DEFYING EXTINCTION

PARTNERSHIPS TO SAFEGUARD GLOBAL BIODIVERSITY








EDITED BY LISA FITZPATRICK
FOREWORD BY MONIQUE BARBUT • INTRODUCTION BY GUSTAVO A. B. da FONSECA

Of all environmental ills, biodiversity loss is the only one likely to be irreversible.

Unfortunately, biodiversity is being lost today at a scale that will threaten the life-support systems that sustain societies and economies, particularly in the developing world. The Global Environment Facility was established as the financial mechanism of the Convention on Biological Diversity, helping developing and transition countries to meet their bold commitments before this international accord. Since 1991, the GEF has invested over $2.9 billion, leveraging $8.3 billion in co-financing, to support implementation of more than 1000 projects in more than 155 countries, to conserve and sustainably use biodiversity.

Published in the United States by Earth in Focus Editions
2011 Crystal Drive, Suite 500
Arlington, VA 22202
10 9 8 7 6 5 4 3 2 1
ISBN 978-0-9841686-5-1
Defying Extinction: Partnerships to Safeguard Global Biodiversity
Edited by Lisa Fitzpatrick
www.ilcp.com

Publisher/Director: Abbie Williams, Earth in Focus Editions–A Division of iLCP
Designer: Stefan Gutermuth
Senior Editor/Writer: Lisa Fitzpatrick

Published in partnership with the GEF and its respective partners and agencies.

Cover images left to right, top to bottom © 2010:

Magellanic Penguin, The Falkland Islands, Jenny E. Ross, iLCP
Brown Bear, Igor Shpilenok, iLCP
Southern Right Whale, Patagonia, Argentina, Doc White, naturepl.com
Two Cranes, Ashok Jain, naturepl.com
Golden Lion Tamarin, Coastal Brazil, Art Wolfe, iLCP
Galápagos Giant Tortoise, Thomas D. Mangelsen, iLCP
Snow Leopard, Ladakh, India, Steve Winter, National Geographic Society
Saiga Newborn Calves, (Black Earth) Nature Reserve, Kalmykia, Russia, Igor Shpilenok, Wild Wonders of Europe

Printed in China through Globalink

Source for Species categories (Least Concern, Near Threatened, Vulnerable, Endangered and Critically Endangered) is the IUCN Red List.

DEFYING EXTINCTION

PARTNERSHIPS TO SAFEGUARD GLOBAL BIODIVERSITY

FOREWORD BY MONIQUE BARBUT • INTRODUCTION BY GUSTAVO A.B. da FONSECA • EDITED BY LISA FITZPATRICK

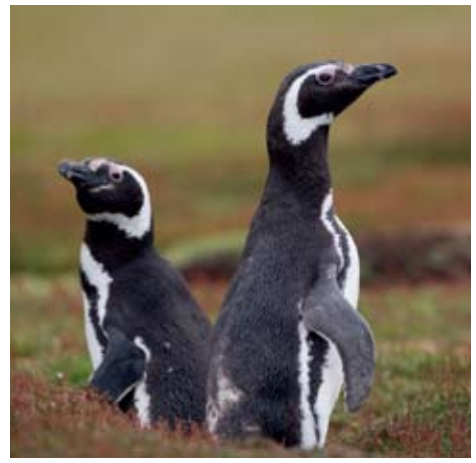
GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

CONTENTS

AFRICA

Southern Right Whale, Patagonia, Argentina, Doc White, naturepl.com

EASTERN EUROPE & CENTRAL ASIA



Magellanic Penguin Carcass Island, Falkland Islands, Suzi Eszterhas, iLCP

LATIN AMERICA

Galápagos Giant Tortoise, Santa Cruz Island, Galápagos Islands, Tim Laman, iLCP

SOUTHEAST ASIA

Lion-tailed Macaque, Sandesh Kadur, iLCP

FOREWORD

Defying Extinction: Partnerships to Safeguard Global Biodiversity

Monique Barbut
CEO and Chairperson, Global Environment Facility

Biodiversity is more than just the number of animal and plant species in the world. Biodiversity is who we are, what we eat, where we live, what we do and, most importantly, how all of these things come together to form a whole. The preoccupations of our daily lives often blind us to the dangers threatening fragile ecosystems around the globe. But we ignore these threats at our peril, for we are all connected to the many facets of the planet's diverse ecosystems. Biodiversity is the fabric that binds us all together, allowing healthy environments to flourish, economies to develop, and humanity to grow and prosper. Whether we realize it or not, the story of biodiversity is our story.

This publication highlights some of the most threatened pieces of the fabric of biodiversity, specifically individual species at risk. Through stories of the GEF's efforts to preserve diversity across the globe, from Romania's Maramures Nature Park to the Paraguayan Wildlands, this book illustrates how far we have come, the successes we have enjoyed – and highlights what will be required of us in the future.

With the vast array of environmental challenges in today's evolving world, in particular the potentially devastating effects of global climate change, this book focuses on one of the most pressing matters facing us all: the loss of our planet's biodiversity, which is occurring at unprecedented rates. The vast, rich and wondrous variety of life on Earth is rapidly disappearing. Thousands of species face extinction. Thousands have already been lost. Livelihoods and cultures are being irrevocably disrupted. This is happening not only in the developing world, but across the globe. The Japanese wolf, for example, was once a dynamic symbol in the lore of Japanese culture, a cultural icon revered in children's stories and worshipped as a deity in Shinto shrines. With its extinction over a century ago, the meaning behind this iconic figure has been forever changed.

Wild Reindeer, Forollhogna National Park, Norway, Vincent Munier, Wild Wonders Of Europe

As the world adapts to meet the changing and ever-growing needs of human development, including food, water and other resources, our environment is bearing unmanageable loads that are having devastating effects. As these loads increase, the need for further investment in biodiversity conservation efforts grows more urgent. More than ever, our efforts are needed to preserve what is left, by protecting wetlands, controlling invasive species and conserving natural resources.

Luckily, there is help. Over the past decade, the GEF has become a global force in providing innovative and effective solutions to biodiversity challenges. As the financial mechanism for the Convention on Biological Diversity, the GEF supports projects in both the public and private sectors. Biodiversity projects constitute 36 percent of the GEF portfolio, making it the largest of all the GEF's project areas. During the 2010 International Year of Biodiversity, the GEF has centered its mission to conserve biodiversity on four specific goals:

- to increase public awareness;
- to promote solutions to biodiversity threats;
- to call on individuals, communities, nations and the international community to act now; and
- to initiate dialogue among stakeholders for further endeavors.

At both the local and international level, the GEF is making great strides toward this mission. Locally, the GEF recognizes the importance of projects to protect individually localized species. One example is the Saiga antelope, which for millennia has grazed on the steppes of Central Asia from Eastern Europe to China, but in recent decades has become significantly threatened. Today, this species represents one of the most dramatic population crashes in recorded history. The GEF is devoted to promoting healthy host ecosystems for this threatened species by working with UNDP and the Altyn Dala Conservation Institute in Kazakhstan to promote the antelope's survival, through anti-poaching actions and better landscape management to protect steppe habitat reserves.

An example of the GEF's international efforts is the Sustainable Forest Management and REDD+ program, which provides incentives for developing countries to reduce emissions from forested lands, not only slowing the degradation of forests but also contributing to the sustainable development of communities in those countries.

In addition to longer-term projects and programs, the GEF has also shown its prowess for action and rapid response to urgent biodiversity needs through its Short-Term Response Measure (STRM) projects. Specifically, in 2008, the GEF worked with UNDP to quickly come to the aid of the already fragile giant panda population after the Wenchaun earthquake struck China. The GEF's ability to rescue pandas and the other rare species in this book illustrates the agency's effectiveness at implementing change on short notice.

Earlier this year, the GEF received a record-high funding of $4.3 billion for its fifth replenishment cycle. With this new replenishment, the GEF will seize the opportunity to strengthen its efforts and expand its resources. And it is my every hope that, as we pursue these endeavors, the GEF will continue its role as a catalytic force in reducing threats to biodiversity today.

INTRODUCTION

Conserving Species, Protecting Biodiversity, Safeguarding the Planet

Gustavo A. B. da Fonseca
Team Leader, Natural Resources, Global Environment Facility

In 2002, the 6th Conference of Parties to the Convention on Biodiversity (CBD) committed to achieving, by 2010, a "significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth." It is now 2010 and, sadly, we have collectively missed this global target. Given the destructive trends that spanned the period covered by the 2010 target, and the lack of resources commensurate with the growing scale of the challenge, this result should not have come as a surprise. Nevertheless, this failing should be seen as a wake-up call to strengthen or to radically change the processes that the international community has established to tackle global environmental issues. As the global community contemplates the next set of targets for biodiversity and the means to achieve them, particularly through the CBD, there is a need to seriously regroup and reflect on the multiple dimensions of the problem.

Biodiversity loss is manifested at a variety of scales – genetic, population, species, community and ecosystem – as are the drivers of its progressive degradation. The consequences of biodiversity loss are also scale-dependent: losing an entire ecosystem is more impactful than the loss of a single species population or certain genes. Because the cumulative impact of the overwhelming number of local biodiversity crises has created a problem of regional and global proportions, the call for broad-scale, wide-ranging conservation responses is understandable. The compelling logic that promotes the need to conserve large landscapes through ecosystem-wide strategies becomes particularly appealing when resources are scant.

However, there can be significant trade-offs in the implementation of landscape approaches to conservation when they lose focus on what happens to individual species and local populations. It is not hard to find examples of these trade-offs. For example, the Global Environment Facility (GEF), the largest financier of projects to conserve globally relevant biodiversity, has

spent approximately $100 million over the past 19 years in the protection of habitat that should, in principle, be suitable for tiger (*Panthera tigris*) populations throughout the 14 countries in the tiger's current range. Yet, during this same period, wild tigers were reduced to fewer than 3,500 individuals, down from about 9,000 in 1999. The species is now considered Endangered by the IUCN, meaning that it is considered to be facing a very high risk of extinction in the wild. Such investments by the GEF and other organizations in the wider tiger landscapes, sometimes referred to as the "coarse filter approach," have certainly resulted in many benefits, as measured by the forests conserved and the wealth of other species they harbor. But we wouldn't be meeting our goal if, in the midst of obtaining these broader results, we allowed keystone species like the tiger and many others to fall through this coarse filter. Therefore, we also need to dedicate our attention to protecting globally relevant threatened species through focused actions that complement the landscape approach.

GEF resources have indeed benefited a host of threatened species and their habitats. In just four years, between 2002 and 2006, the GEF invested $108 million in 24 projects spanning the habitats of hundreds of threatened species worldwide, and attracted $220 million in co-financing. Since its inception, the GEF has spent a total of $398 million (and leveraged $771 million in co-financing) in areas covering the distribution of 647 species considered threatened by the IUCN Red List, representing nearly 17 percent of all historical investments in the biodiversity focal area.

Yet, while it is not uncommon for projects submitted for funding under the GEF biodiversity focal area to be justified on the plight of national endemics and globally threatened species, the implementation of these same projects tends to emphasize landscapes and ecosystem-level actions that do not always include strategies to protect and restore populations of threatened species. In the GEF-5 investment cycle (2010-2014), a key refinement is being introduced to explicitly acknowledge the

Steller's Sea Eagle, Nemero Strait, Japan, Roy Toft, ILCP

need to support the expansion of threatened species coverage in protected area systems. Given that more than 70 percent of all species owe their threatened status to the loss of habitat, this directive can help to fill important gaps in protected areas at the national level.

Some pilot investments focusing on high priority threatened species have already been initiated in GEF-4 (2006-2010). One example in this book is a project that is being implemented by the United Nations Environment Programme (UNEP) and executed by international and local NGOs at a series of pilot sites of the Alliance for Zero Extinction (AZE) in Peru, Bolivia, Ecuador and Colombia. The project, which is designed to demonstrate how community-based models can benefit local societies by protecting species and ecosystem services, is executed by the NGO Rare conservation. Through this concept, flagship species are built into education and capacity-building programs and become particularly helpful in community-based "pride campaigns" focused around the management of natural resources. Endemic species (those restricted to a locality, state or country) can also become icons of cultural identity and act as magnets to mobilize public awareness and trigger policies that support sound environmental stewardship. For example, the mission of the AZE, which is to protect the habitat of Critically Endangered and Endangered species that depend on a single site for their survival, was reinforced recently by a Memorandum of Cooperation between the AZE and the Secretariat of the Convention on Biological Diversity, signed during a plenary session of the 14th meeting of the Convention's scientific advisory body (SBSTTA). We hope this early action will encourage many more countries to join in the AZE alliance and use the framework to expand the coverage of their protected area systems to include critical habitat for endangered species.

Although the conservation community is starting to take concrete steps to protect globally relevant species, there is still a vital missing link that is necessary to effectively scale-up these efforts—namely the private sector. The Save Our Species (SOS) program is an emerging partnership between the GEF, the World Bank and the IUCN that explicitly draws on opportunities to work with businesses and corporations that have built their logos and brands around features possessed by thousands of species worldwide. As many of these companies should have a vested interest in becoming involved in solving the immediate crisis of potential species extinction, the SOS initiative aims to provide incentives for private sector engagement in species conservation efforts around the world. As in other species projects, SOS is predicated on the assumption that conservation action at this scale serves many purposes beyond preventing the extinction of species that are known to be on the verge of disappearing forever. These additional benefits include raising public awareness, coalescing local communities around the plight of biodiversity conservation, and, through these actions, protecting the habitats of many other lesser-known species. The World Bank and GEF have each contributed $5 million to initiate the SOS project, with the objective of matching these funds through private sector engagement and a vision to build a large species conservation fund by 2015. The SOS initiative, administered by the IUCN, will become operational in the second semester of 2010, with the disbursement of the first batch of grants.

Another large-scale effort to protect threatened species is the Critical Ecosystem Partnership Fund (CEPF), an initiative launched in 2000 by the GEF, the World Bank, the John D. and Catherine T. MacArthur Foundation and Conservation International, and later joined by the government of Japan and the French Agency for International Development (AFD). The CEPF is already an active global program that has granted $124 million to protect biodiversity hotspots that are home to hundreds of threatened and endemic species. CEPF investments particularly target the Key Biodiversity Areas (KBAs), which are vital for the survival of globally threatened species; many illustrative projects are included in this volume.

In total, this book includes a sample of 23 case studies of projects funded by the GEF, implemented by UNDP, the World Bank and UNEP, and executed by dozens of local partners in Africa, Eastern Europe, Central and Southeast Asia and Latin America. This beautifully illustrated sampling of initiatives demonstrates how targeted action at multiple levels has helped to improve the conservation status of over 30 species, including several that are Critically Endangered or Endangered in the wild. It also includes a chapter to highlight how we might be losing less conspicuous species, such as those found in cave habitats. Finally, the book also touches on projects that are maintaining populations of species that are not currently threatened. This serves to illustrate our goal to support efforts to maintain heathy populations in the wild, preventing them from becoming threatened in the future.

On the other end of the spectrum, are species on the brink of extinction. In this photographic book, we failed to produce an image of the uluguru bush shrike, a bird from Tanzania, illustrated here by a drawing. These and other examples will hopefully demonstrate that conserving species that we know will perish in the wild in the absence of direct intervention is a multi-generational moral imperative. Some influential commentators have begun to argue convincingly that human-induced species extinction should be considered on a par with slavery, child labor and racism as being unacceptable to our societies. Equally important is the fact that the pursuit of species conservation is in our own best interest, as it can also help trigger an ever-expanding virtuous cycle: when the tide for a particular species shifts for the better, it is often the case that natural resources management has taken a more sustainable path. It is also an indication that capable institutions are being established, that adequate governing mechanisms are starting to take root, and that services such as clean water and soil fertility are being provided by healthy habitats and ecosystems, all of which tend to benefit disproportionally those in our societies most in need of livelihood improvements.

We cannot and should not let species conservation fall by the wayside. With the wealth of lessons accumulated over many decades, the conservation community knows what needs to be done and has repeatedly demonstrated that well-designed strategies to protect species can deliver successful results. At GEF, we would like to help boost the revitalization of this sometimes overlooked key objective in our global quest to protect biodiversity. We hope that this book, with its stunning photography and rich accounts from all around the world, can inspire others to participate in the resurgence of a global movement directed at species conservation. We all have something to gain from it.

AFRICA

SOUTHERN RIGHT WHALE NAMIBIA, SOUTH AFRICA LEAST CONCERN

DAMARA TERN NAMIBIA NEAR THREATENED

PEMBA FLYING FOX TANZANIA VULNERABLE

ULUGURU BUSH SHRIKE TANZANIA CRITICALLY ENDANGERED

TAITA THRUSH KENYA CRITICALLY ENDANGERED

LOVERIDGE'S SUNBIRD TANZANIA ENDANGERED

SANJE MANGABEY TANZANIA ENDANGERED

WILD DOG KENYA ENDANGERED

BLACK RHINO NAMIBIA CRITICALLY ENDANGERED

Southern right whale tail, Patagonia, South America, Doc White, naturepl.com

SOUTHERN RIGHT WHALE

(Eubalaena australis)

LEAST CONCERN

NAMIBIA, SOUTH AFRICA

GLOBAL ENVIRONMENT FACILITY PROJECT: Benguela Current Large Marine Ecosystem
PROJECT REPORT BY: Lisa Fitzpatrick, Jessie Mee
AGENCY: United Nations Development Programme
PARTNERS: Governments of Angola, Namibia and South Africa; Benguela Environment and Fisheries Interaction and Training Program; French IRD & NOAA; IOC-UNSECO; IUCN; GOOS-AFRICA; Norwegian Ministry of Foreign Affairs; Icelandic International Development Agency; Governments of Germany, Spain and France; DFID (UK); De Beers Marine; FAO; Nansen Program

Thus far, the southern right whale is considered a relative success story; largely due to international protections such as those now imposed by the Benguela Current Commission, this species has managed to rebound from centuries of commercial whaling.

Today, in the waters off the coast of South Africa, lingering long at less than three hundred meters from the endangered southern right whale is against state law. Where once southern right whales roamed the open seas from Argentina, Antarctica and Australia to these shores at nearly ten times their current population size,[1] only 7,000[2] now remain. During the winter months, half of these remaining southern rights hug the South African coastline for calving season, making the area both critical to the whale's survival and one of the largest whale watching centers in the world. These waters are part of the Benguela Current Large Marine Ecosystem (BCLME), a transcontinental water body that stretches from the Cape of Good Hope in South Africa northward along Namibia's coast and into Angola, and thus also constitutes an area of significant interest for conservation efforts. The vast, upwelling local currents cycle nutrient-rich waters into the heart of the BCLME, making it an internationally significant center of marine biodiversity and global marine food production, as well as the second-most productive fishing territory in the world. In fact, 85 percent of the world's fish catch comes from such LMEs,[3] including these protected waters.

A variety of baleen, southern rights have dark gray bodies, bow-shaped lower jaws and massive heads. Reaching up to 55 feet in length (roughly the size of a bus), they emit low-frequency moans and pulses. The whales can live up to 60 years, and females give birth once every three years, usually in the spring after a six-to-seven month gestation period. As indicated, the South African coastline remains a vital breeding ground and is an essential part of their circumpolar migratory path through the southern hemisphere. Once calves are strong enough to swim long distances, they head from their calving grounds—the BCLME in South Africa being one of them—to Antarctica for the remainder of the year.

Right whales were so named because they were the "right" whales to hunt, especially for early whalers; they are slow swimmers (easy to catch), float when dead (easy to retrieve), and their huge heads yield vast amounts of oil (once highly prized for lamps). Whaling began in earnest in the 1800s, significantly reducing their global population. In the early 20th century intakes grew even more rapidly; by the 1930s whole populations had been greatly diminished. Despite international protections and a worldwide total ban on right whaling established later that decade, the species recovery continued to be impaired; whaling, both commercial and illegal, unreported and unregulated, continued well into the 1970s. In 1986, the International Whaling Commission imposed a moratorium on all commercial whaling of the southern right, a ban which currently remains on the books.[4] Today, the long-term survival of the southern right whale is even more vulnerable to indirect threats, including overfishing by factory fleets and climate change.

In 1995, numerous cross-border large marine ecosystems, including the Benguela Current, were adopted by the GEF council as areas in need of conservation. These ocean territories provided a catalyst for the GEF and various governing bodies to foster the multinational, ecosystem-based management of transboundary coastal and marine resources. The GEF International Waters Focal Area works to link issues of water, land and climate change in an integrated programming approach. The aim is to more successfully tackle climate change, an issue which is considered by many to be perhaps the most daunting challenge of our time. Coasts and oceans have become degraded, oceanic fish stocks and coastal habitats have been depleted, and pollution-riddled "dead zones" have erupted along the coasts. GEF-sponsored programs, including the Strategic Action Program (SAP) and the International Waters Learning Exchange and Resource Network (IW) aim to address these issues.

Southern right whale, Patagonia, Argentina, Doc White, naturepl.com

In 1998, SAP developed a diagnostic analysis tool which provided a shared vision for action to protect the transboundary economic and community interests in the Benguela Current LME. Using SAP as a foundation, the UNDP implemented a project that resulted in the establishment of the world's first LME Commission—the Benguela Current Commission (BCC). The BCC represents multiple sectors in South Africa, Namibia and Angola, the three countries directly engaging in the sustainable management and utilization of the trans-boundary resources associated with it. As a regional institution, the BCC deals with conflict resolution, trans-boundary marine resource management, and regulatory and environmental protection issues—all of which benefit the ecosystem and strengthen the long-term health of the calving grounds of one of the area's flagship species, the southern right whale.

