Darwin Initiative – Final Report

Darwin project information

Project Reference	14-005
Project Title	Conservation of Pakistan's Marine Cetacean Biodiversity and Pelagic Environment
Host country(ies)	Pakistan
UK Contract Holder Institution	University Marine Biological Station Millport (UMBSM) (University of London)
UK Partner Institution(s)	University Marine Biological Station Millport (UMBSM) (University of London)
Host Country Partner Institution(s)	1) Centre for Excellence in Marine Biology (CEMB) at Karachi University 2) World Wildlife Fund-Pakistan (WWF-Pakistan)
Darwin Grant Value	£167308
Start/End dates of Project	01 October 2005 / 31 September 2008
Project Leader Name	Dr. Mauvis Gore
Project Website	http://www.gla.ac.uk/centres/marinestation/index.html *(note UMBSM no longer updating website, lack of personnel)*
Report Author(s) and date	Dr. Mauvis Gore, Prof. P. Jamal Siddiqui, Dr. Ejaz Ahmad, 30 December 2008

1 Project Background

Evidence indicated that significant, unstudied populations of over 20 species of whale and dolphin occur within the Pakistani EEZ (NE Indian Ocean). The project undertook surveys to determine their abundance, diversity, and seasonal habitat use; assess the status of their pelagic environment; and document threats to their populations. In collaboration with Pakistani partners, the Darwin-badged project developed management options and recommendations, helping to fulfil the "Pakistan National Conservation Strategy". It emphasised, through Karachi University, capacity building and training of Pakistani students, academics, and fisheries officers. Sustainability has been achieved by establishing, with WWF-Pakistan, an active national cetacean conservation group.

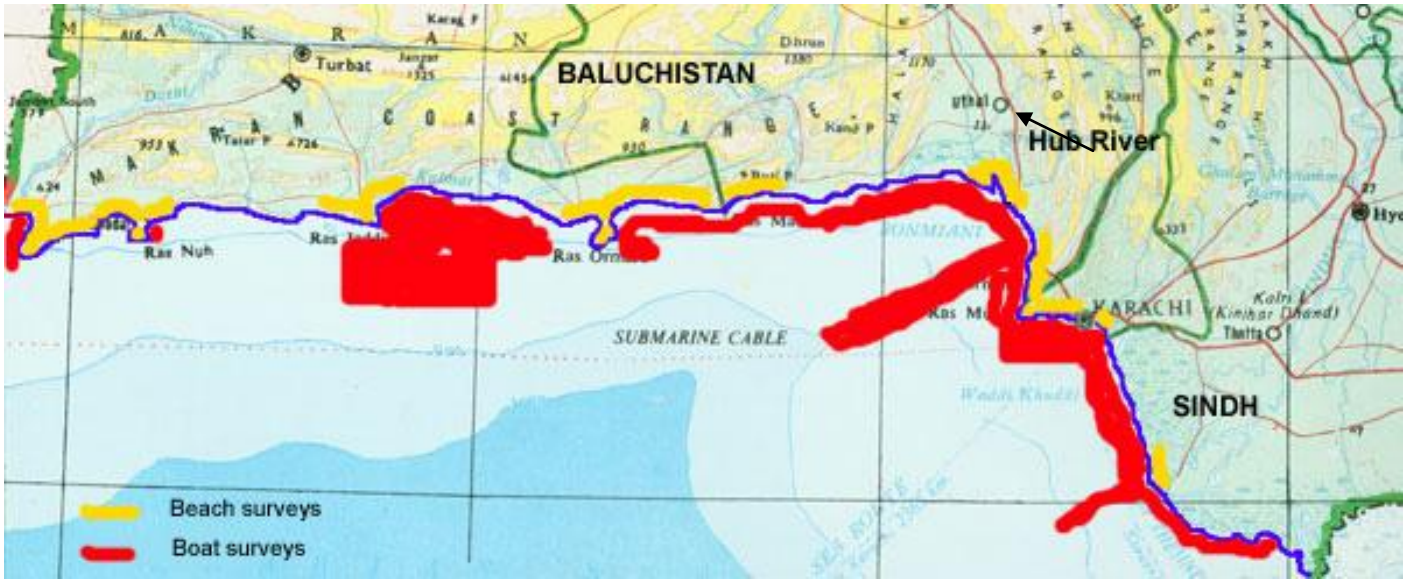

Fig. 1: Map showing the coastline of Pakistan, with the Hub River marking the border between the coastal provinces Sindh and Balochistan (also spelled Baluchistan). The red lines indicate areas where boat surveys have been carried out by this DI Project, while the yellow lines represent beach and community surveys.

2 Project support to the Convention on Biological Diversity (CBD)

In building capacity to meet CBD commitments the Government of Pakistan, through the Pakistan National Conservation Strategy, identified 14 core programme areas among which are " 6. Protecting Water Bodies & Sustaining Fisheries" and "7. Conservation of Biodiversity". The former includes (#24) a recommendation for alternative employment for fishers, and the latter (#30 & #34) to develop new National Parks and to protect endangered species, under which cetaceans fall. Policies for Coastal & Marine Resources recommended by the strategy include "filling information gaps on coastal resources & resource use", and "developing alternative employment for coastal communities". Similarly the Pakistan Biodiversity Action Plan identifies requirements for identification and monitoring, *in situ* conservation, sustainable use, research and training, and public education and awareness, each of which the present project was designed to assist. WWF-Pakistan itself has prioritised marine conservation, especially of threatened species within the Indus Ecoregion (#156) and North Arabian Sea Ecoregion (#232).

This Darwin Initiative (DI) project supported Pakistan's implementation of Article 6 (see Annex 3 for detail), with emphasis on the Themes Biodiversity & Tourism: 10%, Ecosystems Approach: 20%, Marine & Coastal Biodiversity 40%, Protected Areas: 10%, Public Education & Awareness: 10%, and Sustainable Use & Biodiversity: 10%. Little was known of the status of Pakistan's marine cetaceans, except that two species are considered endangered and one vulnerable. The DI project has determined seasonal occurrence and abundance, identified local threats, and provided key information for the development of species action plans to promote *in situ* conservation. Recommendations have been made for a new coastal and marine protected area - the first in Pakistan. The project has assessed the status of the habitat, the pelagic ecosystem (including plankton, fish and sea-birds), and promoted its sustainable use and biodiversity, including developing dolphin-watching. It has promoted public awareness of Pakistan's cetacean population and established, through WWF-Pakistan, a national cetacean conservation group - another first in Pakistan. The project has liaised with CBD focal point(s) in the Ministry of the Environment through the responsible department (Zoological Survey Department) and the Ministry's CBD working party, which includes project counterparts from both WWF-Pakistan and Karachi University.

The DI project supported the CMS. CMS lists several whales on App. I (*Physeter macrocephalus, Balaenoptera physalus, B. musculus, Megaptera novaeangliae*) and whales and dolphins in App. II (*Neophocaena phocaenoides, Sousa chinensis, Stenella longirostris,*

Orcinus orca, Balaenoptera edeni and B. physalus) that we have now confirmed as being found reliably off Pakistan. The CMS Rec. 7.2 Impl. Of Res. 6.2 on By-catch notes that information is particularly needed on cetaceans in South and South-East Asia (which includes Pakistan), with the CMS COP Res. 6.2 By-catch specifically mentioning cetaceans. We have found that some of Pakistan's cetaceans are caught as both by-catch and deliberately in limited numbers. Pakistan also lies within the Indian Ocean Whale Sanctuary and while this has resulted in whales not being commercially hunted, this does not protect dolphins or porpoises and is likely to be up for renewal. Further, the Pakistan government has not previously had access to reliable or detailed information on the cetaceans in its waters and this is necessary to make informed decisions on management or for legislation to protect their cetaceans.

