

# **IRELAND - A SANCTUARY FOR WHALES AND DOLPHINS**

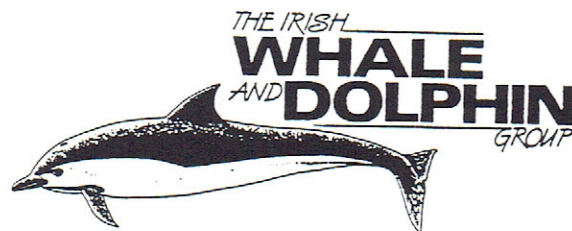


**A discussion document prepared by the  
Irish Whale and Dolphin Group**

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the National Parks and Wildlife Service.



The Irish Whale and Dolphin Group is dedicated to the study and conservation  
of cetaceans (whales, dolphins and porpoise) in Irish waters.

## Introduction

The Irish government's whale and dolphin sanctuary declaration on 7th June, 1991 was greeted with a mixture of celebration and confusion, with reservations being expressed as to the implications of the declaration.

The Irish Whale and Dolphin Group, who originally proposed the whale and dolphin sanctuary, felt that a forum was required to accommodate the diverse and often conflicting opinions that were being expressed. It was decided to produce a discussion document and invite contributions from those organisations, departments and individuals with an interest in Ireland's whale and dolphin sanctuary. Approximately 50 invitations were sent, both nationally and internationally, to fishing, conservation and animal welfare organisations, government departments and individuals. In addition, articles and invitations were published in a variety of media, including fishing and conservation publications and newsletters. The implications of the declaration were also discussed at the 1992 Conamara Sea Week. This document is an integration of those discussions and submissions received.

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## Foreword

Ireland's declaration of its waters as a sanctuary for cetaceans continues a three-thousand-year process which has quickened in this century and is accelerating in its closing decades.

Whales, dolphins and porpoises have probably always loomed in the imaginations of humans who went to sea or lived by the sea. To the Greeks and other Mediterranean peoples dolphins were sacred. In colder regions their larger cousins, the whales were held in awful respect and when they died and stranded they became "Royal fishes".

But in the nineteenth century, and into the twentieth, technology and world markets won over respect, and the greatest whales - the sperm, the right, the grey, the blue and the fin - were decimated for oil, meat and umbrella ribs. This wholesale and worldwide slaughter gave birth to its opposite: the idea of a sanctuary for whales.

This idea found its first public forum in the League of Nations. Sr. Jose Leon Suarez, an eminent Argentine lawyer, was its pathfinder in the 1920s. He was the reporter of a commission to the League on "whether it is possible to establish by way of international agreement rules regarding the exploitation of the products of the sea". Sr. Suarez wanted to create a "new jurisprudence", and in doing so made an impassioned and historic plea for conservation.

Sr. Suarez was especially concerned that uncontrolled whaling was leading to the extermination of whales. Being a sensitive man, ahead of his time in many ways, he also worried that the way of killing them was "barbarous". He suggested that, in addition to bringing whaling under international control, a sanctuary for whales should be declared in the Antarctic. Like others before him, and since, he had the right idea for the wrong reason: he thought the persecuted whales of the northern seas were fleeing southward seeking refuge, whereas we now know that the southern hemisphere and northern hemisphere populations of all whales are quite separate.

The idea mutated, and slowly took hold. Whaling conferences in the 1930s called on governments to take powers collectively to establish protected waters in the high seas. When the International Convention for the Regulation of Whaling was negotiated in 1946, and gave birth to the International Whaling Commission (IWC) the provisions already included a prohibition of all "pelagic" catching (that is, involving butchering the whales at sea rather than towing them back to land) of "whalebone" whales in a vast area of the South Pacific south of 40°S latitude, called "The Sanctuary".



The Sanctuary was opened to the whalers in 1955 - they had cleaned up the biggest species everywhere else in the Antarctic and their demands to move in were irresistible, especially when scientists who in principle favoured conservation said that this would take the pressure off the other oceans. (It did, but the relief only lasted two years. Biologists as well as lawyers evidently can make serious errors for the best of reasons, and they continue to do so.)

