



Department
for Environment
Food & Rural Affairs



Darwin Initiative Newsletter

October 2013

Welcome to another issue of the Darwin Initiative newsletter and the third one of 2013 – the Darwin Initiative's 21st year. Thank you to all the project leaders who have submitted articles and photos.

We received a wide range of interesting articles, from new projects who are just beginning work to a few older projects which highlight the legacy of Darwin.

Darwin received a record number of applicants for Main projects this year, with over 290 Stage 1 applications received, many of which were exceptional! There is clearly no shortage of interesting work being proposed. 57 applications were chosen for Stage 2, (46 in the DFID pot and 16 for Defra), with an idea to fund 15 or so DFID projects and 2-3 Defra ones.

The deadline for Darwin Plus applications also recently closed, with 44 submitted applications. This just demonstrates the impact that Darwin Initiative is having in the UKOTs. A fair few of the projects highlighted in this newsletter describe the important work being undertaken in the UKOTs by the first round awards of the Darwin Plus fund.

To find out more, check out the website darwin.defra.gov.uk and Twitter [@Darwin_Defra](https://twitter.com/Darwin_Defra).



Horse-eye Jacks and Nassau Grouper at a spawning aggregation site (SPAG) on Little Cayman last month. Credit: Croy McCoy

Reintroduced population of Seychelles paradise flycatchers continue to grow (15-009)

A reintroduction success in the Seychelles looks set to continue. Twenty-three Seychelles paradise flycatchers (*Terpsiphone corvina*), locally known as 'Vev', were translocated to Denis Island in November 2008 as part of a dramatic conservation effort under Darwin Initiative project 15-009 to provide a much needed safety-net population for this critically-endangered species. Until that Darwin-funded intervention, the total population of this species was restricted to the tiny island of La Digue in the Seychelles archipelago, where the species is continually under threat of further habitat loss for development. Following the reintroduction, intensive post-release monitoring of the 23 founders has been undertaken. By December 2011 the population was estimated to be between 30-33 individuals. We are now delighted to report that following the most recent population census on Denis Island earlier this year, the reintroduced population has shown clear signs of continued growth with at least 39-41 individuals recorded. This represents a 45% increase in population size since its establishment five years ago.

The field survey also documented the presence of a minimum total of 18 territories, 15 of which contained breeding pairs, two containing single males and one containing a single female. In addition, field observations suggest the presence of four further territories (one with a sub-adult male, two with adult males and one with a

pair). Five active nests were observed during the survey, three containing eggs and one containing a nestling. In addition, two parentally-dependent chicks were detected, one fledgling approximately five days out of the nest and the other older but still being fed by its parents.

The Darwin Initiative project was led by the



A flycatcher on its nest. Seychelles. Credit: Jeff Watson

Durrell Institute of Conservation and Ecology (DICE) at the University of Kent, alongside local host country partner Nature Seychelles, with additional project partners including the Royal Society for the Protection of Birds, Denis Island Limited, RARE, the University of Kent Business School, Wildlife Vets International and the Government of Seychelles' Ministry of Environment. The project received additional support from the La Digue Development Board, Wildlife Clubs of Seychelles and the Seychelles' British High Commission.

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A sustainable future for Chinese giant salamanders(19-003)

Endemic to China, the Chinese giant salamander (*Andrias davidianus*) is the largest extant amphibian in the world. Part of the ancient Cryptobranchidae lineage dating back to 170 million years ago, it earns the moniker "living fossil". Although the Chinese giant salamander

has been under state protection in China since 1973 as a Class II State Special Protected Animal, this charismatic animal is currently Critically Endangered and is near extinction in the wild, and requires immediate conservation actions.

To train Chinese biologists in field survey techniques, and to collect data on disease status, morphology and habitat associations for wild salamanders, a stakeholder training workshop was held at Fanjingshan National Nature Reserve (FNNR) in May 2013, followed

by an extensive field survey in two rivers (Panxi and Heiwan) within the reserve (Figure 1). Although FNNR is considered to be a key protected area for the Chinese giant salamander in Guizhou Province, and habitat in surveyed sections appeared optimal and undisturbed with ample food availability, we failed to encounter any salamanders and suspect that the species is functionally extinct within these river systems. Concurrent questionnaire surveys of rural communities also revealed that few wild salamanders were likely present in FNNR in recent years and we found evidence (e.g. bow hooks that are traditionally used in China to hunt giant salamanders) for ongoing hunting pressure on salamanders within the reserve. This highlights the urgent need for radically improved and strengthened conservation management of the giant salamander in China and for additional surveys throughout this species' range in order to better assess its current population status and distribution.

Communication, Education and Public Awareness-raising (CEPA) is also a strong aspect of this Darwin project and public campaigns and educational outreach have been initiated by the project team in China to raise the conservation profile of the Chinese giant salamander. Earlier this year, public questionnaire surveys were conducted in Yunnan, Shaanxi and Guizhou provinces to collect the first baseline data of public awareness towards the salamander and to find out determinants of people's knowledge and conservation perceptions. Further to these,



Group photo of a school CEPA campaign in Lufeng county, Yunnan Province (September 2013). The students are showing their Chinese giant salamander drawings. Credit: ZSL

school courses, public educational displays and online social marketing on salamanders and the importance of freshwater ecosystems are now under way (Figure 2). Follow-up surveys will be conducted towards the end of the project to determine if social attitudes towards the conservation of this unusual, but magnificent, animal have been changed.

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The field team conducting a survey for Chinese giant salamanders in Fangjingshan National Nature Reserve, Guizhou Province (May 2013) China. Credit: ZSL

Do private nature reserves and ecotourism support biodiversity conservation in Guatemala? (19-018)

The project 'Agroforests: A critical resource to support the Megadiversity in Guatemala' has been exploring the role of two linked national initiatives to recognise and support farms that conserve biodiversity. These are the declaration of private farms as private nature reserves under the national protected areas code, and the development of ecotourism to generate income from these farms. Diego Naziri from the University of Greenwich together with the National Coffee Association and Foundation for the Defence of Nature have interviewed farmers in two regions of Guatemala to understand the influence of these linked processes in generating incentives for biodiversity conservation.