3 Project Partnerships

Our partner organisations are WWF-Pakistan and the Centre of Excellence in Marine Biology (CEMB) at Karachi University (KU). The DI Project was fortunate to find willing partners in WWF-Pakistan and CEMB, with whom the relationship deepened and strengthened over time. The project team, Cetacean Conservation Pakistan (CCP), includes two Project Officers (PO) based at WWF-Pakistan, and two Research Officers (RO) based at CEMB. All CCP members (6 over time) have been similarly trained by the UK team and through government institutions, including Marine Fisheries Department and the Pakistan Wetlands Programme. The Navy provided information on local conditions and security for the CCP Team during surveys. Through WWF-Pakistan, the POs focused on raising awareness, working with fisher communities, and conducting community and beach surveys. They also launched and now run the national cetacean conservation group "Pakistan Whale and Dolphin Society". WWF-Pakistan provides some office facilities and logistics for the field and community work. Through CEMB, the ROs focused on boat surveys, updating and managing the databases, with office and lab facilities. The CCP team meet and work together at CEMB (KU), WWF-Pakistan Karachi office, or Panda House (WWF-Pakistan). WWF-Pakistan has also been very helpful in facilitating supplementary funding for the project work and contacts for further help with the project's aims.

WWF-Pakistan originally identified the lack of knowledge about Pakistan's marine cetaceans and noted some evidence of possible high diversity in Pakistani waters. They encouraged the UK applicants, who already had experience researching cetaceans in neighbouring Oman and elsewhere, to seek support for the original DI project. The partners established MoUs between UMBSM and CEMB, and UMBSM and WWF-Pakistan, as well as the DI proposal, which outlined in detail the responsibilities of each partner.

Some difficulties have been experienced linked to minor differences in priorities between academic and conservation institutions. These are largely resolved through meetings of the three partners. Difficulties have also been experienced where staff at the University of London and at UMBSM lacked experience with the administration of this type of grant, as in fund transfer, scheduling and communication. Dr. Gore took on the administration and accounting of the DI grant when the UMBSM Administrator left office with no replacement.

We have exchanged visits and continued links with the only similar group in the region, the Oman Whale and Dolphin Research Group based in Muscat, Oman, where we have discussed our techniques, methods and findings. We continue our links with the Marine Conservation Society Seychelles. We have also good links with the National Institute of Oceanography (NIO), Karachi, exchanging information on the habitat and cetacean populations offshore. We trained some NIO onboard observers who returned with data on the species and numbers of cetaceans found during oceanographic surveys off Pakistan.

4 Project Achievements

4.1 Impact: achievement of positive impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

To understand the impact, the purpose of the project needs to be outlined. The DI project's aim was to support conservation and management of whale and dolphin biodiversity in the NE Indian Ocean (Pakistan), and the pelagic resources on which they depend, through research,

protective measures, capacity building, and Darwin-badged public awareness and participation programmes.

Great care was taken in selecting an able and enthusiastic Pakistani team, including four DI project Cetacean Conservation Pakistan (CCP) team members. We undertook systematic contingency planning especially for fieldwork, and secured provision of additional boats, vehicles and equipment (from the Ministry of Environment and WWF-Pakistan through Pakistan Wetlands Programme) notably for fieldwork in Balochistan. Much effort was put into gaining the support of a full range of local stakeholders, who in turn have assisted us, such as fisher communities with cetacean reports and strandings, the Pakistan Navy with accommodation and logistics in Balochistan, and the Marine Fisheries Department with fisheries data. The Project Advisory Panel (see App. 1), consisting of representatives of 13 government departments, NGOs, and academic institutions, proved invaluable in gaining high-level support and advice. One shortfall has been that zooplankton samples although collected, have yet to be worked up by the relevant Pakistani partner; on the other hand, although not a planned output, samples were taken and analysed for phytoplankton by another Pakistani collaborator and the results published.

The final project report scheduled for completion shortly and draft cetacean management plan is attached. Fishers, Navy and Coastal Authorities gained an understanding that cetaceans are mammals and that certain practices threatened their existence. Training in scientific techniques have been carried out with government, NGO and university staff for surveying, monitoring and sampling beach-cast cetaceans. Physical resources (see App. 2) have been provided for continued monitoring of cetacean populations. Social networks have been developed with the Fisher Cetacean Reporting Scheme and the Fisher Workshops, and with the establishment of the Pakistan Whale and Dolphin Society.

4.2 Outcomes: achievement of the project purpose and outcomes

The project achieved almost all of its ambitious original targets, and in many instances surpassed them. To serve CBD Annex II Target 2.1, the work of the DI project has provided the first baseline data on the species, estimated population numbers and habitats used that will serve as a benchmark for a monitoring programme to show any future trends in population numbers and point to protective measures needed. As a result of the DI project, the status of the threatened marine cetacean species in Pakistan has been brought to the attention of the government, NGOs, universities and the general public, helping to improve their status (Target 2.2). Targets 4.1 and 4.2 have been addressed by initiating dolphin watching businesses for fishers. Fishers have been disadvantaged by the permits to fish given to large, international commercial enterprises; fishers also use porpoises and dolphin at times for fish bait. The new cetacean watching enterprise will provide an alternative livelihood for the fishers with related business for the community (travel, food, accommodation, souvenirs, guides), which will then aid in alleviating poverty in the local fisher communities.

Our DI project work has resulted in:

a) The first surveys and database on Pakistan's marine cetaceans, resulting in the first reliable and confirmed knowledge on species, population estimates and locations/hotspots.

b) Agreement by the Government for Astola Island to be the first marine protected area (MPA) in Pakistan.

c) A draft marine cetacean biodiversity action plan: "Action Plan for the Conservation of Marine Cetaceans of Pakistan" (App. 4: 1).

d) Education and awareness programmes with coastal communities to bring an understanding of conservation and marine cetaceans, with the general public through the Pakistan Whale and Dolphin Society, and with the academic community by means of a course developed on marine mammals and talks given at academic institutions.

Positive social impact on individuals and local communities was achieved through the following:

a) Individual fishers have joined the Fisher Cetacean Reporting Scheme, in which the fisher provides information on cetacean sightings and strandings to the Cetacean Conservation

Pakistan (CCP) Team, who in turn provide updates and any information requested by the fisher or his local community on issues related to cetaceans and the marine habitat.

b) Two provincial Fisher Workshops.

c) Training, presentations and printed material on the DI project and marine cetaceans and their habitat have been provided to Government departments and institutes including Marine Fisheries, Sindh Wildlife, Balochistan Forestry and Wildlife, Zoological Survey, National Institute of Oceanography, and Pakistan Wetlands Programme, as well as a number of universities and school groups in Sindh, Punjab and Balochistan.

d) The pilot dolphin watching enterprises have brought employment to individual fishers and members of their local community.

e) The Navy and Coastal Authority have provided security and information on local conditions for the CCP Team during surveys, and they have received presentations and printed material on the work of the project, and marine cetaceans and their habitat.

4.3 Outputs (and activities)

As shown in our logframe (see Annex 1 for more details), we conducted extensive surveys covering >83% of the whole (1050km) Pakistan coastline, and achieved significantly more than expected:

- Boat and beach surveys have revealed the seasonal and spatial occurrence of 10 species of marine cetacean (App. 4: 2).
- Interviews with 370 fishers in 82 villages and two formal workshops (one each in Sindh and Balochistan) involving 57 fishers provided further information, including on threats and impacts (App. 4: 4).
- Five peer-reviewed scientific articles have been published, with three more in preparation (Annex 5).
- Key information was provided to the CBD working group within the Ministry of Environment, and a proposal to establish a marine protected area for cetaceans and corals around Astola Island, agreed by Government at Cabinet level (App. 4: 2).
- Two trial dolphin-watching trips were run with fishers (App. 4: 2).
- Public awareness of cetacean conservation issues was promoted through the distribution of 4000 copies of project reports and many thousands of leaflets in English, Urdu and Sindhi, as well as 1000 copies of cetacean identification cards (to fishers etc.), 200 copies of cetacean identification booklets, and numerous stickers and posters. In 2008 alone, team members gave talks to >2800 people and lectures to >1200 students at academic institutes in Sindh, Balochistan and Punjab (App. 4: 4).
- The DI work also featured in 15 newspaper articles and 4 television slots (App. 3).
- A graduate level course on marine mammals was introduced at Karachi University, where a Pakistani team member will submit his doctoral thesis shortly (App. 4: 2).
- The new Pakistan Whale and Dolphin Society has held two meetings
- The Project Advisory Panel (PAP) (App. 1) involving representatives of 13 relevant government departments, NGOs and universities has met regularly, with some agencies participating in activities and providing considerable additional support in-kind (boats, vehicles, equipment).
- 18 staff of these agencies have received fieldwork training, 7 participating in exchange visits to the UK and Oman (App. 4: 2).
- The independent DI reviews of the project noted a “comprehensive, well-planned and ambitious project” in which ”…progress and achievements …are impressive”.

