

Darwin Initiative – Final Report

(To be completed with reference to the Reporting Guidance Notes for Project Leaders
(<http://darwin.defra.gov.uk/resources/reporting/>) -

it is expected that this report will be a **maximum** of 20 pages in length, excluding annexes)

Darwin project information

Project Reference	14-048
Project Title	Galapagos Coral Conservation: Impact Mitigation, Mapping and Monitoring
Host country(ies)	Ecuador
UK Contract Holder Institution	University of Edinburgh
UK Partner Institution(s)	University of Southampton
Host Country Partner Institution(s)	Charles Darwin Foundation, Conservation International, Galapagos National Park Service, WildAid
Darwin Grant Value	£150,000
Start/End dates of Project	May 2005 / April 2008
Project Leader Name	Professor Terence P. Dawson
Project Website	http://gg-svr7.geog.soton.ac.uk/staff/tpd/gcm/
Report Author(s) and date	Terence Dawson, Stuart Banks, Scott Henderson, Godfrey Merlin, 2008

1 Project Background

The northern islands of Wolf and Darwin form a distinct and isolated biogeographic zone in the Galapagos archipelago. The marine habitats that surround these islands support a high level of biodiversity, including priority conservation endemic corals and associated species that are subject to extreme climatic and anthropogenic pressures. This project has undertaken a comprehensive study for the establishment of baseline biodiversity inventory and mapping datasets, as well as actively engaged with the fishing and tourism industries for improved management of the marine environment through capacity-building of local tourism and diving guides and fishers, and the establishment of permanent mooring buoys to avoid boat anchor damage.

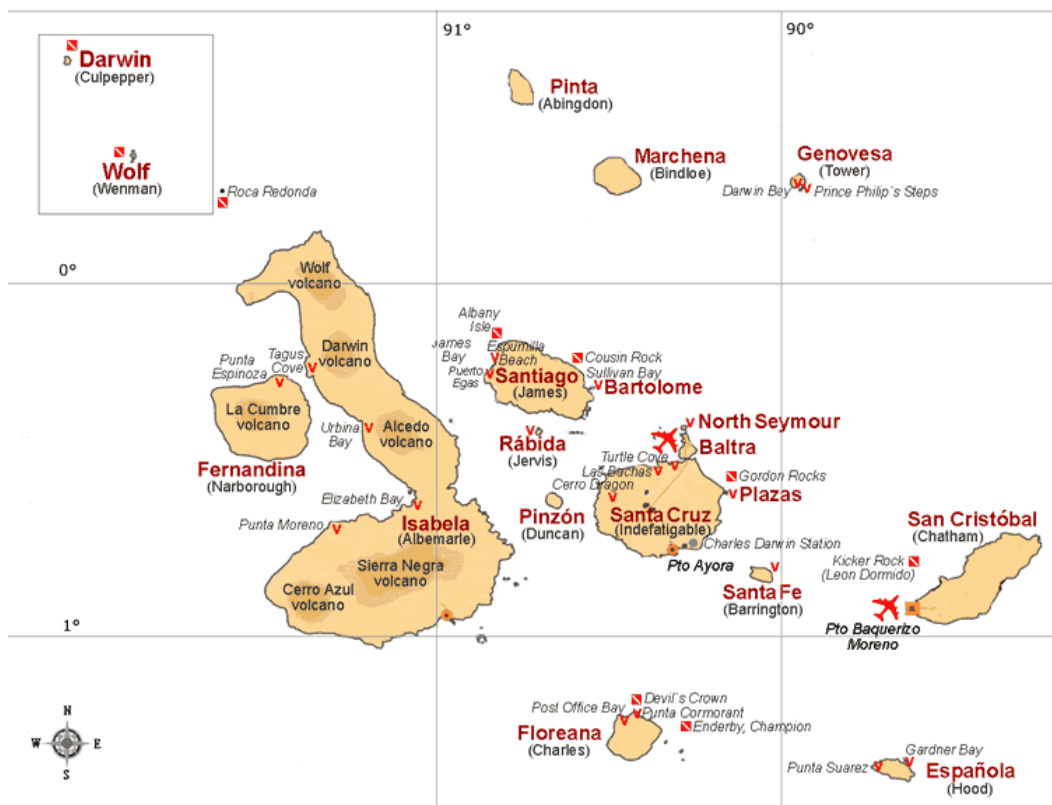


Figure 1. The Galapagos archipelago. The islands of Darwin and Wolf (shown inset) are located 186 km and 229 km, respectively northwest of the northern tip of Isabela.

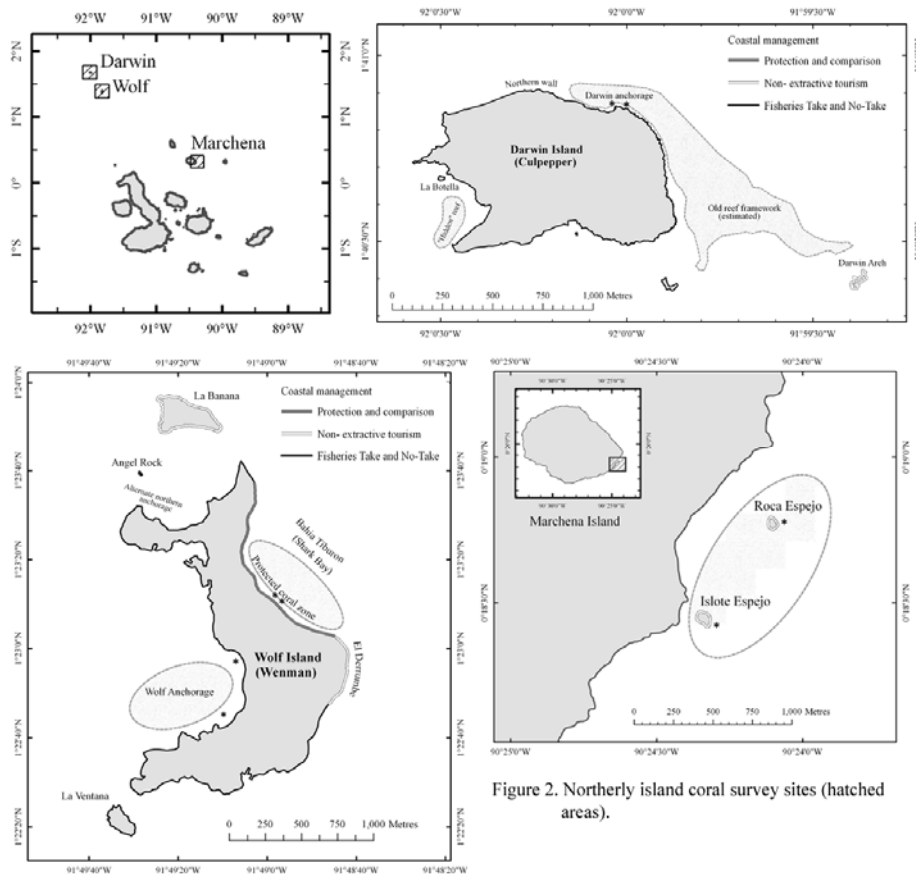


Figure 2. Northerly island coral survey sites (hatched areas).

