Agenda Item 4.1

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

Population Size, Distribution, Structure and Causes of Any Changes

Document 4.1.a

Small Cetaceans in European Atlantic waters and the North Sea (SCANS-III): Project Introduction

Action Requested

- Take note
- Comment

Submitted by

University of St. Andrews

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

Small Cetaceans in European Atlantic waters and the North Sea (SCANS-III): Project Introduction

Background

A series of large scale surveys for cetaceans in European Atlantic waters was initiated in 1994 (SCANS; Hammond et al. 2002) and continued in 2005 (SCANS-II; Hammond et al., 2013) and 2007 (CODA 2009) with the purpose of providing estimates of abundance needed to put bycatch in a population context and to allow EU member States to discharge their responsibilities under the Habitats Directive. The frequency of these surveys was intended to be approximately decadal; a third survey is now due.

In the mid-1990s, the primary need was for comprehensive abundance estimates but, increasingly, there has been an additional need for robust assessments of the impact of anthropogenic activities and for consistent Europe-wide monitoring and reporting. SCANS-II and CODA incorporated work to develop management frameworks for determining safe limits to harbour porpoise and common dolphin bycatch to meet specified conservation objectives. SCANS-II also included work to inform methods for monitoring abundance at temporal and spatial scales smaller than covered by the large-scale surveys. This work has only partially been utilised and it is now imperative to make significant progress to enable EU Member States together to achieve Good Environmental Status under the Marine Strategy Framework Directive.

Overall aim

SCANS-III will estimate current abundance of cetaceans in the European Atlantic, use these results and additional information to assess the impact of direct mortality caused by human activities, and use a focused comparison of methods to create a best practice guide for monitoring to inform European Directives. Integration of the new information will provide a robust basis for reporting and for the identification of any conservation action necessary to achieve good/favourable environmental/conservation status of cetaceans at a European Atlantic level.

Project objectives

SCANS-III comprises four linked objectives which together will move Member States forward several important steps towards effective implementation of the Habitats Directive and the Marine Strategy Framework Directive with respect to cetaceans. The European Atlantic is changing rapidly and it is essential that Member States have access to up-to-date robust information on the status of key species and the threats that they face so that mitigation and future monitoring can be directed effectively and efficiently to achieve and maintain favourable conservation status of species and good environmental status of European Atlantic waters.

- ***Objective 1 – Estimate the abundance of all cetaceans in shelf and oceanic waters of the European Atlantic in summer 2016.***

Up-to-date information on distribution and abundance is at the heart of assessments of status and threats; this objective will provide that information at the necessary large spatial scale and provide essential updates to the information from 1994 and 2005. Objective 1 will be achieved through a large-scale multi-national survey for cetaceans of all European Atlantic waters in summer 2016 using a combination of ships and aircraft. The survey will be comparable with, but improve upon, surveys conducted in 1994, 2005 and 2007.

- ***Objective 2 – Collate all available data on fisheries bycatch mortality and shipping impacts on cetaceans in European Atlantic waters and create layers of threat in time and space.***

Objective 2 will be achieved through an extensive search and collation of available data from a range of sources and their incorporation into a fit-for-purpose database. The database will have the capability to generate threat layers at various scales of time and space.

- ***Objective 3 – Assess the impact of human-induced mortality on cetaceans in the European Atlantic.***

Impact assessments will use the new abundance data from Objective 1 and the collated data from Objective 2. Management frameworks to generate safe limits to human-induced cetacean mortality will be further developed and implemented at a European level.

Objective 3 will be achieved through the use of population models to assess the impact of estimated levels of human-induced mortality on the status of affected species.

- ***Objective 4 – Conduct an intensive, rigorous trial of methods for monitoring cetacean abundance.***

This will inform best practice for monitoring as required by the Habitats Directive and as input to common indicators under the MSFD. EU Member States currently employ a variety of methods for monitoring cetacean abundance that are not readily combined to inform on status at the necessary spatial scale. This objective will allow a common approach to be followed for future cetacean monitoring.

