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TABLE OF CONTENTS

1. Introduction

1.1. List of participants
1.2. Terms of reference

2. Impact of tuna driftnetting in the North East Atlantic

3. Scientific report of the North Sea Cod Task Force

4. Reduction of fishing mortality for hake in ICES Division VIIIc and IXa

5. Comments on technical measures on whiting, pelagic fish and *Pandalus* :

4.1. Whiting derogation
4.2. Mesh size for pelagic fish and *Pandalus*

6. Minimum landing size for horse mackerel in ICES Divisions VIIIe and IXa

7. Terms of reference for work in fishery economics

7.1. Annual economic report (AER)
7.2. Special topics

8. Other business

Appendix 1 : Abbreviations used in the report

Appendix 2 : Summaries of French and Spanish reports on tuna driftnetting

Appendix 3 : Summarized report on the sighting surveys carried out by IFREMER

1. INTRODUCTION

1.1. LIST OF PARTICIPANTS

STCF members and invited experts :

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1.2. Terms of reference

The STCF met in Brussels from 15.11.1993 to 17.11.1993 with the following terms of reference :

a. Appraise and comment on the available information on the ecological risk of fishing for albacore tuna with driftnets in the north-east Atlantic

b. Propose means by which fishing mortality rate on all age groups and catches of juveniles can be reduced for hake in ICES Divisions VIIIc and IXa

c. Appraise and comment on the technical report of the cod task force

d. Comment on the desirability of :
   - continuing the "whiting derogation",
   - increasing the minimum mesh size for fishing in NEAFC Region 2 for herring, mackerel, blue whiting, horse mackerel, pelagic cephalopods and *Pandalus* to 40mm,

   and suggest possible augmentation and/or modification to the existing or proposed regimes.

e. Comment on the biological desirability of reducing the minimum landing size of horse mackerel in ICES Divisions VIIIc and IXa from 15cm to 12cm

f. Propose terms of reference for work in fisheries economics to be carried out by STCF (or the future STECF) over the next 3 years.

2. IMPACT OF TUNA DRIFTNETTING IN THE NORTH EAST ATLANTIC

Following a meeting held in Brussels on 17-19th February 1992 entitled "The Study Group on the Ecological Impact of Tuna Driftnetting in the North East Atlantic", STCF was requested to appraise and comment on the available information on the ecological risk of fishing for Albacore tuna with drift nets in the North East Atlantic. The Commission further requested STCF to comment on the derogation allowed from article 9a. This article states "that no vessel may keep on board, or use for fishing, one or more driftnets whose individual or total length is more than 2,5 km". The derogation has been granted to 37 French vessels, allowing them to fish with nets whose total resulting length may not exceed 5 km.

STCF considered three documents:

1) Approche de l'impact écologique de la pêcherie thonière au filet maillant dérivant en Atlantique nord-est, by IFREMER, 1993.

2) Driftnets and the Northeast Atlantic Albacore Fishery, by IEO and AZTI-SIO.

3) Estimated total Catch of target and non-target species in the Irish Albacore tuna fishery in 1993, based on observer information from a pilot study done for the Irish South & West Fishermen's Organization.

These documents are summarized in appendices 2 and 3.

Fishing with driftnets will affect both the long finned Albacore tuna stock and other fish stocks taken as by-catches, plus marine mammals and sharks taken incidentally. STCF recognizes that fishing for tuna with driftnets has a higher efficiency than traditional techniques measured on a per boat day unit basis. The catch per boat day is of course a function of net length. Potentially therefore, even without increasing the number of boats in the fishery, should no length limitation exist, this could result in a significant increase in mortality, on the target and non target species.

Long finned albacore tuna are exploited by surface gears and longline. Surface gears comprise the so called traditional gears, baitboat and troll, and the recently introduced driftnet and midwater trawl. All surface gears catch mainly juveniles and pre-adult albacore (Age groups 1-4).

Spanish vessels fish with traditional gears from May-June to October in the Bay of Biscay and adjacent offshore waters.

French, Irish and UK vessels fish with driftnets and pelagic trawls during approximately the same period and also within the same wide area as is shown in Figure 1.

The longline fleet in the North Atlantic has in recent years been mainly Taiwanese and it has reduced markedly since 1987 due to a change in the target species.

The total catch of long finned albacore tuna has generally decreased since 1960. This decrease has resulted from a reduction in fishing effort of the French traditional gears as well as from significant reduction in longline effort since 1987.

The French fleet, after a period of sharp decline in catches, introduced two new gears in the fishery in 1987, driftnet and pelagic trawl. Ireland started driftnet operations in 1990 and UK followed in 1991.

The following table shows the reported long-finned Albacore landings in metric tons since 1987, for the driftnet fleet (France and Ireland), for the Spanish traditional fleet, and for the internationnal fleet (all gears, all countries, ICCAT data).

Year	French & Irish driftnet	Spanish troll & baitboat	Total
1987	150	28,200	37,800
1988	750	27,600	33,700
1989	1,400	25,400	32,200
1990	2,100	25,700	36,300
1991	3,400	17,300	24,700
1992	4,916	18,100	29,700

Preliminary information for 1993 indicates that the catches of the traditional fleets have remained at the low level of recent years while catches of the driftnet fleets have increased to 7.300 t.

No information on the effects of the 5 km derogation was available to STCF at this meeting. All studies were conducted based on current fishing practices, without consideration of the length of the net. Consequently STCF was not able to comment on the effects of the derogation.

