

FISHMEAL INFORMATION NETWORK

SUSTAINABILITY DOSSIER

March 2004

The Fishmeal Information Network aims to provide the latest information available about fishmeal and its role in livestock production. A key element of this is the assurance that fishmeal is produced from fish stocks which are properly monitored according to independent scientific advice and managed to ensure that supplies are not over-fished, or from the recycled trimmings from the food fish processing sector.

FIN has put together this dossier of information which summarises recent assessments of the fish stocks used to produce fishmeal. It is based on independent documentary evidence.

An assessment of fish stocks takes into account:

- An estimate of the historical trends in landings, spawning stock biomass, recruitment and fishing mortality rate
- A description of the state of the stock in relation to historical levels
- The likely medium term development of the stock using different rates of fishing mortality
- A short term forecast of spawning stock biomass and catch

The sustainability of fish stocks remains a crucial issue. Feed standards set by food retailers and farm assurance schemes increasingly specify that fishmeal should be derived from sustainable sources. The fishmeal industry is equally concerned to ensure that its raw materials continue to be managed and conserved according to sustainable principles.

This publication is updated annually. This 2004 edition is based on information available to FIN in December 2003.

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FISHMEAL PRODUCTION

Fishmeal is produced almost exclusively from small, bony species of pelagic fish (generally living in the surface waters or middle depths of the sea), for which there is little or no demand for human consumption. Virtually all fishmeal supplies to the UK are sourced from South America (Peru, Chile) and Europe (UK, Denmark, Norway, Iceland).

South America (3 species)

In Peru, anchovy is by far the most important species for fishmeal production, with sardine largely making up the difference. The Chilean fishmeal industry uses anchovy, sardine and jack mackerel.

Europe (7 species)

Seven key species are used to produce fishmeal and fish oil in Europe. These can be divided into three groups:

- a) Not suitable for human consumption (inedible feed grade fish - sandeel, capelin, Norway pout)
- b) Potential use for human consumption but mainly used for fishmeal because of limited outlets for human consumption (blue whiting, sprat).
- c) Primary use is human consumption but any surplus within the Total Allowable Catch (TAC) may be used for fishmeal (herring, horse mackerel).

Fishmeal production also provides a major outlet to recycle trimmings from the food fish processing sector which would otherwise be dumped at extra cost to the environment and the consumer. In the EU the following countries produce fishmeal primarily from trimmings – Spain, France, Germany, Ireland and the UK.

UK fishmeal summary 2002 (tonnes)

UK consumption	240,000
Imports from EU	35,000
Imports from non-EU	155,000
UK production	50,000

UK fishmeal summary 2003 (tonnes)

UK consumption	231,500
Imports from EU	31,500
Imports from non-EU	152,000
UK production	48,000

World fishmeal production 2002 (tonnes)

Peru	1,941,000
Chile	839,000
China	460,000
Japan	225,000
Thailand	387,000
USA	337,000
Denmark	311,000
Iceland	304,000
Norway	241,000
Rest of the World	1,169,000
*Total world	6,214,000

*Source - IFFO

QUICK SUMMARY

STATUS OF FISH STOCKS USED FOR FISHMEAL PRODUCTION

	% world feed fish catch – IFFO source	Whether used for human consumption	Commentary on status of fish stocks at December 2003	Source of info
SOUTH AMERICA				
Anchovy	57	Very small amount for human consumption. Majority used for fishmeal.	Biomass increasing following 97/98 El Nino. Controlled by licensing, satellite tracking, closed seasons, min land'g size.	FAO/IMARPE
Jack mackerel	7	Used for human consumption (Africa). Majority used for fishmeal.	Biomass increasing following 97/98 El Nino. Controlled by company catch limits, satellite tracking, closed seasons.	FAO/IMARPE
Sardine	2	Primarily used for human consumption, very small amount for fishmeal.	Closed seasons, company catch limits.	FAO
EUROPE				
Capelin	10	Roe used for human consumption. Frozen capelin for specific markets. Mainly used for fishmeal.	Icelandic stock – healthy. Barents Sea – outside safe biological limits – no fishing recommended.	ICES
Blue Whiting	7	Potential use for human consumption although there are processing difficulties. Mainly used for fishmeal.	Stock classified as likely to be harvested outside safe biological limits. 1999, 2000 and 2001 year classes seem to be strong but biomass is expected to decline at present level of fishing mortality.	ICES
Sandeel	5	Not used for human consumption.	Uncertainty about current state of stock. Advice to manage stock through capacity control and localised conservation methods.	ICES
Sprat	2	Potential uses for human consumption but mainly used for fishmeal.	Stock in good condition.	ICES
Herring	1	Primarily used for human consumption, but surplus or non-food grade may be used for fishmeal.	There are a number of herring stocks. All are within safe biological limits. Status of spring spawners in the North Sea uncertain but spawning stock biomass has been increasing over last 4 years and incoming 2002 class above average.	ICES
Norway pout	1	Not used for human consumption.	Within safe biological limits.	ICES
Horse mackerel	3	Primarily used for human consumption, but surplus may be used for fishmeal.	State of stock not known. Expansion of the fishery not recommended.	ICES
USA (only fished in the USA)				
Menhaden	5	Not used for human consumption.	Only fished in USA – within safe biological limits.	US Govt

GENERAL OVERVIEW

This note updates the January 2003 FIN Sustainability Dossier, drawing on the latest evidence from independent bodies such as the United Nation's Food and Agriculture Organisation (FAO) and the International Council for the Exploration of the Sea (ICES). A FIN fact sheet, '*Fishmeal from Sustainable Sources*', summarising the key points from this dossier is also available.

General FAO summary for ALL fish species

The mission of the Fisheries Department of the FAO is to facilitate and secure the long-term sustainable development of the world's fisheries and aquaculture. Their global view of capture and aquaculture fisheries entitled 'State of World Fisheries and Aquaculture' is published every two years. The latest 2002 edition was issued in March 2003.

The overall conclusion of this current FAO report assessing the status of ALL fish species, the majority of which are landed only for human consumption, follows the general trend observed in recent years. Overall, as fishing pressure continues to increase, the number of underexploited and moderately exploited fisheries resources continues to decline slightly, the number of fully exploited stocks remains relatively stable and the number of overexploited, depleted and recovering stocks is increasing slightly.

Managing fish stocks generally

- The fishmeal industry continues to support independent fish stock management, the implementation of TACs and effective control measures to conserve its raw materials.
- The information contained in this dossier supports FIN's continued assurance that fishmeal is produced from fish stocks which are properly monitored according to independent scientific advice and managed to ensure that supplies are not over-fished, or from the recycled trimmings from the food fish processing sector.
- Where there are concerns, as in the case of blue whiting, special consideration is given to fishing levels. According to ICES (2003) the stock situation has improved but blue whiting is being harvested outside safe biological limits. In principle agreement has been reached for a long-term management plan consistent with a precautionary approach including sharing out the quota among the main fishing nations.
- Where there is temporary uncertainty about the stocks, as is currently the case with sandeel, horse mackerel and spring spawning herring in the North Sea, steps are being taken to limit the fishery. This will allow time to gather more information about the structure of the stocks to facilitate an adequate assessment.

- The table below provides an overview of controls observed by the principal suppliers:

Management and control of the fish stocks used to produce fishmeal

SPECIES	Total Catch Limits	Area Catch Limits	Minimum Mesh Sizes	Fleet Capacity Controls	Closed Areas*	Seasonal Bans	Minimum Landing Sizes	ITQ System**
Anchovy	✓	✓	✓	✓	✓	✓	✓	✓
Sardine	✓	✓	✓	✓	✓	✓	✓	✓
Jack mackerel	✓	✓	✓	✓	✓	✓	✓	✓
Horse mackerel	✓	✓	✓	✓	✓	✓	✓	✓
Sandeel	✓	✓	✓	✓	✓	✓		
Sprat	✓	✓	✓	✓	✓	✓		
Norway pout	✓	✓	✓	✓	✓			
Blue whiting	✓		✓					
Capelin	✓	✓	✓	✓	✓	✓	✓	✓
Herring	✓	✓	✓	✓	✓	✓	✓	✓

*The closed areas for anchovy and sardine are now enforced by satellite tracking in Peru and Chile. ** Individual Transferable Quota in certain countries

Note - All EU community fishing vessels, exceeding 20 metres, have since January 2000 been equipped with satellite based vessel monitoring systems (VMS), as well as third country vessels of the same size operating in Community waters. VMS is being applied progressively in bilateral fisheries agreements ie EU/Norway, EU/Faroe Islands and in the framework of Regional Fisheries organisations like NEAFC.

