Fisheries Technology Committee (B)

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Chair: Stephen J. Walsh (Canada)
Rapporteur: Yvan Simard (Canada)

Opening

The Committee met on 23 September from 14:00 to 18:00 and 27 September from 11:00 to 13:00. The agenda was adopted without modifications. Participants were 16 members and 5 observers, representing 13 countries.

Reports of Expert Groups

Working Group on Fishing Technology and Fish Behaviour (WGFTFB)

The 2003 report of WGFTFB is Doc. B:07. The Working Group considered reports from the Study Group on Mesh Measurement Methodology, the subgroup reviewing the size selectivity of 90° turned mesh in Baltic cod trawls, and the subgroup compiling a manual on the selectivity of static fishing gear. For the Term of Reference to assess gear-related technical measures for improving species and size selectivity in *Nephrops*, the Working Group considered a summary report as well as seven individual contributions. One recurring theme in these presentations is that *Nephrops* are typically caught with other marketable fish or invertebrates in mixed-species fisheries. This complicates the problem of size selection because the mesh or grid size appropriate for *Nephrops* may be quite different than that for other marketable species. Technical measures that first sort by species using, for example, a grid, then select by size using an appropriate mesh size seem to provide a means to reduce discards. However, *Nephrops* fisheries vary greatly in both the relative proportion of *Nephrops* in the catch and the species/size composition of the other marketable species. Therefore, the most effective approach to the use of technical measures for discard reduction is also likely to vary.

The Working Group reviewed the Study Group on Mesh Measurement Methodology report and noted that its final product will be produced as a *Cooperative Research Report*.

A WGFTFB subgroup working on a manual for the measurement of the selectivity of static gears, similar to the ICES manual for the selectivity of towed gears, reported that they are considering submitting a manual on gillnet selectivity, a gear better researched as compared to longline, pot, and trap fisheries. Once this manual is approved by the WGFTFB, manuals for other static gear sections would be produced. These would be in the same format as the gillnet section.

The group evaluating the selective properties of trawls with codends constructed of 90° turned mesh reported that data from 15 experiments conducted by Polish and German scientists were analysed. Although a statistical model relating the size at 50% selection (L50) to mesh size and several experimental covariates was successfully fitted to the data, the data were insufficient to allow prediction of minimum mesh sizes producing the same L50 value as that produced by the BACOMA 120-mm window. The reasons for this include: 1) there were too few experiments, 2) the experiments were conducted on a variety of gear types rather than focused on only a few, and 3) the mesh sizes considered did not include mesh that was sufficiently large. Although the FTFB did not recommend appropriate minimum mesh sizes, the utility of turned mesh codends was recognised. A Term of Reference for the 2004 meeting to evaluate the merit of this type of codends was drafted.

Due to concern over inadequacies in the "mini-symposium" format of most WGFTFB meetings and to better accommodate research priorities from FAO, a new approach to directing the operations of the Working Group was developed. A steering committee (SC) will be formed comprised of two members chosen by the WGFTFB Chair and one member from FAO. Each year the SC will research potential topics to determine their appropriateness for the Terms of Reference. For each topic, the SC will also choose a convener for that topic who will have the responsibility of soliciting contributions, corresponding with the contributors and creating a summary document.

Working Group on Fisheries Acoustics, Science and Technology (WGFAST)

The first topic in the 2003 report of WGFAST (Doc. B:06) was an initial review of the possibilities and limitations of using fishing vessels to collect acoustic data for fish stock assessment. Several examples of such initiatives around the world were presented. Although the advantage of significantly augmenting the sampling frequency and coverage by using the fishing fleet was evident, several concerns were expressed about the quality of the data collected with a variety of non-adequate sampling gears and platforms, with poor or no calibration. Processing of such large volumes of data would also require the development of efficient automated tools. Given the importance of this topic and the considerable efforts that will be needed for development of appropriate methods, protocols and guidelines, WGFAST recommended that a Study Group on Collection of Acoustic Data from Fishing Vessels (SGAFV) be charged to review this subject and produce a *Cooperative Research Report* within the next 3 years.

