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Report of the

ICES/NSCFP Study Group on the Incorporation of
Additional Information from the Fishing Industry
into Fish Stock Assessments (SGFI)

3–4 February 2004
The Hague, Netherlands

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1 SUMMARY

The Study Group on Incorporation of Additional Information from the Fishing Industry into Fish Stock Assessments (SGFI) met for two days in The Hague, Netherlands. The participants consisted of fishers, their representatives, scientists employed by the industry, ICES scientists and an ICES representative. The national initiatives to improve the relationships between the fishery and fishery science were presented and discussed in detail. Outstanding were initiatives from Canada, where sentinel surveys are conducted together with the fishery. Very close cooperation was achieved also in surveying and harvesting in the Celtic Sea herring fishery and the Danish discard sampling in the Baltic Sea. As compared with the previous year the overall situation in cooperation has not improved. The relationships have, in a number of cases, become more difficult and information flow from the fishery to the fishery science rather decreased than increased. While this is obvious in a number of countries on the working level between the individual fisher and the scientist, it is, in general, not so much the case on the level of fishery representatives and fishery science.

It is understood by the SG that the incorporation of additional information into the fish stock assessments is a process, taking place on different organisational levels. As such it is embedded in the overall move towards more insight of the fishery into the assessment process and participation in the advice formulation. At the same time, as an integral part, the fishery will adopt more responsibility, amongst others for the quality of the input data. Mainly this extends to the landings data, although it was proposed by the fishery at the meeting to utilize more disaggregated data, which might be available in the EU log-book sheets. Since this cannot be accomplished during a two-day meeting with many participants, it is proposed to intersessionally compile more disaggregated data for a “test-fleet” or “test-vessels” of a North Sea fleet and present the CPUE-series to the next SGFI.

The results of the 2003 “Fishers’ Survey” were presented, which contained answers of the fishers about their perception of the present stock situation and the experienced changes. Due to the subjective nature of the survey results it is difficult to integrate the results directly into the assessment. However, the results are considered as part of the advisory process and it was concluded by the group that the survey provides very valuable information and should be continued. The SG came to the conclusion that the survey can only be fully evaluated when sufficient numbers of observations have been made to statistically compare the fishers’ observations with the respective forecasts from the assessments for the same year. Only then it can be fully assessed of what quality the fishers’ survey is. For this reason it is highly recommended to continue the survey, until such statistical evaluation is possible.

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1.2 Acknowledgements

The study Group is grateful to the Agricultural Economics Research Institute (LEI), Netherlands, for hosting this meeting and wishes to acknowledge the excellent meeting facilities provided in The Hague. Furthermore the SG is grateful to the North Sea Commission Fisheries Partnership for supporting the meeting.

1.3 Terms of Reference

At the Annual Science Conference in September/October 2003 in Tallinn (Estonia) it was decided that the Study Group on the Incorporation of Additional Information from the Fishing Industry into Fish Stock Assessment should meet for two days in The Hague, Netherlands, with the Co-Chairs of Hugo Andersson (Sweden) and Cornelius Hammer (Germany).

The Terms of Reference were to:

- a) summarize national and international joint efforts and progress in communication and cooperation between science and fishers in 2003;
- b) identify information from the fishery which is useful for the understanding of the developments in the fisheries and the stocks, and the formulation of biological advice;
- c) consider how such information as identified under b) could contribute to regular stock assessments;
- d) propose mechanisms how to collect and provide to assessment Working Groups and ACFM on a regularly base such information;
- e) respond to feedback from the NSCFP meeting to be held in Copenhagen 8 October 2003.

SGFI will report by 15 March 2004 for the attention of ACFM and the Resource Management Committee.

2 INTRODUCTION

The underlying idea with which SGFI was founded in 2002 (with its first meeting in 2003) was *inter alia* to acquire hard data on the operation of the fishing fleets, including catch at age data (taking account of misreporting, discard & high grading), effort data, technical information on fishing gears, and information on fishing grounds. Some of these data were expected to be obtained from conventional log-books or from satellite data, and in other cases they were expected to be collected from the fishermen directly (ICES justification for the SGFI).

The discussions in SGFI in 2004 concentrated on two of these topics, the data from log-books and the qualitative data from the "Questionnaire" which had been distributed to the fishers around the North Sea, also known as the "Fishers' Survey". During the first meeting of SGFI in early 2003 the data of the first survey were available and used later that year in the 2003 ACFM report as additional qualifying information to the stock status description.

During the 2003 SGFI-meeting it became clear very quickly that the *incorporation of additional information from the fishery into fish stock assessments* is not confined to the use of the Fishers' Survey results but goes beyond this. There are many different approaches to cooperation, which vary from country to country. Information on national initiatives presented to the SG in 2003 and 2004 was mainly descriptive and discussed the potential and limitations of national co-operations. The "national reports" for the activities in 2003 presented in this report are naturally biased towards the achievements, since there is nothing to report where cooperation does not exist or is under-optimal. In addition, it is understandable and indeed sensible, not to focus on areas of conflict, or lack of co-operation at a time when improvement of the situation is sought. As a consequence, positive bias should be expected in the national reports and also in the discussions of SGFI.

However, the reports on national initiatives towards better cooperation show that some progress has been made in spite of serious problems in some countries and fleets. Markedly successful appeared to be the sentinel surveys in Canada, the Irish Celtic Sea Herring Cooperation (Pelagic Management Committees) and the Danish discard sampling (Section 3). In Section 3 the national reports are presented without the reflections of the comments of the SG as a result of the discussions, since many of these were repeated and many topics were of reoccurring nature. The reflections of the SG and the discussions are summarized in Section 4.

The discussions in SGFI showed that the attempts of SGFI to *incorporate additional information from the fishery into fish stock assessments* are a process rather than an act. This, because it is *a priori* not clear what exactly can be incorporated, and if so, to what extent, and what is sensible to incorporate and what not. The field of discussion and different perceptions is marked by two distinct standpoints: It is repeatedly stipulated that the fishers' experience of the most recent history ("this year") has no weight or influence on the assessment, or, more precisely, on the stock projection into the current year and thus on the upcoming setting of the TACs and has therefore no influence on the expected TAC or quota for the next upcoming year. The contrasting scientific viewpoint is that assessments and projections rely on hard data and that qualified landings and discard data, together with the biological data (age, weight, maturity etc.), are the best what is available. Emphasis should be put on improving these hard data from the fishery. The better these data are, the better the projections are likely to be. This is an equally understandable position since conclusions of the assessments and projections (i.e. recommendations for TACs) must be substantiated and defended in any case. If the proposed TAC appears low, it needs to be defended against the fishery, if it appears to be high, it needs to be defended against the NGOs. In most cases both at the same time. In the light of this it is compelling that scientists make conclusions solely on the grounds of hard data, trying to eliminate as far as possible any subjective information.

It is however, acknowledged from the scientific side that stock projections from the assessed year into the "intermediate-year" (nowcasting) and forecasting into next year (the TAC-year) is largely independent of most recent developments in the stocks and the fishery. The purpose of SGFI is to bridge these two positions and to explore where and how information can be sensibly utilized and incorporated.

The discussions on the various national projects showed that the "Fishers' Surveys"-approach, i.e. to have information of the fishery incorporated not in the computation procedure but in the overall evaluation of the status of North Sea stocks is a worthwhile approach and one which should be continued. However, the results are inevitably descriptive, since fishers' answers to questions are of the nature of "more", "better" or "less". Nonetheless, this is still important information since the real value of such interrogation will probably become evident after a couple of years, when sufficient numbers of fishers observations can be compared with what the assessment projections had forecasted for that particular year and stock. With the benefit of hindsight and the retrospective analyses of the assessments it might be possible to decide whether and how much the old projections had been right or wrong. When a number of years of Fisher's Surveys have been conducted, direct comparisons could possibly be made between the projection from the assessments with what in that particular year the Fisher's Surveys had claimed to be. Based on this a validation of the fishers surveys could be possible, or at least an indication for the quality of the Fishers' Survey be achieved and the extent of agreement can be evaluated.

Apart from the "Fishers' Survey" the second approach of incorporating information is the utilization of commercial CPUE-series. Fishers have repeatedly requested that better use be made of the commercial CPUE-series. The SGFI meeting in 2004 detailed its position regarding the quality and usability of commercial CPUE data, which became an important issue of the meeting. The pros and cons of commercial CPUE-series were discussed in greater detail than in the previous year and eventually it was proposed to intersessionally compile data for a North Sea fleet, which could function as a test fleet and of which the data are disaggregated in space and time.

3 NATIONAL REPORTS ABOUT COOPERATION BETWEEN THE FISHERY AND SCIENCE

3.1 Sentinel Surveys (Fisheries) in Atlantic Canada (Gislain Chouinard)

After supporting substantial and economically significant fisheries for generations, many groundfish stocks in Atlantic Canada declined sharply in the early 1990s. Following TAC reductions in the previous several seasons, fishing on the northern (2J3KL) cod stock was stopped in mid-season 1992. By the fall of 1993, six Atlantic cod stocks were closed to fishing and TACs were reduced sharply on other groundfish stocks. Further closures were seen over the next several years.

Beyond the obvious and immediate impact of these events on the economic livelihood of many Atlantic Coast communities, the closure and reduction of so many groundfish fisheries had a negative impact on the stock status assessment process for these resources. While commercial fisheries catch rate-series were no longer being widely used as indices of abundance in the analytical assessments prevalent among these stocks, the commercial fishery had remained an important source of general knowledge of fish abundance, distribution and movement. Sampling of the commercial catches in port and at sea remained a primary source of biological samples and measurements upon which to build population models.

Additionally, the activities of commercial fishermen were the primary means by which the fishing industry maintained its own perspective on the status of these stocks, by comparing and interpolating recent catch results against the accumulated knowledge of the distribution and abundance of those resources over many years of commercial

exploitation. Paradoxically, the reduction and closure of fisheries amplified the demand for information about stock status.

Concerns for the impact of closures for the stock assessment process and the need to maintain contact with these resources became focussed within the then recently created Fisheries Resources Conservation Council (FRCC). In its November 1993 report, the FRCC recommended:

“To provide continuity in stock assessments, attention must be paid to the possibility of using commercial vessels to maintain or implement some form of fishing activity, on a wider temporal basis or geographic scale than scientific surveys alone, but with strong controls to minimize possible adverse impacts on conservation actions. Such fishing could take the form of ‘experimental’ or ‘sentinel’ (test) fisheries.”

At this time, government monies were being made available to support initiatives to deal with a range of outcomes triggered by fishery closures. These included programs to reduce capacity in and dependence on the fishery, income support for those who would remain, and monies to engage those to remain in activities relevant to the future of the fishery and resource economy of the Atlantic Coast. What evolved was the concept to direct some of these latter funds to conduct a program of organized and controlled harvest by commercial fishers to collect information about the stocks under moratorium for the purpose of monitoring their condition. First efforts became operational in mid-1994, with primary funding from Human Resources Development Canada (HRDC), specifically the ‘Green Projects’ component of The Atlantic Groundfish Strategy (TAGS), and technical and scientific support from DFO.

A clear statement of goals and objectives for this program are not available from this formative period, but can be readily inferred from the design of early projects and from the earliest reports of results. The goal of the Groundfish Sentinel Program is presented as: to improve groundfish stock assessments and conservation decision-making. The two objectives are presented to be (1) to enhance scientific information and monitor trends in the biomass of stocks currently under moratorium; and (2) to involve fishers directly in the scientific assessment process, and thus foster cooperation and information flow with the fishing industry.

In 2000, just over \$7,000,000 of financial support was directed toward the Sentinel Program. Of this amount, \$5,000,000 originated with DFO, in the form of contracts with industry organizations and DFO staff time and services. In addition, DFO and the industry collectively contributed services in-kind worth about \$420,000. The value of fish caught, which is to be directed to fund sentinel activities, was worth an additional \$1,560,000 in 2000.

3.1.1 Southern Gulf of St. Lawrence Sentinel Surveys

The southern Gulf sentinel surveys program was started in 1994 with only one mobile gear project in northern NB (2 seiners). Since then, the program has been expanded to cover the four provinces (Quebec, NB, NS and PEI) bordering NAFO Division 4T (Figure 1).

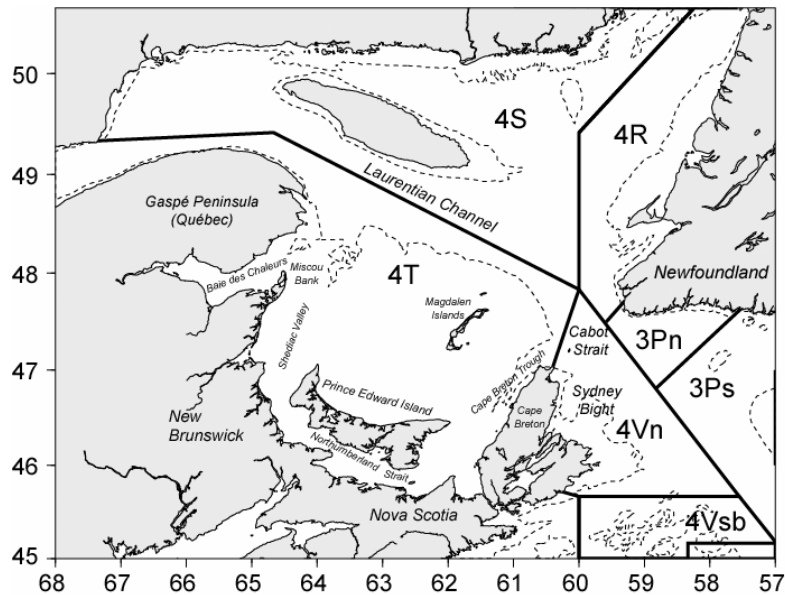


Figure 1 Chart of the Gulf of St. Lawrence showing Northwest Atlantic Fisheries organization (NAFO) areas and place names mentioned in the text.

In 2002, 12 separate projects for both mobile and fixed gears were conducted. Essentially, sentinel surveys consist of limited removals from the stock following a scientific protocol established in consultation with the industry. The objective of the program is to provide additional abundance indices for stocks where the fishery is limited or under moratorium such as the sGSL cod and white hake stocks (4T). On each fishing trip, at-sea observers collect detailed information on the fishing activity, catch composition, length frequency, as well as material for age determination. The sentinel surveys also provide an opportunity to study the distribution, condition and feeding of cod, to gather biological data on other species and to collect oceanographic information. Since their beginning, all sentinel surveys have been conducted using fishing vessels, on historically harvested fishing grounds. A detailed description of the protocols and the results of the surveys from 1994-1998 are summarized in Chouinard *et al.* (1999). In general, results of sentinel surveys are included in stock assessment documents for the various resources (see http://www.dfo-mpo.gc.ca/CSAS/CSAS/English/Publications/Research_Doc_e.htm).

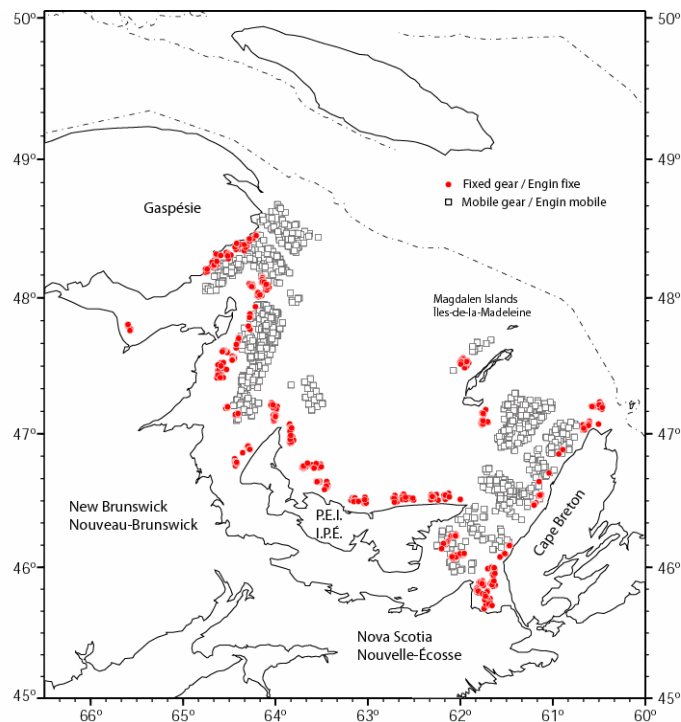


Figure 2 Fishing locations for the sentinel survey projects conducted in 2002 in the southern Gulf of St. Lawrence.