The IWC went its merry way as a club of whalers until the surge of global environmental consciousness in the early 1970s. But it was not until 1979 that it agreed to create another sanctuary. This was done at the request of the coastal states of the Indian Ocean, and it included the entire ocean sector down to 55°S. The coastal states, led by the Republic of Seychelles which at the same time declared all whales and dolphins protected in its new vast Exclusive Economic Zone (EEZ), wanted the sanctuary to extend down to the ice-edge, but opposition from the remaining whaling countries prevented this.

The Indian Ocean whale sanctuary was at first temporary, but at the IWC meeting in Glasgow in 1992 it was extended "for all time", as the Indian Ocean states had expressed it. Meanwhile, countries there and elsewhere had declared the expanded waters now under their control off-limits to whalers: Australia, Oman, New Zealand, Argentina, Brazil and others. Sanctuaries declared by the IWC can and generally will over-lap with those in national waters.

The new international law, as codified in the UN Convention on the Law of the Sea (UNCLOS) signed in 1984, marches in step with changing public attitudes to whales in most countries. Although the UNCLOS is not yet in force its provisions as far as conservation of sea life is concerned have been carried over word for word in "*UNCED Agenda 21*", the consensus document which emerged from the process which culminated at the Earth Summit in Rio de Janeiro in June 1992. The UNCLOS provisions about cetaceans thus become 'soft' law but not the less important for that.

All sea-living cetaceans, except the true porpoises like harbour porpoise, are listed as "highly migratory species"; the others listed are the tunas. As such their "use" is governed by special rules. If they are to be treated anywhere as "exploitable resources" they must nevertheless be allowed to survive in numbers not fewer than their pristine numbers, and if they have already been reduced much below that they must be allowed to recover. But the cetaceans are also "marine mammals", and UNCLOS and *Agenda 21* both say that states and international organizations (the IWC in the case of the whales) are authorised to apply more "strict" conservation measures for them than they might for fishes, including *prohibiting* exploitation of them.



May of this year is a critical month in a critical year for the future of whales. The IWC is being pressed to lift the present world-wide moratorium on commercial whaling, but it is also expected to decide on a proposal by the Government of France that the entire southern hemisphere south of 40°S be designated as a sanctuary for all whales. If approved, this will join with the existing Indian Ocean sanctuary to offer full protection to some populations of all these species, both on their summer feeding and their winter breeding grounds.

The governments of a few remaining and still aggressive whaling countries - especially Japan and Norway - have put enormous effort into misleading propaganda campaigns against the French proposal which, like other binding decisions needs a three-fourths majority of votes to pass. They are claiming among other things that *Agenda 21* says that whale populations *must* continue to be subject to the predations of whalers, subject only to the condition that such smaller cetaceans must be reduced in numbers, not only because they eat some of the fish that they say rightly belongs to humans, but because the small and still relatively numerous minke whales are holding back the recovery of the depleted populations of big species. That is cynical nonsense with no scientific foundation at all.

Most of the recent declarations of sanctuary in national waters that come to mind are in the southern hemisphere and tropics, too: Ecuador (including the Galapagos) and the Falkland Islands are examples. But France and Italy earlier this year declared their waters in the Ligurian Sea as a protected area for cetaceans (few people realise, not even the locals, that fin and sperm whales live there), and the Mediterranean coastal states as a group have said the IWC should declare the entire Mediterranean as a sanctuary.

Ireland's example is now a shining light in a part of the world where the view of whales as merely large and profitable meatballs is still, unfortunately, deeply rooted. Let the contagion spread! Ireland's decision should next become a European Community decision.

We now know that whales in the two hemispheres do not mix. We know that at least some of them can sing. We know that the sperm whale and the dolphins have evolved clever sonar and communication systems, and that all of them live in a marvellous world of acoustic sensation. We have learned to count them (with difficulty), to listen to them (also not so easy), and to recognise individuals from photographs and sonic signatures and family relationships from DNA "fingerprints" of skin samples. And we know they have been in the sea for very much longer than we humans have been on the land.

Sidney Holt, D.Sc.



