



Darwin Initiative for the Survival of Species
Annual Report (Year 2 of Project – 2004/2005)

**Marine biodiversity assessment and development in Perlas Archipelago,
Panama**

162/12/021

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Darwin Initiative for the Survival of Species Annual Report

1. Darwin Project Information

<i>Project Ref. Number</i>	162/12/021
<i>Project Title</i>	Marine biodiversity assessment and development in Perlas Archipelago, Panama
<i>Country(ies)</i>	Panama
<i>UK Contractor</i>	Heriot-Watt University (HWU), Edinburgh
<i>Partner Organisation(s)</i>	Smithsonian Tropical Research Institute (STRI), Panama
<i>Darwin Grant Value</i>	£168,154
<i>Start/End dates</i>	April 2003 – March 2006
<i>Reporting period</i>	1 April 2004 to 31 March 2005 - Annual Report Number 2
<i>Project website</i>	Due to be developed in Year 3 of the project
<i>Author(s), date</i>	James Mair (HWU); Hector Guzman (STRI), 27 April 2005

2. Project Background

- *Several years ago discussions took place between Dr James Mair (HWU) and Dr Hector Guzman (STRI, Panama) following the establishment of collaborative supervision of a HWU MSc student. Dr Guzman has much experience both in marine biodiversity research and development work in national parks in Panama. He also works closely with personnel in the Panamanian government's Environmental Authority (ANAM – Autoridad Nacional del Ambiente) and was able to identify the need for work in Las Perlas Archipelago. In 1972, a study carried out by the United Nations' FAO concluded that Las Perlas should be included in the protected area system of Panama because of its importance in the production of food. Later on, the National Plan for Protected Areas and Biological Corridors proposed the protection of Las Perlas through a legal basis, under the designation "Las Perlas National Park". However, due to the paucity of studies in the Archipelago some basic information was lacking and the park at that time had not yet been designated. The regulation of the economic activities combined with the protection of the natural resources of the Archipelago is today seen as a priority for the Republic of Panama. The Darwin Project (162/12/021) therefore aims to provide good background studies to address this problem of lack of data and, though its work, enable the establishment of a protected area in the Perlas Archipelago.*

3. Project Purpose and Outputs

- *A copy of the project's original Logical Framework is included in Appendix 1 at the end of this report and a tabular summary of progress on outputs against the original plan is given in the Annex with further detail appearing in several of the following sections. The main purpose of this project is to build up research and habitat information about the marine and coastal environment of Las Perlas Archipelago, located in the Gulf of Panama, to properly enable it (or an appropriate area of it) to be designated by Panamanian authorities for Marine Protected Area status. This is to be achieved by: i) Establishing a group dedicated to the assessment of the area's littoral and sub-littoral habitats and identifying potential threats from land and marine based activities. ii) Providing advanced training for three Panamanian Darwin Fellows so that each can specialise in different aspects of the study. These three will form the core of this research group, during the Darwin Initiative Project lifetime and afterwards, and they would subsequently be able to contribute to monitoring and advice on park management. iii) Increasing awareness (through, a. - school and community educational information material, b. - scientific publications and conferences) to promote the designation of the Park so that the Archipelago's important marine natural and commercial*

resources can be protected and sustainably managed. iv) Establishing an active Darwin project network for the exchange of information and experiences relevant to the project.

- The main outputs and proposed operational plan have not needed to be modified over the last year (apart from bringing forward, into Year 2, Darwin Fellow 3 training which was discussed with, and prior approved by, Darwin Secretariat – see below Section 4, Progress).

