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Public Certification Report for

Hastings Fleet Pelagic Fishery

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1. INTRODUCTION

This report sets out the results of the assessment of the Hastings Fleet Pelagic Fishery against the Marine Stewardship Council Principles and Criteria for Sustainable Fishing.

1.1 The fishery proposed for certification

The MSC Guidelines to Certifiers specify that the unit of certification is "The fishery or fish stock (=biologically distinct unit) combined with the fishing method/gear and practice (=vessel(s) pursuing the fish of that stock) and management framework."

The fishery proposed for certification is therefore defined as:

Species:	Herring (<i>Clupea harengus</i>) Mackerel (<i>Scomber scombrus</i>)
Geographical Area:	Within the Eastern English Channel (ICES Division VIIId) and specifically between Beachy Head and Dungeness and offshore to the six mile limit
Method of Capture:	Fishing is undertaken by under 10m boats launched from the beach at Hastings ('Stade-launched boats'). Fishing for pelagic species (herring and mackerel) is at a relatively low level (around three to five vessels only) using drift nets.
Stock	<p>The fishery proposed for certification is part of the overall fishing pressure on the stocks within ICES Management Area VIIId (see below).</p> <p>Herring – The stock under assessment is North Sea Autumn Spawning stock in ICES Divisions IVc, and VIIId (the Downs Herring Stock). Mackerel – The stock under assessment is the Western Component of the North East Atlantic mackerel stock. This is defined as mackerel spawning in the western area (ICES areas VI, VII, VIII a, b, d, e).</p> <p>It is recognised that this fishery represents a small proportion of the total fishing pressure on these stocks and so the status of the stocks as a whole is assessed, together with fishing practices and consequences within the Hastings fleet only.</p>

1.2 Report Structure and Assessment Process

The aims of the assessment are to determine the degree of compliance of the fishery with the Marine Stewardship Council (MSC) Principles and Criteria for Sustainable Fishing, as set out in Section 5. It must be stressed that this assessment is concerned **only** with the fishery defined above.

This report firstly sets out:

- the background to the fishery under assessment
- the qualifications and experience of the team undertaking the assessment
- the standard used (MSC Principles and Criteria)
- stakeholder consultation carried out. Stakeholders include all those parties with an interest in the management of the fishery and include fishers, management bodies, scientists and Non-Governmental Organisations (NGO's)

Section 9 of the report sets out the methodology used to assess ('score') the fishery against the MSC Standard. The scoring table then sets out the Scoring Indicators adopted by the assessment team and Scoring Guidelines which aid the team in allocating scores to the fishery. The commentary in this table then sets out the position of the fishery in relation to these Scoring Indicators. This table is presented as a separate document.

The intention of the earlier sections of the report is to provide the reader with background information to interpret the scoring commentary in context.

Finally, as a result of the scoring, the Certification Recommendation of the assessment team is presented, together with any conditions attached to certification.

In draft form, this report has been subject to is subject to critical review by appropriate, independent, scientists ('peer review'). The comments of these scientists are appended to this report. Responses to these comments are given in the peer review texts and, where amendments are made to the report on the basis of Peer Review comments, these are also noted in the peer review text. Following peer review, the report in draft has been made available for public scrutiny on the MSC website. Any comments made have been addressed in this Final version of the certification report.

A Final Report, containing the recommendation of the assessment team, the peer review comments and any further stakeholder comments has been considered by the Moody Marine Governing Board. The Governing Board has made the final certification determination on behalf of Moody Marine.

Before certification is granted, the Final Report, containing the Moody Marine Ltd Determination and all amendments, has been released for further stakeholder scrutiny. No objections were received in relation to this certification decision which is now confirmed with the release of this Public Certification Report.

1.3 Information sources used

Information used in the main assessment has been obtained from interviews and correspondence with stakeholders in the trawl fishery, notably:

- I1. Hastings Fishermen's Protection Society
- I2. Network Fisheries
- I3. DEFRA
- I4. Sussex Sea Fisheries Committee
- I5. CEFAS
- I6. English Nature
- I7. Sussex Wildlife Trust
- I8. Hastings Driftnet fisherman
- I9. Sea Mammal Research Unit
- I10. Hampshire and Isle of Wight Wildlife Trust
- I11. Environment Agency
- I12. Seafish Industry Authority

Other information sources

Published information and unpublished reports used during the assessment are:

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- R16. ICES (1993). Report of the Herring Assessment Working Group for the Area South of 62°N. ICES C.M. 1993/Assess:15. 245pp
- R17. ICES (1994). Report of the Herring Assessment Working Group for the Area South of 62°N. ICES C.M. 1994/Assess:13. 249pp
- R18. ICES (1996). Report of the Herring Assessment Working Group for the Area South of 62°N. ICES C.M. 1996/Assess:10.
- R19. ICES (2000). Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy. ICES C.M. 2000 /ACFM: 05
- R20. ICES (2002). Report of the Workshop on MSVPA in the North Sea. Resource Management Committee ICES CM 2002/D:04. Charlottenlund, Denmark. 8–12 April 2002
- R21. ICES (2003a). Report of the Advisory Committee on Fishery Management ICES ACFM: May 2003
- R22. ICES (2003b). Report of the Study Group on Multispecies Assessments in the North Sea Bergen, Norway. 25–29 August 2003. Resource Management Committee ICES CM 2003/D:09, Copenhagen, Denmark
- R23. ICES (2003c). Report of the Herring Assessment Working Group for the Area South of 62°N. ICES C.M. 2003 /Assess:17.
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- R25. ICES (2004a). Report of the Herring Assessment Working Group for the Area South of 62°N. ICES C.M. 2004 /ACFM:18. 245pp
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- R27. ICES (2004c) Report of the Advisory Committee on Fishery Management ICES ACFM: May 2004.
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- R41. Pawson, M.G. (1995). *Bio-geographical identification of English Channel fish and shellfish stocks.* MAFF Fisheries Research Technical Report No. 99. Lowestoft.
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2 BACKGROUND TO THE FISHERY

2.1 Biology of the Target Species

2.1.1 Herring

The herring (*Clupea harengus*) is a pelagic species which is widespread in its distribution throughout the North Sea. The herring's unique habit is that it produces benthic eggs which are attached to a gravely substrate on the seabed. This points strongly to an evolutionary history in which herring spawned in rivers and at some later date re-adapted to the marine environment. The spawning grounds in the southern North Sea are in fact located in the beds of rivers which existed in geological times and some groups of spring spawning herring still spawn in very shallow inshore waters and estuaries (Nichols, 2001). Spawning typically occurs on coarse gravel (0.5-5 cm) to stone (8-15 cm) substrates and often on the crest of a ridge rather than hollows. For example, in a spawning area in the English Channel, eggs were found attached to flints 2.5-25 cm in length, where these occurred in gravel, over a 3.5 km by 400m wide strip.

As a consequence of the requirement for a very specific substrate, spawning occurs in small discrete areas in the near coastal waters of the western North Sea the Southern Bight of the North Sea and the eastern English Channel. They extend from the Shetland Isles in the north through into the English Channel in the south. Within these specific areas actual patches of spawn can be extremely difficult to find by grab surveys.

The fecundity of herring is length/weight related and over the whole of the North Sea varies generally between approximately 10,000 and 1400,000 eggs per female although values as high as 175,000 have been recorded (Burd and Howlett, 1974). There is considerable regional variation in fecundity with the Downs spawners in the southern North Sea and eastern English Channel ranging from approximately 10,000 to 60,000 eggs per female. The fecundity of herring is relatively low for teleosts, probably because, in evolutionary terms, the benthic egg is a potentially less hazardous phase of development compared with the planktonic egg of most other teleosts. The age of first maturity is 3 years old (2 winter ringers) but the proportion mature at age may vary from year to year dependent on feeding conditions and year class strength. Over the past 15 years the proportion of North Seas autumn spawners mature at age 3 years (2 winter ringers) has ranged from 47% to 86% and for 4 year old fish (3 winter ringers) from 63% to 100%. Above that age, all are considered to be mature (ICES, 2004a).

The benthic eggs take about three weeks to hatch dependant on the temperature. The larvae on hatching are 5 mm to 9 mm long and are immediately planktonic. The winter hatching larvae in the southern North Sea and English Channel tend to be larger than those hatching further North in the late summer and autumn. Their yolk sac lasts for a few days during which time they will begin to feed on phytoplankton and small planktonic animals. Their planktonic development lasts around three to four months during which time they are passively subjected to the residual drift which takes them to various coastal nursery areas on both sides of the North Sea and into the Skagerrak and Kattegat. (Figure 1).

Herring continue to be mainly planktonic feeders throughout their life history although there are numerous records of them taking small fish, such as sprat and sandeels, on an opportunistic basis. Calanoid copepods, such as *Calanus*, *Pseudocalanus* and *Temora* and the Euphausiids, *Meganyctiphanes* and *Thysanoessa* still form the major part of their diet during the spring and summer and are responsible for the very high fat content of the fish at this time.

In the past, herring age has been determined by using the annual rings on the scales. In more recent years the growth rings on the otolith have proved more reliable for age determination. Herring age is expressed as number of winter rings on the otolith rather than age in years as for most other teleost

species where a nominal 1 January birth-date is applied. Autumn spawning herring do not lay down a winter ring during their first winter and therefore remain as '0' winter ringers until the following winter. When looking at year classes, or year of hatching, it must be remembered that they were spawned in the year prior to their classification as '0' winter ringers. This is with the exception of some late spawning in January / February in the eastern English Channel.

North Sea herring comprise both spring and autumn spawning groups but the major fisheries are carried out on the offshore autumn spawning fish. The spring spawners are found mainly as small discrete coastal groups in areas such as The Wash and the Thames estuary. Juveniles of the spring spawning stocks found in the Baltic, Skagerrak and Kattegat may also be found in the North Sea as well as Norwegian coastal spring spawners.

The main autumn spawning begins in the northern North Sea in August and progresses steadily southwards through September and October in the central North Sea to November and as late as January / February in the southern North Sea and eastern English Channel. The widespread but discrete location of the herring spawning grounds throughout the western North Sea has been well known and described since the early part of the 20th Century. This led to considerable scientific debate and eventually to investigation and research on stock identity. The controversy centred on whether or not the separate spawning grounds represented discrete stocks or 'races' within the North Sea autumn spawning herring complex. Resolution of this issue became more urgent as the need for the introduction of management measures increased during the 1950's. The International Council for the Exploration of the Sea (ICES) encouraged tagging and other racial studies and a review of all the historic evidence to resolve this problem. The conclusions were reviewed by Harden Jones (1968) and formed the basis for establishing the working hypothesis that the North Sea autumn spawning herring comprise a complex of three separate stocks each with separate spawning grounds, migration routes and nursery areas, illustrated in the figure below.

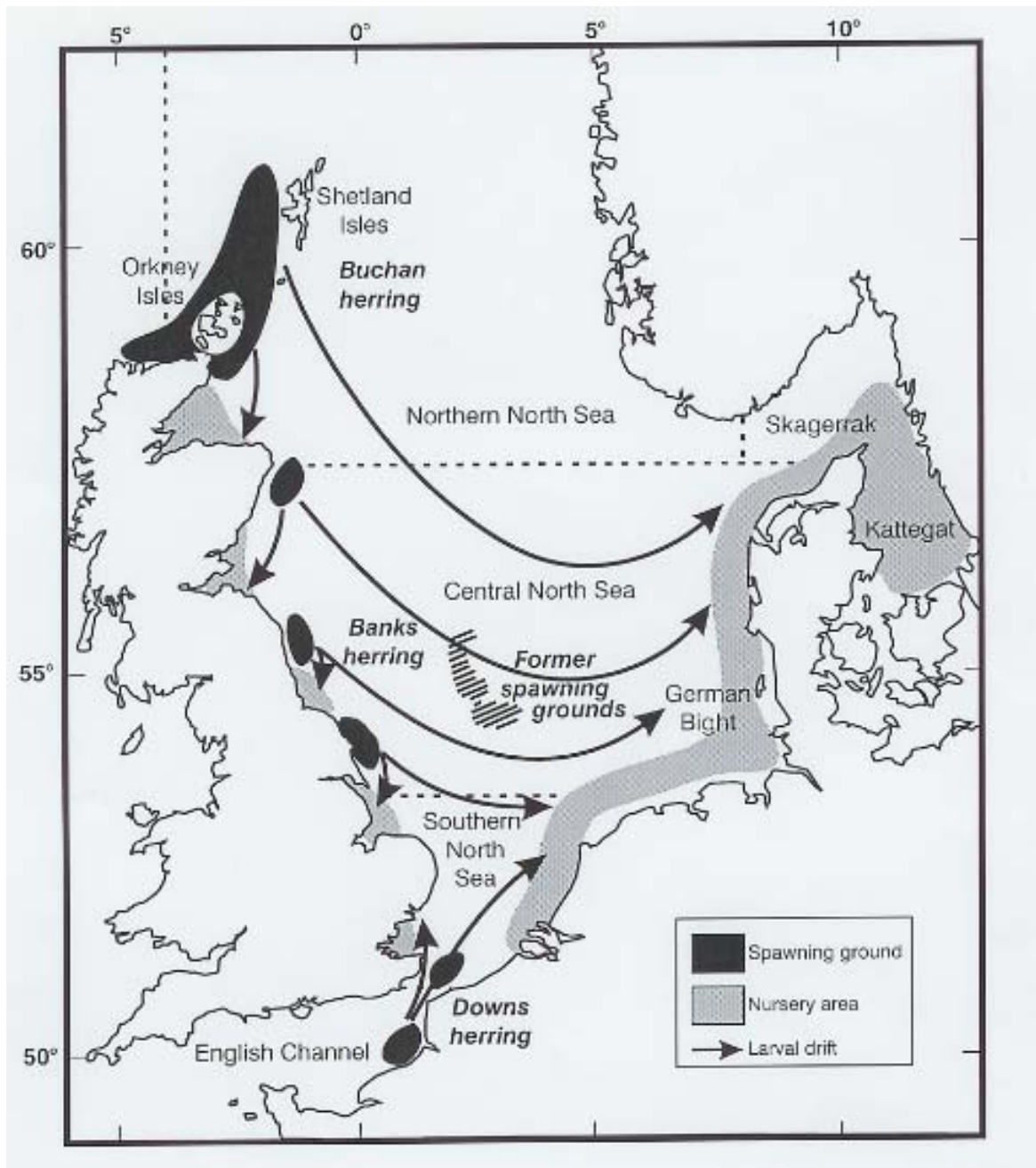
The three stock units are:

- The Buchan or Scottish group which spawn from July to early September in the Orkney Shetland area and off the Scottish east coast. Nursery areas for fish up to two years old are found along the east coast of Scotland and also across the North Sea and into the Skagerrak and Kattegat.
- The Banks or central North Sea group, which derive their name from their former spawning grounds around the western edge of the Dogger Bank. These spawning grounds have now all but disappeared and spawning is confined to small areas along the English east coast, from the Farne Islands to the Dowsing area, from August to October. The juveniles are found along the east coast of England, down to the Wash, and also off the west coast of Denmark.
- The Downs group which spawns in very late Autumn through to February in the southern Bight of the North Sea and in the eastern English Channel. The drift of their larvae takes them north-eastwards to nursery areas along the Dutch coast and into the German Bight.

At certain times of the year, individuals from the three stock units may mix and are caught together as juveniles and adults but they cannot be readily separated in the commercial catches. As a consequence, North Sea autumn spawning herring have to be managed as a single unit, although the Downs group is recognised as having different characteristics and attempts are made to give it special protection by separating the management advice.

A further management complication is that juveniles of the North Sea stocks are found, outside the North Sea, in the Skagerrak and Kattegat areas and are caught in various fisheries there. The proportions of juveniles of North Sea origin, found in these areas varies with the strength of the year class, with higher proportions in the Skagerrak and Kattegat when the year class is good.

The herring taken in the Hastings fishery are all part of the Downs group, spawning in the eastern English Channel in ICES Division VIIId.



2.1.2 Mackerel

The north-east Atlantic mackerel, (*Scomber scombrus*. L) is a member of the Scombridae family, which includes a large number of species, distributed widely throughout the world. A comprehensive account of the biology of the north-east Atlantic mackerel is given by Lockwood (1988). The mackerel is an ectothermic fish, meaning that its body temperature does not remain constant, but varies between 1 and 2° C above that of the temperature of the water. The mackerel has the most northerly distribution of the family and one of its main distinguishing features is the lack of a swim bladder, which means that mackerel can change depth rapidly. It is a pelagic fish spending most of its time in mid-water travelling in large dense, shoals, often at great speed and making very long migrations. It is a voracious, opportunistic feeder and whilst feeding mainly on the rich supply of zooplankton, in spring and summer, it does also take small pelagic fish including myctophids which

migrate up to the near surface waters at night. As a result it is a very oily fish, building up high energy reserves during the spring and summer which it needs both for migration and subsequent gonad development during the following winter. During this period the oil content of a large mature mackerel may fall from 25% to 30% of the total body weight to less than 10% (Lockwood, 1988).

The north-east Atlantic mackerel may begin to mature as one year old fish and over 60% are generally mature by age two. By age four there is virtually 100% maturity. They are highly fecund producing between 200,000 and 800,000 eggs dependant on fish weight. The eggs are released in batches and the spawning of an individual female may be spread over a few weeks. There has been much research, over the past fifteen years, on the biology of spawning in mackerel. This has been targeted at the estimation of fecundity in relation to spawning stock biomass calculation from egg surveys. As a result there is now considerable knowledge on all aspects of their spawning biology including atresia in the ovaries and seasonal, annual and latitudinal variations on oocyte production.

The north-east Atlantic mackerel is widely distributed from the Iberian peninsula in the south to the Norwegian Sea and the North Sea in the north. Over this area it may be found from over the deep waters of the shelf edge right up to the coastal waters of the whole area, including the English Channel and Irish Sea.

After many years of scientific investigation and debate it is now recognised that there is one stock in the north-east Atlantic. However it is further recognised that this stock comprises three different components, a southern component, a western component and a North Sea component (Molloy, 2004).

The pattern of migration of the southern and western mackerel components is complex but basically begins in the late winter and early spring when shoals which have been overwintering in deep water begin their migration northwards to spawn and eventually to reach the rich summer feeding grounds in the North Sea. Most of these mackerel will make their way up to the west of the British Isles and Ireland but some will move into the southern and central North Sea via the English Channel. In the autumn the reverse migration occurs. However in recent years it has been observed that many of these fish remain in the northern North Sea until January or February and only then move back to the western area to spawn. The North Sea component, which overwinters in the deep water of the Norwegian trench moves south to the central North Sea to spawn. It is clear from this pattern of migration that the three components may at times be found together, in particular during summer and autumn in the North Sea. Tagging results have shown that southern component fish tagged off the Iberian peninsula can be found in the northern North Sea in the summer.

Spawning occurs over a very wide area beginning off the Iberian peninsula in January, progressing northwards and ending up to the north of Scotland and in the North Sea in July. In the southern area and to the west of the British Isles and west of Ireland, spawning tends to be strongly concentrated initially along the continental shelf edge eventually spreading to the shallower waters across the shelf. In the North Sea, the spawning area is discrete and clearly separate from those of the southern and western components. There is some spawning in the southern Bight of the North Sea in June, but these are western component fish migrating up the English Channel and not part of the North Sea component.

The eggs are planktonic, about 1.2 mm in diameter and contain a single oil globule. In the early part of the season they may be distributed down to 200 meters depth, but once a strong thermocline has developed over the spawning areas, by late May, the eggs are found concentrated above the thermocline. The duration of egg development is entirely dependant on temperature. At 10°C the larvae hatch in ten days, at a length of 2.5 mm to 3 mm. The larvae develop rapidly in the plankton and eventually arrive as young fish in the shallower near shore areas (Lockwood, 1988). Specific nursery areas are not clearly identified although there are areas, for an example off the south-west coast of Britain and off north-west Ireland where the concentrations of juvenile fish are greatest.

Over recent years there has also been a body of funded research targeted at improving the basic knowledge of factors affecting mackerel distribution. For an example the EU funded programmes: Shelf Edge Fisheries and Oceanographic studies (SEFOS); Spatial Pattern of Migration and Recruitment of Northeast Atlantic mackerel project; Shelf Edge Advection, Mortality and Recruitment (SEAMAR).

2.2 History of the Fishery

2.2.1 *The Hastings Fleet*

Fishing has taken place at Hastings for at least 400 years and possibly 1000 years old. Between 1042 and 1066 Hastings joined with New Romney, Hythe, Dover and Sandwich to become one of the Cinque Ports. Following the Norman invasion, William the Conqueror based himself at Hastings and by 1346 Rye and Winchelsea had joined the Cinque Ports. In return for the provision of men and ships these ports enjoyed certain privileges including the setting of taxes and administering their own law courts.

Hastings in the late 18th Century was a major fishing port noted for mackerel and herring and with its proximity to London and the relatively fast links its success was ensured. Herring at the time was the most valuable fish as it was relatively easy to preserve thereby extending scope for marketing. The mackerel and herring seasons were lengthy with vessels travelling around the coast of Britain following the catch. The mackerel and herring were caught using drift nets and trawling was used during this period for sole and plaice

Hastings changed during the early to mid 19th century from a fishing port to a seaside town. This change brought inherent conflicts such as the Council wanting to utilise the beach for visitors and attempting to displace the fishermen. The rights to the 'stonebeach' area belonged, on paper, to the Council through the Charter of 1588, however the fishermen built a case in support of their rights through the apparent loss of the earliest records relating to the Cinque Ports. During this period the more valuable catch was mackerel. Hastings should have had an enviable position however the valuable London market was receiving fish from French vessels that had targeted the English coastal fisheries. Attempts to alleviate this situation were the 1843 Sea Fisheries Act and a three-mile national limit for the British and the French which included regulations regarding gear, methods and registration of vessels. The Fishermen's Society was formed in 1832 and by the mid 19th Century there were 86 vessels operating from Hastings.

Major mackerel and herring catches in the 1850's and 1860's brought a period of great prosperity. Railway links ensured rapid transport to London with trawling now becoming more popular than drifting for herring and mackerel. Beam trawlers were targeting the sole and plaice.

During the period 1875-95 there was conflict again between the fishermen and the Council. The increased rail links and prominence of East Coast ports reduced prices at Hastings Fishmarket with landings from elsewhere pushing down the prices of local landings. The number of vessels at Hastings was large and this increased capacity to land fish further reduced prices.

The depression in the late 19th and early 20th Century was caused mainly by competition from the North Sea trawlers. However, the herring 'saved' Hastings due to the insatiable demand from Russia. The herring were barrelled in brine on the beach and exported.

Prior to and during the First World War, the internal combustion engine was taken up by increasing numbers of inshore fishermen. It brought with it increased efficiency both in terms of effectiveness of trawling, extending the area fished and not having to rely on the weather. Drift netters also benefited as they could return to port within the same working day. This increased efficiency led to a further

period of prosperity.

Between 1919 and 1945 there was a shift in the pattern of fishing due to a decline in the demand for herring and the loss of overseas markets. Further disputes with the Council who attempted to remove the fishermen from the Stade and the depression brought further hard times to Hastings. During the Second World War drift netting was banned at night and since then it has not regained its popularity. Trawling and trammelling replaced the drift netting and the area fished by the Hastings fisher was reduced to the area currently under assessment between Beachy Head and Dungeness.

There have been periods of conflict between Hastings Council and the fishermen, all thoroughly documented (Peak, 1985). The conflicts centred on the Deed of Compromise signed in 1947 which in effect gave the Council scope for redevelopment of certain areas of the Stade.

By the late 1940's 75% of the Hastings fleet were trawling for plaice and there was a small scale trammel fishery targeting sole. By 1950 the trawlers experienced another poor start to the season and with all their capital tied up in trawl gear it was difficult for them to change from one method of fishing to another. During the 1950's fishers replacing their nets chose to replace gear used for herring and mackerel with trammel nets for targeting sole and plaice. Trammel nets were gradually used year round and not restricted to the spring and autumn.

The 1950's saw the modernisation of the Hastings Fleet and by the 1960's Hastings had a modern trawler fleet alongside the multi-purpose punts. Overfishing in the outer fishing grounds led to a decline in stocks. Between 1950 and the mid 1960's, the average Spawning Stock Biomass (SSB) of the North Sea herring stock was estimated at around 2.5 M tonnes with landings averaging around 650,000 t. Over this same time period, the Downs herring stock collapsed. This collapse was attributed to high mortality of juveniles in North Sea industrial fisheries and heavy fishing by bottom trawlers on spawning concentrations in the English Channel in the 1950's (bottom trawling disturbs spawning fish, destroys spawn and damages the substrate). However, in September 1964 the three-mile fishing limit was extended to twelve miles. Whilst the inner six miles was only available to British vessels the outer six miles was available to the French and Belgians who had historical rights. The Hastings fishery recovered.

The SSB decreased rapidly over the 1960's and early 1970's. Fishing mortality peaked at over 1M t in 1965 and SSB reached a minimum level in 1977 of 52,000 t. At this stage, a moratorium on directed herring fisheries was put in place (from 1977 to 1980). Up until this time, there had been no control (other than market forces) on catches of North Sea herring.

During this moratorium, larval surveys and acoustic surveys were used to monitor the state of the stocks. By 1981 the SSB had recovered to over 200,000 t and the fishery was reopened. Since this time, the fishery has been subject to a TAC.

ICES reported that catches up to 1994 had continued to exceed the TAC and that the SSB had fallen below the minimum acceptable level of 800,000 t. Despite a reduced TAC, assessments in 1996 showed a further decline in SSB to less than 500,000t.

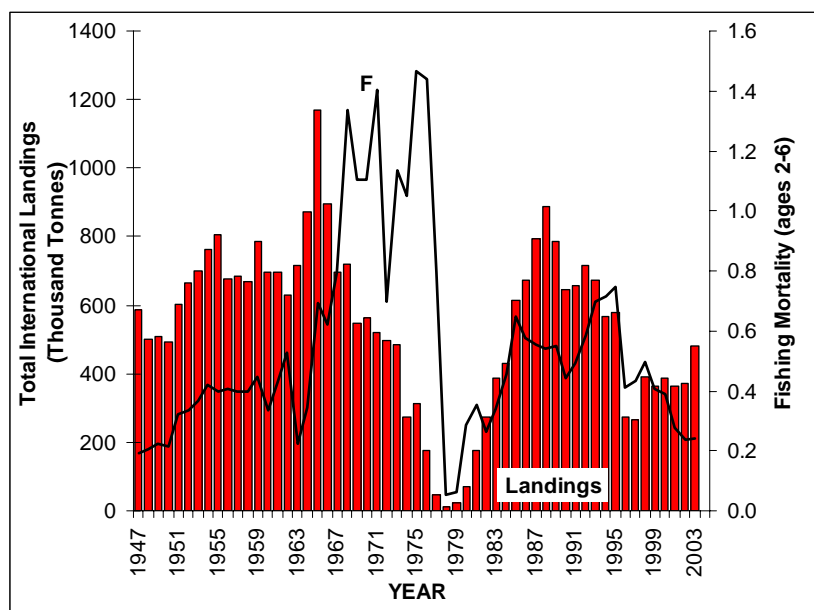
At this point, to avoid a further closure of the fishery, an agreement between the EU and Norway was put in force to limit total catches at 298,000 t and required that all catches (including the industrial fisheries) count against this figure. The implementation and maintenance of these measures have resulted in an increase in SSB.

However, at Hastings today herring and mackerel are caught by only a few fishers using drift nets with Dover sole and plaice now the most valuable catch caught mainly by trammel nets which have replaced trawling as the most popular method in use today.

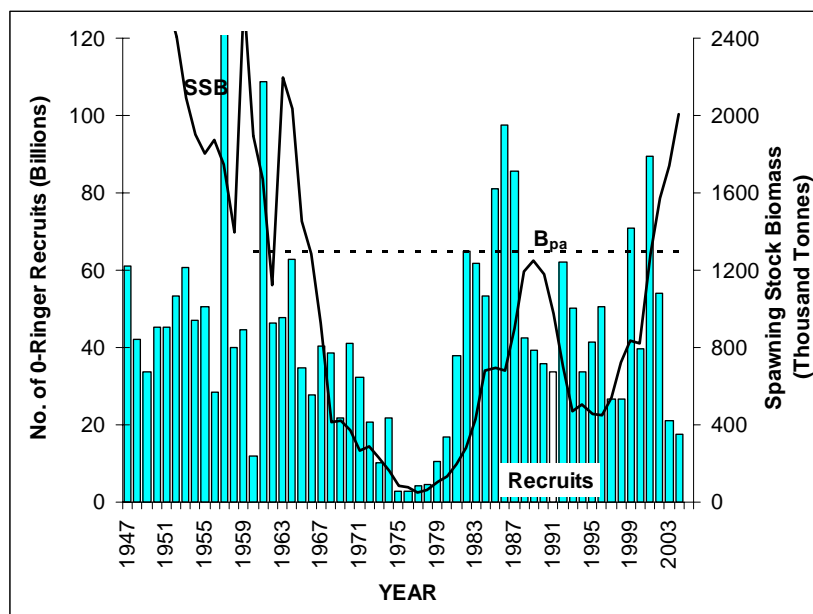
2.2.2 *The North Sea and Eastern Channel Herring Fishery*

Over many centuries the North Sea herring fishery has been a cause of international conflict sometimes resulting in war, but in more recent times in bitter political argument. There have also been fundamental changes in the nature of the fisheries. These have been driven both by changes in catching power and in response to changes in market requirements, particularly the demand for fish meal and oil. Most of these changes have resulted in greater exploitation pressures that increasingly led to the urgent need to ensure a more rational exploitation of North Sea herring. Such pressures really began to exert themselves for the first time during the 1950's when the spawning stock biomass of North Sea autumn spawning herring fell from 5 million tonnes in 1947 to 1.4 million tonnes by 1957. That period also witnessed the decline and eventual disappearance of a traditional autumn drift net fishery in the southern North Sea (Nichols, 2001).

Figure 1: Historical Herring Landings



Source: CEFAS Lowestoft

Figure 2: Herring Recruitment and Spawning Stock Biomass

Source: CEFAS Lowestoft

The annual landings from 1947 through to the early 1960's were high, but stable, averaging around 650,000t. Over the period 1952-62 the high fishing mortality ($F_{1.3}$ ages 2-6) resulted in a rapid decline in the spawning stock biomass from around 5 million tonnes to 1.5 million tonnes. Recruitment over this period was reasonable, but there were fewer and fewer year classes present in the adult stock, a clear indication that the stocks were being over-fished and that they were also being impacted by the developing industrial fishery in the eastern North Sea.

This period witnessed the complete collapse of the historic East Anglian autumn drift net fishery, which was based entirely on the Downs stock moving south to the Southern Bight and eastern English Channel to spawn. The reasons for that failure have been attributed both to high mortality of the juveniles in the North Sea industrial fisheries, and to heavy fishing by bottom trawlers on the spawning concentrations, in the English Channel, during the 1950's. Such intensive trawling, on vulnerable spawning fish, not only generated a high mortality but also disturbed spawning aggregations, destroyed the spawn and damaged the substrate on which successful spawning depends.

Fishing mortality on the herring in the central and northern North Sea began to increase rapidly in the late 1960's and had increased to $F_{1.3}$ ages 2-6, or over 70% per year of those age classes, by 1968. Landings peaked at over 1 million tonnes in 1965, around 80% of which were juvenile fish. This was followed by a very rapid decline in the SSB and the total landings. By 1975 the SSB had fallen to 83,500t although the total landings were still over 300,000t. At the same time, spawning in the central North Sea had contracted to the grounds off the east coast of England whilst spawning grounds around the edge of the Dogger Bank were no longer used. This heralded the serious decline and near collapse of the North Sea autumn spawning herring stock which led to the moratorium on directed herring fishing in the North Sea from 1977 to 1981.

International larvae surveys and acoustic surveys were used to monitor the state of the stocks during the moratorium. By 1980 these surveys were indicating a modest recovery in the SSB from its 1977 low point of 52,000t. By 1981 the SSB had increased to over 200,000t. Prior to the moratorium there had been no control, other than market forces, on catches in the North Sea directed herring fishery. Once the fishery re-opened in 1981 the North Sea autumn spawning herring stock was managed by a Total Allowable Catch (TAC) constraint. It should be noted that the TAC was only applied to the directed herring fishery in the North Sea which exploited mainly adult fish for human consumption.

Targeted fishing for herring for industrial purposes was banned in the North Sea in 1976 but there was a 10% by-catch allowance in the fisheries for other species, including the small meshed fisheries for industrial purposes, mainly for sprat.

Following the re-opening of the now controlled fishery the SSB steadily increased, peaking at 1.3 million tonnes in 1989. Annual recruitment, measured as '0' group fish, was well above the long-term average over this period. The 1985 year class was the biggest recorded since 1960 and the third highest in the records dating back to 1946.

Landings also steadily increased over this period reaching a peak of 876,000 tonnes in 1988. This resulted from a steady increase in fishing mortality to $F_{0.6 \text{ ages } 2-6}$ (ca. 45%) in 1985 and a high by-catch of juveniles in the industrial fisheries for sprat.

Following a period of four years of below average recruitment (year classes 1987-91) SSB fell rapidly to below 500,000 tonnes in 1993. Fishing mortality increased rapidly averaging $F_{0.75 \text{ ages } 2-6}$ (ca. 52%) over the period 1992–95 (Figure 2) and recorded landings regularly exceeded the TAC. The North Sea industrial fishery for sprat improved rapidly over this period with the annual catch increasing from 33,000 tonnes in 1987 to 357,000 tonnes by 1995. With the 10% by-catch limit as the only control on the catch of immature herring, there was a consequent high mortality on juvenile herring which averaged 76% of the total catch in numbers of North Sea autumn spawners over this period.

During the summer of 1991 the presence of the parasitic fungus *Ichthyophonus spp* was noted in the North Sea herring stock. All the evidence suggested that the parasite was lethal to herring and that its occurrence could have a significant effect on natural mortality in the stock and ultimately on spawning stock biomass.