For more detail on the status of each of the fish stocks used for fishmeal production see:

Anchovy and jack mackerel	Page 7-9
Sandeel	Page 10-12
Norway pout	Page 12
Sprat	Page 12
Capelin	Page 13
Horse mackerel	Page 13
Blue whiting	Page 13-14
Herring	Page 14-15

This dossier focuses the sustainability of the fish stocks used in the production of fishmeal. The fishmeal and oil sector acknowledges that in the long term there has to be progress towards holistic sustainability targets with the inclusion of more ecosystem based approaches to fishery management, in line with the Johannesburg commitments for all fisheries management

Fishmeal and oil producers accept the need to play their part in collecting appropriate information and supporting this process.

SOUTH AMERICAN OVERVIEW

The status of fish stocks used by the South American fishmeal industry are detailed in the latest published version of the biennial FAO *State of World Fisheries and Aquaculture 2002* (published March 2003) and in national Government statistics.

Anchovy and jack mackerel in Peru and Chile

El Nino

In South America attention has been focused on the environmental fluctuations on fish stocks caused by the 1997-8 El Nino phenomenon. In an El Nino year, warm water currents are driven down the Pacific coast of Peru and Chile, forcing fish deeper and further out into the ocean in search of food and a cooler environment. This caused a severe decline in biomass and total production of small schooling pelagics, as well as other coastal resources.

Fishmeal production was clearly affected by the El Nino. Production in Peru and Chile was sharply down. The Peruvian Ministry of Fisheries reported that total catches of anchovy and other species used for fishmeal production were 7m tonnes in 1997 and down to 3.7 m tonnes in 1998. The same can be seen in Chile where the Under Secretariat of Fisheries states total catches of anchovy and jack mackerel were 6.4 m tonnes in 1997 and 3.6 m tonnes in 1998.

To alleviate the effects of El Nino a precautionary approach to fisheries management has been maintained to safeguard the viability and prevent depletion of stocks through over-fishing. Careful management of the fishery and a return to normal environmental conditions allowed stocks to recover.

The National Oceanic and Atmospheric Administration (NOAA) of the USA are predicting nearly normal conditions during the first quarter of 2004.

Peru in 2002

Peruvian anchoveta (anchovy) is a short-lived species and according to FAO post-El Nino recovery of anchoveta stocks has been surprisingly fast. In Peru total catch levels were 7.8 million tonnes in 1999, up to 9.7 million in 2000 (the largest single species catch), and 8 million tonnes in 2001 and 2002.

Peruvian fishmeal production in 1999 was 1.9 million tonnes, more than twice the 1998 level of 815,000 tonnes representing a return to normal levels. This increased to 2.3 million tonnes in 2000, was 1.8 million tonnes in 2001 and increased to 1.9 million tonnes in 2002.

Chile in 2002

Anchoveta catches in Chile during 2002 were 1.5 million tonnes, representing an increase from the 2001 figure, when 852,000 tonnes were landed in Chilean ports.

Jack mackerel however in Chile has not shown the same fast signs of recovery as anchoveta according to FAO. Catches in 2002 were 1.4 million tonnes. Catches had been steadily increasing from 1.24 million tonnes in 1999 and up to 1.65 million tonnes in 2001.

Sardine (*Clupea*) in 2002 were 310,000 tonnes, which is nearly the same amount as landed in 2001 (325,000 tonnes). This is in contrast with 782,000 tonnes in 1999 and 723,000 tonnes in 2000.

In addition since 2001 horse mackerel have begun to show in large quantities. In 2001, 290,000 tonnes were landed, and 323,000 tonnes in 2002.

Total catches of pelagic fish used in the fishmeal industry in Chile have moved from 4.5 million tonnes in 1999 to 3.7 million tonnes in 2000, 3.2 million tonnes in 2001 and 3.5 million tonnes in 2002. This is mainly due to a reduction in TACs imposed by the Chilean Government.

Total fishmeal production was 1 million tonnes in 1999, 877,000 tonnes in 2000, 778,000 tonnes in 2001 and 800,000 tonnes in 2002.

To preserve stocks the Under Secretary of Fisheries with the approval of the National Fisheries Council in Chile has responded with a number of monitored control measures based on acoustic assessments of fish stocks. The Chilean government regularly introduces temporary fishing bans throughout the year, mainly to protect spawning activity and recruitment periods. To 'even-out' fishing between these temporary bans legislation has now been introduced which will introduce quotas for each licensed fishing company according to its average catch over the last two years and its storage capacity.

Government controls

This section lists some of the steps that are taken by national governments to strictly monitor and control commercial fishing in Peru and Chile.

Peru

- A major development in Peru is that all fishing boats operating outside the 5 mile limit are now fitted with a satellite tracking system which allows the government to monitor the position of all boats at any given time.
- The Peruvian government imposes closed fishing seasons, closed entry of new fishing boats, and vessel licences to fish within the 200 mile limit.

- Limits on the minimum size of fish that can be landed with local short term fishing closures if the level of small fish exceed the number allowed.
- Fishing stops during February and March to protect the growth of anchovy and sardine juveniles.
- A fishing ban from August to October to protect the spawning stock.
- To assess the environmental status of fish stocks (mainly anchovy) IMARPE launched a hydro-acoustic evaluation of pelagic resources along the entire Peruvian coastline in February 2002.

Chile

- The Chilean Government undertakes regular monitoring surveys to establish the state of the fishery resources, and uses the results of these surveys to set the control measures required to protect the stocks.
- The Chilean Government has introduced legislation to establish a maximum annual total catch limit for each species declared in full exploitation for each owner of a boat or group of boat owners.
- Closed seasons for anchovy and sardine are set on an annual basis to protect the spawning stocks between August and September of each year in the northern part of the country. Closed seasons are also imposed during December to mid January to protect the recruitment process of anchovy.
- In the central-southern part of the country closed seasons are set for anchovy and sardine to protect the spawning period (usually July and August) and also from mid-December to mid-January.
- For jack mackerel several fishing bans have been imposed during the year to protect small-sized fish. Although minimum landing sizes are applied. These measures reinforce controls to protect stock recruitment.
- All fishing boats are fitted with a Satellite Tracking System to assure that boats do not operate outside non-prohibited areas (such as designated areas of recovery) or the zone reserved for small artisanal fisheries (first five miles offshore).

NORTH SEA & NORTH EAST ATLANTIC OVERVIEW

Information relating to the status of stocks of the seven main species caught for fishmeal production in the North Sea and North East Atlantic is taken from the latest reports provided by the FAO and ICES. These include the FAO's *State of World Fisheries and Aquaculture* (2002) and reports of the ICES Advisory Committee on Fishery Management (these are now issued in May and October each year.)

1. Sandeel

ICES states that for 2003 it is uncertain about the state of the total sandeel stock within the North Sea and so is advising that the fishery is managed through effort and capacity control. Once the strength of the incoming class has been evaluated appropriate adjustments can be made.

Reflecting this the EU Fisheries Council in December 2003 agreed a Total Allowable Catch (TAC) of 679,400 tonnes for sandeels in the North Sea for 2004, a 10% reduction on the 863,000 tonnes figure agreed for 2003, which in turn was a reduction on the 918,000 tonnes agreed for 2002. All are lower than the 1 million tonne TAC set in 1999 and 2000.

There are a number of instances where a joint approach has been adopted to manage North Sea sandeel stocks, both as a raw material for fishmeal production and as a food source for other fish and marine species. These are detailed below:

A. DEFRA study

DEFRA funded a three-year scientific investigation by CEFAS which includes an assessment of the affect of the sandeel fishery on the fish stocks that feed on sandeels. The final report entitled '*Multispecies fisheries management: a management procedure for North Sea sandeels*' was completed in March 2002 and is available on the Defra website. The study found no statistically significant evidence that the industrial fishery was having any impact on kittiwake breeding success. As kittiwakes are one of the most sensitive indicators of sandeel availability it is unlikely breeding success of other species had been affected by fishing activity.

This investigation focused on the kittiwake breeding at Bempton. Kittiwakes were selected as the test species due to their dependency on sandeels. An area of the North Sea, extending out from the Yorkshire coast towards the Dogger Bank was selected to encompass the foraging ranges of seabirds from the Bempton colony (north of Bridlington).

B. Sandeel as a food source for other fish

A new ICES report (June 2003) on the *Ecosystem Effects of Fishing Activities* has concluded that the impacts of industrial fishing that have been identified are relatively small in comparison to the effects of directed fisheries for human consumption, and that the indirect (food web) effects of North Sea industrial fishing appear to be relatively small.

