

Agenda Item 6.2

Project Funding through ASCOBANS
Selection and Prioritisation of Projects for
Future Support

Document 6-02 rev.2

**Project Proposals Received for
Future Funding**

Action Requested

- Review proposals
- Group proposals in categories
- Decide on maximum allocations for projects, if necessary

Submitted by

Secretariat



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

Secretariat's Note

A revised version of Annex 8 of this document has been received. All other proposals are unchanged with respect to those published in Revision 1 of this document.

Project Proposals Received for Future Funding

1. Following a call for project proposals issued to ASCOBANS Parties and partner organizations on 12 January 2010, the attached funding applications were received by the Secretariat.
2. The members of the Advisory Committee are requested to consider the proposals and decide on their suitability for funding through the Agreement, as well as the priorities to be assigned to suitable projects.
3. In order to ensure the necessary flexibility, the Secretariat would welcome it if the AC did not produce a definitive shortlist, trying to match the projects selected with the available funds. Rather, it is proposed that proposals are grouped in categories, such as:
 - very high priority
 - high priority
 - medium priority
 - not a priority / not suitable for funding
4. Such a categorization would enable the Secretariat to respond appropriately if a selected project does not materialize or the budgetary needs of a project need to be corrected by the time a funding agreement is concluded. It would also allow the Secretariat to fundraise specifically for those projects that the Committee has assigned high priority, but for which funds are lacking.
5. The Advisory Committee may of course also decide to provide partial funding for projects. In this case, the AC should instruct the Secretariat which maximum amount should be made available to the applicant, provided co-funding from other sponsors can be obtained. A condition for funding through ASCOBANS is that the project is guaranteed to be implemented.
6. The AC retains the right to decide on the use of leftover funds, including assigning them to projects conceptualized during the meeting or emerging issues. If that is the case, the meeting could:
 - request a meeting participant to develop and forward a proposal to the Secretariat, which will be reviewed by email
 - instruct the Secretariat to make a call for proposals on a specific subject, to be reviewed by email
7. In order to aid such an inter-sessional evaluation process, it is suggested that the meeting set up a working group. The Advisory Committee would delegate the authority to decide on the funding of proposals received under the conditions described in paragraph 5 above to this working group.

Proposals Received in Response to the 2010 Call

8. A total of eight proposals was received by the deadline set (28 February). The detailed proposals and CVs of researchers, if provided, are attached in the annexes to this document. The following table gives an overview:

No.	Title	Applicant	Funding Requested
1	Inventories of harbour porpoise <i>Phocoena phocoena phocoena</i> presence in Russian territorial waters of the Baltic sea	Biologists for Nature Conservation	6,950 EUR
2	Porpoise alerting device to enhance awareness towards fishing gear: prototype and field tests (Revised proposal. Cofunding of 24,000 EUR through Friends of CMS)	Prof. Dr. Boris Culik, F ³ . Forschung. Fakten. Fantasie.	21,617 EUR
3	Feasibility study on the creation of a web-accessed strandings database covering Agreement Party and Range States within the ASCOBANS region	Dr Paul Jepson / Rob Deaville Zoological Society of London	8,500 EUR
4	Pollutant exposure in coastal top predators: assessing current levels of exposure and toxic effects	Dr Paul Jepson / Rob Deaville Zoological Society of London	9,750 EUR
5	Effects of contaminants on reproduction, Phase II	Dr Sinéad Murphy Sea Mammal Research Unit, University of St. Andrews	13,591 EUR
6	Understanding harbour porpoise (<i>Phocoena phocoena</i>) and fishery interactions in the north-west Iberian Peninsula	Prof. Graham J. Pierce / Fiona L. Read School of Biological Sciences (Zoology), University of Aberdeen / Instituto Español de Oceanografía	10,000 EUR
7	Evolutionary history and conservation genetics of white-sided dolphin and white-beaked dolphin in the North Atlantic: Evaluating evolutionary differences and causes of diversity decline on pelagic and coastal dolphin species	Dr. Eulalia Banguera-Hinestroza School of Biological Sciences, University of Durham	22,976 GBP
8	Investigation of the Isle of Lewis, Scotland as important habitat for Risso's dolphins (<i>Grampus griseus</i>)	Sarah Dolman Whale & Dolphin Conservation Society	24,962 GBP

**FORMAT FOR PROJECT PROPOSALS
FOR THE CONSIDERATION OF THE ASCOBANS ADVISORY COMMITTEE**

Title Inventories of harbour porpoise <i>Phocaena phocaena phocaena</i> presence in Russian territorial waters of the Baltic sea.	Justification: CMP	Project ID: PP/2010/01
Implementing Agency / Applicant	Saint Petersburg Charitable Public Organisation (SPb CPO) "Biologists for Nature Conservation" Russian Federation, Saint Petersburg, Universitetskaya emb. 7/9 Reg. No 7801210676 Phone: +7 812 328-96-20 Fax: +7 812 328-97-53	
Collaborating Agencies / Other Sponsors	Russian State University named after Kant, St. Petersburg State University, WWF Sweden	
Background / Problem	Harbour porpoise <i>Phocaena phocaena phocaena</i> (Linnaeus, 1758) was considered extinct in the eastern part of the Baltic sea. Nevertheless there are some data obtained recently by Finish biologists on detection of <i>P.p. phocaena</i> in Finish water area. In the Russian Federation there were no recent studies devoted to determination of <i>P.p. phocaena</i> status in the Russian part of the Gulf of Finland. But there're still some concerns on whether this mammal is still exist in the area or not. Currently this species is included into Red Data Book of the Russian Federation as a subspecies with unknown status, poorly studied and low in number.	
Objectives	Project aims to find out if there are any observations or recordings of Harbour porpoises made by fishermen or locals and also to try to find any remains or bones of the animals on the Gulf of Finland islands in order to prove or disprove occurrence of this subspecies in the Russian water area in the Baltic sea. Depending on the results future investigation activities and/or conservation measures will be proposed.	
Relevance to ASCOBANS	Harbour porpoise is an object of Jastarnia group work. For example during the 16 th meeting of ASCOBANS Advisory Committee it was agreed to submit a draft Resolution on the adoption of the revised Jastarnia Recovery Plan for Baltic Harbour Porpoises and the Conservation Plan for Harbour Porpoises in the North Sea to the 6th Meeting of Parties. It was also agreed that the Harbour porpoise population needs urgent conservation measures and for instance south-western Baltic sub-region seems to be a geographic gap between the Baltic and North Sea Action Plans. We suppose that Eastern part of the Baltic sea also needs to be studied in order to complete the data on <i>P.p. phocaena</i> distribution.	

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Activities	<p>The main activities will be the following:</p> <ul style="list-style-type: none"> - To work out questionnaires for fishermen and locals working in the Russian Part of the Gulf of Finland or living near the coast line. - To establish a network of contacts with commercial fishing brigades and individual fishermen in Kaliningrad region and Leningrad region. - To implement questionnaire survey by distribution (and further collection) of questionnaires among target groups and conducting of verbal interviews. - To implement a few field observations (using boat or catamaran) around the main islands, located in the Russian part of the Gulf of Finland in order to find bones or other remains of <i>P.p. Phocaena</i> on the shores. - To process collected data and write a report based on the results achieved. If the results are positive then develop a major project for more precise investigation of <i>P. p. phocaena</i> population in the Gulf of Finland and propose measures for its effective conservation. 		
Outputs	<ul style="list-style-type: none"> - Report on the investigations made containing detailed information received from fishermen in different regions of studying area, maps with points (if any) where <i>P.p. phocaena</i> was observed by fishermen, locals or experts or its remains were found. - Set of measures for further research, conservation and management activities concerning <i>P.p. phocaena</i> in the Gulf of Finland if any traces of its presence in the area are found. - Publication of research results 		
Work Plan and Timetable	Activity	Dates	Responsible persons
	Working out of the questionnaire	20.05.2010 – 10.06.2010	Irina Trukhanova, Rustam Sagitov
	Field observations (boat or catamaran)	20.05.2010-20.07.2010	Mikhail Verevkin, Irina Trukhanova, Gennadiy Grishanov
	Work with fishermen and locals: questionnaire survey, data collecting	10.06.2010 – 31.08.2010	Irina Trukhanova, Mikhail Verevkin, Gennadiy Grishanov
	Processing of data, development of report and related papers	1.09.2010 – 30.09.2010	Irina Trukhanova, Mikhail Verevkin, Gennadiy Grishanov, Rustam Sagitov
	Financial reporting	01.10.2010 – 15.10.2010	Margarita Dudareva
	Project duration – from 20.05.2010 to 20.12.2010		
Project Personnel	<p>1. Irina Trukhanova Position, affiliation: projects coordinator, SPb CPO "Biologists for Nature Conservation" Contacts: e-mail irina_trukhanova@yahoo.com, tel. +79052233156 Specialization – ecologist, marine mammal specialist Role within the project – project coordinator</p>		

2. Mikhail Verevkin

Position, affiliation: research worker in St. Petersburg State University, zoological department, expert in SPb CPO "Biologists for Nature Conservation"

Contacts: vermiv@yandex.ru, tel. +79219769499,

Specialization: mammalogist, marine mammal specialist

Role in the project: expert

3. Gennadiy Grishanov

Position, affiliation: head of zoological and ecological department in Russian State University named after Kant (Kaliningrad region)

Contacts: тел. 8 (4012) 53 37 26.

Specialization: zoologist, PhD

Role within the project: expert

4. Rustam Sagitov

Position, affiliation: director, SPb CPO "Biologists for Nature Conservation"

Contacts: rustam_sagitov@bfn.org.ru

Specialization: zoologist, Phd

Role within the project: expert

5. Margarita Dudareva

Position, affiliation: accountant, SPb CPO "Biologists for Nature Conservation"

Contacts: rita381@mail.ru, tel. 8812-328-96-20

Role within the project: accountant

Budget Estimates	Project item		Per item, Euros	Number of items, max	Funds requested of ASCOBANS, Euros	Additional sources of funding
	Catamaran (boat) rent		800 per day	2	1600	Possibly WWF Sweden - several additional days of catamaran rent within investigation of the Gulf of Finland islands' fauna programme 2010
Salary (including 13% fee)	Experts	30 per day per expert	90	2700	Additional working days if needed (SPb CPO "Biologists for Nature Conservation")	

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		Project coordinator	30 per day	30	900	Additional working days if needed (SPb CPO "Biologists for Nature Conservation")
		Accountant	25 per day	10	250	Additional working days if needed (SPb CPO "Biologists for Nature Conservation")
Travelling		Car fuel			200	
		Train/bus tickets			800	Accommodation and per diems 800 Euros (SPb CPO "Biologists for Nature Conservation" and Kaliningrad State University)
Other project related costs		Office supplies, post services, etc.			300	300 Euros (SPb CPO "Biologists for Nature Conservation")
		Bank charges			200	
Translation services						500 Euros (SPb CPO "Biologists for Nature Conservation")
Publications						300 Euros (SPb CPO "Biologists for Nature Conservation")
Organizing of working meetings (venue, meal)			100 Euros Per meeting	3		300 Euros (SPb CPO "Biologists for Nature Conservation")
Total, Euros					6950	2200





Title Harbour porpoise alerting device to enhance awareness towards fishing gear: prototype and field tests	Justification: (to be completed by the Secretariat)	Project ID: (to be completed by the Secretariat)
Implementing Agency / Applicant	Prof. Dr. Boris Culik F ³ : Forschung . Fakten . Fantasie Am Reff 1 D- 24226 Heikendorf Fon: +49(0) 431 2378 588 Mobil +49 (0) 172 750 41 92 Fax: +49(0) 431 2378 589 Email: bculik@fh3.de Web: www.fh3.de	
Collaborating Agencies / Other Sponsors	Potential partners: L3 ELAC Nautik, Kiel MC-Elektronik, Schwedeneck Fjord and Baelt Centre, Kerteminde, DK Gesellschaft zum Schutz der Meeressäuger, Hamburg SEAMARCO, Harderwijk, NL, (to be confirmed)	
German Summary	<p>Um den Beifang von Schweinswalen in der Fischerei zu verringern, werden derzeit vor allem Pinger eingesetzt. Dabei handelt es sich um akustische Geräte, welche für Schweinswale störende Geräusche aussenden. Als Reaktion darauf halten die Tiere zu den mit Pingern bestückten Netzen einen großen Abstand von bis zu mehreren 100 Metern ein (Culik et al. 2001).</p> <p>Dieser Abstand, das haben unsere Untersuchungen gezeigt (Koschinski et al. 2006), übersteigt jedoch die Maximaldistanz von 2-4 m, aus der die Schweinswale ein Netz noch als Hindernis bzw. Bedrohung mit Hilfe Ihrer Echoortung wahrnehmen können. Folglich lernen Schweinswale nicht, den Bezug zwischen Pinger und Bedrohung herzustellen.</p> <p>Weiterhin werden die Tiere durch Pinger möglicherweise in benachbarte Netze gescheucht, die von Kuttern kleiner als 12 m ausgebracht wurden und daher nicht, laut EU-Bestimmung (European Union Council Regulation No 812/2004) , mit Pingern ausgerüstet sein müssen. Pinger können somit nicht als Ende der</p>	



	<p>Entwicklung akustischer Beifangvermeidungsmethoden angesehen werden.</p> <p>In diesem, für die Friends of CMS dargestellten Forschungsansatz geht es darum, Warngeräusche zu erzeugen, welche von Schweinswalen auch als solche verstanden werden. Hinweise dazu liefert das neueste Paper von Clausen et al. (2010). Wie auch auf der ECS-Tagung in Stralsund im März 2010 dazu zu erfahren war, kommunizieren Schweinswale vornehmlich mit Klicks. Bestimmte Abfolgen werden dabei als Warnung verstanden.</p> <p>Entsprechend den in Clausen et al. (2010) dargestellten und als Warnung z.B. von Kälbern verstandenen Clicktrains von 200 bis 1000 Klicks pro Sekunde, mit upsweep, wollen wir den von uns bereits konstruierten Klickgenerator neu konfigurieren. Wie mit Bernd Würsig in Stralsund diskutiert, wäre dies ein völlig neuer und sehr vielversprechender Ansatz in dem Bestreben, den Beifang von Schweinswalen zu vermeiden.</p> <p>Ferner ergab der anlässlich der ECS-Tagung durchgeführte Workshop zur Beifangvermeidung, dass diese "Warn-Klicks" die akustische Umweltbelastung (die durch herkömmliche Pinger verschlechtert wird) nicht wesentlich erhöhen, da ihre akustische Reichweite aufgrund der hohen Frequenz von über 100 kHz begrenzt ist. Sie sollen zudem in der Netzebene fokussiert abgestrahlt werden, und nicht quer zum Netz, wie bei herkömmlichen Pingern.</p> <p>Zusammenfassend lässt sich nach der ECS-Tagung festhalten, dass zu dem ursprünglichen Antragsentwurf zwei neue Elemente hinzugekommen sind: Bedeutungsvolle Schweinswalklicks, die von den Tieren als Warnung verstanden werden, sowie die Beschränkung der Beschallung auf den unmittelbar um das Netz liegenden Bereich, was der Verminderung von Schallbelastung im Meer sowie der erhöhten Gerätelebensdauer zugute kommt.</p>
English Summary	<p>One of the main tools to reduce by-catch in fisheries, to date, are pingers. Pingers are acoustic devices which produce sounds resulting in disturbance or harassment of harbour porpoises. The reaction of the animals is to maintain a large safety distance of several 100 metres to pinger-equipped nets (Culik et al. 2001).</p> <p>As shown by our investigations, this large distance exceeds the maximal distance of 2-4 metres within which harbour porpoises may detect a net as a barrier or threat by using their own echolocation or biosonar (Koschinski et al. 2006). As a</p>



consequence, harbour porpoises cannot establish a connection between currently used pinger models and the threatening nets.

Furthermore, pingers have the potential to scare harbour porpoises into neighbouring nets which are not pinger-equipped, because e.g. these were laid out by vessels smaller than 12 metres in length and therefore - according to current EU regulations - not obliged to use pingers (European Union Council Regulation No 812/2004).

This entails that pingers cannot be considered as an end-point in the development of acoustic alerting devices.

In this research application for the friends of CMS, I plan to use harbour porpoise alarm calls, which can also be understood as such by harbour porpoises. This is based on the recent paper by Clausen et al. (2010).

In this paper as well as during the recent ECS-meeting in Stralsund (March 2010) it was discussed that harbour porpoises communicate mainly through clicks. Clicktrains meeting certain characteristics are considered and understood as alerting calls. In accordance with the paper of Clausen et al. (2010), where alerting calls of adult harbour porpoises towards calves are characterized by upsweeping clicktrains of 200 – 1000 clicks per second, we plan to re-configure an electronically programmable click generator which we have already developed.

As discussed with Bern Würsig during the ECS conference, this would indeed constitute a completely novel and promising approach in the research on by-catch reduction.

Furthermore, the workshop on by-catch reduction conducted prior to the ECS-conference in Stralsund yielded as a result that alerting clicktrains would not significantly increase environmental noise pollution (as opposed to standard pingers), because their range, due to the high frequency (>100 kHz) employed, is limited. Since we plan to emit alerting sounds parallel to the plane of the net as opposed to orthogonal to it (as in the case of standard pingers), noise pollution will be very restricted.

In conclusion, the ECS-meeting in Stralsund led to the addition of two new elements to an earlier version of this proposal: the generation of “meaningful” harbor porpoise click trains, which are meant to be understood as alerting calls, as well as the limitation of ensonification to an area immediately surrounding the threatening fishing gear. The latter is meant to reduce noise pollution and will also significantly increase battery and device life expectancy.



<p>Relevance to ASCOBANS</p>	<p>As stated in the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (New York, 1992), Chapter 2:</p> <p>2.1 The Parties undertake to cooperate closely in order to achieve and maintain a favourable conservation status for small cetaceans.</p> <p>2.2. In particular, each Party shall apply within the limits of its jurisdiction and in accordance with its international obligations, the conservation, research and management measures prescribed in the Annex.</p> <p>The Annex states explicitly in Chapter 2: “Studies under (c) should include research on habitat requirements, feeding ecology, trophic relationships, dispersal, and sensory biology with special regard to effects of pollution, disturbance and interactions with fisheries, including work on methods to reduce such interactions.”</p>
<p>Activities</p>	<p><u>A. Tests on harbour porpoises in captivity:</u></p> <p>These tests are to be conducted during the summer months in the Fjord and Baelte Centre, DK. The objective of these tests is to assess the reaction of harbour porpoises to electronically generated alerting sounds. These tests are to be scientifically and statistically documented and are required to optimise the performance of the alerting device with respect to power consumption vs. reaction achieved.</p> <p>We plan for a series of 4 tests over the course of 2 months, each lasting 3 days. This requires travel to the aquaria, the help of a field assistant and a contribution towards animal husbandry. Subsequent data analysis and comparison with data on previous sound tests will require ca. 8 days.</p> <p><u>B. Test on naïve animals in the wild.</u></p> <p>These field tests are to be conducted in an area of high Harbour Porpoise density, i.e. in the waters of the Lille Baelte, DK. HP activity will be monitored visually and acoustically using a theodolite from an elevated position as well as an autonomous click detector moored at the same position as the alerting device. The alerting device will be remotely switched on and off and sound / no sound periods compared. A series of 4 field tests is envisaged, each lasting 5 days.</p>



	<p><u>C. Development of self-contained prototypes for further tests.</u></p> <p>The lab-version of the alerting device consists of a sound transducer, cable and electronics box and cannot be used in fishery field tests as it is. This step requires further development of the electronics and transducer. The delicate electronic components and circuits need to be miniaturised and encased in a shock- and waterproof housing and the sound transmission to the surrounding water optimised by using appropriate encapsulation and sound coupling techniques available at ELAC. Two field tests are planned to test that harbour porpoises in captivity and in the wild react to these self-contained prototypes similarly to the results obtained with the lab-version.</p>
<p>Outputs</p>	<p>The aim of this project is to develop an alternative to the acoustic harassment devices currently used to reduce harbour porpoise by-catch. These so-called standard pingers have a variety of drawbacks, such as habitat exclusion, noise generation and reduction in efficiency over time.</p> <p>Alerting at the site of the risk, at frequencies which do not call other species such as seals (because they can't hear above 100 kHz) and which are inaudible to fish, with low energy requirements and at low costs to the customer (i.e. the fishermen) is, in my view, a promising technical solution. The research I propose aims at improving an already developed click-generator so that in the end we have a device that alerts harbour porpoises.</p> <p>Outputs of the activities will be in form of:</p> <ul style="list-style-type: none"> - A novel self-contained acoustic alerting prototype - progress reports to parts A-C - scientific publications on parts A and B - public outreach and popular science reports in the local media <p>The applicant of this proposal is familiar with the various bycatch reducing devices currently available (updated in a dedicated workshop during the European Cetacean Society Conference on March 20, 2010 in Stralsund, Germany). To the best of my knowledge there is no other company or organisation developing a similar product, the novelty of which was confirmed by Dr. Bernd Würsig, Texas A&M University.</p> <p>Note: The investigations proposed here are the basis for further research: In order to test whether wild porpoises learn to</p>