Figure 2. Specific Project study sites across the northerly Islands of Wolf, Darwin and Marchena.

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

Many of the Galapagos corals are now CITES listed. This project contributed valuable information on which to further substantiate such listings for existing and other coral species. Indeed, one of our project's greatest challenges was obtaining CITES permits to be able to transport specimens that we had collected during the expeditions to international laboratories for analysis.

The project directly assisted the Ecuador Government in implementing the following CBD Articles:

1. Baseline research into coral reef composition, distribution and condition (Arts. 7a, 7c, 7d, 12b);
2. Immediate remedial measures to halt rapid coral degradation due to boat anchoring and associated activities (Arts. 8c, 8d, 8f, 8i, 8l, 10b);
3. Establishment of a monitoring program to provide direct measures of reef recovery and guide management measures, which promotes sustainability via stakeholder education & inclusion (Arts. 7b, 7c, 7d, 8e, 10d, 10e, 12a, 13a).

Specifically project contributions to CBD outcomes included:

1. Development of permanent moorings to provide priority conservation of reef species (Arts. 8c, 8d, 8f) and a low/ no anchor concept for the Galapagos Marine reserve
2. Stakeholder training/involvement assures sustained mooring function (Art. 10d).

3. Coral conservation enhances sustainable economic activity by protecting dive tourism, and to a lesser degree, artisanal fishing through strengthening of natural ecosystem function through tourism best practices and No-Take Zone refuge areas for fisheries stocks (Art. 8i).
4. The benefits of coral conservation were conveyed in workshops, encouraging commitment from the dive tourism industry and GNPS to use and maintain moorings (Art. 10e) and implementing the monitoring protocols (Art. 7b). Workshops have trained target groups in coral conservation values (Art. 12a), enlisting them as advocates (Art. 13a).
5. A high quality field guide publication facilitated knowledge transfer for managers and tourism sectors (Art. 13a).
6. The baseline research and subsequent monitoring (Art. 7a, 7b, 7c, 12b) provided the scientific justification for including these coral areas as important components within GMR non-extractive areas (Arts. 8k, 8l, 10b). Research protocols and moorings methods were extended to other Eastern Tropical Pacific (ETP) Marine Corridor protected areas through wider international expert participation (a Conservation International commitment). The project leaves a lasting legacy in Galapagos and beyond through connections to other regional Marine Protected Areas in the ETP, including Gorgona National Park and Malpelo Fauna and Flora Sanctuary (Colombia), Coiba National Park (Panama) and Cocos National Park (Costa Rica), as well as Los Corales de Rosario (Colombian Caribbean) and Los Roques National Park (Venezuela). In each of these cases either researchers or students from these areas participated in research and training activities in Galapagos or local researchers went to these sites to share methods and skills.

In terms of thematic areas, the project successfully addressed the following CBD themes: biodiversity and tourism, climate change and biodiversity, marine and coastal biodiversity public education and awareness and sustainable use and biodiversity, and other themes including 'Ecosystems approach', use of 'Indicators', and "Protected Areas' are also relevant to a significant degree.

Updated coral data is incorporated into the Charles Darwin Foundation (CDF) scientific repository, who continues to manage this information for local decision makers, stakeholders, education and advocacy for coral conservation in the region as part of its institutional mission and agreement with the Ecuadorian government. The scientific review of CITES listed Galapagos corals protected coral species was also requested by the Ministry of the Environment for the period 2002-2008.

In terms of partnerships and capacity building with respect to CBD themes, young researchers at the CDF, guides from the local Galapagos guides association, fishermen from local fishing cooperatives and National Park personnel were trained in coral ecology, reef monitoring and research protocols and mooring installation methods.

Interactions with Ecuador's CBD focal points were not held, but all research components of the project and some training events were undertaken under the auspices of the Galapagos National Park Service, which is Ecuador's environmental authority on all marine biodiversity management issues in Galapagos.

3 Project Partnerships

The partnership arrangement was very successful, with a high degree of commitment from each of the principal partners. The University of Edinburgh (University of Southampton since September 2007) maintained regular communication with in-country partners, and has coordinated project planning and reporting and participated in all major field campaigns. The CDF also integrated the DI project within the Galapagos National Park (GNP) approved Operating Plan which approves, organizes and administers all scientific and conservation activities for the Reserve each year. The GNP had long noted the need for specific coral impact mitigation measures and this project responded to that need. The project was planned with

extensive inputs from all local partners and executed with decisions being made primarily by local partners that took full 'ownership' of the project as an institutional priority, but with careful coordination, and benefiting, from the inputs of the UK-based lead organization.

The principal local collaborators (specifically, the CDF, WildAid and the GNP) have worked cooperatively with each other for many years, and this long-term relationship has helped significantly in resolving minor difficulties in undertaking the project. By bringing these and new partners, including the recently-established Conservation International (CI) and the University of Edinburgh (UoE), together, most project goals were reached, and in some cases, exceeded. This local partnership was greatly extended by bringing many visiting coral experts and MPA managers from other sites (Malpelo and Islas del Rosario) so they could participate in trips and directly supervise field activities, and in some cases, hosted visits from local CDF researchers to contribute to their professional development in other coral reef regions noted in the previous section. These partnerships have been very strongly established with representatives from most of these sites coming together in Ecuador for a major regional ecological monitoring 'summit' at the end of September 2008.

In terms of lessons learned relating to partnerships, the project leaders have been particularly pleased with the level of cooperation between the local NGO partners and attribute this success to regular consultations and joining planning to establish a shared marine conservation agenda in Galapagos. Likewise, the level of commitment and skill showed by local fishermen that participated in research cruises was impressive, and we are confident that the participation of these individuals contributed to their conservation ethic and willingness to more proactively cooperate with future marine management initiatives. In terms of challenges, we found it considerably more difficult than expected to develop strong commitments from the local guides association to participate in project activities. We attribute this to the fact that many local dive guides that spend extensive time away from home when working are reluctant to dedicate 'off time' to spending further time at sea. Another challenge, which has finally been overcome through a great deal of patience and identifying counterpart funding from other projects, has been gaining formal Navy approval for the mooring design and GNP cooperation to transport the moorings to deployment sites. Overcoming these challenges has in fact built much stronger partnerships with both the Navy and Park, which will contribute to project sustainability and facilitate future efforts between the partnership network. To this end, formal MOUs¹ now exist between CDF and GNP, WildAid and GNP, and CI, WildAid and the Navy.

