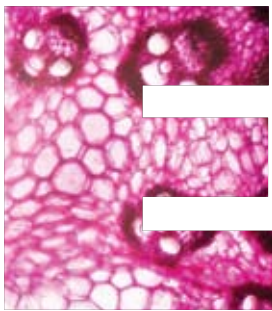
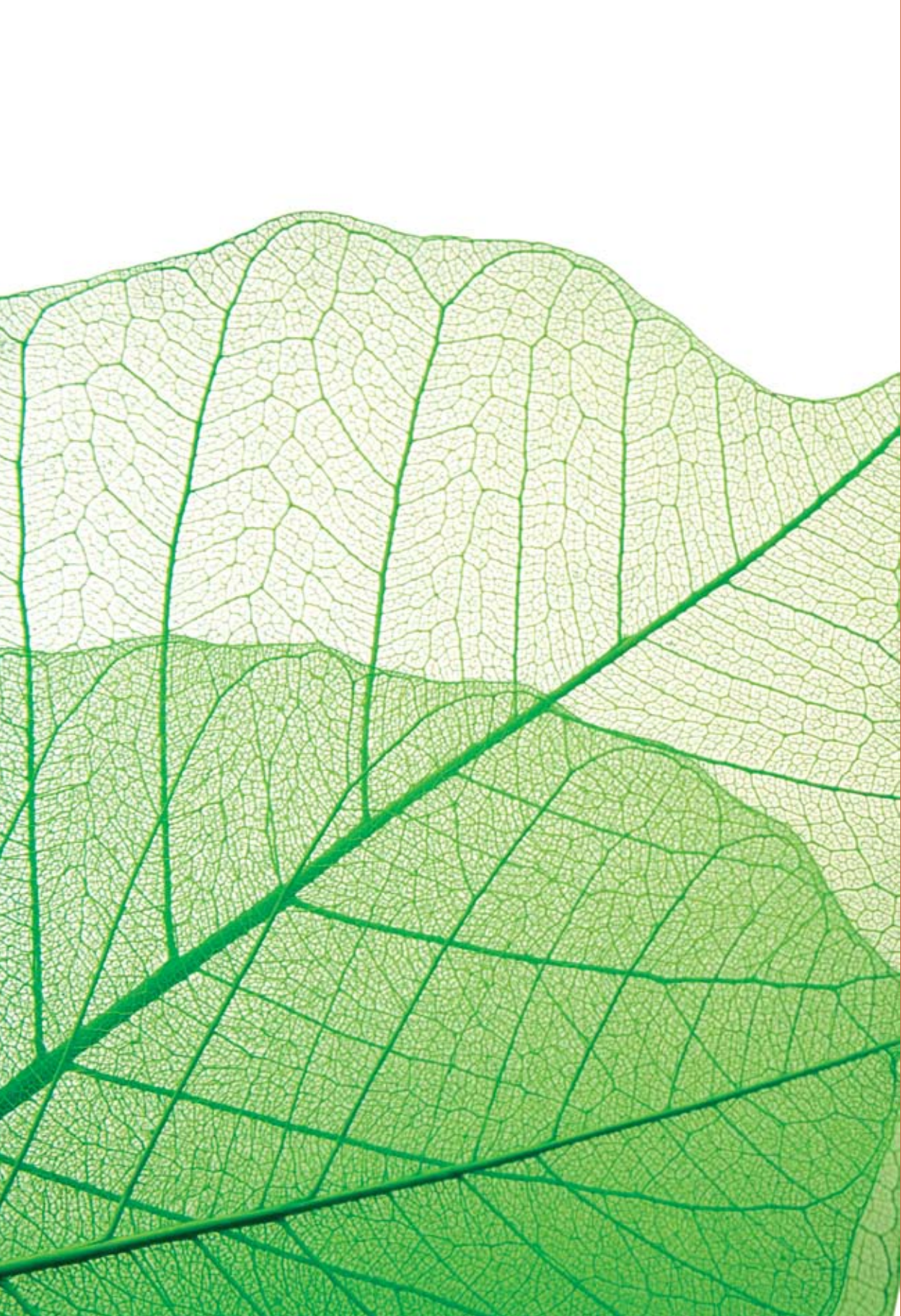




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To enhance knowledge and promote the understanding of biological diversity for the benefit and sustainability of life on earth.

