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Non-Paper/Northern Hake

A long-term management plan for Northern Hake

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1. INTRODUCTION

In 2004, a recovery plan for the northern hake stock was established (EC Reg. No 811/2004). The recovery plan aimed at achieving a spawning stock biomass (SSB) of 140,000 t (the precautionary biomass limit - B_{pa}), by limiting fishing mortality to 0.25, and by allowing a maximum change in TAC between consecutive years of 15%.

The recovery plan is to be replaced by a management plan when, in two consecutive years, the target level for the concerned stock has been reached, in accordance with Article 6 of EC Reg. No 2371/2002. The International Council for the Exploration of the Sea (ICES), with the agreement of the Scientific Technical and Economic Committee for Fisheries (STECF), evaluates and advices if the targets set in the recovery plan have been reached.

Recent ICES assessments indicate that the northern hake SSB is above B_{pa}. The increase in SSB appears to be due to a combination of good recruitment and moderate fishing mortality. As stated above, a management plan should therefore be established to replace the recovery plan to ensure a sustainable exploitation of this stock in the long-term.

Moving from the current conditions of the northern hake fisheries, towards lower fishing rates, lower discarding and higher stock size, may involve some transitional reduction in catches. This process should be done gradually in order to avoid social and economic disruptions. Thus, the Commission has asked the STECF to evaluate several management scenarios in the long term, considering both biological and economic aspects, in order to prepare the future management plan. This non-paper is thus based on the STECF conclusions of both the biological and economic scientific meetings (STECF/SGBRE/07/03 and STECF/SGBRE/07/05).

Scientific evidence shows that continue fishing at the current rate will put the northern hake stock at high risk in the long term. This in turn will cause high TAC variations, as stability in TAC's can only be achieved from a high stable stock biomass. In the long term, a reduction in fishing mortality will increase yields and economic profitability of the industry, with a small short term impact. This increase in profitability is even more significant considering the present high fuel costs, low profitability of some fleets and the excess fishing effort exerted to the stock.

The objective of this non-paper is to consult stakeholders and Member States in the specifications of the future long-term management plan, to be prepared in 2008 to be implemented in 2009.

2. PROBLEM DEFINITION

2.1. Stock status

Although the northern hake stock has recovered to an SSB above B_{pa}, it is only slightly above this precautionary biomass limit, while the fishery for this stock still has overcapacity and experience high discarding rates, particularly of juvenile hake.

2.2. Associated species

The fisheries that catch significant quantities of hake also have important catches of other commercial species such as *Nephrops*, sole, megrim and anglerfish. Some of these stocks are also experience high fishing mortalities, and a reduction in either fleet capacity or fleet activity will improve the status of this stocks.

For megrim in the Celtic Sea and Bay of Biscay, a reduction in fishing mortality of almost 60% is needed to bring the fishery to MSY levels. The fishing mortality exerted to anglerfish in the same area will also have to be reduced by 44% to reach MSY. These figures are referenced to 2006 and already take account of reductions in fishing effort made by several Member States since 1999.

2.3. Overcapacity

Excessive fishing mortality in relation to maximum sustainable yield is an indication of excess capacity. After a transitional period for the stock to rebuild, catches could be the same or higher than at present but could be caught with a smaller fishing fleet and lower variable costs, including lower fuel burn.

2.4. Discarding

2.4.1. Hake

Rates of hake discards are not known because national discard sampling programmes do not cover all fleets contributing to hake catches. Nevertheless, the available information suggests that discard rates can be as high as 95% in some years and in some fisheries, particularly for individuals of age 0 and 1.

2.4.2. Other species

Many other commercial species, but also non-commercial, are discarded by the hake fisheries. A reduction in fishing activity will also minimize discarding of these species.

2.5. Ecosystem considerations

Overfishing seems to be a general feature of the ecosystem of a major part of the geographical area of the northern hake stock. Landings of demersal species increased up to the mid 1960s, but since the mid 1980s landings have declined substantially in the Celtic Sea and Bay of Biscay (Figure 1). The fish in the catches are also becoming progressively smaller (Figure 2), with a consequence increase of discards of juvenile fish.