High levels of infection were recorded in the northern North Sea north of latitude 60°N whilst infection rates in the southern North Sea and English Channel were very low. Efforts were made to estimate the prevalence of the disease in the stock through a programme of research vessel and commercial catch sampling. This led to estimates of annual mortality up to 16% (ICES, 1993) which was of the same order as the estimate of fishing mortality at the time. It was recognised that the behavioural changes and catchability of infected fish affected the reliability of the estimate of prevalence of the disease in the population. The uncertainty about the effect on stock size varied between estimates of 5% to 10% and 20%. Continued monitoring of the progress of the disease showed that by 1994 the prevalence in the northern North Sea had fallen from 5% in 1992 to below 1% and confirmed that the infection did not appear to be spreading to younger fish. Ultimately it was concluded that the disease had caused high mortality in the northern North Sea during 1991 and subsequently declined to the point where by 1995 the disease induced increase in natural mortality was insignificant (ICES, 1994).

The increased fishing pressure during the first half of the 1990's and the disease induced increase in natural mortality led to serious concerns about the possibilities of a stock collapse similar to that in the late 1970's. Reported landings continued at around 650,000 tonnes per year whilst the spawning stock began to decline again from over 1 million tonnes in 1990. The assessments at that time were providing an over optimistic perception of the size of the spawning stock and, for example, it was not until 1996 (ICES, 1996) that it was realised that the SSB in 1993 had already fallen below 500,000 tonnes (see table below). This was well below the minimum biologically accepted level of 800,000 tonnes (MBAL) which had been set for this stock.

It was known that some of this excess herring had been taken in the North Sea and misreported into other areas. Such misreporting has traditionally been attributable to a number of countries and fishing areas with North Sea herring being variously reported from west of Scotland, as Atlanto-Scandian herring and herring from Division IIIa.

The above scenario led to very speedy and unprecedented management action during 1996 to address the potential crisis. The TAC was halved mid way through the year and since then further strict management measures have been enforced. These have been targeted at increasing the SSB to a newly defined safe level of 1.3 million tonnes, reducing the mortality on juvenile herring and eliminating the misreporting of catches into other areas. These measures have resulted in a rapid reduction in fishing mortality since 1996 and are slowly beginning to manifest themselves in greater stability in the catch potential for North Sea herring.

In order to severely reduce juvenile fishing mortality, a by-catch limit was set for fleet B, the small mesh fisheries in the North Sea. This measure has been very effective with juvenile mortality below the target level of $F_{juv} < 0.1$ since 1996. However, overshooting of the TAC has continued to be a problem which has slowed down the recovery of the spawning stock biomass to above the target level. The resultant fishing mortality on the adults, although considerably reduced since 1995, has remained above the target level of $F_{adult} 0.2$. On the positive side, the stock recovery has been helped considerably by above average year classes of 1998, 2000 and 2001 entering the fishery.

It is still a cause for considerable concern that the TAC's for the human consumption fishery continue to be exceeded. For 2003, the Working Group estimate of catch at 450,000t against a TAC of 400,000t which had been increased from 266,000 t in 2002. Once again much of that overshoot is almost certainly attributable to area misreporting (ICES, 2003a, 2004a, 2004c).

Table 1: Herring TAC, By-catch Limits and Landings (1981 – 2004)

Year	Agreed TAC ('000t)	By-catch limit ('000t)	Landings N. Sea & E Channel ('000t)	Total Landings Autumn spawners ('000t)
1981	20*		52	174
1982	72*		116	275
1983	145		148	387
1984	55*		320	429
1985	90*		536	614
1986	570		547	671
1987	600		625	773
1988	530		698	888
1989	514		696	788
1990	415		569	645
1991	420		580	654
1992	430		564	717
1993	430		539	671
1994	440		485	563
1995	440		559	641
1996	313/156	44	265	307
1997	159	24	233	272
1998	254	22	320	380
1999	265	30	331	370
2000	265	36	322	372
2001	265	36	308	364
2002	266	36	346	372
2003	400	52	450	480
2004	460	38		

* Southern North Sea and Eastern English Channel only (IVc/ VIId)

Area misreporting and consistent over-harvesting is a particular cause for concern in the Downs stock component which has always shown independent trends in exploitation and recruitment but cannot be assessed separately. A separate Downs area TAC constraint has been ineffective in controlling the fishing mortality on this stock with the agreed sub-TAC being exceeded in every year since 1987. From 1991 to 1996 the area TAC was set at 50,000 tonnes but this was reduced to 25,000 tonnes mid way through the 1996 season in line with the emergency action taken for the rest of the North Sea stock complex. At the same time, the recommendation from ICES was that no directed fishery for herring should take place in this area. The Downs stock by that time was considered to be outside safe biological limits and at its lowest level since 1980. An annual sub-area TAC of 25,000 tonnes was set in 1997 but the recorded catches have been around 50,000 tonnes per year. In spite of an increase in the area sub-TAC for IVc/VIIId from 25,000t in 2001 to 42,700t in 2002 and to 59,500t in 2003, against the scientific advice from ICES (ICES, 2002), the misreporting of catches from IVc/VIIId into IVb continued to increase. This practice has continued and in 2003 the sub-TAC was exceeded by 14% (8,200t) (ICES, 2003a, 2004a, 2004c) This situation is not good for this component of the North Sea stock, which has never shown the same signs of recovery and development as the rest of the North Sea complex. The sub-TAC for 2004 has been increased to 66,100t and it seems likely that there will be a further increase in the sub-TAC for 2005.

In 2002, the total spawning stock biomass of North Sea autumn spawning herring was estimated at 1.6 million tonnes at spawning time and was predicted to increase to 2.2 million tonnes in 2003. With a steady increase in the number and size of year classes present in the stock the fluctuating affects of recruitment variability, such as the poor year classes of 1999 and 2002, should be cushioned. The assessment in 2004 showed that the SSB for 2003 was 1.74 million tonnes which is lower than the predicted value (ICES, 2004a, 2004c). The reason for the discrepancy is because the very large 2000 year class, the third highest on record, is slow growing, resulting in a lower % mature at age. Had the maturity been normal, as predicted, then the SSB would have been 2.2 mt at spawning time in 2003.

The continued recovery and the harvest strategy of the North Sea herring stock is now firmly based on the 2001 EU / Norway agreement to keep F_{adult} at 0.25 and $F_{juv.}$ at no greater than 0.12. If SSB falls below the B_{pa} of 1.3 mt then these fishing mortality rates will be adjusted based on scientific advice to ensure rapid recovery to above B_{pa} . ICES, ACFM continues to advise against any reduction in the B_{lim} from the well established level of 800,000t (ICES, 2003b). The North Sea TAC for 2004 has been increased by 15% to 460,000t.

2.2.3 The North-East Atlantic Mackerel Fishery

The history of the mackerel fisheries in north-west European waters is well documented by Lockwood (1978 and 1988 and more recently by Molloy (2004).

In north-west European waters there have always been two distinct mackerel fisheries, one in the North Sea and the other to the west of the of Britain including the English Channel. Prior to the early 1960's these fisheries were both relatively small and stable with the combined annual landings, from 1945, from both areas, averaging less than 100,000t. The North Sea fishery was always the more important with landings about three times those from the west. The fishery in the west and English Channel gradually changed from mainly drift netting up to the mid-1950's to hand-liners.

The stable picture began to change dramatically after 1964 when annual North Sea landings began to increase very rapidly from 200,000t in 1965 to nearly one million tonnes in 1967. This was attributable to the development and expansion of the Norwegian purse seiner fleet which took mackerel mainly for fish meal and oil. The huge increase in effort could not be sustained by the stock and landings fell rapidly to around 200,000t by 1972. In spite of the introduction of strict management measures by the Norwegian Government to restrict the industrial fishery, catch rates continued to decline. This led to a collapse of the fishery in the late 1970's and a consequent collapse of the North Sea spawning component to around 50,000t. To date this stock component has shown few signs of

recovery although an egg survey in 2002 did indicate an SSB of around 200,000t. but with no corroborative data.

Whilst the dramatic rise and fall of the North Sea fishery was taking place there were signs of an increase in the fishery in the western area. This coincided with the appearance of vessels (over 100) from the then eastern bloc countries in the late 1960's. Their catches of mackerel from the western area rose rapidly to over 300,000t in 1975. At about the same time the traditional summer handline fishery for mackerel in the south-west of Britain began to extend through the autumn and into the winter. This coincided with the appearance of large over-wintering shoals of mackerel off the Cornish Peninsula. Quite clearly both offshore and near shore, there were environmental changes taking place which were affecting the distribution and abundance of mackerel in the western area. The reasons for, and complexity of these changes remain largely unexplained.

In 1977 the eastern bloc fleet was excluded from fishing in the area under new EEC regulations. However by this time they had been joined in the fishery by both local and Scottish midwater trawlers and the annual catch continued to increase and to over 500,000t by 1978.

The fishery in the south-west then developed into a 'Klondike' fishery with UK vessels taking their catches to the eastern bloc factory vessels for processing. A similar fishery developed in the summer off the west coast of Scotland, based around Ullapool.

Unlike the North Sea fishery the western area fishery has shown no substantial signs of over-exploitation or collapse and has continued to yield annual catches of around 600,000t. They reached a peak of over 800,000t in 1993 but fell to 530,000t in 1996 and 1997. Catches have since stabilised at around 600,000t per year, following a series of reasonable year classes.

Discarding of small mackerel has historically been a major problem in the mackerel fishery and was largely responsible for the introduction of the south west mackerel box. In the years prior to 1994 there was evidence of large-scale discarding and slipping of small mackerel in the fisheries in Division IIa and Sub-area IV, mainly because of the very high prices paid for larger mackerel (>600 g) for the Japanese market. This factor was put forward as a possible reason for the very low abundance of the 1991 year class in the 1993 catches in numbers at age. The difference in prices has decreased since 1994 and the Working Group assumed that discarding may have been reduced in these areas.

Since 1977 the assessment of the state of this stock has benefited from a triennial mackerel egg survey which has provided a fishery independent estimate of the SSB which has remained relatively stable.

The egg survey method relies on plankton and trawl surveys to provide an estimate of both the total of number of eggs spawned in a season and the average number of eggs produced by one female. This was begun because of concerns about the developing fishery and a serious lack of knowledge of the stock. There were no reliable long-term series of catch and biological statistics for the fishery and it was recognised that catch rates alone of shoaling pelagic fish may not reflect their true abundance.

The spawning stock biomass has been subject to some fluctuation and decreased from over 3 million tonnes in 1977 to 2.2 million tonnes by 1994. It has since recovered to 2.7 million tonnes in 1999 and continues to remain above the biomass precautionary approach level of 2.3 million tonnes for the whole north-east Atlantic stock. However the stock is still considered to be harvested outside safe biological limits because the fishing mortality remains above the recommended precautionary level.

The apparent resilience of the western stock owes as much to the high number of good recruiting year classes over the past twenty five years as it does to a firm management and enforcement strategy based on TAC's. Furthermore the young mackerel are protected by the restriction on fishing inside a designated "mackerel box" around the south-west of England and by the complete ban on fishing in

the southern and central North Sea, where the young of the western stock may also be found.

2.3 The Hastings Fishery

2.3.1 Gears

The Hastings-based fleet uses a number of different gears (see Table 2 below) but the gear covered by this certification is the drift net. This gear is used to catch a number of different species that are selected through the use of different mesh sizes and fishing practises, including sprat (mesh size c. 55 mm) and bass (mesh size 90 – 100 mm), although the herring and mackerel drift nets used are monofilament drift nets of 55 mm (2"). A local by-law (Sussex Sea Fisheries Committee) prevents the use of drift nets with mesh sizes between 65 and 89 mm as these have been found to intercept sea trout. These are usually set around 4 m below the surface, with a total net depth of around 10 m. They are designed to fish the water column, although the weighted bottom line might occasionally touch the sea bed, although this is avoided where possible to avoid catching crabs. The drift nets are often fished overnight and are accompanied by the fishing vessel.

2.3.2 Vessels


There are currently 24 boats fishing from Hastings Beach at present (June 2004), all under 10 metres in length. Of the 21 active boats, only one is formally recognised as drift netting, although currently around three vessels fish regularly for herring and mackerel with this gear 

Table 2: Fishing Vessels Based in Hastings Beach

Vessel Name	Length (m)	Fishing method	Status
My Lass	9.10	Demersal trawl	Not fishing
Four Brothers	9.96	Demersal trawl / Dredging	Active
My Sara	9.95	Demersal trawl / Dredging	Active
Jack Henry	9.95	Demersal trawl / Trammel net / Dredging	Active
Bethan Louis	9.95	Demersal trawl / Dredging	Active
Our lady	9.75	Demersal trawl / Trammel net	Active
Bloodaxe	6.75	Drift netting	Active
Patricia	7.77	Trammel net	Active
Jackelly	9.20	Trammel net	Active
Conqueror II	7.50	Trammel net	Active
Saint Richard	9.20	Trammel net	Active
Sandra	8.73	Trammel net	Active
Lucy Ann	9.95	Trammel net	Active
Moonshine	6.28	Trammel net	Active
Nicola	6.58	Trammel net	Active
Jamie	5.88	Trammel net	Active
Rose Haze	8.66	Trammel net	Active
Midnight Sun	5.80	Trammel net	Active
P.G.K	8.50	Trammel net	Active
Alexandra	8.23	Trammel net / Demersal trawl	Active
Roy's Boys	9.90	Trammel net / Demersal trawl	Active
Frederick Rose	8.40	Trammel net / Whelk pots	Active
Young Flying Fish	8.10	Trammel net	Not fishing
Mona Lisa	6.00	Trammel net	Not fishing

Source: Defra Sea Fisheries Inspectorate (pers comm.), June 2004

2.3.3 Quotas

The table below provides the quotas for 2002 and 2003 showing the increase in quota for sole and herring and a decrease for mackerel. The table also shows the proportion landed by the Hastings Fishing Fleet. There are approximately 40 vessels, all under 10m operating from Hastings with a maximum number of 43 allowed in the fleet at any one time. Approximately 100 people are employed directly on the boats or as shore hands and another 250 in the local fish market and other associated service activities. The UK quotas for comparative quotas for 2002 and 2003 for the stocks under assessment together with Hastings landings are as follows:

Stock	UK Quota (tonnes)			Hasting Landings in 2003 (tonnes)
	2002	2003	2004	
Herring for Area IVc, VIId	4,094	5,950	6,662	2.9
Mackerel - Area IIa (non EC), Vb, VI, VII, VIIIa, b, d, e, XII, XIV	202,397	182,331	173,848	4.4

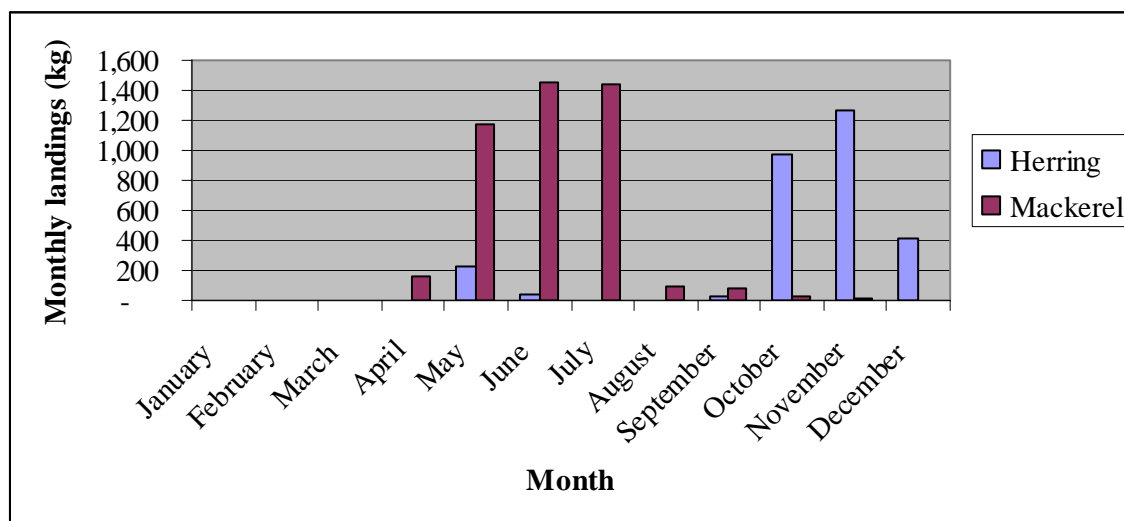
Source: DEFRA

The Non-Sector Quota Restrictions for September 2004 under 10m Quota Allocation is as follows:

Area	Under 10m Allocation (tonnes)
Herring for Area IVc, VIId	186.8
Mackerel - Area IIa (non EC), Vb, VI, VII, VIIIa, b, d, e, XII, XIV	81.0

The scale of activity has increased by as much as ten times as a result of the use of hydraulically operated net haulers and the number of nets used per vessel.

It is recognised that the directed pelagic drift net fishery for herring is very small (*c.* 3 mt in 2003) and operated on an opportunistic basis. The fishery occurs in late autumn and winter when herring of the Downs stock component are in the area to spawn. Most of the spawning occurs well outside the operational area of the Hastings fleet and the fishery is not directed at spawning concentrations.

Figure 3: Landings of Herring and Mackerel in Hastings (all gears) in 2003

Source: DEFRA, pers. comm., 2004

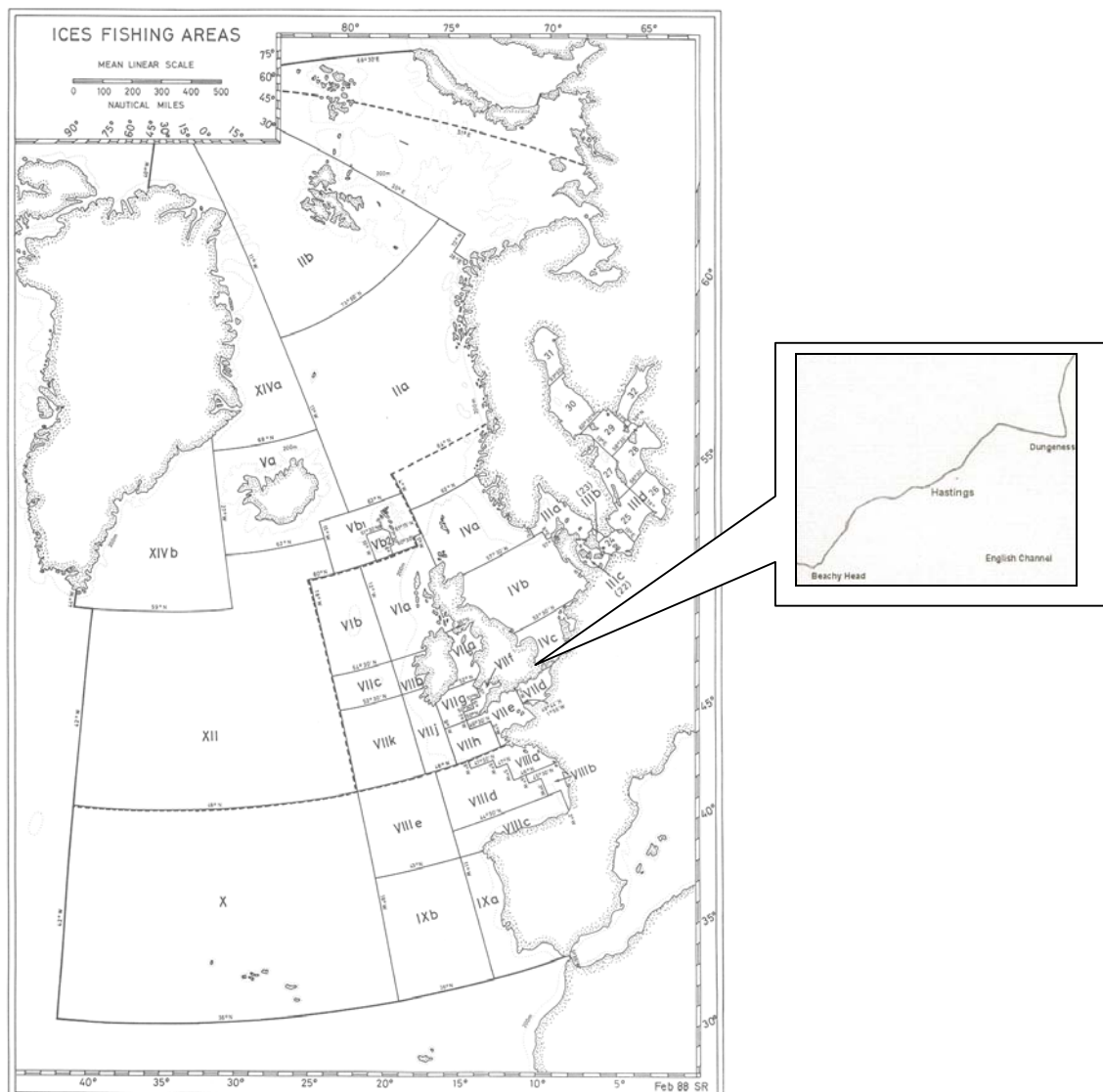
The mackerel catch (around 4.45 t in 2003) Also includes that taken as a by-catch in the trammel net fishery, which does not constitute a directed fishery in itself. The fish passing through this area are western and southern component mackerel heading into the southern North Sea to spawn or to the summer feeding grounds of the central North Sea.

2.4 Fishing Locations and Administrative Boundaries

The Hastings Fishing Fleet operates entirely within ICES Division VIIId between Beachy Head and Dungeness. The area is shown in the Figure 1 below.

For herring the area forms a small part of the administrative area for the North Sea stock. Within the larger area the Downs component of that stock is subject to a sub-area TAC which covers the fishery in ICES Division IVc and VIIId.

For mackerel the area falls within the administrative area for the western component of the north-east Atlantic stock. Catches are set against the TAC for the whole area which comprises ICES Divisions VI, VII and VIII a,b,d,e.

Figure 4: ICES Fishing Areas and Hastings Fishing Area

2.5 Ecosystem Characteristics

Ecosystem here means the general ecosystem characteristics of the Eastern English Channel and its transition into the southern North Sea, considered in relation to fishing boundaries of ICES Areas IVa, IVb, IVc and VIId. The Channel has a maximum depth of 100 m at its western mouth (5°W), shallowing to 40 m in the central Dover Strait. The bottom is relatively flat, except near the coast and around the Hurd Deep. The Channel is a shallow part of the Atlantic Ocean's continental shelf, and has strong tidal currents that are superimposed on long-term water movements called tidal residuals.

Although the currents in the Channel are mainly the result of tide, they are also influenced by wind and pressure gradients and, to a lesser extent, by density gradients and temperature differences induced by freshwater (from rivers) mixing with marine waters. The vertical hydrodynamic structure of this area depends mainly on depth and the effect of bottom topography on tidal currents. It varies from a stratified structure (weak currents, deep water) in the west, where a thermocline develops from March to September, to an eastern zone which remains relatively homogeneous, due mainly to bottom turbulence (strong currents, shallow waters). The transitional areas have characteristics of both regimes: a slightly stratified profile which becomes homogeneous at depth, dependent on the benthic turbulence, and where there are large horizontal surface water temperature discontinuities called

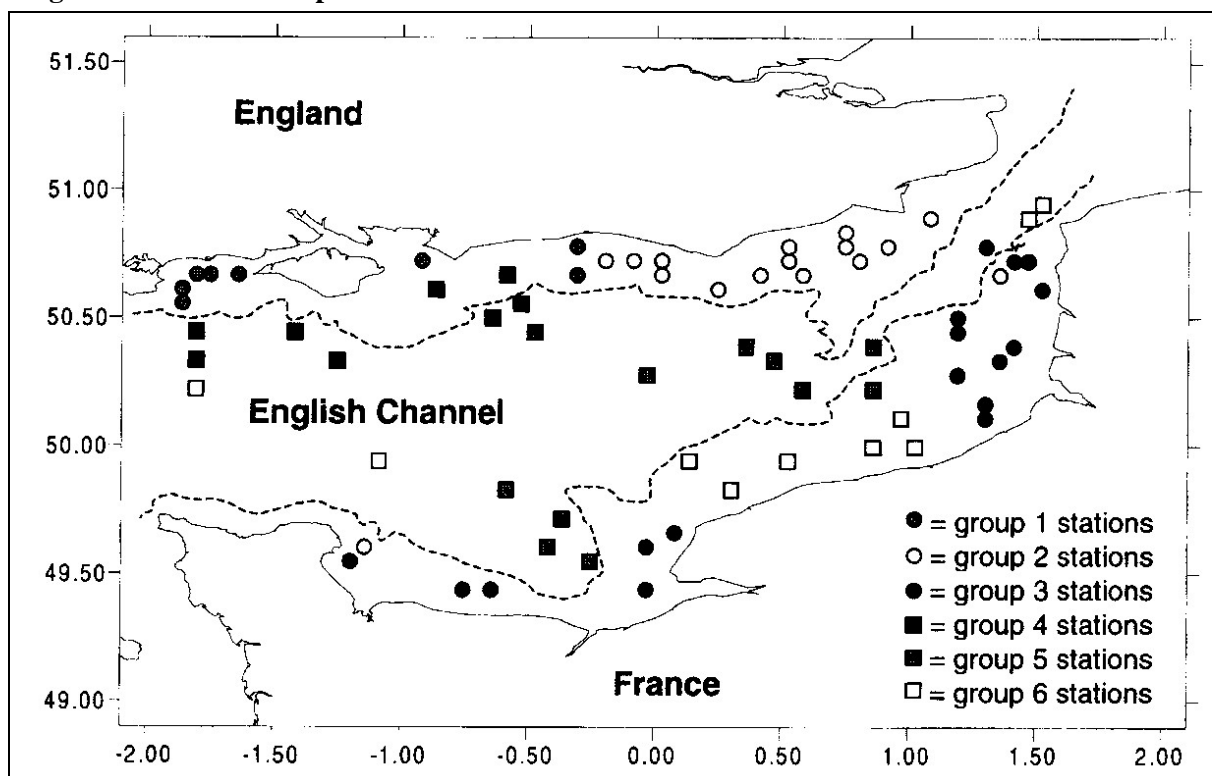
thermal fronts. Salinity gradients have their greatest effect on the physical structure in estuaries, where vertical stratifications can develop due to freshwater input (e.g. in the Baie de Seine).

The general flow of water through the Celtic Sea and the English Channel has been established by direct and indirect measurements with the aid of numerical models. It appears that the circulation pattern is composed of a 'river' between the Atlantic and the North Sea, which carries a water flux of about 17 000 cubic metres per second, for an average tide. Eddies associated with tidal flow around headlands, within basins or over sand ridges have been confirmed from direct observations. Examination of residual circulation also reveals confined areas, closed gyres (eddies) and boundaries, which must play a role in containing fish eggs and limiting the dispersion of larvae in the plankton. Tidal flow also has a significant effect on the transport of solids within the Channel and thus the distribution of sediments. Alluvial deposits and the associated organic material have an important influence on the development and structure of biological ecosystems. It has been estimated that the drainage area of freshwater into the Channel is 13,000 km², of which the Seine basin represents two-thirds.

Phytoplankton is an important component of the ecosystem in the frontal and mixed regions, where the zooplankton biomass considerably exceeds that of the well-stratified water. In the Channel, as in other temperate shelf waters, the distribution of plankton is determined directly by water movement and indirectly by the effects of tidal mixing, and seasonal stratification has an important effect on species' succession and survival.

Key to characterising the fish resources is an understanding of the habitats provided by the eastern Channel. There is increasing understanding that other biotic habitat features are also important, such as the resident prey assemblage and organisms that increase the topographic complexity of the environment. The biotic character of deeper area of the eastern Channel is largely made up of larger, less abundant and slower growing organisms such as sponges, which tend to be more sensitive to disturbance than the relatively fast growing sessile epifauna in shallower waters (Kaiser *et al*, 1999).

Climate and sedimentary texture determine the distribution of benthic organisms. Due to their ecological requirement or tolerance many species are restricted largely to the western Channel whereas other species, fewer in number, have a strictly eastern distribution. Thus there is a net decrease in the diversity of benthic organisms from west to east. The persistent west to east movement of water through the Channel makes north-south connections difficult, and may cause a separate development of colonies of particular species on both sides of the Channel. It is likely that these vertical and horizontal gradients in water properties, and the distribution of substrates in the Channel and its adjacent seas, have a strong influence on the recruitment, survival, migrations and integrity of fish stocks that are found in this area. Kaiser *et al* (1999) conducted cluster analysis on community data sampled with a 4 m beam trawl in the Channel (see Figure 5 below) to determine the relationship between benthic fauna and associated fish assemblages.

Figure 5: Benthic Group Distribution in the Channel

Source: Kaiser *et al* (1999)

This revealed two major groupings (Inshore 1-3 and Offshore 4-6), within which there were three further groupings (see Table 3 overleaf). The highest biomass of both commercial and non-target flatfishes occurred in groups 2 and 3 whilst commercial demersal (non-flatfish) were uniformly distributed among all the stations, although there was a tendency for the highest biomass of non-target demersal (non-flatfish) to occur in Group 3.

Table 3: Habitat Groups for Inshore and Offshore Waters of the Channel

Substrate Type		Fish Fauna	
Inshore (15-30 m)	Group 1: Few rocks, low biomass of soft corals and bryzoans.	Flatfish spp. (<i>P. platessa</i> and <i>S. solea</i> ;	<i>L. limanda</i>
	Group 2: Few rocks, low biomass of hydroids, soft corals, bryzoans and crabs		<i>L. limanda</i>
	Group 3: Few rocks, low biomass of hydroids, soft corals, crabs, starfish and urchins		Dragonets
Offshore (31-40 m)	Group 4: Occasional rocks, hydroids, some sponges	Pogges, dragonets & gurnards	Small gadoids and gurnards
	Group 5: Few rocks, wide selection of soft corals, hydroids, bryzoans and sponges		Dogfish and gurnards
	Group 6: Few rocks, sediments with high constant of broken shell, typical queen scallop habitat		Small gadoids and gurnards

The North Sea is semi-enclosed and situated on the continental shelf of North-western Europe and is bounded by England, Scotland, Norway, Sweden, Denmark, Germany, the Netherlands, Belgium and France. The North Sea covers an area of 745,950 km² of which the greater part is shallower than 200 m. It is one of the most diverse coastal regions in the world, with a variety of coastal habitats (fjords, estuaries, deltas, banks, beaches, sandbanks and mudflats, marshes, rocks and islands), and four ecological seasons. It is a highly productive (>300 gC/m²-yr) ecosystem but with primary productivity

varying considerably across the sea. The highest values of primary productivity occur in the coastal regions, influenced by terrestrial inputs of nutrients, and in areas such as the Dogger Bank and tidal fronts. Changes observed in trophic structure are indicative of a trend towards a decreasing resilience of this ecosystem. This trend is partially a response to inter-annual changes in the physical oceanography of the North Atlantic.

Herring are an integral and important part of the pelagic ecosystem in the North Sea and Eastern Channel. As plankton feeders they form an important part of the food chain up to the higher trophic levels. The prey of herring has been well described. The studies show that, with some variations, the food of herring in the North Sea has remained consistent over a long period, being dominated by the copepods *Calanus* spp. and *Temora* spp. with Euphausiacea and the post-larval stages of *Ammodytes* spp. and clupeids contributing to a large percentage by weight. Fish eggs are also eaten, especially those of plaice *Pleuronectes platessa*, but not in large numbers. The consumption of larvae and post—larvae of other fish have not been found, indicating selective feeding by herring. Herring are also an important prey item, - both as juveniles and as adults they are an important source of food for some demersal fish and for sea mammals. Over the past century the top predator, man, has exerted the greatest influence on the abundance and distribution of herring in the North Sea. The food web (primarily predator prey relationships) related to herring has been well described and herring has been considered as one of 12 key species within a multi-species Virtual Population Analysis (MSVPA) for the North Sea (ICES Area IV). This includes quantitative information on herring as a prey (predominantly by cod, saithe and seabirds) at different life stages, including spawn. While the MSVPA is still under development, it is considered to be robust.

Spawning stock biomass has fluctuated from estimated highs of around 4.5 million tonnes in the late 1940s to a lows of less than 100,000 tonnes in the late 1970s. The species has demonstrated a robustness in relation to recovery from such low levels once fishing mortality is curtailed in spite of recruitment levels being adversely affected. Their spawning and nursery areas, being near coastal, are particularly sensitive and vulnerable to anthropogenic influences. The most serious of these is the ever increasing pressure for marine sand and gravel extraction. This has the potential to seriously damage and destroy the spawning habitat and disturb spawning shoals and destroy spawn if carried out during the spawning season. The sensitivity of herring spawning habitats to aggregate extraction featured heavily in the fisheries assessment as part of the Eastern Channel Association's Cumulative Assessment of aggregate dredging (Banks and Huntington, 2003). Similarly, trawling or scallop dredging at or close to the bottom in known spawning areas can have the same detrimental effects.

In more recent years the oil and gas exploration in the North Sea has represented a potential threat to herring spawning although great care has been taken by the industry to restrict their activities in areas and at times of known herring spawning.

Mackerel. The prey of mackerel has also been well described (Daan, 1989; Hislop, 1997). North Sea mackerel was originally included as a full MSVPA species, and has been shown to be an important predator in the North Sea system (ICES, 2003c). Although mackerel was later dropped as a VPA species from the 4M model as the size of its population declined markedly in the 1970's, the two stocks (Western Mackerel and North Sea mackerel) are being reintroduced, especially due to their predation of 0-class fish.

2.6 By-catch and Discard

By-catch consists of the retained 'incidental' catch of non-target species and discard is a deliberately (or accidentally) abandoned part of the catch returned to the sea as a result of economic, legal, or personal considerations. This section also looks at the impact of the fishery on sea mammal, seabird and other threatened, rare and iconic species which may form part of a by-catch.

2.6.1 *Incidental Catch*

The level of incidental catch from the coastal drift nets as used by this fishery is deemed to be very low. Non-target species affected by the fishery may include the occasional catch of other pelagic fish mixing with herring and mackerel shoals, notably grey mullet and rarely red mullet if fishing near the sea bed. There may be some entanglement of dogfish, although the majority (c. 90%) escape or are released unharmed (Rod Knight, pers. comm.). Supporting this, observer programmes on pelagic fisheries and information from other inshore herring drift-net fisheries have also indicated that by-catch of non-target pelagic fish is very low.

The drift nets used have a mesh size of around 55 mm, well below the locally prohibited 65-89 mm mesh band (SFC Byelaw) that has been implemented to reduce salmonid by-catch. There may be a small-bycatch of salmonids (there is no directed salmonid fishery in Hastings) over the summer period but this is not recorded (Tim Dapling, Sussex SFC, pers. comm.).

2.6.2 *Discards*

The level of discards from the drift net fishery have not been recorded in detail but are considered to be very low as all catches of the target species (herring and mackerel) are retained.

