

**Agenda Item 5.3:            By-catch Issues**

**An assessment of the relationship between the by-catch of selected marine organisms and specific fishing gears on a regional basis in the north east Atlantic**

Submitted by the WWF

***NOTE FROM THE SECRETARIAT:***  
**IN THE INTERESTS OF ECONOMY, DELEGATES ARE KINDLY REMINDED TO BRING THEIR OWN COPIES OF THESE DOCUMENTS TO THE MEETING**

## **An assessment of the relationship between the by-catch of selected marine organisms and specific fishing gears on a regional basis in the north east Atlantic.**

### **A report to WWF by Rowena Rees**

#### **Executive Summary - October 1998**

The review detailed in the report aims to collate existing by-catch data of selected marine species relative to fishing gear type in specific International Council for the Exploration of the Sea (ICES) divisions of the Northeast Atlantic, namely ICES divisions IV a,b, and c; Vb 1 and 2; VI a and b; and VII a,b,c,d,e,f,g,h,j and k. This exercise potentially facilitates an assessment of the costs and benefits of existing fishing gear types, to support area-specific solutions for working towards zero bycatch. Marine species assessed are limited by the information available, namely the Harbour Porpoise, the Common Dolphin, the Auk Family, the Grey Seal and the Common Dolphin.

It is not within the remit of the report to cover by-catch associated with lost or discarded fishing gears; by-catch of or damage to benthic organisms resulting from benthic trawls; by-catch of non target fish; or by-catch of undersized or over quota target species<sup>1</sup>. By-catch resulting from the use of high sea drift nets is also largely ignored by this report due to the 1992/1993 European Union ban (European Community (EC) Regulation 345/92) on the use of these nets over 2.5 km long in Community waters by Community vessels and a vote by EU ministers in June 1998 to ban the use of High seas drift nets. Many drift net fisheries have closed down in response to this recent legislation. At the present time the French, Irish and British have approximately 35, 11 and 5 boats respectively still deploying highseas driftnets (Anon. 1997).

Most of the data used in the report pertaining to abundance and by-catch is taken from a scant collection of specific studies and surveys using fishing statistics that were largely derived from official sources such as the Ministry of Agriculture, Fisheries and Foods (MAFF). Most of these statistics are not appropriate or adequate for the assessment of by-catch. The cetacean abundance and distribution data used for this report were taken from a major survey on Small Cetacean Abundance in the North Sea (SCANS), carried out in 1994, see Hammond *et al* (1995). The SCANS survey was undertaken in waters covered by the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS). The SCANS survey divisions differ from the ICES fishery statistics divisions. The information review is summarised in Tables I-5 which accompany this executive summary.

The gaps of information in the tables demonstrate the appalling and unacceptable gap in information on bycatch which needs to be addressed and embroiled in fisheries management procedures and practice. However, the information which is available provides evidence to demonstrate levels of bycatch for certain animals which is well above that considered to be sustainable. The International Whaling Commission (IWC) Scientific Committee have

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<sup>1</sup> Undersized fish (below the minimum size regulation) and over quota target species (quota species caught incidentally without a quota) may be referred to as bycatch, but are more specifically called "discards".

recommended a precautionary threshold in relation to the by-catch of cetaceans. They advise that a by-catch of 1% of the estimated population size indicates that further research should be undertaken immediately to clarify the status of the stocks and that an estimated annual bycatch of 2% may cause the population to decline and requires immediate action to reduce bycatch. Noting the ICES advise, a Resolution presented at the ASCOBANS 2nd Meeting of Parties in November 1997, defined for the present, "unacceptable interactions" (between fisheries and bycatch of small cetaceans) as being, in the short term, a total anthropogenic removal above 2% and if available evidence suggests that a population is severely reduced then "unacceptable interaction" may involve an anthropogenic removal of much less than 2%. The resolution also recommends that the competent authorities such as the European Union take measures to ensure that the total anthropogenic removal of harbour porpoises in the central and south North Sea (ICES Areas IVb and IVc) is reduced as soon as possible to less than 2% of the current estimate per year.