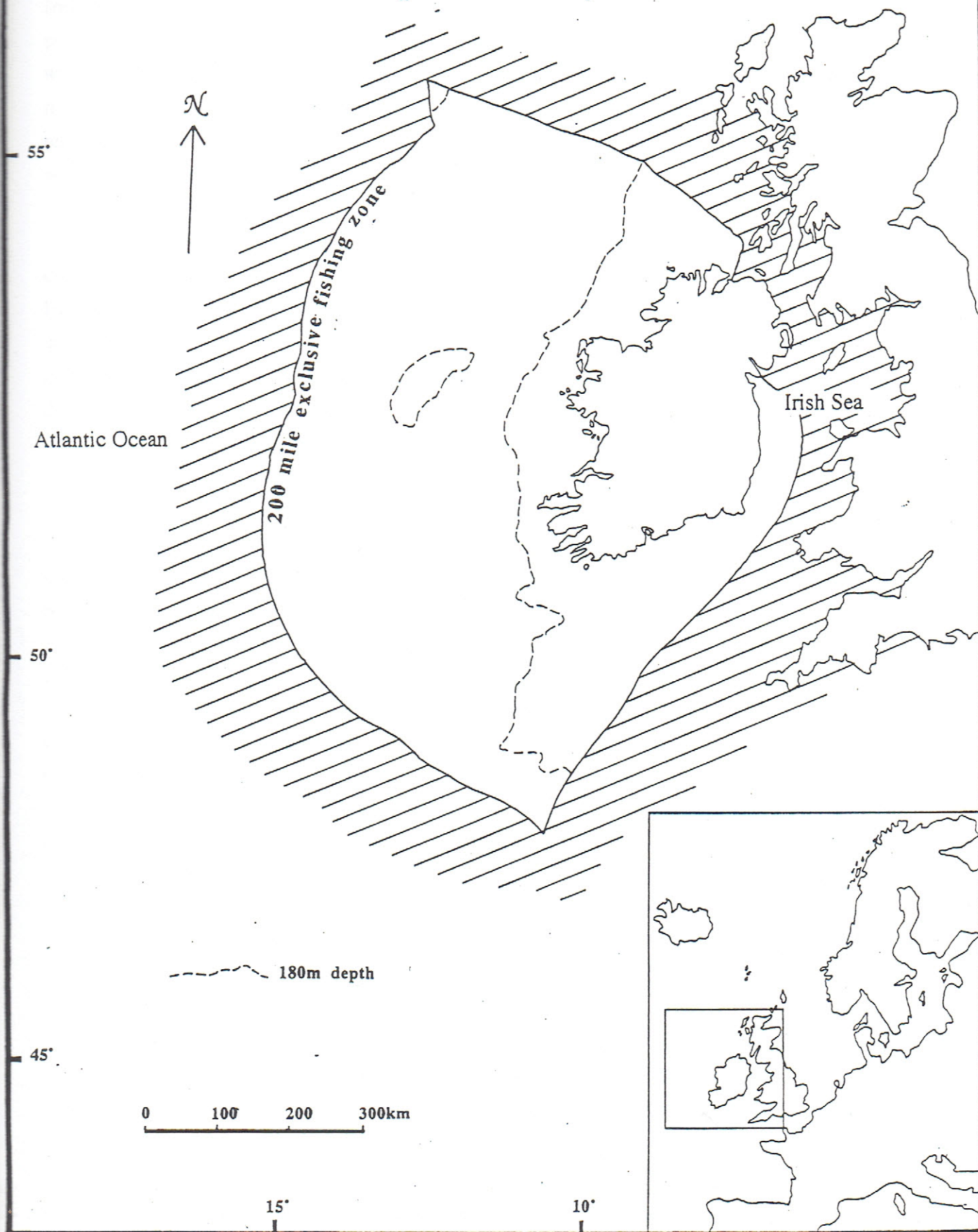
## Whale and dolphin sanctuary declaration

On 7th June 1991 the Irish Government declared Irish waters a whale and dolphin sanctuary. The text of the sanctuary declaration issued from the Department of the Taoiseach (the Irish Prime Minister) is as follows:

*The Taoiseach announced today that the Government have declared all our seas a Whale and Dolphin Sanctuary. This Declaration is in conformity with the Government's Environmental Action Plan Programme and the Dublin Declaration on the Environment which was adopted by the European Council during Ireland's Presidency of the European Community in June, 1990. It is a clear indication of Ireland's commitment to contribute to the preservation and protection of these magnificent creatures in their natural environment, and to do everything possible to ensure that they should not be put in danger of extinction but should be preserved for future generations. Ireland already has a comprehensive legal framework in place - the Whale Fisheries Act, 1937, and the Wildlife Act, 1976 - which empowers the Government to provide this sanctuary. Under this legislation, the hunting of all whale species, including dolphins and porpoises, has been totally banned within the exclusive fishery limits of the State i.e. out to 200 miles from the coast. The Declaration of the Whale and Dolphin Sanctuary within the exclusive fishery limits of the entire country is the first in Europe and will, hopefully, be followed by other maritime nations. The Taoiseach congratulated the recently established Irish Whale and Dolphin Group for their role in promoting the study and conservation of whales and dolphins in Irish coastal waters.*