Catch rates in the sentinel surveys are analysed separately for longlines, standard gillnets, otter trawls and seiners (with and without liners) using a multiplicative analysis with the SAS GLM procedure (SAS Institute Inc. 1989) to obtain standardized indices of catch rates. In turn, these are used to calculate catch rate at age indices suitable for calibration of a population model (SPA using the ADAPT framework). These abundance indices have been used in the assessment of the southern Gulf of St. Lawrence cod stock since 1999.

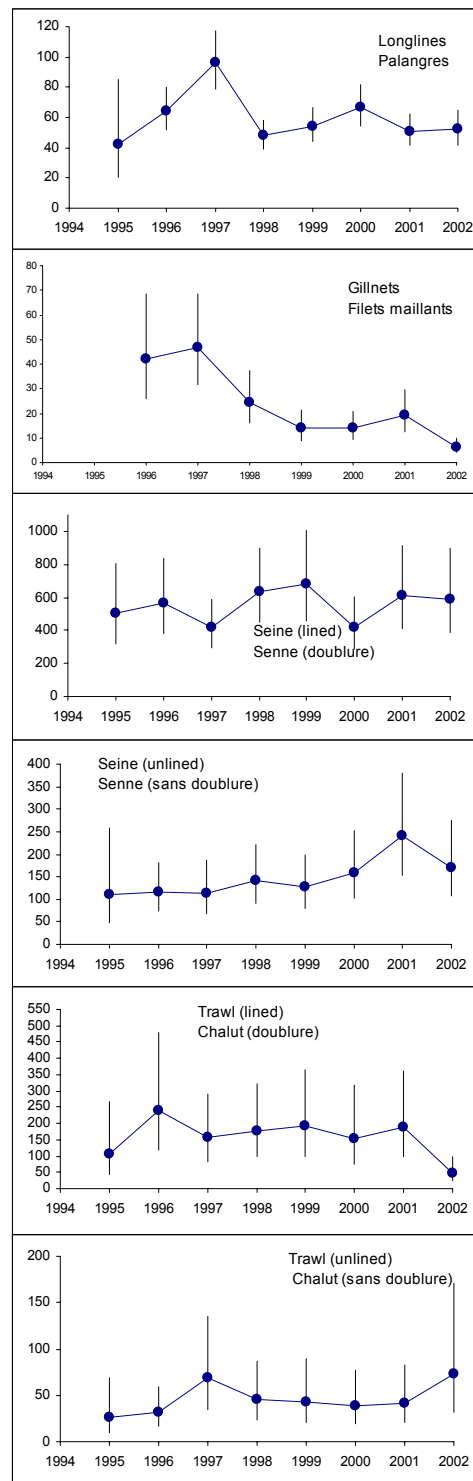


Figure 3 Standardized catch rates indices by gear type in the sentinel surveys in the southern Gulf of St. Lawrence, 1995 to 2002. (Units: longline = kg/1000 hooks; gillnet = kg/net; seine = kg/set; otter trawl = kg/hour). In 2001-2002, there was a review of sentinel survey with the objective of optimizing the program both in terms of costs and utility of the information for stock assessments. As a result of the review, the longline program was retained but the gillnet work was stopped. It was also decided to discontinue the mobile gear catch rate-series and to implement a synoptic survey using commercial fishing vessels in its place.

There are difficulties and benefits with these surveys. A cost-benefit analysis needs to include not only the value of the work in terms of the scientific outcomes but also in terms of improved understanding between the science community and members of the industry and acceptance of assessment results. When examined in this fashion, sentinel or collaborative surveys conducted with industry are beneficial. Some of the problems and benefits of sentinel surveys in the southern Gulf of St. Lawrence are as follows:

3.1.2 Longline and mobile gear catch rate-series

Problems	Benefits
Incomplete coverage of stock area.	Generally improved communication and understanding between fishermen and scientist
Requires constant monitoring (independent observers) to ensure that protocols are adhered to.	Additional abundance indices that can be used in stock assessments
Level of sampling can be limited.	Platforms for other studies
Incomplete coverage of planned sites.	Greater acceptance of assessment results
Over-sampling of some parameters.	Improved knowledge of local conditions or changes in fishing practices.
Socio-economic goals of projects can conflict with scientific objectives	Opportunity to explain fishery concepts
High costs	Coupling of industry and scientists abilities

3.1.3 Synoptic mobile gear surveys

Problems	Benefits
Requires monitoring (independent observers) to ensure that protocols are followed.	Generally improved communication and understanding between fishermen and scientist
Commercial vessels do not have sufficient facilities for detailed biological and oceanographic sampling	Additional abundance indices that can be used in stock assessments
Socio-economic goals of projects can conflict with scientific objectives	Platforms for other studies
Availability and retention of vessels (turnover)	Greater acceptance of assessment results
More than 1 vessel required to completely survey the area rapidly (3 weeks)	Lower costs
	Opportunity to explain fishery concepts
	Coupling of industry and scientists abilities
	Good coverage of stock distribution area

References:

Chouinard, G.A., B. Parent, K. Robichaud-Leblanc and D. Daigle. 1999. Results of the sentinel surveys for cod conducted in the southern Gulf of St. Lawrence in 1994-1998. CSAS Res. Doc. 99/24: 56 p.

3.2 Danish cooperation initiatives (Henrik Degel, DIFRES)

The Danish Institute for Fish Research (DIFRES) and the Danish Fishermen's Association had the following projects in cooperation during 2003:

Monitoring discards in Danish waters

Observers on board commercial vessels record the catches (discard and retained) for all species separately. The sampling is stratified on fishery, quarter and area. App. 400 days at sea per year covering all important fisheries which have significant discards rates.

Monitoring of the sandeel fishery

This self-sampling program includes 15 of the bigger vessels. Unsorted samples are collected to be worked up in DIFRES lab. The vessels selected for sampling cover app 25% of the total landing in the fishery.

Improving the effect of pingers in order to avoid by-catch of marine mammals in gillnet

Commercial vessels are used as platforms for trials testing different designs of pingers in order to improve the effects of the device.

Size selectivity of round fish in *Nephrops* trawl

Commercial vessels are used as platforms for trials testing different designs of gears for improved selectivity in order to avoid catching significant amount of undersized round fish.

Estimating by-catch of sea birds in gillnets

This program combines a list of information in order to combined surveys in a hot-spot which it is likely to be an area where you can expect potential problems with by-catch of sea birds. The sampling period was a year. The project includes:

- Monthly fishing with a research vessel using the same gear as the commercial gill-netters in the area.
- Private logbooks which includes records of by-catch of birds. (2 years back).
- Observer program including most gillnetters in the area.
- Special extended logbooks for most fishermen performing gillnet fishery in the area.
- Simultaneous aerial surveys for estimation of the abundance of birds in the area.

We have planned future cooperation project about:

- Elaboration of detailed logbook for particular fisheries in order to obtain reliable tuning fleets data
- Including the use of satellite data into the analyses of the behaviour of the sandeel fleet.
- Species selectivity in trawl targeting sandeel and *Nephrops*.
- Effects of lost gears doing ghost fishing.

And we have talked about projects dealing with:

- Commercial tuning fleets in Kattegat targeting sole (joint survey)
- Private logbooks from selected fishermen several years back to be used for tuning of sole in order to be able to improve the assessment within a reasonable short time.

3.3 England

3.3.1 Liaison with Fishing Industry Stakeholders in England and Wales (Colin Banister, CEFAS)

Liaison with Fishing Industry Stakeholders in England and Wales.

Links between CEFAS and the fishing industry in England and Wales in 2003/4 have included the following:

- Regional meetings through the NFFO to obtain up-to-date information on stock status prior to ICES assessment working groups

Formal meetings with industry to describe and discuss the ACFM advice

- The use of commercial vessels to carry out specific fishery surveys under the (e.g. western Channel, various fishing gear studies, studies on the distribution and abundance of western anglerfish)
- The commencement of scientific data collection on DEFRA-funded commercial fishing voyages under the DEFRA-NFFO-CEFAS Fisheries Science Partnership (see separate paragraph below)
- The collection of discard data under the EU Data Regulation programme
- Ad hoc CEFAS-industry contact and meetings in relation to specific stock assessment or fisheries management issues:
 - assessment and recovery plans for VIIe sole (use of CPUE from fishery diaries to evaluate assessment SSB trends; discussion on recovery objectives; discussion of the accuracy of fisheries data),
 - TAC uplift for western anglerfish (explanation of the assessment; justification of a TAC uplift; charter vessel surveys; discussions with ACFM),
 - meetings and demonstrations on the effectiveness of the GOV trawl as a survey gear in the CEFAS North Sea and Western groundfish surveys,

- discussion and collection of industry data relevant to the mixed fishery advice.

3.3.2 UK Fishery Investigations by the Fisheries Science Partnership

R.C.A. Bannister, J. Cotter, T. Boon and B. Harley (CEFAS, Lowestoft), and D. Bevan (NFFO).

During financial year 2003/4, the UK Department of Environment, Food and Rural Affairs (DEFRA) provided additional funds to carry out industry-led projects under the heading of the Fisheries Science Partnership (FSP). These projects used commercial fishing vessels chartered by the National Federation of Fishermen's Organisations (NFFO), and manned scientifically by CEFAS, in order to record the results of commercial fishing on specific stocks in specific areas. The sea-going aims were to demonstrate the pattern and performance of commercial fishing at locations largely determined by the vessel skippers; and to collect scientifically valid data on the catch per effort and size (and in some cases age) distribution of the principal target and by-catch species. The longer-term aim is to evaluate the potential use of these data for stock assessments purposes by comparing them with conventional research vessel survey and stock assessment data. Although the commercial fishing locations were chosen by vessel skippers as being typical of the fishery, additional stations were usually also worked away from these locations, in order to illustrate the contrasts in density between preferred locations and others. In some projects additional tasks were accommodated by mutual consent, e.g. mesh size comparisons. The projects identified by the industry and agreed with CEFAS scientists include 8 projects on regional fisheries, including North Sea saithe, cod and *Nephrops*, Channel flatfish, Western Approaches monkfish and megrim, Western cod, Irish Sea cod, and deep water species, and 2 projects on whitefish by-catch issues in the North Sea. The field projects are still in progress, and will not be completed until the end of March 2004. An interim report will be completed by July 2004.

3.3.3 Trawl Surveys Undertaken by Research Vessels and Commercial Fishing Vessels (John Cotter, CEFAS)

Introduction

This document puts forward views about the design and importance of trawl surveys undertaken with research vessels (RVs) for stock assessments and suggests how additional surveys undertaken by commercial fishing vessels (FVs) might be best used to supplement the RV surveys.

RV trawl surveys

Most trawl surveys in European CFP waters are undertaken by RVs. Such surveys serve to collect many types of data but their primary purpose is to create time--series of abundance indices for important fish species, i.e. measures of catch per unit of fishing effort (CPUE). The idea is that the abundance indices will indicate how many fish of different ages are in the stock for comparison relatively from year to year, and sometimes from region to region. For this idea to be reasonable we need:

- Trawling to be carried out in exactly the same way with the same gear every year; otherwise the comparisons would not be 'fair'.
- The RV to be the same each year since different vessels have different underwater sound signatures that may frighten fish out of the path of the trawl to varying degrees;
- The RV survey to cover the whole stock, or at least the same part of the stock each year. Results would be very variable if survey and stock were in different positions relative to each other in each year.
- So far as possible, the different age classes to be equally catchable by the RV; a small mesh cod-end is used to try to achieve this but it is known that some young fish will escape through the meshes of the trawl and that some older fish will escape by swimming ahead of it.

RV abundance indices are used in stock assessments along with official statistics on landings and effort, and, sometimes, observer data on landings and discards. The advantages of RV trawl survey abundance indices are that they are consistently collected from year to year, and they are not influenced by activities of the fishing fleet which may vary due to economic conditions, fishing regulations, capitalisation, weather, etc.

The perceived advantages of RV survey data for stock assessments, and the preference to survey whole stocks regardless of national boundaries have resulted in the establishment of geographically large-scale, internationally coordinated surveys. Such surveys, e.g. the North Sea IBTS, are now funded as priority 1 under the EC Data Collection Regulation (1639/2001). However, because of limitations on finance, these surveys were generally not designed to

survey individual fishing grounds in detail, nor in many cases could they be optimised for one species if they are also required to provide abundance indices for others with different distributions or catchabilities.

FV trawl surveys

Fishing Vessels (FVs) have been used successfully for trawl surveys, e.g. in Icelandic waters (Pálsson, O.K. *et al.* 1989. *J. Northw. Atl. Fish. Sci.*, 9: 53-72.), also for the CEFAS VIIe beam trawl survey. FVs present various advantages and disadvantages compared to RVs. They may be substantially cheaper to operate but accommodation for scientists, and perhaps fishing range may be restricted. They are good for fishing in most weathers but there is no guarantee that the same individual vessel will be available for many years into the future as is desirable for a survey vessel so that trawling may be carried out in the same way every year and with the same vessel sound signature. Even if an FV is available for a long period, it may be re-engined or otherwise modified for its commercial role so affecting comparability of abundance indices over time.

As described in the previous section CEFAS is gaining useful experience of using FVs for trawl surveys in 2003 and 2004, under the 'Fisheries Science Partnership' (FSP) which is undertaking 10 surveys of various stocks of cod, plaice and sole, monk and hake, saithe, deep-sea species, and bycatch fisheries. New finance has been used to lease FVs, each with a CEFAS scientist on board to identify and measure fish in the catches. During these surveys it has been possible to fish at many stations within each regional fishing area, compared to the more extensive but sparser coverage achievable by groundfish surveys. The first available results are now being processed in preparation for discussion with fishing industry representatives. Preliminary findings are that:

- FSP catches are spatially related in a way that cannot usually be identified in RV surveys which cover wider areas and must use fishing stations separated by much greater distances.
- Localised concentrations of fish can be seen from the FSP results. These are generally very important for commercial fishing but are seldom apparent from RV surveys.
- Limited comparisons between FSP and RV catches in the same locality and at similar times-of-year do not suggest that RVs fish with substantially different efficiencies. Figure 4 (from an FSP report in preparation).

Use of FVs for scientific purposes is not limited to the estimation of abundance indices in standardised surveys, particularly if the FV survey may have roles additional to that of contributing to stock assessments. The next section puts forward some ideas for discussion.

