

**Submission Deadline: 30 April 2013**

## 1. Darwin Project Information

Project Reference	18-001
Project Title	Darwin Sustainable Artisanal Fisheries Initiative (Peru)
Host Country/ies	Peru
UK contract holder institution	University of Exeter
Host country partner institutions	Pro Delphinus (PD)
Other partner institutions	Instituto del Mar del Peru Federación de Integración y Unificación de Pescadores Artesanales del peru (FIUPAP) Ministerio del Ambiente (MINAM)
Darwin Grant Value	£299,966
Start/end dates of project	October 2010 / September 2013
Reporting period (eg Apr 2010 – Mar 2011) and number (eg Annual Report 1, 2, 3)	
Project Leader name	Prof. Brendan Godley
Project website	Pro Delphinus <a href="#">Facebook</a> page & <a href="http://www.prodelphinus.org">www.prodelphinus.org</a>
Report authors, main contributors and date	Joanna Alfaro Shigueto, Jeffrey C. Mangel, Brendan J. Godley, Annette C. Broderick, 30 April 2012

## 2. Project Background

**The problem:** Peru has significant natural resources with potential for poverty alleviation (sustainable fishing and ecotourism). Although substantial efforts have focussed on terrestrial conservation, the country's marine biodiversity is largely neglected, despite massive industrial and artisanal fishing.

Key biodiversity includes:

- 1. Major fishing resources:** currently exploited through industrial purse-seiners and artisanal fleets. There is marked under-capacity for spatial management and assessment/mitigation of bycatch which preliminary assessments suggest is globally significant.
- 2. Globally important, yet understudied, marine mammal populations:** Multiple species subject to intense bycatch and harpooning for bait by gillnet and longline fisheries.
- 3. Globally important, yet understudied, seabird populations:** Sole foraging ground for endemic, critically endangered waved albatross. Globally important foraging ground for other endangered species.
- 4. Globally important marine turtle populations:** Foraging area and/or migratory route for five species of sea turtles all subject to direct hunting and incidental capture.
- 5. Globally important, yet understudied, shark populations:** Multiple shark species taken by artisanal fisheries in large numbers as both target and incidental catch.



Figure 1. Peru (filled polygon and the South American continent).

**Priority:** There are clear needs for: a national **Sustainable Artisanal Fisheries Initiative (Darwin-SAFI)** integrating all available information on the spatial distribution of biodiversity and threats; increased local capacity to carry out research to further inform the development/ implementation of the Darwin-SAFI; increased awareness among key stakeholders and the general public as to the importance of Peruvian marine biodiversity.

The project will work from the bottom up (fishermen and communities) and top down (government agencies, NGOs) to inform key decision-makers of project findings. Key agency decision-makers IMARPE and MINAM will be able to use project results to fulfill international obligations and identify and implement future research and management priorities; fishermen can use results immediately to reduce bycatch and promote fishery sustainability.

### 3. Project Partnerships

**Project Partnerships:** At the end of the third year, partnerships are demonstrably strong and continue to expand, with significant progress having been made across all main project areas. As planned, the lead in-country partner for the Darwin Sustainable Artisanal Fisheries Initiative (Peru), or Darwin-SAFI, is the marine research NGO Pro Delphinus (PD; Principle contact is Joanna Alfaro-Shigueto who is the Darwin Research Fellow as well as president and Chief Scientist of Pro Delphinus). PD facilitates contacts with government agencies and other partners and leads coordination and implementation of all project activities in Peru, including research, training and outreach. Further partner organisations in the Darwin-SAFI include: (1) Federación de Integración y Unificación de Pescadores Artesanales del Peru (FIUPAP) which assists in coordination and logistics of fishermen workshops and training at ports and landing sites along the coast and assists with coordination of site visits; (2) Instituto del Mar del Peru (IMARPE); and (3) Ministerio del Ambiente (MINAM), the CBD focal point in Peru. We have made significant progress through bycatch research and mitigation trials that will help Peru meet its international obligations with regard to marine conservation.

Our relationship with project partners is maintained through periods of in-country field work and by an email circulation list, e-mails and telephone. Formal meetings with partners are held during periods of in-country fieldwork when project staff are present.

**Additional Unforeseen Collaboration:** As detailed in our Y1 & Y2 annual reports, the Darwin-SAFI project is now collaborating with numerous educational, governmental and non-governmental institutions both within Peru and regionally to advance the goals and objectives of the Darwin-SAFI project. The groups with which the project developed and fostered collaborations in Y1 & Y2 include the NGOs **Equilibrio Azul** (Ecuador), **Pacifico Laud** (Chile), **ProMar** (Chile), **Nature and Culture International** (Peru), **Life-Out-Of-Plastic** (Peru), **Centre for Development and Sustainable Fisheries** (Regional), **World Ocean Network** (Global), and **Birdlife-Albatross Task Force** (Global). Commercial interests and consortiums within Peru that the project continues to collaborate with include **Amo la Mar**, **Centro de Ornithologia y Biodiversidad**, **Nauticamp**, and **Billabong**. The project has also expanded its collaboration with the industrial purse-seine fishing company **TASA** to train fishers in marine fauna identification and safe release. Partnerships have also been maintained with **Universidad de Piura**, **Universidad Científica**, **Universidad Alas Peruanas** and **University of Puerto Rico-Rio Piedras** and with **UGEL Sechura**, the Ministry of Education office in northern Peru. An MOU is now in place with Universidad Científica del Sur to further facilitate collaboration.

Year 3 has also benefitted from new partnerships and collaborations. Lead partner PD has facilitated the establishment of **Amigos de la Naturaleza**, an organization of small-scale fishermen interested in fishing more sustainably and responsibly. In concert with this initiative, PD has also developed a network of nationally and internationally renowned chefs interested in promoting the use of sustainably caught fish products. This group has developed a facebook site called [Pesca del dia](#) ("catch of the day") to facilitate outreach and communication. We now also work with **Pacificum Peru**, a consortium of institutions celebrating 500 years since the 'discovery' of Pacific Ocean, and are the National Society of Fisheries, an organization of industrial purse-seine fisheries interested in collaborating with PD to build capacity and raise environmental awareness among their members. We have also developed a partnership with **Universidad Cayetano Heredia** to facilitate research collaboration and student involvement.

## 4. Project Progress

### 4.1 Progress in carrying out project activities

#### Output 1. Partners trained in monitoring, research and database use.

##### 1.1 Workshops

###### 1.1.1 Visioning

The primary work under this item was completed in Year 1 as a means to guide subsequent work on the project. However, as new relationships with institutions have been developed (e.g. TASA, CEDEPESCA, LOOP, universities) we consult with project partners to determine how these relationships can best be incorporated towards meeting project goals. In Year 3 we continued to have regular communication with the main in-country partners (e.g. IMARPE, MINAM, SERNANP, AGRORURAL) to keep them informed of project progress and to receive their input and recommendations toward enhancing project effectiveness.

###### 1.1.2 Fisheries observers

Workshops for fisheries observers during Year 3 were held in Lima, Piura and Mancora and augment the on-going fishery monitoring commenced during Years 1 and 2. Peru lead partner Pro Delphinus further expanded its observer network by training a total of 8 national and international students and volunteers in onboard observer data collection protocols and survey techniques. Interest remains high from national undergraduates wanting to participate with Pro Delphinus at the Darwin SAFI project and PD hosted two student volunteers from December 2012 to March 2013 who were trained in field survey methods, fisheries monitoring and data entry.

Field guides and manuals produced during this reporting period included (Table 1, Item 10)

- 3 guides for safe handling and release of seabirds, sea turtles and marine mammals.
- 3 identification guides for seabirds, sea turtles and marine mammals.

###### 1.1.3 Spatial ecology

A spatial ecology workshop was held in Lima in June 2011 focusing on seabird tracking and data analysis. Training in spatial ecology was given JAS and JCM during visits to University of Exeter in September 2011 and February 2012. Two additional workshops were held in Year 3. seabirds. These were held on the topic of seabird species listed in CITES and were with agency officials at SERNANP responsible for the marine environment and with staff from MINAM.

###### 1.1.4 Bycatch mitigation

Multiple bycatch mitigation workshops have been held with fishermen in ports along the Peru coast which served to raise awareness of available technologies and as opportunities to provide equipment to interested fishermen. Over 600 participants (including fishermen and local government officials) attended 43 events held in 31 ports over the course of Year 3. In addition, through our partnership with the industrial purse-seine fishery company (TASA), another 9 events held at their 4 locations were attended by 780 fishers and company officials and provided training s about the status of local marine vertebrates and how to reduce their bycatch.

### 1.1.5 Conservation workshops

Thirty-seven conservation events held in 23 locations and attended by over 850 people were held in Year 3. These events focused on raising awareness of marine conservation among stakeholder groups and the general public (including schools and universities) and covered a wide range of marine conservation topics (e.g. pollution, biodiversity loss, fisheries). Marine conservation talks were usually given with supplementary material, such as pamphlets, posters and drawing sheets, puppet shows and creation and dedication of wall murals. Project staff also took part in a number of public environmental awareness events, such as World Ocean Day, Life-Out-Of-Plastic, and 21Unica to promote awareness of marine issues. Pro Delphinus also conducted a summer youth program at the Whale Museum in the coastal community of Pucusana, Peru (1 h south of Lima) and helped rehabilitate the museum which was severely damaged in the 2007 earthquake.

### 1.2 Darwin Graduate Trainees

Natalia Ortiz completed her MSc at the University of Exeter in August 2012 and is now preparing that work for submission to a peer reviewed journal.

### 1.3 Darwin-IMARPE Fellow identified

IMARPE-Pisco biologist Evelyn Paredes has been identified as the Darwin-IMARPE Fellow and discussions continue to facilitate her participation on the project.

### 1.4 Conference attendance Darwin staff

Five international conferences have been attended:

- In February 2013, JAS and TSY attended the International Sea Turtle Symposium held in Maryland, USA where they presented data on low-cost vessel monitoring systems and green turtle haematology and biochemistry. JAS was also invited to be a panel member on a discussion of success stories in sea turtle conservation, highlighting some of the work made possible by the Darwin SAFI project.
- In December 2012, JAS and ECF attended the Marine Turtles and Fishery Interactions meeting organized by Pacifico Laud in Tarapaca, Chile and shared information on advances in sea turtle bycatch mitigation made through the Darwin-SAFI project.
- In October 2012, JCM attended the meeting of the South Pacific Regional Fisheries Management Organisation held in Lima, Peru to monitor discussion of the impacts of fisheries on threatened seabirds.
- In October 2012, TSY attended the Zoonosis in Wild Animals Conference, Florianopolis, Brazil and presented research on green turtle hematology and biochemistry.
- In April 2012, JAS and JCM attended as observers the Meeting of Parties of the Agreement on the Conservation of Albatrosses and Petrels held in Lima, Peru.
- In July 2012, JAS attended a meeting regarding regional sea turtle conservation in Iquique, Chile, and presented information on efforts in Peru.
- In addition to these conferences attended by Darwin-SAFI staff, research findings from the project were also presented by collaborating researchers at the following conferences:
  - Pacific Seabird Group, Oregon, USA, February 2013: Project information on bycatch of pink-footed shearwaters (*Puffinus creatopus*) in Ecuador, Peru and Chile was detailed in an oral presentation.
  - First Workshop for Latin American Otter Research and Conservation, Corumba, Brazil, June 2012: Information was shared on the status of marine otter (*Lontra felina*) conservation in Peru.
  - Latin America Society of Aquatic Mammal Specialists, Puerto Madryn, Argentina, September 2012: A paper was presented on advances in marine mammal mitigation in Peru.
  - World Congress of Herpetology, Ichthyologists and American Elasmobranch Society, Vancouver, Canada, August 2012. A poster was presented on the use of barcoding to identify shark species caught in Peru's small-scale fisheries using data collected under the Darwin-SAFI project.

