an independent, random observation from a stratum described by a time-period, a region, and a gear type. To avoid complications, assume that the raising factor is known without sampling error. The estimated quantity discarded by the provincial fleet within stratum *f* is

$$D_{pf} = R_p . D_s$$

where R_p is the province's raising factor and D_s is the total quantity discarded on all *n* trips observed by the province in stratum *f*. The variance of this is

$$\mathrm{var}_p\left(D_{pf}\right) = R_p{}^2 . \mathrm{var}\left(D_s\right)$$

where $\mathrm{var}\left(D_s\right) = \dfrac{n\left(\sum D_t^2 - n^{-1}\left(\sum D_t\right)^2\right)}{\left(n-1\right)}$ and D_t is the total quantity discarded on the observed trip labelled $t = 1\mathrm{K}\ n$. The UK discard estimate is then

$$D_{UK,f} = \sum_p D_{pf}$$

and the variance is

$$\mathrm{var}_{UK}\left(D_{UK,f}\right) = \sum_p \mathrm{var}_{\ p}\left(D_{pf}\right).$$

This is a quick and simple method that might be refined in various ways. On the other hand, more elaborate formulations are probably not worthwhile while each province retains its own methods of drawing samples of vessels and raising results to fleet level. Reporting *n* for each province is probably also needed to satisfy the EC and would allow those interested to gauge the reliability of the variance estimates. Given large total sample size over all provinces, i.e. $\sum_p n_p > 30$ say, we could estimate 95% confidence intervals using the normal distribution. In practice, UK sample sizes will often be lower than this but we will probably still have to rely on the normal distribution.

Conclusion: All provinces should estimate discarded quantities by stratum independently and report the estimates, the variances, and the sample sizes to the data coordinator who will form the UK results. Failures to sample for any reason should also be reported.

Growth curves, maturity and fecundity-at-age

Para I(1)c(i) states that 'for growth curves', 'average weights and lengths for each age must be estimated with a precision of level 3 (+/- 5%) . . . ' for all stocks listed in Appendix XVI. Most of the species have to be reported triennially.

The precision of estimated weights and lengths at age will depend on:

- the spread of samples within the stock and period (clustered samples tend to have high apparent precision because they all have a similar component of bias).

- the variation of length-at-age and weight-at-age in the stock over the period. Seasonal growth will obviously be important. Annual year-class size may also be important if there is density-dependent growth.

Where only one province can sample a stock to estimate the required growth curve, computations might either be done locally or by the UK data coordinator. Where two or three provinces are sampling, it would make sense to transmit all data to the UK coordinator for computations. If necessary, data might be thinned or weighted to improve geographic and temporal balance, and any model-based estimates would benefit from the larger data set and the single approach. Alternatively, when one province has particular expertise, all data could be sent there for processing by agreement.

Since seasonal and environmental factors could affect the precision of triennial estimates of length- or weight-at-age, the best idea of measurement precision would be obtained from model-based rather than from sample-based estimates. The former would show precision after known external influences had been accounted for; the latter would provide variances including all sources of variability, not just those related to sampling effort. The models should be kept as simple as possible to avoid over-fitting and consequent instability of the model from year to year.

Para I(1)c(ii) specifies that maturity, fecundity, and sex-ratio must be determined with reference to length or age with a precision of +/- 5% within certain size limits. For statistical purposes, this is the same problem as estimation of lengths- and weights-at-age.

Conclusion: Precision of lengths-, weights-, maturity-, fecundity-, and sex ratio-at-age should be estimated using simple models to allow for influences unrelated to sampling effort. The modelling should be carried out in one location, by the UK data coordinator as the default option when more than one province is contributing data for the stock.

Skates and rays

Para I(1)a(ii) states that 'Biological sampling of landings must be implemented to estimate the share of the various stocks in these landings for . . . the various species of skates and rays in areas IV and VIId'. Para I(1)c(iii) states that these shares must be estimated with level 1 precision (+/- 25%).

Assuming that the species of skates and rays are not reliably identified in fishers' logbooks, it will be necessary to conduct sampling of landings of skate and ray to determine the species 'shares'. The precision of estimates of shares for total UK landings will depend on how much variability of share is evident from sample to sample, and how many samples are taken. Gear-related effects are likely. Only Scotland and England appear to be involved with catches from IV and VIId. A simple plan would be for all sample results to be sent to one of these provinces where the proportions by species of the total UK landings by gear can be estimated with standard sampling theory. The UK data coordinator could be the default option for making the calculations.

Conclusion: The proportions of skate and ray species in samples of landings plus other necessary details should be sent to the UK data coordinator (default option) to estimate proportions and variances for total UK landings by gear.

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10 Dec 2002