4. Progress

- Brief history of Year 1: Major initial project survey work was successfully carried out in the planned August 2003 research cruise to Las Perlas involving three Panamanian (Dr Hector Guzman – host country co-ordinator, Carlos Guevara – Dr Guzman’s research assistant, Beatriz Medina – Darwin Fellow No. 1) and three UK personnel (James Mair - Project Leader, Sarah Benfield – EPSRC-funded PhD student, and Jade Berman – part-time MSc student on a 12-month “Our World Underwater Scholarship Society, European Rolex Diving Scholarship” - www.owuscholarship.org). Subsequently, Dr Guzman was able to make another 7-day research field trip in November/December 2003 to complete coverage of the survey area. Remote grab sampling of the sedimentary and deeper areas around Las Perlas was carried out at over 120 stations in a grid covering the Archipelago (Appendix 2). It had initially been assumed that this would need to be done over two years but progress was quicker than anticipated in the August survey and the remaining sampling was completed during the November survey. There now existed a comprehensive baseline of benthic samples from one season that will, once fully worked-up, give a good description of the benthic biodiversity of the various marine communities around the islands. Dr Guzman’s rapid assessment of the shallower-water, coastal framework reef and non-reef habitats was also completed to provide comprehensive broadscale mapping of the area and to enable appropriate “hot-spot” areas to be identified for future detailed survey. Training of the Darwin Fellows progressed well with Darwin Fellow 1, from October 2003 to April 2004 completing the taught component part (UK) of the MSc in Marine Resource Development and Protection (www.sls.hw.ac.uk/courses/msc_marine_resource_development.htm and Appendix 2). Darwin Fellow 2 was able to be integrated early into the project and was offered a place on the 2004/2005 MSc course. Darwin Fellow 3 (originally planned to be appointed for Year 3 of the project – April 2005 onwards) was identified early and got involved voluntarily on aspects of the project. She applied for EU ALBAN funding (www.albanprogram.org) to enable her to take the MSc course a year early. Contact with potential network partners was established with a view to formalising the “information and experience exchange” network. Initial satellite imagery was bought and was processed both in Edinburgh and Panama. No significant difficulties were encountered and there were no slippages from the project implementation timetable (as described in Year 1 Project Annual report).
- Progress in Year 2 has been generally as planned although, due to the newly elected Panamanian government moving faster than expected to approve and designate marine protected area status in Las Perlas Archipelago, some rearrangement of work schedule was required (mainly involving the Panamanian project co-ordinator, Dr Guzman in STRI-supported meetings/workshops with stakeholders – commercial/artisanal fishing interests, tourism industry developers, landowners and officials from government departments, etc.). April 2004 - Darwin Fellow 1, after completing 7 months of the taught component of MSc course and additional training in UK, returned to Panama to work on Darwin project results and towards completing the MSc dissertation. May 2004 – Project PhD student (Sarah Benfield) and one other MSc student (Laura Baxter - with Heriot-Watt University ALUMNI Fund support) went on field survey trip to Las Perlas with Darwin Fellows 1-3 and Dr Guzman and STRI technicians (additional activity to original plan). July 2004 – With news that nominated Darwin Fellow No. 3 (Panamanian Inez Campbell) was unsuccessful in her ALBAN funding application, DEFRA’s Darwin Secretariat were approached for permission (which was granted) to bring forward into Year 2 £6,000 from Year 3 project budget to enable Inez Campbell to initiate her MSc training in Year 2 instead of Year 3 (original plan). August 2004 - Two UK staff (Dr James Mair, Heriot-Watt University Project Leader and Susan Chambers – National Museums of Scotland), UK PhD student (Sarah Benfield), Heriot-Watt registered Colombian PhD student (Lina Barrios - with EU ALBAN Funding), and NERC-funded MSc student (Jade Berman) travelled to Panama to participate in 9-day survey of study area with STRI staff (Dr Hector Guzman and Carlos Guevara) and Darwin