The two regions differ in the characteristics of the farms that have opted to become private nature reserves. In the Purulha district, the Cloud Forest Corridor links the Biotopo Quetzal Reserve to the Sierra Las Minas Biosphere Reserve, and reserve farms have on average 70% forest cover. In the other region of Palajunoj on the southern slope of the Pacific Volcanic Chain, over half of the farm area is shaded coffee production, with about 18% forest cover. In Palajunoj private reserve farms were compared to neighbouring

farms that had not opted for this status. The two groups contrasted in that the reserve farms had more forest – on average 30% forest cover as opposed to 4% on non-reserve farms, and on the reserve farms the coffee shade tended to be more diverse. However, both groups of farms were similarly active in undertaking conservation activities including reforestation, prohibiting hunting and engaging the local community in conservation.

One of the primary motivations of having reserve status was the additional protection that it provides from land-invasion, particularly of forest land that can be seen as unproductive and thus subject to being taken over by landless families. On the other hand, the farms with nature reserve status are subject to the protected areas regulations that pose additional restrictions on the management (felling or pruning) of the shade trees in the coffee plantations. This is a necessary part of the management of shaded coffee in order to maintain the productivity of the coffee, as well as providing a valuable product in terms of firewood. Unfortunately the protected area restrictions on cutting trees has meant that farmers have not been able to manage the shade and this has affected their coffee and led to some farms abandoning the private reserve status.

On a positive note, in both areas about 60% of the private reserves have developed eco-tourism initiatives, but these are much more economically important in Purulha where they provide between 60-100% of the income of these farms, whereas

in Palajunoj they only contribute for 2-15% of farm revenues, with coffee being the primary source of income. Several farms have built there eco-tourism activities upon the reserve status using it as a promotional tool. The services provided by the farms vary but include lodging, bird watching, horse riding, visits to archaeological sites and range from community tourism to organized tours. In Palajunoj visitor rates are limited to a few hundred visitors per farm per year, about half Guatemalan

Directions for tourists to the Patrocinio Private Nature Reserve and a Nueva Alianza Community Nature Reserve, in Palajunoj, Guatemala.
Credit: Jeremy Haggart



and half international. There is a need for better promotion to expand visitor numbers to enable other interested land-owners to develop this alternative source of income and incentive them to conserve the environment. One of the dreams of the local farmers is to actually offer tours to secondary school students from the cities of Guatemala so they can learn about life in rural

areas, the nature they conserve, and build the environmental conscience of future generations of Guatemalans.

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The graduates display their medals and certificates along with representatives from the project partners at the 'Chagos Connect' Awards Ceremony at Manchester Museum, 26th September. Credit: Darwin Project



Strengthening the World's Largest Marine Protected Area, Chagos Archipelago (19-027)

In July's Newsletter, we not only reported on the First Darwin Initiative Expedition to the Chagos Archipelago, but also introduced our Outreach Programme – 'Chagos Connect' – which aims to engage communities descended from the people who once worked the coconut plantations of the islands, and who now live in London and Manchester. The Outreach Programme aims to increase environmental awareness and capacity within Chagossian communities, and to contribute practically to the conservation of the natural environment of the Chagos Archipelago. Following the successful family days earlier in the year, the Outreach Team at the Zoological Society

of London (ZSL) and partners delivered a second 9 week environmental training course this summer mainly for those from the Manchester area (a similar course was run in London last year).

A Marine Environment module was presented by ZSL and Bangor University working with RSPB, Nature Bites and Dive North Wales, and introduced the trainees to surveying sea birds off cliff tops in Anglesey; marine life identification on the shores of the Menai Strait; and a try at SCUBA diving at the national water sports centre, Plas Menai. Topics also ranged from coral reef ecology to conservation and MPAs. The Terrestrial Ecosystem module was given by the RSPB, Hampstead Ranger Service and Liverpool Botanic Gardens, and covered island ecology including island restoration and land management. A 'Wilderness Weekend' on environmental projects and team building activities was held at Syers Croft with ZSL staff, who also organised a module in developing communication skills,

evaluation and social marketing.

11 trainees graduated from the course at an Awards Ceremony at the Manchester Museum in the presence of their families, and project partners from ZSL, Bangor University, the Pew Environment Trust, and Foreign and Commonwealth Office. Each graduate was presented with a medal and certificate, and they join the 12 graduates from last year as 'Chagos Ambassadors'. The Ambassadors are encouraged to apply for Darwin and Chagos Conservation Trust Bursary Awards, allowing them to receive further skills training, and as a result, 2 Chagossians will be learning to dive with Blue Ventures in Madagascar, and 2 have

already completed chainsaw courses for habitat management with the RSPB, and will now undertake botanical courses at Kew. Each year, one Ambassador is also invited to join the 12 person Darwin scientific expedition to the Chagos Archipelago, where they work alongside scientists to help conserve the marine and terrestrial ecosystems of Chagos. Building on the success and lessons learnt so far, the Darwin Project and its partners are now investigating the challenge of engaging with overseas Chagossian communities in Seychelles and Mauritius.

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Medicinal root trade, plant conservation and local livelihoods in Morocco (20-013)

At the beginning of April, the Global Diversity Foundation began to work in Amazigh (Berber) indigenous communities of the Moroccan High Atlas on a project addressing livelihood improvement and threats to the sustainable harvesting of medicinal and aromatic plants. We are focusing on wild-crafted medicinal roots that are intensively harvested in two rural townships of the High Atlas mountains - Ait M'hamed rural commune in Azilal province and Imegdale rural commune in El Haouz Province.