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JRS BIODIVERSITY FOUNDATION

EARTH'S PLANT AND ANIMAL SPECIES ARE DECLINING AT AN ALARMING RATE. An estimated 50,000 species disappear every year, most of them doomed by human activity—population growth, industrial development, pollution and climate change.

Efforts to stabilize and reverse this trend are hampered by biodiversity knowledge banks that are incomplete, fragmented and not easily accessible to those who create the policies and make the decisions that affect our environment.

About 1.8 million species have been catalogued over the past 300 years and an estimated 20 million more remain to be identified. Detailed information about known species and the value of our planet's biodiversity rests in the hands of relatively few experts, many of them from industrialized countries. This knowledge is often inaccessible to local communities, conservation practitioners, policy makers and the public. Through the projects it funds, the *JRS Biodiversity Foundation* works to make biodiversity information more widely available to these stakeholders.

The *JRS Biodiversity Foundation* was endowed in 2004 with the proceeds from the sale of non-profit publishing company BIOSIS. J.R.S. are the initials of one of the founders of BIOSIS. Though created only in 2004, the foundation has already established itself as an important partner to

organizations working in the new and rapidly growing field of biodiversity informatics, or bio-informatics.

The foundation's mission is: "To enhance knowledge and promote the understanding of biological diversity for the benefit and sustainability of life on earth." More specifically, the *JRS Biodiversity Foundation* supports projects that apply the tools and techniques of information technology (IT) to biodiversity information, namely collecting, aggregating, synthesizing and publishing data, making it easily accessible to potential end users and interpreting the results for informed decision making.

Biodiversity science is interdisciplinary by nature and, as it becomes increasingly data-driven, it requires greater collaboration between environmental biologists, computer scientists and network engineers from around the planet. Biodiversity informatics begins with data collection and management and ends in application of the resulting knowledge for science and society. This includes technology to collect and interpret information, and communication mechanisms and skills to use data and tools between disciplines. The *JRS Biodiversity Foundation* supports these interdisciplinary activities in bio-informatics training and development as well.

Genetic Targeting of Vector Mosquitoes

MORE THAN A BILLION PEOPLE in 80 countries live with the risk of contracting Lymphatic Filariasis (LF). This devastating parasitic infection, commonly known as elephantiasis, currently afflicts 120 million people and is one of the world’s leading causes of permanent disability and disfigurement.

LF is caused by a microscopic thread-like worm that is spread from person to person by a mosquito bite. The disease has been earmarked for eradication by the year 2020 through mass drug administration (MDA)—identifying communities where LF is endemic and then treating the entire at-risk population with once-yearly doses of the combination therapy albendazole/DEC or albendazole/ivermectin.

In West Africa, the widespread effectiveness of this strategy depends on the inability of the Anopheles mosquito, the region’s principal LF vector, to transmit low-density worm larvae. But the Anopheles family contains hundreds of different species and researchers are now learning that, when it comes to passing on worm larvae, not all Anopheles mosquitoes are created equal.

With support from the JRS Biodiversity Foundation, the *Noguchi Memorial Institute for Medical Research* at the *University of Ghana* is using genetic bar-coding techniques in an intensive study of vector mosquitoes in LF affected areas that will determine which species have the ability to transmit low-level worm larvae, where they are located and environmental factors that influence their breeding and abundance.

In areas infested with these species, the MDA strategy can be supplemented with the use of insecticides to complete the elimination of LF from the region. Targeting specific species—and areas—for vector control removes the need for blanket spraying and sprays impact on other wildlife.



In 1993, the International Task Force for Disease Eradication declared Lymphatic Filariasis to be one of six potentially eradicable diseases. The efforts of the Global Programme to Eliminate LF are estimated to have already prevented 6.6 million new cases from developing in children and to have stopped the progression of the disease in another 9.5 million people who are already infected. Program leaders say they are on track to accomplish the goal of elimination by 2020.