Thus far, the southern right is considered a relative success story. Largely due to international protections such as those now imposed by the BCC, this species has managed to rebound from centuries of commercial whaling. Since 1970, the population has been estimated to be growing at a rate of seven percent per year. However, significant threats to these majestic creatures and their habitat remain. In addition to the overarching challenges of habitat degradation and changes in ocean temperatures, as of this printing a new disturbance has appeared. Southern right whale calves have been dying off in large numbers—more so now than at any other time in recorded history. The cause is not yet known.[5]

Southern right whale, Overberg region, South Africa, Jaime Rojo, iLCP

Southern right whale, Overberg region South Africa, Jaime Rojo, iLCP

DAMARA TERN

(Sterna balaenarum)

NEAR THREATENED

NAMIBIA

GLOBAL ENVIRONMENT FACILITY PROJECT: Namibian Coast Conservation and Management (NACOMA) & Conserving the Damara Tern
PROJECT REPORT BY: Rod Braby & Karsten Feuerriegel
AGENCY: World Bank
PARTNERS: Ministry of Environment and Tourism; Ministry of Fisheries & Marine Resources; SPAN; Ministry of Regional and Local Government, Housing and Rural Development; Benguela Current Commission

The Damara Tern has become an icon of conservation off the Namibian coastline and Namibia as a whole. The successful conservation of a species such as this reflects the dedication of a country in conserving its biodiversity as it follows the progressive route of productivity and sophistication.

The Damara tern (*Sterna balaenarum*) is a small seabird endemic to Namibia. It nests in loose colonies along the Namibian coast, feeds on small fish and has been classified for some time as globally Near Threatened owing to its moderately small population (around 14,000). The bird is a partial migrant, and flocks of tens or hundreds of birds gather at the Namibian coast in April, and then move northward as far as Nigeria and Ghana. Terns breed in restricted sites, to which they return each year. The majority of these nesting areas are in the Central Namib or Erongo Region—places currently experiencing a uranium mining rush that, in turn, subjects the sensitive local, coastal environment to all the associated pressures of growth. In addition, increased off-road vehicle activity linked to a ban on beach driving in South Africa has pushed fishermen to Namibia's coastal areas where they and quad bikers overlap with nesting Damara terns. Other human development, especially close to the rapidly expanding waterside towns, exerts another regional pressure on the terns' dwindling numbers. In the face of this kind of persistent disturbance, the terns abandon traditional breeding sites for sub-optimal locations where reproductive success is less assured.

Despite these losses, the Damara terns are integral to the near-shore coastal ecosystem. They have become an early indicator of regional stability; their presence in summer is a sign of health and their absence a sign of perturbations in the system. As such, preserving this species is a prime example of a well-chosen wildlife conservation objective to promote the co-existence of all organisms so that all the natural systems of the region can be maintained. Endemic to the region and particularly vulnerable to human activity, the Damara tern is protected under both Namibia's emerging Protected Area Management Act and the existing conservation ordinance, but more must be done. Current action and measures are not sufficient to prevent loss of habitat due to unwitting and persistent disturbance during breeding.

Recently, interventions by the NACOMA project and its partners have led the Namibian government to formally declare its entire coast and off-shore islands as protected areas. In 2008 and 2009, three new areas were added to Namibia's coastal parks, connecting them to a new megapark provisionally called the Namib-Skeleton Coast National Park. The new megapark will link Namibia to Angola's Iona National Park and South Africa's Richtersveld National Park. The new park will be the largest in Africa, the sixth-largest terrestrial protected area globally, and the eighth-largest protected area in the world. Namibia will become the first non-island nation to have its entire coastline protected by means of a greater national coastal park and marine protected areas. Both the NACOMA-commissioned Namibian coastal policy and the strategic environmental assessment of the Namibian coast recommended the proclamation of the coastal biodiversity hotspots as national parks.

In the interim, a contingency management plan has helped protect and maintain the integrity of the densest number of breeding Damara tern pairs known to exist between Walvis Bay and Swakopmund. This area has been declared an Important Bird Area; cable barriers with information signs demarcate the area and exclude off-road vehicles and other human threats. Inappropriate developments are discouraged through the Strategic Environmental Assessment Decision Support Tool of the coastal zone and the park management and development plans. These sustainable development tools were created by the NACOMA project for the Namibian government's Ministry of Environment and Tourism.

Further measures will have to be implemented to control fishermen accessing their favored fishing spots in the newly proclaimed park. Roads will need to be upgraded and off-road driving discouraged more strongly. The maintenance of long-term and more widespread monitoring at known breeding colonies will be required to assist in effective management.

The Damara tern has become an icon of conservation on the Namibian coastline and in Namibia as a whole. The successful conservation of a species such as this reflects the dedication of a country to conserve its biodiversity even as it follows the road of progress, productivity and sophistication.

Adult Damara Tern brooding a chick, Rod Braby

Photo Left: Adult Damara Tern, Namib Skeleton Coast National Park, Rod Braby
This Page: Damara Tern egg, Namib Skeleton Coast National Park, Rod Braby

PEMBA FLYING FOX

(Pteropus voeltzkowi)

VULNERABLE

TANZANIA

GLOBAL ENVIRONMENT FACILITY PROJECT: Conservation of the Pemba Flying Fox
PROJECT REPORT BY: Fauna & Flora International
AGENCY: World Bank
PARTNERS: Critical Ecosystem Partnership Fund; Department of Commercial Crops, Fruits and Forestry

Today Pemba flying foxes are quite beloved by islanders; in a recent opinion poll nearly one hundred percent of the local people express support for their protection.

Pemba Island, a small landmass just off the coast of East Africa in the Zanzibar archipelago of Tanzania, is the only location in the world where the Pemba flying fox (a species of fruit-bat) has been sighted. This series of islands contains the largest proportion of the world's most threatened bats, including the Pemba flying fox (*Pteropus voeltzkowi*). It is this distinction that highlighted the region as a priority area for global conservation...and just in time.

Fauna & Flora International (FFI), an international conservation organization, first took action in the 1990s, when it was first discovered that the species' survival was at risk. The flying fox is one of Africa's largest bat species, with a wingspan of five-and-a-half feet (as wide as an osprey's). Endemic to Pemba Island, flying foxes evolved here in isolation—away from predators and competitors—making them particularly vulnerable to the effects of over-exploitation and introduced species. Once considered a delicacy, this charismatic species was hunted and eaten widely throughout the Island. As recently as 1989, only a scant few individual fruit bats could be observed on their tropical island home of Pemba. By the 1990s, 95 percent of the species' forest habitat had been destroyed, and its reproductive rates had dropped to an all-time low (just one young per adult female each year). These vital local pollinators appeared doomed.

Today, thanks to the successful emergency intervention efforts of FFI, working closely with their local partner, the Department of Commercial Crops, Fruits and Forestry (DCCFF), the Pemba flying fox has taken a dramatic turn from the edge of extinction. Fewer than 20 years since the scant few recorded sightings, its numbers have soared back to an astounding 22,000.

The latest survey (supported by the Critical Ecosystem Partnership Fund) indicates that the Pemba flying fox population has fully recovered to somewhere between 22,000 and 35,600 individuals.

Pemba Flying Fox, Berenty Reserve, Edwin Giesbers, naturepl.com

In fact, several of the species' sleeping roosts are now home to more than 1,000 bats. This remarkable recovery is testament to the project's dedicated efforts. The species has now been downgraded to Vulnerable on the International Union for Conservation of Nature (IUCN)'s Red List of Threatened Species.™

This amazing resurgence also proves that—if the right actions are taken at the right moment—conservation can work, even in the most seemingly dire situations. Over the past 13 years, FFI has helped to reduce the threat from hunting, set up two new forest reserves to safeguard the bat's habitat and raised awareness of the need for conservation throughout Pemba's communities.

Today Pemba flying foxes are quite beloved by islanders; in a recent opinion poll, nearly 100 percent of the local people expressed support for protection of the species. In fact, community-led "Pemba flying fox clubs," which assist protection efforts through education and monitoring, have been popping up all over the island. Local Joy Juma, FFI East Africa Program Assistant, says: "Less than 20 years ago this bat looked set to disappear. Thanks to the enthusiasm of local people, FFI's ongoing conservation efforts have managed to bring this species back from the brink. Roast bat used to be a very common dish on Pemba. Now people value the bats for different reasons."

FFI is continuing efforts to conserve the Pemba flying fox and is calling for support of the fox clubs. The organization is also broadening its work to develop the island's ecotourism potential. Several community tour guides have been trained, and a visitor's center has been constructed to help local people benefit from the successful recovery of this vital local species.

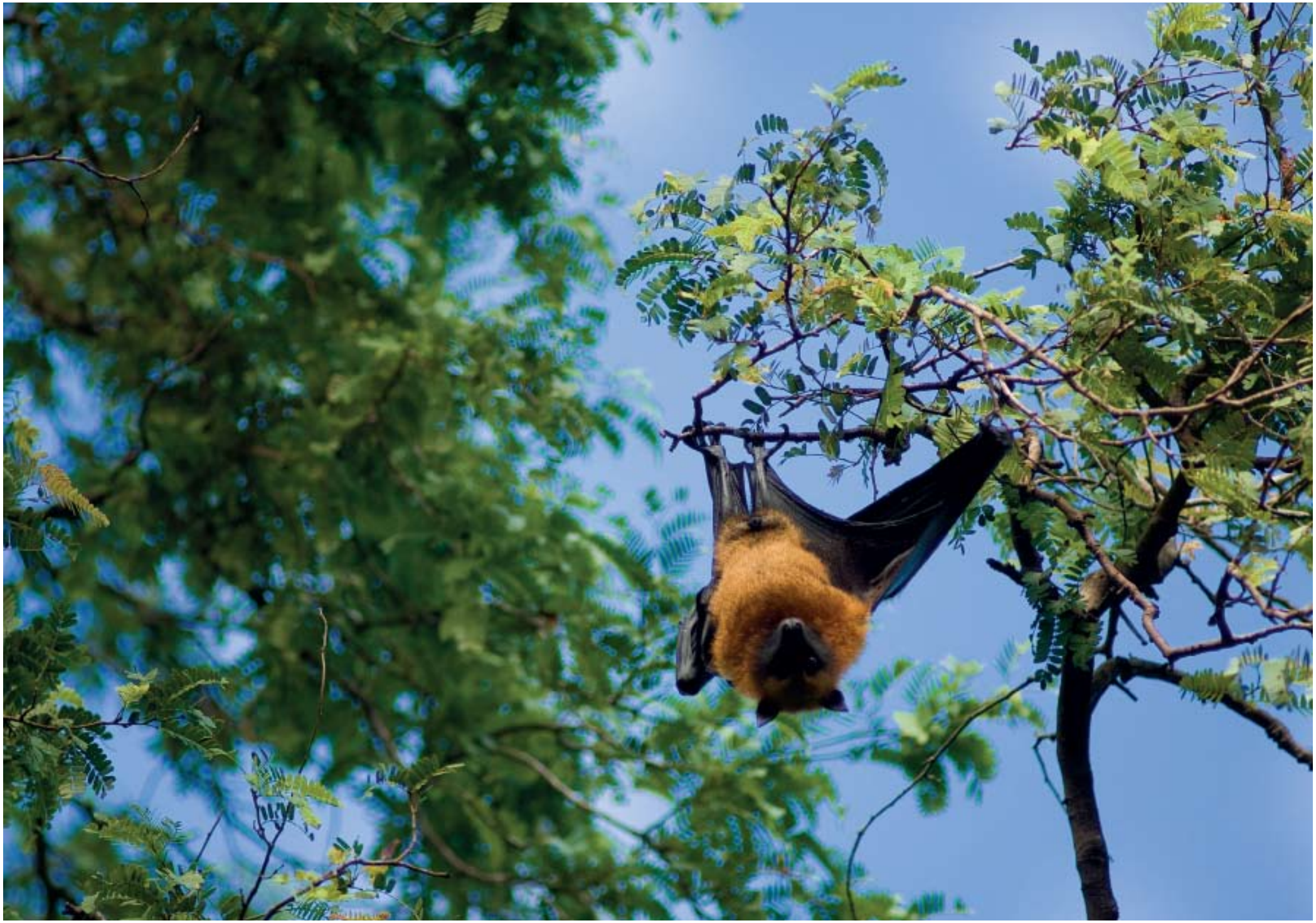


Photo Left: Flying Fox Bat, Berenty Private Reserve, Madagascar, Iñaki Relanzon, iLCP
Photo Right: Flying Fox Bat, Rano island, Vanuatu, Michele Westmorland, iLCP

ULUGURU BUSH SHRIKE

(Malaconotus alius)

CRITICALLY ENDANGERED

TANZANIA

GLOBAL ENVIRONMENT FACILITY PROJECT: Uluguru Bush Shrike Census
PROJECT REPORT BY: Wildlife Conservation Society of Tanzania
AGENCY: World Bank
PARTNERS: Critical Ecosystem Partnership Fund

Recently a team from the Wildlife Conservation Society of Tanzania (WCST) has repeatedly caught sight of this colorful species in the reserve, and recent evidence that suggests that it is also breeding there; this bodes well for the bush shrike's future.

Until January 2007, the only sign that the Critically Endangered[6] Uluguru bush shrike (*Malaconotus alius)* might still exist was a single doubtful record from 1981, that gave evidence of the shrike's presence in the Uluguru South Forest Reserve. This is a place which at the time, was believed to be above its normal altitudinal limit. Unfortunately, several follow-up surveys failed to verify this finding. More recently, however, a team from the Wildlife Conservation Society of Tanzania (WCST) has repeatedly caught sight of this colorful species in the reserve, and recent evidence that suggests that it is also breeding there; this bodes well for the bush shrike's future.

A 1999-2000 census supported by WCST estimated a population of 1,200 pairs. The bulk of this dwindling population is in the 84 km^2 Uluguru North Forest Reserve and an adjacent area, both of which still hold a good tract of flat forest at 1,200 to 1,500 meters above sea level. The Uluguru North and South Forest Reserves are separated by the Bunduki Gap (1.5 km), thought by many to be a potential obstacle to movements of the canopy-reliant Ulugura bush-shrike.

Jasson John of WCST, who led this most recent survey team (supported by the Critical Ecosystem Partnership Fund), shared some detailed accounts of sightings for this rare bird. First, he reported that they attracted a pair of bush shrikes by broadcasting a playback of their calls to a census point at an altitude of 1,739 meters: "This southern point is the nearest between the south and north reserves and has almost the same forest structure as that within Uluguru North. This was about 3.4 kilometers from the nearest, previous record of the Uluguru bush shrike in Uluguru North."

Later that same day the team heard another Uluguru bush shrike about four hundred meters from that first pair: "This was the highest altitude record of our team's survey, at 1,885 meters." Between February 23 and 28, 2000, Jasson, along with WCST's Elias Mungaya, returned to Uluguru South at the same census point. "We were aiming to catch the original pair, so we put up our mist-nets in the tree canopy, and attracted the birds by playing back their calls." Two birds came by, but missed getting caught.

In more recent observations, the pair of Uluguru bush shrikes rarely came to the census point together. Given that a month before the birds had always been seen together, it was reasoned that the female was likely to be sitting on a nest. While this re-count may be modest, it is, nonetheless, another hopeful indicator that the long-term health of the local population can be restored.

Uluguru Bush Shrike Illustration, Sangeetha Kadur

TAITA THRUSH

(Turdus helleri)

CRITICALLY ENDANGERED

KENYA

GLOBAL ENVIRONMENT FACILITY PROJECT: Taita Thrush Monitoring Program
PROJECT REPORT BY: James Mwang'ombe & the East African Wild Life Society
AGENCY: World Bank
PARTNERS: Critical Ecosystem Partnership Fund, University of Ghent, Kenya Forest Service

Hope sometimes arrives in very small packages, such as the ten Taita thrushes that were recently released in the tiny forest fragment known as Chawia Forest in the Taita Hills of Kenya.

Hope sometimes arrives in very small packages, such as the ten Taita thrushes (*Turdus helleri*) recently released in the tiny forest fragment known as Chawia Forest in the Taita Hills of Kenya. This modest addition to the forest's Taita thrush population—which had been estimated at around 10 individuals in this location—represented a potential milestone for this Critically Endangered[7] bird species, whose total population is estimated at 1,350. It also marked the culmination of years of conservation efforts in the Taita Hills.

The area of forest cover in the Chawia "fragment" has been reduced by 98 percent over the last 200 years, mainly due to clearance for agriculture. Meager fragments are all that remain of what was once a single forest, now separated by development; each fragment serves as yet another example of habitat loss and one of the more significant threats to biodiversity in the world today. The remaining 400 hectares of this particular indigenous moist tropical forest, scattered in 11 fragments throughout the district, is relatively minute and under continuing pressure from the densely populated communities nearby.

Professor Luc Lens, head of the University of Ghent Terrestrial Ecology Unit, who has been studying the Taita Hills area since 1996, affirms that these encroached-upon forest patches support a great deal of biodiversity. They are home to numerous rare and endemic plants and animals, including two Critically Endangered bird species, three Critically Endangered gastropods, and an Endangered plant species. "*The biodiversity is still there, so it's not too late*," Lens says.

The fruit-eating Taita thrush is a largely dark-colored bird with white underparts and orange-colored flanks, beak and eye rings. Three of the forest remnants support populations of the thrush, Lens says, but the population of one of those forests, Chawia, has started to crash. This particularly threatens the unique genetic signature of some of the individual birds found in Chawia and, by extension, the quality of the remaining genetic pool.

In 2003, conservationists began hatching a three-pronged plan to come to the aid of the Taita thrush and other fauna and flora in the region without adversely affecting the livelihoods of the surrounding communities. The plan offers support to local groups for reforestation, developing a scientific model to determine the key stepping stones for recovery and training local residents to develop nature-based products that generate non-invasive livelihoods. Such alternatives have included the production and marketing of commercial insects, honey and silk farming—all of which could replace income from more destructive practices. These alternative livelihood efforts have been led by the International Centre of Insect Physiology and Ecology, recipient of a grant from the Critical Ecosystem Partnership Fund (CEPF).

In addition, a broad array of initiatives have been undertaken in the area. Beginning in 2004, CEPF supported the work of the East African Wild Life Society (EAWLS) and the Chawia Community Environment Committee to propagate and plant 68,200 indigenous tree seedlings. The aim was to enrich the understory of Chawia Forest, where livestock grazing and timber extraction had taken a toll. After some initial resistance, residents ultimately played a crucial role in planting and maintaining the new trees in the forest and in other locations within the community.

CEPF also supported a University of Ghent study to determine which forest patches in the Taita Hills would contribute the most to increasing connectivity between the remnants. The researchers used state-of-the-art geographic modeling to translate their findings into a proposed restoration action plan involving conservation and community groups in the area. EAWLS is working with the Kenya

Taita thrush, Job Aben

Forest Service, which is now guiding village forest associations to develop participatory management plans for forest fragments identified as vital to improving the passage of birds throughout the landscape. It is also working with forest reserves in the area to transform plantations of exotic trees into those that support the endemic bird populations' needs. Says Lens: "Large-scale destruction of the forest has come to a stop. Local communities are keeping these tiny bits of forest in place."

The results may also show conservationists and communities how to address forest management and restoration in other portions of the Eastern Arc Mountain region of Tanzania and Kenya. Lens continues: "Naturally, results concerning reforestation take a long while in coming. But the foundation has been laid, lots of the difficult groundwork done, and now there is a great opportunity for a really successful conservation effort."

Witnessing the progress already made in the protection and restoration of the forest, and recognizing the Taita thrush's desperate need for help, National Geographic funded a project that recently released unpaired Taita thrushes from the Mbololo Forest into the Chawia Forest to improve its thrushes' chances for survival. The current translocation project is a pilot study. If it's successful, conservationists will work to move more birds. "If we had done nothing now, this population would have disappeared," Lens said.

All the Taita thrushes that made the transfer to Chawia in late September 2008 survived, but monitoring continued through breeding season in order to assess their longer term stability. The local organizations here carry a long-term view and appreciate that turning these habitats around will require decades of sustained effort. Here in Kenya, and for the sake of the Taita thrush and other vulnerable species, their strategic plans keep this perspective in mind.[8]

Taita Thrush in wild, David Gitau

LOVERIDGE'S SUNBIRD
(Nectarinia loveridgei)
ENDANGERED

SANJE MANGABEY
(Cercocebus sanjei)
ENDANGERED

TANZANIA

GLOBAL ENVIRONMENT FACILITY PROJECT: Conservation and Management of the Forests of the Eastern Arc Mountains
PROJECT REPORT BY: Nik Sekhran
AGENCY: United Nations Development Programme
PARTNERS: Government of Tanzania; CARE International; Tanzania Forest Conservation Group; World Land Trust; Government of Germany; DANIDA; World Bank; Critical Ecosystem Partnership Fund; Wildlife Conservation Society of Tanzania; WWF

The richly biodiverse Eastern Arc Mountains of Tanzania are home to two notable and Endangered species, the Loveridge's Sunbird (Nectarinia loveridgei) and the Sanje mangabey (Cercocebus sanjei).

The richly biodiverse Eastern Arc Mountains of Tanzania are home to two notable and Endangered species, the Loveridge's sunbird (*Nectarinia loveridgei*) and the Sanje mangabey (*Cercocebus sanjei*).

The population of Loveridge's sunbird—a small and colorful bird with a long curved beak[9] that is endemic to the Uluguru Mountains of the Eastern Arc—has been estimated at 37,000 individuals.[10] The primary threat (as for most other species cited within this publication) is the slow destruction of its forest habitat. The three forest reserves in which the sunbird lives have been harvested for firewood and small amounts of timber; the long-term effects of this seemingly minor habitat degradation are as yet unclear, though decreases in the species' population are presumed.[11]

By working to improve the management of the Uluguru Mountain Blocks, the UNDP-implemented and GEF-funded project "Conservation and Management of Forests of the Eastern Arc Mountains of Tanzania" helps to protect the habitat of this rare bird. For example, the project participated in the revision of the International Union for Conservation of Nature (IUCN) Red List status of the Loveridge's sunbird from Near Threatened to Endangered in 2008.

