

DARWIN

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Newsletter of the UK Darwin Initiative



Promoting biodiversity conservation
and the sustainable use of resources



White blossom of a *Varronia*, a new endemic shrub from dry forest in Andean Bolivia (see article "Dry forest of the Inter-Andean valleys of Bolivia")

NEWS

Special Issue –
"Forest Biodiversity"

WELCOME to the third special edition of DARWIN NEWS. In this issue, we present articles exploring the theme of forest biodiversity, to coincide with the Darwin Workshop held on 19th February 2007.

You can find out more about any of these projects from the Darwin Initiative website, in the *Projects* section.

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<http://www.darwin.gov.uk>

<http://www.defra.gov.uk/environment/darwin>

Nature publishes ground-breaking research from Darwin Projects

Project refs.: 12-008; post-project award EIDPO13

ONE of the biggest challenges for conservation biology is to provide conservation planners with ways to prioritize effort. The identification of biodiversity hotspots has received much attention. However, a letter to Nature (Nature **445**, 757-760) arising from research undertaken by Darwin projects in South Africa (led by Vincent Savolainen at RBG Kew) argues that more conservation effort should be directed towards protecting evolutionary processes.

Building on a collaborative Darwin Initiative-funded project between RBG Kew, the South African National Biodiversity Institute and the University of Cape Town, the scientists spent three years collecting data to build a comprehensive map and evolutionary tree that included the entirety of the Cape flora. This is the largest evolutionary tree yet built for an entire flora and covers over 9,000 plant species – many of which are endangered and only found in the Cape.



This biodiversity hotspot, which includes the renowned Cape Peninsula, Cape of Good Hope and Table Mountain (in the distance), dominated by fynbos vegetation, is situated at the southern tip of Africa. Picture credit: A. Proust/iAfrika.

They discovered that, although the western part of the Cape has an impressive number of plant species, all of these are very closely related. The eastern part of the Cape, on the other hand, has fewer, but more divergent species. The article demonstrates that phylogenetic diversity provides an appropriate index of 'feature diversity', and that this measure is not necessarily correlated to taxonomic diversity.

Las Perlas videos online

James Mair, Heriot Watt University

Project ref.: 12-021

FUNDACIÓN Albatrosmedia, in association with The Darwin project "Marine biodiversity assessment and development in Perlas Archipelago, Panama" has produced a number of high-quality videos illustrating the work of the project, and more general themes in biodiversity conservation. The videos are available online, by visiting the project's website at http://striweb.si.edu/darwin_initiative/. Follow the 'videos' link, then navigate to the Albatrosmedia site, where you can view the videos.

Education and public awareness

CAROLINE Howe from Imperial College, in agreement with Defra and ECTF, will be undertaking a qualitative assessment of the role of education and public awareness within Darwin Initiative funded projects. The study will aid both conservationists and the Darwin Initiative to better target public awareness and education within future conservation initiatives. The study will involve looking at final year reports alongside a more in-depth follow-up questionnaire with project leaders. If you would like to know more, you can contact Caroline on Caroline.howe04@imperial.ac.uk

Impact of Land Use Change and Fire on Peat Swamp Forest

Jack Rieley, University of Nottingham

Project ref.: 7-135

PEAT swamp forests occur throughout the humid tropics where they exhibit considerable regional variation. With the exception of Southeast Asia there is little information on their vegetation and plant community structure. The trees of peat swamp forest are usually

restricted to this ecosystem although few are endemic to a single country. The species composition and vegetation types of peat swamp forests are not uniform even across Southeast Asia and there are distinct differences between Peninsular Malaysia, Sarawak and Brunei Thailand, Sumatra, Kalimantan, Irian Jaya and Papua New Guinea.

The upper layer of peat swamp forest in western Indonesia (Kalimantan and Sumatra) is dominated by commercial species such as *Shorea* spp., *Gonystylus* spp., *Palaquium* spp., *Dactylocladus* spp., *Koompassia malaccensis* and *Dyera lowii*. In the middle layer species recorded include *Litsea* spp., *Alseodaphne* spp., *Garcia* spp. and *Eugenia* spp. In the undergrowth members of the Annonaceae, Pandanaceae, Arecaceae and bryophytes and ferns are found.



Mega Rice Project drainage channel in deforested peatland in Central Kalimantan.

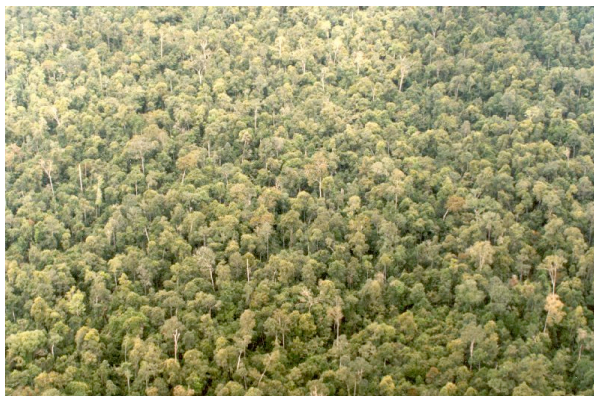
Investigation of peat swamp forest vegetation in the upper catchment of Sungai Sabangau in Central Kalimantan, Indonesia as part of a Darwin Initiative Project revealed a sequence of forest types that changed with distance from the river and as peat thickness increased (Page et al., 1999). Along a 25 km transect the forest exhibited changes in structure and tree species composition, density and height from riverine floodplain forest, marginal mixed swamp forest, low pole forest, tall forest and very low pole forest.