Fellow No. 2 (Jose Miguel Guevara). September 2004 - Darwin Fellows Nos. 2 & 3 travelled to Edinburgh to start MSc course in October. October 2004 - Design of Darwin Project educational leaflets started (set as module assignment exercise using MSc students and classmates overseen and advised by Darwin Fellow 3, Inez Campbell). November 2004 - Darwin Fellow No. 1 (Ms Beatriz Medina) graduated with MSc degree (in absentia). Ms Medina left the Darwin project in October 2004 to join her partner in Spain and to apply for PhD funding in Spain. December 2004 – draft mock-ups and designs of educational material (see Appendix 2) sent to Panama for approval, translation into Spanish and printing. High definition satellite imagery (Quickbird) obtained for northern region of Archipelago for targeted analysis. March 2005 – Networking activities actively commence with 3 taxonomists (Jeffrey Sibaja from University of Costa Rica and Daisi Merino and Maria Fernanda Arroyo from University of Guayaquil, Ecuador – former Darwin Fellows on Project 162/06/029) working at STRI for 2 weeks to quantify and identify to Family level the collected benthic invertebrate samples from Las Perlas. Discussions were held in Edinburgh with Rev. Peter Espeut, Executive Director of the Caribbean Coastal Area Management (C-CAM - www.portlandbight.com.jm) Foundation with a view to developing further networking links. Contact was also re-established with an Ecuadorian biologist and former MSc student (Ms Monica Calvopina – HWU MSc 2003/2004) who is now with WWF in Galapagos Archipelago (www.panda.org/about_wwf/where_we_work/latin_america_and_caribbean/where/ecuador/index.cfm). Throughout the year, further small scale field surveys and specialist studies (e.g. monitoring of the important Red Snapper fishery) in Las Perlas were undertaken and overseen by Dr Guzman and work-up, analysis and preparatory reporting of survey findings continued. To make use of the Darwin Fellow No.1 stipend (from October/November onwards) it was decided not to replace Ms Medina with a full-time Fellow, but to employ, on a short-term/part-time basis, other Panamanian students to work on Las Perlas research, thus increasing the flexibility of skills available and also involving a greater number of young Panamanian scientists in the project.

- A major achievement in Year 2 of the project has been to successfully complete the majority of the planned survey work that was seen as a prerequisite for any decisions to be made on area designations and management plans. This has been important since this new Panamanian government has started pushing the area designation for Las Perlas faster than expected. This is considered by the Darwin Project team as a good "problem" to be faced with. Comprehensive coverage of the marine habitats (shallow water, as well as detailed grid of benthic sample stations in deeper waters all round the Archipelago has been achieved through ground-truthing work in the field (diving and remote sampling methodologies). The main approach to making use of these data has been to ensure all such information is entered into a Geographical Information System (overseen by Darwin Fellow 2 – GIS specialist). The detailed ground-truth information is supplemented by wider coverage using satellite imagery (Landsat Image obtained in Year 1 and high-resolution Quickbird image obtained in Year 2 for shallow marine habitats including the important framework reef areas) and this information is being analysed by EPSRC-funded PhD student, Sarah Benfield whose PhD studies (registration October 2002-September 2005 – jointly supervised by Drs J Mair and J Young with input advice from Dr Guzman) coincided and were linked to the objectives of the Darwin Project. Ms Benfield's PhD thesis is due to be submitted in August 2005 along with three resultant manuscripts for scientific journal submission, so these results will be available before the end of the Darwin Project. Another major achievement, although this has resulted in Dr Guzman's other STRI fieldwork being curtailed, has been his major involvement in negotiations/information workshops with stakeholders and government officials.
- No significant difficulties were encountered in progress of work in Year 2 of the project.
- The design of the project has not been actively enhanced to any great extent during Year 2 but positive developments (see Section 12) that are evolving will enable the design of the project to be adjusted accordingly to take full advantage of all opportunities.
- Workplan/Timetable for Year 3: End of April 2005 - Darwin Fellows 2 & 3, after completing 7 months of the taught component of MSc course and additional training in UK, return to Panama to work on Darwin Project results and towards completing the MSc dissertation. May 2005 – A revised draft of the new law (Presidential Decree) that creates the Las Perlas Special Management Zone will be presented for final approval to the National Fishery