The 2002 ICES Symposium on Acoustics in Fisheries and Aquatic Ecology and the subsequent WGFAST discussion on the needs for research have stimulated efforts for species identification. Several presentations

were made on new approaches to extract the discriminant features from the frequency spectrum of the echoes. New instruments were tested and innovative processing algorithms were presented. The research to develop operational solutions to species identification is progressing steadily by combining numerical simulations, *in situ* measurement, and experimental testing.

From the presentations on advanced technologies and platforms, it is clear that a new set of intelligent Acoustic Observation Systems (AOS) is emerging to monitor the ecosystem. Several prototypes combining optics, passive, and active acoustics were developed and tested. This new technology for automated autonomous acoustic acquisition system could be applied to the problem of standardizing the acoustic gears for data collection from fishing vessels. With similar fast development in platforms such as Automated Underwater Vehicles (AUVs), moorings, surface-linked buoys and shore-cabled systems, acoustic data collection will no longer be limited to fisheries research vessels. Efficient series of automatic data processing algorithms will be required to process and interpret the large quantity of information supplied by such networks of acoustic sensors.

Study Group on Mesh Measurement Methodology (SGMESH)

The final meeting of SGMESH is reported in Doc. B:02. The meeting focused on the analysis and discussion of the inter-laboratory tests made to determine the most appropriate measuring force for the measurement of mesh opening, the proposal for a new mesh measurement methodology, and the need for further standardisation in this matter. The ultimate aim is that the new methodology will be used by scientists, fisheries inspectors, and the industry. Hence the Study Group was of the opinion that advice from inspection services and netting manufacturers should be sought in this matter and representatives of these services should be invited to its final meeting. The proposed new measurement protocol lays down a longitudinal measuring force of 100 N for mesh openings of 55 mm and above and of 40 N for the smaller meshes. The present ICES gauge cannot exert a force of 100 N, but a new mesh gauge is under development in the EU project OMEGA – "Development and Testing of an Objective Mesh Gauge". In the meantime the ICES 4 kg gauge should be used for scientific work, but the results must be converted to the 100 N equivalent using a conversion formula. A draft *Cooperative Research Report,* edited by the Chair, will be presented for publication before the end of the year.

Study Group on Acoustic Seabed Classification (SGASC)

The report of the first meeting of this new Study Group is in Doc. B:04. Participants included industry representatives of seabed classification technologies from Simrad, Quester Tangent, Echoview, and Echoplus. The Terms of Reference for the Study Group were reviewed and discussed. To meet the Terms of Reference it was felt that a comprehensive review of existing knowledge and technologies was necessary. In particular, there is a need to review the existing theory of soundscattering from the seabed as a background for this work. The Study Group listed the topics such a review would include to build the table of contents of a *Cooperative Research Report*, which will be the outcome of its work. This Study Group has aligned itself with the Working Group on Marine Habitat Mapping. A joint FTC-MHC theme session on acoustic seabed classification, to which this Study Group will be a major contributor is planned for 2004.

Study Group on Survey Trawl Gear for the IBTS Western and Southern Areas (SGSTG)

The report of the first meeting of this Study Group is in Doc. B:01. The Group reviewed the documentation on several survey gears as candidates for the new survey trawl for the surveys in IBTS Western and Southern Areas. A decision is urgent because of two new surveys beginning in 2003. The Group will address the concerns about breaking old time-series. After much discussion it was decided to choose gears already in use in the IBTS Western and Southern Areas. The Study Group recommended that sea trials be carried out to compare catch efficiency and performance of the GOV and Porcupine Baca trawls with modifications to the ground-gear, which should also give similar geometry as the traditional rigging.

Study Group on the Review of the Structure of the Fisheries Technology Committee (SGRSFTC)

The report of this Study Group (Doc. B:08) is the result of an extensive review through correspondence and discussion sessions with its Expert Groups and Committee members. The Fisheries Technology Committee's scientific area of responsibility is twofold; it covers the development of more optimal selective and ecosystem-friendly fishing gears and focuses on the technical improvement and development of fisheries survey methodology. The Committee also provides scientific information directly to the Advisory Committees and other Science Committees, forming the basis of advice on the selection of appropriate technical measures in fishing operations and the improvement and selection of appropriate survey and sampling gears for resource survey and monitoring studies. The Committee provides a technical bridge that spans the issues of fishing practices, environmental impact, bio-diversity studies, and fisheries resource evaluation and management.