It is postulated that each crewman required 1 km of net to operate in an economically viable fashion. Larger vessels usually carry a crew of 6-8 men. STCF was doubtful whether the 5 km is adhered to rigorously. It was recognized that raising observed catches and by-catches to totals preferably would involve effort estimates stratified by time and area. Because of the doubt of the length of the nets used, STCF decided not to use any assumption on the length of the driftnet in its estimations.

The shift in a fleet from traditional gears to driftnets would have social implications as fewer fishermen would be required to generate a unit of effort.

STCF also recognized that the limitation on the total length of the net (2,5 or 5km), if adhered to, would effectively prevent larger boats from participating in this fishery.

STCF agreed to abide by the conclusions and recommendations as specified by the [illegible] Study Group which agreed that, before 1993 if at all, "it was not possible to quantify ecological risk as tentatively defined by the group and as implicitly assumed in the Council regulation "Règlement (CEE) du Conseil 345/92 J.O. No. L42 du 18/02/92. Nevertheless it is possible to make an impact assessment at the population level. The only species that could be considered were cetaceans as it was possible to collect information on these species in the short term and there was sufficient biological data available to initiate research."

IFREMER presented the results of a two-year observer programme covering 27 % of the total French fleet. For the most part, only vessels fishing under the 5 km derogation were included in the programme. The programme quantified all by-catches, particularly cetaceans. The observer programme was supplemented with a dedicated line transect sighting survey which provided first cetacean population estimates in the fishing zone.

The results from the observers programme were as follows

Catch and by-catch	1992		1993	
	Observed	Estimated to the total fleet	Observed	Estimated to the total fleet
Albacore tuna	245 300	904 900	258 600	994 900
Other tunas	52	190	232	890
Swordfish	259	955	847	3 260
Atlantic pomfret	17 750	65 500	22 180	85 320
Wreckfish	1 560	5 760	3 040	11 690
Blue shark	18 970	70 000	21 550	82 910
Others sharks	70	260	77	300
Cetaceans	475	1 722	377	1 754
Turtles	8	30	26	100
Birds	11	41	44	170

The incidental catches constituted 15 % of the total catches in numbers and in weight.

The two cetacean species mainly affected are the striped dolphin (69 % in 1992 and 64 % in 1993 of the total incidental catch of cetacean) and common dolphin 24 % both years).

Preliminary information from the pilot study on the Irish tuna driftnet fleet gave a lower level of by-catch than the French results. But in order to be conservative, the French results were used to grosse up by-catch numbers to the level of the total albacore driftnet fishery.

As recommended by the Study Group on Ecological Impact of Tuna Driftnetting [illegible] Northeast Atlantic, February 1992, the estimations of the total catch of cetaceans were compared with the population estimates. The mortality estimates presented in the next table refer to the French driftnet fleet only. The worst case scenario proposed by the Study group involved the ratio between the upper 95 % confidence interval and the lower 95 % confidence interval limits (this is shown in the French report). However, this estimate of mortality has an extremely low probability and this estimator is considered irrelevant in the present context. Then, the worst case scenario was considered by STCF to be based on the upper 95 % confidence limit. For common and striped dolphin the results were as follows:

Species		Estimated catch	Estimated population size	Ratio	95 % confidence interval
Common dolphin	1992	410	61 888	**0,66 %**	[0,26 %, 1,06 %]
	1993	419	61 888	**0,68 %**	[0,22 %, 1,13 %]
Striped dolphin	1992	1 193	73 843	**1,62 %**	[0,39 %, 2,84 %]
	1993	1 152	73 843	**1,56 %**	[0,29 %, 2,83 %]

Conclusions

STCF agreed to abide by the conclusions and recommendations as specified by the original Study Group which agreed that, before 1993 if at all, "it was not possible to quantify ecological risk as tentatively defined by the group and as implicitly assumed in the Council regulation "Règlement (CEE) du Conseil 345/92 J.O. No. L42 du 18/02/92. Nevertheless it is possible to make an impact assessment at the population level. The only species that could be considered were cetaceans as it was possible to collect information on these species in the short term and there was sufficient biological data available to initiate research."

Concerning the dolphin impact study presented by IFREMER, because of lack of knowledge of stock boundaries of both dolphin species the mortality estimates obtained cannot be interpreted as mortalities on the stock level.

The mortality estimates obtained constitute removals of dolphin actually occurring in the fishing zone in June-September.