A previous report, prepared by the Danish Ministry for the EU Parliament in October 2001, looked at the *Ecological Effects of the North Sea Industrial Fishing Industry on the Availability of Human Consumption Species* and concluded industrial fisheries took 20% or less of the annual production of the industrial species and that surplus production of sandeel is not fully utilised. There was no evidence to support the view that the cod fishery was limited by sandeel availability.

C. Sea Birds and other predators

The sandeel population is estimated to provide one third of the food taken by sea birds in the North Sea. The latest ICES report on the *Ecosystem Effects of Fishing Activities* comments on the intensively studied seabird-sandeel interactions in the Shetlands. Seabirds in this area are entirely reliant on sandeels during the breeding season. The report has concluded that fisheries were unlikely to be the direct cause of the decline in sandeel abundance as the availability of sandeels was primarily driven by recruitment variation.

The ICES report has indicated that whilst black-legged kittiwakes in the region showed an increase in breeding success comparable to pre-fishery levels, kittiwake chick productivity did not respond primarily to sandeel abundance and it was difficult to determine whether this recovery was due to the fishing cessation or climatic changes.

This is supported by Professor Robert Furness of the University of Glasgow. In his paper, *Management implications of interactions between fisheries and sandeel-dependent seabird and seals in the North Sea*, he indicates that predatory fish, such as herring and mackerel, take far more sandeel than taken by the industrial fishery or wildlife.

Despite this advice as an extra assurance a joint approach to fisheries management has been adopted in two precautionary initiatives:

1. North Sea

In a precautionary move in 2000 the EU Council prohibited fishing for sandeels in a 20,000 km² band of the North Sea off the Firth of Forth and Grampian Coast as a safeguard for seabird colonies. These arrangements were renewed in 2001 for another three years. The April to August closure in an area off the east coast of Scotland covers the period when kittiwake, puffin, gannet and other species use the sandeel to feed their chicks. The

EU advised that during the period of closure a very limited commercial monitoring be conducted, not to exceed 10 boat-days in each of May and June. The thresholds to close and re-open the sandeel fisheries in areas important for foraging by the kittiwake colonies are based on using 0.5 and 0.7 fledged chicks per well-built nest respectively.

2. Shetland

A voluntary agreement reached in 1998 between the Shetland fishmeal industry and local conservation groups demonstrates how commercial and environmental interests can be sustained through an integrated approach to fish stock management and conservation.

A yearly quota of 7,000 tonnes is applied to the sandeel fishery off the coast of Shetland. Fishing would normally continue uninterrupted from April onwards. For the first time it was agreed to stop fishing during June and July to protect food supplies for the breeding seabird population. There is also a limit on vessel size to boats of 20 metres or less. These arrangements were renewed in 2001 for another three years.

An assessment of fish stocks was carried out in both 2000 and 2001 by ICES based on survey data. Because fishing mortality appears to be very low compared with natural mortality, the assessment uses a model to estimate total mortality. It is natural processes which largely drive stock variations. Landings in 2000 were 4,871 tonnes, dropped to 1,264 tonnes in 2001 and dropped further to 543 tonnes in 2002. This is substantially lower than the TAC of 7,000 tonnes.

2. Norway pout

The Norway pout stock in 2003 is considered by ICES to be within Safe Biological Limits and can sustain current fishing mortality. Recruitment is highly variable and influences stock biomass rapidly due to the short life span of the species. Recruitment has been low within the last three years. Fishing mortality has generally been lower than the natural mortality.

At the EU Fisheries Council in December 2003 a TAC of 173,000 was agreed for the North Sea for 2004 (exactly the same figure as set for 2003). This compares with 198,000 tonnes agreed for 2002 and 211,200 set for 2001. The issue of by-catch in the Norway pout fishery has been acknowledged and is being addressed in research projects being undertaken in Denmark and the UK.

3. Sprat

ICES states the sprat stock in 2003 is in good condition, although status cannot be evaluated relative to safe biological limits because reference points have not been set. There are signs of a good 2002 year class recruiting to the 2003 fishery.

At the EU Fisheries Council in December 2003 a TAC of 284,250 tonnes was agreed for the North Sea and Skagerrak/Kattegat in 2004 (slightly less than the 286,250 tonne quota agreed for 2003). This compares with the 307,000 tonnes agreed for 2002, 282,000 tonnes for 2001 and 275,000 for 2000.

4. Capelin

The stock is managed commonly by Iceland, Norway and Greenland, There are two capelin stocks – Barents Sea capelin and Icelandic capelin. According to the Icelandic Ministry of Fisheries the Icelandic capelin stock is healthy. ICES reported in October 2003 that the Barents Sea capelin is currently considered outside safe biological limits and has accordingly recommended that no fishing take place in 2004.

There are two fishing seasons, the main season is January-April, fishing mainly 3-4 year old capelin and the season in the second half of the year for 2-3 year old capelin. The quota for any season is based on that year class. An initial quota is given in June but it is subject to revaluation after research results are available in October and January. During the fishing year 2001/2002 the capelin catch in Iceland was 1,250,000 tonnes. On a calendar year basis the landings by Icelandic vessels were 1,080,000 tonnes in 2002.

The initial TAC for the 2003/2004 seasons that started in the summer of 2003 was set at 555,000 tonnes (360,000 tonnes for Iceland) pending further assessment during the winter. This is in line with scientific recommendations. This is lower than the initial TAC for the 2002/2003 Icelandic capelin season that started in the June 2002, which was set at 690,000 tonnes (410,000 tonnes for Iceland).

5. Horse mackerel

The present state of the North Sea horse mackerel stock is not known. Catches have been increasing in recent years, reaching highs in 2000 of 48,000 tonnes and 46,000 tonnes in 2001. The catch in 2002 was 50% lower than the highest 2000 catch.

At the EU Fisheries Council in December 2003 a total TAC of 36,248 was agreed for 2004 for the North Sea and all areas where North Sea horse mackerel are fished. The quota was 41,667 in 2003 and 58,000 tonnes in 2002.

6. Blue whiting

Blue whiting, whilst it is widely distributed in the eastern North Atlantic is treated as one stock. Its distribution extends from the Straits of Gibraltar to the Barents Sea. The fishery is made up of several populations which are fished by the EU, the Faroe Islands, Greenland, Iceland, Russia and Norway, which together with Poland form the North-East Atlantic Fisheries Commission (NEAFC).

Blue whiting stocks are receiving special consideration at the moment and according to ICES the stock situation has improved. The ICES Northern Pelagic and Blue Whiting Fisheries Working Group reported in May (2003) that the current estimates of fishing mortality are uncertain with conflicting signals in catch and survey data. Even though the 1999, 2000 and 2001 year classes seem to be strong ICES classifies the stock as likely to be harvested outside safe biological limits with a consequent decline in the stock biomass. Total landings in 2002 were almost 1.6 million tonnes.

The members of NEAFC, recognising the urgent need to establish conservation measures for the entire blue whiting stock, have agreed in principle to implement a long-term management plan consistent with a precautionary approach. This will ensure that the catch is limited to a sustainable level, is applied to all areas in which blue whiting is fished and is shared out among the main fishing nations. The agreed management plan has not been implemented yet.

ICES has recommended that for 2004 the catch should not exceed 925,000 tonnes to sustain stocks. This corresponds to 600,000 tonnes in 2003.

7. Herring

The herring stock is spread across a number of fishing divisions. Herring stocks are fished by two types of operations and by a number of different fleets

7.1 Herring in the North Sea - In the North Sea herring stocks are divided into autumn and spring spawners for which ICES makes separate assessments. Autumn spawning stock is considered by ICES to be inside safe biological limits. The spawning stock was estimated at 1.6 million tonnes in 2002 and is expected to increase to 2.2 million tonnes in 2003. Both the 1998 and 2000 classes are very strong but the incoming 2002 class could be weaker. Although there is uncertainty about spring spawners, spawning stock biomass has been increasing over the last four years and the incoming 2002 class appears to be above average.

The EU Fisheries Council in December 2003 agreed a TAC for autumn spawning herring of 326,600 tonnes for 2004 (for areas IVc, VIId and the North Sea north of 53° 30 Mins N), a 15% increase on the 284,000 tonne quota set for 2003. The quota for 2002 and 2001 was 265,000 tonnes.