GHANA



Ghana Biodiversity Informatics Project

IN GHANA AND MANY OTHER developing countries, loss of plant and animal species is more than an environmental issue, it is a threat to human health, nutrition and economic development. Ghana’s latest Growth and Poverty Reduction Strategy identifies the absence of effective environmental management as a major factor impeding efforts to improve the nation’s standard of living.

However, Ghana’s efforts to conserve its biodiversity are constrained by the absence of a working list of the country’s flora and fauna that is widely accessible, accurate and up-to-date. The JRS Biodiversity Foundation is supporting the University of Ghana Department of Botany in a project that will address this problem by establishing a node of the Global Biodiversity Information Facility (GBIF) that will provide a focus for the collection, sharing and dissemination of biodiversity data.

Ghana has been a GBIF member since it began in 2001 with the mission of working with partner countries, international organizations, natural history museums, herbaria, the scientific and IT communities and the international biodiversity conventions to provide free and universal access to the world’s primary biodiversity data.

Under the University of Ghana project, the country’s existing data will be digitized and information on medicinal plants will be collated and synthesized in a practical demonstration of how

bio-informatics tools produce meaningful analysis to support policy and decision making.

Initial activities will include a stakeholders workshop to build national consensus on Ghana’s GBIF node; setting up the node (GhanaBIF); a workshop on specimen digitization; digitization of herbarium specimens and museum insect and vertebrate specimens, and a workshop on IUCN conservation assessment and mapping of the distribution of medicinal plants.



Ghana consists of two major biomes—tropical high forest and the savannas—with over 3,600 species of plants (19 of them believed to be endemic), 724 species of birds, 221 amphibians and reptiles and 225 mammals. The country boasts a high degree of butterfly endemism with some 23 species thought to be unique to Ghana. There are also 157 species of freshwater fish and 392 marine species have been recorded.

GHANA



The APOC Fish & Invertebrate Database

THE INTERNATIONAL PARTNERSHIP to eliminate river blindness (Onchocerciasis) from sub-Saharan Africa is one of the great global health success stories of modern times. But the two partnership initiatives—the Onchocerciasis Control Programme (OCP) and its successor, the African Programme for Onchocerciasis Control—have left a legacy that goes beyond better lives for millions of Africans.

For almost three decades, the two initiatives sent ecological teams into the field to collect biological information from thousands of miles of rivers. They were evaluating the environmental impact of vector control—the preferred method of fighting Onchocerciasis at the time—which involved widespread spraying of blackfly larva-killing insecticide on infested waterways.

When spraying was discontinued in favor of mass distribution of the drug ivermectin in 2003, APOC found itself with a massive stockpile of data about the distribution, size and abundance of freshwater fauna—fish and invertebrates—in the river systems of West Africa. With a grant from JRS Biodiversity Foundation, APOC is convening scientists who have worked with Onchocerciasis data from African countries and others likely to use such data to evaluate its value and applicability to regional biodiversity studies.

They will evaluate various influences on data quality, and describe sampling, sorting and analysis methods on insecticide applications in the surveyed areas.

Other priorities include: identifying which components of the data can be improved and how; resolving data ownership issues; choosing formats that will make the data useful to future researchers; and preparing a full proposal for future funding.



Before the advent of Onchocerciasis control programs, tens of millions of people living in West, Central and East Africa were infected and hundreds of thousands suffered total blindness. Thanks to the programs' success in West Africa, 600,000 cases of blindness have been prevented and 25 million hectares of formerly evacuated arable lands restored to use, with the potential to feed an additional 17 million people a year, transforming the region from aid dependent to food exporting.

BURKINA FASO



A Conservation Strategy for the African Savannas

AFRICA'S ELEPHANTS, RHINOS AND OTHER MEGA VERTEBRATES, the last great assemblage of such creatures on the planet, are now threatened. The wildlife of Africa continues to struggle under intense pressure from an increasing human population and land fragmentation—all set against a background of changing climate patterns.

Conserving East Africa's large vertebrates and biological diversity rests on understanding the basis of coexistence between wildlife and people, identifying the emerging threats and finding creative solutions and building support among the region's primarily nomadic pastoral communities. The lack of quantitative tools for mapping spatial and temporal patterns of biodiversity in savanna ecosystems, as well as poor data-sharing among organizations are major impediments to conservation in East Africa. Finding creative solutions comes down to biological research, collaborative conservation planning and rural development on a landscape and regional scale.