2.6.3 *Catch of Threatened, Rare and Iconic Species*

The relatively small mesh used by this fishery has resulted in a highly selective fishery. Whilst the larger mesh (90-100mm) bass drift nets might result in some incidental catch of the two UK Biodiversity Action Plan (BAP) species Allis shad (*Alosa alosa*) and Twaite shad (*Alosa fallax*), this is unknown in the smaller mesh (55 mm) herring and mackerels drift nets. Shad catches are almost entirely (93%) in the first quarter when herring and mackerel landings are negligible. Some by-catch of seabirds has been reported (Rod Knight, pers. comm.) but only when fishing near rocks and mortality rates low.

2.7 **Other Fisheries Relevant to this Assessment**

2.7.1 *Herring fisheries*

The very small catches of herring by the Hastings fleet are from the Downs component of the North Sea autumn spawning stock. The North Sea Autumn-spawning stock is targeted by four discrete fleets:

- Fleet A: Directed herring fisheries with purse-seiners and trawlers in the North Sea
- Fleet B: All other vessels which take herring as by-catch in the North Sea
- Fleet C: Directed fisheries with purse-seiners and trawlers in Division IIIa
- Fleet D: Vessels fishing in Division IIIa for herring and sprat and other vessels participating in fisheries where herring is taken as by-catch in Division IIIa

These Fleets are all taken into consideration in estimating total fishing pressure on the North Sea herring stock.

Most of the catch of North Sea autumn spawners is taken by fleet A which comprises mainly, pelagic fishing vessels from Germany, France, The Netherlands, Scotland, Norway, Denmark and England. Most of the catches of The Netherlands, France, Germany and England are taken by vessels comprising a Pelagic Freezer Association fleet. They operate over the whole area including ICES Division VIIId. Their combined landings for 2003 were 175,000t of which 59,000t were taken in ICES Division VIIId. The Scottish fleet participating in this fishery comprises pelagic trawlers and purse seiners landing mainly fresh herring to onshore processing facilities. The fleet operates mainly around

the Shetland area with the major fishery occurring in the third and fourth quarters of the year. In 2003, the Scottish fleet caught 40,000t of herring taken mainly in the western part of ICES Division IVa. The Norwegian pelagic fleet took a total of 112,000t of North Sea herring in 2003 half of which came from the eastern part of ICES Division IVa. This figure includes by-catches of herring in the Norwegian industrial fishery (ca. 9,000t) which is included in the fleet A quota. The 12,000t by-catch of herring in the Danish industrial fishery is included as fleet B. This accounts for about half of their catch of 23,000t of herring which they took in ICES Division IVb in 2003. Denmark also took a total of 56,000t of herring in ICES Division IVa in 2003, only a small proportion of which was fleet B by-catch in their other North Sea fisheries.

2.7.2 Mackerel fisheries

The targeted mackerel drift-net fishery, and a small by-catch of mackerel in the trammel-net fishery is from the western component of the north-east Atlantic mackerel stock. The areas where the major fisheries on this stock occur are controlled by temporal closure legislation designed to protect the severely depleted North Sea stock component and also juvenile western mackerel which are numerous in Division IVbc during the second half of the year. They are:

- No fishing for mackerel in ICES Divisions IIIa, IVbc at any time of the year.
- No fishing for mackerel in ICES Division IVa from 15 February to 31 July
- A 30cm minimum landing size throughout ICES Sub-area IV

More than half of the catch of north-east Atlantic mackerel is taken in the North Sea (Division IVa) during the last four months of the year. Of the 369,000t taken in that area in 2002 almost half was taken by Norwegian vessels whilst most of the remainder was shared between vessels from EU countries. A further 74,000t was taken in 2002 by Norwegian and Russian vessels fishing in the Norwegian Sea and around the Faeroes (ICES Divisions IIa and Vb). In ICES Sub-areas VI, VII and Division VIII a,b,d,e a total of 225,000t was taken in 2002. More than half of these were taken by UK vessels whilst Ireland took 50,000t with France, Germany and The Netherlands each taking around 20,000t (ICES, 2004b)

3 ADMINISTRATIVE CONTEXT

3.1 Legislation

3.1.1 General

3.1.2 Herring Specific

The North Sea herring fishery is managed under a specific International Agreement, the EU-Norway Agreement of December 1997. Key elements of the agreement are:

1. Every effort shall be made to maintain a level of Spawning Stock Biomass (SSB) greater than the Minimum Biological Acceptable level (MBAL) of 800,000 tonnes.
2. A medium-term management strategy, by which annual quotas shall be set for the directed fishery and for by-catches in other fisheries as defined by ICES, reflecting a fishing mortality rate of 0.25 for 2-ringers and older and 0.12 for 0-1-ringers, shall be implemented.
3. Should the SSB fall below a reference point of 1.3 million tonnes, the fishing mortality rates referred to under paragraph 2, will be adapted in the light of scientific estimates of precise conditions then prevailing to ensure rapid recovery of SSB to levels in excess of 1.3 million tonnes.

The recovery plan referred to above may, *inter alia*, include additional limitations on effort in the form of special licensing of vessels, restrictions on fishing days, closing of areas and/or seasons, special reporting requirements or other appropriate control measures.

4. By catches of herring may only be landed in ports where adequate sampling schemes to effectively monitor the landings have been set up. All catches landed shall be deducted from the respective quotas set, and the fisheries shall be stopped immediately in the event that the quotas are exhausted.
5. The allocation of the TAC for the directed fishery for herring shall be 29% to Norway and 71% to the Community. The by-catch quota for herring shall be allocated to the Community.
6. The parties shall, if appropriate, consult and adjust management measures and strategies on the basis of any new advice provided by ICES including that from the assessment of the abundance of the most recent year class.
7. This arrangement entered into force on 1 January 2002. A review of this arrangement shall take place no later than 31 December 2004.

This agreement is implemented in each member country of the EU and in Norway through EC Regulations or Norwegian management regulations.

As a consequence the Hastings herring fishery falls within the general remit of UK fisheries policy. In common with all other Member States, UK fisheries are managed through the EU Common Fisheries Policy (CFP). This policy came into being in the form we recognise to-day in 1983. It was reviewed thoroughly in 2002 and the current basic fisheries regulation (No.2731/2002) was adopted by the Council of Ministers on 20 December 2002.

This regulation is a ‘chapeau’ regulation setting out the strategic aims of the CFP and enabling the Council of Ministers, or in certain cases the Commission, to make more detailed Regulations. These include ones dealing with control requirements, fleet structure, technical conservation, marketing and annual total allowable catches (TAC) etc. The European Commission relies extensively on advice from the International Council for the Exploration of the Seas (ICES) in preparing the TAC regulation. Outside the CFP framework other EU legislation dealing with habitats and species protection and is also relevant to fisheries management and to fishermen.

In order to protect spawning concentrations of herring from disturbance by fishing there are spawning ground closures off the east coast of the United Kingdom. The controlling regulation is as follows:

“Fishing for herring shall be prohibited in the zone extending from 6 to 12 miles off the east coasts of the United Kingdom as measured from the baselines between latitudes 54°10’N and 54°45’N for the period 15 August to 30 September and between latitudes 55°30’N and 55°45’N for the period 15 August to 15 September.”

There is also a closed area off the west coast of Denmark from 1 July to 31 October where fishing for herring is prohibited in order to protect juveniles. The area is bounded by the following coordinates:

- the west coast of Denmark at latitude 55°30’N
- latitude 55°30’N; longitude 7°00’E
- latitude 57°00’N; longitude 7°00’E
- the west coast of Denmark at latitude 57°00’N

This area is also closed to sprat fishing at the same time, which is an additional safeguard for juvenile herring. There is a minimum landing size of 20 cm in the North Sea and Eastern Channel

The EC Regulations made to manage fisheries are directly applicable in each Member State. In the United Kingdom, for example, Statutory Instruments are made as necessary to specify offences and prescribe penalties. These Statutory Instruments in effect provide the authority for the UK British Sea Fisheries Officers to take enforcement action.

3.1.3 Mackerel Specific

The main countries involved in the exploitation of north-east Atlantic mackerel are either EU, Norway or the Faeroe Islands. Northeast Atlantic mackerel are also taken by Russian vessels fishing in International waters under the jurisdiction of NEAFC. In 1999 the EU, Norway and the Faeroe Islands agreed on a legal framework in line with scientific advice on the state of the stock.

The agreed record of negotiations between them, states:

“For 2000 and subsequent years, the Parties agreed to restrict their fishing on the basis of a TAC consistent with a fishing mortality in the range of 0.15 - 0.20 for appropriate age groups as defined by ICES, unless future scientific advice requires modification of the fishing mortality rate.”

“Should the SSB fall below a reference point of 2 300 000 tonnes (Bpa), the fishing mortality rate, referred to under paragraph 1, shall be adapted in the light of scientific estimates of the conditions prevailing. Such adaptation shall ensure a safe and rapid recovery of the SSB to a level in excess of 2 300 000 tonnes.”

“The Parties shall, as appropriate, review and revise these management measures and strategies on the basis of any new advice provided by ICES.”

- There is also an agreement between the three parties in relation to area closures and minimum landing size, put in place in order to protect the severely depleted North Sea stock. Those regulations state: No fishing for mackerel in ICES Divisions IIIa, IVbc at any time of the year.

- No fishing for mackerel in ICES Division IVa from 15 February to 31 July
- A 30cm minimum landing size throughout ICES Sub-area IV and Divisions VIIIc and IXa

An EU regulation has been in force since 1984 to protect juvenile mackerel in an area described as “the mackerel box” off the south-west peninsula of the UK. This bans targeted fishing by purse seiners or trawlers within the designated area.

ICES recognizes that there are other areas where juvenile mackerel sometimes occur in large numbers within the distribution area of the north-east Atlantic mackerel. The situation is kept under constant review and appropriate measures will be recommended if necessary.

Various national measures such as closed seasons and boat quotas are also in operation in most of the major mackerel catching countries

Landings are also made by non-EU/Norway countries, e.g. from Russian vessels in International waters. However, in February 1999 the North East Atlantic Fisheries Commission (NEAFC) agreed on safeguards aimed at sustaining stocks of mackerel and deep-water species. NEAFC has responsibility for managing fish stocks in international waters beyond 200 miles, in the North East Atlantic and includes Denmark on behalf of the Faeroe Islands and Greenland, the European Union, Iceland, Norway and Russia. In 1999 a regulation was implemented to set a catch limit of 44,000 tonnes for mackerel in NEAFC waters (DEFRA). Catches are reported to ICES but there are concerns, expressed by ICES, that these may be under reported.

The internationally agreed TAC's have covered the total distribution area of the Northeast Atlantic mackerel stock since 2001. The different agreements cover the total distribution area of Northeast Atlantic mackerel, while each agreement in some cases covers different parts of the same ICES Divisions and Sub-areas. The agreements also provide flexibility of where the catches can be taken. The various agreements for dividing and managing the TAC's are:

- A coastal states agreement (EU, Norway and Faeroes)
- NEAFC agreement
- EU / Norway agreement
- EU Autonomous TAC's

3.1.4 Local Byelaws

Fisheries regulations within the UK's six nautical mile inshore zone are subject to byelaws under the Sea Fisheries Regulation Act (1988) and subsequent amendments. Under the current byelaws only drift nets or “*nets with a mesh size of not more than 65 millimeters and not less than 89 millimeters when measured in accordance with Commission Regulation (EEC) 2108/84 between directly opposite mesh knots*” are permitted in waters under the jurisdiction of the Sussex Sea Fisheries Committee.

3.2 Management Responsibilities and Interactions

At the wider regional level, scientific research and assessment is carried out by ICES Working groups. The assessments are reviewed and evaluated by the ICES Advisory Committee on Fisheries Management (ACFM) who then provide advice on the status of target and non-target stocks to the European Commission. Where relevant (as for herring) the advice is considered at a joint meeting between officials of the EU and Norway. ICES advice, via Commission proposals, informs the annual EU Council of Ministers regulation establishing management measures, in particular TAC's and quotas. TAC's and quotas for this fishery are set in this regulation for EC member states and recorded for Norway.

Implementation of the CFP (and implementation of Habitats Directive etc) at a national level is carried out through the individual Member States. Member States Fisheries enforcement authorities co-operate in policing the fishery (e.g. satellite monitoring, landing recording etc). The European Commission's fisheries inspectorate monitors the national enforcement process and its results. The Commission can also request fishery related data from member states.

Within EU member states, Fisheries Departments divide the Total Allowable Catch agreed each year in the Council of Ministers in Brussels between their various fleets. It is up to these fleets, usually operating within a Producer Organisation, to allocate their quota share to individual vessels. In turn, fishers have to report landings to the National Authorities who in turn report aggregate national information to the European Commission. For the Hastings fleet, DEFRA obtain that information directly from the Hastings Fishermen's Protection Society through whom all the landings are processed.

If the stage is reached when the aggregate Total Allowable Catch is near to being taken the Commission will make a Regulation to close the fishery. and this is then enforced through national legislation.

At the national level, there are a number of organisations responsible for management of the fishery:

Defra: the Fisheries Directorate of the Department for Environment, Food and Rural Affairs (Defra) is responsible for managing sea fisheries in England and Wales. In particular, Defra's Sea Fisheries Inspectorate (SFI) ensures that effort and regulatory compliance remains within those limits agreed under the Common Fisheries Policy. A branch of Defra's SFI is based in Hastings with two full time fisheries inspectors.

CEFAS: the Centre for Environment, Fisheries and Aquaculture Science is an Executive Agency of Defra. CEFAS provides the UK Government with scientific research on fish stocks and populations as well as wider environmental and oceanographic information.

Sussex Sea Fisheries Committee: The Sussex Sea Fisheries Committee (SFC) provides a regulatory framework for fishing effort within the six nautical mile limit and is thus particularly relevant to the Hastings fleet. Based in Shoreham, the Sussex SFC has a patrol boat based in Brighton and ensures that the local byelaws, stipulating vessel length restrictions, fishing instrument regulations and various other input controls are complied with.

Environment Agency: the Environment Agency is responsible for establishing and maintaining environmental standards in England and Wales. Their activities range from influencing Government policy and regulating major industries nationally, right through to day-to-day monitoring and clean up operations at a local level. In particular, the Environment Agency is responsible for migratory freshwater fish such as salmon and sea trout but not shad, which are covered by English Nature (Marc Thain, Environment Agency, pers. comm.).

English Nature: like CEFAS, English Nature is a Government agency set up by the Environment

Protection Act 1990 and are funded by the Defra. In particular, English Nature is responsible for enforcing the Wildlife and Countryside Act (1981), which is the major legal instrument for wildlife protection in the UK. This includes marine and freshwater protected species and habitats.

Other, non-statutory agencies also have an influence on the management and conservation of fish stocks and their marine habitat. In the Sussex area, the Sussex Wildlife Trust is involved in marine conservation initiatives, although this is largely conducted under the South East Marine Programme.

Hastings Fishermen's Protection Society: Commercial fishermen operating from the Hastings Stade are members of the society. The society is the client for this certification. The key objective of the society is to represent, protect and promote the interests of commercial fishermen.

4 STOCK ASSESSMENT

4.1 Management Unit

4.1.1 Herring

As described in section 2.1 and reviewed by Nichols (2001), the North Sea Autumn spawning herring comprise a complex of three separate stocks, the Buchan or Scottish group, the Banks or Central North Sea group and the Downs group, which spawns in the southern North Sea and the eastern English Channel. Individuals from the three stock units may mix and can be caught together as juveniles and adults but they cannot be separately identified in the catches. As a consequence North Sea autumn spawning herring have to be managed as a single unit because the catches cannot be apportioned to the separate stocks. The management area comprises ICES Divisions IVa,b,c and VIIId. The herring taken in the Hastings fishery are all part of the Downs group, spawning in the southern North Sea and eastern English Channel. Stock assessment and management is complicated by the fact that four separate fisheries exploit North Sea autumn spawning herring. Only two of these fisheries are in the North Sea the others are in ICES Division IIIa (Skagerrak and Kattegat).

Those four fisheries are:

- A: Directed fisheries for herring with purse seiners and trawlers (with 32 mm minimum mesh size) in the North Sea. (*By-catches of herring in industrial fisheries by Norway are included*).
- B: Herring taken as a by-catch in the small mesh fisheries in the North Sea (with mesh size less than 32 mm).
- C: Directed fisheries in the Skagerrak and Kattegat with purse seiners and trawlers (with a 32 mm minimum mesh size).
- D: By-catches of herring caught in the small mesh fisheries (with mesh size less than 32 mm) in the Skagerrak and Kattegat.

It should be noted that the TAC constraint, which has been operating since 1981, is only applied to fleet A the North Sea directed fisheries. There is however a by-catch limit for herring set for the fleet B, small mesh fisheries in the North Sea.

The Downs stock in the southern North Sea and English Channel has always been considered to be a separate management unit within the North Sea because the population in this area is clearly separated from the other components for most of the year. Historically this component has always been subjected to a higher fishing mortality than the rest of the North Sea and is seen to develop independently of the other two stock units. As a consequence advice is now given separately for this stock in order to give it special protection in the form of a separately allocated sub-TAC within the overall North Sea TAC.

4.1.2 Mackerel

Assessments are now performed for mackerel (*Scomber scombrus*) over the whole distribution area. Stock components are separated on the basis of catch distribution, which reflects management considerations and different historical information for the components, rather than on any biological evidence. This conclusion came after many years of scientific investigation and debate and it is now recognised that there is but a single management unit of mackerel in the north-east Atlantic. However it is further recognised that this Northeast Atlantic stock unit comprises three different components, a southern component, a western component and a North Sea component (Molloy, 2004).

The north-east Atlantic mackerel is widely distributed from the Iberian peninsula in the south to the Norwegian Sea and the North Sea in the north. Over this area it may be found from over the deep waters of the shelf edge right up to the coastal waters of the whole area, including the English Channel and Irish Sea. Because of the migratory nature of the species the three components may be found together in the North Sea during the summer and autumn.

By far the largest component of the stock is the western component which when last assessed separately in 1999 (ICES, 2000) had a spawning stock biomass (SSB) of 2,700,000t. This compares with an estimated SSB of for the southern component of 450,000t at the same time. The current combined estimate of SSB is 3,147,000t in 2002, predicted to decrease slightly to 3,091,000t in 2003 (ICES, 2004b). The North Sea component has been severely depleted since the late 1970's and is no longer fully assessed. There is no targeted fishing on this component and a nominal annual by-catch of 10,000t is allocated to this part of the stock.

Management of the NEA stock is complicated by the fact that more than half of the western component TAC is taken in the North Sea during the last four months of the year

The distribution and spawning areas of the three components are listed in the table below:

North-East Atlantic Mackerel			
Distributed and fished in ICES sub-areas and Divisions IIa, IIIa, IV, Vb, VI, VII, VIII and IXa			
Spawning component	Western	Southern	North Sea
Spawning Areas	VI, VII, VIII abde	VIII c, IXa	IV, IIIa

4.2 Monitoring of Stock Status

4.2.1 Herring

The ICES Herring Assessment Working Group monitors the status of the stock annually. The working group comprises a team of fisheries scientists drawn mainly but not exclusively from the member states with an interest in the fishery. The working group uses data, both from the fishery and survey data independent of the fishery. The most recent working group report provides an excellent insight into the whole process (ICES, 2004a)

The data from the fishery consists of the total weight of catches of North Sea autumn spawning herring taken in the North Sea and outside the North Sea, in the eastern English Channel, the Skagerrak and Kattegat. The biological composition of the catches are sampled to provide data on the age composition, catch in numbers at age, maturity and weight. The sampling also provides the proportion of spring spawning herring in the catches. Biological sampling has deteriorated in recent years to the point where in 2000 four countries were not sampling their landings at all. In an attempt to improve sampling, target levels for each country participating in the fishery were set by the European Commission in 2002. In general sampling of commercial catches has improved since the implementation of the EU sampling regime with 80% of the catch sampled in 2002 compared with 71% in 2001. However some countries are still falling well short of the targets set. There is also a

need to improve the spread of sampling by area and by fleet, an issue which is not satisfactorily addressed in the EU sampling regime (ICES, 2004a).

The fishery independent data consist of a series of surveys which provide various indices of abundance, which are either age aggregated, or age disaggregated. In this context there are three types of survey, the acoustic surveys, bottom trawl surveys and plankton surveys for herring larvae.

The acoustic surveys are carried out from late June through July in the northern and central North Sea from latitude 53°30'N to 62°N. The surveys provide data on numbers at age, maturity stage and mean weights at age. These data are combined to provide an overall estimate of abundance which is used as a relative index in the stock assessment because the absolute abundance cannot be used. This survey now provides good information on ages 1 to 8 for the assessment.

The international bottom trawl surveys cover the whole of the North Sea and are now carried out in the first and third quarters of the year. The bottom trawl hauls provide age disaggregated indices of abundance of the 1 winter ring group and the 2-5 winter ring group herring. Simultaneous sampling with a course meshed plankton net provides a recruitment index of 0 winter ring fish. The bottom trawl survey now provides good information in quarter 1 on the abundance of 0-1 winter ring herring and useful, but 'noisy' information on the abundance of 2-5 winter ringers. The quarter 3 survey provides some useful information on the 0 winter ringers but information from the other age groups is inconsistent and unreliable.

The plankton surveys for herring larvae, which have been carried out in the North Sea since 1972, have generated a long time series of larval production estimates. These estimates, combined with retrospective estimates of SSB, have provided a valuable age aggregated index of abundance of the three separate spawning components. The larval surveys were the only indication of the recovery of the spawning stock during the period of the moratorium on fishing for North Sea herring from 1977 to 1981. Unfortunately there has been a substantial decline in ship time and international sampling effort on these surveys since the late 1980's. The effort was halved in 1990 and has further decreased since then. By 1993 the temporal and spatial coverage of the larvae surveys had reduced to such an extent that the larvae production estimate could no longer be calculated. Since 1994 the production estimate has been replaced by a multiplicative larval abundance index (MLAI) which can be calculated on the now severely limited data set. This MLAI produces a good SSB index and the surveys continue to provide a valuable insight into herring spawning abundance. For example in 2002, in spite of poor coverage in the central North Sea, the one survey in October resulted in the highest estimate of abundance ever found there at that time. The surveys also continue to provide the only fishery independent estimate of the state of the Downs stock component. It is of some concern that in 2002 the index was half that of the previous year and more comparable with the lower abundances found in 1998 and 1999.

The various survey indices described do not contribute equally to the assessment each year. The method for determining the weightings has been extensively researched. After due consideration of the various alternatives the working group has concluded that the inverse variance method outperforms other methods and is the best one to use for these surveys.

4.2.2 Mackerel

The ICES Mackerel, Horse mackerel, Sardine and Anchovy Assessment Working Group monitors the status of the stock annually. This large working group comprises a team of fisheries scientists drawn mainly but not exclusively from the member states with an interest in the various fisheries. For the North-east Atlantic mackerel the working group uses data, both from the fisheries and survey data independent of the fishery. The most recent working group report provides an excellent insight into the whole process (ICES, 2004b)

Catch data - Estimation of catches (i.e. fishery dependent data) is based on official landings of mackerel with additional national reporting of information on discards and misreporting. This was considered to be under-estimated, as discard levels had not been explicitly reported for any fleet. The working group reported that discarding of small mackerel had been a problem in the past and that the discarding of small mackerel might again be a problem in all areas if a strong year class enters the fishery. The UK landings for Western Mackerel Stock are recorded in Table 1 above.

Fishery independent data is currently obtained through a triennial egg and larvae survey which has been conducted since 1977. The survey area currently extends from ICES Division IXa in the south, through Biscay, the Celtic Sea, west of Ireland to north of Scotland in the north. The whole spawning time, for both mackerel and horse mackerel, over that area is covered from January in the south through to July in the north.

A separate and less extensive mackerel egg survey has been carried out in the North Sea on an irregular basis since 1980. This is the only indication of any recovery of this spawning component. The last survey was carried out in 2002.

Other surveys - There is a Russian aerial survey and there has been a Norwegian acoustic survey, however these data are not currently considered sufficiently reliable to be used in the assessment.

Age, size and sex-structure - Information is provided by national sampling programmes and biological samples from commercial and research vessels. National compliance with sampling requirements has been variable in the past. This has now been addressed by an EU Directive scheme which stipulates the numbers of fish to be sampled per tonne of fish landed.

Tagging information - This is used to indicate the mixing of Southern and Western components and to estimate mortality, including natural mortality.

Fishery information - The working group reports that the assessment includes the involvement of scientists familiar with the fishery. It also states that observers have been placed on many of the fishing vessels and information they provide may contribute to the assessment.

4.3 Modelling

4.3.1 Herring

From 1972 to 1995 the assessment of the total North sea stock was done by means of a Virtual Population Analysis (VPA) with *ad hoc* tuning to the data series of larvae production estimates, acoustic surveys and bottom trawl surveys.

In 1992 the ICES Herring Assessment Working Group considered that the VPA estimates of stock size were rather uncertain, with an increasing tendency to overestimate SSB and to underestimate fishing mortality. The uncertainty was generated because of differences in the perception of stock size between, larval indices and the bottom trawl surveys on the one hand and acoustic surveys on the other. The serious reduction in the temporal and spatial coverage of the herring larval surveys was further exacerbating the problem. Furthermore, there was additional uncertainty surrounding the level of natural mortality caused by the observed effects of the *Ichthyophonus* fungal disease.

As a consequence of the uncertainty of the SSB estimate, the working group agreed to explore alternative models for the assessment of North Sea herring. In 1995 the working group decided to change to an integrated catch analysis method (ICA) (Patterson and Melvin, 1996). This method was adopted for the 1994 assessment and has been used since then. The method has the advantage of being able to use age aggregated indices of stock size and also to incorporate assumptions about errors, both in the survey indices and also in the catch at age data set. This model affords an improved estimate of uncertainty in the assessment and in the forward projections of stock size.

In the 2003 assessment of the stock in 2002 (ICES, 2004a) the working group compared the performance of the ICA model with another regularly used assessment model, XSA. They concluded, that whilst both gave similar perceptions of the state of the stock, it was appropriate to continue to use the ICA model. This would maintain consistency of the assessment with previous years.

4.3.2 Mackerel

The current assessment model is Integrated Catch Analysis (ICA) (Patterson and Melvin, 1996). Key model parameters are natural mortality and fishing mortality. Historic uncertainty analysis is based on the Monte-Carlo evaluation of the parameter distributions. Two other models were tested against the ICA model in 2003 and all showed similar flat F-patterns in the recent years and all indicated 2000 as a weak year class and 2001 as a strong one. The WG decided to use ICA for the assessment, to use the SSB values from the egg surveys as an absolute index with a weighting of 5 and with a period of separable constraint of 11 years.

Prediction models - The short term prediction model used is age-structured, by fleet and area fished. Key model considerations are stock weight at age, natural mortality at age, maturity at age, catch weight at age by fleet (all these are averages from the last three years), proportion of male and females before spawning, fishing mortality by age, numbers at age and fishing mortalities by area (and age). Uncertainty model parameters are not incorporated though it is stated that sometimes a limited number of sensitivity analyses are performed, usually regarding recruitment level. The medium term prediction model is age structured with key model parameters the same as for the short-term prediction model.

The assessment model is considered as unreliable at estimating the most recent year classes prior to their appearance in the fishery. Given this, and the over-sensitivity of the model to the most recent egg survey SSB estimate leading to fluctuations in the stock assessment, a management regime is needed which is capable of incorporating this uncertainty in their advice. Specifically the regime should consider the possibility that poor year classes are not recognised until several years later, and that the recent perceptions of the stock is subject to variability and allow for this uncertainty in the advice. See Section 2.9.2 for a detailed discussion of the reliability of the assessment and its implications for management.

The working group reported that in 2002 87% of the total mackerel catch was covered by sampling programmes and the overall sampling level had been consistent and at a satisfactory level in recent years. However there are big national differences and England and the Faeroes sampled less than 15% of their commercial catches in 2002. There were also area differences with the Celtic Sea, southern North Sea, English Channel and parts of North Biscay not adequately sampled. It also emphasised that the fishing mortalities derived from studies of predictions and simulations apply to the total exploitation of the stock, including areas where no quota regulations apply.

4.4 Management Advice

All the advice is provided by ICES through their Advisory Committee on Fisheries Management (ACFM) and is now firmly based on the principle of the precautionary approach. The state of the stock is always described in terms related to both a precautionary level biomass and fishing mortality rate (see ICES, 2003b, 2003d).

4.4.1 Herring

For herring, a biomass limit level below which the SSB must not be allowed to fall, has also been set. The fishing mortality rate related to this has not been defined. The precautionary principle and the related biomass and fishing mortality rates for adults and juveniles are now firmly embedded in the

2001 EU / Norway agreement.

This agreement sets adult fishing mortality rates of F_{2-6} 0.25 and for juveniles F_{0-1} 0.12 whilst the SSB remains above the biomass precautionary level of 1.3 million tonnes. Below that biomass level fishing mortality rates will be reduced to F_{2-6} 0.2 for adults and for juveniles F_{0-1} 0.1. If the stock falls below the biomass limit level of 800,000 tonnes then fishing mortality must be further reduced.

Assessment of the North Sea autumn spawning herring stock is normally carried out by the ICES working group in March each year. It is subsequently reviewed by the ICES Advisory Committee for Fisheries Management (ACFM) in the following May (see ICES, 2003b). During the review, changes may be made to the assessment before ACFM go on to provide advice on the state of the stocks to the EU. The ICES advice always includes a series of options for fishery managers to consider in setting the TAC's for the following year. Providing catch options for North Sea herring is complicated, not only by the existence of the separate stocks but also by the different fleets exploiting North Sea autumn spawning herring. As a consequence the options and advice have to be formulated by the four separate fleets, each exerting different fishing mortalities on the autumn spawning stocks.

The annual advice of the ACFM to the EU is subsequently considered at joint meetings between officials of Norway and the European Commission (for the member states of the EU) when the available TAC is divided between the two parties. Using the options table catch levels for the four fleets can be decided and a TAC set for the fleet A, North Sea directed fishery. Since 1996 a by-catch limit has also been set for fleet B in the North Sea.

The southern North Sea and English Channel stock has been considered to be a separate management unit within the North Sea because the population in this area is clearly separated from the other components for most of the year. Historically this component has always been subjected to a higher fishing mortality than the rest of the North Sea and is seen to develop independently of the other stocks. As a consequence advice is now given separately for this stock component in order to give it special protection in the form of a separately allocated sub-TAC within the overall North Sea TAC.

4.4.2 Mackerel

As stated in 4.1.2 above, assessments are now performed for mackerel over the whole distribution area. Stock components are separated on the basis of catch distribution, which reflects management considerations and different historical information for the components rather than on any biological evidence. The three stock components are the southern, western and North Sea. Their areas of distribution, fishing and spawning are given in a table in section 4.1.2

Assessment of the Northeast Atlantic mackerel stock is normally carried out by the ICES working group in September each year. It is subsequently reviewed by the ICES Advisory Committee for Fisheries Management (ACFM) in the October (see ICES, 2003c). During the review, changes may be made to the assessment before ACFM go on to provide advice on the state of the stocks to the EU. The ICES advice always includes a series of options for fishery managers to consider in setting the TAC's for the following year. For mackerel those options are based on a range of fishing mortality values (F) from the lower level of the agreement between EU, Norway and the Faroese and F *status quo* which represents the upper level of that agreement. The options give a catch forecast for the following year together with a prediction of SSB at spawning time for the following and subsequent year. Stochastic medium term predictions are also provided to indicate the future risk of SSB falling below the Precautionary biomass limit.

The annual advice of the ACFM to the EU is subsequently considered at joint meetings between officials of Norway and the European Commission (for the member states of the EU) and the Faeroe Islands and also with NEAFC. As a result the available TAC is divided between the various parties.

In 2003 the ACFM considered the Northeast Atlantic mackerel as a suitable candidate to be managed by multi-annual TAC's. However this has been deferred until the results of the 2004 egg survey are available because this will provide a more precise starting point for multi-annual advice.

5 FISHERY MANAGEMENT

5.1 Management Objectives

5.1.1 Herring

Long term objectives for the North Sea herring fishery have been agreed between Norway and the EU. These are stated in the 2001 Agreement between these two North Sea fisheries managers in terms of two reference levels. These are B_{lim} of 800,000 tonnes and B_{pa} of 1.3 million tonnes. The EU/Norway agreement aims to maintain fishing mortality on adults at 0.25 and on juveniles at 0.12. (see ICES, 2003b)

In the short term an annual Total Allowable Catch is agreed between Norway and the EU following ICES' advice.

In the context of the North Sea herring fishery other (by-catch) species are protected by the setting of appropriate TAC's, including a nil TAC for North Sea mackerel (noting that mackerel taken as by-catch in the herring fishery in the northern North Sea are from the western mackerel stock).

5.1.2 Mackerel

Based on the most recent estimates of fishing mortality and SSB, ICES classifies the Northeast Atlantic mackerel stock as being harvested outside safe biological limits. The spawning stock biomass in 2003 is estimated to be well above the biomass precautionary approach level (B_{pa}), but the fishing mortality in 2002 is above the fishing mortality precautionary level (F_{pa}). The North Sea component remains severely depleted since the 1970s (see ICES, 2003c).

The agreed record of negotiations between Norway, Faeroe Islands, and EU in 1999, states:

1. "For 2000 and subsequent years, the Parties agreed to restrict their fishing on the basis of a TAC consistent with a fishing mortality in the range of 0.15 - 0.20 for appropriate age groups as defined by ICES, unless future scientific advice requires modification of the fishing mortality rate."
2. "Should the SSB fall below a reference point of 2 300 000 tonnes (B_{pa}), the fishing mortality rate, referred to under paragraph 1, shall be adapted in the light of scientific estimates of the conditions prevailing. Such adaptation shall ensure a safe and rapid recovery of the SSB to a level in excess of 2 300 000 tonnes."
3. "The Parties shall, as appropriate, review and revise these management measures and strategies on the basis of any new advice provided by ICES."
4. The rationale for ICES proposing $F_{pa} = 0.17$ is to have a high probability of avoiding exploiting the stock above F_{lim} . In addition, projections indicate that $F = 0.17$ will optimise long-term yield and at the same time result in a low risk for the stock to decrease below B_{pa} . If F on average is kept below 0.17, ICES regards the management plan as meeting precautionary criteria.

