

The North Sea Regional Advisory Council



Report on Nephrops Long Term Management Focus Group

Date: Wednesday 30 May 2007 10:00 -16:00
Venue: Scottish Executive Victoria Quay Edinburgh
Chair: Mike Park
Rapporteur: Pim Visser
Attendants: See separate list

Mike Park opened the meeting welcoming the many attendants, thanking the Scottish Executive for use of their facilities.

Rationale for this meeting lies in the decision of the NSRAC Demersal Working group of June 2006. It was decided at that time to set up 5 long term focus groups to look at long term fisheries management plans. The Terms of Reference for the meeting were stated by the chair; to discuss elements which could help build a long term (multi annual) management plan for North Sea Nephrops

History

Nick Bailey (FRS Aberdeen) presented the framework for provision of advice on Nephrops. (Presentation attached or made available on the website)

Background

The animal (*Nephrops norvegicus*) lives from Iceland to Morocco and North Sea to Israel. Landings in the North Sea have increased significantly over the last 20 years with relative importance of the fishery growing substantially over the same period. The Farn Deeps fishery shows a gradual growth over recent times with the Fladen Grounds fishery also increasing significantly over the last 5 years. The Fishery in the Botney Grounds by Belgian fleet has declined over time, but Dutch and German Fishers have increased their activity in this area. Horns Reef is also fished by Dutch, Danish and German fishers..

Biology

Due to the discontinuous growth, ageing of the animals is not possible and the males and females display different behavioural traits. There is no recruitment index due to a large gap between larva and grown animals (2.5 years). The animals live in burrows, and the fishing is affected by time of day (dusk and dawn), tide and wind (in some cases); all these situations/actions determine whether or not the animal leaves the confines of the burrow.

Framework

The West Coast TAC for Nephrops was set in 1986. around the same time as the first evaluation of the stock. A North Sea TAC was first set in 1992. Untill 1995 ICES assessed the Nephrops stock annually, since 2004 ICES has assessed the stock bi-annually, although assessments were carried out in both 2005 and 2006.

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Providing advice for Nephrops is not straightforward constantly presenting a challenge to the ICES systems as-well-as the STECF 'stock review' group which has led to a mixture of misunderstanding and difficulty.

Spatial considerations must be taken into account due to the component structure of the stock. Effort would seem to be an issue, as is catch considerations. Internal management considerations for specific stocks may be required, with stock regional caveats on either TAC restrictions or effort ceilings. So far more questions than answers.

Facts about interchange of regional populations are unknown! Research does not show a change in distribution pattern, although fishermen have noticed a wider spread of the animal in recent times. The soil in which nephrops make their burrows is post glacial (around 10-11.000 years old). These areas have not moved however, in some areas larva seem to settle while in other areas larva move. Again more uncertainties.

Helen Dobby (FRS Aberdeen) presented the research on possibilities and impossibilities of stock assessment. (Presentation attached or made available on the website)

Two stages:

1. Retrospective analysis to theoretically reconstruct the size of the stock biomass and estimate fishing mortality.
2. Forward predictions of catch and stock size using best estimates of future mortality and biology.

Difficulties in research or modelling of this kind seem to be prevalent with the main hurdles lying in the analysis of landings, effort, LPUE, mean size, length cohort analysis and yield per recruit although age cohort analysis (VPA) also creates its own set of difficulties. More recently other methods, like dynamic length base methods were introduced. An additional problem seems to be the overestimating of fishing effort.

A conclusion at this stage would be that the above method has not provided the answers to the questions on stock assessment although we should be wary of interpreting this as there being no answers. The presentation on TV surveys will show developments in that field.

Analysis show there is no decline in the number of larger animals, despite increased fishing.

There are now newer models in Australia and New Zealand, there are however insufficient time series of reliable commercial data for analytical assessments. Dynamic Pool Assumptions may not be appropriate for sedentary species. Previous methods deemed unsuitable, have been rejected by ICES. Research is continuing

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Given all of the above information it is still extremely difficult to come up with a figure which is truly representative of MSY.

The analytical approach would only be feasible if further information was known about the biology of the animal. TV surveys may give an amount of additional information and perhaps act as tuning for the analytical model although Nick Bailey thought that camera surveys provided more than this.

A question was asked on what the best management tool would be, input or output (effort restrictions or TACs) although questions were raised in response to the question about assessing actual levels of effort in the fishery.

Ken Patterson brought the economical angle in the discussion. Answer: there are different markets for different sizes. So purely aiming at larger animals is not a solution. The fishers suggested that fishing activities have created fishing possibilities (opening up the grounds and making them more fertile). Research seems to back this up although the serious question lies in whether or not the trends have relevance for absolute figures. Last year, the good state of the stock (positive fishing possibilities) took fishermen 'by surprise' in most areas.