*At the recent meeting of the International Whaling Commission in Iceland, Ireland took the position that the moratorium on commercial whaling in international waters, begun in 1986, should continue. Some 10 years ago Ireland joined the International Whaling Commission, the aim of which is to provide for the proper conservation of whales throughout the world and for the orderly development of the whaling industry in that context. Ireland's efforts on both the national and international fronts, therefore, have ensured that we are making a significant contribution to the world wide conservation of whales and dolphins.*

# Ireland's whale and dolphin sanctuary





## Whales, dolphins and porpoises in Irish waters

Ireland is one of the most important places in Europe for cetaceans (whales, dolphins and porpoises). Important breeding and feeding grounds for dolphins, porpoises and some smaller whale species have been identified off the Irish coast while many of the larger whale species migrate annually through Irish waters. To date, twenty-three species of cetaceans have been recorded in Ireland including beaked whales which are very rare in Europe, some species of which have never been seen alive.

The reason why Ireland is so important for cetaceans lies in its geographical position, close to the edge of the continental shelf. At the edge of the shelf the water depth increases from about 400m to 4000m over a relatively short distance. Cold, nutrient rich water is forced up by the edge of the continental shelf where it mixes with warm, nutrient rich surface water. At these areas, known as "upwellings", high densities of plankton and fish occur which attract dolphins, whales and seabirds that feed on these species<sup>1</sup>. As the edge of the shelf is relatively close to the Irish coast high numbers of these species may occur in Irish waters especially off the southwest and northwest coasts.

Of the twenty-three cetacean species identified in Irish waters, eleven are frequently recorded. The harbour porpoise is considered to be the most abundant species. It has been recorded off all coasts but is especially abundant off southwest Ireland where an estimated 20,000 may occur in the summer<sup>2</sup>. Harbour porpoise (*Phocoenaphocoena*) are known to calve off the southwest and east coasts of Ireland. Important habitats for bottle-nosed (*Tursiops truncatus*) and Risso's (*Grampus griseus*) dolphins have been identified in Irish coastal waters where both species are known to calve. The common dolphin (*Delphinus delphis*) is one of the most abundant cetacean species found off the south and southwest coasts and is frequently observed in the Irish sea. The striped dolphin (*Stenella coeruleoalba*) is distributed worldwide mainly in tropical and warm temperate waters and in recent years there has been an increase in the number of striped dolphins recorded in Irish waters. White-sided (*Lagenorhynchus acutus*) and white-beaked (*L. albirostris*) dolphins frequently occur offshore where they feed on a variety of pelagic fish species and white-sided dolphins have been shown to calve off the southwest coast. The long-finned pilot whale (*Globicephala melas*) is the most commonly observed whale species in Irish waters. Although mainly pelagic, large numbers have been recorded along the edge of the continental shelf west of Ireland and southwest Ireland is thought to be an important breeding ground for this species<sup>3</sup>. Killer whales (*Orcinus orca*) are frequently observed in small numbers in Irish waters especially off the west coast.

Of the baleen whales, the fin (*Balaenoptera physalus*) and minke (*B. acutorostrata*) whale are the most frequently observed. Fin whales migrate through Irish waters along the



edge of the continental shelf from breeding grounds at lower latitudes to summer feeding grounds in the sub-Arctic. The minke whale is the most common rorqual in Irish waters. Widely distributed along the Atlantic seaboard, they are reported sporadically in the Irish sea and are frequently seen from land.

The deep water to the west of the continental shelf provides suitable habitats for deep diving species such as sperm whales (*Physeter macrocephalus*) and beaked whales. There is evidence that sperm whales may be occurring more frequently off the Irish coast<sup>4</sup> but many of the beaked whales have never been seen alive and are known only from stranded specimens. Six of the nine European records of True's beaked whale (*Mesoplodon mirus*) are from the west coast of Ireland and a recent stranding of a Gervais beaked whale (*M. europaeus*) was only the second record for Europe<sup>5</sup>.