	<p>associate the sound emitted by the new alerting device with threatening gillnets employed in commercial fisheries, a subsequent field study will be required. A positive outcome would suggest that the alerting device is sufficient to focus the porpoises attention towards avoiding lethal nets in time. A negative outcome would require a subsequent test in conjunction with reflective nets, which have been shown to increase harbour porpoise detection range and reaction time (Koschinski et al. 2006).</p>
<p>Work Plan and Timetable</p>	<p>Part A: Tests with harbour porpoises maintained in captivity are to be conducted:</p> <ul style="list-style-type: none"> a) in August-September on the lab-version of the alerting device. Data analysis is to be completed in October, 2010. b) after October 2010 on the self-contained prototype alerting device. <p>Tests will involve visual observation of porpoise behaviour, e.g. using a video camera, as well as acoustic monitoring using a click detector moored at the same position as the alerting device.</p> <p>Part B: Field tests on wild animals are to be conducted:</p> <ul style="list-style-type: none"> a) on the lab-version of the device during the summer months as of August 2010. b) On the self-contained version after October 2010. <p>In addition to the setup described in “A” above, a theodolite will be employed to determine porpoise position, course and minimal distance from the alerting device during periods of “on” and “off”.</p> <p>Part C: Re-programming and optimisation of the lab-version of the alerting device to generate 200-1000 clicks per s (upsweep) will commence immediately upon positive evaluation of this proposal. The design and building of four self-contained prototypes with properties allowing autonomous use in a fishery test will commence in September 2010. These devices are to be tested in the aquarium as well as field situations as outlined above.</p>
<p>Project Personnel</p>	<p>The project is to be carried out by the applicant as well as by partners in the institutions mentioned above.</p>



Budget Estimates	<p>Part A: tests in Fjord and Baelt Centre, DK. 12 testing days scientist à € 350 12 testing days student à € 100 12 testing days animal husbandry à € 600 12 Overnight stays including daily allowance à € 150 4 Travelling allowance from Kiel to Fredericia à € 150 Data analysis 8 days scientist à € 350 Sum Part A: € 17.800 + € 3.382 (19% VAT) = € 21.182</p> <p>Part B: Tests in the field 4 x 5 days scientist à € 350 rental of theodolite equipment € 3.200 4 x 4 overnight stays à € 150 4 trips à € 150 Data analysis scientist 8 days à € 350 Sum Part B: € 16,000 + € 3.080 (19% VAT) = € 19.080</p> <p>Part C: Building of four self-contained prototypes Includes electronic layout, sound transducer, encapsulation, physical testing in tank Lump sum: € 4.500 + € 855 (19% VAT) = € 5.355</p>
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Literature

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**FORMAT FOR PROJECT PROPOSALS
FOR THE CONSIDERATION OF THE ASCOBANS ADVISORY COMMITTEE**

<p>Title Feasibility study on the creation of a web-accessed strandings database covering Agreement Party and Range States within the ASCOBANS region.</p>	<p>Justification: CMP</p>	<p>Project ID: PP/2010/03</p>
<p>Implementing Agency / Applicant</p>	<p>Dr Paul Jepson; Rob Deaville Institute of Zoology (Zoological Society of London) Regent's Park London NW1 4RY UK</p>	
<p>Collaborating Agencies / Other Sponsors</p>	<p>All stranding networks in the ASCOBANS regions will be invited to participate and a list of initial contacts has already been compiled.</p>	
<p>Background / Problem</p>	<p>Existing stranding networks throughout Europe monitor and investigate cetacean strandings around the coastlines of the countries in which they operate. Although data which they collect during the course of such investigations are routinely recorded and in some cases made available through reports or public release of information, no centralised European point of access currently exists for the recording and display of data on both strandings and any necropsies which have been carried out. Creation of a web-accessed database in the ASCOBANS region would facilitate access to data on European strandings and would be of potential benefit for scientists, policy makers and NGOs, as well as helping inform the wider public.</p>	
<p>Objectives</p>	<p>In this project, we aim to invite participants from stranding networks in the ASCOBANS region to attend a meeting at Zoological Society of London (ZSL) in London, UK. At the meeting, strandings and necropsy data held by each network would be discussed, with a view to establishing potential common areas and current methods of data output. Stranding networks from both Agreement Party states and Range States would be invited to attend.</p> <div data-bbox="667 1563 1313 2018" data-label="Figure"> <p>ASCOBANS Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (as of 1 November 2005)</p> <p>ASCOBANS ■ Agreement Party ■ Agreement Area ▨ Extension ■ Range State</p> </div>	

Figure 1 Agreement Parties and Range States

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	<p>If agreement is reached that display of selected strandings and necropsy data could take place, discussion would next focus on the possible structure and operation of a web-accessed database. The proposed web-accessed database could act as a central point of access for data from European strandings networks in the ASCOBANS region. Outcomes from the meeting and discussion process could be used to produce a detailed proposal for the creation of such a system.</p> <p>An ASCOBANS web accessed database would act as a centralised repository for selected strandings data and selected pathology data derived during necropsies. Data could ideally be uploaded at periodic intervals to the portal by contributing networks. Display of data could take place through a portal that either mirrored the current ASCOBANS design or one that had a specifically designed appearance. Selected data could be exported in one or more agreed formats and could also be directly mapped through the front end interface (e.g. via Google Maps capability). The system would ideally be expandable to allow future inclusion of data from other networks.</p>
<p>Relevance to ASCOBANS</p>	<p>Creation of a web-accessed database would allow a long standing objective of the Conservation and Management Plan of the Agreement to be met;</p> <p>“3. Use of by-catches and strandings Each Party shall endeavour to establish an efficient system for reporting and retrieving by-catches and stranded specimens and to carry out, in the framework of the studies mentioned above, full autopsies in order to collect tissues for further studies and to reveal possible causes of death and to document food composition. The information collected shall be made available in an international database.”</p> <p>In addition, public display of data collected throughout the ASCOBANS region along with a qualitative overview of information on both strandings and research carried out by strandings networks (e.g. species found stranded, reporting arrangements, causes of death and conservation threats etc) will help facilitate another objective;</p> <p>“5. Information and education Information shall be provided to the general public in order to ensure support for the aims of the agreement in general and to facilitate the reporting of sightings and strandings in particular; and to fishermen in order to facilitate and promote the reporting of by-catches and the delivery of dead specimens to the extent required for research under the agreement.”</p> <p>Finally, such a system would serve as a potentially useful point of access for scientists, policy makers and NGOs.</p>
<p>Activities</p>	<p>If funding is agreed, a meeting will be held at ZSL, London with potential collaborating partner networks and other stakeholders. Where possible, this meeting should;</p> <ul style="list-style-type: none"> • establish common areas of data held by each network • establish current methods of data archive and dissemination • agree a defined list of fields for a potential centralised database

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	<ul style="list-style-type: none"> • agree a process and outline timetable for the production of the potential centralised database <p>Efforts will be made to consult and involve as many stranding networks in the ASCOBANS region as possible. During this process, an attempt to identify all potential partner organisations will be undertaken. Agreement on a likely process for creation of an ASCOBANS database may be reached following this meeting, but further follow up meetings and/or discussion may also be necessary.</p>														
Outputs	<p>Following the meeting at ZSL, a report will be submitted to the ASCOBANS Secretariat that will detail;</p> <ul style="list-style-type: none"> • outcomes of the discussion process between networks • partner stranding networks that could contribute data to a potential centralised database • common areas of data that could be included in a potential centralised database • structure and operation of a potential centralised database <p>If agreement is reached between networks that such a system is possible, a detailed proposal (with associated costs and timetable) on the creation of a centralised web-accessed database and portal will also be prepared and submitted.</p>														
Work Plan and Timetable	<p>A ten month timetable is envisaged from initiation of project and funding through to the delivery of the feasibility study on the creation of a web accessed database.</p> <table border="1" data-bbox="539 1328 1444 1832"> <thead> <tr> <th data-bbox="539 1328 930 1368">Date</th> <th data-bbox="930 1328 1444 1368">Milestone</th> </tr> </thead> <tbody> <tr> <td data-bbox="539 1368 930 1411">May-August 2010</td> <td data-bbox="930 1368 1444 1411">Initial discussion/information gathering</td> </tr> <tr> <td data-bbox="539 1411 930 1453">September-October 2010</td> <td data-bbox="930 1411 1444 1453">Stranding networks meeting at ZSL</td> </tr> <tr> <td data-bbox="539 1453 930 1529">November-December 2010</td> <td data-bbox="930 1453 1444 1529">Follow up discussion/report preparation</td> </tr> <tr> <td data-bbox="539 1529 930 1606">January-February 2011</td> <td data-bbox="930 1529 1444 1606">Preparation of draft report in consultation with partner networks</td> </tr> <tr> <td data-bbox="539 1606 930 1648">February 2011</td> <td data-bbox="930 1606 1444 1648">Delivery of final report to Secretariat</td> </tr> <tr> <td data-bbox="539 1648 930 1832">February 2011</td> <td data-bbox="930 1648 1444 1832">(If agreement reached between networks) Delivery of costed proposal for a centralised web-accessed database to Secretariat</td> </tr> </tbody> </table>	Date	Milestone	May-August 2010	Initial discussion/information gathering	September-October 2010	Stranding networks meeting at ZSL	November-December 2010	Follow up discussion/report preparation	January-February 2011	Preparation of draft report in consultation with partner networks	February 2011	Delivery of final report to Secretariat	February 2011	(If agreement reached between networks) Delivery of costed proposal for a centralised web-accessed database to Secretariat
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Project Personnel	<p>Dr Paul Jepson Senior Research Fellow Institute of Zoology Regent's Park London NW1 4RY UK</p>														

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	<p>Email: paul.jepson@ioz.ac.uk Web: http://www.zsl.org/science/ioz-staff-students/jepson,1084,AR.html Overall scientific overview.</p> <p>Rob Deaville Project Manager (UK CSIP) Institute of Zoology Regent's Park London NW1 4RY UK Email: rob.deaville@ioz.ac.uk Web: www.ukstrandings.org Project management (day to day).</p>								
<p>Budget Estimates</p>	<p>Project Costs:</p> <p>Contribution towards the costs of networks attendance at a meeting hosted by ZSL in London, UK</p> <p>Preparation of a report to the ASCOBANS Secretariat on the outcome of inter-network discussions. Delivery of a costed proposal if feasible.</p> <table border="1" data-bbox="539 963 1439 1124"> <thead> <tr> <th>Item</th> <th>Cost</th> </tr> </thead> <tbody> <tr> <td>Meeting between networks/stakeholders</td> <td>€8000</td> </tr> <tr> <td>Report/costed proposal production</td> <td>€500</td> </tr> <tr> <td>Total</td> <td>€8500</td> </tr> </tbody> </table>	Item	Cost	Meeting between networks/stakeholders	€8000	Report/costed proposal production	€500	Total	€8500
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For more information please contact the ASCOBANS Secretariat at ascobans@ascobans.org.

**FORMAT FOR PROJECT PROPOSALS
FOR THE CONSIDERATION OF THE ASCOBANS ADVISORY COMMITTEE**

Title Pollutant exposure in coastal top predators: assessing current levels of exposure and toxic effects.	Justification: CMP	Project ID: PP/2010/04
Implementing Agency / Applicant	Dr Paul Jepson; Rob Deaville Institute of Zoology (Zoological Society of London) Regent's Park London NW1 4RY UK	
Collaborating Agencies / Other Sponsors	Bob Reid, Wildlife Unit, SAC Veterinary Science Division (Inverness), Drummondhill, Stratherrick Road, Inverness, IV2 4JZ, UK Bob.Reid@sac.co.uk Marine Environmental Monitoring, Penwalk, Llechryd, Cardigan, SA43 2PS, UK rodpenrose@strandings.demon.co.uk Robin Law, CEFAS Laboratory, Pakefield Road, Lowestoft, Suffolk, NR33 0HT, UK r.j.law@cefas.co.uk Dr Graham Pierce/Fiona Read, School of Biological Sciences, University of Aberdeen, Scotland/Instituto Espanol de Oceanografia, Valencia, Spain g.j.pierce@abdn.ac.uk José Vingada, Soc. Port. Vida Selvagem, Dep. Biologia - Univ. do Minho, Campus de Gualtar, 4710-057 Braga Portugal spvs@socpvs.org Dr Emer Rogan, University College Cork, Cork, Ireland e.rogan@ucc.ie Professor Antonio Fernandez, Antonio Fernández, Facultad de Veterinaria, Universidad de Las Palmas de Gran Canaria, Gran Canaria, Spain afernandez@dmor.ulpgc.es Prof. Vincent Ridoux, Centre de Recherche sur les Ecosystèmes Littoraux Anthropisés, UMR 6217 CNRS-IFREMER-Université de la Rochelle, 22 avenue Michel Crépeau, 17042 La Rochelle, France vridoux@univ-lr.fr Dr Ursula Siebert, Forschungs- und Technologiezentrum Westküste, Hafentoern, D-25761 Buesum, Germany ursula.siebert@ftz-west.uni-kiel.de Dr. Simon Berrow, Irish Whale and Dolphin Group, Merchants Quay, Kilrush, County Clare, Ireland simon.berrow@shannondolphins.ie Dr. Thierry Jauniaux, Department of Veterinary Pathology, University of Liege, Liege, Belgium t.jauniaux@mumm.ac.be	
Background / Problem	Cetaceans and other marine mammals can accumulate high levels of a wide range of persistent organic pollutants (POPs) that are persistent, bioaccumulative and toxic (Reijnders, 1996). Within this broad group of chemical pollutants, it is the polychlorinated biphenyls (PCBs) that are thought to pose the greatest threat to marine mammals in industrialised	

	<p>regions due to their abundance and relative toxicity (Safe 1994). Of fundamental importance is to establish what levels of exposure may cause significant adverse physiological and lethal effects to individuals and populations. This is often very difficult to establish in marine mammals, despite having some of the highest levels of exposure ever recorded. It is nonetheless essential if the vulnerability of exposed populations is to be robustly evaluated and facilitate informed conservation and management plans.</p> <p>A large dataset (n=530) on pathology and toxicology of UK-stranded harbour porpoises (<i>Phocoena phocoena</i>) has been generated by the Defra funded UK Cetacean Strandings Investigation Programme (CSIP, www.ukstrandings.org) from 1989-2005 using internationally standardised methodologies (Jepson 2005; Jepson <i>et al</i> 2005). Large subsets of this data have already enabled rigorous statistical analyses to be conducted that show compelling associations between elevated tissue concentrations of PCBs and death due to infectious disease when compared to a control group that died of physical trauma (e.g. by-catch) using large sample sizes (see Jepson <i>et al</i> 2005; Hall <i>et al</i> 2006). These analyses are highly consistent with PCB-induced immune suppression leading to infectious disease mortality at summed PCB congener concentrations above 15-20mg/kg lipid weight. Although long-term studies show a very gradual temporal decline in PCBs and other organochlorine pollutants in UK-stranded harbour porpoises since 1989 (Law <i>et al</i> in press; Jepson 2005), PCB levels in coastal top predators such as bottlenose dolphins (<i>Tursiops truncatus</i>) are still almost one order of magnitude higher than levels thought to predispose to infectious disease mortality in UK-stranded harbour porpoises (Jepson <i>et al</i> 2008) (Figure 1). Inshore bottlenose dolphin populations are still small, fragmented and declining or disappearing in many parts of Europe- areas where historic and current PCB exposure is greatest (Evans 1996). Levels of PCBs in UK-stranded killer whales (<i>Orcinus orca</i>) which have been examined at necropsy (n=5) are even higher than those in bottlenose dolphins (CSIP, unpublished data).</p> <p>Data on PCB levels in bottlenose dolphins from other ASCOBANS regions is also scarce, partly because inshore bottlenose dolphin populations are very small or have disappeared completely from many European locations within the ASCOBANS range (Evans 1996). Since levels in UK-stranded bottlenose dolphins and killer whales are around one order of magnitude higher than levels associated with infectious disease mortality in UK-stranded harbour porpoises, it is highly possible that PCBs continue to be a primary driver of population decline and a suppressor of recovery in these coastal top predator species. With evidence of declines of these species in NE Atlantic (Evans 1996; Jepson <i>et al</i>, 2008), surveillance of PCB levels in bottlenose dolphins and killer whales should be a top conservation priority, rather than an area of research that currently enjoys only minimal funding.</p>
Objectives	<ol style="list-style-type: none"> 1) In this project, we aim to determine and analyse existing pollutant exposure data for PCBs and organochlorine pesticide levels within the ASCOBANS range. 2) The levels of PCBs in bottlenose dolphins and killer whales would be compared with levels of PCBs in healthy and diseased harbour porpoises in UK waters (Jepson <i>et al</i> 2005; Hall <i>et al</i> 2006) (Figure 1) and to a proposed threshold of toxicity for total PCBs of 17mg/kg lipid

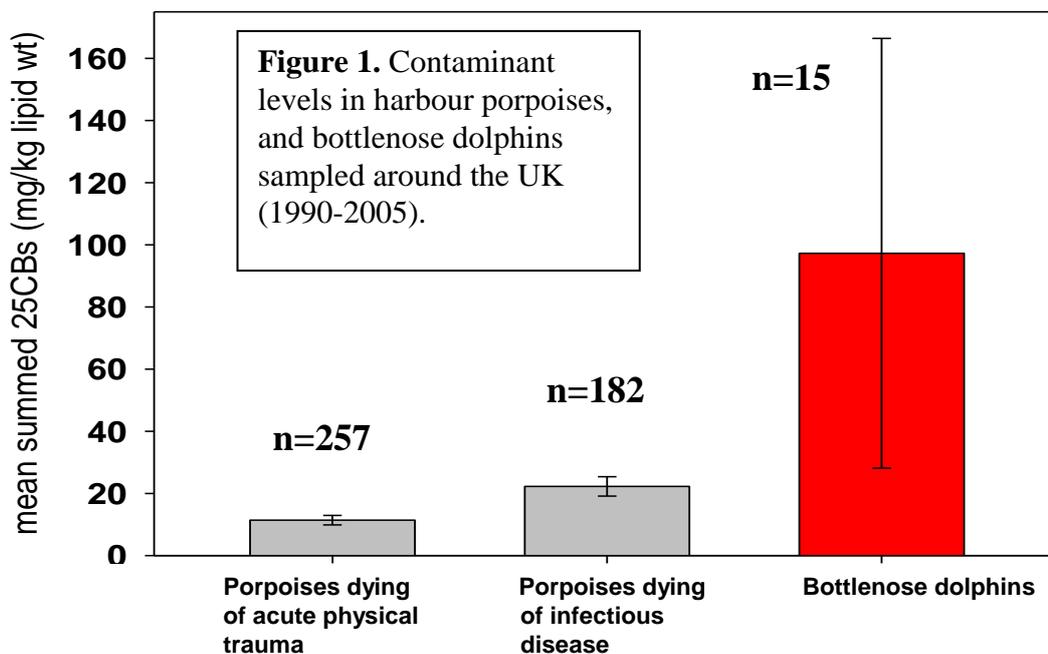
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	<p>weight (Kannan <i>et al</i> 2000). PCB levels could also be compared with those associated with reproductive impairment in bottlenose dolphin studies in the US (e.g. Schwacke <i>et al</i> 2002). There is sufficient data from UK-stranded harbour porpoises to generate the first dose-response curve for risk assessments of lethal effects of PCBs (i.e. infectious disease mortality) in exposed populations using empirical cetacean data. This may enable some risk assessments to be conducted for the toxic effects of PCB exposure in bottlenose dolphins and killer whales in European water within the ASCOBANS range.</p>
Relevance to ASCOBANS	<p>This project is highly relevant for the attainment of ASCOBANS goals by generating pollutant data in species that have the greatest recorded exposures on earth and to assess the likely effects of these pollutants on mortality of reproductive function. Such research would clearly comply the Agreement's Conservation and Management Plan, Resolutions, Activities in the Agreement's Triennium Work Plan and actions recommended by the Advisory Committee.</p>
Activities	<p>All toxicological analyses would be conducted at the Centre for Environment, Fisheries and Aquaculture Science, Lowestoft Laboratory (CEFAS, www.cefasc.co.uk) using internationally standardised methodology (Jepson 2005; Law <i>et al.</i> 2006). Blubber samples would be stored frozen prior to being analysed for a suite of organochlorine contaminants including concentrations of 25 chlorobiphenyl (CB) congeners and several organochlorine pesticides including dichlorodiphenyltrichloroethane (DDT) and its metabolites.</p>
Outputs	<p>Around 18 months after the onset of the project a final report would be submitted to the ASCOBANS Advisory Committee assessing the levels of exposure in UK/European bottlenose dolphins and killer whales and their likely toxicological impacts. It is also envisaged that the results of this research would be submitted to one or more peer-reviewed scientific journals.</p>
Work Plan and Timetable	<p>The project would be one year in duration for toxicological analysis of samples. Archived blubber samples available for analysis would be collated and despatched to CEFAS Burnham Laboratory as soon as the project was operational. All data generated would then be analysed to assess the threat posed by PCBs. The project would be one year in duration for collation of available samples and analyses of contaminant levels and 6 months for data analysis and report writing.</p>
Project Personnel	<p>Dr Paul Jepson Senior Research Fellow Institute of Zoology Regent's Park London NW1 4RY UK Email: paul.jepson@ioz.ac.uk http://www.zsl.org/science/ioz-staff-students/jepson,1084,AR.html Overall scientific overview/data analysis/report writing.</p>

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	<p>Rob Deaville Project Manager (UK CSIP) Institute of Zoology Regent's Park London NW1 4RY UK Email: rob.deaville@ioz.ac.uk Project management (day to day)/report writing</p> <p>Robin Law CEFAS Laboratory Pakefield Road Lowestoft Suffolk NR33 0HT Email: R.J.Law@cefas.co.uk Oversee analytical chemistry for PCBs and organochlorine pesticide analyses (internationally standardised methodology)/Data analysis/report writing.</p> <p>Prof Graham Pierce School of Biological Sciences University of Aberdeen Scotland Email: g.j.pierce@abdn.ac.uk Oversee analysis of teeth ageing/report writing.</p>
<p>Budget Estimates</p>	<p>Project Costs:</p> <p>Cost/animal (PCBs and OC pesticides)</p> <p>Analysis of 20 bottlenose dolphins/killer whales (PCBs/OC pesticides)</p> <p>Teeth ageing (Univ. of Aberdeen) €1000</p> <p>Funding for sample transfer/storage and data analysis €150</p> <p>Data analysis/final report (IoZ/CEFAS) €1000</p> <p>Total €9750</p>

For more information please contact the ASCOBANS Secretariat at ascobans@ascobans.org.