Low intensity selective logging in Setia Alam Jaya concession in peat swamp forest in Central Kalimantan

Riverine forest occupies the zone of maximum river flooding in the wet season to a distance of about 1 km from the river bank. The

peat is shallow (>1 m) and the forest has been disturbed greatly by human influence and removed completely over large areas where it has been replaced by secondary sedge swamp dominated by *Cyperus* spp and *Scleria* spp. Mixed swamp forest with three tree canopy layers, the upper of which reaches to 35 m above the peat surface, is located 1 to 5 km from the river on peat up to 6 m thick. Low pole forest occurs in the wettest areas, where the water table is permanently high (above the surface during the wet season and only 20 cm below in the dry season) at a distance of 5-13 km from the river on peat up to 10 m thick. This forest has a dense, low canopy of only two layers in which there are very few trees of commercial value. The upper canopy has a maximum height of 25m whilst the under layer reaches only to 10-15 m above the ground. A well stratified, taller canopy forest occurs at distances greater than 13 km from the river and which continues over the watershed in the centre of the peat dome to more than 23 km. Paradoxically, this tall forest occurs on the thickest peat (up to 13 m). The canopy has three layers, the upper of which reaches a height in excess of 45 m. Many of the trees have buttress or stilt roots for support in this unstable substrate.



Overview of natural peat swamp forest

Peat swamp forest is the last frontier for land development in many tropical countries where it is regarded as wasteland, which has neither use nor value unless it is converted to some economically acceptable land use. Numerous major land development projects have been initiated on the peatlands of Indonesia and Malaysia, especially in Kalimantan, Sumatra and Sarawak. Unfortunately, these involve deep drainage of the peat surface that results in peat subsidence, and loss of carbon to the atmosphere through decomposition and oxidation and fire. In Central Kalimantan, the so-called Mega Rice Project (1996-99) to convert one million hectares of wetland, mostly peatland to agriculture for rice production failed disastrously. As a result, vast, peat-covered landscapes with their giant stores of carbon were drained, burned and destroyed while the poverty of local people increased. In the forest and peat fires that ravaged Indonesia in 1997 it is estimated that between 0.87 and 2.57 Gigatonnes (billion tonnes) of carbon were released to the atmosphere in only 4 months, contributing to climate change processes.

It has been estimated that the current emission of CO₂ from deforested and drained peatland in Indonesia is 516 million tonnes a year, excluding losses as a result of fire (Hooijer et al., 2006). When the latter are included the emission rate reaches a staggering 1,800 million tonnes a year. This is the most concentrated land use related CO₂ emission in the world that is equivalent to almost 8% of global CO₂ emissions from the burning of fossil fuel and, if taken into account, would place Indonesia in 3rd place, behind the USA and China in terms of carbon gas emissions to the atmosphere.

Dry forest of the Inter-Andean valleys of Bolivia

John Wood, University of Oxford

Project ref.: 11-010

IN collaboration with four Bolivian institutions, Oxford University's Department of Plant Sciences recently completed a Darwin project to identify plant conservation priorities in the central Andean valleys of Bolivia. Some six areas for conservation were identified and with support from Rio Tinto and the Royal Botanic Gardens at Kew, efforts are currently being made to win community support and provide publicity material for five of these.

The project area was essentially the basin of the Rio Grande, which lies between the three Bolivian cities of Sucre, Cochabamba and Santa Cruz. The whole area was originally covered in open dry

forest, much of which has been degraded or cleared over the last millennium. The area is rich in endemic species. The commonest and most characteristic tree, *Schinopsis haenkeana*, is unknown elsewhere. Another remarkable plant is the pink-flowered *Bougainvillea berberidifolia*, which can turn whole hillsides pink during its brief flowering in the spring. The area is also noted for a huge diversity of cactuses. The giant *Neoraimondia herzogiana*, whose small tubular flowers are pollinated by humming birds, forms cactus forest while *Harrisia tetraacantha* is abundant everywhere. Its large white flowers open at night to be pollinated by bats. Neither grows anywhere else in the world.



Bougainvillea berberidifolia, an abundant endemic species of dry forest in Andean Bolivia



Leucochloron boliviense, a new tree species from a genus previously unknown in Bolivia



Brilliant yellow trumpet flowers of a new *Tecoma*

During the project, many new species were found. What is surprising is that many of these were not inconspicuous herbs but large trees and shrubs. One of the most symbolic is *Aspidosperma resonans* described during the project and so named because it provides the preferred wood for the construction of one of Bolivia's traditional string instruments, the charango. Sadly all fully-grown trees have disappeared from the region where charangos are made but mature trees are still found in one of the areas that we hope will be

protected. Legume trees are also typical of the region and two new ones were found and described, one an *Acacia* to be named *Acacia riograndensis* and the other the first record of the genus *Leucochloron* in Bolivia.