At the national level, Darwin SAFI project staff attended six meetings and conferences with government departments, national science institutions and NGOs to share research findings on marine otters, sea turtles, seabirds and marine vertebrate interactions with fisheries, and to help in the preparation of national biodiversity action plans.

- IMARPE workshop on marine mammal strandings, Lima, March 2013. Project staff participated in this multi-day workshop to build capacity for marine mammal stranding response in Peru.
- Conservation Leadership Programme grant writing workshop, September 2012. Four project staff participated in the workshop and PD helped in meeting logistics and coordination.
- Humboldt Current Large Marine Ecosystem capacity building workshop, September 2012. JAS attended this multi-day meeting to foster cooperation and build capacity among the multiple environmental research and management institutions operating within the Humboldt Current LME.
- MINAM marine mammal strandings network meetings, July to August 2012. Project staff attended multiple meetings toward establishing more effective response to stranding events.
- 3<sup>rd</sup> Congress of Marine Science in Peru, June 2012. Multiple staff attended and gave poster presentations on shark catch in Peruvian fisheries and marine mammal strandings.

## **Output 2. Increased knowledge of the marine biodiversity of Peru to inform decision makers.**

### 2.1 Artisanal fisheries assessment completed

This task was completed in Year 1. Detailed analyses of the data are underway with one manuscript regarding sea turtle bycatch is nearing submission to a peer reviewed journal. Data from this assessment was also used in preparation of a report on the vulnerability of the pink-footed shearwater to fisheries interactions in Ecuador, Peru and Chile. This report will be presented at the ACAP-Seabird Bycatch Working Group meeting, La Rochelle, France, May 2013.

### 2.2 Spatial ecology database established

This database was established in Year 1 and we continue to use it to manage the bycatch data coming in to the project. Updates and revisions to the database are made as necessary. Two additional databases were prepared during the project year. One database manages radio communications and bycatch data gathered through a HF-Radio program and a second is designed to manage purse-seine and net bycatch information.

### 2.3 Fisheries observer programme underway

Onboard observers are currently placed in four ports: Mancora, Constante, Salaverry and Ilo. The programs in Salaverry and Ilo are part of a long term monitoring project. Shore-based observers are now also operating in the ports of San Jose and Mancora. IMARPE staff in the ports of Salaverry and Mancora assisted in establishing the onboard observer program in Mancora and continue to assist with the network in Salaverry. Discussions are also underway to establish shore-based or onboard observer effort with IMARPE participation at the port of Pisco.

### 2.4 Marine vertebrate monitoring underway

Marine vertebrate monitoring is underway at all the observer programme ports mentioned above (Item 2.3) with additional wide-area monitoring made possible through a real-time HF radio communication program with at-sea fishing vessels. The HF radio program continues to be well received by fishermen and has led to numerous repeat communications as well as visits by fishermen to the Pro Delphinus Lima office and requests for additional information and mitigation equipment.

In November 2012 two critically endangered waved albatrosses (*Phoebastria irrorata*) were equipped with satellite transmitters to monitor their movements and overlap with Peruvian small-scale fisheries. Monitoring continued until the units ceased transmitting in February 2013.

We continue to use C-POD acoustic monitoring devices ([www.chelonia.co.uk](http://www.chelonia.co.uk)) to monitor the presence and behaviour of small cetaceans in the gillnet fisheries sampled. An exploratory trip to the city of Pucallpa in the Amazon basin was conducted in January 2013 to assess the feasibility of using C-PODs to monitor river dolphins, human disturbance and their interactions with fisheries.

Project staff and partners have also participated in monthly Humboldt penguin counts at Punta Guanera Coles. Beach surveys were also performed to register the number of vertebrates stranded or used for human consumption.

## 2.6 Scientific papers

Four papers have been produced during project Year 3. In addition, project staff are co-authors on chapters for three books released this year on sea turtle biology and conservation. Copies of these papers and chapters have been presented to the government offices at IMARPE, MINAM and SERNAMP. Apart from those papers and chapters released or in press, three other papers were submitted for peer review during the project year and another four manuscripts are in preparation.

## 2.7 Project summary report prepared, presented to stakeholders and decision makers

We have presented the results of this project to stakeholders during workshops in Constanate, Salaverry, Mancora and Ilo. Summary reports are also being prepared for IMARPE, MINAM, FIUPAP and SERNANP.

## **Output 3. Increased awareness of the marine environment.**

### 3.1 Website established

A Darwin SAFI project webpage was completed in early 2011 and is located at the Peru lead partner Pro Delphinus website. The project's Facebook webpage continues to be the main venue for project announcements, updates and photo sharing. The page now has over 4,000 followers. A full update of the PD website is currently underway and is scheduled completion June 2013.

### 3.2 Production of Darwin Newsletters

The second newsletter was produced as scheduled in December 2011 and is regularly distributed at fishing ports along the entire Peru coast, as well as being posted to the Pro Delphinus Facebook page and blog. The newsletter was used as a means to disseminate information on project progress, the availability of bycatch mitigation measures and the project contact information.

In addition to the newsletter we have also produced other educational materials (Annex 3) to promote raised awareness of marine conservation and bycatch mitigation including eight cut-and-fold animal designs for use with elementary school groups, pocket calendars, a leaflet on the threatened pink-footed albatross, and key chains with waved albatross and pink-footed shearwater themes.

### 3.3 Press releases in Peru and UK

There was ample press coverage of project activities within the past year. This includes articles in the magazines Peruvian publications *Etiqueta Verde*, *Propuesta* (produced by Ricardo Palma University), *El Correo*, and *Peru Shimpo* (a Peruvian Japanese language newspaper). An article also appeared in the *El Comercio* Ecology page (Peru) as well as a story highlighting JAS winning a Whitley Award in May 2012. Radio interviews of JAS were conducted by *Radio Filarmonia* (Peru), *Radio and TV Bethel* (Peru) and BBC Radio 4 *Woman's Hour* (UK). A television interview of JAS was broadcast by the program *Cinco Minutos* (Peru). JAS was also highlighted in the WWF [Education for Nature](#) newsletter as an alumnus and winner of a 2012 Whitley Award. A short online video was posted by produced by the Peru Ministry of Production

on the sustainability of the industrial purse-seine fishery, and features an interview with Darwin Fellow JAS ([video link](#)).

### 3.4 Darwin Seminars for key stakeholders

Meetings with key Peruvian stakeholders (MINAM, FIUPAP, IMARPE) were held throughout 2012 and early 2013.

### 3.5 Darwin Conference

The conference, to be held in mid-2013, will serve as an opportunity to summarize project results and findings and to chart the way forward upon project completion.

## **Output 4. Bycatch mitigation experiments and implementation.**

### 4.1 Bycatch mitigation trials and implementation

Bycatch mitigation trials and implementation continue to expand, ahead of schedule. A paper documenting results from experimental trials of acoustic alarms (pingers) to reduce small cetacean bycatch in driftnets is in press with the journal *Oryx*. Based upon the success of this work the project has now moved toward implementing the use of pingers on a wider scale and has distributed pingers to fishermen at numerous ports along the coast. Fishermen themselves have expressed great interest in using these devices, to avoid bycatch and entanglements of small cetaceans and large whales.

Experimental trials of LED lights to reduce sea turtle and seabird bycatch in bottom-set nets continue and the first several years of data were developed into a Masters thesis of Darwin Graduate Trainee Natalia Ortiz who is now in the advanced stages of preparing this work for submission to a peer-reviewed journal.

In November 2012 a new experimental trial was also begun to reduce bycatch of sea turtles, seabirds and small cetaceans in surface driftnets. This work entails alterations to net depth designed to reduce bycatch opportunities. This work will continue into project Year 4.

In addition to the above trials, distribution of net cutters and dehookers (mitigation methods for seabirds, sea turtles and other marine life) has continued during Year 3 and has been received favourably by fishermen who regularly request additional equipment.

## **Output 5. Project monitoring.**

### 5.1 Darwin reporting

This report demonstrates our progress to date.

### 5.2 Steering group meetings

In August 2012, Peru staff Joanna Alfaro-Shigueto and Jeffrey Mangel visited the University of Exeter and held extensive steering group meetings with UK based staff and further elaborated the work plan for the rest of the reporting year. A follow-up conference call was held between core UK and Peru staff in February 2013 to continue tracking project progress.

## **4.2 Progress towards project outputs**

We are now 90% of the way through the project and are well on target to attain all project outputs, with targets met or exceeded for 35 of 38 relevant standard output criteria.

## **4.3 Standard Measures**

We have made excellent progress against standard reporting measures, being on target or ahead of schedule in all criteria.

Table 1 Project Standard Output Measures

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Number planned for reporting period	Total planned during the project (% of target reached)
1A	Number of people to submit thesis for PhD qualification (in host country)	0	2	0		0	1 (200%)
1B	Number of people to attain PhD qualification (in host country)	0	2	0		0	1 (200%)
2	Number of people to attain Masters qualification (MSc, MPhil etc)	0	0	2		1	1 (200%)
3	Number of people to attain other qualifications (ie. Not outputs 1 or 2 above)	0	2	3		1	3 (167%)
4A	Number of undergraduate students to receive training	11	5	5		5	15 (140%)
4B	Number of training weeks to be provided	80	24	136		10	7 (>1000%)
4C	Number of postgraduate students to receive training	4	3	3		1	1 (1000%)
4D	Number of training weeks to be provided	16	21	30		8	50 (134%)
5	Number of people to receive at least one year of training (which does not fall into categories 1-4 above)	0	2	1		1	4 (75%)
6A	Number of people to receive other forms of education/training (which does not fall into categories 1-5 )	479	974	2284		500	500 (>400%)
6B	Number of training weeks to be provided	5	6	12		3	8 (>200%)
7	Number of (ie different types - not volume - of material produced) training materials to be produced for use by host country	4	7	12		5	5 (>400%)
8	Number of weeks to be spent by UK project staff on project work in the host country	4	16	42		5	26 (>200%)
9	Number of species/habitat mgt plans (or action plans) to be produced for Governments, public authorities, or other implementing agencies in the host country	0	0	1		0	1 (100%)



Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Number planned for reporting period	Total planned during the project (% of target reached)
10	Number of individual field guides/manuals to be produced to assist work related to species identification, classification and recording	7	2	6		2	4 (>300%)
11A	Number of papers to be published in peer reviewed journals	3	3	4		2	4 (250%)
11B	Number of papers to be submitted to peer reviewed journals	6	4	3		2	4 (>250%)
12A	Number of computer based databases to be <b>established</b> and handed over to host country	2	2	2		0	3 (200%)
12B	Number of computer based databases to be <b>enhanced</b> and handed over to host country	1	1	1		1	3 (100%)
14A	Number of conferences/seminars/workshops to be <b>organised</b> to present/disseminate findings	2	1	3		1	4 (150%)
14B	Number of conferences/seminars/workshops <b>attended</b> at which findings from Darwin project work will be presented/ disseminated.	4	7	11		2	2 (>1000%)
15A	Number of national press releases in host country(ies)	5	3	1		1	5 (180%)
15B	Number of local press releases in host country(ies)	5	3	1		3	6 (150%)
15C	Number of national press releases in UK	1	1			1	2 (100%)
15D	Number of local press releases in UK	1	1			1	2 (100%)
16A	Number of newsletters to be produced	1	1	1		1	4 (75%)
16B	Estimated circulation of each newsletter in the host country(ies)	1000	1000	1000		500	1000 (200%)
16C	Estimated circulation of each newsletter in the UK	250	500	250		100	250 (>100%)
17A	Number of dissemination networks to be <b>established</b>	1	1	2		0	1 (400%)

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Number planned for reporting period	Total planned during the project (% of target reached)
17B	Number of dissemination networks to be <b>enhanced/ extended</b>	1	1	1		1	1 (300%)
18A	Number of national TV programmes/features in host country(ies)	1	0	4		0	2 (250%)
19A	Number of national radio interviews/features in host county(ies)	0	0	2		0	2 (100%)
19C	Number of local radio interviews/features in host country(ies)	8	2	1		1	3 (>300%)
19D	Number of local radio interviews/features in UK	0	2	1		0	1 (300%)
20	Estimated value (£'s) of physical assets to be handed over to host country(ies)	£16,190	£42,185	£8,884			£36,490 (>100%)
21	Number of permanent educational/training/re search facilities or organisations to be established and then continued after Darwin funding has ceased	1	0	2		0	Extra
22	Number of permanent field plots to be established during the project and continued after Darwin funding has ceased	3	2	1		1	5 (>100%)
23	Value of resources raised from other sources (ie in addition to Darwin funding) for project work	£69,182	£ 92,222	£ 92,222	£ 91,287		£300,960 (85%)
New -Project specific measures							

**Table 2 Publications**

Type (eg journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (eg contact address, website)	Cost £
Journal	Garcia-Godos, I. et al. <i>In press</i> . Entanglements of Large Cetaceans in Peru: Few Records but High Risk. <i>Pacific Science</i> .	University of Hawaii Press	Publishers website	NA
Journal	Mangel, J.C. 2013. <i>In press</i> . Using pingers to reduce small cetacean bycatch in the small-scale driftnet fishery in Peru. <i>Oryx</i> .	Cambridge Journals	Publishers website	NA

Type (eg journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (eg contact address, website)	Cost £
Journal	Alfaro-Shigueto, J., et al. 2012. Trading information for conservation: a novel use of radio broadcasting to reduce sea turtle bycatch. <i>Oryx</i> 46(3): 332-339.	Cambridge Journals	Publishers website	NA
Journal	Cossios, E.D. et al.2012. The order Carnivora (Mammalia) in Peru: State of knowledge and research priorities for its conservation. <i>Rev.Peru Biol.</i> 19(1): 17-26.	Universidad Nacional Mayor de San Marcos, Lima, Peru	Publishers website	NA
Book	Lewisson, R. et al. 2013. <i>Fisheries bycatch of Marine turtles: Lessons learned from decades of Research and Conservation</i> . Ch 12 in <u>The Biology of Sea Turtles</u> (Vol 3), Wyneken, K. & Lohman K. (eds.).	CRC Press	Publishers website	NA
Book	Seminoff, J.A. et al. 2012. <i>Biology and conservation of sea turtles in the Eastern Pacific Ocean: A general overview</i> . Pp. 11-29 in <u>Sea turtles of the Eastern Pacific: Advances in Research and Conservation</u> . J. Seminoff & B. Wallace (eds.).	University of Arizona Press	Publishers website	NA
Book	Alfaro-Shigueto, J. & J.C. Mangel. 2011. <i>Sea Turtle Conservation in Peru: Limitations and Efforts</i> .Ch 15 in <u>Conservation of Pacific Sea Turtles</u> . Dutton, P., D. Squires & M. Ahmed (eds.).	University of Hawaii Press	Publishers website	NA

#### 4.4 Progress towards the project purpose and outcomes

We feel that at this stage we are making strong progress towards stated purposes and outcomes, and our purpose level assumptions still hold true.

#### 4.5 Progress towards impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

We feel our indicators for measuring outcomes remain entirely adequate toward monitoring project progress, and, subsequently, evaluating potential for bycatch reductions resulting from the project. We note that preliminary results from the ongoing bycatch mitigation trials have all been positive and indicate that reductions in marine fauna bycatch are possible. Moreover, buy-in by fishermen to the goal of the Darwin SAFI project is evidenced by their participation in all project activities (e.g. workshops, mitigation trials). The project also continues to build broad partnerships with a network of agencies and institutions that will promote post-project implementation and continued progress.

### 5. Monitoring, evaluation and lessons

As articulated in the main bid, the progress of the project against key milestones and indicators is appraised by a Steering Group made up of partner organisations that will meet bi-annually. There is also regular communication among project partners, facilitated by the field presence of the key Darwin Staff. The key indicators show the progress of the project as catalysed by the launch of several ongoing initiatives. These include websites development, establishment of a spatial ecology database, a commencement of a Fishery Observer Programme and marine vertebrate monitoring and bycatch mitigation initiatives. All of these are clearly articulated and time stamped and have moved beyond the planning stages to varying levels of implementation.

## **6. Actions taken in response to previous reviews (if applicable)**

There were no review comments to be addressed from our Year 2 report.

## **7. Other comments on progress not covered elsewhere**

There have been no major enhancements or refinements to the project, nor any significant difficulties encountered. We do not foresee any major additional risks.

## **8. Sustainability**

As detailed above, the project has made considerable inroads to creating a profile in-country. There is strong buy-in from partners for the project, demonstrated by the number of initiatives we have been able to get off the ground and carry forward. There has also been growing interest and considerable buy-in among the main stakeholder groups (e.g. fishermen, coastal communities, authorities) that have made it possible for the Darwin-SAFI project to meet or exceed many of its goals, and to do so ahead of schedule. Our ability to move from trials of bycatch mitigation to implementation also reveals increased interest in and capacity for sustainable biodiversity conservation efforts.

The exit strategy will be the formulation of a spatially explicit sustainable artisanal fisheries initiative which will act as a roadmap for further action in the waters off Peru and, indeed, regionally, as many of these marine resources and issues are found throughout the southeast Pacific. There is a stable project endpoint in that capacity and awareness will have been raised to an all-time high with the launch of the Darwin-SAFI. Sustainability will depend on the on-going commitment of the organisations that currently make up the consortium. This is highly likely given the sustained efforts made by all organisations to date, and given the representation of the key stakeholders in the project. That buy-in continues to grow and solidify as new relationships are formed with collaborating institutions and fishermen and as projects with existing partners are implemented and mature. There will be considerable legacy aspects to this project including greatly enhanced levels of training of local staff and project participants, training and educational materials, and a spatially explicit database.

## **9. Dissemination**

Dissemination efforts initially targeted key stakeholders in fishing communities and government during the launch period of the project although media activity widened the impact. These efforts (including media outreach) continued in Year 2 but were also broadly expanded to include the general public and to raise awareness of marine conservation through multiple outreach activities including repeated conservation workshops along the Peru coast. In Year 3 we built upon this strong foundation and further expanded the depth and breadth of dissemination activities. Outreach with the general public was enhanced through increased press coverage of project activities and through support and attendance of multiple environmental awareness events. The project had an active web presence, with over 4,000 followers receiving daily posting on the Pro Delphinus Facebook page. Workshops targeting the main stakeholders were also maintained and additional stakeholders (chefs, seafood restaurants) also approached and now forming an active component to Darwin-SAFI outreach activities. The project has also deepened its relationships with fishermen by helping form a core network of fishermen interested in sustainable fishing and providing them with the tools and knowledge to succeed. And by expanding our dissemination activities to organizations working in Ecuador and Chile we have further broadened the reach and impact of the project. We will continue these efforts through the end of the project and are confident in their post-project sustainability given the interest expressed and coordination exhibited.

## 10. Project Expenditure

**Table 3 project expenditure during the reporting period (1 April 2012 – 31 March 2013)**

Item	Budget	Expenditure	Variance/ Comments
Staff costs specified by individual			
Overhead costs			
Travel and subsistence			
Operating costs			
Capital items/equipment (specify)			
Others: Consultancy			
Others (please specify) Peruvian Student Fees			
Overclaimed in 12/13			
<b>TOTAL</b>			

*Budgets are as per Forecasting Exercise and email from Eilidh Young to Prof Brendan Godley dated 01/03/13.*

## 11. **OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum). This section may be used for publicity purposes**

I agree for LTS and the Darwin Secretariat to publish the content of this section (please leave this line in to indicate your agreement to use any material you provide here)

**Continued innovation, gathering momentum:** Through a combination of strong partnerships and a tremendous commitment for local partners and UoE staff, the project continues to lead the way with innovative solutions to fisheries bycatch and to build momentum toward making sustainable artisanal fisheries a reality in Peru. In the project's final year we look forward to further progress that will lay the groundwork for sustained advances for years to come.

**Images:** We have many excellent images of local partners involved with fieldwork that we would happily share. These include photos of staff conducting fishermen interviews and workshops, fishing vessels, marine fauna bycatch, and attachments of satellite transmitters to sea turtles and seabirds. Please contact Darwin Research Fellow, Joanna Alfaro-Shigueto [jas\\_26@yahoo.com](mailto:jas_26@yahoo.com) with any requests for specific images.

## Annex 1: Report of progress and achievements against Logical Framework for Financial Year 2012-2013

Project summary	Measurable Indicators	Progress and Achievements April 2012 - March 2013	Actions required/planned for next period
<p><b>Goal:</b> 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</p> <p>⇒ 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</p>		(report on any contribution towards positive impact on biodiversity or positive changes in the conditions of human communities associated with biodiversity eg steps towards sustainable use or equitable sharing of costs or benefits)	
<p><b>Purpose</b>            Improved national and local capabilities applied to the sustainable and equitable management of marine biodiversity of Peru</p>	Sustainable artisanal fisheries initiative effectively enacted.	Training, research and involvement of key stakeholders are well underway.	<p><i>Fisheries observer programme continued and expanded.</i></p> <p><i>MSc completed.</i></p> <p><i>Additional research and mitigation trial outputs.</i></p>
<p><b>Output 1.</b> Partners trained in monitoring, research and database use</p>	<ul style="list-style-type: none"> <li>• Training workshops</li> <li>• Training of Darwin Research Fellow and other local partners</li> <li>• Training of Darwin Graduate Trainee to MSc</li> <li>• Darwin Staff to international conferences</li> </ul>	Progress generally good and indicators appropriate.	
Activity 1.1 Workshops (1. Visioning; 2. Fisheries observers; 3. Spatial ecology; 4. Bycatch mitigation; 5. Conservation workshops; Dates per workplan)		Visioning, Fisheries Observers, Spatial Ecology and Bycatch Mitigation workshops completed. Conservation workshops undertaken on a continuing basis.	
Activity 1.2 Darwin Graduate Trainee identified		One completed with possible additional under consideration.	
Activity 1.3 Darwin-IMARPE Fellow identified		Planned but awaiting IMARPE action.	
Activity 1.4 Conference attendance Darwin staff		Underway. Staff attended 6 international conferences and 5 national events.	
<p><b>Output 2.</b> Increased knowledge of the marine biodiversity of Peru to inform decision makers</p>	<ul style="list-style-type: none"> <li>• Current assessment of artisanal fisheries and associated bycatch</li> <li>• Sustainable Artisanal Fisheries Initiative</li> <li>• Species and fisheries effort maps</li> <li>• Darwin conference</li> <li>• Scientific Papers</li> </ul>	Progress generally good and indicators appropriate.	