The present structure of the Fisheries Technology Committee consists of two working groups, viz., Fisheries Acoustics, Science and Technology (WGFAST), and Fishing Technology and Fish Behaviour (WGFTFB), which hold back-to-back annual meetings. At these annual meetings time is allocated for a one-day Joint Session of both Expert Groups to deal with common topics such as resource sampling and surveys, and fish behaviour studies. The Joint Session may be

described as the glue that binds the two Working Groups together, the reason to hold back-to-back meetings. Study and planning groups are periodically created to look in-depth at special topics arising from the discussions of the working groups. WGFAST and WGFTFB use their meetings to disseminate and discuss new information and ongoing research in their respective technological fields. The Committee's working groups respond to requests for scientific information from the Advisory Committees and other Science Committees and also from the industry, with whom both Working Groups are closely allied. Industry representatives regularly participate in the working group meetings.

In reviewing and rationalizing the existing structure of the Fisheries Technology Committee, the Study Group recognized that there was a need to clarify responsibilities, and to evaluate the need for change against the goals in the ICES Action and Strategic Plans. The Fisheries Technology Committee Action Plan serves as a blueprint and provides the background for the Study Group. The Group considered the following topics in-depth: the present number of Expert Groups; the need for additional Groups; the utility of the Joint Session; collaboration with other Committees; and communication of the Fisheries Technology Committee's activities through Annual Science Conference (ASC) theme sessions, and through symposia.

The Study Group concluded that the present structure of the Fisheries Technology Committee with two working groups holding annual meetings and a joint session together should be maintained. The concept of study and planning groups being periodically created to look in-depth at special topics contributes to the development of the working groups and hence the Committee, and this concept is working well. The Study Group made 16 recommendations for improvements to activities under the Fisheries Technology Committee's Action Plan. Under the existing structure, the Committee should be able to meet the demands of the Integrated Action Plan and contribute effectively to the success of the Strategic Plan.

The Fisheries Technology Committee accepted all 16 recommendations. It instructed the Chair to bring to the Consultative Committee a request to have the chair of FTC considered for *ex-officio* status on ACFM as a way to harmonize requests for scientific information and to contribute more directly to the formulation of advice in several keys areas such as fisheries-independent surveys, mesh selectivity, and other technical measures.

Planning Group on the HAC Data Exchange Format (PGHAC)

The Group is still active in updating and improving the HAC format in order to adapt to the latest versions of equipment. It works closely with the industry in developing the way acoustic data are processed and stored. A new document on the HAC format will be forthcoming. The 2003 report of this Group is Doc. B:03.

Study Group on Target Strength Estimation in the Baltic Sea (SGTSEB)

The 2002 report (Doc. CM2002/B:03) and a summary report on the work at the 2003 meeting (Doc. B:05) were presented. The Group now recommends a TS-relationship based on fewer terms than suggested in the 2002 report and to consider some effects included then as corrections to the biomass calculations instead of the target strength. A final report based on previous material and new data presented during the 2003 meeting will be compiled and presented within one year. It is recommended that this report be published as a *Cooperative Research Report*.

2003 ICES Symposium on Fish Behaviour in Exploited Ecosystems

The symposium with Å. Bjordal (Norway) and S. Walsh (Canada) as conveners attracted 180 participants from 31 countries. A total of 61 oral presentations and 52 posters were given within the five sessions. Forty-six papers were submitted for review to the ICES Journal of Marine Science. Three editors are involved in the process and work is progressing with 50% of the manuscripts covered. It is expected that there will be a 20% rejection rate; several are too long and need to be shortened. The final selection of papers will be published by the end of 2004.