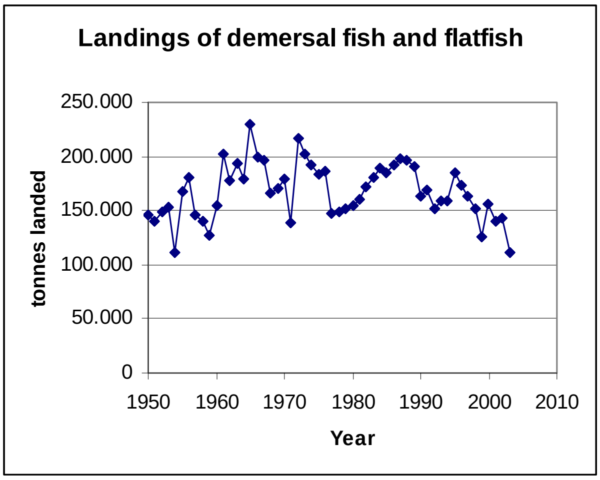

Figure 1. Landings of demersal fish and flatfish in the Celtic Sea and Biscay area. (source: http://seaaroundus.org/lme/SummaryInfo.aspx?LME=24).

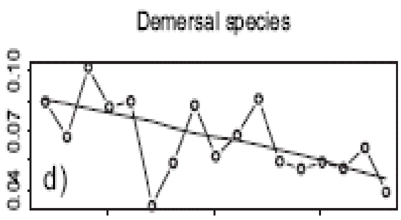

Figure 2. Average weight of individual demersal fish caught in the Celtic Sea in the period 1985-2005 (Kg). Reproduced with permission[1]

3. THE SECTORS AFFECTED

3.1. Identification of the sectors

The sectors affected are fishing vessels from Spain, SW France, SW Ireland and SW UK, and associated on-shore processing industries. Spain accounts for the main part of landings with 59% of the total hake landings in 2006. France was taking 26% of the total, UK 6%, with Ireland and Denmark taking each 3%.

The main fisheries identified are:

- "Long-lines" fishing in ICES Divisions VII, targeting hake (mainly Spain), with 22% of landings;
- "Gillnets" fishing in ICES Divisions VII and VIII, targeting mostly hake and sole (mainly France), with 21% of landings;

[1] Do climate change and fishing influence size-based indicators of Celtic Sea fish community structure? Blanchard, J.B.; N.K. Dulvy; S. Jennings; J.R. Ellis; J.K. Pinnegar; A. Tidd and L.T. Kell. ICES Journal of Marine Science, 62: 405-411.

- "Demersal" trawlers fishing in ICES Divisions VII targeting anglerfish, hake, megrim (mainly France, Spain), with 33% of landings;

- "*Nephrops*" trawlers fishing in ICES Divisions VII; targeting *Nephrops* but taking by-catches of anglerfish, hake and megrim (mainly France).

3.2. Current size of the sectors and economic dependency on hake landings

France in 2006 had around 650 vessels engaged in fisheries for hake, while Spain had 197 vessels in 2004. Of the main fisheries identified in the previous section, the following have a high economic dependency on hake landings:

- "Long-lines" depend highly economically on hake landings (around 70%) although in France this fishery (only 5 vessels) catches low quantities of hake (7% of French landings), while in Spain the fleet consists of 84 vessels catching 44% of the Spanish landings;

- "Gillnets" consist of 78 FR vessels catching 57% of the total French landings;

- "Demersal" trawlers include 160 French vessels (corresponding to 15% of French landings) with low economic dependency (<6%) on hake landings. Spain has 113 vessels involved in this fishery (with 56% of Spanish landings), the majority of which have a higher dependency (20%) on hake landings.

"*Nephrops*" trawlers include 204 French vessels (10% of French landings), the majority of which have very low economic dependency (<4%) on hake landings.

3.3. Magnitude of the effect on the sector

The long-term plan may include the progressive adjustment of TACs that will allow the stock to be above B_{pa} at a low risk in the long term. This is achieved by an annual reduction in fishing mortality until reaching the long term fishing mortality target.

The economic analysis carried out by STECF concludes that there will be a small impact in the short term on the fisheries subjected to a reduction of fishing mortality. Nevertheless, after a period of stability, catches will increase in the long term, and thus profitability of the sector will increase very substantially. If the exploitation pattern of the fisheries involved is improved the long term benefits are even higher.

STECF also concluded that the impact on the sectors on shore will be of minor importance since most of the hake caught is sold chilled with very little processing.