We found that sandstone outcrops were particularly rich in plant diversity despite their apparent aridity. Several new species of shrub were found in these areas including two plants with beautiful flowers, one a small shrub with large white flowers in the genus *Varronia* and the other a species of *Tecoma* with large tubular yellow flowers. The descriptions of both new species should be published this year.



Cactus woodland dominated by the endemic *Neoraimondia herzogiana*

Although none of the new species mentioned here are immediately threatened, they are all uncommon and underline the importance of establishing more protected areas in this region of Bolivia. They also serve to emphasize the importance of tropical dry forests for conservation planning. Most conservation efforts are focussed on humid forests, but in Bolivia rates of endemism and the possibilities of finding new species are at least as high in the dry forests. Unfortunately these are amongst the most vulnerable habitats because of their proximity to major centres of human settlement.

Conservation and sustainable management of Xate palms in Belize

Samuel Bridgewater, Natural History Museum

Project ref.: 12-012

THE Belize Forest Department faces the same conundrum as many tropical countries with large reserves of tropical forests: how can their natural resources be managed sustainably to conserve biodiversity whilst providing economic benefits to Belizeans?



Confiscated illegally-harvested xate leaf being destroyed by the Belize Defence Force

At the end of March 2007, the Darwin-funded project 'xate palms (*Chamaedorea* spp.) in Belize: conservation and sustainable management' will draw to a close. *Chamaedorea* is the largest palm genus in the Neotropics, occurring as an understorey component in rain forest from Mexico to Bolivia. Comprising between 80 and 100 species, the genus – locally known as xate – is of regional and international significance due to its trade as a houseplant and as a source of foliage for flower arrangements. The *Chamaedorea*

industry provides an excellent case study of the many cross-sectoral conflicts involved in attempting to improve Non-Timber Forest Product (NTFP) management in tropical forests, and Darwin funding has been crucial in resolving many of the ecological, educational and policy issues constraining the development of a sustainable NTFP industry based on palm leaf. It is hoped that the retiring xate project will serve to illustrate the important role of applied science and broad international partnerships in improving tropical forest management.

The current Darwin Initiative project was established in 2003 to assist the Belizean government conserve and manage its populations of xate palm which are being threatened by the illegal harvesting of their leaves for the floricultural industry. After three years field research, the distribution, abundance and economic value of all of Belize's 11 species of *Chamaedorea* are now known for Belize's National Forest Reserves, and the intensity of illegal harvesting of those species of economic importance has been assessed. This work has been conducted by local natural resource specialists within government and by NGOs, guided by Belizean and international scientists, and assisted by the production of photoguides to Belize's rich palm flora (41 species).



Leaves of fishtail (*Chamaedorea ernesti-augustii*) collected from the Chiquibul Forest Reserve

Although illegal harvesting within these reserves continues, the first steps towards legitimising the industry have been made, and the first legal Belizean concessions to harvest xate were granted in 2006 by the Belize Forest Department. For the first year of operations, the leaves collected under these concessions were exported to the US and Europe via Guatemala. However, this month, the first direct shipments to Europe from Belize are anticipated, further strengthening Belize's control over its nascent industry.



Fishtail is abundant in Belize's tropical forests, especially in central and southern areas over limestone bedrock, such as the Manatee forest Reserve pictured here

There are still concerns as to the long-term sustainability of xate harvesting, but Darwin-funded research has helped clarify xate growth rates, the effects of repeated defoliation on xate population health and local population genetics. The essential information is now in place to manage xate populations in a sustainable fashion. Concession guidelines on extraction intensity, for example, are based on Darwin project research, which now forms part of Belize's Forest Policy. In addition, project researchers form part of a network of international scientists forming the Sustainable Palm Initiative which has provided an assessment of certification for the sustainable harvest

of *Chamaedorea* leaves for the Forest Stewardship Council. This will help pave the way for the 'green market' abroad to influence local xate management by providing incentives for environmentally friendly forest management.

In recent years there has been an increased interest in the role of plantations in the xate industry with Mexico and Guatemala beginning to favour the economies of scale of these silvi-agricultural systems. Although debate continues as to the economic and ecological pros and cons of plantation versus wild-harvested xate leaf, over 50 farmers from across Belize have established plantation trials to see if agricultural production is worthwhile. Again, this work has been funded by the Darwin Initiative through the agricultural extension work of the Belize Botanic Garden. As part of this work, a cultivation manual has been produced and distributed widely across the country.

Participatory forest management in Peru

Charles Veitch, University of Oxford

Project ref.: 13-015

FOREST conservation and development projects are particularly important where there is still significant forest cover and large numbers of people who rely on it for their daily needs. The challenge is justifying the forest's existence in the face of growing population pressure and the attraction of alternative destructive land uses.