Fisheries Technology Committee and Consultative Committee business

Election of new Chairs for WGFAST and WGFTFB

The Committee welcomed the incoming Chairs of WGFAST, David Demer and of WGFTFB, Norman Graham and thanked the outgoing Chairs, Yvan Simard and David Somerton for their hard work in the past three years.

On the matter of the 2004 elections for the incoming Chair of the Fisheries Technology Committee, the present Chair reminded members who may be interested to stand for election to have permission from their institute and/or their National Delegates prior to the 92nd Statutory Meeting in Vigo.

Matter arising from the Advisory Committee on Ecosystems (ACE)

The Chair of FTC attended the ACE meeting as an *ex officio* member, at ICES Headquarters in May 2003 and for the ACE Consultations at this Conference. A request by the Chair of WGECO for information on the effect of static gears on sensitive habitats was forwarded by the FTC chair to WGFTFB who have incorporated it into their 2004 meeting agenda. At the meeting of ACE earlier in the week, ACE was informed that there may be a forthcoming request from EU-DG-FISH for information on the effect of low-frequency sonars on

marine mammals. When this request arrives it will be forwarded to both WGFAST and the Working Group on Marine Mammal Ecology via the Advisory Process.

Matters arising from the ICES Consultative Committee

ICES Action Plan

The Chair presented the new Implementation and Audit Programme for the ICES Action Plan which will be used to track progress on the Action Items related to the FTC. The audit calls for linking the terms of reference from the applicable Expert Group with the output in 2003 for each Action Item. The committee members thought that this would be a cumbersome task in that some Action Items are linked with up to 5 committees, resulting in 5 outputs for that one item. At the end of the 5-year plan this would amount to a 5 *X* 5 matrix from which no one would be able to effectively collate the responses for this one item. Suggestion was made to automate the plan into a database whereby one could access it electronically. The database could use the terms of reference numbers and report numbers as the coding scheme. Other comments were related to how the number system would change when an Action Item was dropped or when a new item was added. The Chair agreed to take these concerns forward to the Consultative Committee.

The responsibility of filling in the Action Plan audit in 2004 will be the Chairs of the various Expert Groups.

2005 ASC/Statutory Meeting format

The Committee was informed that the 2005 ASC meeting in Scotland will have several changes in format and all Committees have been asked by the Consultative Committee for their comments. The Committee agreed that 2 sessions (4 hrs+2 hrs) allocated to FTC were sufficient to carry out its business. It also supported the idea of having the first meeting start during the ASC, not the day before as it now stands.

New Committee business

Forthcoming theme session topics, workshops, and symposia

The Committee recommended the following workshop:

A workshop on "Survey design and data analysis". Conveners: P. G. Fernandes (UK) and M. Pennington (Norway) to be held in Aberdeen, UK, for 5 days in late May or early June, 2004 (with LRC).

Rationale: There are a number of demands being made on surveys that have not been required in the past; changes to assessments based solely on surveys, improved survey efficiency and tools, incorporation of new instrumentation, ecosystem monitoring. In addition there is a need to protect against legal challenging of methodology and results. There is an urgent need to develop robust surveys that meet today's demands and that are soundly based in science.

The Committee considered various topics for theme sessions for the 2005 meeting:

1. 2005 joint FTC-RMC theme session on "Technologies for monitoring fishing activities and observing catch". Conveners: Bill Karp (FTC), USA, and Kjell Nedreaas (RMC), Norway**.**

   Rationale: Accurate and precise catch accounting is generally required for effective TAC or IFQ management. Traditional approaches for collecting this type of data include industry reports, port sampling, and deployment of observers, but costs and logistical considerations limit the extent to which human resources can be deployed to collect catch information. This theme session will focus on evaluating developments in this area and identifying technological approaches that can be implemented to meet objectives for monitoring fishing activities and catches.

2. 2005 joint FTC-MRC theme session on "Quantifying, summarizing, and integrating total uncertainty in fisheries resource surveys". Conveners: David Demer, USA, and Steve Smith, Canada.