Project summary	Measurable Indicators	Progress and Achievements April 2012 - March 2013	Actions required/planned for next period
Activity 2.1. Artisanal fisheries assessment completed		Completed	
Activity 2.2. Spatial ecology database established		Completed	
Activity 2.3 Fisheries observer programme underway		Underway	
Activity 2.4 Marine Vertebrate monitoring underway		Underway	
Activity 2.6 Scientific papers		Underway	
Activity 2.7 Project summary report prepared, presented to stakeholders and decisionmakers		Planned	
<b>Output 3.</b> Increased awareness of the marine environment	<ul style="list-style-type: none"> <li>• Website; newsletters; press releases; Workshops; Lectures; Darwin conference</li> </ul>	Progress generally good and indicators appropriate.	
Activity 3.1 Website established		Completed. With regular updates to the project Facebook page.	
Activity 3.2 Production of Darwin Newsletters		Underway. Released in October 2010, December 2011, December 2012 with additional newsletters to be released as scheduled.	
Activity 3.3 Press releases in Peru and UK		Target reached, with ample press coverage and press releases continuing.	
Activity 3.4 Darwin Seminars for key stakeholders		Underway. Seminars with key stakeholders held during 2011, 2012 and early 2013 with Year 4 seminar to occur as planned.	
Activity 3.5 Darwin Conference		Planned	
<b>Output 4.</b> Increased awareness of the marine environment	<ul style="list-style-type: none"> <li>• Animals released</li> <li>• Declines in capture rates, both absolute and catch per unit effort</li> <li>• Reduced severity of injury</li> <li>• Number of fishers agreeing to change fishing techniques/employ mitigation</li> </ul>	Progress generally good and indicators appropriate.	
Activity 4.1 Bycatch mitigation trials and implementation		Underway	
<b>Output 5.</b> Project monitoring	<ul style="list-style-type: none"> <li>• Darwin reporting.</li> <li>• Steering group meetings.</li> </ul>	Progress generally good and indicators appropriate.	
Activity 5.1 Darwin reporting		Effectively draws strands of project together for appraisal.	
Activity 5.2 Steering Group meetings		Excellent periodic format for project review.	

## Annex 2 Project's full current logframe

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<b>Goal:</b> Effective contribution in support of the implementation of the objectives of the Convention on Biological Diversity (CBD), the Convention on Trade in Endangered Species (CITES), and the Convention on the Conservation of Migratory Species (CMS), as well as related targets set by countries rich in biodiversity but constrained in resources.			
<b>Sub-Goal:</b> The marine biodiversity of Peru is preserved for future sustainable use	<ul style="list-style-type: none"> <li>• Artisanal fisheries methods and bycatch accurately assessed</li> <li>• Bycatch mitigations identified and implemented for threatened taxa and fisheries observed</li> <li>• programmes show reduced levels of marine vertebrate bycatch.</li> <li>• Increasing populations of key marine taxa</li> </ul>	<ul style="list-style-type: none"> <li>• Data from Peruvian fisheries ministries and non-governmental monitoring programmes</li> <li>• Monitoring by Peruvian Navy and IMARPE, Spatially referenced fishing and bycatch data</li> <li>• Data from governmental and non-governmental monitoring programmes</li> </ul>	
<b>Purpose</b> Improved national and local capabilities applied to the sustainable and equitable management of marine biodiversity of Peru	<ul style="list-style-type: none"> <li>• Sustainable artisanal fisheries initiative effectively enacted</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring continued</li> <li>• Reports and publications by partner organisations</li> </ul>	<ul style="list-style-type: none"> <li>• Peruvian partner organisations incorporate new knowledge into future strategies and workplans</li> <li>• Continued political stability</li> </ul>
<b>Outputs</b> (add or delete rows as necessary) 1. Partners trained in monitoring, research and database use	<ul style="list-style-type: none"> <li>• Training workshops</li> <li>• Training of Darwin Research Fellow and other local partners</li> <li>• Training of Darwin Graduate Trainee to MSc</li> <li>• Darwin Staff to international conferences</li> </ul>	<ul style="list-style-type: none"> <li>• Workshop Reports</li> <li>• Functioning fisheries observer programme and bycatch data</li> <li>• MSc thesis</li> </ul>	<ul style="list-style-type: none"> <li>• Trained individuals remain in employment by partner organisations</li> </ul>
2. Increased knowledge of the marine biodiversity of Peru to inform decision makers	<ul style="list-style-type: none"> <li>• Current assessment of artisanal fisheries and associated bycatch</li> <li>• Sustainable Artisanal Fisheries Initiative</li> <li>• Species and fisheries effort maps</li> <li>• Darwin conference</li> <li>• Scientific Papers</li> </ul>	<ul style="list-style-type: none"> <li>• Outputs provided to Darwin; included on project website and reports</li> </ul>	<ul style="list-style-type: none"> <li>• Partners provide and share data</li> </ul>
3. Increased awareness of the marine environment	<ul style="list-style-type: none"> <li>• Website; newsletters; press releases; Workshops; Lectures; Darwin conference</li> </ul>	<ul style="list-style-type: none"> <li>• Web hits</li> <li>• Circulation of Darwin Newsletter</li> <li>• Media Items</li> <li>• Conference outputs</li> <li>• Number workshops held and</li> </ul>	



Project summary	Measurable Indicators	Means of verification	Important Assumptions
		attendance levels • Number of fishers collaborating in fieldwork	
4. Bycatch mitigation experiments and implementation	<ul style="list-style-type: none"> <li>• Animals released</li> <li>• Declines in capture rates, both absolute and catch per unit effort</li> <li>• Reduced severity of injury</li> <li>• Number of fishers agreeing to change fishing techniques/employ mitigation</li> </ul>	<ul style="list-style-type: none"> <li>• Reports and publications</li> <li>• Number of fishers employing the techniques</li> </ul>	<ul style="list-style-type: none"> <li>• Effective, appropriate measures can be defined for the fisheries and species</li> </ul>
5. Project monitoring	<ul style="list-style-type: none"> <li>• Darwin reporting.</li> <li>• Steering group meetings.</li> </ul>	<ul style="list-style-type: none"> <li>• Reports to Darwin Initiative.</li> <li>• Minutes of meetings.</li> </ul>	
<p><b>Activities</b> (details in workplan)</p> <p>1.1 Workshops (1. Visioning; 2. Fisheries observers; 3. Spatial ecology; 4. Bycatch mitigation; 5. Conservation workshops; Dates per workplan)</p> <p>1.2 Darwin Graduate Trainee identified</p> <p>1.3 Darwin-IMARPE Fellow identified</p> <p>1.4 Conference attendance Darwin staff</p> <p>2.1 Artisanal fisheries assessment completed</p> <p>2.2 Spatial ecology database established</p> <p>2.3 Fisheries observer programme underway</p> <p>2.4 Marine Vertebrate monitoring underway</p> <p>2.6 Scientific papers</p> <p>2.7 Project summary report prepared, presented to stakeholders and decisionmakers</p> <p>3.1 Website established</p> <p>3.2 Production of Darwin Newsletters</p> <p>3.3 Press releases in Peru and UK</p> <p>3.4 Darwin Seminars for key stakeholders</p> <p>3.5 Darwin Conference</p> <p>4.1 Bycatch mitigation trials and implementation</p> <p>5.1 Darwin reporting</p> <p>5.2 Steering Group meetings</p>			

## Annex 3 Onwards – supplementary material (optional but encouraged as evidence of project achievement)

This may include outputs of the project, but need not necessarily include all project documentation. For example, the abstract of a conference would be adequate, as would be a summary of a thesis rather than the full document. If we feel that reviewing the full document would be useful, we will contact you again to ask for it to be submitted.

It is important, however, that you include enough evidence of project achievement to allow reassurance that the project is continuing to work towards its objectives. Evidence can be provided in many formats (photos, copies of presentations/press releases/press cuttings, publications, minutes of meetings, reports, questionnaires, reports etc) and you should ensure you include some of these materials to support the annual report text.

### Darwin SAFI project associated educational materials produced, 2012-2013:

- **Darwin SAFI Responsible Fisheries Bulletin 3:** As in past years, this bulletin is used to inform people along the Peru coast about the Darwin Initiative, its results and achievements. It is distributed regularly during Pro Delphinus visits to different artisanal ports and activities along the coast.

## BOLETÍN PESCADORES RESPONSABLES

Tercera Edición: Diciembre 2012

### Iniciativa Darwin: Pesca Artesanal Sostenible

La Iniciativa Darwin inició en el 2010 con el objetivo de mejorar la dirección del manejo de la biodiversidad marina de Perú. Al finalizar el segundo año de la iniciativa, Pro Delphinus con el apoyo de la Iniciativa Darwin y el Whitley Fund for Nature, y la participación de pescadores artesanales, está más cerca a una pesquería artesanal sostenible en el Perú.

**Logros de la Iniciativa Darwin:**

Durante el 2012 se realizaron charlas sobre medidas de mitigación para reducir la captura incidental de especies en peligro en 30 puertos diferentes; desde Puerto Pizarro en Tumbes hasta Morro Sama en Tacna. En cada puerto se tuvo la oportunidad de conversar con pescadores artesanales sobre oportunidades para mejorar su trabajo.

Durante estas charlas se pudieron presentar los resultados obtenidos hasta el momento con los diferentes materiales de mitigación. Las luces LED utilizadas en la bahía de Sechura en Piura, han disminuido la captura incidental de tortugas verdes en un **47%**. Por su parte, las alarmas acústicas ensayadas en Salaverry, Trujillo redujeron la captura de chanchos marinos en un **37%**. Ambos materiales no mostraron ningún efecto en la respectiva pesca objetivo. Estos instrumentos ayudan a proteger animales permitiendo una pesca más eficiente y amigable con el medio ambiente.

Adicionalmente, se ha comenzado a llevar la idea de pesca responsable a restaurantes de renombre en Lima. Es este grupo quien podrá ofrecer un mejor precio a la pesca de aquellos que utilicen el material de mitigación, obteniendo beneficios adicionales para los pescadores artesanales.