The sustainable harvesting of vulnerable plant resources is essential in maintaining the delicate ecological integrity of the unique and biodiverse High Atlas montane ecosystem of Morocco, and especially the designated Important Plant Areas that are rich in endemic species. Commercialization of medicinal plants helps to ensure the subsistence of millions of herbal remedy users, and sustains trade that contributes to the livelihoods of thousands of collectors, vendors and traditional practitioners.

In order to launch our project, we organized a workshop on plant conservation and local livelihoods in Morocco that brought together colleagues from academia, civil society,

government and the private sector. Held on 31 May and 1 June at a beautiful location in the High Atlas mountains, it allowed participants to share with each other what they and their institutions are doing to ensure that conservation and sustainable use of medicinal plants supports local livelihoods in Morocco. Through short presentations, small working groups and a final plenary session, we were able to engage in mutual learning about current initiatives on



Stephen Jury of the University of Reading and Ahmed Ouhammou of the Cadi Ayyad University regional herbarium teaching botany student Fatimazahra Yous plant pressing techniques. Credit: Hassan Rankou

the conservation and sustainable use of plant resources in Morocco. Perhaps most exciting of all, we were able to take the first steps towards creating a Moroccan Plant and Livelihoods Specialist Group – guided in its early stages by Hassan Rankou of the Royal Botanic Gardens, Kew – to ensure continued communication and cooperation among specific colleagues who are involved in diverse projects on medicinal, aromatic and other useful plants.

With the High Atlas Foundation, one of our partners, we are establishing fruit tree and medicinal plant nurseries in the rural townships to enable terrace cultivation and enrichment planting of selected medicinal roots, providing a direct benefit for the livelihoods of rural families. This is supplemented by cultivation and marketing of organic fruits and nuts that have an expanding market in Morocco and internationally.

In addition to generating viable income increases for medicinal plant collectors and supplementary livelihood benefits for other community members, our project seeks to build the capacity of university students and community researchers.

For example, our collaborators Stephen Jury (University of Reading) and Hassan Rankou (Royal Botanic Gardens, Kew) visited Morocco in early October to teach students of Cadi Ayyad University in Marrakech about plant collecting techniques and the use of botanical databases.

All of these activities contribute to our goal of assisting the Moroccan government to implement the Global Strategy for Plant Conservation that supports the nation's commitment towards the Convention on Biological Diversity, and to conserve vulnerable plant species in protected areas, forest domains and agdals (community conserved areas). Six months into the project, we are witnessing both the potential and the challenges of engaging in applied research from the local to the national scale.

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Conserving biodiversity and reducing poverty through wildlife-friendly farming in Cambodia (20-014)

Cambodia is located in the rice bowl of Asia. About 80% of the population lives in rural rice-growing areas, and the importance of having enough rice to food security is paramount. The conversion of forest land into agriculture is one of the biggest threats to biodiversity in this region, home to over 40 globally threatened species of wildlife, eight of which are Critically Endangered.

The Wildlife Conservation Society (WCS) is supporting the Royal Government of Cambodia to conserve forests across two large landscapes, using an innovative payments for environmental services approach. Ibis Rice is an eco-labelling initiative which offers farmers preferential prices for their agricultural produce contingent upon their adherence to conservation agreements, with the aim of reducing human impact on protected areas as well as increasing farmers' incomes. The

initiative is implemented in conjunction with a local partner organization Sansom Mlup Prey (SMP), a local NGO, which is responsible for establishing the local farmers' cooperatives, called village marketing networks (VMN). The farmers' cooperatives then buy the produce from farmers that have been certified as 'Wildlife Friendly™' and SMP sells it at a price premium to hotels, restaurants and supermarkets in Cambodia. Independent research has suggested that Ibis Rice boosts local incomes by 20-30%. The rice is organic, because farmers are trained in and use organic farming techniques.

Wildlife Friendly™ is a new international certification system set up to develop and market products that contribute to the conservation of wildlife while enhancing the economic vitality of rural communities (more at www.wildlifefriendly.org). For Ibis Rice, compliance is defined as farmers not clearing new agriculture fields without permission, and agreeing not to hunt key species of wildlife. Research suggests that over 90% of Ibis Rice farmers in each village are in compliance with these rules, and this has led to reductions in deforestation rates by around 50%.

The Darwin Initiative's multi-year grant will help us to establish Ibis Rice as a sustainable socially and environmentally responsible enterprise. This will require expanding the scope of the scheme to work across most of the villages inside two protected areas, and enhancing sales and distribution in order to sell the produce. At this scale, the profits from the sale of Ibis Rice will cover the costs of the operation, including

independent monitoring of compliance. In addition, the Darwin project will analyse the impact of Ibis Rice achieving its environmental and social goals, against a baseline data collected during 2009-2011 by WCS and Imperial College London.

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Cambodian farmer Prey Veng weighing rice. Credit: WCS staff in Preah Vihear

Scaling Up Biodiversity Conservation and Ecological Connectivity across Caribbean Guatemala (20-025)

For 23 years the Foundation for Ecodevelopment and Conservation (Fundaeo) has developed a successful strategy to protect and conserve one of the most important tropical forests in Guatemala, Cerro San Gil. One of our main goals is to maintain its extraordinary biodiversity and unique beauty through the creation and implementation of productive and development projects to ensure an income for local families and communities that will diminish poverty and will reinforce the concept of sustainable development. In this video you can find the wonderful job of local farmers that value the concept of conservation. You will

also see Miguel Ramirez a local expert on bird watching describing what has been for almost 20 years the longest Bird Monitoring Program in Mesoamerica at Cerro San Gil. Oswaldo Calderon the Director of the area also explains the crucial alliances with government institutions and communities that legitimize our conservation efforts. This video was transmitted 24 times in one month on a local channel (CanalAntigua) that can be seen throughout the country via cable. Thanks to the support of Darwin Initiative and UKGuatemala, we are able help protect this marvellous forest. Here is the link where you can see this amazing video.