Along with our successes, there have been a few details that have not run as smoothly as expected. The Cetacean Conservation Pakistan (CCP) Team collected zooplankton samples during each boat survey, representing a significant proportion of survey time, but the person

responsible for analysing these has not been able to produce any results. However, we also collected phytoplankton samples, and these have been analysed and the results have been peer-review published by Dr. Butt (Jinnah University for Women, Karachi) (Annex 5), providing valuable data on productivity. We experienced difficulties with transfer of funds from UMBSM to University of London to Karachi University to CEMB, and at each stage we had been assured that the problem was in hand. This proved not to be the case and Dr. Gore sought the funds to provide them directly when the system failed at each venture, but this resulted in delay of salaries and expenses being paid. UMBSM also underwent changes, partly as a result of those being experienced at the University of London, the result was the UMBSM administrator left and was replaced intermittently with an accountant. Dr. Gore took on the day to day responsibility in the end for the smooth running of the budget and the accounts.

On the whole, we achieved the majority of our goals and surpassed them in many instances, leading to good results and firm partnerships.

4.4 Project standard measures and publications

Details are given in Annexes 4 and 5

4.5 Technical and Scientific achievements and co-operation

The DI Project has contributed to CBD Art. 18 through:

a) Biological research and technical work: we have conducted surveys of cetacean species, populations and habitat by boat, on beach and through fishers in local communities. We have also taken data on oceanographic parameters, as well as other large vertebrates (e.g. turtles, sharks), seabirds and plankton, all three of which represents local indicators of productivity in the habitat (App. 4: 2).

b) Social Research: in visiting over 100 local coastal communities in our surveys, we have gained an understanding of how the individuals and communities perceive their marine cetaceans and the seas (App. 4: 2). The Cetacean Conservation Pakistan (CCP) Team built up trust over time with fishers and community members, resulting in the success of the Fisher Cetacean Reporting Scheme and Fisher Workshops.

The UK staff included Dr. Mauvis Gore (UMBSM, now at Marine Conservation International (MCI)), Dr. Rupert Ormond (UMBSM, now at MCI and SaveourSeas Foundation (SoSF)), Ross Culloch (UMBSM, now at Durham University), Dr. Chris Parsons (UMBSM, now at George Mason University, Washington DC, USA).

The Pakistan staff (App. 4: 2) included the current members of the CCP Team with Babar Hussain and Umer Waqas at WWF-P, Shoaib Kiani and Pervaiz Iqbal at CEMB, University of Karachi. Earlier team members included Shaista Hameed (CEMB, now in Norway) and Attaullah Padrani (WWF-Pakistan, now at IUCN-Pakistan). We also trained Mehrban Ali (Zoological Survey Department (ZSD)), Tahir Ehsan (Pakistan Wetlands Programme, (PWP)), Dr. Ghazala Butt (Jinnah University for Women, Karachi, now Bahauddin Zakariya University, Multan), Qadeer Ali (Marine Reference Collection and Research Centre, Karachi University), and Cdr. Liaquat (Pakistan Navy) in techniques used in surveying and background to marine cetaceans.

We also had two students from Hong Kong Universities (funded by Ocean Park Conservation Fund) who came to Pakistan specifically to train with the DI project in field techniques, practical field work and course work.

Scientific and Technical Cooperation: we have forged close links with the Pakistan Wetlands Programme (PWP), which provided excellent technical support and equipment; with Marine Fisheries Department, which provided fishery data and background on historical cetacean sightings; and with National Institute of Oceanography, which provided access to offshore onboard observers. We have trained staff from these institutes as well as ZSD, Sindh Wildlife Department, WWF-Pakistan, Karachi University and Jinnah University for Women (Karachi), and also gained knowledge from our collaborations that has added to the understanding of our results. The Pakistan Navy provided support and security for survey.

The Methods used included:

- Band transects for boat surveys, with rotation in a team of observers, a recorder and navigator (most boats hired did not have navigation equipment or knowledge beyond the normal route taken by the skippers), on and off effort surveying, use of binoculars and naked eye, and use of closing mode.

- Navigation techniques using chart plotting, as well as Geo-Positioning System, with supplemental training from the Marine Fisheries Department for the CCP team.

- Band transects for beach surveys, varying the team number needed to the local conditions, and a recorder. Cetacean beach casts were identified and recorded. Strandings were attended (App. 4: 2) and data recorded (no live strandings occurred) to a protocol for measurements and information on local conditions that might have led to stranding, potential cause of death, and tissue samples taken for future genetics analysis and toxicology.

- Cetacean stranding protocol was developed, based on peer-reviewed schemes that were agreed with the team, and on-site training took place with equipment purpose-bought.

- Questionnaire development, in collaboration with sociologist in WWF-Pakistan, and used in fisher communities to gain an understanding of fisher knowledge, and the opportunity used to educate the local community on marine cetaceans. Printed material was developed and distributed in English, Sindhi and Urdu, as well as in pictorial form for illiterate folk (App. 4: 4).

- Fisher Cetacean Reporting Scheme for strandings and sightings, where fishers in local communities call the CCP Team members and are reimbursed for their phone call.

- Plankton sampling and preserving techniques, using coarse and medium net for zooplankton and a very fine net for phytoplankton.

- Oceanographic sampling: temperature and salinity using both sophisticated electronic equipment (Hydrolab) and simpler techniques, and wind speed and direction.

- Photo-identification technique for dorsal fins of humpback dolphins in the Indus Creeks, using high quality digital camera and lens, with supplemental training from a PWP wildlife photographer for the CCP Team.

Our findings covered:

- Species diversity and distribution of cetaceans in estuaries, inshore, offshore
- Fisher knowledge
- Individual identification
- Phytoplankton
- Hotspots

We encouraged peer review of work:

- Techniques and methodology assessed by a) Oman Whale and Dolphin Research Group (Muscat, Oman), b) Dr. Chris Parsons, a cetacean expert (now at George Mason University, Washington DC, USA), and c) Ross Culloch, with expertise in field work and cetacean strandings (now at Durham University, Durham, UK).

- Strategy and fieldwork by a) Dr. Rupert Ormond (now at MCI and SoSF), and b) Members of our Project Advisory Panel (see App. 1)

- We have published 5 peer-reviewed papers on the work to date, with at least 3 more papers in preparation for peer-reviewed journals.

4.6 Capacity building

The capacity of UK lead institution staff has built on experience gained during the DI project. Drs. Gore and Ormond formed a partnership Marine Conservation International, focusing on conservation issues in the marine environment. Dr. Parsons gained a lectureship at George Mason University, USA, and Ross Culloch was accepted into a PhD programme.

The capacity of the host country partners has increased and been supported through:

1) Training and management techniques for staff:

- Survey methods: boat, beach, fishers, cetacean strandings, and navigation, as noted in Section 4.5

- Training in the use of identification keys for recognising cetacean species from skeletal material. This was carried out on the beach, in the lab, and on cetacean skeletons at the Navy Museum, Sindh Wildlife Department, Zoological Survey Department, and Zoology Department at Karachi University.

- Training in sampling and preservation of cetacean tissue for future genetic and toxicology work

- Report writing: each Cetacean Conservation Pakistan (CCP) Team member was required to write a report monthly on the work done in the previous month, and to include findings from survey work. This was reviewed periodically and any changes in format agreed with the CCP Team. Work has been done on how to write popular level articles and initial work has been done on how to write scientific articles.

- Presentation skills: CCP Team members had to develop a presentation on their work, using Microsoft PowerPoint as a tool, and make their presentation to the Project Advisory Panel. WWF-Pakistan CCP Team members also gave frequent presentations to visiting groups and to local communities. A CCP Team member from CEMB also gave presentations to university graduate and undergraduate level courses.