Suggestions for using FV surveys

1. Contributing abundance indices for all ages to assessments. The difficulties of standardisation, discussed above, must be satisfactorily dealt with if the-series is to be acceptable to a stock assessment working group. Usually, a working group asks for at least 5 years of data before including any CPUE-series in an assessment in order to have a minimal number of replicates for statistical purposes. The seasonal timing of FV surveys would not necessarily be critical but localisation of an FV survey in one regional fishery is likely to be a disadvantage for the assessment of a stock distributed over a large area. Given suitable resources, the localisation problem could be overcome by arranging that all regional fisheries for a species were covered by FV surveys.
2. Contributing abundance indices to assessments with emphasis on young fish. Best knowledge of young fish could be obtained by timing the survey to coincide with the arrival of newly catchable recruits in the fishery, and by using a relatively small-meshed trawl (given a derogation from CFP rules if necessary). Young age-groups are especially important in assessments of stocks under heavy fishing pressure because a large fraction of next year's TAC (total allowable catch) is then made up of young fish. Furthermore, numbers of youngsters are least well-known in assessments because a) there can only be one or two years of observations on the youngest groups, and b) RV survey results may provide relatively poor indices of abundance for young fish because a) they have not settled to the bottom, b) they can too easily escape the gear, or c) the seasonal timing of the RV survey is not good for young of that species. For these reasons, FV surveys that effectively register numbers of young age-groups would have special value for assessments.
3. Early warning of discarding problems. Associations between large year classes and high discarding are probably well-known to many fishers. Figure 5 shows estimated numbers of discards and retained cod by time of year for different year classes in the trawl fishery off the NE coast of England. It can be seen that discarding may approximately double in terms of numbers of fish when an exceptionally strong year class of cod is born, as happens in occasional years. The high curves in the discard panel of Fig. 5 mainly represent one-year-old fish of

the 1996 and 2001 year classes; the other, lower curves mainly represent one-year-olds of the eight other year classes from 1994. Figure 5 suggests that a special survey with a smaller-than-usual mesh net in spring could provide useful warning of large numbers of one-year-olds coming into the fishery. Co-operative action by fishers and/or fishery authorities to reduce discarding in the following 6 months appears to offer dividends in the months immediately afterwards by increasing catches of legally landable fish from the good year class. If such a strategy were thought worthwhile, FV surveys could often provide the best 'early warning' system for large year classes. RV surveys may not be well located or timed for this purpose, and observer surveys of discarding may be covering too many types of FV and gear to be able to achieve reliable forecasts of good year classes every year. Note that this suggested role of FV surveys could be combined with (2) above.

4. Study of fish distributions. Localised studies of fish distributions may provide useful biological information about a species for consideration by an assessment working group. Large-scale migrations and the effects they may have on RV abundance indices, landings and discards appear likely to be of most interest. However, fine-scale distributional information, apart from what they tell about fishing strategies, are of limited value for stock assessments mainly because the mathematical methods for utilising them are not generally available or well-established at present. A special problem arises if the spatial information is patchy, as is likely to be the case unless very substantial funding is available for the FV survey.
5. Gaining other biological information about assessed fish. In addition to information about numbers and weights of fish landed, stock assessments need to know the proportions-at-age within each -length group, and the proportions of mature fish at a given age. Such information is obtained under the EC Data Collection Regulation. FV surveys could be used to supplement the collection of age-length material – usually using otoliths marked with annual rings - but the need for trained age-readers to look at the additional material has significant resource implications. Opening fish to inspect their maturity demands less time from specialised biologists and may be more feasible. A problem arises when FV surveys only cover a small part of the total area occupied by the stock. There is no guarantee that the results for one restricted locality will provide good estimates for the whole stock. Ideally, FV surveys would cover all the main fisheries and RV surveys would cover the areas between where, despite the lack of regular fishing, a substantial proportion of the entire stock may reside. Increasing the area of stock covered by FVs would naturally increase costs significantly.
6. Study of technical measures. This is mentioned for completeness. FVs are already leased for gear trials using codend covers, parallel tows, etc. The results can be very useful to a working group trying to formulate advice on a technical measure, or as a demonstration to industry of the conservation benefits of technical measures. Reduction of discarding is often an important consideration. It is important that gear trials be conducted to a statistical plan. There is little value in fishing several tows with one net, then several with another, if conditions between the first and second part of the trials varied so as to mask the effects of changing gear. Good experimental design can minimise unwanted influences and enhance the generality of the findings. Similarly, there must be enough replication of the trials to ensure that statistically reliable results are obtained despite variable presence of fish. Gear trials intended to assess effects on catches of a relatively scarce species may be doomed to fail because too few fish are caught to give statistical reliability to the results.

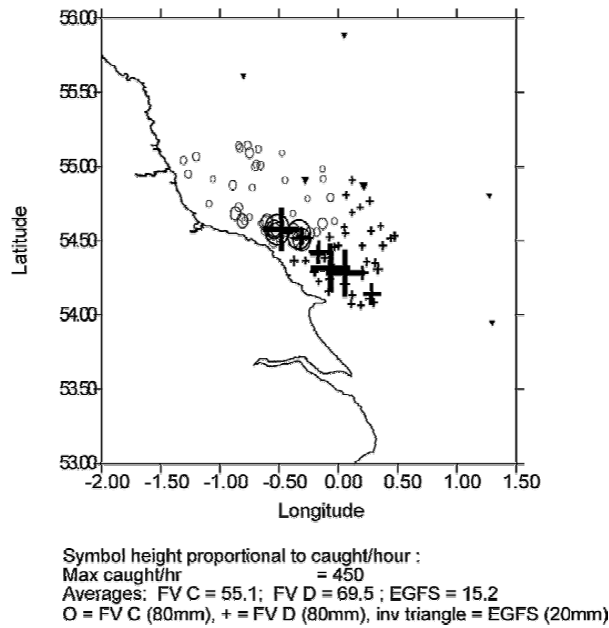


Figure 4 NE coast FSP surveys & English groundfish survey. Cod caught /hour, various codend mesh sizes. O=FV C (80mm), + = FV D (80mm), inv. triangle = EGFS 20 mm).

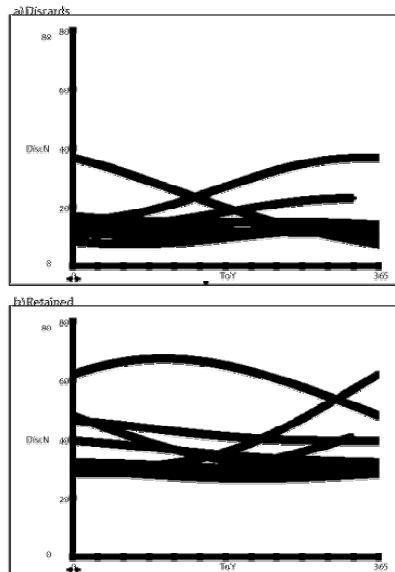


Figure 5 North Sea cod model: estimated fish per hour of trawling against time of year. The different curves represent different years. A) Discards. B) Retained fish up to 100 cm length (For draft x-axis = year, y-axis = numbers * hr⁻¹).

3.3.3.1 Proposed reporting on English and Welsh fisheries by a discard sampling team (John Cotter, CEFAS)

Introduction

2003 saw the start of long-term (EC and DEFRA) funding for discard sampling aboard English and Welsh fishing vessels. Sea-going observers are in a unique position to liaise with the fishing industry and communicate its knowledge and views to scientists, and vice versa. Such communications is currently being actively encouraged at the ICES/NSCFP Study Group on the Incorporation of Additional Information from the Fishing Industry into Fish Stock Assessments (SGFI), and by the DEFRA/NFFO Fisheries-Science Partnership Surveys. It is proposed that anecdotal

information collected at sea by discard officers employed by CEFAS, Lowestoft, should be recorded for use within the scientific community.

The proposal

CEFAS observers are based at Scarborough, Lowestoft, Weymouth, and Newlyn. The aim is to have 2 officers in each location, to permit sampling of most active vessels over 10 m in the region in accordance with the EC Data Collection Regulation (EC 1639/2001). At present the quantitative data collected at sea are transferred to a database at Lowestoft, but qualitative information, learned from conversation with skippers, crew, and owners, is not stored.

CEFAS has therefore now agreed record more of the qualitative information by briefly completing a simple debriefing form at the end of each trip. The form is at Annex 1. An example of a completed form is at Annex 2.

- It is proposed that copies of the completed forms will be held in each regional office and circulated back to skippers/owners, along with the standard feedback form detailing quantities discarded and retained etc.
- The form should also be copied to the shore-based contact in Lowestoft for use by scientists
- Reports should remain confidential and will preserve the anonymity of the records. It is not yet envisaged that the forms will be held electronically.

Trip forms will be accumulated and could be aggregated into an informal quarterly binding, which could form the basis for an edited, bound annual report providing routine information about fisheries and observer trips by coastal region, including UK vessels operating from overseas ports. Much of the text would be put together by the observers during their times ashore, and be based on their trip and quarterly reports plus routine retrievals of fisheries statistics. The aim is to achieve timely production with the minimum of overheads.

3.3.4 National Federation of Fishermen's Organisations (Doug Beveridge on behalf of NFFO)

Introduction

The UK fishing industry considers involvement of the industry in the collation and interpretation of fish stock assessments a priority. A summary of interaction with the fisheries science community on a UK and European basis is appended (Appendix I).

Moreover, there is now wide agreement that direct information from the fishery is vital to complement formal stock assessment techniques if we are to move towards an accurate and complete picture of stock status and development.

Fishermen must be brought into the heart of the assessment both in order to provide high quality data in which all may have confidence but also to break down barriers and improve confidence and transparency into the assessment and process.

It is important to make rapid progress in this but it is also has to be faced that the industry at present is preoccupied with economic survival. Requests for voluntary participation are not likely to be met with a consistent response. For this reason it is vital that funding be sources to pump-prime projects that will demonstrate the value of participating in data gathering/supply exercises. A start has already been made but unless there initiatives are supported by co-finance in the early stages their uptake may be small.

Background:

- Reduced TACs, mesh size combinations and effort control have placed “artificial” constraints upon fishing activity and distorted the catch and effort information (catch rates) essential for more accurate stock estimates.
- ICES lacks confidence in fishery dependent data (catch and effort statistics) and excludes some of the data from stock assessments.
- Research vessel survey results (inherently variable and aggregated over large geographical areas) are increasingly relied upon for stock estimates.

- Stock assessment methodology has outpaced the provision of appropriate data.
- Anecdotal evidence cannot be incorporated into digitised, statistical models.
- Fish stock estimates fail to accurately reflect the abundance of fish.

Additionally, a number of related requirements are on the horizon:

- the EU Data Collection Regulation will require additional information.
- industry requires independent, objective data to mount robust and convincing arguments.
- increasing requirement for the industry to corroborate with industry/science partnerships.
- the probable requirement for Regional Advisory Councils to develop alternative and credible fishery management plans.

Consequences:

The fishing industry will be obliged to provide additional information and will increasingly become involved with the development of credible management plans. Financial aid for projects to improve the quality of stock assessments and develop collaboration with CEFAS may be available from the EU Commission and UK agencies.

Fisheries Science Partnership

In 2003, the NFFO and CEFAS undertook a trial joint programme called the Fisheries Science Partnership. The programme comprised surveys or investigations of an agreed set of priority fish stocks by chartered commercial fishing vessels.

Background

The fishing industry alleges that the fisheries science community do not have an accurate measure of how much fish is available for capture commercially, and that commercial fishing practice provides a different view of the stocks from that obtained by scientific sampling on research vessel surveys and biological sampling of landings at the main ports. In light of this, fishery managers encouraged CEFAS Lowestoft and the National Federation of Fishermen's Organisations (NFFO) to undertake a trial joint programme called the Fisheries Science Partnership, comprising surveys or investigations of an agreed set of priority fish stocks by chartered commercial fishing vessels, during 2003/2004. Six surveys were completed by December 2003, three would undertaken during the first quarter of 2004.

Summary Objectives

- NFFO and CEFAS to identify fisheries and fish stocks representing the principal concerns of the fishing industry with regard to the monitoring, assessment or management of fish stocks.
- NFFO and CEFAS to plan when and how to execute the associated fishing surveys.
- A CEFAS scientist would accompany each trip to collect and record data on the location, quantity and biological structure (size, age and maturity) of the catch and by-catch of the key species.
- NFFO and CEFAS will analyse and interpret the scientific data collected on the trip, and complete a scientific report.
- It is intended to compare these data with those currently used in the relevant ICES assessment working groups.

Principal Output: 2004 - a joint report summarising the findings and recommendations resulting from the Partnership programme.

Programme 1: White-fish by-catch issues (SNS)

Programme 2: North Sea saithe

Programme 3: NE coast cod Programme

Programme 4: Channel sole and plaice

Programme 5: Western anglerfish & hake

Programme 6: White-fish by-catch issues (NNS)

Programme 7: Irish Sea roundfish

Programme 8: Western cod

Programme 9: Deep water species

Programme 10: Farn Deeps *Nephrops*

To enhance the dissemination of results and to consider the programmes remit, it is intended to hold regional debriefing sessions at participating fishing ports and to convene a strategic meeting to review the programme.

Fishing Intensity Surveys

Coastal developments and activities (e.g. offshore wind farms, telecomm cables etc.) are subject to Environmental Impact Assessments (EIA). Commercial consultants are engaged to interrogate the fishing industry (with mixed results), and to collate, interpret and supply the information.

However, the efficacy of these studies can be limited by the reluctance of fishermen to provide confidential data and the collation of official fisheries data at an inappropriate resolution. The NFFO intends to systematically collect and provide, on a commercial basis, fishing intensity data (activity, landings, values etc.) to developers at the scoping stage of developments.

Data Collection (FRIDGE)

Fisheries Research: Industry Data Gathering Exercise.

A proposed collaboration between the fishing industry, fisheries science community and statutory conservation bodies leading to the collection and analysis of valid and relevant fisheries dependent data. (NB In preparation)

The intention is to improve the validity and reliability of fishery dependent catch and effort data via a pilot project to develop a fishing industry based confidential, scheme to monitor catch (landings and discards) and effort.

Research Vessel Surveys

The UK and European fishing industry has long-standing concerns regarding the fishing gear used, performance and data uses of research vessel surveys.

The industry and CEFAS met, in January 2004, to discuss aspects of the fishing gear used and the overall survey design for CEFAS research vessel surveys. The focus was the ICES North Sea International Bottom Trawl Survey (IBTS) but with implications for Area VII surveys (which use a modified trawl).

This represents an initial step in reaching agreement on UK research vessel operations that have the confidence of the industry and supply scientifically valid data.

The Federation outlined a number of concerns regarding:

- i) gear design
- ii) trawl positions

- iii) the rigging of the gear (e.g. the significant gaps evident between ground rope and fishing line).
- iv) haul duration

CEFAS and the NFFO agreed to participate in following collaborative actions:

NFFO / CEFAS RESEARCH SURVEYS: JOINT ACTIONS

Research Trawls

Performance

Whilst the gear design was viewed by the industry as capable of catching fish, the rigging of the gear required further consideration. Consequently, Federation members will sail on fishing / calibration trials.

Duration

The IBTS standard tow duration is 30 minutes. The calibration cruise and the IBTS survey will repeat a selection of hauls by a parallel tow of longer duration. Data demonstrating the variance of distance, tow length and speed over ground will be sourced.

Positions

The Federation will provide additional trawling positions (approx. 6) for the August IBTS survey. These stations will provide the first of time-series of data reflecting areas of interest to commercial operations. The Federation will also request, via the North Sea Commission Fisheries Partnership, the proposal be expanded to all other IBTS research vessels.

Environmental Factors

Industry concerns regarding variability of results due to time, tide, season, water clarity etc. were considered. Consequently, it is intended to conduct a statistical analysis of recent and historic data to identify potential trends and variance.

Comparative Trials

Funding, possibly via the industry/science partnership, will be sought to allow commercial tows in tandem with research vessel surveys.

Commercial Catch Data

The Federation will consider the prospect of expanding the annual Fishermen's Fish Stock Survey to obtain non-attributable catch and effort data.

