

Agenda Item 4.3.1

Review of New Information on the Matters  
Relevant for Small Cetacean Conservation

New Agreement Area

Report and Recommendations of the  
Extension Area Working Group

Document 4.3.1

**Intersessional Working Group on  
Research and Conservation Actions  
Undertaken in the Extended  
Agreement Area: Update for the  
Period September 2013 to August  
2014**

**Action Requested**

- Take note
- Give Guidance

Submitted by

Working Group



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

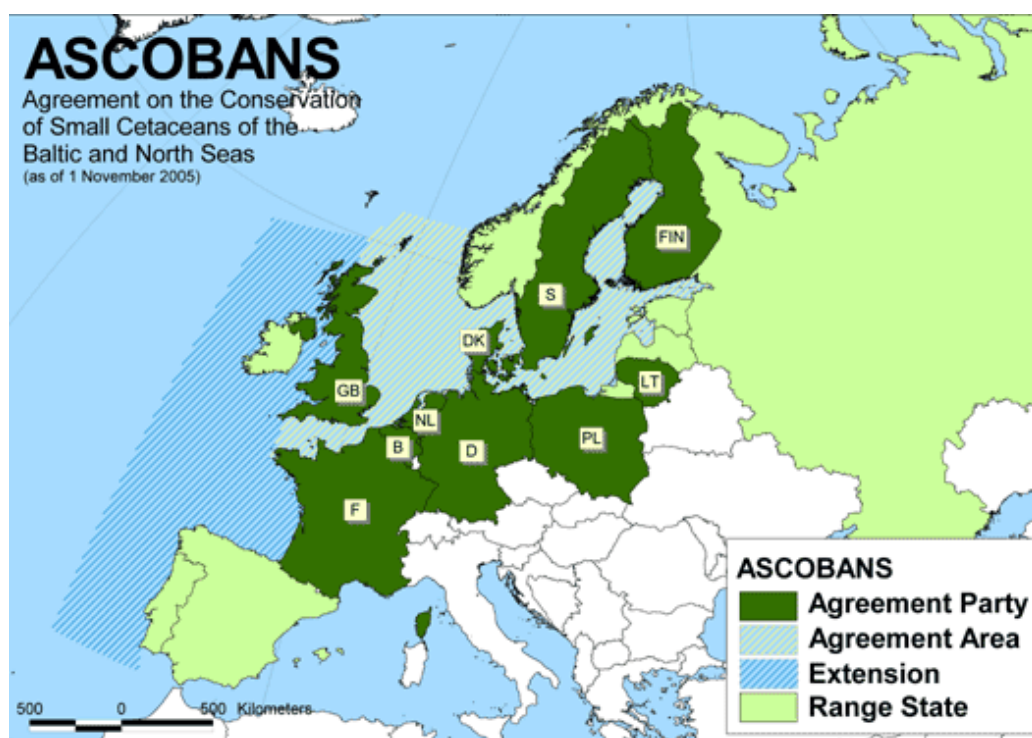


**INTERSESSIONAL WORKING GROUP ON RESEARCH  
AND CONSERVATION ACTIONS UNDERTAKEN  
IN THE EXTENDED AGREEMENT AREA:  
UPDATE FOR THE PERIOD SEPTEMBER 2013 TO AUGUST 2014**

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

## **Introduction**

This aim of this group is to review the current research and conservation efforts undertaken by Contracting Parties, Range States and others within the ASCOBANS Extension Area (Fig. 1), and to identify what opportunities for collaboration exist. A summary of recent research and conservation actions undertaken by country was presented in March 2012 at AC19 in Galway, Ireland and at AC20 in Warsaw in August 2013. The present report updates those, covering the last 12 months.



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

## **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) as well as 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**

#### *Marine Strategy Framework Directive*

The UK published the first part of its Marine Strategy as required under the Marine Strategy Framework Directive in December 2012. This contains the characterisation of Good Environmental Status (GES) and associated targets and indicators in UK waters. Part two of the UK Marine Strategy outlining UK monitoring programmes was published in July 2014. The final part of the UK Marine Strategy, programmes of measures necessary to achieve GES, will be consulted on during early 2015. Further information on implementation of the MSFD in the UK can be found on the UK government website<sup>1</sup>.

#### *Marine Protected Areas*

During 2013-14, analyses of harbour porpoise and bottlenose dolphin distributions were undertaken by DHI Consultancy Services using offshore survey datasets submitted to the Joint Cetacean Protocol on behalf of the Joint Nature Conservation Committee (JNCC). Alongside this exercise, surveys of coastal waters from land-based surveys were analysed by the Sea Watch Foundation (SWF). The aim of these studies was to determine whether for these Annex II species, any further areas suitable for designation as a Special Area of Conservation (SAC) under the Habitats Directive are present in UK waters.

In Scotland, Scottish Natural Heritage took forward the Marine Scotland-led Scottish Marine Protected Area (MPA) Project, to identify MPA search features within Scottish territorial waters for three species of cetaceans: Risso's dolphin, white-beaked dolphin and minke whale. SNH contracted CREEM (Centre for Research into Ecological and Environmental Modelling) at the University of St Andrews to analyse data from the JCP to determine whether persistent areas of high occurrence could be identified for potential MPA designation. Following on from their report (Paxton *et al.*, 2014), SNH has advised the Scottish Government of possible MPAs for minke whale and Risso's

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<sup>1</sup> <https://www.gov.uk/government/policies/protecting-and-sustainably-using-the-marine-environment/supporting-pages/implementing-the-marine-strategy-framework-directive>

dolphin. Further information on this project can be found on the SNH and Scottish Government websites<sup>2</sup>.

### *Surveys*

Visual and acoustic vessel surveys continue to be conducted during summer months in West Scotland throughout the Sea of Hebrides, extending into the Minches and to some extent west of the Outer Hebrides (Hebridean Whale & Dolphin Trust, HWDT). Visual ferry surveys have continued around the Small Isles (Rum, Eigg, Canna and Muck), with other vessel surveys further afield in the Sea of Hebrides and Minches in conjunction with basking shark observations (Sea Watch Foundation, SWF). Whale & Dolphin Conservation (WDC) has continued surveys targeting Risso's dolphin on the east coast of Lewis, Outer Hebrides, and has recently published the results of land-based surveys from the area between 2008-11 (Dolman *et al.*, 2014).

Images continue to be added to photo-ID catalogues for minke whale, killer whale, bottlenose dolphin and Risso's dolphin (HWDT, SWF & WDC). The populations of bottlenose dolphin and killer whale in West Scotland remain small.

During summer 2014, harbour porpoise, minke whale, common dolphin, Risso's dolphin, and killer whale have been seen regularly in West Scotland, with the first three species seen most frequently. Along the north coast of Scotland, large groups of white-beaked dolphins were observed in late July. In early August, two humpback whales frequented coastal waters around Stoer Head (SWF, unpublished data).

Further south around the Isle of Man, The Manx Whale & Dolphin Watch (MWDW) continue to actively record sightings of cetaceans in their coastal waters, undertaking some opportunistic surveys mainly targeting Risso's dolphin photo-ID. Some bottlenose dolphins were also photographed in Manx waters, and have been matched with individuals photographed within Cardigan Bay and off the North Wales coast.