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FOR THE CONSIDERATION OF THE ASCOBANS ADVISORY COMMITTEE

<p>Title Effects of contaminants on reproduction, Phase II</p>	<p>Justification:</p>	<p>Project ID:</p>
<p>Implementing Agency / Applicant</p>	<p>Dr Sinéad Murphy, Sea Mammal Research Unit, Scottish Oceans Institute, University Of St Andrews, St Andrews KY16 8LB, UK Email: snm4@st-andrews.ac.uk</p>	
<p>Collaborating Agencies / Other Sponsors</p>	<p>Dr Paul Jepson and Rob Deaville, UK Cetacean Strandings Investigation Programme The Wellcome Building Institute of Zoology Zoological Society of London Regent's Park London NW1 4RY UK Email: Paul.Jepson@ioz.ac.uk Email: rob.deaville@ioz.ac.uk www.ukstrandings.org</p> <p>Dr Robin Law, Cefas Lowestoft Laboratory, Pakefield Road, Lowestoft, Suffolk NR33 0HT, UK Email: robin.law@cefas.co.uk</p>	
<p>Background / Problem</p>	<p>The EC BIO CET project reported that a large proportion of blubber samples analysed (obtained from Spain, Ireland, Scotland, the Netherlands and France, 2001-03) from stranded <i>D. delphis</i> (n = 70) and <i>P. phocoena</i> (n = 67) were above a threshold level identified to have adverse health effects from PCB exposure in the blubber of marine mammals (Pierce et al., 2008). This threshold was frequently exceeded in both <i>P. phocoena</i> (47% of individuals) and <i>D. delphis</i> (40%),</p>	

especially *P. phocoena* from the southern North Sea (74%) and *D. delphis* inhabiting waters off the French coast (50%). The threshold in question is 17 µg/g total PCBs lipid weight, which was derived by Kannan et al. (2000) and based on experimental studies of both immunological and reproductive effects in seals, otters, and mink.

Further analysis of BIO CET data identified that common dolphins with the highest PCB contaminant burdens were resting mature females, and these individuals also had the highest number of ovulation scars, suggesting either that (a) due to high contaminant burdens, females may be unable to reproduce, thus continue ovulating, or (b) females are not reproducing for some other reason, either physical or social, and started accumulating higher levels of contaminants (Murphy et al. in revision a). However, as information on health status was not available for all individuals, it was not known if these females were unable to reproduce for other reasons.

In 2009, a follow up study to the EC BIO CET project was initiated by the SMRU, Cefas and the Institute of Zoology, using samples from *D. delphis* and *P. phocoena* that stranded along the English and Welsh coastlines. The remit of the project was to investigate the effects of contaminants on reproduction in females using a larger sample size (91 female *P. phocoena*) obtained over a longer time period (1990 to present), and also by analysing samples from a control group of individuals. 43 female *D. delphis* taken incidentally as bycatch in fishing gear, and which subsequently stranded along the UK coastline, were designated as the control group. Detailed pathological investigations (gross examination, histological, bacteriological and/or virological analyses) undertaken by the UK Cetacean Strandings Investigation Program identified that individuals were not suffering from any infectious or non-infectious disease that would inhibit reproduction, and were overall in good nutritional condition. Contaminant analysis undertaken on blubber samples from the control group (25 PCBs, hexachlorobenzene, hexachlorocyclohexane (α -, β -, and γ), and 3 organochlorine pesticides (OCPs)) was funded by the Defra Marine Research Program, which was allocated to Cefas. Over the last number of years, Cefas has also analysed tissue samples from *P. phocoena* for a suite of contaminants (25 PCB congeners, 13 heavy metals, three butyltin compounds, 5 OCPs and 15 polybrominated diphenyl ethers), and these contaminant data were provided for statistical analysis. Age and reproductive assessments were undertaken during Phase I of "Effects of contaminants on reproduction in small cetaceans", funded by ASCOBANS.

Preliminary assessment of the *D. delphis* control group and the *P. phocoena* data suggests that increased PCB burdens, above the threshold level, are not inhibiting ovulation, conception or implantation (Murphy 2009; Murphy et al. in revision b). However for both species the impact on the foetal and newborn survival rates needs to be investigated, as well as the effects of other contaminants on reproductive activity. Detailed post-mortems examinations revealed that all sexually mature female *P. phocoena* with PCB loads above the threshold level had

previously been gravid. However, considering that up to c80% of a females PCB load can be offloaded during the first seven weeks of lactation, the high contaminant loads reported in these individuals indicates that they may have miscarried/aborted (Murphy 2009). Within the *P. phocoena* sample only 50% of individuals died from acute physical trauma. As a casual immunotoxic relationship has been reported between PCB exposure and infectious disease mortality in UK harbour porpoises (Jepson et al. 2005), the indirect effects of contaminants, through lowering immunity, may have a significant impact on reproductive activity - which requires further investigation.

As part of Phase I of the ASCOBANS funded project, preliminary investigations were also undertaken on assessing the incidence of ovarian lesions and reproductive tract abnormalities within *D. delphis*. In other marine mammal species, stenosis, occlusions and leiomyomas have been associated with increased contaminant burdens, along with cancer and hermaphroditism (Murphy 2009). Preliminary investigations (samples were processed for histological examination) of ovarian samples from *D. delphis* (n = 95) reported the existence of a true hermaphrodite with an ovotestis (Murphy et al. in revision b).

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Pierce GJ, Santos MB, **Murphy S**, Learmonth JA, Zuur AF, Rogan E, Bustamante P, Caurant F, Lahaye V, Ridoux V, Zegers BN, Mets A, Addink M, Smeenk C, Jauniaux T, Law RJ, Dabin W, López A, Alonso Farré JM, González AF, Guerra A, García-Hartmann M, Reid RJ, Moffat CF, Lockyer C, Boon JP (2008) Bioaccumulation of persistent organic pollutants in female common dolphins (*Delphinus delphis*) and harbour porpoises (*Phocoena phocoena*) from western European seas: Geographical trends, causal factors and effects on reproduction and mortality. Environmental Pollution 153: 401-415.

<p>Objectives</p>	<p>The objective of this study is to assess the effects of pollutants, such as PCBs, DDT and other contaminants, on reproductive activity in the common dolphin <i>Delphinus delphis</i> and the harbour porpoise <i>Phocoena phocoena</i>. This project was initially funded by the EC BIO CET project (2001-2003), and recently by the Defra Marine Research Program and ASCOBANS (2009).</p> <p>(1) <i>Assessment of the direct and indirect effects, through lowering immunity, of contaminants on reproduction in female P. phocoena</i></p> <p>This study will increase the current <i>P. phocoena</i> sample size to c150 individuals, and statistical analysis will incorporate data such as health status and nutritional condition, along with contaminant levels.</p> <p>(2) <i>Assessment of reproductive abnormalities within English and Welsh D. delphis and P. phocoena and, where data are available, investigate their association with pollutants</i></p> <p>This study will assess abnormalities associated with the reproductive tract. Gonadal inactivity or lesions can be caused by many factors including genetic defects, infectious disease, degenerative changes, neoplasia or aging (senescence), or secondary to other primary problems such as nutritional or environmental stress, systemic infection and central nervous system disease. Therefore within the proposed study, genital pathology will be linked to other data such as age, nutritional status, disease, as well as contaminant levels. Further, evidence of shortened reproductive spans, abortions, stillbirths, premature births and evidence of low birth size/weight in newborns will be assessed.</p> <p>Ovaries will be examined for evidence of atrophy and early senescence, ovarian cysts including luteinized cysts, and tumours. Other abnormalities of the reproductive tract will be investigated such as tumours, uterine stenosis, occlusions and leiomyomas and vaginal calculi, as well as hermaphroditism. Completion of the assessment for reproductive abnormalities in UK female <i>D. delphis</i> and a full assessment of the English and Welsh female <i>P. phocoena</i> sample will be undertaken.</p>
<p>Relevance to ASCOBANS</p>	<p>The research undertaken by this study has important implications for conservation of both these species in the ASCOBANS area.</p> <p>This project will contribute to:</p> <ul style="list-style-type: none"> - ASCOBANS Conservation and Management Plan <ul style="list-style-type: none"> 2. Surveys and Research 3. Use of by-catches and strandings - ASCOBANS Triennium Work Plan 2010-2012 <ul style="list-style-type: none"> 2. Continue to review [...] new information on pollution and its effects on small cetaceans which occur in the ASCOBANS area and, on the basis of this review, provide recommendations to

	<p>Parties and other relevant authorities</p> <p>4. Review new information on cetacean population size, distribution, structure, and causes of mortality in the ASCOBANS area and based on implications for conservation to make appropriate recommendations to Parties and other relevant authorities</p> <ul style="list-style-type: none"> - ASCOBANS Conservation Plan for Harbour Porpoises in the North Sea <ul style="list-style-type: none"> Action 10. Investigation of the health [...] of harbour porpoises in the region. To collect fundamental information the question of human activities (other than bycatch) including contaminants [...] for input into population dynamics modelling
<p>Activities</p>	<p>Reproductive and age determination (where necessary) laboratory analysis, statistical analysis and production of the final report for Phase II will be undertaken by Sinéad Murphy at the Sea Mammal Research Unit, Scottish Oceans Institute. Contaminant analysis was undertaken by Robin Law at the UK Centre for the Environment, Fisheries and Aquaculture Science (Cefas), and autopsies were carried out by Paul Jepson, Rob Deaville and colleagues at the Institute of Zoology, London. Contaminant data includes 25 PCB congeners, 13 heavy metals, three butyltin compounds, 5 OCPs and 15 polybrominated diphenyl ethers.</p> <p>Work already undertaken and funded by ASCOBANS during Phase I</p> <ol style="list-style-type: none"> I. Analysed teeth samples from the <i>D. delphis</i> control group, for age determination II. Histological analysis of corpora scars (scars of ovulation and/or pregnancy) from the ovaries of individuals within the <i>D. delphis</i> “control” group III. Preliminary investigations, including processing samples for histology, of reproductive abnormalities in <i>D. delphis</i> ovaries (n = 95) IV. Gross assessment of corpora scars on the ovaries of <i>P. phocoena</i> (n = 91) V. Submitted paper entitled “Assessing the effect of persistent organic pollutants on reproductive activity in common dolphins and harbour porpoises” to the proceedings of the NAFO/ICES/NAMMCO symposium on “The Role of Marine Mammals in the Ecosystem in the 21st Century”, which will be published in a special issue of the Journal of the Northwest Atlantic Fisheries Science VI. Submitted paper entitled “True hermaphroditism: First evidence of an ovotestis in a cetacean species” to the Journal of Comparative Pathology

	<p>Work which will be undertaken during Phase II</p> <ol style="list-style-type: none"> I. Analysis of histological slides processed during Phase I of suspected abnormalities in <i>D. delphis</i> ovaries (1 week) II. Detailed analysis of all additional available <i>P. phocoena</i> ovarian material (n ~ 60) with corresponding contaminant data. Laboratory analysis includes gross examination of gonads, sectioning of ovaries, counting all corpora scars, and where required histological analysis of corpora scars (3 weeks) III. Assessment of reproductive abnormalities in all <i>P. phocoena</i> ovaries. Laboratory work will include gross and histopathological analysis of ovarian material (4 weeks) IV. Where data gaps exist, analysis of teeth samples from <i>P. phocoena</i> for age determination (2.5 days) V. Statistical analysis will be undertaken incorporating age, reproductive, contaminant, nutritional and health status data. This is order to assess the indirect effects of contaminants on reproductive activity in female <i>P. phocoena</i>. Further additional analysis will assess the prevalence of abnormalities in female <i>D. delphis</i> and <i>P. phocoena</i>. (2.5 weeks) <p>Laboratory work will be undertaken by Dr Sinéad Murphy at the Sea Mammal Research Unit. Additional costs for all laboratory analysis have been included within the budget, and all essential equipment has already been purchased by previous grants.</p>
<p>Outputs</p>	<p>Expected outputs from this project include:</p> <ul style="list-style-type: none"> – Information on the effects of contaminants on reproduction in small cetaceans – Implications for conservation of both these species in the ASCOBANS area: If the results identify that contaminants have an adverse effect on individual reproductive capabilities, both species would be more vulnerable to exploitation, especially from other anthropogenic activities such as incidental capture, and would not necessarily recover from exploitation in a predictable way. – Production of the final report from Phase II – Production of a scientific paper for peer review on “Assessing the direct and indirect effects of contaminants on female reproductive activity in UK harbour porpoises” – Production of a scientific paper for peer review on “The prevalence of reproductive abnormalities in small cetaceans, and association with pollutants”

Work Plan and Timetable	<p>This project will be undertaken on a part-time basis from 1st July to 30th November.</p> <p>The work plan is attached to this proposal. Dr Sinéad Murphy is responsible for implementation all project activities.</p>
Project Personnel	<p>Sinéad Murphy, Honorary Research Fellow, Sea Mammal Research Unit, Scottish Oceans Institute, University Of St Andrews</p> <p>Correspondence address: 5 Castle Brae, Newport-On-Tay, Fife, DD68HW, UK Mob: +44 (0) 7814 178885</p> <p>Role within the Project: Principal Investigator</p> <p>A succinct CV is attached to this proposal</p>
Budget Estimates	<p>The budget for the project is attached to this proposal.</p>

Work Plan

Activity	July	August	September	October	November
Analysis of histological slides from abnormalities in the <i>D. delphis</i> control group sample (n = 43)	X				
Detailed analysis of additional <i>P. phocoena</i> ovarian material (n = 50)	X	X			
Age determination analysis of teeth from <i>P. phocoena</i>		X			
Assessment of reproductive abnormalities in <i>P. phocoena</i> (n = 140)			X	X	
Statistical Analysis			X	X	X

Investigating the effects of contaminants on reproduction in small cetaceans Phase II

Budget for 2nd year of the project: 1st July 2010 – 30th November 2010
 Salary costs are for Dr Sinéad Murphy working on a part-time basis.

Group		Cost £	Cost €
<u>FINANCIAL DETAILS:</u>	Rates		
	SALARIES (100% salary, including NI and USS)	8,384	10,480
	Other Costs (histopathology laboratory costs for sectioning teeth and gonadal tissue, consumables, courier costs)	1,500	1,853
	TOTAL DIRECT COSTS	9,844	12,355
	University 10% overheads		1,236
	TOTAL INDIRECT COSTS		1,236
	TOTAL COSTS		13,591

CURRICULUM VITAE - SHORT

Dr Sinéad Murphy

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Date of birth: 25/01/77

Nationality: Irish

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WEBPAGES

SMRU: <http://soi.st-andrews.ac.uk/staffProfile.aspx?sunID=snm4>

SMRU Ltd: <http://www.smru.co.uk/>

EC NECESSITY Project: www.rivo.dlo.nl/sites/necessity/

EC BIO CET Project: www.abdn.ac.uk/biocet/

ICES WGMME: <http://www.ices.dk/workinggroups/ViewWorkingGroup.aspx?ID=32>

ACADEMIC INFORMATION

- **1999 – 2004: PhD** carried out at the University College Cork, Ireland. PhD thesis: “The biology and ecology of the common dolphin *Delphinus delphis* in the North-east Atlantic”.
- **1995 – 1999: Degree in Zoology**, University College Cork, Ireland (2.1 Hons)

RESEARCH EXPERIENCE

- **January 2010: International Visiting Research Fellow**, Massey University, New Zealand. “Life history of the New Zealand common dolphin” (Collaborator Dr Karen Stockin). Funded by Massey University International Visitor Research Fellowship fund.
- **2005-2009: Post-doctoral Research Fellow**, Sea Mammal Research Unit, University of St Andrews.
 - **January 2009 - July 2009, principal investigator**. “Effects of contaminants on reproduction in small cetaceans: Phase I” (Principal Investigator). Funded by ASCOBANS.
 - **September 2008 – November 2008** “Marine mammal Strategic Environmental Assessments (SEA) for offshore oil & gas licensing and wind leasing” (supervisor Prof Philip Hammond). Funded by UK DECC.
 - **April 2008 – August 2008** “Cetacean stock assessment in relation to exploration and production industry sound” (supervisor Prof Philip Hammond). JIP contract 07-02.
 - **August 2006 - March 2008** “Monitoring impact and mitigation of marine mammal bycatch” (supervisor Dr Simon Northridge). DEFRA contract MF0736.
 - **March 2005 - April 2007** “NEphrops and CEtacean Species Selection Information and Technology” (supervisor Dr Simon Northridge). EC NECESSITY contract 501605.
- **2000-2004: Research Assistant**, University College Cork, Ireland (Supervisor Dr Emer Rogan)
 - **May 2004 – August 2004** “NEphrops and CEtacean Species Selection Information and Technology”. EC NECESSITY contract 501605.
 - **January 2004 – April 2004, Coordinator and researcher** “Irish marine mammal stranding project” Funded by the Irish National Parks and Wildlife Service.
 - **January 2001 – December 2003** “BIOaccumulation of persistent organic pollutants in small CETaceans in European waters: transport pathways and impact on reproduction”. EC BIO CET contract EVK3-2000-00027.
 - **June 2000 – January 2003, Coordinator and researcher** “Irish marine mammal stranding project”.

MEASURES OF ESTEEM

- Current chair of the ICES Working Group on Marine Mammal Ecology (WGMME, 2009-2011).
- Appointed UK member of the ICES WGMME (2005-present).
- Invited participant to the IWC intersessional workshop “Considering climate change and small cetaceans” (Vienna, 2010).
- UK delegate at the International Whaling Commission (Madeira, June 2009).
- Invited participant and speaker to the ASCOBANS/HELCOM workshop on “Small cetacean population structure in the ASCOBANS area” (Bonn, October 2007).
- Referee for eleven journals including Journal of Mammalogy, Marine Biology, Journal of Experimental Marine Biology and Ecology, Marine Ecology Progress Series, Endangered Species Research, Journal of Northwest Atlantic Fisheries Science, Marine Mammal Science, Journal of the Marine Biological Association of the UK, Australian Journal of Zoology, Biologia, and Zoology.
- 41 publications; including 18 peer-review publications, 1 book chapter, 4 proceedings and IWC papers, and 18 reports. Currently an additional two papers in review and nine papers in preparation.

PUBLICATIONS

Papers, in preparation

- I. Learmonth, J.A., Pierce G.J., **Murphy, S.**, Luque, P.L., Reid, R.J., and M. B. Santos. in prep. Life history and population parameters of harbour porpoises (*Phocoena phocoena*) in Scottish waters (1992-2005): comparison with other areas and implications for population status. Marine Biology.
- II. Spradlin, T., **Murphy, S.**, Mackey, B., McVee, J., Androukaki, J., Tounta, E., Karamanlidis, A. A., Dendrinou, P., Joseph, E., Lockyer, C., and J. Matthiopoulos. Age-related mortality of Mediterranean monk seals (*Monachus monachus*) estimated from dental samples. Endangered Species Research.
- III. Brophy, J., **Murphy, S.**, and E. Rogan. in prep. The diet and feeding ecology of the common dolphin (*Delphinus delphis*) in the North-east Atlantic. ICES Journal of Marine Science.
- IV. Mirimin, L., Viricel, A., Amaral, A.R., **Murphy, S.**, Northridge, S., Ridoux, V., and E. Rogan. in prep. Population genetic structure of common dolphins in the North-east Atlantic using microsatellite loci and mtDNA control region markers.
- V. **Murphy, S.** in prep. Comparative aspects of reproductive seasonality in promiscuous male small cetaceans.
- VI. Cañadas, A., and **S. Murphy.** in prep. Anecdotal notes on evidence of promiscuity and mating units in wild common dolphins *Delphinus delphis*.
- VII. **Murphy, S.**, Stockin, K., Perrott, M., et al. in prep. Deposition of dental growth layer groups in long term captive common dolphins. Marine Mammal Science
- VIII. Stockin K., **Murphy, S.**, et al. life history of New Zealand common dolphins.