A Machiguenga participant, Silverio explaining the use of a medicinal plant

We are working in the south-east of Peru with five indigenous communities from the Machiguenga, Yine and Huachipaeri ethnic groups. They have legal entitlement to large communal forests and depend on timber and non-timber forest products for subsistence in the face of encroachment by miners, colonists and loggers. They make decisions about their natural resources through regular communal assemblies.



Distances between communities are large and boat is the only method of transport.

The use of medicinal plants is very widespread amongst these forest dwellers as they have no access to any medical facilities.

Our project aims to assist them in managing their forest resources and, in realising the commercial potential of medicinal plants, we aim to help them cherish and protect their forests. The commercialisation

of medicinal plants is an effective means for indigenous people to generate an income in the long-term, and further enforces the need for the continuing protection of their forests in the face of conflicting interests. The principal aim of the project is to support the communities in preparing and publishing a participatory forest management plan for medicinal plants that will ensure this project leaves a legacy and that progress made will be built on in the future. Project staff and local people are also writing a book on how to identify and prepare medicinal plants.

As the Shaman of Santa Rosa de Huacaria, Alberto Manqueriapa stated, "We decided to trust this project and accept it as although we had many projects before that have left nothing, we see that the book about our medicinal plants will help preserve this knowledge for our children."

There is an enormous amount of knowledge concerning medicinal plants, but its use is declining amongst the young. One focus of the project is therefore to raise awareness by establishing gardens in village schools. The participative and flexible project approach mean that it has adapted to local people's changing needs, for example a tour of regional and national medicinal plant markets was organised for the participants on their request. Plant nurseries and gardens can now be seen in each village, so more and more people are taking an interest. Three other communities have also approached us wanting to take part in the project.



A workshop on the preparation of herbal remedies being explained in Machiguenga

It has been exciting to see the development in self-confidence of the participants over time, and the regular interactions and sharing of knowledge between different communities has been beneficial to all. Medicinal plants are also "shared" as people take plants they do not know back to their village for inclusion in their gardens.

The remaining challenge is to secure further funding to allow this important work to continue, until such time as the communities' feel capable of running it and are self-sufficient financially. We have sent off various funding applications on behalf of our Peruvian partner, Centro EORI and they are being considered.

Developing local conservation areas in the Polillo Islands

Errol A. Gatumbato¹ and William L. R. Oliver²

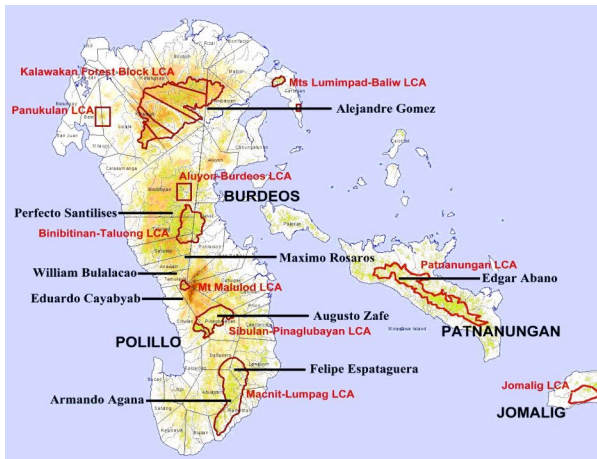
Project ref.: 13-025

THE Polillo Group of Islands, located off east-central Luzon in the Philippines, is the one of the most distinct sub-centres of endemism within one of the world's highest conservation priority areas in terms of numbers of both threatened endemic species and degrees of threat. The Group comprises a total of 27 islands and islets, supporting an astonishingly diverse range of lowland terrestrial, coastal and marine habitats and species, including a large number of Polillo endemic taxa and globally important populations of many severely threatened Philippine endemic species. However, all of these habitats and species were greatly reduced in size and numbers by commercial logging during the 1950s to 1980s, and the conversion of former forest into agriculture and other land uses. As a consequence, the overall forest cover was reduced to less than 16% of land area, and most of what's left is secondary and badly fragmented.

¹ Project Manager, Polillo Islands Biodiversity Conservation Foundation Inc.

² Director, Philippines Biodiversity Conservation Programme, Fauna & Flora International

Given that the Philippine Archipelago is generally regarded as one of the world's highest conservation areas, the Polillos not only exemplify the critical importance of the wider archipelago, but also the country's greater malaise of global importance *versus* unknowing neglect and/or developmental processes that tend to benefit very few people. As if to make matters worse the Philippines is noted for its remarkably strong environmental protective legislation, though this same legislation is rarely enforced and is often realistically unenforceable, thereby often serving only to ensnare those agencies and individuals genuinely striving to effect more positive conservation outcomes. This conundrum is also manifested in the fact that there were no 'effectively protected' protected areas in the Polillos when the Polillo-Darwin project was conceived and the chance of establishing any such areas were essentially zero under the Philippine Government's 'National Integrated Protected Areas System (NIPAS)'. The latter, enacted in 1992, is now so cumbersome as to be more-or-less counter-productive in that it adds many more tiers to the bureaucracy, but offers little or nothing in terms of more effective protection and management of the NIPAS sites.