3.4 Germany: Improved communication in Baltic fishery and science (Cornelius Hammer, Fed. Res. Centre for Fisheries)

In 2003 Germany the Federal Research Centre for Fisheries has taken the initiative to further develop and improve the relationships with the Fishery, namely the Baltic Sea fishery. The Institute for Baltic Sea Fisheries (IOR) initiated "round table" discussions to which all fishermen and representatives of the fishery were invited. By the end of 2003 three meetings had taken place. The set-up was deliberately chosen to be very informal. There were no agenda or protocols as such for the meetings. The only explicitly stated objective was to improve communication and to take it beyond that achieved by occasional official meetings. It was the articulated aim that anyone was allowed to say anything he or she felt needed to be said, that nothing would be reported or would have any negative consequences. The Chatham House rules were applied and agreed by all parties.

In spite of initial modest expectations, the first meeting turned out to be highly productive. The burning issue was the adaptation of the fishery rules and the enforced nets in the Baltic Sea to minimize discards of cod. The fishery made suggestions about how to design a BACOMA-net which would be less prone to manipulation and announced that it would be in favour of using it, provided the mesh size in the BACOMA window was reduced from 120 mm to 110 mm, which is the only way to catch cod of the legal minimum landing size. For the previously enforced 120 mm BACOMA-window the catches of cod were practically zero. As a consequence of this the fishery chose to use the legal alternative net with diamond meshes and bigger cod-end mesh size. However, due to the employment of extra-stiff net material the selection properties of the nets were reduced so much that even small herring were retained in the net. In a common initiative between Sweden, Denmark and Germany experiments were organised and conducted during the summer of 2003 on the selection properties of the BACOMA-110mm net on commercial cutters. The results were analysed and

presented to a working group of the International Baltic Sea Fisheries Convention (IBSFC) and the European Commission in summer. As a result the rules were changed at the IBSFC-meeting in June and eventually endorsed at the EU-IBSFC-meeting in October, to the effect that the mesh size in the BACOMA-window was reduced from 120 mm to 110 mm and the alternative net was banned in the Community waters of the Baltic Sea.

The Baltic fishery was pleased with these developments and regulations. During the round-tables talks the fishery proposed to specify the BACOMA net to make it less likely and more difficult to manipulate the net. It was felt that this could be a good case for integrating the fishery into the process, since the fishermen know best how to manipulate the net. So, why not let them making the proposals? This was perceived as a good approach.

As a next step the fishermen of the Baltic Sea were invited to come up with a concept of how to manage real time closures for the Baltic Sea and how to identify the areas in a combined effort between fishery and fishery science. This initiative was published in a German fishermen's journal and a journal for the fish industry and fishery science in German and English. A request for contributions was made public by the Baltic Fishermen Association. However, the only input from the fishery came from the one fishermen who made the original suggestion to involve the fishery.

The common and combined effort from the fishery science community together with the fishery to have the official BACOMA-regulations changed and adapted were perceived by all participants as a great success and as an example that mutual understanding and co-operation are possible. It was admitted by many fishermen that they benefited from the results directly. However, in spite of this the fishermen at the same time blame fishery biologists for the many restrictions which are imposed on them and an increasing number of them refuse to take scientists on board for sampling.

In conclusion, the situation has become more difficult with the fishermen in 2003, the relationships have deteriorated. At the same time the communication and relationships with the fishery representatives (cutter associations etc.) have significantly improved due to the "round table"-initiative.

3.5 Ireland (John Molloy, Marine Institute, Galway). Co-operation between Irish Marine Institute and fishing industry (pelagic industry)

Information from Pelagic Fisheries that can be used in stock assessments

In Ireland the formation of Pelagic Management Committees has presented an opportunity whereby much additional information can be obtained that will prove useful in the assessment of the stocks. This type of information is summarized briefly for the herring and mackerel and horse mackerel fisheries.

3.5.1 Herring fisheries

Description of resource

It is considered essential that a proper management plan for any herring fishery should be based on a comprehensive understanding of the resource. This understanding includes the normal information on the status of the resource as provided by the ICES Working Groups but also an understanding of the location and the distribution of the stock throughout the various phases of its life cycle. The latter type of information can largely be provided by fishermen. This has been done in the case of one of the important Irish herring fisheries (Divs. VIaS and VIIb) when a workshop was held between fishermen and scientists. As a result of this the spawning grounds, the nursery grounds, the over wintering areas and seasonal migrations have been described and documented. This data is considered essential for real time management of the stock.

Trends in seasonal distribution and abundance of the stock

In the Irish herring fisheries there is considerable information available on the distribution of the stocks during the main fishing seasons. However, the location of the stocks throughout the remainder of the year is not known with any degree of certainty. Information on this can be readily collected by organising "white fish" skippers to collect records of their herring by catch and of herring "marks". This type of information, if consistently collected on a long-term basis, could be used to examine the trends and location in distribution of the stock and could also be used to form conclusions on changes in abundance.

Enhancement of biological sampling programmes

A number of processors have, under the supervision of scientific staff, collected biological information (length distributions) of the catches being processed in their factories. This data has been used in real time management of the stock and has also been used to enhance the normal biological sampling programmes.

3.5.2 Mini acoustic surveys

The use of modern technology now means that it is possible for commercial vessels to be quickly equipped with quantitative data loggers that can be used to obtain biomass estimates of portions of the stock. This type of procedure has long been in use in Canada and the USA. Mini acoustic surveys of this type have been carried out in the Celtic Sea by commercial vessels in January 2004, under the supervision of scientists from the Marine Institute and it is intended that the results will be presented at the ICES Herring Working Group. These mini surveys have been organised by the management Committee for the area and were carried out by normal commercial vessels.

3.5.3 Mackerel fisheries

Egg surveys for mackerel and horse mackerel have been organised and funded by one Management Committee and were successfully carried out by normal commercial pelagic vessels with Marine Institute scientists. The information has been submitted and accepted by the Mackerel Assessment Working Group and incorporated into the assessment process. It is also an accepted practice that vessels engaged in the mackerel fishery and landing their catches into Norway must provide random weight distributions of their catches before they can be sold. This data would be another valuable source of biological data and could be included with a little effort in the sampling programmes.

Use of the data collected

The above are examples of how fishermen can collect data that can be used in the improvement of the assessments of Pelagic Stocks. It is recognized that Ireland has a unique advantage because the herring fisheries are targeted fisheries with little by catch and Ireland controls most of the overall TAC. It is suggested that the results of the programmes should be presented to the ICES assessment working groups each year in a special working document submitted on behalf or by the fishermen. The discussion on the working document should be carefully recorded and communicated back to the industry. If the data has been used in the assessment then the effects that this has had should be described. If it is not used, then the reasons why it has been rejected should also be described. The problem of course is to decide if the data provided by the industry gives the better estimate of the state of the stock than the conventional assessments. If the evidence is conflicting it will be difficult to reach a decision. In any event the opinions based on information provided by the industry should be included in the assessment report and should be communicated to managers as a matter of routine.

3.6 Netherlands: Progress and cooperation between science and fishers in 2003 (Fenneke Brocken, Floor Quirijns, Wim van Densen)

All activities are organised within the framework of the F-project. The overall objective of this project is to improve mutual understanding between fishermen, scientists and fisheries managers, by stimulating communication and collaboration between fishermen and fisheries scientists. The project focuses on the beam trawl fishery for plaice and sole in the North Sea and started in 2002. It is funded by the Dutch government in collaboration with the fishing industry and carried out by the Netherlands Institute for Fisheries Research (RIVO). The Steering Committee comprises representatives of the fishing industry (Fish Product Board and Fishermen Organisations) and the Directorate of Fisheries of the Ministry of Agriculture, Nature Management and Fisheries (LNV). The projects consist of three interrelated work packages: 1. Improvement of stock assessment of plaice and sole, 2. Effective use of fisheries data, 3. Communication.

Improvement of stock assessment of plaice and sole

A report was produced on ICES short-term forecasts of North Sea plaice and sole as dependent on the "current year" assumption (Kraak, Pastoors & Rijnsdorp 2003).

Every year ICES Working Groups produce assessments of fish stocks as well as forecasts for the future of these stocks, which serve as a basis for advice. The short-term forecasts consist of a forward projection based on estimates of the numbers-at-age at the beginning of the current year. The weights-at-age and the relative exploitation-at-age are usually assumed to equal the average of the last three years. An assumption has to be made about the catch of the current year. Usually it is assumed that the catch of the current year corresponds to the catch that would be taken under a *status quo* F (that is the F estimate of the previous year). The alternative assumption is that the catch taken would equal the TAC that was set for the current year. From the study it was concluded that in order to minimise the prediction error in the short-term forecast, given the uncertainty and bias in the VPA, the *status quo* F assumption should be preferred. Also the

quality of the outcome of the VPA itself plays a large role in the quality of the forecast. Further study of the uncertainty and bias in the stock assessment, as planned in the F-project, is clearly necessary.

Further studies concentrated on the process and extent of discarding (van Keeken *et al.* in prep.). In the WGNSSK- and in the ACFM-report 2003 it is mentioned that discarding caused the strong 1996 year class of plaice to be still less abundant in exploited stock in later years. For that reason the predicted recovery of the spawning stock failed to occur. Reasons for this discarding are sought amongst others in the more offshore migration of 2-year old plaice, becoming more vulnerable for discarding by the beam trawlers.

Effective use of fisheries data

Fishermen participating in the so-called F-fleet continued to report on their catch rates for plaice and sole. In the course of 2003 technical and logistic problems became more easily to overcome. It turned out to be more efficient to discuss the maps with catch rates plotted and the graphed time-series with small groups of fishermen in their own harbour. For that purpose visits were made to individual harbours and the discussion on the spatial and temporal patterns in catch rates combined with that on the ultimate use of the data in stock assessment and management. Fishermen themselves, also fishermen from the F-fleet, are inclined to cast doubt on the indicative value of catch rates for developments in stock size. Many state that the TAC-constraint for plaice is an incentive to stay away from fishing grounds with higher abundance of plaice. The resulting fishing behaviour would be non-random and would cause progressively lower catch rates for the same stock size. This topic is discussed at length and the debate is still going on (see also under 3). Data analysis showed that the effect of the TAC-constraint in affecting catch rates in the same ICES-quadrant was limited. Ways are sought now for making corrections in catch data to make them more indicative for developments in the stock.

The fishermen's data on catch rates in the F-fleet were not used by the WGNSSK 2003 for calibration of model output in the stock assessment for plaice. The arguments of the WGNSSK for not doing so (no clear index area identified for standardisation and averaging, no break-down by year classes available) were not easily understood by the fishermen. Further efforts in explaining and discussing this matter are necessary.

Communication

On the whole communication between fishermen and scientists improved but the communication worsened considerably after the presentation of the ACFM-advice at the end of October 2003. Until then standardisation of catch rates was the major topic for discussion.

The ACFM-report contained a number of topics that were difficult for fishermen to understand or accept. : a. The new data --series for the size of the spawning stock biomass (SSB) of plaice showed by comparison with earlier assessments that this biomass was consistently over-estimated over the last 10-15 years. The "new truth" on developments and actual size of SSB implied a correction for the 2003 SSB of more than 100,000 tonnes downwards, with SSB varying below SSB_{lim} for years already. The precautionary approach aimed at keeping SSB above 210,000 tonnes thus turned out to be ineffective, b. The advice for plaice was difficult for them to understand in direct quantitative terms (a reduction of F by 40% relative to the F in 2002), c. The linkage of the TACs for plaice and sole with the advice for a 0-catch for the endangered cod was poorly understood. The ACFM-report advised 0-catch without any bycatch of cod but the report at the same time contained information that no fishery on the North Sea could abstain from taking cod as bycatch. This very cod was the same species for which large downward adjustments in the time --series had to be made in late 2000. Fishermen found the ACFM-advice in 2003 vague and interpreted it as an indirect way of curtailing the fleet.

All efforts must be made now not only to explain management procedures and the way in which assessments are made, limit reference points are set and advice is formulated, but also how systematic errors in the assessments arise and how to improve on that situation. One way to go in this compounding situation is first to emphasize the role separation between governmental managers, independent research institutes and fishermen as civilians. The management is the one responsible for showing its civilians in a transparent manner how effective management measures were, to reach the management objectives set (accountability). And also how uncertainty and bias was formally handled. Successively, the shortcomings in the assessments could then be highlighted, including the errors due to poor data quality and availability on fleet-specific catch rates, catch composition and discarding.

Another way to go is to concentrate on catch rates when discussing developments in the stock and management options with fishermen. Either time --series of catch rates are only used as calibration --series in traditional stock assessments. Or they are used as well as a starting point in searching for alternative ways of fisheries management, based on indicators like catch rates, catch composition, community characteristics etc.

3.7 Scotland

3.7.1 Co-operation between FRS and the Fishing Industry 2003 (Anne McLay, FRS Scotland)

3.7.2 Gear Technology – Liaison with industry on EU gear development

In 2002 the EU funded a three year project, entitled RECOVERY, which involves gear technologists and net makers from Norway, England, Denmark, Belgium, Northern Ireland and the Netherlands. The objective is to modify existing gears, otter, beam and *Nephrops* trawls so as to reduce the capture of cod whilst maintaining fishing opportunities for other species such as haddock and flatfish. The Dutch and Belgium partners will focus on the beam trawl, England and Northern Ireland on the *Nephrops* trawl while Norway, Scotland and Denmark will concentrate on the otter trawl. The gear designs will minimise the losses (if any) of other target species and the economic feasibility of the new designs will also be monitored.

From an early stage, project partners realised that the expertise of commercial net makers and fishermen was essential, and national liaison meetings are held on a regular basis. Relevant fishermen's associations are invited to nominate skippers to attend. Two such meetings were held in 2003. The first in Aberdeen in July which was attended by five representatives (of which four were skippers) from the main fishermen's associations involved in the North Sea whitefish fisheries, plus two Scottish net makers. The second, which took place in December in Hull, to look at model gears in the flume tank, was attended by five skippers and two net makers, along with scientists from participating institutes and a Danish net maker. Feedback from these liaison group meetings is actively encouraged and is used in making key decisions as the project progresses. The liaison groups are seen as an important way of making sure that industry views are fed into the process of development of selective gears for stock conservation purposes.

Survey of gears used by the Scottish fishing industry

FRS continues to collect and update information on the gears used by Scottish fishermen through survey questionnaires. These are completed by skippers, or by FRS staff in consultation with skippers. The questionnaire (Appendix 2) asks for details of cod ends, and other information to identify which fleet vessels belong to, whitefish, single boat trawl, pair trawl, pair seine *Nephrops* twin trawl etc. This provides essential baseline information against which to assess the effects of further technical changes.

Annual acoustic survey of west of Scotland herring

In 2003, as in previous years, FRS chartered a commercial fishing vessel, a pelagic trawler, to carry out an acoustic survey on the west coast of Scotland. The survey is part of the International North Sea Herring Acoustic Survey (INNSHA) which takes place in July each year and involves six other (research) vessels and covers the whole of the North Sea and its north western approaches. The aim of the survey is to provide an age disaggregated abundance index and associated biological parameters (mean weight-at-age in the stock and maturity ogive) for the west of Scotland herring stock.

Several months prior to the survey vessels are invitations to tender are sent to appropriate authorities. Vessels must be capable of pelagic stern trawling have a track record for fishing for herring, have an experienced skipper and crew and trawling facilities, be capable of deploying a towed body housing an acoustic transducer and capable of accommodating a team of up to six scientists.

The basic premise for the use of a commercial vessel is the requirement for a large ocean going vessel at a time when FRV Scotia is occupied with the acoustic survey in the North Sea. However, experience has shown that the survey provides an excellent opportunity for the transfer of knowledge between the fishing and scientific communities. From FRS' point of view access is gained to a state of the art fishing vessel with a motivated and skilled skipper and crew. Fishing operations tend to be quicker and less problematic as compared to equivalent operations on research vessels. Working on a fishing vessel provides scientists with insights into modern fishing techniques and identification of echo traces, and sheds light on local distribution characteristics and fish movements. The industry also learns more about the methods scientists use to determine the population parameters which are used in assessments and affect quotas. There is no evidence that using a commercial vessel compromises the quality of data obtained. The survey has produced a reasonable time --series essential to the assessment of the stock and is a good example of science industry co-operation.