The project has maintained an on-going working relationship with the Darwin project No. 12-021 (Marine biodiversity assessment and development in Perlas Archipelago, Panama) to share information and data to support high quality research, and 'best practice' approaches to managing marine protected areas. Dr Hector Guzmán, from the Smithsonian Tropical Research Institute (STRI) attended and contributed to an IUCN red-listing workshop to evaluate Eastern Tropical Pacific corals and using data collected on field expeditions funded under this project held on Santa Cruz, Galapagos from 27th-30th May, which was organised back-to-back with the 2nd Darwin expedition cruise to the northern Islands of Galapagos in May 2006.

Reciprocally, our project sent a representative to an event hosted by Dr. Guzman in Panama to review advances on the Las Perlas project in March 2006. The 2nd expedition conducted over the period 15th to 25th May 2006, together with a 3rd expedition cruise from 2nd to 9th March 2007 included the following invited international marine and coral scientists (listed with their respective institutions):

- Dr. Sylvia Earle, Executive Director, Global Marine Programs, Conservation International; Explorer in Residence, National Geographic Society, USA (Former chief scientist of the U.S. National Oceanic and Atmospheric Administration). May 2006 expedition and researcher in the Galapagos Islands in the late 1960's.
- Professor Peter W. Glynn, Division of Marine Biology and Fisheries, Rosenstiel School of Marine and Atmospheric Science, University of Miami, USA (May 2006 and March 2007 expedition). Pre-eminent Galapagos coral researcher active in the Galapagos since the early 1970's.

¹ Note that these MOUs were not established as a result of this project, but they have been initiated and/or strengthened by it.

- Professor (Emeritus) Cleve Hickman, Department of Biology, University of Washington and Lee, Virginia, USA (May 2006 and March 2007 expedition), author of four field guides covering Galapagos marine invertebrates, including the coral guide produced with support from this project.
- Dr. Graham Edgar, Tasmanian Aquaculture and Fisheries Institute, University of Tasmania; Conservation International, Australia (May 2006 expedition), former Director of the Darwin Station's Marine Biology Department and expert in marine monitoring protocols in the Eastern Tropical Pacific.
- Dr. Jorge Cortes, Centro de Ciencias del Mar y Limnologia (CIMAR), Universidad de Costa Rica, Costa Rica (May 2006 expedition), one of Costa Rica's foremost coral ecologists with extensive regional and international experience.
- Dr. James D. Reimer, University of the Ryukyus - Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Okinawa 901-2213, Japan (March 2007 expedition), international expert on zooanthids.
- Dr. Odalisca Breedy, Centro de Ciencias del Mar y Limnologia (CIMAR), Universidad de Costa Rica, Costa Rica (March 2007 expedition), foremost regional expert on soft corals (gorgonians).
- Dr. Bernhard Riegl, National Coral Reef Institute, Oceanographic Centre, Nova Southeast University, U.S.A (March 2007 expedition), expert in coral ecology and recovery following disturbance events.
- Dr. Iliana B. Baums, Department of Biology, The Pennsylvania State University, U.S.A (March 2007 expedition), expert in coral larval dispersal and genetics.
- Dr Estrella Villamizar, Ph.D INstitute of Tropical Zoology Central University of Venezuela, Venezuela (September 2005 expedition), expert in coral health and ecology, Los Roques National Park.
- Adrienne M. Romanski (PhD candidate), Department of Ecology, Evolution and Environmental Biology, Columbia University, New York, USA (May 2006 expedition), expert in coral recovery and zooxanthellae genetics as related to resistance to climate change associated with warming sea conditions.

The project also hosted a representative from UNESCO. Marjaana Kokkonen, from the UNESCO World Heritage Centre, joined us on our 1st diving expedition to the northern islands in September 2005 and assisted us with the monitoring and mapping activities.

4 Project Achievements

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

When the Galapagos Marine Reserve was declared in 1999, including the far northerly islands which contain the majority of the last remaining coral reef structures, there were few indications as to the status of those reefs after the strong ENSO events. Early surveys suggested that the zone was functionally important in maintaining GMR diversity, yet there was no systematic way of following recovery, or justifying improved management measures in the face of a near exponential increase in dive tourism and fishing pressures. Ten years later the DI project catalogued the species assemblages with a view to provide the basis for improved protection of what is now known to be a fragmented spatially restricted habitat for the islands, which nonetheless accounts for a significant portion of the total marine diversity of the archipelago as a whole. The analysis of the data collected during the project recommends that from a biodiversity standpoint managers should prioritise coral conservation measures and encourage a sustainable use of the northern islands reef system. This is a complicated facilitation process towards adoption of best tourism practices, changes in user perception, and specific measures such as the low impact anchorages advocated during this project. Although more remains to be done in the longer term and definitive quantitative measures of coral recovery will require ongoing surveys for which we have already secured additional funding, we are confident that coral cover will increase and the associated reef biodiversity will increase as a direct result of deployment of fixed moorings in the near term and eventual designation of these areas as fully

protected No Take zones in the medium term. This project has achieved the former and provided the information base for the latter.

The social impacts included an improved awareness for coral conservation through various local outreach events, involving representatives from the tourism and fishing sectors, a series of coral publications in a special edition of Galapagos Research journal, production of a series of coral indicators for the National Park Service in 2008 and inclusion of the Galapagos results as part of a wider high profile publication in Science (July 2008) concerning extinction risk to corals through an IUCN analysis during the project lifetime. Although it is difficult to estimate change in behaviours we expect that the number of infractions from anchor deployment in coral zones will decrease as a result of general operator awareness and a stronger Park Ranger presence in the northern Islands who are appropriately aware of the issue. Additional social impacts include:

1. A more secure natural capital foundation (intact coral reefs) on which to base dive tourism, which generates direct and indirect economic benefits for a significant number of Galapagos residents.
2. Although tourism has long existed in project focal sites, the deployment of moorings is an important step in improving the sustainability of tourism as a primary income generating activity.

4.2 Outcomes: achievement of the project purpose and outcomes

Perhaps one of the greatest outcomes motivated by the project has been an endorsement by the National Park Service for anchor free tourism, as a means of both regulating the activity through limiting visits to available berths and an accompanying support (including financial donation of equipment) from the tourism sector itself. Up to date coral information was passed to sector groups and Park managers during the project and is summarised in detail within the *Galapagos Research* publication Special Edition dedicated exclusively to articles directly produced by this project. Updates in taxonomy are generally available in a new Galapagos Marine Life Series guide endorsed by the varied coral experts involved in the DI project. The coral reef component for Galapagos compares directly with well studied reef systems in Coiba, Panama, Gorgona and Malpelo Island, Colombia, Coco Island, Costa Rica through an Eastern Tropical Pacific Marine Corridor Scientific Advisory group. This important network works under sponsorship by CI to standardise comparisons between regions, promote consistent monitoring and gauge the impact and functional importance of regional MPAs across connected marine systems.

In terms of local stakeholders, we anticipated stronger commitments from local fishermen, specifically those that participated in research cruises, to cooperate with marine management authorities and NGO groups in framing and complying with management measures, in particular those designed to protect fragile reef habitats.