Map of the Polillo Islands showing the location of the first 10 LCAs and placement of existing PIBCFI Forest Wardens; the latter being generously supported by the North of England Zoological Society under the auspices of the Polillo Ecology Stewardship Project (illustration courtesy of Don de Alban)

By contrast, the Polillo-Darwin Project, entitled: "Pioneering Community-based Conservation Sites in the Polillo Islands, Philippines", was designed to circumvent the NIPAS dinosaur and instead capitalise on the Local Government Code (LGC) of 1991. This code not only mandates local (municipal) legislative councils to establish, maintain and protect local watersheds and other forestlands and forest development projects, but necessarily involves and promote greatly increased levels of local stakeholder participation.



The main entrance to Polillo Town (right) is now graced by a large statue of the Polillo Tropic Hornbill (*Penelopides manillae subnigra*), recently adopted as the emblem of the municipality and also now celebrated in the Annual Tropic Fiesta (left), with costume displays featuring the Polillo Forest Wardening Scheme (photos: William Oliver).

The Polillo-Darwin Project is not the first to use this tool, but it is the first to aim to establish a whole new network of 'Local Conservation Areas (LCAs)', based not only on wide-ranging field research by highly experienced field biologists, but also and most importantly on both demonstrable biological 'importance' and 'representiveness'; i.e. not just saving whatever little may be left, but

actually aiming to secure a broad spectrum of all key terrestrial habitats and species whilst the opportunity still exists to do so. To these ends, the Project aims to establish at least six new LCAs, though we are actually aiming for at least ten, possibly as many as fourteen, such areas.

Thus far, a total of 8 LCAs, varying in size from 106 to 3,901 hectares and all located on the main island of Polillo, have been agreed, surveyed and mapped following extensive consultations with all relevant stakeholders; the latter also being involved in the origination of the salient ordinances and development of site management and sustainability plans. All three local municipal governments have now committed their full support for this project, and two of these have also committed greatly increased funding allocations for forest protection, restoration and local community wardening schemes. These commitments are not only key in themselves, but have also established crucial precedents which can and will be used to further similar discussions with the remoter island municipalities of Patnanungan and Jomalig, which are targeted for development during the last year of this project.



The last main stronghold of the Polillo Forest Frog (*Platymantis polilloensis* – inset) near Aluyon, one of the proposed new LCAs (photos courtesy of Katie Hampson and Juan Carlos Gonzalez)

Although there is still a long way to go the 'thus far' results are extremely encouraging; hence, indeed, the hope and expectation of not only considerably exceeding the originally agreed objectives of this project, but also to extend the same principles and strategies to other global priority areas elsewhere in the country.

Sustainable private forest management in Romania

Florin Ioras, Buckinghamshire Chilterns University College

Project ref.: 14-018

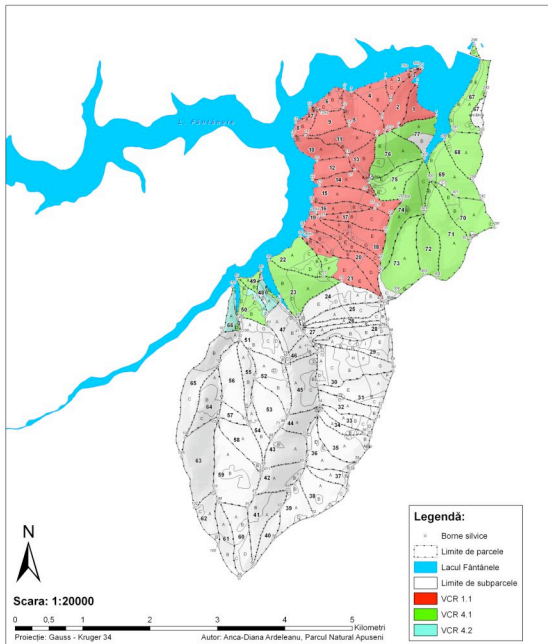
THERE has been a recent shift in forest ownership in Romania from mainly state-owned to majority non-state forest ownership. This change is largely due to the change in property ownership rights underway since the process of restoring land to its rightful owners began in 1991. Many owners had received back forest that was theirs before the nationalisation process that took place in Romania in 1948 but were not given proper tools to manage and conserve this source despite the legal requirement defined in the national forest code. This extensive change in ownership has created an unprecedented case study for the European forests.

The Darwin Initiative project "Capacity Building for Managing Eastern European High-Conservation Value Forests: Romania" focuses on finding ways to maintain and improve the biodiversity which new owners are now legally obliged to undertake by employing the HCVF concept when managing their forest land.