**¡Gracias por ayudarnos a protegerlos! ¡Sigamos así!**

**Animales en peligro de extinción en Perú**

- Tortuga Laúd o 7 quillas
- Tortuga carey
- Pajarote o albatros de Galápagos

**Metas para el 2013:**

- Seguir evaluando y distribuyendo material para reducir la captura incidental.
- Capacitar pescadores artesanales en temas ambientales a lo largo de la costa Peruana.
- Abrir mercado de "Pesca responsable" en restaurantes y supermercados.





Para más información visítanos en: [www.prodelfinuso.org](http://www.prodelfinuso.org) / [prodelfinuso@gmail.com](mailto:prodelfinuso@gmail.com)  
O llámanos al Teléfono: 51-1-4451816 / RPM #0414566 / Next. 411\*0455

## Reporte de Bandas

¿Alguna vez has visto una tortuga o un ave con un anillo o banda con números? Se pueden encontrar en las patas y aletas. Estas bandas son utilizadas para reconocer animales de forma individual. Generalmente, son animales migratorios que se encuentran distribuidos en áreas extensas. Las bandas tienen un número diferente para cada animal. De esta forma podemos saber cómo se desarrolla y a dónde viaja cada individuo.

No tienen recompensa monetaria ya que son utilizados para estudios de migración, y deben permanecer con el animal.

### Acuérdate de estos pasos al encontrar un ave o tortuga con banda:

1. Anota:
  - Número de la banda
  - Posición (nombre del lugar, coordenadas)
  - Fecha y hora
2. Contacta a Pro Delphinus para mandar la información





### ¿Buscas información de temperatura y vientos en el mar?

Contáctate desde tu embarcación con nuestra base en Lima en las frecuencias. **Norte 10.695.0 / Sur 8.281.2**

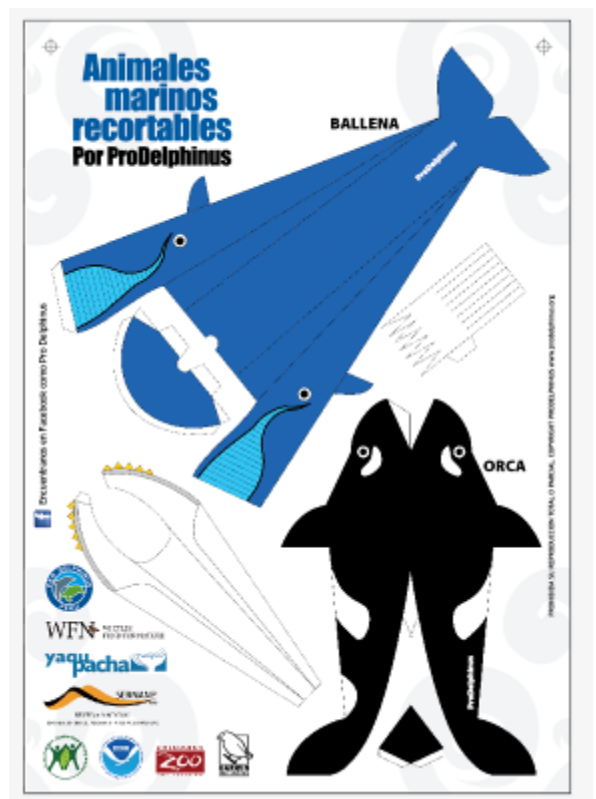
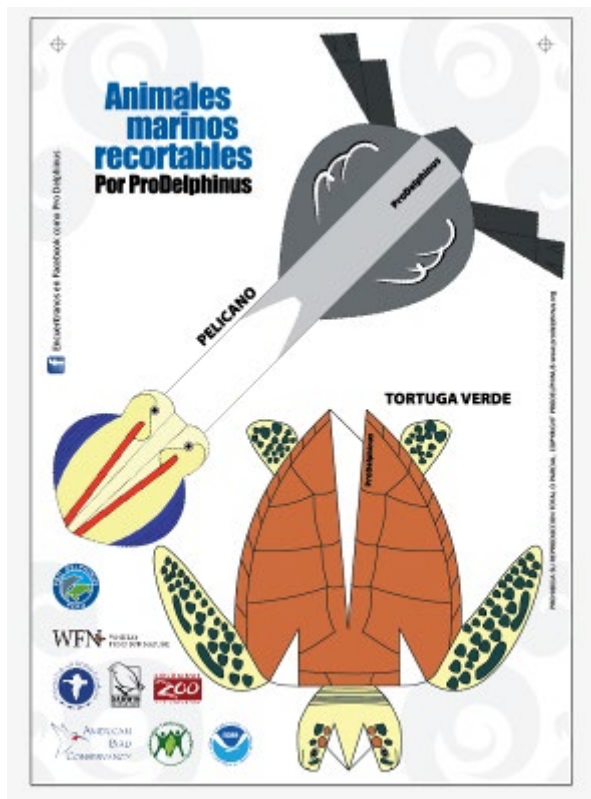
Te brindaremos información sobre vientos, mareas, temperatura del mar, precios de tus productos y mucho más. También podemos ayudarte a evitar daños a las especies protegidas como chancos marinos, tortugas y aves marinas.

### Calendario Lunar 2013

● Luna llena ○ Nueva ☾ Creciente ☽ Menguante

Enero	Febrero	Marzo	Abril	Mayo	Junio
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Julio	Agosto	Septiembre	Octubre	Noviembre	Diciembre
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

- Examples of some of the cut & fold animal designs used during marine conservation education classes with elementary school groups and in fishing communities.



- **Seabird safe handling and release guide:** This guide was produced and designed to help inform small-scale fishermen to safely handle and release seabirds incidentally captured during fishing operations and also to inform them what to do if they find an animal with an identification band.

**30 min**

**5 ESPERAR ANTES DE SU LIBERACIÓN:**

- Manténla en tu embarcación en un lugar tranquilo y protegido hasta que se seque y pueda volar.
- Revisa su estado cada media hora.
- No intentes alimentarla.

**6 LIBERAR EL AVE:**

- Cuando se encuentre seca, sobre sus patas, con la cabeza firme y respondiendo al sonido, estará lista para ser liberada.
- Reduce la velocidad de tu embarcación y colócala suavemente en el agua sujetando sus alas contra su cuerpo.

**¡FELICITACIONES, TU AVE HA SIDO RESCATADA!**

**BANDAS DE IDENTIFICACIÓN**

Si encuentras un ave con anillos plásticos o metálicos en sus patas, **NO LOS QUITES**. Anota lo que dice en ellos, la posición, fecha y hora cuando los encontraste y envía esa información a los contactos que figuran en esta guía. Recuerda que no hay recompensa monetaria por las bandas y su uso tiene fines científicos.

**Al seguir estas recomendaciones TÚ estás siendo un pescador responsable y colaborando con la conservación de las aves marinas del Perú.**

Para más información, visita:  
[www.prodelphinus.org](http://www.prodelphinus.org)  
[www.blogprodelphinus.blogspot.com/](http://www.blogprodelphinus.blogspot.com/)

O comunícale a los teléfonos:  
**51-1-4451816 / 51-996 681 041 / 411\*0455**  
 O desde tu embarcación a la BASE RADIO LIMA:  
**NORTE: 8.281.2 / SUR: 10.695.0**

**GUÍA DE RESCATE Y LIBERACIÓN DE AVES MARINAS**

**Si encuentras un ave marina viva enganchada o enredada en tu aparejo de pesca, sigue estas recomendaciones.**

- 1 SUBIR EL AVE A BORDO:**
  - Utiliza guantes si es posible.
  - Acércala al bote sujetándola por el pico, **SIN** cubrir sus fosas nasales.
  - **NUNCA** la sujetes por el cuello, pues puedes causar mayor daño.
- 2 MANTENER EL AVE CALMADA:**
  - Una vez a bordo, mantén sus ojos cubiertos con una tela **SIN** cubrir sus fosas nasales.
- 3 CONTROLAR LOS MOVIMIENTOS DEL AVE:**
  - Sujeta firmemente sus alas contra su cuerpo y sostén su cabeza, mientras otra persona desengancha o desenreda cuidadosamente el aparejo.
- 4 DESENGANCHAR EL ANZUELO:**
  - Si el anzuelo ha sido tragado profundamente y no se ve, **NO** tires de la línea, pues podría dañar más al ave.
  - Para esto, empuja el anzuelo a través de su piel y retiralo cortando de la línea.

- **Seabird identification guide for northern Peru:** Distributed along Peru's north coast to raise awareness of seabirds and their conservation.



- Announcement of a workshop on wildlife veterinary medicine held at Universidad Alas Peruanas and sponsored by main in-country partner Pro Delphinus.

**UAP**  
UNIVERSIDAD ALAS PERUANAS

ESCUELA ACADÉMICO PROFESIONAL DE MEDICINA VETERINARIA  
ESCUELA ACADÉMICO PROFESIONAL DE INGENIERIA AMBIENTAL

**PRO DELPHINUS PERU**

**29 DE SEPTIEMBRE**  
**DÍA MUNDIAL DE LOS MARES**

**Fecha:** Viernes 28 de septiembre  
**Hora:** 11:00 a 14:00 Hrs.  
**Lugar:** Auditorio de la Escuela Académico Profesional de Medicina Veterinaria

**Temática:**

- ◆ Presentación de Convenio "ProDelphinus & UAP" - Escuela de Medicina Veterinaria
- ◆ Presentación de Proyectos de ProDelphinus
- ◆ Programa de anillamiento de aves migratorias marinas - CORBIDI
- ◆ Presentación del Impacto en la Flora y Fauna Marina por la contaminación de los Mares - Escuela de Ingeniería Ambiental
- ◆ Exhibición de material biológico - ProDelphinus
- ◆ Registro de participantes para voluntariados
- ◆ Venta de productos ProDelphinus y CORBIDI
- ◆ Tómate tus mejores fotos en "Face in hole" de ProDelphinus

**FAUNA SILVESTRE**  
U.A.P.

**CORBIDI**

Darwin SAFI project press coverage, 2012-2013:

El Correo journal article on the work of ProDelphinus



Photo during a panel discussion of JAS on Peru national radio station Bethel discussing the Darwin-SAFI work and marine conservation in Peru (Mar 2013).



## Una bióloga peruana es premiada en Inglaterra

La Whitley Fund for Nature reconoce la labor de Joanna Alfaro-Shigueto en nuestras comunidades costeras

Los conservacionistas más comprometidos y efectivos pasarán a la final, había dicho un mes antes el director del Whitley Fund for Nature (WFN), David Wallis. La bióloga peruana Joanna Alfaro-Shigueto no solo llegó a la final sino que ganó el Whitley Award debido a su dedicación en construir un mejor futuro para la vida marina y comunidades pesqueras del Perú.

Eso lo reconoció el jurado y Wallis: "El objetivo de este premio es elogiar a conservacionistas del mundo que inspiran cambios positivos para la vida silvestre. En el caso de Joanna, los jueces estuvieron impresio-



La princesa Ana entregó el premio a Joanna Alfaro-Shigueto.

nados sobre su gran influencia en las comunidades costeras, donde promueve la idea de que la pesca puede coexistir con la conservación de la vida marina y también ser más eficiente y rentable".