JRS Biodiversity Foundation is supporting the African Conservation Centre (ACC) through its funding partner African Conservation Fund (ACF) in a project that will provide decision support tools to help wildlife agencies and community-based associations sustainably maintain the productivity and integrity of savanna ecosystems in the face of pending privatization and land subdivision. The

platform will facilitate the integration and sharing of data scattered among various institutions, conservation researchers and managers and provide



The African Conservation Centre has established direct links with local community conservation initiatives and management personnel in national parks such as Maasai Mara and Amboseli to develop a decision-making platform that will be applicable to conservation programs both inside and outside the protected areas of East Africa.

new tools to support biodiversity planning, assemble data sets, map spatial and temporal patterns, as well as build analytical models suitable for conservation planning.

KENYA



Ewaso Tracking Project

FOR DECADES, monitoring animals, their movements and migrations has been a key component of the study of animal behavior, ecology and conservation. The advent of biodiversity informatics now permits the aggregation and detailed analysis of data collected over many years by many different groups, greatly enhancing its value as a tool for ecosystem management and conserving biodiversity.



Save the Elephants pioneered GPS tracking of elephants and has remained at the forefront of technological developments in the field. The new cell phone technology being used in the Ewaso Tracking Project has long battery life and allows researchers to pinpoint animals and download an almost continuous stream of data.

JRS Biodiversity Foundation is supporting the Wildlife Conservation Network and its partner Save the Elephants as they use mobile phone technology to undertake the Ewaso Tracking Project. It involves integrating tracking information with landscape features as key components for wildlife conservation and management in the Ewaso watershed in the Samburu, Laikipia and Isilio districts of northern Kenya.

The objective is to collect comparative data on the movements of elephants, lions, cheetahs, hyena, zebra and cattle, integrating tagging and satellite tracking with ongoing and new wildlife research programs. Harmless electronic collars are deployed on all species and the project has developed custom tools for use with mapping software.

Information on how various species use the range will be assembled and available to researchers and policy makers. This will promote understanding

of the overlap between wildlife and cattle as well as the potential health risks of this relationship. Preliminary tracking data has already revealed key concentration areas and the tenuous corridors connecting them. The data also show how human activities, especially fences, influence wildlife distribution in the system.

KENYA



Expanding the Reach of the Tanzanian Bioportal

WHILE MUCH OF THE EXISTING KNOWLEDGE ON BIOLOGICAL DIVERSITY—on taxonomy, genetics, ecology, conservation and legislation—is already available in digital form, it is often compiled for specific purposes and stored in individual databases using different formats. This makes the task of gathering and organizing information cumbersome and time-consuming.

International initiatives such as the Global Biodiversity Information Facility (GBIF) and the Encyclopedia of Life are making data in specific domains globally accessible but much of the demand for information is driven by national or local user groups with specific questions or problems.

JRS Biodiversity Foundation is helping the Netherlands-based ETI Bioinformatics to expand the recently-launched Tanzanian Biodiversity Information Facility (TanBIF) web portal—*www.tanbif.or.tz*. The portal allows users to harvest text or map-based data from some 50 national sources, as well as GBIF and other international databases.

TanBIF will organize local training sessions with the goal of getting as many Tanzanians and visitors as possible involved in the task of gathering and uploading biodiversity photographs, location details and other information.



Thanks to JRS funding, ETI will extend the functionality and reach of its TanBIF portal by adding new features, including a photo upload tool for tourists and a tool for scientists that will promote greater collaboration in the generation of species distribution information.

The TanBIF portal will also feature a special biodiversity project tool for schools with learning materials and teacher training modules provided by the educational organization Viafrica. The website materials will also be available in CD format and all project outputs will be available to other countries in the region looking to build or extend their own biodiversity portals.