Information was also given on the natural life expectancy of nephrops. Males live 10-12 year, female live up to 30 years. Therefore the populations have great possibilities for reproduction a completely different biology from that of finfish.

Nick Bailey (FRS Aberdeen) held a presentation on the use of underwater television camera surveys. (Presentation attached or made available on the website)

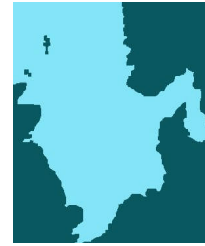
This assessment is based on information 'provided' by the sighting and counting of nephrops burrows which are semi permanent, and stable over time thus providing suitable distribution and abundance data.

Nephrops grounds are muddy areas from a specific period (see above). The Fladen Grounds are extremely large with the other grounds being much smaller in comparison .

TV surveys started in the 50's and were further developed in the 70's. The surveys started as a means of analyzing selectivity of nets and developed into a stock survey. Annual surveys have been carried out since 1992 with FRS (Previously the Marine Lab Aberdeen).being the pioneers in the field.

This type of survey counts the burrows using a towed camera, the appearance of animals is of less importance than the actual burrow count. A sledge with a camera mounted on top is towed by a combined towing/umbilical cord. Small periods of research vessel time lead to multiplied hours of analyzing time.

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Compensations of camera angles, camera and sledge heights and all other technical developments are essential, as they can lead to estimates being out of tune by as much as 25%. FRS has now fine tuned the technical aspects to a high degree of accuracy.

A number of significant northern grounds are being surveyed. Camera surveys of the Horns Reef is soon to be carried out by the Danish institute; the Botney Grounds are not scheduled to be surveyed at this time.

The adaptive survey has 2 stages with the first being a rough sweep, 2nd stage reduces variations. Continuous process such as identification, size ranges of animals viewed vs. caught is used to calibrate the system. Protocols for analysis are required when using different labs.

Percentage of mud (sediment and clay) is an indicator for distribution and abundance of burrows, but populations operate differently in different areas.

Conclusion: TV Camera Surveys provide a good indication of stock status with the survey results showing that stocks are generally stable or increasing. 'despite' increased fishing activity.

Harvest rate approach: Is a departure from average landings in the direction of a % of the stock that can be removed in a given time. The big question is 'what the harvest rate should be'? An attempt was made to find this in a recruit analysis using an arbitrarily chosen point. This resulted in an outcome slightly below F_{max} $F_{0.1}=0.22=19.4\%$ and this is in line with other harvest rules for shellfisheries in the world, where 20% is used. (note: This is higher than earlier STECF assumptions of 7-8% but on the other hand Iceland uses the $F_{0.1}$) The 'gut' feeling is that the actual F is not far away from this 0.1.

A cautious conclusion: Nephrops are fished sustainably at current effort levels however the catch advice remains difficult to provide resulting in a precautionary approach to the issue.

One possible way forward is to use information which is available on existing historical video material, and matching it against what we now know about the stock and fleet effort levels.

Establishing reference points is essential if the status of the stock is to be changed.

What is the confidence as far as TV surveys are concerned? One of the biggest uncertainties lies in the geographical limits of Nephrops inhabited areas, the fishers believe the areas are larger than perceived by the scientific community

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How do we translate this into management? Please note that F0.1 does not translate directly into fishing effort. *Could the fishermen get involved in carrying out TV work?* Yes: as far as the boat involved is capable of deploying the camera unit, but the investment and costs of analysis may be restrictive.

Development of automatic image recognition techniques to analyse the underwater picture is not simple but worthwhile exploring nevertheless. Parts of the North Sea previously ignored will be part of the upcoming survey. This is now developing into a joint UK, DK, D and NL interest

Remark: As far as research is concerned the Botney Grounds are presently a 'dark hole' although the Danish, German and Dutch scientists have recently shown an interest having attended the ICES WG meeting.

The current exploitation regime treats the North Sea Nephrops as one stock, but in fact this stock consists of seven components. Question is, 'could we manage risk better regionally'? From a biological point of view a regional approach might be better although this would be very difficult in view of the current management framework and relative stability issues. Two management extremes are plausible, broad brush or deep detail (in respect of the areas concerned). Management by means of input (effort) tailored to specific stocks/areas seems to be broadly appropriate while others felt that a footnote provision detailing maximum tonnages from more detailed areas was the more appropriate option. However, there seems to be no immediate relationship (yet) between F and effort, so this raises questions (again), about the level at which such a cap would be applied. This discussion was centered on the possible situation where all the effort or TAC descended on one sub stock although it was agreed that the likelihood of such a situation occurring remote

The goal of the Commission is in setting overall levels which promote sustainable fishing (MSY levels). The now Annex II started as a simple document, but as member states tried to ensure a level playing field, it ended up as a collection of detailed regulations and derogations. A means of overcoming this predicament could be the regionalisation (sub stock) of the fishery, taking away the need for complicated derogations. Issues around the reporting of catches and areas catches come from, especially in vessels outside of the VMS regulation, was viewed as a possible hurdle.