Papers, in review

1. **Murphy, S.**, Deaville, R., Monies, R. J., Davison, N., and P. D. Jepson. in review. True hermaphroditism: First evidence of an ovotestis in a cetacean species. Journal of Comparative Pathology.
2. **Murphy, S.**, Pierce, G.J., Law, R.J., Bersuder, P., Jepson, P.D., Learmonth, J.A., Addink, M., Dabin, W., Santos, M.B., Deaville, R., Zegers, B.N., Mets, A., Rogan, E., Ridoux, V., Reid, R.J., Smeenk, C., Jauniaux, T., López, A., Farré, J.M.A., González, A.F., Guerra, A., García-Hartmann, M., Lockyer, C., and J.P. Boon. in review. Assessing the effect of persistent organic pollutants on reproductive activity in small cetaceans in the eastern North Atlantic. NAFO/ICES/NAMMCO symposium "The Role of Marine Mammals in the Ecosystem in the 21st Century". Journal of Northwest Atlantic Fishery Science.

Papers and notes in peer-reviewed journals

3. **Murphy, S.**, Winship, A., Dabin, W., Jepson, P.D., Deaville, R., Reid, R.J., Spurrier, C., Rogan, E., López, A., González, A., Read, F., Addink, M., Silva, M., Ridoux, V., Learmonth, J.A., Pierce, G.J., and S.P. Northridge. 2009. The importance of biological parameters in assessing the current status of the short-beaked common dolphin *Delphinus delphis* in the eastern North Atlantic. Marine Ecology Progress Series **388**: 273-291
4. Pierce, G.J., Santos, M.B., **Murphy, S.**, Learmonth, J.A., Zuur, A.F., Rogan, E., Bustamante, P., Caurant, F., Lahaye, V., Ridoux, V., Zegers, B.N., Mets, A., Addink, M., Smeenk, C., Jauniaux, T., Law, R.J., Dabin, W., Lopez, A., Alonso Farre, J.M., Gonzalez, A.F., Guerra, A., Garcia-Hartmann, M., Reid, R.J., Moffat, C.F.,

- Lockyer, C., and J.P. Boon. 2008. Bioaccumulation of persistent organic pollutants in female common dolphins (*Delphinus delphis*) and harbour porpoises (*Phocoena phocoena*) from western European seas: Geographical trends, causal factors and effects on reproduction and mortality. *Environmental Pollution* 153: 401-41
5. McHugh, B., Law, R.J., Allchin, C.R., Rogan, E., **Murphy, S.**, Foley, M.B., Glynn, D., and E. McGovern. 2007. Bioaccumulation and enantiomeric profiling of organochlorine pesticides and persistent organic pollutants in the killer whale (*Orcinus orca*) from British and Irish waters. *Marine Pollution Bulletin* 54(11): 1724-1731.
 6. **Murphy, S.**, and E. Rogan. 2006. External morphology of the short-beaked common dolphin, *Delphinus delphis*: growth, allometric relationships and sexual dimorphism. *Acta Zoologica* 87(4): 315-329.
 7. **Murphy, S.**, Herman, J.S., Pierce, G.J., Rogan, E., and A.C. Kitchener. 2006. Taxonomic status and geographical cranial variation of common dolphins (*Delphinus*) in the eastern North Atlantic. *Marine Mammal Science* 22(3): 573-599.
 8. **Murphy, S.** 2006. Sexual dimorphism in cranial measurements of *Delphinus delphis* in the eastern North Atlantic. *Marine Mammal Science*, online document 22(2): 1-4.
 9. Brophy, J., **Murphy, S.**, and E. Rogan. 2006. Records from the Irish Whale and Dolphin Group for 2003. *Irish Naturalists' Journal* 28(5): 214-219.
 10. **Murphy, S.**, Collet, A., and E. Rogan. 2005. Mating strategy in the male common dolphin *Delphinus delphis*: what gonadal analysis tells us. *Journal of Mammalogy* 86(6): 1247-1258.
 11. **Murphy, S.**, and E. Rogan. 2005. Records from the Irish whale and dolphin group for 2002. *The Irish Naturalists' Journal* 28(1): 37-40.
 12. Rogan, E., **Murphy, S.**, Cronin, M., and P. Smiddy. 2005. Risso's dolphin *Grampus griseus* (Cuvier). *Irish Naturalists' Journal* 28(4): 171.
 13. **Murphy, S.**, Mirimin, L., Englund, A., and M. Mackey. 2005. Evidence of a violent interaction between *Delphinus delphis* L. and *Tursiops truncatus* (Montagu). *Irish Naturalists' Journal* 28(1): 42-43.
 14. Hurley, J., and **S. Murphy**. 2005. Sowerby's beaked whale *Mesoplodon bidens* Sowerby, in Co. Wexford. *Irish Naturalists' Journal* 28(1): 41.
 15. **Murphy, S.**, and E. Rogan. 2004. Records from the Irish whale and dolphin group 2000-2001. *The Irish Naturalists' Journal* 27: 357-364.
 16. Cotton, D.C.F., and **S. Murphy**. 2004. Cuvier's beaked whale *Ziphius cavirostris* Cuvier, in Co. Sligo. *The Irish Naturalists' Journal* 27: 364-365.
 17. Murray, T., and **S. Murphy**. 2003. Common Dolphin *Delphinus delphis* L. strandings on the Mullet Peninsula. *The Irish Naturalists' Journal* 27(6): 240-241.
 18. Power, E., and **S. Murphy**. 2002. *Staphylococcus aureus* septicaemia in a killer whale. *Veterinary Record* 150(26): 819.
 19. Smiddy, P., **Murphy, S.**, and S. Ingram. 2002. Fin Whale *Balaenoptera physalus* (L.). *The Irish Naturalists' Journal* 27(4): 169.
 20. **Murphy, S.**, Rogan, E., and Stoneman, A. 2002. Pygmy sperm whale *Kogia breviceps* (de Blainville). *The Irish Naturalists' Journal* 27(4): 164.

Book chapter

21. **Murphy, S.**, Evans, P.G.H., and Collet, A. 2008. Common dolphin *Delphinus delphis*. In *Mammals of The British Isles. Handbook 4th Edition. Edited by S. Harris and D.W. Yalden. The Mammal Society. pp. 719-724.*

International Whaling Commission scientific committee and proceedings papers

22. Winship, A.J., **Murphy, S.**, Deaville, R., Jepson, P.D., Rogan, E., & P.S. Hammond. 2009. Preliminary assessment and bycatch limits for northeast Atlantic common dolphins. International Whaling Commission, SC/61/SM19.
23. Brophy, J., **Murphy, S.**, and E. Rogan. 2009. The diet and feeding ecology of the common dolphin (*Delphinus delphis*) in the northeast Atlantic. International Whaling Commission, SC/61/SM14
24. Mirimin, L., Viricel, A., Amaral, A.R., **Murphy, S.**, Northridge, S., Ridoux, V., and E. Rogan. 2009. Population genetic structure of common dolphins in the northeast Atlantic using microsatellite loci and mtDNA control region markers. International Whaling Commission, SC/61/SM27
25. **Murphy, S.** 2005. Geographical variation in aspects of morphology in the common dolphin *Delphinus delphis*. In the proceedings of the workshop on "Common dolphins: current research, threats and issues". ECS Newsletter No. 45, Special Issue July 2005: 23-28.

Reports, published and in review

26. **Murphy, S.** 2009. Effects of contaminants on reproduction in small cetaceans. Final report of phase one to ASCOBANS. Sea Mammal Research Unit, University of St Andrews, St Andrews, 63pp.
27. ICES WGMME. 2009. Report of the Working Group on Marine Mammal Ecology. 2-6 February 2009, Vigo, Spain.
28. **Murphy, S.**, Natoli, A., Amaral, A.R., Mirimin, L., Viricel, A., Caurant, F., Hoelzel, R., and P. Evans. 2009. Short-beaked common dolphin *Delphinus delphis*. Report of ASCOBANS/HELCOM small cetacean population structure workshop.
29. **Murphy, S.**, Gordon, J.C.D., McConnell, B., Matthiopoulos, J., Isojunno, S., and P.S. Hammond. 2009. Background information on marine mammals for Offshore Strategic Environmental Assessment. Consultation document for the UK Department for Business, Enterprise and Regulatory Reform's [BERR] offshore energy Strategic Environmental Assessment programme. 130pp.
30. **Murphy, S.** 2008. Environmental and anthropogenic factors linked to influencing or controlling cetacean population growth rates. Task 3 Report for the Joint Industry Program project "Cetacean stock assessment in relation to exploration and production industry sound" (JIP 07-02), September 2008. Sea Mammal Research Unit Ltd. 64pp.
31. **Murphy, S.** 2008. Investigating biological parameters in common dolphins and harbour porpoises. Final Report to the UK Department for Environment Food and Rural Affairs, Project MF0736, Sea Mammal Research Unit. 38pp.
32. Hammond, P.S., Northridge, S.P., Thompson, D., Gordon, J.C.D., Hall, A.J., **Murphy, S.**, and C.B. Embling. 2008. Background information on marine mammals for Strategic Environmental Assessment 8. Consultation document for the UK Department of Trade and Industry's offshore energy Strategic Environmental Assessment programme.
33. ICES WGMME. 2008. Report of the Working Group on Marine Mammal Ecology. 25-28 February 2008, St Andrews, Scotland.
34. **Murphy, S.**, S. Northridge, W. Dabin, O. Van Canneyt, V. Ridoux, E. Rogan, E. Philpott, P. Jepson, R. Deaville, B. Reid & Y. Morizur (2007) Biological parameters of common dolphin population resulting from stranded or bycaught animals in the Northeast Atlantic. EU NECESSITY Contract 501605 Periodic Activity Report No 2 – Annex 6.2. 22pp.
35. Mirimin, L., Viricel, A., Amaral, A.R., **Murphy, S.**, Ridoux, V., and E. Rogan. 2007. Stock structure in the common dolphin *Delphinus delphis* in the Northeast Atlantic: analysis of genetic material. NECESSITY Contract 501605 Periodic Activity Report No 2 – Annex 8.1.a. 13pp.
36. **Murphy, S.**, Mirimin, L., and E. Rogan. 2007. Stock structure reports for bottlenose dolphins *Tursiops truncatus*, striped dolphins *Stenella coeruleoalba*, and white-sided dolphins *Lagenorhynchus acutus* in the Northeast Atlantic. NECESSITY Contract 501605 Periodic Activity Report No 2 – Annex 8.1b. 27pp.
37. **Murphy, S.**, Dabin, W., Ridoux, V., Morizur, Y., Larsen, F., and E. Rogan. 2007. Estimation of Rmax for the common dolphin in the Northeast Atlantic. NECESSITY Contract 501605 Periodic Activity Report No 2 – Annex 8.4. 11pp.
38. ICES WGMME. 2007. Report of the Working Group on Marine Mammal Ecology. 27-30 March 2007, Vilm, Germany.
39. ICES WGMME. 2005. Report of the Working Group on Marine Mammal Ecology. 9-12 May 2005, Savollinna, Finland.
40. **Murphy S.**, and E. Rogan. 2004. Marine Mammal Stranding Project 2003-2004. Final report to National Parks and Wildlife (Ireland). 34pp.
41. Pierce, G.J., Santos, M.B., Learmonth, J.A., Smeenk, C., Addink, M., García Hartmann, M., Boon, J.P., Zegers, B., Mets, A., Ridoux, V., Caurant, F., Bustamante, P., Lahaye, V., Guerra, A., González, A., López, A., Alonso, J.M., Rogan, E., **Murphy, S.**, Van Canneyt, O., Dabin, W., Spitz, J., Doemus, G., and L Meynier. 2004. Bioaccumulation of persistent organic pollutants in small cetaceans in European waters: transport pathways and impact on reproduction. Final Report to the European Commission's Directorate General for Research on Project EVK3-2000-00027.
42. Learmonth, J.A., **Murphy, S.**, Dabin, W., Addink, M., Lopez, A., Rogan, E., Ridoux, V., Guerra, A., and G.J. Pierce. 2004. Measurement of reproductive output in small cetaceans from the Northeast Atlantic. BIO CET workpackage 5 - final report. Project Reference: EVK3-2000-00027. 53 pp.
43. Rogan, E., **Murphy, S.**, Learmonth, J.A., González, A., and W. Dabin. 2004. Age Determination in Small Cetaceans from the NE Atlantic. BIO CET workpackage 4 - final report. Project Reference: EVK3-2000-00027. 34 pp.
44. Learmonth, J.A., Santos, M.B., Pierce, G.J., Moffat, C.F., Rogan, E., **Murphy, S.**, Ridoux, V., Meynier, L., Lahaye, V., Pusineri, C., and J. Spitz. 2004. Dietary studies on small cetaceans in the NE Atlantic using stomach contents and fatty acid analyses. BIO CET workpackage 6 - final report. Project Reference: EVK3-2000-00027. 99 pp.

Oral and poster presentations

1. **Murphy, S.** 2010. Conservation status of small cetaceans in the North-east Atlantic. Institute of Natural Sciences, Massey University, New Zealand [INVITED SPEAKER]
2. **Murphy, S.**, R. J. Law, P. D. Jepson, R. Deaville, P. Bersuder and G. J. Pierce. 2009. Assessing the effect of contaminants on reproductive activity in small cetaceans. 18th Biennial Conference on the Biology of Marine Mammals, 12th -16th October, Québec, Canada [POSTER].
3. Spradlin, T. R., **S. Murphy**, B. Mackey, J. McVee, J. Androukaki, E. Tounta, A. Karamanlidis, P. Dendrinos, E. Joseph, C. Lockyer, and J. Matthiopoulos. 2009. Age-related mortality of Mediterranean monk seals (*Monachus monachus*) estimated from dental samples. 2009. 18th Biennial Conference on the Biology of Marine Mammals, 12th -16th October, Québec, Canada [POSTER].
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5. **Murphy, S.** 2008. Marine Mammals in UK waters. UK Department for Business, Enterprise and Regulatory Reform, UK Offshore Energy Sea Assessment Workshop, Bristol, 3rd – 4th September, 2008 [ORAL]
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**FORMAT FOR PROJECT PROPOSALS
FOR THE CONSIDERATION OF THE ASCOBANS ADVISORY COMMITTEE**

Title Understanding harbour porpoise (<i>Phocoena Phocoena</i>) and fishery interactions in the north-west Iberian Peninsula	Justification: CMP	Project ID: PP/2010/06
Implementing Agency / Applicant	<p>Prof. Graham J. Pierce and Fiona L. Read</p> <p>School of Biological Sciences (Zoology), University of Aberdeen, Tillydrone Avenue, Aberdeen, AB24 2TZ, Aberdeen, UK and Instituto Español de Oceanografía, Centro Oceanográfico de Vigo, PO Box 1552, 36200, Vigo, Spain Email: g.j.pierce@abdn.ac.uk</p> <p>Fiona L. Read: Instituto de Investigaciones Marinas (C.S.I.C), Eduardo Cabello 6, 36208 Vigo, Spain and Instituto Español de Oceanografía, Centro Oceanográfico de Vigo, PO Box 1552, 36200, Vigo, Spain Email: fionaread@iim.csic.es</p>	
Collaborating Agencies / Other Sponsors	<p>The following persons/institutions will contribute access to data and samples and/or specific expertise and will participate in writing up the results:</p> <p>a) Dr M. Begoña Santos, Instituto Español de Oceanografía, Centro Oceanográfico de Vigo, PO Box 1552, 36200, Vigo, Spain Email: m.b.santos@vi.ieo.es</p> <p>b) Dr Ángel F. González, Instituto de Investigaciones Marinas (C.S.I.C), Eduardo Cabello 6, 36208 Vigo, Spain Email: afg@iim.csic.es</p> <p>c) Dr Jose Vingada, Sociedade Portuguesa de Vida Selvagem (SPVS), Departamento de Biologia, Universidade do Minho, Campus de Gualtar, 4710-057 Braga, Portugal Email: spvs@socpvs.org</p> <p>d) Dr. Alfredo Lopez / Angela Llavona, Coordinadora para o Estudo dos Mamíferos Mariños (CEMMA), Apdo. de Correos Nº 15, 36380-Gondomar, Pontevedra, Spain Email: cemma@arrakis.es</p> <p>e) Dr Jennifer Learmonth, School of Biological Sciences (Zoology), University of Aberdeen, Tillydrone Avenue, Aberdeen, AB24 2TZ, Aberdeen, UK Email: j.a.learmonth@abdn.ac.uk</p> <p>f) Bob Reid, Wildlife Unit, SAC Veterinary Science Division (Inverness), Drummondhill, Stratherrick Road, Inverness, IV2 4JZ, UK Email: Bob.Reid@sac.co.uk</p> <p>g) Dr Paul Jepson / Rob Deaville, Institute of Zoology, Regent's Park,</p>	

	<p>London, NW1 4RY, UK Email: paul.jepson@ioz.ac.uk / rob.deaville@ioz.ac.uk</p> <p>h) Dr Emer Rogan, Department of Zoology, Ecology and Plant Science, University College Cork, Distillery Fields, North Mall, Cork, Ireland Email: e.rogan@ucc.ie</p> <p>i) Mardik Leopold, IMARES – Texel, Postbus 167, 1790 AD Den Burg, The Netherlands Email: Mardik.Leopold@wur.nl</p>
Background / Problem	<p>The north-west Iberian Peninsula (NWIP), comprising Galicia (NW Spain) and northern Portugal, is one of the world's main fishing regions (1). It also has one of the highest rates of marine mammal strandings in Europe and a high number of by-catches (2), including harbour porpoises (<i>Phocoena phocoena</i>). At present, Spain and Portugal are ASCOBANS Range States but not Member States. In addition the NWIP harbour porpoise has recently been recognised as being a genetically distinct population (3). Thus the NWIP is an important area for cetacean-fishery interactions to be monitored. To provide context for information on by-catches, baseline information is required on cetacean populations, including birth and mortality rates and diet.</p> <p>Current cetacean monitoring under ASCOBANS does not make full use of available life history data (e.g. age, maturity and diet studies are not funded within core monitoring programmes) and this has been recognised by ICES WGMME (4) as representing an important gap in coverage. Knowledge of life-history traits is increasingly recognised as important for effective management and conservation (5) and trends in such parameters can provide important information on population status. Life history data from stranded cetaceans can be used to estimate overall mortality and fishery mortality rates. Diet analysis provides information on feeding ecology and can indicate potential competition for resources with fisheries.</p> <p>SCANS-II in 2005 (6) estimated 2600 porpoises in the Iberian Peninsula. Following the recent genetic studies (3), ICES WGMME recommended immediate action by the Spanish and Portuguese governments to introduce adequate monitoring and conservation measures (4). However, very limited life history data exist for the NWIP porpoise population, although individuals appear to be larger (7,8) than in other studied populations.</p> <p>Preliminary data from interview surveys (1) suggest that cetacean by-catch in Galicia is likely to substantially exceed limits recommended by ASCOBANS (9) and the IWC (10). As many as 50% of the stranded cetaceans in Galicia and Portugal for which cause of death can be determined, show evidence of fisheries interactions (11). Previous dietary studies on cetaceans in the NWIP show that commercially important fish species constitute a significant part of the diet (12,13,14) although there are no published results for porpoises in the area.</p> <p>Necropsies of stranded and by-caught animals in NWIP have been conducted following standard protocols (15,16) by NGOs, since 1990 in Galicia (by Coordinadora para o Estudo dos Mamíferos Mariños) and since 2000 in Portugal (by Sociedade Portuguesa de Vida Selvagem). In Galicia, over 40% of porpoise strandings have indications of by-catch, compared to almost 60% in northern Portugal (where the use of beach seines may account for the higher rate). Preliminary analysis of age-at-death data from 58 porpoises stranded along the NWIP indicates an estimated 15% annual population mortality rate, of which approximately</p>