5.2 Consultative Process

At local level, the Hastings Fishermen's Protection Society provides a forum for fishermen representation. Society membership costs £5 per boat per week. The Society has a Committee of 8

persons plus three officers and represents the majority of Hastings fishermen. It is a member of the UK's National Federation of Fishermen's Organisations (NFFO) although tends to take its concerns directly to DEFRA. The Society also provides a feedback mechanism to the fishermen, for instance by posting information on changes in fishing regulations, but there is no formal system. The Society is considered close-knit and cohesive.

There are mechanisms at National level for issues to be raised by industry and other bodies with National Governments and resolved where possible by them.

The European Commission is also accessible to interested parties to make direct representations. The Commission may well decide to ask the Member State concerned for its opinion before taking the matter forward. Consideration by the Commission may range from a meeting between D G Fish and the complainant to formal discussion in the Commission's Fisheries Advisory Committee. Any necessary legislative action would be on the basis of a proposal by the Commission to the Council of Ministers.

Disputes between the Member States and the Commission are resolved in the Council of Ministers if bilateral discussions have not been able to resolve the issue. Both the Commission and the Council of Ministers can be called to account through the normal political process in the European Parliament. Ultimately, any European Citizen or organisation can take legal action against the Council of Ministers in the European Court of Justice. This is a system which is widely known and has been used when considered necessary.

The 2001 / 2002 review of the CFP included 'roadshows' led by the Commission and other Consultation processes with all relevant stakeholders including industry and NGO groups. These were designed to provide maximum transparency and feedback about the shape the post 2002 CFP should take.

6 STANDARD USED

The MSC Principles and Criteria for Sustainable Fisheries form the standard against which the fishery is assessed and are organised in terms of three principles. Principle 1 addresses the need to maintain the target stock at a sustainable level; Principle 2 addresses the need to maintain the ecosystem in which the target stock exists, and Principle 3 addresses the need for an effective fishery management system to fulfil Principles 1 and 2 and ensure compliance with national and international regulations. The Principles and their supporting Criteria are presented below.

Principle 1

A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.¹:

Intent:

The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favour of short term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

Criteria:

¹ The sequence in which the Principles and Criteria appear does not represent a ranking of their significance, but is rather intended to provide a logical guide to certifiers when assessing a fishery. The criteria by which the MSC Principles will be implemented will be reviewed and revised as appropriate in light of relevant new information, technologies and additional consultations

1. The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.
2. Where the exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within a specified time frame.
3. Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

Principle 2

Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.

Intent:

The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

Criteria:

1. The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.
2. The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimises mortality of, or injuries to endangered, threatened or protected species.
3. Where exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.

Principle 3

The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

Intent:

The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.

A. Management System Criteria:

1. The fishery shall not be conducted under a controversial unilateral exemption to an international agreement.

The management system shall:

2. Demonstrate clear long-term objectives consistent with MSC Principles and Criteria and contain a consultative process that is transparent and involves all interested and affected parties so as to

consider all relevant information, including local knowledge. The impact of fishery management decisions on all those who depend on the fishery for their livelihoods, including, but not confined to subsistence, artisanal, and fishing-dependent communities shall be addressed as part of this process.

3. Be appropriate to the cultural context, scale and intensity of the fishery – reflecting specific objectives, incorporating operational criteria, containing procedures for implementation and a process for monitoring and evaluating performance and acting on findings.
4. Observe the legal and customary rights and long term interests of people dependent on fishing for food and livelihood, in a manner consistent with ecological sustainability.
5. Incorporates an appropriate mechanism for the resolution of disputes arising within the system².
6. Provide economic and social incentives that contribute to sustainable fishing and shall not operate with subsidies that contribute to unsustainable fishing.
7. Act in a timely and adaptive fashion on the basis of the best available information using a precautionary approach particularly when dealing with scientific uncertainty.
8. Incorporate a research plan – appropriate to the scale and intensity of the fishery – that addresses the information needs of management and provides for the dissemination of research results to all interested parties in a timely fashion.
9. Require that assessments of the biological status of the resource and impacts of the fishery have been and are periodically conducted.
10. Specify measures and strategies that demonstrably control the degree of exploitation of the resource, including, but not limited to:
 - a) setting catch levels that will maintain the target population and ecological community's high productivity relative to its potential productivity, and account for the non-target species (or size, age, sex) captured and landed in association with, or as a consequence of, fishing for target species;
 - b) identifying appropriate fishing methods that minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;
 - c) providing for the recovery and rebuilding of depleted fish populations to specified levels within specified time frames;
 - d) mechanisms in place to limit or close fisheries when designated catch limits are reached;
 - e) establishing no-take zones where appropriate.
11. Contains appropriate procedures for effective compliance, monitoring, control, surveillance and enforcement which ensure that established limits to exploitation are not exceeded and specifies corrective actions to be taken in the event that they are.

B. Operational Criteria

Fishing operation shall:

² Outstanding disputes of substantial magnitude involving a significant number of interests will normally disqualify a fishery from certification.

12. Make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target size, age, and/or sex of the target species); minimise mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive.
13. Implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas.
14. Not use destructive fishing practices such as fishing with poisons or explosives;
15. Minimise operational waste such as lost fishing gear, oil spills, on-board spoilage of catch etc.
16. Be conducted in compliance with the fishery management system and all legal and administrative requirements.
17. Assist and co-operate with management authorities in the collection of catch, discard, and other information of importance to effective management of the resources and the fishery.

7 BACKGROUND TO THE EVALUATION

7.1 Evaluation Team

Evaluation leader: Dr Andrew Hough: Moody Marine Limited. Dr Hough has a Ph.D. in marine ecology from the University of Wales, Bangor and eleven years post-doctoral experience in commercial marine and coastal environmental management projects. He is manager of Moody Marine operations within Moody International Certification with particular responsibility for the implementation of MSC Certification procedures and development of MSC methodologies. Dr. Hough has acted as lead assessor on a number of MSC pre assessments and six main assessments.

Expert advisor: John Nichols. John Nichols is a retired UK government fisheries biologist with 42 years research experience in plankton ecosystems, including ichthyoplankton, in the North Atlantic. From 1977 he was involved in plankton surveys for stock assessment. From 1994 to 2000 he was involved in the assessment of pelagic and western demersal fish stocks, including North Sea herring and Thames Estuary herring, running a team of six permanent staff. He has been a member of ICES working groups on herring, mackerel, horse mackerel, sardine and anchovy assessments; and mackerel and horse mackerel egg surveys. He was also a member of ICES study groups on herring larval surveys and plankton sampling. John provided management advice in relation to the MSC certification of the Thames Estuary Driftnet herring fishery.

John Nichols led the assessment against Principles 1 and 3, but also contributed on Principle 2.

Expert advisor: Tim Huntington. Tim Huntington is Founder and Director of the *Poseidon Aquatic Resources Management Ltd*, a UK-based international consultancy specialising in fisheries, aquaculture and aquatic environment. He has over twenty years experience in aquaculture and fisheries as a fisheries biologist. He has designed, managed and directed coastal, marine and freshwater resource management projects in Europe and many other countries worldwide and is an environmental impact assessment specialist with wide-ranging experience of fisheries and aquaculture development world-wide. He has recent experience in fisheries, aquaculture and 'chain of custody' certification.

Recent or ongoing projects he has taken part in include assessment of World Fisheries By-catch Issues for FAO; Feasibility Study for the Environmental Certification of Aquaculture for MSC; Assessment of Environmental Variables for Inclusion in the Common Fisheries Policy (EU); Evaluation of the NAFO Fisheries Observer Programme (EU) and Valuation of Biodiversity Damage for Environmental

Liability (EU)

Tim Huntington led the assessment against Principle 2, but also contributed on Principles 3 and 1.

7.2 Previous certification evaluations

No previous certification evaluations have been carried out for the Hastings Fleet Fishery. The Pelagic Freezer-Trawler Association North Sea herring fishery is also undergoing assessment against the MSC standard and targets the same stock in the Eastern Channel, but uses different fishing methods (pelagic trawls). The Thames Herring Fishery has been certified but although this fishery targets the same species, *Clupea harengus* within the North Sea, the Thames/Blackwater stock is a localised spring-spawning stock and is subject to a separate UK (not EC) TAC.

The South West (England) mackerel handline fishery has been certified and, although targeting the same stock of the Hastings fishers, uses different gear and in a different area.

7.3 Inspections of the Fishery

Inspection of the fishery focused on the practicalities of fishing operations at Hastings, the mechanisms and effectiveness of management agencies (DEFRA and the SSFC) and the operation of the Hastings Fishermen's Protection Society. The landing and subsequent handling of fish was also investigated to determine the suitability of fish landed to enter into a subsequent chain of custody.

Meetings were held as follows. The key issues discussed have been identified for each meeting.

Name	Affiliation	Date	Key Issues
Paul Joy Graham Cogan	Hastings Fishermen's Protection Society	15 June 2004	Fishing operations HFPS constitution and operation
Matthew Gandy	Network Fisheries	15 June 2004	Landing and marketing of fish at Hastings
Angus Radford Paul Johnstone Ian Glasgow	DEFRA	16 June 2004	Fishery management practices and regulation Landing data.
Tim Dapling	Sussex Sea Fisheries Committee	16 June 2004	Fishery management Fishery bye-laws Inspections and compliance Survey and monitoring
Richard Millner John Dann Colin Whiting Jim Ellis	CEFAS	7 and 12 July 2004	Stock assessment By-catch and gear use Local (Hastings) fishery knowledge
David Fraser Audrey Jones	English Nature	Contacted by phone	Nature conservation Protected species
Kate Cole	Hampshire Wildlife Trust	Contacted by phone	Nature conservation Protected species Survey and monitoring
Rod Knight	Hastings Driftnet fisherman	Contacted by phone	Fishing operations
Simon Northridge	Sea Mammal Research Unit	Contacted by phone	Protected species
Lisa Browning	Hampshire and Isle of Wight Wildlife Trust	Contacted by phone	Nature conservation Protected species

Marc Thain	Environment Agency	Contacted by phone	Nature conservation Protected species Survey and monitoring
Ken Arkley Gary Dunlin	Seafish Industry Authority	Contacted by phone	By-catch and gear use

8 STAKEHOLDER CONSULTATION

8.1 Stakeholder Consultation

An eventual total of 18 stakeholders were identified and consulted specifically by Moody Marine. Information was also made publicly available at the following stages of the assessment:

Table 4: Stakeholder Consultations Held

Date	Purpose	Media
30 Sep 2003	Notification of confirmation of assessment	Direct E-mail/letter Notification on MSC website Advertisement in press
5 Dec 2003	Notification of Assessment Team nominees	Direct E-mail Notification on MSC website
14 Jan 2004	Confirmation of Assessment Team	Direct E-mail Notification on MSC website
11 Mar 2004	Consultation on draft Scoring Indicators and Guideposts	Direct E-mail Notification on MSC website
8 Jun 2004	Notification of assessment visit and call for meeting requests	Direct E-mail Notification on MSC website
15 Jun – 12 Jul	Assessment visit	Meetings
14 Feb 2005	Notification of Proposed Peer Reviewers	Direct E-mail Notification on MSC website
27 May 2005	Notification of Draft Report	Direct E-mail Notification on MSC website
14 July 2005	Notification of Final Report	Direct E-mail Notification on MSC website

8.2 Stakeholder Issues

Feedback from stakeholders has helped greatly in the identification and final selection of the assessment team. Feedback was also received on the scoring indicators and guideposts. Although no specific issues were identified by stakeholders, the assessment team have consulted specifically on the issue of shad by-catch with relevant stakeholders (notably English Nature, Environment Agency, and DEFRA).

9 OBSERVATIONS AND SCORING

9.1 Introduction to scoring methodology

The MSC Principles and Criteria set out the requirements of certified fishery. The certification methodology adopted by the MSC involves the interpretation of these Principles and Criteria into specific Scoring Criteria against which the performance of Fishery can be measured. Performance is determined on the basis of compliance with each Scoring Criterion.

The Scoring Criteria developed by the Moody Marine assessment team have been identified on the MSC website (Certification Performance Criteria and Scoring Guidelines). In order to make the assessment process as clear and transparent as possible, these identify the level of performance necessary to achieve 100, 80 (a pass score), and 60 scores for each Indicator.

These generic Scoring Indicators and Guideposts have been the subject of stakeholder consultation and have been confirmed or modified following this process based on the judgement of the assessment team. Prior to scoring, the Indicators are also 'weighted' in relative importance according to the nature of the fishery undergoing certification.

At the top level, no weightings are assigned in terms of each MSC Principle; a fishery must 'pass' each of Principles 1, 2 and 3 in order to achieve certification and these are of equal importance.

Within each Principle, Scoring Indicators are grouped in a hierarchy. Each level represents separate areas of important information (e.g. Indicator 1.1 requires a sufficient level of information on the target species and stock, 1.2 requires information on the effects of the fishery on the stock and so on).

At the level of Scoring Indicators, the performance of the fishery is assessed as a 'score'. In order for the fishery to achieve certification, an overall score of 80 is considered necessary for each of the three Principles and no Indicator should score less than 60. Accordingly, 100 represents surpassing of the performance necessary and 60 a measurable shortfall. As it is not considered possible to allocate precise scores, a scoring interval of five is therefore used in evaluations. As this represents a relatively crude level of scoring, weighted average scores are rounded to the nearest whole number.

Weights and scores for the Hastings Fleet Pelagic Fishery are presented in the scoring table. Weights for criteria, sub-criteria and sub-sub criteria add to a total of 100 for each Principle or Scoring Indicator, Scores are allocated relative to the Scoring Guidelines.

9.2 Evaluation results

Observations are presented in the scoring table, together with any weighting applied to the Fishery and the scores allocated.

10 LIMIT OF IDENTIFICATION OF LANDINGS FROM THE HASTINGS FLEET PELAGIC FISHERY

The extent of the fishery certification is the landing of herring and mackerel by vessels with Hastings Stale licences at the beach in Hastings. To be eligible to carry the MSC logo, these fish must then enter into separate Chain of Custody certifications.

11 CERTIFICATION RECOMMENDATION

11.1 Certification recommendation

The Performance of the Hastings Fleet Pelagic Fishery in relation to MSC Principles 1, 2 and 3 is summarised below:

MSC Principle	Fishery Performance
Principle 1: Sustainability of Exploited Stock	Overall : 89 PASS
Principle 2: Maintenance of Ecosystem	Overall : 85 PASS
Principle 3: Effective Management System	Overall : 89 PASS

The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any MSC Criteria. It is therefore recommended that the Hastings Fleet Pelagic Fishery be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.

Following this Recommendation of the assessment team, and review by stakeholders and peer-reviewers, a determination is hereby made by the Moody Marine Governing Board to certify this fishery.

11.2 Scope of Certification

This assessment relates only to the fishery defined in Section 1.1 up to the point of landing as defined in Section 10.

Monitoring and control of fishing locations and methods is considered sufficient to ensure fish and fish products invoiced as such by the fishery originate from within the evaluated fishery. Accordingly, the assessment team recommend a joint fishery and chain of custody certificate. This would allow fish and fish products from this fishery to enter into further chains of custody subject to appropriate assessment and certification.

11.3 Pre-conditions, Conditions or Recommendations Associated with Certification

11.3.1 Pre-Conditions

The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any MSC Criteria. No pre-conditions are therefore required prior to certification being granted.

11.3.2 Conditions

The fishery attained a score below 80 against a number of Scoring Indicators. The assessment team has therefore set a condition for continuing certification that the client is required to address. The condition is applied to improve performance to at least the 80 level within a period set by the certification body but no longer than the term of the certification.

As a standard condition of certification, the client shall develop an 'Action Plan' for Meeting the Conditions for Continued Certification', to be approved by Moody Marine.

The condition is associated with one key area of performance of the fishery, which addresses a number of Scoring Indicators. Condition, associated timescale and relevant Scoring Indicators are set out below.

Condition 1. Recording of by-catches and discard

Action required: It is acknowledged that levels of by-catch and discard are expected to be very low in this fishery. However, no quantitative information is available on this issue. Records of fish by-catch and discard should be maintained by species and approximate numbers or weight, and any other incidental catch (such as seabirds etc) should include numbers caught. Records should be kept on a regular basis e.g. monthly/quarterly. These records should be made available to relevant agencies on request.

Timescale: Recording should begin immediately after certification.

Relevant Scoring Indicators: 2.1.2.1, 2.1.2.2

11.3.3 Recommendations

The assessment team has also made a number of recommendations. These are not required to maintain certification but would improve the performance of the fishery against the MSC Principles and Criteria. Accordingly, the action taken and timescales are at the discretion of the client.

The recommendations are as follows.

1. **Improved communication.** Whilst fishermen are aware of general regulatory requirements, more efficient and comprehensive dissemination of information to the whole fleet appears desirable. The Hastings Fishermen's Protection Society and DEFRA may wish to consider more effective means of communicating information on regulations and other fishery-related matters to fishermen, such as through regular meetings, informative notice boards etc. Such communication should include the outcome of this certification and associated conditions.
2. **Waste management.** As this is a day fishery, waste production, particularly at sea, is low. However, this could be further improved by the provision of better waste disposal facilities on shore together with raising of awareness on this issue within the fishing community. The HFPS should consider working with the local authority to address this issue.

12 AGREEMENT

12.1 Applicant's Agreement to meet Specified Conditions.

The applicants Action Plan to address the above conditions is appended to this document.

APPENDICES

Appendix A: Peer Review Reports

1. Peer Reviewer Biographies
2. Peer Review Report A
3. Peer Review Report B
4. Client Action Plan



MoodyMarine
certification for the marine environment

APPENDIX A 1
Hastings Fishing Fleet Dover Sole and Pelagic Fisheries
MSC Certification
Certification Body: Moody Marine Ltd

Notification of Peer Reviewers

A Peer Review panel has been selected for this fishery. Peer reviewers were been approached on the basis of their experience of one or more of the following; the fishery under assessment, fishery management, stock assessment issues and relevant ecosystem interactions.

Brief details of each reviewer are provided below.

Peer Reviewers:

1. John Molloy. John Molloy is formerly of the Department of the Marine and the Marine Institute, Republic of Ireland. He was involved in the assessment of pelagic fish stocks (herring, mackerel, horse mackerel) around Ireland and in the provision of management advice. He served on many international committees on fish stock assessments including the ICES Herring Assessment Working Group: the ICES Working Group on the Assessment of Mackerel, Horse mackerel Sardine and Anchovy Working Groups and the ICES Advisory Committee for Fisheries management (ACFM). He served on the EU Scientific Technical and Economic Committee for Fisheries (STECF) and has been engaged in an advisory capacity by two of the Irish Pelagic Management Committees and served on the Herring Task Force established by the Minister for the Marine in 1999. He was engaged by DGXIV of the EU in evaluating a number of fisheries project submitted for funding under one of the many research initiatives. He has spent many years at sea carrying out fish surveys around Ireland on commercial and research vessels.

2. Paul Medley. Paul Medley is an independent fisheries consultant, based in the UK. His expertise includes mathematical modelling of fisheries and ecological systems, techniques for multi-species stock assessment and external review of stock assessment methodologies. He has been an invited expert for a number of stock assessment working group meetings. He has a wide practical experience in marine biology, including design and implementation of surveys and fisheries experiments. This includes addressing wider environmental issues of ecological management, including maintenance of marine biodiversity.

APPENDIX A 2

Hastings Pelagic Fishery Review

Comments: Reviewer A

The overall conclusion of the report, that certification should go ahead, appears justified. Clear control over fishing and has been demonstrated in the fishery and the resources remain in a desirable state. However, there are clear areas for improvement should and is being encouraged as part of the certification. These problems have been identified by the reports and scoring comments.

The assessment appears to be complete and to cover the main issues. I have no major problems with the scoring or assessment although scoring may have been generous in some areas.

The Hastings component forms only a small part of the overall fishery. This makes it a little more difficult in weighting the different criteria of the assessment. I have tried to take this into account in my comments.

The main issue I have with the assessment is the treatment of the narrow objectives maintained for these fisheries. Although F and SSB are primary indicators for the state of the stock (principle 1), they have their limits in terms of meeting all management objectives. They do not assess growth overfishing (although the text does imply this is probably not an issue) and there is no direct assessment of fishing capacity, social or economic targets.

MML Comment: Growth overfishing is currently not a problem although it has been in the past. Fishing capacity is not really an issue as it can be assumed that it exceeds the available quota. The working group does keep the composition of the national fleets under review although this is an informal voluntary arrangement on the part of WG members. Social and economic targets are not the remit of the scientific assessment teams, but are addressed at a political level.

Furthermore, in some cases there appear to be missing target or limit reference points for some indicators.

MML Comment: The only reference point missing here is the F_{lim} for herring, which is reasonably not defined.

An F target is used as a dummy variable for setting the TAC for herring.

MML Comment: The management advice for herring is complex and provides a whole series of potential catch options for each of the fleets taking into account the precautionary approach F levels for both juvenile (0-1) and adult (2-6) fish. Management are presented with these choices and the resultant SSB both for the following year and the year after.

The international standard for performance indicators and reference points would be a target (based on where you want the fishery to be rather than on where you do not

want to be), a precautionary level when some special management action is taken (e.g. rebuilding) and a limit which the fishery needs to avoid and more serious action is taken. Ideally, you would have all these for each indicator (F and SSB).

MML Comment: It is considered that North Sea herring is a classic example of this ideal in action. Quite clearly there is a target to maintain the SSB above 1.3 million tonnes and once above that level F can be increased above the precautionary approach level dependent on SSB and predicted recruitment.

F and SSB are performance indicators, so they are used to measure how well the management is doing. The way the report is written tends, for me, to confuse F with the control, the TAC, which is the management action. The reports do imply that the performance has been tested, particularly with respect to misreporting catches, so I think this may only be an issue of clarity.

MML Comment: The control process necessarily starts with setting a target F to maintain or improve the Bpa. The result is a TAC for the management process to work within. Misreporting is subsequently taken into account in the stock assessment process in the following year and may well be found to have affected the target F. The whole stock assessment process is in itself a test of all aspects of the management of the fishery and a self test as well via the retrospective analyses.

Finally there is no reference to fishing capacity (i.e. potential F). ! No reference is made for developing other indicators or reference points, such as might be used for principle 2 or to measure management performance in other areas. Mostly, these might not be considered too important, but there is clearly room for improvement than scores given in these areas imply to me for all the fisheries (reference 1.1.3, 3A.3). In particular, I would like to see some reference to fishing capacity and the potential for a very high F, and whether the team see this a problem in future for these fisheries. If this is a problem, Hastings will be making a contribution, albeit small. Is it possible for gear to change or number of licences to increase (how limited are licences for under 10m vessels)?

MML Comment: It can be safely assumed that the North Sea purser and midwater trawl capacity grossly exceeds available catch potential. Growth of F has been a problem for North Sea and Channel fisheries and is an issue for this fishery only in relation to the overall stock status. At Hastings, capacity is limited by the number of places on the Stade.

Comments include a few suggested minor editorial changes.

Scoring Comments: Herring and Mackerel

1.1.2.3 Is gear selectivity known for the fishery?

The comment states this not well known, but not important. If this is true, I suggest switching the weight and score. That is make both the weight and score lower, or change the text. 85 implies better than “Selectivity of gear types has been well estimated by size, sex and maturity”. The text says selectivity has not been well studied for these species.

MML Comment: The comment related to the fact that selectivity is not being well studied in comparison with the extensive studies on demersal fish trawl selectivity, but it is considered that the information available is certainly adequate. Selectivity is controlled by mesh size and so is well known and controlled. Also, there is a minimum landing size for herring in the North Sea and English Channel of 20cm.

1.1.3.1 *“Target reference points are set based on a precautionary approach. Precautionary biomass (B_{pa}) is set at 2.3 M tonnes, F_{pa} is set at 0.17. F provides 95% probability of avoiding F_{lim} .”* doesn't quite make sense. It reads as if F is set lower than F_{lim} so that there is only a 5% chance it will lie above F_{lim} . If F is set lower than F_{lim} it is bound to be below F_{lim} 100% of the time. The TAC quota is set, not F . F_{pa} is just a sleight of hand used for calculation, being a limit on a random, unknown variable F . I suggest change to something like *“Target reference points are set based on a precautionary approach. Precautionary biomass (B_{pa}) is set at 2.3 M tonnes, F_{pa} is set at 0.17. The F_{pa} is used to calculate a precautionary quota which gives a 95% probability of the true F being above F_{lim} ”*

MML Comment: This is a mistake in the text which should read *“ F_{pa} provides a 95% probability that SSB will remain above B_{pa} in the medium term”*. We thank the reviewer.

I am also not entirely happy with the target they use. The target is a probability-based limit reference point defined by where you don't want the fishery to be rather than where you want it to be. A target based on socio-economic conditions would in my opinion be preferable. European fisheries have never considered economic incentives properly, and this is arguably partly why they have gotten into so much trouble. I would like the team to consider whether they have or wish to take this into account in the scoring.

MML Comment: The remit of an assessment team is to evaluate the existing system in relation to the MSC Standard. Here the existing system was considered to be at an adequate level. The validity of the comments raised should be the subject of a wider debate.

1.1.4.2 *“The only negative aspect of this is the failure of the managers to heed the advice and warnings regarding the Downs stock. As a consequence the area TAC for IV c/VIIId has been increased against the advice of ICES assessment scientists who believe that this will slow the recovery of this stock.”* Presumably ACFM might have good reason to set higher quotas than recommended. The problem is lack of transparency – why they have set a higher quota. Also, if quotas are set on the basis of risk, presumably not only will the recovery be slowed, but overfishing is more likely i.e. its not precautionary. Is it possible to find out why managers are not following scientific advice?

MML Comment: In this context the term ‘ICES assessment scientists’ includes ACFM. Recovery continues but, is likely to be slowed. As noted above, a lack of transparency at the final level of decision-making within the CFP prevents us presenting a clear explanation of the decision-making process.

1.1.4.3 “Both input (fishing mortality rates) and output (catch /TACs) controls are specified in the advice.” The only input control is presumably number of licences – a control on capacity rather than directly on effort. F is not really controlled except through the TAC. The limited licence system may be only *de facto* for <10m vessels as opposed to set on management advice. Do scientists recommend the number of licences based on the average or actual q’s?

MML Comment: Scientists have no input to this. There is also the minimum mesh and landing size as input controls.

1.1.6.1 “Long term predictions are heavily dependant on the type of stock recruitment relationship used (Ockham razor) and would be different if a Beverton and Holt or Ricker relationship were used.” Maybe change to “Long term predictions are heavily dependant on the type of stock recruitment relationship used. The simplest relationship is currently used (Ockham razor), but results would be different if a Beverton and Holt or Ricker relationship were used.” I presume the simplest is a fixed average, but it might be best to say what it is. Whether the simplest is always the best to use is debateable under the precautionary approach.

MML Comment: It is clear from the 2004 WG report that the use of the appropriate S/R relationship has been carefully explored. It was also studied by an ICES WG on Stock and Recruitment. The Beverton and Holt relationship is considered to give an unreasonably high representation of recruitment at high SSB levels.

2.3.1.3 The text indicates that this is not a significant issue for this fishery, which suggests the weight should be lower. Maybe it would be best to say the issue of management control has not been tested for this fishery as its impact on these populations is negligible? This would be more consistent with the score of 80.

MML Comment: Amended in text.

3A.3.1 “Short-term objectives are represented by annual TAC’s, achievement of which is measured at sub-annual levels.” This is true if “objectives” means enforcement. However, I interpret objectives in terms of the state of the fishery – in this case in terms of SSB and F. In terms of rebuilding the Downs herring, this is supposed to be slower than desirable. Does not this suggest objectives are not being met well? Also, maybe there is no differentiation between short and long term objectives. It would be worth specifying exactly what the objectives are for this fishery as a whole and Hastings in particular. Is it only maintaining F and SSB. This is a bit crude if these are the only objectives.

MML Comment: Objectives for stock are achieved through maintaining B_{pa} via TAC’s. It would not be appropriate to specify objectives for the Hastings pelagic fishery.

3A.3.2 There is no comment here on whether recorded landings are accurate or not. Presumably this would require some reference as landings are the control i.e. the means of meeting the objectives.

MML Comment: Recording of landings at Hastings is considered to be accurate.

3A.3.3 I am not clear on what performance measures are being used here. Presumably managers set the TAC in order to achieve an Fpa and build or maintain an SSB. So, it should be possible, for example, to plot Fpa (target) against F actually achieved. This would give a performance measure. Also, are there any measures specific to the Hastings fishery.

MML Comment: Not surprisingly there is nothing specific for the Hastings fishery. For the general performance of the stock (Herring and Mackerel) the WG always produce a quality control document for F and SSB which is in effect the retrospective analysis. Compliance with the overall TAC is also recorded and from the available data it is also possible to look at this on a national basis. The EU also monitors TAC compliance at a national level.

Certification Report for Hastings Fleet Pelagic Fishery

Page 10 Para 6 “From 1950 until the mid 1960’s, the average Spawning Stock Biomass (SSB) of the North Sea herring stock was estimated at around 2.5 M tonnes with landings averaging around 650,000 t.” repeats sentence in previous paragraph.

MML Comment: Amended in report.

“Table 1: Herring TAC, By-catch Limits and Landings (1981 – 2004)” Asterisks should be explained in a footnote to the table.

MML Comment: Amended in report.

APPENDIX A 3

General Review of Certification Report for the Hastings Fleet Pelagic Fishery

Review B

The international European herring and mackerel fisheries are two of the most important pelagic fisheries and both the assessment and management of both fisheries involve a great number of countries. In contrast, the Hastings pelagic fishery is extremely small but it is undoubtedly important to the local economy. The authors of this report are aware of this and have stated at the outset that it is recognised that the Hastings fishery represents only a small proportion of the total fishing pressure on the mackerel and herring stocks. Therefore the status of the stocks as a whole was assessed. This has on occasions presented some difficulties in the treatment of the various sections, as it is sometimes not clear whether it is the international or the national fisheries that are being discussed. Nevertheless the report is in general very well laid out and the different aspects of the fishery are well presented.

Section 1 deals with the structure of the report and outlines the assessment procedure of the fishery that is being evaluated for certification. The various sources of information that are used are outlined. The section is well laid out and the various sources are clearly documented.

The background to the fishery and the biology of the target species, herring and mackerel, are dealt with in Section 2. It must have been difficult for the authors to allocate the amount of attention that should be devoted to the local fishery and to the national fisheries in this section. However, this has been overcome and the report gives the reader a good description of the local fishery and how it fits into the overall international fisheries. I found that the sections on the international fisheries and the assessment of the stocks were very clear and well written. There is a very good description of the complicated herring stock structure in the North Sea herring stocks and the relationship of the stock exploited by the Hastings fleet to the overall North Sea stocks. There are however some surprising factual errors in the sections dealing with the biology of herring.

MML Comment: The text in the report has been updated in relation to fecundity. We note that the figure of 10,000 to 60,000 eggs per female relates only to Downs spawners and not to the North Sea as a whole.

There is also a very good section dealing with the biology and distribution of the North East Atlantic mackerel stock. As pointed out elsewhere the mackerel assessment carried out by the ICES Working Group on Mackerel, Horse mackerel, Sardine and Anchovy in September 2004 was rejected by ACFM in November 2004. This has meant that there is now a whole new perception of the stock and this different to that which is presented in the Hastings Report. This new assessment will probably result in new biological reference points for the mackerel stock. At the time of producing the Hastings Report the authors were not aware of this development and therefore some of the conclusions drawn about the status of the mackerel stock may not be entirely correct.

MML Comment: Assessment teams are required to continue the assessment based on the knowledge available at the time (to prevent continual updating). Changes in management, stock status etc are reviewed as part of the ongoing surveillance programme as and when fisheries are certified.

The history of the Hastings fishery is very interesting and the development of the fishery and how it has been affected by changes in the international fisheries and in the stock sizes is well described. There is a short section dealing with the local fleet and the gear used. In June 2004 only 21 boats, all under 10 m, were actively engaged in fishing from Hastings Beach. Of these boats, only one the *Bloodaxe* was drift netting but three other vessels may also participate. The total catch in 2003 was about 3 tonnes of herring and 4.45 tonnes of mackerel. Landings and the fishery however must obviously be important to the local community. Section 2 also contains a very good general description of the ecosystem characteristics of the Channel area. This section is well written and easy to understand. Of particular importance is the threat to the herring spawning grounds posed by desire to extract gravel. This is an issue that is very controversial and ICES have recommended that gravel should only be removed from spawning grounds outside of the spawning season (In my opinion gravel should never be removed from a known herring spawning ground). This section also contains a description of the by-catch and discards in the Hastings fishery. This is a very important issue but it doesn't seem to present a problem in the local fishery. However it is recommended that details of shad catches should be recorded. A short description is given of other fisheries relevant to the assessment and while it is interesting and factually correct I found this a bit confusing and it is unclear why it is included. MML Comment: As a general feature of MSC assessments, other fisheries which could affect the same stock/ecosystem as the fishery under assessment must be identifiable.

Section 3 deals with the administration and management of the fishery and describes the various international agreements. The small Hastings fishery is subjected to these international agreements and the enforcement of the various regulations is well documented. Even though the Hastings pelagic fishery is at present very small it would have been interesting to see how it is managed at local level but perhaps it is even too small for that.

Very good descriptions of the procedures used in the assessment of the herring and mackerel stock are given in Section 4. The various surveys are well described and the problems associated with them are clearly shown. There are some small factual errors but these do not detract from what is a well-written and well-presented section. The models used in the assessments are also well described without much detail and the complicated stock predictions by which TACs are allocated to the various fleets taking part in the fisheries are explained. The section also gives a brief description on how the advice on the management of the fisheries is formulated.

The actual management of the international fisheries is described in Section 5. This section also includes a short description on the consultative process by which these results of these agreements are eventually filtered down to the local fisheries.

Section 6 outlines the MSC principles and Criteria for Sustainable Fisheries that form the basis for the evaluation of this fishery for Certification.

In general I agree with the recommendations made by the evaluation team that the Hastings Fleet Pelagic Fishery should be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries. I also agree with the conditions set for continuing certification. I would also endorse the recommendations made about improved communications and waste management.

Peer Reviewers Comments on Hastings Fleet Pelagic Fishery

Outline.

My comments are mainly directed to the following issues relating to the scoring indicators, guidelines and comments by the reviewers.

1. Comments on the Accuracy of Information in Report
2. Has the information been applied appropriately to the scoring indicators used in the tables
3. Whether the interpretation of this information justifies the decision to certify this fishery.