Objective 4 will be achieved through a rigorous, small-scale, focussed survey in the summer of 2015 to allow a robust comparison of the effectiveness of a suite of monitoring techniques. This survey will involve shipboard and aerial surveys, including digital photographic techniques, and static and towed passive acoustic techniques. In addition, the creation of a new generation of trained personnel and equipment will be achieved through a series of workshops and specific training sessions.

Description of project actions

The SCANS-III Project will be made up of multiple actions, which together will achieve the overall objectives. These relationships between these are detailed in Figure 1.

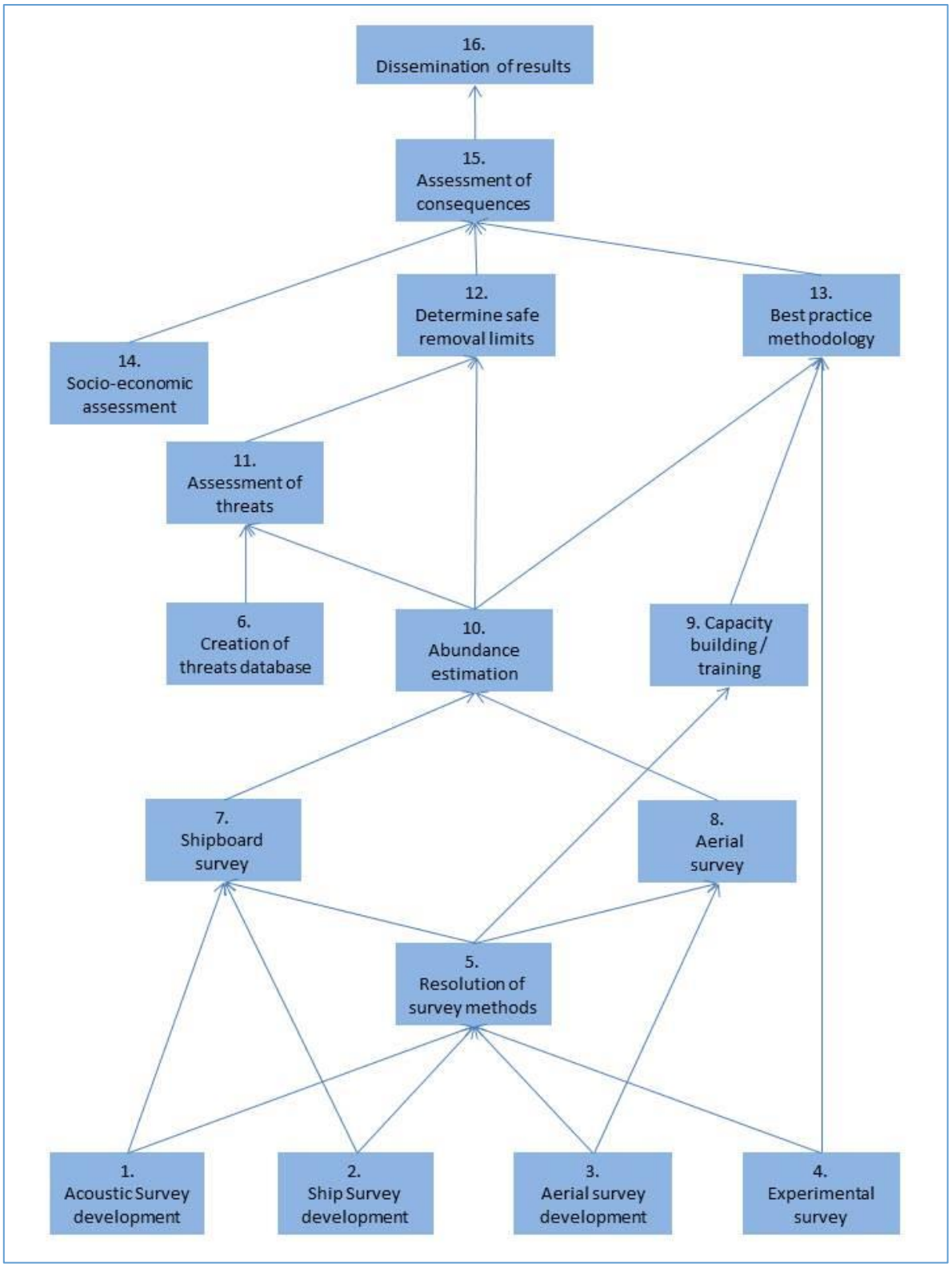

Figure 1: Graphical representation of the project Actions 1-16 which will complete the four objectives making up the SCANS-III project. Actions are described below.