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	<p>half is attributable to fisheries interactions.</p> <p>The proposed project will allow all available porpoise samples (teeth, gonads) for the NWIP to be analysed and facilitate comparisons with porpoises from the UK (17) and elsewhere in Northern Europe. Data from Ireland, Scotland, France and Netherlands were compiled during 2000-2004 as part of the EU-funded “BIOCET” project, co-ordinated by the applicant. Comparison with UK porpoises will be facilitated through collaboration with the Defra-funded UK Cetacean Strandings Investigation Programme (www.ukstrandings.org). Regional differences in life history/mortality patterns are expected; e.g. a major cause of porpoise deaths in Scotland is due to attacks by bottlenose dolphins.</p>
<p>Objectives</p>	<p>The proposed project aims to:</p> <ol style="list-style-type: none"> 1) Quantify life history parameters (age structure, age and length at sexual and asymptotic maturity, pregnancy rate, etc) in harbour porpoises for the NWIP. 2) Use age-at-death data to estimate total and fisheries mortality rate for porpoises in the NWIP. 3) Examine evidence for temporal trends in age at sexual maturity, reproductive output and mortality rates. 4) Compare life history parameters for Iberian porpoises with those from northern Europe. 5) Investigate seasonal, geographic, annual and ontogenetic variation in the diet of NWIP in relation to prey abundance and thus define their trophic role in the area. 6) Provide recommendations on conservation of porpoises along the north-west Iberian Peninsula.
<p>Relevance to ASCOBANS</p>	<p>The by-catch rate in NWIP porpoises is currently unknown and there is currently no nationally funded strandings monitoring in the area, this role being taken by NGOs. Analysis of diet and life history parameters for stranded animals, coupled with diagnosis of cause of death provides a mechanism to both directly estimate by-catch mortality and to provide basic parameters for monitoring of population status and trends.</p> <p>The recent recognition of this population as genetically distinct and the recommendation by ICES WGMME to treat it as a separate management unit makes this work particularly timely.</p>
<p>Activities</p>	<p>Teeth will be extracted and prepared using a standard protocol whereby they are decalcified, sectioned at 25 µm on a cryostat and stained with Erlich’s haematoxylin. Age will be determined by counting growth layer groups in the dentine. Age data will be used to construct life tables and thus estimate mortality rate.</p> <p>Stomach contents will be collected and prey will be identified, counted and original sizes estimated using hard parts (fish otoliths and bones and cephalopod beaks) following a standard protocol (18). Inter-annual, seasonal, regional and ontogenetic variation in diet will be investigated using generalized additive models (GAMs). Results will be compared to fishery catch data to determine the potential for competition between cetaceans and fisheries e.g. catch composition, minimum landing size and geographical overlap.</p> <p>Females will be examined for pregnancy and lactation. Formalin-fixed ovaries will be weighed, measured, sectioned and the presence of mature follicles, <i>corpora lutea</i> and <i>corpora albicantia</i> recorded to</p>

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	<p>determine individual reproductive status and history. Histological examination will be conducted to confirm macroscopic findings. For males, testes with attached epididymis will be measured, weighed and a central cross-section formalin-fixed. Histology will be performed to measure the diameter of seminiferous tubules (an indication of maturity) and to note cell activity (e.g. sertoli and germinal cells). Together with age data, these data will be used to construct maturity ogives (to establish age and size at sexual maturity), and determine the pregnancy rate and the annual reproductive cycle.</p> <p>While sensitivity is likely to be limited by sample size, statistical analysis of trends in life history parameters will allow us to detect any strong trends in life history parameters over time, permitting inferences about population status. Comparison with equivalent data for other populations (notably for Scotland) will facilitate interpretation of results.</p>
<p>Outputs</p>	<p>The proposed work is expected take approximately 12 months, after which a report will be presented to ASCOBANS. The data will also be used for a scientific publication in an international peer-reviewed journal.</p> <p>Additionally, we expect that the data generated from the proposed project will be useful for conservation. Information will be provided to the relevant regional and national authorities.</p>
<p>Work Plan and Timetable</p>	<p>The proposed project is expected to take 12 months (Table 1, below).</p>
<p>Project Personnel</p>	<p>a) Prof. Graham J. Pierce School of Biological Sciences (Zoology), University of Aberdeen, Tillydrone Avenue, Aberdeen, AB24 2TZ, UK Email: g.j.pierce@abdn.ac.uk Project co-ordination, overall responsibility for data analysis and reporting</p> <p>b) Fiona L. Read Instituto de Investigaciones Marinas (C.S.I.C), Eduardo Cabello 6, 36208, Vigo, Spain Email: fionaread@iim.csic.es Practical work on life history (age and reproductive tract) samples. Assistance with data analysis and report writing.</p> <p>c) Dr M. Begoña Santos Instituto Español de Oceanografía, Centro Oceanográfico de Vigo PO Box 1552, 36200, Vigo, Spain Email: m.b.santos@vi.ieo.es Supervisor for diet samples and data analysis.</p> <p>d) Dr Ángel F. González Instituto de Investigaciones Marinas (C.S.I.C), Eduardo Cabello 6, 36208, Vigo, Spain Email: afg@iim.csic.es Supervisor for age analysis. Second reader for age slides.</p>

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Budget Estimates	<p>Expected budget** of the proposed project:</p> <p>Ageing: 50 Euros per tooth (x 140 animals) = 7000 Euros</p> <p>Histology: 10 Euros per animal (x 140 animals) = 1400 Euros</p> <p>Diet analysis: 20 Euros per sample (x 60 samples) = 1200 Euros</p> <p>Transport to Iberian NGOs to sort and collect samples and for access to necropsy forms and data. 150 Euros</p> <p>Shipping of samples from Portugal and Scotland: 150 Euros</p> <p>Insurance for laboratory work for Fiona Read at the IIM: 100 Euros</p> <p>Total = 10,000 Euros</p> <p>Rates are based on those used in comparable projects. As an alternative basis for costing this is equivalent to paying for 2.5 months of Fiona Read's time (@3.35 K euros per month) plus a materials budget of 1.6 k euros.</p> <p><i>The University of Aberdeen will manage this budget without charging an overhead.</i></p>
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Table 1. Timescale of project and responsible persons for each activity.

	Activity
Month 1	Sort available samples, make database and determine of cause of death from necropsy forms. Responsible person: Fiona Read.
Month 2	Age determination, including 2 independent readings by two different readers. Responsible persons: Fiona Read and Ángel F. González.
Month 3	
Month 4	
Month 5	Reproductive tract analysis, including histology. Responsible person: Fiona Read.
Month 6	
Month 7	
Month 8	Diet analysis. Responsible persons: Fiona Read and M. Begoña Santos.
Month 9	
Month 10	
Month 11	Data analysis. Report for ASCOBANS. Publications in Scientific Journals (1 on life history, 1 on diet). Responsible persons: Graham Pierce and Fiona Read, with all collaborators.
Month 12	

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Curriculum Vitae - Graham John Pierce

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PhD, 1985, University of Aberdeen; MSc (Ecology), 1981, University of Aberdeen; BSc (Zoology), 1st Class Honours, 1980, Royal Holloway College, University of London.

Publications Editor, European Cetacean Society, 2008-10 (Secretary 2007-08, society member since 1997). Member of the *ICES Working Group on Marine Mammal Ecology* (2005 onwards). Co-ordinator of several EU-funded projects including BIO CET (on contaminant bioaccumulation in marine mammals, 2001-05). Leader of large research group (over 20 researchers). Supervised 27 successfully completed research degrees.

Around 170 peer-reviewed scientific papers and around 50 other publications; presented or contributed to around 280 conference talks and posters, including invited talks at the SAFESEA workshop (Viano do Castelo, 2010), Symposium on Monitoring Strategies for Marine Mammal Populations (La Rochelle, 2008), Annual Conference of the European Cetacean Society (La Rochelle, 2005) and the CIESM Workshop on “Understanding the role of cetaceans in the marine ecosystem” (Venice, 2004).

Selected Publications

- Lambert, E., Hunter, C., MacLeod, C.D. & **Pierce, G.J.**, Accepted. Sustainable whale watching tourism and climate change reviewed: towards framework of resilience. *Journal of Sustainable Tourism*.
- Pierce, G.J.**, Caldas, M., Cedeira, J., Santos, M.B., Llavona, A., Covelo, P., Martinez, G., Torres, J., Sacau, M. & López, A., Accepted. Trends in cetacean sightings along the Galician coast, north-western Spain, 2003–2007, and inferences about cetacean habitat preferences. *Journal of the Marine Biological Association of the United Kingdom*.
- Fernández, R., Santos, M.B., Carrillo, M., Tejedor M. & **Pierce G.J.**, 2009. Stomach contents of cetaceans stranded in the Canary Islands 1996-2006. *Journal of the Marine Biological Association of the United Kingdom* **89**, 873-883.
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FIONA LOUISE READ

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2001 – 2002 Aberdeen University, Aberdeen, United Kingdom
M.Res. Marine and Fisheries Science: Sustainable Management of Living Marine Resources
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Invited participant for the closed working group ‘Age Validation of Seals’ in November 2006, Bergen, Norway.

Organiser of ‘Age Determination Workshop’ at the European Cetacean Society conference, April 2006, Gdynia, Poland (co-organisers: Dr Patricia Lastra and Dr Christina Lockyer)

EMPLOYMENT HISTORY:

Instituto de Investigaciones Marinas (CSIC) and Instituto Español de Oceanografía, Vigo, Spain.

Marie Curie Fellow

April 2007 – December 2009

Understanding Marine Mammal and Fisheries Interactions in the north-west Iberian Peninsula.

Objectives

- To estimate mortality rate for common dolphins, striped dolphins and bottlenose dolphins in Galician and Portuguese fisheries using life-history (teeth and gonads) data and interviews with fishermen
- Provide valuable new life history data by producing a life-history table for all the above species in Galician and Portuguese waters
- Investigate seasonal, geographic, annual and ontogenetic variation in the diet of the cetaceans in relation to prey abundance
- Investigate potential relationships between environmental parameters, such as sea depth, and fishing characteristics that may be associated with high by-catch rates
- Recommend mitigation measures to prevent by-catch. Including support from the fishing industry to minimise adverse effects on the fisheries and maximise participation from fishermen
- Provide recommendations on issues related to the conservation of cetaceans and the management of fisheries in Galician waters

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January 2003 – April 2007

Research Technician and Pathology Assistant

My position at the Erasmus is divided 50:50 as the research analyst on the life history of harbour seals stranded along the Dutch coast during the 2002 phocine distemper outbreak and the pathologist’s assistant.

Duties include:

- Research project titled ‘Life History of Harbour Seals in Dutch Waters’. Including the analysis of over 1400 reproductive organs and canine teeth (for age determination)
- Age determination of stranded marine mammals, mainly harbour porpoises
- Use of magnetic resonance imaging (MRI) to conduct a research project on its uses for reproductive studies in marine mammals
- Ability to conduct laboratory research, perform data analysis and write reports on my present research
- In charge of the necropsy theatre and responsible for the maintenance and cleaning of the theatre and the necropsy equipment and ensuring all the required supplies are ordered
- Assisted in a mass necropsy session of over 1150 seal carcasses during the 2002 PDV outbreak
- Act as the ‘clean’ person during necropsies to record all biological data, lesion characteristics and ensure that all measurements and standard samples are taken correctly and consistently for all necropsies of live stranded cetaceans along the Dutch coastline and collection animals from the *Dolfinarium*, Harderwijk

- Masceration of 250 seal skulls for morphometric studies (Japanese collaborators and The Natural History Museum of Rotterdam archive) and 700 seal jaws and bacula for life history studies
- Responsible for the following archives: pathology databases, tissue bank (-70°C), freeze dried (-70°C), toxicology (-20°C), formalin fixed samples, mascerated samples e.g. skulls and bacula, paraffin blocks, microscope slides

SOS Dolfijn, Dolfinarium, Harderwijk, the Netherlands

October 2004 – April 2007

Voluntary Helper

Duties included:

- Good animal husbandry and general welfare of stranded cetaceans, primarily harbour porpoises
- Knowledge of basic medical procedures
- Feeding the animals and assisting with the dispensing of medication, measuring breathing rates, tube feeding, taking core body temperature and blood samples of the animals
- Supporting and ‘walking’ newly stranded animals that are unable to support themselves in the water
- Assisted with the release of live animals back into the wild

Fisheries Research Services Marine Laboratory and University of Aberdeen, Aberdeen, U.K.

Research Assistant

October 2002 – January 2003

This work was conducted as part of the *BIOCET* (Bioaccumulation of Persistent Organic Pollutants in Small Cetaceans in European Waters: Transport Pathways and Impact on Reproduction) project.

Duties include:

- Dissection of various fish species for lipid extraction of muscle, liver and digestive tract samples
- Lipid extraction of squid, fish, fish organs and cetacean blubber for analysis of fatty acid profiles
- Assisting fatty acid profile analysis and comparison of prey fatty acid profiles to that of cetacean blubber samples
- Calculating percentage of lipid extracted from samples using standard method
- Maintaining a good ‘laboratory notebook’ for all work, including sample weights, labels and chemical waste

PRESENTATIONS

15 presentations in International conferences including:

Present Knowledge of Marine Mammal and Fisheries Interactions in the North-West Iberian Peninsula. **Fiona L. Read**, M. Begoña Santos, Ángel F. González, Sabine Goetz, Marisa Ferreira, Alfredo López and Graham J. Pierce. By-catch of cetaceans. ‘Present scenarios and mitigation measures’ SAFESEA conference, Viana do Castelo, Portugal. January 2010. Oral presentation. Invited.

Trends in Bycatch Rates of Cetaceans in the North-West Iberian Peninsula between 1990-2008. **Fiona L. Read**, Ángel F. González, Sabine Goetz, Marisa Ferreira, Alfredo López, Jose Martínez-Cedeira, M. Begoña Santos and Graham J. Pierce. Marine EcoSystems and Sustainability Conference (MESS), Aberdeen, U.K. December 2009. Oral presentation.

Marine Mammal and Fisheries Interactions in the North-West Iberian Peninsula. **Fiona L. Read**, Marisa Ferreira, Sabine Goetz, Ángel F. González, Alfredo López, Jose Martínez-Cedeira, M. Begoña Santos and Graham J. Pierce. 18th Biennial Conference on the Biology of Marine Mammals, Quebec, Canada. October 2009. Oral presentation.

*Fishery Mortality Rate of *Delphinus delphis* in Galicia (NW Spain).* **Fiona L. Read**, M. Begoña Santos, Ángel F. González, Jose Martínez-Cedeira, Alfredo López and Graham J. Pierce. University of Vigo, Vigo, Spain. July 2009. Oral presentation.

Marine Mammal and Fisheries Interactions in Galicia, North-West Spain. **Fiona L. Read**, Jose Martínez-Cedeira, Ángel F. González, Alfredo López, Begoña M. Santos and Graham J. Pierce. 23rd European Cetacean Society conference, Istanbul, Turkey, March 2009. Oral presentation.

Understanding Marine Mammal and Fisheries Interactions in Galicia, North-West Spain: Past, Present and Future. **Fiona L. Read**, Jose Martínez-Cedeira, Ángel F. González, Alfredo López, Begoña M. Santos and Graham J. Pierce. North Atlantic Fisheries Organization Conference, Halifax, Canada, September 2008. Oral presentation.

Age and Body Length at Sexual Maturity of Harbour Seals in the Netherlands. **Fiona L. Read**, Graham J. Pierce and Thijs Kuiken. 17th Biennial Conference on the Biology of Marine Mammals, Cape Town, South Africa, December 2007. Oral presentation.

OTHER INVITED PRESENTATIONS

Overview of the 2002 Phocine Distemper Outbreak in the Netherlands: Epidemiology, Pathology and Life History. **Fiona L. Read**, Jolianne M. Rijks, Marco W.G. van de Bildt, Hester G. van Bolhuis, Joost D.W. Philippa, Byron E.E. Martina, Albert D.M.E. Osterhaus and Thijs Kuiken. Sea Mammal Research Unit, St Andrews, United Kingdom, March 2008. Oral presentation.

What do Dolphins, Seals and Trees have in Common? **Fiona Read** and Christina Lockyer. Whale and Dolphin Conservation Society, Spey Bay, United Kingdom. March 2008. Oral presentation.

PUBLICATIONS

The importance of biological parameters in assessing the status of Delphinus delphis. Sinéad Murphy, Arliss Winship, Willy Dabin, Paul D. Jepson, Rob Deaville, Robert J. Reid, Chris Spurrier, Emer Rogan, Alfredo López, Angel F. González, **Fiona L. Read**, Marjan Addink, Monica Silva, Vincent Ridoux, Jennifer A. Learmonth, Graham J. Pierce, & Simon P. Northridge, 2009. Marine Ecology Progress Series, 388: 273–291.

Age Determination Methods in Harbour Seals with a review of methods applicable to carnivores. Christina Lockyer, Beth Mackay, **Fiona Read**, Tero Härkönen and Ilka Hasselmeier. In press. NAMMCO Scientific Publication 8.

Common dolphin (Delphinus delphis) in Galicia, NW Spain: distribution, abundance, life history and conservation. **Fiona L. Read**, Begoña Santos, Ángel F. González, Jose Martínez-Cedeira, Alfredo López and Graham J. Pierce, 2009. Working paper, Scientific Committee, International Whaling Commission, SC/61/SM5.

Quantitative Analysis of the 2002 Phocine Distemper Epidemic in the Netherlands. Jolianne M. Rijks, **Fiona L. Read**, Marco W.G. van de Bildt, Hester G. van Bolhuis, Byron E.E. Martina, Jaap A. Wagenaar, Karst van der Meulen, Albert D.M.E. Osterhaus and Thijs Kuiken, 2008. Veterinary Pathology, 45: 515-530.

Curriculum Vitae

Maria Begoña Santos Vázquez

Investigadora Titular OPIS, Instituto Español de Oceanografía, Centro Oceanográfico de Vigo, P.O. Box 1552, 36200, Vigo, Spain

- **PhD (Feeding ecology of harbour porpoises, common and bottlenose dolphins and sperm whales in the Northeast Atlantic)** Part-time registration, University of Aberdeen, Scotland, 1994-1998. Supervisors: Professor. P.R. Boyle, Dr. G.J. Pierce, Dr. P. Thompson and Dr. A. Guerra Sierra.
- **BSc (Zoology)** University of Santiago de Compostela, La Coruña, 1987-1992. Qualifications: 14 Matriculas de Honor (10/10), 5 Sobresalientes (9/10), 4 Notables (8/10) and 1 Aprobado (5/10).

Memberships of Professional Bodies, external groups and networks

- Member (alternate) of the International Council for the Exploration of the Sea (ICES) Science Committee (SCICOM) since 2009 (attended 2 out of the 3 SCICOM meetings to date)
- Chair of the ICES Study Group on Scientific Cooperation (SCSGSC) since 2009
- Member of the ICES Steering Committee on Sustainable Use of the Ecosystems since 2009
- Member of the following ICES Working Groups: Marine Mammal Ecology (2005 onwards), Cephalopod Fisheries and Life History (2003 onwards), on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy (since 2004, dissolved in 2007), Widely Distributed Stocks (since 2007), Sardine and Anchovy (since 2009) and on the Acoustic and Egg surveys for Sardine and Anchovy in ICES areas VIII and IX (since 2006), Ecosystem Assessment of Western European Shelf Seas (since 2010).
- Founding member of the Spanish Cetacean Society (1999 -)
- Member of the European Cetacean Society, Society for Marine Mammalogy and Coordinadora para o Estudio dos Mamíferos Mariños (Galicia, Spain)
- Member of the British Ecological Society and the Marie Curie Fellowship Association

Publications - over 60 scientific papers on peer-reviewed journals, as well as several chapters in books and other publications, including:

1. Luque, P.L., Pierce, G.J., Learmonth, J.A., **Santos, M.B.**, Ieno, E., López, A., Reid, R.J., Rogan, E., González, A.F., Boon, J., Law, R.J. & Lockyer, C.H., 2009. Dentine anomalies in teeth of harbour porpoises (*Phocoena phocoena*) from Scottish waters: are they linked to sexual maturation and environmental events? *Journal of the Marine Biological Association of the United Kingdom* **89**, 893-902
2. Luque, P.L., Learmonth, J.A., **Santos, M.B.**, Ieno, E. & Pierce, G.J., 2009. Comparison of two tooth-preparation histological techniques for age determination in small cetaceans. *Marine Mammal Science* **25**, 902-919.
3. Fernández, R., **Santos, M.B.**, Carrillo, M., Tejedor M. & Pierce, G.J. 2009. Stomach contents of cetaceans stranded in the Canary Islands 1996-2006. *Journal of the Marine Biological Association of the United Kingdom* **89**, 873-883.
4. Pierce, G.J., Caldas, M., Cedeira, J., **Santos, M.B.**, Llavona, A., Covelo, P., Martínez, G., Torres, J., Sacau, M. & López, A., Accepted. Trends in cetacean sightings along the Galician coast, north-western Spain, 2003–2007, and inferences about cetacean habitat preferences. *Journal of the Marine Biological Association of the United Kingdom*.
5. Meynier, L., Pusineri, C., Spitz, J., **Santos, M.B.**, Pierce, G.J. & Ridoux, V., 2008. Intraspecific dietary variation in the short-beaked common dolphin *Delphinus delphis* in the Bay of Biscay: the importance of fat fish. *Marine Ecology Progress Series* **354**, 277–287.
6. Pierce, G.J., **Santos, M.B.**, Murphy, S., Learmonth, J.A., Zuur, A.F., Rogan, E., Bustamante, P., Caurant, F., Lahaye, V., Ridoux, V., Zegers, B.N., Mets, A., Addink, M., Smeenk, C., Jauniaux, T., Law, R.J., Dabin, W., López, A., Alonso Farré, J.M., González, A.F., Guerra, A., García-Hartmann, M., Reid, R.J., Moffat, C.F., Lockyer, C. & Boon, J.P., 2008. Bioaccumulation of persistent organic pollutants in female common dolphins