- Workshop organisation: the CCP Team members led the practical part of the organisation of two provincial Fisher Workshops, having been an integral part of the initiation and development of the concept. This involved drawing up a list of participants and sending out invitations, organising the programme and inviting key speakers, preparing and giving presentations on their work, facilitating break out discussion groups and co-ordinating the resulting discussion, providing certificates of attendance and printed material on cetacean conservation, and writing up and distributing a report on the workshops.

- Database development and maintenance: each CCP Team member was trained in basic use of spreadsheets for databases using Microsoft Excel, entering the data and the relationship with developing protocols for ease of data transfer, cleaning a database, adding data, and safely archiving and storing copies. Simple analyses on the data were worked with the team.

- Photo-identification techniques: caring for the digital camera and lens, particularly in a marine environment that is both wet and saline, holding and using the camera and optimising settings for taking photo-id in an unstable environment (a small boat), capturing the fleeting image of a cetacean dorsal fin at the surface, downloading and safely archiving images using specific software, and optimising images using specific software. Further, training on taking photographs of stranded cetaceans for species identification and providing further material for analysis of cause of death.

- Dorsal Fin Recognition: identifying points of reference to identify individuals through their dorsal fins and introduction to specific software for semi-automatic recognition of fins.

- Navigation skills and techniques (details in Section 4.5).

2) Organisational development through the introduction of the Marine Mammal Module, covering marine cetaceans and their conservation, biology, anatomy, physiology, and use as a sustainable resource in tourism, has been attended in UK and Pakistan by Pakistanis with a university degree.

3) Enabling further funding, whereby a) our CEMB partner has obtained a British Council Development Partnerships in Higher Education programme (DelPHE) grant, b) our WWF-Pakistan partner obtained an Ocean Park Conservation Fund (OPCF) grant and then Pakistan Wetlands Programme (PWP) funding, and c) our programme provided the support for developing the WWF-Pakistan Marine Programme.

4.7 Sustainability and Legacy

The project achievements most likely to endure are the: a) knowledge gained through training and practical experience, b) Pakistan Whale and Dolphin Society, c) material from the Marine Mammal Module for use in university lectures, d) Fisher Cetacean Reporting Scheme with the

local fishers and the WWF-Pakistan Cetacean Conservation Pakistan (CCP) Team members, having built up a good relationship, e) public education and awareness of Pakistan's marine cetaceans, f) marine cetacean study incorporated in the Pakistan Wetlands Programme (PWP) work, and g) marine programme developed in WWF-Pakistan.

Project staff member Babar Hussain and Umer Waqas are expected to be part of WWF-Pakistan programmes for the immediate future, Shoaib Kiani will finish his PhD in 2009 and is expected to be employed by the PWP for 6 months to support his doctoral work, and Pervaiz Iqbal intends to register for a PhD in 2009. The partner WWF-Pakistan plans to initiate a marine conservation programme which will continue most of the initiatives of this project, while CEMB has incorporated the marine mammal material in a lecture course. The partners are in touch and we have plans to remain in touch through future collaboration.

We feel that we now have a baseline of information and expertise, but that further work is needed to provide a more sustainable programme. The CCP Team have expressed a keen desire to continue as a team for the near future until they have acquired sufficient expertise to play a larger part in organising and carrying out surveys themselves. Funding has been sought to build on our knowledge and progress, to secure the sustainable management of Pakistan's threatened whale and dolphin species (including Humpback Whales, Indo-Pacific Humpback and Indo-Pacific Bottlenose Dolphins), and to promote the sustainable use of related marine resources by local fishing communities depending on them.

5 Lessons learned, dissemination and communication

Communication is very important to allow each party to have ownership in the project. This is not always easy, given different languages, cultures and temperaments, but a common goal and good relationships have been key to our commitment and success in achieving our goals. Disseminating our findings was central to our work and we distributed information on our project achievements to a wide variety of target audiences through an academic course, through presentations, and reports distributed to universities, through the Project Advisory Panel, through the newly formed Pakistan Whale and Dolphin Society (PWDS), through schools, NGOs, specific government departments, specific businesses, reports, and through media including newspaper, television and the web. We expect dissemination will continue through the work of WWF-Pakistan and CEMB, as well as the government departments Marine Fisheries Department, Sindh Wildlife Department, Forestry and Wildlife Department Balochistan, Zoological Survey Department, and the government's National Institute of Oceanography.

However, we need to ensure that a sustainable system is in place to allow continued surveys and scientific research to continue and this requires a further limited period of engagement with the Cetacean Conservation Pakistan (CCP) Team, NGOs, government departments and institutes, and the PWDS. The universities did not have the expertise to work with overseas grants and did not appear to acquire this over time, which made it very difficult for the partners and team to work to budget and to administer the funding at times. This was unexpected and we learnt to be prepared to run all aspects of the grant ourselves, which will stand us in good stead for similar situations in the future.

5.1 Darwin identity

The DI Programme is not difficult to explain and it is readily understood when discussed, as the Project Leader, Dr. Gore, has done throughout the project's lifetime. It was most readily understood by the relevant NGOs, universities and government departments. We used the Darwin logo at every opportunity including on presentations, stickers, leaflets, reports, workshops, conferences, survey expeditions, press releases, and during interviews. We ensured that the Cetacean Conservation Pakistan (CCP) Team understood the importance of the DI support and from whence it came. The DI support was recognised as both distinct, and as part of the larger CCP Project. This was clear the majority of the time, although the media failed to mention DI on occasion, despite stressing the importance of this.

6 Monitoring and evaluation

The system of M&E was introduced after the initiation of our DI project. Nonetheless, we have monitored and evaluated our work throughout as follows:

The work of the project provided the first baseline data on Pakistan's marine cetacean species, populations and habitats, at sea and as beach casts. The data collected was scientific and social, on fisher knowledge, seabird and cetacean numbers and species, plankton samples, oceanographic parameters, and cetacean skeletal material and tissue samples. External evaluation of the work took place through: a) Annual DI reviews that provided feedback on the project that were discussed between the partners and the Cetacean Conservation Pakistan (CCP) Team, and the few recommendations (see Section 6.1) were acted upon, b) reports on the work were presented to PAP members prior to each meeting (average biannually), and feedback and discussion provided advice to the team on contacts to aid in aspects of our DI project, and c) peer reviewed papers provided evidence of the value of our work.

Internal evaluation was carried out by Dr. Rupert Ormond (now at Marine Conservation International and SaveourSeas Foundation), who gave considerable and valuable advice on strategy and negotiations, particularly in handling problems that arose with the administration at UMBSM and University of London in their inexperience in handling overseas grants. See also Section 4.5.

6.1 Actions taken in response to annual report reviews

Our reviews have been very supportive of, and given high regard for, the work that we have done and the output that we have achieved. The reviews were discussed among our partners and issues taken to the PAP for further discussion. The only issue raised concerned contacting neighbouring projects. This was in our plan and was achieved after a delay by the nearest (and only) comparable project (OWDRG, see Section 3 for detail) in visiting and accepting visits, due to a re-structuring within their group.