A second (much smaller fishery) in the North Sea and Skagerrak takes some of the juvenile stock as a by-catch in the small mesh industrial fishery for sprat. This was formalised in 1998 in a new Council Regulation which specified the conditions under which certain stocks of herring could be landed for industrial purposes (eg fishmeal production). Herring landed as a by-catch has been managed by a catch ceiling since 1996.

A TAC of 36,000 tonnes was agreed for 2000 for the industrial by-catch (used for fishmeal) in the North Sea. For 2001 this was set at 34,450, was maintained in 2002 and increased to 51,693 tonnes for 2003. For 2004 the new TAC is 36,377 tonnes. A TAC of 7,950 tonnes was set for Skagerrak/Kattegat in 2002 and 2003, and has been maintained for 2004.

There are three separate stocks of herring found in Icelandic waters and the North-east Atlantic which differ in rate of growth, time of spawning and migration patterns.

7.2 Herring in Icelandic waters – The first, Icelandic spring spawning herring, with very low abundance and the second, Icelandic summer spawning herring, are both considered by ICES to be inside safe biological limits. A TAC of 105,000 tonnes was set for the 2002/2003 fishing year from 1 Sept to 31 August in line with recommendations of the Marine Research Institute.

7.3 Herring in the North-east Atlantic – The third stock, Norwegian spring spawning herring (Atlanto Scandian herring), is considered by ICES to be within safe biological limits. The fishery is shared between Norway, Iceland, Russia, Faroe Islands and the EU. The fishing nations agreed to maintain fishing mortality at or below 1.125 million tonnes from 2002. This is in line with ICES advice of a total catch of 825,000 tonnes in 2004 (710,000 tonnes in 2003 and 850,000 tonnes in 2002).

DOCUMENTARY EXTRACTS

For ease of reference, relevant extracts have been reproduced verbatim from the cited documents in support of the FIN summary and are presented in date order (the most recent first). Copies of the original documents are available on request from FIN.

Extracts

1. **EU Council Regulation of 17 – 19 December 2003**– setting TAC's for 2004 in the North Sea and surrounding area,
2. **Responsible Fisheries – Icelandic Ministry of Fisheries, August 2002** - statement on capelin stocks.
3. **Report by CEFAS, December 2003** – North sea Multi-species management
4. **Report of the ICES Advisory Committee on Fishery Management, May and October 2003** extracts from ICES latest assessment of North Sea industrial stocks and by-catch levels.
5. **ICES Report, June 2003** – Ecosystem effects of fishing activities.
6. **ICES Report, 2003** – Environmental Status of the European Seas.
7. **Common Fisheries Policy Reform, December 2002** – looks at industrial fishing within the CFP.
8. **UN FAO State of World Fisheries and Aquaculture, March 2002** - relevant extract detailing FAO's independent assessment of the status of fish stocks off the Pacific Coast of Latin America.
9. **Extract from paper by Professor Furness, October 2001** – interactions between sandeel-dependent seabirds and seals in the North Sea.
10. **Extract from Danish Ministry report for the EU Council, October 2001** – fishery for industrial species in Denmark.
11. **UN FAO State of World Fisheries and Aquaculture 2000** - relevant extract detailing FAO's independent assessment of the status of fish stocks off the Pacific Coast of Latin America.
12. **Letter from Royal Ministry of Fisheries of Norway (26 June 2000)** regarding resource management to maintain North Sea stocks.
13. **MAFF news release (14 December 1999)** announcing the MAFF response to the proposal for a closed season for sandeel fishing in a section of the North Sea off the Firth of Forth and Grampian Coast as a precautionary safeguard for seabird colonies.
14. **Map showing the sandeel closed area issued by MAFF (December 1999)** the section of the North Sea off the Firth of Forth and Grampian Coast as a precautionary safeguard for seabird colonies.
15. **Extract from the 1999 Report of the Advisory Committee on the Marine Environment on Sandeel/Seabird Interaction (June 1999)** uses kittiwake breeding success as a measure of sandeel availability and proposes the closure of the sandeel fishery west of 1°W in sandeel Area 3.
16. **Letter from the Danish Fisheries Department (19 June 1996)** outlining the Danish Government's commitment to sustainable management of fish stocks.

Extracts on file and available on request:

Report of the ICES Advisory Committee on Fishery Management, 2001 - extracts from ICES latest assessment of North Sea industrial stocks and by-catch levels.

Report of the ICES Advisory Committee on Fishery Management, 2000 – extracts from ICES latest assessment of North Sea industrial stocks and by-catch levels.

Written question E-1583/99 by Glyn Ford (PSE) to the Commission (1 September 1999) published in the Official Journal of the European Communities 29 January 2000 – regarding 'green' fishmeal.

Report of the ICES Advisory Committee on Fishery Management, 1999 - extracts from ICES latest assessment of North Sea industrial stocks and by-catch levels.

Review of The State of World Fisheries and Aquaculture 1998 - relevant extracts from the United Nations Food and Agriculture Organisation (FAO) independent assessment of the status of fish stocks.

New EU Council Regulation (EC) No 1434/98 dated 29 June 1998 specifies a change to the herring fishery in the Baltic with conditions under which herring can now be landed for industrial purposes other than direct human consumption.

Review of the State of World Fishery Resources 1997 - relevant extracts from the United Nations Food and Agriculture Organisation (FAO) - independent assessment of the status of fish stocks off the Pacific Coast of Latin America (FAO Statistical Area 87).

Extract from the ICES Advisory Committee on Fishery Management report presented to the Govt of Denmark May 1997 - ecological effects of the North Sea Industrial Fishing Industry on the availability of human consumption species.

Extract from a Scottish Office press release dated 19th December 1997 reporting on the December Fisheries Council quoting Scottish Fisheries Minister, Lord Sewel – detailing the new herring management arrangement recently negotiated with Norway as a model of responsible management imposing tighter controls on various industrial fisheries, and encouraging longer term, sustainable fishing. For the first time this introduced a Total Allowable Catch (TAC) for sandeels in the North Sea.

Letter from the Icelandic Ministry of Fisheries dated 24 June 1997 regarding the management of capelin and herring stocks in Icelandic waters - This statement of basic principle is updated by the Icelandic Ministry of Fisheries each year.

EXTRACTS

Extract 1

EU Council Regulation of 17 - 19 December 2003– setting TAC's for 2004 in the North Sea and surrounding area.

Fixing for 2004 the fishing opportunities and associated conditions for certain fish stocks and groups of fish stocks, applicable in community waters and, for community vessels, in waters where limitations in catch are required and temporary measures for the recovery of some cod stocks.

Extract 2

Responsible Fisheries – Icelandic Ministry of Fisheries. December 2003. Statement of principle.

General

The Ministry of Fisheries aims at achieving sustainable utilisation of marine resources and basing management decisions on the best available scientific grounds. Every effort shall be made to preserve the biodiversity and ecosystem of the ocean. Government decisions shall show regard for the obligation of each generation to pass on to its descendants a viable environment and for the duty of nations to protect marine life and the ecosystem but also for the importance of providing wholesome products for consumer of Icelandic seafood.

Capelin

Capelin is caught by capelin purse seine and it is presently the largest fish stock in Icelandic waters. There are two fishing seasons, the main season is January-April, fishing mainly 3-4 year old capelin and the season in the second half of the year for 2-3 year old capelin. The fishable stock (2+) in late summer 2003 was estimated at 1.4 – 1.5 million tonnes.

.....Fishing is shared between Iceland, Norway, Faroe Island and Greenland by special agreement but by far the largest quantities are fished by Iceland. Landings by the Icelandic fleet in the 2002 summer season were 180,000 tonnes and in the 2003 winter season they were 585,000 tonnes. On a calendar year basis the landings by Icelandic vessels were 1,080,000 tonnes in 2002.

The initial TAC for the 2003/2004 seasons that started in the summer of 2003 has been set at 360,000 tonnes pending further assessment during the coming winter. This is in line with scientific recommendations.

In 2002

The fishable stock (2+) in 2001 was estimated at 1.6 – 1.7 million tonnes.

.....Fishing is shared between Iceland, Norway, Faroe Island and Greenland by special agreement but by far the largest quantities are fished by Iceland. Landings by the Icelandic fleet in the 2001 summer season were 134,000 tonnes and in the 2001/02 winter season they were 781,000 tonnes. On a calendar year basis the landings by Icelandic vessels were 920,000 tonnes in 2001.

The initial TAC for the 2002/2003 seasons that started in the summer of 2002 has been set at 410,000 tonnes pending further assessment during the coming winter. This is in line with scientific recommendations.