3.4. Mixed fisheries considerations

Hake is caught in mixed fisheries where other by-caught species have economic importance. Of these, *Nephrops*, megrim and anglerfish are the most important.

A reduction in fishing mortality on hake will also reduce the fishing mortality on the accompanied species. However, STECF concluded that the magnitude of the decrease on megrim and anglerfish fishing mortality will be lower than on hake. The yields of these species will increase in the long term, although only in one species to higher levels than at present. This fact may highlight the need for further reduction in the fishing mortalities of these stocks, to unable them to recover in the long term.

4. POLICY OPTIONS

Maintaining present levels of fishing mortality will put the northern hake stock at high risk in the long term. STECF concluded that a reduction of current fishing mortality will increase the stock biomass and thus landings in the long term. Furthermore, for a small economic impact in the short term, a reduction in fishing mortality will yield high economic benefits and stability in TACs.

The main question is how to reduce fishing mortality. This can be achieved by improve selectivity and/or reduction of fishing effort. Improving the exploitation pattern of the fishing fleet is an aspect acknowledged by both STECF meetings that will increase benefits of the management plan in the long term. Reducing fishing effort, on the other hand, may be considered as a better choice since it will also reduce costs. Nevertheless, both options will lead to adjustments in annual TACs.

The long term management plan for northern hake may therefore include the following elements:

→ Rules for setting TACs on the basis of scientific advice that will lead to exploiting the northern hake stock according to MSY within a medium-term timeframe;

→ Technical measures for special protection of hake juvenile and to reduce discards;

→ Industry's voluntary decommissioning targets, a possibility available in the operational programmes of each member State;

→ Provisions for periodic review and adaptation of the plan.

4.1. MSY targets

A long term management plan needs to include achievable and measurable long term objectives, that will ensure a sustainable exploitation of the fishing resource. These are usually related to fishing mortality targets and are set by the MSY approach.

STECF chosen F_{max} (0.17) as the long term target fishing mortality since F_{max} is well defined for Northern hake, is quite stable between years, and does not depend on the S-R relationship assumed. Furthermore, with a harvest control rule based on 0.17, SSB will increase above B_{pa} and remains stable regardless on the S-R relationship assumed.

Nevertheless, it is necessary to review the long-term plans and to keep under review (according to scientific advice) the latest perceptions of appropriate objectives. These are likely to need adaptation as ecosystems change and as changes to environment and climate affect fish populations.

4.2. Harvest Control Rules

To maintain a healthy fishing industry and the northern hake stock, the harvest control rules need to be established in order for the exploitation of this resource to be sustainable in the long term.

An annual rate of 10% reductions in fishing mortality should be a minimum standard considering the variability in the system and the natural increase in fishing efficiency. The question is then what should be, overall, the speed of the reduction of fishing mortality towards the objective of 0.17

4.3. Technical measures

STECF concluded that an improvement in the exploitation pattern of the northern hake fishery will considerably improve the benefits of the management plan in the long term. Furthermore, the target fishing mortality may be reached sooner by improving the exploitation pattern.

The long term management plan may foresee the introduction of technical measures that protect juvenile hake and reduce discards.

4.4. Overcapacity

In a situation of low economic profitability, with a reduction of fishing effort and increasing fuel costs, a possible economic solution might be a reduction of overcapacity accompanying the options described above. The removal of excess fishing capacity will increase the economic benefit of each remaining vessel by increasing the available fishing opportunities per vessel and will reduce costs.

4.5. Control measures

To maintain a healthy fishing industry and the northern hake stock, the plan must include specific control provisions, adapted to the nature of measures foreseen in the plan. Possible measures may include:

– The reduction of flexibility that now exist between different areas, where quantities of Northern hake allocated to zone VI and VII maybe caught in area VIII and vice versa

– The prohibition to fish in both quota zone (VI and VII) and zone (VIII a, b, d, e) during the same trip (at least as long as the electronic logbook is not universally implemented).

– The need to draft a specific control and inspection programme to make possible for the European Control Agency to draft a Joint Deployment Programme in 2009

– The control rules will have to be adapted to management measures. Beyond existing control measures, it could be envisaged to develop standard control measures for long term management plans. Such measures could include:

  (a) Designated ports and times, including previous authorisation to land

(b) Pre-notification of catches of all species from a certain threshold

(c) Compulsory weighing of catches at landing and before transportation

(d) Definition of a more restrictive margin of tolerance between estimations made by the master and quantities actually landed

(e) Separate stowage of catches

(f) Prohibition of transhipments at sea and/or in port

5. COMPARING THE OPTIONS

Based on existing information, a number of questions can be raised within each policy option for consultation with the relevant industry sectors.