- (*Delphinus delphis*) and harbour porpoises (*Phocoena phocoena*) from western European seas: geographical trends, causal factors and effects on reproduction and mortality. *Environmental Pollution* **153**, 401-415.
7. Canning, S.J., **Santos, M.B.**, Reid, R.J., Evans, P.G.H., Sabin, R.C., Bailey, N. & Pierce, G.J., 2008. Seasonal distribution of white-beaked dolphins (*Lagenorhynchus albirostris*) in UK waters with new information on diet and habitat use. *Journal of the Marine Biological Association of the United Kingdom* **88**, 1159-1166.
 8. **Santos, M.B.**, Pierce, G.J., Learmonth, J.A., Reid, R.J., Patterson, I.A.P. & Ross, H.M., 2008. Diet and ecology of striped dolphin *Stenella coeruleoalba* in Scottish waters with notes on strandings of this species in Scotland since 1992. *Journal of the Marine Biological Association of the United Kingdom* **88**, 1175-1183.
 9. Lahaye, V., Bustamante, P., Law, R.J., Learmonth, J.A., **Santos, M.B.**, Boon, J.P., Rogan, E., Dabin, W., Addink, M.J., López, A., Zuur, A.F., Pierce, G.J. & Caurant, F., 2007. Biological and ecological factors related to trace element levels in harbour porpoises (*Phocoena phocoena*) from European waters. *Marine Environmental Research* **64**, 247-266.
 10. MacLeod, C.D., Pierce, G.J. & **Santos, M.B.**, 2007. Starvation and sandeel consumption in harbour porpoises in the Scottish North Sea. *Biology Letters* **3**, 535-536.
 11. MacLeod, C.D., **Santos, M.B.**, Reid, R.J., Scott, B. & Pierce, G.J., 2007. Linking sandeel consumption and the likelihood of starvation in harbour porpoises in the Scottish North Sea: could climate change mean more starving porpoises? *Biology Letters* **3**, 185-188.
 12. Pierce, G.J., **Santos, M.B.** & Cerviño, S., 2007. Assessing sources of variation underlying estimates of cetacean diet composition: a simulation study on analysis of harbour porpoise diet in Scottish (UK) waters. *Journal of the Marine Biological Association of the United Kingdom* **87**, 213-221.
 13. **Santos, M.B.**, Fernández, R., López, A., Martínez, J.A. & Pierce, G.J., 2007. Variability in the diet of bottlenose dolphin, *Tursiops truncatus* (Montagu), in Galician waters, NW Spain, 1990-2005. *Journal of the Marine Biological Association of the United Kingdom* **87**, 231-242.
 14. **Santos, M.B.**, Martin, V. Arbelo, M. Fernández, A. & Pierce, G.J., 2007. Insights into the diet of beaked whales from the atypical mass stranding in the Canary Islands in September 2002. *Journal of the Marine Biological Association of the United Kingdom* **87**, 243-252.
 15. Learmonth, J.A., Macleod, C.D., **Santos, M.B.**, Pierce, G.J., Crick, H.Q.P. & Robinson, R.A., 2006. Potential effects of climate change on marine mammals. *Oceanography and Marine Biology: An Annual Review*, **44**, 429-462.
 16. MacLeod, C.D., Santos, M.B., López, A. & **Pierce, G.J.**, 2006. Relative prey size consumption in toothed whales: implications for prey selection and level of specialisation. *Marine Ecology Progress Series* **326**, 295-307.
 17. **Santos, M.B.**, Pierce, G.J., López, A., Reid, R.J., Ridoux, V. & Mente, E., 2006. Pygmy sperm whales *Kogia breviceps* in the NE Atlantic: new information on stomach contents and strandings. *Marine Mammal Science*, **22**, 600-616.
 18. López, A., Pierce, G.J., Valeiras, X., **Santos, M.B.** & Guerra, A., 2004. Distribution patterns of small cetaceans in Galician waters. *Journal of the Marine Biological Association of the United Kingdom*, **84**, 283-294.
 19. MacLeod, C.D., Pierce, G.J., & **Santos, M.B.**, 2004. Geographic and temporal variations in strandings of beaked whales (Ziphiidae) on the coasts of the United Kingdom and the Republic of Ireland 1904 - 1993.. *Journal of Cetacean Research and Management*, **6**, 79-86.
 20. Pierce, G.J., **Santos, M.B.**, Reid, R.J., Patterson, I.A.P. & Ross, H.M., 2004. Diet of minke whales *Balaenoptera acutorostrata* in Scottish waters with notes on strandings of this species in Scotland 1992-2002. *Journal of the Marine Biological Association of the United Kingdom*, **84**, 1241-1244.
 21. **Santos, M.B.**, Pierce, G.J., Reid, R.J., Ross, H.M., Patterson, I.A.P., Reid D.G. & Peach, K., 2004. Variability in the diet of harbour porpoises (*Phocoena phocoena*) in Scottish waters 1992-2003. *Marine Mammal Science*, **20**, 1-27.
 22. López, A., Pierce, G.J., **Santos, M.B.**, Gracia, J. & Guerra, A., 2003. Fishery by-catches of marine mammals in Galician waters: Results from on-board observations and an interview survey of fishermen. *Biological Conservation* **111**, 25-40.
 23. **Santos, M.B.** & Pierce, G.J., 2003. The diet of harbour porpoise (*Phocoena phocoena*) in the Northeast Atlantic. *Oceanography & Marine Biology: An Annual Review* **41**, 355-390.
 24. López, A., **Santos, M.B.**, Pierce, G.J., González, A.F., Valeiras X. & Guerra, A., 2002. Trends in strandings and by-catch of marine mammals in northwest Spain during the 1990s. *Journal of the Marine Biological Association of the United Kingdom* **82**, 513-521.
 25. **Santos, M.B.**, Pierce, G.J., García Hartmann, M., Smeenk, C., Addink, M.J., Kuiken, T., Reid, R.J., Patterson, I.A.P., Lordan, C., Rogan, E. & Mente, E., 2002. Additional notes on stomach contents of sperm whales

- Physeter macrocephalus* stranded in the NE Atlantic. *Journal of the Marine Biological Association of the United Kingdom* **82**, 501-507.
26. **Santos, M.B.**, Clarke, M.R. & Pierce, G.J., 2001. Assessing the importance of cephalopods in the diets of marine mammals and other top predators: problems and solutions. *Fisheries Research* **52**, 121-139.
 27. **Santos, M.B.**, Pierce, G.J., Herman, J., López, A., Guerra, A., Mente, E. & Clarke, M.R., 2001. Feeding ecology of Cuvier's beaked whale (*Ziphius cavirostris*): a review with new information on the diet of this species. *Journal of the Marine Biological Association of the United Kingdom* **81**, 687-694.
 28. **Santos, M.B.**, Pierce, G.J., Reid, R.J., Patterson, I.A.P., Ross, H.M. & Mente, E. 2001. Stomach contents of bottlenose dolphins (*Tursiops truncatus*) in Scottish waters. *Journal of the Marine Biological Association of the United Kingdom* **81**, 873-878.
 29. **Santos, M.B.**, Pierce G.J., Smeenk, C., Addink, M.J., Kinze, C.C., Tougaard, S. & Herman, J., 2001. Stomach contents of northern bottlenose whales *Hyperoodon ampullatus* stranded in the North Sea. *Journal of the Marine Biological Association of the United Kingdom* **81**, 143-150.
 30. **Santos, M.B.**, Pierce, G.J., Boyle P.R., Reid, R.J., Ross, H.M., Patterson, I.A.P., Kinze, C.C., Tougaard, S., Lick, R., Piatkowski, U. & Hernández-García, V., 1999. Stomach contents of sperm whales *Physeter macrocephalus* stranded in the North Sea 1990-1996. *Marine Ecology Progress Series* **183**, 281-294.

Conference presentations: I have presented or contributed to 130 conference talks and posters, including invited talks at the SafeSea Project Conference on “Bycatch of cetaceans. Present Scenarios and Mitigation Measures” (Viana do Castelo, Portugal, January 2010) and at the PICES/ICES workshop on “Integrating marine mammal population and rates of prey consumption in models and forecast of climate change – ecosystem change in the North Pacific and North Atlantic Oceans” at the Annual Conference of the North Pacific Marine Science Organisation (PICES) 2009 (Jeju, South Korea, November 2009).

Projects - Current and recent projects include:

- *Forage Fish Interactions (FACTS)*, CEC Framework 7, Project No 244966, 2010-2012. Partner.
- *Climate Change and Migratory species: Indicator Species and Protocols for Data Collection*. British Trust for Ornithology/DEFRA, 2007-08. Member of University of Aberdeen team.
- *Mamíferos marinos y ecosistema (MME-II)*. Internal Project IEO, 2009-11, Partner.
- Cetacean Offshore Distribution and Abundance in the European Atlantic (CODA), UK Department for Environment, Food and Rural Affairs, UK Department for Trade and Industry; Irish Department of the Environment, Heritage and Local Government, Irish Bord Iascaigh Mhara, IEO, AZTI, SGPM, 2006-08, Partner and responsible for analyses on abundance estimates for pilot whales in the whole surveyed area.
- *Estudio del ecosistema pelágico, la distribución de las especies y sus relaciones con el medio ambiente (ECOPEL)*. Internal Project IEO, 2006-08. I was the lead researcher.
- *Mamíferos marinos y ecosistema (MME)*. Internal Project IEO, 2006-08, Partner.
- *Integrating multiple demands on coastal zones with emphasis on aquatic ecosystems and Fisheries (INCOFISH)* CEC INCO project, PL 003739, 2005-08, Member of University of Aberdeen team.
- *Climate Change and Migratory Species*. British Trust for Ornithology/DEFRA, 2004-05, Member of University of Aberdeen team.
- *Bioaccumulation of persistent organic pollutants in small cetaceans in European waters: transport pathways and impact on reproduction (BIOCET)*. CEC Framework 5 project, EVK3-CT-2000-00027, 2001-04, Member of co-ordinating team and WP leader, 1,200,000 euros (written with Dr. Graham J. Pierce).
- *Pelagic fisheries in Scotland (UK) and Galicia (Spain): observer studies to collect fishery data and monitor by-catches of small cetaceans*. CEC DG Fisheries Study Project 2000/27, 2001, Member of co-ordination team.
- *Evaluation of the state of knowledge concerning by-catches of cetaceans*. CEC DGXIV Tender No XIV/1999/01 Lot 7, 2000, 44,000 euros Member of University of Aberdeen team (written with Dr. Graham J. Pierce).

Research supervision: The PhD and MSc students I co-supervised were:

1. Jennifer Learmonth, PhD 2006. “Life history and fatty acid analysis of harbour porpoises (*Phocoena phocoena*) from Scottish waters”. Co-supervisors: Dr Graham Pierce, Dr Colin Moffat (FRS Marine Laboratory).

2. Colin MacLeod, PhD 2005. “Niche partitioning, distribution and competition in North Atlantic beaked whales”. Co-supervisor: Dr Graham Pierce.
3. Laureline Meynier, MSc 2004. “Food and feeding ecology of the common dolphin, *Delphinus delphis*, in the Bay of Biscay: intraspecific dietary variation and food transfer modelling”. Co-supervisor Dr Graham Pierce and Dr. Vincent Ridoux (University of La Rochelle).

At present I co-supervise the following students:

4. Susana García Tiscar, Universidad Autónoma de Madrid, Spain. “*Interacciones entre delfines mulars (Tursiops truncatus) en el Mar de Alborán y el Estrecho de Gibraltar*” [*Interactions between fisheries and bottlenose dolphins (Tursiops truncatus) in the Alboran Sea and the Strait of Gibraltar*]. Co-supervisors: Dr Angel Baltanás Gentil (Universidad Autónoma de Madrid), Dr. Graham Pierce (University of Aberdeen).
5. Ruth Fernandez, Universidad de Vigo, Spain. “Population structure of the bottlenose dolphin, *Tursiops truncatus*, in Galician waters (NW Spain)”. Co-supervisors: Dr Antonio Palanca (Universidad de Vigo), Dr Graham Pierce, Dr. Stuart Piertney (University of Aberdeen).
6. Sabine Goetz, University of Kiel, Germany. “Interactions between cetaceans and fisheries in Galicia, Portugal and in the Spanish distant water fleets”. Co-supervisors: Julio Portela (Instituto Español de Oceanografía), Dr Graham Pierce (University of Aberdeen), Dr. Ursula Siebert (University of Kiel).
7. Fiona Read, University of Vigo. Cetacean life history and interactions with fisheries. Co-supervisors: Dr Angel González (Instituto de Investigación Mariñas), Dr Graham Pierce, Dr. (University of Aberdeen).
8. Silvia Monteiro, University of Minho, Portugal. Ecology of pilot whales in NE Atlantic. Co-supervisors: Dr. Jose Vingada (University of Minho), Dr. Graham Pierce (University of Aberdeen).

Curriculum Vitae - Ángel Francisco González González

Head of *ECOBIMAR* Research Group, Instituto de Investigaciones Marinas (IIM-CSIC), Eduardo Cabello 6, 36208, Vigo. Spain. E-mail: afg@iim.csic.es

Date of Birth: 10-12-1966

Specialization (UNESCO codes): 240106, 240119, 251001, 251008

Professional situation: Scientific Research of CSIC

Starting date of the permanent position: 01-06-2003

- *Educational qualifications.*

- Degree on Biological Sciences (University of Navarra, Spain. 1991).
- PhD degree on Biological Sciences (University of Vigo, Spain. 1994). Title: “Bioecology of the ommastrephid squid *Illex coindetii* (Vérany, 1839) in Galician waters (NW Spain)”. Qualification: Cum laude.

- *Fields of scientific specialisation.*

Biodiversity, Marine Ecology, Renewable resources, Relationships between oceanography and fisheries, Biological Oceanography.

- *Previous work experience of a scientific-professional nature (selected projects).*

I have participated in 24 National and International Research projects since 1992, leading 10 of them.

- *Research stays in foreign centres.*

Centre: Institut für Meereskunde, Kiel (Germany). From 01/08 to 15/08, 1992 (2 weeks). Cephalopod fisheries and trophic webs. Pre-doctoral.

Centre: Graduate School of Oceanography. University of Rhode Island (USA). From 01/01 to 31/12, 1995 (52 weeks). Trophic dynamics of Squid in Georges Bank: Feeding and growth relative to management. Post-doctoral.

Centre: British Antarctic Survey (NERC), Cambridge, United Kingdom. From 01/01 to 31/12, 2006 (52 weeks). Interactions between oceanography, ecology and fisheries of ommastrephid squid in the South Atlantic. Post-doctoral.

Centre: Falkland Islands Fisheries Department, Stanley (United Kingdom). From 20/06 to 20/07, 1996 (4 weeks). Exploratory research and further analysis to establish a new fishery in the area 48.3 of CCAMLR. Post-doctoral.

Centre: British Museum of Natural History, London (UK). From 01/04 to 15/04, 2008 (four weeks). Biodiversity of cephalopods. Post-doctoral.

Centre: French Institute of Research and Exploitation of the Seas (IFREMER) and the National School of Engineers of Brest (Brest). From 14/06 to 27/06, 2009 (two weeks). Cronobiology using hard structures in marine organisms. Post-doctoral.

- *Recent international scientific publications.*

Books: 2

Book's chapters: 5

International papers except those included in SCI: 11

SCI Papers: 67

Number	Impact	Número	Impact
<i>Science</i>	28.103	1	<i>Polar Biol</i> 1.515 1
<i>Biol Rev</i>	8.755	2	<i>Antarct Sci</i> 1.496 1
<i>Environ Pollut</i>	3.135	1	<i>Hydrobiologia</i> 1.449 1
<i>Biological Invasions</i>	2.788	1	<i>Fish Res</i> 1.434 7
<i>Mar Ecol Prog Ser</i>	2.631	4	<i>Sarsia (Mar Biol Res)</i> 1.147 4
<i>Mar Environ Res</i>	2.032	1	<i>Sci Mar</i> 1.075 6
<i>J Exp Mar Biol Ecol</i>	2.074	1	<i>J Mar Biol Assoc UK</i> 1.056 12
<i>Rev Fish Biol Fisher</i>	1.792	1	<i>B Mar Sci</i> 0.929 1
<i>Mar Mammal Sci</i>	1.787	1	<i>Cah Biol Mar</i> 0.821 3
<i>J Plankton Res</i>	1.707	2	<i>Vie et Milieu</i> 0.723 1
<i>J Morphol</i>	1.702	2	<i>Aquaculture International</i> 0.608 1
<i>Aquaculture</i>	1.678	1	<i>Veliger</i> 0.534 1
<i>ICES J Mar Sci</i>	1.661	7	<i>S Afr J Mar Sci</i> 0.486 1
<i>Dis Aquat Organ</i>	1.586	1	<i>Bull Eur Ass Fish Pathol</i> 0.396 1

- Other merits or supporting comments.

Contributions to international meetings: 72

Invited conferences: 7

Supervisor of 5 PhD students (4 presently)

Supervisor of 2 successfully completed Masters

Professor of several pre-doctoral courses of the Universities of Vigo, Santiago and A Coruña since 1994

Professor in two Masters courses for graduate students since 2000

Evaluator of PhD: 6

Referee of journals: 19 (17 belonging to SCI)

Member of the Editorial board of Fisheries Research

Oceanographic surveys: 210 days (105 as responsible)

Participation in International Committees: 3

Organization experience in I+D+i activities: 10

**FORMAT FOR PROJECT PROPOSALS
FOR THE CONSIDERATION OF THE ASCOBANS ADVISORY COMMITTEE**

<p style="text-align: center;">Title</p> <p><i>Evolutionary history and conservation genetics of white-sided dolphin and white-beaked dolphin in the North Atlantic: Evaluating evolutionary differences and causes of diversity decline on pelagic and coastal dolphin species.</i></p>	<p>Justification: CMP</p>	<p>Project ID: PP/2010/07</p>
<p>Implementing Agency / Applicant</p>	<p>Dr. Eulalia Banguera-Hinestroza, Currently at School of Biological Sciences, University of Durham DH1-3LE. e-mails: eulalia.banguera@durham.ac.uk; eubangui@yahoo.com</p>	
<p>Collaborating Agencies / Other Sponsors</p>	<p>Funds will be obtained through different funding agencies. The project has already been submitted to the Molecular Evolution Smithsonian Fellowship. Samples that have not been yet collected will be obtained through previously established collaborations with museums and other researchers in the area (e.g., Samples of white-beaked dolphins could be obtained from Dr. Mikkelsen at the Museum of Natural history in Faeroes Islands and Dr. Gisli Vikingsson at the Marine Research Institute, Hafrannsóknastofnunin in Iceland)</p>	
<p>Background / Problem</p>	<p>The Atlantic white-sided dolphin (<i>Lagenorhynchus acutus</i> Gray, 1828) and the white-beaked dolphin (<i>Lagenorhynchus albirostris</i> Gray, 1846) are confined to temperate and sub-polar waters of the North Atlantic Ocean. Little is known about these species regarding their evolutionary history population dynamics, ecology and behaviour. A recent molecular study suggested that both species have had a long evolutionary history in the North Atlantic; their common ancestor probably inhabited this area around the Miocene-early Pliocene epoch. These findings suggest that these species could be an important model to understand how climate changes during the Pliocene and the Pleistocene epochs could have drive the evolution, dispersion and speciation of marine North Atlantic organisms.</p> <p>In addition, recent studies of <i>L. acutus</i> and <i>L. albirostris</i> have suggested that changes in habitat distribution, imposed by the last ice ages, may have had an important and differential influence on their genetic diversity, population growth and phylogeographic patterns. Both species show the pattern of high haplotypic diversity/low nucleotide diversity expected in bottlenecked populations, but differ markedly in their model of expansion. Refugial zones on both sides of the North Atlantic were apparently important in determining these expansion patterns and the population structure of these species. Although previous studies have suggested that the main cause of diversity decline in these species could have been the restriction of habitat during glaciated epochs, it has also been proposed that anthropogenic disturbance could have affected the genetic variability of some populations in an important extent (e.g., white-beaked dolphins in Norwegian areas). To date, few studies have addressed whether or not pelagic and coastal populations of the same and/or different species responded differentially to constraints of habitat availability, and few studies have addressed the effect of human activities in the long term survival of these species.</p> <p>This proposal aims to complement previous and ongoing studies in <i>L. acutus</i></p>	