Action 1 – Acoustic Survey Development

Acoustic survey methods are now well established for a number of species likely to be encountered during cetacean surveys conducted both on and off the continental shelf edge (Gillespie et al., 2005; Lewis et al., 2007). Acoustic data are generally collected using a hydrophone towed astern of the survey vessel. Data can be both collected and processed using semi-automated software such as PAMGuard (Gillespie et al. 2009) and processed to detect and localise different species. To maximise the usefulness of acoustic data from the SCANS-III survey (Action 7), the following three actions are necessary:

1. Vessel noise measurement: the most important factor governing the success of acoustic surveys is vessel noise. Not only does vessel noise mask the sounds of interest, but noisier vessels are likely to cause higher levels of avoidance in small cetaceans. Noise assessments for each vessel used during the survey will be conducted.
2. Development of a regional dolphin click classifier: whilst there has been considerable progress in identifying dolphin whistles to species level in recent years (Gillespie et al. 2013), we do not have a good species classifier for dolphin clicks. The SCANS-III project will complete development work to ensure that a click classifier is available to apply to data from the main survey.
3. Changing distances between visual and acoustic platforms: the experimental survey (Action 4) offers a unique opportunity to trial hydrophones towed at different distances behind a vessel to allow the comparison of the numbers of detections and the numbers of matches with visual data from each in order to determine the most effective cable length for future survey work.

Action 2 – Ship Survey Development

The objective of this action is to provide all the survey vessels with equipment and software that facilitates accurate data collection for the main ship survey (Action 7). This includes accurate measurement of critical data items such as distances and angles to sightings, together with software to allow data to be validated at sea on a daily basis.

The primary aims of the ship survey development action for SCANS-III are to:

1. Maintain the essential functionality of the SCANS-II system in terms of providing accurate measurement of sighting times, bearings and distances from the Tracker team while improving the overall reliability of the system.
2. Replace bespoke cabling and junction boxes from SCANS-II with smart devices connected using Wireless LAN technology. We believe this will make the system more reliable and also easier to build allowing others to replicate and reconfigure.
3. Replace the validation software that was hard coded to the design of the SCANS-II survey with a more flexible package that mirrors the flexibility in design of the Logger data collection software making this a much more useful tool for future surveys.
4. Conduct experiments with multiple fixed cameras to try and capture images of naked eye sightings from the Primary team that are suitable for distance and angle measurement.

Action 3 – Aerial survey development

This action is necessary to design and develop the practical methodologies for the main aerial visual surveys (Action 8). Experience has shown that the key to a good survey is adequate preparation in

data collection and analysis methodology, and sufficient training of survey personnel. The methods needed for aerial surveys for cetaceans have been developing over the last decade and it is important to use the best available. This action will complete all necessary preparations to undertake the aerial surveys described under Action 8.
The focus will be twofold:

- Developing methodology: This will include conducting a workshop to analyse existing datasets and evaluate available methodologies for calculating g(0) for different species using aerial surveys.
- Development/testing of equipment. This will include video range methods, audio equipment for data back-up, and investigating the potential of new technological developments, such as electronic inclinometers.

Action 4 - Experimental Survey

The experimental survey is planned to take place in the Great Belt in the inner Danish waters. This is a high density area for harbour porpoises and also a Danish Natura 2000 site. The area is protected from strong winds, which increase the chance for a successful survey with high effort. The survey will take place during the summer of 2015, and the aim is to test new techniques and assess the reliability of multiple different methods to estimate absolute abundance.
This will provide a unique opportunity to compare four different survey methods in the same area at the same time so that they can be evaluated directly, which has never been done before. Testing will include a comparison of aerial and vessel based data collection; a comparison of towed and static passive acoustics and comparison of digital aerial and traditional observer based aerial surveys.
Outputs of this experimental phase will be used to inform protocols for the main survey (Actions 7 and 8) as well as produce a set of Best Practice Monitoring guidelines which can form the basis of national monitoring standards (Action 13). By testing new techniques the project will contribute to the development of more efficient and reliable abundance surveys as well as fulfilling the secondary function of training all cruise leaders for the main survey to ensure consistency across survey platforms in Actions 7 and 8.