5.1. Management of fishing mortality by TAC and effort

Annual fishing opportunities could be adjusted in order to reach long-term management objectives. Consideration needs to be given as to (a) which fishing opportunities should be adjusted: TACs, fishing effort or both; (b) how would fishing effort be reduced: reduction of kw/days-at-sea, "scrapping" vessels or both? (c) how much should the fishing opportunities be adjusted annually?

5.1.1. Which fishing opportunities should be adjusted: TACs, fishing effort or both?

Purpose: A reduction of TAC may reduce the fishing mortality of adult hake, but may also cause high-grading and increase discards of hake. A reduction of fishing effort will ensure a reduction in hake fishing mortality but may reduce, in the short term, catches of associated species. It will nevertheless decrease discards of hake and all by-caught species.

> Should a regional KW-days limit be applied in parallel with the TAC adaptations in order to prevent high-grading and discarding of all species?
>
> Should the 15% rule of maximum change of the TAC be maintained? Should it be changed to 10%?

5.1.2. How can fishing effort be reduced: reduction of kw/days-at-sea, decommissioning vessels or both?

Purpose: A reduction of fishing effort will ensure a reduction in hake fishing mortality and will also decrease discards of all species. However it may also reduce, in the short term, commercial catches and thus the profitability of the fishery. This may be compensate by a reduction in fishing capacity, particularly considering the high and increasing costs of fuel.

> Which sector(s) of the hake fishery will reduce capacity? By which amount?

5.1.3. How much should the fishing opportunities be adjusted annually?

Purpose: The rate at which the long term objective is reached will determine the short term impacts but also how soon the benefits of the management plan will be reached. It is important to note that an annual rate of 10% reductions in fishing mortality should be a minimum standard considering the variability in the system and the natural increase in fishing efficiency.

How fast should we move to reach the long term objective? By an annual rate or by a higher rate fixed for a specific period of time?

5.2. Technical Measures

One of the main issues identified by both biological and economic scientific meetings was the importance of improving the exploitation pattern of the hake fishery to increase the benefits of a long-term plan. The question that arises now to stakeholders is *how to improve the exploitation pattern of the hake fishery?* This general question can be divided into several questions:

5.2.1. Should the mesh size for the hake gillnet fishery be increased from 100mm to 120mm?

Purpose: to reduce discards of medium size hake, to reduce discards of other commercial and non-commercial species; to help reduce overfishing of anglerfish and megrim.

Is a different value than 120mm appropriate?

5.2.2. Should the mesh size of the Nephrops fishery be increased?

Purpose: To reduce discarding of juvenile hake. The Celtic Sea fishery has increased its mesh size from 70 to 80 mm in recent years. In the Celtic Sea and Bay of Biscay fisheries square mesh panels were also introduced that significantly reduced hake discards. However, can the selectivity for hake be improved further in these fisheries?

What is the largest mesh-size that can be used without losing important catches of *Nephrops*?

5.2.3. Should the mesh size of the demersal fishery less than 100mm be increased?

Purpose: To reduce discarding of juvenile hake. Can the selectivity for hake be further improved in this fishery?

What is the largest mesh-size that can be used without losing important catches of commercial size hake, sole, megrim and anglerfish?

5.2.4. Can an (several) area(s) be closed to fishing to protect hake juvenile?

Purpose: To reduce mortality of juvenile hake. There are at least to areas, one in the West of Ireland and the other in the Celtic Sea, that have been identified as a nursery ground for hake.

What size of the area should be closed? Should it be closed seasonally or annually?

6. ANALYSIS OF IMPACTS

6.1. Environmental impacts

The environmental impact of fishing is related to the amount of fishing effort deployed. Two broad categories can be defined regarding direct and indirect impacts: on bycatch species and on fishing mortality, respectively.

In the demersal trawl fishery bycatch species are mainly non-commercial fish species (e.g. boarfish, dragonets, etc.), most of which that die; but also harbour porpoises and dolphins caught in gill nets and a variety of benthic invertebrates caught in *Nephrops* trawls.