TANZANIA



East Africa Regional Project on the Global Strategy for Plant Conservation (GSPC)

THE SURVIVAL OF RURAL POPULATIONS in the East African countries of Kenya, Tanzania and Uganda is inextricably linked to the region's rich natural heritage of plant biodiversity. Among the region's more than 35,000 plant species are many that make vital contributions to local livelihoods and well-being by providing food, shelter, primary healthcare and income.

Even so, the region's ecosystems continue to decline under multiple assaults: unsustainable resource use, overexploitation, poor farming practices, land degradation and loss of soil fertility. As more plant species face the threat of extinction,

the poverty trap closes more tightly on communities already among the poorest on the planet.

The region's three national governments have all ratified the Convention on Biodiversity (CBD), whose Global Strategy for Plant Conservation (GSPC) provides a framework to halt the continuing loss of plant diversity. However, implementation of GSPC programs is hampered by the absence of a widely accessible working list of flora and fauna and limited knowledge about the status of regional biodiversity.

With support from the JRS Biodiversity Foundation, Botanic Gardens Conservation International US is working on a project to collect and synthesize baseline data, build infrastructure for biodiversity informatics, and make information more widely available to end-users. Working within existing regional initiatives, the project is building capacity and infrastructure for regional implementation of the GSPC by addressing the need for three types of primary data—taxonomy, biodiversity status and sustainable use.

The project conducts workshops, provides equipment and training and collaborates on existing digitization initiatives for plant specimens. Other outputs will include a synthesis of existing sustainable use information on medicinal plants and a joint Red List of threatened medicinal plant species in the region.

The world renowned Aloe species – known for its healing properties and in great demand by the cosmetic and herbal industries: 83 species occur in East Africa, all except three poisonous species have potential for cultivation and value addition.



KENYA, TANZANIA AND UGANDA



Digitizing the Compton Herbarium Collections

ALTHOUGH THE GREATER CAPE FLORISTIC REGION (GCFR), commonly known as the Cape Floral Kingdom, is the smallest of the world's floristic regions it is also the most diverse and contains two of Africa's seven biodiversity hotspots. Much of what is known about this botanic wonderland is housed in the Compton Herbarium. This venerable facility, part of the South African National Biodiversity Institute (SANBI), focuses on documenting and studying the flora of the GCFR and now boasts a collection of about 750,000 specimens spanning 170 years of research.

Currently, only about 12.5 percent of the herbarium's vast collection is digitized and available electronically and fewer than half of these databased entries are geo-referenced. Thus a vast amount of valuable floristic and spatial data remains trapped on herbarium labels that are not easily accessible to researchers, conservation biologists or planners.

JRS Biodiversity Foundation is supporting a SANBI project to digitize and georeference the herbarium collections of the five largest plant families —the Asteraceae, Ericaceae, Fabaceae, Proteaceae and Restionaceae—within the GCFR.

Employing dedicated digitizers, it is anticipated that 80,000 to 100,000 herbarium specimen records will be digitized and geo-referenced during the two-year project. SANBI expects that making

the information freely available will enhance knowledge and understanding of past and present species distribution, current and potential threats, and how they can be minimized. This will help scientists, conservationists, and planners make better informed land use and protection decisions.



The Succulent Karoo area of the GCFR is one of only two arid biodiversity hotspots in the world. It has the richest succulent flora (water-retaining plants adapted to arid climate or soil conditions) on earth. A remarkable 69 percent of flora species in the Succulent Karoo are endemic, including the mysterious tree-like succulent known as the "halfmens".

SOUTH AFRICA



Southern African Reptile Conservation Assessment

SOUTH AFRICA, LESOTHO AND SWAZILAND are home to a remarkable variety of reptiles, from the Nile crocodile, black mamba, puff adder and Cape cobra to less notorious species that, nevertheless, play vital roles as predators and prey in the region's terrestrial, freshwater and marine ecosystems.

But efforts to protect and conserve the region's

rich reptile biodiversity face many hurdles: distribution data that is incomplete and difficult to access from many separate databases; unresolved taxonomic issues; a *Red Data* book so outdated that it does not list 25 percent of known species; scant information on threatened species with no clear priorities to conserve them; and a poor public image of reptiles in general, snakes in particular.