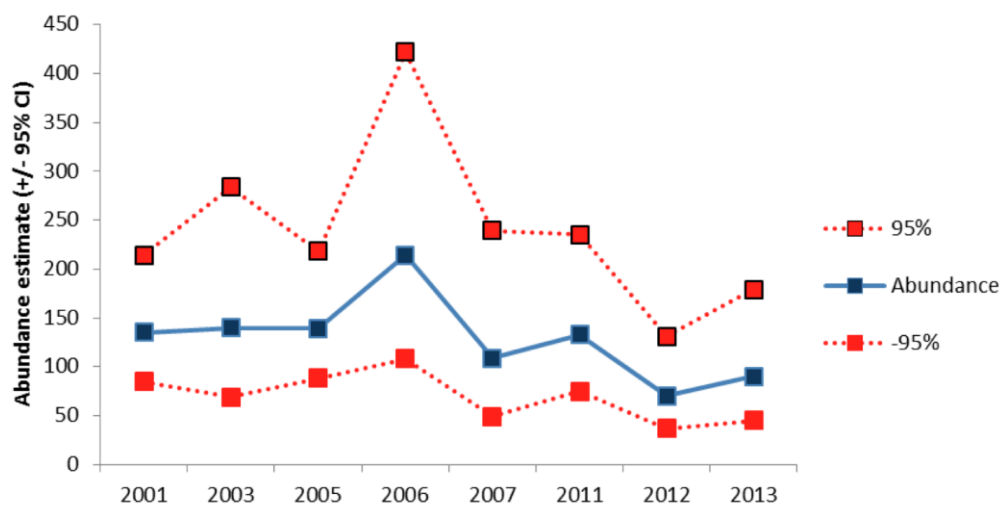
Annual monitoring of cetaceans by the Sea Watch Foundation continued in Cardigan Bay and Pen Llyn a'r Sarnau SACs under contract to Natural Resources Wales (NRW). Results for the years 2001-13 have been published (Feingold & Evans, 2014a). Further north around the north and east coasts of Anglesey and North Wales, ad-hoc photo-ID surveys of bottlenose and Risso's dolphins were continued by SWF as part of the Connectivity Project under contract to NRW (Feingold & Evans, 2014b). Whale & Dolphin Conservation (WDC) also continued its long-term photo-ID studies of Risso's dolphin around Bardsey Island (De Boer *et al.*, 2013, 2014). A collaborative effort by WDC, 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, returning to the same locations from one year to the next.

After earlier (2001-07) increases, abundance estimates of the bottlenose dolphin population of Cardigan Bay Special Area of Conservation have

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<sup>2</sup> [http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/national-designations/marine-protected-areas-\(mpa\)/](http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/national-designations/marine-protected-areas-(mpa)/) and <http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork>

shown a general decline (Figure 2), although this has not been mirrored over Cardigan Bay in general. On the other hand, porpoises have shown a marked decline in the last three years. In 2011, the overall Cardigan Bay abundance estimate for bottlenose dolphin was 309 (CV=28.3), and for harbour porpoise was 1074 (CV=28.7), from line transect surveys. Comparable figures in 2012 were 330 (CV=24.9) for bottlenose dolphin, and 565 (CV=20.4) for harbour porpoise; and in 2013, they were 254 (CV=26.8) for bottlenose dolphin and 410 (CV=20.4) for harbour porpoise. Life history parameters measured from photo-ID for bottlenose dolphin indicate an annual birth rate for 2013 of between 3.9% and 5.9% (cf. 8.8-11.3% in 2011), depending upon whether a closed or open population model is adopted; an inter-calf interval ranging from 2-7 years, with 3 years being the most common; and calf mortality rates of 15% (year 1), 17% (year 2), and 7% (year 3) (Feingold & Evans, 2014a). 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 & Evans, 2012; Feingold & Evans, 2014a, b). In the summers of 2013 & 2014, however, some Cardigan Bay individuals were photographed by SWF in Liverpool Bay, NW England. These results collectively suggest that Cardigan Bay SAC, which was the main area occupied by the species, is being used less than in earlier years for some reason.



**Fig. 2.** Absolute Abundance estimates (& 95% confidence limits) from line-transect surveys in Cardigan Bay SAC (from Feingold & Evans, 2014)

Two Masters theses were undertaken upon the Welsh bottlenose dolphin population in 2013. Baylis (2013) studied the relationship between reproductive success and home range size, and found that females with smaller home ranges had higher reproductive success and higher juvenile survival compared with those with larger home ranges. Lawton (2013) examined whether the behaviour of bottlenose dolphins changed in the presence of boats, and found short-term negative responses to vessels.

Visual sightings surveys in the Irish Sea continue to be made 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, & Gower Marine Mammal Project). Further south around Southwest England, both land watches and vessel surveys aboard platforms of opportunity continue to be undertaken by Cornwall & Devon Wildlife Trusts, MarineLife, ORCA, and SWF.

On a wider scale, the Joint Cetacean Protocol (JCP) aims to support the identification of trends in distribution and relative abundance but will not generate precise abundance estimates in NW European waters. The outputs assist governmental reporting to various Directives (e.g. the Habitats Directive and the Marine Strategy Framework Directive) and also improve the robustness of marine Environmental Impact Assessments. The JCP brings together effort-related cetacean sightings data from a variety of sources including large scale international surveys such as SCANS & SCANS-II and CODA, surveys based on platforms of opportunity such as ICES International Bottom Trawl Surveys (European Seabirds at Sea (ESAS) cetacean data), as well as non-governmental data (e.g. Sea Watch Foundation and Atlantic Research Coalition) and industry data (e.g. that collected in relation to potential renewable energy installations).

There have been three major phases of JCP analyses (<http://jncc.defra.gov.uk/page-5657>). The first phase concentrated upon the Irish Sea, and the second phase the entire west coast of UK. For the third phase, models were developed to cover the NW European Atlantic area for seven species. The Phase III analysis was completed in early 2013, resulting in species specific density layers at the UK scale. Power analysis concluded that the annual population change detectable with good power ( $>0.8$ ), lay between 6% and 40%, depending on the species. Updates are posted on the Joint Cetacean Protocol webpage.

### *Strandings Network*

Strandings schemes exist for all UK coastlines, with regional management by the Scottish Agricultural College Veterinary Services, Inverness (for Scotland), Marine Environmental Monitoring, Cardigan (for Wales), and Institute of Zoology, London (for England). The UK Cetacean Strandings Investigation Programme (CSIP) acts as a coordinator for these strandings schemes and holds data on nearly 11700 cetaceans reported stranded around the UK between 1990 and the present day. In addition, detailed pathological data is also held on over 3300 UK stranded cetaceans which were necropsied by the CSIP during the same period. Data collected on strandings and during necropsies are routinely recorded in a web-accessed relational database (<http://data.ukstrandings.org>). A proportion of data held on this system is also made available to the public via a Defra funded portal, the NBN gateway ([www.nbn.org.uk/](http://www.nbn.org.uk/)).