Commission of Panama in May. The draft has been discussed in several fora already and calls for the creation of the “Zona Especial de Manejo (ZEM) Archipiélago de Las Perlas” encompassing an area of 160,167 ha - including 33,153 ha and 127,014 ha of terrestrial and marine habitats respectively (see Appendix 2). Project Leader (James Mair), ALBAN-funded PhD students (Lina Barrios and Nohora Galvis) and two other MSc students (NERC- funded Orea Anderson and Karen Greaney – funded through HWU Alumni Fund and private finances) go to Las Perlas with Darwin Fellows and other Panamanian personnel for final 11-day fieldwork survey. Darwin-related research being carried out by Ms Barrios for her PhD thesis includes ecology and taxonomy of Sabellariidae reefs and molluscan vermetid tubes within coral frameworks in Las Perlas. The thesis of Ms Galvis is covering ‘Spatial Multicriteria Assessment of artisanal fishermen’s acceptance and compliance to fisheries management’. Ms Anderson’s MSc dissertation is to finalise the Red Snapper fishery survey, and Ms Greaney’s dissertation is on sediment and tissue metal contamination from samples collected from numerous stations around Las Perlas and from sample stations on transects from Las Perlas to the heavily contaminated Panama City bay area. Mr Jose Miguel (Darwin Fellow No. 2) is basing his MSc dissertation/Darwin work on following up GIS/Satellite imagery analysis of Las Perlas and Ms Campbell (Darwin Fellow No. 3) will be working on socio-economic aspects of marine activities carried out by the local inhabitants of Las Perlas. To coincide with the UK group visit to Panama in May, the three taxonomists from Ecuador and Costa Rica (see above) will return to STRI to finish off processing of the benthic samples collected from Las Perlas in 2003, and to discuss the analysis of the results with Drs Mair and Guzman with a view to agreeing the format for a publication resulting from this work. Mr Anthony Mitchell from Colombia will also be visiting STRI in May. Mr Anthony Mitchell (first round recipient of Darwin Scholarship scheme) is now involved in linking his organisation (Coralina, San Andres, Colombia – Darwin Project 021/07/147) with the Panama project. An article on his activities is to appear shortly in Issue 4 of the Darwin Newsletter. San Andres Islands were recently (2000) designated a Biosphere Reserve and Coralina has obtained GEF funding for further developments. Mr Mitchell collaborated with Darwin Fellow 2 (Jose Miguel Guevara) whilst they were together in Edinburgh and these GIS specialists will be exchanging experience that will benefit both individuals and organisations. Also during May, the UK and Panamanian project collaborators will finalise planning for rest of Year 3, including arrangements for Darwin Project Conference in Panama in March 2006. September 2005 - Darwin Fellows 2 & 3 submit their MSc dissertation projects and graduate with MSc degree in November 2005 ceremony. Throughout Year 3 and, in particular, once Darwin Fellows 2 & 3 return to Panama at the end of April, there will be increased activity on expanding the Darwin Project Network amongst existing and new contacts, early development of a project specific website to aid in this activity, plus to increase dissemination of project results and to advertise the Darwin Project Conference. Work-up, analysis and reporting of survey findings to continue. During the year, the remaining standard Outputs (7, 9, 10, 11, 12, 13, 14, 20, 22, 23) to be achieved. March 2006 – Darwin Project Conference (changed from August 2005).

5. Actions taken in response to previous reviews (if applicable)

- There were only minor comments within the Review of Year 1 Annual Report on project activities that required responding to, and these points were clarified with ECTF (Stephanie Halfmann) and copied to the Darwin Secretariat (Sarah Moon and Carrie Haloun) by email on 12 July 2004. On 13 July, Stephanie Halfmann confirmed that these clarifications would be passed onto the reviewer and that no further actions were required.

6. Partnerships

- Collaboration has been excellent and a very good working relationship has continued to be developed enabling further joint ideas to be implemented (e.g. additional Darwin project-related work to be carried out by local Panamanian students, visiting H-WU/other institution MSc and PhD students as part of their research dissertations).
- Collaboration with partners in similar projects was one of the planned Outputs (17 - “Information and Experience Exchange” network of Darwin workers to be established). For further details on this, please see Section 12.

7. Impact and Sustainability

- *Dr Guzman is ensuring that the profile of the Darwin Project is kept high both within STRI itself and with relevant groups, agencies and government departments within Panama. He and Dr Mair have also produced progress updates for the British Embassy in Panama for them to use accordingly. The Darwin Project team were invited to the Ambassador's residence during the August 2004 trip to meet with several other invited guests (including the Director of the new National Museum of Biodiversity currently under construction in Panama City) and discuss means of potential collaboration for future work. To promote the aims of the project, and to indicate the progress of the work, a second article (see Appendix 2) was published in August 2004 in the STRI Newsletter. This newsletter has a wide distribution/readership amongst the scientific and conservation community. Mainly through the efforts of Dr Guzman, the project objectives are being promoted through the local fishing communities, the agencies and other private bodies involved in environmental legislation. The work of the project is increasingly being seen as a major driving force for biodiversity conservation implementation in Las Perlas as evidenced in the country by the Panamanian government pushing the agenda for early protected status designation. This type of activity (including the concluding Darwin Project conference planned for end of Year 3) is considered essential by the team in order to achieve the desired and planned exit strategy for the Darwin Project in Year 3.*