The Sanje mangabey, a primate, is a second notable species in the project area. The "discovery" of this population of the species can be attributed to renowned conservationists Katherine Homewood and Alan Rodgers (a well-regarded project team member, Alan passed away in 2009). In 1979 Rodgers — as he was affectionately known to his friends — was on a field trip with the anthropologist Katherine Homewood to survey a remote forest on the Udzungwa Mountains in southwest Tanzania when they heard an unusual monkey call which they recognized as a mangabey, a species not previously known to exist within hundreds of kilometers of the spot. It turned out to be a completely new species which was later named the Sanje Mangabey and was the first new primate found in East Africa for many years. Its discovery alerted biologists and conservationists to the potential importance of the forests on the chain of mountains known as the Eastern Arc in Tanzania. The Sanje mangabey is considered Endangered due to its limited

Red Tufted Malachite Sunbird, Tanzania, Jim Clare, naturepl.com

habitat and fragmented population.[12] It faces threats that include poaching and exploitation of the forest for charcoal and timber.[13] As with Loveridge's sunbird, the project works to strengthen the management of the forests that house the mangabey. Several sites in the area have been proposed as World Heritage Sites, including reserves where the mangabey lives. The UNDP-GEF project established teams that are actively involved in spot checks and have recently helped authorities catch three illegal timber cutters. The project is nearly complete, and has been successful in curbing deforestation in key reserves in the Eastern Arc Mountains. Nature reserves are now four times more likely to be spared deforestation than unprotected forests in this region. This offers hope for the survival of these important and rare species.

Photo Left & Right: Sanje Mangabey, Francesco Rovero

WILD DOG

(Lycaon pictus)

ENDANGERED

KENYA

GLOBAL ENVIRONMENT FACILITY PROJECT: Dryland Livestock Wildlife Environment Interface Project
PROJECT REPORT BY: Mohamed F. Sessay & Stephen Twomlow
AGENCY: United Nations Environment Programme
PARTNERS: African Wildlife Foundation; African Union/Interafrican Bureau for Animal Resources Regenesis Ltd.

In three years, the conservation area has demonstrated significant positive impacts: five thousand hectares have been established to support wild dogs and other wildlife species and a tourism lodge was initiated.

Communities in Africa will not set aside significant tracts of land critical for conservation unless they receive tangible benefits to compensate for the related livelihood they will most likely lose. Kijabe Group Ranch is located in the Laikipia district of Kenya. The ranch, managed entirely by the local communities, covers approximately 17,000 hectares and has an estimated population of 360 registered members. The ranch borders other communal areas on the eastern, western and southern sides, all of which are also shared by local communities. On its northern side, however, it is bordered by trust land. Kijabe is home to important wildlife species, such as the greater and lesser kudus, plains zebras and the small antelopes. It is also home to leopards. But more importantly for this story, it is home to the highly endangered wild dog (*Lycaon pictus*).

The African Wildlife Foundation (AWF) started working with the Kijabe community in 2002 to mitigate a number of threats facing all these species—the wild dogs in particular. With support from the African Union/Interafrican Bureau for Animal Resources, AWF was able to assist the community in developing a natural resource management plan where land was zoned for conservation, livestock grazing, and settlement to harmonize land uses and reduce conflict with local wildlife. Five-thousand hectares (which form part of the home to these endangered dogs and other species) was set aside exclusively for conservation.

Game scouts were hired and trained to monitor the movements of the wild dogs. The project provided the scouts with uniforms and field equipment such as binoculars, GPS units, compasses, etc. AWF, in partnership with Regenesis Ltd. (a private business owned by John and Gill Elias), assisted in developing a tourism facility within the conservation area, with the aim of providing benefits to the community as well as long-term, self-generating compensation for setting the conservation area aside. Now, in addition to being home to the wild dogs, the conservation area supports wildlife viewing for the Kijabe lodge and is financed through visitor fees.

This income has helped the community to invest in area maintenance, marking a vast improvement from its former, severely degraded state. The game-scout security system has helped improve safety for the dogs in the area. As a result, incidences of poaching and human/wildlife conflict have been reduced, and the wildlife population has increased. Various species are now resident in the conservation area (with many more being sighted during wet season), as they expand from the neighboring communal area and trust land. In three years, the conservation area has demonstrated significant positive impacts.

African Wild Dog Pup, Botswana, Art Wolfe, iLCP

Left, Right Top & Bottom: African Wild Dog, Botswana, Roy Toft, iLCP

BLACK RHINO

(Diceros bicornis)

CRITICALLY ENDANGERED

NAMIBIA

GLOBAL ENVIRONMENT FACILITY PROJECT: Strengthening the Protected Area Network
PROJECT REPORT BY: Nik Sekhran
AGENCY: United Nations Development Programme
PARTNERS: Government of Namibia; Namibia Nature Foundation; Southern African Institute for Environmental Assessments; USAID; KFW; GTZ; CI; WWF-UK; NAMDEB

As a result of the limited food and water sources in their habitat, these herbivores typically forage across some twenty-five hundred kilometers for the plants, branches and shoots that compose their diet.

The black rhinoceros (*Diceros bicornis*) is a unique desert-dwelling species, well adapted to the arid climate of northwest Namibia. This Critically Endangered species[14] can commonly go without water for three or four days but, like most living things, it ultimately depends on permanent sources of water to survive.[15] As a result of the limited food and water sources in their habitat, these herbivores typically forage across some 2,500 kilometers for the plants, branches and shoots that compose their diet.[16]

The 20th century saw dramatic declines in black rhinos across their ranges in sub-Saharan Africa; gun-toting hunters seeking sport and profit were—and continue to be—the single greatest threat to this species. The black rhino population, which once numbered in the hundreds of thousands,[17] reached its lowest population count in the early 1990s; approximately 2,300 are now present in the wild.[18] Nearly 98 percent of the black rhino population now lives in only four countries (Namibia, South Africa, Kenya and Zimbabwe)[19]—a significant reduction in their distribution across the region. Poaching continues to represent a major threat to these creatures, with a high demand for their horns driving illegal trade in China, Yemen, South Korea and other countries.[20] Anti-poaching and conservation efforts remain critical to their protection.

The Strengthening the Protected Area Network (SPAN) project area houses 95 percent of the subspecies *Diceros bicornis*, one of the three subspecies listed as Critically Endangered on the International Union for Conservation of Nature (IUCN) Red List (the fourth and last subspecies, *D. b. longipes*, is listed as Extinct in the Wild[21]). To reduce the threat to the black rhinos and other species, this UNDP-GEF project has provided training and equipment to rangers responsible for enforcement; however, it is too early to gauge the effectiveness of this investment in deterring poaching. The project has also initiated species monitoring at two protected areas, and has been involved in maintaining traditional wildlife migration corridors in Etosha Park and Skeleton Coast Park, which include critical black rhino habitat. Improved management of these and other national parks in Namibia will help to secure the habitat for the black rhino.

Black Rhino, Africa, Art Wolfe, iLCP

This Page: Rhino Eye, Africa, Art Wolfe, iLCP
Top Right: Black Rhino, Lake Nakuru National Park, Kenya, Art Wolfe, iLCP
Bottom Right: Black Rhinoceros, Masai Mara National Reserve, Kenya, Art Wolfe, iLCP

EASTERN EUROPE AND CENTRAL ASIA

SIBERIAN CRANE CHINA, RUSSIA, IRAN, KAZAKHSTAN CRITICALLY ENDANGERED

SAIGA ANTELOPE KAZAKHSTAN CRITICALLY ENDANGERED

SPOON-BILLED SANDPIPER RUSSIA CRITICALLY ENDANGERED

STELLER'S SEA EAGLE RUSSIA VULNERABLE

BROWN BEAR, WILD REINDEER, SNOW SHEEP RUSSIA LEAST CONCERN

SNOW LEOPARD KAZAKHSTAN, KYRGYZSTAN ENDANGERED

GOLDEN LINE FISH CHINA CRITICALLY ENDANGERED

GUANGXI CAVES CHINA STATUS NOT AVAILABLE

EURASIAN OTTER ROMANIA NEAR THREATENED

Steller's Sea Eagle Flight Path, Igor Shpilenok, iLCP

SIBERIAN CRANE

(Grus leucogeranus)

CRITICALLY ENDANGERED

CHINA, RUSSIA, IRAN, KAZAKHSTAN

GLOBAL ENVIRONMENT FACILITY PROJECT: Siberian Crane Wetland Project
PROJECT REPORT BY: Lisa Fitzpatrick, Claire Mirande, Mark Zimsky
AGENCY: United Nations Environment Programme
PARTNER: International Crane Foundation

No bird is of greater cultural or environmental significance than the majestic, globally threatened Siberian Crane.

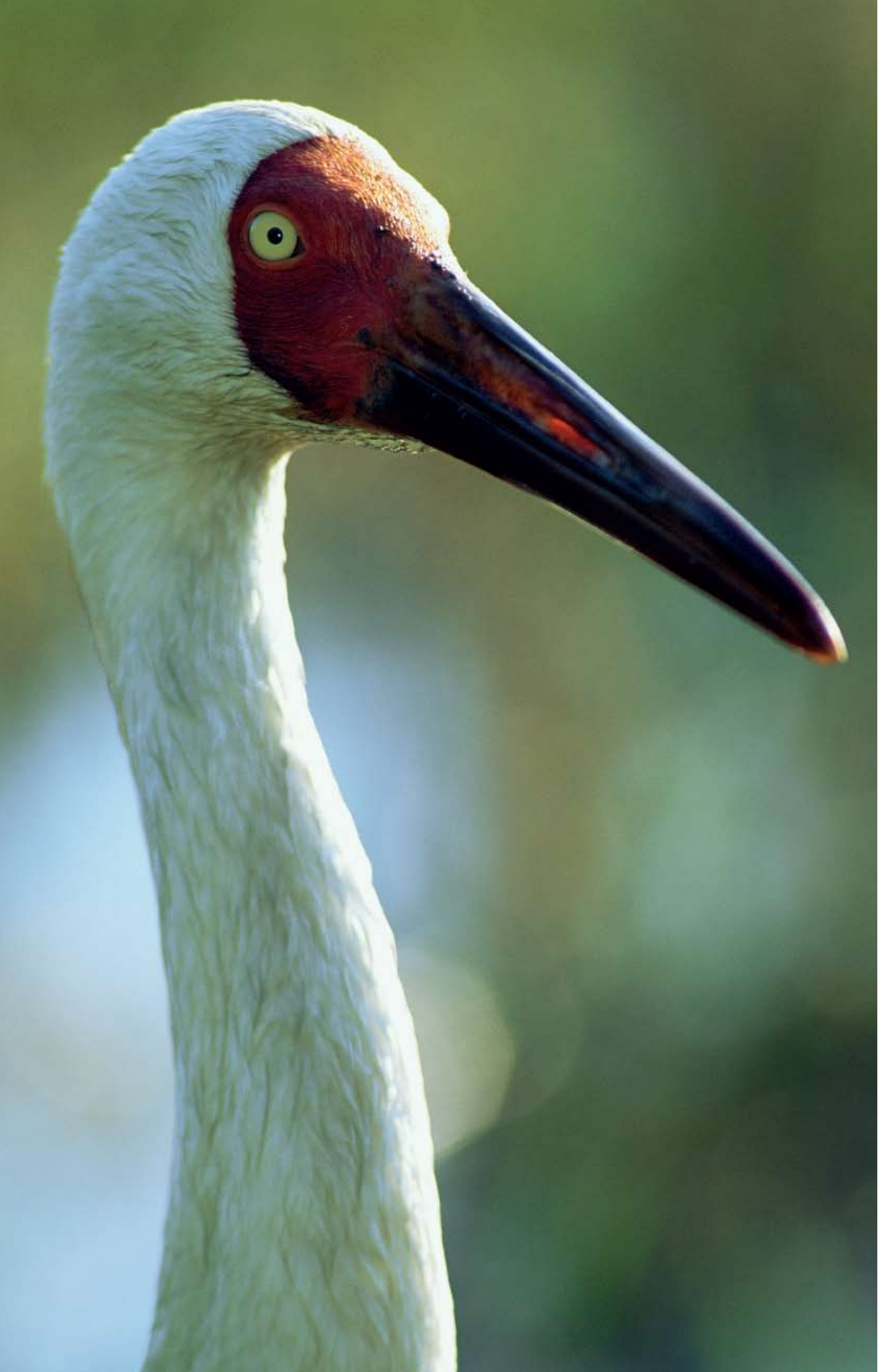
Life flourishes, species emerge and evolve, and civilizations rise and fall along the banks of rivers, waterways, and coastal regions across the globe. Yet where water resources are compromised, so too are the life-forms they support. Many bird species dwell in such wetlands and as essential members of the rich diversity of creatures with whom we share habitats across the globe, their well-being—and that of the environments they inhabit—is a universal concern.

For those who take note, bird migrations have long been early indicators of shifting global weather patterns.[22] No bird is of greater such cultural or environmental significance than the majestic, globally threatened Siberian crane (*Grus leucogeranus*). A flagship species for all waterbirds, the Siberian crane's calls can be heard for miles across marshes where they nest. These cranes breed, winter, and migrate along two key flyways spanning thousands of miles…unaware of the many political boundaries that crisscross Asia beneath them as they travel. Although cranes were once abundant, by the 1970s seven of the world's 15 crane species were threatened with extinction. Despite decades of conservation effort, the number of threatened crane species has now risen to 11. Similar negative trends appear among the other waterbird groups. Within Asia, 59 percent of known water-bird populations are declining, 27 percent are stable, and only 10 percent are increasing. Across vast portions of Asia, escalating human demand on limited water supplies, as well as land, are leading to the loss and degradation of wetlands upon which both humans and waterbirds depend.

This relationship linking water, wetlands, wildlife, and people's welfare has been a core theme of the United Nations Environment Programme as well as for one of its signature programs, the Siberian Crane Wetland Project (SCWP). The SCWP was launched in 2003, led by the International Crane Foundation in collaboration with the governments of the People's Republic of China, the Islamic Republic of Iran, the Republic of Kazakhstan, and the Russian Federation. With a spotlight on the highly migratory crane, this six-year project has focused on enhancing long-term protection of wetlands, a host of migratory waterbirds, and other wetland biodiversity. The project addressed threats and strengthened management at sixteen key sites along the Siberian crane's western and eastern flyways, scattered across Russian Siberia, China, Kazakhstan and Iran. As the project's international ambassador, this charismatic bird attracted and linked a host of domestic and international agencies together in solving common and sometimes shared environmental challenges. There were two phases to the SCWP. Sites under the most immediate threat (or that are most essential for the life cycle and survival of the Critically Endangered Siberian crane and other globally significant species) were addressed during Phase 1 (2003–2006). Sites under a less urgent level of threat, as well as the Phase 1 sites that needed prolonged support to achieve conservation objectives, were addressed during Phase 2 (2006–2009). Activities occurred at regional, national, and site levels.

Requiring an array of executing agencies across numerous countries, the SCWP was the first GEF-funded project to take a flyway approach to conservation. The complexity of the issue required an unusually long period for project development and implementation. The project lasted 10 years from the start of planning to project completion (2000–2009) and included an investment of $10 million by the GEF, which was matched by more than $37 million in contributions from countries and partners. The project aimed to ensure legal protection of wetlands and raise the capacity of the responsible agencies to manage them effectively, in cooperation with local communities and other stakeholders. In addition, the project has supported the work at the sites through national and flyway-level activities, such as strengthening legislation and policies, and has improved coordination of international activities. The 16 selected sites cover the whole migration cycle of the Siberian crane and are globally important for conservation. For example, eleven are designated Ramsar sites

Siberian Crane, Oksky, Russia, Igor Shpilenok, naturepl.com



("wetlands of international importance"); all 16 sites meet the Ramsar criteria and all sites fall under some level of their respective country's protected area systems.

The innovative flyway-level approach of the project demonstrated how coordinated actions on multiple levels are needed to conserve migratory species, which may depend on a chain of sites spread over thousands of kilometers between their northern breeding grounds and wintering areas far to the south. The project further highlighted that the safety of entire flyways can be threatened by factors affecting key sites, requiring national and local attention. Targeted activities addressing these site-based threats to the flyway are of great importance in protecting regional migratory waterbird populations, as well as ecosystem services (such as drinking water) for local communities.

The SCWP has been implemented through United Nations Environment Programme (UNEP) in cooperation with the Convention on Migratory Species (CMS), the latter agency which, together with the country executing agencies, will continue a large part of the project objectives under different mechanisms. The SCWP strengthened the network of wetlands along the Siberian crane's flyways in a number of ways: expanding protected areas or designating new nature reserves; targeting research; securing water supplies to water-stressed wetlands; integrating stakeholders' concerns and decision-making into reserve management; and undertaking education and awareness programs at local, national, and flyway levels. Its outcomes directly benefit the local communities, millions of migratory waterbirds, and more than 27 globally threatened wetland bird species dependent upon the 16 internationally important wetlands selected as project sites—a significant contribution to biodiversity conservation in 2010, the International Year of Biodiversity.

Siberian Crane, Pete Oxford, naturepl.com

Two Cranes, India, Ashok Jain, Naturepl.com

SAIGA ANTELOPE

(Saiga tatarica)

CRITICALLY ENDANGERED

KAZAKHSTAN

GLOBAL ENVIRONMENT FACILITY PROJECT: Steppe Conservation and Management Project
PROJECT REPORT BY: Lisa Fitzpatrick, Adriana Dinu & Nik Sekhran
AGENCY: United Nations Development Programme
PARTNERS: Government of Kazakhstan, Committee of Forestry and Hunting of the Ministry of Agriculture; Ministry of Environmental Protection of the Republic of Kazakhstan; Association of the Conservation of Biodiversity in Kazakhstan

As recently as the 1970s, a thriving population of one million saiga (so-named by the Russians) was recorded throughout the steppes and desert plains of Kazakhstan.

Since the Ice Age, saiga antelope are known to have roamed in vast herds, reaching as far as the British Isles in the west and Alaska and the Yukon in the east. "As recently as the 1970s, a thriving population of one million saiga (so-named by the Russians) was recorded throughout the steppes and desert plains of Kazakhstan." Now extinct within China's borders, the current worldwide population of these long-nosed, migratory grazers stands at 81,000—marking one of the most sudden and dramatic population crashes of a large mammal on record worldwide.

While the 1990s brought open borders in Russia and China, they also brought a decline in legal controls, as well as economic hardship to rural communities and an upwelling of rapacious hunting by poachers, who sold saiga meat and horns for uses in traditional Chinese medicine. By 2002, this creature had been hounded to the edge of extinction. Targeted poaching of the horned males set off a major gender imbalance in what population remained, further compromising their chances for survival…or recovery. In less than two decades (an unfathomably brief flash in the global timeline) the saiga had landed squarely on the IUCN Red List as Critically Endangered.[23]

The Steppe Conservation and Management Project (SCMP) was formed as a much-needed response to these ongoing losses. Led by the Government of Kazakhstan in partnership with the Association for the Conservation of Biodiversity in Kazakhstan, the Royal Society for the Protection of Birds, and the Frankfurt Zoological Society—and funded by the Global Environment Facility (GEF) and implemented by the United Nations Development Programme (UNDP)—this project has been giving this essential creature and its diverse steppe habitat renewed hope.

Altyn Dala steppe, Kazakhstan, Adriana Dinu

Post-Soviet Kazakhstan stands among the nine largest countries in the world and has long provided ample territory for the saiga—as well as the once-nomadic Kazakh people—to roam. Three of the five saiga populations (the Betpak-Dala, Ustyurt and Ural) call the Kazakhstanian steppes home, migrating more than 1,000 kilometers between the more southerly winter desert plains to the northerly summer pastures. Saigas are natural grazers; their travels widely disperse seeds of steppe plants, their droppings help fertilize the soil, and their trampling hooves push seeds into the dirt, facilitating germination. The sudden 90-percent drop in the saiga population was a shock to the regional ecosystems; the antelopes' presence had kept the grasslands open and created habitats for a rich diversity of plant and animal species, including the great bustard and the Critically Endangered sociable lapwing, both characteristic birds of the steppe. Like the saiga antelope, these birds are now facing global extinction. Local scavengers such as the black vulture and the Kazakhstan wolf have also been affected.

Protected areas (PAs) have a potentially significant, yet largely unrealized, role to play in eliminating threats not only to the steppe area biodiversity in Kazakhstan, but for all programs involving the protection of endangered species around the globe. Healthy host ecosystems are essential for species survival; this makes PAs the prime focus of the GEF. In this case specifically, protecting the steppe habitat reserve is a critical first act in reviving the saiga. In 2009, the SCMP partnered with an existing conservation program, the Altyn Dala Conservation Initiative, to create an integrated conservation network extending through central Kazakhstan. More than 5.2 million hectares have already been legally protected by the government of Kazakhstan, but Altyn Dala ("golden steppe" in Kazakh) plans to increase this by up to another five million hectares—more than twice the size of Wales.

The project is supporting the government of Kazakhstan in developing a highly strategic, landscape-based approach to PA expansion and management within the steppe zone, involving a system of financially sustainable PAs that range from permanent and fully staffed national parks (in the calving areas for saiga) to seasonally protected areas on saiga migratory routes, and from fully government-administered areas to PAs in which local communities play a central role in management.

Due to coordinated project intervention, the main Kazakh population of this enigmatic, Critically Endangered species is now recovering steadily. By combining a more informed understanding of saiga behavior, effective mobile anti-poaching units, and ambitious landscape-scale conservation management to increase protection of grassland steppe and semi-desert habitats, these efforts have led directly to an improving picture. The saiga's primary Kazakh population in the Altyn Dala region rose from fewer than 4,000 individuals in 2002 to more than 53,440 in 2010. As with the famous vast herds of wildebeest on the African plains, very little is known about the saigas' present distribution and migratory routes, but the project teams and park staff are learning. For the first time in Central Asia, for example, 20 antelopes are now being tracked by satellite as they move south—potentially up to 800 kilometers—across Kazakhstan from their calving grounds to their remote wintering sites.

