

Agenda Item 5.5

Implementation of the Triennium Work Plan  
(2010-2012) – Other Issues  
Extension of the Work of the Agreement  
into the New Agreement Area, incl. Areas  
Beyond National Jurisdiction

Document 5-09

**Intersessional Working Group on  
Research and Conservation Actions  
Undertaken in the Extended  
Agreement Area**

**Action Requested**

- Take note

Submitted by

Extension Area Working Group



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



## INTERSESSIONAL WORKING GROUP ON RESEARCH AND CONSERVATION ACTIONS UNDERTAKEN IN THE EXTENDED AGREEMENT AREA

Compiled by Peter G.H. Evans (WG Chair)

### Introduction

This group will review the current research and conservation efforts by Contracting Parties, Range states and others in the ASCOBANS extension area, and identify what opportunities for collaboration exist.

In February 2008, the ASCOBANS Agreement extended its area of coverage to include the Irish Sea and contiguous areas of the North East Atlantic from latitude 61°N and longitude 15°W to latitude 36°N and longitude 15°W eastwards (see Fig. 1). The primary logic for the change is that the distribution of many small cetacean species found within the original Agreement area extends further west and south than those original boundaries, as do the human pressures on those populations. It also hoped to make the Agreement more coherent in its coverage, and it removes the gap in cover that existed between ASCOBANS and the Agreement on the Conservation of Cetaceans of the Black and Mediterranean Seas (ACCOBAMS).

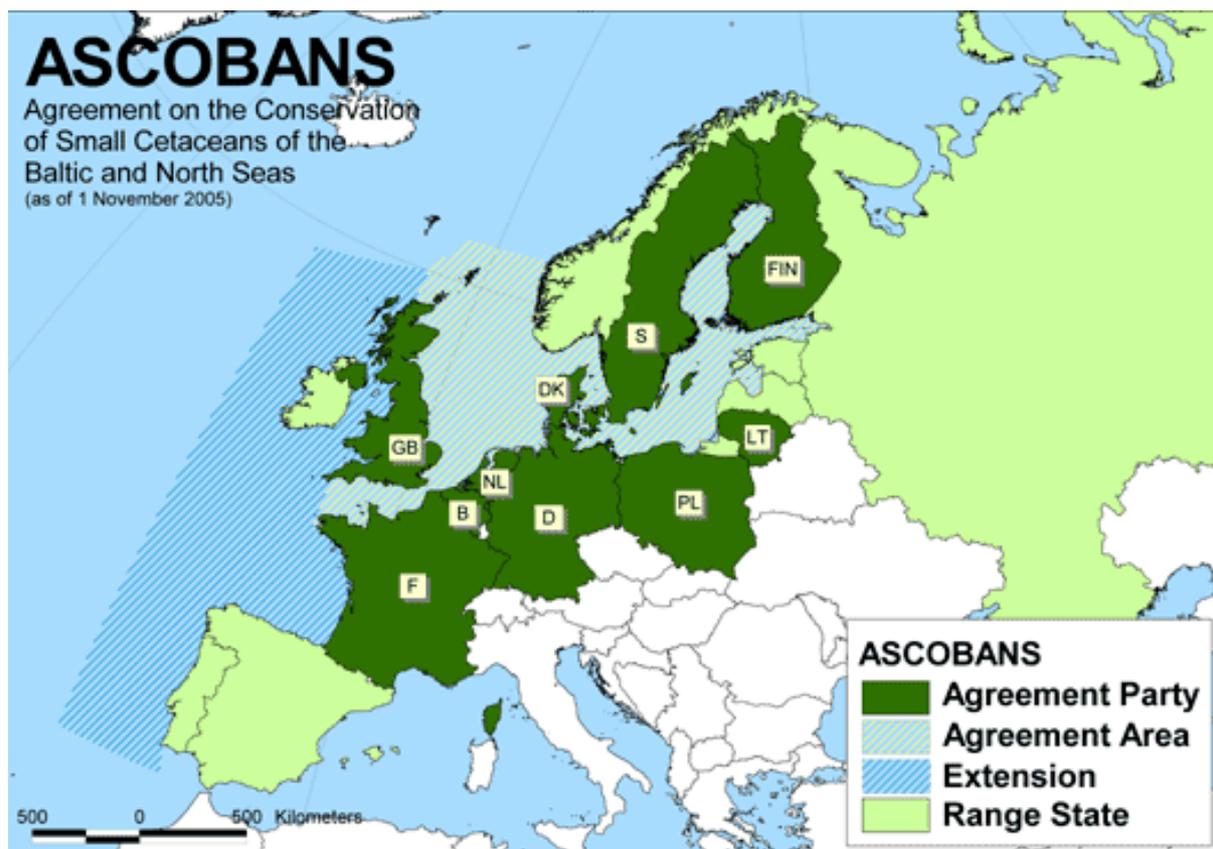


Fig. 1: Map of ASCOBANS Agreement Area showing Extension area covered by this Working Group

Since 2008, Parties have, by design, focused efforts on the North Sea and Baltic regions. This group will report on the current research activities and conservation status of small

cetaceans in the extension area to help ensure adequate consideration of this region by the Agreement.

### **Terms of Reference**

*Intersessional Working group on research and conservation actions undertaken in the extended Agreement Area*

1. Reporting will concentrate upon giving summary information on progress in the extension area to-date, identifying common themes and any region specific issues (e.g. particular fisheries, new pressures identified, local species abundance or trends).
2. To make recommendations to Contracting Parties on how the Agreement could address such issues.
3. To promote collaboration with ACCOBAMS and those non-Party Range States within the extended Agreement area.
4. The group will report back to the ASCOBANS MoP7

### **Membership**

UK, France, ACCOBAMS (open to any Contracting party/observer to ASCOBANS, IGO's) + any Government or NGO representative of non-Party Range States (Ireland, Spain and Portugal).

### **Summary of Recent Research & Conservation Actions in the Extension Area**

#### **a) United Kingdom**

Visual and acoustic vessel surveys have been conducted during summer months in West Scotland throughout the Sea of Hebrides, extending into the Minches and to an extent west of the Outer Hebrides (Hebridean Whale & Dolphin Trust, HWDT). These build upon earlier surveys by Sea Watch Foundation (SWF) and HWDT (Marubini *et al.*, 2009; Embling *et al.*, 2010; Booth, 2010). Most common species are harbour porpoise, short-beaked common dolphin, white-beaked dolphin, and minke whale. Photo-ID catalogues exist for minke whale, killer whale, bottlenose dolphin and Risso's dolphin (Anderwald, 2009; Foote *et al.*, 2009b; Cheney *et al.*, 2012; HWDT, SWF & WDCS, unpublished catalogues). The populations of bottlenose dolphin and killer whale in West Scotland are thought to be small, perhaps only 10-20 in the case of killer whale (Foote *et al.*, 2009b; HWDT & SWF, unpublished data) and c. 45 in the case of bottlenose dolphin, mainly around the Sound of Barra and Inner Hebrides (Cheney *et al.*, 2012).

The Manx Whale & Dolphin Watch (MWDW) actively recorded sightings of cetaceans in coastal waters around the Isle of Man, and undertook some opportunistic surveys, mainly targeting Risso's dolphin photo-ID.

Photo-ID surveys of bottlenose and Risso's dolphin were undertaken in North Wales by the Sea Watch Foundation, as part of the Connectivity Project funded by Countryside Council for Wales. The Whale & Dolphin Conservation Society (WDCS) continued its long-term photo-ID studies of Risso's dolphin around Bardsey Island. A collaborative effort by WDCS, MWDW, and SWF contributes to an Irish Sea Risso's dolphin Photo-ID catalogue, resulting in confirmation that individuals may range between Pembrokeshire, Bardsey Island area, Anglesey and the Isle of Man, and will return to the same locations from one year to the next.