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	<p>and <i>L. albirostris</i> in the North Atlantic and to test several hypotheses proposed by the author and collaborators about dispersion routes, phylogeographic patterns and population structure of these species. In order to test these hypotheses, the number of sampling sites in the in the eastern North Atlantic (e.g. Iceland, Faeroes Islands, Norway and Northern North Sea) and in the western North Atlantic (e.g. west coast of United States, Canada and Greenland) will be increased. New phylogeographic analyses, bringing together previously and newly sampled places, analysing populations throughout the range of distribution of these species, and increasing the number of nuclear and mitochondrial markers used, will improve our understanding of the evolutionary history of these species and give insights about the main causes affecting their diversity. This study will provide important elements for effective long term conservation planes.</p>
<p>Objectives</p>	<ul style="list-style-type: none"> • To expand previous and ongoing studies in <i>L. acutus</i> and <i>L. albirostris</i> in order to identify population structure and migration patterns of both species, and provide genetic data for the implementation of conservation planes in the eastern and western North Atlantic. • To perform a comparative phylogeographic analyses in order to understand the main evolutionary processes that account for the differences between coastal (<i>L. albirostris</i>) and pelagic (<i>L. acutus</i>) species in the Northern Hemisphere. • To test previous hypotheses about the evolutionary history and dispersion routes of <i>L. acutus</i> and <i>L. albirostris</i> and identify the possible existence of past refugial areas in both sides of the North Atlantic.
<p>Relevance to ASCOBANS</p>	<p>The White-sided and the White-beaked dolphins are the least known species of the genus <i>Lagenorhynchus</i>. They have been classified as insufficiently known and highly vulnerable by IUCN (2007). Based in previous findings by Banguera-Hinestroza 2008, the ASCOBANS workshop on small cetacean population structure highlighted the need for further genetic analysis of <i>L. acutus</i> in the eastern North Atlantic to elucidate whether or not different populations are presented in ASCOBAN area (Evans and Teilmann 2009). At the moment there is an ongoing project funded by ASCOBAN, which is evaluating the differences among samples from different regions, using mainly the mtDNA control region. This new proposal will include a least 20 microsatellites markers previously standardized, in order to complement the ongoing study and evaluate differences at the nuclear level. The inclusion of microsatellite data will be important to test hypothesis about the influence of human activities in the reduction of genetic diversity in this species.</p> <p>On the other hand, in a previous study Banguera-Hinestroza et al. (2010) suggested the existence of a least two differentiated populations of <i>L. albirostris</i> in the eastern North Atlantic, one around the British Islands and other in Northern Norway-Barents Sea (See Evans and Teilmann 2009). A new study including samples from other regions such as the Faeroes Iceland and Iceland will improve our understanding of the population structure of <i>L. albirostris</i>, detect barriers to dispersion and generate important data for future conservation planes.</p>
<p>Activities</p>	<p>Activity 1: Museum sampling or/and coordination for field work with other institutions: Most samples have been previously obtained through collaboration already built during my PhD studies and my current research</p>

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	<p>appointment; and it is expected that samples from other regions can be obtained through new collaborative agreements. New samples are expected to be obtained during the firsts 8 months of the project.</p> <p>Activity 2: Sampling analysis and methodology: Samples will be analyzed using two mitochondrial markers and 20 microsatellite loci (nuclear markers) using methodologies that have been previously standardized in these species (See Banguera-Hinestroza 2008). Statistical analyses will be performed using several statistics and programmes based on Bayesian analysis and coalescent theory. In summary, the extent of genetic variation will be assessed by examining both haplotype (h) and nucleotide diversity (π), using Arlequin v 3.11 (Excoffier et al. 2007) and DNAsp v 4.0 (Rozas et al. 2003). The degree of genetic differentiation among geographic samples will be determined using the Analysis of Molecular Variance (AMOVA). Phylogenetic relationships among haplotypes will be examined generating a neighbour-joining tree for the complete set of mtDNA haplotypes. A median-joining network tree will be constructed to infer the ancestral relationships among haplotypes using the programme Network version 4.5.0.0 (Bandelt et al. 1999).</p> <p>The demographic history of the population will be addressed using the distribution of the number of observed differences between pairs of DNA sequences (mismatch distribution) (Rogers & Harpending 1992), and test statistics of neutrality such as Fu's test (Fu 1997) and Tajima's test (Tajima 1989b). Microsatellite variation will be examined by estimating the number of alleles per locus, gene diversity and allelic richness using the Fstat programme vers. 2.9.3 (Goudet 2001). Regional differences in frequencies and deviation from the Hardy-Weinberg equilibrium will be tested, using different programmes such as GENEPOP 1.2 (Raymond and Rousset 1995). Population differentiation will be assessed using the fixation index (F_{st}) approach of Weir and Cockerham (1984) and R_{st} (Slatkin 1995). Reduction in population sizes will be tested using the statistic M, proposed by Garza and Williamson (2001) and different statistical test in the program bottleneck (Cornuet and Luikart, 1996).</p>
<p>Outputs</p>	<p>A least 2 publications in peer-review journals.</p> <p>A detailed report to the ASCOBAN advisory committee to complement previous recommendations about management units in both species.</p> <p>Presentation of the outcomes of the study at least in one international conference.</p> <p>An updated list of institutions and museums where samples from these species and kept.</p>

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Work Plan and Timetable																																															
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	Sample Collection																																														
	DNA extraction																																														
	Microsatellites amplification																																														
	mtDNA amplification and sequencing																																														
	Data Analyses																																														
Preliminary report																																															
Final report																																															
Project Personnel	<p>Eulalia Banguera-Hinestroza (Principal Researcher). Currently at the University of Durham, School of Biological Sciences. South Road, DH1 3LE Durham. E-mails: eulalia.banguera@durham.ac.uk; eubanguie@yahoo.com. Cooperation for this study will be obtained from different researchers and Lab work will be performed in different Laboratories. Agreement for the use of spaces at Durham University and other institutions are being made.</p> <p>CV in attachment below.</p>																																														
Budget Estimates	<table border="1"> <thead> <tr> <th>LAB analysis and sampling</th> <th>Value in pounds per sample</th> <th>x 500 samples</th> <th>Research support from ASCOBA N</th> <th>Research support from other agencies</th> <th>Total Project x 18 months</th> </tr> </thead> <tbody> <tr> <td>DNA extraction per sample (Including teeth and tissue samples)</td> <td>3</td> <td>1500</td> <td>750</td> <td>750</td> <td>1500</td> </tr> <tr> <td>PCR per sample</td> <td>1.6</td> <td>800</td> <td>400</td> <td>400</td> <td>800</td> </tr> <tr> <td>PCR cleaning per sample</td> <td>1.96</td> <td>980</td> <td>490</td> <td>490</td> <td>980</td> </tr> <tr> <td>Sequencing per sample</td> <td>4</td> <td>2000</td> <td>1000</td> <td>1000</td> <td>2000</td> </tr> <tr> <td>Microsatellites PCR and genotyping</td> <td>5</td> <td>2000</td> <td>1000</td> <td>1000</td> <td>2000</td> </tr> </tbody> </table>											LAB analysis and sampling	Value in pounds per sample	x 500 samples	Research support from ASCOBA N	Research support from other agencies	Total Project x 18 months	DNA extraction per sample (Including teeth and tissue samples)	3	1500	750	750	1500	PCR per sample	1.6	800	400	400	800	PCR cleaning per sample	1.96	980	490	490	980	Sequencing per sample	4	2000	1000	1000	2000	Microsatellites PCR and genotyping	5	2000	1000	1000	2000
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	<i>Sample collection (Museum visits and/or sampling)</i>		3000	1500	1500	3000
	<i>Bench Fees</i>		2000	1000	1000	2000
	<i>Materials</i>			500	500	1000
	<i>Conferences and meetings</i>			500	500	1000
	<i>*Main researcher's salary</i>			15836	31671	47507
	Total	£15.56	£12280	£22976	£38811	£61787
<p>*Main researcher's salary is based in the current salary fixed for a Postdoctoral researcher at Durham University per year.</p>						

EULALIA BANGUERA HINESTROZA

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University of Durham, DH1 3LE. Durham-UK
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Researcher. United Nation Environmental Program/Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas (UNEP/ASCOBAN)/ and University of Durham. Project: Molecular identification of management units for white-sided dolphins in the eastern North Atlantic and North Sea. Present.

Previous appointments

Doctoral Researcher. University of Durham. U.K. **Project:** Phylogeography of *Lagenorhynchus acutus* and *L. albirostris* and Phylogeny of the genus *Lagenorhynchus*. 2004-2008.

Lecturer. Universidad del Valle. Cali, Colombia. One semester Taxonomy course for undergraduate students. 2004

Consultant. Alexander von Humboldt Biological Research Institute: Laboratory of Molecular Biology. Colombia. **Project:** “Strengthening of the national capacity in research on molecular ecology and phylogenetics.” 2003.

Researcher. Alexander von Humboldt Biological Research Institute. Bogotá, Colombia. In charge of the scientific area of the project: “Policy of access to genetic resources in Colombia”. 2002.

Lecturer and Research Assistant. Department of Biology. Pontificia Universidad Javeriana, Bogotá, Colombia. Taught courses on evolution, aquatic mammals, genetics and basic biology for undergraduate students. 2000-2002.

Visiting Researcher. International Center for Tropical Agriculture (CIAT) and Laboratory of Molecular Biology (Alexander von Humboldt Biological Research Institute). Cali, Colombia. Project: Molecular taxonomy of river dolphins 1998-1999.

Assistant Professor. Department of Biology, Marine Biology section. Universidad del Valle. Cali-Valle. Colombia. Marine Ecology course. 30 undergraduate students. 1997.

Instructor

Instructor: One-week extensive experimental and theoretical course in population genetics, PCR-based techniques, electrophoresis and data analyses. 30 final-year undergraduates and MSc students. Title “Population genetics and conservation biology: molecular applications and mathematical models, 2001”. Universidad Distrital, Bogotá, Colombia. Additional instructors included Ruíz-García Manuel; Álvarez-González, Diana and Martínez-Agüero, María.

Instructor: One semester theoretical and practical course in population genetics and computer programmes for population genetics analyses (Arlequin, DNAsp, Fstat and Genepop). 35 PhD and MSc students. Universidad Nacional de Colombia, Palmira-Valle. 2003. Additional instructors included Dr. Cardenas-Henao Heiber, Gonzalez Ivan, Garcia Victor Hugo.

Awards

- Alban PhD Studentship: European Union Programme of High-Level Scholarships for Latin America. 2004
- Award from the “Third World Academy of Sciences (TWAS) and Academia Nacional de Ciencias Exactas, Físicas y Naturales, for young scientists in biology”. 2001
- Research Award “Instituto Colombiano para el Desarrollo de la Ciencia y la Tecnología – COLCIENCIAS”. Project: “Phylogeography, population structure and genetic diversity in two species of river dolphin *Inia boliviensis* and *Inia geoffrensis* using molecular markers.”2001
- MSc thesis with honors. Universidad del Valle. Cali, Colombia. 2000
- Robin Best Award: Best research work in Latin America (oral presentation): 9th Specialists Meeting on South American Aquatic Mammals and 3rd Congress of Latin American Society of Specialists on Aquatic Mammals. Buenos Aires, Argentina. 2000
- Research Award “Fondo FEN”. Colombia. Research award. Project: Genetic differentiation of the Amazon River dolphin genus *Inia* (Blainville 1817) and contributions to its taxonomy status through mtDNA analysis. 1997
- Research Award “Fundación FES” Colombia. Project: Preliminary studies of genetic variation in river dolphins (*Inia geoffrensis*, Blainville 1817) using fingerprinting techniques. 1993-1994
- Field work Award “Fundación Natura”. Project: Preliminary studies of genetic variation in river dolphins (*Inia geoffrensis*, Blainville 1817) using fingerprinting techniques. 1993

Education

Degrees

PhD, Molecular Ecology, University of Durham, Dept. of Biological Sciences. Molecular Ecology Group. Durham. UK. Project: Phylogeography of *Lagenorhynchus albirostris* and *Lagenorhynchus acutus* & phylogeny of the genus *Lagenorhynchus*. Finished August 2008, Awarded January 2009.

Master of Sciences, MSc in Biological Sciences, with Honors. Universidad del Valle, Dept. of Biology, Cali. Colombia. Project: Genetic differentiation of the Amazon River dolphin genus *Inia* (Blainville, 1817) and contributions to its taxonomy status through mtDNA analysis. Finished June 1999, Awarded March 2000.

BS in Marine Biology, Universidad del Valle, Dept. of Biology, Cali. Colombia. Thesis: “Preliminary studies of genetic variation in river dolphins (*Inia geoffrensis*, Blainville 1817) using fingerprinting techniques.” Awarded 1995.

Languages

Fluent in English (written and spoken); Spanish (mother tongue).

Expertise in Molecular Biology Techniques

DNA extraction from fresh tissue, teeth, bone samples and ancient samples, PCR, DNA hybridization with radioactive DNA probes, automated DNA sequencing, DNA cloning, Southern blotting, DNA microsatellite libraries, agarose and polyacrylamide gel electrophoresis, SNPs (Single nucleotide polymorphism) microsatellites (STRs), Random Amplified DNA Polymorphism (RAPD), Amplified Fragment Length Polymorphism (AFLP), Restriction Fragment Length Polymorphism (RFLP).

Expertise in Population genetics, Phylogeographic and Phylogenetic analyses

Good knowledge of theoretical population genetics, Bayesian statistics and coalescence theory; good understanding of population genetics and phylogenetics programmes such as Arlequin, Fstat, DNAsp, Genepop, Bottleneck, MEGA, IM, IMA, PAUP, MrBayes, Model test, Mr. Model Test, PAML, Multidivtime, Beast, among others.

Publications and chapters in books.

Banguera-Hinestroza, E., Bjørge, R., Reid, J., Jepson, P., A.R., Hoelzel. 2010a. The influence of glacial epochs and habitat dependence on the phylogeography of a coastal species: *Lagenorhynchus albirostris*. **Conservation genetics** (In press).

Banguera-Hinestroza, E., Hayano, A., Crespo E., and A.R. Hoelzel. 2010b. Multigenic phylogeny of the genus *Lagenorhynchus* (Gray, 1846) and the contrasting position of *L. acutus* and *L. albirostris* among delphinidae; insights for the reclassification of the two North Atlantic species. In prep.

Luca Mirimin, **Eulalia Banguera-Hinestroza,** Rus Hoelzel, Tom Cross and Emer Rogan. 2010. Genetic relationships and parentage analyses in groups of Atlantic white-sided dolphins (*Lagenorhynchus acutus*) that live-stranded on the Irish coast. Submitted.

E. Banguera-Hinestroza. 2008. Phylogeography of *Lagenorhynchus acutus* and *Lagenorhynchus albirostris* and phylogeny of the genus *Lagenorhynchus*. PhD thesis. 194 pp.

Ruiz-García, Manuel, **Banguera, Eulalia,** Cardenas, Heiber. 2006. Morphological analysis of three *Inia* (Cetacea: Iniidae) populations from Colombia and Bolivia. **Acta Theriologica** 51: 411-426.

Banguera-Hinestroza, E., H. Cardenas, M. Ruiz-Garcia, M. Marmontel, E. Gaitan, R. Vasquez, F. Garcia-Vallejo. 2002. Molecular identification of evolutionarily significant units in the Amazon River Dolphin *Inia* sp. (Cetacea: Iniidae). **Journal of Heredity** 93:312-322.

Banguera-Hinestroza, E., H. Cardenas, M. Ruiz-Garcia, M. Marmontel, E. Gaitan, R. Vasquez, F. Garcia-Vallejo. 2002. Genetic differentiation in populations of river dolphin genus *Inia* (Blainville, 1817) and identification of its taxonomic status with molecular analysis. **Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales** No. 1001: 576-588.

Banguera-Hinestroza, E., M. Ruiz-Garcia, H. Galvez, and D. Alvarez. 2001. **English title:** Classification of species genera *Saimiri* and *Aotus* using RAPDs and STRs. A preliminary study toward the detection of intraspecific differences. **Spanish title:** Discriminación de especies de los géneros *Saimiri* y *Aotus* mediante las técnicas de RAPDS y STRs: Un estudio preliminar para la identificación de diferencias interespecíficas. **Chapter in book:** **Avances de la Primatología en Latinoamérica.**

Banguera-Hinestroza, E. 1999. Genetic differentiation of the Amazon River dolphin genus *Inia* (Blainville 1817) and contributions to its taxonomy status through mtDNA analysis. MSc thesis.

Banguera-Hinestroza, E. 1995. Preliminary studies of genetic variation in river dolphins (*Inia geoffrensis*, Blainville 1817) using fingerprinting techniques. BSc thesis.

Abstracts In Scientific Meetings

Eulalia Banguera-Hinestroza, Bob Reid, Arne Bjørge, Luca Mirimin and Rus Hoelzel. 2007. Conservation genetics of *Lagenorhynchus acutus* and *L. albirostris* in ASCOBANS area. ASCOBANS/HELCOM workshops on small cetacean population structure in the ASCOBANS area, and on genetics and population structure of the harbour porpoise in the Baltic Sea. Bonn, Germany.

Eulalia Banguera-Hinestroza, Bob Reid, Arne Bjørge, Luca Mirimin and Rus Hoelzel. 2007. A preliminary study on genetic variability in two species of the genus *Lagenorhynchus* in the eastern North Atlantic. 40th Population Genetics Group meeting, p. 48. Manchester. UK.

Eulalia Banguera-Hinestroza, Bob Reid, Arne Bjørge, Luca Mirimin and Rus Hoelzel. 2006. Molecular ecology of *Lagenorhynchus acutus* and *Lagenorhynchus albirostris* in the North Atlantic and North Sea. 20th Annual Conference of the European Cetacean Society and associated workshops. Poland.

Ruiz García, Manuel, **Banguera Hinestroza, Eulalia**. 2001. Tráfico Ilegal, rehabilitación y liberación de fauna silvestre: genética y liberación In: V Congreso Internacional de Manejo de Fauna en la Amazonía y Latinoamérica. Cartagena de Indias, Colombia.

Banguera Hinestroza, Eulalia, Ruiz García, Manuel, Cárdenas, Heiber, García-Vallejo, Felipe, Marmontel, M., Gaitán, Eliana, Vasquez, René. 2001. **English title:** “Mitochondrial DNA analyses (D-loop and Cytb genes) and morphometric studies confirmed the existence of two species of pink river dolphins (*Inia boliviensis* e *Inia geoffrensis*). **Spanish title:** “Confirmación de la existencia de dos especies de delfines rosados (*Inia boliviensis* e *Inia geoffrensis*) mediante el análisis de las regiones mitocondriales (D-loop y Cytb) y mediante morfometría multivariante. V Congreso Internacional de Manejo de Fauna Silvestre en la Amazonía y Latinoamérica. Cartagena de Indias, Colombia.

Banguera Hinestroza, Eulalia, Ruiz García, Manuel, Gálvez, Hugo, Alvarez González, Diana. 2001. **English title:** Identification of species of *Aotus* and *Saimiri* using RAPDs and microsatellite markers. **Spanish title:** Discriminación de especies de *Aotus* y *Saimiri* mediante el uso de marcadores RAPDs y niveles de diversidad génica utilizando marcadores microsatélites 2001. V Congreso Internacional de Manejo de Fauna Silvestre en la Amazonía y Latinoamérica. Cartagena de Indias, Colombia.

Banguera-Hinestroza. E., Cardenas-Henao H., Hamilton H., Ruiz-Garcia M., Gaitan E., Vasquez R. and Garcia-Vallejo, F. 2000. **English title:** Genetic variability at the mtDNA control region in populations of river dolphin *Inia* ssp. in the Orinoco, Amazon and Beni-Mamore Basins. **Spanish title:** Variabilidad genética de la región D-loop del ADN mitocondrial en poblaciones del delfín de río *Inia* ssp (Cetacea: Iniidae) en las Cuencas de los ríos Orinoco, Amazonas y Beni-Mamoré. 9a Reunión de Especialistas en Mamíferos Acuáticos de América del Sur y Tercer Congreso de la Sociedad Latinoamericana de Especialistas en Mamíferos Acuáticos. Oct.-Nov. 2000. Buenos Aires, Argentina. **Robin Best Award**. 2000.

Banguera- Hinestroza. E. 1997. Conservation genetics of river dolphins in South America. III Congreso Internacional sobre Manejo de Fauna Silvestre de la Amazonia, Santa Cruz, Bolivia.

Banguera-Hinestroza. E., García-Vallejo, F., Trujillo, F., Mayer, J., Gallego, G. 1996. **English title:** Preliminary study of the genetic variation of *Inia geoffrensis* (Blainville, 1817). **Spanish title:** Estudio preliminar de la variación genética en *Inia geoffrensis* (Blainville, 1817). Resúmenes 7a Reunión de Especialistas en Mamíferos Acuáticos de América del Sur y Primer Congreso de la Sociedad Latinoamericana de Especialistas en Mamíferos Acuáticos. Viña del Mar, Chile.

Research interests

My main research interests are the conservation of diversity and the study of the evolutionary history of terrestrial and aquatic organisms. My research has focused so far on the study of the mechanisms that promote divergence between and among populations, using molecular tools, population genetics theory and mathematical models. I use phylogeographic analyses to evaluate the spatial distribution of independent evolutionary lineages and to understand the effect that past demographic processes have had on the evolutionary history of organisms. I am also interested in the reconstruction of the phylogenetic history of species using single and multigenic approaches.