I have not made comments about the scoring or weighting procedures unless I have disagreed with the results. For my own convenience I have inserted some crude headings on the various sections to help me remember the subject matter of each section

At the outset I should state that the ICES ACFM carried out a radical reassessment of the North East Atlantic Mackerel stock in October 2004. This reassessment has changed the perception of the stock and therefore much of what the Evaluators have said about the status of the stock is not now correct, though no fault of their own. I have pointed this out in the relevant sections.

[MML Comment: See comment above, information available at the time of the original scoring only can be taken into consideration.](#)

There are a few general issues on which I would like to comment and these mainly concern the scoring procedures and comments.

The relationship between the Hastings fishery and the International fisheries is clearly defined in the report but in many of the comments throughout the scoring procedures it is very difficult to decide whether it is the international or the Hastings fisheries that are being discussed. This is particularly so in the sections dealing with discards and by-catch.

The comments on herring and mackerel in the various sections are sometimes very different and seem to address different issues. I suspect that these sections were evaluated by different individuals but there appears to have been no communication between the different evaluators as to what issues should be addressed and the issues raised are sometimes completely different. This has made judging the scores awarded difficult in some cases.

Principle 1

1.1 (*Criteria 1*)

1.1.1 Target species and stock identification

1.1.1.1. Species Identification.

I think it is possible to confuse pilchards with herring and this may be a problem in the Channel area where pilchards stocks are present. However most fishers would not have a problem in this respect.

I agree with the score.

1.1.1.2. Gravel Extraction.

I have a personnel interest in this subject because of the threat to herring spawning grounds and spawning beds in the Celtic Sea. In the Eastern Channel the location of spawning beds are well known and this information has been used to specify spawning seasons and during these seasons gravel cannot be removed. However, it has always seemed to me that this procedure provides only a limited protection for the herring shoals. If all the gravel is removed outside of the spawning season then there will be no suitable substrate left for herring on which to lay their eggs. I maintain that no gravel should ever be removed from known spawning grounds.

I agree with the score.

1.1.1.3. Geographical range of stocks.

The Hastings fishery targets the Downs component of the North Sea stock and the TAC for this component has not been observed. I think this is important in later sections of the report.

I agree with the comments and score.

1.1.1.4. Fecundity and Growth.

There is very little difference between scoring indicators 60 and 80. (Some information and estimates seem to me to be very similar!). There are some factual errors in the report and in the reviewer's comments. The fecundity of herring is stated in the Report to vary according to length to between 10,000 and 60,000 eggs per female. I think there are a number of estimates of fecundity many of which would suggest that fecundity is much greater than that quoted here. Mackerel larval production has not been measured by the Triennial Egg Surveys.

I think the score is too high because of the factual errors.

MML Comment: The text in the report relating to fecundity has been amended. However, as the value of 10,000 to 60,000 eggs relates to Downs spawners it does not affect the scoring. The reference to mackerel larvae production in the scoring comments has been deleted and we thank the reviewer. Otherwise, much of this is 'new' data and so will be considered in future reports as appropriate.

1.1.1.5. Abundance/Density Composition of stock.

There are some comments about the sampling programmes for mackerel that seem to suggest that 87% of the catches are covered by sampling programmes. This may be so but up until recently nobody had defined what a sampling programme was and some countries had very poor programmes. This situation has been addressed by the EU with the introduction of the Data Directive Scheme– a measure that stipulates the number of fish that must be aged and measured by each country for each tonne of fish landed.

MML Comment: We have clarified this in the scoring comments and in the report.

1.1.1.6. Environmental Influences.

There are indications that changes in the timing of spawning seasons have occurred in some of the herring stocks around Ireland. Maybe changes in spawning of the Downs stock needs to be monitored in relation to temperature changes.

1.1.2. Effects on target stock

1.1.2.1 Records of all fishery related mortality.

I don't agree with the statement that herring landings are sufficiently well recorded in view of the fact that the TAC for the Downs stock has for many years been seriously exceeded. There is also a statement that "*Discarding within the fishery (which may not include slippage of catches prior to landing on vessels) is not regarded as a problem*), yet on P 12 there is a reference to the fact that a very conservative estimate of discards might be as high as 50,000 t.

In the section on mackerel the ICES` Working Groups have consistently have had problems with the poor quality of catch and landing data. The problem of discards of small mackerel has again arisen in recent years because of the very high prices being paid for medium to large mackerel. I am not sure of the meaning of the last paragraph that states that "*for both species landings are well recorded.*" What species is being discussed?. I don't agree with the sentence that states "*discards and other mortality are well estimated*". There are poor estimates of natural mortality for both mackerel and herring and the estimates of discards for mackerel up to 2003 only referred to mackerel discarded by the Dutch fleet.

I agree with the low score awarded for this indicator.

MML Comment: We have added to the scoring comments here as it is considered that the WG does get a reasonable estimate of total fishing mortality. It is therefore considered that the WG makes every effort to provide a reliable estimate of all fishing related mortality to use in the assessment process.

1.1.2.2. Fleet Descriptions.

Fleet descriptions are well known for both the international herring and mackerel fisheries. In particular the ICES Mackerel Working group regularly updates its description of the mackerel fleet. This is in order to monitor changes in the development of the fleet in such items as horsepower, catchability, detecting equipment etc so that the effect of these changes on the efficiency of the fleet might be evaluated. Although the Hastings fleet is very small it might be useful to maintain a description of the age, size, horsepower of vessels and the detecting equipment as a matter of routine.

I agree with the comments and the score.

1.1.2.3. Gear Selectivity.

I am certain that there is a minimum landing size of 20 cm for herring in the North Sea and English Channel, although it is stated in the comments that this is not the position.

MML Comment: This is correct and has been amended I the text as appropriate.

1.1.2.4. Target species in other fisheries

In the herring section I am not clear as to what is meant when it says that *the present fishery is part of Fleet A*. Fleet A is the one that exploits directed herring fisheries with purse-seiners and trawlers in the North Sea. It can't mean the Hastings fishery. Maybe it means that the Hastings fleets exploits the same stock as that exploited by Fleet A.

MML Comment: Under current definitions, this fishery only really fits into the fleet A category. The definitions only refer to 'North Sea' but must also include catches of 'North Sea herring taken in the eastern English Channel. The definition only includes the bulk catchers (trawlers and seiners) whereas the previous definition of fleet A was herring caught for human consumption, which had its problems but quite clearly includes the drift-net caught herring.

In the mackerel section the last sentence paragraph says, *For both species, other sources of fishing mortality are known. Catches are recorded or estimated in Stock Assessments*. The first sentence doesn't make any sense. The second sentence is meaningless in this context because catches are normally always used in stock assessments.

I agree with the score.

MML Comment: this has been clarified in the report.

1.1.2.5. Robust systems to monitor misreporting.

In theory there are robust systems in place to monitor area and landings misreporting. In practice the systems don't always work and scientists at the Working Groups have always had problems in estimating the amounts of mackerel and herring that have been misreported. The official catches supplied to the scientists are based on logbook data and it is rare that management authorities try to correct these figures. It is left to scientists to interpret them and correct them if necessary. This they do on the basis of confidential information received from the industry. There are also serious problems in species misreporting, usually whereby mackerel are reported as horse mackerel. I am a bit dubious about awarding this indicator a score of 80.

MML Comment: This issue was considered to merit a score of only 80; it is factored into the stock assessment and is not an issue for the Hastings fishery.

1.1.3. Appropriate reference levels.

1.1.3.1. Appropriate limit and precautionary reference points.

The target reference points for mackerel have not been revised despite the new assessment carried out by ACFM. A revision will probably take place after the 2005 meeting of the Working Group

1.1.3.2. Reference points are set by ICES but may need to be revised for mackerel in view of the latest assessment.

1.1.4 Harvest Strategy

1.1.4.1. Mechanism to contain harvest.

There is a very different approach to this criterion by the reviewers. In the mackerel section it is stated that the Hastings fleet would fish against the UK National quota and arrangements are put in place to close the fishery should the national quota become exhausted. I wonder why is this included -presumably the same situation is in place for herring. Further down in the mackerel section it is stated that "*however*

although both stocks are above B_{pa} .” I don’t know what stocks are being referred to. In the revised assessment for mackerel the spawning stock is below B_{pa} and the fishing mortality is above F_{pa} . I agree with most of the comments and the score.
MML Comment: As this is ‘new’ data, implications will be considered in future reports as appropriate. Based on the assessment in 2003 SSB is above B_{pa} and F is also above F_{pa} . The reference to ‘both stocks’ does refer to herring and mackerel and this has been clarified in the report.

1.1.4.2. Clear tested decision rules.

I agree with the comments and score -but I don’t really believe that all U.K mackerel landings are monitored on a daily basis!

I agree with most of the comments and the score.

1.1.4.3. Appropriate management tools.

I am not sure if the management tools referred to include such measures as boat quota, closed seasons and closed areas, specified landing places and landing times. I would have thought that these were the important sorts of management tools but they have not been mentioned in the comments except in a vague sort of way in the mackerel section. The mackerel section seems to be talking about the Hastings fishery while the herring section is dealing with the overall management tools as applied to the international fishery.

I agree with the comments but it is difficult to agree with the score because of the different approaches to the subject.

MML Comment: This section has been amended to clarify the issue.

1.1.5 Robust Assessment

1.1.5.1. Applicability of assessment models

Herring comments are fine. Both assessments of mackerel and herring rely heavily on the ICA model but the comments on the mackerel assessment mention the key parameters such as natural mortality, vulnerability, fishing mortality and catchability. I am not sure what vulnerability means in this context and why catchability is mentioned as a key parameter.

MML Comment: This comes from a description of the ICA model, but the issue of ‘vulnerability’ does not change our evaluation of this Indicator.

1.1.5.2. Major uncertainties in data.

I agree with the comments and scores although both mackerel and herring are treated very differently.

1.1.5.3. Uncertainties and assumptions

There are major uncertainties in the assessments of herring and mackerel and these uncertainties are carried forward into the predictions. The Working Group does try to allow for these in the models used but the management advice is usually distilled down into an advice on a single TAC based on the precautionary principle. The single TAC rather than a range of TACs has led to major difficulties in the setting of the mackerel advice on at least one occasion. In 1995 ACFM issued advice for a major reduction of the 1996 TAC for the Western mackerel stock, based on preliminary results of the 1992 egg surveys in which assumptions had been made about fecundity and the timing of spawning. When the actual results became available it was found

that the stock was much higher than previously estimated. A similar situation had arisen in the 1980s, known as the “million tonne mistake”. Although ICES would like to have and did intend to have a multi-annual TAC for mackerel it has now ruled out this possibility because of the uncertainty surrounding the 2004 assessment.

I don't think this criterion justifies a score as high as 95

MML Comment: There have been problems in the past but, based on the 2003 assessment, the comments are considered to be justified. In light of the comments made, however, we have reduced the score for this indicator.

1.1.5.4. Stock status and reference points and forecasts

I agree with the comments and score. In the mackerel section it is stated that the stock is above the biomass reference point. This may not now be true because of the revised assessment.

1.1.5.5 and 1.1.5.6. Current harvest strategies and retrospective analysis.

I agree with many of these comments for herring. The fact that the TAC has been exceeded by over 38,000 t for North Sea herring doesn't give one much confidence in the robust control mechanisms.

Comments on mackerel might need to be revised in light of the new assessment SSB may now be below 2.3 million tonnes. The triennial egg surveys have provided an index of SSB but they have not provided a reliable age aggregated index of SSB as stated.

I agree with the comments and score.

1.1.6 Stocks at appropriate reference levels

1.1.6.1. Reference levels

This section seems OK for both stocks except that the mackerel section might need to be revised. The text needs to be altered so that 2.2 tonnes and 2.3 tonnes are changed to 2.2 million tonnes and 2.3 million tonnes. This mistake occurs a number of times.

I agree with the comments and scores.

1.3 (Criteria 3)

Age or Genetic structure

1.3.1. Fishing activity in relation to above

1.3.1.1 Dynamics of sub populations.

In the mackerel section it is stated “*age and stock structure information is gained primarily from samples and size frequency data collected by fisheries officers.*” I wonder if this is in the Hastings fishery because it doesn't apply to all the international fisheries. It is also stated “*studies on parasite load have been used to separate individuals from these stocks.*” I don't think this is true. I know that parasite infestation levels were studied in an attempt to separate catches belonging to the different stock components but these studies were unsuccessful and were eventually abandoned. Parasites were never used to separate individuals from stocks.

MML Comment: the text has been modified accordingly.

1.3.1.2 and 1.3.1.3

Monitoring of age, sex genetic structures and reproductive capacity'

I think these sections are OK and I agree with the comments and scores.

Principle 2

1.1 (Criterion 1)

Maintenance of high productivity of target populations

2.1.1. Determination of ecosystem factors

2.1.1.1 Nature, sensitivity of habitats

I agree with the comments and the scores awarded.

2.1.1.2 and 2.1.1.3. Non-target species and trophic position

I am presuming that all this refers to the Hastings fishery and I agree with the comments and scores

2.1.1.4. Recovery of ecosystem

I am not sure if the comments address the question. The question is about the potential of the ecosystem to recover from fishery related impacts. The comments deal with the herring stock and its recovery for stock depletion. Herrings are part of the ecosystem. I don't understand the relevance of the comment on the mackerel.

MML Comment: [The key ecosystem impact of this fishery is considered to be the removal of target species biomass.](#)

2.1.2 General risk factors

2.1.2.1 Nature and Extent of by-catch

These comments refer directly to the Hastings drift net fishery and I agree with them. However there are problems with cetacean by-catch in the international pelagic trawl fisheries. A low score has been awarded –presumably because the by-catch levels have not been recorded. However it has been clear that by catch is not a problem in the drift net fishery so the score could be a bit higher.

2.1.2.2. Discards

Comments again refer to the drift net fishery in which the situation as regards discards does not seem to present a problem.

I agree with the comments and the score.

2.1.3. Effects of gear use

I presume both of these refer to the Hastings fishery. It is confusing the way the comments jump from the local to the international fisheries. However I agree with the comments and scores. Discards and by-catch are also discussed later on. If they are negligible then the score may be too low!

2.1.4 Management System and fishery impacts on the ecosystem

2.1.4.1 Review of acceptable impact levels

Most of these comments appear to have been already stated in the section dealing with assessments. In the mackerel section it is stated that the North Sea mackerel stock has been replenished. This is not true and the stock remains at a low level. I agree with the score.

2.1.4.2. Management objectives and impact identification

Both sections have been addressed in very different ways. The herring section seems to deal with the international fisheries while the mackerel section deals with the drift net fishery. I agree with the comments and scores although as in other sections it is very difficult to comment on the score because of the different treatment of the two target species.

2.1.5. Effects of fishery on ecosystem
I agree with the comments and score.

2.1.5.2. Target stock and ecosystem structure
I don't see the difference between this question and the previous one!

2.1.5.3. Non target stock and ecosystem
I agree with these comments. I presume they refer to the Hastings fishery.

2.1.5.4. Impact on habitat structure
I agree with these comments and score.

2.1.5.5. Biological diversity
As mentioned these concerns have been addressed in the next section.

1.2 (Criterion 2) Biological Diversity

2.2.1 Unacceptable impacts on recognised protected species etc,

1.2.1.1 and 2.2.1.2. Information on protected species

I agree with the comments and the scores.

2.2.1.3. Interaction on protected or endangered species.
I agree with the comments and score.

2.2.2. Strategies to protect endangered species.
I agree with these comments and the scores.

2.3. (Criterion 3)

2.3.1. Management measures to rebuild affected populations

2.3.1.1 and 2.3.1.2 and 2.3.1.3. Measures to allow determination of necessary changes in management, fishery practices and recovery.

I agree with these comments and scores.

Principle 3

3.A Management System Criteria

3.A.1 Management System (Criterion 3). Institutional and operational Framework

3.A.1.1. Organisations and management responsibility

These comments refer to the international aspects of these fisheries and with the Hastings fishery. I agree with them and the scores.

3.A.1.2 Cultural Context

I agree with this comment and the score.

3.A.1.3 Management System and Internal Review.

Most of the comments refer to the International fisheries. ICES include a section in the ACFM report on management considerations for each fishery and have now started to review and evaluate management plans. Both the herring and the mackerel fisheries would therefore have been reviewed in 2004. It would have been interesting to know how the Local management System works. e.g., Have the vessels got individual quota? When are landings permitted? etc.

3A 1.4. External Review

ICES have begun to employ external scientists to review the assessment Working Groups. This has been done for the first time on the 2004 Mackerel Working Group and as a result the assessment of the stock carried out by Working Group was rejected. As far as I am aware there is as yet no external review of any of the management systems although as stated the management measures are evaluated by the EU as it is the controlling body.

3A. 2. Management system and legal basis.

3.A.2.1. and 3A 2.2. International Conventions.

I agree with these comments.

3.A 2.3. Customary rights

The comment refers to the Hastings fishery and I agree with it.

3A 3 Management system and consultative procedures and disputes

3A.3.1. Management system and short and long term objectives.

I agree with these comments although ICES have decided that the mackerel stock is not yet suitable for a multi-annual TAC.

[MML comment: This was decided in 2004 after production of the report.](#)

3A 3.2 and 3a.3.3. Operational procedures and objectives

The comment refers to the methods for ensuring that the national quota is not exceeded and that it is divided fairly between participating vessels. I agree with the comments.

3A 3.4. Objectives and the Precautionary Approach.

I agree with the comment and score.

3A 3.5.

Consultative Approach.

I agree with the comment and score.

3A 3.6 Resolution of disputes.

I agree with the comment and score. It would have been interesting to know if there is a procedure at local level whereby members of the Hastings Fishermen's Protection Society can solve disputes at a local level.

MML Comment: The HFPS Constitution allows for disputes within the society to be considered at an AGM or Special General Meeting

3.A 4 Management System and objectives of the fishery

3A 4.1 and 3A 4 2

I agree with the comments and scores. I am aware of Irish vessels being heavily fined for contravening mackerel measures in the Cornwall Box.

3A 5 Research Plan

3.A 5.1 Key research areas

As mentioned earlier the EU have for some time been concerned about the lack of adequate sampling programmes in some fisheries and the continuing lack of basic biological data. The new EU Data Directive sets out to address these deficiencies by setting targets for the number of fish that must be measured and aged for each tonne of fish landed. It also funds measures to obtain basic biological data necessary to improve assessments. I do not understand the difference in the scoring indicators - they appear very similar.

3A .5 .2

Research in relation to the Management Plan

I agree with the comments and scores.

3A 3.5.3.

Research and other organizations

I agree with the comments and scores.

3A 6 Measures to pursue objectives

3A 6.1 Monitoring of resource and effects of fishery

I think all of this has been addressed in previous sections. I agree with the comments and score.

3A.6.2.

Evaluation of results against precautionary target and reference points.

I think all of this has been addressed in previous sections. I agree with the comments and score.

3A.6.3.

Procedures for speedy reduction of harvest

I agree with the comment and score.

3A 7 (Criterion 10)

Management system and measures to protect affected ecosystem

3A 7.1 Measures and environmental impacts

I agree with the comment and score.

3.A 7.2. No take zones, etc

I thought (but I may be mistaken) that there was a spawning box closure for herring off the east coast of England but this may no longer be enforced. The ICES Divs. IVb, c and IIIa are closed for mackerel fishing throughout the year and Div IVa is closed from 15 Feb – 31 July. Both closures are designed to protect the North Sea spawning component.

I agree with the comment and score.

MML Comment: there are no closures in IVc/VIIId, the spawning area closures referred to are in IVb off the North East coast of England.

3A 8 Control measures (Criterion 11)

3A 8.1 Information on training etc to fishery operatives.

I would ask if Hastings fishermen take an active part in the scientific assessment of the stock by collecting samples for scientists and providing observations, etc?

I agree with comments and score.

MML Comment: Hastings fishermen have been very cooperative with CEFAS scientists.

3A 8 2 and 3A 8 3 Surveillance and Monitoring to ensure compliance with management system.

I agree with the comments. It is a source of concern that management regulations in the international herring and mackerel fisheries are not always enforced but this doesn't seem to be the case in the Hastings fishery.

3B Operational Criteria

3B 1 (Criterion 12)

Management measures that reduce impacts on non-target species

3B 1.1. Impacts on non-target species

I agree with the comments and score.

3B.2. Adverse impact

3B 2.1 Fishing methods and impact on habitat

This concern has been addressed in a previous section.

3B 3 Destructive Practices

I agree with the comments and score.

3B 4 Management System and operational waste

Comments only refer to the Hastings fishery and I agree with them and the score.

3B 5 (Criterion 16) Fishing operations in compliance the management system and admin requirements.

3B5.1 and 3B 2 Fishers awareness

All the comments refer to the Hastings Fishery and its fishers and I agree with the scores.

3B 5.3 Record of Enforcement. Again this refers solely to the Hastings Fishery and I agree with the comments and the score.

3 B.6 Data Collection

3 B.6 1 Data Collection by fishery operatives.

As mentioned earlier it would be good to have fishers involved in the collection of biological and environmental data that would help in the assessment process.

I agree with the comment and the score.

HASTINGS FISHING FLEET

DOVER SOLE FISHERY
PELAGIC FISHERY

(HERRING – MACKEREL)

ACTION PLAN

for

Meeting the Conditions for continued

MSC Certification

of these fisheries

HASTINGS FISHING FLEET

Action Plan for meeting the conditions for continued MSC Certification of the Hastings Dover Sole and Pelagic Fisheries

The scheme shall be managed jointly by the Head of the Hastings Fishermen's Protection Society and Hastings Borough Council's Fishing Sector Development Officer, and shall be known as the Hastings Fishery Management Group (HFMG)

HFMG submits this Action Plan for meeting the conditions for continued certification of the Hastings Dover Sole Trammel Net and Hastings Pelagic Fisheries. HFMG agrees to make a good faith effort to meet the intent of the Conditions set forth in the certifier's 18th July 2005 Final Report determining that the Hastings Dover Sole (HDS) and Hastings Pelagic (HP) Fisheries are sustainably managed under the MSC Principles and Criteria. Furthermore, HFMG recognises its responsibility as the Applicant/Licensee in the certified fisheries to comply with annual surveillance audits by an accredited MSC certification body.

HFMG'S APPROACH TO MEETING THE CONDITIONS FOR CONTINUED CERTIFICATION

HFMG shall establish immediately a Steering Committee which will to oversee, develop and direct a program to give effect to this Action Plan for meeting the conditions for the HDS and HP fisheries. This committee will comprise members of the fishing community, council officers and outside members of the business community, as well as the HFMG.

HFMG and the Steering Committee will liaise with Government and Scientific bodies most notably the Department for Environment, Food and Rural Affairs (DEFRA), English Nature (EN) and the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) as necessary, in an effort to meet the conditions established by the certification body.

HFMG will also oversee the adherence to a Code of Practice for Certified Fishermen for the catching and landing of MSC Certified fish, and also the Chain of Custody for the buying and onward selling of MSC Certified fish (as the Hastings Fisheries Chain of Custody Management Body).

PROPOSED HFMG ACTIVITIES IN ACHIEVING THE CONDITIONS

1 HASTINGS DOVER SOLE TRAMMEL NET FISHERY

CONDITION 1 – RECORDING OF CATCHES

INDICATORS

- 1.1.2.1 *Are all major sources of fishery related mortality recorded/ estimated, including landings, discards, incidental mortality and mortality of juveniles?*
- 1.1.2.5 *Are there robust systems to monitor any area and landings misreporting?*
- 1.1.5.6 *How reliable has the stock assessment been historically using retrospective analysis?*

ACTION REQUIRED

Misreporting in the offshore fishery and under-reporting in the inshore fisheries has been identified as a significant potential source of uncertainty in the stock assessment and in forecasts for this stock. Whilst it is recognised that the Hastings fishery does not now appear to contribute to such under-reporting, it is important that accurate reporting of all catches (including by-catch), discards and landings take place to the relevant scientific agency, in this case CEFAS.

Accordingly, the data requirements of the relevant scientific agency (CEFAS) should be determined and these requirements should be met from within the fishery.

Timescale: Contact with CEFAS should be initiated within three months of certification and data collection underway within 3 months of specification by CEFAS. This would then be an ongoing condition of certification.

HFMG'S PLAN FOR SATISFYING CONDITION 1

Contact will be made with CEFAS immediately upon Certification, and their requirements for data recording will be met within 3 months of specification. Their requirements will also be made known to the certification body as will the relevant contact details, in order that the certification body may be satisfied that condition 1 is being met.

CONDITION 2 – INTERACTIONS WITH ENDANGERED, THREATENED OR PROTECTED SPECIES

Indicators

- 2.2.1.2 *Are interactions of the fishery with such species adequately determined?*
2.2.1.3 *Do interactions pose an unacceptable risk to such species?*

ACTION REQUIRED

Interactions of the fishery with endangered, threatened or protected species appear limited but are not formally quantified. Such interactions may be with groups such as seabirds, sea mammals and shad (*Alosa* spp).

Records of incidental catches (of sea birds, sea mammals etc) should be maintained and made available through an appropriate body such as the Sea Fisheries Committee.

Shad are currently caught and landed by the trammel-net fishery and this **may** include both Allis and Twaité shad. This should be raised with the relevant agency (DEFRA and/or English Nature) with a view to establishing or confirming the conservation significance of catches within the certified fishery. If necessary, any required modifications to fishing practices should be implemented as soon as practically possible.

Timescale: This issue should be raised immediately upon certification.

HFMG'S PLAN FOR SATISFYING CONDITION 2

Records of all by-catches shall be made on the relevant form as approved by the certification body. These data shall be made available for inspection through the Sea Fisheries Committee. Contact will be established with DEFRA and EN immediately on certification, in order that the conservation significance of catches within the fishery can be established. If any modifications are necessary, this shall be communicated to the certification body forthwith.

Condition 1 – Recording of by-catches and discard.

Indicators

- 2.1.2.1 *Is information available on the nature and extent of the by-catch (capture of non-target species)?*
- 2.1.2.2 *Is information available on the extent of the discard (the proportion of the catch not landed)?*

ACTION REQUIRED

It is acknowledged that levels of by-catch and discard are expected to be very low in this fishery. However, no quantitative information is available on this issue. Records of fish by-catch and discard should be maintained by species and approximate numbers or weight, and any other incidental catch (such as seabirds etc) should include numbers caught. Records should be kept on a regular basis e.g. monthly/quarterly. These records should be made available to relevant agencies on request.

Timescale: Recording should begin immediately after certification.

HFMG'S PLAN FOR SATISFYING CONDITION 1

As with condition 2 of the Dover Sole Fishery, on certification records of all by-catches shall be made on the relevant form as approved by the certification body. These data shall be made available for inspection through the Sea Fisheries Committee.

RECOMMENDATIONS

In addition to the conditions, two recommendations were made for both fisheries by the certification body.

- 1: Improved communication with the fishing fleet.
- 2: Improvement of waste facilities.

Since the beginning of the accreditation process, the local authority has employed a Fishing Sector Development Officer, one of whose tasks is to explain the MSC Certification not only to the fishing community, but to the wider public. This officer is considering many of the points raised in the recommendations, and will soon inaugurate a Newsletter, so that the fishermen can be better informed of the various projects and initiatives that are taking place. The authority is also soon to employ a “Stade¹ Education Officer”, which will further help this process.

The FSDO has been invited to partake in Stade Management meetings, and one of the major agenda items is waste management improvement. The local authority is aware of the various issues, and is working with the Fishermen’s Protection Society to resolve them.

Action Plan submitted on 1st September 2005 by the members of the Hastings Fishery Management Group:

**Paul Joy – Hastings Fishermen’s Protection Society;
Stephen Potter – Fishing Sector Development Officer, Hastings Borough Council.**

¹ The Stade is the name given to where the fishing boats are landed and launched

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
Principle 1	A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.		33.3	89	
1.1 (MSC Criterion 1)	The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.		61.5	90	
1.1.1	There should be sufficient information on the target species and stock separation to allow the effects of the fishery on the stock to be evaluated.		16.7		
Weighting Commentary	<p>No weighting is applied to the MSC Principles – these are equally weighted and each must attain a weighted score of 80 or more for certification to be granted.</p> <p>As the stock is considered to be above appropriate reference levels (see below), MSC Criterion 2 is not currently applicable to this fishery. Given the importance of MSC Criterion 1 (1.1 here) in determining the health of the stock, this criterion is weighted more heavily than MSC Criterion 3 (1.3).</p> <p>Within MSC Criterion 1, each element at the next level of the scoring hierarchy (1.1.1 to 1.1.6) is considered to be of equal importance. Within the 1.1.1 group of indicators, (1.1.1.1 to 1.1.1.6), abundance of the stock and environmental influences (1.1.1.5 and 1.1.1.6) are considered to be particularly important.</p>				
1.1.1.1	Are the species readily identified as adults and juveniles?				
60	Misidentification is possible and increases recording errors of catches, but this does not compromise monitoring to unacceptable levels.	<p>Herring</p> <p>Larval identification is straightforward – important as stock assessment uses information from larval surveys.</p> <p>Herring are easily identified at one year old. Potential misidentification (e.g. with sprat) is not a problem in the Hastings area as the fishery is based on adults only.</p>	R32, R33	12.5	100
80	The target species are unlikely to be significantly confused with any other species; or if target species are grouped, then life history or stock identification information exists to justify this grouping.	<p>Mackerel</p> <p>Mackerel - <i>Scomber scombrus</i>, is easily identified throughout its life history by fishers, regulators and buyers.</p>			
100	The species is readily identified by fishers and by regulators and is recorded appropriately.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
1.1.1.2		Is the life history of the species understood and the spawning and nursery areas well described?			
60	There are gaps in information but the basis of the life history is understood. Information is adequate to support a general population model. There is some information on spawning and nursery areas.	<p>Herring</p> <p>The life history and the spawning and nursery areas are well described and understood, based on research and monitoring going back over more than a hundred years.</p> <p>Life history information is comprehensive and there are no serious gaps in relation to population modelling for stock assessment.</p>	R37, R41	12.5	95
80	The life history of the species is clearly documented and understood. Information is adequate to support an appropriate population model. Spawning and nursery areas are well described	<p>The general spawning areas are known, as are the distribution of the gravel banks in the Eastern Channel on which spawning takes place. This knowledge of the spawning and nursery areas was used to establish and support the continuing seasonal closures of the fishery along the east coast of England at spawning times and in the nursery area off the west coast of Denmark. This information is also used to limit and control aggregate extraction, the timing of seismic surveys in relation to oil and gas exploration in the North Sea and the placement of structures on the sea bed in and around the widespread but discrete spawning grounds.</p>			
100	The life history of the species is clearly documented and understood including behaviour and ecological interactions. Spawning and nursery areas are sufficiently well documented to support closed area / seasons where this is deemed necessary.	<p>This is an issue discussed further in relation to Indicator 2.1.1.1</p> <p>Mackerel</p> <p>Life history is documented and well understood including different life stages. The triennial mackerel egg surveys carried out since 1977 have led to an extensive knowledge of the temporal and spatial distribution of spawning and changes that have occurred over time. There is surprisingly little information on the distribution and habits of the '0' group fish but the subsequent distributions of juveniles (1yr group +) are well documented from survey data. These data are updated annually and used to support the continuing 'mackerel box' closed area and also to review the appropriateness of recommending other closed areas.</p> <p>Adult fish sampling in relation to the egg surveys has provided a considerable amount of information on the spawning behaviour and physiology of spawning.</p>	R32, R33, R41		

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
1.1.1.3		Is the geographical range of the target stock known and any seasonal migration described?			
60	An estimate of the geographical range of the target stock is available. A management unit approximating the stock is used with some biological justification.	<p>Herring</p> <p>This is an important issue in terms of stock management. There are quite clearly three separate spawning stocks within the North Sea herring population, the ‘Downs’ stock in the southern North Sea and eastern English Channel, the ‘Banks’ stock in the central North Sea and the ‘Buchan’ stock in the northern North Sea. The geographical ranges and seasonal migrations of these three stocks are well known and described although individuals cannot be separated.</p> <p>At certain times of the year fish from the three stocks may mix and be caught together as juveniles and adults. Because they cannot be readily separated in the commercial catches, or by subsequent catch sampling, North Sea herring has to be assessed and managed as a single unit. Also known for this species is that North Sea autumn spawning herring move into the Skagerrak and Kattegat, mainly as 0, 1 and 2 ringers, and are taken commercially, together with Baltic spring spawning herring. Both for management and assessment purposes these have to be apportioned. To date this has been done on an unsatisfactory morphometric basis. However extensive research in recent years on otolith based separation techniques has greatly improved the precision of this apportioning process. Similarly Baltic spring spawners and Norwegian coastal spring spawners are also taken in the North Sea.</p> <p>The spawning fishery in the southern North Sea and eastern English Channel is, however, a discrete one on the Downs stock. It is known that this stock shows trends in both exploitation rate and recruitment which are independent of the other two stocks. Similarly, it is not showing the same pattern of recovery from the low SSB levels of the mid 1990’s. As a consequence a separate area TAC is set for ICES Divisions IV c and VIIId in an attempt to aid recovery. The Hastings herring fishery targets the Downs component of the North Sea stock</p> <p>Annual availability is estimated and documented</p> <p>Mackerel</p> <p>The geographical range of the three components of the North East Atlantic Mackerel Stock is clearly documented (The Western Component -spawning in ICES Divisions VI, VII, VIIIA, b, d, e, the Southern Component spawning in ICES Divisions VIIIC, IXa and the North Sea Component spawning in ICES Divisions IV, IIIa. Migratory patterns are understood and research including tagging studies continues to further differentiate stocks.</p>	R10, R37	12.5	100
80	A reliable estimate of the geographic range of the target stock is available including seasonal patterns of movement/availability.				
100	The complete geographic range of the stock, including seasonal patterns of movement/availability, is estimated and documented each year.		R10, R31, R32		