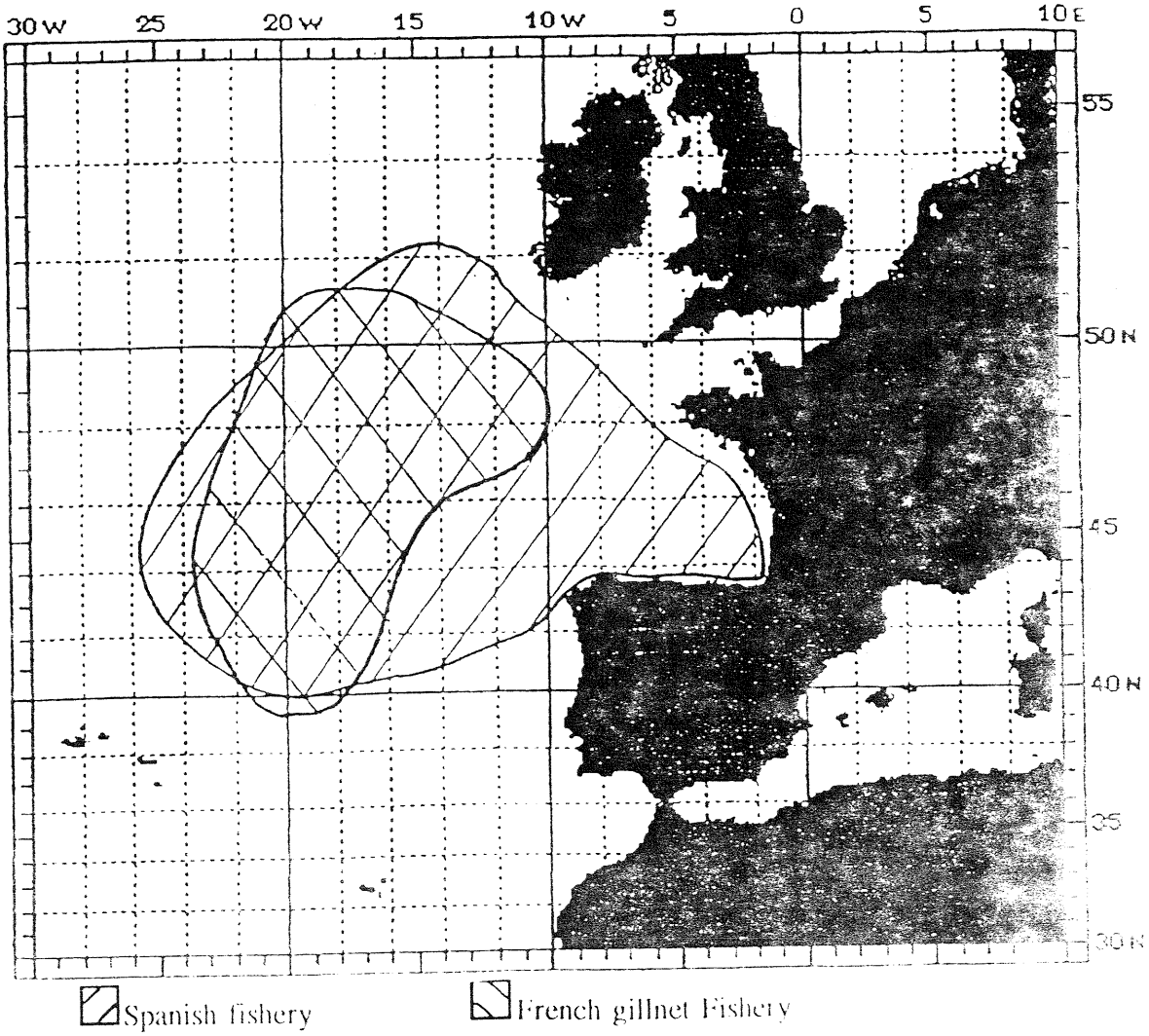
The mortality estimates presented in the third table refer to the French driftnet fleet only. A worst case scenario is considered by STCF to be based on the upper 95 % confidence limit.

Cetaceans are also caught incidentally in driftnets operated by Ireland and the UK and in pelagic trawls. However the French driftnet fishery is at present the dominant component. Raising these additional mortalities by means of the French approach gave mortalities to the total driftnet fishery about 30 % higher.

STCF suggests that these mortalities should be judged on two criteria: the population of dolphins should be maintained above 50 % of the carrying capacity and that the annual removal should be kept below half of the maximum rate of increase (2 to 6 %). [illegible] proposes that the removal be kept below 2%, i.e. half of the estimated average. Similar criteria were used for the US legislation for reducing dolphin mortality in the Eastern Tropical Pacific. In spite of the lack of knowledge on dolphin stock boundaries, STCF agreed, for the time being, to use this removal estimate for the entire fleet, in judging the effects of the incidental catches. For common dolphin the estimates are all within the criteria specified above while for striped dolphin the upper limit is higher than the recommended 2% figure.

Because the importance of the long finned albacore tuna and its impact on cetaceans and other marine animals, these fisheries should be closely monitored. Also, the possibility of an effort increase in the driftnet fishery should be closely monitored.

Driftnets are very effective in catching long finned Albacore tuna (85% in numbers). However driftnets also have undesirable selection properties on certain non target species and the French study showed that other cetacean, birds and turtles are captured occasionally. STCF recognized the need for further research in this field and specifically recommended that further impact studies should be undertaken on for example blue sharks, wreckfish, and swordfish. Furthermore STCF recommends that research on improving the selectivity properties of these nets should be supported by the EC. Potential solutions to this problem are likely to involve improved knowledge of the behaviour of the non desirable species. Further technical modifications that could be made to nets should be evaluated. This could include for example, submerged headlines, size of gaps between nets, improving the acoustic properties of nets and any other deterrent devices.



3. SCIENTIFIC REPORT OF THE NORTH SEA COD TASK FORCE

Introduction

ACFM has for a number of years commented on the poor state of the North Sea cod stock and has recommended substantial reductions in fishing effort. At the 1993 December Council it was agreed that a Task Force would be set up to look into measures which might be introduced specifically to protect cod. Meetings of scientists involved in the Task Force took place in October and November 1993.