See: www.fisheries.is

Extract 3

CEFAS 3-year study 'Multispecies fisheries management: a management procedure for North Sea sandeels 1999 to 2002' commissioned by Defra and completed March 2002. Published on the Defra website December 2003.

In response to a question on the impact of industrial fishing on fish stocks and the UK fishing industry in the House of Commons (9 January 2001), Mr Morley stated that sandeel stocks fluctuate considerably due to natural causes and that MAFF was funding a three-year scientific investigation by CEFAS. This would include an assessment of whether the sandeel fishery affects fish stocks that feed on sandeels.

Kittiwakes breeding at Bempton were selected as a test species due to their dependency on sandeels established by previous studies at Shetland and the Firth of Forth.....This study has found no statistically significant evidence that the industrial fishery on the Dogger Bank is impacting kittiwake breeding success. This result is relevant to policy, albeit based on a short time series. Kittiwakes are one of the most sensitive indicators of sandeel availability, so it is unlikely that, using current available data, signals from the Dogger Bank fishery would be found in other species.

Extract 4

Report of the ICES Advisory Committee on Fishery Management, May and October 2003 extracts from ICES latest assessment of North Sea industrial stocks and by-catch levels.

(ICES now publishes advice on fish stocks twice a year in May and October. In May new advice is published on sprat, blue whiting and herring. In October new advice is published on sandeel, Norway pout, North Sea horse mackerel and Barents Sea capelin.)

ICES STOCK BY STOCK ASSESSMENT

SANDEEL

Sandeel (Sub-area IV)

State of stock/exploitation October 2002

The stock is within safe biological limits. SSB in 2002 is estimated to be just above biomass precautionary approach. No fishing mortality reference points have been set for this stock. The 2001 year class is estimated to be the strongest in the time-series.

State of stock/exploitation October 2003

The state of the stock is uncertain. The 2001 class still appears to be abundant and the 2002 class is estimated to be extremely weak..... ICES is unable to provide predictions that can be used for TAC setting for 2004. The fishery should therefore be managed through effort and capacity control.

Sandeel (Sub-area IV)

Advice on management October 2002: ICES recommends that fishing mortality should not be allowed to increase because the consequences of removing a larger fraction of the food-biomass for other biota are unknown. Local depletion of sandeel aggregations by fisheries should be prevented, particularly in areas where predators congregate.

Advice on management October 2003:

The exploitation at the beginning of the 2004 sandeel season should be kept below the exploitation in 2003. This restriction should apply until the strength of the incoming year has been evaluated, at which time appropriate adjustment in management can be advised.

Sandeel (Sub-area IV)

Relevant factors to be considered in management October 2002: The stock can sustain current fishing mortality. Sandeel are important prey species for many marine predators. The fishing mortality is lower than the natural mortality....in the light of studies linking low sandeel availability to poor breeding success of kittiwakes, ICES advised for 2000 a closure of the sandeel fisheries east of Scotland... for three years with an evaluation every year.

Relevant factors to be considered in management October 2003:

Local depletion of sandeel aggregations by fisheries should be prevented, particularly in areas where predators congregate.

Sandeel (Shetland area)

State of stock/exploitation October 2002

Safe biological limits have not been defined for this stock. It is believed that fishing mortality is well below natural mortality. This means that natural processes largely drive stock variations. Landings in 2001 were 1,246t, substantially lower than in 2000, and below the TAC of 7,000 t.

State of stock/exploitation October 2003

Safe biological limits have not been defined for this stock. It is believed that fishing mortality is well below natural mortality. This means that natural processes largely drive stock variations. Landings in 2002 were 543t, substantially lower than in 2001 and below the TAC of 7000t.

Sandeel (Shetland area)

Relevant factors to be considered in management October 2002: ICES suggested in October 2001 that the management plan be evaluated before the agreed end date. The evaluation has been carried out and all interest groups have agreed to the continuation of the current measures.

Relevant factors to be considered in management October 2003

ICES suggested in October 2001 that the management plan be evaluated before the agreed end date. The evaluation has been carried out and all interest groups have agreed to the continuation of the current measures. An update of the assessment for this stock is required for 2004.

NORWAY POUT

Norway pout (Sub-area IV – North Sea and Division IIIa – Skagerrak and Kattegat)

State of stock/exploitation October 2002

The stock is within safe biological limits. Recruitment is highly variable and influences stock biomass rapidly due to the short life span of the species. Fishing mortality has generally been lower than the natural mortality and fishing mortality has generally decreased in recent years to well below the long-term average....

State of stock/exploitation October 2003

Based on the most recent estimate of SSB and fishing mortality ICES classifies the stock as being inside safe biological limits. Recruitment is highly variable and influences stock biomass rapidly due to the short life span of the species. Recruitment has been low within the last three years. Fishing mortality has generally been lower than the natural mortality.

Norway pout (Sub-area IV – North Sea and Division IIIa – Skagerrak and Kattegat)

Advice on management October 2002: The stock can sustain current fishing mortality.

Advice on management October 2003: The stock can sustain current fishing mortality. In managing this fishery, by-catches of other species should be taken into account. Existing measures to protect other species should be maintained.

SPRAT

Sprat in the North Sea (Sub-area 1V)

State of stock/exploitation March 2002

The sprat stock shows signs of being in good condition, as the biomass seems to be stable and relatively high. There is an indication from the IBTS (February) 2002 survey of a good 2001 year class recruiting to the 2002 fishery (the age-1 index in 2002 was among the highest observed).

State of stock/exploitation May 2003

The sprat stock is in good condition, although status cannot be evaluated relative to safe biological limits because reference points have not been set. There is an indication.....of a good 2002 year class recruiting to the 2003 fishery.

Sprat in the North Sea (Sub-area 1V)

Advice on management March 2002:

For this stock only in-year advice is available. Based on the historic relationship between survey and catch, the 2002 survey value indicates that a catch of 160,000 tonnes in 2002 would allow the SSB to remain stable or increase.....the sprat fishery in 2002 may be restricted by the existing limit placed on the allowable by-catch of herring, rather than by the actual sprat TAC.

Advice on management May 2003:

For this stock only in-year advice is available. The 2003 TAC is set 257,000 tonnes. The information available suggests that with this catch the SSB will remain near or above the long-term average.

NORTH SEA HORSE MACKEREL

North Sea Horse Mackerel (Division IIIa – eastern part, Divisions Ivb, c, VIId)

State of stock/exploitation October 2002

The state of the stock is not known. There is no recent quantitative information on stock size. Catches have been increasing in recent years.

State of stock/exploitation October 2003

The state of the stock is unknown. Catches have been increasing in recent years except for 2002 which was 50% lower than the highest catch on record in 2001.

North Sea Horse Mackerel (Division IIIa – eastern part, Divisions Ivb, c, VIId)

Advice on management October 2002

ICES recommends that catches in 2002 be no more than the 1982-1997 average of 18,000 tonnes, in order to avoid an expansion of the fishery until there is more information about the structure of horse mackerel stocks, and sufficient information to facilitate an adequate assessment...the 1998 year class appears to be abundant in the landings in recent years and may be a relatively strong year class.

Advice on management October 2003

ICES recommends that catches in 2004 be no more than the 1982 -1997 average of 18,000 tonnes, in order to avoid an expansion of the fishery until there

is more information about the structure of horse mackerel stocks, and sufficient information to facilitate an adequate assessment. The TAC for this stock should apply to all areas in which North Sea horse mackerel are fished

BLUE WHITING

Blue whiting combined stock (Sub-areas I-IX, XII and XIV)

State of stock/exploitation April/May 2002

The stock is harvested outside safe biological limits. The spawning stock biomass for 2001 at the spawning time (April) is inside safe biological limits while the SSB for 2002 is expected to be below the biomass precautionary approach. Fishing mortality has increased rapidly in recent years, and is estimated at 0.82 in 2001. Total landings in 2001 were almost 1.8 million t. The incoming year classes seem to be strong.

State of stock/exploitation May 2003

The current estimates of fishing mortality are uncertain.....based on the most recent estimates of fishery mortality and SSB, ICES classifies the stock as likely to be harvested outside safe biological limits. Total landings in 2002 were almost 1.6 million tonnes. The incoming class seems to be strong.

Blue whiting combined stock (Sub-areas I-IX, XII and XIV)

Management objective April/May 2002:

EU, Faroe islands, Iceland and Norway agreed to implement a long-term management plan for the fisheries of the blue whiting stock, which is consistent with a precautionary approach, aimed at constraining the harvest within safe biological limits and designed to provide for sustainable fisheries and a greater potential yield.