Annual monitoring of bottlenose dolphin and harbour porpoise populations continued in Cardigan Bay, West Wales using photo-ID (bottlenose dolphin) and line transect survey (both species) (Veneruso and Evans, 2012). After earlier (2001-07) increases, abundance estimates of the bottlenose dolphin population of Cardigan Bay Special Area of Conservation show a general decline. In 2011, the overall Cardigan Bay abundance estimate for bottlenose dolphin was 296 (CV=28.8) and for harbour porpoise was 990 (CV=27.1), from line transect surveys. Life history parameters measured from photo-ID for bottlenose dolphin indicate a mean annual birth rate of between 5.2% and 7.7% (2001-11) depending upon whether a closed or open population model is adopted; an inter-calf interval ranging from 2-5 years, with 3 years being the most common; and calf mortality rates of 20.4% (year 1), 24.5% (year 2), and 10.2% (year 3) (Veneruso and Evans, 2012). Bottlenose dolphins from Cardigan Bay disperse in winter and generally move northwards in November to waters between Anglesey and the Isle of Man (and probably beyond) where they largely remain until the following April (Veneruso and Evans, 2012). Acoustic studies using T-PODs and C-PODs have been undertaken between 2009-11 (Hanna Nuuttila, PhD student, University of Bangor), extending earlier acoustic monitoring within Cardigan Bay SAC by SWF.

Other sightings surveys in the Irish Sea have been undertaken by the Irish Whale & Dolphin Group (IWDG), Friends of Cardigan Bay, Sea Trust South & West Wales, and SWF, either using platforms of opportunity such as ferries, or small chartered vessels. Land-based watches have been conducted around Irish Sea coasts, by various NGO groups (IWDG, MWDW, SWF, Cardigan Bay Marine Wildlife Centre, Ceredigion County Council, Marine Awareness North Wales, and Gower Marine Mammal Project).

Between 23 May and 25 June 2011, Marine Conservation Research International (MCRI) conducted a combined visual and acoustic survey of the Channel aboard RV *Song of the Whale*, with funding from the International Fund for Animal Welfare (IFAW). The survey covered 4,243 km in total, with 2,749 km on at least acoustic effort. Of the 397 hours of total cruise time, almost 37% (147 hrs) included visual effort; visual effort increased to 44% (100 hrs) of the 228 hours spent on the survey track. The survey yielded 16 visual encounters of three species of cetaceans (13 sightings of harbour porpoise, two of common dolphin, and one of white-beaked dolphin).

During the collection of seabirds at sea survey data, effort related cetacean sightings have also been collected. This data set includes over 13,000 cetacean records (comprising around 49,000 individual animals) from the period 1979-1997. Since publication of the cetacean Atlas (Reid *et al.*, 2003), the surveys have continued on an ad hoc basis, focusing in the North Sea. However, in 2010 a pilot scheme was initiated to assess the contribution that

annual ESAS cetacean observations on board the ICES International Bottom Trawl Surveys (IBTS) could make as part of the development of a UK monitoring and surveillance scheme. Through these surveys, there is coverage of UK shelf waters and some offshore areas, as well as adjacent waters of northwest Europe.

The Sea Mammal Research Unit have used spatial modelling to estimate absolute abundance and explore species-habitat relationships of cetaceans in European Atlantic waters. The analysis combined data from SCANS-II (surveyed in 2005), CODA (surveyed in 2007) and the Faroes block of TNASS (surveyed in 2007). Species for which abundance will be estimated are harbour porpoise, white-beaked dolphin, white-sided dolphin, bottlenose dolphin, short-beaked common dolphin, striped dolphin, long-finned pilot whale, minke whale, fin whale, sperm whale, and all beaked whale species combined. Results of these analyses should become available during 2012.

In the Irish Sea, an Atlas of marine mammal distribution was produced for the Countryside Council for Wales (Baines and Evans, 2009, 2012); harbour porpoise, bottlenose dolphin, short-beaked common dolphin, Risso's dolphin and minke whale were the five most frequently recorded species. Whilst at the NW European level, the Joint Cetacean Protocol (JCP, Paxton *et al.*, 2011, see <http://jncc.defra.gov.uk/page-5657>) has been further progressed with publication expected later in 2012. Effort-related cetacean sightings data from the ACSOBANS extended agreement area have been provided by governmental organisations, non-governmental organisations and from the offshore renewable energy sector. All major data sources are included e.g. SCANS I & II, CODA, European Seabirds at Sea (ESAS), SeaWatch Foundation (SWF) and other non-governmental organisations, as well as industry (e.g. in relation to potential renewable energy installations). These data, collected between 1979 and 2010, represent the largest NW European cetacean sightings resource ever collated. The JCP will deliver information on the distribution, relative abundance and population trends of the more common cetacean species occurring in NW European waters with the outputs assisting governmental reporting for various Directives (e.g. the Habitats Directive and the Marine Strategy Framework Directive) and will also improve the robustness of marine Environmental Impact Assessments. A preliminary phase of the project, covering the Irish Sea and west coast of Scotland, has recently been completed (Paxton *et al.*, 2011). This work was used to refine the modelling techniques that had been developed in earlier projects (Thomas, 2009; Paxton and Thomas, 2010).

Strandings schemes exist for all UK coastlines, with regional management by the Scottish Agricultural College, Inverness (for Scotland), Marine Environmental Monitoring (for Wales), and Institute of Zoology, London (for England). Results for the period 2005-10 have been compiled on behalf of all three bodies by Deaville and Jepson (2011). Harbour porpoise and common dolphin remain the most commonly recorded stranded species. Most common identified causes of death include fisheries by-catch, bottlenose dolphin kills (for harbour porpoise, particularly in Wales), starvation (mainly harbour porpoise), and infectious disease. An analysis of post-mortem examinations conducted between 1991 and 2010, showed a slight decline in the proportion of by-catch in UK stranded harbour porpoises and short beaked common dolphins, and a relative increase in the proportion of infectious disease and starvation in harbour porpoises.

In a net entanglement study for the Scottish government, seventeen (38%) of 44 stranded baleen whales within UK as a whole were known or inferred cases of entanglement, and where identified, these had usually been entangled in creel lines and other ropes (Northridge *et al.*, 2010). Most of the entanglements occurred in Scotland and involved minke whales, but there were also a number of humpback whales, and one sei whale. In Scotland, for 16 cases (53%) of 30 post mortem examinations of baleen whales, the cause of death was thought probably (2) or actually (14) to have been due to entanglement (Northridge *et al.*, 2010).

In 2010, the Cornwall Wildlife Trust launched the Seaquest Netsafe Project to increase its understanding of key cetacean species around the coast of Cornwall and work to identify practical means of reducing cetacean by-catch within fisheries. To date, the pinger trial has shown a 48% reduction in harbour porpoise activity around nets equipped with pingers (as measured by C-PODs) with no evidence for habituation to the pingers. Very few practical issues associated with using the pingers were recorded, although some concerns were raised about the cost and life span of pingers.

At the national level, a dedicated monitoring scheme is operated by the Sea Mammal Research Unit (SMRU), while collaborative links with the three Fishery Research Laboratories in the UK also allow selected observations from the Discard Sampling Programmes to be included in our assessments of cetacean by-catch. The observer scheme relies upon good collaborative links with industry. Nevertheless fisheries regulations were enacted in England and Scotland to ensure that there is also a legal obligation for skippers and owners to take observers when asked to do so.