A report on the results of these meetings was made available at the beginning of the STCF meeting. The North Sea Task Force made a fresh assessment of North Sea cod which included discard data based upon Scottish estimates. The report describes various scenarios which were investigated by the group. These included area closures in the North Sea, a spawning season closure, increases in minimum mesh size and effort reduction. The methodology used was the STCF sub-group model based on data in 1991, a medium term projection model which attempts to model stock-recruitment effects and the ICES multispecies model.

The group concluded that area closures and spawning closures were not likely to be effective in bringing about a substantial increase in the cod spawning stock biomass. Simulations of mesh size increases indicated potentially large gains in SSB but the Task Force felt that in reality fishermen were likely to find counter-measures to these which would reduce their effectiveness.

Effort reduction appeared to be capable of producing an improvement in SSB. None of the measures investigated was cod-specific and the report gives figures for the effects of these measures on other stocks. Multispecies simulations gave qualitatively similar results in respect of changes in SSB, however these were much smaller gains than in the case of single species models. This would mean that if the multispecies model results are accepted, then measures required to improve the SSB would have to be much more substantial.

The task Force also considered other technical measures such as square mesh panels, separator trawls and modifications to ground gear. However, other than noting that these were likely to be beneficial, the group was unable to quantify the likely effects.

STCF comments on the report

STCF thought that the North Sea Cod Task Force produced an excellent report and congratulated the members of the Task Force.

1) The Cauchy kernal method used to model recruitment in the medium term simulations is likely to be optimistic. Thus the simulations using this model may not reflect the seriousness of the present state of the stock.

2) The choice of boxes used in the simulations and the fact that effort in the closed boxes was redistributed to areas outside the box was questioned. This approach was likely to produce results which minimised the apparent beneficial effect of the box. However, the conclusion by the Task Force that there is insufficient spatial separation of age groups and persistence in the temporal distribution which could be exploited by a box closure still seems valid.

3) The Task Force had re-assessed the North Sea cod stock using estimates of discards. These estimates were based on extrapolating data from Scottish discards. As the task Force report points out, this makes assumptions which are bound to be less than ideal. The estimated fishing mortality on the youngest age groups is likely to be biased, but this bias may well be less than using no discard data at all. It is necessary to include estimates of discards in order to examine the potential benefits of mesh size increases.

4) Reductions in fishing effort were simulated by applying multipliers to fishing mortality rate. This assumes a proportionality between fishing mortality and effort. Such simple proportionality is often not detectable from real data and more complex relationships may exist in reality. Thus if a reduction of 20% in fishing mortality is required this may actually require a much larger reduction in nominal fishing effort.

5) The report discusses some of the constraints in the choice of a suitable target SSB. It was suggested by STCF that the choice of target value, provided it satisfied the criterion of stock viability, could be chosen using appropriate economic considerations since by increasing the SSB there is a consequent effect on the yield from the fishery.

6) STCF noted that there are substantial differences between the single species and multispecies analyses. This applies mostly to the expected yields. In general the multispecies simulations give negative gains on equilibrium yields for the roundfish (except cod) for any reduction in fishing mortality. However, this model does not take into account stock-recruitment effects which may well change these results.

4. REDUCTION OF FISHING MORTALITY FOR HAKE IN ICES DIVISIONS VIIIc AND IXa

Item 3 of the agenda ask the Committe to make proposals by which fishing mortality rate on all age groups and catches of juveniles can be reduced for hake in ICES Divisions VIIIc and IXa.

The Committee analyzed the diagnose about Southern Stock of hake made by the ACFM during its latest meeting in November 1993 and aditional information made available to this Committee.

ACFM advice reflects a very serious stock situation, indicating that fishing mortality should be kept at the lowest possible level and that it should not exceed 20% of that in 1992.

The Committee was concerned of the possible effects on the assessment of the absence of certain amounts of catches of juveniles in the matrix of catches. These juveniles were not taken into account either because they were discarded or landed for the illegal market, due to a better surveillace in recent years. ACFM had also expressed its concern on this lack of information. The working documents presented to STCF showed the importance of this underestimation of catches mainly of juveniles as responsible for a likely underestimation of recent recruitments and show the difficulties to obtain good estimates of catch at length for young hake.

Despite all the uncertainties expressed, STCF acknowledges that the stock is in a very deteriorated state until 1990. Thereafter it appears to stabilize at a low level in subsequent years. This indicates that a reduction in fishing mortality is required both for juveniles and adults. However it was felt that, given the multispecies nature of the fisheries involved, such a reduction is a difficult task which would very likely result in unnecessary losses of yield of other stocks if the management measures taken are not properly tailored to the situation. STCF were not in a position to give this advice at the current meeting.

In that regard, STCF recommends that an ad hoc group should be established as soon as possible, to deeply review the situation with the following terms of reference :

i) a) To assess the short term and long term effects of the supression of the derogation allowing for the use of trawls with a 40 mm mesh when fishing for mackerel, horse mackerel and blue whiting.

b) Review the efficacy of the existing closures for trawl and, if necessary, recommend measures to achieve a better protection of juveniles.

c) Evaluate and, if necessary, recommend closures for all gears aiming at the protection of spawners.

d) Recommend periods for which a ban on fishing or a strong reduction in fishing effort could be set for different gears, taking into account the fraction of the stock exploited by each gear.

ii) Define the action to be taken to improve the existing data bases on catch and to enhance biological knowledge, in particular growth.