Tally book and GPS logger work in Scotland

During 1999 an EU funded study was conducted in the Clyde sea area, investigating the micro-scale mapping of fishing effort and landings in the Clyde *Nephrops* trawler fleet. The project was coordinated by the University Marine Biological Station Millport (UMBSM), and FRS was a partner. The work involved skippers filling in confidential tally books on daily landings, and vessels carrying GPS units which recorded vessel locations at 10 minute intervals. The vessel location information was used to estimate vessel speed, and from discussions with skippers, certain speed ranges

were interpreted as fishing, therefore providing accurate track information for fishing tows conducted. The track information was used in conjunction with the tally books to provide maps of catch rates and removals. The Clyde Fishermen's Association was very supportive of the work, which built on previous good co-operation between themselves and UMBSM.

The project was repeated in 2000, with data collected from a larger component of the Clyde *Nephrops* fleet, and a preliminary study also conducted at the Fladen Ground, investigating the potential of the approach for more offshore fisheries. This work was also funded as an EU study project, but the work at the Fladen was augmented by PESCA funding, providing tally books to a greater number of vessels. The work in both the Clyde and North Sea benefited from good co-operation from the fishing industry. The work was considered successful, and some of the data collected in the North Sea was used to examine the extent of linkage between cod and *Nephrops* fisheries.

FRS started a further similar study in 2003. This is funded by SEERAD and builds on the earlier projects and will concentrate in the North Sea. **The aim is to investigate the effects of fishing gear and vessel characteristics on fishing capacity, and the relationship between fishing effort and fishing mortality.** Data collection started early in 2004 and will continue through to the end of 2005. The work will include studies of both the Scottish mixed demersal and pelagic fleets operating in the North Sea, and may be extended if an EU funding proposal is successful. The demersal component of the work will involve fitting 30 GPS loggers to vessels fishing in inshore and offshore areas of the North Sea, and by transferring loggers between vessels, aims to collect information from 50 – 60 vessels each year. Each vessel involved in the scheme will be issued with a tally book to record landings on a haul by haul basis. Work in the first year will concentrate on the *Nephrops* fisheries at the Fladen (25 loggers) and Firth of Forth (5 loggers), but during the second year it is hoped to target more vessels fishing for whitefish. The pelagic component of the work will collect data from 5 vessels targeting herring and mackerel in the North Sea. Vessels in both aspects of the work will be asked to provide details of the gear and vessel characteristics. FRS will also conduct some charters to measure gear parameters in the demersal sector.

Observer programme

Despite difficult circumstances prevailing over the past year, fishing skippers have continued to co-operate with FRS in its observer / discard sampling programme which involves sampling on board demersal, pelagic and *Nephrops* fishing vessels. This programme provides information on the quantities and age structure fish discarded which is used in some stock assessments. FRS have also been looking at data treatment and are developing new methods to reduce the bias and determine precision of raised estimates.

Meetings with industry

Demersal industry briefings

Staff at FRS meet regularly with the representatives of national fishermen's federations and associations (SFF, FAL, SWFPA and others), fish producer organisations and other sectors of the fishing and processing industries to discuss stock assessments and management recommendations. These meetings take place before ICES assessment working group meetings and pre and post ACFM, and provide an opportunity for fishermen to put forward their views about the state of the stocks and to provide information about recent developments in the fishing industry. FRS hosted ca. 12 such half-day meetings held in 2003. Meetings with other stakeholder groups including, the Cod Crusaders, Shetland SoS, and various NGOs were also conducted.

Pelagic and shellfish industry briefings

Similar briefing and liaison meetings (3-4 per year) take place with representatives from the pelagic industry including the Herring Buyers Association, Scottish Pelagic Fishermen's Association and FRS staff attend the SFIA Pelagic Advisory Meeting. Discussions cover the state of the stocks, management measures and further co-operation and information exchange.

Other *ad hoc* meetings with elements of the shellfish industry also take place, usually away from Aberdeen. Typically, an evening or weekend session is organised in a location likely to facilitate attendance by as many fishermen as possible. Recent events include briefings of shellfish interests in the Outer Hebrides, the Clyde Fishermen's Association and Solway Firth cockle fishermen who are in the process of developing a Regulating Order for managing their local stock.

3.7.3 North Sea Stock Survey (Sue Marrs, North Atlantic Fisheries College, Shetland and Mette Bertelsen, ICES)

In 2003, SGFI made the request to ICES that the results from the North Sea Stocks Survey (the Fishers' Survey) should be evaluated more fully and that the results should be compared with research vessel surveys and stock assessments. This should be done with an aim of recommending how to proceed and how to improve the quality and utility of such

questionnaires in the future. At the North Sea Commission Fisheries Partnership (NSCFP) meeting held during October 2003 in Denmark, this request was repeated and was consequently put on the agenda at this year's SGFI meeting.

Survey Layout

2003 was the second year that a survey, coordinated by the NSCFP, of the views of North Sea fishermen on the state of eight main demersal species, took place in its current form. The aim of the survey was to collate the views of fishermen who take part in the North Sea demersal fisheries so that their knowledge could be incorporated into the assessment of the state of the North Sea stocks.

Questionnaires, where skippers were asked to compare features of the state of eight stocks to the same period in the previous year (i.e. January – June), were distributed in July/August 2003. Fishermen were not required to answer questions on all of the species, but only to comment on those species for which they had direct, recent experience. To allow comparisons between years the questionnaire remained broadly similar to that in 2002, however in the light of experience gained in that first survey it was necessary that some changes be made.

The 2003 survey comprised four sections. The first section asked for details of the fishing vessel and the main type of gear used. The next section formed the main part of the questionnaire with questions relating to the state of eight demersal stocks in the North Sea (cod, haddock, whiting, saithe, monkfish, *Nephrops*, sole and plaice). Skippers were asked to compare the state of their catch in January to June 2003 with the same period in 2002. For the purpose of the survey the North Sea was subdivided into zones based on the ICES statistical rectangles, but without cutting through fishing grounds. Where a skipper indicated that he fished in more than one zone, his opinions were taken to apply to all the zones in which he fished. A third section, added in 2003, asked for details of the financial state of the respondent. Finally, respondents were given the opportunity to add any additional comments that they felt to be important.

Fishermen's representatives from each state undertook distribution of the questionnaires. Methods of distribution varied between countries with some instigating a mail drop to members of the national association and others publishing the questionnaire in the relevant industry journal. Anonymity of all data supplied was assured.

A preliminary synopsis of responses to the questions on the state of the stocks by area (but not by vessel or gear type) was made available to ICES on 9th September 2003, and the results were incorporated in the 2003 ACFM report. That process is reported in the following section.

Overall the number of responses was similar to the survey in 2002, with 327 completed questionnaires being received in 2003. Responses were received from Belgium, Denmark, England, Netherlands, Scotland and Sweden (Figure 6). There was a decrease in the numbers (Figure 7) who responded to the questions on cod, haddock and plaice, and an increase in the numbers for monkfish; responses for haddock, saithe, *Nephrops* and sole were broadly similar between the two years.

Evaluation of the Survey

The most pressing question for SGFI to consider was whether the survey is of value and whether it should continue. This is a critical stage for the survey; with two years data collected it could be tempting to resist changes that may jeopardise the time-series of data so far. However, it may be that on reflection improvements can be made that will be to the long-term benefit of the programme. It is recommended however, that the format adopted in 2004 should be the definitive one.

The purpose of the survey is to have more stakeholder involvement in the assessment/advisory process and to make sure that the surveys provide qualitative data which can be compared with the results of assessments.

The questionnaire itself is simple in design, a deliberate strategy to encourage high returns, but cannot account for the subjectivity in the answers, which may affect the overall credibility of the survey. This is a problem that should be considered when evaluating the results from these surveys and account should be taken of the fact that the respondents are stakeholders who have a direct interest in the outcome of the survey and stock trends. One also has to consider whether the answers represent the opinions among all fishers or if there are differences in response rates between fleet segments, countries etc. e.g. more answers from fishers from larger boats. This will be addressed in future years, where it is intended that the results are collated by vessel size and gear type prior to start of the North Sea Demersal Working Group (WGNSSK) meeting.

The value of the survey results is still somewhat limited at this point because the time-series are still short but with this being ongoing the value will of course increase over time; it will be possible to compare data to survey (index) data

when there is a longer time --series. However, even with this codicil, it was demonstrated to SGFI that the perceptions of the state of the stock by the responding fishermen were broadly in agreement with the output of analytical assessments by WGNSSK (Figure 8).

The survey was found useful and informative by ICES and is being used in a descriptive way in the ACFM report. An example of tables, figures and text that were included for the North Sea cod stock in the ACFM 2003 report is included in this report. The preliminary report from the survey in 2003 was finalised at the start of the WGNSSK meeting. However, in autumn 2003 the workload for ACFM was very heavy because the form of advice was changed to be given for fisheries instead of being stock based as in previous years. The timing and the workload in 2003 were therefore not optimal for WGNSSK to give the survey the full attention that it deserved. It is recommended that the results will be available at an earlier stage in 2004.

Question Formats

The questionnaire asks the respondents to compare the abundance of species in relation to the same period in the previous year. This becomes conceptually difficult to interpret when a number of years data are being analysed, however it should be noted that the fishermen are not supplying data in absolute values, but in trends and data should be considered in relation to the previous year(s) results so that trends can be identified.

The 2003 questionnaire included questions on abundance, size range, discards, distribution and financial circumstances. The questions on abundance, size range and financial circumstances were considered by most of the steering group to work well. Although it was felt that the format of the question on discarding worked, there were three key factors in addition to the year class strength that could be the cause of changes in discards, such as quota limitation, technical measures or no fish caught to discard. It was agreed that a second question in the discards section to determine this would be of value. It was felt that the question on species distribution was ambiguous, mainly due to slight differences in the meaning of translations in different languages, and data generated from this question were not analysed. It was agreed that this question should be reappraised in the future. Scientists from ICES noted that the size question could also have been ambiguous as it was not clear whether the question referred to the size of the fish, or the size of the catch.

It was also noted by ICES that it was not entirely clear if the responses on size range were illustrating what they were intended to. For the category 'size range', the responses for 'mostly large' could accidentally be showing percentage of responses from gill-netters instead and percent responses of 'mostly small' could in reality be percent responses returned from beam trawler fishers (Figure 9). In other words, there is a risk that the size range plot could instead be showing the percentage of responses by gear type. During the discussion it was observed that subsequent more detailed analysis of the data supported this view to a certain extent and ***it was agreed that in future the full analysis of the data by gear type and vessel size should be made available before WGNSSK.***

At the third consultation meeting of the North Sea Commission Fisheries Partnership in October it was suggested that qualitative options such as 'slightly more' and 'slightly less' should be quantified in some manner; a scale of 1-10 was suggested. Whilst this would be of benefit to those analysing the data, very specific and carefully constructed instructions would need to be provided to those completing the form as to the meaning of this scale. There is a real danger that although such a change would generate pseudo-data that would be easy for scientists to evaluate, it may not in fact confer greater precision – e.g. one respondent's 5 may be equivalent to another's 8. To circumvent this, it was suggested that it might be more valuable to give a quantitative value to the data once the results have been collated, however, after discussion it was agreed that ***SGFI should ask the ICES Methods Working Group (WGMG) consider the issue of what information/data should be requested and what is needed to be able to compare the data (responses) in a quantitative way.***

The strategy of weighting responses according to whether the species was a target species or a by-catch species was controversial. The purpose of this question was to attempt to reduce the weight of an opinion expressed for a species of which the respondent did not have much experience. The value of this question very much dependent on the behaviour of the national fleets, with some countries having fisheries that are directed to specific species, whilst others countries conduct a more mixed fishery. This question may be resolved by assuming that a section will not be completed if the species is of minor importance to the respondent. The comments section is very valuable as it allows fishermen the opportunity to raise issues that cannot be addressed in the simple questions about specific species. Although the responses in this section were wide-ranging the inclusion of the section has two major benefits: 1) the opportunity to vent opinions or raise specific issues may encourage more responses than a straightforward restrictive questionnaire would; 2) because the fishing fleets are in regular contact with the sea, it is likely that the fishermen will be the first to notice any paradigm shift in the North Sea and the comments section may prove to function as a mechanism whereby causes for concern (e.g. species change or advent of disease) can be investigated more rapidly. Following on from the fact that a number of respondents in the 2003 survey made reference to environmental factors affecting the fishing, the

steering group has discussed the potential of including an opportunity for observations specifically related to environmental factors to be recorded in subsequent questionnaires. In addition, accounts of catches of unusual species could indicate possible climatic changes.

Timing and Reference Period

The timing of the study should be reviewed. The deadline for submissions in 2003 was 1st August. Databases were received for analysis between 20th August and 2nd September, which was a lot of work for those who sent their data in early. In practise, this left 5 working days to collate the data, check, undertake a preliminary analysis and to produce the preliminary report by 9th September. As indicated earlier even this was late for WGNSSK and ICES have indicated that in future they would prefer to receive the data two weeks before the WG meeting, this would not be possible in the current timescale. It would be beneficial to ICES for the full analysis of the data by vessel size and gear type to be available prior to WGNSSK; this will require a longer lead in time.

The reference period should be changed from 6 to 12 months. But this should be noted in comparisons with previous years, so like with other modifications this should attempt not to jeopardise the time-series of information so far.

Effects of Area

Differences in the size of the area may have an affect on the results of the survey. However this matter would be difficult to resolve on a species by species basis, as the area of fishing ground in each area will also differ, as each survey area is not uniformly covered by each species. There will also be differences in terms of the 'importance' of each area for each species and this will likely change with time. Any weighting exercise may bring in more problems that it alleviates, especially as we have an imperfect knowledge of the distribution of fishing effort across the North Sea. At best it may be worthwhile noting that this may have an effect without taking any action on it. ICES noted that there would be more information if there were more stratification of the areas and the information could then be compared at smaller spatial scale.

Return rates

There are marked differences in questionnaire return rates from the countries that fish in the North Sea, from 0% to about 40%. A higher response rate is obviously desirable and it can therefore be questioned whether the results fully represent the perceptions of all fishers in the North Sea. *Efforts should be made by all countries involved to increase return rates.* In the current analysis no account has been taken of the country of origin of respondents, other than to note what this is. It should be borne in mind that the survey in itself is fairly simplistic and perhaps the best approach is also to keep the analysis simple and not to overly manipulate the data, which we know to have limitations.

Trust of Fishermen

Extreme care must be taken to retain the anonymity of the participating fishermen, both at the individual and sectorial level. Prompt feedback both of the results and how the data have been utilised are also important to maintain interest and confidence.

Data Storage

Data from each years survey will be retained centrally by the NSFCP to ensure long-term integrity of the data. These data sets will be available on request.

Other information that could be useful for accounting for trends in fishery/CPUE

It was noted that changes in catches do not only reflect changes in the abundance of species, but may reflect changes in fishing strategy compared to the previous year such as target species, fishing grounds and gear changes. It may therefore be beneficial to ask fishermen questions on these topics.

In addition to the current survey, it could also be useful to undertake a more detailed survey where data were selectively sampled from selected fishers to compare perception of stocks, it could be useful to relate current perception to perception of 10 years ago and to compare fishing areas for the species with 10 years ago – how abundant is a stock compared to 10 years ago. Although it was noted during discussion that this in itself could be susceptible to biases, especially in relation to financial situation.