7 Finance and administration

7.1 Project expenditure

	2005/2006	2006/2007	2007/2008	2008/2009	TOTAL
Rents, rates, heating , cleaning, overheads					
• Darwin funding					
• Other funding					
Office costs e.g. postage, telephone, stationary					
• Darwin funding					
• Other funding					
Travel and subsistence					
• Darwin funding					
• Other					
Printing					
• Darwin funding					
• Other					
Conferences, seminars etc.					
• Darwin funding					
• Other funding					
Capital items/equipment (please break down)					
• Darwin funding Photo-id equipment for cetacean identification for species & individuals					
• Other funding					

					200
Other costs (including Audit costs to a maximum of £500)					
• Darwin funding OWDRG training costs Audit costs Vessel hire, 48 days/yr Vehicle hire & diesel, 84 days/yr WWF-P vehicle maintenance & diesel Consumables & minor equipment					
• Other funding Vehicle use, 50 days/yr (WWF-P) Field costs (OPCF) Transport costs (OPCF) Consumables & minor equipment (OPCF)					
Salaries (from previous table)					
• Darwin funding					
• Other funding					
TOTAL PROJECT COSTS					
TOTAL COSTS FUNDED FROM OTHER SOURCES					
TOTAL DARWIN COSTS ***(See notes below on minor changes made)***					

SALARY BREAKDOWN	**2005/2006**		**2006/2007**		**2007/2008**		**2008/2009**	
Project team member	**Darwin**	**Other**	**Darwin**	**Other**	**Darwin**	**Other**	**Darwin**	**Other**
Dr Mauvis Gore								
WWF-P Project Officer 1 Mr. Babar Hussain								
WWF-P Project Officer 2								
KU Research Officer 1								
KU Research Officer 2								
Tim Collins								
Dr Chris Parsons								
Gill Braulik								
Dr Ejaz Ahmad*								
Dr Pirzada JA Siddiqui*								
Dr Gianna Minton*								
Dr Rupert Ormond*								
Qadeer M Ali*								
Moazzam Khan*								
TOTAL COST OF SALARIES								

Notes on Budget

[a] DI agreed to carryover of one month salary for Dr. Gore not paid by UMBSM, and one salary for OWDRG as they could not visit in this first half year.

[b] DI agreed to carryover of one month salary for Dr. Parsons as CEMB was not yet ready for his visit

[c] DI agreed to carryover next one month salary for Dr. Parsons as CEMB was not yet ready for his visit

*salaried by own institutes

7.2 Additional funds or in-kind contributions secured

1. Higher Education Council-British Council sponsored 4 conferences
2. Two Ocean Park Conservation Fund grants for small equipment and some field costs
3. Rufford Small Grants for small field camera, and airfare, accommodation and subsistence for Ross Culloch
4. Pakistan Wetlands Programme provided boats, vehicles, oceanographic sampling equipment, staff, technical expertise, and accommodation
5. WWF-Pakistan provided accommodation and use of a small boat in Keti Bundar
6. Getz-Pharma: support for a Pakistan Whale and Dolphin Society manager
7. HSBC: dolphin watching funds for two initial trial runs

7.3 Value of DI funding

The DI funding has enabled the host country, Pakistan, and the UK partners to gain funding for:

- Staff for the initial and day to day running of the Pakistan Whale and Dolphin Society
- Preliminary dolphin watching enterprises
- Expertise, information and advice for the Marine Mammal Module
- Knowledge of technique for systematic surveys by boat and along beaches for cetaceans
- Information and impetus to raise awareness of Pakistan's marine cetaceans and their conservation
- Further funding (see Section 4.6 and 7.2)

Annex 1 Report of progress and achievements against final project logframe for the life of the project

Project summary	Measurable Indicators	Progress and Achievements April 2007 - March 2008	Actions required/planned for next period
Goal: To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve • The conservation of biological diversity, • The sustainable use of its components, and • The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources		To serve CBD Annex II Target 2.1, the DI project has provided the first baseline data on the species, estimated population numbers, and habitats used that will serve as a benchmark for a monitoring programme for future trends in population numbers and point to protective measures needed. The status of marine cetaceans in Pakistan has been brought to the attention of the government, NGOs, universities, and the general public, helping to improve their status (Target 2.2). We have initiated dolphin watching businesses for fishers, addressing Target 4.1 & 4.2. Fishers have been disadvantaged by the permits to fish given to large, international commercial enterprises; they also use porpoises and dolphin at times for fish bait. The new cetacean watching enterprise will provide an alternative livelihood for the fishers with related business for the community (travel, food, accommodation, souvenirs, guides), which will then aid in alleviating poverty in the local fisher communities.	Funding has been sought to build on our knowledge and progress, to secure the sustainable management of Pakistan's threatened whale and dolphin species (including Humpback Whales, Indo-Pacific Humpback and Indo-Pacific Bottlenose Dolphins), and to promote the sustainable use of related marine resources by local fishing communities depending on them. It will achieve this by a) undertaking surveys to monitor cetacean numbers and their causes of mortality, b) working with local fishing communities to further increase their marine conservation awareness and promote fisher-operated whale-and-dolphin watching enterprises, c) working with partners and government departments to develop policies and implement measures to secure the protection of threatened marine cetaceans, and d) sustaining wider environmental awareness activities to generate public support for the protection of cetaceans, and their marine environment.

Purpose Conservation & management of whale & dolphin biodiversity in the NE Indian Ocean (Pakistan), and of the pelagic resources on which they depend, through research, protective measures, capacity building, and Darwin-badged public awareness and participation programmes.	At least one cetacean hotspot to be established as a Marine Protected Area (MPA). Steps taken to reduce threats to cetaceans. Conservation and research projects established in KU and WWF-P. National cetacean group established. Fishers and others participate in sustainable use initiatives.	The government has agreed that Astola Island be the first MPA for Pakistan, an area with populations of whales and dolphins. This and the positive work with the fishers and their attitude towards non-sustainable use and by-catch of cetaceans are major steps towards reducing threats to cetaceans. This progress is underpinned by the formation of a national cetacean conservation group.	
Output 1. Regular monitoring of cetaceans & pelagic environment established with two partner institutions.	Three annual reports (not the DI annual reports) and three scientific articles published and distributed. Database running.	Two annual reports have been produced and distributed with a third in preparation. Five scientific articles have been published and distributed, with at least three more in preparation. The databases on a) cetacean, zooplankton, seabird, and environmental parameters from boat and beach surveys and b) fisher and other reports from community surveys and the Fisher Cetacean Reporting Scheme are running.	
Activity 1.1 Boat surveys		>83% of the 1050km Pakistan coastline has been surveyed by boat, political unrest and permits for foreigners not always available for Balochistan hampered surveys. However, further resources gained allowed us to survey a larger area than originally expected. Data collected included measures of productivity (plankton samples, sightings of other large marine vertebrates, oceanographic data) and cetacean species, populations and locations.	
Activity 1.2 Beach surveys		See Activity 1.1, noting that the coastline of SW Sindh is largely mangrove forests and creeks. Much of these were covered in detail near to Keti Bundar, giving us the data needed. Data collected included cetacean species, numbers, locations, tissue samples, and skeletal material.	
Activity 1.3 Training		13 staff have received training in fieldwork techniques and practical experience (survey methods by boat, on beaches, in communities), including academic staff, research and project officers, as well as staff of the Zoological Survey Department, Sindh Wildlife Department, Pakistan Wetlands Programme and National Institute of Oceanography.	
Activity 1.4 Lab work		Zooplankton samples were taken regularly but no results were forthcoming. However, Dr. Butt (Jinnah University for Women, Karachi) analysed phytoplankton samples taken and published and distributed the	

		results.
Activity 1.5 Stakeholder liaison		89% of all fisher villages were visited and so covering more than expected. Fishers were also met on board boats; liaison with Pakistan Game Fish Association and Agha Sport Fishing Club was established six government departments, four NGOs, and four universities, as well as the new Pakistan Whale and Dolphin Society, several schools, and visitors to WWF-Pakistan centres.
Activity 1.6 Reporting		As noted in Output 1 draft Cetacean Biodiversity Action Plan prepared, and recommendations for the MPA in collaboration with WWF-Pakistan and Pakistan Wetlands Programme. Popular level articles were published in Urdu language magazines.
Activity 1.7 Community surveys		Interviews with 370 fishers in 82 (out of 92) villages were conducted.
Output 2. Understanding of threats to cetacean populations.	Specific reports and scientific article published.	Two scientific articles (peer-review published and distributed) have specific reports on stranded cetaceans, while work with the local communities and the Navy has increased our understanding of the attitude to cetaceans and the threats posed to them.
Activities 1.1, 1.2, 1.4, 1.6 & 1.7		The results have been key to our understanding.
Activity 2.1 Workshop		Two Fisher Workshops in Sindh (Karachi) and Balochistan (Gwadar) were successfully held as planned with 57 key fisher community leaders invited and participated.
Output 3. Recommendations for establishment of MPAs and other protective actions.	Specific report published and distributed.	As mentioned above in “Purpose” above and reported in collaboration with WWF-Pakistan and Pakistan Wetlands Programme.
Activities 1.5, 1.6		The results have been important to the successful outcome.
Activity 3.1 Government liaison		We liaised with the relevant departments and institutes: Zoological Survey Department (responsible for CBD), Marine Fisheries Department, Sindh Wildlife Department, Forestry and Wildlife Department Balochistan, National Institute of Oceanography, Pakistan Wetlands Programme, and Ministry of the Environment.
Output 4. Training of Pakistani academics and project officers.	At least 4 Pakistani personnel attend UMBSM courses.	We were able to train seven Pakistani personnel at relevant courses held at UMBSM in the UK, including academic staff, project and research officers, and a member of the Pakistan Navy.
Activity 4.1 Training		In addition to Act. 1.3, the six Cetacean Conservation Pakistan (CCP) Team members and seven further participants were educated in training.