The mortality rate of commercial species can be unnecessarily high. For overfished stocks, the stock sizes are brought down to lower levels than necessary for taking the highest catches and to levels where their productivity is reduced. This has three indirect environmental consequences:

- species interactions change as prey availability to predator species in the ecosystem is reduced by removing biomass (landed fish), while to other species more food is available trough discards;
- more fuel has to burn in order to maintain commercial catches;
- more small fish are discarded, because the abundance of larger fish is relatively low.

6.2. Economic Impacts

STECF was asked to carry out an economic analysis of a progressive annual reduction of fishing mortality, with accompanied TAC changes restricted to 15%, of the fisheries that catch hake. STECF concluded that the cost of the investment of reducing fishing mortality to MSY is relatively low, between 1% and 5% of the GVA, depending on the fleet and reduction policy. The payback period is always between 10 and 15 years, i.e. relatively long. In addition, the small short term impact may be further reduced by voluntary decommission of vessels belonging to fleets with low profitability due to increasing fuel costs.

After a period of stability, catches will increase in the long term, and thus profitability of the sector will increase very substantially. STECF predicts that landings will increase around 48%, to 62000 tonnes in the long term. If the exploitation pattern of the fisheries involved is improved the long term benefits are even higher, increasing up to 60%. A larger stock biomass will generate higher catch per unit of effort and hence less running costs and higher value of landings for the fleet.

Table 1 - Example of costs of reducing current fishing mortality (Fsq) to MSY (Fmax) for the aggregated fleet segments of Spain and France.

TIME HORIZON: short and	Costs in absolute terms to move	Costs in relative terms to move to

medium term (2008-2016).		to *Fmax* from *Fsq* (€ million GVA)			*Fmax* from *Fsq* (%)		
	POLICY OPTIONS	*Fmax*	*80% of Fmax*	*120% of Fmax*	*Fmax*	*80% of Fmax*	*120% of Fmax*
French fleet	5% reduction	24,0	28,8	9,8	2,2%	2,6%	0,9%
	10% reduction	23,8	46,6	6,6	2,2%	4,3%	0,6%
	15% reduction	20,8	46,6	4,0	1,9%	4,3%	0,4%
Spanish fleet	5% reduction	42,7	44,1	26,1	3,5%	3,6%	2,2%
	10% reduction	56,8	86,6	26,4	4,7%	7,2%	2,2%
	15% reduction	57,9	97,7	26,0	4,8%	8,1%	2,1%

STECF also concluded that the impact on the sectors on shore will be of minor importance since most of the hake caught is sold chilled with very little processing. Therefore the employment in onshore activities would not be significantly impacted.

A decrease in the short term of hake landings will not have a major impact on the market. There will be no shortage of supply as a major share of the hake market is supply by imports (frozen hake).

In the long term perspective, economic gains will likely benefit employment in fisheries dependent regions.

6.3. Social Impacts

In order to offset the high fuel costs in overfished situations, employment at sea is often reduced to the lowest feasible crewing levels on each vessel.

Low net revenues can result in limited resources available for vessel maintenance and investment in safety. Also, the need to fish intensively in a situation of low net revenue means that working hours are extremely long and fatigue levels are often dangerous. There is also a pressure to continue working even in unsafe weather conditions. The combination of these factors results in very high accident rates: this is by far one of the most dangerous occupations.

Because of low rates of pay and harsh working conditions, some fishing vessels rely heavily on nationals of new Member States (Especially Poland and Baltic States) and of third countries (e.g. Cape Verde Islands) to crew fishing vessels.

After a transitional phase, the industry could move to a situation of higher revenues with more possibilities for investment in safer vessels, shorter working hours, better pay and a lesser need to work in poor weather conditions. However, an overall reduction in employment would be needed, which may impact disproportionately on immigrant seafarers.

Changing to larger mesh sizes and less intensive fishing is likely to reduce the on-board workload due to the lower time spent discarding small fish and in handling and processing equivalent volumes of larger fish.

7. FOLLOW-UP

Stakeholders and Member States are invited to respond concerning the approach and the specific questions raised in this non-paper.

The NWWRAC, the SWWRAC, ACFA and Member States are requested to provide its opinion to the Commission by 31 May 2008, taking account of the STECF conclusions on the matters raised.