The CSIP Annual Report to Defra for 2011 and 2012 (Deaville, 2012, 2013) may be accessed via the following links:



<http://sciencesearch.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=17835>

The Scottish Marine Animal Strandings Scheme is an on-going project which provides a systematic and coordinated approach to the surveillance of marine animal strandings. It builds on the wider UK Cetacean Strandings Investigation Programme (CSIP), and is supported by Scottish Government. It aims to collate, analyse and report data for all cetacean, marine turtle, seal and basking shark strandings around the Scottish coast; to determine the causes of death; and to undertake surveillance on the incidence of disease in stranded cetaceans in order to identify any substantial new threats to their conservation status. See: <http://www.strandings.org/>

Since 2009, the Irish Whale and Dolphin Group (IWDG) have been contracted by Department Of Environment Marine Division to handle all cetacean records from Northern Ireland. This has included carrying out monthly quantified effort watches at Ramore Head (within Skerries and Causeway SAC) (Co. Antrim), Portmuck (Co. Antrim) and Bloody Bridge (Co. Down) and the use of ships of opportunity operating in Northern Ireland (since Nov 2012 this has included a monthly survey on the Belfast-Cairnryan route with Stena line, and 2007-2012 included a monthly survey on the Larne-Cairnryan route with P&O). In addition to the three-monthly quantified effort watches carried out by IWDG, the DOE Marine Division undertake monthly quantified effort watches at 12 sites around NI.

Harbour porpoise and common dolphin remain the most commonly recorded stranded species with the most commonly identified causes of death being by-catch, bottlenose dolphin kills (for harbour porpoise, particularly in Wales), starvation (mainly harbour porpoise), and infectious disease.

### *Bycatch*

A national dedicated bycatch monitoring scheme is operated by 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 assessments of cetacean bycatch. 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.

The principal area of concern for cetacean by-catch remains the southwestern waters of the Western Channel and Celtic Sea (the situation in the North Sea remains unclear as there has been only limited monitoring since the late 1990s). Monitoring is now being focused on these two areas, and as sufficient data are compiled, more robust estimates of current bycatch rates will become available.

The latest UK cetacean bycatch report for 2013, as required under EU Regulation 812/2004, suggests an increase in estimated porpoise by-catch



compared with estimates for previous years. The most recent figures for 2013 estimate levels of porpoise bycatch by the UK fleet in UK waters to be between 1,600 and 1,900 individuals per year (18 actual observed porpoise bycatch incidents). This is significantly higher than in previous years where levels had been estimated at about 800 individuals per year. However, annual bycatch estimates for other species have remained consistent with previous years - c. 320 common dolphins and c. 470 seals.

This estimated increase is not primarily due to an increase in direct observations, but rather the result of the inclusion of new data on fishing effort this year (all UK gillnet fisheries are now included). This estimated increase brings with it a number of uncertainties, which the authors note may have led to an over-estimate of porpoise bycatch. This is therefore considered as a precautionary maximum with actual numbers likely to be much lower. The most recent reports on cetacean bycatch in UK waters submitted to the European Commission under the requirements of EC Regulation 812/2004 can be found on the Department for Environment Food and Rural Affairs (Defra) website<sup>3</sup>.

A sensitivity analysis of impacts upon various cetacean species of different fishing activities in the Irish Sea, was conducted for NRW by the Sea Watch Foundation (Evans & Baines, 2013).

Pingers have been adopted by the over 12m gill and tangle net fleet in the Celtic Sea. The SMRU is currently monitoring their use in order to provide an understanding of the longer-term effects of pingers on cetacean bycatch rates and seal depredation levels. Observations have shown these devices reduce porpoise bycatch by over 90% in nets of up to 4km in length, although the effect on common dolphins is not yet clear.

A number of research projects have been carried out by the Scottish Government, including a recent project concluded at the end of 2013, entitled 'Evaluating and assessing the relative effectiveness of non-lethal measures, including Acoustic Deterrent Devices (ADDs), on marine mammals'. The aim of this project was to carry out a comprehensive literature and data review on the capabilities of current and developing non-lethal measures for deterring marine mammals. This should help answer questions on design, effectiveness, best practice and impacts of these devices on marine mammals. The final report will be available later in 2014. However, further details on this and other cetacean bycatch avoidance research undertaken by the Scottish Government can be found on their website<sup>4</sup>.

### *Contaminants*

Work has continued since the initial UK research undertaken during 2011 to analyse 100 retrospective samples from UK-stranded harbour porpoises (2004-2008) for polychlorinated biphenyls (PCBs) at the Centre for Environment, Fisheries and Aquaculture Science (CEFAS). This initial work

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<sup>3</sup> <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=18535>.

<sup>4</sup> <http://www.scotland.gov.uk/Topics/marine/marine-environment/species/19887/20826>.

combined new data with older data from 1990-2008 in order to provide a near 20-year time series of data for polychlorinated biphenyls (PCBs) (n=540), organochlorine pesticides (OC) (n=489) and brominated diphenyl ethers (BDEs) (n=415) in UK-stranded harbour porpoises.

During 2013, CEFAS, in collaboration with the UK Cetacean Strandings Investigation Programme (CSIP), finalised analyses on a further 102 cetaceans for levels of PCB's. Samples were derived from both stranded and biopsied animals across Europe and comprised harbour porpoises (n=43), bottlenose dolphins (n=41) and killer whales (n=18). The funding for these analyses was provided by Defra under a project entitled "Risk assessment of polychlorinated biphenyl (PCB) exposure in marine top predators". The results of this work, and the previous analyses carried out (including those funded under a small ASCOBANS project in 2010, reference SSFA2010-3), are now being compiled by the Institute of Zoology in a paper describing levels of PCB's in over 1,000 cetaceans sampled across Europe between 1990 and 2012. This paper will be published during 2014 and will be included in the next UK voluntary report.

The results show that concentrations of organochlorine pesticides, HBCD and BDEs are declining. In contrast, PCB concentrations have reached a plateau since 1997 following earlier reductions due to regulation of commercial use. Further reductions in PCB levels in UK waters are likely to take decades. Blubber PCB concentrations are still at toxicologically significant levels in many stranded harbour porpoises (Jepson *et al.*, 2005) and occur at even higher levels in UK-stranded bottlenose dolphins and killer whales (ICES, 2010), mainly due to the higher trophic level in marine food chains of these top predator species. Further reductions in PCB inputs into the marine environment are undoubtedly needed to mitigate risk from PCB exposure in these species (ICES, 2010, Law *et al.*, submitted).

In addition, during 2013, publications were produced on levels of organochlorine pesticides and chlorobiphenyls in bycaught common dolphins (Law *et al.* 2013a) and also on levels of alternative flame retardants in stranded harbour porpoises (Law *et al.* 2013b), as a result of the ongoing collaboration between CEFAS and the UK strandings programme.

### *Marine Noise*

In order to meet our obligations under the MSFD for marine noise, the UK has been developing a noise registry, which will capture and store spatial and temporal records of activities generating impulsive sounds in the UK marine environment. This will aid regulators and industry in providing a clear picture of the distribution in space and time of noise generating activities and help the UK to assess whether it is delivering GES.