		and management techniques on: a) cetacean strandings and tissue sampling, b) navigation, c) photo-identification of dolphin dorsal fins, d) curating skeletal material, e) presentation skills, f) reporting, g) database management, and h) workshop organisation. In addition, two CCP members went on exchange visit to the Oman Whale and Dolphin Research Group (OWDRG) to build contacts and exchange information, one OWDRG member visited the CCP in Pakistan. Further details are given in Section 4.6 Capacity Building above.
Activity 4.2 Teaching		Seven Pakistani personnel (four CCP Team members, three academic staff) attended the Marine Mammal Course and one Navy Cdr. attended the Coastal Zone Management Course at UMBSM.
Output 5. Cetacean biology teaching established Karachi University.	Annual module attended by total of 100+ students.	Partner Prof. Siddiqui led the Marine Mammal Module (MMM), brought to Karachi University (KU) by the project. The material was incorporated in lectures in the Zoology Department at KU, and the universities Lasbela, Shah Abdul Latif (Balochistan), Jinnah University for Women (Karachi), Bahauddin Zakariya (Multan) and Kinnaird College (Lahore).
Activity 5.1 Boat surveys		20 students from the MMM (undergraduates, post graduates, NGO and government staff) at Karachi University and two from Hong Kong universities participated.
Activity 5.2 Beach surveys		20 students from the MMM (undergraduates, post graduates, NGO and government staff) at Karachi University and two from Hong Kong universities participated
Activity 5.3 Publicity		Publicised by invitation by Prof. Siddiqui.
Activity 4.1 Teaching		50 students were invited to attend the course, taught by UK staff: Dr. Parsons, Dr. Gore and Ross Culloch, and Pakistani CCP Research Officer Shoaib Kiani.
Output 6. National cetacean conservation group established.	Membership of at least 300. Regular newsletter.	The Pakistan Whale and Dolphin Society was established in 2007 and is seeking legal status to invite a wider membership.
Activity 6.1 Publicity		A launch with a beautifully designed poster attracted wide interest in the new society, as anticipated, accompanied by news articles.
Activity 6.2 Networking		WWF-Pakistan, CCP and the Project Advisory Panel members have made contacts to draw attention to the new Pakistan Whale and Dolphin Society.

Output 7. Awareness by stakeholders (e.g. fishers) of potential for sustainable use.	Fisher Cetacean Reporting Scheme and whale-watching business launched.	Fisher Cetacean Reporting Scheme has fisher volunteers that contact the CCP Project Officers on cetacean strandings and sightings. 2 dolphin-watching businesses were trialled, with further trial expected to provide information on best practice.
Activity 7.1 Stakeholder liaison		Project Officers visit the fish communities regularly and have built up a rapport and relationship with fishers and community members.

Annex 2 Project's final logframe, including criteria and indicators

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Goal: **To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve** • **the conservation of biological diversity,** • **the sustainable use of its components, and** • **the fair and equitable sharing of benefits arising out of the utilisation of genetic resources**			
Purpose Conservation & management of whale & dolphin biodiversity in the NE Indian Ocean (Pakistan), and of the pelagic resources on which they depend, through research, protective measures, capacity building and Darwin-badged public awareness and participation programmes.	At least 1 cetacean hotspot to be established as a Marine Protected Area (MPA). Steps taken to reduce threats to cetaceans. Conservation & research projects established in KU and WWF-P. National cetacean group established. Fishers and others participate in sustainable use initiatives.	Proposals for MPAs and other protective actions published. Correspondence with ministries concerning implementation. Researchers and project officers in post, and publishing papers and reports. Cetacean group with membership of at least 100. Fishers set up 1+ whale-watching business, and attend workshops.	Cetacean populations are not affected by impacts beyond the control of the conservation programme, such as by-catch mortality outside Pakistani waters. The effects of economic factors do not exceed the benefits of increased public and official support for cetacean conservation.
Outputs Regular monitoring of cetaceans & pelagic environment established with two partner institutions.	3 annual reports & 3 scientific articles published & distributed. Database running.	Reports, articles and database copied to Darwin Initiative.	Security situation on coast continues to be acceptable. Weather conditions not atypical.
Understanding of threats to cetacean populations.	Specific reports and scientific article published.	Reports and article copied to Darwin Initiative	Reasonable progress with survey work.
Recommendations for establishment of MPAs and other protective actions.	Specific report published and distributed.	Report available. Correspondence with relevant Pakistani agencies.	Reasonable progress with survey work.
Training of Pakistani academics and project officers.	At least 4 Pakistani personnel attend UMBSM courses.	Course registration documentation.	None
Cetacean biology	Annual module	KU academic	Expected interest among

teaching established Karachi University.	attended by total of 100+ students.	records.	students.
National cetacean conservation group established.	Membership of at least 300. Regular newsletter.	Group records and newsletters copied to Darwin Initiative.	None
Awareness by stakeholders (e.g. fishers) of potential for sustainable use.	Fisher Cetacean Reporting Scheme and whale-watching business launched.	Publicity material. Reports of data. Workshop proceedings.	Expected interest among fishers.

Activities	**Activity Milestones (Summary of Project Implementation Timetable)**
Boat-based surveys	Yr 1 Nov: preliminary surveys of inshore areas of Sindh. Yr 2 Nov: survey of inshore areas of Balochistan. Yr 3 Nov: surveys of offshore marine areas. Yr 1-3 Apr-Oct: observers on deep sea vessels offshore
Beach surveys	Yr 1 Nov, Yr 1-3 Jan: beach surveys (for cetacean remains) of Sindh and Balochistan.
Training	Yrs 2 & 3 July: Pakistani counterparts attend UMBSM course in UK. Yr 1-3: Training in field of these & other Pakistani staff.
Teaching	Yr 2: UMBSM course taught at KU by UK staff. Yr 3: by KU & UK staff.
Publicity	Yrs 1-3: Quarterly Darwin-badged press / TV / radio promotion. Annual publicity leaflet distributed to all WWF-Pakistan target groups. Yr 1: Web site established. Yr 2 onwards: Semi annual newsletters published. Yr 2: publish cetacean educational package.
Government liaison	Yr 1: liaise with government ministries & agencies, form Project Advisory Panel. Yrs 2 & 3: semi-annual meetings of panel.
Workshop	Yr 2 Feb: for fishers, government departments & scientists to promote understanding of pelagic biodiversity; Yr 3 Nov: for development and running of commercial whale-watching
Stakeholder liaison	Yr 1: meet with fishers' groups during beach surveys. Yr 2: identify interested fishers & promote reporting scheme, launch of national cetacean conservation group. Yr 3: select fisher group to establish whale-watching activities.
Laboratory Work	Yrs 1-3: process plankton samples and habitat data, collate fisheries data, obtain satellite imagery; analyse data.
Reporting	Yrs 1-3 Mar: prepare annual reports on activities. Yr 3 & 4 Sep: prepare first two scientific publications. Yr 3 June: first report on management options. Yr 3 Feb: recommendations for MPAs and other conservation actions; draft cetacean biodiversity action plan.
Networking	Yr 1: establish exchange of personnel and photo-identification material with OWDRG (Oman), and other N. Indian Ocean specialists.