8. Post-Project Follow up Activities

- *The possibility of post-project follow up activities has been discussed by the project co-ordinators and Dr Guzman confirms that he would have full support from STRI on any such activities since it is certainly not envisaged that STRI's involvement in the further development, scientific monitoring and advice on management of Las Perlas protected area would stop in March 2006 at the end of the Darwin Project. Both co-ordinators have actively sought and continue to seek other funding sources to maintain the momentum of the joint collaboration underway (see Section 12 for more details). Dr Guzman and STRI are currently considering putting together an initial PDF1 proposal to UNDP for subsequent consideration to develop a medium-large scale proposal to GEF on "Mainstreaming Biodiversity Conservation in Production Systems" which would include and develop all aspects of the Darwin Las Perlas study and involve tourism, fisheries and management plans. Given these possibilities and interest in follow-up activities, both STRI and Heriot-Watt University would certainly wish to be considered to be invited by the Darwin Secretariat to apply for the Darwin Post-Project Funding scheme.*
- *The initial 3-year Darwin Project has so far been meeting its original objectives, and circumstances have also been fortunate in that Protected and Management areas/zones are now to be designated for Las Perlas within the lifetime of the main Darwin Project. Full designation may enable other internal and external funding sources to be obtained for further development work (and these are actively being considered by both co-ordinators, as indicated in the paragraph above and elsewhere) but any such funding cannot be guaranteed at this stage and some funding sources may require work to be carried out for very specific aspects of the Marine Protected Area. There are specific follow-up activities that are seen by the project co-ordinators as most directly consolidating the progress on the main Darwin Project results so far and thus strengthening the impact and legacy of the initial Darwin Project. These would be: a) to ensure continued involvement of Darwin Fellows (2 & 3 especially) in the project so that their expertise (GIS and Educational Liaison respectively) and qualifications obtained in the last year are applied to continued work; b) to enable more small-scale but essential activities to take place such as organised workshops and education for local stakeholder groups to fully integrate them into the still-developing action plans; and finally, c) through reasonably modest expenditure, to enable further in-field biodiversity/sustainability research to take place through the existing well-established collaboration between STRI and Heriot-Watt University staff and student placements. If further research is continued by the Darwin Fellows then there may also be potential of research work being suitable for PhD theses through registration at Heriot-Watt University, e.g. on an "off-campus" registration basis, and so with more likelihood of possible ALBAN funding/Heriot-Watt fee abatement to go towards covering registration/tuition costs.*

9. Outputs, Outcomes and Dissemination

- All major outputs scheduled for Year 2 were effectively achieved with some others partially achieved or still in progress (see Table 1 below). Publications produced are listed in Table 2.
- Dissemination activities in Year 2 of the project have been described in Section 7. Relevant dissemination activities will continue throughout, and after, the Darwin Project since STRI is the local institution that will maintain these activities as part of its remit in Panama.

Table 1. Project Outputs scheduled for Year 2 (According to Standard Output Measures)

Code No.	Quantity	Description
2	3	Darwin Fellow No. 1 graduated with MSc degree (November 2004). Darwin Fellows 2 & 3 are now successfully 50% through MSc course
4	1	* Only partially achieved so far (see explanation under Output 8) but one local undergraduate is receiving training/project related work under the supervision of Dr Guzman, with guidance also from Dr Mair to be given in May 2005
6	2	* Only partially achieved so far (see explanation under Output 8) but two STRI technicians have been involved in various short-term supervised experience training with Dr Guzman on Darwin Project related work
8	4x3-weeks	**UK project leader, Susan Chambers and Ms Sarah Benfield spent 3 weeks each in Panama in August 2004 as planned. Ms Benfield spent an additional 3 weeks in Panama in May 2004
11	3	2 papers published and 1 accepted (so far) in peer reviewed journals
17	1	Active networking has begun and is expanding (see Sections 7 & 12)
23	1	Extra funding in the form of "in-kind" contributions have been achieved by Dr Guzman for extra resources from within STRI for additional Las Perlas field-work and he obtained "in-kind" contributions towards assistance in drafting plans for Park designation. The British Embassy has given local leads for further in-kind/direct contributions for such activities as further pamphlet publication and sponsorship of Darwin Conference in March 2006
15/16/18/19	3	*** Only partially achieved so far – mainly under Outputs 15, 16 & 17