Action 5 - Resolution of survey methods

The purpose of this Action is to finalise methods for estimating absolute abundance that have been developed under Actions 1-4 so they can be implemented for data collection in the main survey (Actions 7 and 8) and data analysis to generate abundance estimates (Action 10).
Estimation of absolute abundance of cetaceans over a wide area using multiple platforms requires strict adherence to a methodological protocol for the careful collection and analysis of accurate data. This Action will finalise this protocol to ensure that the data obtained from the main survey are collected effectively, efficiently and consistently so that the absolute abundance estimates generated are robust and comparable with those from SCANS (1994) (Hammond et al. 2002) and SCANS-II (2005) (Hammond et al. 2013). This action will include two workshops to confirm methodological developments and finalise methodologies for data collection and analysis.

Action 6 – Threats database

Cetacean populations are threatened by a range of anthropogenic activities. Some of these threats cause direct mortalities e.g. hunting, incidental catch in fisheries (bycatch), ship strikes and naval

sonar (Reeves et al. 2003). Other threats may indirectly cause mortalities through cumulative or long-term exposure or in combination e.g. noise (from seismic surveys, offshore infrastructure & shipping), chemical pollutants (e.g. DDT/DDE, PCBs & PAHs) and climate change related effects. Data on both direct and indirect mortality of cetaceans are patchy over time and space and there is a clear need to collate and analyse these data from all available sources to assess health status of cetacean populations.
SCANS-III will collate the available data from as many threat sources as possible and create layers of threat in time and space for mortality inflicted by fisheries, shipping, noise and other indirect threats to assess their potential impact on cetacean populations. The objective is to create a database and GIS framework for threats to cetaceans within the SCAN-III proposed survey area. The information from the action will provide the necessary data to conduct the threat assessment in Action 11.

Action 7 - Shipboard Survey

The aim of this action, in conjunction with Action 8, is to conduct the surveys required to collect data necessary to estimate the abundance of all cetaceans in shelf and oceanic waters of the European Atlantic (Figure 2).This action will deal with data collection carried out by vessel in the waters to the west of the continental shelf.

Shipboard surveys will be conducted to collect data to estimate absolute abundance of cetaceans in European Atlantic continental shelf waters. The surveys will be carried out in summer 2016 for a period of one month. Suitable ships will be chartered and modified for cetacean data collection.

The area to be covered by ship survey corresponds to and extends the area covered during the CODA (CODA 2009) surveys which were conducted using comparable methodology. The continental shelf will be covered by aerial surveys as described in Action 8. Four ships will be required to cover the survey transects for this area.

The shipboard survey methodology will be developed in Actions 1 and 2 informed by the experimental survey (Action 4) and resolved by Action 5. The survey area will be stratified into survey blocks; pre-determined cruise tracks will be designed to ensure representative coverage of each block. Line transect sampling fine-tuned for the collection of data on small cetaceans will be used, similar to the methods employed during SCANS II (Hammond et al. 2013) but with methodological advances incorporated as determined under Action 2.

Action 8 – Aerial Survey

Aerial surveys are the preferred method of surveying in areas with convoluted/geographic complex coastlines that are difficult to access via ship and in areas with short windows of acceptable weather. Aircraft can cover a large area in a short time and, in general, are more cost effective than shipboard surveys because aircraft are less expensive to charter. However they are restricted by distance to a safe landing runway, endurance, and most survey aircraft lack the range and speed to operate in far offshore waters.
It is important that the survey takes place over as short a time period as possible. Seven aircraft are needed to cover the area in one month.