New guidance on marine European Protected Species has been published in Scotland: *The Protection of Marine European Protected Species from Injury and Disturbance. Guidance for Scottish Inshore Waters.*

<http://www.scotland.gov.uk/Topics/marine/marine-environment/species/19887/20813/epsguidance?refresh=0.6352101364748239>

There have been a number of other relevant publications relating to marine noise, listed below under references.

A JNCC contract will report in autumn 2014 on the potential effects of seismic surveys on cetaceans. The report will analyse data from Marine Mammal Observer reports, submitted as part of the consenting regime for any seismic surveys within the United Kingdom Continental Shelf (UKCS), analysing data from 1994-2010. The work will build on earlier analysis of Marine Mammal Observer reports (e.g. Stone and Tasker, 2006), but will allow for longer-term analysis of potential effects of seismic activities on cetaceans, as well as general trends in the implementation of the JNCC seismic guidelines throughout this time period. See the following link: ([http://jncc.defra.gov.uk/pdf/JNCC Guidelines Seismic%20Guidelines August%202010.pdf](http://jncc.defra.gov.uk/pdf/JNCC_Guidelines_Seismic%20Guidelines_August%202010.pdf)).

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## **b) France**

No formal report has been submitted this year to the Extension Area WG. However, it can be noted that the main cetacean project in France was to have been a series of aerial surveys initially planned 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*), were aimed at covering the entire French EEZ and some adjacent waters, following a line-transect methodology at low altitude (600 feet) and constant speed (90 knots) with pre-determined linear transects designed in four bathymetric strata (coastal, shelf,

slope, oceanic).

The first study year was completed from Nov 2011 to Feb 2012, and from May to August 2012 but, for budgetary reasons, the decision was taken not to undertake the second year of sampling. Thus only one winter and one summer survey were achieved.

On the other hand, a small winter survey restricted to the eastern Channel and southern North Sea was conducted from January to March 2014, with a primary focus on areas where wind farms are planned and secondly taking the opportunity to complement double-platform experiments aimed at assessing the impact of multi-target protocols (mostly seabirds and cetaceans being monitored by the same pairs of observers) on the detection of small cetaceans. Preliminary analyses failed to demonstrate a measurable effect by which cetacean detection would be negatively biased in multi-target survey. It is believed that answering this question could contribute to the debate about relevant survey methodology to be used under MSFD.

Under a programme called “INPECMAM” (running from 2010-13), the bycatch of marine mammals (cetaceans and seals) and the depredation in set net fishery have been studied in the Iroise Sea. In addition to observers, a questionnaire survey was undertaken to determine the point of view of the fishermen and how they perceive marine mammals. This programme was agreed between the fishermen, the Iroise Sea MPA, the University of Brest, the French National Natural History Museum, and Oceanopolis. The report will be available soon (but will be in French).

Within this programme, a study has commenced on the diet of harbour porpoise and grey seal using a combined analysis of stomach contents based on the visual observation of prey hard remains and, in parallel, a simple DNA barcoding approach to identify the soft remains.

A publication has been submitted concerning the dietary study (DNA barcoding for the identification of soft remains of prey in the stomach contents of grey seals and harbour porpoises by Eléonore Méheust, Eric Alfonsi, Patrick Le Méné, Sami Hassani, and Jean Luc Jung.

Pelagis/University of La Rochelle remains involved in the collection of cetacean data using opportunistic platforms collected during different fishery campaigns of IFREMER.

Studies on bycatch have been continuing. A contribution to the national report has been made by Ifremer and communicated to ICES/WGBYC. It concerns the bycatch estimates for the year 2012. Extrapolations of bycatch have been made for some fleets: 48 common dolphins in pelagic trawls for demersal fish species in ICES Area VIIh, 22 harbour porpoises in set nets for monkfish with vessels  $\geq 15$  m in Area VIIh, and 61 harbour porpoise in gill net fisheries with vessels  $< 15$  m in Area VIIh. No significant bycatch was found in 2012 for pelagic trawling (for small pelagic fish species) in Area VIIIb, or for large pelagic fish (i.e. tunas) in

Areas VIIa and VIIId. For the other segments of the fleet observed with no bycatch, the samples were considered too low to be representative. In the same study, average bycatch rates were also provided, from the last three years of observations.

In August 2014, a synthesis of set net bycatch was achieved by Ifremer. It uses all the data available since 2008. Extrapolations of bycatch rates were made by using fishing effort for the year 2012. The figures yielded an annual estimate of 92 harbour porpoises and 33 common dolphins in the Celtic Sea (Areas VIIf,g,h); and 271 harbour porpoises, 194 striped dolphins, and 72 common dolphins in the Bay of Biscay (Area VIII).

## **Ireland**

### **Conservation Plan and Protection Strategy**

Measures under Ireland's action plan for cetaceans - the *Conservation Plan for Cetaceans in Irish Waters* (2009) - have been progressing in the 2013-2014 period. 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 that such threats are addressed. It consists of five main programmes of measures presented in a delivery grid against which progress can be clearly measured. Most short-medium term actions have already been completed 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). A number of actions are long-term in nature (i.e., extend beyond the lifetime of the Plan) and thus represent ongoing work for the relevant statutory authorities and partner organisations. Particular emphasis in the 2013-2014 period has been given to the process and scientific rigour by which fisheries, aquaculture and other industrial activity (e.g., petroleum exploration, marine construction) are assessed with regard to their risk of impact on cetaceans whether within designated sites or more broadly in the waters of Ireland's EEZ.

Ireland's National Cetacean Protection Strategy, which is underpinned by the Conservation Plan, focuses on (1) designating and monitoring SACs, (2) ensuring general regulatory and administrative functions are sufficiently rigorous, and (3) 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 Arts, Heritage and the Gaeltacht (DAHG) via the following link: <http://www.npws.ie/marine/marinemammals/cetaceans/>. A further update to the Delivery Schedule is expected in late 2014.

### **Designations for Annex II cetacean species under the Habitats Directive**

In December 2012 Ireland announced its intention to designate two further candidate Natura 2000 Special Areas of Conservation (cSACs) with cetacean



qualifying features, in addition to those protected sites already in place under EU Natura 2000 provisions. The new sites announced were (i) Rockabill to Dalkey Island SAC off the Co. Dublin coast (i.e., western Irish Sea) for harbour porpoise, and (ii) the West Connacht Coast SAC for bottlenose dolphin. Details concerning these sites can be obtained via the following link: <http://www.npws.ie/protectedsites/>.

As part of the suite of cetacean surveillance initiatives underpinned by the National Cetacean Protection Strategy both newly designated sites have been the subject of targeted research in the last year. The new Rockabill to Dalkey Island SAC and existing Roaringwater Bay and Islands SAC (Co. Cork) for harbour porpoise were both subject to repeated line transect surveys in the summer of 2013 (Berrow *et al.*, 2013). Based on randomised designs appropriate to each site the combined visual and acoustic surveys produced individual-survey and pooled-survey summer density estimates for porpoises within each study area. In addition an ongoing PhD study based out of University College Cork has been investigating bottlenose dolphin population size and ecology along the west and north-west coasts of Ireland, including within the new West Connacht Coast SAC. Key objectives of this project are to estimate the size of the bottlenose dolphin community inhabiting western Irish coastal waters, to describe the community structure and habitat use within the regional study area and to determine further the genetic structure of this community. Further monitoring of designated sites for Annex II cetaceans in Ireland also continues with six line-transect surveys of the Blasket Islands SAC (Co. Kerry) for harbour porpoise also recently completed (summer 2014).