Through agreement with the European Commission, the UK is now undertaking more limited monitoring in its pelagic trawl fleets, except where cetacean by-catch is known to be a concern, or where there is insufficient information to form an assessment of likely by-catch rates. Instead, most sampling effort is now directed at under 15m vessels using static gears in subareas VII and IV, while the over 12m vessels that are involved in ongoing trials of acoustic mitigation devices are also subject to ongoing collaborative study.

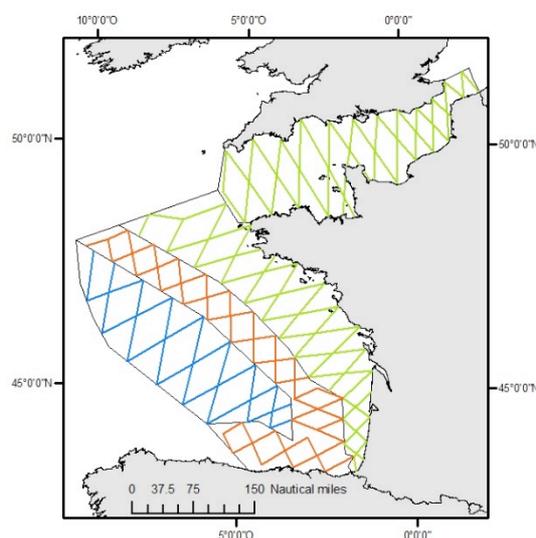
Work on mitigation continues to focus on the use of one specific type of acoustic deterrent device (DDD). These devices are being used in the UK component (outside 12NM) of the midwater pair trawl fishery for bass in the Western English Channel with continued success. A variant of the same device is being adopted by the over 12m gill and tangle net fleet in the Western Channel and Celtic Sea. Observations on this fleet segment continue to demonstrate the effectiveness of these devices in minimising porpoise by-catch, but the effects on common dolphins is not yet clear. This work has been expanded and includes deployment in the static net fisheries in the Southwest and the North Sea. Firm conclusions on the devices effectiveness and safety should become available in 2012.

## b) France

### **Distribution**

#### *Visual surveys from aircrafts*

In the Natura2000 framework, PACOMM (*Programme d'acquisition de connaissances sur les oiseaux et mammifères marins*) aims to describe the initial state of cetacean and seabird distribution and hotspots in the French EEZ and their seasonal variation, in order to support the management strategy of existing and proposed Natura 2000 sites and contribute to the design of new ones offshore. The main cetacean project included in PACOMM is a series of aerial surveys to be conducted during two consecutive years in winter (November 2011 and 2012 to February 2012 and 2013) and in the summer (May to August 2012 and 2013). These aerial surveys, named SAMM (*Suivi Aérien de la Mégafaune Marine*), cover the entire French EEZ and some adjacent waters. The survey follows a line-transect methodology conducted at low altitude (600 feet) and constant speed (90 knots) along pre-determined linear transects designed in 4 bathymetric strata (coastal, shelf, slope, oceanic).



**Fig. 2:** Spatial range of the study area in the ASCOBANS area, with design effort into each stratum (shelf in green, slope in orange, oceanic in blue; the coastal stratum not shown extends from the coastline to 12 nm offshore)

The first winter survey (Nov 2011 to Feb 2012) has just been completed. In the English Channel, 270 cetacean sightings of six species were obtained from 72 hours of effort (6 000 nm). Harbour porpoise and common dolphin are the dominant species in the eastern Channel and in the western Channel respectively. In the Bay of Biscay, 610 cetacean sightings of 11 species were collected from 125 hours of effort (12 000 nm). Dominant species are the common dolphin, bottlenose dolphin and harbour porpoise.

#### *Visual surveys from research and other vessels*

Cetacean distributions were surveyed over the shelf of the Bay of Biscay (April-May, PELGAS and PELACUS surveys, and October-November, EVHOE survey) and English Channel (January, IBTS survey) by the University of La Rochelle (ULR) in order to determine relative abundance, preferential habitats and relationship with distribution of pelagic fish as determined by simultaneous acoustic survey carried out by the *Ifremer/ Instituto Español de*

*Oceanografía* (IEO) research vessel *Thalassa* (Certain *et al.*, 2008, 2011). This survey followed a standardised protocol in use since 2003 in the Bay of Biscay (starting on the PELGAS surveys). Since 2007, ULR and IEO *Vigo* co-operated to collect data on cetacean distribution by using the same protocol in April in the south of the Bay of Biscay (PELACUS surveys). Finally, in 2010, ULR collected sightings from a benthic fish survey over the shelf of the Bay of Biscay in October and November (EVHOE surveys, *Ifremer*). Data on top predators from PELGAS, PELACUS, EVHOE and IBTS surveys are stored in a single database managed by ULR. During the nine PELGAS surveys conducted from 2003-11, 720 cetacean sightings of 11 cetacean species were collected from 18 000 nm of effort. The main features of cetacean distribution revealed high densities of common dolphins between the 30-100m isobaths in May, highest concentrations of bottlenose dolphins from the 150 isobath to the continental slope and a high diversity of delphinids, including long-finned pilot whales, along the shelf break. By comparison, the middle of the continental shelf exhibits low density of small cetaceans in May. Preliminary data collected in the autumn would suggest less contrasted distribution patterns for bottlenose and common dolphins.

Cetacean sightings were collected from the research vessel, *Belgica* (MUMM), over the northern canyons of the Bay of Biscay in June. This survey, conducted in the framework of the European program *CoralFish*, has been carried out to identify and map deep-sea coral ecosystems at two locations in the northwestern Bay of Biscay. Data of cetacean sightings were collected in partnership between ULR and the Management Unit of the North Sea Mathematical Models (MUMM, Belgium).

A ferry from Roscoff (France) to Cork (Ireland) is used as a platform of opportunity to survey cetaceans across the Celtic Sea (Laboratory for the Study of Marine Mammals, Brest, LEMM-Oceanopolis).

In 2011, the two crews of the Patrol boat *Iris* of the Maritime Affairs were trained by Laboratory for the Study of Marine Mammals, Brest, LEMM-Oceanopolis to collect opportunistic sightings of cetaceans in the Bay of Biscay during their various missions: fisheries control and monitoring, navigation assistance and safety, pollution prevention, etc. It is planned to train other patroller crews in the current year. Since 2002, within a campaign named "Observons la Mer", opportunistic sightings have been recorded online or on dedicated paper forms and regularly compiled by the LEMM-Oceanopolis (Jung *et al.*, 2009).

#### *Acoustic survey for harbour porpoise*

Although the recent SCANS and SCANS-II surveys detected no or only a few harbour porpoises in French waters, about 150 have been found stranded yearly in recent time. To solve this apparent paradox, a large-scale passive acoustic survey is planned, to complement the visual surveys. As a preparatory step to this project still to be fully designed, a pilot study will be conducted in 2012 by deploying 15 C-PODs in order to test various issues regarding technical and logistical aspects.

#### ***Stranding and associated biological data***

##### *Stranding scheme*

The French stranding network is nationally coordinated by ULR under an agreement with the Ministry of the Environment. Local voluntary observers (generally under local

supervision by various institutions or NGOs) have been trained to process stranded cetaceans under a common standardised protocol. An annual synthesis of all stranding events reported in France is produced by ULR (Van Canneyt *et al.*, 2009, 2010).