Management objective May 2003:

EU, Faroe islands, Iceland and Norway agreed to implement a long-term management plan for the fisheries of the blue whiting stock, which is consistent with a precautionary approach, aimed at constraining the harvest within safe biological limits and designed to provide for sustainable fisheries and a greater potential yield.....The agreed management plan has not been implemented yet.

Blue whiting combined stock (Sub-areas I-IX, XII and XIV)

Advice on management April/May 2002:

ICES recommends that fishing mortality..... should correspond to landings of less than 600,000 t in 2003.

Advice on management May 2003:

ICES recommends that catches should be less than 925,000 tonnes in 2004. the current estimate of stock size is uncertain. This is caused by conflicting signals in the catch and survey data.....Even though the 1999, 2000 and 2001 year classes seem to be strong, the SSB is expected to decline at the present level of fishing mortality.

HERRING

Herring (Sub-area IV, Divisions VIId and IIIa (autumn spawners))

State of stock/exploitation March 2002:

The stock is inside safe biological limits. SSB in 2001 was estimated at 1.4 million tonnes and is expected to increase to 1.7 million tonnes in 2002.....SSB has increased gradually since the low stock size in the mid 1990s. This is in response to reduced catches, strong recruitment and management measures that reduced exploitation both on juveniles and adults.....Both the 1998 year class and the 200 year class appear to be very strong in all the surveys

State of stock/exploitation May 2003:

ICES classifies the stock as being inside safe biological limits. SSB in 2002 was estimated at 1.6 million tonnes and is expected to increase to 2.2 million tonnes in 2003. This is in response to reduced catches, strong recruitment and management measures that reduced exploitation both on juveniles and adults.....Both the 1998 year class and the 2000 year class appear to be very strong in all the surveys, but the incoming 2002 class is estimated to be one of the weakest in the series.

Herring (Sub-area IV, Divisions VIId and IIIa (autumn spawners))

Advice on Management March 2002:

ICES advises that catches in 2003 should be within the constraints on fishing mortality agreed by the EC and Norway.....revised assessment methods is a 22% greater estimate of the 2000 stock size and a lower estimate of the fishing mortality than in the 2001 assessment.

Advice on Management May 2003:

ICES advises that catches in 2004 should be within the constraints on fishing mortality agreed by the EC and Norway.

Herring (Sub-area 22-24 and Division IIIa (spring spawners))

State of stock/exploitation March 2002:

SSB has been relatively stable over the last five years, but the stock is being harvested outside of biological limits. Fishing mortality is 0.50 for adults and 0.25 for the juveniles....The age structure in the catch appears to be relatively stable over the last four years.

State of stock/exploitation May 2003:

The status of the stock is unknown relative to safe biological limits. Although the assessment is uncertain SSB has been slightly increasing over the last four years.....The incoming 2002 year class seems to be above average.

Herring (Sub-area 22-24 and Division IIIa (spring spawners))

Advice on management March 2002:

ICES recommends that the fishing mortality be reduced.....corresponding to catches in 2003 of less than 84,000 t. According to the recent geographic distribution of catches, approximately half of the total catch should be taken from the Subdivisions 22-24..... the fisheries on herring in Division IIIa should be

managed in accordance with the management advice given on spring-spawning herring.....An abundant 200 year class of North Sea autumn spawning herring is expected to be present in the area as one-winter-ringers in 2002. The 2001 North Sea autumn spawner year class also appears to be abundant.

Advice on management May 2003:

ICES recommends that the fishing mortality be reduced.....corresponding to catches in 2004 of less than 92,000 t. According to the recent geographic distribution of catches, approximately half of the total catch should be taken from the Subdivisions 22-24..... the fisheries on herring in Division IIIa should be managed in accordance with the management advice given on spring-spawning herring.....An abundant 2000 year class of North Sea autumn spawning herring is expected to be present in the area as one-winter-ringers in 2003.

Norwegian spring-spawning herring

State of stock/exploitation April 2001:

The stock is harvested slightly above fishing limit mortality. The stock biomass is within safe biological limits. The recruitment of the very strong 1992 year class led to an increase in the SSB in 1997 to 9 million tonnes, but this has declined to approximately 6.0 million tonnes in 2001. Continued fishing under the present management agreement, and given the recruitment prospects, give a low probability of the spawning stock falling below 5 million t in the medium term.

State of the stock/exploitation May 2003:

ICES classifies the stock as being inside safe biological limits. The incoming year classes 1998 and 1999 are estimated to be relatively strong.

Norwegian spring-spawning herring

Advice on management April 2001:

ICES advises that this fishery should be managed according to the agreed management plan corresponding to a catch of 853,000 tonnes in 2002.

Advice on management May 2003:

ICES advises that this fishery should be managed according to the agreed management plan corresponding to landings in 2004 of less than 825,000 tonnes.

Icelandic summer-spawning herring (Division Va)

State of stock/exploitation May 2002:

The stock is inside safe biological limits. The spawning stock biomass in 2001 is estimated at 540,000 tonnes.

State of stock/exploitation May 2003:

ICES classifies the stock as being inside safe biological limits. The spawning stock biomass in 2002 is estimated at 475,000 tonnes.

Icelandic summer-spawning herring (Division Va)

Advice on management May 2002:

ICES recommends that this stock should be continued to be harvested..... corresponding to a maximum catch of 105,000 t in the season 2002/2003.

Advice on management May 2003:

ICES recommends that this stock should be continued to be harvested.....
corresponding to a maximum catch of 113,000 tonnes in the season 2003/2004.

CAPELIN

Barents Sea capelin (Subareas I and II, excluding Division IIA west of 5 W)

State of stock/exploitation October 2002

The stock is within safe biological limits.

State of stock/exploitation October 2003

Based on the most recent estimate of the biomass ICES classifies the stock as being outside safe biological limits. The maturing component in autumn 2003 was estimated to be 0.28Mt and is predicted, without fishing, to be 0.09Mt at the time of spawning in 2004.

Barents Sea capelin (Subareas I and II, excluding Division IIA west of 5 W)

Advice on management October 2002:

In order for the SSB to stay ...the catch in 2003 should be less than 310,000 t. ICES further recommends that the fishery should be directed on the spawning stock in the period January-April.

Advice on management October 2003:

ICES recommends that no fishing take place in 2004. Even with no fishing at all, there is a very high probability of the spawning stock falling below acceptable biomass levels.

See: www.ices.dk

Extract 5

June 2003 – EU Commission requests ICES comments on Ecosystem Effects of Fishing Activities

At the request of the European Commission ICES was asked to review the state of knowledge about the impacts on the ecosystem of the current industrial fisheries in the ICES areas.

The key points (from text) are:

Industrial fisheries remove more fish biomass from European waters than fisheries targeting species for direct human consumption. The blue whiting fishery on the shelf slope is the largest industrial fishery (by landings) and more than half of the industrial landings from the North Sea are sandeels. Given the scale of these industrial fisheries, it is expected that they have impacts on those human consumption species that are also taken in the catch and on the food webs. However, the impacts of industrial fishing that have been identified are relatively small in comparison with the effects of directed fisheries for human consumption species.

Most catches in the North Sea industrial fisheries that target specific species also contain a fraction of other industrial species. The North Sea Norway pout fishery has a high fraction of blue whiting. The 'sprat' industrial fishery in the North Sea also catches 9% by weight of other species, predominantly herring, sandeel, and a small fraction of gadoid species.

The effects of variation in the sizes of most industrial stocks on their predators are also poorly known. A better understanding of the interactions between industrial species and their fish predators is needed, and the historically low stock sizes of predators such as North Sea cod may have reduced their overall dependence on the species targeted by industrial fisheries.

Seabirds in the Shetland's (entirely dependent on sandeel in the breeding season) suffered a decline in the 1980's but the report states:
.....fisheries were unlikely to be the direct cause of the decline in sandeel abundance as the availability of sandeels was primarily driven by recruitment variation. If fishing did affect the recruitment of sandeels, as a result of its impacts on the target stock, then fishing would have had an indirect effect on the seabirds, but the evidence for such an indirect effect was weak.

Based on available analyses, the indirect (food web) effects of North Sea industrial fisheries appear to be relatively small when viewed at large spatial scales, though small-scale effects may be significant and detailed small-scale analyses are often not available.

Extract 6

2003 ICES report 'Environmental Status of the European Seas'

Whilst demersal stocks have declined, landings of many pelagic stocks have shown an increasing trend over the past two decades.....The pelagic stocks generally fluctuate more in abundance – compared to the demersal stocks – due to the higher reproductive variability. In many pelagic stocks, a series of bad years are often followed by several years of very good reproduction.