STCF is aware of the bad condition of this stock, given the uncertainty of the analytical assessment, it is difficult to qualify on ACFM advice on the reduction in fishing mortality required. However, STCF felt that this reduction should be realistic. Other technical measures such as those already referred to, and particularly the generalized use of 65mm in all trawl finfish fisheries, could be a significant step in the process of reducing fishing mortality and the rebuilding of the stock.

Despite the uncertainties about the catch data and the assessment STCF are seriously concerned about the very low level of this stock. ACFM have suggested that the spawning stock should be rebuilt to the 1986-1988 level at which it produced average recruitment. This would require a reduction in fishing mortality of 80%. Such a severe reduction would in effect require a virtual closure of the fishery and would have serious social and economic

implications (because of the mixed species involved). A reduction of the fishing mortality to the F med. level would require a severe reduction in F. STCF consider that [illegible] a reduction is the minimum required if the present spawning stock is to be maintained even at the present low level. However it appears that such a reduction would also have severe social and economic implications and it may not be possible to achieve immediately [illegible] STCF therefore recommends that the management authorities should seriously address the stock situation in this areas and should immediately introduce measures - either by catch or effort limitations - which are capable of achieving the desired reduction in fishing mortality. These measures should be introduced in addition to those which may be recommended as a result of the establishment of the special ad hoc group.

5. COMMENTS ON TECHNICAL MEASURES ON WHITING, PELAGIC FISH AND *PANDALUS*

5.1. WHITING DEROGATION

In 1989 the Commission initiated discussions at various levels on appropriate measures to manage the fisheries of North Sea roundfish. As a result, it was decided to propose an increase in mesh size for towed gears. But whereas this increase was expected to produce significant benefits to the stocks of cod, haddock and saithe, huge short-term loses in catches were forecasted for whiting in counterpart of only minor increases in long terms yield. On the other hand, the biomass of whiting was expected to increase sharply, and this species being a major predator of young cod and haddock, the end result would be that long-term benefits expected for the most valuable species would be severely decreased.

It appeared, then, that a derogation was required to conduct fisheries on whiting,which is an important component of the economical results of several fleets. Initially the rule adopted (Regulation 345/92, amending for the 11th time Regulation 3094/86, the main regulation on technical measures) was that fishing for whiting could be conducted with 90mm mesh, provided that catches after sorting consisted of a minimum of 50% of whiting, and that by-catches of protected species were limited to 100% (including whiting), but of which no more than 10% of cod, saithe and haddock was allowed. These conditions appeared then sufficient to define a directed fishery for whiting.

However, subsequent experience suggested that a fishery for whiting was very difficult in practice, especially in the Southern North Sea.

Accordingly, a temporary change in the derogation was adopted (Regulation 2120/92, amending for the 13th time Regulation 3094/86) stating that fishing for whiting could be conducted with 90mm mesh, provided that catches after sorting consisted of a minimum 70% of whiting (relative to the catches of cod, haddock, whiting and saithe)and that by-catches were limited to no more than 10% of cod, haddock and saithe and no more than 10% of plaice.

The Committee recognised that there is only limited interest in such a fishery, except for a small part of the French fishery based in northern France. Considering the present by-catch regulation, it was realised that this french fishery is not hampered in the moment by these by-catch regulations. It was generally agreed that these are acceptable and concluded that the whiting derogation can be continued.

5.2. MESH SIZE FOR PELAGIC FISH AND *PANDALUS*

5.2.1. Herring

When the 11th modification of the technical measures (Regulation (CEE) n°3094/86) was adopted a derogatory mesh size of 40mm was set for vessels fishing for mackerel, horse mackerel, herring, pelagic cephalopods, sardines and blue whiting. Prior to this, some fleets fishing for pelagic species were already using 40mm mesh size and it was considered that it would be desirable to extend the 40mm mesh to all fleets. It was felt that an uniform mesh size would be more easily enforcable and would result in an increase in escapement and survival of young fish particularly herring.

However the proposed measure was opposed by a number of countries on the grounds that the increase in mesh size would result in no biological benefits to the stocks and would create unecessary inconvenience and expense to the fleets. A derogation was therefore allowed in order to permit the use of 32mm mesh but this derogation is due to expire on 31 December 1993. At present most of the larger fleets fishing pelagic species in Ireland, United Kingdom, Netherlands and Denmark use 32 to 36mm mesh.

In order to obtain information on the practical aspects of an increase in mesh size from 32mm to 40mm a Dutch study was carried out on the Dutch pelagic trawl fishery for herring(RIVO Rapport co 30/93). The experiments were carried out using different cod ends on pavied pelagic trawlers over the period October 1992 to July 1993. The results showed clearly that the use of the 40mm mesh size increased substantially the number of herring that were meshed in the cod end in the majority of hauls. This in turn increased the labour on board and the amounts of discards and had a negative effect on the quality of the catch. It was concluded that there was no increase in selectivity as a result of the use of the 40mm mesh and that the introduction of the larger mesh did not result in any improvement of the exploitation pattern for herring. In addition there was no significant difference in the length distributions between the fish captured in the 32 and 40mm cod ends and in fact the fish which were "meshed" were above the minimum legal size limit of 20cm.

Selectivity experiments have also been carried out by the Netherlands Institute (RIVO) on mackerel and horse mackerel (Eltink, 1983, Mesh Selection results from mackerel ICES CM 1984/B : 15). These results, which were reported by the 1985? ICES mackerel working group, showed that it was not possible to determine an optimum mesh size for mackerel because any significant catches produced a blocking effect and no escapement was possible.