Annex 3 Project contribution to Articles under the CBD

Project Contribution to Articles under the Convention on Biological Diversity

Article No./Title	Project %	Article Description
6. General Measures for Conservation & Sustainable Use	10	Develop national strategies that integrate conservation and sustainable use.
7. Identification and Monitoring	20	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities that have adverse effects; maintain and organise relevant data.
8. In-situ Conservation	20	Establish systems of protected areas with guidelines for selection and management; regulate biological resources, promote protection of habitats; manage areas adjacent to protected areas; restore degraded ecosystems and recovery of threatened species; control risks associated with organisms modified by biotechnology; control spread of alien species; ensure compatibility between sustainable use of resources and their conservation; protect traditional lifestyles and knowledge on biological resources.
9. Ex-situ Conservation		Adopt ex-situ measures to conserve and research components of biological diversity, preferably in country of origin; facilitate recovery of threatened species; regulate and manage collection of biological resources.
10. Sustainable Use of Components of Biological Diversity	10	Integrate conservation and sustainable use in national decisions; protect sustainable customary uses; support local populations to implement remedial actions; encourage co-operation between governments and the private sector.
11. Incentive Measures		Establish economically and socially sound incentives to conserve and promote sustainable use of biological diversity.
12. Research and Training	20	Establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components; promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries (in accordance with SBSTTA recommendations).
13. Public Education and Awareness	10	Promote understanding of the importance of measures to conserve biological diversity and propagate these measures through the media; cooperate with other states and organisations in developing awareness programmes.
14. Impact Assessment and Minimizing Adverse		Introduce EIAs of appropriate projects and allow public participation; take into account environmental consequences of policies; exchange information on impacts beyond State

Article No./Title	Project %	Article Description
Impacts		boundaries and work to reduce hazards; promote emergency responses to hazards; examine mechanisms for re-dress of international damage.
15. Access to Genetic Resources		Whilst governments control access to their genetic resources they should also facilitate access of environmentally sound uses on mutually agreed terms; scientific research based on a country's genetic resources should ensure sharing in a fair and equitable way of results and benefits.
16. Access to and Transfer of Technology		Countries shall ensure access to technologies relevant to conservation and sustainable use of biodiversity under fair and most favourable terms to the source countries (subject to patents and intellectual property rights) and ensure the private sector facilitates such assess and joint development of technologies.
17. Exchange of Information		Countries shall facilitate information exchange and repatriation including technical scientific and socio-economic research, information on training and surveying programmes and local knowledge
18. Technical and scientific co-operation	10	(*NB this was included in original Guidance Notes 2004 and one of the Articles to which we worked*)
19. Bio-safety Protocol		Countries shall take legislative, administrative or policy measures to provide for the effective participation in biotechnological research activities and to ensure all practicable measures to promote and advance priority access on a fair and equitable basis, especially where they provide the genetic resources for such research.
Other Contribution		Smaller contributions (e.g. of 5%) or less should be summed and included here.
Total %	100%	Check % = total 100

Annex 4 Standard Measures

Code	Description	Totals (plus additional detail as required)
Training Measures		
1a	Number of people to submit PhD thesis	1, a bonus as not included in measures
4a	Number of undergraduate students receiving training	100+
4b	Number of training weeks provided to undergraduate students	2 weeks/year
4c	Number of postgraduate students receiving training (not 1-3 above)	5 (B Hussain, S Kiani, S Hameed, P Iqbal, U Waqas, A Padrani)
4d	Number of training weeks for postgraduate students	30 weeks/year
6a	Number of people receiving other forms of short-term education/training (i.e. not categories 1-5 above)	4 (Mehrban Ali, Tahir Ehsan, 2 NIO staff)
6b	Number of training weeks not leading to formal qualification	30 weeks/year
7	Number of types of training materials produced for use by host country(s)	Package to teach Marine Mammal Module
Research Measures		
8	Number of weeks spent by UK project staff on project work in host country(s)	M Gore: 27, R Ormond: 20, R Culloch: 16, C Parsons: 1.5 = 64.5
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)	1 Action Plan for the Conservation of Marine Cetaceans of Pakistan
10	Number of formal documents produced to assist work related to species identification, classification and recording.	2: Cetacean Identification Sheet & Cetacean Identification Booklet
11a	Number of papers published or accepted for publication in peer reviewed journals	5 (listed in Annex 5)
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	2: productivity measures & cetacean data
13a	Number of species reference collections established and handed over to host country(s)	2: zooplankton & cetacean skeletons
Dissemination Measures		

Code	Description	Totals (plus additional detail as required)
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	2 Fisher Workshops
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	6: including conferences on Coastal Zone Management, Marine Mammal Module, and HEC-BC conferences on joint programme with DI
15a	Number of national press releases or publicity articles in host country(s)	48 (see App. 3)
15b	Number of local press releases or publicity articles in host country(s)	3 (see App. 3)
16a	Number of issues of newsletters produced in the host country(s)	12: Indus Forever, Wetnotes, and Panda Post
16b	Estimated circulation of each newsletter in the host country(s)	Unclear as no counter included
17a	Number of dissemination networks established	2: Fisher Cetacean Reporting Scheme, Pakistan Whale & Dolphin Society
18a	Number of national TV programmes/features in host country(s)	7 (see App. 3)
19a	Number of national radio interviews/features in host country(s)	2 for BBC Urdu Service
Physical Measures		
20	Estimated value (£s) of physical assets handed over to host country(s)	Ca. £7200 scientific equipment (see list attached)
21	Number of permanent educational/training/research facilities or organisation established	Marine Mammal Module
23	Value of additional resources raised for project	£47,367 grants, facilities, and salaries, in kind

Annex 5 Publications

Type (e.g. journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (e.g. contact address, website)	Cost £
Peer reviewed scientific publication	Sperm whale, *Physeter macrocephalus*, stranding on the Pakistani coast. Gore, M.A., Ahmad, E., Ali, Q.M., Culloch, R.M., Hameed, S., Hasnain, S.A., Hussain, B., Kiani, S. Shaik, N., Siddiqui, P.J. & Ormond, R.F.	JMBA 87: 363-364 (2007)		Free
Peer reviewed scientific publication	New records of neonatal whale shark (*Rhincodon typus*) from the Northern Indian Ocean. Rowat, D., Gore, M.A., Baloch, B.B., Islam, Z., Ahmad, E., Ali, Q.M., Culloch, R., Hameed, S., Hasnain, S.A., Hussain, B., Kiani, S., Siddiqui, J. & Ormond, R.F.	Env. Biol. Fishes 82:215-219 (2008)		Free
Peer reviewed scientific publication	Cuvier's beaked whale, *Ziphius cavirostris*, remains recovered on the Pakistani coast. Gore, M.A., Ahmad, E., Ali, Q.M., Culloch, R.M. Hasnain, S.A., Hussain, B., Iqbal, P., Kiani, S., Macleod, C.D., Parsons, E.C.M, Siddiqui, P.J., Ormond, R.F., and Waqas, U.	JMBA 87: 363-364 (2007)		Free
Peer reviewed scientific publication	Phytoplankton communities of Pakistan: I Dinophyta and Bacillariophyta from the coast of Sindh. Butt, G, Ormond, R, Hannah, F	Int. J. Phycol. Phytochem. 2:105-116 (2006)		Free
Peer reviewed scientific publication	Phytoplankton communities of Pakistan: I Dinophyta and Bacillariophyta from the coast of Balochistan. Butt, G, Ormond, R, Hannah, F	Int. J. Phycol. Phytochem. 3:101-106 (2007)		Free
Biodiversity Action Plan	Draft Action Plan for the Conservation of Marine Cetaceans of Pakistan.	2008		Free

	Prepared by Gore, M.A.		CD	
booklet	A Field Guide to Cetaceans in Pakistani Waters. Gore. M.A. and Culloch, R	2007	Printed for limited use in training	