* Outputs 4&6, in original plan, were expected to include 10-days formal training from UK staff for several Panamanian students/personnel during visit in July/August 2004. This did not happen (see ** below) but some of this training is hoped to be made up in 2005/2006.

** In the original plan, it was expected that Dr Young (Heriot-Watt University) would take part in the visit to Panama in July/August 2004 to run a similar course that was run by him in Colombia in 2000 on Darwin Project 162/07/147. Dr Young, due to retire in 2006, was not able to travel to Panama, and due to restricted time (and full involvement in Darwin Las Perlas fieldwork) Susan Chambers (National Museums of Scotland) was not able to run her planned course either (Outputs 4 & 6). Nevertheless, Dr Young's main involvement in the overall project is in advice/research in the interpretation of the Darwin Project acquired satellite imagery of Las Perlas and also specialised tutoring for Darwin Fellow No. 2 (whilst in UK) on GIS developments of Darwin Project results.

*** Dissemination activities were originally generally scheduled to take place throughout Years 1-3 of project. Due to main efforts being applied to field work, results interpretation/analysis and earlier development of action plans for site designation, perhaps less of these outputs have been forthcoming than anticipated. Nevertheless, it is expected that very early in Year 3, when the government announces official Protected Area status for Las Perlas (and later during the Darwin Conference in 2006), there will be more outputs (particularly press, TV and Radio – Outputs 15, 18, 19).

The involvement of 3 PhD Heriot-Watt University registered students, with external funding support, may be seen as an additional achievement (under Output 1 category). The UK student is in Year 3 of her studies and due to submit her dissertation and associated papers in August 2005. The two EU ALBAN-funded Colombian PhD students are in Year 2 and 1 of their studies respectively (activities described in more detail in Section 4). Involvement of the Colombian researchers (both mature students) in the Darwin Project brings in their previous experience and regional connections in South/Central America which is helping in the development of the Darwin networking activity.

Table 2. Publications produced during 2004/2005

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (e.g. contact address, website)	Cost £
Journal - Marine Pollution Bulletin	"An assessment of metal contamination in mangrove sediments and leaves from Punta Mala Bay, Pacific Panama" L. H. Defew, J. M. Mair, H. M. Guzman 2005	Elsevier	www.elsevier.com/locate/marpolbul *see Appendix 2	N/A
Journal of Environmental Management	"An assessment of mangrove forest structure and development after human reclamation in Panama City, Panama" Benfield S, Guzman H & Mair J 2005	Elsevier	www.elsevier.com/wps/find/journaldescription.cws_home/622871/description#description *see Appendix 2	N/A
MSc Dissertation	"Assessment of <i>Agropecten ventricosus</i> population recovery after a collapse almost two decades ago" †Beatriz Medina, 2004	Heriot-Watt University, Edinburgh	Heriot-Watt University Library www.hw.ac.uk	Through Inter-Library Loans process
MSc Dissertation	"A study of the reef fish communities of Las Perlas Archipelago, Panama" ††Laura Baxter, 2004	Heriot-Watt University, Edinburgh	Heriot-Watt University Library www.hw.ac.uk	Through Inter-Library Loans process
MSc Dissertation	"Sponge diversity in coral frameworks and coral communities within Las Perlas Archipelago, Panama" ††Jade Berman, 2004	Heriot-Watt University, Edinburgh	Heriot-Watt University Library www.hw.ac.uk	Through Inter-Library Loans process
MSc Dissertation	"Educational material for Las Perlas Archipelago, Panama" Panagiotis Gardelis, 2004	Heriot-Watt University, Edinburgh	Heriot-Watt University Library www.hw.ac.uk	Through Inter-Library Loans process

† Manuscript (from dissertation work) submitted and accepted, subject to final revisions

MEDINA B, GUZMAN H, MAIR J, (accepted - Journal of Shellfish Research). Failed recovery of a collapsed scallop (*Argopecten ventricosus*) fishery in Las Perlas Archipelago, Panama.