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score	
1.1.1.4		Is there information on fecundity and growth?				
60	There is some information available on fecundity and growth.	<p>Herring</p> <p>Basic fecundity information is available, but whilst fecundity <i>per se</i> is not an important issue in terms of management of the stock, the related maturity rate is a crucial element. This is clearly linked to growth and periodic changes in growth rate have been noted for North Sea herring. This has a direct effect on the proportion mature within each age group which translates directly into spawning stock biomass via abundance at age in the stock</p> <p>Research vessel surveys, and in particular the acoustic surveys, are used to keep a careful check on both growth rate changes and proportion mature at age and weight at age. These data are reviewed annually and when necessary revisions made to the maturity ogive. The mean weight at age relationship, used in the stock assessment process for the predictions, is based on a three year running mean.</p> <p>Key factors in relation to growth and weight at age are regularly monitored, which allows significant trends and shifts to be detected. But fecundity is not being monitored for short and long term changes.</p> <p>Mackerel</p> <p>Egg production is measured triennially by international sampling programmes as a measure of stock size. As a basis for this, fecundity (average egg production per female) is measured. Stock size is then modelled from the egg production. Commissioned research has been targeted at whether or not mackerel are determinate spawners, which has now concluded that these are determinate. This has provided an extensive knowledge of the factors controlling fecundity, including atresia, and annual changes in fecundity. Specific information on the relative importance of factors causing natural mortality is not available, but is modelled based on the life-span of the species (20-30 yrs) and is taken to be a constant of 0.15.</p> <p>There is a long time series of information allowing determination of trends and shifts.</p>	R16, R17, R18, R24, R25	12.5	95	
80	Estimates are available of fecundity at size and growth rates.					
100	There is comprehensive and reliable information on the fecundity at size, growth rates, and length and weight at age, and these are monitored over time to detect trends and shifts.			R19, R26, R32, R33		

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
1.1.1.5	Is information collected on the abundance/density/composition of the stock?				
60	<p>Either fishery dependent or fishery independent indices are available on the abundance of the stock biomass. Qualitative information exists on the appropriateness of the indices as proportional indicators of stock size.</p>	<p>Herring</p> <p>Fishery dependent indices are generally not appropriate for a pelagic fishery of this type. Instead, the most reliable fishery independent estimates of abundance / stock density currently come from the acoustic and trawl surveys carried out mainly in the northern and central North Sea.</p>	R16, R17, R18, R24, R25	25.0	90
80	<p>Fishery dependent and/or fishery independent indices are available on the abundance of the stock. Uncertainties have been analysed and those uncertainties have been reduced so as to allow trends to be determined from indices.</p>	<p>There have been some problems with the consistency of these indices in the past and, as a consequence, they have been subjected to very close scrutiny, inter-calibration exercises and general quality control. This has led to significant improvements in their reliability. As recently as last year some technical problems with the acoustic survey data were identified and the resultant corrections backdated in the historic database. International bottom trawl surveys of the whole of the North Sea are used to provide separate estimates/ indices of '0' ringers, '1' ringers and '2' – '5'+ ringers.</p>			
100	<p>Fishery dependent and fishery independent indices are available on the abundance, density and composition of the stock. Indices are consistent and there is clear evidence that they are proportional to the stock size.</p>	<p>Historically, larvae surveys were the most reliable fishery independent index of stock abundance and were particularly valuable in monitoring the recovery of the stock from the collapse in 1977. These surveys were extensive and covered the spawning areas and periods of all three stocks, including the IVc and VIId stock in the Eastern Channel. In the North Sea these surveys have reduced in intensity and geographical coverage and their value has been considerably reduced as an index, but survey intensity has reduced less in the Eastern Channel. The data series, back to 1979, has now been statistically analysed to produce a multiplicative larval abundance index of total biomass. Currently, only the Netherlands and Germany participate but the surveys do still provide the only reliable estimate of the development of the 'Downs' stock.</p>			
		<p>Survey data reliability in determining stock size is considered by ICES to be good. Indices are subject to analysis and interpretation and, in the stock assessment model, the various indices are now subjected to an inverse variance weighting scheme. Inconsistent and/or noisy indices are then also excluded.</p>			

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
	<p>Mackerel</p> <p>Relevant fishery dependent data is collected by all countries participating in the fishery. In 2003 it was reported that 87% of the commercial catch was covered by the biological sampling programme. This satisfactory level has been sustained over recent years. There are however some national and regional differences and England achieves only a 15% sampling level. Catches in ICES sub-area VII are not considered to be adequately sampled. This whole question is now addressed by an EU Data Directive scheme which stipulates sampling levels based on the quantity of mackerel landed in each member state.</p> <p>The only fishery independent index of stock abundance is measured via the robust triennial egg survey. This provides an estimate of the daily production of stage 1 eggs on each of the surveys Fecundity is expressed as viable oocytes per gram female and so the early stage egg production in the plankton can be extrapolated to the spawning (female) biomass. The total fishable biomass is then twice the female biomass. Although landing figures are collected on an annual basis and provide the basis for the annual stock assessment, egg surveys are carried out only triennially (due to the costs involved in such extensive surveys) the accuracy of this fishery independent information declines in the second and third years post survey.</p>	R19, R26, R31, R32, R33		

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
1.1.1.6		Is information available on environmental influences on the stock dynamics?			
60	Evidence is available of studies on the effects of biological and physical influences on the stock (including natural mortality). Research is encouraged and ongoing.	<p>Herring</p> <p>Distribution of spawning areas is governed by the availability of gravel beds and their local physical conditions, the locations of these are generally known. Eggs are laid in a carpet 1-2 cm thick in established areas of up to 1.5 km² each, usually on well oxygenated coarse gravel ridges that benefit from tidal currents. They are laid in late November through to January and remain for 2-3 weeks before the eggs hatch and the larvae drift into the water column. Egg viability may be affected by direct trauma as well as changes to substrate structure (e.g. compaction and loss of aeration).</p> <p>Previously, research and monitoring on secondary productivity (zooplankton – prey of herring) was carried out, but is not ongoing. Distributional changes in relation to subtle changes in, for example temperature, have not yet been observed for this species.</p>	R16, R17, R18, R24, R25, R37	25.0	90
80	There is knowledge of physical and biological factors affecting distribution, survival and year class strength (including natural mortality). Some information is sufficiently robust for use in the stock assessment process.	<p>Significantly, time series data on year class strength suggests a robustness to environmental change. North Sea herring have also demonstrated a robustness in relation to recovery from very low SSB levels once fishing mortality is either removed (1977 – 1981) or severely reduced and controlled (1996 to date). Research in this context is ongoing and is most often incorporated into the general studies on recruitment variability. All such studies are normally regularly reported to the ICES community either through specific study groups set up by ICES, working documents to the assessment WG, or papers to the annual conference. In this way the significance of research findings, in relation to the stock assessment process, can be reviewed at an early stage.</p>			
100	There is extensive knowledge of biological and physical factors affecting distribution, survival and year class strength (including natural mortality). Key information is sufficiently robust for use in the stock assessment process.	<p>Mackerel</p> <p>The over exploitation and eventual demise of the North Sea mackerel stock, followed by the advent of a large fishery on the western stock, has generated extensive research and monitoring of all the related factors. Much of that research and monitoring has been targeted at the immediate practical issues of improving the quality of the stock assessment procedures. There has also been a body of funded research targeted at improving the basic knowledge on factors affecting mackerel distribution. For example, the EU funded programmes: Shelf Edge Fisheries and Oceanographic Studies (SEFOS); Spatial Pattern of Migration and Recruitment of Northeast Atlantic mackerel project; Shelf Edge Advection, Mortality and Recruitment (SEAMAR). This information will feed, as appropriate, into the stock assessment process.</p>	R19, R26, R32, R33		

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score		
1.1.2		There should be sufficient information on the fishery to allow its effects on the target stock to be evaluated			16.7		
Weighting Commentary		At this level, the recording/estimation of fishery related mortality from other, larger fisheries, is considered of greatest significance, followed by the recording of catches in this fishery and the issue of misreporting and discarding - factors which contribute to total fishing mortality. Knowledge of gear and selectivity were considered of lower significance for this fishery.					
1.1.2.1		Are all major sources of fishery related mortality recorded/estimated, including landings, discards, incidental mortality and mortality of juveniles?					
60	Sufficient information is available to allow accurate estimates to be made of landings broken down as required by the population model. Estimates of discards and incidental mortality are available.	<p>Herring</p> <p>Herring landings are recorded at fleet level and for fishing techniques (gear, metiers) and annual discard is estimated (for Areas IV and VIIId)</p> <p>For management purposes, the official landings statistics are used. These rarely agree with the independent information supplied by individual members of the ICES working group for assessment purposes. The discrepancy level (27,000t to 75,000t) has shown little improvement over the past eight years and did deteriorate in 2002 and 2003 (53,000t and 50,000t discrepancy) after showing an improvement in 2001 (27,000t).</p> <p>Since by-catch regulations to control the fishing mortality on juveniles came into force in 1996, there has been very strict and reliable monitoring of juvenile herring catches by Denmark and Norway in their small meshed fisheries. This is evidenced by the fact that the by-catch ceiling has never been exceeded over the period of regulation and monitoring. The herring by-catch regulation is mainly targeted at the small mesh fisheries for sprat and in effect operates as a quota on juvenile herring.</p> <p>Landings are therefore considered sufficiently well recorded by the assessment Working Group to provide an estimate of fishing mortality.</p> <p>Discarding within the fishery (which may not include slippage of catches prior to landing on vessels) is not regarded as a problem but there is strong evidence of discarding of herring in the North Sea mackerel fishery. The assessment working group therefore has some additional information on both discards and misreported landings and uses these confidential data in the assessment. Misreporting of catching locations is also an issue in terms of estimating mortality. Discarding/misreporting information is therefore estimated, but the values used are not considered robust.</p>			R16, R17, R18, R24, R25	22.1	75
80	Landings are accurately recorded. Discards and incidental mortality are well estimated. Mortality on juveniles is monitored and recorded separately.						
100	Landings, discards and incidental mortality are accurately recorded and monitored. Mortality on juveniles is monitored and recorded separately						

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
	<p>Mackerel</p> <p>Landings of NE Atlantic mackerel within Europe are recorded by all countries participating in the fishery. For England and Wales DEFRA fishery officers in each main port record and report the landings. Landings are also reported by processors and PO's etc for stock assessment purposes. Landings are also made in International Waters beyond 200 miles by non EU/Norway countries, e.g. Russian vessels. These are reported to ICES but may be underreported. Catch estimates for stock assessment purposes are based on the official landing statistics augmented by national information on misreporting and discarding. Reliability of the information on discarding in this fishery is considered to be a problem. In 2002 some information was available on the age structure of discards in one fleet. Some information has been obtained on mackerel discarding in the North Sea herring fishery.</p> <p>Discarding of small mackerel has historically been a major problem in the mackerel fishery and was largely responsible for the introduction of the south west mackerel box. In the years prior to 1994 there was evidence of large-scale discarding and slipping of small mackerel in the fisheries in Division IIa and Sub-area IV, mainly because of the very high prices paid for larger mackerel (>600 g) for the Japanese market. This factor was put forward as a possible reason for the very low abundance of the 1991 year class in the 1993 catches in numbers at age. The difference in prices has decreased since 1994 and the Working Group assumed that discarding may have been reduced in these areas.</p> <p>Area misreporting continues to be a problem particularly between ICES Divisions IVa and VIa. In 2002 an estimated 50,000t was misreported but this is taken into account in the assessment process.</p> <p>Any deviations in actual vs. estimated stock is, however, picked up by triennial egg surveys of stock size. As landings in international waters are generally outside of the recording system, the accuracy of stock size estimates degrades each year following the triennial egg survey.</p> <p>For both species, landings are well recorded. Discards and other mortality are well estimated. Information on juvenile mortality is not well estimated. There is no evidence of discarding or misreporting in the small Hastings fishery.</p>	R19, R26		

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
1.1.2.2		Are fleet descriptions, fishing methods and gear types known throughout the fishery?			
60	Main fishing methods and gear types are known for the fishery. Information is available on the size and composition of the fleets, but is not regularly updated.	Hastings vessels fishing for both species, and gear used, is well known. All vessels are licensed and mesh size is controlled as appropriate, including <i>in-situ</i> observations. More general information on fleets fishing for the two species is also available as follows. Herring	I1, I4, I5	19.3	100
80	Main fishing methods and gear types are known and information is available on the geographical areas of use. Recorded information is available on the size and composition of the fleets. This is updated at irregular intervals.	Also, knowledge of fleet type and size is good for the major North Sea and Eastern Channel herring fisheries. The ICES assessment working group attempts to regularly up-date its detailed knowledge of participating fleets, by vessel type and mesh size, mainly for historical purposes. It recognises that these data do not represent an important element of the assessment process. Similarly, the types of gear in use are all well known and described. Access to and reliability of these data are now greatly enhanced by the presence of observers on many vessels in the various fleets.	R16, R17, R18, R24, R25		
100	All fishing methods and gear types employed in the fishery are known. <i>In-situ</i> observations are made of fishing practices. Comprehensive knowledge is recorded and regularly updated on the size and composition of the fleets.	Mackerel Knowledge of the national pelagic fleets participating in the mackerel fishery is extensive. The information is monitored and reviewed by the ICES working group. The bulk of the catches are taken by large midwater trawlers or purse seiners operating mainly in the offshore fisheries. There are also some handline fisheries, the best known and monitored of these being the one operating within the mackerel box off south-west England. There are also a few inshore drift net fisheries around the coast of the UK taking insignificant catches. The Hastings mackerel fishery is one such fishery and operates very much on a seasonal basis.	I1, I4, I5 R19, R26, R32, R33,		

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
1.1.2.3		Is gear selectivity known for the fishery?			
60	Information is available on selectivity and qualitative changes in selectivity.	<p>Herring</p> <p>This is not an important element in relation to the management and protection of the stocks. and so has not been well studied. Also juvenile fish tend not to occur in the area of these fisheries. There is a minimum landing size of 20cm for herring in the North Sea and Eastern Channel, and also minimum mesh sizes are specified to control selectivity.</p> <p>Mackerel</p> <p>As for herring this is not a major issue in relation to mackerel fisheries. There are no small meshed fisheries which impact on mackerel. There is a minimum landing size for mackerel of 20cm other than in the North Sea where it is 30cm.</p> <p>Although not a regulatory issue for both species, operationally, selectivities are well known by fishers.</p>	15	12.7	85
80	Selectivity of gear types has been well estimated by size, sex and maturity.				
100	Full selectivities have been accurately estimated for all gears, locations and seasonality of fishing over time.				
			13, I4, I5		

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
1.1.2.4		Is the target species taken in other fisheries in the area that are not subject to this certification and are such catches recorded or estimated?			
60	There is some information relating to other fisheries in the area that are not subject to this certification, although these are not fully identified. The catches are estimated in the stock assessments.	Herring At a management level, there is a broad-scale division of the fisheries on North Sea and Eastern Channel autumn spawning herring into four fleets –	R25, R37	29.2	80
80	The main fisheries not subject to certification are identified. The catches of the target species are either recorded or estimated in the stock assessments.	<ul style="list-style-type: none"> • The North Sea directed fisheries with purse seiners and trawlers (mainly human consumption) including by-catches in the Norwegian industrial fishery (Fleet A) • All other fisheries in the North Sea where herring are taken as a by-catch under EU regulations. • Directed fisheries for herring in ICES Division IIIa • Small meshed fisheries in ICES Division IIIa which take by-catches of herring. 			
100	All fisheries (and other sources of human-induced mortality) in the area that are not subject to this certification are identified and monitored. All the catches are recorded and used in the stock assessment.	<p>The present fishery is considered to be a part of Fleet A. For each fleet, however, vessels are subjected to the same degree of monitoring and sampling. All the landings, including estimates of their discards are used in the assessment process.</p> <p>The target species is taken as a by-catch, mainly as juveniles, in various sprat fisheries both in the North Sea and in the Skaggerak and Kattegat. The quantities are accurately monitored by rigorous sampling regimes at specified landing ports but in 2002 only Denmark and Norway provided information on these landings. The landings are subject to a by-catch quota and the data are all included in the assessment.</p> <p>Herring are also taken as a by-catch in other North Sea fisheries in particular the mackerel fishery. It was noted by on board observers (from Scotland and Germany) in the 2002 North Sea mackerel fishery that there was considerable discarding of herring after the herring fishery had closed. An estimate of 17,000t of discarded herring was made for inclusion in the catch statistics for the assessment. This was based on the Scottish discard estimates being raised to the whole of their fleet in the area at the same time, whilst the German estimate reflected only the herring discards observed on the one vessel. It was recognised that this was a very conservative estimate and that the actual figure could have been as high as 50,000t, representing a 13% underestimate of the catch. Increased observer coverage in the mackerel fishery is underway to determine the full extent of this.</p>			

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
	<p>Mackerel</p> <p>The North East Atlantic mackerel stock is also fished over its entire distribution, from the coast of Spain to the Northern North Sea (ICES Areas IIa to IXa). Mackerel fishing over this area is predominantly by purse seiners (Norway, Scotland, Iberia) and trawlers (Scotland, Germany, France, Holland, Ireland).</p> <p>For both herring and mackerel other sources of fishing mortality are known and recorded and used by the Assessment Working Groups in the Stock Assessments process.</p>	R19, R26, R32, R33		

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
1.1.2.5	Are there robust systems to monitor any area and landings misreporting?				
60	There is information on area and landings misreporting. Estimates are included in the stock assessments.	<p>Herring</p> <p>Misreporting is an element of the North Sea herring fishery and continues in spite of regulatory attempts to curtail it. Through the continued vigilance of working group members and their collective knowledge of their own fleets, the effect of misreporting on the robustness of the assessment is minimised. The working groups confidential estimates of misreporting are included in the landings data for use in the assessment. From time to time, retrospective changes to the assessment have been made. The major problem has been catches taken in ICES Division IVa and misreported into Division VIa although there are other examples. In 2002 the working group estimate of the catch (which includes an estimate of discards) exceeded the official landings by 20%. The element of misreported catch was 32,000t. A recent analysis by an ICES Study group has suggested that this figure could be much higher.</p> <p>Interception of vessels by patrol vessels takes place on a regular basis within the North Sea and allows for controls on misreporting. Satellite monitoring allows tracking of vessel locations (currently for vessels over 20m overall length - approximately 20% of fleet, to be expanded to include smaller vessels) which would help to deter misreporting and allow interception of vessels by patrol vessels.</p> <p>Misreporting is therefore a recognised problem which is subject to monitoring and control. It remains, however, a source of uncertainty but is factored into the stock assessment at a satisfactory level.</p> <p>Mackerel</p> <p>Area misreporting across the boundary line from ICES Division IVa into VIa has been occurring for many years. The practice is well known and is related to western stock mackerel remaining in the North Sea after its closure to mackerel fishing. In spite of the vessel monitoring system (VMS) and an extension of the North Sea fishing period the practice appears to have continued in 2002. However, the practice does not affect the assessment process.</p> <p>Misreporting is not an issue for the Hastings fishery.</p>	R16, R17, R18, R24, R25, I3	16.8	80
80	Enforcement systems include measures to control misreporting Where it occurs, it is carefully evaluated and taken into account in the stock assessment.				
100	Robust enforcement systems are in place to control misreporting. Where it occurs, reliable estimates are made and used in the stock assessment.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
1.1.3	Appropriate reference levels have been developed for the stock		16.7	
Weighting Commentary	The two indicators at this level were considered to be of equal significance.			
1.1.3.1	Are there appropriate limit and precautionary reference points based on both biomass and fishing mortality?			
60	Limit and precautionary reference points have been chosen and are justified based on standard international practice.	R20, R21, R27	50.0	95
80	Limit and precautionary reference points are justified based on stock biology (e.g. a stock-recruitment relationship) and are measurable given data and assessment limitations.			
100	Limit and precautionary reference points are justified based on stock biology, uncertainty, variability, data limitations and statistical simulations of these factors.			
<p>Herring</p> <p>Appropriate limit and precautionary reference points have been set for the complex of stocks for both biomass and fishing mortality. The precautionary fishing mortality reference points are specified and monitored separately for juveniles and adults. With the exception of the biomass limit point, all points are based on a well functioning harvest control regime in place for this stock. All reference point are clearly integrated into a management regime which sets to ensure the sustainability of the fishery.</p> <p>The biomass limit reference points are strongly based on the stock and recruitment model and recent attempts to lower the MBAL from 800,000t to 560,000t, based solely on historic recovery levels for the stock have been resisted.</p> <p>All reference points have been rigorously tested statistically to support their validity and to quantify uncertainty. The information is made widely available through working group and ACFM reports.</p> <p>Mackerel</p> <p>Target reference points are set based on a precautionary approach. Precautionary biomass (B_{pa}) is set at 2.3 M tonnes, F_{pa} is set at 0.17. F provides a 95% probability that SSB will remain above B_{pa} in the medium term.</p> <p>ICES limit reference points are set as biomass limits (B_{lim}) and fishing mortality limits (F_{lim}). There is no biological basis for defining F_{lim} or B_{lim} for mackerel, but these are based on historical information on the performance of the stock. F_{lim} is set at 0.26.</p>		R24		

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
1.1.3.2		Do reference points meet acceptable international standards?			
60	Reference points recognise appropriate international standards and are being developed to meet these.	<p>Herring</p> <p>The whole process is a model of the ICES precautionary approach to fisheries stock management. It combines levels of both fishing mortality and biomass into a harvest control strategy designed to ensure stock recovery and subsequent sustainability. The fishing mortality points are further specified separately for juveniles and adults.</p> <p>Mackerel</p> <p>ICES defines the appropriate international standard reference points.</p>	R20, R24, R28	50.0	95
80	Reference points recognise, and are in line with, acceptable international standards.				
100	Reference points meet or exceed international standards.				
			R25		

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score	
1.1.4		There is a well-defined and effective harvest strategy to manage the target stock.			16.7	
Weighting Commentary		The three indicators at this level were considered to be of equal significance.				
1.1.4.1		Is there a mechanism in place to contain harvest as required?				
60	Mechanisms exist to monitor and (if necessary) reduce harvest, but do not fully contain harvest, or have not been tested.	<p>Herring</p> <p>As stated in 1.1.3.2 above, the reference points are used to describe the current state of the stock and projected levels. They are an integral part of a harvest control strategy which is being used successfully in the stock recovery and rebuilding programme.</p> <p>Whilst the biomass limit point (MBAL) has been in place since the end of the moratorium on herring fishing in the North Sea in 1981, fishing mortality reference points are more recent in origin. They have been in place for both adults and juveniles, together with an upper precautionary approach biomass target point, since the collapse of the spawning biomass below MBAL in 1995 and the emergency measures to counteract that collapse, taken in 1996.</p> <p>The advice on the state of this stock complex is now very firmly based on all the reference points. The machinery is in place via the ICES ACFM advice, the EU and the EU / Norway agreement to quickly implement measures to reduce the harvest as and when required. Strong evidence for its effectiveness is in the speed with which action was taken in 1996 to halve the agreed TAC for North Sea herring, mid-way through the year, when it became apparent that the SSB had fallen well below MBAL.</p> <p>Mackerel</p> <p>For mackerel fisheries within UK, other than the south-western handline fishery, POs monitor landings and determine monthly allocations for vessels. Non-sector vessels (i.e. non PO) would have monthly allocations determined in liaison with DEFRA via licence variations. The Hastings fleet would fish against the UK national quota and arrangements are in place to close the fishery should the national quota become exhausted.</p> <p>The advice on the Northeast Atlantic mackerel stock is firmly based on the precautionary approach with reference points for biomass and fishing mortality. The mechanisms exist through international agreements between EU and Norway, Faroe Islands and NEAFC to implement measures to ensure that the SSB remains above 2.3 million tonnes. The SSB has remained above that level since the measures were put in place, indicating their effectiveness.</p> <p>However, although both herring and mackerel stocks are above B_{pa}, and for mackerel F remains above F_{pa}, indicating some issues in terms of reducing harvest for all fisheries targeting the stock.</p>	R21, R17, R27	33.3	95	
80	Mechanisms are in place to reduce harvest as and when required to maintain, or allow the target stock to return to, productive levels.					
100	Mechanisms are in place to reduce harvest as and when required to maintain (or allow the target stock to return to) productive levels. Measures to demonstrate effectiveness are in place.					
			R24			

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
1.1.4.2	Are clear, tested decision rules set out?				
60	It can be demonstrated that decision making, though not documented, is logical and appropriate. Rules have not been tested.	<p>Herring</p> <p>Clear harvest control rules are specified by ACFM in the advice given to the EU and for the EU / Norway agreements. Various catch options are provided in relation to fishing mortality on adults and juveniles within the four specified fleets. The validity of these advice options are rigorously tested and evaluated and the uncertainty spelled out to managers. Increasing confidence in the system is based on the continuing recovery of the stock since rigorous imposition of the harvest control rules since 1996.</p> <p>The only negative aspect of this is the failure of the managers to heed the advice and warnings regarding the Downs stock. As a consequence the area TAC for IV c/VIIId has been increased against the advice of ICES assessment scientists (including ACFM) who believe that this will slow the recovery of this stock.</p>	R20, R21, R27 I3	33.3	85
80	Clear decision making rules exist, are fully documented, but have not been fully tested. Decision rules are reconciled with reference points and with data and assessment limitations.				
100	Clear, documented and tested decision rules are fully implemented and have been fully reconciled with reference points, and the data and assessment limitations, and have been periodically evaluated.				
	<p>Mackerel</p> <p>All UK landings are carefully monitored on a daily basis and the mechanisms are in place to close the fishery should the quota become exhausted, although the rapidity of implementation has not required testing.</p>	R24, I3			

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
1.1.4.3		Are appropriate management tools specified to implement decisions in terms of input and/or output controls?			
60	Management tools exist to implement decisions of input and/or output controls although these are not developed for the specific fishery, or management tools are not fully developed, but are specifically related to the fishery. Some evidence exists to show that tools can be effective.	<p>Hastings Fishery</p> <p>For vessels >10m, output controls are specified in terms of monthly catches.</p> <p>Vessels <10m, input controls through closure of fishery when the non-sector quota has been reached.</p> <p>For both species, input controls also exist in terms of the number of vessels licensed to operate from the Stade at Hastings.</p>	R20, R21, R27	33.3	95
80	Management tools have been specified to implement decisions of input and/or output controls. These are generic although some attempt has been made to relate them to the specific fishery OR tools are lacking in some details but are specifically related to the fishery. Evidence exists to show clearly that tools are effective.	<p>Herring</p> <p>The option table provided in the advice to managers quite clearly takes account of the complexity of managing the various fisheries and the fact that juvenile herring are taken as a by-catch in other fisheries. There are the four separate fleets which take North Sea autumn spawning herring and two of those fleets operate outside of the North Sea control area. Considering the complexity of this situation the management tools appear to be appropriate and effective, as evidenced by the recent rebuilding of the stock since 1996. Both input (fishing mortality rates) and output (catch /TACs) controls are specified in the advice.</p>	R24		
100	Management tools, appropriate to the species and fishery, have been specified to implement decisions of input and/or output controls. Tools are responsive, relevant and timely. Performance of the tools has been evaluated and evidence exists to show clearly that tools achieve their objectives.	Presentation of options, however, represents a highly complex situation for managers to evaluate.			

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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1.1.5		There is a robust assessment of stocks.		16.7	
Weighing Commentary		The applicability of the assessment models used was considered to be of greatest significance, followed by the evaluation and consideration of uncertainties in providing management advice.			
1.1.5.1		Are assessment models used and are they appropriate to the biology of the target species and the type of fishery?			
60	Robust assessment models are used. These are generic and do not account for specific characteristics of either the biology of the species or the nature of the fishery.	<p>Herring</p> <p>Prior to 1994 the assessment was carried out by means of a conventional VPA with <i>ad hoc</i> tuning to a series of fishery independent data sets. It was noted that from the early 1990's this method regularly tended to overestimate SSB and to underestimate fishing mortality. This was a particular problem in 1992 and 1993 when retrospective analysis showed that the SSB had fallen below the MBAL. The problem was generated in part by the conflicts in the perception of stock size from the fishery independent surveys and the high juvenile mortality. As a result, the assessment working group changed the model in 1995 to an integrated catch at age analysis (ICA) method for the 1994 assessment. This method has the benefits of being able to use age-aggregated indices of stock size and to incorporate assumptions about errors in all the data sets. This assessment model better fits the biology of the species, the fishery, the survey data and the forward projections required for management of the stock complex.</p>	R16, R17, R18, R24, R25, R40	28.2	85
80	Assessment models are used. Major criteria are related to the species and/or the fishery, but there are some areas of the assessment that are generic.	<p>Nevertheless SSB continues to be overestimated although the extent of that overestimation has reduced in recent years (including with additional information on misreporting and discarding).</p>			
100	Assessment models are used and capture all major features appropriate to the biology of the species, the nature of the fishery and the nature of the management questions being asked.	<p>Mackerel</p> <p>The model used is ICA (Integrated Catch Analysis) applied by ICES to pelagic stocks and regarded as the most suitable model available. The key model parameters for mackerel are; natural mortality, vulnerability, fishing mortality and catchability. The model incorporates an evaluation of uncertainty but no retrospective evaluation is directly available within ICA. Major deficiencies are recognised and listed.</p>			

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
1.1.5.2		Does the assessment take into account major uncertainties in data and have assumptions been evaluated?			
60	Major uncertainties are identified. Some attempt has been made to evaluate these in the assessment.	Herring	R16, R17, R18, R24, R25, R40	19.7	90
80	The assessment takes into account major uncertainties in the data and functional relationships. The most important assumptions have been evaluated and the consequences are known.	The ICA model has the advantage of being able to incorporate assumptions about errors both in the survey data and in the catch at age data set. These data sets are known not to be error free but the most important sources of error and assumptions are well documented and evaluated. For example:- area and catch misreporting; recruitment; acoustic surveys; larvae survey coverage; quality of the catch and biological sampling data; separation of autumn and spring spawners in the catch data; weight at age data. Mackerel			
100	The assessment addresses all significant uncertainties in the data and functional relationships and evaluates the assumptions in terms of scope, direction and bias relative to management-related quantities.	The assessment takes account of natural mortality and fishing mortality. Maximum likelihood estimates of parameters and 95% confidence limits are given. Total variance for the model and model components given, both weighted and unweighted. Several test statistics given (skewness, kurtosis, partial chi-square). Historic uncertainty analysis based on Monte-Carlo evaluation of the parameter distribution. The major deficiencies are also listed.			