Conclusions from the report regarding the current situation with respect to bycatch/ fishing gear interactions in the NE Atlantic are as follows:

- the best approach to date for the quantification of by-catch requires the combination of data derived from three main sources: observers placed on commercial vessels (to obtain a representative sample of by-catch data from a particular fishery); official fishery statistics (so that the sample data collected on by-catch can be extrapolated to give an estimate for the fishery in question); and animal abundance and relative distribution surveys (to obtain data on the abundance and location of susceptible animal populations so that losses through by-catch can be assessed against the known abundance of animals inhabiting the waters under survey). However observer schemes, official statistics and abundance studies all have limitations in respect to their use in the assessment of by-catch estimates for particular fisheries.
- to date there have only been a very few studies making quantitative estimates of by-catch. Other by-catch studies of interest have looked at data from voluntary reporting schemes, anecdotal evidence and standings information. Whilst such studies are not quantitative they do provide indicative evidence of potentially harmful interactions between marine animals and fishing gear requiring immediate attention for further monitoring and conservation action.

Interactions already recognised to be of concern include:

- those between monofilament bottom-set gill and tangle nets and the harbour porpoise and auks. In the case of the harbour porpoise the main regions of concern are the Celtic Sea and the central and southern areas of the North Sea; as these are areas where takes are greater than 2% of the best abundance estimate thus indicating that the sustainability of harbour porpoise populations in these waters could be under threat and warrant urgent attention. Auk-fishing gear interactions would appear to be most damaging when fishing activity is occurring simultaneously with high aggregations of auk activity.
- those between driftnets, namely salmon nets and auks, tuna nets and auks, tuna nets and turtles and tuna nets and cetaceans (other than the harbour porpoise). However there is a real paucity of quantitative data on these interactions which needs to be addressed, particularly in the case of the turtle by-catch in the tuna driftnets,

should the vote to ban high seas driftnets on European vessels be disputed.

- those between pelagic trawls and cetaceans. There has been very little research into by-catch associated with pelagic trawls. However assessments of by-catch resulting from pelagic trawls are necessary as the fleet operates on a large scale and evidence shows that such trawls are potentially harmful to cetaceans. Further research is necessary particularly for the North Sea as this is an area exhibiting high pelagic trawl activity. Bottom trawls and purse-seiners have been associated with harbour porpoise takes but the impact of these methods on the harbour porpoise is not likely to be substantial.

Studies are currently either in progress or planned for the future to address some of the shortfalls identified in number above. In spite of such studies it will still be necessary:

- to implement further monitoring of the pelagic trawl fishery in order to assess the exact nature of its impact on marine animal populations, especially cetaceans, particularly as the overall effort of this fishing method is high and as such has a potential for significant capture of non-target animals. For such studies to be effective it will be necessary to implement a suitable means of detecting cetaceans immediately upon capture (otherwise there is a likelihood of their bodies being released to sea without ever being recorded). Acoustic monitoring equipment such as Tregenza and Harland's POD<sup>2</sup> may be the equipment required to obtain this necessary information. As assessment of the bycatch threat posed to bottom trawls is also required.
- to determine the scale of the North sea gillnet fishery and UK bottom set, particularly the wrecknet, fishery.
- to monitor the expanding automated longlining fishery to assess whether it poses a threat to non-target marine animals.
- to initiate an extensive data collection programme to collect and store data relating to by-catch including more detailed information on the distribution and abundance of the animals under threat (including regional and seasonal distributions) and pathological data from stranded or landed animals (to determine factors such as age, genetic structure, cause of death and stomach contents), so that a profile can be established detailing the population genetics, age group most susceptible to capture and the consequences for the rest of the affected population.
- to undertake an extensive evaluation of existing methods to reduce by-catch as those used to date have largely proved ineffective and expensive. In particular it is necessary to make an evaluation of regional gear design and usage as well as a determination of the actual aspects of these that influences by-catch so that risk assessments relating to the gear and its deployment can be made. Although modifications to fishing gear and practices may help towards reducing by-catch levels, they have not generally proved successful or popular with the fishing industry. It maybe that the establishment of conservation sites will be the best way forward for