4.3 Outputs (and activities)

All the important outputs have been met or exceeded. This project has already greatly enhanced local, regional and international-level knowledge and appreciation for Galapagos highly threatened and unique coral reefs and associated fauna. Although it is always difficult to measure improvements in general ecological condition of an entire ecosystem over two years of field surveys, the coral areas are showing remarkable improvement that has surely been helped by the combination of increased awareness by stakeholders and interim measures by the Park Service to reduce anchoring in sensitive reef areas, as well as natural recovery which is being observed at other sites in the Eastern Tropical Pacific. Experience has shown, however, the moorings are much needed as some boats are still anchoring inappropriately. The presence of permanent moorings, the new floating base (*Tiburón Martillo*), which is to be installed in the northern islands, and a clear Park Service policy to use them is the only way to eliminate this highly damaging act. CI and WildAid using counterpart funds to the DI project have worked continuously to promote the installation of the Park floating base station which is

scheduled for installation in late September 2008 by the National Park (not a project output), CI WildAid and CDF encountered various technical and logistical challenges in the installation of buoys which called for considerable coordination between Navy groups and the Park Service led by DI project technicians. After extensive negotiations a test mooring was installed locally in Puerto Ayora and monitored continuously for a month (Figure 3), which was followed by further buoy deployments at Bartolomé island (Figure 4). The output indicators were appropriate for their purpose and are reported against in annex 1.



Figure 3. Painting the Darwin Initiative logo on the mooring buoys and a test deployment in Puerto Ayora, Galapagos.

In terms of assumptions, most held well. Despite early indications that 2007 could have been a strong El Niño year which may have resulted in coral mortality, conditions did not warm to a level that produced effects that would have possibly overridden the coral recovery that has been observed on the recent field expeditions. What proved to be an interesting event was a subsequent shock of cold upwelling water and development of a strong La Niña cold condition which resulted in extensive previously undocumented bleaching effects across the archipelago. Corals recovered in the far north, yet suffered strong mortalities in certain cold intolerant species in the southern archipelago into 2008. This thermal shock event was subsequently documented and included within the published analysis in *Galapagos Research* as well as shared with the US NOAA Coral Reef Check groups and climate change forums. Although participation by guides and fishermen in the workshops and field activities was secured, a generalized stakeholder survey did not prove feasible. However, we do not believe this has hindered our ability to state with confidence that perceptions, knowledge and concern for Galapagos corals has greatly improved due to project interventions.



Figure 4. Installation and deployment of a mooring buoy at Bartolomé island, Galapagos.

4.4 Project standard measures and publications

4.5 Technical and Scientific achievements and co-operation

8 peer review publications were collated in a Special Edition of the CDF publication Galapagos Research covering the wide range of coral research undertaken during the project. In house protocols were produced for coral habitat swath mapping, coral specific linear intercept transects and an adapted Atlantic Gulf Rapid Reef Assessment method across fixed plots for long term comparisons elaborated through project PIs and invited regional experts. Two taxonomic guides were published including the most elaborate and challenging guide to the radiate invertebrate groups as part of the Galapagos Marine Life Series (Hickman, 2008). Technical data incorporated into GMR long term monitoring for the Galapagos National Park Service and stakeholders includes a current species inventory for the northerly coral reef communities, and an assessment of the state of marine communities for a comprehensive indicator system being developed by CDF with the Park for the entire GMR. The data produced by the DI project fed into an IUCN red listing process producing the first red listing of threatened coral groups in 2007, later published as an extensive global review of extinction risk to corals in Science (July 2008).

4.6 Capacity building

Local partner CDRS has significantly increased its capacity to conduct coral research as a result of DI investment, having been afforded support in both sampling design techniques and a range of expert inputs coordinated under the project. CDRS, WildAid and Park Service also have qualified technicians experienced in installation of moorings for the future. Ecuadorian project students and junior staff were trained in coral sampling methods, and are developing

postgraduate research proposals for 2009 with some of the invited coral experts involved in the research expeditions. There is a pattern of CDF project trained postgraduate students reintegrating into resource management and local resource manager positions upon their return to Ecuador since the local education base is very limiting. Trained CDF staff past and present also gained and shared their skill set with other regional MPA researchers conducting subtidal ecological surveys in Los Roques, Venezuela, Coiba, Panama, Coco Island, Costa Rica and Machalilla, mainland Ecuador. Finally, local tour guides and fishermen that participated in research expeditions were trained in habitat mapping, coral sampling and species identification techniques.

4.7 Sustainability and Legacy

The base line coral information is now available, and will also be published on-line through our UK partners. The coral field guide and IUCN coral red listing assessments provide two lasting tools to facilitate the work of coral researchers and managers at the local, national and regional scales. Project staff are being retained by their respective institutions pending continuation projects. Project mooring equipment has been largely installed in the marine reserve with some materials for replacements and future installations, as well as the hydraulic systems which will now be managed by CDF, WildAid, Park and the Ecuadorian Navy with discussions as to an independent unit responsible for maintaining the buoy arrays. An explicit aim of this project was to ensure concrete measures, the installation of moorings, and to provide enduring protection for the Galapagos most important coral areas. The biological and economic importance of Wolf and Darwin Islands as part of the regional biodiversity heritage and a source of dive tourism income is much more visible at a local level and with managers and planned revisions of the management plan will include sensitivity recommendations through continued work by science and conservation groups together with stakeholders. Partner institutions and PIs have strong links through various ongoing initiatives and projects in Galapagos that will continue as well as a much reinforced larger regional network through the rich scientific involvement of other coral MPA experts during the project. Although not yet accomplished, an important ongoing goal is the establishment of Wolf and Darwin islands as fully protected 'no take' zones, and this project has provided the technical basis and the local partnership to pursue this goal as the Galapagos Marine Reserve zoning system is reviewed over the coming years. Full protection of these islands as a result of this project would be one of the more significant legacies made in the GMR to date.

5 Lessons learned, dissemination and communication

In terms of lessons learned, somewhat to our surprise we found it significantly more difficult to engage local dive guides in project expeditions. We chalk this up to their reluctance to use valuable vacation time to spend even more time away from their homes. We knew this would be an issue, but in retrospect underestimated this factor. Another lesson learned was that despite our confidence that adequate understandings had been reached with local authorities regarding the installation of the moorings, written agreements regarding use of transport vessels to deploy the moorings and regarding their technical specifications would have expedited field activities. On the positive side, we were greatly impressed with the interest shown by regional and international researchers to freely share their time and expertise by participating in expeditions. This greatly contributed to building local capacity and improved the scientific output component of the project beyond our expectations.