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
1.1.5.3	Are uncertainties and assumptions explored and reflected in management advice?				
60	Major uncertainties are recognised and are reported in management advice, as well as possible implications of those uncertainties on the management advice.	<p>Herring</p> <p>There continues to be some uncertainty in terms of both the current SSB and predicted levels in the short and medium term. This uncertainty continues to be reinforced by the ongoing problems of area misreporting and over-fishing of the quota. Furthermore, the management advice is always complicated by the nature and geography of the fisheries exploiting North Sea autumn spawning herring. As a result it is given separately for each of the four management fleets in a series of linked management options. In that way managers are provided with choices when considering the uncertainties in the assessment and the short and medium term projections. Information on weaknesses and uncertainties is also provided to managers.</p> <p>The management advice and continued recovery of the stock complex is now firmly embedded in the 2001 EU/Norway agreement which sets levels of fishing mortality on both adults and juveniles for spawning stock biomass levels above and below the precautionary level (Bpa) of 1.3million tonnes.</p> <p>Mackerel</p> <p>Management advice is based on the stock assessment and interpretation by advisers familiar with the species and fisheries. Uncertainties are identified and account taken.</p> <p>Although the ICA model does not provide retrospective analysis, the historic realisations of the assessment are routinely presented and provide an overview of the changes in the perception of the state of the stock in relation to SSB, fishing mortality and recruitment. The estimation and short term predictions for this fishery have been good over the past 25 years and have generated no major management problems. ICES are now considering a multi annual TAC for this stock which confirms confidence in the assessment process.</p>	R20, R21, R27	19.7	85
80	Major uncertainties and assumptions are addressed in the management advice and through the appropriate decision rules to address those limitations.				
100	All significant uncertainties and assumptions are addressed and reflected in the management advice, including appropriate decision rules.				
			R24, R40		

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
1.1.5.4		Does the assessment evaluate current stock status relative to reference points and make forecasts for the future?			
60	The stock status is estimated relative to reference points.	Herring	R20, R21, R27	13.0	95
80	The assessment makes an approximated evaluation of the stock status relative to the reference points. Both short and medium term forecasts are made.	Upper and lower biomass reference points are established and are used to evaluate the status of the stock, including short and medium term projections. The lower biomass reference point, MBAL or B_{lim} , was established following the moratorium on fishing for North sea herring from 1977 to 1981. This SSB level of 800,000t was set at one-third the SSB in an unexploited phase. It is strongly supported by the stock and recruitment model which indicates the likelihood of poor recruitment at SSB levels below this. This lower SSB level has been the driving force in the management of this stock over the past twenty years and has been instrumental in dictating the management advice and action. A recent attempt to lower this point to 560,000t has been resisted following doubts about the robustness of the advice from an ICES study group.			
100	The assessment makes a reliable probabilistic evaluation of the stock status relative to the reference points and projects these into medium and longer term projections.	<p>As an integral part of the most recent recovery plan, an upper SSB reference point of 1.3million tonnes was established. At SSB levels above this a different harvest strategy can be employed based on increased fishing mortality rates (input control) for both juveniles and adults. This is in keeping with the ICES precautionary approach and represents the target level above which SSB should be maintained. These biomass reference points are strongly supported within the EU/Norway agreement by fishing mortality reference levels for both adults and juveniles.</p> <p>All advice is given in relation to these biomass and fishing mortality reference points and rigorous evaluation of the probability of success against the various options is made for the short and medium term.</p> <p>Mackerel</p> <p>Stock status is currently above the biomass reference point but is also above the fishing mortality reference point. The current advice takes account of that and recommends a harvest strategy based on reducing fishing mortality to the precautionary level or below. The harvest strategies take account of short and medium term predictions and the estimation of the size of year classes coming into the fishery.</p>			

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
1.1.5.5		Does the assessment include the consequences of current harvest strategies?			
60	The assessment makes an initial approximation of the consequences of current harvest strategies.	<p>Herring</p> <p>The forecast tables provide options for each of the fleets, which always include an F <i>status quo</i> option. They clearly indicate the consequences of different levels of fishing mortality, on adults and juveniles, applied to the different fleets. The catch predictions for each of the options all go on to indicate the consequences for the stock in the short term.</p> <p>Mackerel</p> <p>Models used are based on predicted future stock status incorporating current harvest strategies. Uncertainties are identified and the consequences of management options according to standard ACFM practice.</p>	R20, R24, R21, R25, R27	13.0	100
80	The assessment includes a robust approximation of the consequences of current harvest strategies.				
100	The assessment includes the consequences of current harvest strategies, forecasts future consequences of these and evaluates stock trajectories under decision rules.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
1.1.5.6		How reliable has the stock assessment been historically using retrospective analysis?			
60	Annual estimates of SSB and F have been reviewed. Where estimates have been found to be unreliable, efforts have been made to improve the performance.	<p>Herring</p> <p>Retrospective analysis of the assessment shows a major deterioration in the quality of the assessment and predictions of SSB levels, from 1991 onwards. The causes of this decline were complex and generally outside the control and perception of the assessment working group. The major contributory factors were that a) the TAC, which is set only against the North Sea human consumption fishery (fleet A), was regularly exceeded; b) there was no effective control of fishing mortality on the juveniles other than the sprat TAC and c) some catches taken in the North Sea were being misreported into other areas. Other factors were a change in the growth rate and the proportion mature at age and uncertainties in the fishery independent survey data used for <i>ad hoc</i> tuning in the assessment. All of these issues have now been identified and are being addressed with varying degrees of success. This is indicated by an improvement in the performance, viewed retrospectively, of both SSB and F.</p> <p>However SSB still continues to be revised downwards annually with the latest assessment 100,000t lower than the forecast, one year earlier. Similarly the two previous years 2001 and 2000 have both been revised downwards by over 100,000t. It is still a major cause for concern, acknowledged by the Stock Assessment Working Group that the TAC for North Sea autumn spawned herring (targeted by Fleet A) is always exceeded. In 2003 the estimated catch was 438,000t against a TAC of 400,000t.</p> <p>Mackerel</p> <p>There have been no major problems with the quality of the assessment in terms of the estimation of current SSB, F and the prediction of future trends. The SSB has remained above the precautionary level since it was set at 2.3 million tonnes for the combined stock. The triennial egg survey has provided a robust and reliable age aggregated index of SSB since it started in 1977.</p>	R21, R25, R27	6.5	85
80	Uncertainty in the estimates of SSB and F are known to occur and are regularly reviewed and corrected. Investigation of the associated problems has led to significant improvement.				
100	Retrospective analysis shows excellent agreement historically for the assessment of both SSB and F.		R24, R28		

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
1.1.6	The stock(s) is/are at appropriate reference level(s).			16.7	
1.1.6.1		Is the stock(s) at or above reference levels? [YES - Criteria 1 is complete. NO - Answer Criteria 2]			
60	The stock is likely to be above the limit reference point and trends in the stock are positive.	<p>Herring</p> <p>The spawning stock biomass has increased gradually since the low levels of the mid 1990's. This has been in response to reduced catches, strong recruitment and management measures to reduce fishing mortality on juveniles. The SSB in 2002 is now considered to be above the precautionary approach level (Bpa) of 1.3 million tonnes. Based on past performance it is probable that the SSB of 1.59 million tonnes, for 2002, could be reduced retrospectively but it is still unlikely to fall below Bpa.</p> <p>Strong recruitment continues to be a major factor in the recovery with the 1998 year class constituting 41% of the SSB in 2002. The 2001 year class is predicted to be 20% above average and early estimates of the 2000 year class suggest that it could be the third highest on record. Current short-term predictions for the SSB at spawning time in 2003 indicate a biomass of 2.1million tonnes compared with 2.2tonnes predicted last year. Medium term predictions (based on F status quo) indicate an SSB of 2.5tonnes in 2004 falling to 2.3tonnes in 2005 because of a poor 2002 year class. The SSB should stabilise at around 2.5 tonnes in 10 years. Long term predictions are heavily dependant on the type of stock recruitment relationship used (Ockham razor) and would be different if a Beverton and Holt or Ricker relationship were used.</p> <p>The harvest strategy is firmly based on the two reference levels of Blim (800,000t) and Bpa (1.3tonnes). The 2001 EU/Norway agreement sets to maintain F on adults at 0.25 and juvenile F at 0.12 whilst SSB remains above 1.3tonnes. If it falls below that point then these rates will be reviewed. The Blim threshold is the lower level below which there is the threat and likelihood of a complete closure of the fishery for North Sea autumn spawned herring. As stated in 1.1.6.1 above, the target fishing mortality rates for 2003 have now increased in line with the EU/Norway agreement.</p>	R21, R25, R27	100	90
80	The stock is likely to be above the target reference levels				
100	The stock is highly likely to be consistently above target reference levels.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
	<p>Mackerel</p> <p>Over the period 1995 to the present, F has declined so that in 1999 the estimated F was approximately F_{pa} i.e.0.17. ACFM advice has been to reduce F and this is being done. The F_{pa} should also be viewed in the light of the historical development of the Spawning Stock Biomass (SSB) and its relationship to B_{pa} (2.3×10^6 t).</p> <p>However, the SSB has always been above B_{pa} and has been remarkably stable between 1984 and 1994. Thereafter, SSB slowly increased (currently approximately 3.2×10^6 t). Recruitment has fluctuated and in recent years recruitment has been average or above average. This may be responsible for the increasing trend in the SSB. In summary, SSB is rising and above B_{pa}, and fishing mortality is declining and is currently at F_{pa}. Landings have been reasonably stable over the last four years which, with an increasing SSB has lead to a reduction in F. It is, therefore, considered that this stock is being fished in a sustainable manner.</p>	R24, R26		

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score	
1.3 (MSC Criterion 3)		Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.			38.5	87
1.3.1		Fishing activity maintains the age, genetic structure or sex composition of the stock to a degree that does not impair reproductive capacity.			100	
Weighting Commentary		The three indicators at this level were considered to be of equal significance.				
1.3.1.1		Is there adequate information on the nature and dynamics of sub-populations/sex/age structure?				
60	There is information available on the sex, age and genetic structure of the stock, and the relationship of these factors to reproductive capacity.	Herring Information on the fecundity/recruitment/sex/age structure and natural mortality is adequately studied and sampled, as reflected in the comments in section 1.1.1.4, 1.1.1.5 and 1.1.1.6. This information is collected for North Sea herring as a single stock, not for separate spawning stocks.	R16, R17, R18, R24, R25	33.3	90	
80	Estimates are available of the sex, age and genetic structure of the stock, and the relationship of these to reproductive capacity.	Mackerel Age and stock structure information is gained primarily from samples and size frequency data collected by fisheries departments nationally (including scales and otoliths for ageing of fish). This information is collated annually. Information is also available on spawning stock size from the triennial surveys. The Northeast Atlantic stock currently has a large number of year classes present and in that context is considered to be in a healthy state. Genetic research to date has shown no detectable differences between the three spawning components.	R19, R26, R31			
100	There is comprehensive and reliable information on the sex, age and genetic structure of the stock, and the relationship of these to reproductive capacity, as well as evaluations of the implications of shifts in these parameters on productivity and management quantities.					

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
1.3.1.2		Is the age/sex/genetic structure of the stock monitored so as to detect any impairment of reproductive capacity?			
60	Population structure is based on some sampling and verification. Some genetic information is available as necessary.	Herring The age and sex structure of the three stock components are reasonably well sampled both from the fishery and from research vessel surveys. However, target sampling levels from the fishery are still not fully met by all the countries participating in the fishery. Sampling is, however, considered to be adequate.	R16, R17, R18, R24, R25	33.3	85
80	Population structure is based on adequate sampling and verification for this stock. Ageing errors are estimated and included in the stock assessment. Genetic studies have been carried out as appropriate.	An ICES study group is investigating genetic composition with the aim of establishing temporal variability in sub-stocks and so differentiate separate spawning stocks.			
100	Population structure is well estimated with only insignificant errors. Genetic studies have been conducted at appropriate time intervals.	Ageing techniques, based on otoliths, are well established and tested and checked through cross country calibration. There is a considerable amount of ongoing research to attempt to improve the separation of autumn and spring spawners, using otolith microstructure techniques. These techniques are still experimental and separation still relies on a tenuous statistical separation based on vertebral counts (mean vs autumn spawners, 56.5; spring spawners 55.8). Mackerel The age, sex and maturity structure of the stock is well sampled from the commercial catch and ICES are generally satisfied with the level of sampling. Additional sampling every three years provides an extensive additional data base on age, sex, maturity and fecundity. In relation to fecundity, the research over the past twenty five years has been extensive and has led to a huge increase in the knowledge of the behaviour, biology and physiology of spawning in mackerel. Current research is investigating area differences in fecundity and atresia and relating this fish condition.	R19, R26		

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
1.3.1.3		Does information from stock assessment indicate any changes in structure that would alter reproductive capacity?			
60	Changes in stock structure have been detected but there is no evidence of negative effect on recruitment of the stock.	<p>Herring</p> <p>The stock and recruitment relationship does indicate that intense fishing pressure, affecting the age composition of the stock (i.e. reducing the number of year classes present), will eventually reduce recruitment. The current management strategy is targeted at improving the age structure of all three components in order to maintain a stable abundance of older year classes well beyond the age of first maturity. The current assessment indicates that generally this is happening with up to 8 year old fish well represented in the main North Sea fishery.</p> <p>However, although not genetically discrete, the Downs component is not showing the same recovery pattern as the Banks and Buchan stocks and the age structure has not improved to the same degree. It is known that the Downs component of the stock complex is subject to a different development and did not recover from the low levels of the late 1970's and mid 1990's in the same way as the central and northern North Sea components. The most recent ICES Working Group report shows encouraging signs of a recovery in 2002 which resulted in an increased TAC for the area. However this area TAC which has been set at 25,000t since 1996 has been regularly overshot since 1987. The Working group have recognised a need for a reassessment of the methods used to investigate the size of the Downs stock.</p> <p>Similarly, although not genetically discrete, there has still been no real recovery in the central North Sea of spawning on the former grounds around the western edge of the Dogger Bank</p> <p>Mackerel</p> <p>As a result of the extensive monitoring and research, changes in the reproductive capacity of mackerel have been noted. These are well documented in the reports of the ICES Mackerel and Horse Mackerel Working Group. There is no evidence that the changes in fecundity have affected the overall reproductive capacity in terms of affecting year class strength.</p>	R16, R17, R18, R24, R25	33.3	85
80	There is evidence of no fishery-related changes in stock structure that would affect recruitment.				
100	Data and assessments strongly indicate a robust age, sex and genetic structure in the stock, such as would maintain reproductive capacity.				
			R19, R26, R32, R27		

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
Principle 2	Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends		33.3	85	
2.1 (MSC Criterion 1)	The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.		60.0	85	
2.1.1	There is adequate determination of ecosystem factors relevant to the geographical scale and life history strategy of the target species.		22.7		
Weighting Commentary		<p>Within Principle 2, MSC Criterion 1 (2.1) is considered to be of greatest significance, reflecting the importance of removal of biomass of the target species in maintaining ecosystem relations. Criteria 2 and 3 are considered to be of approximately equal significance.</p> <p>Within Criterion 2.1, the groups of indicators are considered to be of equal significance except 2.1.3 (relating to effects of gear use and loss) which is considered to be of lesser significance for a pelagic fishery with little opportunity for gear loss.</p> <p>Within the 2.1.1 level of the hierarchy, greatest weighting is given to the potential for by-catch and the importance of the target species in the food web. Information on the potential for ecosystem recovery and knowledge of habitats and by-catch, although important, are considered less significant for a relatively selective pelagic fishery.</p>			
2.1.1.1		Are the nature, sensitivity and distribution of habitats relevant to the fishing operations known?			
60	Information exists but may not be comprehensive or up to date. The seasonal distribution of fishing operations is mapped.	Catching operations take place within the upper and mid water column and are thus essentially pelagic in nature. The pelagic habitat can be characterised by the nature of (i) the physico-chemical (i.e. water movement, mixing, temperature, salinity and nutrient content), the (ii) non-motile plankton component and (iii) the nekton component (i.e. free-swimming organisms). Of these, (i) and (ii) are highly variable and their dynamics within the North Sea well understood. Impacts of fishing activities on these two components of the pelagic habitat are negligible and in any case transient. Impacts on the nekton component may be more profound and are considered further as both (a) non-target species (see 2.1.1.2) and (b) where the species are protected and/or considered threatened or endangered, under 2.2.1.	R1, R2, R5, R23	16.9	95
80	Nature, sensitivity and distribution of all main habitats are known in moderate detail. Information is recent. The distribution of fishing operations is monitored.				
100	The nature, sensitivity and the distribution of all habitats relevant to the fishing operations are known in detail. Information is recent. The distribution of fishing operations and their effort is monitored.				
		One habitat type critical to the herring stock are the gravel spawning beds. The distribution of these are well known from larval surveys and increasingly from direct observations targeted towards marine aggregate extraction. For the Eastern English Channel these have been surveyed recently (1996-2001). However the distribution of larvae is not a direct indication of herring spawning sites as larvae move and drift with water movements (e.g. tide and residual currents) and the surveys are conducted some time after spawning.			
		Distribution of fishing vessels and effort is monitored by log books, although effort in relation to specific habitat types (in relation to gravel substrates) is not recorded.			

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
2.1.1.2		Is information available on non-target species directly affected by the fishery?			
60	The main non-target species affected have been identified.	Non-target species affected by the fishery may include the occasional catch of other pelagic fish mixing with herring and mackerel shoals, notably grey mullet and rarely red mullet if fishing near the sea bed. Supporting this, observer programmes on pelagic fisheries and information from other inshore herring drift-net fisheries have indicated that by-catch of non-target pelagic fish is very low. No direct information is available, however, for this fishery. The ecology of these species is generally known in inshore waters.	R3, R34, R35, R42	33.8	80
80	Information is available on non-target species directly affected by the fishery including their distribution and/or ecology.				
100	Information is available on all non-target species directly affected by the fishery including their distribution and ecology.				
2.1.1.3		Is information available on the trophic position, status and relationships of the target species within the food web?			
60	Key prey, predators and competitors are known.	Herring	R4, R12, R23, R39, R44	28.8	90
80	Information is available on the position, relationships and importance of target species in the environment at key life stages.	The prey of herring has been well described. The studies show that, with some variations, the food of herring in the North Sea has remained consistent over a long period, being dominated by the copepods <i>Calanus</i> spp. and <i>Temora</i> spp. with Euphausiacea and the post-larval stages of <i>Ammodytes</i> spp. and clupeids contributing to a large percentage by weight. Fish eggs are also eaten, especially those of plaice <i>Pleuronectes platessa</i> , but not in large numbers. The consumption of larvae and post-larvae of other fish have not been found, indicating selective feeding by herring.			
100	Quantitative information is available on the position and importance of the target species and their relationships within the food web at key life stages.	The food web (primarily predator prey relationships) related to herring has been well described and herring has been considered as one of 12 key species within a multi-species Virtual Population Analysis (MSVPA) for the North Sea (ICES Area IV). This includes quantitative information on herring as a prey (predominantly by cod, saithe and seabirds) at different life stages, including spawn. While the MSVPA is still under development, it is considered to be robust. Mackerel The prey of mackerel has been well described (Daan, 1989; Hislop, 1997). North Sea mackerel was originally included as a full MSVPA species, and has been shown to be an important predator in the North Sea system (ICES, 2003). Although mackerel was later dropped as a VPA species from the 4M model as the size of its population declined markedly in the 1970's, the two stocks (Western Mackerel and North Sea mackerel) are being reintroduced, especially due to their predation of 0-class fish.			

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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2.1.1.4		Is there information on the potential for the ecosystem to recover from fishery related impacts?			
60	Key elements of the functioning of the ecosystem, relevant to the fishery, are identified.	<p>Herring</p> <p>The ability of the herring stocks to recover from fishery-related impacts (i.e. over-depletion) are well documented, especially following the formation of the ICES Assessment Group on North Sea herring in 1969. In particular, two stock-depletion (mid-1960s – c. 1980 and mid-1990s) events have been extensively studied and now provide the basis for the current, more precautionary fisheries management regime. It is noteworthy that few changes in predator populations were identified following these population collapses. Further information on the potential trophic impacts of stock biomass removal is also available from the MSVPA analysis. Any impacts on habitat would principally affect gravel beds which form spawning areas. However, these are not considered particularly sensitive to pelagic trawl impacts.</p> <p>Mackerel:</p> <p>Information on the potential trophic impacts of stock biomass removal is available from the MSVPA analysis, especially its predation of 0 class fish.</p>	R15, R25	20.5	85
80	The main elements of the functioning of the ecosystem, relevant to the fishery, have been documented and are understood.				
100	Detailed information is available on the potential for affected elements of the ecosystem to recover from fishery related impacts.				

2.1.2	General risk factors are adequately determined.			22.7	
Weighting Commentary		These two indicators were considered of equal importance.			
2.1.2.1		Is information available on the nature and extent of the by-catch (capture of non-target species)?			
60	Qualitative information is available on significant by-catch species.	<p>The level of bycatch from the drift net fishery have not been recorded in detail but are considered to be very low as catches of commercial species are retained.</p>	I1, R35, R39, I5	50.0	70
80	Quantitative information is available on significant by-catch. If obtained by sampling, this is considered sufficient to provide adequate information				
100	Accurate records are kept on the nature and extent of all by-catch species including species, size and sex composition.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
2.1.2.2		Is information available on the extent of discard (the proportion of the catch not landed)?			
60	Information is available of the extent of discarding, including an assessment of the main species represented.	The level of discards from the drift net fishery have not been recorded in detail but are considered to be very low as selectivity is high and catches of commercial species are retained and landed.	I1, R35, R39, I5	50.0	75
80	Information is available to allow estimates of discard to be calculated and interpreted.				
100	Accurate and verifiable information is available on the extent of all discards, and the consequences of these. Or the entire catch is landed.				
2.1.3	There is adequate knowledge of the effects of gear-use on the receiving ecosystem and extent and type of gear losses.			9.3	
Weighting Commentary		Within this section, the potential for lost gear/ghost fishing is considered more significant than impacts upon habitat.			
2.1.3.1		Is there adequate knowledge of the physical impacts on the habitat due to use of gear?			
60	Main impacts of gear use on the habitat are identified including extent, timing and location of use. Effects of habitat perturbations are estimated and appear stable.	The gear used only affects the upper and middle water column. Impacts are therefore considered incidental and negligible.	I1, R30	33.3	100
80	Impacts of gear use on the habitat are identified including extent, timing and location of use. Habitat perturbations appear sustainable.				
100	The physical impacts on the habitat due to use of gear have been studied and quantified, including details of any irreversible changes.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
2.1.3.2		Is any gear lost during fishing operations and can 'ghost fishing' occur?			
60	Some recording of gear losses takes place and an assessment can be made of possible 'ghost fishing'.	Gear loss is highly unusual in this fishery as nets remain attached to fishing vessels and are closely monitored.	I1	66.7	95
80	There is knowledge of the type, quantity and location of gear lost during fishing operations. Estimates made show that losses do not cause unacceptable effects on the ecosystem through, for example, 'ghost fishing'.				
100	There is detailed knowledge of the type, quantity and location of gear types lost during fishing operations. The impact of gear loss on target and non-target species has been measured and shown to have negligible effects on habitats, ecosystems or species of concern through, for example, 'ghost fishing'.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score	
2.1.4		Strategies have been developed within the fisheries management system to address and restrain any significant impacts of the fishery on the ecosystem.			22.7	
Weighting Commentary		The two indicators at this level were considered to be of equal significance.				
2.1.4.1		Are levels of acceptable impact determined and reviewed?				
60	There is sufficient information to determine acceptable impacts for significant target and non-target species and habitats.	<p>Herring</p> <p>Fishing mortality, the key impact, is reassessed on an annual basis by ICES who's ACFM recommend TAC's for the North Sea stocks (ICES Area IV and Division VIIId) to maintain stocks in line with the EU Norway agreement. These TAC's are based upon the biological information of catches (numbers, weight, length, catch at age and relative age composition) obtained through commercial catch sampling and fisheries independent information. Information gathering is developed by the ICES Planning Group for Herring Surveys. Herring is one of 10 species included in a multi-species VPA conducted for the North Sea (whose database is updated on a quarterly basis) since 1984. This MSVPA has been constantly updated and subjected to sensitivity analyses as well as other tests to refine the model. The model is considered to represent a reasonable tool for predicting trends in stock levels and herring assessments are considered to be in the top half of quality appraisals. MSVPA includes key predator species of herring.</p> <p>Mackerel</p> <p>North Sea mackerel was originally included as a full MSVPA species, and has been shown to be an important predator in the North Sea system (ICES, 2003). Although mackerel was later dropped as a VPA species from the 4M model as the size of its population declined markedly in the 1970's, the two replenished stocks (Western Mackerel and North Sea mackerel) are being reintroduced, especially due to their predation of 0-class fish.</p> <p>Non target species: TAC's are also set annually for most potential by-catch species. Such stock assessments are annually reviewed through relevant ICES working groups.</p> <p>Habitat impacts are reasonably expected to be negligible as the fishery is conducted primarily in the water column.</p>	R22, R23	50.0	90	
80	Levels of acceptable impacts (e.g. biological reference points) for key aspects of the ecosystem within main fishing areas have been estimated and are regularly reviewed.					
100	Levels of acceptable impact for key populations (such as of indicator species) and habitats have been estimated and are subject to frequent review.					

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
2.1.4.2		Are management objectives set in terms of impact identification and avoidance/reduction?			
60	Management systems include some impact identification and avoidance/reduction.	Herring	R26, R27, R28	50.0	90
80	Management objectives are set to detect and reduce impacts, although these have not been fully tested. These are designed to adequately protect key aspects of the ecosystem within main fishing areas.	Objectives for herring biomass are implemented through a TAC system. Under advice from the ICES ACFM, a precautionary management regime has resulted in the spawning stock biomass exceeding a precautionary level. As past assessments have tended to overestimate stock size and underestimate fishing mortality, the ICES Herring Assessment Working Group are revising projection methods to provide a more realist assessment. EC Regulations require high target species percentages. In the case of herring, these are 90% where there are two or more pelagic target species and 60% where there is a single pelagic target species but in that case there must be no more than 5% of any mixture of cod, haddock and saithe and no more than 15% of any mixture of a range of mostly demersal species identified in the Regulations. However, as discussed under Indicator 2.1.2.1, the fishery is easily expected to exceed these requirements.			
100	Tested management objectives are set to detect and reduce impacts These are designed to adequately protect ecosystems, habitats and populations of target and non-target species.	ICES's Herring Assessment Working Group (HAWG) is currently investigating the impact of aggregate dredging on the spawning beds in VIII and have firmly recommended that, under the precautionary principle, aggregate extraction activities do not take place over the spawning period of November to February. No other management objectives have been considered necessary for other impacts, e.g. that of fishing gear.			
		Mackerel			
		Objectives for mackerel biomass are also implemented through a TAC system.			
		Drift net gear mesh size restrictions and gear use restrictions are imposed to maximise selectivity, prevent gear loss and minimise impacts upon migratory salmonids.			

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
2.1.5		Assessments of impacts associated with the fishery including the significance and risk of each impact, show no unacceptable impacts on the ecosystem structure and/or function, on habitats or on the populations of associated species.		22.7	
Weighting Commentary		The key factor here was considered to be the removal of target species biomass, greatest weighting was therefore given to indicator 2.1.5.1 dealing with knowledge of fishery impacts. Impacts of target stock removal and overall impacts on community structure, productivity and diversity were highly weighted, followed by by-catch and finally impacts upon habitat (reflecting the pelagic nature of the fishery).			
2.1.5.1		Have all the significant effects of the fishery on the ecosystem been identified?			
60	Main impacts of the fishery on the ecosystem are known from existing information.	Herring Ecosystem impacts stem from biomass removal and resultant changes in predator prey relationships, in particular the importance of herring as a prey of key North Sea species such as cod, whiting and saithe. The key impact is considered to be the removal of target species biomass. Stock assessment and management measures (TAC's) are in place for the target and main by-catch species. Impacts on predators are further considered in the ICES multi-species VPA model for the North Sea and are considered to be reasonably well understood. Impacts on seabed habitat in spawning grounds in Area VIId may occur but has not been identified as a potentially significant impact.		R22	29.1
80	There is a comprehensive evaluation of the effects of the fishery on the ecosystem based on existing information.				
100	The effects of the fishery on the ecosystem have been identified by appropriate comparative and/or experimental studies.	Mackerel Ecosystem impacts also stem from biomass removal and resultant changes in predator prey relationships. The role of mackerel as a key predator of 0-class fish has been considered by the ICES multi-species VPA model and the implications for other species included in this assessment.			90

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
2.1.5.2		Does the removal of target stocks have unacceptable impacts on ecosystem structure and function?			
60	The removal of target stocks could lead to impacts upon ecological systems (applying the precautionary approach where necessary). A program is in development to reduce these to acceptable, defined limits.	<p>Herring</p> <p>Herring larvae provide an important food component for cod, whiting and saithe – thus the relative abundance of young herring may influence the recruitment of their main predators. This has been modelled as part of the ICES multi-species VPA model for the North Sea and the current improving status of the stock is likely to benefit these predators. However, the level of coupling between predator-prey-relationships, and opportunities for prey-switching, is less well known and are likely to increase uncertainty over the response of predators to diminished prey availability. Further development of the MSVPA model, including incorporation of new stomach content data, should allow the interrelationships between herring and other key North Sea species to be better established.</p>	R22, R29	22.0	95
80	Some information is available on consequences of current levels of removal of target species. These suggest no unacceptable impacts of the fishery on ecological systems within major fishing areas.	<p>Mackerel</p>			
100	The ecological consequences of current levels of removal of target stocks has been quantified and documented to be within acceptable, pre-determined, limits.	The role of mackerel, particularly as a key predator of 0-class fish, has been considered by the ICES multi-species VPA model and the implications for other key species included in this assessment.			

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
2.1.5.3		Does the removal of non-target stocks have unacceptable impacts on ecosystem structure and function?			
60	The removal of non-target stocks could lead to impacts upon ecological systems (applying the precautionary approach where necessary). A program is in development to reduce these to acceptable, defined limits.	No unacceptable impacts have been identified due to the highly selective nature of the fishery. Capture of non-target species is at a very low level and, in light of the scale of this fishery, are not considered likely to interfere with ecosystem structure or function in any way.	I1, R39	14.6	80
80	Some information is available on consequences of current levels of removal of non-target species. These suggest no unacceptable impacts of the fishery on ecological systems within major fishing areas.				
100	The ecological consequences of current levels of removal of non-target stocks has been quantified and documented to be within acceptable, pre-determined, limits.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
2.1.5.4		Does the fishery have unacceptable impacts on habitat structure?			
60	There is no evidence that the fishery is having unacceptable impacts, although the issue has not been directly studied.	The fishery will have a negligible impact upon the structure and function of the pelagic habitat and no unacceptable impacts have been demonstrated for the benthic habitats (as discussed under Indicator 2.1.5.1).	R22, R39	12.4	95
80	No unacceptable impacts of the fishery on habitat within major fishing areas have been demonstrated.				
100	Effects on habitat structure are well documented and are within acceptable tested/justified limits.				
2.1.5.5.		Are associated biological diversity, community structure and productivity affected to unacceptable levels?			
60	There is no evidence that the fishery is having unacceptable impacts, although the issue has not been directly studied.	Biological diversity, in terms of rare, protected or threatened species is considered in Section 2.2.	I10, R22, R39	22.0	90
80	The effects of the fishery on biological diversity, community structure and productivity have been considered and no unacceptable impacts have been found.	Since rebuilding of the herring stock, biomass has increased. For both species, there is no evidence to suggest that productivity of the pelagic system has been impaired due to fishing mortality. Similarly, the pelagic community structure would not be expected to be adversely affected as a result of fishing activity, and for key fish species this is modelled through the MSVPA.			
100	The effects of the fishery on biological diversity, community structure and productivity have been quantified and are within acceptable tested/justified limits	As discussed under Indicator 2.1.3.1, no significant impacts of the fishery upon benthic habitats or communities have been identified.			

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
2.2 (MSC Criterion 2)		The fishery is conducted in a manner that does not threaten biological diversity (at the genetic, species or population levels and avoids or minimises mortality of, or injuries to endangered, threatened or protected species.		18.8	89
2.2.1		Fishing is conducted in a manner, which does not have unacceptable impacts on recognised protected, endangered or threatened species.		56.5	
Weighting Commentary		The two indicators within MSC Criterion 2.2 were considered to be of roughly equal significance. Slightly greater weighting was given to the identification of potential impacts as the area in which attention is most warranted.			
		The three indicators within the 2.2.1 level were considered to be of equal significance.			
2.2.1.1		Is there information on the presence and populations of protected, endangered or threatened species?			
60	There is a program in place to identify protected, threatened and endangered species directly related to the fishery. There is periodic monitoring of the main population trends and status of protected, endangered and threatened species.	Seals. The populations of seals in the North Sea are monitored by a number of organisations including NERC's Special Committee on Seals (SCOS) and the Sea Mammal Research Unit. In addition to these studies, harbour seals are surveyed annually in the Kattegat/Skagerrak by Swedish scientists and in the Wadden Sea by Dutch scientists. Elsewhere surveys are less frequent but data are relatively complete for most harbour seal populations in the region of the North Sea. Grey seals are also surveyed intermittently along the Norwegian coast and in the Baltic but there are no systematic surveys of abundance.	R1, R6, R42	33.3	95
80	Key protected, threatened and endangered species directly related to the fishery have been identified. The populations and health of key protected, threatened and endangered species directly related to the fishery are monitored on a regular basis.	Cetaceans. A major international survey was conducted in 1994 (known as SCANS) to estimate the abundance of harbour porpoises and other small cetaceans in the North Sea and adjacent waters. The current plan is to repeat the survey in the North Sea and to extend the survey area to include shelf waters to the west of the British Isles where there are not yet any robust estimates of cetacean abundance. Cetacean populations in the English Channel are very low, although there are signs of some recovery with increasing regulation on fishing mortality in prey stocks in North Sea waters in particular (Northridge, pers. comm.). Therefore some caution needs to be applied to ensure that recovery of these populations is not hindered by this fishery.			
100	There is knowledge of all populations of protected species directly or indirectly related to the fishery including and their dynamics. Regular monitoring of protected, endangered and threatened species undertaken, supported by research programmes to assess threats and promote their conservation. The type and distribution of critical habitats have been identified.	Fish. Basking shark are not typical of the North Sea or Eastern Channel waters but sightings off the Isle of Wight (Fowler, 1995) are recorded. The twaite and allis shads are herring family members that are listed as threatened (OSPAR, 2003) but are known to occur in Kent and Sussex coastal waters. The common skate (<i>Raja batis</i>) is now extremely rare in Area IVc. Migratory salmonids (particularly sea trout) are also known to be present. Seabirds. Seabirds at sea are monitored by the seabirds at sea unit of JNCC.			

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
	<p>Benthos. Areas of strong tidal currents are associated with coarse sediments characterised by sessile epibenthic communities dominated by suspension-feeders. Such gravel substrates in Area VIIId support the main spawning grounds of the Down's herring. EC Habitats Directive Annex I reef areas (including bedrock, cobble and boulder substrates) are known in the Eastern English Channel basin which is dominated by a large expanse of potential reef habitats which stretches 142 km in length and 32 km wide. Shallow inshore areas are better known due to greater survey area, such as the SeaSearch programme.</p>				
2.2.1.2	Are interactions of the fishery with such species adequately determined?				
60	The main interactions directly related to the fishery are known.	<p>Sea mammals. Observations made on two small driftnet fisheries in the UK (with relatively low proportionate effort) showed no bycatch of cetaceans (EC, 2002).</p> <p>Fish. Elasmobranchs (sharks, skates and rays) bycatch is not considered to be an issue in this fishery. Basking shark are not typical of the North Sea or Eastern Channel waters but sightings off the Isle of Wight (Fowler, 1995) are recorded. Twait and Allis shads (herring family members) and sea trout may be intercepted by these gears. However, timing of fishing and mesh size constraints would reduce or avoid impacts on these species.</p> <p>Seabirds. Interactions of seabirds are rarely reported for these gears, although some incidental catch when fishing close to rocks. However mortality rates are considered low.</p>	R7	33.3	80
80	Quantitative estimates are made of the effects of interactions directly related to the fishery. There is a requirement to record and report all incidental mortalities.				
100	Reliable quantitative estimates are made of the interactions of all populations directly related to the fishery, and qualitative information is available on indirect impacts. Incidental mortalities are recorded and reported.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
2.2.1.3		Do interactions pose an unacceptable risk to such species?			
60	Known effects are within acceptable limits of national and international legislative requirements and are believed to create no biological threats to the species concerned.	Cetaceans The very low rates of interactions with the species discussed above indicate that the fishery does not pose a risk to protected, endangered or threatened species.	R45	33.3	90
80	Critical interactions are well estimated and do not threaten protected species.	The Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS) has adopted 1.7% as the maximum allowed removal rate for harbour porpoises and this was also adopted by EC (2001) and ICES. However, potential impacts with this fishery are such that a requirement to set specific mandatory levels has not yet been identified.			
100	It is known that the direct and indirect effects of fishing on threatened and endangered species are within acceptable limits.	Fish Due to seasonal fishing times, by-catches of shad are unlikely in this fishery. Potential risks to sea trout are reduced through mesh size restrictions.			