At this stage it was concluded that the fishery should not be managed in a regionalised manner although it was envisaged that some caveats would protect the long term stability of the stock .

Ken Patterson advised to focus on managing Nephrops on its own, in such a way that it will not be influenced by the Cod recovery programme. It was argued that this could be well managed by a TAC regime. It was pointed out that we should not confuse management of this completely different, pretty resilient animal, with that of finfish. With nephrops there will always be females in burrows to reproduce.



Long Term Management

We are not equipped with responsiveness to changes in stocks. There is no answer to what is best. There are simply too many uncertainties. *Suggestion:* Set stable TAC controlled by CPUE/LPUE indicators and TV Camera surveys, this in combination with the quality of improved landing data (e-logbook) could be a way forward to reach a level of fishing mortality we want to aim at.

Could Maximum Economic Yield (MEY) play a part in any long term plan? It could be argued that this would lead to a more conservative approach than the system which uses MSY as the target. FRS is to draw up a template for the biological component of a long term management plan although it would be foolhardy to expect surprises or miracles. It will not be too different from what has been brought forward so far, as there are no more tools in the toolbox than have already been presented.

A comment was made that both MSY and MEY are too simplistic and theoretical approaches. A suggestion was made to have a simple management plan in place with use of progressing knowledge delivering all the information. In a few years time we can use the improving knowledge to get management systems to a higher level of robustness.

Ken Patterson mentioned the progressing views, where (even) MSY already seems too high a level. So therefore MSY has 'progressed' to be the absolute maximum to aim at.

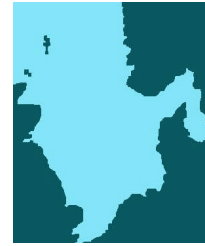
The problem remains in translating the output of an agreed long term plan to appropriate TAC's. A simple effort system coupled with a likewise simple monitoring system of reference points used as the beacons for adjustment up or down seemed to be the preferred route.

In addition it was felt that for the picture to be complete adequate information was required from less regulated sectors such as the under 10 metre fleet.. Their landings are fully counted, but their effort is not, this influence varies from region to region. The issue of the under 10 metre fleet seems to be UK centric

A cap on regional (stock component) effort (Kw-days) in Nephrops fisheries using gears 70-99mm would create a burden on member states who would need to provide accurate data. To achieve this with a degree of success and accuracy it would be necessary to decouple the fishery from the mixed fisheries. If however, mixed fisheries remain you would need to work out a system which takes account of them all.

On targeted fisheries, comment was made that in practicality the skipper of a vessel has no control over the cod end until it is on the deck and as such creating and enforcing catch ratios on a 24 hour basis was viewed as less than practical only serving to promote discards. The 30% catch composition rule in the nephrops fishery leads to perverse results and discarding of unwanted catch by fishermen.

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Extensive selectivity research has been carried out by FRS in recent years, some of it in response to requests from members of the NSRAC. The fishers were posed questions relating to square mesh panels (SMP) and their positioning; most stated that both the standard ‘diamond’ minimum mesh size and the position, length and mesh size of the SMP was at the extremes at the moment leaving very little scope for improvements to be made on a selectivity basis (Catching larger prawns, avoiding cod, develop clean (minimum discard) nephrops fishery).

Industry response to mesh size and selectivity has various drivers, size of boats and grounds, sea state etc. It was felt that fishermen should be encouraged to a larger and more selective mesh size by the use of ‘sensible’ incentives.

Technical problems during the trials were discussed, twisting nets etc. Stainless steel or plastic grids as means of selectivity met with little favour by the fishers being too big to handle and in some cases less effective than square mesh panels this statement was based on a technical paper presented by the Swedish government. It was also argued that choices should be built into the management system as voluntary options.

Should accreditation play a part in the creation of a long term management plan for the North Sea Nephrops fishery? It was agreed that achieving a long term sustainable fishery would deliver the necessary standards. Discussion concluded that initiatives can be taken by groups of fisheries. Markets in NW Europe are definitely asking for it, but interest in southern countries (largest market) seems low although increasing.