<http://vimeo.com/74889349>

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NBSAPs 2.0: Mainstreaming Biodiversity and Development (19-023)

plans that conserve rather than threaten biodiversity.

Championing biodiversity in Namibia

Speaking up for biodiversity

We all know the power of a high profile person speaking up for a cause. Whether it's the UN Goodwill Ambassadors or an international football personality backing a charity, their enthusiasm, commitment and connection with the audience influences the way we think about the organisation or issue - and the issues are many. We should celebrate the fact, therefore, that there are carefully-chosen champions in at least two countries making the case for biodiversity to be at the heart of development.

We heard the story of how Uganda is using biodiversity champions at a recent NBSAPs 2.0 project workshop in Entebbe. "We've chosen people who are passionate about biodiversity to help us raise awareness of how important it is, both with government and private sector colleagues and out in the community," said Francis Ogwal of the National Environment Management Authority (NEMA).

The Ugandan champions are in government departments, the academic world, the private sector and in NGOs. There are journalists who write about biodiversity whenever they can and Francis Ogwal wants other popular personalities to get involved too.

"We've tasked our government champions to report on progress against particular Aichi targets and linked these to the NBSAPs objectives. In that way, we've included them in the NBSAPs 2.0 revision process," he says. "We want them to tell us about pollution levels, the status of wildlife or private sector engagement, he added." The non-government champions, on the other hand, are encouraged to use every opportunity they get to raise awareness in the community about the value of incorporating policies in development

The NBSAPs 2.0 team in Namibia is using biodiversity champions too. It has engaged parliamentarians to solicit support at the highest level in order to profile the importance of the NBSAP within the national development context. In March 2013, it had what Jonas Nghishidi, NBSAPs 2.0 project manager, called a 'marathon' of workshops to seek commitments to fast track the development and approval of the NBSAP. This process has been invaluable in gaining the support and engagement of stakeholders at different levels. The Ministry of Environment and Tourism nominated a key figure in the Namibian parliament – the minister of foreign affairs - as champion, and they made the links to multilateral environmental agreements and hence Namibia's global obligation and role.

Likewise, the NBSAP 2.0 process has been driven at the local level by the traditional leaders and councillors. "Our most valued interventions are at the youth level", says Jonas Nghishidi. "The Namibian youth have been able to influence others through school, to improve understanding of biodiversity by demonstrating ecosystem services, biotrade, and their impact on young people." This has been discussed in the context of sustainable development, helping Namibians to realise that they should care about biodiversity because of its critical importance to Namibia's economy and livelihoods now and in the future.

Read more about the NBSAPs 2.0 Mainstreaming biodiversity and development project at <http://povertyandconservation.info/en/pages/biodiversity-poverty-mainstreaming-nbsaps>

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A Darwin Initiative Biodiversity Action Plan for Ascension Island (19-026)



The critically endangered Ascension Island spurge (*Euphorbia organoides*) is now protected under the Wildlife Protection Ordinance, 2013. Photo credit: AIG Conservation

The focal aim of this highly collaborative project is to design and implement the first National Biodiversity Action Plan (BAP) for Ascension Island, a UK Overseas Territory in the South Atlantic Ocean. The BAP will comprise multiple action plans for priority species and habitats with defined targets to promote the recovery of populations of endemic and threatened species, including actions to increase their protection through legislative changes and the protection of key habitats. As part of the project, the team has undertaken a review of existing environmental legislation to ensure that it meets the needs and international commitments of Ascension Island Government. To this end, we are delighted to be able to report that following a unanimous vote by the Ascension Island Council, the Wildlife Protection Ordinance, 2013 is currently being enacted.

This new Ordinance replaces the now repealed Wild Life (Protection) (Ascension) Ordinance, 1944 that was out-dated and in urgent need of modernising. For example,

under the previous legislation, several common, introduced species, some of which were having negative effects on the Island's native biodiversity, were given protected status. However, with the enactment of the new Ordinance, these anomalies have been corrected and many of our rare endemic plants, fish and invertebrates (amongst others) have been afforded legal protection for the first time. Additionally, the Wildlife Protection Ordinance has an important marine conservation element, introducing powers to establish closed seasons, quotas, no-take zones and/or prohibited means for extracting marine resources, subject to the necessary research being undertaken to enable informed decision-making.

This represents a significant step forward for safeguarding the native biodiversity of Ascension Island and could not have been achieved without the expertise of the Crown.

Counsel, Walter Scott, the support of the Administrator HH Colin Wells, the Island Council and the Island's residents, and funding from the Darwin Initiative. Many thanks to everybody that has been involved; next on the legislative agenda is the improvement of Ascension's protected areas network.

To find out more about this progress of this project and the work of AIG Conservation Department in general, please visit our website: www.conservation-ascension-island.gov.ac and/or Facebook page: www.facebook.com/AscensionIslandConservation

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The land crab (*Johngarthia lagostoma*), only found on Ascension Island and 3 other small islands, is now protected under the Wildlife Protection Ordinance, 2013. Credit: Sam Weber, AIG Conservation

Darwin Fellowship Report. Biol. Karina Aguilar Vizcaino

Bosque La Primavera is a unique, fragile area. It is a 30,500 hectares biosphere reserve located in the center of the state of Jalisco, adjacent to Guadalajara -Mexico's second most populous metropolis- and is the city's most important ecosystem service provider. Its location in the nearctic-neotropical confluence zone, and between two floristic regions (the Western Sierra Madre and the Transversal Neovolcanic Range) give the reserve rich biodiversity. It is also a geological wonder, an enormous caldera dotted with volcanic domes, ridges and valleys; with a great diversity of acidic rock formations, obsidian, pumice and volcanic ash plains.

zone, closing in just a few hundred meters from the reserve's nucleus.