The UNDP-GEF project will continue to work on long-term solutions for strengthening the ecosystems of the region long after the program has ceased. It will also build upon UNDP-GEF's previous work in strengthening the wetland and mountain PAs of Kazakhstan, including techniques for increasing the effectiveness of steppe PAs, such as the enhancement of intervening landscape areas. GEF will provide incremental support for the development of tools for landscape-level steppe conservation planning and management. For this purpose, the Irgiz-Turgai-Zhylanshyk (ITZ) area has been chosen as a pilot program site. Approximately 60 to 70 percent of the Betpak-Dala population of saiga has been inside the ITZ during the 2010 census.

A new UNDP-GEF project—planned to start by the end of 2010—will target the Ustyurt saiga population shared by Kazakhstan and Uzbekistan, which, at 4,900 animals according to a 2010 census, has suffered more than most from illegal hunting activities.

Across the border, in Russia's Kalmykia Republic, there is a third UNDP-GEF project aimed at strengthening the steppe protected area system to provide a safe habitat for one of the world's five populations of saiga. The president of Russia's Kalmykia Republic, Kirsan Ilyumzhinov, declared 2010 the "Year of Saiga" in Kalmykia, echoing the widely held sentiments that the saiga antelope are, like so many endangered species, critical to the long-term health of larger ecosystems and must not be lost. UNDP-GEF and their partners have been successful at achieving short-term goals, including bringing the saiga back from the edge of extinction.

Baby Saiga Antelopes, Cherniye Zemly, Nature Reserve, Kalmykia, Russia, Igor Shpilenok, naturepl.com

Photo Left: Mother and Calves , Igor Shpilenok, Wild Wonders of Europe
This Page: Saiga Antelopes, Cherniye Zemly, Nature Reserve, Kalmykia, Russia, Igor Shpilenok, Wild Wonders of Europe

SPOON-BILLED SANDPIPER

(Eurynorhynchus pygmeus)

CRITICALLY ENDANGERED

RUSSIA

GLOBAL ENVIRONMENT FACILITY PROJECT: An Integrated Ecosystem Approach to Conserve Biodiversity and Minimize Habitat Fragmentation in Three Selected Model Areas in the Russian Arctic (ECORA)
PROJECT REPORT BY: Evgeny Kuznetsov
AGENCY: United Nations Environment Programme

The main factors affecting the birds are habitat degradation and oil pollution; disturbance from other human activities; predation by common fox, ermine, dogs, gulls, and jaegers; and unfavorable weather conditions and climate change.

ECORA is a Global Environment Facility (GEF)–sponsored project that uses an integrated ecosystem management (IEM) approach to conserve biodiversity and minimize habitat fragmentation in three selected model areas in the Russian Arctic. One is the Beringovsky District of the Chukotka Autonomus Okrug; it was selected for its unique biological diversity and landscapes. One of the indicator species identified for this model area was a rare little Beringian bird, the spoon-billed sandpiper (*Eurynorhynchus pygmeus*), which has breeding grounds in this region. The project made the spoon-billed sandpiper a flagship species for the conservation of area wetlands.

The spoon-billed sandpiper is a small bird, 14-to-16 centimeters in length, distinguished by its spatulate bill. It breeds in northeastern Russia (Chukotka and Kamchatka) and migrates along the East Asia Waterbird Flyway through Japan, North Korea, South Korea and China to wintering grounds in South and Southeast Asia, where it has been recorded in India, Bangladesh, Sri Lanka, Myanmar, Thailand, Vietnam, the Philippines, Peninsular Malaysia and Singapore.

At the end of the 20th century, the precise number of spoon-billed sandpipers was not known; all evaluations were based on the extrapolation of results from a few breeding colonies. Because of its specialized breeding habitat requirements, this species has always been rare, but surveys on the breeding grounds in recent years have revealed a sharp decline in its numbers, from 4,000-to-5,000 pairs in the 1970s, to 2,000-to-2,800 pairs in the 1980s and 1990s, to fewer than 1,000 pairs in 2000. These declines have taken place across all known breeding colonies, and data received in recent years escalated the status of the species to Critically Endangered in 2009.

A number of studies were undertaken to examine the main factors affecting the population size and species distribution. Among those factors are habitat degradation and loss from oil pollution; disturbance from other human activities; predation by common fox, ermine, dogs, gulls and jaegers; and unfavorable weather conditions and climate change. Before the 1990s, some nests were subject to destruction by reindeer herds, but in the last 20 years the number of domestic reindeer has decreased by a factor of ten (in some areas they have disappeared completely), and that particular threat has subsided.

The studies conducted by ECORA revealed that the breeding success of spoon-billed sandpipers is very low, and does not exceed 0.66 young fledged per nest. The color markings of birds show that very few juveniles and adults return to the breeding grounds. Analysis of all the information gathered between 2000 and 2009 in the breeding areas revealed that weather conditions play a very important role in the success of sandpipers. Changing humidity in breeding areas—as well as climate change overall—is leading to drier tundra and an increase in fires. On the wintering grounds, hunting and trapping of small waders also plays a role.

The ECORA project encompassed numerous activities, ranging from biological studies and mapping to training and education. Knowing that conservation measures must include habitat protection, one of ECORA's tasks was to develop an ecological and economic rationale for establishing the Beringiva National Park, in keeping with the Russian government's decree to create a park in 2010. Project experts developed a detailed cluster scheme for the park that includes eastern and southern Chukotka, which house the key breeding sites of spoon-billed sandpiper.

Environmental education should also play a role, particularly around key breeding sites, where the public can be informed of the importance of coastal wetlands to these and other wildlife and educated about protection of the broader environment. To increase local awareness concerning spoon-billed sandpipers, ECORA provided environmental education programs to adults and

Spoon-Billed Sandpiper, Russia, Staffan Widstrand, iLCP

children in three villages situated close to breeding sites. In one village, project experts organized the Friends of the Spoon-billed Sandpiper Club to strengthen the "Species Guardian Program" of BirdLife International, run by the Russian nongovernmental organization (NGO) Birds Russia. During three summer seasons, local children were taught bird watching and the fundamentals of conservation. To further assist in regional bird identification, the ECORA project published the book Birds of Chukotka, with full-color photos.

ECORA's efforts at conserving the spoon-billed sandpiper have been recognized by BirdLife International, the world's leading NGO for the conservation of birds and their habitats. In his letter of 30 November 2009, addressed to the Ministry of Natural Resources of the Russian Federation, Dr. Marco Lambertini, BirdLife International's chief executive officer, expressed "appreciation for the conservation work by ECORA for the Critically Endangered spoon-billed sandpiper in Chukotka." It is hoped that measures taken for protection of that species under the ECORA project will help to stabilize breeding grounds and, together with contributions from the international scientific community, allow the spoon-billed sandpiper population to recover.

Sandpiper Everglades National Park, Eco Pond, Tim Laman, iLCP

STELLER'S SEA EAGLE
(Haliaeetus pelagicus)
VULNERABLE

BROWN BEAR
(Ursus arctos beringianus)
LEAST CONCERN

WILD REINDEER
(Rangifer tarandus)
LEAST CONCERN

SNOW SHEEP
(Ovis nivicola)
LEAST CONCERN

RUSSIA

Kamchatka is a place of vast, globally significant biodiversity and incredible beauty; UNESCO has named one of its volcanoes a World Natural Heritage site. This remote locale, a long peninsula in the Russian Far East, was also recognized by the World Wildlife Fund as one of its Global 200 Ecoregions.

GLOBAL ENVIRONMENT FACILITY PROJECT: Demonstrating Sustainable Conservation of Biodiversity in Four Protected Areas of Russian Kamchatka Krai Phase II
PROJECT REPORT BY: Adriana Dinu & Nik Sekhran
AGENCY: United Nations Development Programme
PARTNERS: Government of Russia; Ministry of Natural Resources and Environment; Kamchatka Krai Administration; Government of Canada; Regional Public Foundation for Kamchatka Protection

Kamchatka is a place of vast, globally significant biodiversity and incredible beauty; UNESCO has named one of its volcanoes a World Natural Heritage site. This remote locale, a long peninsula in the Russian Far East, was also recognized by the World Wildlife Fund as one of its Global 200 Ecoregions. Its rich natural heritage includes a wide array of species, including Steller's sea eagle (a closely watched indicator species), brown bear, wild reindeer and snow sheep. Each has been and continues to be monitored through a collective of regional organizations (including park and wildlife protection services, forestry agencies, nature park administrators, and the Special Protected Natural Areas). Kamchatka shelters approximately five percent of the global brown bear population and is the center of distribution for the rare sea eagle. The main threats against these four species and their wider ecosystems are poaching, uncontrolled visitation and fire. Bans have been implemented against hunting for each of these vulnerable creatures, and all their populations are considered at risk.

The United Nations Development Programme (UNDP)–implemented project "Demonstrating Sustainable Conservation of Biodiversity in Four Protected Areas of Russian Kamchatka Krai Phase II" targets representative and globally significant biomes, species assemblages and ecosystems of the Kamchatka Peninsula. The areas encompass tundra, boreal coniferous forests, temperate deciduous forests, freshwater lake ecosystems, freshwater wetlands and marine inshore waters. The project's work has included effective protected area (PA) management, sustainable alternative livelihoods, awareness and advocacy, and sustainable financing mechanisms. The project has distilled its lessons learned/best practices and its successes serve as a model for other local PA projects in the Kamchatka area. This all spells good news for the now at-risk and endangered species that have for centuries called this diverse peninsula home.

Steller's Sea Eagle, in South Kamchatka Sanctuary, Igor Shpilenok, iLCP

Under the project, a monitoring program has been designed for rare birds of prey, and a project indicator species is the Steller's sea eagle (*Haliaeetus pelagicus*). One of the world's largest birds of prey, the Steller's is listed as "category 3" (rare) in the Red Data Book of the Russian Federation, and Vulnerable in the International Union for Conservation of Nature (IUCN) Red List. This blackish-brown and white raptor is highly sensitive to human impact; approximately 5,000 individuals remain in the wild, and the population is declining.[24] The survival of the world population of Steller's sea eagle depends to a great extent on its status in the Kamchatka Peninsula, where it breeds.[25]

The status of the eagle's Kamchatka population will become available by the end of 2010, based on the case of sample salmon reservoirs within the SPNA boundaries where this species traditionally breeds and winters. The results will help the project formulate further actions to protect the species and its habitat.

The Kamchatka subspecies of brown bear (*Ursus arctos beringianus*) is among the largest terrestrial carnivores in the world. There have been reports that, by autumn, the larger individuals can weigh more than 700 kilograms (1,540 pounds). The overall habitat of the Kamchatka brown bear covers 95 percent of the peninsula. Its population is currently stable, with total numbers estimated between 15,500 and 16,500 individuals (12 to 15 percent of the total number of brown bears in Russia). A 2001 aerial census in Kamchatka recorded the world's highest brown bear population density (8.48 individuals per 10 km^2) in the spring. One factor contributing to the bear's strong status is its relatively low dependence on ecological conditions—that is, its habitat integrity and resistance to human activity (logging, burned-out forest, roads, etc.). Nonetheless, illegal hunting in the bear's habitat has remained a problem. This project helped to establish a poaching control group in the Nalychevo Nature Park, including GEF-financed interdepartmental support teams (anti-poaching teams from the Bystrinsky and Nalychevo Nature Parks included). This kind of joint patrolling has been proven to be most effective.

Until recently, the Kamchatka wild reindeer (*Rangifer tarandus*) was an important game animal in the Kamchatka region. Until 2006, the Kronotsky-Zhupanovsky herd was considered highly promising. Unique among the reindeer, whose overall numbers are now relatively small and vulnerable, this population had been relatively stable for nearly a decade, with approximately 2,900 to 3,200 individuals steadily reported. Since 2006, however, the project team has observed extremely strong poaching pressure throughout the mountainous part of Eastern Kamchatka along the reserve boundaries—despite a total ban implemented in 2006. This pressure immediately affected the wild reindeer numbers within the protected area (PA) and led to this subspecies' inclusion in the Kamchatka Red Data Book (2006) as one "with declining populations and sporadic occurrence." An aerial census implemented by this project in 2009 confirmed the declining trend in the numbers of hoofed mammals within the reserve, and in particular throughout the Kronotsky-Zhupanovsky herd range. The expert estimate of the current size of the Kronotsky reindeer population stands at 1,400 to 1,500 individuals—half what it was just five years ago. Natural factors (a growing wolf population, snowy winter and a shortage of winter pastures) have also limited the reindeer habitat, adding to the importance of preserving territory to maintain a stable population nucleus. Despite all these pressures, conservationists are confident, based upon the protected Kronotsky population, that restoring the wild reindeer population can be achieved.

The snow sheep (*Ovis nivicola*), an economically valuable species, could be vulnerable if unprotected and/or exploited without control; in certain parts of the Kamchatka Peninsula, the population has been on the decline. The project designed a monitoring program, using model sites and pilot routes, to assess ecological characteristics, extent of human impact, comparative available data, and the size of the surveyed groups. The resulting 2007-2008 Special Protected Natural Areas (SPNA) census information confirmed the species' decline throughout southern Kamchatka, including the protected areas, by a factor of three over the past seven years. A ban on snow sheep hunting until 2010 was requested and readily granted by the Kamchatka Krai Governor.

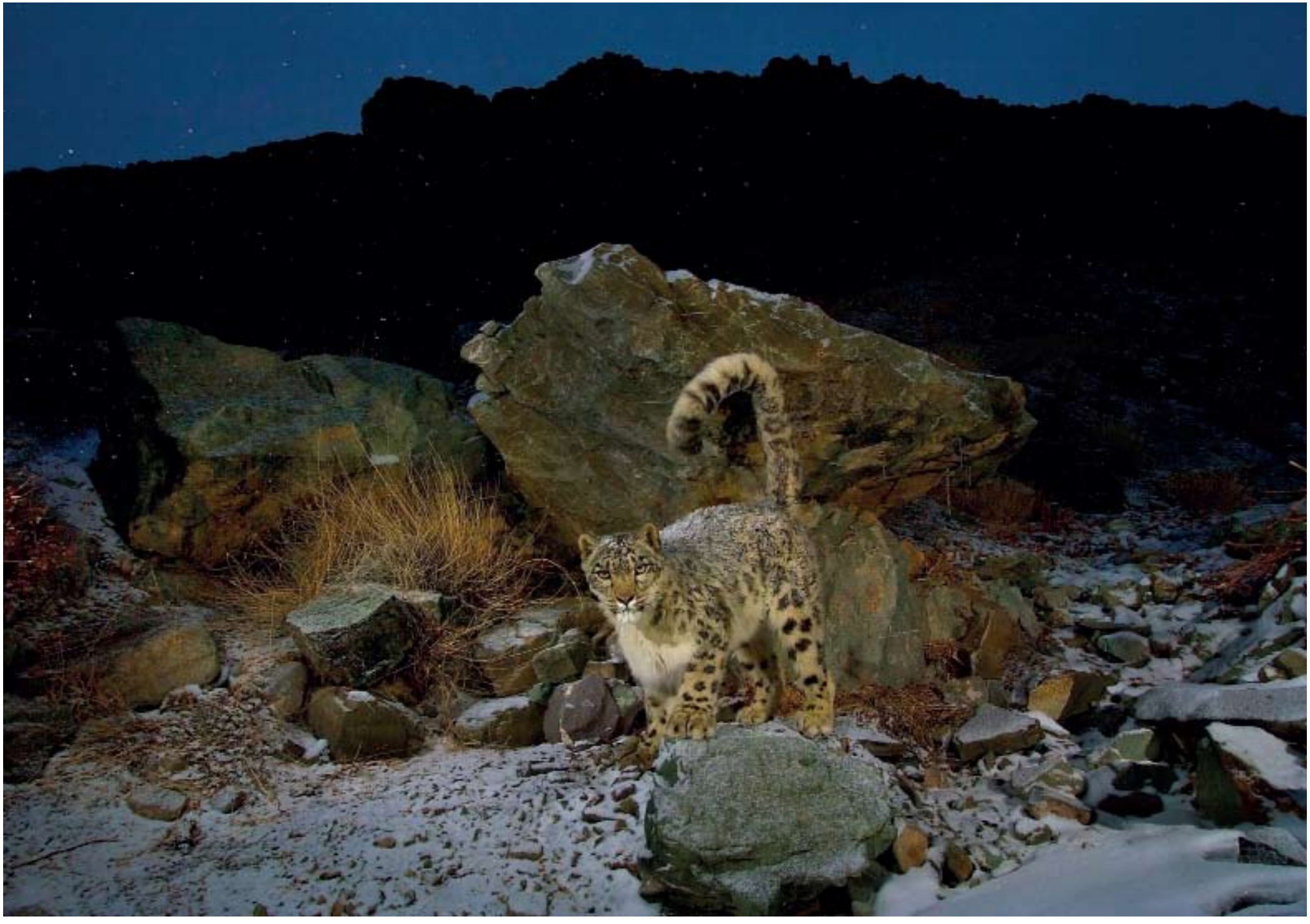
Steller's Sea Eagle, Nemero Strait, Hokkaido, Japan, Roy Toft, iLCP

Photo Left: Steller's Sea Eagle, Nemero Strait, Hokkaido, Japan, Roy Toft, iLCP
Photo Right: Kamchatka bear, Tikhaya river at Kronotsky Volcano, Igor Shpilenok, iLCP

Photo Left: Kamchatka Bear, Kuril Lake, South Kamchatka Sanctuary, Igor Shpilenok, iLCP
This Page: Brown Bear, Igor Shpilenok, iLCP

Photos Left & Right: Wild Reindeer, Forollhogna National Park, Norway, Vincent Munier, Wild Wonders of Europe

Wild Reindeer, Forollhogna National Park, Norway, Vincent Munier, Wild Wonders of Europe



SNOW LEOPARD

(Panthera uncia)

ENDANGERED

KAZAKHSTAN, KRYGYSTAN

GLOBAL ENVIRONMENT FACILITY PROJECT: Tien Shan Ecosystem Development Project
PROJECT REPORT BY: Andrew Mitchell
AGENCY: World Bank

Snow leopards have several adaptations for living in a cold mountainous environment. Their bodies are stocky, their fur is thick, and their ears are small and rounded, all of which help to minimize heat loss.

Snow leopards (*Panthera uncia*) are rare; only an estimated 2,500 remain in the wild (effective population size).[26] They are beautiful, relatively small "big cats," with long, thick fur that varies from smoky gray to yellowish tan, with whitish underparts. Their body coats have dark gray to black open rosettes, with small spots of the same color on their heads and larger spots on their legs and tail.

Snow leopards have several adaptations for living in a cold, mountainous environment. Their bodies are stocky, their fur is thick, and their ears are small and rounded, all of which help to minimize heat loss. Their feet are wide, which distributes their weight better for walking on snow, and they have fur on their undersides to increase their traction on steep and unstable surfaces. The snow leopard's tail is long and flexible, which helps the cat maintain its balance. The tail is also thickly covered with fur—which, in addition to minimizing body-heat loss, makes an effective blanket over the leopard's face when sleeping.

The snow leopard's range extends through central and south Asia in the rugged, mountainous regions of 12 countries: Afghanistan, Bhutan, China, India, Kazakhstan, the Kyrgyz Republic, Mongolia, Nepal, Pakistan, Russia, Tajikistan and Uzbekistan. It is classified as Endangered.

The Tien Shan mountain range covers most of the Kyrgyz Republic, southern Kazakhstan and smaller areas of Uzbekistan, China and Tajikistan. This territory plays an important role in conserving biodiversity and maintaining environmental sustainability in Central Asia. The Tien Shan is a biological oasis surrounded by vast arid and semi-desert plains, particularly to the north, producing conditions conducive to high biological diversity. Ecosystems range from glaciers to deserts, creating exceptional habitat diversity and endemism in a relatively small part of Central Asia. Based on the high numbers of endemic species and the significant levels of threat, the Tien Shan range has been identified as a "biodiversity hotspot"— the concentration of species in western Tien Shan is 63 times higher for birds and 37 times higher for mammals than the average for Central Asia.

Winds that travel undisturbed for long distances over the vast steppes are lifted by the Tien Shan range, causing concentrated precipitation. The area has enormous temperature variations that range from minus 50°C in winter to a maximum in the summer months of above 40°C. Tien Shan residents and surrounding populations in both Kazakhstan and Kyrgyzstan derive livelihoods, energy and water from the range, and enjoy its recreational activities, as do the growing numbers of overseas visitors.

The range is crucial for agro-biodiversity and is home to a striking array of wild ancestral landraces of commercialized crops; in particular, valuable fruit and nut trees such as apples and walnuts.[27] The Tien Shan range also plays a key connecting role in the distribution of Asian mountain fauna such as the snow leopard.

Threats to the Tien Shan's unique biodiversity—habitat destruction, overgrazing, poaching, unregulated game hunting and excessive firewood extraction—are accelerating. An even greater threat is posed by the long-term effects of global warming, which could radically alter the environment and biota in the long term.

The Global Environment Facility component of the Tien Shan Ecosystem Development Project provides technical assistance and training to strengthen biodiversity conservation in the Tien Shan region of the Kyrgyz Republic and Kazakhstan. Some of the technical assistance is specifically targeted at better understanding the needs and life cycle of key species such as the snow leopard. The project helps improve management in 12 key protected areas (PAs)—all unique and valuable

Snow Leopards, India, Steve Winter, National Geographic Society

habitats—by strengthening technical capacity, investing strategically in PA infrastructure, supporting local efforts to reduce threats to biodiversity, increasing public awareness, and promoting sustainable tourism. It also finances specific investments in equipment and infrastructure, such as tourist trails, camping sites, signage, visitor booths and small-scale upgrades to PA facilities (for example, renovation of remote posts).