This project educates local people in the importance of HCVF and its benefits, demonstrating how adopting a management system that satisfies sustainability requirements can be both economically viable and rewarding. This project established techniques for identifying social values; options for managing and monitoring the maintenance of values identified; governance of the use of the HCVF concept - particularly when assessments are done outside the framework of forest certification; and the role of governance in HCVF analysis and maintenance.

Since its start in 2005 the project has successfully created a database of non-state forest districts and has begun the process of identifying which of these have potential high conservation value and those which are under threat of valuable biodiversity elements, habitat loss.

**Ocol Silvic Beliș
UP I Ghiduri
PĂDURI CU VALOARE RIDICATĂ
DE CONSERVARE**



A private forest management unit with identified HCV elements



Working in the field to identify endemic species at risk of habitat loss

A complex matrix-based assessment was conducted to identify the management needs of these forests so that appropriate training programmes could be created and delivered. These were designed in partnership with WWF-Danube Carpathian Program.

WWF also designed a toolkit for HCVF identification and management, which addressed the specific conditions of Romanian state-owned forests. This project then adapted this manual in order to meet the needs specifically arising from change in land ownership and the subsequent land fragmentation.

The next phase of this project will focus on establishing a monitoring scheme to ensure that sustainability prevails beyond this

project life. It will also deliver training to forest managers to this end, and continue to update the non-state owned forest database.



Workshop organised in partnership with WWF-Danube Carpathian Programme, Natura 2000 Life Project at Sibiu (16.10.2006)

Certifying the world's most expensive timber

Mpingo Conservation Project Team

Project ref.: 14-043

THE Mpingo Conservation Project (MCP) is making progress towards certified African blackwood; but the process is not without obstacles.

Participatory Forest Management (PFM) is an increasingly popular approach to conservation in developing countries, offering a potentially rewarding alternative to the problematic protectionist methods. In the Kilwa District of south-east Tanzania, where illegal logging is rampant and deforestation a growing threat, the MCP has adopted PFM with a view to producing a harvest of mpingo (the Swahili name for East African Blackwood, *Dalbergia melanoxylon*) that is certified as legal and sustainable.



Mpingo timber is considered one of the finest in the world

Blackwood is a highly prized timber, used in the West to make musical instruments such as clarinets, oboes and bagpipes, but commercially viable stocks are rapidly depleting and timber quality is declining. The benefits to be reaped from certification would be significant, both for those requiring a reliable supply of blackwood, and local communities managing the forests.

MCP operates within four pilot villages in the Kilwa District, assisting the communities to set aside and manage sustainably areas of forest within their land - Village Land Forest Reserves (VLFs) - from which, it is hoped, extraction of blackwood timber will be certified. However, the road to certification is not without challenges. Even before reaching the certification stage, PFM often carries its own problems, ranging from resistance from stakeholders with an interest in logging, to village disputes, all of which can delay progress.

A particular challenge lies in maintaining the cooperation of logging companies who, misunderstanding its purpose and fearing a negative impact on their business, have opposed PFM. Yet, alienation of logging companies would be fatal to the project. If loggers boycott VLFR timber, choosing instead cheaper timber from the surrounding poorly managed forest, the PFM villages would lose out and would likely abandon PFM. The Mpingo Conservation Project has been working closely with both sawmills and the local loggers' union in Kilwa District to convey the opportunities available to them, such as securing their income for the future and gaining profit from the premium placed on certified timber.



Hand sawing mpingo logs at Sameja sawmill in the Lindi region of Tanzania

Although MCP has made progress in establishing a rapport with the sawmills, one difficulty has been convincing them that there is a market for certified blackwood. However, an initial market assessment by UK partners Fauna & Flora International suggests many musical instrument manufacturers are concerned about the source of their timber and, on average, are willing to pay a 25% price premium for certified timber. The cost of timber is only a tiny fraction of the sale price of quality instruments, so the extra cost of premium timber will have little impact on consumers who, in any case, are increasingly feeling a social responsibility to consider the source of their merchandise.



With the help of the MCP, villagers from Kikole surveyed their forest to determine what would be a sustainable cut of mpingo

MCP hopes that once the first harvest of certified blackwood reaches the market and the expected benefits to stakeholders along the mpingo supply chain have been realised, more communities will seek to benefit from such opportunities. This increasing momentum will help PFM for blackwood overcome the challenges.