The fellowship developed from the Darwin Project 17027 'Market Based Scheme for Conservation in La Primavera Forest Mexico' led by Prof. Jon Lovett and Arturo Balderas Torres, which conducted research now being used to implement a community based forestry project support by Selva Negra, the NGO of the world famous music group Maná, who are based in Guadalajara. During my fellowship I will attend a course in the Leeds University School of Geography under Mr. Stephen Carver PhD, specializing in Geographic Information Systems (GIS) to further my knowledge on how to use these technological platforms on a real scenario, planning wildlife crossings using the actual map and wildlife data of Bosque La Primavera. To

prepare for this stage, I have been attending an English language course since June 2013. The UK-based course will begin in the spring of 2014, and the time prior to the trip will be used to work on my current duties as Director of Wildlife in Bosque La Primavera -where I have worked for 5 years, advocating conservation, education, communication and interdisciplinary and community projects- and to prepare myself, obtaining practical knowledge of GIS software and the data of the area itself.

Darwin Fellow Karina Aguilar in the field in the La Primavera Biosphere Reserve. Credit: Gerardo Cabrera



However, Bosque La Primavera –declared a “Man and Biosphere” site by the UNESCO in 2006- faces a large number of anthropogenic threats on a daily basis. The number of vehicles in Guadalajara has quintupled in the last years, not only increasing local pollution, but also outgrowing the road system in the city and neighboring municipalities. Local authorities, in an attempt to clear part of the gridlock, projected (and as of 2013 started to build) a second, outer beltway surrounding the city called Macrolibramiento. The first stage of the beltway is 111 Km, cutting through 3 of the 4 biological corridors connecting Bosque La Primavera to surrounding forests, and invading the buffer

I would like to give a special acknowledgement to Prof. Jon Lovett and Dr. Arturo Balderas for their support and guidance throughout my Darwin Initiative fellowship application. Thanks to them I will be able to work on this project for the Bosque La Primavera MAB-UNESCO site, with the objective of aiding the mobility of its populations through the design of optimally-located wildlife crossings to establish and ensure the connectivity of biological corridors.

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Bermuda Invasive Lionfish Control Initiative (DPLUS 001)

The invasion of lionfish (*Pterois miles* and *Pterois volitans*) in the Western Atlantic threatens the natural balance of marine ecosystems and the overall health of coral reefs. The Bermuda Invasive Lionfish Control Initiative is a collaborative project tasked with understanding the extent and impact of the invasive lionfish species in Bermuda's waters. Researchers from the Bermuda Institute of Ocean Sciences (BIOS), the Bermuda Zoological Society (BZS), the Bermuda Aquarium, Museum & Zoo (BAMZ), the Bermuda Department of Conservation Services (DCS), the Marine Resources Section of the Bermuda Government Department of Environmental Protection (DEP), the Ocean Support Foundation (OSF), and the University of Massachusetts Dartmouth are working together to gather key scientific data required for the development and implementation of an island-wide management plan.

Since its initiation in March 2013, the team has completed surveys of lionfish and prey fish at a total of 37 sites, ranging in depth from 10m



Darwin team technical diver, Alex Chequer, spearing a lionfish in Bermuda. Credit: James Whittaker



Dissected adult lionfish sampled for size, weight, stomach content, gonadal indices, otolith microchemistry, stable isotopes and genetic analyses. Credit: Corey Eddy

to 60m, and collected over 140 fish to be used in studies of diet preferences, demography, and population genetics. Lionfish-specific traps are also being developed and cooperative networks are currently being organized with local fishermen for trap deployment and testing. The data obtained will be used to develop a model of the Bermuda lionfish population and generate a distribution map that will highlight hotspots for targeted removal and management in the future. Overall, the Bermuda Invasive Lionfish Control Initiative project will generate the tools and data required for the implementation of an ongoing Bermuda Lionfish Control Plan being developed by the Bermuda Lionfish Taskforce. This plan will provide strategies for government and other stakeholder efforts to control the lionfish population at a level that will mitigate the long-term impact of this invasive species on native fishes, reef communities, the island's economy and public health.

"This cooperative team has made great strides toward furthering our understanding of lionfish ecology and population demography in Bermuda's waters. Furthermore, participation in and support of the Bermuda Invasive Lionfish Control Initiative by scientific researchers, government officials, dive operators, and local citizens has been remarkable and highlights the importance of this environmental issue as a unifying activity within the local community. Bermudians are directly connected to the marine environment and their continued involvement and assistance is essential for long-term management of this invasive species."

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Seed conservation in the Caribbean UK Overseas Territories (DPLUS 006)

The five Caribbean UK Overseas Territories (Anguilla, British Virgin Islands, Cayman Islands, Montserrat and the Turks and Caicos Islands) are part of the Caribbean 'biodiversity hotspot' sensu Myers et al 2000 and are home to a diverse flora. In common with tropical islands around the world, the native plants of the UKOTs face a range of threats, mainly through habitat loss and fragmentation and the spread of alien invasive species.

The Millennium Seed Bank Partnership (MSBP), led by Royal Botanic Gardens, Kew has to date collected and secured over 33,000 species in ex-situ accessions at the Millennium Seed Bank at Wakehurst Place, West Sussex and partner seed banks across the globe. While a number of collections from the Caribbean UKOTs are represented in the MSB's holdings, none are banked locally and many more UKOTs conservation priorities are yet to be secured ex-situ.