It is hoped that protecting and enhancing the management of these important PAs will provide a key network of habitats for the snow leopard long into the future. Reducing poaching of prey species will help preserve the leopard's food sources, and preventing land-use change will allow the ecosystem to flourish undisturbed, to create safe refuges for all the endemic endangered species.

A fundamental part of the project is to increase the regional cooperation and dialogue between the Kyrgyz Republic and Kazakhstan, to ensure that there are synergies and no lost opportunities for conservation and increased understanding. Issues to be addressed include the status of threatened species, enforcement of legislation across borders, and regional tourism development opportunities.

In Kazakhstan, the project will finance small grants for local groups and organizations directly linked to either reducing threats or developing opportunities for biodiversity protection. The main objective of these small grants is to increase the benefits for the surrounding population, in order to encourage their support for protection activities. Small grants could finance ecotourism activities (accommodations such as small guest houses and traditional nomad yurts, guide training, trail development, bird watching treks, etc.); low-cost livestock protection measures; wildlife information programs; waste-management schemes; alternative-energy promotion; environmental certification assistance; site and landscape restoration; and similar initiatives. Creating opportunities for local income generation will decrease the need for alternative unsustainable land-use practices.

The project will also support the development and implementation of public awareness and information campaigns to increase support for biodiversity conservation, generate interest in the region's natural and cultural heritage, and increase awareness of obligations associated with international conservation treaties. Public awareness programs will focus on increasing the profile of the Tien Shan and the range's tourism attractions in international and regional markets.

There is consensus among stakeholders in each country to nominate a Western Tien Shan World Heritage Site comprised of eight protected areas and suitable buffer zones in the Kyrgyz Republic, Kazakhstan and Uzbekistan (Uzbekistan's nomination will be directly financed by UNESCO). By the time the Tien Shan Ecosystem Development project is completed, the investments in PA management, including technical assistance to better understand the needs of threatened wildlife and alternative income-generating activities for local populations, should have had considerable impact on improving the status of the PAs included in the project. This, in turn, should help protect the habitat and outlook of endangered species such as the snow leopard.

Photo Above: Snow Leopard, India, Steve Winter
Photo Right: Snow Leopard, India, Steve Winter, National Geographic Society

Photos Left & Right: Snow Leopards, India, Steve Winter, National Geographic Society

The Golden Line Fish is only one of nearly two dozen fish species that have almost entirely vanished from their native Lake Dianchi.

GOLDEN LINE FISH

(Sinocyclocheilus grahami)

CRITICALLY ENDANGERED

CHINA

GLOBAL ENVIRONMENT FACILITY PROJECT: Yunnan Environment Project
PROJECT REPORT BY: Lisa Fitzpatrick, Yang Jun-xing
AGENCY: World Bank

Today, the lake once proudly referred to as the "Sparkling Pearl Embedded in a Highland," has since been assigned a Class V rating (the lowest grade) by the Chinese government.

The golden line fish (*Sinocyclocheilus grahami*) is only one of nearly two dozen fish species that have entirely vanished from their native Lake Dianchi, an ailing, algae-plagued freshwater lake changed beyond recognition by decades of pollution, overfishing and species invasion. Located in the Yunnan Province and the sixth largest water body in all of China, Lake Dianchi had, until recent years, a remarkable assemblage of endemic species. Today, the lake once proudly referred to as the "Sparkling Pearl Embedded in a Highland," has since been assigned a Class V rating (the lowest grade) by the Chinese government.[28] Not only is the lake unswimmable and undrinkable, it is also unfit for use by industry and the ability to support aquatic life has been severely compromised.[29]

The lake rests within the boundaries of the province's capital city, Kunming, which has enjoyed two decades of rapid urbanization, with industry and service sectors growing at more than 11 percent per year.[30] These severe developmental pressures have been countered by a comprehensive, integrated response to reduce the pollutant loads to the lake and restore it to a better condition, including the World Bank-financed Yunnan Environment Project (YEP), as well a Global Environment Facility (GEF) co-financed project for biodiversity restoration in the area.

Lake Dianchi has a long road to full recovery ahead, however. Up until the 1990s, for example, untreated wastewater was pumped directly into the lake. Another threat dating back to the early 1960s comes from several varieties of carp that commercial fisheries introduced into the lake. These "lawnmowers with gills,"[31] have consumed the Dianchi's underwater plants and inadvertently induced lake-wide eutrophication (increased nutrient load that incites algal growth) onto this already stressed shallow water body. As a result, aside from being overfished (the golden line is considered a delicacy by the Chinese), the lake has become uninhabitable for this and other endemic species.

Once the lake's largest catch, the golden line was thought to be extinct along with many other endemic species of Lake Dianchi. "We are talking about a fish extinction comparable to Lake Victoria when Nile perch were added," says David Aldridge, a zoologist at the University of Cambridge, UK. "It looks pretty massive."

Golden Line, Professor Yang Jun-xing

In fact, 21 of Dianchi's 25 indigenous fish species are gone, having been supplanted by 31 alien species.[32] Professor Yang Jun-xing of the Kunming Institute of Zoology made a fortunate discovery of an isolated golden line population in the well of a local Buddhist temple; he then embarked upon a multi-year effort to restore the species. After more than a decade of observation, Yang's Yunnan team at the Endemic Species Breeding Center finally stumbled upon a solution for these seemingly non-breeding fish in captivity. They theorized that the wild golden lines migrate to underwater caves to reproduce; by mimicking these conditions in their Olympic-pool-sized breeding facility the team suddenly had 80,000 fry. Within a year's time Yang had a plan for bringing the native golden lines back into Lake Dianchi, including a successful trial run reintroducing some 5,000 golden lines into cages there. Yang's long-term plan includes hitting the ten-million mark with these fish, and encouraging commercial fisheries to swap out Lake Dianchi's carp for the more lucrative golden line—a plan he proposes is good for the lake, and good for the economy.[33]

"Their plan for transforming Lake Dianchi has caught the imagination of many of Yunnan's decision-makers," says World Bank biodiversity specialist Tony Whitten,[34] who oversaw the team's work under a just-completed five-year Global Environment Facility grant. The World Bank's $150 million dollar loan has focused on reversing pollution and establishing a framework for environmental regulation and infrastructure in southwestern China's Yunnan province.

While the YEP has staved off worst-case scenarios under the current water treatment program,[35] full restoration of Lake Dianchi will continue to require decades of sustained effort. The multi-phased development program of the Yunnan Province—of which YEP and the GEF program are a part—have many long-term objectives, including: pollution control, restoration of a potable water supply and the introduction of urban environmental infrastructure investments. As the World Bank's Tony Whitten has recently stated, "Freshwater biodiversity concerns are not always wholly addressed by attention to fisheries management or wetland conservation. In Asia, in particular, attention also needs to be given to encouraging awareness, collecting good and current data, and nurturing partnerships between engineers and biodiversity specialists, as well as releasing scientific data concerning the region."[36]

The Yunnan team is now working with the provincial authorities on a new wetland park and has made a real success of the golden line fish-breeding facility. The YEP has come to a close, but as the work continues, "the future of Lake Dianchi's biodiversity is brighter now than it has been for decades."[37]

CAVES OF GUANGXI

CHINA

GLOBAL ENVIRONMENT FACILITY PROJECT: Guangxi Integrated Forestry Development and Conservation Project
PROJECT REPORT BY: Tony Whitten
AGENCY: World Bank
PARTNERS: Forestry Bureau, Guangxi Zhuang Autonomous Region

While the knowledge of Guangxi caves has improved enormously as a result of the GEF project, there are still hundreds of caves that have not been examined and there are doubtless hundreds, perhaps thousands, of un-described cave animals awaiting discovery while facing a range of threats.

One of the least considered kinds of biodiversity worldwide, and yet one of the most remarkable, is that which occurs in caves. While countries and donors give increasing attention to wetlands, forests, grasslands, coral reefs, mountaintops and mangroves, caves tend to languish. Of course it must be admitted that caves are not everyone's favorite ecosystem—they can be difficult to get into, provoke claustrophobia, be dirty and sweaty to work in, and lack charismatic mammals or birds.

If cave biodiversity were not noteworthy or threatened, this would not be an issue; but caves tend to host highly modified and range-restricted species, many of which are threatened with extinction through thoughtless development.

From an ecosystem point of view, the dominant feature of caves is the darkness. It stands to reason that plants cannot live in caves, and so all cave life is dependent on organic material brought in from the outside. No herbivore can survive in caves (other than a few root-sucking insects). Communities of cave animals are thus very unlike those on the surface. Many cave species eat rotting organic material and the other organisms that feed on it. Some cave species, such as bats and swiftlets (small, insectivorous birds), echolocate to hunt their prey; they live in caves during the day and venture out at night to feed on insects. Given such unusual conditions, it is not surprising that cave biodiversity is highly characteristic and restricted in range.

Cave animals are evolutionarily adapted to their environment. Their eyes and pigment (not needed in the dark) are typically either absent or minimal. Their wings are no longer functional, all their body parts tend to be slender, their lifespans have increased dramatically, and their reproductive potential has decreased. In the high humidity of caves, most species have lost their ability to regulate water exchange, and most are unable to survive outside cave habitats for even a short time. Many species are thus restricted to the block of limestone where they have evolved. Because these limestone landscapes are usually highly fragmented (isolated from one another) many are the only home to endemic species (and even genera). Some species are known from a single limestone mountain, or even from a single cave.

These narrow distribution ranges make cave species very vulnerable to local disturbance, such as water pollution or quarrying. With any change to the balance of darkness, humidity and energy flow in the cave, many species will die. By any assessment of biological hotspots using degree of endemism and threat, cave ecosystems must rate very high, yet they rarely figure in any substantive way in conservation funding.

Most of the species concerned are relatively small invertebrates, little-known and rarely, if ever, included in the lists of protected species—which tend to focus on larger and more conspicuous organisms. Extinctions of limestone-restricted species as a result of economic development have already been recorded, and the status of other species is perilous.

China has one of the largest extents of cavernous limestone areas in the world, mainly in the southern provinces of Guangxi, Guizhou, Guangdong, Yunnan, Sichuan, Chongqing and Hubei. Despite this, there is very little information—and even less management—with which to conserve the region's cave life. Since 2005, during the preparation phase of the Guangxi Integrated Forestry Development and Conservation Project and for the first three years of its implementation, a series of biodiversity surveys has been conducted in the caves of Guangxi in an attempt to document and demonstrate their environmental significance and promote their conservation. These surveys

Species, Guangxi Caves, Louis Deharveng

are by no means complete, but already it seems that the project is discovering things of truly global proportions, and that Guangxi—even if its animals are small and not exactly pretty—is incontestably one of the richest areas on Earth for cave biodiversity.

A combined team from the Paris Museum of Natural History and the South China Agricultural University in Guangzhou has been leading the collecting efforts, and a multinational team of taxonomists is working its way through the many specimens to identify the animals found. A rough and conservative estimate is that 117 new species have been collected in the surveys, exceeding the count of any previous expedition in Southeast Asia; sadly, for some groups of species, there is no longer anyone alive who can help with identifications.

With the publication of these species' descriptions, Guangxi has become the world's major source of new cave animals. The new animals include blind, non-sucking leeches; de-pigmented flatworms; various new pseudoscorpions; and a palpigrade specimen, a minute and fragile relative of spiders—it is white, eyeless and rare (this was the first one ever recorded from a Chinese cave, and only the second recorded for all of China). At least five new species and two new families of harvestmen ("Daddy Longlegs") were also recorded, along with highly diverse detritus-eating cave millipedes, numerous species of springtails, cave crickets, blind cave fish, and at least six new species of woodlice (two are from the genus in the same cave, but one species is terrestrial and the other aquatic, an interesting evolutionary phenomenon). The most remarkable cave insects are trechine beetles, which have become highly diverse and extremely modified, most notably with long "necks." At least five species and one genus new to science have been discovered so far. The surveys have also revealed a remarkable new aquatic genus of beetle, totally blind, collected as a single specimen. It is only the second aquatic cave beetle discovered in China, and certainly the more cave-adapted. These are just a few of the vast diversity of cave-dwelling species to be discovered in Guangxi, an indication of how much more will be found.

While the knowledge of Guangxi caves has improved enormously as a result of the project, there are still hundreds of caves that have not been examined—and doubtless hundreds, perhaps thousands, of undescribed cave animals awaiting discovery while facing a range of threats. The global awareness of the Guangxi caves is soon to be significantly increased through project activities; a growing appreciation of natural caves and all the rich, previously unknown diversity of their curious inhabitants will likely follow. Many of the caves lie within nature reserves such as Mulun, but many do not have any formal protection. Among the project's final tasks is the preparation of guidelines for the management of cave biodiversity. These will be discussed with government agencies in the position of having the greatest impact on the guidelines, with the hope that they will be adopted and used.

Species, Guangxi Caves, Louis Deharveng

EURASIAN OTTER

(Lutra Lutra)

NEAR THREATENED

ROMANIA

GLOBAL ENVIRONMENT FACILITY PROJECT: Strengthening Romania's National Protected Area System by Demonstrating Public-Private Partnership in Maramures Nature Park
PROJECT REPORT BY: Adriana Dinu & Nik Sekhran
AGENCY: United Nations Development Programme
PARTNERS: Government of Romania; National Forest Agency; Maramures County Council; Ecological Society of Maramures; ProViseu Foundation

In the last two years, the project-park team discovered the presence of the Eurasian otter on three tributaries and the main stream of the Viseu River, where it had not been reported in decades.

European scurvy grass (*Cochlearia borzaeana*) is a glacier relict endemic to the northern group of Romanian Carpathian Mountains, which run through both Maramures and Suceava Counties. This flowering plant genus was once popular among sailors who returned home sick with scurvy—hence its name.[38] Twenty years before the Maramures Mountains Nature Park (MMNP) was established, two locations within this region known to carry European scurvy grasses were set up as protected areas with a size of five hectares.

Two decades later, this GEF-funded and UNDP-implemented project zoned these areas as part of the "core area" of the MMNP, in which all human activities are forbidden. Both populations were determined to be in good condition when assessed in the summer of 2008; a second flowering was noticed in August of that year, suggesting the scurvy grass to be in good health—and further demonstrates that these efforts to implement PAs around the globe can assist in the protection of not only the many species cited within this book but the vast diversity of life found within each one of these—now protected—bioregions. Additionally, at about one kilometer from the two locations, project staff noticed the presence of another two growths of scurvy grass on a slope where forest exploitation had ceased thanks to the project's intervention. A year later, these new growths of scurvy grass were determined to be expanding. In other words, the conservation measures supported by the project—specifically, the core area status of the scurvy grass habitat—ensure not only the survival of European scurvy grass in Maramures Mountains, but the species' expansion.

Otter, North Atlantic, Norway, Staffan Widstrand, Wild Wonders of Europe

The Eurasian otter *(Lutra lutra),* an aquatic mammal species, requires strict protection under European regulation; according to the International Union for Conservation of Nature (IUCN) Red List of 2009, the species is Near Threatened.[39] Its presence in the park area was generally known before the project, but had not been precisely located. Being aquatic, the species is particularly susceptible to degradation or alteration of the water bodies in which it dwells.[40] This habitat degradation is the primary threat facing the population of Eurasian otters in the MMNP. The project engages in a number of management activities that have improved the species' habitat by:

- reducing sawdust deposits on riverbanks by promoting the diversion of sawdust for use as fuel for heating stations;
- elaborating a set of rules—included in the Tisa Basin Management Plan—related to riverbank vegetation and mineral sediments exploitation (gravel extraction) on the Viseu River lower course (10-12 km long); and
- including the species' watercourse in the MMNP's core and sustainable management areas and covering part of its habitat in the Maramures Mountains Natura 2000 site.

In the last two years, the project-park team discovered the presence of the Eurasian otter on the main stream and three tributaries of the Viseu River, where it had not been reported in decades. Its presence there can be attributed to the improved water quality and larger fish populations brought about by the project's management activities. The project chose the Eurasian otter (rather than a fish species) as an indicator of water quality because it is easy to monitor and ecologically relevant. Another endangered species, the Danube salmon (*Hucho hucho)*, which is endemic to the Danube region, has found its last refuge in Maramures Park. This species is also considered an indicator of water quality, however the observation and monitoring of its population is rather difficult. The project has also positively impacted other species of the Viseu River: the bullhead (*Cottus gobio*), the Balkan golden loach (*Sabanejewia balcanica*), and the spirlin *(Alburnoides bipunctatus*).

This Page: Otters, Scotland, Laurie Campbell, Wild Wonders of Europe
Photos Right: Otters, River Tweed, Northumberland, England, Laurie Campbell, Wild Wonders of Europe

This Page: Otter, River Tweed, Scotland, Laurie Campbell, Wild Wonders of Europe
Photo Right: Otter Eating Fish, part of Karanambu Otter Trust, Pete Oxford, iLCP

LATIN AMERICA

MAGELLANIC PENGUIN ARGENTINA NEAR THREATENED

GALÁPAGOS GIANT TORTOISE ECUADOR VULNERABLE

GOLDEN LION TAMARIN BRAZIL ENDANGERED

CHACOAN PECCARY PARAGUAY ENDANGERED

HYACINTH MACAW PARAGUAY ENDANGERED

GIANT ARMADILLO PARAGUAY VULNERABLE

Hyacinth Macaw, Pantanal Wetland, Brazil, Luciano Candisani, iLCP

MAGELLANIC PENGUIN

(Spheniscus magellanicus)

NEAR THREATENED

ARGENTINA

GLOBAL ENVIRONMENT FACILITY PROJECT: Consolidation and Implementation of the Patagonian Coastal Zone Management Program and Biodiversity Conservation
PROJECT REPORT BY: Lisa Fitzpatrick, Helen Coles de Negret & Nik Sekhran
AGENCY: United Nations Development Programme
PARTNERS: Wildlife Conservation Society; Government of Argentina; Fundación Patagonia Natural

Magellanic penguins eat small fish, crustaceans, krill, and squid, and can swim at speeds of up to fifteen miles per hour when pursuing prey.

The magellanic penguin—named after Portuguese explorer Ferdinand Magellan, who first spotted the birds in 1520[41]—makes its home along the coastlines of South America, on both the Atlantic and Pacific shores. Described as "global sentinels for the state of our environment,"[42] by Dr. Dee Boersma, Chair in Conservation Science (University of Washington and Wildlife Conservation Society) and one of the world's most dedicated researchers of this beleaguered species, these seabirds winter off the coast of Brazil, Uruguay and northern Argentina. Like all penguins, magellanic penguins have tightly packed feathers and fat to keep them insulated from the cold and comfortable in the heat. To cool off during the hot days of the South American summer, they shed feathers around their bill. When they get too hot, they can pant like dogs and stand with their flippers extended to catch a breeze. They also nest under the shade of bushes or in cool burrows.

Magellanic penguins can swim at speeds of up to 15 miles per hour when pursuing prey. They are noisy and can bray like donkeys; the males' loud calls to attract females can be heard for miles up and down the coast. During breeding season, these medium-sized birds gather in colonies as large as 400,000.[43] They are the only penguins to breed on the Patagonian mainland, and faithfully return to the same location year after year. The penguins, which live up to 30 years in the wild, can dive up to 240 feet (80 meters) and hold their breath for four minutes.[44]

These strong, highly athletic swimmers are no match, however, for the vast, encroaching commercial fishing industry. While the coastline is largely undeveloped, its wildlife and biodiversity has been increasingly threatened by commercial fishing. Nets can entangle birds as they feed. Oil pollution from tankers transporting petroleum from southern Patagonia to Buenos Aires, coupled with expanding offshore oil drilling, has become increasingly dangerous, claiming the lives of over 41,000 birds each year through chronic oil spills at sea (reported between 1983 and 1990[45]).