### El galardón

La directora de la ONG Pro-Delphinus recibió en Londres el premio de la mano de la princesa Ana de Inglaterra, embajadora de los Premios Whitley para la

Naturaleza. El galardón consta de una donación de 30.000 libras esterlinas (cerca de 50 mil dólares), un trofeo y la oportunidad de pertenecer a una red que conecta a todos los ganadores de Whitley Award y entrenamiento para su desarrollo profesional.

"Este premio contribuirá directamente con el empoderamiento de miles de pescadores artesanales, ayudándolos a pescar de una manera más selectiva y responsable, lo cual reducirá el efecto de las pesquerías en las tortugas, aves y mamíferos marinos que quedan atrapados incidentalmente. Con el apoyo de WFN aseguramos el logro de un importante paso hacia la conservación de nuestros océanos y de miles de comunidades que dependen de estos recursos", dijo Joanna.

El jurado también resaltó su esfuerzo en convencer a los restaurantes que ofrecen recursos marinos a comprar los que son extraídos sosteniblemente.

Announcement of the BBC Radio 4 – Woman's Hour interview of Darwin SAFI Research Fellow JAS (Apr 2012).

### Joanna Alfaro, Peruvian Environmentalist

Joanna Alfaro first became interested in wildlife when she was growing up in Lima and her father bought a book with pictures of exotic birds. Little did she know then that her interest would lead her to some of the remote communities in the world, in the western deserts of the Peruvian coast, helping fishermen organize themselves to make their livelihoods more efficient - and environmentally sustainable. Joanna joins Jane to talk about how environmental science has led her from conservation work to community leadership, and how being a woman has helped her get to grips with a macho, wild west culture.

### Pro Delphinus



4to. Semestre de 2012  
Año XI | Número 90  
Producción de la  
Facultad de Humanidades y Ciencias Políticas

# PROPUESTA

30 / LIMA, DICIEMBRE DEL 2012

## +ALMA MÁTER

**MENSAJE PARA LAS(OS) ESTUDIANTES DE LA URP**

Sea que la URP ha crecido en su estructura y en carrera. Uno que esto beneficia a los estudiantes y a los docentes en general. El mensaje sería que se pueden hacer cosas sin ser biólogos o expertos, todos podemos tomar acciones que ayuden al medio ambiente, por ejemplo usando menos bolsas de plástico. Y decirles a los futuros biólogos que hay campo en el Perú. Hay mucho por hacer en estos temas, y hay una demanda laboral importante. Si bien los fondos son escasos, con dedicación y perseverancia se pueden alcanzar todas las metas.



**JOHANA ALFARO SHIGUETO, EGRESADA DE LA FACULTAD DE CIENCIAS BIOLÓGICAS.**

### CONSERVANDO LA BIODIVERSIDAD MARINA

**JOHANA ALFARO SHIGUETO, EGRESADA DE LA FACULTAD DE BIOLÓGIA DE LA URP. ES HOY PRESIDENTA DE LA ORGANIZACIÓN PRO DELPHINUS, ENCARGADA DE LA PROTECCIÓN Y CONSERVACIÓN DE ANIMALES MARINOS: ACABA DE GANAR EL PREMIO DE LA WHITLEY FUNDS FOR NATURE (WFN).**

**LOS INICIOS**  
Se graduó el año 2001 en la Facultad de Ciencias Biológicas de nuestra casa de estudios, obteniendo su licenciatura en 2004. Su tesis fue sobre parásitos en el vientre de los cetáceos. Siempre supo que

quería trabajar con el mar y justo al finalizar la carrera, una amiga suya hace prácticas en Pucallpa con un grupo (ONG) que trabaja con delfines. Allí empezó su pasión por conservar a estos sorprendentes animales.

**¿QUE ES PRO DELPHINUS?**  
La ONG se formó en noviembre del 2000, pero recién empezaron sus actividades a partir del 2001. En el 2001, se organizaron una propuesta ya como Pro Delphinus, buscando la protección de los turgidos marinos, replicando lo que habían hecho

con los delfines. Documentando dónde eran más vulnerables los animales y cuáles eran las capturas. Describiendo y registrando el programa para después poder tomar acciones.

**PROYECTOS ACTUALES**  
Trabajan directamente con los pescadores, explicándoles qué hay un problema del cual ellos pueden ser parte de la solución. La mayoría de veces los animales son capturados por error, dentro de lo que se denomina "poco a propósito" a los pescadores no les conviene, se

muestran sus redes. Entregan las planchas de uso de dispositivos que indican qué se piergen los animales. Dánles algunas lecturas al respecto que producen sorridos. En la actualidad se hace lo que se puede en el estado. También cuentan con un LEO para atender a las aves y tortugas. Estos dispositivos reducen en al 30% las capturas.

**El proyecto que tenemos ahora denominado Pesca artesanal sostenible recibió el premio de la Whitley Fund for Nature el 2010 de Inglaterra. Consulta de anteproyecto gratuitamente**

estas dispositivos a los pescadores artesanales, como se les indica a ellos y llevar un registro de las capturas. A su vez nosotros conectamos a estos pescadores con los chefs que prefieren sus productos por tener preferencias de responsabilidad ambiental. Actualmente trabajamos con Christian Bravo de Restrepo, Luis Encaden, Miguel Schaffner, así como con el equipo de staff que hacen el restaurante. Esta iniciativa está en práctica en varios puntos como Puerto Pizarro, Máncora, Sotaventura entre otros."

**WFN WHITLEY FUNDS FOR NATURE**

**EL DATO**  
El Whitley Award es un programa de competencia que se realiza anualmente desde 1994. En estos 18 años, se han otorgado más de 5 millones de dólares. Apoyando así a más de 130 líderes conservacionistas en 60 países.



Artículos completos en <http://www.urp.edu.pe/propuesta>



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## University researcher reaches finals of prestigious global competition

Joanna Alfaro-Shigueto, from Lima (Peru) has been named as a finalist in one of the world's most prestigious wildlife conservation competitions - the Whitley Awards.

Joanna is a recent graduate of the [Centre for Ecology and Conservation](#) and is currently working on a Darwin project for the University.

The next stage involves an interview with the panel of experts who will decide which of this year's seven international candidates will win a share of grants worth a total £210,000 GBP for their projects. The results will be announced during a ceremony at the Royal Geographical Society, on Wednesday 9 May at which WFN's patron, Her Royal Highness The Princess Royal (Princess Anne) will present the prizes.

Commenting on the shortlist, the [Whitley Fund for Nature's](#) (WFN) acting director David Wallis said: "Winning a place on the Whitley Awards shortlist is a major achievement in itself. Entries are always of a high calibre and only the most committed and effective nature conservationists win through to the finals. The candidates we are inviting to London for the next stage of judging are particularly impressive. Each one is taking inspirational steps to create a better future both for people and wildlife and we know that our judges are going to find it very difficult to choose between them."

Joanna Alfaro-Shigueto has won through to the finals because of her work with ProDelphinus to provide small-scale fishermen with the tools to fish more selectively and reduce their impacts upon endangered marine fauna such as sea turtles, seabirds and marine mammals.

She said: "This award will directly contribute to the empowerment of small-scale fishermen, by helping them to fish in a more selective and responsible way, and reduce the effect of their fisheries on the sea turtles, seabirds and marine mammals that are caught incidentally. With the generous support of WFN we envision achieving major advances in the conservation of our oceans and toward improving the livelihoods of the thousands of fishermen, their families and the communities that depend upon marine resources in Peru."

In addition to meeting the judges and HRH The Princess Royal, the trip to London includes opportunities to hear about the work of the six other finalists, attend receptions with leading conservation organisations and academics, meet WFN donors and receive professional development training.

Each Whitley Award winner will also have a new short film made about their work, narrated by the internationally-acclaimed wildlife broadcaster, Sir David Attenborough, a long-standing supporter and trustee of WFN. The films will be premiered as part of the awards ceremony and, later, be available to view online on YouTube.

The Whitley Awards scheme is an annual competition, first held in 1964. In the 49 years since the scheme began, it has given grants worth more than £5m to support the work of more than 130 grassroots conservation leaders in over 60 countries. To learn more about the charity, its donors and past winners, please see its [website](#).

Date: 14 April 2012

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Joanna Alfaro-Shigueto working with local fishermen in Peru



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## Pesca, iniciativa Darwin y premio para una peruana

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May 22, 2012

El 22 de mayo se celebra el Día Internacional de la Biodiversidad y el tema de este año está basado en los ecosistemas marinos. La peruana Joanna Alfaro, Directora de ProDelphinus, acaba de recibir un prestigioso premio en el campo de la conservación otorgado por la Whitley Fund for Nature (WFN).

**ProDelphinus**, trabaja desde el 2001 para la conservación de especies marinas en peligro en el Perú, como tortugas y aves marinas, nutrias marinas, cetáceos y tiburones. Los proyectos que se llevan a cabo están relacionados a la captura no deseada de estas especies en la pesca artesanal. Actualmente, ProDelphinus está focalizado en cómo solucionar y reducir la pesca no deseada de estas maravillosas especies.

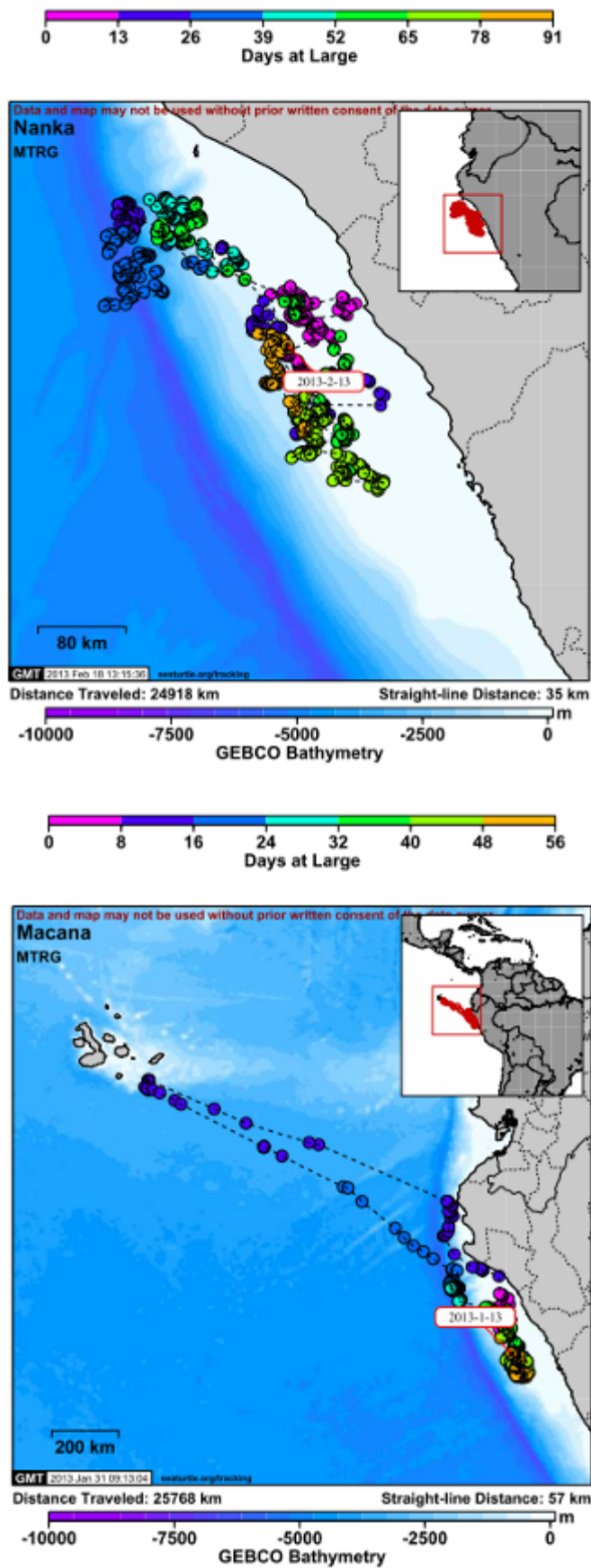
“El Océano Pacífico del lado del Perú es una de las zonas más productivas del planeta. Sostiene una de las pesquerías más grandes a nivel mundial- la pesca de la anchoveta. Esta gran productividad de sus aguas, nos permiten recibir especies, algunas en peligro de extinción, que viajan miles de kilómetros para alimentarse – como las tortugas laúd (*Dermochelys coriacea*) que vienen desde las playas de anidación en México o Costa Rica; así como las tortugas amarillas (*Caretta caretta*) que vienen desde Australia a 8000 kilómetros de distancia”, expresa **Jeffrey Mangel, PhD, de la Universidad de Exeter, Reino Unido.**