Any project which aims to effect positive change in perceptions for responsible dive tourism, for example, or implement infrastructure such as the mooring installations demands a high level of facilitation and outreach from project partners, against which changes in the local political landscape must be continuously navigated and negotiated. Since these are often outside of the direct control of project PIs we can only develop a positive "receptive environment" through project activities such as through talks and presentations given to stakeholders, present the case for improved anchorages, or advocate the need to reduce user infractions over coral regions, and to offer support and assistance in implementation of any solution. Through

continued perseverance, the institutions involved have advanced the concept of low impact anchorages (through facilitation, purchase of the right technologies, training and testing, to installation in tourism anchorages) to the point where Park managers are actively developing a GMR wide plan to reduce anchor impact. The take home message is that these processes began with an idea and discrete (DI) funds inspired for biodiversity conservation, yet led to both an impact mitigation strategy and tool to support regulation of tourism activities at visitor sites, invested in by the same tourism sector, that is being further developed into the future by the MPA Park stewards.

As this project has sparked a Galapagos-wide effort to install a reserve-wide system of moorings – the ‘Cero Anclas’ (translation: Zero Anchors) initiative, outreach activities will indeed continue well beyond project life.

5.1 Darwin identity

The Darwin logo was imprinted upon mooring buoys used in the testing and evaluations. The DI logo was used in all pamphlets and literature produced locally for stakeholders and in all presentations relevant to the project, together with all presentations that included project results passing through the CDRS during the project period. Since there have been various DI sponsored projects in Galapagos through CDRS as project partners, most NGO and government authorities recognise the consistent and significant level of DI support to the region. Although initially the deployment of moorings was a DI-specific effort, we successfully used this first seed funding to leverage considerable additional funding and partnerships to build a larger program referred to locally as ‘Cero Anclas’, which enjoys funding support from a number of sources and political support from the Galapagos National Park Service and Ecuadorian Navy.

6 Monitoring and evaluation

There were periodic reviews of progress between partner institution PIs with no major changes in project design. One change in project design was the decision to not deploy a mooring at the Marchena study site in lieu of increased attention to the northern islands of Wolf and Darwin. This change was made as we determined that coral protection could be secured through a Park resolution regarding the use of non-sensitive anchor areas, which would also provide flexibility to anchoring sites in this area of highly variable currents and winds, rather than providing a single fixed mooring option. The implementation of low impact moorings required an unanticipated testing phase to comply with Navy regulations and this resulted in the first installation in a high use tourism anchorage in Bartolomé Island in 2008, which was later than projected in the project planning stages. Aside from developing stakeholder confidence in the successful deployment of the mooring systems, this was a key step in training to overcome and understand technical obstacles and dive safety concerns before progressing to a highly exposed and strong current site such as Wolf or Darwin. Local partners in the DI project; WildAid, CI and CDF continue to work with Park managers in this ongoing process which also requires a longer term maintenance strategy outside of the scope of the DI project. Considerable base line scientific information was collected across the coral reef systems with peer review publications and local databases of direct use for management recommendations.

CI also assumed a coordinating role in tracking project progress and facilitating interactions between working groups in each institution throughout the project. Although monitoring was regular throughout project life, we gave particular attention to this in preparation of the DI annual reports. Likewise, we took advantage of research expeditions when both local and UK-based PIs were present to evaluate progress, consider options and more carefully plan the following year’s activities. New indicators were not developed during the life of the project as we found the original set adequate for project tracking. Although there was no specific external evaluation, given the unexpected high turnover in Galapagos National Park staff we had to regularly present the project, review its progress and chart next steps with the National Park. Finally, we provided a thorough presentation of project progress and prospects to a DI mission

that came to Galapagos to review past and current projects under the supervision of Rob Wild, Programme Director of Darwin Initiative Applications, Monitoring and Evaluation from the Edinburgh Centre for Tropical Forests.

6.1 Actions taken in response to annual report reviews

All of the issues that were raised in previous reviews had been addressed in subsequent earlier reports, which have been reviewed and highlighted in this final report where the choice of indicators for specific objectives and targets proved to be impractical at this stage of the project timescale. These issues have been discussed in this report where appropriate.

7 Finance and administration

7.1 Project expenditure

See separate excel spreadsheet to follow.

There were no significant changes to the overall budgets, although there has been some movement of the timing of some expenditure due to delays in equipment delivery, etc and subsequent wrap-up workshop.

7.2 Additional funds or in-kind contributions secured

We were fortunate in achieving significant financial and in-kind matching funding primarily through CI.

Conservation International secured funding for complementary ecological monitoring at other GMR sites from two sources (Walton Family Foundation, Gordon and Betty Moore Foundation) that amounted to approximately \$100,000. Additionally, \$169,000 was secured to purchase additional mooring sets (Crown Family Legacy Fund). Project partners together were successful in obtaining nearly \$10,000 in donations from three dive tour operators to assist in the purchase of moorings.

7.3 Value of DI funding

The DI funding award maintained 33% of the regional GMR ecological monitoring costs in counterpart funding for 2 of the project years. DI funding was able to consolidate a regional group of coral experts, bridging knowledge gaps between Eastern Tropical Pacific Marine Protected Areas. DI funds have made a very significant contribution to the application of low impact moorings to reduce coral and benthic habitat damage. The DI project provided a clear focus for action by allowing key stakeholders to concentrate exclusively upon a high-priority marine habitat and generate a comprehensive information base for its improved protection.

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
<p>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</p> <ul style="list-style-type: none"> • 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 		(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)	(do not fill not applicable)
<p>Purpose</p> <p>To assist Ecuador in protecting the last remaining extensive Galapagos coral reefs.</p>	Amount of reef showing recovery from impacts originating from tourism and fishing, in particular those resulting from anchor damage.	(report on progress towards achieving the project purpose, ie the sum of the outputs and assumptions)	(Highlight key actions planned for next period)
<p>Output 1.</p> <p>Improved baseline knowledge of northern GMR coral reefs</p>	<p>1a. Number of species recorded at each site over current species lists</p> <p>1b. Number of anchor sites for which coral distribution maps are produced</p> <p>1c. % of reefs in anchorage areas that are mapped and inventoried</p>	<p>(report general progress and appropriateness of indicator)</p> <p>All activities and objectives were achieved and the indicators were deemed appropriate.</p> <p>1a. >5 hermatypic coral species were confirmed as new or previously unconfirmed records – (principally <i>Gardinoseris</i>, <i>Leptoseris</i> and particularly <i>Pocillopora</i> spp.) across northerly coral sites. Complete subtidal communities were surveyed providing new abundance, size structure and habitat substrate information for coral reef habitat for >80 species.</p> <p>1b. Three anchor sites mapped (Wolf, Darwin and Marchena anchorages)</p> <p>1c. 100% of reef mapped and inventoried in the northerly Islands anchorages (at 2 depths).</p>	
<p>Activity 1.1.</p> <p>Field research programme: trips to (a) inventory and map corals, (b) determine impact locations and baselines, (c) determine sites for mooring deployment and (d) identify parameters to monitor</p>		<p>(report completed or progress on activities that contribute toward achieving this output)</p> <p>A total of 4 coral research diving expeditions were conducted during the project with coral survey observations made subsequently as part of 4 other subtidal monitoring trips. A full report of candidate mooring locations</p>	