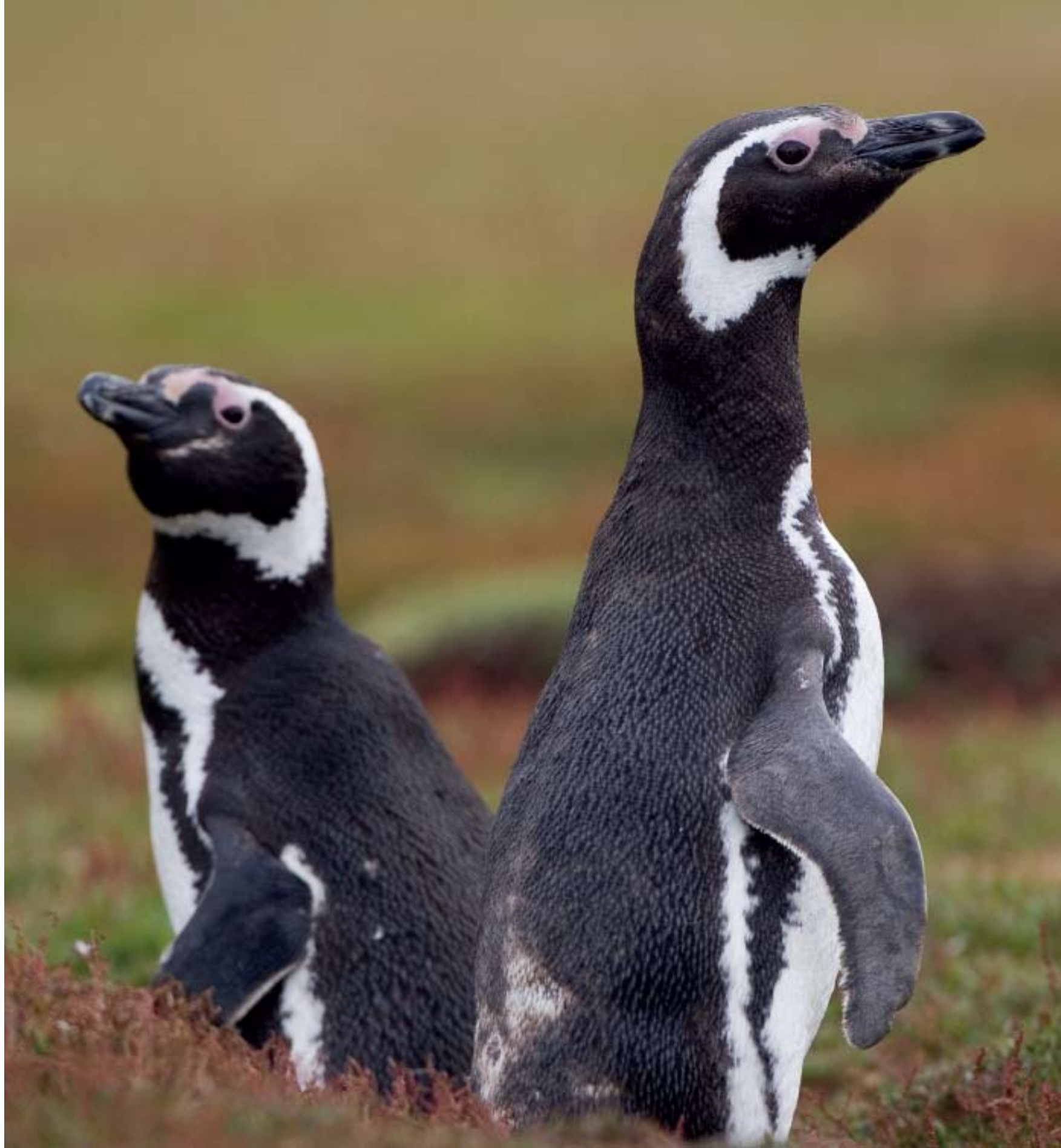
Adult Magellanic Penguin, The Falkland Islands, UK, Jenny E. Ross, iLCP

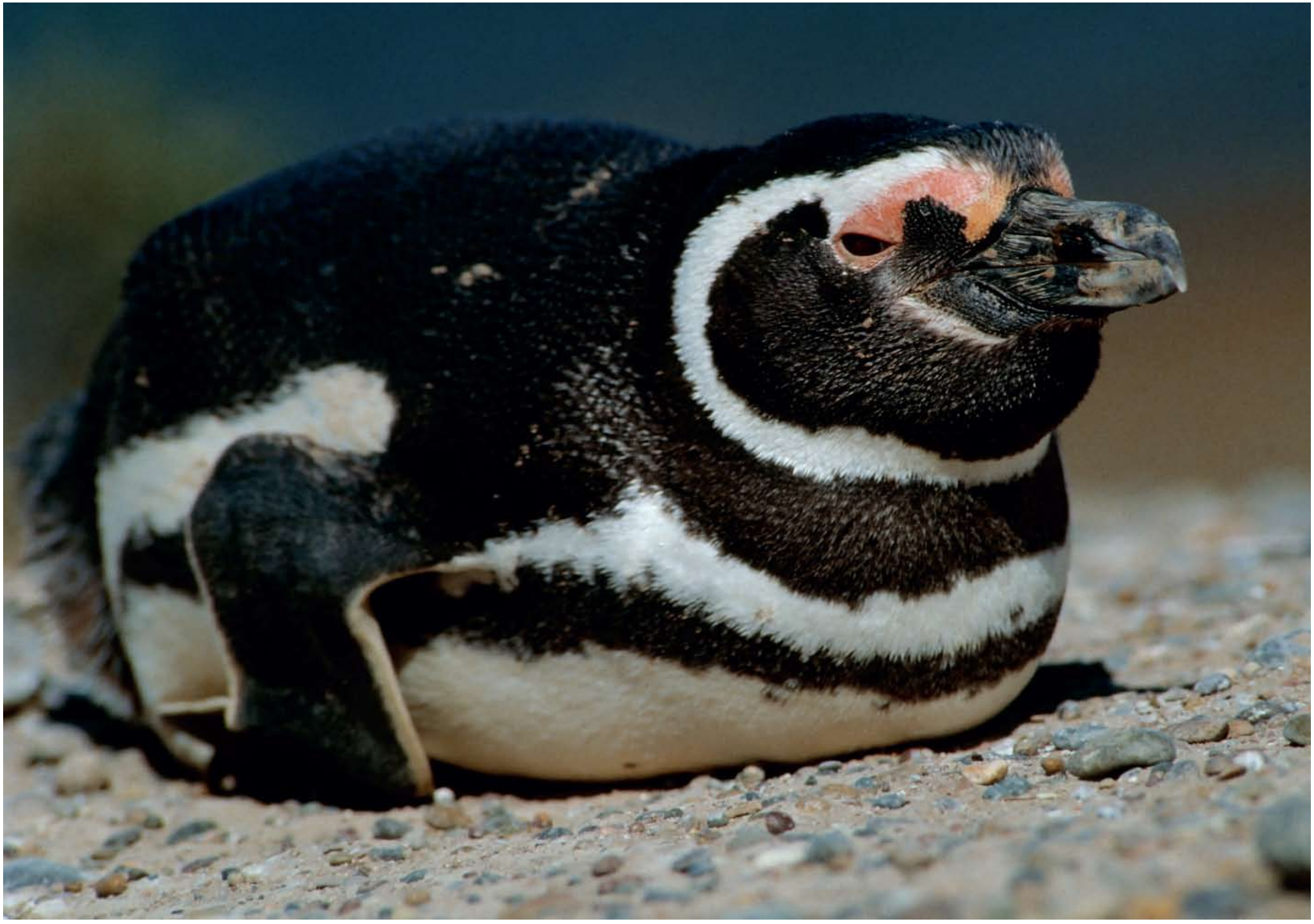
The Argentine Patagonia is one of the richest, most highly productive, temperate marine ecosystems in the world. Characterized by high biomass and a relatively high percentage of endemic species, the region provides breeding and feeding sites for many other species of global importance. This high coastal productivity and diversity is of great economic significance to Argentina. Patagonia has one of the world's largest continental and maritime zones, with more than 1 million km^2 supporting one of the fastest growing commercial high-seas fisheries.

To address the threats facing the biodiversity of this region, UNDP implemented the project "Consolidation and Implementation of the Patagonian Coastal Zone Management Program and Biodiversity Conservation" with GEF support. The project has worked to strengthen the more than 35 coastal protected areas (PAs) in the region through increased management effectiveness. One of these PAs, Punto Tombo, protects the largest magellanic penguin breeding colonies in the world. By targeting this and other important habitats, the project has worked to ensure that the magellanic penguin population in the region remains stable at one million pairs.

In 2008, the project and its partners—WCS and Fundación Patagonia Natural—helped to establish a new coastal marine park, the Patagonia Astral, which is located in Golfo San Jorge in Chubut Province and covers approximately 647 km^2 of coastal waters and nearby islands along almost 160 km of shoreline. Patagonia Astral was the first protected area in Argentina that is specifically designed to safeguard not only onshore breeding colonies but also areas of ocean where wildlife feed at sea. WCS researchers, including Dr. Boersma, working with Fundación Patagonia Natural, provided data critical to the development of the strategic plan to protect the regional wildlife and ensure that the park's boundaries would include both onshore areas and adjacent waters.

This new PA protects half a million penguins of all varieties, along with several species of rare seabirds and the region's only population of South American fur seals. The PA "comes in the nick of time for many species that are threatened by the region's fishing and energy industries," says Dr. Guillermo Harris, director of the Wildlife Conservation Society's Argentina Program. With this project's work concluding in 2010, UNDP-GEF is in the process of creating a new project that will work to expand coastal protected areas to cover the feeding grounds of the species. This new project will increase the protected habitat for marine mammals and birds from 18,000 km^2 to 34,900 km^2, a 94 percent increase. This increased coverage includes feeding areas of the magellanic penguins (currently unprotected) and will protect 20 percent of their feeding grounds. Thus, the work to protect this creature and its habitat will continue into the future.





This Page: Magellanic Penguin, Staffan Widstrand, iLCP
Photo Left: Magellanic Penguin, Falkland Islands, Suzi Eszterhas, iLCP

Following Page: Magellanic Penguins, Falkland Islands, Kevin Schafer, iLCP

GALÁPAGOS GIANT TORTOISE

(Chelonoidis nigra)

VULNERABLE

EQUADOR

GLOBAL ENVIRONMENT FACILITY PROJECT: Integrated Program for the Control of Introduced Species in the Galápagos Archipelago
PROJECT REPORT: Helen Coles de Negret & Nik Sekhran
AGENCY: United Nations Development Programme
PARTNERS: Government of Ecuador; Government of Germany; USAID; WWF; CI; Charles Darwin Foundation; Galápagos National Institute (INGALA); UNESCO; UNF; Inter-institutional Committees for the Control and Management of Introduced Species; Ecuadorian Service for Agriculture and Livestock; IADB; AECI

During a four year interval, goats had transformed the densely forested landscape—a key habitat for the largest remaining population of the giant Galápagos tortoise—into a desert of bleached tree trunks and dry grasslands.

Probably the best-known endemic species in the Galápagos Archipelago is the giant tortoise (*Chelonoidis nigra)*. In fact, the name Galápagos originated from the Spanish word "saddle," after the saddle-backed tortoises. A Galápagos giant tortoise may weigh up to 250 kilograms and measure 150 centimeters over the curve of its carapace. At one time, there were likely 14 sub-species of this tortoise, though only 10 now remain. Five are found on the main volcanoes on Isabela Island; in fact the island's northern region is home to nearly half of the remaining populations of this endemic and charismatic species.

In the highlands of Alcedo volcano, in northern Isabela, large groups of giant tortoises can be found in rain-formed pools or dew ponds shaped by sea mist and drizzle dripping off the trees. Giant tortoises also have considerable water storage abilities and commonly gather by shaded ponds, wallowing in the mud in the highlands of some islands. In recent decades, large populations of feral goats have been found here; their presence is competitive with native tortoises and iguanas, making food less available and destroying native vegetation, the loss of which reduces shade areas as well as the surrounding pools tortoises prefer.

This UNDP-implemented and GEF-funded project has made significant impacts by addressing what is considered the central threat to the biodiversity of the Galápagos Islands: invasive alien species introduced, either deliberately or accidentally, to previously pristine areas of the Galápagos. These non-native species thrive under local conditions, propagate naturally, and invade local ecosystems. Once established, they threaten evolutionary processes and biodiversity by competing with, displacing, predating and parasitizing native and endemic species. The project has empowered Ecuadorian institutions charged with conserving the Islands to proactively (and adaptively) manage invasive species threats, guard against future "bio-invasion" by developing a total-control framework for invasives, and build technical skills for different invasive species management models.

This project included a number of pilots for control and eradication of different invasive species. One pilot focused on building capacities for management of invasives using the elimination of the feral goat population on northern Isabela Island. This location was chosen due to its biodiversity representation, ecological integrity and conservation value. Isabela is the largest island in the Galápagos and contains the greatest representation of the archipelago's endemic biodiversity. Given its size and relative isolation from southern Isabela (due to the Perry Isthmus), northern Isabela can be considered the largest relatively undisturbed landmass in the Galápagos archipelago. Its protection, therefore, is fundamental to protecting the conservation values of the Galápagos overall.

The feral goat population, first observed in small numbers in the south of northern Isabela in the early 1970s, had, by the mid-1990s, exploded to an estimated 50,000 to 75,000 goats. The extent of damage caused by these wild grazers on Isabela Island was first documented by internationally acclaimed wildlife photographer Tui de Roy. Her images captured on the rim of Alcedo (northern Isabela's southernmost volcano) in 1995 were compared to those taken in 1991. During this four-year interval, goats had transformed the densely forested landscape—a key habitat for the largest remaining population of the giant Galápagos tortoise—into a desert of bleached tree trunks and dry grasslands. At the project start, an estimated 40 to 60 percent of northern Isabela's suitable goat habitat remained free of goat populations. In other words, the potential for further damage on the island was very high; an eradication campaign was needed to prevent additional degradation of Isabela's native ecosystems.

Galápagos Giant Tortoise, Charles Darwin Research Station, Santa Cruz Island, Galápagos Islands, Laman, iLCP

Elimination of the goat population was achieved by March 2006; the largest mega-fauna eradication operation on record worldwide. An independent expert described the work as “a spectacular conservation achievement.” Eradicating goats from northern Isabela Island has had great benefits in terms of protecting native and endemic species, rare populations, undisturbed ecosystems and non-human induced evolutionary processes. The Galápagos National Park Service and Charles Darwin Foundation report good regeneration of native vegetation on northern Isabela following the goat eradication. Monitoring data also indicate that native vegetation is responding well to goat removal and that there is increased giant tortoise recruitment in this important landscape.

Photo Left: Galápagos Giant tortoise, Santa Cruz Island, Galápagos Islands, Tim Laman, iLCP
Photo Above: Tartaruga Gigante, Santa Cruz, Galápagos, Ecuador, Luciano Candisani, iLCP
Photo Right: Giant Tortoise Galápagos Islands, Ecuador, Cristina Mittermeier, iLCP

This Page: Galápagos Giant Tortoise, Galápagos Islands, Thomas D. Mangelsen, iLCP
Photo Right: Alcedo giant tortoise, Tui De Roy, iLCP

GOLDEN LION TAMARIN

(Leontopithecus rosalia)

ENDANGERED

BRAZIL

GLOBAL ENVIRONMENT FACILITY PROJECT: Private Natural Heritage Reserves Project
PROJECT REPORT BY: Lisa Fitzpatrick
AGENCY: World Bank
PARTNERS: Critical Ecosystem Partnership Fund; Associação Mico-Leão-Dourado (AMLD)

The goal is that by 2025 there will be a minimum viable population of 2,000 wild golden lion tamarins naturally evolving on 25,000 hectares of protected and connected habitat.

Rescuing the golden lion tamarin (*Leontopithecus rosalia*) from extinction began in the 1960s as a story of zoological science—a study in genetic diversity and demographics. Over the next 30 years, it evolved into an epic tale of habitat conservation. The tamarin, both wild and strikingly elegant, became a flagship species for southeastern Brazil, a symbol of vitality and hope in the pursuit of environmental protection against habitat and species loss all across its native region.

Known for its impressive reddish-gold mane, the golden lion tamarin was first described to the European world by Antonio Pigefetta, shipmate of Portuguese explorer Ferdinand Magellan and chronicler of Magellan's famous voyage, as "beautiful simian-like cats similar to a small lion."[46] The tamarin's picture is on the 20 *Real* banknote of Brazil. Thousands of Brazilians have seen or heard media messages about it, hundreds of teachers and families have been trained in environmental education and agricultural management practices, and smaller nongovernmental organizations in the Serra do Mar Corridor have implemented 30 projects specifically aimed at the tamarin's preservation. Organizations such as the Global Environment Facility (GEF), Critical Ecosystem Partnership Fund (CEPF) and the Associação Mico-Leão-Dourado (the Golden Lion Tamarin Association, or AMLD) became involved in the tamarin's protection, and between 2002 and 2011, CEPF funding, in the form of five separate grants, totaled approximately $1.1 million.

Golden lion tamarins are a species of small monkey living in the heart of the Serra do Mar Corridor, a biodiversity hotspot in the Atlantic Forest of Brazil. They weigh about two pounds and eat insects, fruits, nectar and tree sap. Their native lowland coastal rainforests once contained miles of closed-in canopies and tangles of vines—lofty arboreal pathways through which these long-fingered primates could endlessly swing. Logging, agriculture and industry have changed all this. Sandwiched between two of the largest industrial metropolises of all of South America—Rio de Janeiro and São Paulo, each with its own vast network of agriculture, ranching, industry and accelerated commercial growth—most of the forest has been lost, and it looked as though the tamarin would be lost along with it. By the 1970s, the golden lion tamarin was down to as few as 250 individuals in the wild and Critically Endangered according to the International Union for Conservation of Nature (IUCN) Red List.

Indeed, only a staggeringly low 2 percent[47] of the tamarins' now highly fragmented former natural habitat remains. The other 98 percent has become uninhabitable, not only for the tamarins but for a host of other species in these regions. Brazilians, in conjunction with project partners, have sought alternative solutions to carving out permanent areas for this endangered species. Together they created the Private Natural Heritage Reserves (RPPN), an organization which created private conservation areas reserved in perpetuity. The Brazilian government formally recognizes RPPNs as a method for private landowners to permanently protect important pieces of their land in exchange for property tax exemptions. Silva Jardim, a municipality in the heart of golden lion tamarin territory, has the largest number of RPPNs in the country, and, overall, there are more than 100 private ranches and settlements participating in landscape management, protection and restoration. Furthermore, about 30 percent of Silva Jardim's private ranches have converted at least some element of their operation from agriculture or livestock to ecotourism or conservation. Since the late 1970s, with RPPNs and improved management in public protected areas, the habitat area with strict protection for tamarins has increased by 140 percent.

The most significant current effort in the Serra do Mar is the strengthening of formally recognized protected area "mosaics," which are contiguous pieces of land falling under some type of protection and coordinated management. Mosaics can include separate plots of federal, state, municipal and private land, all under differing levels of protection; when managed in a coordinated fashion,

Golden lion tamarin, Brazil, Kevin Schafer, ILCP

however, these plots create a conservation corridor that still allows for sustainable economic development in a regional context. The project is now participating in the latest phase of strategic planning for the long-term conservation of this rare primate. As of 2010, the project is actively supporting the strengthening of four mosaics in the region, including the golden lion tamarin mosaic, with 16 contiguous protected areas.

Groups like AMLD, the Brazilian government's Institute of the Environment and Renewable Natural Resources, and the more than 35 international and national partners and donors that have joined this effort over the years can now see their goal achieved. Today, the tamarin population stands at 1,600 monkeys, thanks largely to the reintroduction of captive-born individuals and translocation of wild populations. The reintroduced population currently represents more than half of the wild population; the goal is that by 2025 there will be a minimum viable population of 2,000 wild golden lion tamarins naturally evolving on 25,000 hectares of protected and connected habitat. The support that the GEF is offering today to the land management structures of mosaics is ensuring the long-term viability of this animal, seemingly now on its way to recovery.

Photo above: Golden Lion Tamarin, Brazil, Art Wolfe, iLCP
Photo Right: Golden Lion Tamarin, Jenny E. Ross, iLCP

CHACOAN PECCARY

(Catagonus wagneri)

ENDANGERED

HYACINTH MACAW

(Anodorhynchus hyacinthinus)

ENDANGERED

GIANT ARMADILLO

(Priodontes maximus)

VULNERABLE

PARAGUAY

The chacoan peccary, listed as Endangered in the IUCN Redlist, is a pig-like ungulate with a brownish, bristly coat. Endemic to the dry Chaco of western Paraguay and parts of Argentina and Bolivia, the chacoan peccary has fragmented populations that are believed to be declining in size.

A cobalt blue parrot with a black beak and yellow facial markings, the Hyacinth Macaws prefers the fruit of certain locally endemic palms as its primary source of food.

Native to a number of countries in South America, including Paraguay, the giant armadillo is threatened primarily by subsistence hunting and loss of its habitat due to deforestation.

GLOBAL ENVIRONMENT FACILITY PROJECT: Paraguayan Wildlands Protection Initiative
PROJECT REPORT BY: Helen Coles de Negret & Nik Sekhran
AGENCY: United Nations Development Programme
PARTNERS: Government of Paraguay; UN FAO; Debt for Nature Swap; Alter Vida; Guyra Paraguay; WWF; Environmental Law and Economics Institute; Fundación Jose Cardjin; ICA/IDRC BD; AECI BD; WILAC BD; Secretary of the Environment

Paraguay has an especially rich biological heritage that includes a host of globally significant—and now well-conserved—eco-regions, such as the newly established Chaco, Pantanal, Cerrado and interior Atlantic Forest protected areas (PAs). Once entirely isolated, these territories are important repositories for numerous globally threatened species, including the chacoan peccary (*Catagonus wagneri*), the hyacinth macaw (*Anodorhynchus hyacinthinus*) and the giant armadillo (*Priodontes maximus*). Lying at the heart of the floristically diverse La Plata River Basin, Paraguay is also a center of distribution for flora (up to 13,000 species of vascular plants) paralleled by great faunal richness, with an estimated 167 species of mammals, 672 to 700 bird species, 46 amphibians, 100 reptiles, and possibly as many as 100,000 species of invertebrates.

The chacoan peccary, listed as Endangered in the International Union for Conservation of Nature (IUCN) Red List, is a pig-like ungulate with a brownish, bristly coat. Endemic to the dry Chaco of western Paraguay and parts of Argentina and Bolivia, the Chacoan peccary has fragmented populations that are believed to be declining in size. A host of threats face this species, including hunting, disease and habitat destruction. Though illegal in Paraguay, killing the peccary for meat goes on with little fear of legal ramification. Crop planting is increasing in the dry forests where they roam, supplanting their habitat and further compromising their ability to recover.[48]

Chacoan Peccary, Luiz Claudio Marigo, naturepl.com

A cobalt blue parrot with a black beak and yellow facial markings, the hyacinth macaw primarily eats the fruit of certain locally endemic palms. This macaw's presumed decline—noted throughout its habitat in Paraguay, Bolivia and Brazil—can be attributed to the cage-bird trade as well as to habitat loss from cattle-ranching, agriculture and fire.[49]

The giant armadillo, Red Listed as Vulnerable, is naturally rare, with a density of approximately six individuals per 10,000 hectares. Native to a number of countries in South America, including Paraguay, the giant armadillo is threatened primarily by subsistence hunting and loss of its habitat due to deforestation.[50]

This project seeks to establish conservation management within four protected areas (PAs). By design, each is located in one of four rich, biologically diverse eco-regions: a forest, a grasslands complex, an ecotone (transition area between ecosystems) and a savannah. By stopping threats to native habitats, the project aims to safeguard sizeable global conservation values and support the potential survival of the endangered species that reside there.