†† Manuscripts (from MSc work) in preparation and with joint authors: GUZMAN, MAIR, BENFIELD.

The most appropriate journals for submission have still to be decided. The dissertation by Laura Baxter has been short-listed for consideration for the SUT Fugro-GEOS award for best student dissertation in UK (www.sut.org.uk/htmlfoldr/sut_FugroAwards.htm - see Appendix 2) in marine science and technology – outcome should be known in May 2005.

- *At this mid-stage of the project, only a few publicly accessible publications are as yet available (see above), but work is well advanced on preparation (and submission) of scientific manuscripts with several publications expected to appear in late 2005 and in 2006. Four MSc dissertations (of work carried out between May and September 2004) on some initial studies of the Las Perlas marine environment were produced and are available through Heriot-Watt University library (and the Inter-Library Loan scheme). Journal papers are being prepared from three of these MSc dissertations and the fourth dissertation assisted as the basis for draft publicity/educational pamphlet/posters for the Darwin project.*
- *Note: Although the two Journal publications listed above by Defew et al., and Benfield et al., are not specifically on results from Las Perlas studies, both pieces of research (on sediment metal contamination and mangrove structure) are going to be followed up in project Year 3 by similar research in Las Perlas and so these mainland studies will form a good baseline and comparison on which to compare results from Las Perlas.*

ANNEX: Report of progress and achievements against Logical Framework for Financial Year: 2004/2005

Project summary	Measurable Indicators	Progress and Achievements April 2004-Mar 2005	Actions required/planned for next period
Purpose: To build up research expertise in a team dedicated to obtaining habitat information and to producing management plans for the marine and coastal environment of Las Perlas in the Gulf of Panama in order to enable the designation of a Marine National Park within the Archipelago's boundaries	Information obtained during surveying and research from project used in formulation of action plans for protected area management during discussions with ANAM (Panamanian National Environmental Authority)	Most of the baseline field information has now been collected in Year 1 and 2 survey work and this is being used to influence current discussions on Action Plans. After further analysis, more results from Years 1 & 2 will soon be used.	Main lesson learnt is the need to be adaptable to take advantage of changing/favourable political events/support. Main actions remain as planned. Continued analysis of Years 1-3 fieldwork results will feed into policy decisions. Dissemination work now to be given higher priority.
Outputs:			
3 Panamanian Darwin Fellows with MSc level degrees and experience in applied field research	Continuous assessment and marks obtained during taught modules and research dissertation)	Darwin Fellow 1 obtained MSc degree. Fellow's 2 & 3 successfully completed taught component (in UK) of course.	Darwin Fellow's 2 & 3 to complete their MSc dissertation work in Panama on Las Perlas related projects (May-September 2005).
Field plots and action plans produced	Plot sites geographically defined and Action Plan draft report presented	From field results available, boundaries of different areas and management zones of MPA have been agreed.	Early in Year 3 designations should be formalised by Panamanian government and recommended field plots and action plans implemented.
Results disseminated through conference, scientific papers and other means	Papers being peer-reviewed, Conference arrangements and attendance confirmed	Journal papers have been published and several more are in press or in preparation. 2006 Conference dates fixed. Educational/publicity material in final draft stage.	Further specific studies and papers being planned. Conference still planned for Year 3 (but for March 2006 not August 2005 as in original plan) – this we have realised is much more suitable for all concerned and will have higher impact for project.
Information and experience exchange network of Darwin workers established	Numbers of groups participating and numbers of communications	Three groups currently actively involved in Network/exchange activities (see Year 2 achievements) and others joining/interested.	Darwin Fellow No.3 is to expand Network and Project Webpage on return to Panama from UK training. Lessons – needs person designated and fully committed to take charge of co-ordination/liaison and needs continued contact/explanation of mutual benefits. Good contact: - http://www.mpa.gov/information_tools/education.html#InfoExchange .