Concluding Remarks

The SGFI recommended that the survey should continue in 2004

One important point that was discussed but not resolved was, what was to be done if the results of the survey were in conflict with the output of the stock assessments e.g. if the output of the XSA showed a decrease in SSB and all the fishers in the survey reported that the stock abundance had gone up? It must be kept in mind that assessments usually

relate only to the SSB, whereas the fishers experience is a reflection of the whole fishable stock, which is not necessarily the same.

In conclusion, for 2003, the perception of the trends in the North Sea stocks of the fishers and of ICES WGSSK was basically the same, an observation that indicates that the disagreement between the scientists and the industry relates to management advice and the estimates of actual biomass, rather than to differences in perception of stock development.

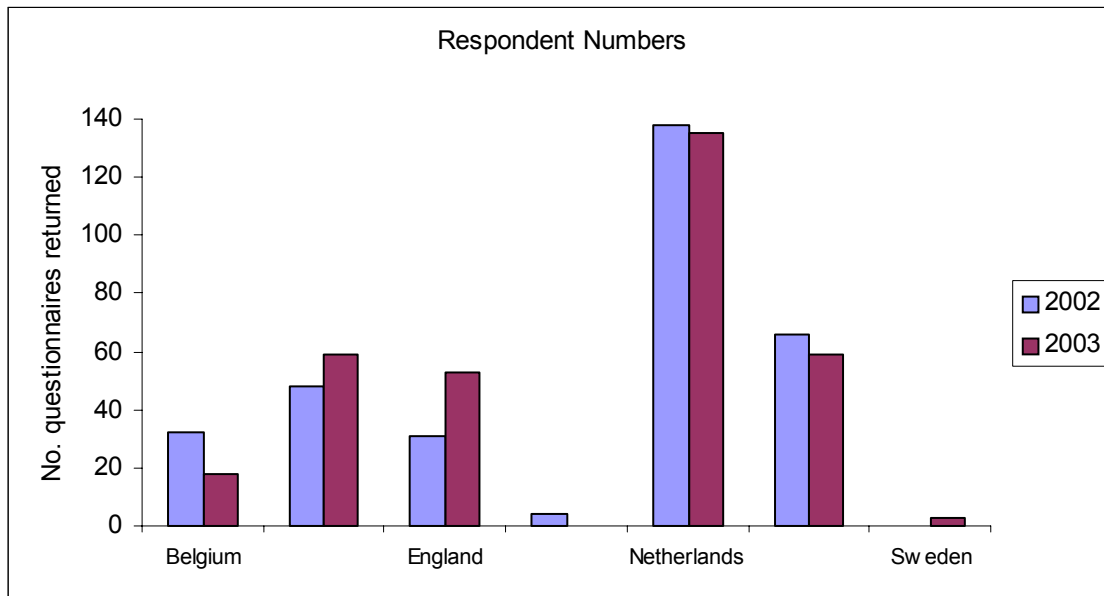


Figure 6 Numbers of respondents to the 2002 & 2003 stock surveys by country of registration.

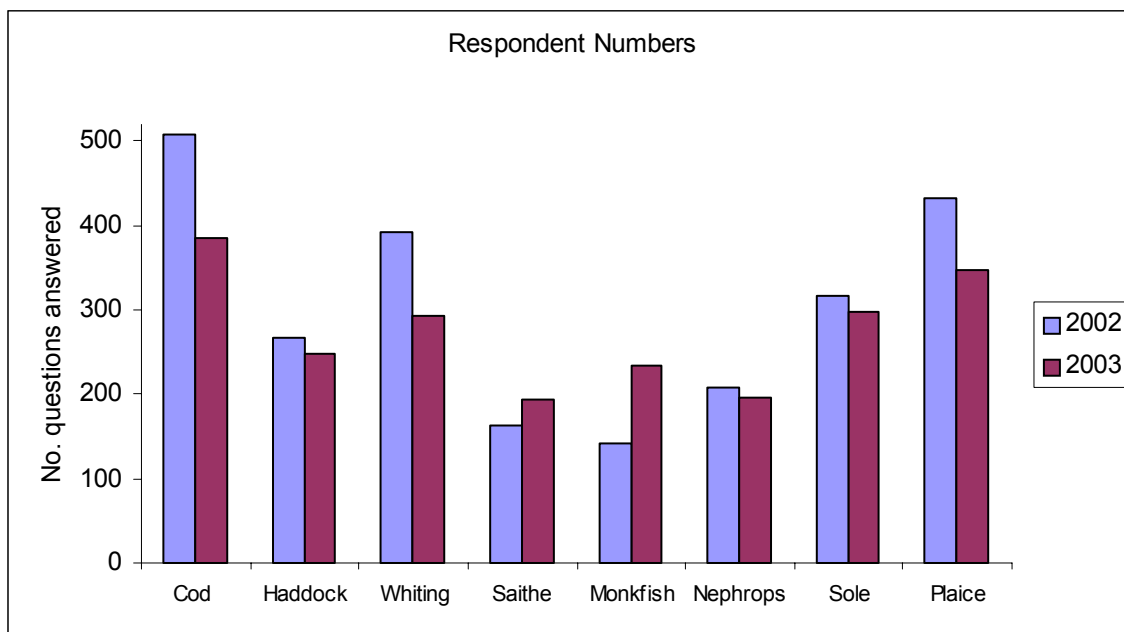


Figure 7 Numbers of respondents for each species in the 2002 & 2003 North Sea Stock Surveys. Note one questionnaire will have responses on more than one species.

	Abundance (From Fisher's Survey)	SSB (from ACFM)	Small in catches (from Fisher's Survey)	Recruitment (from ACFM)
Cod	↑	↑	↓	↓
Haddock	↑	↑	↓	-
Whiting	↑	-	→	-
Saithe	↑	↑	→	-
Sole	→	↘	→	→
Plaice	→	→	→	→
Angler.	→	→	→	→

Figure 8 Comparison between the fishermen's perceptions generated via the North Sea Stock Survey and those of the ICES WG/ACFM scientists from their standard plots (see Figure 5). Abundance from the fishers' survey has been compared with trend in spawning stock biomass. Relative numbers of small fish in comparison to the previous year has been compared with trend in recruitment as perceived by WGNSSK/ACFM.

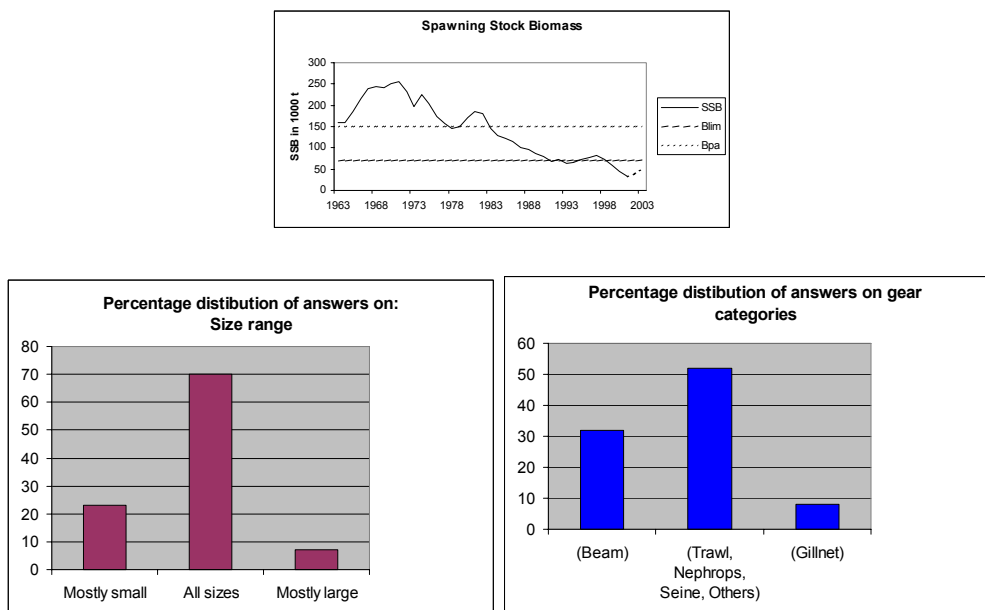


Figure 9 Example presented at the meeting to demonstrate the potential for the aggregated size range data to represent the responses by gear type rather than the size distribution of fish species.

The following is an example of what was included from the fishers' survey regarding North Sea cod in the ACFM 2003 report and the text that went with it:

The North Sea Commission Fisheries Partnership has again initiated a survey that has been conducted among fishermen in order to evaluate their perceptions of the stock and catches in 2003 in relation to 2002. The results of the 2003 survey were made available to ICES in September 2003 (Figure 10). The survey indicates that there is a perceived increase in cod abundance, with most areas recording either an increase in cod abundance or remaining the same. This is especially notable in the southern North Sea. ICES notes that the results of the fishermen survey could be consistent with the results of the assessment for this stock, although absolute estimates of abundance cannot be derived from the survey, which is comparing this year with last year's catch rates.

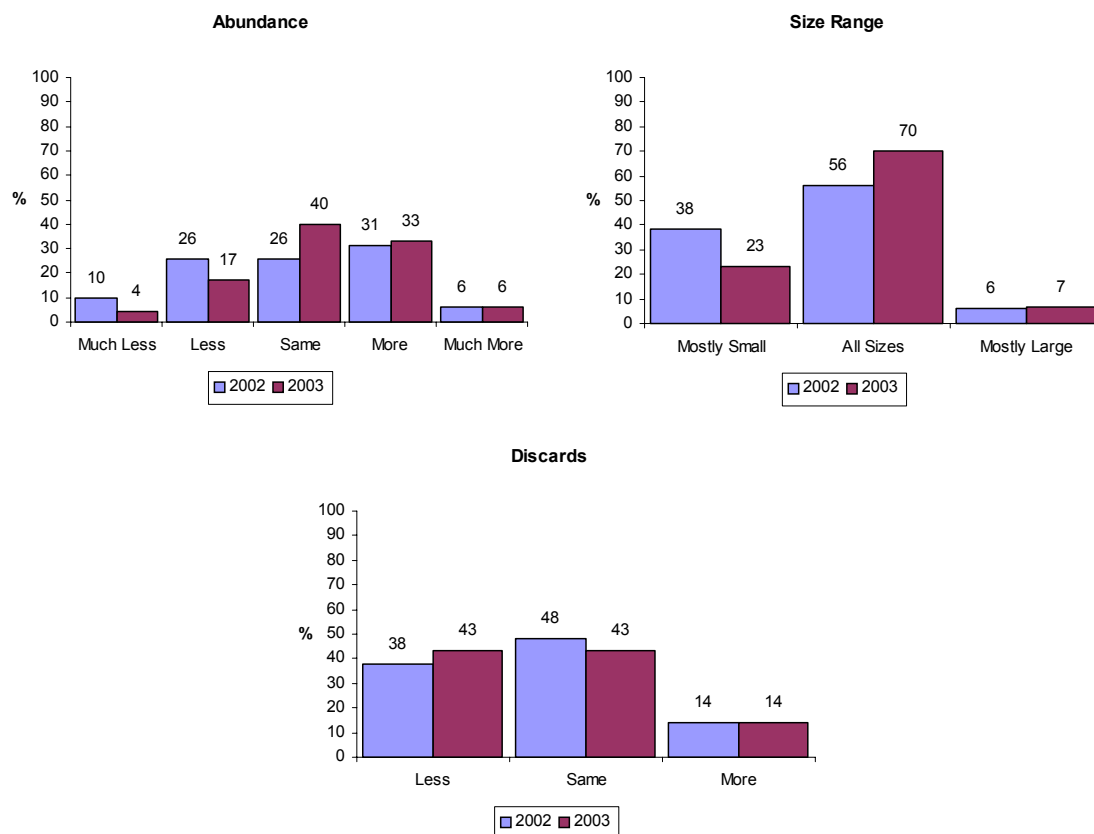


Figure 10 Percent frequency of responses for cod abundance, size range and discards, 2003

Area	Abundance					Size Range			Discards		n	
	Much Less	Less	Same	More	Much More	Mostly Small	All Sizes	Mostly Large	Less	Same		More
1	2	12	51	33	2	7	74	19	64	22	14	54
2	6	19	50	25	0	24	71	6	56	31	13	17
3	18	6	71	0	6	33	67	0	47	53	0	21
4	2	20	27	38	13	17	83	0	58	38	4	48
5	3	5	31	51	10	31	69	0	11	64	25	42
6a	3	22	28	39	8	22	75	3	49	40	11	38
6b	2	22	30	38	8	35	61	4	43	48	10	88
7	6	12	58	24	0	11	75	14	31	47	22	37
8	7	11	52	26	4	26	67	7	19	54	27	28
9	8	33	42	17	0	33	50	17	42	42	17	12
Overall	4	17	40	33	6	23	70	7	43	43	14	385

Figure 11 North Sea fishermen survey for cod abundance, size range and discards for the years 2002 and 2003 (Source: Europeche 2003).

4 SUMMARY OF THE DISCUSSIONS

4.1 Utilization of commercial CPUE-data and the “Fishers Survey”

Commercial CPUE-series have in the past been an integral part of SSB estimation in VPA. The basic assumption was that fish are more or less homogeneously distributed and that catches reflect the abundance of the fish. Increasing catches will accordingly indicate an improvement of the stock situation. The basic assumption is therefore that the CPUE is proportional to the abundance of the fish. If this was the case the catchability of the fish and therefore the fishers' observations were a good measure of the stock trends. For many reasons this is not always the case, and is less so with increasing technological and biological changes taking place.

The potential and limitations of CPUE-series have been a reoccurring issue during the SGFI-meeting. From scientific side it was explained and emphasized that there are a number of inherent problems in the CPUE-series, the most pronounced being that the effort is very difficult to measure and to standardize. New technological developments, such as fast information transfer, information access via internet, GPS, echosounders providing three-dimensional seabed profiles, gear development and many other small and big changes have a great impact on the effort exerted by a skipper per time given, leading to a gradual increase of efficiency. A number of small changes in the longline technology in Iceland have, for instance, led to a doubling of the efficiency within the past 15 years. The changes were made at different times by the individual fishers and have had different impact on the efficiency increase of the particular vessels. The technological improvements lead therefore to a permanent but usually not linear increase in the efficiency, differing from vessel to vessel. The catches and the CPUE-series are furthermore sensitive to changes in the mesh sizes which are imposed on the fishery, together with changes in the catchable area due to restrictions or changes in abundance, migration or alteration in stock distribution.

Moreover, the commercial CPUE is in most cases not even reflecting the catch which is taken within a given period, but only the landings, i.e. the-series are LPUE's rather than CPUE's, since discards or slippings etc. are not quantified. With more specified regulations for the fishery the discard fraction happens to change quickly with changing fishing conditions. If cod catches for instance decline in the North Sea, parts of the fleet target other whitefish such as haddock, leading to rapidly increasing significant discards in undersized haddock. Further problems occur, where fleets target not only one species. Modern vessels are often equipped for more than one fishery and are able to change the rigging within short time. In mixed fisheries it is often not even possible to define clearly what a target species and what a bycatch species is. This may even change during one fishing trip. All these factors lead to using the CPUE-series as indicators but, in many cases, are not any longer for tuning the VPA, i.e. the incorporation of the commercial-series in the analytical process.

From the side of the fishery it is argued that despite of all technological changes the fishers' experience of the catchability of fish does not necessarily match the trends described by the analytical procedures. As a consequence, the perception of the fishers is often contradicting the scientific advice. In some cases it turned out later that the fishers' perceptions had been correct in the first place, in many other instances this was however not the case. Nonetheless, the CPUE-series should (and in most cases are) used for validation of the assessment results. In assessments which are not based on the VPA the commercial CPUE-series can be (and are) used, in addition, they are used for direct modelling of the stock trends. In many assessments commercial CPUE-series are indeed essential and for a number of fisheries the commercial CPUE-series are the only basis for describing the trends in the biomass development (e.g. deep sea fisheries). The CPUE data do not need to be based on the entire fleet if reference vessels give a representative picture of the whole fleet, if there is sufficient homogeneity in the fleet. However, in the light of the above-mentioned mobility of the fleets and “fisheries”, these need to be defined and the data need to be validated over time.