Referees

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INVESTIGATION OF RISSO'S DOLPHIN NURSERY GROUNDS
IN THE OUTER HEBRIDES, WESTERN SCOTLAND

<p>Title Investigation of the Isle of Lewis, Scotland as important habitat for Risso's dolphins (<i>Grampus griseus</i>)</p>	<p>Justification: CMP</p>	<p>Project ID: PP/2010/08</p>
<p>Implementing Agency / Applicant</p>	<p>Sarah Dolman Head of Policy for Scotland Whale & Dolphin Conservation Society WDCS Wildlife Centre, Spey Bay, Moray IV32 7PJ 0131 667 9154 / 078 3449 8275 Sarah.dolman@wdcs.org</p>	
<p>Collaborating Agencies / Other Sponsors</p>	<p>Sponsor: Project Aware (PADI International). Collaborating agencies: Scottish Natural Heritage (Lewis, western Scotland), Countryside Council for Wales (Bardsey Island, north Wales). Collaborations with scientists have included: Oliver Yates (Chile) and Tethys (Mediterranean), Tim Atkinson (Lewis), as well as Bob Reid and Andrew Brownlow at Scottish Agricultural College (SAC), who collect strandings data and conduct necropsies. This project is part of WDCS's 'Risso's dolphins in Celtic Seas' programme and linked to the Risso's Dolphin Conservation Plan available on the WDCS website: http://www.wdcs.org/submissions_bin/Rissos_Conservation_Plan.pdf</p>	
<p>Background / Problem</p>	<p>No population-level information is available on trends in abundance in Scotland or the UK. Information on the distribution, habitat use and range of the Risso's dolphin found in the UK population is limited. WDCS has recently completed its conservation plan for Risso's dolphins, which is available on the WDCS website.</p> <p>Risso's dolphins are oceanic dolphins which inhabit a few coastal sites where the continental shelf is narrow and close to shore, including the Isle of Lewis in the Outer Hebrides. Preliminary results from previous studies conducted (Atkinson <i>et al.</i>, 1999)¹ indicate that the waters around north Lewis, along with a few other sites on the west coast of Scotland (including Tiree, Coll and Ushinish Peninsula, South Uist) are important for Risso's dolphins.</p> <p>In the late 1990s, WDCS funded a Risso's dolphin project on the Eye Peninsula, Lewis. An estimated 142 individuals were identified. At least 52 of these recognisable individuals were observed both within and between years.</p> <p>Considerable numbers of mother-calf pairs are reported around Lewis, making the Eye Peninsula not only locally and nationally important, but also significant internationally for</p>	

¹ Atkinson, T. Gill, A. & Evans, P.G.H. 1999. A photo-identification study of Risso's dolphin in the Outer Hebrides, northwest Scotland. *European Research on Cetaceans*, **12**, 102.

INVESTIGATION OF RISSO'S DOLPHIN NURSERY GROUNDS
IN THE OUTER HEBRIDES, WESTERN SCOTLAND

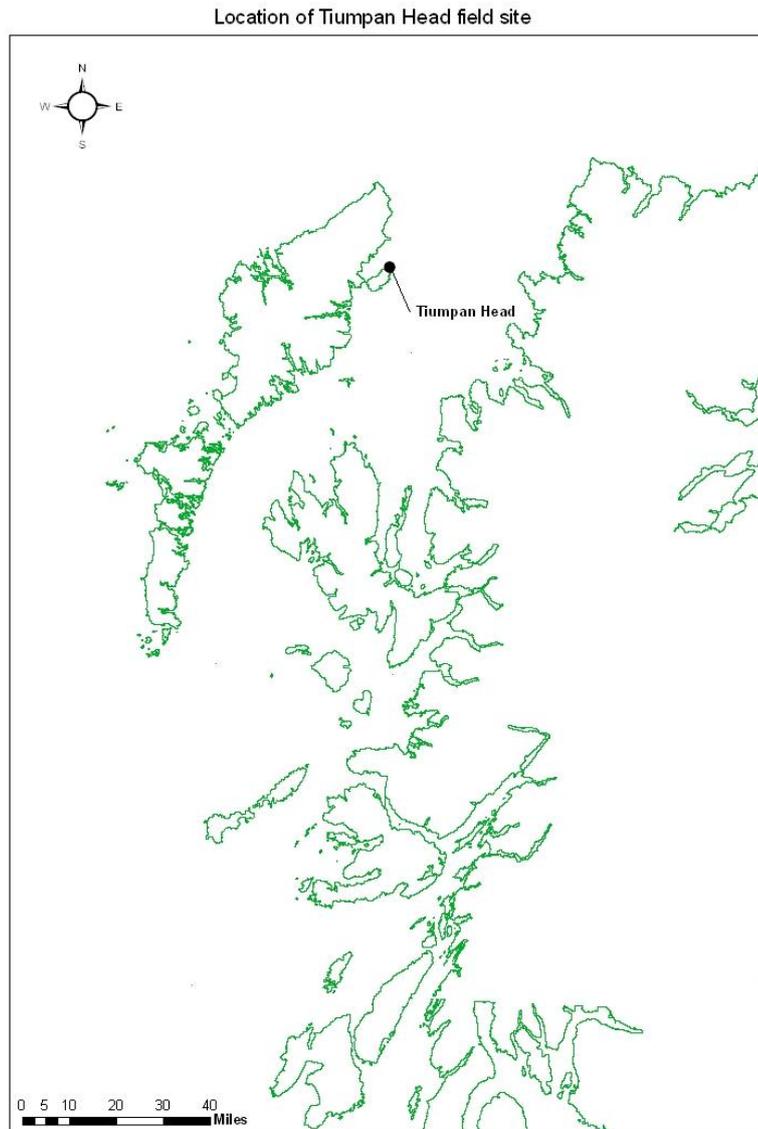
	<p>Risso's dolphins, and particularly as a nursery area. No more than a handful of sites around the world (including those introduced above, around Bardsey Island, North Wales and La Herradura, southern Chile) have been documented as nursery grounds for Risso's dolphins.</p>
<p>Objectives</p>	<ul style="list-style-type: none"> ▪ Our primary objective is to collect scientific data that will enable us to determine the significance of the coastal waters of Lewis for Risso's dolphins. <p>Basic observation data including habitat use, group size, composition and behaviour will be collected from land-based survey platforms, vocalisations will be collected using passive acoustic monitoring equipment and information about site fidelity and residency will result from opportunistic photo-identification work conducted from small boats.</p> <ul style="list-style-type: none"> ▪ Information on known and potential threats will be gathered, including fisheries interactions (for example, there is some existing evidence of bycatch from strandings data) and disturbance. <p>This will be achieved by reporting strandings, we maintain a good working relationship with the Scottish Agricultural College (SAC), who conduct post-mortem examinations of all cetaceans stranded in Scotland and distributing information on codes of conduct to prevent disturbance, by working closely with the Police Wildlife Crime Unit.</p> <ul style="list-style-type: none"> ▪ We will provide educational outreach through providing training to a network of observers to conduct regular and year-round shore-based watches with the aim of collecting conservation focused data. <p>Volunteers will also receive training as naturalists/visitor guides to promote the value of the marine environment in Scotland, raise awareness of the conservation issues affecting the animals and highlight the need to protect the natural heritage of the region to the general public. In this way, partners will collect valuable observational data but will also become ambassadors for the animals themselves. Through the project we will also endeavour to increase the number of people who report strandings and incidences of disturbance.</p>
<p>Relevance to ASCOBANS</p>	<p>Section 2b (<i>locating areas of special importance</i>) of the ASCOBANS Conservation and Management Plan is relevant to this study, as are sections 3, 4 and 5 (<i>stranding data, legislation, information and education</i> respectively).</p> <p>In addition, MOP 6, Document Doc.5-07 (Proceedings of the ECS/ASCOBANS/ACCOBAMS Workshop on Selection Criteria for Marine Protected Areas for Cetaceans, Dist. 10 August 09), is relevant given the UK Marine Act and the Marine (Scotland) Act both commit the UK to designation of sites for important species and habitats.</p> <p>Resolution 7 of MOP 5 (Research on Habitat Quality, Health and Status of Small Cetaceans in the Agreement Area) <i>Continue</i> or <i>Initiate</i> research aimed at identifying the location of any further suitable sites for the establishment of protected areas and <i>Recommends</i> a one day workshop to establish criteria and guidelines for the identification of sites of importance for small cetaceans should be held as soon as possible.</p>

INVESTIGATION OF RISSO'S DOLPHIN NURSERY GROUNDS
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Resolution 8 (Educational and Promotional Activities) is pertinent to this project as we will be working with the local community to develop ongoing projects in the region.

In addition, MOP5 Resolutions 4 (Adverse Effects of Sound, Vessels and Other Forms of Disturbance on Small Cetaceans) and 5 (Incidental Take of Small Cetaceans) are relevant due to the deep diving nature of Risso's dolphins and their inclusion in embolism research conducted in the UK (Jepson et al., 2005)² and due to the number of Risso's dolphins that strand with evidence of bycatch marks. Four of 21 Risso's dolphin necropsied in Scotland since 1992 have been diagnosed as bycatch/entanglement as the cause of death.

Activities



² Jepson, P.D., Deaville, R., Patterson, I.A.R., Pocknell, Ross, H.M., Baker, J.R., Howie, F.E., Reid, R.J., Colloff, A. and Cunningham, A.A. (2005) Acute and chronic gas bubble lesions in cetaceans stranded in the United Kingdom. *Veterinary Pathology* **42**: 291-305.

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	<p>Static acoustic monitoring in key coastal habitats is a cost effective way to provide valuable information that will enable us to more accurately determine site use, including during hours of darkness and inclement weather. Initially we propose deploying one C-POD during the visual survey period. Complementary visual and acoustic data provide an opportunity to compare visual and acoustic observation rates scientifically.</p> <p>Photo-identification will play a fundamental role in recognising individual Risso's dolphins and their habitat use around Lewis. Photo-iD is a valuable tool that provides us with a mechanism towards a co-ordinated approach to understand population movements throughout Scotland, the UK and Europe, as photographs will be made available to compare with existing databases. Catalogues of dorsal fins are available for Bardsey Island in North Wales and more broadly through Europhlukes. Any photographs that are gathered through this project will provide a valuable contribution at not only a UK but European level.</p> <p>The WDCS Shorewatch project has been running for 7 years from our Wildlife Centre in the Moray Firth. This study demonstrates that networks of trained volunteer observers can provide a cost-effective, non-invasive means of gathering year round scientific data on cetaceans, as well as reporting strandings, for the purposes of marine conservation. We propose to set up a Shorewatch project on Lewis.</p> <p>Whilst Risso's dolphins are the focus of this study, all marine mammals will be recorded. Cetaceans that are likely to be encountered in the waters of Lewis include harbour porpoises (<i>Phocoena phocoena</i>) and white-beaked dolphins (<i>Lagenorhynchus albirostris</i>), as well as bottlenose dolphins (<i>Tursiops truncatus</i>), orca (<i>Orcinus orca</i>), common dolphins (<i>Delphinus delphis</i>) and minke whales (<i>Baleanoptera acutorostrata</i>).</p>
<p>Outputs</p>	<p>Scientific outputs:</p> <ul style="list-style-type: none"> ▪ A scientific report. ▪ Presentation of results at scientific fora. <p>Conservation & management outputs:</p> <ul style="list-style-type: none"> ▪ Recognition of Lewis as an internationally important site for Risso's dolphins. ▪ Better understanding of use of the area by other cetaceans. ▪ Inclusion of the species in future designations of Marine Protected Areas. ▪ Informed government decisions based upon the Habitats Regulations that offers protection to all cetacean species. ▪ Data to be input to WDCS Risso's Dolphin Conservation Plan. ▪ Strengthening the stranding network of volunteers. <p>Educational outputs:</p> <ul style="list-style-type: none"> ▪ Increased awareness of the value of the Outer Hebrides marine environment and the species that are dependant upon it and increase the protection of cetaceans in the region as a result of volunteers who are also trained as naturalists/visitor guides.

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Work Plan and Timetable		Start date	End date	Lead																																															
	Full field study (yr. 1)	Sept. 2011	Oct. 2011	WDCS																																															
	Subsequent field study (yr.2)	Sept. 2011	Ongoing	WDCS																																															
	Volunteer observations (year round)	Sept 2011	Ongoing	WDCS																																															
Project Personnel	Sarah Dolman & Nicola Hodgins – Principle Investigators. See attached CV for more information.																																																		
Budget Estimates	<p>Lewis Risso's Project</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 35%;">Travel</td> <td style="width: 55%;">Ferry (Rtn. Ullapool - Stornoway)</td> <td style="width: 10%; text-align: right;">£102</td> </tr> <tr> <td></td> <td>Fuel (1900 @ 40p per ml)</td> <td style="text-align: right;">£760</td> </tr> <tr> <td>Accommodation</td> <td>8 wks @ £250 per wk</td> <td style="text-align: right;">£2,000</td> </tr> <tr> <td>Food</td> <td>8 wks @ £70 per wk</td> <td style="text-align: right;">£560</td> </tr> <tr> <td rowspan="4">Equipment</td> <td>C-POD x2</td> <td style="text-align: right;">£3,412</td> </tr> <tr> <td>Batteries, mooring equipment</td> <td style="text-align: right;">£100</td> </tr> <tr> <td>High powered marine transmitter radios</td> <td style="text-align: right;">£308</td> </tr> <tr> <td>Servicing & cleaning binoculars</td> <td style="text-align: right;">£120</td> </tr> <tr> <td>Interpretation</td> <td>Educational materials</td> <td style="text-align: right;">£1,000</td> </tr> <tr> <td>Shorewatch</td> <td>Materials & training packs for 2 sites</td> <td style="text-align: right;">£1,100</td> </tr> <tr> <td>Analysis</td> <td>Acoustic data</td> <td style="text-align: center;">-</td> </tr> <tr> <td>Project expenses</td> <td>Phone, post etc (6 wks)</td> <td style="text-align: right;">£90</td> </tr> <tr> <td>Insurance</td> <td></td> <td style="text-align: right;">£50</td> </tr> <tr> <td>Boat hire</td> <td>8 wks @ £200 per day</td> <td style="text-align: right;">£11,200</td> </tr> <tr> <td>Contingency</td> <td>5%</td> <td style="text-align: right;">£1,040.10</td> </tr> <tr> <td>WDCS management costs</td> <td>15%</td> <td style="text-align: right;">£3,120.30</td> </tr> <tr> <td></td> <td style="text-align: right;">TOTAL</td> <td style="text-align: right;">£24,962</td> </tr> </table> <p>* WDCS contribution to the project includes field preparation (4 wks), two field staff (16 wks) and analysis and report writing (8 wks) would equate to approximately 28 weeks of senior staff members time in total. WDCS will provide field equipment, including 'big eye' binoculars and reticuled binoculars and DSLR camera equipment.</p> <p>Whilst this funding proposal only covers costs to be incurred during the first year of the survey, we anticipate that a minimum of three years worth of survey data will be required. The success of the project will be continually evaluated and a comprehensive field survey report will be provided within two months of 2011 field work completion.</p>			Travel	Ferry (Rtn. Ullapool - Stornoway)	£102		Fuel (1900 @ 40p per ml)	£760	Accommodation	8 wks @ £250 per wk	£2,000	Food	8 wks @ £70 per wk	£560	Equipment	C-POD x2	£3,412	Batteries, mooring equipment	£100	High powered marine transmitter radios	£308	Servicing & cleaning binoculars	£120	Interpretation	Educational materials	£1,000	Shorewatch	Materials & training packs for 2 sites	£1,100	Analysis	Acoustic data	-	Project expenses	Phone, post etc (6 wks)	£90	Insurance		£50	Boat hire	8 wks @ £200 per day	£11,200	Contingency	5%	£1,040.10	WDCS management costs	15%	£3,120.30		TOTAL	£24,962
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22nd May 1974

EDUCATION

Master of Research	<i>Marine & Fisheries Science</i> - Distinction University of Aberdeen, Scotland	2006 - 2007
BEng (honours)	<i>Electronic & Communications Engineering</i> - 2:2 University of Bath, BANES, UK	1993 – 1996
National Diploma (BTEC)	<i>Electrical & Mechanical Engineering</i> , Wiltshire, UK	1991 – 1993
GCSE's (8)	George Ward School, Melksham, Wiltshire, UK	1986 – 1991

EMPLOYMENT

WDCS Scotland	Head of Policy for Scotland	Oct 2008 - Present
WDCS UK	Science Team, Programme Leader	Jun 2004 – Oct 2008
Dokumente des Meeres	Scientific Advisor	May 2006 - Present
Ketos Ecology	Visual Observer, Marine Wind Surveys	Feb 2007 – Aug 2007
WDCS Australasia	International Science Officer	Dec 2000 – Jun 2004
WDCS UK	Volunteer briefly, then Science Officer	Jul 1996 – Oct 2000
Longleat Safari Park UK	Animal Husbandry, Elephant Keeper	Apr 1995 – Jul 1996
Henney Veterinary Surgery	Receptionist and general assistant	Mar 1992 - Apr 1995

CURRENT RESPONSIBILITIES

- Responsible for policy development for WDCS in Scotland & Noise Pollution Campaign
- Development of management strategies, policy advice and technical reports
- Management of budgets, including grants & restricted funds
- Management of consultants, including legal advisors, and volunteers
- Participation in a number of international and regional policy and scientific meetings, organisation of scientific workshops, membership of a number of government committee's
- Data collection from live and dead cetacean strandings and participation in necropsies
- Knowledge Transfer Partnership (KTP) Programme Facilitator/Company Supervisor
- Steering Group member – UK government (DECC) oil and gas development in Moray Firth

PROFESSIONAL EXPERIENCE & OTHER INFORMATION

I am competent in Microsoft Access, Excel, Powerpoint, GIS ArcView 3.3, WinBUGS, Brodgar, Minitab, Logger and Ishmael. I am a member of the Acoustical Society of America, Society of Marine Mammalogy and European Cetacean Society.

I hold a full and clean driving license and a Royal Yachting Association National Powerboat Certificate – Level 2. I hold a First Aid at Sea certificate and I am VHF trained. I am a Volunteer BDMLR Marine Mammal Medic and a trained Bat Worker up to date with pre-exposure rabies vaccinations. I am learning Spanish and enjoy walking, yoga, swimming.

FIELD EXPERIENCE

I currently lead seasonal land-based visual surveys in the Minch off the west coast of Scotland. I have led visual and acoustic boat-based surveys in Antarctic, Scottish and Hawaiian waters and land-based surveys off Bardsey Island in North Wales. I have participated in RIB-based research, including photo-identification, of beaked whales off El Hierro, Canary Islands and deep diving species off Great Abaco Island in the Bahamas. I have participated in a number of surveys as a volunteer, including aerial surveys of blue whales in Australia and yacht based basking shark surveys.

PEER REVIEWED PUBLICATIONS

Dolman, S. J., Evans, P.G.H., Notarbartolo-di-Sciara, G. and Frisch, H. In press. Active sonar, beaked whales & European regional policy. *Marine Pollution Bulletin*.

Dolman, S. J. and Simmonds, M. P. In Press. Towards best environmental practice for cetacean conservation in developing Scotland's marine renewable energy. *Marine Policy*.

Dolman, S. J., Pinn, E., Reid, R. J., Barley, J. P., Deaville, R., Jepson, P. D., O'Connell, M., Berrow, S., Penrose, R. S., Stevick, P. T., Calderan, S., Robinsons, K. P., Brownell, Jr. R. L. and Simmonds, M. P. 2010. A preliminary note on the unprecedented strandings of 45 deep-diving odontocetes on UK and Irish coasts between January and April 2008. *Marine Biodiversity Records, Vol. 3*.

Parsons, E. C. M., **Dolman**, S. J., Wright, A. J., Rose, N. A. and Simmonds, M. P. 2009. A critique of the UK's JNCC Seismic Survey Guidelines for minimising acoustic disturbance to marine mammals: best practise? *Marine Pollution Bulletin*.

Dolman, S. J., Weir, C. and Jasny, M. 2009. Comparative Review of Marine Mammal Guidance Implemented during Naval Exercises. *Marine Pollution Bulletin*.

Dolman, S. J., Jopling, B. C. and Simmonds, M. P. 2008. The worldwide extent of seismic exploration, 1994-2004. *Bioacoustics*, 17, 245-248.

Parsons, E. C. M., **Dolman**, S. J., Wright, A. J., Rose, N. A. and Burns, W. C. G. 2008. Navy sonar and cetaceans: How much does the gun need to smoke before we act? *Marine Pollution Bulletin*.

Weir, C. and **Dolman**, S. J. 2007. Comparative review of the regional marine mammal mitigation guidelines implemented during industrial seismic surveys, and guidance towards a worldwide standard. *Journal of International Wildlife Law and Policy*, 10:1-27.

Dolman, S. J. 2007. Spatio-temporal restrictions as best practise precautionary response to ocean noise. *Journal of International Wildlife Law and Policy*, 10:219-224.

SOME SCIENTIFIC REPORTS & POSTERS

Dolman, S. J., MacLeod, C. D. and Evans, P. G. H. (Eds.) 2009. Proceedings of the Workshop: Beaked Whale Research. ECS Special Publication Series no. 51. Proceedings of the 21st Annual meeting of the European Cetacean Society, San Sebastian, Spain, 26th April 2007.

Dolman, S. J. 2007. Assessing abundance trends of deep-diving cetaceans off Abaco Island in the Bahamas. Master of Research Thesis. 91 pages. (Poster presented to 17th Biennial Conference on the Biology of Marine Mammals.)

Dolman, S. J. 2006. Cetaceans, Sea Ice & Wildlife Diversity, V3 Broke West Voyage Report: BROKE West 2006, RVIB *Aurora Australis*. A WDCS Report.

Dolman, S. J., Swift, R., Asmus, K. and Thiele, D. 2005. Preliminary analysis of passive acoustic recordings made in the Ross Sea during ANSLOPE III in 2004. Presented to the IWC Scientific Committee, SC/57/E10.

Simmonds, M. P., **Dolman**, S. J. and Weilgart, L. 2003. Oceans of Noise. A WDCS Science Report. 169 pages.