### **Regulatory and administrative functions**

In progressing the necessary regulatory and administrative actions under the Conservation Plan, Ireland's Department of Arts, Heritage and the Gaeltacht recently reviewed and updated its guidance in relation to anthropogenic noise where protected marine mammals are concerned and the specific marine activities which in its view should be subject to proper risk assessment. The review and its associated risk identification, assessment and management guidelines underwent a public consultation process and follow-up measures in 2012-2013. The document was then finalised and published as new guidance in January 2014 (DAHG, 2014; see <http://www.npws.ie/marine/bestpracticeguidelines/>) with a view to it operating with immediate effect.

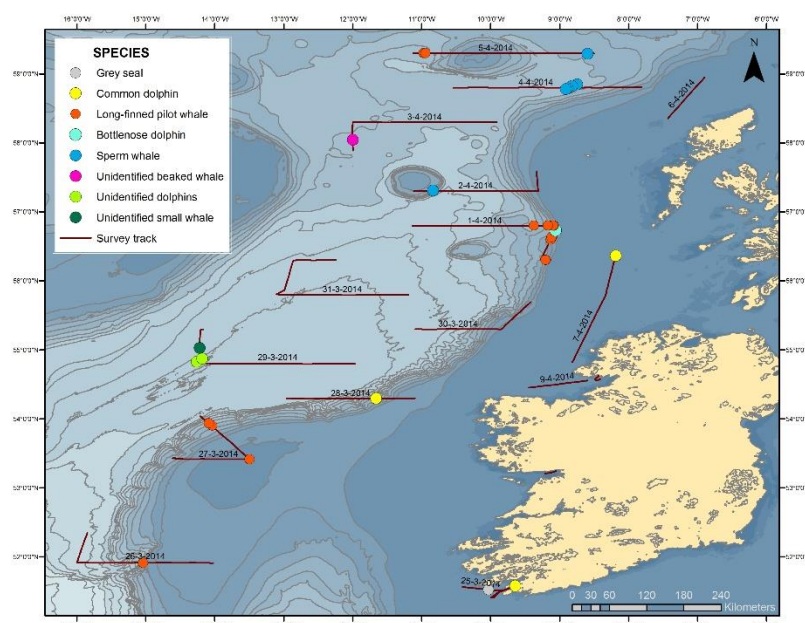
Successive independent observer programmes aboard pelagic fishing vessels to meet compliance with European Council Regulation 812 continued to operate during 2010, 2011 and 2012. During this sampling period no cetacean bycatch was observed in any of the independent observer trips undertaken aboard pelagic fishing vessels. However evidence from a notable stranding event of common dolphins on the west coast of Ireland in early 2013 (Deaville *et al.*, 2013) and from certain set-net fisheries (Cosgrove *et al.*, 2013) indicated that cetacean bycatches in Irish fisheries can and do occur. A number of bycatch monitoring initiatives are continuing, led by the Department of Agriculture, Food and the Marine, An Bord Iascaigh Mhara (The Irish Sea Fisheries Board) and the



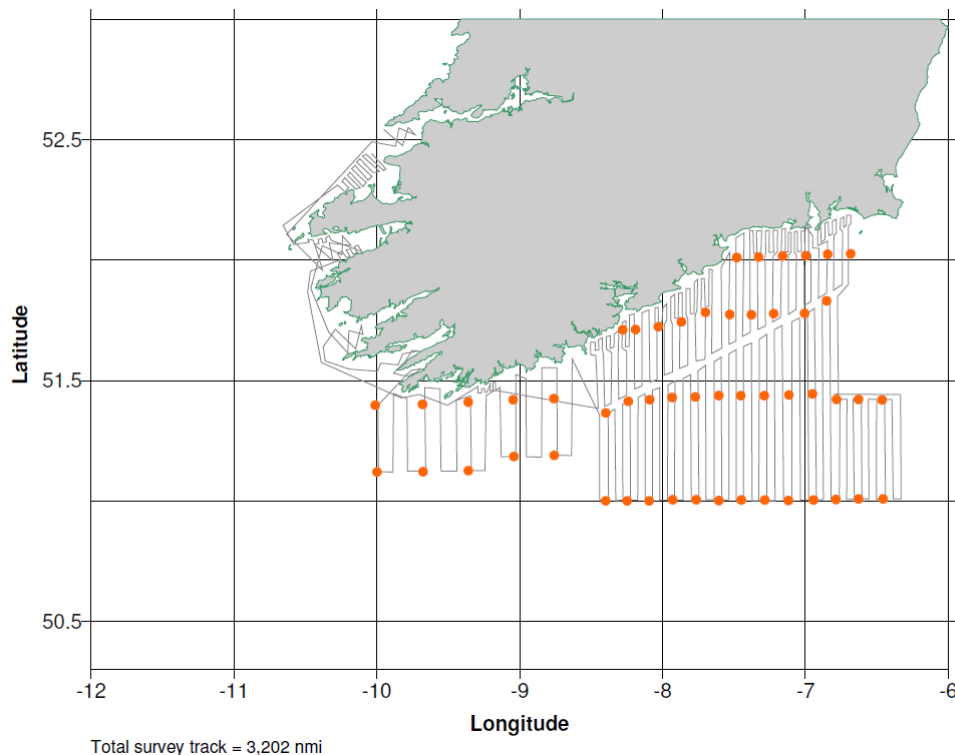
Marine Institute, including continued regional sampling of set-net fisheries and standardised recording efforts under the Data Collection Framework (DCF).

### Surveillance under existing Directives

Following completion of a major offshore project led by Galway-Mayo Institute of Technology (GMIT) and the Irish Whale and Dolphin Group (IWDG) (PReCAST: Policy and Recommendations from Cetacean Acoustics, Surveying and Tracking, 2008-2012) and additional vessel-based line-transect surveys carried out regionally between 2010 and 2012 (e.g., Berrow *et al.*, 2011; Berrow *et al.*, 2012), Ireland has been undergoing a process of reviewing and harmonising its surveillance programmes for the Irish offshore beyond its designated SAC sites, particularly with respect to (a) ongoing and future threats to cetacean populations (e.g., via specific commercial fisheries), (b) obligations under the Habitats Directive and Marine Strategy Framework Directive and (c) the potential for transnational collaboration and more integrated species reporting. Offshore ship-based surveys contracted by DAHG recommenced in early 2014 with line transect coverage of continental shelf and deep Atlantic waters (Figure 3; Oudejans, 2014). Further targeted observer coverage is planned this autumn during the forthcoming Celtic Sea Herring Survey (Figure 4) and on an ongoing basis within the current 6-year Habitats Directive reporting cycle.