North Sea stocks

Each year the North Sea supplies a total of about 2 mt of fish. A large part of this (more than 1 mt mainly sprat, sandeel, Norway pout, blue whiting and herring is not directly consumed by humans, but is processed into fishmeal and fish oil. The next biggest proportion, about 700,000 t, is used for human consumption and comes from the pelagic fishery, which is mainly for herring or mackerel. Throughout recent years, the yield from the pelagic stocks has been stable, and they are generally in good shape.

Overview

Many fish stocks in the Northeast Atlantic have declined during the past decade. In 2001, out of 113 stocks assessed by ICES, only 18% were inside safe

biological limits (the same figure was 27 in 1996). There has also been an increase in the number of stocks of which the status is unknown.

Generally the demersal stocks like cod, haddock and plaice have declined during the last two decades, the pelagic stocks like herring and blue whiting have increased and so have the smaller but economically important stocks of shrimps and Norway lobster.

The news on fish stocks is not all bad, however, and the recovery of North sea herring and Norwegian spring spawning herring stocks after their collapse in the 1970's and 1980's, respectively, shows what can be achieved if scientific advice is followed and international management plans are agreed.

Extract 7

Common Fisheries Policy Reform – Agreement on CFP was reached in December 2002 and the changes became effective 1 January 2003.

The Commission's 'roadmap' for reform stated that:

... industrial fishing for conversion to fishmeal should target fish for which there is no market for direct human consumption. While it acknowledged these species had not deteriorated in the past 20 years, industrial fishing is to be subject to the conservational and management measures developed under the CFP, including the multi-annual management plans.

In addition, ICES will evaluate the impact of industrial fishing on marine ecosystems and continue to monitor the conduct of industrial fisheries to ensure that their impact on human consumption fish species and other marine species remains low. Improved management of fish stocks of interest for both industrial use and human consumption, such as blue whiting, will also be proposed.

Extract 8

Review of The State of World Fisheries and Aquaculture March 2002 - relevant extracts from the United Nations Food and Agriculture Organisation (FAO) independent assessment of the status of fish stocks. (premier advocacy document published every 2 years)

Part 1 World Review of Fisheries and Aquaculture

The status of fishery resources

Status of marine fisheries

Following a decline to 79.2 mt in 1998 total production of marine capture fisheries increased to 84.7 mt in 1999 and 86 mt in 2000, thus recovering to the levels close to the maximum for 1996 and 1997.... Most of the recent changes in total global landings from wild marine fishery resources can be explained by the decline and rapid recovery that followed the 1997-98 El Nino. The areas most

seriously affected by this recent El Niño were the southeast Pacific and to a lesser extent the Eastern Central Pacific.

The global situation of the main marine fish stocks for which assessment information is available follows the general trend observed in recent years. Overall, as fishing pressure continues to increase, the number of underexploited and moderately exploited fisheries resources continues to decline slightly, the number of fully exploited stocks remains relatively stable and the number of overexploited, depleted and recovering stocks is increasing slightly.

An estimated 25% of the major marine fish stocks or species groups for which information is available are underexploited or moderately exploited. Stocks or species groups in this category represent the main source for the potential expansion of total marine catches. About 47% of the main stocks or species groups are fully exploited and are therefore producing catches that have reached, or are very close to, their maximum sustainable limits. Thus, nearly half of world marine stocks offer no reasonable expectations for further expansion. Another 18% of stocks or species groups are reported as overexploited. Prospects for expansion or increased production from these stocks are negligible, and there is an increasing likelihood that stocks will further decline and catches will decrease, unless remedial management action is taken to reduce overfishing conditions. The remaining 10% of stocks have become significantly depleted, or are recovering from depletion and are far less productive than they used to be.

In the Southeast Pacific, total annual catches reached an all-time high in 1994, and then declined sharply as a consequence of the severe 1997-1998 El Niño and the depletion of the Peruvian anchoveta and other important stocks in the area. Post-El Niño recovery has been surprisingly fast, particularly in the stocks of Peruvian anchoveta. This has taken the total catches back to pre-El Niño levels, although some other important and declining stocks such as Chilean jack mackerel and the South American pilchard have given no signs of recovery.

Fishmeal

The bulk of fishmeal production – about 60% - is exported each year. In 2001, fishmeal production was an estimated 5.4mt, a 12% decrease from 2000. Various fishing bans and problems with jack mackerel resources in Chilean waters were the main cause of the reduced catch. Peruvian production was also relatively low. In 2001, the BSE scare overshadowed the fishmeal market in Europe because, early that year, the EC prohibited the use of fishmeal in ruminants' diets. In most plants in the EC, feed for non-ruminants is prepared on the same production lines as feed for ruminants, and the legislation resulted in lower use of fishmeal in pig and poultry feeds as well. Peru and Chile lodged a complaint with the World Trade Organisation (WTO) Sanitary and Phytosanitary (SPS) Committee (Oct 2001) to persuade the EC to lift the current restrictions on

fishmeal usage. Fishmeal prices are expected to increase as a result of good demand, especially from China and other Asian countries.

Extract 9

Paper by Robert W. Furness ‘Management implications of interactions between fisheries and sandeel-dependent seabird and seals in the North Sea’, October 2001 – published in ICES Journal Of Marine Science, 59: 261-269, 2002

The lesser sandeel is a key food for many seabirds and seals, and is also the target of the largest single-species fishery in the North Sea. Despite claims that sandeel fishing has harmed dependent predator populations, census data show that most seabirds and grey seals increased in numbers as the fishery grew and reached peak harvest. Generally high breeding success of black-legged kittiwakes at North sea colonies also suggests that sandeel abundance has remained good for breeding seabirds at the broad scale, though local and small-scale effect of sandeel fishing should not be overlooked. VPA and CPUE data suggest that abundance increased as the fishery grew. A negative correlation between sandeel recruitment and total stock size preceding spawning suggests that there is now resource competition (bottom-up control). Biogenergetics modelling indicates that predatory fish take far more sandeel than taken by the industrial fishery or wildlife. Effects of decreases in predatory fish stock have been greater than increases in the take by seabirds and seals and by the fishery. Thus, overall, there appears to have been a reduction in mortality during the last 30 years. Changes in predatory fish abundances, especially mackerel and whiting, may influence sandeel stocks more than changes in industrial fishery, at least at the scale of the North Sea as a whole. These interactions imply that seabird and seal food supply in terms of sandeel may be strongly dependent on decisions regarding management of stocks of mackerel and gadoids.

Extract 10

Extract from a report prepared by the Danish Ministry of Food, Agriculture and Fisheries for the Council of the European Union October 2001 – on the fishery for industrial species in Denmark

The fishery as such is carried out with due respect to the scientific advice and the fishery is generally considered to be environmentally sustainable. It can be added, that the fishery for industrial species is among the most monitored, controlled and scientifically best suited fisheries.

The most discussed consequences of industrial fisheries are the by-catches of species mainly fished for human consumption, and the removal of prey species biomass from the food chain. The by-catch issue is related to a possible reduction of the potential yield within the human consumption fisheries. The

catch of the target species raises the question whether the removal causes food deprivation for predators such as larger fish, seabirds and marine mammals, or whether removal may cause other changes within the ecosystem.

..... industrial fisheries harvest less than 25% of the annual production of the industrial species sandeel, sprat and Norway pout leaving more than 75% of the annual production for human consumption species, birds and marine mammals. No research from the \north Sea has show changes in fish growth due to changes in food availability. Nor are there indications that the current industrial fisheries have caused food deprivations for fish in the North Sea. The removal of the high quality industrial species and human consumption species as well affect the ecosystem.

....The most important target species for the industrial fisheries are sand eel, Norway pout, sprat, capelin, horse mackerel and blue whiting. ICES assesses the stock situation for the most important industrial species each year. Fishing mortality is generally moderate or low for the industrial species. Sand eel and Norway pout are considered biological safe limits. ICES is not able to make analytical assessment of the sprat in the North Sea, the Skagerrak and the Kattegat, but abundance index from scientific surveys indicate a relatively large biomass.

(This updates the previous extract from the ICES Advisory Committee on Fishery Management report presented to the Government of Denmark **May 1997** on the ecological effects of the North Sea Industrial Fishing Industry on the availability of human consumption species. This stated:

....The assertion that a reduction in industrial fishing would 'allow increased spatial overlap between food and predators' is unsupported by any analysis and is largely wishful thinking.... It has been estimated that the industrial fisheries take in the order of 20% or less of the annual production of the industrial species, whereas 70% or more of the annual production of sole, cod, saithe and plaice is removed and between one third and one half of the annual production of haddock, whiting and herring).