Sin lugar a dudas, la biodiversidad marina en el Perú es altamente privilegiada. Sin embargo, el constante crecimiento del esfuerzo de pesca genera grandes amenazas para algunas de estas especies, reduciendo sus poblaciones debido a la pesca incidental.

Está claro que la pesca artesanal es una fuente significativa de trabajo y de alimentos para comunidades costeras, por ello, lo que se busca es generar alternativas que mejoren las redes o aparejos de pesca de las embarcaciones pesqueras.

A través del apoyo de la **Iniciativa Darwin**, del Ministerio británico para el Medio Ambiente, Alimentación y Asuntos Rurales (DEFRA por sus siglas en inglés), algunos integrantes de ProDelphinus, como la estudiante de Maestría **Natalia Ortiz**, trabajan junto con los pescadores artesanales probando diferentes métodos de reducción del impacto de la pesca, como alarmas acústicas para reducir la

Satellite tracks of two waved albatrosses monitored from November 2012 to February 2013.



Examples of some of the technologies employed by the Darwin-SAFI project to monitor and reduce the bycatch of threatened and endangered marine fauna.

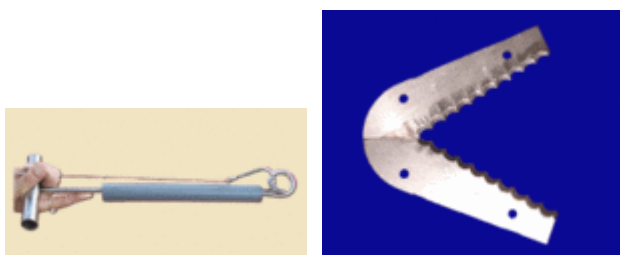
Cpods: marine mammal acoustic monitoring devices.



Weighted swivels increase sink rates of longlinebranchlines and reduce availability to seabirds.



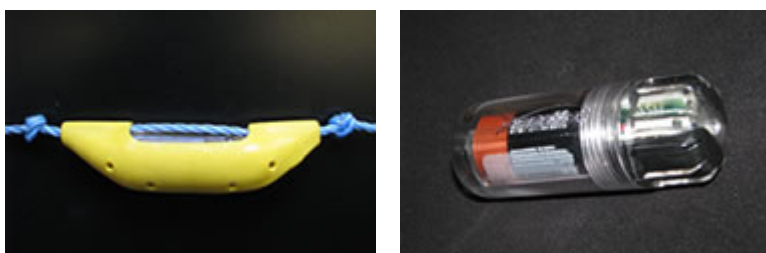
Dehookers and line-cutters assist in safely releasing incidentally caught animals.



LED lights have been shown to reduce sea turtle bycatch in nets while not impacting target catch.



Acoustic pingers have been shown to reduce the bycatch of porpoises and dolphins in nets.



Some of the of small-scale fishermen who have travelled to Lima, Peru to meet Pro Delphinus staff after first communicating through the HF-Radio program.



Makana and Johny from the port of Pucusana.



Two crew from the vessel Chelita 1, Pucusana.

Fishermen who attended a bycatch workshop in the port of Salaverry.



## **Assessment of a pinger trial to reduce small cetacean bycatch in a Peruvian driftnet fishery using passive acoustic monitoring**

### **Abstract**

The Peruvian small-scale driftnet fishery has one of the highest takes of small cetaceans in the world, and the use of acoustic alarms (pingers) has been found to significantly reduce bycatch rates in Peru, as well as elsewhere. This study used C-PODs to acoustically monitor the effect of pingers on small cetacean behaviour and offer insights into marine mammal distribution. A total of 105 control and 88 experimental sets were observed from April 2009 to May 2012 from the port of Salaverry, northern Peru. Dolphins and porpoises were recorded around 70% of control sets and 58% of experimental sets, highlighting how they regularly interact with the gillnet fishery. The use of pingers did not appear to significantly influence dolphin activity, with a reduction in detection positive minutes of only 8%. Pingers had a strong influence on porpoise activity, however, reducing detections by 96%. In control sets there were a total of one porpoise and 43 dolphin captures, and 17 dolphin captures in experimental sets. There was not a clear relationship between acoustic activity and bycatch. The results from this study suggest that pingers cause evasive reactions in porpoises and warn dolphins to the presence of the net, as the bycatch rate of both was reduced. This paper documents the first use of passive acoustic monitoring of the data deficient Burmeister's porpoise (*Phocoena spinipinnis*). C-PODs were successful in detecting the porpoise and are recommended for the management of this species, yet future studies require visual observations to confirm species identity.

**Key words:** passive acoustic monitoring, C-POD, pinger, small-scale fishery, gillnet, small cetacean, behaviour, Burmeister's porpoise, *Phocoena spinipinnis*, Peru

## Testing the use of visual deterrents to mitigate marine turtle bycatch of bottom set gillnets in Peru

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### Abstract

Fisheries have been shown to be one of the main threats to endangered marine fauna including sea turtles. Gillnets, one of the least selective gears, have been shown to have high interaction rates with sea turtles in Peru. Visual cues have been tested as a potential method to reduce sea turtle bycatch in this gear under controlled environments. We studied the effectiveness of light emitting diodes (LEDs) as visual deterrents in a field trial in small scale bottom set gillnet fishery in Peru whilst assessing the effect on capture of target species (guitarfish: *Rhinobatos planiceps*). Fifty one paired deployments (control and treatment) were undertaken between January 2011 and June 2012 in Sechura Bay, Northern Peru. Forty seven green turtles were caught in control nets resulting in a mean bycatch rate of 0.32 (range  $\pm$  1 SE: 0.25 to 0.42) individuals (1000m<sup>2</sup>day)<sup>-1</sup>, while in treatment nets twenty three green turtles were caught for a mean bycatch rate of 0.19 (range  $\pm$  SE: 0.14 to 0.25) individuals (1000m<sup>2</sup>day)<sup>-1</sup>. This 59% reduction indicates that LEDs may be effective at reducing green turtles bycatch in small scale bottom set gillnets. Catch rates of target guitarfish showed no significant difference between control and treatment nets (control nets mean CPUE: 0.85 (range  $\pm$  SE: 0.60 to 1.21) guitarfish (1000m<sup>2</sup>day)<sup>-1</sup>, treatment nets CPUE: 0.82 (range  $\pm$  SE: 0.58 to 1.17) guitarfish (1000m<sup>2</sup>day)<sup>-1</sup>). Implementation of this technology in the fishery could prove advantageous to green turtles which are likely originated from breeding populations in Ecuador and Mexico, particularly given current bycatch rates and the continuing growth in the fishery. Challenges to implementation remain however, and include equipment and fiscal costs, increased net handling time and fishers perceptions toward the technology and its effectiveness.

**Keywords:** LEDs; sea turtles; *Chelonia mydas*; catch per unit effort; small scale fishery; eastern Pacific; conservation.

## Darwin SAFI project associated conference presentations, 2012-2013

Adams, J., J.C. Mangel, J. Alfaro-Shigueto, P. Hodum, K.D. Hyrenbach, V. Colodro, P. Palavecino, M. Donoso, J. Hardesty Norris. 2013. Conservation implications of pink-footed shearwater (*Puffinus creatopus*) movements and fishery interactions off South America assessed using multiple methods. Oral presentation, Pacific Seabird Group, Oregon, USA, 20-24 February 2013.

### ABSTRACT:

Approximately 60,000 pink-footed shearwaters (PFSH, *Puffinus creatopus*) breed on three islands off Chile and undertake trans-equatorial migrations to foraging grounds off the Pacific coasts of Central America, Mexico, USA, and Canada. Known anthropogenic threats at their breeding colonies include chick harvesting, depredation by introduced species, and habitat degradation. To better understand threats at sea related to fisheries off South America, we determined the movements of satellite-tracked PFSH in relation to geographic and political boundaries and movements through known fishing grounds. PFSH interact with fisheries in Chile, Peru, and Ecuador; our measured distribution of satellite-tracked PFSH off South America indicates potential risk for bycatch with multiple fisheries. In addition, rapid assessment surveys at 13 Chilean ports yielded an estimated annual bycatch and subsequent mortality of 1,384 and ca. 1000 PFSH, respectively. Tracking revealed fine-scale coastal movements of the species and its affinity with waters over the continental shelf and shelf-break shared also by numerous fisheries that use gillnets and purse-seines. The Peruvian Port of Salaverry driftnet fishery had the greatest overlap with PFSH and observers in this fishery documented a PFSH bycatch rate of 0.004 PFSH set<sup>-1</sup>. Given the size of the Peruvian gillnet fleet (ca. 3000 vessels, 80,000+ trips annually) - this catch rate could result in considerable total catch. Several options for future actions include, additional monitoring, additional observer effort off central-northern Peru, assessments of risks with purse-seiners off Chile and Peru, and artisanal fisheries off Central America and Mexico.

Alfaro-Shigueto, J. 2013. Conserving sea turtles by land and by sea in Peru. Oral presentation, Sea Turtle Symposium, Maryland, USA, 2-8 February.

### ABSTRACT:

Building on the effectiveness of the renowned series "Beyond the Obituaries: Success Stories in Ocean Conservation" presented at the past two International Marine Conservation Congresses, this session will highlight outstanding, inspiring sea turtle conservation successes around the world, with celebrated experts distilling the recipes of their success for conservation professionals, policy makers, and press. The session will be moderated by Juliet Eilperin, science writer for the Washington Post and author of the acclaimed *Demon Fish*. The program will consist of presentations followed by a structured Q&A, using the best audience questions to seed an insightful dialogue. The short presentations and dynamic format are designed for accessibility to the public and press to highlight sea turtle conservation success and opportunities while the 33rd ISTS is in the Washington DC area.