Recent developments have been completed (H. Peltier, PhD thesis, 2011) to improve the monitoring value of long term stranding data series by modeling the drift of cetacean carcasses and constructing a set of predictions for cetacean stranding under a null hypothesis, defined as a homogenous and constant cetacean distribution across study area (from northern North Sea, to southern Bay of Biscay) and period (1990-2009). An analysis of porpoise stranding data from Belgium, France, the Netherlands and the UK over the period 1990-2009 revealed an increase in long term stranding anomalies for harbour porpoise starting in the early 2000's. This increased stranding anomaly appeared first in the southern North Sea, then along the Channel and Bay of Biscay coasts, and finally along the eastern North Sea. Changes in harbour porpoise stranding anomaly were consistent with several local visual surveys and with the two SCANS surveys carried out in 1994 and 2005. Similarly French and UK common dolphin stranding data were analysed. Ultimately this work is aimed to develop cetacean population indicators based on stranding data to be incorporated in national and international monitoring strategies.

#### *Tissue bank and biological studies*

Stranded cetacean and to a lesser extent by-catches are an invaluable source of biological samples. Health status, cause of death, body condition, population structure (heavy metals and contaminants, P. Mendez-Fernandez PhD thesis), age composition and reproductive status (Dabin *et al.*, 2008; L. Mannocci, MSc thesis) and dietary ecology (stomach content, J. Spitz PhD thesis, 2010; stable isotopes, T. Chouvelon PhD thesis) are documented.

During the last decade, by-catch in fisheries was diagnosed for 40% of the common dolphins and represented up to 80% during the multiple stranding events regularly observed along the Atlantic coast in winter. The analysis of ecological tracers, such as heavy metal, fatty acids, stable isotopes, suggests that common dolphins living on the continental shelf may represent a separate management unit (Caurant *et al.*, 2009). The impact assessment of by-catch on the common dolphin population by demographic and management oriented modelling reveals that current by-catch would be unsustainable under the hypothesis of the neritic common dolphins constituting a separate conservation management unit (Mannocci *et al.*, 2012). The common dolphin neritic unit would be decreasing at a yearly rate of -4%.

Large whales (fin whale, sperm whale, minke whale) recorded stranded were mostly identified as related to vessel strikes. A closer examination of the stranding time series of stranded beaked whale along the coast of France during the period 1970-2010 suggests that in several instances, events occurred in short series of 2 to 8 animals reported from fairly restricted stretches of coastline, suggesting unusual mortality events, plausibly in relationship with naval exercises (Dabin *et al.*, 2011).

Field surveys have reported a general shift in harbour porpoise distribution in European waters during the last 15 years, including a comeback along the coasts of France. In a study in progress, the University of Brest and Oceanopolis analysed the genetic polymorphisms at a fragment of the mitochondrial control region (mtDNA CR) and at 7 nuclear microsatellite

loci for 52 animals stranded and by-caught between 2000 and 2010 along Atlantic French coasts. The analysis of nuclear and mitochondrial genomes has led to contrasting results. The mtDNA revealed two genetically distinct groups, one closely related to the Iberian and African harbour porpoises, and the second group related to individuals from the more northern waters of Europe. In contrast, nuclear polymorphisms did not reveal such a group distinction. Nuclear markers suggested that harbour porpoises behaved as a random mating unit along the Atlantic coasts of France. The difference between the two kinds of markers can probably be explained by the difference in their heritability, the mtDNA being maternally inherited in contrast to nuclear loci that are bi-parentally inherited. The results provide evidence that a major proportion of the animals sampled are admixed individuals from the two genetically distinct populations previously identified along the Iberian coasts and in the North East Atlantic. The French Atlantic coasts are clearly the place where these two previously separated populations of harbour porpoises are now meeting. It is strongly suspected that the present shifts in distribution of harbour porpoises around French coasts may be caused by habitat changes that will need to be further studied.

#### *By-catch studies*

By-catch in French fisheries has been regularly studied since 2007 in the application of the EU regulation 812/2004. Observers on board are used in pelagic trawling and set net fisheries in those areas fished within the Bay of Biscay. The tuna fisheries and bass fisheries both may cause by-catch (mainly common dolphins), and the average annual quantities are now well known. By-catch of porpoises, as well as some by-catch of striped dolphins and common dolphins, exists in the Bay of Biscay and in the western inshore fishing areas of the Iroise Sea. The observations on board vessels have provided an extrapolated estimate of some hundreds of porpoise caught annually in set nets from French vessels during recent years in the Bay of Biscay.

Some information on the by-catch rate of porpoise exists also for the set nets in the French fishing areas of the western part of the English Channel as a result of the FilMancet project. The present situation in the Bay of Biscay is not clearly established as the data for set nets are now of poorer quality over the last two years, but data provided by Spain (in their national report) seem to indicate that significant by-catch of porpoises was still occurring in the Bay of Biscay area during the year 2010. Synthesis of the knowledge on by-catch in the French areas of Bay of Biscay and the Celtic Seas have recently been achieved for the Marine Strategy Framework Directive (Morizur *et al.*, 2011), and the documents are available on internet.

#### **c) Ireland**

Systematic surveys are undertaken by the Irish Whale & Dolphin Group (IWDG); University College Cork; Coastal & Marine Research Centre, Cork (CMRC); and Dúlra Research (DR). Effort has concentrated upon the south and west coasts with offshore surveys west of Ireland. Impact monitoring of the Corrib gas pipeline in Broadhaven Bay, Co. Mayo has involved vessel surveys and land-based watches. Monitoring of the resident bottlenose dolphin population in the Shannon Estuary has continued (Berrow *et al.*, 2010).

Policy and Recommendations from Cetacean Acoustics, Surveying and Tracking (PReCAST) is a partnership between IWDG and the Galway-Mayo Institute of Technology (GMIT). This three-year project (2008-2011) aims to provide robust scientific data to support conservation policy and provide guidance to state agencies in implementing national and international obligations and in so doing to build national capacity in the area of automated assessment and monitoring wildlife populations. PReCAST is funded by the Marine Institute under the NDP Sea Change initiative and the National Parks and Wildlife Service.

Standardised dedicated inshore boat-based surveys of the north-west, west and south-west were carried out between August and October 2010, by IWDG, under contract from the Irish government. A total of 92 sightings were made of a total of 528 individuals of at least five species (Ryan *et al.*, 2010). Density and abundance estimates were derived for common dolphins in the west survey area (4.56 individuals/km<sup>2</sup>) equivalent to an abundance estimate of 5,254 (CV = 0.44) and in the southwest survey area (2.44 individuals/km<sup>2</sup>), equivalent to an abundance of 2,812 (CV = 0.45). These were extended into the Irish Sea in 2011, with two survey blocks covered (north-east & east), and density/abundance estimates for harbour porpoise derived.

A population assessment of the bottlenose dolphins living in the Lower River Shannon cSAC was undertaken (Shannon Dolphin & Wildlife Foundation, SDWF) between July and October 2010 (Berrow *et al.*, 2010). During 12 transects, a total of 64 dolphin groups were encountered with 547 individuals recorded. The proportion of dolphins with identifiable marks (Grade 1 only) ranged from 0.60 to 0.63. The estimated abundance of marked individuals was elevated depending on the estimated proportion of marked individuals in the population to give a final estimate of 107 (CV=0.12). Previous abundance estimates for bottlenose dolphins in the Lower River Shannon cSAC ranged from 114 in 2008 to 140 in 2006. This suggests that, within the power of the survey technique, the population of bottlenose dolphins in the Lower River Shannon cSAC is relatively stable. Dedicated surveys were made in other areas around the coast of Ireland at different scales, mostly carried out in coastal areas and embayments (UCC, CMRC, DR), with some surveys extending to the edge of the continental shelf (IWDG, DR).