In 1908 two whaling companies were established in County Mayo in northwest Ireland. Operations commenced in 1910 and they continued whaling intermittently until 1923. During this period at least 818 whales were killed, mostly in the summer months, within a 95-120km radius of Inishkea. More than two-thirds of these whales were fin whales with sperm, blue (*B. musculus*) and sei (*B. borealis*) whales contributing about one tenth of the catch. A few humpback (*Megaptera novaeangliae*) and right (*Eubalaena glacialis*) whales were also taken.

## Legislation

The protection of cetaceans in Irish waters is covered by the following legislation: Whale Fisheries Act of 1937; Wildlife Act of 1976 and an amendment to the Whale Fisheries Act in 1982. The Whale Fisheries Act of 1937 prohibits the hunting of baleen whales within the exclusive fishery limits (200 miles) of the State. However, it was not until 1982 that this act was extended to protect all species of cetaceans, including dolphins and porpoises within this area.

The Wildlife Act of 1976 also protects cetaceans from being hunted but it provides additional protection to the Whale Fisheries Acts by protecting them from "wilful interference", including interference with their habitat and destruction of their breeding places. However, this Act only covers the area 12 miles from the coast.

Ireland is signatory to a number of International Conventions that protect whales and dolphins. The Whaling Convention came into force in 1948 and established the International Whaling Commission (IWC) which meets annually to review catch quotas, protected species etc. International co-operation is essential to prevent over exploitation of these species as they occur beyond the boundaries of national jurisdiction<sup>6</sup>. Ireland became a member of the IWC



and signatory to the International Convention for the Regulation of Whaling on 2nd January 1985.

The Convention on the Conservation of Migratory species of Wild Animals (Bonn Convention) enables countries to take action to preserve and manage endangered migratory species within their borders. It was initiated from the realisation that failure to protect migratory species can severely damage efforts to maintain or restore its population<sup>6</sup>.

The Convention of the Conservation of European Wildlife and Natural Habitats (Berne Convention) aims to conserve wild flora and fauna and their natural habitats. It also aims to promote co-operation between countries in their conservation efforts. Both the Bonn and Berne conventions cover the following species occurring in Irish waters: blue whale, humpback whale, Northern right whale, harbour porpoise, bottle-nosed dolphin, white-beaked dolphin, Atlantic white-sided dolphin, Risso's dolphin and long-finned pilot whale. Additionally, the Bonn convention includes the beluga and the Berne convention includes common dolphin, striped dolphin, killer whale, false killer whale, Northern bottle-nosed whale, True's beaked whale, Sowerby's beaked whale and Cuvier's beaked whale.

The EC directive on the conservation of natural habitats and of wild flora and fauna includes bottle-nosed dolphins and harbour porpoises in its list of species of community interest whose conservation may require the designation of special areas of conservation (Annex II). Both of these species are common in Irish waters and the harbour porpoise calves off southwest Ireland. All cetacean species are included in Annex IV of this directive.

The Agreement on the Conservation of small cetaceans of the Baltic and North Seas (ASCOBANS) is open for signature at the United Nations in New York by the range states. Under the agreement, range states are to take initiatives and co-operate on conservation, research and management in order to conserve small cetaceans in the North and Baltic seas, with a conservation and management plan forming part of the agreement<sup>7</sup>. It is thought that once the agreement has been ratified and comes into force that the area covered by the agreement could be extended to include Ireland.

The Convention on International Trade in Endangered Species of wild fauna and flora (CITES) regulates the international trade in wild animals and plants. Protected species are listed in three appendices to the Convention and all cetacean species are listed in one or other of these. A permit must be issued before trading in any species listed in the appendices is undertaken. While Ireland is expected to ratify this convention soon, it has been implementing the CITES protocols for a number of years.



## **Implications of sanctuary declaration**

### **Awareness**

At present, the most immediate impact of the sanctuary declaration has been an increase in public awareness of the presence of cetaceans in Irish waters. Prior to the declaration, the public were largely unaware that so many cetacean species frequent the waters around Ireland or that Ireland is an important area in Europe for cetaceans.