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<sup>2</sup> the porpoise detector (POD) is a recent innovation which could prove a highly useful tool for gaining more information on porpoise detection and behaviour, and thereby prove effective in minimising by-catch. It works by logging acoustic data on porpoise sonar activity.

protection of vulnerable species/ fisheries interactions but lack of cohesion between fisheries and conservation policies currently hinders this way forward. The most suitable answer which would be both ecologically and economically viable is the extension of the fisheries policy on temporal/spatial fisheries exclusion zones, currently adopted to protect fish stocks, to include the protection of certain animals deemed particularly susceptible to by-catch.

- to collect more detailed information on all EC fisheries i.e. vessel details (e.g. length and HP), gear deployed (including type of net, mesh size, average length of net worked per day and haul duration), weather and sea conditions whilst gear is deployed, time of fishing (day or night), season, target species, local geography and days at sea. Such information would be useful if collected from and stored for both local and whole fleet categories distinguishing between variations of similar gears. It would also be important to collect information on the geographical distribution of all EC fisheries. Some of this information is already collected as official fishery statistics but it would be of far more use if its presentation could be tailored to meet by-catch assessment needs. With such information to hand by-catch extrapolations would be far easier and more reliable to assess for specific gears utilised by the particular fisheries, including international vessels, deploying them. Such detailed information will become increasingly necessary in the future as assessments of by-catch become more complicated due to the trend for fishermen to move away from specialist vessels to those able to carry a variety of gears allowing a more opportunistic means of making a living. Such vessels will make classification far more complex and difficult.
- to collect further information on smaller inshore boats so that some idea of effort can be assessed.

Incidental take of the leatherback turtle situation in particular warrants immediate investigation especially as there has been an increased shift in the turtle population entering these waters, which, along with increased reports of strandings indicates a capacity for increased mortality via incidental take.

Incidental take of the grey seal situation also warrants some attention as it would appear that there has been no systematic study on seal by-catch around the UK coasts.

The scale of auk mortalities resulting from fishing gear interactions and the effects to local auk populations also needs further assessment, particularly in regions where gear is deployed in the proximity of major breeding sites. Fishing activities in Scotland and Wales have been shown to be relatively benign as far as auks are concerned and as such do not require urgent study. Areas requiring further attention include the salmon driftnet and cod gillnet fisheries in the north-east of England, currently being assessed by SMRU for cetacean by-catch; the Cornish inshore and offshore gillnet fisheries; the northern, western and southern Irish salmon driftnet fisheries; and the French gillnet fisheries operating in the Channel and off of Brittany.

**Note:** the following tables on by-catch and associated fishing gears recorded for the North east Atlantic (extracted from the full report) are annexed to this summary:

Table 1: Harbour porpoise

Table 2: Common dolphin

Table 3: Grey seal

Table 4: Auk family

Table 5: Leatherback turtle

## ANNEX

Table 1. Harbour porpoise (*Phocoena phocoena*) by-catch and associated fishing gears recorded for the North east Atlantic (ICES areas IVa,b & c, Vb1, Vb2, VIa & b, VIIa,b,c,d,e,f,g,h,j &k)