Action 9 – Capacity Building

The overall goal of this Action is to enable researchers and organisations carrying out research on cetacean abundance and habitat modelling to develop the knowledge and skills base to collect good

quality data, perform appropriate analyses, develop adequate monitoring programmes and, overall, increase their capacity to deliver scientifically sound results to inform conservation.
A programme of workshops will be carried out over the course of the project to train observers and data analysts with the final aim of creating a pool of experienced European observers/researchers that would be able to continue applying their experience after the project finishes. It is expected that many of the candidate observers would come from organisations (NGOs, universities, research bodies) already participating in cetacean research and monitoring in Europe. This training will strengthen the capacity of these national and regional organisations to deliver good quality data and scientific advice. Three in-depth workshops are also planned to familiarise participants with:

- working practices, techniques and instrumentation used,
- data analysis and interpretation,
- survey design and monitoring.

The project will also produce a series of e-learning materials and other online tools that will help create a community where questions and experiences can be answered and shared.

Action 10 – Abundance Estimation

This action will be conducted in three steps:
1. Validate data sets collected from shipboard surveys (Action 7) and aerial surveys (Action 8)
This time-consuming but essential process will ensure accuracy and consistency in all datasets. Standard and purpose written software will be used. All modifications to the data will be documented.
2. Analyse datasets to generate estimates of absolute abundance for cetaceans in European Atlantic waters for summer 2016

The analytical methods finalised under Action 5 will be applied to the validated survey datasets to generate estimates of absolute abundance for all species for which there are sufficient data. Analyses will include design-based abundance estimation (e.g. Hammond et al. 2013) and density surface modelling using methods similar to those used to analyse SCANS-II and CODA data (Hedley et al. 1999; SCANS-II 2008; CODA 2009; Hammond et al. 2013). Using model-based methods, abundance can be predicted for any appropriate defined area and not just for designed survey blocks. This is important in the context of using the estimates to inform area-based management and for use in the framework for determining safe removal limits (Action 12).

3. Compare estimates of abundance with those from 1994 and 2005/07

As part of the SCANS-II project, the new design-based estimates for 2005 were compared with those for 1994 from SCANS (Hammond et al. 2002, 2013). Similarly, the new estimates for 2016 from this project will be compared with those from 1994 and 2005 and also those from offshore waters in 2007 (CODA 2009).

Data from SCANS were re-analysed using model-based methods as part of the SCANS-II project to allow modelled density surfaces to be compared between 2005 and 1994 (Hammond et al. 2013). A similar re-analysis will be undertaken in this project.

Action 11 – Assessment of threats

Building on the work of Action 6, this action will populate the threats database with abundance data generated during Actions 7 & 8 to allow spatial and temporal assessment of threats to cetacean

populations. The methods and results from this action will provide tools and information that will be very useful for management of fisheries, shipping, marine fossil and renewable energy developments and military sonar use, and for development of mitigation measures to prevent harm from these activities to cetacean populations. Combining spatial and temporal data on threats with cetacean species densities will facilitate member states' obligatory assessments of species' Good Environmental Status under the MSFD directive. Through this action, the SCANS-III project will provide the tools and the first comprehensive compilation of threats to cetaceans in EU and adjacent waters.

Action 12 – Safe removal limits

This action is based on work initially undertaken during the SCANS-II project for harbour porpoise (SCANS-II 2008), continued under the CODA project for common dolphin (CODA 2009) and further developed in a UK contract (Lonergan & Hammond 2013) for harbour porpoise, common dolphin and bottlenose dolphin. These previous projects have developed management frameworks for determining safe limits to bycatch removal as described in detail in Winship (2009).

The basis of these management frameworks is to determine limits to removals that enable specified conservation objectives to be met. This is achieved by performing computer simulations that assess the ability of removal limit setting algorithms to allow simulated populations under management to meet specified performance targets. The simulations incorporate a wide range of plausible uncertainties in population dynamics and structure, historical removals, abundance estimates, environmental change, etc, and the resulting removal limit algorithms are thus robust to lack of past, present and future knowledge.

The purpose of this action is to take the existing management frameworks and develop them further to allow their implementation for all cetacean species of conservation concern in the European Atlantic and to incorporate consideration of anthropogenic mortality additional to fisheries bycatch, including ship strikes. The aim is to generate safe limits to non-natural removals for all these species for Management Units determined by ICES for a Habitats Directive/MSFD reporting period of 6 years.