No information was available on the effects of a change in mesh size from 32mm to 40mm on the cod ends used by boats fishing for blue whiting or pelagic cephalopods. At present cod ends with mesh size of 40mm are in use in some blue whiting fisheries with no apparent blocking problems.

The Committee recommends the derogation wich permits the use of cod ends of 32mm mesh size in fisheries for pelagic species should be continued during 1994 and this derogation should be permanently introduced.

5.2.2. *Pandalus*

A minimum mesh size of 40mm was also adopted for *Pandalus* by the Commission. However, a temporary derogation was introduced which allowed the use of 30mm mesh size (the former minimum mesh size permitted in the pandalus fishery)until further information on the selectivity of *Pandalus* and the by-catch become available.

To investigate the effects of an increase of mesh size from 30mm to 40mm and to evaluate the use of square mesh panels in shrimp trawls a Danish experiment was carried out on the Fladen shrimp stock which normally has a size distribution smaller thant found elsewhere.

The twin trawl method was used in the experiment and the results obtained from the normally used 35mm cod end were compared with those obtained from the 40mm cod end. Comparisons were also made between results from both cod ends fitted with 90mm square mesh panels fitted in front of the cod end. The comparisons showed that the use of the 40mm cod end produced no reduction in by catch but did produce a minor reduction in catch weight. The reduction was mostly due to reduced catch of small shrimps, i.e., year classes 1 and 2. On the other hand, the introduction of the 90mm square mesh panel in both the 35mm and 40mm cod ends produced no reduction in the catch of shrimp but did produce a reduction in the by catch of haddock and whiting of at least 25%.

Conclusions : The use of a square mesh panel in front of the cod end in the shrimp trawls is a much more effective method of reducing by catch of fish than an increase of cod end mesh size to 40mm. As ACFM has not recommended any increase in mesh size or expressed concern about the state of the Floden Ground Pandalus stock an unecessary increase in mesh size should be avoided. This would entail an unecessary change of trawls for fishermen while the introduction of a square mesh panel would reduce by catch more effectively.

STCF recommends a minimum mesh size of 35mm for *Pandalus* fishery when the present derogation will expire at the end 1993. STCF also recommends that a square mesh panel of 90mm and of dimensions as indicated by the Danish report be put before the cod end.

6. MINIMUM LANDING SIZE FOR HORSE MACKEREL IN DIVISIONS VIIIc AND IXa

The question of the minimum landing size (MLS) for Southern horse mackerel was raised at the September 1993 meeting of STCF. The Committee felt that there was a case for reviewing the present MLS of 15cm. Further advice was sought from ACFM at its November 1993 meeting. Unfortunately, the ACFM advice raises more questions than it answers.

ACFM did not accept the assessment of horse mackerel performed by the ICES Working Group on the assessment of Mackerel, Horse Mackerel, Sardine and Anchovy (ICES CM 1993/Assess:19). Thus no scientifically agreed state of the stock exists. This means that there is no objective biological basis on which to judge the consequences of a reduction in MLS. In general it is undesirable on biological grounds to encourage or allow fishing on immature fish since this potentially erodes the future spawning stock. However, if the magnitude of the fishery for small fish remains low there may be little real risk.

Knowledge of the fisheries which take small horse mackerel suggests that reducing the present MLS to 12cm would not alter the fishery in the short term. It would simply legalise the present situation which has endured for many years. Changing the MLS would have the effect, either of converting discards to landings or legitimsing illegal landings. The stock is not believed to be outside safe biological limits at present. In the short term, therefore, a change in MLS would not appear to present any immediate risk to the stock. However, if the fishery for the juveniles is profitable, then with the reduction of the MLS, there is an incentive for an increase of the fishery. As a result there may be long term consequences for the stock which cannot be estimated at present and may be serious.

Given some uncertainties about the state of the stock it may be convenient for the present to make a judgement on the MLS based on socio-economic criteria. However, in doing so, the biological problems will not disappear. There is a need to ensure that adequate data are collected from the fishery so that useful assessments can be performed and alternative management measures can be evaluated. For example, it has been suggested that management could be achieved by setting a TAC for small fish and that the mesh size for trawls might be raised. TACs cannot be evaluated and successfully implemented without adequate assessments and appropriate monitoring. Equally, mesh size changes can only be assessed with appropriate selectivity data which may need to be obtained. Furthermore, horse mackerel in the area in question are taken partly as a component in a mixed fishery. If a mesh size change is considered, then it will be necessary to examine the effect on other species taken in the same fisheries.

STCF is of the opinion that the MLS could be reduced to 12 cm on socio-economic criteria as an interim measure only. In so doing it will be necessary to set in place an adequate monitoring system which would allow assessments to determine trends in fishing mortality and to evaluate alternative management measures to prevent an expansion of the fishery.

7. TERMS OF REFERENCE FOR WORK IN FISHERIES ECONOMICS

7.1. ANNUAL ECONOMIC REPORT (AER)

In the report of the last STCF meeting the approach and procedures for the creation of the Annual Economic Report were outlined to be a specimen report on the economic status of example fisheries. It was recommended that a workshop should be set up and funded by the Commission to produce the specimen report. Given that economic analyses follows different approaches, which is linked to the type of fisheries, it is recommended to have at least two

examples. The first Annual Economic Report should be focused on the flatfish fishery in the North Sea and the Italian multi-species, multi-gear fisheries. Through the judicious use of sensitivity analysis it is hoped that key inputs to the analysis could be identified, thereby allowing evaluation of less well documented fisheries to be undertaken. It is envisaged that more than one meeting may be necessary and it is important to begin this work at an early stage and therefore it would be necessary to hold the first workshop early in 1994.