A genetic structure analysis using 62 biopsy samples from free ranging bottlenose dolphins and 23 necropsies from stranded animals, has revealed fine-scale population structure among three distinct populations (Mirimin *et al.*, 2011). The Shannon Estuary population appears to be genetically isolated from adjacent coastal areas, with the exception of four animals sampled from a small group of six dolphins that are now resident in Cork Harbour (south coast) indicating ongoing gene flow or recent dispersal between these two areas. A second genetically distinct aggregation was identified in the Connemara–Mayo region, where recent photo-ID studies have suggested that dolphins found in this area show a degree of site fidelity. The study found moderate nuclear (15 microsatellites) and low mitochondrial (544 bp of the control region) gene diversity in dolphins using the Shannon Estuary and the Connemara–Mayo region, while dolphins that stranded along the coast showed markedly higher levels of gene diversity at both classes of markers. Specifically, these stranded dolphins formed a third genetically distinct cluster, which may be part of a larger pelagic population, as also suggested by the high levels of gene diversity.

A number of organisations/individuals have used a variety of Platforms of Opportunity to collect sightings data in the waters around Ireland. These include IWDG (particularly ferry surveys in the Irish Sea), UCC (aboard fishing vessels), SDWF and Dúlra Research (ecotourism vessels). Some of these data are effort related. Sightings data are archived at the National Biodiversity Data Centre in Waterford. A standardized land-based monitoring scheme is also currently underway at eight regional sites up to the end of 2012, funded by the government and with IWDG as contractor.

Onboard observer programmes aboard fishing vessels were in operation during 2010 (Marine Institute, MI/BIM), including a dedicated cetacean programme to examine by-catch in pelagic trawls in compliance with the EU 812 Directive (McCarthy *et al.*, 2011). Towards the end of the calendar year 2010, dedicated observers monitored pelagic trawls targeting albacore tuna and herring. No by-catch was observed in these trips.

The Cetacean Strandings Scheme, funded by the Irish government and managed and co-ordinated by IWDG, operates throughout the year around the entire coastline of Ireland (Northern Ireland and the Republic of Ireland). Records are received from IWDG members, National Parks and Wildlife Conservation Rangers and members of the public, usually by e-mail or phone. All records are validated by the IWDG and published in the Irish Naturalists' Journal (O'Connell and Berrow, 2011).

A total of 92 stranding records were reported during 2010. Ten species were identified with the most frequent being harbour porpoises (25%) and common dolphins (23.9%). Twenty strandings were of live animals representing 21.74% of total stranding incidents. This figure compares with 2008 and 2009 when live strandings accounted for 13.33% and 16.91%, respectively. A small number of individuals were recovered for post-mortem examination (IWDG, UCC).

A spatially explicit model of cetacean and fisheries overlap is currently being developed (UCC). This model will be used to examine various factors that may contribute to cetacean by-catch. A number of testable hypotheses will be considered including: "random hypothesis" where cetaceans and fisheries overlap in a mechanical sense; "prey hypothesis" where cetaceans and fisheries share the same prey and are therefore attracted to the same area; and "attraction hypothesis" where cetaceans are attracted to fishing activity. "Hot spot" areas, with high potential for by-catch, will be identified and will be used to inform Ecological Risk Assessments for the Effects of Fishing for the waters around Ireland. Studies on diet of small cetaceans/fisheries interactions are on-going (UCC).

A PhD (UCC/UP) examining the population structure and habitat use of bottlenose dolphins in Irish coastal waters has recently been undertaken and an MSc thesis looking at the impact of gas pipeline construction on cetacean habitat use using PAMs, has been completed (M. Coleman, 2011). DeepPAM project is studying the use of passive acoustic monitoring technologies for monitoring sub sea canyon habitat use by beaked whales off the west coast of Ireland (IWDG/GMIT). This is a 6-month pilot study and is complemented by deployment of Deepwater C-POD on the M6 weather buoy in abyssal habitat to the west of the Porcupine Bank.

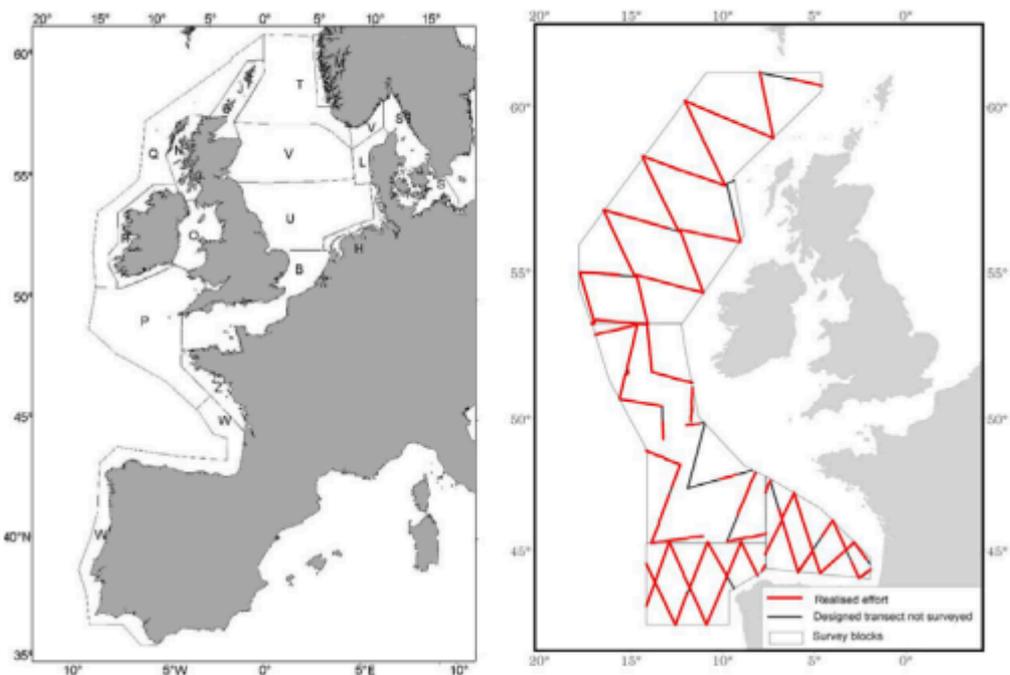
Measures under Ireland's action plan for cetaceans, the *Conservation Plan for Cetaceans in Irish Waters* (Dec. 2009), have been progressing in the June 2010-May 2011 period (NPWS). The plan identifies the primary pressures and the administrative and scientific gaps that pose a threat to the protection of cetaceans in Ireland, and identifies clear measures required to ensure such threats are addressed. It consists of five main programmes of measures presented in a delivery grid against which progress can be clearly measured. A number of actions have commenced or been completed in the June 2010 - May 2011 period including several species/site monitoring, research and management actions (e.g., SAC monitoring, regional cetacean monitoring, maintenance of a national stranding scheme, establishment of an Irish marine mammal database, case-specific risk assessments via the statutory consultation process). Details of a National Cetacean Protection Strategy have also been elaborated. Its three-pillared approach underpinned by the Conservation Plan focuses on (i) designating and monitoring SACs, (ii) ensuring general regulatory and administrative functions are sufficiently rigorous, and (iii) pursuing an integrated strategy for general surveillance of cetaceans.