		and bottom characteristics was prepared by WildAid and used in the selection of sites and mooring design.
Activity 1.2. Colour field guide production covering the northern GMR corals including the participatory monitoring protocol and a mooring maintenance checklist		A full-colour field guide was published in 2006: ' <i>Corals of Galápagos</i> ' by C. Hickman, Á. Chiriboga and W. Ober (see Annexe 5: publications). The guide was subsequently updated as a result of the later DI expeditions re-printed in 2008 as part of the Galapagos Marine Life Series – the most comprehensive and accessible taxonomy guides developed to date for subtidal marine invertebrates. Although a detailed scientific monitoring protocol was finalized, we were unsuccessful at developing a systematic participatory monitoring protocol to be implemented by dive guides at this time although negotiations with the tourist dive-boats are on-going.
Activity 1.3. Produce scientific manuscripts for publication in high-profile peer-review journals		Current 10 scientific papers have been published or are in press (see Annex 5: publications). We anticipate additional publications as data will be used to evaluate the existing zoning system as part of the development of an updated GMR management plan.
Output 2. Reduced coral damage due to the use of permanent moorings	2a. Number of moorings deployed 2b. % of boats visiting moored sites using moorings 2c. Number of coral areas with visible impacts relative to baseline	(report general progress and appropriateness of indicator) All activities and objectives are in progress, with testing and evaluation phases completed and the deployment of six mooring buoys at Bartolomé Island (others to follow) and one in Puerto Ayora. The indicators were deemed appropriate, although further time is required to evaluate indicators 2b and 2c. 2a. 6 moorings deployed (5 Bartolomé, 1 Academy Bay test mooring) with installation for the northern islands planned by Park officials for October 2008 with support of a permanently installed floating laboratory at Wolf Island. 2b. 100%. So far indications show that all boats used the moorings as soon as they were deployed. They are also being considered as a management tool to limit visitation to PNG authorised levels. 2c. Due to the slow recovery and growth of corals it is difficult to estimate recuperation over this project. Future surveys will evaluate any change in physical damage, although differences are expected to be significant - we have clearly observed the effects of just one anchor chain in one morning destroying decades of reef growth in seconds..

<p>Activity 2.1. Mooring design and deployment</p>	<p>Suitable mooring sites have been surveyed at all proposed coral reef sites and testing and evaluation of mooring equipment have been successfully completed. An ongoing activity.</p>		
<p>Activity 2.2.</p>			
<p>Output 3. Knowledgeable stakeholders committed to participating in coral monitoring and conservation</p>	<table border="1"> <tr> <td data-bbox="604 339 1088 895"> <p>3a. Level of knowledge about coral species relative to baseline established in year 1</p> <p>3b. % of boats that return high quality monitoring data sheets</p> <p>3c. Number of persons by sector involved in monitoring activities</p> <p>3d. Number of students with advanced degrees</p> </td> <td data-bbox="1088 339 2078 895"> <p>Most activities and objectives were achieved and the indicators were deemed appropriate.</p> <p>3a. Coral understanding increased through the expert scientist interactions during the project – covering taxonomy, symbiont clades, reef recovery and coral health/ illness. These findings are summarised in the Galapagos Research Special Edition.</p> <p>3b. We were unable to obtain the formal cooperation of live-aboard dive boats to implement a participatory monitoring protocol, although negotiations are still in progress. Dive operators have relatively little time in these highly sought after dive locations, so all guide time is dedicated to tending to tourists or preparing for next dives.</p> <p>3c. 4 fishermen and 4 naturalist guides/ tourism representatives.</p> <p>3d. 1 Galapagos local student using her coral research for MSc applications and 2 UK MSc degrees</p> </td> </tr> </table>	<p>3a. Level of knowledge about coral species relative to baseline established in year 1</p> <p>3b. % of boats that return high quality monitoring data sheets</p> <p>3c. Number of persons by sector involved in monitoring activities</p> <p>3d. Number of students with advanced degrees</p>	<p>Most activities and objectives were achieved and the indicators were deemed appropriate.</p> <p>3a. Coral understanding increased through the expert scientist interactions during the project – covering taxonomy, symbiont clades, reef recovery and coral health/ illness. These findings are summarised in the Galapagos Research Special Edition.</p> <p>3b. We were unable to obtain the formal cooperation of live-aboard dive boats to implement a participatory monitoring protocol, although negotiations are still in progress. Dive operators have relatively little time in these highly sought after dive locations, so all guide time is dedicated to tending to tourists or preparing for next dives.</p> <p>3c. 4 fishermen and 4 naturalist guides/ tourism representatives.</p> <p>3d. 1 Galapagos local student using her coral research for MSc applications and 2 UK MSc degrees</p>
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<p>Activity 3.1. Stakeholder survey to establish baseline knowledge and identify project participants</p>	<p>Gaining an adequate sample size for a formal stakeholder survey proved untenable. However, we are confident that through their participation in the research expeditions guide and fishermen appreciation for coral conservation was increased and television and news articles relating to the 'Cero Anclas' program jointly undertaken with the Park Service and Navy have raised awareness.</p>		
<p>Activity 3.2. Scientific and participatory monitoring protocol development</p>	<p>Protocol developed with regional scientists to put in context with existing work across the eastern tropical Pacific. Specific coral monitoring now forms part of the CDRS monitoring protocols and has been included in subsequent research cruises since the project end. A participatory monitoring protocol was not implemented for reasons noted above.</p>		
<p>Activity 3.3. Conduct a workshop with GNPS to train their staff and stakeholders in coral conservation, identification and application of the participatory</p>	<p>Stakeholder workshop held in January 2007.</p>		

monitoring protocol	
Activity 3.4. Scholarship student selection and thesis project development	2 MSc students have successfully completed their degrees in 2006.

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

Original logframe

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 <ul style="list-style-type: none"> • 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 To assist Ecuador in protecting the last remaining extensive Galapagos coral reefs.	Amount of reef showing recovery from impacts originating from tourism and fishing, in particular those resulting from anchor damage.	CDRS and stakeholder monitoring program results integrated into GIS maps	Relatively stable climatic conditions, such that overwhelming environmental factors (such as strong El Niño) do not mask the benefits of project interventions.
Outputs 1. Improved baseline knowledge of northern GMR coral reefs 2. Reduced coral damage due to the use of permanent moorings 3. Knowledgeable stakeholders committed to participating in coral monitoring and conservation	1a. Number of species recorded at each site over current species lists 1b. Number of anchor sites for which coral distribution maps are produced 1c. % of reefs in anchorage areas that are mapped and inventoried 2a. Number of moorings deployed 2b. % of boats visiting moored sites using moorings 2c. Number of coral areas with visible impacts	1. CDRS GIS maps and inventory lists 2a. GNPS records and photo-documentation 2b. GNPS records from dive guide reports 2c. Stakeholder monitoring reports 3a. Pre-study survey results 3b and 3c. Datasheets archived by	1. No assumptions 2,3. Cooperation from the tourism and fishing sectors in using moorings and in participating in workshops and subsequent monitoring