In spite of all restrictions the commercial CPUE-series do reflect in many cases the actual **distribution of the stock** and potentially provide quasi “real-time” information about the stock status for particular areas and certainly also general trends in stock development. On exactly this basis the commercial CPUE-series can provide important information for the stock assessment and the stock description for the intermediate year. **Moreover, CPUE-series will probably gain importance in the context of integrated coastal zone and offshore management, i.e. in the context of a possibly extended water frame directive into the exclusive economic zones. Highly detailed fishery data might become essential for the fishery in proving the importance of specific fishing areas, in the context of extended environmental impact assessments in the EEZ's, in establishing for instance marine protected areas or large wind-parks.**

The SG recognised that fishers' perceptions about the state of stocks are most influenced by the catch rates they achieve, and are therefore subjective. Scientific assessments on the other hand are always a reconstruction of the stock, and therefore limited to the estimate of the SSB at end of the assessment year. In spite of all limitations fishers could help improving the assessments and projections.

During the SGFI meeting the fishery requested that better use of the log-book data be made in the assessment process. The fishery is invited to take part in intersessional work on CPUE-data of a selected fleet, to prepare a document for the SGFI 2005-meeting, which could be treated as a test-case and be of direct use for the respective assessment working group.

It would have been an advantage for the identification of an appropriate fleet for a representative CPUE-series if the Study Group on the Development of Fisheries-Based Forecast (SGDFF) would have come into the position to recommend a particular fleet. This was, however, not possible. A summary of the outcome of the SGDFF-meeting is given here:

The SG came to the conclusion the **Fishers' Survey** should be extended to include comparisons of the situation now with the situation 10 years ago and that the spatial and temporal distributions of catches be included in view of the long-term changes of spawning aggregations. In addition, approximate length distributions from different gears and catches of unusual species (which might indicate environmental and climatic change) would be very helpful.

4.2 Summary of the second meeting of SGDFF (Study Group for the Development of Fishery-based Forecasts), 27-30 January 2004, Oostende

The SGDFF worked on three tasks:

1. to discuss the relevant groupings of vessels and vessel voyages into fleets and fisheries;
2. to discuss the data formats in which to compile the required data disaggregated by fleet and fishery, and to evaluate data quality in relation to sampling at the appropriate level of disaggregation;
3. to discuss appropriate models for the calculation of fishery-based forecasts.

Fleet and fishery identification

SGDFF defines a "fleet" as a "physical group of vessels sharing similar characteristics in terms of technical features and/or major activity", and a "fishery" as a "group of vessel voyages targeting the same (assemblage of) species and/or stocks, using similar gear, during the same period of the year and within the same area". Thus, a vessel belonging to a particular fleet may operate in one fishery during one part of the year and in another fishery during another part of the year. *Vice versa*, two vessels operating in the same fishery may belong to different fleets. At their first meeting in February 2003, SGDFF proposed a procedure to be used by the National Institutes to identify the fleets and fisheries operating in their countries. The identification of fleets and fisheries may be based on gear, mesh size, fishing area, and/or species composition of the catch. The proposed procedure may involve (statistical) analyses of the catch profile and *ad hoc* expert knowledge of the fishing activities. It is explicitly left to the National Institutes to decide upon the final groupings into fleets and fisheries. Here collaboration with the industry may prove useful.

Data formats and evaluation of sampling

At their 2003 meeting SGDFF proposed a data exchange format to be used for the compilation of catch-at-age data disaggregated by fleet and fishery. Subsequently, several countries used this format for the compilation of 2002 catch data, and encountered ambiguities in the specifications of the format. This year SGDFF revised and finalised the data exchange format and its specifications. No new data were actually compiled, because due to the early timing of the meeting, 2003 data were not yet available. These data need to be compiled by WG data-coordinators before their assessment WG meets. Another issue is that currently, the data sampling programs are designed to provide stock-based catch-at-age data. SGDFF recognised the need to ensure sampling by fishery stratum to provide fishery-based catch-at-age data (in terms of landings and discards). SGDFF assessed the current situation for the 2002 data. SGDFF found that for some countries the most important fisheries are sampled, but not for other countries. In case a fishery is not sampled, the age composition of the catch of another stratum is used. Collaboration with the industry may be useful to ensure the quality of fishery-disaggregated catch- and discards-at-age data.

Models

SGDFF evaluated the use of the MTAC model. This model has been used by STECF at the request of the EC in 2002 and 2003 to calculate Mixed-Species TACs (MS-TACs) taking technical interactions into account, such that the MS-TACs of the different species can be depleted more synchronously; the MS-TACs that are output by the MTAC model depend strongly on political choices (reflecting priorities) set as inputs. SGDFF judged that MTAC is not very useful in the long term for various reasons. One reason is that it is not consistent with the principal of relative stability (*i.e.* allocation of TAC-shares to the member states according to a fixed key). Another reason is that it does not consider fleet adaptations, *i.e.* responses of the fishermen to management measures (such as changes in spatial distribution and/or target species). SGDFF concluded that the future for fishery-based forecasting lies in the type of models that are being developed in various EU-funded projects (*e.g.* TECTAC, EFIMAS); these models should then accommodate relative

stability and fleet adaptations, as well as biological interactions and recruitment dynamics. Collaboration with the industry may prove useful for an understanding of fleet adaptations.

4.3 Discussion on the potential changes in the ICES advisory process in 2004

ICES is changing its advisory structure in accordance with the MoUs agreed with the Fisheries Commissions and also there is an internal review aimed at increasing the efficiency of the process. This is described in the report of SGAWWP (2003) (see: www.ICES.dk).

An important element is that the reviews will be done by separate non-ICES groups and it is the aim to include experts from non-ICES countries or regions in the review process. Another element is the wish to increase the transparency of the ICES advisory process.

4.3.1 Review group meetings

The review of assessments from external experts was not a central topic of the SGFI discussions. However, the topic was touched since the external review is a step towards opening the assessment procedures to scrutiny and discussion from others than only scientists. It is believed that due to in depth reviews faith into the assessments is increased, and faith into ICES assessment work is one of the cornerstones for improved relationships between science and the fishery.

It is essential for ICES that its advice is credible and reliable and in order to assure that this remains to be the case ICES assessments must be peer reviewed. The needs for such a review system are stressed as the ICES fisheries advice is closely scrutinised by its Clients, by the fishing industry and by other NGOs. ICES has had a review system in place and such reviews have been a regular feature of the fisheries advisory process for many years; the reviews were done internally by ACFM. However, a proposal was adopted by the Council in October 2003 to have the review process lifted out of ACFM and an independent review system be established. By doing this, ICES advice would benefit from involving a wider range of expertise in the reviews.

The ACFM Recommendation adopted at the 91st Statutory meeting reads: “Assessments made by fish stock assessment working groups will be reviewed by groups set up for that purpose. These groups will work in sessions or by correspondence. The tasks of these review groups are to ensure quality of the assessments made by the Assessment Working Groups and, if necessary, update the assessments and projections. These groups will each have at least three members: one Chair who is appointed amongst the ACFM members, and two or three nominated experts chosen as independent experts with relevant expertise to allow them to do a technical review of the assessments. Chairs of the Assessment Working Groups will assist in the review of their reports. The review meetings are open to other members of ACFM. Costs of these review meetings will be borne by the national institutes.”

The proposal also opened for recruiting reviewers from “non-ICES laboratories”, e.g., from academia and from fisheries laboratories in countries or regions that are completely without involvement in the ICES fisheries advisory process. However, recruiting outside experts is costly and the ICES budget does not provide for such recruitment on a large scale. Realising the financial constraints, the system that was adopted by the ICES Council in October 2003 builds on the principle that each laboratory contributes by reviewing fish stock assessments with which it has no involvement.

4.3.2 “Sandwich” meetings – a pilot project in 2004

Over the last few years, ICES has several times discussed the matter of increasing transparency of the ICES Advisory process. This has been done with the aim of allowing stakeholders a better understanding of the rationale behind decisions taken and also with the aim of making better use of valuable insights as well as data that stakeholders may possess.

At its 2004 January meeting, MCAP made a recommendation to promote the process of increasing transparency. This recommendation has been endorsed by the Bureau at their meeting here in the Secretariat at the end of January: the so-called “sandwich approach”. This approach involves holding an open session the day before the WG convenes to seek stakeholder input, and the day after the WG meeting, to inform stakeholders of the results (with the appropriate caveats that they are not final until they are peer reviewed, and that advice will be prepared later by the appropriate Advisory Committees). It was agreed to try this approach as a pilot project for four groups during 2004: WGNSSK, WGSSDS, WGSE and WGBFAS. For WGNSSK the meetings will be conducted in cooperation with the North Sea Commission Fisheries Partnership. For WGBFAS the open session before the WG will have to be on the same day as the WG starts (13 April) as this group will meet just after Easter which makes it impossible to have the open session earlier.

The pre-meeting will be open for contributions on ToR items addressed by the Working Group. Observers who want to contribute must submit written papers to the open session the day before the WG; the Chair may put limits to the number of pages of such submissions. The document should present information pertinent to assessing the status of the stock. The requirement that observers present a paper is expected to limit participation to groups that are serious in the approach. Stakeholders may present their papers as short PowerPoint presentations. This meeting will be attended by the WG Chair and one member, as well as by the Chair of ACFM if possible. The working group report will reflect, and where necessary, comment on the papers submitted.

At the post-meeting that is to take place the day after the WG meeting, the WG Chair will provide summaries of the assessments and how the observers' papers from the pre-meeting were handled, after which there will be a discussion. The participation in this meeting should be open, and may be the same as for the pre-meeting. There are stocks that are politically more sensitive than others and this should be reflected in setting up the agenda for the meeting. The WG Chair should present summaries of the outcome on selected stock assessed, particularly describing the basis for the assessment. However, if there have been submissions regarding other stocks at the pre-meeting these should also be dealt with.

At present it is planned that specific press contacts will be informed and invited to this meeting. The press will be made aware of the assessment, review and advisory process and that it is currently at the assessment phase of the process. The meeting will also give the press the opportunity to learn the state of the stocks as assessed by ICES, thus countering other interpretations by other sources. The SGFI discussed this point in particular. There were severe reservations on the usefulness of inviting the press at this stage. This is further commented upon in the following section.

The working group report will be made publicly available when it has been completed and checked and a stronger disclaimer will be placed on the front page. The disclaimer will be strengthened to emphasize that the report has not been subject to review.

4.3.3 Notes on the SGFI's response to the proposed ICES reforms (as reported to the SGFI)

The Study Group welcomed the intention of ICES to make the process of preparing scientific advice more open and transparent, and in particular supported the proposal for peer review of the stock assessments. However, there were reservations about the limited extent of the reforms proposed. The Group regretted the decision by ICES that ACFM would continue to remain closed to observers from the fishing industry, and that this position had been supported by the European Commission. It was already evident from the Consultation Meetings held by ICES with the North Sea Commission Fisheries Partnership that much was to be gained by ICES from interacting with the fishing industry. The comments made by the industry at Consultation Meetings held at ICES with the North Sea Commission Fisheries Partnership showed that the industry is taking its share of the responsibility for the quality of the assessment seriously and this has already strengthened the assessment process and much would be gained by extending these interactions. The external experts that were invited to these meetings have not made significant criticism of the assessments that have been reviewed at these meetings.

The Study Group supported the proposal to allow scientific contributors from the industry to attend Working Group meetings. However, ICES pointed out that this procedure is not new and that access is controlled through the national ICES Delegates. Nothing in the procedure would prevent scientists working for the industry to contribute to the assessment process, but noted that industry scientists have not pursued this route in the past.

There was a mixed response to the proposed 'sandwich' meetings which would take place before and after meetings of the Working Groups. It was thought valuable to allow fishers to meet with Working Groups at their start, when fishers would be able to provide valuable information from the fisheries to support assessments. Combined with attendance at the Working Group itself this would ensure that any misunderstandings about the fishery were corrected, and additional data from the fishery provided. However, the proposal that the second part of the 'sandwich' meeting would be limited to a short briefing, attended by the press, met with disapproval. That meeting should provide an opportunity for further feedback from the industry on the provisional assessments. The presence of the press would disrupt that process. It would inhibit detailed discussion of the assessments and would instead focus attention on the more dramatic and newsworthy aspects of the Working Group findings. The 'sandwich' meetings should provide an opportunity for ICES to interact with informed stakeholders, rather than seeking to publicise the assessments, which at that stage would only be provisional.

Members of the SG representing the fishing industry believed that ICES, should have consulted more widely with stakeholders about the best ways to involve them before producing its own plans for reform. The support of fishers in providing both new data and valuable information on the operation of the fisheries was important in enabling Working Groups to produce assessments that were rigorous, transparent, and made best use of the available knowledge. The

process of stock assessment would greatly benefit from joint interaction between the Working Groups and well-informed stakeholders. It should be a priority for ICES to engage with fishermen, whether to decide on future arrangements for making the assessments more transparent, or to improve the assessments themselves.

It should be recognised that the plans for reform are not firm; rather it is a step-wise procedure and the sandwich meetings are a pilot project this year. The best ways to increase transparency and stakeholder involvement have yet to be determined. Increasing the transparency of the advisory process has to respect the recognised status of ICES advice as being scientifically sound and, which is the issue at stake here, **independent of political influence**. ICES would welcome suggestions from the industry on how they would like to participate in the process.

In the context of the above discussion, there was a short presentation of the NSCFP proposal for the how the Commission should implement the RACs. The presenter considered that ICES should be addressing, now, the issue of how it will interact with the new Regional Advisory Councils (RACs). He considered that these will be regional gatherings of informed stakeholders with their own sources of data and information, providing their own advice on fisheries management to the European Commission. He indicated that it is inconceivable that ICES and the RACs should operate independently, preparing their own advice on fisheries without co-operating with one another.

ICES notes that the RAC framework regulation is still not agreed and at this point it is difficult to address the question of how to interact with the RACs as the workings of these have not yet been completely clarified and therefore ICES cannot possibly comment on how ICES would relate to the RACs. ICES received only a draft proposal from the Commission last autumn and noted that this text and the proposal presented did not agree in all elements.

5 CONCLUSIONS OF THE MEETING

Regarding the state of **national cooperation** between the fishery and science, it is concluded from the 2-day meeting that national initiatives aimed at improving the relationship and communication between the fishery representatives and science have made progress. This has occurred in spite of serious problems that particular fisheries and fleets are currently facing. In some cases, communication between scientists and fishers has been strained, scientific sampling activities have been curtailed and working relationships have suffered. This is because some fishers see scientists as responsible for reduced catching opportunities, the quotas and other restrictions on fishing. For others, withdrawing their co-operation is the only route they consider to have in expressing their dissatisfaction with the fishery management system currently operative. Despite this working relationships between fishery representatives and scientists have improved. This was apparent from the numerous reports of national initiatives. There is however a recognised need for fishers' organisations to communicate to their members the urgent need for data provision and cooperation in data acquisition and the potential gains to the fishers from co-operation at this critical time. There are concerns that this is apparently not sufficiently well communicated to the fishers.

The national reports on the initiatives have demonstrated that co-operation develops positively where personal relationships have developed. It is emphasized that the on-board sampling programmes require continuity, and trust can only grow on the basis of stable personal relationships. One fishery representative offered to provide more detailed data than presently provided by the logbook sheets. This includes his personal records on the exact location and the duration of the fishing i.e. disaggregated data in time and space. The SG appreciated this offer greatly and emphasized that progress in **incorporation of commercial CPUE-series** in the assessment procedures is only going to be successful, if the data are disaggregated on such a scale.