Biodiversity conservation in Chile's temperate rainforest ecoregion

Jerry Laker, Macaulay Institute
Project ref.: 15-006

A NEW project – “Capacity building for temperate rainforest biodiversity conservation in Chile” - aims to develop a science-based approach to achieving conservation of endemic biodiversity within a framework of local sustainable development. Advances in sustainable development need the informed inspiration and coordination of actors

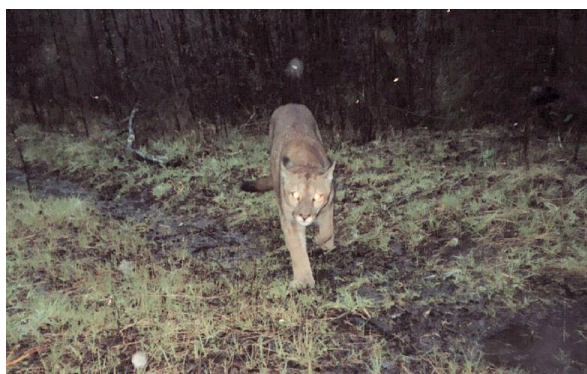
and decision-makers throughout society. Sustainable development is more paradigm than politics, tending to cut through traditional political differences, and is often inspired just as much by intuition as it is by information. By combining the skills of Chilean conservation NGO, Parques para Chile, with an international research team comprising Scotland's Macaulay Institute, Oxford University's Wildlife Conservation Research Unit, and Fauna Australis, the wildlife research centre of the Pontificia Universidad Catolica de Chile, this Darwin Initiative project aims to create a powerful alliance to guide landscape level decision making based on reliable, science-based knowledge.



Araucaria forest in the Cañi Sanctuary.

The araucaria is one of the 5 global conservation priority trees recognised by UNEP-World Conservation Monitoring Centre (<http://www.ourplanet.com/wcmc/pdfs/trees.pdf>). The nucleus zone of the planned Biosphere Reserve will include almost the entire global distribution of this species.

The project is focused on establishing a permanent research and training facility in the catchment of the Rio Tolten, near Pucon in the temperate rainforests of Southern Chile. The Centre for Biodiversity is working to find mechanisms that inspire private landowners to practice conservation management either within or outside the National Park system, seeing this as the key to generate wide scale benefits for society, making the links between biodiversity, sustainable development and landscape management. The centre aims to provide local solutions to issues with global relevance, providing positive reasons for biodiversity conservation, exploring new models for private-sector investment in conservation, and creating awareness and enthusiasm at all levels for addressing biodiversity conservation issues



A puma visits a camera trap site in the Rio Tolten catchment

The science strategy developed within the Darwin Initiative project is designed to support this process. Several lines of research together aim to generate information about the flora and fauna of the catchment and its relationship with ongoing processes of land use change.

The Centre for Biodiversity is supporting ongoing UK-driven conservation work in a park created by Rainforest Concern and managed by Parques para Chile, and engages young British conservation volunteers in the practice of both research and building infrastructure. The research outcomes are supporting an ongoing process of NGO action that seeks to establish mechanisms for local decision making that foster a more joined-up approach to catchment management. Plans are being developed to enlarge the already existing Araucarias Biosphere Reserve to include the whole range of the monkey puzzle tree in Chile. Such a change, which is already supported by several of the key government agencies involved, would

establish a sound framework for integrated planning to ensure that biodiversity and the protection of old-growth forests are included as fundamental components of the human environment and the development process. The linking of science and technology with community-oriented social change is the essence of this Darwin project, and the mechanism by which we expect the Tolten catchment to become the benchmark for environmental good practice in Chile.



A stakeholder workshop increases awareness on the part of regional government of the potential of adopting an effective sustainable development agenda

From Amazon to Andes to Atacama

Toby Pennington (RBGE) & William Milliken (RBG Kew)

Project refs.: 9-017 and 15-016; post-project EIDP04; Darwin Fellowship EIDPS06 to Reynaldo Linares

SINCE 2000, three Darwin projects have run continuously in Peru, each working in a different major forest ecosystem, but with the same principal Peruvian partner, the Forestry Faculty of the National Agrarian University, Lima (FCF-UNALM). “Tree diversity and agroforestry development in the Peruvian Amazon” (2000-2003) and the post-project funded “Tree diversity, agroforestry development and reforestation in the Peruvian Andes” (2004-2006)¹, aimed to improve the livelihoods of local people via diversified agroforestry systems. In the Amazonian region it is hoped that such systems will slow the rate of slash and burn of virgin forest, whilst in the Andes, maintaining and increasing forest cover is vital to prevent soil erosion and to protect water supplies. Both projects published non-technical identification guides in Spanish to a total of 270 tree species (140 Amazonian, 130 Andean) with economic potential.



Darwin trainee Aniceto Daza outside new teaching herbarium in the Peruvian Andes (photo: T. Pennington)

These two projects formed part of an ongoing effort to build capacity in Peru for the identification of forest trees, and included training of Peruvian students, technicians and scientists, together with improvement of facilities and curation of collections at the herbarium of FCF-UNALM. The first project trained Peruvians in the UK, and Reynaldo Linares, who gained an MSc degree in Biodiversity and Taxonomy of Plants at the University of Edinburgh and Royal Botanic Garden Edinburgh (RBGE) in 2002, was able to return to RBGE for a second time in 2004 supported by a Darwin Scholarship. Reynaldo’s project focused on providing an online taxonomic checklist² to the woody plants found in Peruvian dry forests.