	<p>relative to baseline</p> <p>3a. Level of knowledge about coral species relative to baseline established in year 1</p> <p>3b. % of boats that return high quality monitoring data sheets</p> <p>3c. Number of persons by sector involved in monitoring activities</p> <p>3d. Number of students with advanced degrees</p> <p>Further specific targets will be established by partners as a basis for the monitoring and evaluation program specified below.</p>	<p>GNPS and CDRS</p> <p>3d. Student thesis</p>	
<p>Activities</p> <ol style="list-style-type: none"> 1. Field research programme: trips to a) inventory and map corals, b) determine impact locations and baselines, c) determine sites for mooring deployment and d) identify parameters to monitor 2. Stakeholder survey to establish baseline knowledge and identify project participants 3. Mooring design and deployment 4. Scientific and participatory monitoring protocol development 5. Colour field guide production covering the northern GMR corals including the participatory monitoring protocol and a mooring maintenance checklist 6. Conduct a workshop with GNPS to train their staff and stakeholders in coral conservation, identification and application of the participatory monitoring protocol 7. Scholarship student selection and thesis project development 8. Produce scientific manuscripts for publication in high-profile peer-review journals 		<p>Activity Milestones (Summary of Project Implementation Timetable)</p> <ol style="list-style-type: none"> 1. First trip completed to Darwin/Wolf Islands by August 2005, second to Wolf/Darwin/Marchena/Genovesa by March/April 2006 and third by Dec 2006 (note slight timetable modifications from stage 1 application) 2. Stakeholder survey completed by July 2005 3. First mooring built by December 2005 and deployed by GNPS in April/May 2006, second by Dec 2006, third by May 2007 4. Scientific and participatory monitoring protocols finalized by May 2006 5. Field guide finalized by July 2006 6. Workshop conducted in August 2006 7. Student thesis completed by Dec. 2007 8. manuscripts accepted for publication 2006-2008. 	

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	25	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	15	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.
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.
12. Research and Training	10	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	15	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 Impacts	15	Introduce EIAs of appropriate projects and allow public participation; take into account environmental consequences of policies; exchange information on impacts beyond State boundaries and work to reduce hazards; promote emergency responses to hazards; examine mechanisms for re-dress of international damage.
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	
1b	Number of PhD qualifications obtained	
2	Number of Masters qualifications obtained	
3	Number of other qualifications obtained	
4a	Number of undergraduate students receiving training	
4b	Number of training weeks provided to undergraduate students	
4c	Number of postgraduate students receiving training (not 1-3 above)	
4d	Number of training weeks for postgraduate students	
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification(ie not categories 1-4 above)	
6a	Number of people receiving other forms of short-term education/training (ie not categories 1-5 above)	
6b	Number of training weeks not leading to formal qualification	
7	Number of types of training materials produced for use by host country(s)	
Research Measures		
8	Number of weeks spent by UK project staff on project work in host country(s)	
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)	
10	Number of formal documents produced to assist work related to species identification, classification and recording.	
11a	Number of papers published or accepted for publication in peer reviewed journals	
11b	Number of papers published or accepted for publication elsewhere	
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	
12b	Number of computer-based databases enhanced (containing species/genetic	

Code	Description	Totals (plus additional detail as required)
	information) and handed over to host country	
13a	Number of species reference collections established and handed over to host country(s)	
13b	Number of species reference collections enhanced and handed over to host country(s)	
Dissemination Measures		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	
15a	Number of national press releases or publicity articles in host country(s)	
15b	Number of local press releases or publicity articles in host country(s)	
15c	Number of national press releases or publicity articles in UK	
15d	Number of local press releases or publicity articles in UK	
16a	Number of issues of newsletters produced in the host country(s)	
16b	Estimated circulation of each newsletter in the host country(s)	
16c	Estimated circulation of each newsletter in the UK	
17a	Number of dissemination networks established	
17b	Number of dissemination networks enhanced or extended	
18a	Number of national TV programmes/features in host country(s)	
18b	Number of national TV programme/features in the UK	
18c	Number of local TV programme/features in host country	
18d	Number of local TV programme features in the UK	
19a	Number of national radio interviews/features in host country(s)	
19b	Number of national radio interviews/features in the UK	
19c	Number of local radio interviews/features in host country (s)	
19d	Number of local radio interviews/features in the	

Code	Description	Totals (plus additional detail as required)
	UK	
Physical Measures		
20	Estimated value (£s) of physical assets handed over to host country(s)	
21	Number of permanent educational/training/research facilities or organisation established	
22	Number of permanent field plots established	
23	Value of additional resources raised for project	
Other Measures used by the project and not currently including in DI standard measures		

Specific details

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	TOTAL
Training output 2	Postgraduate training leading to an MSc degree.		2			2
Training output 3	Number of other qualifications obtained. A selection of the most proactive guides and fishermen received specialized, technical dive training (Nitrox) so that they will have the skills and expertise to participate in deep-water installation and maintenance of the moorings.		15			15
Training output 4A/B	Specialist training in coral identification, reef assessment, ecological monitoring	3	3	1		7
Training output 4C	Number of postgraduate students receiving training		3			3
Training output 6a	Fishermen/dive guides receive training in pre-trip workshops, during research cruises and in participatory monitoring workshop.	7	25	2		34
Training output 7	Number of types of training materials produced : workshop materials/identification guides and checklists		2	2		4
Research output 8	PI field research, workshop and annual					

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	TOTAL
	planning participation	7 weeks	7 weeks	7 weeks	2 weeks	23
Research output 9	Plans corresponding to emergent MPA zoning criteria - This work is ongoing. In 2007-8, the team produced recommendation reports for (1) Zoning/ GMR evaluation; (2) The fixed anchorages; and (3) Best tourism practices.	3 (on-going)	3	3		6
Research output 10	A pioneering field guide produced for Galapagos corals. A Red List assessment report	1		1		2
Research output 11a/b	3 peer-reviewed publications submitted with at least 1 accepted by project's end (year 3)			10 (8 in press)		10
Research output 12a/b	Databases- Coral database with associated data finalized.	2	1	1		4
Research output 13b	Enhancement of CDRS coral species reference collection.		Dozens of new collections for CDRS reference collection.	New collections in year 3		
Dissemination output 14a	Local public conferences to disseminate research findings and collaborative methods.		2 public presentations, and 12 have been delivered on the boat expeditions, themselves in the on-board lecture series'	>6 presentations to student groups and other international agencies/ NGOs which included the DI coral work		8
Dissemination output 14b	Number of conferences/seminars/workshops attended at which findings from Darwin project work will be presented/ disseminated.			3		3
Dissemination output 15a/b/c/d	Press release, newspaper coverage and radio commentary associated with widely attended stakeholder workshop held Jan. 18, 2007. 1 x local newspaper article; 1 x national newspaper article.		3	2		5
Dissemination output 17a and 17b	MOU's established or strengthened. Eastern Tropical Pacific and central South American MPA network		1	2		3