The SARCA region includes three of Conservation International's 34 global biodiversity hotspots. Of the 377 described species, 35% occur nowhere else in the world, and the region has the richest tortoise diversity and the third-richest lizard diversity in the world.

The Southern African Reptile Conservation Assessment (SARCA), run by the Animal Demography Unit at the University of Cape Town with funding from JRS Biodiversity Foundation and the South African National Biodiversity Institute, has addressed these problems on three fronts.

SARCA incorporated all existing distributional data for the region's reptiles—about 130,000 records for over 400 species and subspecies—into one database. Gaps in the data were filled through field surveys; 24 sorties yielded more than 4,220 new distribution records.

To promote public awareness and participation, the SARCA website, <http://sarca.adu.org.za>, was regularly updated with newsletters and field trip reports. The site also hosts the SARCA Virtual Museum, which invited members of the public to contribute to the distribution database by sending in reptile photos and accompanying geo-reference data. A total of 6708 records were received from about 350 contributors.

The third major output from SARCA is the soon to be published *Atlas and Red Data Book of the Reptiles of South Africa, Lesotho and Swaziland*, which will contain information relevant to the conservation of species (taxonomy, distribution, threats and recommended conservation actions).

SOUTH AFRICA



The Vahinala Project: A Catalogue of the Vascular Plants of Madagascar

THE ISLAND NATION OF MADAGASCAR is a biodiversity hotspot of global importance, its remarkable flora and fauna the product of more than 100 million years of evolution in relative isolation. With six whole families of flowering plants and more than 90 percent of its 14,000 or so plant species endemic to the island, the diversity and uniqueness of Madagascar's flora is without parallel.

However, despite more than two centuries of botanical exploration—and with new species being discovered at an astonishing rate—the inventory, description and documentation of Malagasy plants are still very far from complete. Consequently, the role of plant information in conservation planning, economic development initiatives and assessing their impact on human livelihoods is severely compromised.

JRS Biodiversity Foundation is supporting the Missouri Botanical Garden (MBG) and its partners as they undertake the *Vahinala Project: A Catalogue of the Vascular Plants of Madagascar*. The goal is to create a practical, up-to-date, on-line synthesis of the flora of Madagascar for a diverse group of

users, including systematists working on Malagasy plants, ethno-botanists and natural products chemists, natural resource and protected areas managers, conservation scientists and government agencies.

Such a comprehensive catalogue is now possible because of the 25 years MBG has devoted to compiling baseline taxonomic data on all names ever applied to Malagasy plants into its TROPICOS database. The new catalogue, available on the web through *eFloras.org*, organizes these names within a modern phylogenetic hierarchical framework, resolving naming issues and attaching critical information for biodiversity policy and planning.

Each species profile includes its habitat, ecology, endemic status and distribution by province, bioclimatic zone, vegetation type, elevation and presence in protected areas, along with its rarity and conservation status. To facilitate research, identification, and communication among users, "species pages" also come with images of specimens, line drawings and photos of living plants in their habitats.

Full species pages for more than 40% of Madagascar's 10,000 plant species known to science (an estimated 4,000 more have yet to be described), are now accessible through *eFloras.org*. The authoritative database of endemic flora feeds directly into international biodiversity databases, including the *Encyclopedia of Life*, the *Catalogue of Life* and the *Global Biodiversity Information Facility* (GBIF).

MBG is accelerating the pace, with the goal of listing the remaining known species by 2010 to coincide with both Global Strategy for Plant Conservation and the UN's Millennium Development Goals.

MADAGASCAR



Eco-Informatics Centre

NOWHERE IS THE CONNECTION between human development and environmental degradation more apparent than in India—a country of exceptional biodiversity that is also home to almost one-fifth of the world’s population. India’s environmental challenges are charted in its rapidly diminishing biological resources. The lack of biodiversity information that is easily accessed, retrieved, disseminated and applied is hampering efforts to reverse these trends.

With a network of offices and field stations across India, the Ashoka Trust for Research in Ecology and the Environment (ATREE) works to develop the

human and social capital needed to address the country’s environmental requirements at local, regional and national levels. ATREE recently created the Eco-informatics Centre to give researchers, educators, government and non-government organizations, planners, policy makers and the public easy access to critical information on conservation and natural resource management.