Species	Region of interest	Population estimate (n)	Population estimate (95% C.L)	Population study area	Date/s of population study	Reference of population study data
Harbour porpoise	West Scotland, West Ireland & Irish Sea	important concentrations	N/A	ICES areas: VIa, VIb, VIIa, VIIb & VIIc	N/A	Northridge <i>et al</i> 1995
	Northern North Sea	105,000	73,000-151,000	SCANS: D,E,J,M (equivalent to ICES:IVa & N.E side of VIa)	1994	Hammond <i>et al</i> 1995
	Central and eastern side of the Southern North Sea	170,000	130,000-234,000	SCANS: C,G,F,H,L,Y (equiv. ICES:IVb & east side of IVc)	1994	Hammond <i>et al</i> 1995
	South-western corner of Southern North Sea & Channel	none recorded	N/A	SCANS: B (equiv. ICES: IVc,VIIId & VIIe (excl. western part lying in Celtic Sea)	1994	Hammond <i>et al</i> 1995
	Celtic Sea and westwards	36,000	13,000-103,000	SCANS:A (equiv. ICES: VIIIf,VIIg,VI Ih,VIIj & N.W of VIIe)	1994	Hammond <i>et al</i> 1995

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Table 1 (contd.)

By-catch estimate (n per year)	By-catch estimate (95% C.L)	By-catch (% of population)	By-catch (% of population (95% C.L))	Reference of by-catch study	Fishing gear linked with by-catch	Target fish
not estimated	N/A	N/A	N/A	N/A	needs assessing	needs assessing
not estimated	N/A	N/A	N/A	N/A	needs assessing	needs assessing
4,450	2,580 - 6,320	2.6 %	1.2 - 4 %	Vinther 1995	Danish North Sea bottom set gillnet fishery	cod, turbot & sole
not estimated	N/A	N/A	N/A	N/A	<sup>1</sup> English gillnetters <sup>2</sup> French gillnetters	
2,237	923 - 3,525	6.2 %	Not given	Tregenza <i>et al</i> 1997	<sup>3</sup> English and <sup>4</sup> Irish bottom set gillnet fishery in Celtic sea	<sup>3</sup> mainly hake <sup>4</sup> mainly hake

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Table 1 (contd.)

Fishing effort (per year)	Comments
needs assessing	
needs assessing	Area fished by Norwegian and Scottish gillnetters.
8,600 t per year cod in 1992 in larger boats	UK North Sea bottom set gillnet fishery also operating in this region (landing ca. 3,000 t/yr cod).
<sup>1</sup> 1,000 t per year all spp. <sup>2</sup> Unknown	<sup>1 &amp; 2</sup> Gill net fisheries are known to pose a threat to harbour porpoises, but due to the scarcity of harbour porpoises in these waters this threat is unlikely to be substantial in this particular region.
<sup>3</sup> 5,500 boat days <sup>4</sup> 90 boat days	<sup>3 &amp; 4</sup> All gillnetters other than tangle and turbot netters or boats less than 10 m. Approximately 160 French tanglenetters and 270 French hake netters also operate in this area.

Table 2. Common dolphin (*Delphinus delphis*) by-catch and associated fishing gears recorded for the North east Atlantic (ICES areas IVa,b & c, Vb1, Vb2, VIa & b, VIIa,b,c,d,e,f,g,h,j &k)

Species	Region of interest	Population estimate (n)	Population estimate (95% C.L)	Population study area	Date/s of population study	Reference of population study data
Common dolphin	North Sea	< 1,000 (only 4 schools seen)	not calculated	all of North Sea	1994	Hammond <i>et al</i> 1995
	Celtic Sea & westwards	75,000	23,000 - 285,000	SCANS: A (equivalent to ICES: VIII f, VII g, VII h, VII j & N.W of VII e	1994	Hammond <i>et al</i> 1995
	Celtic Sea & westwards contd.	as above	as above	as above	as above	as above
	Celtic Sea & westwards contd.	as above	as above	as above	as above	as above

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Table 2 (contd.)