The aim of such a workshop is:

1) to develop a systematic procedure and outline for the Annual Economic Report, including comment on the availability and adequacy of data, economic tools useful for policy advice, and research capacity.

2) to work out an Annual Economic Report for the example fisheries. The contents of the Annual Economic Report should be:

a) a report on the economic performance in terms of profit and value added (return to capital and labor combined) by major fleets involved.

b) evaluation of the probable short-term changes on economic performance implied by the proposed changes in current regulation, e.g. ACFM-advice on TAC, technical measures and national regulations.

c) long-term changes implied by the current management proposals.

d) eventual recommendations.

Participants in the workshop could include biologists.

7.2. SPECIAL TOPICS

In the last STCF report, some of the areas which might usefully be undertaken by economists have already been defined. Reference was made to the Commission's expections that they would like to know why attempts to reduce fleet overcapacity have failed and would welcome new ideas and opinions about effort management and licence system. Other areas are in the economic implications of technical measures and control and compliance regulations as well as providing an input to mid term strategies.

It would be helpful if the Commission were able to provide some indication on priorities between possible areas of special interest. Choice could be between the following issues . Many of which are included in the AIR programme.

- fleet overcapacity;
- multi annual/multi species TAC´s;
- behaviour of fishermen with respect to compliance and enforcement;
- economic impact of specific technical measures;
- effort reallocation in light of changes in biological and economic factors;
- policy evaluations;
- bioeconomic modelling.

If the Commission wishes to receive advice on one of the special topics listed above it should organise, fund and prepare the terms of reference for such special workshops on these subjects. For example these workshop could review the current state of knowledge (e.g. results of AIR projects) and indentify areas for future work.

8. OTHER BUSINESS

The meeting was overlapping with two other meetings organised by the Commission. One meeting was dealing with the situation of the market. The other meeting was held in the framework of the North Sea cod task force. These meeting required participation of STCF members. Consequently these STCF members participated only part of this STCF meeting.

It would be helpful the Commission could schedule regular meetings of STCF as early as possible in the year, and give the maximum possible advance notice to extraordinary meeting.

APPENDIX 1

ABBREVIATIONS USED

ACFM	Advisory Committee for Fisheries Management
AIR	Agricultural and agro-Industrial Research programme
AZTI-SIO	Instituto de Investigación para la Oceanografía, Pesca y Alimentación
ETP	Eastern Tropical Pacific
EU	European Union
ICES	International Council for the Exploration of the Sea
IEO	Instituto Español de Oceanografía
IFREMER	Institut Français de Recherche pour l'Exploitation de la Mer
MLS	Minimum Landing Size
MMS	Minimum Mesh Size
NEAFC	North-East Atlantic Fisheries Commission
RIVO	Rijksinstituut voor Visserijonderzoek, Ijmuiden
SSB	Spawning Stock Biomass
STCF	Scientific and Technical Committee for Fisheries
TAC	Total Allowable Catch

APPENDIX 2

SUMMARIES OF THE FRENCH AND SPANISH REPORTS ON TUNA DRIFTNETTING

a) IFREMER Report

This report presents the results obtained by IFREMER from the French albacore tuna drift gill net fishery study. This study was conducted at the request of the French Ministery of the seas, following a regulation of the European Council on DGN. It is based on the analysis of incidental cetacean catches data collected during two observer campaigns in 1992 and 1993, and on the results of a sighting survey dedicated to delphinids populations undertaken in 1993. As recommended by the study group, the ecological risk linked to DGN was approached by the assessment of the impact of the incidental catches at the population level of two dolphin species. Moreover, all by-catches have been quantified and the main ones have been the subject of a descriptive study.

The program was divided in two sub-programs: the first one consisted in embarking observers on board French tuna driftneters in order to identify and count all by-catches, and the second one consisted in a dedicated sighting survey to estimate the size of delphinids population that were known to be concerned by the fishery from previous studies.

During the 1992 and 1993 fishing campaigns, 18 observers were embarked on board tuna driftnetters covering 27% of the total fleet. They reported that about 85 % of the catch is composed of the target specie: albacore tuna. The main by-catches are blue shark, atlantic pomfret, wreckfish and swordfish. Incidental catch concerns mainly cetaceans and a small amount birds and turtles.

Since effort in terms of kilometers of net was not available, and since landings by cruise were known for all vessels, by-catch may been extrapolated to the total fleet by using their ratio to the albacore catches. Estimated total Cetacean incidental catch amounted to about 1700 individuals each year. The two species principally concerned are the striped dolphin (69 % in 1992 and 64 % in 1993 of the total incidental catch of cetaceans) and common dolphin (24 % both years).

The biological parameters of these dolphins that were obtained were the length frequency data, age data from tooth reading and reproductive status from gonads specimens. The results show that catches of calves of the year were predominant for both common and striped dolphins, whereas catches of 1-year old youngs were predominant in the 1993 catches, suggesting the progression of a strong 1992 cohort in the catches for both species. Gonads analysis suggests an age at first reproduction of 9 to 10 years for common dolphin and of 7 to 8 years for striped dolphins.