The Darwin Plus-funded project is enabling partners from all five Caribbean UKOTs to collect and bank seeds in-country for the first time, following simple protocols developed and refined by the MSBP. This includes the establishment of small-scale seed banks in each partner country, each equipped for cleaning seeds (using graded sieves), drying (using silica gel desiccant), monitoring seed moisture (using a digital hygrometer), and finally banking seeds sealed in laminated foil bags in a freezer. Seed collections

are also collected with herbarium vouchers to ensure correct identification.

In October 2013, a workshop, hosted in the Turks and Caicos Islands, is bringing together participants from across the project partners, to be trained in making targeted seed collections of priority species and processing collections ready for banking. It will also be an opportunity to foster cross-UKOT collaboration through the development of a regional seed conservation network, to deliver support and share expertise.

The remainder of the project will focus on a collecting programme, with partners targeting native seed-bearing species for banking and use locally, as well as duplicating collections at the MSB in the UK.

In addition to being a valuable long-term 'insurance policy' against extinction, seed banks can support other conservation activities such as propagation of threatened species, habitat restoration, reintroductions, and landscaping with native species. It is expected that enabling seed to be banked in-country will provide a readily available source of material for such conservation work as well as encouraging the use of native species in plant nurseries, in addition to its core role as a long-term genebank for species of high conservation value. Meanwhile, at Kew, seeds banked at the MSB are yielding data on viability and dormancy, as well as the resulting live material used for developing horticultural protocols (<http://www.kew.org/science-research-data/directory/projects/ExSituConsCollsUKOTs.htm>) and undertaking research into species genetics and their position on the tree of life.

Partners in the project are the Departments of Environment in Anguilla, Montserrat, and the Cayman Islands, respectively, the Department of Environment and Maritime Affairs in the Turks and Caicos Islands, and the National Parks Trust of the Virgin Islands.

Updates on the project will be posted at the Kew UKOTs team's blog: <http://www.kew.org/news/kew-blogs/ukots/index.htm>

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Huayruro seeds. Credit: Tom Heller/RBG Kew

Establishing the First Coral Nursery in the Cayman Islands (DPLUS 010)

Staghorn coral (*Acropora cervicornis*) is one of the most threatened coral species in the western Atlantic. Since the 1980s, staghorn coral populations have declined by over 90% in some regions, as a result of factors such as disease, bleaching, and hurricane damage. But the specific cause that resulted in widespread mortality is still unknown. Staghorn corals reproduce by broadcast spawning (releasing eggs and sperm into the water, where they are fertilized) once per year. With densities of sexually mature colonies so low, the chance of genetically distinct gametes meeting and developing into an embryo is low, resulting in low recruitment success.

In recent years, coral nurseries have become an increasingly popular tool for artificially increasing the number of staghorn colonies on the reef. The process of establishing a coral nursery involves taking samples from wild donor colonies, fragmenting them into smaller pieces, and attaching them to artificial structures at a nursery, an ideal site away from predators, competitors, and other stressors. Staghorn corals are one of the fastest growing corals in the western Atlantic, and thus can grow as much as 20 cm per branch per year in a nursery.

In Little Cayman, the Central Caribbean Marine Institute (CCMI) and the Cayman Islands Department of Environment (DOE) have teamed up to create the first coral nursery in the Cayman Islands, focused specifically on the threatened staghorn coral. The nursery is located just north

of CCMI's Little Cayman Research Centre, and is comprised of coral fragments from 5 distinct local parent colonies. Since it was established in September 2012, the nursery has grown from 58 to 200 corals, with a tenfold increase in the amount of tissue in the first 10 months alone.

After corals have grown up in a nursery setting, the next step is to outplant the nursery-reared corals back to the wild. Here, they can grow even larger and eventually reach sexual maturity, increasing the density of healthy, spawning colonies on the reef. Increasing the number of spawning colonies on the reef increases the species' chances of successful fertilization and recruitment.

Thanks to the support of the Darwin Initiative, the first round of staghorn coral outplanting occurred at two sites in Little Cayman in June 2013. These new colonies are already improving the biological and structural complexity of the reef system. The newly outplanted colonies are monitored monthly and we anticipate that they will begin to spawn in 2-3 years.

The next step of the project will be to expand the size and increase the genetic diversity of the existing nursery, plus establish at least one more nursery in Little Cayman. Once these expansions take place and the new corals have plenty of time to grow, outplanting will take place on a regular basis, helping to create a healthy, thriving population of staghorn coral at Little Cayman. This winter, we will host a workshop at the Little Cayman Research Centre to develop a new strategy for outplanting that integrates climate change.

CCMI's mission is to improve biodiversity through research, conservation, and education. The Little Cayman Research Centre has become a premiere research and education facility in the Caribbean, where work on invasive species, threatened species, and climate change is being conducted year round. Over 100 scientists from 7 countries and thousands of students have visited to participate in workshops, courses, and internships. Little Cayman harbours some of the most biologically diverse Caribbean reef systems and the island therefore affords rich opportunities to address some of the most pressing issues facing the UK Overseas Territories.



CCMI Research Intern Becks Green measures colonies of staghorn coral on a PVC tree nursery at Little Cayman, Cayman Islands. Credit: Sonia Bejarano

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Horse eye Jacks at a spawning aggregation site (SPAG) on Little Cayman last month. Credit: Croy McCoy

Assuring Engagement in Cayman's Enhanced Marine Protected Area System (EIDPO 045)

This Darwin Post Project follows The Darwin Initiative to Enhance an Established Marine Protected Area in the Cayman Islands (18-016), through which a new MPA system has been designed and submitted to Government, potentially increasing No-Take protected area by a factor of 3. The Post Project focusses on 4 challenges to the new MPA: (1) the effectiveness of invasive lionfish culling; (2) Protection of fish spawning aggregations (SPAGs), (3) the sustainability of zoned concessions to fishers; and (4) new technology to support enforcement of a larger MPA, and we will report on each of these topics in future newsletters

Fishing at SPAGs is an important issue, because it rapidly decimates adult fish, and 5 out of the 6 aggregation sites for Nassau grouper have been lost previously, forcing the seasonal closure of the last. After more than 8 years of closure, grouper populations are recovering at this site. Unfortunately, fishers now target other fish at SPAGs, and recent observations suggest that at least 24 species spawn at these sites after full moon, many at times of year beyond the grouper spawning closures (Figure 2). The tides are largest after full moon, and currents strong,

dispersing fish larvae and circular eddy currents often form, retaining larvae close to shore, potentially bringing larvae back to the islands.