The SG agreed that spatially disaggregated commercial CPUE data contain much information that is currently under-utilised. CPUE data could (and should) be used to better document and analyse the migration patterns or changes in the geographical distribution of stocks, e.g. analogue to the use of the CPUE data and the fleet distribution data during the spring migration of the North Atlantic mackerel stock and the summer migration of the Norwegian Spring Spawning herring. This is particularly the case in the light of decreasing biological knowledge and the lack of basic biological research on the fish stocks. The value of CPUE data should be recognized, especially when the fishery offers spatially and temporally disaggregated data. The SG is of the opinion that this is an important issue and proposes to follow this up.

The fishery frequently stated that in their opinion, their real time observations (and data) on fish abundance / catch rates are not taken into adequate consideration by the assessment working groups. It was, however, explained by the scientists that it is difficult to incorporate information from the fishery in the "assessment year" directly into stock assessments, especially if these data are of a qualitative nature.

Nonetheless the SG is inclined to react upon the criticism of the fishery and to define intersessionally a test fleet for which the disaggregated data be presented in the 2005 SG meeting, ready for use by the appropriate assessment

working group. It is yet to be decided which data and which fleet or reference vessels are to be used. The data must be processed intersessionally and should be analysed before the 2005-meeting takes place, since specific data-work, data analysis and interpretation cannot be accomplished during a two-day meeting. Only if this is achieved intersessionally, will it then be possible to use the data during the 2005-meeting constructively and make concrete proposals for using them by an appropriate assessment working group. It is proposed to intersessionally have a 3 day workshop with a few selected members of the SG, including the fishery to develop a test fleet or test-CPUE.

However, even if this should not be accomplished until the next meeting, SGFI is of the opinion that the ICES stock assessment working groups should take into account fishers' perception of the state of the stocks by analysing and reporting annually on the best available indices of catch per unit of effort. Ideally these should be compiled from trip data collected nationally for fleets and fisheries defined on the basis of information from the fishing industry and the criteria developed by SGDFF. The trip data should be sufficiently detailed to allow the indices to take into account year to year changes in catchability, fishing area, season, and management measures. The WGs is requested to explain the utility or otherwise, of the data. The CPUE data-series should appear in the WG reports, under all circumstances and the Chairs of assessment working groups should take the stakeholders criticism seriously, by making best use of the CPUE and LPUE data and to comment appropriately on the use or non-use of the data.

The SG was of the opinion that the collection of qualitative information (The Fishers' North Sea Stock Survey) should be continued, even though it is still difficult to translate qualitative data to a numeric scales. The SG learnt that one of the difficulties with the survey is the very different interpretation of the questions by respondents due to their varying circumstances and frames of reference; the questions are perceived and interpreted differently, depending on the socio-economic conditions and cultural background of the individual fisher.

However, the subjective nature of this survey is likely to remain. Still, the perception of the stock situation can be presented semi-quantitatively, based on the results of the Questionnaire, thus rendering an **index**. As such these indices can (in future) be compared with the projections which were given for the year and stock in question. Having sufficient data from a number of years, a comparison can be made between the projection and the index. *Such a correlation would statistically substantiate the relationship and quality of scientific and non-scientific perception of the perception of the current state of the stocks. In other words, it would show how close or how apart the fishers' perception is to the stock projections made for the current year.*

From these conclusions the following recommendations were derived:

6 RECOMMENDATIONS

- **The SGFI is of the opinion that the group should continue and meet in February 2005 for two days. However, to make progress, the SG should work intersessionally with real CPUE data: available data (on EC log-sheets) should be used to map information on the North Sea fishery in space and time (as a starting point for various discussions on the fishery/ecosystem). In doing so it should become apparent, what exactly the use of these data constrains.**
- **SGFI recommends that ICES stock assessment working groups should take the criticism of stakeholders seriously by taking into account fishers perceptions about the state of the stocks and by making best use of the CPUE and LPUE-series, and by analysing and reporting annually on the best available indices of catch per unit of effort. Ideally these should be compiled from trip data collected nationally for fleets and fisheries defined on the basis of information from the fishing industry and the criteria developed by SGDFF. The trip data should be sufficiently detailed to allow the indices to take into account year to year changes in catchability, fishing area, season, and management measures. The WGs are requested to explain the usability or otherwise, of the data. It is proposed that the assessment WGs should be obliged to comment on the use or rather non-use of CPUE data-series in the assessments. The CPUE-series should always be published in the WG reports.**
- **SGFI recommends that the ICES Methods Working group should address the problem of how the ICES assessment working groups should incorporate real time qualitative data on fishing success (e.g. questionnaire data) and fishing effort into the assessment process alongside fishery catch per effort, survey results, and analytical assessment data. Also, the methods Working Group should deal with the issue of what information/data should be sampled by the "Fishers Survey" and what is needed to be able to compare the data in a quantitative way, also in view of a comparison of the Fishers' Survey-results with the assessment projections.**

- **SGFI recommends that the fishers' survey on collecting data from the fishery ("questionnaire") should be continued until it is possible to compare statistically the indices derived from the questionnaire with stock forecasts from the assessments. The ICES Methods Working group should be asked to evaluate whether this is statistically possible. It is also recommended that the format adopted in 2004 should be the definitive one. In future the full analysis of the data by gear type and vessel size should be made available in advance of the WGNSSK.**

It is recommended that an inventory be made by the SG containing options on the improvement in data quality, starting from the EC-logbook system and focussing on a few major species from the North Sea (plaice, cod). In addition suggestions should be made how to expand the logbooks with information that is useful for the assessment work (position, haul duration etc.).

ANNEX 1

Trip Debriefing form

Observers should report briefly in relation to each heading, attaching diagrams if necessary. There is no need to duplicate quantitative data archived on the discard database. Copies should be a) retained by the observer, b) go to the observer programme manager in Lowestoft, and c) go to the skipper or owner of the vessel. The form should be marked 'In confidence' and further circulation prevented in case information contained could reveal the identity of the vessel observed.

Headings:

1. Link variables: Trip code, gear, observer, date disembarked, approx. days aboard. (Vessel and skipper omitted to assist confidentiality).
2. Names of fishing grounds fished and approximate duration on each.
3. Fishing success (e.g. good, poor, etc) and any likely explanations.
4. Points of biological interest learned from trip (e.g. spawning events, maturity observations, disease incidence, etc).
5. Points of fishery interest learned from trip (e.g. efficiency of particular gear modifications).
6. Points of safety interest learned from trip.
7. Any other comments by observer.
8. Any views of the skipper on the observer or the CEFAS observer programme as a whole.
9. Any other views of skipper/crew/owner that they would want passed on to CEFAS.
10. Person filling in form and date.
11. Copied to.

ANNEX 2

Example of completed trip de-briefing form

Trip code: **NN403OT** Gear: **Otter trawl** Observer: **Rob Forster**

Date disembarked: **11/12/03** Days aboard: **3**

Fishing grounds worked: Clean ground in VIIe, 28E4.

Fishing success: Catch rates were fairly steady throughout though for the first 24 hrs the weather was poor and fish quality suffered a bit. Skipper was pleased to have got 3 days fishing in for the time of year and the weather forecast, but catch rates were not particularly noteworthy one way or the other. Virtually no sole or plaice, a few lemons; main flatfish catch consisted of megrim. Great interest in John Dory (not much else left!).

Points of biological interest: Unable to examine gonad condition or gut contents on this occasion. Catch composition seemed consistently low in diversity. John Dory believed to migrate up with warmer water in March-April, and congregate near Scilly in July. Not known how spawning may fit into this, but apparently feed extensively on pilchard and herring.

Points of fishery interest: 125mm mesh in the square, then 100mm throughout. Very little discard, despite retaining red gurnards for sale. Almost no benthos. Rockhopper consisted of 10" discs in the bosom, 8" in the wings; heavy chain (16mm middling) used on lower bridles, presumably to allow harder grounds to be worked. Also employed chain dangles between large discs, and two tickler chains.

Points of safety interest: Shelter-decked. Crew wear life jackets whilst working on after deck as a matter of course.

Other comments: This vessel has operated in this area for at least 12 years. The catch of hake, pollack and ling has virtually disappeared compared to what they used to find. They put this down to netting which they believe targets specifically for these species.

Views from skipper, crew or owner: Prohibition of wreck netting was suggested as a worthy management measure. The skipper would prefer to have more frequent catch sampling than is currently feasible with present resources – and he is not the first person to put this idea forward. I think he understands the need to generate a picture of catch rates across the various gear sectors, but there is a strong feeling that our sampling intensity is simply too low. They are very keen to understand how the data we are collecting will feed into future stock assessments.

Date completed: 11/12/03

Circulation: (1) Lowestoft (2) Skipper

ANNEX 3

Annual report contents list

The intention of an annual report is to summarise the states of significant regional fishing fleets, and the activities and findings of CEFAS observers in each region for each calendar year for the benefit of funding agencies, the fishing industry, CEFAS fishery advisors and researchers, ICES, and any interested members of the public. The report is not intended to be a compilation of discard data, nor to repeat data presented in the annual DEFRA compilation of fishery statistics. CEFAS discard data are already reported routinely to ICES working groups.

The following sections are intended to be the same for each coastal region used by CEFAS sea-going observers, currently: NE coast, S and E coasts, SW and Welsh coasts, NW coast, and UK vessels operating from ports outside UK. [Exact boundaries between these regions have still to be decided.] Fishing, effort, and vessel stats should be obtained from official databases operated from Lowestoft. Reporting should be for the calendar year just ended. Reports should be completed by 1 May in each year.

Note: The words "Give views on" are intended to encourage the dissemination of worthy opinions but without naming the source personally, e.g. "Some fishers think . . .", "Scientific opinion is . . . (reference)". Observers should not usually volunteer their own opinions because of the need to remain impartial.

1. Introduction

Summarise,

- main fishing ports and markets in the region.
- main types of fishing, i.e. gears, and their target species. Use categories given in the EC Data Collection regulation if applicable (EC 1639/2001)
- effects of season or other significant regional influences on fishing activities.
- significant changes of fishing patterns occurring in the year compared to previous years.

2. Effort and Landings

For each type of fishing as categorised in EC 1639/2001, tabulate as accurately as official data allow

- number of vessels, indicating proportion of part-timers
- total effort, e.g. hours fishing, days-at-sea, horse-power
- total official landings of principal target species

Comment on changes and trends compared to previous years, and give views about the factors causing them, by fishing category if appropriate.

3. Observer programme

For each type of fishing as categorised in EC 1639/2001 with regard to discard data, tabulate:

- Number of fishing trips observed
- Number of days at sea
- Staff time spent on this part of observer programme (e.g. 0.5 person)
- Names of fishing areas visited
- For principal target species, give total discards and total retained by number and weight as estimated from catch-sampling at sea.

Then, also by fishing category,

- Comment on levels of discarding observed relative to previous years.

- Give views about factors that may be affecting discarding.
- Comment on the level of observer effort applied and factors affecting it (observer views are appropriate here).

Finally in this section, industry views on the observer programme should be summarised impartially, including critical views. Any rebuttals thought necessary should be put at the end.

4. Fishing industry views on the fishery and related matters

Give industry views on the success of the fishery, management, trends, stock assessments/scientists, the CFP, etc. Views should be grouped under topic headings, and views on regional matters should be separated from views on generalities so that the latter can be moved to a general section in the England and Wales report. Similar views should be summarised and the numbers holding them indicated. Diverse views could be listed as separate anonymous statements if sufficiently interesting.

5. Points of biological interest noted by observers

Information on spawning areas, growth, maturity, migrations, disease, what have you, should be summarised from trip reports, indicating the likely degree of reliability of the information. Where possible, presentations of information should build on previous presentations on similar topics with cross-references.

7. Points of fishery interest noted by observers

Information on gear efficiency, gear modifications in use, market factors, quota regulations, etc., should be summarised from trip reports. Where possible, presentations of information should build on previous presentations on similar topics with cross-references.

8. Matters of related interest and acknowledgements

Any other business plus appropriate acknowledgements to those who hosted observers, etc.

APPENDIX I

▪ Existing Interaction

UK: Fisheries Science Partnership.

DEFRA Science Project Reviews.

Pre-Working Group meetings (held with CEFAS prior to relevant ICES Stock Assessment Working Groups).

Industry observers on CEFAS Research Vessel Surveys.

Consultation on Research Vessel Fishing Gear Performance.

Confidential logbook reporting scheme.

Skippers debrief following discard observation trips.

EC North Sea Commission: Fisheries Partnership.

ICES: Peer and Industry Review of ICES advice.

European North Sea Fishermen's Survey.

Trans-national Fishermen's Surveys for Irish Sea and Area VII.

▪ Planned Interaction

UK: Post Working Group debriefs

EU: Industry observers at ICES Working Groups

▪ Potential Interaction

UK: Potential Recalibration of catch and landings statistics

Pilot data collection exercise (funded by English Nature) appendix

Co-operative study into discrete fish stock sub-populations

EU: Industry participation within ICES North Sea Assessment Working Group (September 2004)

APPENDIX 2

FORMAT OF THE NORTH SEA STOCK SURVEY IN 2003

Survey of North Sea Stocks

The purpose of this questionnaire to ensure that fishermen's knowledge of the state of the stocks is integrated into the development of TACs.

The questionnaire should be completed by comparing January – June this year with a similar 6 month period one year ago and then filling in the blank boxes.

ALL RESPONSES ARE REQUIRED BY 1ST August 2003

Confidentiality. All information provided will remain **strictly confidential**. All data will be transferred into tables before transmission to ACFM. To ensure complete confidentiality, **do not** write your name or the name of your vessel on the completed questionnaire.

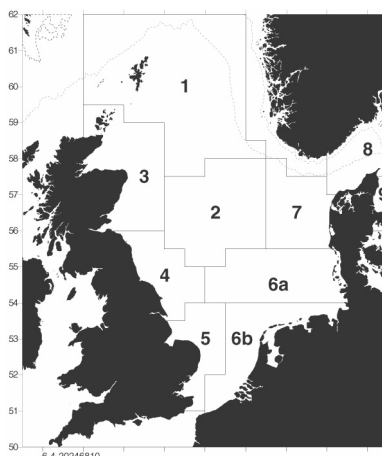
Instructions

1. The questionnaire refers to the North Sea only.
2. Information on abundance should be provided on the basis of **catch** not landings.
3. When completing the questionnaire, comparisons should be made with the same period last year (*i.e.* Jan – Jun 2002).
4. When completing the section on fishing area, reference should be made to the numbered boxes on the map below.
5. Questions should be answered by putting a tick in the appropriate box (see example below).

EXAMPLE		
Question 1	Answer 1	←→

Answer 2	
----------	--

Answer 3	
----------	--



VESSEL DESCRIPTION										
Size	Under 15m				15-24m				Over 24m	
Main fishing method	Trawl		<i>Nephrops</i> Trawl		Beam Trawl		Gill Net		Seine	
	Other (please specify)									

Example	Target species		By catch							
Area of fishing (refer to map)	1		2		3		4		5	
	6a		6b		7		8		9	
Abundance	Much less		Less		Same		More		Much more	
Size range	Mostly small				All sizes				Mostly large	
Cod Discards	Less				Same				More	
Distribution	Patchy								Wide spread	

ECONOMIC CIRCUMSTANCES										
Have your economic circumstances changed since last year?										
Difficulties in obtaining or retaining crew	Much less		Less		Same		More		Much more	
Operating costs	Much less		Less		Same		More		Much more	
Profits	Much less		Less		Same		More		Much more	
Are you more or less optimistic about the future?	Much less		Less		Same		More		Much more	

Have you any additional information on the state of stocks?