Population levels of both species were estimated from the observer data from the sighting survey analysed with the DISTANCE program, assuming that the population is entirely confined to the sampled area. In fact, the sampled area covers an unknown fraction of the complete distribution of the two species. Mean population size of common and striped dolphin were estimated respectively to 61 888 and 73 843 individuals.

As recommended by the group of Brussels, the estimations of the total catch of these two cetaceans were first compared with the estimations of the population size, giving an average ratio of 0.7 and 1.6 % for respectively comon and striped dolphins. Secondly, a model was

built in order to simulate the change in the annual rate of population increase due to additional mortality caused by the fishery. This model used parameters such as age at first reproduction, calving interval and annual rates of survival of calf and non-calf individuals. Under the initial population balance assumption, a fishing mortality of 1.5 % and 3 % (worst case defined by the 95 % upper confidence limits) respectively for common and striped dolphins would lead to an annual rate of decrease of 1 %.

Both results of the comparison (short term) and the simulation (medium term), show that it is unlikely that the actual mortalities would jeopardize the survival and the presence of these species in the north-east Atlantic ocean.
On the other hand, considering the amount of the catches and their biology, the blue shark and the wreckfish (to a lesser extent) could be potentially affected and should be the object of evaluation studies.

b) Spanish report

Drifnets and the North East Atlantic albacore fishery

This document review the different information available on the impact of driftnets in the North Atlantic albacore fishery at different levels: the traditional fishing activity, the target species and the incidental catches. The main conclusions of the document are:

- North Atlantic Albacore catches by EC driftnet fleets have increased sharply becomming from being almost testimonial to represent 20% of the total international catch of this stock.

- There is a wide area-time coincidence between both traditional fleet and driftnetters, interacting and competing for the same resource.

- Since albacore is a highly migratory species with a seasonal presence, it is not possible to apply a management policies based on the division of the resource.

- Fishing effort of the driftnet fleet increased 126% from 1990 to 1992. Available information also indicates that the average length of the nets used by the driftnet fleet was significative longer than allowed by EC Regulation 345/92.

- Information on albacore CPUE and effort of the driftnet fleets has not been available up to now and is urgently needed in order to evaluate the impact of their activity on this stock adequately,

- Catch rates of the traditional fishing gears have declined for 3 and 4 age groups during the latest years. The SCRS of ICCAT proposes two possible explanations: interaction with new fishing gears and/or reduction of 3-4 year-olds due to a much higher fishing mortality rate for 2 year-olds.

- There are sources of additional mortality that up to mow has not been properly estimated. This means that landings may not accurately reflect the real mortality caused by driftnetting. Particularly the loss of fish by mechanical effect, during the hauling-in of the

net, or because of wave movement, which would seem to reach levels that could significantly increase the contribution of driftnets to the mortality rate of 2 and 3 year-old albacore, and other species.

- According to the 18th Considerandum of EC Regulation 345/92 and taking into account the possible present level of explotation of the stocks, it would not seem suitable to develop fishing techniques which, on the one hand, cause additional mortality of no benefit to anyone, and on the other hand, monitoring of which is extremelly difficult.

- The most frequent species in the driftnet by-catch were sharks and promfrets. It is not possible to determine the impact of this mortality at the population level because the structure, status and dynamics of these species are not known.

- The impact caused by driftnets on cetaceans should not be valorized considering only the number of most frequent species in the catches, common and stripped dolphins. Other species that appear in the by-catch as the sperm whale, fin whale, bottlenose and pilot whale are currently objects of different protection plans of endangered species.

- Catch rates of cetaceans in the NE Atlantic driftnetting have been estimated in 0.39 individuals (35 kg) per ton of albacore (0.11 individuals - 9.9 kg per km of net set). These values are around the levels reported from the purse seine fishery targetting yellowfin tuna associated with dolphins in the Pacific in 1990 and are significantly above the current levels in that ocean. Comparing with driftnet fisheries in other oceans, incidental catch of cetaceans in the NE Atlantic albacore fishery are also much higher (0.11 versus 0.04 to 0.06 cetaceans per kilometer net set).

APPENDIX 3

SUMMARIZED REPORT ON THE SIGHTING SURVEYS CARRIED OUT BY IFREMER

The IFREMER campaign was a line transect sampling survey. The sampling system of line transects are today recognized as a reliable method of estimating a density of cetaceans in a specific area. The following describes the main points of this survey technique

The objective of the survey is to estimate the number of cetaceans found in an pre-defined area at a specific time.

The approach is to sample along a linear transect whilst counting all the individuals and shoals of cetaceans seen whilst travelling. Furthermore the width of the strip in which cetaceans are reliably observed should be estimated. The total estimate of cetaceans is then simply achieved by raising the number of observed cetaceans to the total area under consideration. The observer estimates for each observation the distance and bearing from the ship. The number of cetaceans seen per nautical miles together with the distance and bearing then estimate the effective observed strip width.

General problems with this approach includes estimation of the width of the strip in which cetaceans are reliably detectable, the observers may differ in their ability to detect cetaceans and cetaceans may react to the ship either by being attracted or repelled. Weather conditions may also influence the observers ability to detect cetaceans.

The IFREMER campaign was particularly hampered by bad weather which lead to less valid observation time than planned. Consequently the number of observations were below what would be desirable. Other problems did not appear particularly serious for this survey.