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	TOTAL
	established.					
Dissemination output 18c and 19c	Radio commentary provided in Galapagos by CI on main morning radio show. 2 x local TV programme features promoting the 'Cero Anclas' objectives.		1	3		4
Physical output 20	Following purchased from DI funding: Zodiac boat (\$6000), underwater camera equipment (\$7000), 6 Helix moorings (3 with project funds) and hydraulic installation equipment, floats, anchoring screws (Scott/Stuart - how much?)		8 (main capital items)			8
Physical output 22	Multiple field plots over coral reef structures established in the northern islands- 3 fixed plots in Wolf, 2 in Darwin, 2 in Marchena and detailed surveys across more than 1800m ² of coral communities.		7			7
Physical output 23	Value of additional resources raised for project (see also next item below)		\$110,000	\$169,000		\$279,000
New - Project specific measures	\$140,000 secured to replicate mooring placement in many other sites. Commitments from large tour operators for funds for very large moorings where big boats (over 50 passengers) anchor. Extensive inter-site collaboration and replication of monitoring efforts with researchers and managers at other Eastern Tropical Pacific sites (Malpelo, Coiba and Cocos) and international research institutions.		Many			Many

Annex 5 Publications

Type * (eg journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (eg contact address, website)	Cost £
Book	'Corals of Galápagos' C. Hickman, Á. Chiriboga and W. Ober, 2006	Sugar Spring Press, Lexington, VA		
Report	'Establishment of Anchorage sites in the Galapagos Northern Islands', G. Merlen and S. Banks, 2005		CDRS, Galapagos	
MSc thesis	A Review of Marine Conservation along the Pacific coast in the Humbolt Current, South America: A Policy Analysis Approach, Bello, M., 2006.	University of Edinburgh, UK	University of Edinburgh, UK	
MSc thesis	A 3-D depth and temperature spatial envelope to predict the present and future distribution of coral reefs around the Galapagos Islands, Jarvis, F., 2006.	University of Edinburgh, UK	University of Edinburgh, UK	
Brochure	'Coral Habitat Mapping and Conservation', in Environmental Change and Sustainability at Edinburgh, School of Geosciences, 2006, Page 9-10.	School of Geosciences, University of Edinburgh, UK	School of Geosciences, University of Edinburgh, UK	
Brochure	'Galapagos Islands' in The Edinburgh Earth Observatory, School of Geosciences, 2006, Page 11-12.	School of Geosciences, University of Edinburgh, UK	School of Geosciences, University of Edinburgh, UK	
Newsletter	'Extinct' coral species is rediscovered in the Galápagos Islands, Darwin News, Issue 6, March	DEFRA UK	http://www.darwin.gov.uk/newsletters/	

	2006, DEFRA			
Peer-reviewed journal manuscript	Reproductive ecology of the azooxanthellate coral <i>Tubastraea coccinea</i> Lesson 1829 in the eastern Pacific: Costa Rica, Panama, and Galapagos Islands (Ecuador). V. Dendrophylliidae, 2007, (submitted). Authors: Glynn PW, Colley SB, Mate JL, Cortes J, Guzman HM, Bailey RL, Feingold JS & Enochs IC.	<i>Marine Biology</i>	Publisher Springer Berlin / Heidelberg ISSN 0025-3162 (Print)	
Press Release	'Concern for corals unites GMR Stakeholders', (February 2007, Galapagos Conservation Trust website)	Galapagos Conservation Trust	http://www.gct.org/feb07_3.html	
Peer-reviewed journal manuscript	Zoanthid diversity (Anthozoa: Hexacorallia) in the Galapagos Islands: a molecular examination	<i>Coral Reefs</i>	Publisher Springer Berlin / Heidelberg ISSN 0722-4028 (Print)	
Peer-reviewed journal manuscript	Peter W. Glynn, P.W., Bernhard Riegl, B., Romanski, A.M. & Baums, I.B., (2008, in press) Rapid Recovery of a Coral Reef at Darwin Island, Galápagos Islands	<i>Galapagos Research</i>		
Peer-reviewed journal manuscript	Breedy, O., Hickman, C.P. Jr. and Williams, G., (2008, in press), Octocoral research in the Galapagos Islands.	<i>Galapagos Research</i>		
Peer-reviewed journal manuscript	Reimer, J.D. and Hickman, C.P. Jr. (2008, in press) Preliminary survey of zooxanthellate zoanths (Cnidaria:	<i>Galapagos Research</i>		

	Hexacorallia) of the Galapagos and associated symbiotic dinoflagellates (Symbiodinium spp.).			
Peer-reviewed journal manuscript	Hickman, C.P. Jr. (2008, in press) The evolutionary response of marine invertebrates in Galapagos to insular isolation.	<i>Galapagos Research</i>		
Peer-reviewed journal manuscript	Dawson, T.P., Jarvie, F. and Reitsma, F. (in press, 2008) A habitat suitability model for predicting coral reef distributions in the Galápagos Islands	<i>Galapagos Research</i>		
Peer-reviewed journal manuscript	Dawson, T.P., Henderson S. and Banks, S. (in press, 2008) Galapagos Coral Conservation: Impact Mitigation, Mapping and Monitoring	<i>Galapagos Research</i>		
Peer-reviewed journal manuscript	Banks, S., Vera M & Chiriboga A. (in press, 2008) Characterizing the northern Galápagos coral reefs: establishing reference points to assess long term change in zooxanthellate coral communities.	<i>Galapagos Research</i>		
Peer-reviewed journal manuscript	Vera, M. and Banks, S. (in press, 2008) Health status of the coral communities of the northern islands; Darwin, Wolf and Marchena of the Galápagos Archipelago.	<i>Galapagos Research</i>		

Conference proceedings (CD-ROM)	Dawson, T.P., Jarvie, F. and Reitsma, F., 2007, Synthesizing remote sensing data for estimating the bioclimatic envelope of coral reefs in the Galapagos Islands	Proceedings of the RSPSoc conference, University of Newcastle, 2007.	The Remote Sensing and Photogrammetry Society http://www.rspsoc.org/	
Press release	'Corals added to IUCN red list of threatened species for the first time' (September 2007, Galapagos Conservation Trust website)	Galapagos Conservation Trust	http://www.gct.org/sep07_1.html	
Article	Dawson, T.P., 2007, Coral conservation in the northern islands	Galapagos News No. 24, Spring/Summer 2007	Galapagos Conservation Trust	

Annex 6 Darwin Contacts

Ref No	14-048
Project Title	Galapagos Coral Conservation: Impact Mitigation, Mapping and Monitoring
UK Leader Details	
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Partner 1	
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Role within Darwin Project	Co-Investigator
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