By-catch estimate (n per study)	By-catch estimate (95% C.L)	By-catch (% of population)	By-catch (% of population (95% C.L)	Reference of by-catch study	Fishing gear linked with by-catch	Target fish
not estimated	N/A	N/A	N/A	N/A	N/A	N/A
small number observed (12) from 1 study so not extrapolated	N/A	N/A	N/A	Morizur <i>et al</i> 1997	pelagic trawl fisheries for: <sup>1</sup> French tuna <sup>2</sup> French hake <sup>3</sup> French seabass <sup>4</sup> Dutch horse-mackerel	<sup>1</sup> tuna <sup>2</sup> hake <sup>3</sup> seabass <sup>4</sup> horse-mackerel
small number observed (17 per 10,000 tuna landed) from 1 study so not extrapolated	N/A	N/A	N/A	Shephard <i>et al</i> 1995	Cornish tuna driftnets	tuna
small number observed (4) from 1 study so not extrapolated	N/A	N/A	N/A	Trogenza <i>et al</i> 1997	<sup>5</sup> UK and <sup>6</sup> Irish bottom set gillnet fishery	<sup>5</sup> mainly hake, <sup>6</sup> mainly hake,

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Table 2. (contd.)

Fishing effort (per year or per study)	Comments
N/A	Large tracts of these waters mostly fished by Danish and UK gillnetters. Some salmon and mackerel driftnet fisheries also in operation.
<sup>1</sup> 1907 tonnes (1994) <sup>2</sup> 3310 tonnes (1994)  <sup>3</sup> 217 tonnes (1994) <sup>4</sup> 110000 tonnes (1994)	Note that many of the fishing vessels were observed outside the region selected for this report (i.e. ICES areas VIIIa, VIIIb, VIIIc & VIId. Also that the whole of VIIe was covered but not all of this area falls into SCANS block A (abundance survey area).
10,000 tuna landed from observed boats only	
<sup>5</sup> 5,500 boat days <sup>6</sup> 90 boat days	<sup>5&amp;6</sup> All gillnetters other than tangle and turbot netters or boats less than 10 m. Approximately 160 French tanglenetters and 270 hake netters also operate in this area.

Table 3. Grey seal (*Halichoerus grypus*) by-catch and associated fishing gears recorded for the North east Atlantic (ICES areas IVa,b & c, Vb1, Vb2, VIa & b, VIIa,b,c,d,e,f,g,h,j &k)

Species	Comments
Grey seal	<p>No specific by-catch studies have been undertaken for the grey seal in the waters selected for the purposes of this report. However:</p> <ul style="list-style-type: none"> <li>• 4 grey seals were observed to be by-caught in the Irish pelagic trawl fishery (over 1788 hours of fishing) by Morizur <i>et al</i> (1997) during their study on incidental mammal captures in pelagic trawls in the North-east Atlantic.</li> <li>• entanglement of grey seals has been reported in the Welsh inshore gillnet and tanglenet fleets (Thomas 1992).</li> <li>• estimations of tag returns indicate that several hundred seals may be drowned each year in fishing nets around the UK coast (Northridge 1988).</li> </ul>

Table 4. Auk family (*Alcidae*) by-catch and associated fishing gears recorded for the North-east Atlantic (ICES areas IVa,b & c, Vb1, Vb2, VIa & b, VIIa,b,c,d,e,f,g,h,j &k)

Species	Region of interest	Population estimate (n)	Population estimate (95% C.L)	Population study area	Date/s of population study	Reference of population study data
Auk family (guillemot and razorbill)	Northern Ireland (Portrush)	None given	N/A	N/A	N/A	N/A
	West Ireland (Galway Bay)	10,000 pairs guillemots 1,800 pairs razorbills	not estimated not estimated	Galway Bay (ICES VII b)	1976	Whilde 1979 & Evans 1984
	West Ireland (contd.)	None given	N/A	N/A	N/A	N/A
	North-east England (Northumberland to North Yorkshire)	None given	N/A	N/A	N/A	N/A
	English Channel & Brittany (French coast: Baie de Seine & along Pays de Caux coast)	None given	N/A	N/A	N/A	N/A
	Celtic Sea (St Ives Bay west)	<sup>1</sup> None given	N/A	N/A	N/A	N/A

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Table 4 (contd.)