The Conservation Plan and its accompanying Delivery Schedule and National Cetacean Protection Strategy are available on the website of the National Parks & Wildlife Service, Department of the Environment, Heritage and Local Government ([www.npws.ie/marine](http://www.npws.ie/marine)).

#### **d) Spain**

The SCANS-II and CODA cetacean sightings surveys produced spatial distribution/density maps for several species around the Atlantic coasts of the Iberian Peninsula. In July 2005, the SCANS-II survey estimated 17 916 common dolphins in the continental shelf waters of the southern Bay of Biscay and Atlantic Iberia. The abundance estimation for the Iberian population of porpoises was 2646 animals (CV = 0.80) and 3 935 for the bottlenose dolphin population (CV = 0.38) (SCANS-II, 2008; ICES, 2011).

During July 2007, a CODA survey was undertaken in European offshore waters. Density surface maps provided information on predicted spatial distribution of abundance and habitat use for the more abundant species. Common and striped dolphins displayed a similar distribution, with higher densities predicted to occur in the southern part of the surveyed area (Bay of Biscay), and associated with the shelf break. In the southern Bay of Biscay the abundance of common dolphins was 38 673 (CV = 0.46) and 21 071 individuals (CV = 0.51) in the northwest coast of Spain. For striped dolphins the abundance estimation in the southern Bay of Biscay was 17 108 (CV = 0.44) and 10 501 (CV = 0.42) offshore Galicia. The abundance of bottlenose dolphins was estimated as 1 174 (CV = 0.45) in the southern Bay of Biscay and 876 (CV = 0.82) individuals in Galician offshore waters. Sperm whale predicted density was highest in the northwestern waters of the Iberian Peninsula (656 animals, CV = 0.34) and in the inner part of the Bay of Biscay (477, CV = 0.33). A main area of distribution was predicted for beaked whales in the inner part of the Bay of Biscay in association with deep underwater canyons (2 156 individuals, CV = 0.5). High densities of fin whales were predicted in front of the Galician coasts (3 206 animals), in depths between 1,000–3,000m (CODA, 2009; ICES, 2010).



**Fig 3:** (a) Survey blocks defined for the SCANS II survey: Blocks S, T, V, U, Q, P and W were surveyed by ship. The remaining blocks were surveys from aircraft (SCANS-II 2008)), (b) CODA survey region divided into the survey blocks, and survey route (in red) (CODA 2009)

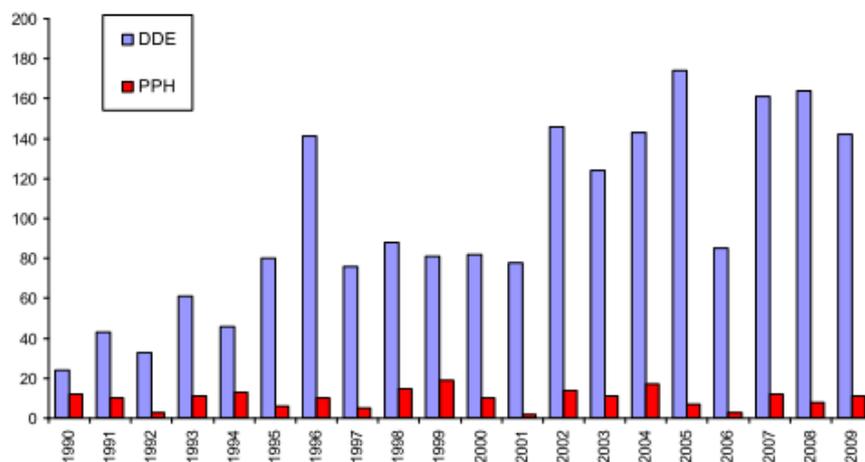
Sightings of marine mammal and seabirds have been routinely collected since 2007, during the spring (March-April) acoustic survey (“PELACUS”). This annual survey covers the northwest and northern shelf Iberian waters and aims to estimate pelagic fish abundance and characterise the pelagic ecosystem of the Galician and Cantabrian Sea shelf (Spanish Institute of Oceanography, Vigo, IEO). Three observers are placed on the RV *Thalassa* using the same methodology as used by CRMM in the Bay of Biscay during the French acoustic survey (“PELGAS”). Preliminary results on habitat use of some of the species have been presented in Louzao *et al.* (2011).

A programme of regular, systematic land-based surveys along the Galician coastline has been conducted by CEMMA (Coordinadora para o Estudo dos Mamíferos Mariños) since 2003. Results from analysis of the 2003-07 information have been published (Pierce *et al.*, 2010). Dedicated surveys have also been run by CEMMA over the Galician shelf from April to October since 2003, to provide information on distribution and habitat use of the different species (PhD project, A. Llavona, University of Vigo). Sightings of cetaceans have also been collected on an opportunistic basis by marine mammal observers placed onboard fishing vessels by CEMMA and the University of Vigo (e.g. López *et al.*, 2004; Spyarakos *et al.*, 2011).

Results from these studies indicate that bottlenose dolphins are the species most frequently sighted in Galician coastal waters, especially in those areas where the shelf is wider. Conversely, common dolphins are more frequently sighted in areas where the shelf is narrow and generally in deeper waters although the species has also been recorded in coastal waters. A cetacean sightings programme combining observations from ships and

land-based monitoring has been carried out in northern Spain by CEMMA in Galicia, AMBAR (Sociedad para el Estudio y Conservación de la Fauna Marina) in the Basque Country, CEPESMA (Coordinadora para el Estudio y la Protección de las Especies Marinas), and the Fundación para la Protección de los Cetáceos Atlánticos in Asturias. This programme has been financed by the Fundación Biodiversidad. Results have been summarised by Covelo *et al.* (2008). Land-based observations at 25 sites resulted in 60 sightings of four species (bottlenose dolphin, 46.7%; common dolphin, 36.7%; harbour porpoise, 3.3%; killer whale, 1.7%), mainly on the Atlantic and west Cantabrian coasts. Line-transect vessel surveys conducted over 2,490 km resulted in 61 sightings of seven species (bottlenose dolphin, 31.1%; common dolphin, 27.9%; long-finned pilot whale, 13.1%; minke whale, 4.9%; fin whale, 4.9%; striped dolphin, 3.3%; and Risso's dolphin, 1.6%), with highest numbers in west Cantabrian waters.

Several networks and organizations collect information on strandings along the north Spanish coasts including AMBAR in the Basque Country, CEPESMA on the coast of Asturias, and CEMMA in Galicia.



**Fig. 4:** Number of harbour porpoises (PPH) and common dolphins (DDE) stranded along the Galician coast (1990-2009) (CEMMA, unpublished data). (Taken from ICES, 2010)

Studies on the life history and the interactions with fisheries of other small cetaceans along the Galician coast are also being carried out based on analysis of stranded and by-caught individuals, interview data, marking of carcasses, voluntary reporting and evaluation of evidences of by-catch in stranded animals (PhD project, F. Read, University of Vigo; PhD project, S. Goetz, Universities of Aveiro and Kiel; see also for example García *et al.*, 2011; Goetz *et al.*, 2011; Martínez Cedeira *et al.*, 2011).

Analysis of the stranding records in Galicia (available since 1990) indicates that the common dolphin is the species most frequently stranded (López *et al.*, 2002). An increase in the number of stranded *D. delphis* has been observed since 2000, with a peak of 174 individuals in 2005 (see Figure 4, taken from ICES, 2010).

**Table 1:** By-catch diagnosis from harbor porpoise strandings in Galicia, 1990-99 and 2000-09

TIME-PERIOD	STRANDINGS	EXTERNAL EXAMINATION	EVIDENCE OF BYCATCH	% BYCATCH*
1990–1999	104	45	14	31.1
2000–2009	95	27	8	29.3

\* These figures are expressed in relation to the number of animals examined externally and represent a minimum estimate.