JRS Biodiversity Foundation is supporting ATREE and its Eco-informatics Centre to meet four objectives:

- Develop taxonomic and landscape level databases;
- Build capacity among environmental professionals to handle large databases, niche modeling, GIS and Remote Sensing based analysis, and information management;
- Enrich existing databases; develop new tools and novel ways to process, analyze and disseminate information;
- Collaborate in building India’s Biodiversity Portal.

Through its website, *www.ecoinfoindia.org*, the Eco-informatics Centre is providing a publicly accessible resource for integrated information on ecology and the environment, the first in India to offer interactive, searchable web-GIS services, allowing users to analyze, integrate and map spatial data for conservation and natural resource management.

The recently launched the India Biodiversity Portal (www.indiabiodiversity.org) will be one of the beneficiaries of the work being done at the Eco-Informatics Centre. Its goal is to rapidly increase the available reliable data on the country’s biodiversity and its distribution.

INDIA



Towards a New Generation of Naturalist Citizens

FOR TWO DECADES, the *National Biodiversity Institute of Costa Rica* (INBio) has captured, processed and transferred information and knowledge about the country’s rich biodiversity to promote its sustainable use.

The Institute’s pioneering work in biodiversity informatics—turning field data from professional taxonomists and talented amateurs into usable biodiversity information for educators, policy makers and conservationists—has earned international recognition.

JRS Biodiversity Foundation is supporting the Institute’s efforts to take advantage of new technology. These improvements will enable INBio to scale up and streamline information generation and delivery, particularly multimedia (photographs, illustrations maps and videos), and to generate new outputs such as structured natural history descriptions.

The goal is to make biodiversity knowledge and multimedia information so accessible and easy to use that it will empower a new generation of naturalist citizens. Soon any Costa Rican or visitor can become a botany “expert,” for example, using a PDA or cell phone web browser to identify species instantly through INBio’s information systems.



The small nation of Costa Rica shelters four percent of the Earth’s biodiversity, giving it one of the world’s highest indices of biodiversity per area. This natural wealth is the result of its position as a land bridge between North and South America and having both Pacific and Atlantic ocean coasts. Costa Rica is a leader in natural resource conservation and has designated more than 25 percent of its territory as protected areas.

COSTA RICA



Establishing Conservation Priorities by Integrating Biodiversity & Geospatial Data

THE INTER-AMERICAN BIODIVERSITY INFORMATION NETWORK (IABIN) was established in Panama in 1996 to promote better natural resource management and conservation among countries of the Americas through a web-based forum that fosters technical collaboration and coordination in the collection, sharing and use of biodiversity information.



To demonstrate the usefulness of integrating biological and geospatial data, IABIN created a model that predicts the invasion of streams in northern Mesoamerica by African tilapia fish. The modeling system was developed for all Belize's domestic and international watersheds, including portions of Guatemala and Mexico. It allows a user to draw on 27 specially prepared environmental datasets to predict habitat vulnerability to tilapia invasion in streams throughout the project area.

IABIN has developed five thematic networks—Species and Specimens, Ecosystems, Invasive Species, Pollinators and Protected Areas—supported by a catalog service with search and retrieval capabilities to provide access to information, coordinate technological developments, build capacity for information exchange and facilitate inclusion of biodiversity themes in national agendas.

JRS Biodiversity Foundation is supporting a new IABIN project that will combine data generated through the five thematic networks with geospatial data. The extensive and growing collections of digital data will be geo-referenced, fostering development of user-friendly decision-support tools, applications and information products.

The project will also develop and promote applications and activities that support the establishment of ecosystem conservation priorities, with an initial focus on existing plant species and bats in Mesoamerican natural history collections, and on geospatial data for the region, integrated through the IABIN *Geospatial Network*.

The project will integrate: specimen and observation records with species data, including images; data on invasive species and pollinators with socio-economic data; and geospatial data analysis of ecosystems and protected areas for conservation and sustainable development planning.

