

Executive summary

The ICES-FAO Working Group on Fish Technology and Fish Behaviour (WGFTFB) chaired by Mike Pol, USA, met in Reykjavik, Iceland from 9 to 13 May 2011 to address four Terms of Reference. The main outcomes related to the ToR's are detailed below.

Key Findings

Incorporation of Fishing Technology Issues/Expertise into Management Advice (Section 14)

- Decommissioning continues in some countries (France, Belgium (10% of the fleet) and Sweden), and effort continues to decrease for a variety of reasons. The largest number of vessels leaving a fishery (>50) was reported in the elver fleet in France. Small numbers of vessels were added to fleets in Italy, Netherlands, Sweden, Ireland, and Belgium.
- Vessels are altering gear use in response to high fuel prices, generally away from higher energy gears such as beam trawls and bottom trawls, to gears requiring less fuel, such as Scottish seines and static gears. For example, increasing use of SumWing, a hydrodynamic beam trawl that fish off the bottom was reported by Belgium and the Netherlands. Over 10 large beam trawlers have installed new engines, propellers and Kort nozzles in Belgium.
- Shifts away from mobile high energy gears commonly also reduce bottom impact, and thus the motivations for and benefits of a shift sometimes overlap. Shifts related directly to bottom impact included the use of off-bottom doors in several countries as well as electric pulse dredging.
- In some cases, the benefits of the gear shift were unclear: some French vessels shifted from Nephrops twin trawling to single rig trawling to reduce fuel consumption; conversely in the Mediterranean, French and Italian vessels shifted from single rig trawling to twin trawling.
- Several significant changes for the Mediterranean were reported. Italy in the Northern Adriatic Sea prohibited the use of towed gears within 3 nautical miles from the coast (with some derogations). The implementation of EC regulations requiring a minimum mesh size and shape of 40 mm square, with 50 mm diamond allowed "at the duly justified request of the shipowner" was broadly felt in Spain and Italy.
- Demand from retailers for certified or "green" fish was noted by industry in Belgium.

Redfish fishing technology and physiology (Section 15)

- An inventory of gear specifications (such as mesh size, trawl design, trawl orientation) used in harvesting redfish in member countries was created using the information available during the meeting.
- Redfish selectivity information from Russia, Canada, Norway, Germany and Iceland was summarized by the participants. Different experimental designs and lack of information about codend construction and rigging for some trials require caution in the interpretation of the reported selectivity parameters.

- Morphometric data are available for five species of redfish in the North Atlantic. Applying conclusions from morphometric data for one *Sebastes* species or population to others was deemed inadvisable based on these data. Collection of cross sectional data following FISHSELECT protocols are planned as part of joint efforts between participants in the topic group for *S. marinus* and *S. viviparous*, and perhaps *S. mentella*.
- The topic group recommended that: further studies on redfish selectivity be carried out on a species-specific basis; morphometric data collection for different redfish species beyond those previously studied be enhanced; initiation of investigations on new gear designs and devices to improve the current rates of escapement of redfish during towing and to reduce stickers. The group will continue its work intersessionally and at the 2012 WG meeting.

Small boat selectivity (Section 16)

- No evidence was found that there are any differences in selectivity of larger/smaller and higher/lower powered vessels from the catch comparison, selectivity and discard data reviewed. However, it was concluded that to prove this lack of difference definitively would require further analysis and ultimately a series of dedicated trials on vessels with a range of engine powers and in controlled conditions.
- A number of parameters were identified that may be influenced by the size or power of a fishing vessel, and lead to differences in the selectivity of larger/smaller and higher/lower powered vessels. These were: size and design of fishing gear; sea state; light levels; towing speed; catch size; codend design; and fishing operations.
- The work of the topic group was concluded.

Innovation in Fishing Gear Technology (Section 17)

- Saving energy coincides well with reducing seabed impact and bycatches, as gear components are designed with less bottom contact and releasing unwanted bycatches avoids the need to drag these inside the net and bring these aboard. Substantial energy savings can be obtained with gear modifications.
- Success of introducing new selective, low impact and fuel efficient gears depends very much on strong (economic) incentives for fishers to use them. Examples are sharp rises in fuel prices, threats of closing areas when selective gears are not used, enforcement by law, and fish products losing markets if not caught in a sustainable manner.
- The scientific community, having specific knowledge of fish behaviour, and not being restricted by the need to earn from catches, proved to be able to develop prototype fishing gears that can play a role in diminishing adverse ecosystem effects and produce better economy, but getting these applied was often difficult.
- It helps when fishers identify themselves with potential solutions, instead of being told what is good for them, and involving them more directly in identifying research needs leads to higher motivation and acceptability.
- Fishers' views and attitudes are changing as the world around them is changing, but they must be enabled to earn their living at sea.

- Best results may be obtained if scientists and fishers are working closely together to avoid the development of unsustainable ecosystem unfriendly technologies and practices. Cooperation between fishers and scientists needs to be stimulated, with emphasis on open-minded attitudes on both sides.