Appendix 1

LOGICAL FRAMEWORK (162/12/021) - Original

Project summary	Measurable indicators	Means of verification	Important assumptions
<p><i>Goal:</i></p> <p>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</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 			
<p>Purpose</p> <p>To build up research expertise in a team dedicated to obtaining habitat information and to producing management plans for the marine and coastal environment of Las Perlas in the Gulf of Panama in order to enable the designation of a Marine National Park within the Archipelago's boundaries</p>	<p>Information obtained during surveying and research from project used in formulation of action plans for protected area management during discussions with ANAM (Panamanian National Environmental Authority)</p>	<p>ANAM endorsement of final reports produced by Darwin project team</p>	<p>Panamanian authorities accept the information obtained and advice/recommendations made during the project and pass appropriate legislation, policy and funding schemes to set up and manage the Park</p>
<p>Outputs</p> <p>3 Panamanian Darwin Fellows with MSc level degrees and experience in applied field research</p> <p>Field plots and action plans produced</p> <p>Results disseminated through conference, scientific papers and other means</p> <p>Information and experience exchange network of Darwin workers established</p>	<p>Continuous assessment and marks obtained during taught modules and research dissertation</p> <p>Plot sites geographically defined and Action Plan draft report presented</p> <p>Papers being peer-reviewed, Conference arrangements and attendance confirmed</p> <p>Numbers of groups participating and numbers of communications</p>	<p>Degree certificates awarded by Heriot-Watt University</p> <p>Feedback and final Action Plan report endorsed</p> <p>Scientific papers appearing in journals</p> <p>Network aims and details of active partners appear on websites</p>	<p>Darwin Fellows pass all academic requirements of HWU's MSc Course</p> <p>ANAM agrees on proposed Action Plan</p> <p>Manuscripts submitted to peer-reviewed journals are accepted</p> <p>Other partners maintain commitment to Network</p>
<p>Activities</p> <p>Provision of training</p> <p>Survey and habitat mapping</p> <p>Results dissemination and consultations</p> <p>Production of educational material</p> <p>Networking</p>	<p>Activity Milestones (Summary of Project Implementation Timetable)</p> <p>In each of the 3 Years, one Darwin Fellow selected in April, starts MSc taught course training in UK in October and completes degree with dissertation in Panama by following September. Main UK staff-run training courses held in Panama in July/August 2004.</p> <p>Survey programme planning finalised by June 2003. Main field survey work carried out in July/August of each year jointly by UK and Panamanian team with additional small-boat/shore survey work carried out locally throughout study period. Field plots, databases and reference collections consolidated by August 2005.</p> <p>Peer-reviewed scientific journal papers starting to be prepared after collation of initial survey results and being produced regularly in Years 2, 3 and afterwards. Project Conference held August 2005. Continuous discussions/liaison with ANAM personnel.</p> <p>Design of school and community education leaflets started September 2004 and printed ready for distribution in August 2005.</p> <p>Immediate "information and experience exchange" network initiated (May 2003) with core of other Darwin project personnel. Expanded throughout project.</p>		

Appendix 2 List of separately attached paper documents or electronic files supplied

* Paper format

† On web pages

- * Map of benthic sample stations from 2003/2004 surveys around Las Perlas Archipelago and final zoning area
- * Leaflet describing the MSc Course undertaken by the three Panamanian Darwin Fellows
- * Example of one of the draft leaflets prepared for printing in Panama and soon to be distributed once final zoning agreed, translated into Spanish, final corrections and logos included. Other leaflets are designed to cover fishing, tourism, pollution and special packs for schools.
- * STRI Newsletter and Darwin Project article (August 2004)
- † Journal articles by Defew et al., 2005
www.elsevier.com/locate/marpolbul
Benfield et al., 2005
www.elsevier.com/wps/find/journaldescription.cws_home/622871/description#description
- * Information on Las Perlas MSc dissertation nominated for 2005 Fugro-GEOS award
- * Summary of MSc dissertation undertaken by another student at University of Wales, Bangor
- * Final Draft of Executive Decree creating the “*Zona Especial de Manejo del Archipiélago de las Perlas*” (*Special Management Zone of the Las Perlas Archipelago*)
- * SMG poster - presentation given by Sarah Benfield on PhD research work on Las Perlas