   Rationale: Fisheries management requires risk assessments and methods for quantitatively evaluating change in fish stocks or ecological systems. To evaluate risk and change, fisheries managers and scientists must be armed with quantitative understanding of survey uncertainty that includes all of the components of measurement and sampling error, both random and systematic.

3. 2005 FTC theme session on "Three-dimensional classification and characterisation of pelagic ecosystems". Conveners: Arnaud Bertrand, France, and one convener from the Oceanographic Committee or from the Marine Habitat Committee**.**

   Rationale: Aquatic ecosystems are fundamentally structured in three dimensions. All physical, chemical, and biological properties show strong gradients (e.g. coast/offshore, north/south) and complex structures (e.g. fronts, eddies, coral reefs) along the vertical and the horizontal, which define particular habitats for pelagic and benthic organisms. An understanding of the relationship between the environmental characteristics and the organisms is necessary, as well as the intra- and inter-specific interactions required to preserve the three-dimensional context where these interactions take place. New technologies to

efficiently collect, compute, and display three-dimensional multivariate data on aquatic ecosystems are now available. This session will show the present state of these emerging new ways to look at aquatic ecosystems in their intrinsic three-dimensional spatial context.

4. 2005 joint FTC-LRC theme session on the "Development of effective and acceptable gear modifications and alternative fishing tactics to reduce the bycatch and mortality of cetaceans, pinnipeds, and sea turtles in trawl and static gear fisheries". Convenors: Norman Graham, Norway, Dominic Rihan, Ireland, and Simon Northridge, UK.

   Rationale: The bycatch of cetaceans, pinnipeds, and sea turtles in fishing operations is an issue of growing concern globally to organizations such as the European Commission and FAO, under pressure from NGO's and the general public. Given the current state of research into this topic, notably in European fisheries, it is an opportune moment to review and evaluate all work and identify proven solutions in both trawl and static gear fisheries, with potential for technology transfer into other fisheries with similar bycatch problems.

The Committee agreed that these four theme sessions should be put forward to the Consultative Committee for inclusion in the 2005 programme.

With regard to a proposed 2006 theme session on "Integrated assessments for the North Sea", being planned by the Regional Ecosystem Assessment Group (REGNS) of ACE, the Committee reviewed the background for this session and concluded that it felt that it would be appropriate to contribute to this session. The Chair will continue the dialogue with the Chairs of REGNS and ACE.

The Committee approved a draft resolution for the following symposium to be held in 2006:

A symposium on "Fishing technology in the 21st century" will be held in Boston (or New England), USA for 4 days in November 2006 with Chris Glass (USA) and Bob van Marlen (Netherlands) as conveners.

Rationale: Scientific understanding is necessary to mitigate the negative aspects of commercial fishing while protecting the right to continue fishing operations. The objective of the symposium is to attract contributions from around the world to address issues relating to bycatch and discard from commercial fishing operations and to fishing gear impact on sensitive habitats and marine resources, as well as on the performance of fishing gears used in fisheries-independent scientific surveys to estimate the resources. Collectively these issues have not been addressed since the world symposium in St Johns, Newfoundland in 1988.

The Committee also noted preliminary plans for the following proposed symposium in 2007:

2007 symposium on "Acoustics in aquatic ecology" (tentative title) – Rationale: Further development of title, place, time, conveners, and scientific justification will take place at the WGFAST meeting in Poland in 2004.

Draft resolutions

All existing resolutions for the continuing work of the present Expert Groups were approved by the Committee. Two study groups have finished their mandate, SGMESH and SGRSFTC and the Committee thanked Ronald Fonteyne and Steve Walsh and their group members for the excellent work shown. Two new Study Groups were proposed as follows:

- Study Group on Collection of Acoustic Data from Fishing Vessels [SGAFV] (Chair: W. Karp, USA), which will meet in Gdynia, Poland, on April 16-17 2004.
- Study Group on Unaccounted Fishing Mortality [SGUFM] (Chair: Mike Breen, UK), which will work by correspondence in 2004.