Action 13 – Best Practice monitoring

There is a wide variety of management related questions that can be informed by the monitoring of cetacean populations; these occur at two spatial scales:

1) Regional monitoring where the requirement is to monitor the use of a specific area by one or more species, e.g. monitoring status through estimation of relative abundance between and within years in national waters, protected marine protected areas or construction sites;

2) Population level monitoring where the requirement is to monitor the status of a whole population.

The aim in both cases is to detect if abundance changes by more than a certain percent over a certain time period.

Using data collected both during the experimental survey (Action 4) and the main survey (Actions 7 and 8), a power analysis will be conducted to assess the abilities of the different methodologies to detect change in numbers of animals over time, and thus produce recommendations for monitoring. The main output of this action will be a comprehensive report on best practice for monitoring cetaceans as required by the Habitats Directive and as input to common indicators under the MSFD.

Action 14 – Socio Economic Aspects

By providing the first pan-European map of the estimated risks of fishery bycatch (and other cetacean-fishery interactions) and ship strikes in the European Atlantic area (Actions 6 & 11), the project will facilitate development of mitigation and management in a marine spatial planning context. This action will:

- Estimate the value of cetaceans as a component of ecosystem goods and services (e.g. value as tourism resource, possible negative impacts on fisheries due to competition);
- Estimate the socio-economic impacts of interactions between cetaceans and human activities, especially with fisheries and boat traffic (e.g. damage to fishing gear; public perception of fishery bycatch and boat strikes and its potential consequences in terms of tourism and consumption of fishery products);
- Estimate the socio-economic costs and benefits of adopting possible management and mitigation measures (including associated monitoring) to reduce the risk of bycatch and collisions (e.g. gear modification, area closures, changes in fishing gear or shipping lanes).

This action will be achieved through a combination of systematic review of the relevant literature, surveys of key stakeholders and the general public in the main Member States in the study area, workshops/focus groups and cost-benefit analysis.

Action 15 – Assessment of consequences

This action will focus on the integration of information on distribution, abundance and threats to assess good/favourable environmental/conservation status of cetaceans at a European Atlantic level.

The Habitats Directive requires Member States to report every 6 years on the conservation status of all cetacean species under Article 17. Cetaceans are highly mobile species that move widely among the waters of the European Atlantic. Reporting at the national level and integration of national reports by the Commission is thus a poor way to assess conservation status of any of these species (with the possible exception of some resident coastal groups of bottlenose dolphins). In the UK, however, JNCC has noted the desirability of aggregating data at a level higher than Member State for all species.

In contrast, the focus of the Marine Strategy Framework Directive is on cooperation and collaboration among Member States to achieve Good Environmental Status; for cetacean species, such integration of approach is essential to informing the common indicators on distribution, abundance and threat levels used to assess GES.

This Action will provide such integration by bringing together the new information obtained in SCANS-III on distribution, abundance and levels of threat for cetacean species to assess good/favourable environmental/conservation status of cetaceans at a European Atlantic level. It will provide a robust basis for reporting and for the identification of any conservation action necessary to achieve GES for these species.

Action 16 – Dissemination of results

In order to facilitate dissemination of results as widely as possible, a series of sub-actions will be undertaken, including the use of a dedicated website, project information boards, technical and non-technical publications, and a final report to funders.

Project Area

The SCANS-III study area will include waters covered by both the SCANS-II and the CODA projects (Figure 2) but extended to the 200nm limit in all waters. The SCANS-II areas (continental shelf) will be covered by aerial survey, whilst the CODA areas (off shelf) will be covered by ship survey.