Ireland's most famous cetacean is a male bottle-nosed dolphin ("Fungi") resident in Dingle bay, Co. Kerry. This "friendly" dolphin is present all year round, has generated much interest and is a major tourist attraction. An estimated 150,000 people visit Dingle each year to see Fungi, generating £750,000 (\$1,290,000)/year in whale-watching tours and an estimated £1,000,000 (\$1,720,000) in total revenue, including money spent on transport, food, accommodation, souvenirs etc<sup>8</sup>.

With the sanctuary declaration and the realisation that whales, dolphins and porpoises are found in Irish waters and are not the preserve of areas traditionally associated with cetaceans, such as California, Washington State and Alaska, a lot of interest has been generated in developing whale-watching tours in Ireland. Bord Failte, the Irish tourist board, are now actively promoting whale-watching by producing information leaflets on the best places to go, what species will be seen and at what time of the year, and by encouraging boat owners who wish to take people out whale-watching. As the whale-watching industry is still in its infancy, the necessary guidelines and codes of conduct can be implemented to allow the sensible and sustainable development of this industry. Restrictions on the number of whale watching boats that can operate in a specific area may be necessary and the use of motorised vessels restricted in sensitive areas.

Increasingly, people want to become actively involved in the study and conservation of cetaceans. The Irish Whale and Dolphin Group have established and co-ordinate a cetacean stranding and sighting scheme which provides people with a focus for their interest. The number of people wishing to get involved in the group and requesting information on cetaceans has increased considerably since the sanctuary declaration.

### **Research**

Management of the whale and dolphin sanctuary will require monitoring of cetaceans in Irish waters and research into potential threats. The most effective way of monitoring cetaceans in Irish waters is through a combined stranding and sighting recording scheme. Recording



cetaceans washed up on the Irish coast (stranded) enables accurate species identification and the recording of additional information such as sex and morphometrics. The analysis of samples from stranded cetaceans for diet, reproductive condition, parasite load and determination of contaminant levels contributes greatly to our knowledge of the biology of these species. Recording cetaceans sighted in Irish waters provides information on distribution and movements and may identify important breeding and feeding areas. When corrected for effort these data can be used to determine indices of abundance for cetaceans in Irish waters. Stranding and sighting schemes can also be used to monitor the use of an area by cetaceans which has important implications for the EC 1992 Habitats Directive.

Management of the sanctuary will also require that the threats to cetaceans in Irish waters be identified and quantified. Four main threats to cetaceans in European waters have been identified namely;

- pollution
- reduction in the abundance of important prey species
- incidental capture in fishing nets
- disturbance

There is little data available on the magnitude of these potential threats to cetaceans in Irish waters. One study found high levels of polychlorinated bi-phenyls (PCBs) in marine mammals from the east coast of Ireland in the Irish Sea although there was no apparent correlation with the health of the animals sampled<sup>9</sup>. High concentrations of trace metals were found in marine mammals from the eastern Irish Sea but were not thought to have contributed to their mortality<sup>10</sup>.

The distribution and abundance of cetaceans has been correlated with the distribution of their preferred prey species<sup>1</sup>. Cetaceans feed on a variety of pelagic and demersal fish species and cephalopods are an important food source for species such as Risso's dolphins and sperm, pilot and beaked whales. The most important fish stocks in Irish waters are probably pelagic fish such as herring, mackerel, Norway pout and whiting. Where fish stocks have been severely reduced through overfishing there may be an adverse effect on cetaceans, as switching to less preferred prey may reduce the animals net energy gain and consequently its energy balance. The smaller species such as harbour porpoise are likely to be more vulnerable to a reduction in food supply as they require a relatively greater increase in food to support reproduction. Any reduction in fish biomass therefore, may have adverse effects on reproductive success but data are not available on the reproductive biology of cetaceans in Irish waters to quantify this impact.



The incidental capture of cetaceans in fishing nets has been documented throughout the world<sup>11,12</sup>. All fishing methods catch non-target species but gill-nets are generally considered to have the highest catch rates. Gill-net fisheries are widespread in Irish waters and one recent study estimated that the total length of gill-nets set on the bottom of the sea annually in Ireland is around 100,000 kilometre days<sup>13</sup> - a kilometre day is the product of the number and length of nets fished, the time nets are in the water, the frequency of lifting and the number of days fished annually. A variety of cetacean species including harbour porpoise, common, white-sided, white-beaked and bottle-nosed dolphins and minke whale have been reportedly caught in fishing gear in Ireland but the extent and impact of this incidental capture is not known.