**Fig. 3:** Map of visual survey effort (survey track line) and the sighting locations of marine mammal species (coloured circles) recorded during the Blue Whiting Acoustic Survey 2014



**Fig. 4:** Map outlining the potential extent of total survey effort (survey track line and hydrographic sampling stations – circles) normally undertaken during the annual Celtic Sea Herring Survey (example from Marine Institute, 2013)

Ireland is also participating in ongoing discussions with national & international research and regulatory partners concerning *inter alia* future large-scale survey programmes within the current 2013-2018 Habitats Directive reporting cycle, including the proposed SCANS 3 project provisionally slated for 2015-2016, its actions, and its proposed deliverables.

The most recent Cetacean Strandings Scheme, funded by the Irish government and coordinated by the IWDG, operated between late 2010 and the end of 2013 and the resulting final report is due to be published shortly. A revised version of the scheme is continuing in 2014, again operated by the IWDG. Through an arrangement with the Department of Environment in Northern Ireland coverage has been maintained there throughout the year and thus stranding reporting collectively spans the entire coastline of Ireland. Under the Irish scheme records are received from IWDG members, NPWS Conservation Rangers and members of the public, usually by email or phone. All records were and continue to be validated by the IWDG and are periodically published in the Irish Naturalists' Journal (e.g., O'Connell and Berrow, 2011). Stranding reports in Ireland totalled 92, 157, 161 and 193 events during 2010, 2011, 2012 and 2013 respectively. The increase in overall numbers since 2010 has largely been driven by higher numbers of common dolphin and harbour porpoise records. A detailed analysis by the IWDG and University College Cork of the Irish stranding scheme dataset is currently under way to investigate short-medium term patterns, trends and variability in the strandings data.

Additional cetacean surveys and/or projects led by Galway-Mayo Institute of Technology, the Irish Whale & Dolphin Group, the Coastal & Marine Research Centre, University College Cork and Dúlrá Research continue to be carried out. Inshore effort has concentrated mostly upon the south, west and east coasts with offshore surveys targeting the northern Celtic Sea and the 'Atlantic Margin' in particular. A new PhD study of bottlenose dolphin ecology in the Shannon Estuary has also commenced in 2013-2014 based at GMIT. Baseline surveys and impact monitoring of various development projects around the Irish coast also continue, including long-term cetacean monitoring for the Corrib gas pipeline and coastal development in Broadhaven Bay, Co. Mayo (2001-present) which has involved vessel-based surveys, acoustic monitoring and land based watches.

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## c) Spain

### *New estimates on population abundance*

Marcos-Ipiña & Salazar (2013) provided new estimates for bottlenose dolphins (*Tursiops truncatus*) and long-finned pilot whales (*Globicephala melas*) in the Basque country using photo-identification data obtained from over an eight-year period (2003-2010). These estimates are: 1579 individuals (95% CI 918-2830) for bottlenose dolphins and 1737 (95% CI 1236-2514) for pilot whales.

## Threats

Around half of the stranded harbour porpoises (*Phocoena phocoena*) in the north-west Iberian Peninsula (Galicia and northern Portugal) analysed in the 1990-2010 period show evidence of fishery by-catch (Read *et al.*, 2014). Since porpoises in this area form a genetically isolated population, estimated to be only of around 2,600 individuals, bycatch rates are believed to be unsustainable.

Age, maturity and pregnancy data obtained from the stranded individuals were used to construct life tables and provided an estimated annual population mortality rate of around 18%. Combined with cause of death data and assuming there are no important biases this implies that approximately 11% of the NWIP population dies annually due to by-catch.

Saavedra *et al.* (2014) developed population models for common dolphins (*Delphinus delphis*), using mortality-at-age curves derived from stranding data obtained in Galicia (NW Spain), using Siler and Heligman-Pollard models. Their results show an effective annual population growth of 0.912, which indicates a population decline, likely due to an unsustainably high by-catch rate.

Goetz *et al.* (2014) used a variety of data sources to assess cetacean distribution, habitat preferences and determine potential hotspots for cetacean-fishery interactions in Galicia (NW Spain). Their research involved stakeholder participation (fishers, fisheries observers, fisheries authorities and scientists), together with the combination of different opportunistic data sources (interviews and on-board observations) and made use of Generalized linear models and GIS maps to relate cetacean occurrence patterns to environmental variables and to fishing activity. Their results suggest that cetacean occurrence is linked to prey distribution and that interactions with fisheries are most likely for common dolphins (with coastal purse seines and offshore trawls), bottlenose dolphins and harbour porpoises (coastal nets).

Concentrations and patterns of polychlorinated biphenyls (PCBs) and polybrominated diphenyl ethers (PBDEs) in the blubber of common dolphin, long-finned pilot whale, harbour porpoise, striped dolphin (*Stenella coeruleoalba*) and bottlenose dolphin (*Tursiops truncatus*) stranded in the north-west Iberian Peninsula (Galicia and northern Portugal) revealed that differences in PCB and PBDE concentrations among cetacean species are highly dependent on age and sex but also on ecological factors such as trophic level, prey type and habitat (Méndez-Fernández *et al.*, 2014a). Concentrations in bottlenose dolphin and harbour porpoise exceeded the toxic threshold of 17 µg g<sup>-1</sup> lipid weight for health effects on marine mammals, for 100% and 75% of the individuals tested, respectively. The PCB and PBDE levels observed were of the same order of magnitude or lower than those reported in other areas of the NE Atlantic.

Méndez-Fernández *et al.* (2014b) analysed concentrations of Ag, As, Cd, Co, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Se, V and Zn in the liver and kidney of common dolphin, long-finned pilot whale, harbour porpoise, striped dolphin and bottlenose dolphins stranded in the north-west Iberian Peninsula (Galicia and northern Portugal). Results indicated differences between species in the bioaccumulation

of these trace elements. The highest concentrations of renal Cd and hepatic Hg and Se were found in pilot whales and striped dolphins. Bottlenose dolphins showed the highest concentrations of Hg in kidney. The authors indicate that based on their results these cetaceans do not seem to be specially threatened by Hg and Cd exposure in the area.

#### *Diet studies*

Santos et al. (In Press) provided estimates and confidence limits for consumption of sardine (*Sardina pilchardus*), gadoids, hake (*Merluccius merluccius*) and scads (*Trachurus* sp.) by common dolphins, harbour porpoises, bottlenose dolphins and striped dolphins along the Atlantic coast of the Iberian Peninsula. Their results indicate that cetacean predation probably has little influence on sardine population dynamics but could have a more significant impact on hake populations. The authors also highlighted the uncertainties and biases inherent in the information presently available on energy requirements, diet and population size, with different approaches to estimate cetacean energy requirements resulting in figures that differ by at least a factor of 2.

#### *Population structure*

Results from microsatellite DNA analysis on samples of harbor porpoises from Iberia (n=189), northern Europe (n=113), and Turkey (n=16) and their combination with previously published sequences indicate a level of differentiation of the Iberian population that could elevate its category to a different subspecies (Llavona et al., 2014).

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## e) Portugal

### Surveys

In September 2013 and September 2014 under the Life MarPro framework, aerial surveys were conducted between the coast line and the 50 nm, covering an area of 62 716 km<sup>2</sup> with 3 322 km of survey effort along a systematic set of parallel 50 nm-long transects (approximately) separated by a distance of 10nm and oriented either in east–west or north–south directions (only in the Algarve region). In 2013 a total of 13 taxa were recorded during 5 days of census, with 185 sightings and 2557 observed individuals. In 2014, a total of 12 species were recorded in 4 days of census, with 181 sightings, totalizing 4732 individuals.