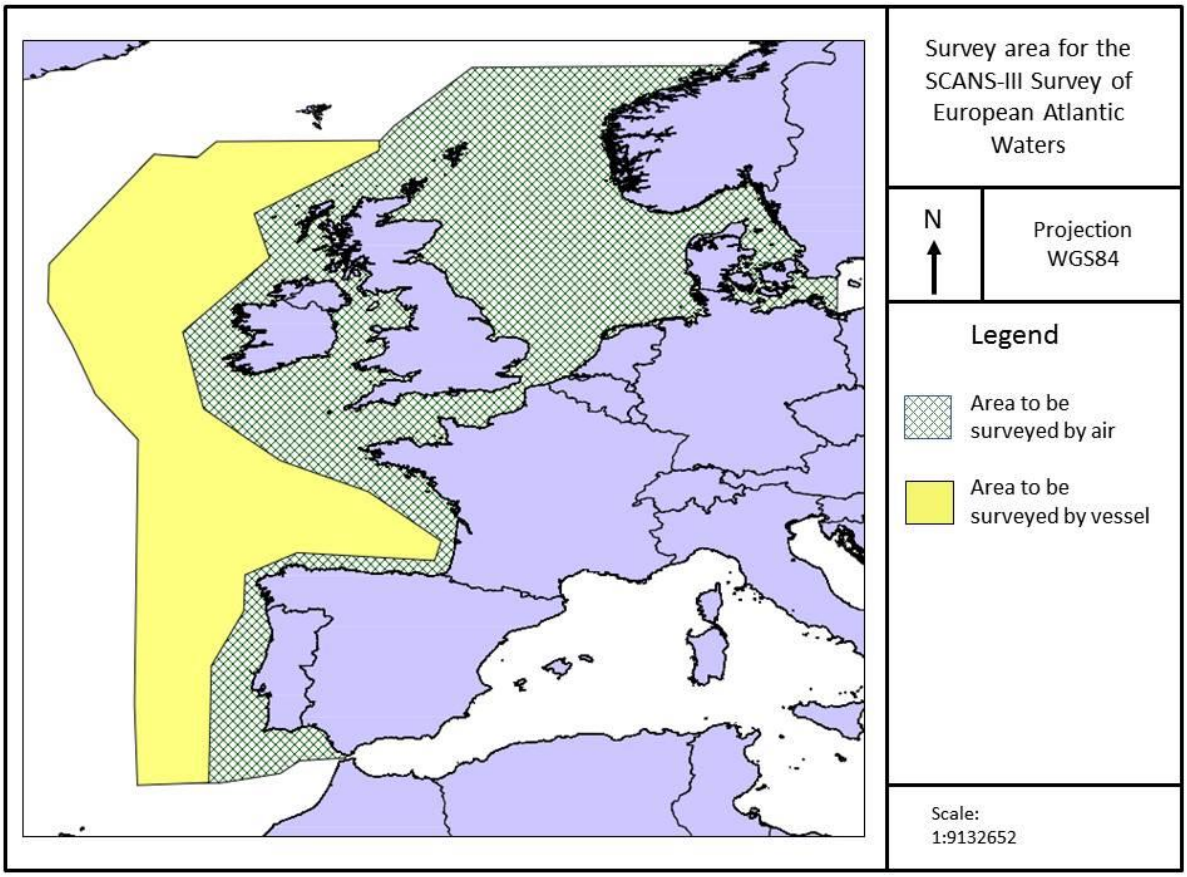

Figure 2: Map showing the extent of the SCANS-III survey area and illustrating, provisionally, which areas will be surveyed by air and which by vessel surveys.

Target Species

The SCANS-III initiative will collect data on all cetacean species encountered during surveys of European Atlantic Waters (Figure 2).
This will include, but is not limited to the following species:

Harbour porpoise	Scientific name: ***Phocoena phocoena***
Bottlenose dolphin	Scientific name: ***Tursiops truncatus***
Common dolphin	Scientific name: ***Delphinus delphis***
Striped dolphin	Scientific name: ***Stenella coeruleoalba***
White-beaked dolphin	Scientific name: ***Lagenorhynchus albirostris***
White-sided dolphin	Scientific name: ***Lagenorhynchus acutus***
Minke whale	Scientific name: ***Balaenoptera acutorostrata***
Sei whale	Scientific name: ***Balaenoptera borealis***
Long-finned pilot whale	Scientific name: ***Globicephala melas***

Fin whale	Scientific name: ***Balaenoptera physalus***
Sperm whale	Scientific name: ***Physeter macrocephalus***
Beaked whale Sp.	Scientific name: ***Mesoplodon bidens, Ziphius cavirostris*** and ***Hyperoodon ampullatus***

Expected results

On completion of the project, Member States will have the means to assess favourable conservation status for cetacean species in the European Atlantic at the necessary large spatial scale, to prioritise mitigation measures to improve the status of these species, and to monitor them effectively in the future to ensure that good environmental status can be achieved in this context.