The project is using direct underwater observations, hydrophones, remote underwater cameras, and acoustic techniques to investigate the fish aggregations. In addition, satellite tracked drifters are being released each month when fish are observed to spawn, in order to track larval dispersal. We will then use models to identify fish larval dispersal for larvae originating monthly from the Little Cayman SPAG over a year. Figure 2 (inset) shows 12 hours drifter tracks from before the night of spawn and the main track shows a drifter released on the night of spawning, which returns to the islands. These initial results indicate that the islands coral reef fish may depend on a process of self-recruitment, such that after a pelagic larval phase, the young fish recruit back to the reefs of Cayman. If this is indeed the case, then it is essential that all species of fish (and not just grouper) are protected at the SPAGs throughout the year. Understanding larval dispersal patterns generally, and protecting all larval sources to ensure a constant supply of larvae will be important for sustainable fishing, and may also be important for coral reef recovery and adaptation to climate change.

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Resource Conflicts in Boni-Dodori Forest Ecosystem in northern Kenya (20-011)

The Boni-Dodori forest ecosystem in northern Kenya comprises Boni (1,340 km²) and Dodori (880 km²) National Reserves in Garissa and Lamu counties, respectively. These two wildlife conservation areas are separated by currently unprotected coastal forests known as the Boni and Lungi forests. The National Reserves are located in multi-functional spaces resulting in conflicts between humans and wildlife. These conflicts have become intense within the ecosystem in the recent past, where wildlife competes directly with a rapidly increasing human demand over scarce pasture and water.

Increasing encroachment of forest areas for agriculture, infrastructure development and livestock grazing, combined with forest fires and collection of forest products have exacerbated conflicts between humans and wildlife in the area. Droughts, habitat loss and degradation of habitats force wild animals to stray into human habitations that surround forest areas creating conflicts which have led to crop losses and human injuries.

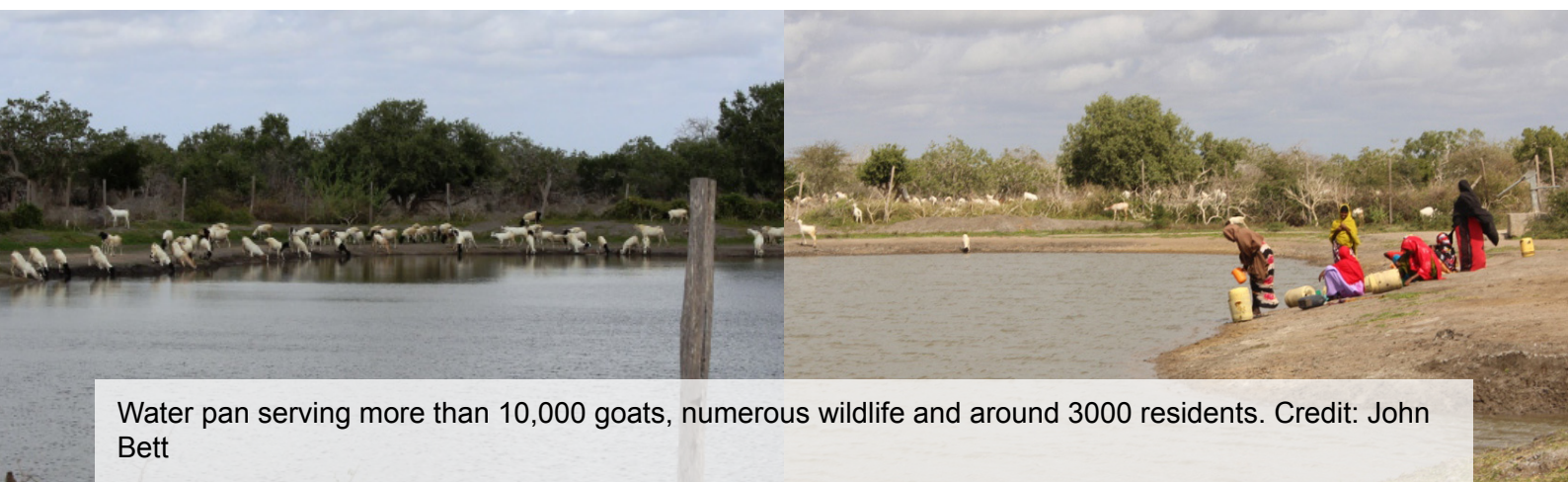
WWF-Kenya in partnership with the Zoological Society of London (ZSL) and local partners such as the Kenya Forest Service (KFS), Kenya Wildlife Service (KWS) and local Aweer and Ijara communities successfully secured funds through the Darwin Initiative to support the implementation of a 3-year "Community based conservation and livelihoods development project" within Boni-Dodori. The project anticipates that by 2016, the biodiversity and

ecosystem services associated with the Boni-Dodori forest complex will have been understood and the knowledge generated is being used by the responsible agencies and six Aweer and two Ijara forest communities, to sustain community-based forest management and deliver resilient conservation-based livelihoods for the poorer majority (1,800 people) of the local population.

Local communities have for a long time used local methods to keep at bay wild animals from their farms and homes such as simple and temporary fencing, fire and noise through clapping, banging jerry cans and drumming. However these strategies have little impact and local people continue to experience crop losses, attacks to themselves and to livestock which on occasion do result in deaths.