In addition two resolutions regarding the production of *ICES Cooperative Research Reports* were proposed:

- "Mesh Size Measurement Revisited", edited by R. Fonteyne (Belgium) and R. D. Galbraith (UK);
- "The *Nephrops'* fisheries of the Northeast Atlantic and Mediterranean – A review and assessment of fishing gear design", edited by N. Graham (Norway).

Keynote speaker on acoustics at the 2004 ASC

The Chair informed the Committee that at the mid-term meeting of the Consultative Committee, he put forward the idea that a keynote speaker on the use of acoustics in ecosystem research should be considered among the keynotes selection for the 2004 ASC. The Consultative Committee tentatively agreed. A small *ad hoc* group (Y. Simard, F. Gerlotto, and O. R. Gødo) was formed by e-mail and met in Bergen at the WGFAST meeting to look at the possible suggestions. Using this list and the suggestions from the Consultative Committee, the group made a proposal which has been passed on to the Consultative Committee.

Figure B1. Photograph of a *Nephrop* (left) and a porpoise wrapped in netting – relating to the two sections of Project NECESSITY (**NE**phrops and **CE**tacean **S**pecies **S**election **I**nformation and **T**echnolog**Y**) which addresses current selectivity and bycatch issues in *Nephrops* and pelagic fisheries.

Website hosting

Because of new NOAA security rules, AFSC cannot be the host for both WGFAST and WGFTFB webpages after the end of this year. After discussions with the ICES Web Master it was clear that ICES could not provide us with the requirements we need to make our webpages workable, i.e. continuous uploading of new information in a timely manner, on-line meeting registration, list server, etc. Before the end of the meeting we had a tentative offer from IMR in Bergen to host the website. Dave Somerton has volunteered to coordinate the switch-over of websites.

Future meeting locations

2005 FAO, Rome
2006 Ege University Izimir, Turkey

Dave Somerton has volunteered to continue further communications with both host countries.

Membership lists

The Chair noted the large number of un-registered attendees at the WGFAST and WGFTFB meetings in Bergen 2003. The Chairs were asked to be more diligent in handling this matter, but the Committee also recognised that it will be a continuing problem since these two working groups, which have a technological mandate, attract a lot of new people who may be unfamiliar with the registration process. One suggestion from the secretariat was to hold our meetings as workshops, since there are no restrictions on who can attend these, and use the day after for *bona fide* members to synthesize the workshop proceedings into terms of reference for the following year. Unfortunately there was insufficient time to discuss this suggestion.

New and on-going science initiatives

Bob van Marlen presented to the Committee an overview of Project NECESSITY (**NE**phrops and **CE**tacean **S**pecies **S**election **I**nformation and **T**echnolog**Y**) (see Figure B1). NECESSITY is a 7.5 million euro, pan-European project to address current selectivity/bycatch issues in *Nephrops* and pelagic fisheries, including cetaceans in the latter. The project will start in January 2004 and last for 38 months.

For the *Nephrops* section, the objectives are to develop effective and acceptable gear modifications (bycatch reduction devices) and alternative fishing tactics in co-operation with the fishing industry to reduce the bycatch and mortality of non-target fish species in European *Nephrops* fisheries, and determine the biological effects and socio-economic repercussions.

For the Cetacean section, the objectives are to develop effective and acceptable gear modifications (bycatch reduction devices and acoustical deterrents) and alternative fishing tactics in cooperation with the fishing industry to reduce the bycatch and mortality of cetaceans in European pelagic fisheries, and determine the biological effects and socio-economic repercussions.

New format for FTC meetings

The Committee expressed interest in learning about Project NECESSITY and similar projects. It supports the idea of setting aside time to discuss such projects which permit the exchange of ideas between the Expert Groups. The Committee also felt that less time should be spent on hearing the summaries of the various Expert Groups' reports; this would free up more time to identify priority areas for future activities and allow ample time to review ongoing scientific work. The discussion of science development over the next 5 years as it pertains to our Expert Groups is necessary for the Committee to continuously update its Action plan and the ICES Action Plan.

Closure

The Chair thanked everyone for their excellent contributions and gave special thanks for the outgoing Chairs of the various Expert Groups and the Rapporteur. The meeting adjourned at 13:00.