2.2.2	Strategies have been developed within the fisheries management system to address and restrain any significant impacts of the fishery on protected, endangered or threatened species.			43.5	
2.2.2.1		Are management objectives set in terms of impact identification and avoidance/reduction?			
60	Some management systems exist in terms of impact identification and avoidance/reduction.	The extremely low incidence of interactions with such species has meant that no specific management objectives other than mesh sizes and gear setting restrictions have either been set or are reasonably considered to be required.	R6, R7, R14	100	90
80	Management objectives are set to detect and reduce impacts. These are designed to adequately protect key aspects of the ecosystem within main fishing areas.	If issues relating to protected, endangered or threatened species are identified, various mechanisms have been developed to detect and reduce their impact. This includes i) the ASCOBANS Agreement that sets the 1.7% maximum allowed removal rate for harbour porpoises; (ii) the EC Habitats Directive that provides protection for key habitats and species; (iii) Biodiversity Action Plans that provides protection for the protection of key and threatened species and habitats; (iv) the OSPAR Strategy on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area that has identified a number of key species and habitats in the North Sea and Eastern Channel considered as 'threatened or declining'.			
100	Tested management objectives are set to detect and reduce impacts These are designed to adequately protect ecosystems, habitats and populations of target and non-target species.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
2.3 (MSC Criterion 3)		Where exploited populations (of non-target species) are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.		21.2	83
2.3.1		There are management measures in place that allow for the rebuilding of affected populations.		100	
Weighting Commentary		The three indicators under MSC Criterion 2.3 were considered to be of equal significance.			
2.3.1.1.		Is there sufficient information to allow determination of necessary changes in fishery management to allow recovery of depleted populations?			
60	There is some information on functional relationships, sufficient to allow alterations to be made to fishing to recover and rebuild depleted species.	Minor interactions could occur with two uncommon species – shad and sea trout. Interactions with shads will be minimised by the timing of fishing operations and small mesh sizes used. Interactions with sea trout are also minimised by specified mesh size restrictions and the setting of the nets around 4m below the water surface.		R42, I11	33.3
80	There is adequate information, combined with a precautionary approach wherever necessary, to allow alterations to be made to fishing to recover and rebuild depleted species.				
100	There is a clear understanding of functional relationships between the impacted population and the fishery. Intervention measures based on this understanding have been tested.				
					80

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
2.3.1.2		Are management measures in place to modify fishery practices in light of the identification of unacceptable impacts?			
60	A mechanism exists for the modification of fishing practices in light of the identification of unacceptable impacts.	Monitoring of by-catch species occurs under the auspices of ICES working Groups. Objectives and limits are set for each species as discussed in 2.3.1.1 – biomass and fishing mortality reference points.	R20, R22, R25	33.3	90
80	Effective management measures are in place to modify fishery practices in light of the identification of unacceptable impacts.	The CFP basic fisheries regulation (2371/2002) provides the framework within which management measures can be introduced to modify fishery practices in the light of the identification of unacceptable impacts. For Hastings fishermen, regulations may also be implemented or augmented in the form of SSFC by-laws.			
100	Monitoring programs are in place within the management system to allow modification of fishery practices in light of the identification of unacceptable impacts. Objectives and limits for environmental change are used to guide operational practices. It is demonstrated that these are effective.	Interactions with shads will be minimised by the timing of fishing operations. Interactions with sea trout are minimised by specified mesh size restrictions.			

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
2.3.1.3		Do management measures allow for recovery of affected populations?			
60	Rebuilding measures exist and are fully implemented. Measures have not been tested.	Management measures for shad and sea trout are implemented to assist in rebuilding of populations, primarily focussed on spawning areas in rivers. This is not a significant issue for this particular fishery.	R14, I11	33.3	80
80	Appropriate rebuilding measures are being implemented. Measures have been tested and can be shown to be rebuilding the affected populations.				
100	Appropriate rebuilding measures are being implemented to promote recovery as quickly as is possible. Additional measures are being implemented to prevent problems in the future.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
Principle 3		The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable		33.3	89
3.A		Management System Criteria		41.7	90
Weighting Commentary		<p>Within MSC Principle 3, 3B (operational criteria) were weighted slightly higher than 3A (management system criteria) as the actual implementation of management measures was considered highly important.</p> <p>Under 3A, the greatest weighting was given to issues of compliance, monitoring and control (3A.8), followed by the establishment of appropriate objectives etc (3A.3) and control of impacts on the stock (3A.6).</p>			
3A.1 (MSC Principle 3 Intent and Criterion 3)		A management system containing an institutional and operational framework exists with clear lines of responsibility.		11.2	95
Weighting Commentary		The four indicators at this level were considered to be of equal significance except the requirement for external review which, given the existing levels of scrutiny and control, was considered less significant for a fishery within the CFP.			
3A.1.1		Are organisations with management responsibility clearly defined including areas of responsibility and interactions?			
60	Organisations with management responsibility are known. Responsibilities and interactions require clarification.	Fisheries are managed through the Common Fisheries Policy of the EU in accordance with the basic fisheries regulation (2371/2002) and additionally, these fisheries are managed according to EU-Norway agreements.	R20, R21, R24, R27 I3, I4	31.3	100
80	Organisations with management responsibility have been defined including key areas of responsibility and interaction	Scientific research and assessment is carried out by ICES. Advice is provided through the Advisory Committee on Fisheries Management (ACFM) on the status of target and non-target stocks to the European Commission. ICES advice, via Commission proposals, informs the annual EU Council of Ministers regulation establishing management measures, in particular TAC's and quotas. TAC's and quotas for the herring and mackerel fisheries are set in this regulation for EC member states and recorded for Norway.			
100	Organisations with management responsibility are clearly defined including all areas of responsibility and interaction. Interactions are demonstrably effective.	<p>Implementation of the CFP (and implementation of Habitats Directive etc) at a national level is carried out through DEFRA.</p> <p>In addition, local by-laws may be implemented by the Sussex Sea Fisheries Committee (within 6 nm). Other agencies such as English Nature, Environment Agency and Local Authorities are represented on the committee, as is the Hastings Fishermen's Protection Society. These agencies also have specific advisory positions in relation to rare species, diadromous fish species etc.</p>			

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
3A.1.2		Is the system consistent with the cultural context, scale and intensity of the fishery?			
60	Inconsistencies arise in some key areas but a programme is in place to address these.	The majority of nations with a history in North Sea herring fisheries are represented in the EU-Norway agreement. Similarly for mackerel there are agreements between the EU, Norway and the Faroe Islands and agreements with NEAFC in relation to mackerel taken in International waters. These systems are considered to be entirely consistent with the multi-national nature, scale and intensity of these fisheries. Locally, the Hastings fishery is regulated by a well established framework consistent with traditional regional practices.	R21, R24, R27	31.3	100
80	The system is consistent with key elements of the cultural context, scale and intensity of the fishery.				
100	The system is entirely consistent with the cultural context, scale and intensity of the fishery.				
3A.1.3		Is the management system subject to internal review?			
60	There are mechanisms in place to allow for internal review.	EC management systems allow ICES, National Governments, the fishing industry and other groups to make a case to the Commission for review and change. In practice, the Commission may well bring forward a proposal for change on its own initiative. Within ICES, a Methods Working Group keeps methods for fish stock assessment under regular review and there is a specific Study Group on Evaluation of Current Assessment Procedures for North Sea Herring. In addition, other study groups exist to review, for example, Revision of Data, Herring Surveys, Precautionary Approach Preliminary Limits and Discards and Biological Sampling Each member state must also report annually on control matters. EC fishery inspectors monitor National enforcement activity. EC data collection requirements, carried out by member states, are reviewed each year. Quota allocations within the UK are administered by DEFRA, which is subject to internal audits to review the nature and efficacy of control measures. Within SFC's, regular meetings allow for representations by member organisations. A number of systems are involved in these various review programmes operating on varying timescales of review and implementation and to meet varying priorities.	I3, I4	31.3	90
80	The management system is subject to internal review. This includes the performance of the assessment methods and improvements to the method have been tested and made.				
100	The management system is subject to regular and frequent internal review. This includes evidence that the assessment methodology has been evaluated extensively and that any recommended changes have been made. Monitoring and evaluation are ongoing and improvements quickly tested and implemented.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
3A.1.4		Is the management system subject to external review?			
60	There are mechanisms in place to allow for external review.	<p>ICES can, and do, involve external scientists in review of its methodologies if considered necessary. However, this has not been deemed necessary for the North Sea herring or western stock mackerel fisheries.</p> <p>Political pressure from the Member States on the Commission and the independence and international standing of ICES and other bodies ensure CFP review processes are externalised. A recent review of the CFP, in particular, involved extensive stakeholder input (including representatives of the fishing industry, NGO's, independent scientists etc).</p> <p>DEFRA management measures, such as enforcement and FIG effectiveness, are reviewed by the European Commission. The structure and effectiveness of SFC's has also been recently reviewed within England and Wales.</p> <p>Although various (and more urgent) elements of the management system are subject to review, there is no systematic review of the system as a whole.</p>	R28, I3, I4	6.3	80
80	The management system is subject to regular external review.				
100	The management system is subject to regular and frequent external review.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3 A.2 (MSC Criteria 1, 2, 4)		The management system has a clear legal basis.	5.4	100	
Weighting Commentary		The three indicators at this level were considered to be of equal significance.			
3A.2.1		Is the fishery consistent with International Conventions and Agreements?			
60	The management system operates under relevant international conventions and agreements, but some management actions may be questionable in relation to the terms of these.	The basic EC fisheries regulation was elaborated in the full knowledge of the FAO Code of Conduct and all other international conventions dealing with fishing. The herring fishery is fundamentally managed under an international agreement between the EU and Norway. The Northeast Atlantic mackerel fishery is basically managed under agreements between the EU, Norway and the Faroe Islands plus an agreement with NEAFC regarding the catch levels to be taken in International waters.	R21, R24, R27	33.3	100
80	The management system appears to be in full compliance with international conventions and agreements.	The Habitats Directive is also relevant in terms of protected habitats and species and is implemented in the UK through the Habitats &c Regulations.			
100	The management system is demonstrably compliant with all relevant international conventions and agreements.				

3A.2.2		Is the system consistent with national legislation?			
60	The management system operates under relevant EU and national legislation, but some management actions may be questionable in relation to the terms of these.	The management system is in accord with EC regulations implemented in the UK and UK fishery and nature conservation legislation. As detailed in Section 3.A.1.3, EC fishery inspectors monitor National enforcement activity and action can be taken if appropriate.	I3, I4, I5	33.3	100
80	The management system appears to be in full compliance with EU and national legislation.				
100	The management system is demonstrably compliant with all relevant EU and national legislation.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
3A.2.3		Does the system observe the legal and customary rights of people dependent upon fishing?			
60	The customary and legal rights of people dependent upon fishing are known and no major conflicts have occurred.	Rights are set out in EC and Nation State law. In particular, Hastings Fisher's have historic protected rights to access to the Stade for fishing activities.	I1, I4, I8	33.3	100
80	The system observes the legal and customary rights of people dependent upon fishing but does not necessarily have a formal codified system.				
100	The system observes all legal and customary rights of people dependent upon fishing under a formal codified system.				

3A.3 (MSC Criteria 2, 5, 7)	The management system includes strategies to meet objectives including consultative procedures and dispute resolutions.			17.7	92
Weighting Commentary		The greatest weighting at this level of the hierarchy was given to the adoption of a precautionary approach to management measures. Lower weightings were given to consultative and dispute resolution mechanisms. The setting of objectives, adoption of procedures to meet objectives and measurement of performance in doing so, were considered to be of high, and roughly equal, significance.			
3A.3.1		Does the management system contain clear short and long-term objectives?			
60	Short and long-term resource and environment objectives are implicit within the management system.	Long-term objectives are set out in the EU/Norway agreement for herring. The long term objectives for Northeast Atlantic mackerel are set out in the agreement between the EU, Norway, the Faroe Islands and NEAFC. Short-term objectives are represented by annual TAC's, achievement of which is measured at sub-annual levels. These objectives are based on a precautionary approach. Total Allowable Catches are set by the Council of Ministers each December for the following year in the light of ICES advice. There is an intention, for mackerel, to move to multi-annual TACs after the 2004 egg survey results become available. All objectives are firmly based on the precautionary approach. Significant environmental objectives are included within fishery-related objectives and separate conservation objectives.	R21, R24, R27	16.8	90
80	The management system contains short and long-term resource and environment objectives.				
100	The management system contains clear and explicit short and long-term resource and environment objectives that can be measured by performance indicators.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3A.3.2		Do operational procedures exist for meeting objectives?			
60	Operational procedures exist which are applied to the meeting of objectives.	National quota is sub divided among fleets in member states and Norway for herring. For mackerel the quota is divided among the fleets of member states, Norway and the Faroe Islands. Account is also taken of catches in International waters via an agreement through NEAFC Landings are recorded by logbook, reported to the national authority, which in turn reports uptake to the Commission (and Norway). The reporting process provides timely information to the commission and DEFRA. The Commission and DEFRA has power to close the fishery (including the non-sector) immediately once quota is taken. Procedures exist within the SFC and other agencies for the meeting of relevant conservation objectives. However, procedures are dependent upon accurate reporting of catch areas. Area misreporting, as detailed in section 1.1.2.6, is an ongoing issue for the North Sea and Eastern Channel herring fishery.	R21, R24, R27 I3	17.6	85
80	Transparent operational procedures are applied to the meeting of objectives. These procedures can be shown to support the objectives.				
100	Operational procedures are transparent and clearly applied. There is a feedback mechanism testing effective application.				

3A.3.3		Are there procedures for measuring performance relative to the objectives?			
60	Operational procedures exist which can be used to measure performance relative to the objectives.	Performance relative to objectives is monitored at Regional and National level. Performance at national government level within the EU is monitored by the Commission (as described in Section 3.A.3.2). National results are published in annual reports to the Council of Ministers, SFC results are reported publicly on an annual basis.	I3, I4	17.6	100
80	There are procedures used for measuring performance relative to the objectives.				
100	Tested procedures are used for regular measurement of performance relative to the objectives.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
3A.3.4		Do objectives and operational procedures follow the precautionary approach?			
60	Some objectives and procedures implement a precautionary approach.	The EC sets Total Allowable Catches in the light of ICES (ACFM) advice, which is firmly geared towards following the precautionary approach. The adoption of a precautionary approach for both the North Sea herring and North East Atlantic mackerel stocks is recognised.	R21, R24, R27	31.4	85
80	Key objectives and procedures explicitly implement a precautionary approach.	However, within this overall precautionary approach, the degree of precaution afforded the Downs spawning component of the North Sea herring stock is less than that recommended by the ICES ACFM.			
100	All relevant objectives and procedures explicitly implement a precautionary approach.	There has been, therefore, a much slower recovery of this component of the overall North Sea/Eastern Channel stock. As a result of this reduction in the degree of precaution (for this component of one of the stocks), the score allocated here is lowered from what would otherwise be a very high overall score.			

3A.3.5		Does the system include a consultative process including affected parties?			
60	The system includes a consultative process including key stakeholders within the fishery.	The recent review of the CFP included consultation with all relevant stakeholders, including industry, NGO's etc. Further consultation processes exist between fishing industry and National authorities and often between National fishing associations, NGO's etc and the Commission, particularly the Advisory Committee and Working Groups (such as the Conservation Working Group) within the Directorate General of Fisheries (DG Fish).	I1, I2, I3, I4, I8	8.6	90
80	The system includes a consultative process including all main public and private stakeholders and can demonstrate consideration of representations made.	Information gathering, and dissemination of results, takes place between DEFRA and industry stakeholders. Local relevant parties are afforded representation on the SFC, including industry and regulatory bodies. Local issues are specifically addressed at the SFC.			
100	The system includes a consultative process including all affected stakeholders. Decisions specifically discuss and/or address stakeholder concerns				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3A.3.6		Is there an appropriate mechanism for the resolution of disputes within the system?			
60	Mechanisms are theoretically adequate but have not been consistently applied or tested.	There are mechanisms at National level for issues to be raised with National Governments and resolved where possible by them. This has been implemented by the HFPS (possibly including NFFO assistance) and DEFRA. The HFPS constitution allows for disputes within the society to be considered and resolved at an AGM or Special General Meeting. Ultimately, any European citizen or organisation can take legal action against the Council of Ministers in the European Court of Justice. This is a system which is widely known and has been used when considered necessary.	I3, I4	8.0	90
80	There is an appropriate and established mechanism for the resolution of disputes within the system.				
100	There is an appropriate and tested mechanism within the system for the documentation and resolution of disputes of varying magnitude.				

3A.4 (MSC Criterion 6)	The management system operates in a manner appropriate to the objectives of the fishery.			4.3	92
Weighting Commentary		The two indicators at this level were considered to be of equal significance.			
3A.4.1		Does the system include subsidies that contribute to unsustainable fishing?			
60	Subsidies exist that may contribute indirectly to unsustainable fishing. These are short-term and are in the process of being removed within acceptable timescales.	No subsidies that would contribute to unsustainable fishing are identified for these fisheries. Any subsidies that were made available would have to be cleared with the European Commission under the EC State Aid rules.	I3	50.0	100
80	The system is essentially free from subsidies that contribute to unsustainable fishing or ecosystem degradation.				
100	The system has no subsidies that contribute to unsustainable fishing or ecosystem degradation.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
3A.4.2		Does the system include economic/social incentives that contribute to sustainable fishing?			
60	Measures to allocate fishing opportunities and/or entry to the fishery, or other incentives, are generally supportive of achieving fishery objectives	Contravention of conservation regulations results in economic penalties and negative publicity. There is evidence of imposition of such penalties for non-compliance in the North Sea herring fishery and in the mackerel fishery	I3	50.0	85
80	Allocations of fishing opportunities, and/or other incentives, promote fishery and ecosystem management goals.	FIFG funding is made available to measures that would support sustainable fishing.			
100	The system has established economic and social incentives that contribute to sustainable fishing and ecosystem management				

3A.5 (MSC Criterion 8)	A research plan exists in line with the management system to address information needs.			7.8	87
Weighting Commentary		The three indicators at this level were considered to be of equal significance.			
3A.5.1		Have key research areas requiring further information been identified?			
60	Major areas requiring further research have been identified.	ICES establishes study groups based on information requirements identified by national delegates, including through industrial representations. These include, for example, a study on effects of aggregate extraction on herring spawning and egg survival in the English Channel and genetics of stock separation in North Sea herring. Areas requiring further research have been identified including further investigation of the state of the Downs Stock, discards monitoring and the performance of the sampling programme generally. Key research areas in relation to the mackerel egg surveys and assessment have also been identified, including biology, distribution of 0 group juvenile stages etc. Fundamental research, for example on recruitment variability and environmental influences on stock dynamics, however, seems to be left to individual scientists and the priorities and financial constraints of their parent organisations as funding is not made available from ICES. Such work is undertaken, for example, by UK, Dutch, Danish, German and Norwegian institutes.	R25, R26	33.3	85
80	Key areas requiring further research have been identified.				
100	A comprehensive review of information requirements has been undertaken.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
3A.5.2		Is research planned/undertaken by the scientific advisers to meet the specific requirements of the management plan?			
60	Research is planned for highest priority information needs.	Herring		33.3	85
80	Research is planned and undertaken to provide necessary scientific support to the plan. There are demonstrable resources to allow implementation of the programme.	Research/investigation is undertaken in relation to specific requirements, which generally come from the recommendations of the Stock Assessment Working Group. For example in their 2003 report the WG considered the reports and recommendations of four ICES study groups, two planning groups and a Methods Working group (ICES CM 2003/ACFM:17). Resources are made available by the EU or member states directly.	R8, R13, R14, R30, R36, R38, R41		
100	There is an ongoing, funded, comprehensive and balanced research programme, linking research to the management plan.	<p>In the recent past ‘cutting edge’ research into otolith microstructure has been carried out in an attempt to improve the discrimination of autumn and spring spawning herring.</p> <p>At their most recent working group meeting members, from various Institutes, have developed an informal agreement to carry out research into Downs herring. This has been instigated to move the management of the separate quota for Downs herring within the North Sea herring TAC to a more scientific basis. The proposed informal programme takes two main approaches to address the trends in the population; firstly a re-analysis of the larvae surveys of the English Channel and southern North Sea and secondly an investigation of the proportion of winter spawners in the summer catches from the North Sea (the spawning-origin of herring).</p> <p>Mackerel</p> <p>Specific research requirements identified by the working group in recent years have been targeted at further improving the precision of the SSB estimate from the triennial mackerel egg surveys. This has proved particularly successful in relation to estimation of fecundity, survey design and estimation of variance. Other funded research has been targeted at recruitment and an understanding of variability and also environmental effects on changes in distribution.</p>	R19, R26, R32, R27		

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
3A.5.3	Is relevant research carried out by other organizations (e.g. Universities) and is this taken into consideration?				
60	The management system is aware of research carried out by other organisations and elements of this are taken into consideration.	Members of the ICES community keep abreast of developments within the scientific community of relevance to the fishery under consideration. This ICES community is wider than Europe and includes relevant research elsewhere.	R26	33.3	90
80	Appropriate research carried out by other organisations is taken into consideration, although there is not necessarily any proactive co-ordination between organisations.	Research contracts are let to other organisations, including Universities, (e.g. through the EC) to supplement scientific understanding relevant to the fishery and related ecosystem.			
100	Relevant research carried out by other organisations is taken into account for management considerations. This research is often co-ordinated with existing research plans of the management system.	In the North Sea herring some sectors of the industry have given strong indications that they are keen to fund and become involved in aspects of North Sea herring research. Research on Northeast Atlantic mackerel has benefited enormously from EU funded research carried out at Universities. In particular, much of the early research on fecundity and atresia was carried out at the University of Aberdeen. The Irish fishing industry have also sponsored research and monitoring surveys in relation to the distribution and spawning of mackerel. These are all co-ordinated programmes targeted at improving the precision of the stock assessment process.			

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3A.6 (MSC Criteria 7, 9, 10)	The management system includes measures to pursue objectives for the stock.			15.5	89
Weighting Commentary	The three indicators at this level were considered to be of equal significance.				
3A.6.1	Are the resource and effects of the fishery monitored?				
60	A monitoring programme is in place that addresses some aspects of resource and effects and which can be extended.	<p>Herring</p> <p>The resource (the stock status) is monitored as described in Section 1.1.1 and is considered good. The extent of fishery-related mortality was considered in Section 1.1.2.1 and a number of deficiencies were noted however.</p>	R25	33.3	80
80	A monitoring programme is in place that addresses all key aspects of resource and effects at appropriate intervals and results are recorded.	<p>These data are collected virtually in real time as the fishery proceeds and full records are kept at member state level. Results of monitoring are made available to research and management bodies.</p>			
100	The resource and effects of the fishery are closely monitored over appropriate geographical areas and time periods. Full records are kept of monitoring results and these are made available to relevant research and management bodies.	<p>Mackerel</p> <p>Landings data are collected and available on a daily basis at all designated landing ports. For some countries individual vessel catches are monitored on a daily basis and quota uptake controlled accordingly. Actual catches for stock assessment purposes use the official landings data augmented by national information on misreporting and discarding.</p> <p>The stock status of the western and southern components is well monitored and there is now a concerted effort to try to monitor the recovery of the North Sea spawning component by a regular egg survey.</p>	R26		

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
3A.6.2		Are results evaluated against precautionary target and limit reference points?			
60	Target, precautionary and limit reference points exist and some level of evaluation against these is possible. These take account of the precautionary approach, but this may not be explicit	<p>Herring</p> <p>Precautionary target and limit biomass and target fishing mortality reference points do exist and the management of the fishery is firmly based on these (see under Indicator 1.1.3.1).</p> <p>Mackerel</p> <p>Precautionary biomass target and fishing mortality target and limit reference points have been established and the management of the fishery is firmly based on these. Because of the severely depleted nature of the North Sea spawning component the target fishing mortality on this part of the stock is zero.</p>	R21, R25, R27	33.3	100
80	Results of monitoring are regularly interpreted in relation to precautionary, target and limit reference points.	Precautionary biomass target and fishing mortality target and limit reference points have been established and the management of the fishery is firmly based on these. Because of the severely depleted nature of the North Sea spawning component the target fishing mortality on this part of the stock is zero.	R24, R26		
100	Results of monitoring are quantitatively evaluated against precautionary, target and limit reference points on a regular and timely basis.	Evaluations are regular and timely.			

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
3A.6.3		Do procedures exist for reductions in harvest in light of monitoring results and how quickly and effectively can these be implemented?			
60	Practical procedures exist to reduce harvest. Programmes to link these with monitoring results are underway.	The CFP system allows the Commission to make a proposal to the Council for an immediate (in-year) reduction in quota. This system has been used previously for North Sea herring in 1996 and has allowed for rapid recovery to specified levels. In addition both the Commission and DEFRA have fast track closure procedures available for any fishery.	I3	33.3	90
80	Practical procedures exist to reduce harvest in the light of monitoring results and provide for stock recovery to specified levels. Measures can be implemented speedily				
100	Practical procedures exist to reduce harvest in light of monitoring results and provide for stock recovery to specified levels within specified time frames. There are well documented procedures to implement changes and these can be introduced with immediate effect.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3A.7(MSC Criterion 10)		The management system includes measures to pursue objectives for the affected ecosystem.	7.9	85	
Weighting Commentary		The two indicators at this level were considered to be of equal significance.			
3A.7.1		Are measures in place to address (avoid or minimise) significant environmental impacts?			
60	Significant environmental impacts are known and measures are being applied to reduce key impacts.	The key environmental impact is the removal of biomass. Measures to control stock status are in place and have been shown to be effective for both juveniles and adults of both species and are under regular review. Other impacts include a minimal non-target species by-catch. Catches and status of by-catch species is also regularly reviewed.	R26, R27, R28	50.0	90
80	Environmental impacts are known. Measures are being applied to minimise all significant ones and there is evidence that the measures are working.				
100	Measures are in place to avoid all significant environmental impacts and are subject to monitoring and periodic review.				

3A.7.2		Are no take zones, Marine Protected Areas or closed areas for specific periods appropriate and, if so, are these established and enforced?			
60	Suitability of no-take zones and closed areas / seasons has been reviewed against objective biological criteria. Plans are in place to implement some or all of these as appropriate.	No closed areas have been established in Areas IV c and VIId (Downs area) and this area has not been subject to any restriction (other than the Sub-area TAC), despite this fishery targeting spawning aggregations. It is also noted that this spawning stock has not shown the same rate of recovery as the other spawning stocks. The consequences of closed areas cannot be directly monitored, but their effect is expected to be reflected in the overall status of the stock, which is monitored.	R14, I7	50.0	80
80	Suitability of no-take zones and closed areas / seasons has been reviewed and these have been or are currently being implemented and enforced if and where appropriate.	A joint East and West Sussex Marine Habitat Action Plan (inc. the intertidal) has also been proposed, but this is still at an embryonic stage with a possible delivery date of end 2004 (Kate Cole, pers. comm.). This will be based upon Seasearch data (essentially information derived from voluntary recreational divers, see http://www.seasearch.org.uk). This will limit information to about 6-12 miles from the coast and 30 m depth but will provide a high level of ground truthing.			
100	No-take zones and closed areas / seasons are established and enforced if and where appropriate and, if implemented, the consequences are being monitored.	A 'Mackerel box' has been established to protect known juvenile areas in SW England – excluding targeted mackerel fishing other than by handlining.			

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3 A.8 (MSC Criterion 11)		There are control measures in place to ensure the management system is effectively implemented.		30.1	89
Weighting Commentary		The monitoring of fishing activities and availability of corrective mechanisms were considered to be of equal significance. The provision of information to fishers was considered of slightly lower importance.			
3A.8.1		Are information, instruction and/or training provided to fishery operatives in the aims and methods of the management system?			
60	Mechanisms exist for the dissemination of information, instruction and training of fishery operatives. Implementation of these mechanisms may not be universally implemented.	Information is made readily available to all fishing organisation within member states on the requirements, aims and methods of the management system. The Hastings fleet members are part of a small, close knit local community. Through the Hastings Fishermen's Protection Society, of which they are all members, there is an exchange of relevant knowledge. Through the Society, very good relationships have been built up with DEFRA and with the Local Sea Fisheries Committee and in that way the aims and changes in the methods of the management system are promulgated. However, the dissemination of information to individual fishermen is often unstructured and irregular, although this does not appear to compromise the management of the fishery or compliance.	I1	23.8	80
80	Information, instruction and training are provided to fishery operatives in the aims and methods of the management system allowing effective management of the system.				
100	Information, instruction and training are provided to fishery operatives in the aims and methods of the management system allowing effective management of the fishery and operatives demonstrate comprehensive knowledge of this information.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3A.8.2		Is surveillance and monitoring in place to ensure that requirements of the management system are complied with?			
60	An enforcement system has been implemented; however, its effectiveness and/or compliance pose a risk of failing to achieve conservation objectives.	National Authorities enforce EC fisheries legislation and report on their activities annually to the Commission. Surveillance of the wider fleet includes use of satellite VMS, patrol vessels and overflights. Inshore vessels are subject to surveillance by SFC patrol vessels. DEFRA and the SSFC follow up shortcomings as appropriate. Compliance appears generally good, and no records of enforcement action have been determined against any Hastings vessels within this fishery.	I3, I4	38.1	90
80	An effective enforcement system has been implemented and there is an appropriate degree of control and compliance.				
100	An effective enforcement system has been implemented and there is a high degree of control and compliance.				

3A.8.3		Can corrective actions be applied in the event of non-compliance and is there evidence of their effectiveness?			
60	Mechanisms exist or are being developed which can be implemented or applied to deal with non-compliance.	Non-compliance is dealt with by DEFRA or the SFC through the UK criminal justice systems using agreed and tested procedures. High levels of compliance within this fishery suggests that this system is effective although evidence suggests issues around DEFRA's enforcement record.	I3, I4	38.1	95
80	There are set measures that can be applied in the event of non-compliance although these may not be included in a formal or codified system.				
100	Agreed and tested corrective actions can be applied in the event of non-compliance.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3 B		Operational Criteria	58.3	88	
Weighting Commentary		Within Criterion 3B, Compliance with the requirements of the management system (3B.5) was given the highest weighting, followed by the adoption of appropriate fishing methods (3B.1) and the provision of data from the fishers to management bodies (3B.6).			
3B.1(MSC Criterion 12)		There are management measures that include practices to reduce impacts on non-target species and inadvertent impacts upon target species.	24.8	90	
3B.1.1		Do management measures, principally through the use of gear and other fishing practices, include avoidance of impacts on non-target species and inadvertent impacts upon target species? These would include by-catch, discard, slippage and high grading.			
60	Measures have been implemented that are intended to reduce the major impacts on non-target species and inadvertent impacts on target species, but their effectiveness is uncertain.	Gear specifications ensure high selectivity. Accordingly, by-catch levels are very low and catches are landed and marketed under the non-sector quota. Sussex SFC by-laws mean that drift nets must be set over 1.5 m below the surface over May to September to prevent by-catch of surface-swimming migrants such as sea trout.	I1, I3, I4, I5	100	90
80	Measures have been implemented to reduce the major impacts on non-target species and inadvertent impacts on target species and there is evidence that they are having the desired effect.				
100	Measures have been implemented to reduce the major impacts on non-target species and inadvertent impacts on target species, and their effectiveness is clearly demonstrated.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3B.2 (MSC Criterion 13)	There are management systems in place that encourage fishing methods that minimise adverse impacts on habitat.		8.5	95
3B.2.1		Do fishing operations implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning or nursery areas?		
60	Fishing operations use measures that significantly reduce major impacts on habitat, especially in critical or sensitive zones such as spawning or nursery areas.	Fishing operations are undertaken to fish in the water column and to avoid contact with the sea bed, although this may occur intermittently and accidentally.	I1, I3, I4	10
80	There is evidence that fishing operations are effective in avoiding significant adverse effects on the environment, especially in critical or sensitive zones such as spawning or nursery areas.			
100	There is direct evidence that fishing operations implement appropriate methods to avoid significant adverse impacts on all habitats.			

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3B.3 (MSC Criterion 14)		The management system incorporates measures that discourage destructive practices.		2.0	100
3B.3.1		Does the fishery employ destructive fishing practices (such as poisons or explosives)?			
60	The fishery does not allow any such destructive fishing practices.	The EC technical conservation regulation prohibits use of explosives, poisonous or stupefying substances or electric current.	13	100	100
80	The fishery does not employ any such destructive fishing practices and enforcement is considered sufficient to prevent their use.				
100	The fishery does not employ any destructive fishing practices. There is a code of conduct for responsible fishing that is fully supported by fishers.				

3B.4 (MSC Criterion 15)		The management system incorporate measures that reduce operational waste.		5.5	90
3B.4.1		Do measures exist to reduce operational waste?			
60	Measures/facilities are in place to reduce sources of operational waste that are known to have detrimental environmental consequences, but further reductions may be possible.	The drift net fishery is a 'day fishery' with all operational waste being landed at Hastings. Also, all boats are dry-berthed on the Stade.	18	100	90
80	Measures/facilities are in place to reduce all sources of operational waste that are known to have detrimental environmental consequences, and there is evidence that they are effective.				
100	Measures/facilities are in place to reduce all sources of operational waste that are known to have detrimental environmental consequences, and there is evidence that they are effective and these measures are supported by the fishers.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3B.5 (MSC Criterion 16)		Fishing operations are conducted in compliance with the management system and legal and administrative requirements.	43.0	88	
Weighting Commentary		The three indicators at this level were considered to be of equal significance.			
3B.5.1		Are fishers aware of management system, legal and administrative requirements			
60	Fishers are aware of key management and legal requirements.	Hastings fishermen are made aware of the management system and any changes in the legal and administrative requirements through their 'umbrella' organisation, the Hastings Fishermen's Protection Society. HFPS has good relations built up locally with DEFRA and SFC.	I1, I3, I4	33.3	85
80	Fishers are aware of management and legal requirements upon them and are kept up to date with new developments.	Whilst this provides sufficient information to allow functioning of the management system, knowledge of all relevant information by fishers appears lacking.			
100	All fishers are aware of management legal requirements through a clearly documented and communicated mechanism such as a code of conduct.				

3B.5.2		Do fishers comply with management system, legal and administrative requirements?			
60	Fishers appear generally compliant with requirements, but there is incomplete information on the actual extent of compliance.	The records show general compliance with all quota, gear and minimum landing size regulations in force.	I3	33.3	90
80	Fishers appear compliant with relevant management and legal requirements and there are no indications of consistent violations.				
100	Fishers are fully compliant with, and fully supportive of, legal and administrative requirements, such as through a code of conduct.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
3B.5.3		What is the record of enforcement of regulations in the fishery: e.g. quota control, by-catch limits, MLS, mesh regulations and closed areas?			
60	There is information on breaches of regulations and on corrective action to prevent or curtail these.	There is no information suggesting any breaches of regulation within the Hastings fleet despite active monitoring by DEFRA and SSFC officers.	I3, I4	33.3	90
80	Evidence of rigorous monitoring of all the enforcement measures and evidence of actions taken in the event of breaches is available.				
100	Strong evidence of rigorous monitoring and control of the enforcement measures through for example satellite monitoring, shipboard observers and nominated landing ports. Strong evidence of firm action taken in the event of breaches is available.				

3B.6 (MSC Criterion 17)	The management system involves fishers in data collection.			16.2	80
3B.6.1		Do fishery operatives assist in the collection of catch, discard and other relevant data?			
60	Fishery operatives are occasionally involved in the collection of catch, discard and other information.	Hastings fishermen have been generally co-operative with regulatory bodies, although specific information requests have not been made in relation to this fishery.	I1, I8	100	80
80	Fishery operatives are regularly involved in the collection and recording of catch, discard and other information.				
100	Fishery operatives assist significantly in the collection and recording of catch, discard and other information.				