During the last decade, an average of 9.5 porpoises stranded per year in Galicia (see Fig. 4) of which 29.3% showed signs of by-catch. Earlier data (1990–1999) indicated 10.4 porpoise strandings/year with a larger proportion of by-catches (31.1%) (CEMMA, unpublished data) (see Table 1, taken from ICES, 2010).

Incidental catches of cetaceans are routinely monitored through IEO fisheries observer's schemes in different long distance and domestic fisheries, including the trawl fishery in ICES Areas VII, VIII and IX.

To comply with Regulation (CE) nº 812/2004, the IEO was funded by the General Secretary for the Sea (Ministry of Environment and Rural and Marine Affairs) to carry out a pilot observer program to monitor the incidental catch of cetaceans in the gillnet fishery (GNS) in ICES Areas VII and VIIIab. In 2009, the incidental catches in this fishery were estimated as 302 and 72 harbour porpoises (respectively in VIIIa and VIIIb) and 773 common dolphins in VIIIa (ICES, 2011; see Fig. 5 for map of ICES areas).

Diet analyses of all marine mammal species stranded and by-caught in Galicia have been carried out since 1990 (e.g. Pierce *et al.*, 2007; Santos *et al.*, 2004; 2007a,b; 2011). In addition, inferences on diet have also been obtained from the analysis of the stable isotopes in muscle and skin samples of bottlenose dolphins stranded and by-caught in Galicia and their main prey (Fernández *et al.*, 2011a), long finned pilot and minke whales (PhD S. Monteiro, University of Minho) and in muscle of five cetacean species and their prey (Méndez *et al.*, 2012).

Stable isotopes and trace elements (Cadmium) levels have been used to investigate the existence of long-term ecological segregation in common dolphins, striped dolphins, harbour porpoises, bottlenose dolphins and pilot whales (Mendez *et al.*, In Prep.). Analysis of microsatellites and mitochondrial DNA (Fernández *et al.*, 2011b) indicated the presence of two sub-populations of bottlenose dolphins within Galicia, with the resident population inhabiting the southern Galician rias (river valleys) being genetically distinct. No estimates of the size of this population are available. Photo-ID studies have identified ca. 90 individual bottlenose dolphins over a period of three years, of which only 15 were re-sighted after three years (MSc project, García-Pérez, 2011, University of Vigo).

The Iberian population of harbour porpoises has been identified as genetically isolated from the rest of Europe (Fontaine *et al.*, 2007, 2010). It has been proposed for management as an independent demographically significant unit (Evans *et al.*, 2009). Recent genetic analysis suggests a separation between this population and the one inhabiting the northwest African coast (ICES, 2010). Life history analysis of stranded and by-caught porpoises (Read *et al.*, 2011) indicate that there are very few older animals in the Galician population, as over 85% of stranded animals were 10 years old or younger (n = 103 porpoises stranded between 1990 – 2009).

Genetic analyses are also being carried out on population structure of long finned pilot whales in Atlantic waters (PhD project, S. Monteiro, University of Minho).

**Table 2:** Designated Special Areas of Conservation with presence of Annex II cetacean species in Atlantic Spain

Spanish Autonomous region	STECODE	Site Name	Marine surface (Ha)	<i>Tursiops truncatus</i>	<i>Phocoena phocoena</i>
Galicia	ES0000001	Illas Cíes	544,64	x	
Galicia	ES1110005	Costa da Morte	4.966,30	x	x
Galicia	ES1110006	Complexo húmido de Corrubedo	7.404,99	x	x
Galicia	ES1140004	Complexo Ons - O Grove	5.382,25	x	x
Galicia	ES1140010	Costa da Vela	989,85	x	x
Asturias	ES0000317	Penarronda-Barayo	3.344,12	x	x
Asturias	ES0000318	Cabo Busto-Luanco	7.662,89	x	x
Asturias	ES0000319	Ría de Ribadesella -Ría de Tinamayor	4.937,36	x	
Asturias	ES1200047	Yacimientos de Icnitas	3.222,52	x	x
Asturias	ES90ATL01	El Cachucho	234.952,22	x	
Andalucía	ES0000337	Estrecho	9.392,75	x	x
Andalucía	ES6120017	Punta de Trafalgar	550,26	x	

Since 2007, CEMMA has carried out a study to investigate and evaluate the potential impact of interactions between coastal populations of bottlenose dolphins and the different boat types in Galician ports. The study began in the ports of Portonovo and Sanxenxo and was extended to the ports of Ribeira in 2010 and Portosín in 2011. Results from 262 sightings indicate that, in most cases, dolphins reacted to the approach of the vessels, generally moving away, although on some occasions approaching the boats. In those cases when the boats actually harassed the dolphins, they showed avoidance reactions ranging from changes in direction, prolonged dives, and hitting the surface of the water with the tail (Llavona *et al.*, 2009, MSc projects, Sabela Fonseca, University of Santiago de Compostela, and Richard Sirmel, University of Southampton).

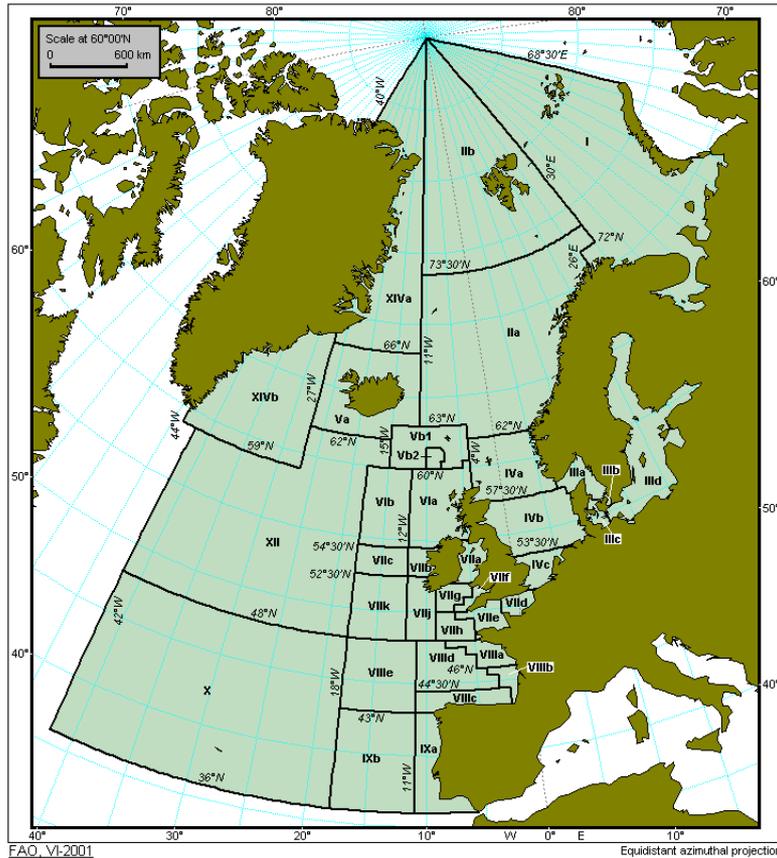


Fig. 5: Map of ICES Sea Areas



Fig. 6: Map of Spanish candidate SACs under the INDEMARES Project

Several studies have been carried out on marine spatial planning in Spain (see for example: Suárez de Vivero *et al.*, 2009). More specifically a strategic study has been done to characterize the Spanish maritime area for wind farm installations (See: [http://www.mityc.es/energia/electricidad/RegimenEspecial/eolicas\\_marinas/Paginas/estudioEstrategico.aspx](http://www.mityc.es/energia/electricidad/RegimenEspecial/eolicas_marinas/Paginas/estudioEstrategico.aspx), in Spanish).