**Table 1.** Estimations of total abundance and relative density based on Distance Sampling from the vessel dedicated survey covering the offshore area between the 50 and 220mn for each species that was possible to estimate abundance with correction for “availability bias” (Santos *et al.* 2012)

Species	N	% CV	95% CI	D
<i>Balaenoptera</i> sp	906	56.01	306 -2682	0.00358
Fin whale	664	71.85	173 -2545	0.00263
Common dolphin	2406	74.92	495- 11698	0.00951
Striped dolphin	20684	49.78	7726 -55375	0.08179
Bottlenose dolphin	3798	87.58	756 -19089	0.01502
Atlantic spotted dolphin	5773	89.88	1118 -29795	0.02283
Cuvier's beaked whale	6964	148.80	709 -68396	0.02754
<i>Mesoplodon</i> sp	871	134.49	101 - 7545	0.00344

In 2014, the fourth consecutive year with systematic aerial surveys was reached, and at least one more survey will be made next year. The recent estimations of abundance and relative density from the several census already implemented are presented in Tables 1 to 3. The data were introduced in the LIFE+ MarPro database, presently including more than 1100 sightings using data collected by SPVS and during SAFESEA and MarPro projects, allowed the estimation of annual near shore abundances of seven cetacean taxa and offshore abundances of eight cetacean taxa out of the 28 cetacean species with confirmed occurrence in Portuguese Mainland waters (LIFE+ MarPro Midterm Report, 2013).

**Table 2.** Estimations of total abundance and relative density based on Distance Sampling from the aerial dedicated survey until the 50 mn for each species that was possible to estimate abundance with correction for “availability bias” (Santos *et al.* 2012 revised in 2014 with new data from 2013). NE – Not estimated.

Species	N	% CV	95% CI	D
<b>2010</b>				
Minke whale	360	72.23	99-1310	0.00574
Fin whale	90	105.99	16- 507	0.00143
Common dolphin	16166	24.1	10091-25899	0.25777
Striped dolphin	NE			NE
Bottlenose dolphin	825	67.77	243- 2798	0.01316
Common dolphin + Striped dolphin	2116	39.82	977- 4584	0.03374
<b>2011</b>				
Minke whale	2021	55.9	709-4765	0.03223
Fin whale	619	61.81	198- 1934	0.00986
Common dolphin	32452	27.17	19053- 55273	0.51745
Striped dolphin	4554	56.48	1584- 13095	0.07262
Bottlenose dolphin	2825	68.47	782-10200	0.04505
Common dolphin + Striped dolphin	NE			NE
<b>2012</b>				
Minke whale	1238	61.99	390-3927	0.01974
Fin whale	1389	66.23	415- 4646	0.02215
Common dolphin	32521	25.06	19883- 53192	0.51854
Striped dolphin	4947	78.20	1233- 19848	0.07889
Bottlenose dolphin	1191	93.25	187- 7575	0.01899
Common dolphin + Striped dolphin	1280	100.82	235- 6955	0.02040
<b>2013</b>				
Minke whale	2073	42.67	915-4696	0.03306
Fin whale	371	67.28	109- 1261	0.00592
Common dolphin	53795	26.25	32061- 90262	0.85776
Striped dolphin	13764	74.54	3622- 52310	0.21947
Bottlenose dolphin	6294	69.04	1805-21994	0.10035
Common dolphin + Striped dolphin	15249	75.25	2947- 58908	0.24314



**Table 3.** Estimations of total abundance and relative density based on Distance Sampling from the aerial dedicated survey until the 20 mn for harbour porpoise with “**g(0) correction 0.45).**” (Santos *et al.* 2012 revised in 2014 with new data from 2013). NE – Not estimated.

Surveyed Stratum	N	% CV	95% CI	D
<b>2011</b>				
Norte	298	75.98	71- 1258	0.04439
Centro	744	66.74	207- 2673	0.08138
Alentejo	NE	-	-	NE
Algarve	NE	-	-	NE
Total	1042	57.12	347- 3134	0.04160
<b>2012</b>				
Norte	1069	34.14	537-2131	0.15935
Centro	994	57.71	311-3176	0.10865
Alentejo	234	67.36	55-989	0. 06829
Algarve	138	101.83	21-911	0.02390
Total	2435	32.97	1270-4669	0.09719
<b>2013</b>				
Norte	1000	48.89	397 - 2520	0.14897
Centro	372	103.55	57-2409	0.04063
Alentejo	109	103.55	14-828	0.03192
Algarve	645	73.41	154-2699	0.11173
Total	2125	42.54	938- 4185	0.08484

Using data from the MarPro database has allowed the development of distribution models based on Maxent for harbour porpoises, common dolphins, bottlenose dolphins, striped dolphins, long-finned pilot whales, minke whales and fin whales in Continental Portuguese waters.

#### *Genetic analyses*

Population genetic analyses have been conducted on harbour porpoise populations inhabiting Portugal and Galicia under the framework of Angela Llavona PhD thesis. Relationships between porpoises from Iberia (n=189), other regions of Northern and South Europe (n=113), and Turkey (n=16) were established by genotyping 10 microsatellite DNA loci. Structure-based analysis for the best-supported number of *a posteriori* genetic populations identified three groups: Iberian Peninsula, Turkey and North Europe. DNA sequence variation across 334 base pairs of the mitochondrial control region was also

used to determine population structure. In total 167 samples from areas across Europe were obtained and combined with 1352 previously published sequences from Europe, West Africa, Aegean, Marmara and Black Sea. 111 different haplotypes were found; 3 were newly discovered and found in Iberia. The information from this new study identifies Iberian porpoises as a single genetic population (also confirmed by Fontaine et al. (2014) that could be defined as a different subspecies and this should be considered in the future designation of SACs and management plans in the study area.

### *Strandings*

A formal stranding scheme covers the entire Portuguese coast, and strandings are reported to the Instituto da Conservação da Natureza e das Florestas (ICNF). This stranding scheme is divided into several regional networks, and a consortium of two Universities (Aveiro and Minho University) together with SPVS is responsible for the systematic monitoring of three-quarters of the Mainland coast with more than 1700 animals collected in the last 14 years. All tissue samples collected since 2000 and strandings data are presently archived in the Portuguese Marine Animal Tissue Bank (MATB – Portugal). New storage facilities will be ready to receive the archived samples in November 2014 in Minho University and Aveiro University.

### *Bycatch data*

By-catch of cetaceans has been continuously evaluated since 2009 using different methodologies: on-board observers, interviews with boat captains, voluntary logbooks, tag and release of dead dolphins at sea, and using electronic monitoring devices.