1. Up-to-date, robust estimates of absolute abundance and summer distribution of cetaceans in the European Atlantic. Estimates are expected for 12 species: harbour porpoise; bottlenose, common, white-beaked, white-sided, striped and Risso's dolphin; pilot, sperm, fin, sei, and beaked (combined species) whales.
2. A set of "threat layers" describing cetacean mortality inflicted by fisheries and shipping in time and space.
3. A comprehensive assessment of the impact of human-induced mortality from fisheries and shipping on cetacean species in the European Atlantic and quantified safe limits to removals for key species.
4. An expert good practice guide for monitoring abundance between major decadal-scale surveys, based on rigorously tested experimental protocols.
5. A new generation of trained personnel and equipment that will enable abundance to be estimated, threats to be assessed, and status to be determined for cetaceans in European waters.

Participating organisations (to date)

Aarhus University, Denmark
Management Unit of the North Sea Mathematical Models, Belgium
University of Veterinary Medicine, Hannover, Germany
University of La Rochelle, France
University College Cork, Ireland
Wageningen UR, Netherlands
Instituto da Conservação da Natureza, Portugal
Instituto Español de Oceanografia, Spain
Newcastle University, UK
University of Aberdeen, UK
University of St Andrews, UK
Joint Nature Conservation Committee, UK

Funding

The following budget outlines estimated costs of the actions outlined above. Overheads are estimated at 7% as per EU funding stipulations.

Action	Description	Estimated Cost

		(Euros)
1: Acoustic Survey Development	Personnel	72,800
	Equipment	40,800
	Travel / Shipping equipment	1,500
	Action total	***114,600***
2: Ship survey development	Personnel	52,326
	Equipment	4,350
	Travel / Shipping equipment	2,100
	Action total	***58,776***
3: Aerial survey development	Personnel	22,000
	Action total	***22,000***
4: Experimental survey	Personnel	129,000
	Equipment	616,900
	Travel / Shipping equipment	24,5000
	Action total	***770,400***
5: Resolution of Survey methods	Personnel	30,000
	Workshop	6,000
	Action total	***36,000***
6: Creation of threats database	Personnel	30,600
	Travel / meetings	2,500
	Equipment	3500
	Action total	***36,600***
7: Shipboard survey	Vessel charter	1,200,000
	Personnel	300,000
	Travel to vessels	16,000
	Equipment	49,000
	Action total	***1,565,000***
8: Aerial survey	Plane charter	240,000
	Personnel	161,000
	Travel and subsistence	142,200
	Equipment	21,000
	Action total	***564,200***
9: Capacity building and training	Personnel	48,000
	Workshops	30,000
	Travel	4,500
	Action total	***82,500***
10: Abundance estimation	Personnel	162,000
	Action total	***162,000***
11: Assessment of threats	Personnel	61,400
	Data purchase	5,000
	Travel / meetings	2,500
	Action total	***64,400***
12: Determination of safe removal limits	Personnel	44,000

	Action total	***44,000***
13: Best Practice methodology	Personnel	44,000
	Action total	***44,000***
14: Socio-economic assessment	Personnel	192,000
	Questionnaires and surveys	150,000
	Action total	***342,000***
15: Assessment of consequences	Personnel	16,000
	Travel and subsistence	4,000
	Action total	***20,000***
16: Dissemination of project results	Personnel	48,000
	Website	1,500
	Publicity materials	2,000
	Conference / workshop	2,500
	Action total	***54,000***
Project management	Personnel	**144,000**
Financial administration support	Personnel	**144,000**
	Subtotal	**4,268,476**
	Overheads @7%	**298,793**
	Total	**4,567,269**

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