Alfaro-Shigueto, J., J. Mangel, N. Ortiz, B. Godley, E. Campbell. 2013. Overcoming logistical challenges of implementing observer programs in small-scale fisheries. Poster presentation, Sea Turtle Symposium, Maryland, USA, 2-8 February.

### ABSTRACT:

Onboard observers has been identified as the most accurate way to assess bycatch and mortality in fisheries operations. However, the implementation of onboard observer programs in small-scale fishing fleets, which are thought to have high levels of sea turtle bycatch, is very challenging. This is due mostly to logistical factors, such as small vessel size, which limits the space available for an extra person (the observer).

We tested the use of a SPOT Satellite GPS Messenger in parallel with an onboard observer program aboard small-scale fishing vessels. This device allows communication with up to ten previously programmed contacts. It operates using satellites and can therefore be used anywhere in the world. The SPOT has five standard functions that can be used to track the unit's position (Lat/Lon), send SOS alerts, send emergency alerts, provide regular check-ins, and, in more advanced versions, even send short text messages.

SPOT trials were conducted from Salaverry port, Peru from May 2011 to August 2012. The function used was 'Check-in' which we programmed so that two email addresses received real-time position alerts. It was not necessary to change the unit's batteries during the study period. We received a total of 163 signals, corresponding to the GPS positions of 163 fishing sets conducted by the observed vessels. A comparison of positions between the SPOT messages and those noted by observers using handheld GPS units indicates that the two devices typically provided locations within  $0.20 \pm 0.19$  km of each other, with the differences accounted for due issues such as vessel drift and timing of position.

Given the SPOT's low cost (\$120US, plus a \$99 annual subscription), compact size, and ability to gather and transmit real time position information, it can serve as option in facilitating the implementation of an observer program where logistical challenges preclude obtaining more detailed trip or bycatch data. As one of the SPOTs functions is as an emergency alert, it could be of added value to small-scale vessels which frequently lack safety devices such as EPIRBs.

Suarez-Yana, T., J. Alfaro-Shigueto, J.C. Mangel, D. Montes I., R. Zuñiga. 2013. Determination of hematological and biochemical values in a wild population of green turtles (*Chelonia mydas*) in northern Peru. Poster presentation, Sea Turtle Symposium, Maryland, USA, 2-8 February.

#### ABSTRACT:

The green sea turtle (*Chelonia mydas*) is the most common sea turtle in Peru. The species is considered endangered by the IUCN as a result of anthropogenic threats including fisheries bycatch and threats at nesting beaches. Due to their migratory behavior, green turtles are an important bioindicator of the coastal marine environment, both locally and globally. In addition, variability in hematological and biochemical values may occur because of geographic area, diet, season, age, etc., which help define the variance in each population. In this study, we analyzed 32 clinically healthy individuals that were incidentally captured in artisanal fisheries from Sechura Bay, Peru. The average hematological and biochemical values found were: erythrocytes  $0.52 \pm 0.18 \times 10^9/\mu\text{L}$ , hematocrit  $33 \pm 5$  %, mean corpuscular volume  $720.62 \pm 288.76$  fL, leukocytes  $15.25 \pm 5.73 \times 10^3/\mu\text{L}$ , heterophils  $9.66 \pm 4.43 \times 10^3/\mu\text{L}$ , lymphocytes  $3.58 \pm 1.61 \times 10^3/\mu\text{L}$ , eosinophils  $0.55 \pm 1.41 \times 10^3/\mu\text{L}$ , monocytes  $1.47 \pm 0.91 \times 10^3/\mu\text{L}$ , normal thrombocytes, alkaline phosphatase  $38.04 \pm 14.85$  UI/L, alanine aminotransferase  $32.38 \pm 42.89$  UI/L, aspartate aminotransferase  $191.17 \pm 64.63$  UI/L, urea  $64.31 \pm 37.84$  mg/dL, creatinine  $0.25 \pm 0.28$  mg/dL, glucose  $148 \pm 52$  md/dL, total protein  $4.2 \pm 0.7$  g/dL, albumin  $2.2 \pm 0.6$  g/dL, globulin  $2.1 \pm 0.4$  g/dL and A/G ratio  $1.1 \pm 0.6$  g/dL. There was no correlation of body size with any of the blood parameters measured. The values of erythrocytes, hematocrit and mean corpuscular volume are within the reference values from other Pacific Ocean regions. While there are similarities with blood chemistry values reported here with those from other healthy green sea turtle populations, urea, total protein, albumin and globulin values are higher, probably due to an omnivorous diet rich in proteins and carbohydrates. Post-capture stress may have affected glucose and heterophils values. This is the first hematological and biochemical study for green turtles in Peru and is thus an important advance in our understanding of this species in the region.

Velez-Zuazo, X., J. Alfaro-Shigueto, J. Mangel, R. Papa, I. Agnarsson. 2012. What barcoding is revealing about the shark fishery in Peru. Poster presentation, World Congress of Herpetology, Ichthyologists and American Elasmobranch Society, Vancouver, Canada, 8-14 August 2012.

#### ABSTRACT:

Many sharks and rays are globally threatened as a result of overfishing and bycatch. Currently, there is a growing interest in sustainable conservation of sharks but important gaps in knowledge hinder decision-making at the government level including a lack of basic knowledge



of the diversity of species targeted as well as incidentally captured by commercial fisheries. In Peru, in the southeast Pacific, the small-scale fisheries comprise ca. 10,000 vessels and, for most elasmobranchs species, it goes largely unregulated and unmonitored. Moreover, for the elasmobranchs fisheries, insufficient monitoring of landings coupled with limited taxonomic identifications have resulted in a poor understanding of the diversity of species caught in Peruvian waters. Molecular analyses, particularly the use of a genetic barcode approach, can play an important role in improving our knowledge of the diversity of elasmobranchs species occupying the marine habitats of Peru and captured by the small-scale fisheries. We analyzed samples collected from six ports along the coast of Peru between 2004 and 2009. We successfully amplified 715bp of the cytochrome oxidase I region of the mitochondrial DNA and identified 110 specimens at the species level. Nine species of sharks were identified. In many cases landed specimens had been misidentified. In port, the smooth hammerhead (*Sphyrna zygaena*) was identified correctly every time, the blue shark (*Prionace glauca*) was correctly identified 86% of the time and the shortfin mako (*Isurus oxyrinchus*) 66% of the time. For other specimens with a non-informative common name (i.e. shark), molecular identification clarified the species. Interestingly, all samples from thresher shark were identified as pelagic thresher (*Alopias pelagicus*) although in Peru the common thresher (*A. vulpinus*) is the species reported as more common and commercially important. We identified one specimen of the dusky shark (*Carcharhinus obscurus*) which represents a new species report for Peru. Of the nine sharks species identified, five are considered a threatened by the IUCN Red List. This study represents the first large-scale initiative to barcode Peruvian marine species and generated a molecular-based taxonomic list of elasmobranchs targeted by fisheries in Peru.

Alfaro-Shigueto, J., N. Balducci, D. Montes, N. Ortiz, J.C. Mangel. 2012. Varamientos de grandes cetáceos y su relación con interacciones con la pesca artesanal en el norte de Perú. Poster presentation, 3rd Congreso de Ciencias del Mar del Peru, Lima, Peru, 25-29 June.

#### ABSTRACT:

El presente trabajo establece una posible relación entre los cetáceos mayores y la cantidad de avistamientos, interacciones con embarcaciones pesqueras y varamientos.

Desde Julio del 2011 a Febrero del 2012 se llevó un registro mensual del número de interacciones durante faenas de pesca artesanal y grandes cetáceos frente a Lambayeque. Esta información fue registrada a través de entrevistas en el puerto San José (06°46.141; 79°58.068). La ubicación, fecha y cantidad del grupo de cetáceos avistados, el efecto de estas interacciones en embarcaciones y aparejos de pesca y, pérdidas económicas fueron registradas. Se realizaron 64 encuestas correspondientes a 64 viajes de pesca, de los cuales el 85.5% tuvieron avistamiento y/o interacción con cetáceos mayores. Un total de 164 individuos fueron registrados. El daño en aparejos fue representativo, 28 redes afectadas en el 25% de viajes, lo que genero una perdida aproximada de 25 000 nuevos soles de gasto. No hubo registro de muerte consecuente de ballenas. Diciembre, Julio, Octubre y Enero fueron los meses con mayor registro de cetáceos mayores. La mayor cantidad de daños a aparejos se presento en Diciembre y Enero. Adicionalmente, se obtuvo información de 3 varamientos de cetáceos mayores en la costa norte del Perú entre Noviembre y Enero.

Para mitigar las interacciones fatales de cetáceos con actividades de pesca, se realizaron talleres de capacitación a pescadores locales sobre conservación y el uso de material de mitigación de captura incidental, así como la correcta liberación de cetáceos mayores. Recomendamos incrementar el esfuerzo de prevención durante la época de migraciones de ballenas con el fin de concientizar y minimizar el impacto negativo entre la pesquería artesanal y estas especies amenazadas.

Velez-Zuazo, X., J. Alfaro-Shigueto, J. Mangel, R. Papa, I. Agnarsson. Lo que el código de barras genético nos revela sobre la pesquería de tiburones en Perú. Poster presentation, 3<sup>rd</sup> Congreso de Ciencias del Mar del Peru, Lima, Peru, 25-29 June.

#### ABSTRACT:

Muchos tiburones y rayas están amenazados a nivel mundial debido a sobrepesca y captura incidental. En el Perú, la pesquería artesanal para muchas especies de elasmobranchios, pasa

en gran medida no regulada y no controlada. El control insuficiente de los desembarques, junto con una limitada identificación taxonómica ha dado lugar a un conocimiento incompleto de la diversidad de elasmobranquios capturados en aguas peruanas. Los análisis moleculares, usando el código de barras genético, pueden mejorar nuestro conocimiento de la diversidad de las especies de elasmobranquios que ocupan los hábitats marinos de Perú y capturados por la pesquería artesanal. Analizamos 715bp del gen mitocondrial COI en 110 muestras de tejido obtenidas en seis puertos a lo largo de la costa del Perú entre 2004 y 2009 para identificarlas a nivel de especie. Nueve especies de tiburones fueron identificados. En muchos casos, los especímenes desembarcados habían sido identificados erróneamente. El tiburón azul (*Prionace glauca*) se identificó correctamente el 86% del tiempo y el marrajo (*Isurus oxyrinchus*) 66% del tiempo. Para muestras con un nombre común no informativo (i.e. tiburón), la identificación molecular aclaró la especie. Curiosamente, todas las muestras de tiburón zorro fueron identificadas como zorro pelagico (*Alopias pelagicus*), aunque en el Perú, el zorro común (*A. vulpinus*) es la especie reportada como común y de importancia comercial. Se identificó un ejemplar del tiburón arenero (*Carcharhinus obscurus*), que representa un reporte nuevo. De las nueve especies de tiburones identificados, cinco son considerados Amenazados por la Lista Roja de la UICN. Este estudio representa la primera iniciativa para caracterizar genéticamente especies marinas en Perú usando código de barras.

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