There are 12 designated Special Areas of Conservation (SAC's) with presence of cetacean species in the ICES area. The main characteristics and locations of these areas are provided in Table 2 above (see also ICES, 2011, Annex 2).

The LIFE+ INDEMARES project is collecting information on 10 other candidate marine areas (<http://www.indemares.es/>, see Fig. 6 above). As part of the work for this project, CEMMA has carried out dedicated boat-based surveys to study cetacean distribution and abundance on the Galician Bank and Cañón de Avilés candidate areas (Fig. 6). Most frequently seen species (86 sightings) were fin whale and striped dolphin on the Galician Bank, and bottlenose dolphin and Cuvier's beaked whale (62 sightings) in the Cañón de Avilés (Llavona *et al.*, 2011).

### e) Portugal

Vessel surveys have been undertaken in northern Portugal by SPVS (Sociedade Portuguesa de Vida Selvagem, Wildlife Portuguese Society) and Escola de Mar (Sea School), with land-based observations made in central and southern Portugal. In 2007 and 2008, Escola de Mar conducted a total of 63 boat-based visual surveys from three different geographic locations, Nazaré, Peniche and Sesimbra, and as a result, 45 independent sightings of cetaceans were recorded. The most frequent small cetacean species off the Portuguese mainland coast was the short-beaked common dolphin followed by bottlenose dolphin and striped dolphin (Brito *et al.*, 2009). Overall, the small delphinid community along the central coast of Portugal is similar to the one that can be found along the Iberian shore (Brito *et al.*, 2009).

Population genetic analyses have been conducted on common dolphin populations inhabiting near-shore waters of the Portuguese mainland coast (Amaral *et al.*, 2007, 2012; A. Moura PhD study, University of Durham). Tissue samples were collected from stranding animals along the Portuguese mainland coast, comprising a total of 45 (35 from the northern and central coasts and 10 from the southern coast). 630 bp of the mitochondrial DNA (mtDNA) control region and 1121 bp of the mtDNA cytochrome *b* gene were PCR amplified and sequenced. Measures of genetic diversity obtained were within the range described for other cetacean species and no significant genetic differentiation was observed, thus meaning that a single common dolphin population inhabits the Portuguese mainland coast (Amaral *et al.*, 2007). These samples have been included in a broader phylogeographic study, including *D. delphis* from the Atlantic, the Pacific and Indian Oceans, *D. capensis* from the Pacific and *D. capensis tropicalis* from the Indian Ocean. Preliminary results of this study, which was based on sequences from the mitochondrial cytochrome *b* gene, indicate that two different groups/populations exist in the Northeast Atlantic, with common dolphins off the Portuguese mainland coast included in both groups. These preliminary results also seem to indicate that the current taxonomy within the genus *Delphinus* is not verified in genealogical lineages, and this has important implications for stock management and conservation policies. Further analyses have been conducted in order to clarify taxonomic status of common dolphin populations across their geographical distribution, and have found marine productivity and sea surface temperature to be correlated with genetic structure, with isolation occurring by distance (Amaral *et al.*, 2012).

The bottlenose dolphin that inhabits the Sado estuary is the only resident population in mainland Portugal. Around 25 individuals live in the estuary although the population has been in decline for some years (dos Santos *et al.*, 2010). An action plan for the safeguard and monitoring of the resident population of bottlenose dolphins from the Sado estuary has been put in place by ICNB since 2010. The main objective of this action plan is the protection and maintenance of this population through the improvement of its habitat quality. General objectives include: 1) Improvement of the conservation status of the bottlenose dolphin population; 2) Monitoring the environmental quality of the dolphins' habitat and 3) Involvement of the public opinion and local stakeholders for the urgent need to improve the environmental quality of the estuary and the protection of this resident population.

Several projects are already in place and these include: monitoring of the resident population; evaluation of the impact of maritime traffic on the resident population of bottlenose dolphins; habitat use inside the estuary by the resident bottlenose dolphins; habitat use outside the estuary and interactions with other coastal small dolphins (including coastal bottlenose dolphins); impact of fishing activities in the estuary on the resident population of bottlenose dolphins; environmental awareness campaigns in local schools; and publication of a children's story book about the Sado dolphins.

A formal stranding scheme covers the entire Portuguese coast and strandings are reported to the Instituto da Conservação da Natureza e da Biodiversidade (ICNB), and on some of these, a post-mortem examination is made. The last strandings summary was published for the years 1989-94 (Sequeira *et al.*, 1996).

The SafeSea project began in 2008 and during a 3-year period, has been collecting scientific data concerning small cetacean population status, and incidental captures of cetaceans in gillnets, purse-seine and beach purse-seine fisheries. The project has also involved the testing of deterrent devices (pingers and acoustic enhanced nets) in order to reduce incidental capture of cetaceans. Simultaneously the project has worked to increase the awareness of local fisherman communities towards a more sustainable exploitation of sea resources and to the conservation of threatened species. This project is a collaboration between Universidade do Minho, The Portuguese Wildlife Society (SPVS), CEMMA in Galicia, IMR (Institute of Marine Research) in Norway, and two fisheries producers (VianaPesca and Centro Litoral).

The SafeSea project (J. Vingada, SPVS) covers the central-northern coast of Portugal (about 300 km), between the village of São Martinho do Porto and Caminha. The area covered extends from the coastline to the 200-metre contour (30 to 50 km off the coast).

During the first year of the project, interactions between cetaceans and fisheries were evaluated, based on interviews with boat captains, on-board observers, and voluntary logbooks. At the same time, the evaluation of the distribution and abundance of cetaceans was initiated using three approaches: watches from coastal vantage points, opportunistic vessel surveys, and aerial surveys. The information collected during the first year was then used to help define the field trials with pingers and acoustic nets, as well as to make a cost/benefit analysis of the use of deterrent devices in Portuguese artisanal fisheries.

By-catch has been evaluated by use of different methodologies: on-board observers, interviews with boat captains, voluntary logbooks, tag and release of dead dolphins at sea, and a trial using electronic monitoring devices developed at Minho University.

Field trials with Fumunda pingers were carried out in three types of fisheries: purse-seine, gillnets and beach purse-seine. In each fishery, different ways to use pingers and also two types of pingers (10 kHz and 70 kHz models) were tested. These were followed by trials using acoustic enhanced gillnets and trammel nets.

Since 2011 a LIFE+ funded project (MARPRO) is in place, aiming at establishing SCIs for both seabirds and cetaceans (harbour porpoises and bottlenose dolphins) in the Portuguese EEZ. The project LIFE+ MARPRO is co-financed by the LIFE programme as a result of a partnership between the Aveiro University, Minho University, SPEA (Portuguese Society for the Protection of Birds), IPIMAR (Portuguese Fisheries Institute) and ICNB.

## **ACKNOWLEDGEMENTS**

I would like to thank the following for their input to this report: Willy Dabin, Jim Gray, Sami Hassani, Santiago Lens, Alfredo López, Yvon Morizur, Oliver O’Cadhla, Xavier Pantoja, Hélène Peltier, Eunice Pinn, Vincent Ridoux, Emer Rogan, Begoña Santos, Marina Sequeira, Olivier Van Canneyt, Toño Vázquez, and José Vingada.

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