The first results of these monitoring efforts were recently submitted to publication and are related with the effects of purse-seine fishing upon cetaceans (Marçalo et al, submitted). In this study, operational interactions between cetaceans and the purse seine fishery along the whole Portuguese continental coast were studied, based on onboard observations from 2010-2011. We observed 163 fishing trips (0.7 % of the average annual number of fishing trips) and 312 fishing operations/hauls. Cetaceans were present in 14.2 % of the fishing events; common dolphins (*Delphinus delphis*) accounted for 96 % of occurrences that took place mostly overnight in summer and early autumn. Encirclement and mortality occurred in 1.5 % and 1.0 % of the fishing events respectively. Regression models showed that cetacean presence during fishing was associated with significantly higher total CPUE ( $p < 0.05$ ), sardine catches ( $p < 0.01$ ) and effort ( $p < 0.05$ ): cetacean presence and by-catch are correlated with areas or hauls with higher target fish abundance. When raised to fleet level 138 (73-183) cetaceans were encircled in the North and 91 (55-165) cetaceans in the South in 2010, and 477 (246-575) cetaceans in the North and 78 (47-140) in the South in 2011. Encircled species were the common dolphin, bottlenose dolphin and harbour porpoise, but only common dolphin showed mortality  $> 0$  (three individuals) with an estimated total mortality of 69 (37-110) individuals in the North and 91 (55-165) individuals in the South for 2010 and 78 (47-140) individuals in the South for 2011. Estimated annual mortality, due to purse seining, is 113 (0-264) common dolphins, which is 0.29 % of the current best

estimate of population size for the Portuguese fishing area (Santos et al. 2012).

Still under the Life MarPro, several approaches and essays are being implemented in order to promote a reduction of by-catch of cetaceans. Among the different efforts there is the implementation of several manual of good practices targeting the main Portuguese fisheries. The aim of these manuals is to promote simple operational changes in the fisheries (such as avoid the haul of a net in the presence of cetaceans). Besides the good practice manuals, several boats are using pingers (Fumunda 10 kHz and 70 kHz models) in order to evaluate their effectiveness in reducing by-catch (purse-seine nets, beach purse-seines, gillnets and trammel).

#### *Other projects*

Under the framework of the project CetSenti-Cetaceans as marine ecosystem health sentinels (an FCT funded project) coordinated by University of Aveiro, in 2013 a new protocol for sample collection was implemented both by the Portuguese and Galician teams targeting the genomic identification of bacteria and fungi in samples from fresh stranded animals.

In this project, the Marine Animal Tissue Bank (MATB) has been greatly improved: the removal of stranded animals from the coastal area where they strand, transportation to the necropsy facilities and the complete necropsies, sample collection and storage according to purpose (following protocols) were carried out. As a result, in the first 12 months of the project, 254 stranded cetaceans recovered by the stranding network were sampled. Furthermore, samples previously archived in the marine animal tissue bank were sorted out and sent for heavy metal, POPs and virology analysis (see below).

Contaminant analyses began in January 2014. Considering the tissues stored in the MATB until the end of 2013, 4 cetacean species were selected for contaminant analysis. Presently, trace element concentrations were already quantified by ICP-MS in liver, kidney and muscle of harbor porpoises, bottlenose dolphins, striped dolphins and common dolphins. Two species of helminthic parasites infecting harbor porpoises (lung and ear sinus microhabitats) were also analysed for heavy metal concentrations. The results emphasize very high levels of mercury in bottlenose dolphins, particularly those collected from the central and northern coast of continental Portugal in comparison to those collected from the southern Algarve region. For POPs analyses, blubber samples of the same cetacean species were quantified by GC-MS. In total 200 individuals were already analysed for inorganic elements and organic compounds. In order to allow for the bacteriology and mycology evaluations on stranded cetaceans, samples are now collected in triplicate and frozen with RNAlater (-20°C) or in saline medium with glycerol (-80°C). These samples include oral cavity, blowhole, conjunctive, anal cavity and first stomach (swabs in saline solution), tongue, oral cavity, oral cavity lesions, skin lesions, 1st stomach, duodenal ampulla, duodenum, medium and terminal intestine, and genital mucosa (swabs or tissue stored in vials with RNAlater preserved for 1 day at -5°C and then frozen at -20°C). The evaluation of the microbial community structure in the foregut of a small number of common dolphin and striped dolphin individuals has already begun in order to compare between specimens and their health status. Total RNA

was extracted from some of the available 293 samples for a molecular survey (performed on tissue pools from each animal: lung, pulmonary lymph node, brain and mesenteric lymph node) and several animals were found positive for cetacean Morbillivirus RNA. A similar procedure was performed for Herpes virus detection.

**Brief review of cetacean occurrences off Portugal's mainland coast, 2009-2013, conducted by the Escola de Mar research team ([www.escolademar.pt](http://www.escolademar.pt))**

During **2009**, 12 surveys in the Portuguese coast were carried out (Sesimbra, Nazaré, and Póvoa de Varzim), with 14 sightings of cetaceans:

One Mysticeti

- minke whale (*Balaenoptera acutorostrata*)

Three Odontoceti

- 8 common dolphin (*Delphinus delphis*)
- 3 bottlenose dolphin (*Tursiops truncatus*)
- 2 harbour porpoise (*Phocoena phocoena*)

In **2010**, 19 surveys were carried out, with 12 sightings of cetaceans (Nazaré, Sesimbra):

Two Mysticeti

- 1 minke whale (*Balaenoptera acutorostrata*);
- 1 humpback whales (*Megaptera novaeangliae*)

Two Odontoceti

- 7 common dolphin (*Delphinus delphis*)
- 3 bottlenose dolphin (*Tursiops truncatus*)

In **2011**, 31 surveys were made in the Portuguese coast (Sesimbra, Peniche and Nazaré) totaling about 130 hours of total effort, with 33 sightings of cetaceans, two of which mixed groups:

One Mysticeti

- 1 fin whale (*Balaenoptera physalus*)

Three Odontoceti

- 16 common dolphin (*Delphinus delphis*)
- 14 bottlenose dolphin (*Tursiops truncatus*)
- 2 striped dolphin (*Stenella coeruleoalba*)

Between **2012 and 2013**, 49 surveys were made in the Portuguese coast (Sesimbra, Sado Estuary, Lisbon and Peniche) totaling about 132 hours of total effort, with 64 sightings of cetaceans, two of which mixed groups (Brito et al. 2014):

### One Mysticeti

- 1 minke (*Balaenoptera acutorostrata*);

### Four Odontoceti

- 22 common dolphin (*Delphinus delphis*);
- 37 bottlenose dolphin (*Tursiops truncatus*) of which 27 sightings were identified as bottlenose dolphins of the Sado Estuary;
- 3 striped dolphin (*Stenella coeruleoalba*);
- 1 harbour porpoise (*Phocoena phocoena*);

In the years **2012 and 2013**, bottlenose dolphin was the species most frequently observed, followed by common dolphins, which is similar to that found for the coast of Galicia, Spain (Pierce *et al.*, 2010). However, it is important to note that the vast majority of sightings of bottlenose dolphin were sightings of individuals of the resident population of the Sado Estuary (where the sampling effort was focused due to the research projects funded) (Martinho 2012; Martinho *et al.* 2013; Martinho *et al.*, 2014). This is a change from the typical observations for coastal cetaceans in previous years (2009-2011), based mostly on surveys in coastal areas, which showed a predominance of occurrence of common dolphin (Brito *et al.*, 2012).

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**Fig. 5.** Main areas of boat based surveys off the Portugal mainland, by Escola de Mer

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