By-catch estimate (n per study or per year)	By-catch estimate (95% C.L)	By-catch (% of population)	By-catch (% of population (95% C.L)	Reference of by-catch study	Fishing gear linked with by-catch	Target fish
takes of 74 guillemots & 5 razorbills from 3 boats in 1971	N/A	N/A	N/A	Melville 1973	salmon driftnets (night fishing)	salmon
5,000 'auks/year	N/A	N/A	N/A	Whilde 1979 & Evans 1984	salmon driftnets (night fishing)	salmon
N/A	N/A	N/A	N/A	N/A	salmon driftnets	salmon
N/A	N/A	N/A	N/A	N/A	salmon driftnets (summer) cod gillnets (winter)	salmon cod
estimate of several thousand diving birds per year	N/A	N/A	N/A	Vincent 1990	French gillnet fishery	bass, pollack cod, sole
>520 individuals over one season	N/A	N/A	N/A	RSPB unpublished study (study period Dec.1989-Feb.1990)	monofilament set nets	bass

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Table 4 (contd.)

Fishing effort (per year)	Comments
Not assessed	121 guillemot and 10 razorbill bodies were found on Castlerock beach in July 1991. They were presumed do have drowned in local salmon driftnets (Murray 1993). These takes were recorded after boats had switched to daytime fishing (although they could have been taken by unlicensed boats operating at night).
too much illegal fishing to assess	<sup>1</sup> Where auks were guillemots and razorbills combined. The ratio of razorbills to guillemots landed was 2:1 although razorbills comprised only 18% of local population of the two species, thus selectivity shown for razorbills in the fishing gear. The salmon fishery ran from May until June.
N/A	Decline in razorbill numbers at Horn Head, Co. Donegal, and at Skelig Michael and Puffin Island, Kerry, have been blamed on by-catch in salmon driftnets (Whilde 1979 & Evans 1984), also unconfirmed reports of large auk mortalities resulting from fishing takes in Donegal, Sligo, Mayo and Cork (Whilde 1979 & Evans 1984).
N/A	Anecdotal 'takes' of seabirds recorded in this region (Dunn 1994).
600 French gillnetters (anon 1992)	Small inshore gillnetters at Le Havre had observed by-catch of 250 guillemots (mostly adults) and 37 razorbills in 1 month, February 1984, (Vincent (1990)
7 boats (less than 10 m operating inshore)	<sup>1</sup> Winter net mortality off north Cornish coast likely to affect migratory Irish Sea and south-western English populations of guillemots & razorbills; estimated as ca. 100,000 guillemot pairs (plus juveniles) & 25,000 razorbill pairs (plus juveniles) by Tasker ( <i>pers.comm.</i> to Robins (Robins 1991)). The local St Ives Bay population is much smaller.

Table 5. Leatherback turtle (*Dermochelys coriacea*) by-catch and associated fishing gears recorded for the North east Atlantic (ICES areas IVa,b & c, Vb1, Vb2, VIa & b, VIIa,b,c,d,e,f,g,h,j &k)

Species	Region of interest	Population estimate (n)	Population estimate (95% C.L)	Population study area	Date/s of population study	Reference of population study data
Leatherback turtle	West of Celtic Sea	not estimated	N/A	N/A	N/A	N/A

By-catch estimate (n per study)	By-catch estimate (95% C.L)	By-catch (% of population)	By-catch (% of population (95% C.L)	Reference of by-catch study	Fishing gear linked with by-catch	Target fish
small number (8) observed from 1 study (thus not extrapolated)	N/A	N/A	N/A	Shephard <i>et al</i> 1995	Cornish tuna driftnets	tuna

Fishing effort (per study)	Comments
10,000 tuna landed from observed boat trips only	French & Irish tuna driftnets also operating in the region. Combined landing from French, English & Irish boats estimated at 1 million tuna in 1992/1993.