At the outset of the project, much of the country's wild lands remained in relatively pristine condition, and there was a clear potential to protect large, contiguous blocks of land. The full implementation of Paraguay's National System of Protected Areas master plan, however, first developed in 1995, had been hindered by a number of issues, including the PAs remote locations, limited funding, lack of management planning and steady communication gaps. This project was designed to support Paraguay in overcoming these barriers, but has been plagued by interruptions, mainly due to continual changes in the national government.

Despite the difficulties, the project has made specific advances. At the institutional level, the project focused largely on the governance of the four target PAs, and this is where most advances have occurred. All four parks have been formally decreed and gazetted. With support from the project, the government has started paying for the expropriation of properties to secure land tenure of one PA (US$20 million), which is a milestone in the history of PA conservation in Paraguay. The project has also brought about a closer alignment between indigenous groups and environmental authorities at the national level. Other project activities have included strengthening park management functions (planning, enforcement, monitoring and assessment); training in conservation methods and values; and supporting buffer areas to protect critical habitats and maintain biological corridors with neighboring parks.

Despite shortcomings in a complex political and socio-economic context, this project has had a measureable impact on improving the management of four globally important PAs that provide habitat for the Chacoan peccary, the hyacinth macaw, the giant armadillo and many other significant species. The improved management of these PAs should have a positive impact on these species by preventing further destruction of their habitat and limiting the illegal hunting and capture of its resident wildlife.

Photo Above & Right: Hyacinth Macaw, Brazil, Staffan Widstrand, iLCP

Photo Left: Hyacinth Macaw, Brazil, Roy Toft, iLCP
Photo Right: Hyacinth Macaw, Pantanal, Brazil, Staffan Widstrand, iLCP

Photo Left: Giant Armadillo, Tatu Carreta, Chaco, Argentina, Gabriel Rojo, naturepl.com
Photo Above: Giant Armadillo, Emas National Park, Brazil, Carly Vynne

SOUTHEAST ASIA

ELEGANT SUNBIRD INDONESIA ENDANGERED

LION-TAILED MACAQUE INDIA ENDANGERED

GIANT IBIS CAMBODIA CRITICALLY ENDANGERED

Giant Ibis, Allan Michaud

ELEGANT SUNBIRD

(Aethopyga duyvenbodei)

ENDANGERED

INDONESIA

GLOBAL ENVIRONMENT FACILITY PROJECT: Conservation of Key Forests in the Sangihe-Talaud Islands
PROJECT REPORT BY: Tony Whitten
AGENCY: World Bank
PARTNER: Burung Indonesia (Birdlife International Affiliate for Indonesia)

Sangihe is covered with long-established mixed plantations of fruit trees, but there are 800 hectares of mixed primary and old secondary forest on the steep upper slopes of the dominant (though extinct) volcano, Mount Sahendaruman.

Back in 1978, the report author, a biologist with many years of experience living and working in Indonesia, and a few colleagues wrote a paper in the very first issue of what became one of the most popular journals in their field, *Conservation Biology*. The article suggested that the pale-blue, long-whiskered caerulean paradise-flycatcher (*Eutrichomyias rowleyi*) was likely extinct. The species was known from a single specimen caught in 1873 on Sangihe Island, a small island off Sulawesi in the far north of Indonesia, just south of the Philippines. More recent efforts to find the bird had been unsuccessful and the remaining area of suitable habitat was tiny. The possible extinction of some other Sulawesi endemic birds and fishes was also proposed. None of the species concerned was listed on the famous Red List of threatened species and none was protected. As it happened, a painting of the specimen by article co-author Stephen Nash graced the cover of that issue as well.

Sangihe is covered with long-established mixed plantations of fruit trees, but there are 800 hectares of mixed primary and old secondary forest on the steep upper slopes of the dominant (though extinct) volcano, Mount Sahendaruman. This forest was granted "protection forest" status in 1994, to safeguard its watershed values. The small area of remaining forest was vulnerable to further clearance for subsistence cultivation and for local timber.

The fauna of Sangihe started to get some attention in 1995, when a student expedition—Action Sampiri, from the University of York in the United Kingdom—together with the local Universitas Sam Ratulangi, began doing bird surveys and designing a community-based conservation education program. The slopes of Sahendaruman are particularly notable because they support no fewer than *three* Critically Endangered species found nowhere else—caerulean paradise-flycatcher, Sangihe shrike-thrush (*Colluricincla sanghirensis*) and Sangihe white-eye (*Zosterops nehrkorni*)—plus two endangered species that are also endemic to the island: Sangihe hanging parrot (*Loriculus catamene*) and elegant sunbird (*Aethopyga duyvenbodei*). All three of the critical species are confined to the forest, making Sangihe a great place for birdwatchers to add to their "life lists" of rare birds; a small tourism industry with cozy home stays developed.

In June 1998, the caerulean paradise-flycatcher was sighted and given the local name of *burung niu,* to honor the local farmer, Pak Niu, who first spotted it. In 2001, BirdLife International, together with the World Bank, instigated a GEF-supported, five-year project for Sangihe and the neighboring Talaud Islands, which also had threatened endemic bird species. The report author, thrilled that his extinction prediction had been proven wrong, took over the management of the project for its final two to three years. By then, Action Sampiri had morphed into an active local nongovernmental organization (NGO), Yayasan Sampiri, and the project's awareness-building activities were contracted out to them. The objectives of the project were to strengthen protection and improve management of natural forests and biodiversity on Sangihe-Talaud Islands; strengthen awareness, commitment and capacity for forest and wildlife conservation at the local level; and monitor baselines and conservation assessments.

It might be thought that raising the status of the protection forest to a wildlife sanctuary or nature reserve would be a positive step. However, such designations would put forest management under the control of a distant central government, whereas protection forests are under the authority of the local district head, and local solutions for local problems could be said to be more viable. Beyond any biodiversity-based argument, there is a strong local justification for the conservation

Elegant Sunbird, Markus Lagerqvist

of the forest on Mount Sahendaruman, given its role in maintaining water quality and quantity for the people living below it and for the hydropower plant in the foothills, as well as its function providing some measure of local protection against flooding and landslides.

A public awareness program has been implemented addressing the social and cultural context in which conservation management is embedded. The conservation education campaign employed social marketing techniques to build awareness and pride in the island's unique biodiversity, as well as in the importance of forest resources, and was successful at significantly increasing levels of public and government support for local conservation activities and future initiatives. The island's churches were very active in preaching on the need to conserve the remnants of the natural forests and their threatened denizens as an expression of religious faith.

During its five-year life, the project successfully stabilized the forest area. Some 250 hectares were lost between 1999 and 2003 (before the project), but only 31 were lost between 2004 and 2005 and only 0.2 in 2006. Communities developed local regulations for the cutting of forest trees, and the loss showed a marked reduction, particularly following the well-publicized arrest and sentencing of four illegal loggers.

Although surveying the birds in such steep and rough country is fraught with problems, it is possible to report that there have been no significant declines in populations of the key indicator bird species. Despite the lack of a formal management body for the area, measures of management effectiveness of the protection forest showed a considerable strengthening. District-wide regulations were instituted. Local government provided the budget to increase the work with surrounding villages. Some of these villages spontaneously formed an inter-community forest protection alliance, *Elung Banua*, which enabled them to act on common problems and support each other's efforts, such as lobbying local government to enforce environmental crimes and to stop illegal gold mining. This was one of the notable successes of the project, and provided the basis for a forest protection network to spread across Sangihe as more villages developed conservation regulations.

In addition, church groups, youth organizations, the state electricity company, *Elung Banua*, and local government were all involved in tree-planting activities, with the local government shouldering most of the costs. (It became clear, however, that local government officials still lack ecological understanding, as non-native mahogany trees were planted in the primary forest, but this was brought to their attention and the practice has apparently halted.)

The cover of the 20th-anniversary issue of *Conservation Biology* showed the cover of the first issue—with one joyful addition: an inset of the living bird and an internal article on the turn of fate for the Sangihe birds. It would be foolish to think that a single five-year project can magically remove all threats and offer a guarantee of sustained protection, but the caerulean paradise-flycatcher and its fellow Critically Endangered species of Sangihe now have a fighting chance of survival.

Volcano eruption, Sangihe Talaud Island, Sulawesi Indonesia, Jurgen Freund

LION-TAILED MACAQUE

(Macaca silenus)

ENDANGERED

INDIA

GLOBAL ENVIRONMENT FACILITY PROJECT: Conservation of the Lion-Tailed Macaque
PROJECT REPORT BY: Balachandra Hegde
AGENCY: World Bank
PARTNERS: Critical Ecosystem Partnership Fund; l'Agence Française de Développement; Conservation International; Government of Japan; The John D. and Catherine T. MacArthur Foundation

Lion-tailed macaque is endemic to the Western Ghats. Its selective feeding habitats and the seasonality of many of its preferred food items, combined with late maturity and a long inter-birth period, make the species intrinsically rare in the wild.

It is easy to find the group," says Dr. Kumara, "the animals are always on the move." As he speaks, a dark shape descends through the branches overhead and a curious face, framed by a long mane of silver hair, appears among the leaves. "Don't be fooled by the mane," he says, "both the males and the females have that. This is actually a female. The male has a larger tuft on the end of its tail."

It is this tuft that gives the species its name, lion-tailed macaque (*Macaca silenus*). Dr. H. N. Kumara and his research assistant, K. Santosh, have been studying the lion-tailed macaques in order to understand their feeding ecology. Their focus is on a specific troop of a species that, overall, is on the decline. Best guess is that there are approximately 3,500 individuals remaining today; even within protected areas, the species has declined or disappeared from several locations over the last decade. Through Dr. Kumara's research, it's been discovered that the lion-tailed macaques, as specialist feeders, spend a lot of time moving around the forest in search of their preferred food items. "We have found that they spend about 60 percent of their waking time travelling and that 80 percent of their food is plants," notes Kumara.

Scientific data such as these greatly assist in understanding the survival patterns of this endangered species and thus better equip conservation organizations to develop more successful species protection strategies.

The lion-tailed macaque is endemic to the Western Ghats. Its selective feeding habitats and the seasonality of many of its preferred food items, combined with late maturity to adulthood and a long period between births, make the species intrinsically rare in the wild. This natural rarity has been compounded by human-induced threats, including habitat loss, habitat fragmentation and hunting. Of these, habitat fragmentation is particularly insidious. To begin with, this species is contained exclusively within its evergreen rainforest. If a macaque troop becomes restricted to a small fragment of this forest, the food plants they depend on during a certain season may simply not be available. Also, because female macaques prefer to mate with males from outside their troop, they may not be able to reach potential mates.

One area that shows an opposite trend is the forest region of Sirsi and Honnavar divisions, in the northwest of India's Karnataka state. When these forests were brought to the attention of researchers in 2002, scientists were surprised to discover that the forests supported the world's largest population of lion-tailed macaque; around 650 individuals in 32 troops. They were even more surprised to learn from local people that, 20 years earlier, fewer than six troops had inhabited this contiguous tract of habitat. "The key to these animals' survival," explains Kumara, "is that the local people have a taboo about hunting primates."

This taboo, however, is not shared by outsiders, who come to the forests to hunt lion-tailed macaques and other species. To afford better protection to the lion-tailed macaques of Sirsi-Honnavar, the Critical Ecosystem Partnership Fund (CEPF) is supporting efforts to designate the currently unprotected forests as a "Conservation Reserve."

A fundamental goal of the project is to ensure that local communities are engaged in biodiversity conservation. CEPF grants go directly to civil society groups, to build this vital constituency for conservation alongside government partners. This idea had started long back, but there had never been the opportunity to put it into action. The local population was not keen on total protection, which made the idea of a reserve so attractive.

Lion-Tailed Macaque, Cristina Mittermeier, ILCP

The project prepared a proposal for a 24,000-hectare conservation reserve within the Sirsi-Honnavar forests. With this, it applied to the CEPF small-grant program in the Western Ghats. The grant allowed the project to bring in experts to prepare the protected area proposal, and in 2009 all the necessary documentation was submitted to the principle chief conservator of forests (wildlife) for Karnataka State. The financing was granted, as was the directive to research whether there was a resource conflict between the local communities and the macaques for non-timber forest products (NTFPs). The preliminary results indicate the answer to be "no"; however, some trees that the macaques eat in other areas have been over-exploited to the point of disappearance. "So far, we have only found one food species, Garcinia gummi-gutta, used by the macaques, that is also an NTFP for humans," says Kumara, "but it makes up only four percent of their diet."

The project's research concerning the impacts of NTFP collection on the lion-tailed macaque population will continue. Based on new findings, a strategy will be developed for sustainable harvest of NTFPs that can be adopted by the joint forest management committees established for the future conservation reserve. The hope is that the designation process can be completed by the end of 2010, thereby extending protection to the largest population of a flagship species of the Western Ghats.

This Page & Middle: Lion-Tailed Macaque, Sandesh Kadur, ILCP
Photo Far Right: Lion-Tailed Macaque, Cristina Mittermeier, ILCP

GIANT IBIS

(Thaumatibis gigantea)

CRITICALLY ENDANGERED

CAMBODIA

GLOBAL ENVIRONMENT FACILITY PROJECT: Establishing Conservation Areas Landscape Management (CALM) in the Northern Plains
PROJECT REPORT BY: Lisa Fitzpatrick
AGENCY: United Nations Development Programme
PARTNERS: WCS; Royal Government of Cambodia (Ministry of Environment and Ministry of Agriculture, Forestry and Fisheries); Ponlok Khmer; Farmers for Livelihood and Development; Sansom Mlu Prey

Now Cambodia's national bird, the giant ibis was once known from only a handful of records throughout the 1900s. Thought to be extinct throughout Vietnam, it was recently re-discovered in considerable numbers in the Northern Plains and now stands at approximately 100 pairs.

In the latter decades of the 20th century, while most of the world's territories were being mined for commercial development at historically unprecedented rates, a remote corner of Cambodia remained ominously pristine. Up until the late 1990s, the Northern Plains—a sparsely populated province—served as the central base for the Khmer Rouge; the civil strife of the times kept development there at bay. Ironic as it may be, decades of political instability and limited access served to protect this natural habitat, now the largest known and remaining intact block of a deciduous dipterocarp forest, which once covered much of Indochina from Bangkok to Saigon.[51] Though smaller now, this forest contains the most unique assemblage of large mammals and waterbirds in the world, including the largest number of Critically Endangered and Endangered species on record.[52] Sixteen of its native species are on the International Union for Conservation of Nature (IUCN) Red List, including two species of the rarest birds on Earth: the white-shouldered ibis and its cousin, the near-mythical giant ibis (*Pseudibis gigantean*).

Now Cambodia's national bird,[53] the giant ibis was once known from only a handful of records throughout the 1900s. Thought to be extinct throughout Vietnam, it was recently re-discovered in considerable numbers in the Northern Plains and now stands at approximately 100 pairs.[54] Difficult to track and observe, much of their habits and living patterns remain a mystery.

The final departure of the Khmer Rouge from this unique biome in 1998 opened the door for biologists, other scientists and conservationists to enter. Once better known for the ancient temples of Angkor, this relatively untouched territory of open deciduous forests, grasslands and seasonal wetlands was quickly determined to be a landscape of national and international significance in the field of conservation. In 2000, the Wildlife Conservation Society (WCS) established its presence in Cambodia; by 2006, WCS formed a partnership with UNDP-GEF as the executing agency of the project "Establishing Conservation Areas Landscape Management" (CALM) in the Northern Plains. Thus began efforts to protect the dry dipterocarp forests of the Northern Plains and its unprecedented collection of Critically Endangered bird species, including the giant ibis.[55]

Running, on average 102-106 cm and by far the world's biggest member of the ibis family,[56] the giant ibis is thought to nest in trees (among other suspected habits of this rarely sighted bird). What is certain is that the ibis are natural waders and rely on seasonal pools, which in the past were created by the now much-depleted megafauna. Destruction of most of this contiguous, dry forest and the associated wetlands in Thailand and Vietnam occurred during the 20th century and led to its extinction in those territories—this same process is now underway in Cambodia.[57] Indeed, many of these formerly widespread waterbirds are now contained in just a few small localities, making the species all the more vulnerable. The bird's sharp decline was first due largely to habitat loss and wetland drainage for agriculture, but in recent years trophy hunting has also become a significant threat to its survival. The species appears to be very sensitive to human disturbance, as well, particularly during the dry season when birds are concentrated around available waterholes. As political stability—and people—return to these regions, there is much greater potential for access in these formerly remote areas. This is almost certainly one of the more significant threats going forward, rendering much apparently suitable habitat unusable for the ibis.[58]

Cambodia has undergone a period of rapid legislative change with regard to the legal framework governing the ownership and management of land and natural resources, including forestry and wildlife. The country implemented its first land law in 2001, a new forestry law in 2002, and a

Giant Ibis, Preah Vihear, Cambodia, Allan Michaud

series of sub-decrees on community forestry and wildlife protection in 2003. This provides, for the first time in Cambodian history, sufficient legislation to cope with issues of land tenure, community user rights and resource utilization, including wildlife.[59] While the Cambodian government's primary agenda is to alleviate poverty, it does consider part of the "backbone of good governance" to be the sustainable use of natural resources and sound environmental management.

CALM, a GEF-funded and UNDP-implemented project, aims to assist the Cambodian Ministry of the Environment in realizing some of these national objectives. The project works to facilitate the mainstreaming of biodiversity into production sectors—including tourism, agriculture and forestry—in the region. Executed by WCS, the project employs many of their system-wide approaches to conservation, such as site-specific interventions and the "Living Landscape" project approach, which centers on preserving the ecological integrity of a large area of wilderness—a useful strategy for migratory species such as the giant ibis, which is heavily reliant on being able to disperse across the Northern Plains between wet and dry seasons.

Additionally, the project assisted the Cambodian government in implementing a series of biological surveys across the country that identified the key areas most important to conserve.[60] Its work on identifying these key conservation areas led to the establishment of Preah Vihear Protected Forest, which has a total area of 112,616 hectares. The project has also worked to improve the management of the Kulen Promtep Wildlife Sanctuary, a large Cambodian protected area in which a significant number of giant ibises have been recorded. Through improved monitoring and more effective patrol activities, the project has helped to reduce illegal logging and illegal hunting. By making such improvements to the management of these threats to biodiversity, the project helps to protect the forests and wildlife of the Northern Plains—including the giant ibis.

This project resulted from a concerted effort on the part of Cambodia's Ministry of the Environment, in conjunction with a $2.5-million grant from UNDP-GEF, as well as matching funds from the WCS. The future of the now rare giant ibis, and all such critically endangered species, is in the hands of these agencies and depends upon the establishment of additional—and effectively managed—protected area networks. This work shall carry on throughout the project's duration, scheduled to continue through 2011.

AFTERWORD

Cristina Goettsch Mittermeier
President, International League of Conservation Photographers

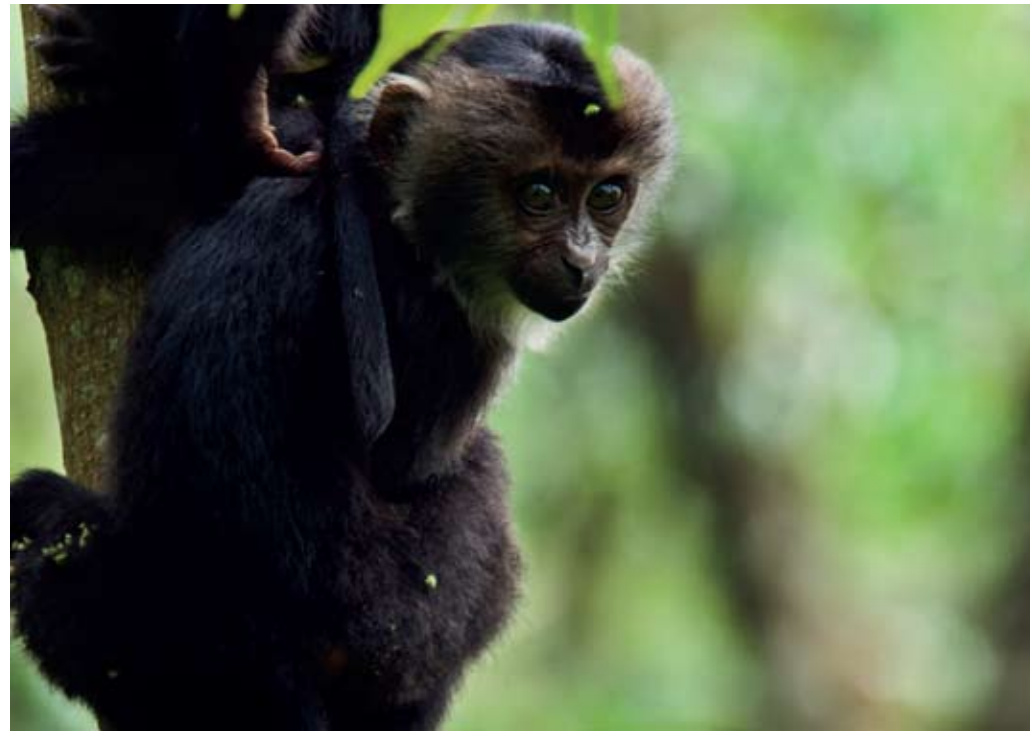
A book that celebrates the success of conservation interventions and the beauty of the natural world through the work of talented scientists, conservationists, and photographers invites reflection on both purpose and aesthetics. We are thrilled to present just such a book.