Annex 6 Darwin Contacts

Ref No	14-005
Project Title	Conservation of Pakistan's Marine Cetacean Biodiversity and Pelagic Environment
UK Leader Details	
Name	Dr. Mauvis Gore
Role within Darwin Project	Project Leader
Address	Marine Conservation International, 37 Main St, Newton, West Lothian EH52 6QE
Phone	
Email	
Other UK Contact (if relevant)	
Name	Dr. Rupert Ormond
Role within Darwin Project	Team Member
Address	Marine Conservation International, 37 Main St, Newton, West Lothian EH52 6QE
Phone	
Email	
Partner 1	
Name	Prof. Pirzada Jamal Siddiqui
Organisation	University of Karachi
Role within Darwin Project	Partner
Address	Centre for Excellence in Marine Biology, University of Karachi, Karachi, Pakistan
Email	
Partner 2 (if relevant)	
Name	Dr. Ejaz Ahmad
Organisation	WWF-Pakistan
Role within Darwin Project	Partner
Address	Deputy Director General, WWF - Pakistan 60 Bazar Road, Sector G-6/4, Islamabad, PAKISTAN
Fax	
Email	

Appendix 1: List of Project Advisory Panel

- Dr. Ejaz Ahmad, Deputy Director General WWF-Pakistan, Islamabad
- Dr. Ghulam Akbar, Director *Indus for All* Programme, WWF-Pakistan Karachi
- Cdr. Liaquat Ali, HQ Coastal Command, Pakistan Navy
- Mr. Qadeer M. Ali, Marine Reference Collection & Resource Centre, Karachi University
- Dr. Fehmida Firdous, Sindh Wildlife Department
- Mr. Richard Garstang, National Programme Manager, Pakistan Wetlands Programme
- Dr. Mauvis Gore, Project Principle Investigator, UMBSM
- Abrar ul Hasan, Marine Zoology Office Incharge, Zoological Survey Department
- Syed Ali Hasnain, Project Manager WWF-Pakistan Karachi
- Mr Hizbullah Jamali, Balochistan Forestry & Wildlife Dept.
- Mr. Moazzam Khan, Marine Fisheries Department, Govt. of Pakistan
- Dr. Samina Kidwai, Principal Scientific Officer, National Institute of Oceanography
- Dr. Rupert Ormond, Marine Conservation International & SaveourSeas Foundation
- Mr. Mohammed Tahir Qureshi, IUCN-Pakistan.
- Dr. Solaha Rahman, Zoology Department, Karachi University
- Prof. Pirzada J.A. Siddiqui, Asst. Professor CEMB, University of Karachi

Appendix 2: List of Darwin Initiative Equipment
Currently at CEMB, Karachi University

- 1 complete Motor Engine for Land Rover plus salary for a driver
- 1 Desktop Computer
- 1 Hard Drive
- 1 Acer computer: personal property of M Gore on temporary loan to S Kiani
- 1 Canon EOS Digital Rebel Camera body
- 1 Canon 18-55mm 1:3.5-5.6 lens
- 1 Canon EF 70-200mm 1:2.8 L Zoom lens with Image Stabiliser, USM, AF, MF with case
- 1 Canon 1.4x extender for 300mm conversion
- 2 Canon batteries and charger
- 2 Compact Flash Memory Cards
- Canon manuals both paper & CD, all cabling
- 2 pairs of Marine Fixed Focus Binoculars & cleaning cloths *(Belong to WWF-P)*
- 1 Garmin Etrex GPS *(Belong to WWF-P)*
- 2 Stopwatches
- 4 Zooplankton Nets: 2 medium, 2 coarse, plus spare filter ends *(Belong to WWF-P)*

As well as:

- 3 Thermometers
- Secchi disc and 102 m rope
- 27 meter rope
- 5 liters Ethanol
- 6 Lifejackets
- Books
- Copies of scientific articles
- 12 Hard box folders
- Tools
- 2 Tin containers & 3 plastic crates & 6 mesh sacks

- Several hundred double sealed plastic sample bottles
- Parallel rulers for navigation
- First aid kit & manual
- Stranding Notes, Transect & Observation notes, Tissue Sampling Procedure
- Tarpaulin and foam mattress for beach strandings
- Plastic box containers
- Clipboards, pencils, pens, photocopied protocols, sharpeners, erasers, marker pens, protective plastic bags, over 300 AA batteries, notebooks
- 4 sets of laminated Bird Guides
- 5 torches & 1 waterproof torch
- Compass
- Tape measures
- 2 metal rulers
- Disposable and rubber gloves, sponges, elastic bands, knife, scrubbing brushes, duct and scotch tapes, 3 towels

Currently at WWF-Pakistan

- None, CEMB has the items at present

Note: UMBSM has retained the right to request the return of the equipment

Appendix 3: List of Press coverage & Publicity

Media	Company	Date	Some details
newsletter	Panda Post	01/11/2005	CCP Launching news
newspaper	Dawn	23/11/2005	
newspaper	The News International	23/11/2005	News about launching ceremony of CCP
newspaper	The Star	16/12/2005	
newspaper	Dawn	01/01/2006	News about launching ceremony of CCP
newspaper	The Star	03/01/2006	
newspaper	Dawn	04/01/2006	
newspaper	Dawn	17/01/2006	
newspaper	The Star	17/01/2006	News about stranding whale on KHI beach
newspaper	The Star	19/01/2006	
newspaper	Dawn	30/01/2006	
newspaper	Dawn	04/02/2006	
newspaper	DAWN	08/02/2006	News about stranding whale on KHI beach
TV	Geo TV	01/06/2006	On DI project
TV	AAJ	01/08/2006	due summer 2006
newspaper	Daily Times	14/12/2006	
newspaper	Dawn	14/12/2006	
newspaper	Jang	14/12/2006	
newspaper	The Nation	14/12/2006	
newspaper	The News International	14/12/2006	
newspaper	The News	15/12/2006	
TV	GeoTV (Safiq)	16/12/2006	
newspaper	Dawn	16/12/2006	
newspaper	The Nation Daily	18/12/2006	
Magazine	Farozaan	19/12/2006	
report	DI Project	Jan 2007	
newspaper	DAWN	17/01/2006	News about dead whale
newspaper	The STAR	19/01/2007	News to preserve skeleton
newspaper	DAWN	30/01/2007	News about whale skeleton to be put on display
newspaper	The Nation Daily	01/02/2007	
newspaper	The STAR	01/03/2006	Launching of whale survey
radio	BBC Urdu Service	Jan 2007	EA on cetacean biodiversity
radiio	BBC Urdu Service	Jan 2007	MG on DI project
TV	AAJ	27/08/2007	2 transmissions Documentary on cetaceans (B H & U W)
TV	AAJ	28/08/2007	4 transmissions Documentary on cetaceans (B H & U W)
newsletter	Panda Post	01/09/2007	Fisher Workshop

newsletter	Indus Forever	Jul-Sep 2007	Fisher Workshop
newsletter	Indus Forever	Oct-Dec 2007	CCP-OWDRG visit
newsletter	Panda Post	Nov-Dec 2007	PWDS
newsletter	Panda Post	Jul-Aug 2007	Fisher Workshops
report	DI Project	Dec 2007	
newspaper	Indus Forever	01/01/2008	CCP-OWDRG visit
newspaper	Dawn Lahore	05/01/2008	survey results
newspaper	Dawn	05/01/2008	survey results
newspaper	Daily Dawn	08/01/2008	PWDS
newspaper	Daily News	08/01/2008	PWDS
newspaper	The Nation	08/01/2008	PWDS
newspaper	The Nation	04/04/2008	survey results
newspaper	Daily Times	03/04/2008	Sindh strandings
newspaper	Daily Times	06/04/2008	Sindh strandings
newspaper	The News	03/04/2008	Sindh strandings
newspaper	The News	04/04/2008	Sindh strandings
TV	GeoTV	Apr 08	BH interview on strandings
TV	Dawn TV	Apr 08	MG on project
magazine	Wildlife & Environment	01/01/2008	CCP
newsletter	Panda Post	01/01/2008	PWDS, results & poster
newspaper	Dawn Lahore	01/01/2008	PWDS
newsletter	Panda Post	01/09/2007	Fisher Workshop
newsletter	Indus Forever	01/10/2007	Fisher Workshop

Appendix 4: List of Supplementary Material on accompanying CD

1. Draft Action Plan for the Conservation of Marine Cetaceans of Pakistan
2. DI Photos showing some of the work of the DI Project and the CCP Team in action
3. Scientific Publications
4. Reports, Leaflets, Poster
5. First Training Packet for CCP 14XI05