Extract 11

Review of The State of World Fisheries and Aquaculture 2000 - relevant extracts from the United Nations Food and Agriculture Organisation (FAO) independent assessment of the status of fish stocks. See: www.fao.org

Part 1 World Review of Fisheries and Aquaculture

World marine capture fisheries production

World marine capture fisheries production dropped to 78 million tonnes in 1998, representing a 9 per cent decline with respect to the all-time production highs of

about 86 million tonnes in 1996 and 1997. The decline appears to have been caused essentially by climatic conditions.....Most of the decline in the world's marine fisheries landings in 1998 can be attributed to changes in the Southeast Pacific, which was severely affected by the El Niño event in 1997 –1998. Total capture fisheries production from this area dropped from 17.1 million tonnes in 1996 to 14.4 million tonnes in 1997, decreasing even more dramatically to 8 million tonnes in 1998.

The status of fisheries resources

Although the situation regarding some of the highest-producing stocks has worsened, global exploitation of the main marine fish stocks for which assessment information is available continues to follow the general trend observed in previous years. Overall, the number of underexploited and moderately fisheries resources continues to decline slightly and, as fishing pressure increases, the number of fully exploited stocks remains relatively stable while the number of overexploited, depleted and recovering stocks is increasing slightly,

Among the major marine fish stocks or groups of stocks for which information is available, an estimated 25 to 27 per cent are underexploited or moderately exploited and thus represent the main potential source for expansion of total capture fisheries production. About 47 to 50 per cent of stocks are fully exploited and are, therefore, producing catches that have either reached or are very close to their maximum limits, with no room expected for further expansion. Another 15 to 18 per cent are overexploited and have no potential for further increase. Moreover, there is an increasing likelihood that catches from these stocks will decrease if remedial action is not taken to reduce or revert overfishing conditions. Only then will sustained higher catches be possible. The remaining 9 to 10 per cent of stocks have been depleted or are recovering from depletion. As they are less productive than usual depleted and recovering stocks tend to have ample potential for recuperation that is commensurate with their pre-depletion catch levels.

Fishmeal

Fishmeal production for 1999 is estimated at 6.6 million tonnes, close to the annual average for 1976-1997 of 6.5 million tonnes. This is 29 per cent up on the 4.8 million tonnes produced in 1998, which was one of the worst production years ever. Increased production was due to the recovery of fishing in South America after the El Niño phenomenon. Peruvian fishmeal production in 1999 was more than twice the 1998 figure of 815,000 tonnes representing a return to normal levels. Export earnings from fishmeal increased by 35 per cent in 1999 compared with 1998, reaching US\$534 million. On the other hand, the situation in Chile did not completely return to normal. Total fishmeal output from this country was 980,000 tonnes in 1999, up from 640,000 tonnes in 1998, but still lower than the 1.2 million tonnes recorded in 1997. Chilean fishmeal exports in 1999 were close to 600,000 tonnes, some 100,000 tonnes more than in 1998.

Extract 12

Letter from the Royal Ministry of Fisheries of Norway dated 26 June 2000 regarding resource management to maintain North Sea stocks. (Statement of basic principle).

The main goal of the Norwegian fishery policy is a long term sustainable utilisation of the resources. This will require yearly quotas based on biological criteria and management decisions that secure the long term yield and protection of the resources.

.....In Norway it is not permitted to discard fish from the most important species. Furthermore it is not allowed to catch fish below a certain size.

The Norwegian fishing policy is based upon best scientific evidence and advice in co-operation with accredited expert organisations such as approved/official marine organisations, ICES and FAO etc. This is supported and further enforced by appropriate controls and regulations in response to this advice.

Extract 13

MAFF news release (14 December 1999) announcing the MAFF response to the proposal for a closed season for sandeel fishing in a section of the North Sea off the Firth of Forth and Grampian Coast as a precautionary safeguard for seabird colonies.

Comment from Elliot Morley following a visit to the area on 14 December 1999.

“We are committed to securing sustainable management of industrial fishing and have already succeeded in gaining an annual limit to sandeel catches in the North Sea.

“The east coast plays host to some of the UK’s most important bird habitats. Early indications show there may be an important knock-on effect from industrial fishing to sea bird breeding success and this closed area will be an important test of that.

“We can now move forward on the basis of good science as we fully understand that fishermen’s jobs and livelihoods in Denmark depend on this fishery.”

Extract 14

Map showing the sandeel closed area issued by MAFF (December 1999) – The section of the North Sea off the Firth of Forth and Grampian Coast as a precautionary safeguard for seabird colonies.

Map co-ordinates from the UK coast are 55°30'N, East to 55° 30'N 1° 00'W, North to 58°00'N 1°00'W, West to 58°00'N 2°00'W, then South of the UK coast at 2°00'W. See map at back.

Extract 15

Extract from the 1999 Report of the Advisory Committee on the Marine Environment on Sandeel/Seabird Interaction (June 1999) presented to the European Commission DG XIV.

Under management advice:

...kittiwake breeding success is proposed as the best practical indicator of food availability at least to seabirds, and possibly to all sandeel-dependent predators in the vicinity of seabird breeding colonies. ICES advises using 0.5 and 0.7 fledged chicks per well-built nest as thresholds to close and re-open, respectively, sandeel fisheries in areas important for foraging by the kittiwake colonies being monitored.

Applying these criteria, ICES advises that the sandeel fishery west of 10° W in sandeel Area 3 be closed to sandeel fishing (except as specified below), because the recent breeding success of kittiwakes has been less than 0.5 fledged chicks per well-built nest. Such a closure should stay in place until kittiwake breeding success exceeds 0.7 fledged chicks per well-built nest. ICES also advises that during the period of closure a very limited commercial monitoring fishery be conducted, not to exceed 10 boat-days in each of May and June.

Extract 16

Letter from the Danish Fisheries Department dated 19 June 1996 (Statement of basic principle)

The Common Fisheries Policy of the EU lays out the conditions for the fisheries in Denmark and other EU member states. The Danish fisheries policy objective is to maintain a responsible fisheries management assuring a sustainable use of fish stocks with full regard to the ecosystem of the sea.

GLOSSARY

ACFM – Advisory Committee on Fishery Management, an ICES committee with representatives from each country which decides on official ICES advice.

CEFAS - The UK Government's Centre for Environment, Fisheries and Aquaculture Science, based in Lowestoft, provides scientific research and advice in fisheries management and environmental protection.

FAO - United Nations' Food and Agriculture Organisation, based in Rome, monitors fishery resources world-wide and provides independent scientific assessments of the status of individual stocks.

GAFTA - Grain and Feed Trade Association. The international Association promoting trade in grain, animal feedingstuffs, pulses and rice world-wide.

ICES - International Council for the Exploration of the Sea, an independent scientific organisation advising North Sea and North East Atlantic Governments on the status and management of commercial fish stocks. The information collected by ICES is developed into unbiased, non-political advice about the marine ecosystem.

IFFO - International Fishmeal and Fish Oil Organisation (formerly IFOMA).

IFOP – Institute of Fisheries Research (Chile)

IMARPE – Institute of Fisheries Research (Peru)

MCS - Marine Conservation Society. A registered charity

MSC - Marine Stewardship Council. An independent body set up to establish basic principles for sustainable fishing and provide standards for individual fisheries.

NEAFC - North-East Atlantic Fisheries Commission.

Seafish - The Sea Fish Industry Authority, a statutory, levy-funded body whose role is to promote the efficiency of the sea fish industry in the UK whilst having regard to the interests of consumers.

TAC - Total Allowable Catch - the EU annual quota limit applied to commercial landings of individual fish stocks.

University of Glasgow – Dr Robert Furness, Personal Professorship (Institute of Biomedical and Life Sciences) to study seabird and fishing interactions.

Useful web sites for information on feed stocks

www.ices.dk	ICES - International Council for the Exploration of the Sea
www.fao.org	FAO - United Nations' Food and Agriculture Organisation, based in Rome
www.seafish.co.uk	Sea Fish Industry Authority
www.fisheries.is	Information Centre of the Icelandic Ministry of Fisheries
www.srmjol.is	Company web site for SR – Mjol HF
www.fin.org.uk	FIN – Fishmeal Information Network
www.iffco.org.uk	IFFO - International Fishmeal and Oil Organisation