WWF, working with local people, has identified a number of short and long term mitigation strategies, for piloting, including the use of chili plants alongside oil and tobacco crops; use of bees as a deterrent by placing beehives at the edge of the fields; separating human from wildlife water sources; increasing the number of water points and de-silt existing water pans so as to reduce competition for water. Additionally, to improve data collection on human wildlife conflict, trainings are provided on species identification, effective record keeping and use of log books. Long-term mitigation measures include, but not limited to the development and implementation of comprehensive land use plans with clear boundaries and a comprehensive reporting and recording system.

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Water pan serving more than 10,000 goats, numerous wildlife and around 3000 residents. Credit: John Bett

Building capacity to develop and provide long-term sustainability for St Helena's paper and card recycling unit (DPLUS 014)

Saint Helena's Active Participation in Enterprise (SHAPE) is a registered charity that provides training, support and meaningful employment for vulnerable and disabled adults in the local community. SHAPE opened in 2008, with an aim to enable people to reach their true potential by empowering them and providing independent life skills, craft and horticulture training.

SHAPE produce an exciting range of products and services, with 32 people currently engaged in activities held at our craft production units. We produce niche products for local and tourist markets, such as soaps, candles, local hand-spun wool, hand-made books, hand-made packaging etc, and we have built a strong social presence in the community through workshops and fundraising events. SHAPE



David loading the Hollander beater at the recycling centre. Credit: SHAPE

thrives to use local natural materials and in recent years, paper recycling has become a major driving force behind the organisations environmental sustainability ethos.

In 2011 SHAPE secured funding from OTEP for a project to establish the first paper and card recycling facility on the Island. The aim was to increase production capacity of our paper fuel bricks and hand-made paper through the purchase of mechanised equipment, increase work space and integrating additional disabled people into the workplace. Our objectives were achieved and SHAPE now has a dedicated paper and card recycling centre.



A selection of handmade paper. Credit: SHAPE

Our Darwin Plus project aims to achieve SHAPE's capability to increase the amount of paper and card recycled, therefore reducing the amount going into landfill from 12% to 6% by 2015. This will materialize from purchasing further equipment and machinery, providing six additional placement opportunities for disabled and vulnerable adults, and the employment of one further staff member to enhance production. A volunteering and tourism workshop will also be initiated to help build capacity and generate revenue for the centre through the sale of products. This project will also bring about a fully functional economically sustainable recycling centre that uses renewable energy (solar photovoltaic), is disability friendly, and will also trial paper pulp insulation boards for buildings. In the second year one member of staff will go on an overseas training and exposure visit and lessons learnt will be passed on to all staff at SHAPE.

Now as the first quarter draws to an end, we are in the process of employing our well needed staff member. A paper press and materials for creating our insulation boards have now been ordered and the building is now being fitted with disabled friendly aids.

This is an exciting and challenging project which will strengthen SHAPE's footprint in society by helping to forge public awareness about recycling and our environment, and heighten the public's perception of disadvantaged groups on St Helena.

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Research to Policy - Building Capacity for Conservation through Poverty Alleviation (19-013)

Putting the I into ICD in Uganda

The International Institute for Environment and Development (IIED) marked the end of the research phase of its Conservation through Poverty Alleviation project with a two-day workshop in Kampala, Uganda. A wide range of participants attended including local government officials from the districts around Bwindi Impenetrable National Park, staff and board members of the Uganda Wildlife Authority (UWA) and local and international NGOs.



Groups discuss a Theory of Change for improving Integrated Conservation and Development. Credit: Andrew Kirby

The workshop participants heard about the threats facing Bwindi as a result of the high population pressure and extreme poverty in the area, and the importance of conservation in this critical habitat for Mountain Gorillas – hence the introduction of a programme of Integrated Conservation and Development (ICD) at Bwindi 20 years ago. Our research was intended to explore why people continued to access the Park for resources, despite this investment in ICD. The research showed that poverty compels local people to gather resources illegally from the national park – and that the poorest villagers had received the lowest level of benefits from ICD. But the issue wasn't completely black and white - poorer villagers were more likely to collect minor

resources such as firewood whereas bushmeat hunters, who pose a greater threat to Bwindi's mountain gorillas, were among the wealthier members of the community and are clearly motivated by factors beyond simply accessing essential resources for day to day living. The workshop therefore moved on to explore recent efforts to improve ICD. The Wildlife Conservation Society described the new SMART database for monitoring resource use within Uganda's protected areas while UWA presented a new draft management plan for Bwindi and new guidelines for sharing of revenue from park entrance fees and gorilla tracking.

For Day Two, IIED's monitoring and evaluation expert guided workshop participants through a Theory of Change to improve the effectiveness of ICD. Based on the research findings, participants identified key outcomes and indicators of improved ICD and the pathways and actions for change. With discussions extending into evening hours, the workshop received national media coverage (<http://www.independent.co.ug/news/news/8232-bwindi-study-shows-poverty-is-not-major-cause-of-wildlife-loss>) and set the foundation for stage two of the project – building capacity of the Ugandan Poverty and Conservation Learning Group in policy advocacy for more effective ICD that meets the needs of the poor and reduces threats to national park conservation.

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The Uganda Wildlife Authority describes challenges to conserving Bwindi Impenetrable National Park. Credit: Andrew Kirby

The Darwin Initiative aims to promote biodiversity conservation and sustainable use of resources around the world including the UK's Overseas Territories. The Darwin Initiative projects work with local partners to help countries rich in biodiversity but poor in resources to fulfil their commitments under the CBD, CMS and CITES. The initiative is funded and administered by the UK Government's Department for Environment Food and Rural Affairs (Defra). Since 1992, the Darwin Initiative has committed over £97million to over 830 projects in over 155 countries.

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For more information on the Darwin Initiative see <http://darwin.defra.gov.uk>

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