There is little quantified data on the effects of disturbance on cetaceans. Recreational and commercial marine traffic in Ireland is concentrated in a few ports and resorts so disturbance is likely to be local. The Irish coast, especially on the west coast, is only thinly populated by people so it is unlikely that any disturbance will have long-term adverse effects on cetaceans in Irish waters.

### **Implications for the fishing industry**

Probably the most contentious and sensitive issue with respect to the whale and dolphin sanctuary declaration is the implications for Ireland's fishing industry. Fishermen and the fishing industry are an integral part of the sanctuary and both the industry and the sanctuary can be accommodated and management of the sanctuary should strive to achieve this aim.

The Irish fishing fleet comprises around 1,796 vessels the majority of which are under 12m in length (Table 1). Of these vessels, only 2% are less than 5 years old and 20% are over 30 years old. Although Ireland has around 20% of EC waters it has, at present, only 4% of the EC fish quotas, so most fishing in Irish waters is carried out by non-Irish vessels. Therefore, any potential conflict in the sanctuary is likely to be with non-Irish vessels.

Table 1. Composition of the Irish fleet at the end of 1989 (from Review of Common Fisheries Policy. July, 1991)

Length (m)	Number of vessels	Tonnage (GRT)
<12	1,258	7,615
12 - 17	271	8,874
18 - 23	196	13,135
24+	71	25,199
TOTAL	1,796	55,823



Fishing may interact with cetaceans either biologically, through competition for fish stocks, or operationally through incidental capture in fishing nets.

The diet of cetaceans in Irish waters is poorly understood but studies elsewhere in Europe have suggested that, for example, harbour porpoise generally feed on fish below the minimum landing size which will reduce competition between commercial fishing and this species. The ability of cetaceans to switch to other prey species when commercially important prey species have declined is not known.

Most fishing methods will catch cetaceans at some time and no species of cetacean can be excluded from the possibility of some conflict with fishing<sup>11</sup>. There is little qualitative information on incidental capture of cetaceans in Irish waters and no quantitative information. Harbour porpoise are known to be caught in set gill-nets and common dolphins in drifting gill-nets. White-beaked, white-sided and bottle-nosed dolphins have also been reportedly caught in fishing nets. The recent involvement of Irish vessels in the albacore tuna fishery in the northeast Atlantic has caused concern. A potential gill-net season for albacore tuna is thought to exist for Irish vessels in July, and August and possibly part of September from which time pelagic fishing could predominate into October<sup>14</sup> but this fishery operates beyond the 200 mile exclusive fishery zone and therefore outside the limits of the sanctuary.

There are anecdotal accounts of occasionally large numbers of dolphins being caught in trawl nets. The species involved and catch rates is not known but there is evidence that white-sided dolphins may be caught in pelagic trawls. There are also records of an immature common dolphin caught in a buoy rope and a minke whale entangled in lobster pots.

There are potential conflicts between the fishing industry and management of the Irish whale and dolphin sanctuary. To address these issues the fishing industry must become an integral part of the management of the sanctuary and not be alienated. This will ensure that potential conflicts will be identified and if possible minimised before they escalate.

## Summary

The Irish government declared Irish waters a whale and dolphin sanctuary in June, 1991. This declaration was welcomed throughout the world. The immediate implication of the sanctuary declaration has been to increase public awareness of cetaceans (whales, dolphins and porpoises) in Ireland. People are now becoming actively involved in the study and conservation of cetaceans in Irish waters. The Irish Tourist Board is encouraging the development of a whale and dolphin watching industry in Ireland. The successful management of Ireland's whale and dolphin sanctuary will require potential threats to cetaceans in Irish waters to be identified and quantified. This can be achieved by increasing publicity of the sanctuary and the integration of the fishing industry in management decisions. In view of the fact that most of the fishing activity in Irish waters is carried out by non-Irish vessels international collaboration will be necessary to achieve this end.

The Irish whale and dolphin sanctuary has been important in raising awareness of the importance of Irish waters for cetaceans. It is hoped that this awareness will lead to the *"preservation and protection of these magnificent creatures in their natural environment.....for future generations"*.



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