In the same breath, however, recent catastrophic events bring us painful proof of a rapidly changing planet—the oil spill in the Gulf of Mexico, rampant wildfires in Russia, flooding in Pakistan, drought across much of Africa. Faced with climate change, an imminent wave of extinction, and civil conflict over diminishing resources, we must focus our reflection on the relevance of nature photography itself.

Can images influence the fate of our planet's natural wonders? Absolutely, yes. From documenting the first national parks in America to recording the recent establishment of an entirely new protected area system in Gabon, photography has played a pivotal role in showcasing the beauty and uniqueness of wild places, the frailty and irreplaceability of endangered species, and the wonder of indigenous cultures. It has played a key role in shaping legislation to protect these special landscapes and species.

In fact, images have always been used as powerful campaign symbols and calls to action.

Witness a single photograph made by the late Peter Dombrovskis as an anguished cry against the imminent loss of the mighty Gordon River and Franklin River valley in Tasmania, Australia; this



Lion Tailed Macaque, India, Cristina G. Mittermeier, iLCP

image riveted the world's imagination and inspired an entire nation to oppose a project that would have dammed one of our planet's most beautiful wild rivers. The image was effective because it was infused with a sense of purpose. It was crafted with emotion and underlain with urgency and grief. It was taken to show those who could not see, first-hand, the beauty, wildness, and incomparable value of what was about to be lost.

Photographs, and photographers, are powerful tools. They mold perceptions, awaken principles, and inspire. Photographers can choose to give their work a higher purpose and to invest it with a fundamental value that goes far beyond the mere beauty of an image.

One may argue that many, if not most, beautiful images are achieved in the absence of deeper purpose. I submit to you, however, that photographs born out of concern for the tragic loss of our natural world carry an intrinsic emotional and spiritual weight that is projected onto those who view them.

The magnificent images in this book will no doubt capture the world's attention. They will find their place in the hands of influential decision makers and, it is to be hoped, shape their perceptions. As these photographs are disseminated, they will become ambassadors for a world that is changing fast. I am proud to head the group of photographers whose images are featured in this book. We hope that our work not only captures beautiful moments, but that it infects others with a sense of purpose and beauty. It makes us proud to share this passion with the Global Environment Facility and its many partners and affiliates around the world.

ACKNOWLEDGMENTS

Gustavo A.B. da Fonseca
Team Leader, Natural Resources - Global Environment Facility

Christian Hofer
Senior Communications Officer - Global Environment Facility

Leo Viana
Consultant, International Year of Biodiversity - Global Environment Facility

Nik Sekhran
Principal Technical Adviser - Biodiversity and Ecosystems
Environment & Energy Group, Bureau for Development Policy,
United Nations Development Programme (UNDP)

Adriana Dinu
Regional Practice Leader - Environment and Energy
United Nations Development Programme (UNDP), Europe & the CIS

Jessie Mee
Consultant, United Nations Development Programme (UNDP), Biodiversity

Midori Paxton
Regional Technical Specialist - Ecosystems and Natural Resources
United Nations Development Programme (UNDP), Asia & the Pacific

Helen Coles de Negret
Regional Technical Adviser - Biodiversity and Land Degradation
United Nations Development Programme (UNDP), Latin America & Caribbean

STAFF CREDITS

Cristina Mittermeier
President, iLCP

Abbie Williams
Publisher, Managing Editor and Production Director

Justin Black
Director, iLCP

Stefan Gutermuth
Layout and Design

Lisa Fitzpatrick
Executive Editor/Writer

Nicole Parizeau
Editorial Consultant

Sarah Claxton
Image Management

Jerry Dodrill
Image Pre-Press

Michelle Mercer
Production

Deborah Petersen
Assistant to Publisher

REFERENCES

Altrichter, M., Taber, A., Noss, A. & Maffei, L. 2008. *Catagonus wagneri*. In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.1. <www.iucnredlist.org>. Downloaded March 17, 2010.

Bird Conservation International. 14:1:25-32 Cambridge University Press. <journals.cambridge.org /action/displayAbstract;jsessionid=0A73E5EB4C94D2A7FF576FB5901D77C3.tomcat1?fromPage =online&aid=215885>

BirdLife International. 2009. Species factsheet: *Nectarinia loveridgei*. <www.birdlife.org/datazone/species/index.html?action=SpcHTMDetails.asp&sid=8304&m=0>

———, 2009. Species factsheet: *Thaumatibis gigantea*. <http://www.birdlife.org/datazone/species/index.html?action=SpcHTMDetails.asp&sid=3800&m=0>

———, 2009. Species factsheet: *Haliaeetus pelagicus*. <http://www.birdlife.org> Downloaded February 19, 2010.

———, 2008. *Nectarinia loveridgei*. In: IUCN 2009. IUCN Red List of Threatened Species. Version 2009.2. <www.iucnredlist.org/apps/redlist/details/149038/0>

———, 2008. *Anodorhynchus hyacinthinus*. In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.1. <www.iucnredlist.org> Downloaded March 17, 2010.

Boersma, W. Dee. 2010. *Mission Blue, TED talk*. TED, May 19. <http://www.ted.com/talks/dee_boersma_pay_attention_to_penguins.html>

Boersma, P. Dee. 2008. *Penguins as Marine Sentinels*. Bioscience Magazine July, August. Vol. 58 No. 7. <www.aibs.org/bioscience-press-releases/resources/Boersma.pdf>

Cuellar, E., Meritt, D., Porini, G. & Members of the IUCN SSC Edentate Specialist Group. 2008. *Priodontes maximus*. In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.1. <www.iucnredlist.org> Downloaded March 17, 2010.

Dinu, Adriana. 2009. *Project 3835: Steppe Conservation and Management – Kazakhstan Summary*. UNDP-GEF.

Ehardt, C., Butynski, T.M. & Struhsaker, T. 2008. *Cercocebus sanjei*. In: IUCN 2009. IUCN Red List of Threatened Species. Version 2009.2. <http://www.iucnredlist.org/apps/redlist/details/4203/0>

Farnsworth, Andrew. *An Answer Is Blowin' in the Wind*. Cornell Lab of Ornithology. <www.birds.cornell.edu/NetCommunity/LbPrintPage.aspx?print=2928&pid=1479&type=aab>

Gandini et. al. 1994. *Chronic oiling affecting Magellanic penguins: a review*. International Bird Rescue Research Center, <www.ibrrc.org/pdfs/EOW03_Chronic_oiling.pdf>

Global Environment Facility. 2008. *From Ridge to Reef*: *Water, Environment and Community Security, GEF Action on Transboundary Water Resources.* <www.thegef.org/gef/gef_country_prg/ZA>

———, 2008. *International waters focal area strategy and strategic programming for GEF-4*. <www.thegef.org/gef/gef_country_prg/ZA>

———, Project executive summary GEF council work program submission. Document name: "4-9-04 2177 CALM Proposal Annex 7 thru 12.doc," PIMS 2177, Cambodia.

Honolulu Zoo. *Golden Lion Tamarin*. Honolulu, HI. <www.honoluluzoo.org/golden_lion_tamarin.htm>

International Crane Foundation. 2010. *Species Field Guide: Siberian Crane*. <http://www.savingcranes.org/siberiancrane.html>

International Rhino Foundation. *Black Rhino (Diceros bicornis*). <www.rhinos-irf.org/black>

IUCN Red List. SSC African Rhino Specialist Group. 2008. *Diceros bicornis*. Edition 2010.1. <www.iucnredlist.org>

———, *Lutra lutra*. Edition 2010.2. <www.iucnredlist.org/apps/redlist/details/12419/0>

Kottelat, Maurice and Tony Whitten. *Freshwater Biodiversity in Asia: with special reference to fish.* World Bank, Technical Paper No. 343.

National Marine Fisheries Service. 2007. *Southern Right Whale, 5-Year Review: Summary and Evaluation*. Silver Spring, MD.

Natural Heritage Trust. 2010. *Southern Right Whale Recovery Plan 2005 – 2010*. Department of Environment and Heritage, Australian Government.

International Whaling Commission. 2001. *Marine Species, Mammals: Lives of Whales: Southern Right Whale.* <http://iwcoffice.org/conservation/lives.htm>

NOAA Fisheries. *Southern Right Whale*. <www.nmfs.noaa.gov/pr/species/mammals/cetaceans/rightwhale_southern.htm>

Rhino Resource Center. *Black Rhino, Diceros bicornis*. <www.rhinoresourcecenter.com/species/black-rhino>

Save the Rhino Trust. *Background, Black Rhino*, <http://www.savetherhinotrust.org/index.php?option=com_content&view=article&id=5:black-rhino&catid=2:background&Itemid=2>

Science Daily. 2010. *Something's Wrong With the Right Whales*. April 10. <www.sciencedaily.com/releases/2010/04/100409163450.htm>

Shaw, Julie. 2009. *Kenyan Community Reforestation Also Aids Taita Thrush*. Critical Ecosystem Partnership Fund, <www.cepf.net/news/top_stories/Pages/jan122009_taita_thrush.aspx>

Siberian Crane Wetland Project. *UNEP/GEF Siberian Crane Wetland Project: Program Overview.*

Stone, Richard. 2008. *From Remarkable Rescue to Restoration of Lost Habitat*. Science Magazine, VOL 322, 10 October. <www.sciencemag.org>

Tøttrup, Anders P., Jørn Lennart Larsen, and Neil D. Burgess. 2004. A first estimate of the population size of Loveridge's Sunbird *Nectarinia loveridgei*, endemic to the Uluguru Mountains, Tanzania.

World Wildlife Fund. *Black rhinoceros: Key Facts.* <www.panda.org/what_we_do/endangered_species/rhinoceros/african_rhinos/black_rhinoceros>

United Nations Development Programme. 1994. Project of the Government of Cambodia project support document: Cambodia CALM. April 9, 994, 147:38, Project Number PIMS 2177.

United Nations Development Programme. Global Environment Facility. 2009. *2009: UNDP-GEF Portfolio Performance Evaluation Report*. <www.undp.org/GEF/documents/publications/bd_web.pdf>

Whitten, Tony. 2008. *Blog: Biodiversity Restoration in Lake Dianchi, China - Part 1*. <Worldbank.org> July 17.

Wildlife Conservation Society. *Saving Wildlife: Magellanic Penguin*. <www.wcs.org/saving-wildlife/birds/magellanic-penguin.aspx>

———, *Cambodia*. 2010. <wcs.org>, Downloaded June 21, 2010.

———, *Northern Plains, Cambodia*. 2010. <http://www.wcs.org/saving-wild-places/asia/northern-plains-cambodia.aspx> Wildlife Extra. *Critically Endangered Giant ibis spotted in Cambodia*. April. <www.wildlifeextra.com/go/news/giant-ibis.html#cr>

Williams, Laura. 2004. *Saga of the Saiga*. National Wildlife Foundation, <http://www.nwf.org/News-and-Magazines/National-Wildlife/Animals/Archives/2004/Saga-of-the-Saiga.aspx>

World Bank. 1996. *A Better Environment for China's Yunnan Province.* Press Release No:96/47 /EAP, <http://web.worldbank.org/external/default/main?pagePK=34370&piPK=34424&theSitePK =4607&menuPK=34463&contentMDK=20011655>

World Wildlife Fund. *Giant Ibis*. <www.wwf.panda.org/what_we_do/where_we_work/project /projects_in_depth/dry_forests_ecoregion/about_the_area/indochina_spp/giant_ibis/>

Xiangcan, Jin. *Lake Dianchi: Experience and Lessons Learned Brief*. Chinese Research Academy of Environmental Sciences (Beijing, China).

Zipcodezoo. *Cochlearia (Genus)*. <www.zipcodezoo.com/Key/Plantae/Cochlearia_Genus.asp>

Zoo Logic with TV Host Jorge Ribas. *Golden Lion Tamarin*. Discovery Network. <www.youtube.com/watch?v=K2DogPzYipo>

ENDNOTES

1 International Whaling Commission, 2001. *Marine Species, Mammals: Lives of Whales: Southern Right Whale.* <http://iwcoffice.org/conservation/lives.htm>

2 IUCN, 2010. IUCN Red List of Threatened Species™. Version 2010.2. <http://www.iucnredlist.org/apps/redlist/details/8153/0>

3 Global Environment Facility, 2008. *From Ridge to Reef*: *Water, Environment and Community Security, GEF Action on Transboundary Water Resources.* <www.thegef.org/gef/gef_country_prg/ZA>

4 NOAA Fisheries, *Southern Right Whale*. <www.nmfs.noaa.gov/pr/species/mammals/cetaceans/rightwhale_southern.htm>

5 Science Daily, *Something's Wrong with the Right Whales*. Apr. 10, 2010. <www.sciencedaily.com/releases/2010/04/100409163450.htm>

6 IUCN, 2010. IUCN Red List of Critically Endangered Species. Version 2010.2. <www.iucnredlist.org> Downloaded July 20, 2010.

7 IUCN, 2009. IUCN Red List of Critically Endangered Species, Version 2010.2. <http://www.iucnredlist.org/apps/redlist/details/147241/0>

8 Shaw, Julie, 2009. *Kenyan Community Reforestation Also Aids Taita Thrush*. Critical Ecosystem Partnership Fund, 12 January, 2009.

9 BirdLife International, 2009. Species factsheet: *Nectarinia loveridgei*. <http://www.birdlife.org/datazone/species/index.html?action=SpcHTMDetails.asp&sid=8304&m=0>

10 Anders P. Tøttrup, Jørn Lennart Larsen, and Neil D. Burgess, 2004. A first estimate of the population size of Loveridge's Sunbird *Nectarinia loveridgei*, endemic to the Uluguru Mountains, Tanzania.

11 BirdLife International, 2008. *Nectarinia loveridgei*. IUCN 2009. In: IUCN Red List of Threatened Species. Version 2009.2. <http://www.iucnredlist.org/apps/redlist/details/149038>

12 Ehardt, C., Butynski, T.M. & Struhsaker, T., 2008. *Cercocebus sanjei*. IUCN 2009. IUCN Red List of Threatened Species. Version 2009.2. <http://www.iucnredlist.org/apps/redlist/details/4203/0>

13 Ibid, Ehardt.

14 IUCN SSC African Rhino Specialist Group, 2008. *Diceros bicornis*. IUCN Red List of Threatened Species. Version 2010.1. <www.iucnredlist.org>

15 Save the Rhino Trust, “Background, Black Rhino.” <www.savetherhinotrust.org/background/black-rhino/>

16 The Rhino Resource Center, “Black Rhino, *Diceros bicornis*.” <www.rhinoresourcecenter.com/species/black-rhino/>

17 Ibid, The Rhino Resource Center.

18 International Rhino Foundation, “Black Rhino, *Diceros bicornis*.” <www.rhinos-irf.org/black>

19 IUCN SSC African Rhino Specialist Group, 2008. *Diceros bicornis*. IUCN Red List of Threatened Species. Version 2010.2. <www.iucnredlist.org>

20 World Wildlife Fund, “Black rhinoceros.” <www.panda.org/what_we_do/endangered_species/rhinoceros/african_rhinos/black_rhinoceros>

21 IUCN, 2010. <http://www.iucnredlist.org/apps/redlist/details/6557/0> Downloaded July 20, 2010.

22 Farnsworth, Andrew, “An Answer Is Blowin’ in the Wind,” Cornell Lab of Ornithology, <www.birds.cornell.edu/NetCommunity/LbPrintPage.aspx?print=2928&pid=1479&type=aab>

23 Mallon, D.P. 2008. *Saiga tatarica*. IUCN Red List of Threatened Species. Version 2010.1. <www.iucnredlist.org>

24 Birdlife International, 2009. Species factsheet: *Haliaeetus pelagicus*. <http://www.birdlife.org> Downloaded February 19, 2010.

25 Ibid, Birdlife International.

26 Effective population size (Ne) is an estimator of the genetic size of the population, and is generally considered representative of the proportion of the total adult population (N) which reproduces itself through offspring which themselves survive and reproduce. Ne is usually smaller than N, and based on four field demographic studies, it is roughly estimated at 50% (Nowell et al. 2007). The global snow leopard effective population size is suspected to be fewer than 2,500 (50% of the total population, or 2,040-3,295). IUCN Red List, 2010. <http://www.iucnredlist.org/apps/redlist/details/22732/0> Downloaded August 26, 2010.

27 Almaty, the name of the commercial capital of Kazakhstan, means “father of apples.” Some tulips also originated in this mountain range, and some species are endemic (because of this, the Kyrgyz unrest during spring 2005 was called the “Tulip Revolution”).

28 Xiangcan, Jin. “Lake Dianchi: Experience and Lessons Learned Brief,” Chinese Research Academy of Environmental Sciences, Beijing, China.

29 World Bank, 2007. “China: Environmental Cost of Pollution in China: Economic Estimates of Physical Damages,” p. 6. <http://siteresources.worldbank.org/INTEAPREGTOPENVIRONMENT/Resources/China_Cost_of_Pollution.pdf>

30 World Bank, 1996. *A Better Environment for China’s Yunnan Province.* Press Release No: 96/47/EAP. <http://web.worldbank.org/external/default/main?pagePK=34370&piPK=34424&theSitePK=4607&menuPK=34463&contentMDK=20011655>

31 Stone, Richard, 2008. *From Remarkable Rescue To Restoration of Lost Habitat*. Science Magazine, VOL 322, 10 October. <www.sciencemag.org>

32 Ibid, Stone.

33 Ibid, Stone.

34 Ibid, Stone.

35 Ibid, Xiangcan.

36 Kottelat, Maurice and Tony Whitten, *Freshwater Biodiversity in Asia: with special reference to fish.* World Bank, Technical Paper No. 343.

37 Whitten, Tony. *Blog: Biodiversity Restoration in Lake Dianchi, China - Part 1*. July 17, 2008. <Worldbank.org>

38 Zip Code Zoo, Cochlearia (Genus). <http://zipcodezoo.com/Key/Plantae/Cochlearia_Genus.asp>

39 IUCN Red List. *Lutra lutra*. <http://www.iucnredlist.org/apps/redlist/details/12419/0>

40 Ibid, IUCN Red List.

41 Wildlife Conservation Society, Saving Wildlife: Magellanic Penguin. <www.wcs.org/saving-wildlife/birds/magellanic-penguin.aspx>

42 Boersma, P. Dee, 2008. *Penguins as Marine Sentinels*. Bioscience Magazine July/August / Vol. 58 No. 7. <www.aibs.org/bioscience-press-releases/resources/Boersma.pdf>

43 Ibid, Wildlife Conservation Society.

44 Boersma, W. Dee, 2010. Mission Blue, TED talk. TED, May 19, 2010. <http://www.ted.com/talks/dee_boersma_pay_attention_to_penguins.html>

45 Gandini et al, 1994. Chronic oiling affecting Magellanic penguins: a review. International Bird Rescue Research Center. <www.ibrrc.org/pdfs/EOW03_Chronic_oiling.pdf>

46 Honolulu Zoo, 2008. Golden Lion Tamarin. <http://www.honoluluzoo.org/golden_lion_tamarin.htm>

47 Morell, Virginia, 2010. "The Rain Forest in Rio's Backyard," Republished from National Geographic magazine. <http://ngm.nationalgeographic.com/ngm/0403/feature1/index.html>

48 Altrichter, M., Taber, A., Noss, A. & Maffei, L., 2008. *Catagonus wagneri*. IUCN Red List of Threatened Species. Version 2010.1. <www.iucnredlist.org> Downloaded March 17, 2010.

49 BirdLife International, 2008. *Anodorhynchus hyacinthinus*. IUCN Red List of Threatened Species. Version 2010.1. <www.iucnredlist.org> Downloaded March 17, 2010.

50 Cuellar, E., Meritt, D., Porini, G. & Members of the IUCN SSC Edentate Specialist Group, 2008. *Priodontes maximus*. IUCN Red List of Threatened Species. Version 2010.1. <www.iucnredlist.org> Downloaded March 17, 2010.

51 United Nations Development Programme, 1994. Project of the Government of Cambodia project support document: Cambodia CALM. April 9, 1994, 147:38, Project Number PIMS 2177.

52 Ibid, UNDP, p. 48.

53 World Wildlife Fund, *Giant Ibis*. <www.wwf.panda.org/what_we_do/where_we_work/project/projects_in_depth/dry_forests_ecoregion/about_the_area/indochina_spp/giant_ibis>

54 According to IUCN, systematic surveys have been suggesting a minimum estimate of 100 pairs (20-30 at each of the two high density sites, 5-10 at each of seven low density sites). IUCN Redlist, 2010. "Thaumatibis gigantea: Geographic Range," <http://www.iucnredlist.org/apps/redlist/details/144751/0>

55 Wildlife Conservation Society, *Cambodia*. <wcs.org>, Downloaded June 21, 2010.

56 Birdlife International, "Species factsheet: Thaumatibis gigantea." <http://www.birdlife.org/datazone/species/index.html?action=SpcHTMDetails.asp&sid=3800&m=0>

57 Wildlife Extra, 2010. *Critically Endangered Giant ibis spotted in Cambodia*. April. <www.wildlifeextra.com/go/news/giant-ibis.html#cr>

58 Ibid, Wildlife Extra.

59 Global Environment Facility. Project executive summary GEF council work program submission. Document name: "4-9-04 2177 CALM Proposal Annex 7 thru 12.doc,": PIMS 2177, Cambodia.

60 Wildlife Conservation Society, *Northern Plains, Cambodia*. <http://www.wcs.org/saving-wild-places/asia/northern-plains-cambodia.aspx>

Biodiversity – “the variability among living organisms

from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems.” In simple terms, it can be described as the “diversity of life on Earth.” Biodiversity is under heavy threat, and reducing and preventing further biodiversity loss are considered among the most critical challenges to humankind. Of all the problems the world faces in managing “global goods,” only the loss of biodiversity is irreversible.

EARTH IN FOCUS

iLCP

gef GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

2010 International Year of Biodiversity