Dry forests have been more deforested than any other ecosystem in Latin America, and are the focus of the current project, “Habitat

restoration and sustainable use of southern Peruvian dry forest” (2006-2009)³. This addresses two critical environmental issues in the country’s dry Atacama desert coastal zone: rapid loss of native forest and spreading desertification. Through a three-year programme of research, consultation, education, training and outreach, the project aims to raise public awareness of the importance and value of native biodiversity, promote sustainable use of forest resources as viable economic alternatives to clearance, develop, test and disseminate appropriate technologies for habitat restoration in degraded areas, and facilitate the conservation and management of surviving forest fragments.



Harvesting pods of Huarango (photo: O. Whalley)

The Huarango (*Prosopis*) forests of the region are important primary producers, securing fragile soils, stabilising dunes and providing the principal refuge for biodiversity in large areas of hyper-arid desert – as well as food, forage and other useful products for local people. Most of these forests have been cleared for fuel and large-scale agriculture and the few remaining relics are highly threatened.



Peruvian undergraduates learn to identify trees of the legume family (photo: T. Pennington)

Thorough documentation and monitoring of biodiversity of forested and deforested areas is vital for baseline reference and impact evaluation. Thus the project is drawing on – and building on – local capacity achieved at FCF-UNALM through the previous Darwin projects. With its strong focus on applied conservation, sustainable management and livelihoods, a broad collaborative base is essential. The project is working with a wide range of schools, community

1 Lead organisation: Royal Botanic Garden Edinburgh (with Royal Botanic Gardens, Kew, World Agroforestry Centre and Asociación Peruana para la Promoción del Desarrollo Sostenible)

2 <http://rbg-web2.rbge.org.uk/dryforest/database.htm>

3 Lead organisation: Royal Botanic Gardens, Kew

organisations, landowners, farmers, conservation groups, government organisations, local university students and other relevant stakeholders.

Conserving Borneo's Canopy Cats

Katherine Secoy, Global Canopy Programme

Project ref.: 15-026

THE Darwin Initiative 'Bornean Wild Cat & Clouded Leopard Project' is an international collaboration between the Global Canopy Programme (GCP), UK and the Institute for Tropical Biology and Conservation (ITBC) at the University Malaysia Sabah. The project aims to facilitate the conservation of Borneo's endangered wild cats by merging pioneering research, host country capacity building and environmental education.



A female clouded leopard recently captured by a camera trap at Danum Valley. Photo © J Ross and A J Hearn/GCP



Photo-capture of a bay cat at Danum Valley. This elusive felid, endemic to the island of Borneo, is rarely seen and seldom photographed. Photo © J Ross and A J Hearn/GCP

The tropical rainforests of Borneo support five species of wild cat: clouded leopard (*Neofelis nebulosa*), bay cat (*Catopuma badia*), flat-headed cat (*Prionailurus planiceps*), marbled cat (*Pardofelis marmorata*) and leopard cat (*Prionailurus bengalensis*). Of these five felids, three are considered by the IUCN as Vulnerable, and one, the endemic Bay cat, as Endangered. The main threats to the Bornean wild cats are believed to stem from habitat degradation and fragmentation, and from hunting. These threats are exacerbated by the lack of knowledge regarding the ecology of these felids, which is needed to facilitate the development of effective management and conservation measures.

The project, based at Danum Valley, (primary lowland Dipterocarp rainforest within a 9730 km² timber concession), and Tabin Wildlife Reserve, (predominantly logged lowland Dipterocarp forest with a central primary forest area), both located in Sabah, Malaysia will provide baseline data regarding the behaviour and ecology of the five cat species, upon which informed conservation and management decisions can be based. The effects of habitat alteration on the felids will be investigated and actions recommended to help reduce any potentially deleterious effects on these possible keystone species. Additional aims are to provide conservation

research training to host country scientists and students, by means of mammal field research courses for ASEAN region scientists. Enhanced capacity for mammal research will also result from the training of Daniel Pamin, an ITBC postgraduate, who will receive three years on-the-job training. We will increase awareness of the Bornean wild cats among local people, schools, university students and tourists by producing and disseminating wild cat specific educational materials. We will also conduct questionnaire surveys to assess the level of hunting/trade of the wild cats and their prey. Project findings will be used to provide recommendations for a Bornean Wild Cat Conservation Action Plan, and presented at a GCP/ITBC hosted, Bornean wild cat conservation workshop.



Segama River, Danum Valley, primary lowland Dipterocarp rainforest, Sabah, Malaysia. Photo © J Ross and A J Hearn/GCP

Fieldwork started in November 2006 and to date (February 2007) camera trapping efforts at Danum Valley have resulted in nine photo-captures of wild cats and revealed a healthy prey base. Photo-captures include two photographs of bay cats, the fourth and fifth ever of this species in the wild, and the first from Sabah; a female clouded leopard and six photographs of at least four different leopard cats. Wild cat presence/absence data obtained from our camera trapping efforts and field sign surveys will be used to guide the placement of wild cat live-traps over the coming few months. Captured cats will be fitted with radio collars and later tracked with radio telemetry receivers. Over the coming months we will focus on initiating a camera trapping programme at Tabin Wildlife Reserve.

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