PANAMA



Developing a Biodiversity Information System in Ecuador

ECUADOR IS ONE OF THE MOST BIOLOGICALLY ABUNDANT COUNTRIES IN THE WORLD, with a species count that includes 464 amphibians, 405 reptiles and 1,600 birds, accounting for seven, five and 16 percent of global diversity.

But the threats to Ecuador's natural wealth have never been more serious. The country now has the highest rate of deforestation in South America. Many species have already disappeared, and many more species and their habitats are threatened by the ever-increasing human footprint.

Efforts to reverse this trend are hampered by the absence of detailed and easily accessible biological information, an indispensable resource for researchers, conservationists and policy makers. JRS Biodiversity Foundation is supporting a new project—a strategic partnership between the Museo de Zoología de Vertebrados, at Pontificia Universidad Católica del Ecuador, and the University of Kansas—to develop an open access information system capable of integrating and providing updated, high quality biodiversity data.

The Biodiversity Information System of Ecuador will accelerate the process of species discovery and description by providing reliable and up-to-date taxonomic information and biodiversity

tools and training through a user-friendly Internet interface. The project partners are



Ecuador's Natura Foundation says 45 percent of the country's lowland forests, 48 percent of its highlands and eight percent of its Amazon basin have been lost and that deforestation now claims about 680,000 acres every year. At that rate, Ecuador's remaining forests would be gone in 40 years.

designing the system to be used by a wide audience, including researchers, government and non-governmental organizations, indigenous and non-indigenous communities, conservation biologists, policy makers, educators, students, tourists and interested citizens.

ECUADOR



Enhancing the 'SpeciesLink' Network

THE REFERENCE CENTER ON ENVIRONMENTAL INFORMATION (CRIA) developed the *speciesLink Network* to bring together scattered data from biological collections from the state of São Paulo, Brazil. When the first version of *speciesLink* was launched in 2002, it drew its few thousand entries from just 12 collections. Today, *speciesLink* integrates primary data from 159 collections and sub-collections nationwide—a vast and growing network of more than 3 million online records (1.35 million of them geo-referenced) incorporating more than 260,000 different species names.

The networked collections are part of the information infrastructure to underpin sustainable development and scientific and technological innovation in health, agriculture, industry, biodiversity and environment. But the rapid growth of *speciesLink* has

exposed the need to consolidate and improve existing systems and develop new tools to ensure that scientists and policy-makers have easy access to data and information on Brazil's biodiversity. JRS Biodiversity Foundation is supporting CRIA in this initiative.

Improved features include a specially developed software that enables collections to filter sensitive data and update their information in the network; the user query interface integrated with a map service; data cleaning routines; the management system that tracks the progress of each collection; and a reliable routine backup system.

New tools developed include a data harvester that stores non-sensitive data at a centralized database; network indicators (produced dynamically or on a regular basis); an automatic georeferencing tool, and new data cleaning applications to help data providers identify potential errors.



Although Brazil's natural heritage faces many serious threats—from cattle ranching, logging and mining to dams, invasive species and urban development among others—it remains the planet's treasure trove of biodiversity. It has the most known species of plants, mammals and freshwater fish, ranks 3rd in bird species and 5th in reptiles and is 2nd to Indonesia in endemic species. The actual extent of the country's biodiversity remains a mystery, though some scientists estimate the total number of plant and animal species could be as high as 4 million.

BRAZIL



Index for Conservation Compatibility

WHILE MOST COUNTRIES recognize the need for robust ecological monitoring programs that serve conservation efforts, many find the complex task takes a disproportionate share of vital resources from other conservation priorities. This problem is particularly acute in neo-tropical countries where the sheer scale of biological richness, the size of areas in need of protection, the persistence of threats, the diversity of stakeholders and funding constraints make it difficult to integrate conservation efforts and collect relevant data.

Chicago's Field Museum of Natural History is using a JRS Biodiversity Foundation grant to refine a new monitoring tool developed for central Peru's Parque Nacional Cordillera Azul (PNCAZ) and its buffer zone. This national park is the last remaining intact expanse of Andean foothills in Peru.

The Index for Conservation Compatibility (ICC) guides the park's management activities and measures success based on geo-referenced field information that is synthesized into maps immediately. The ICC is a composite measure of cultural assets, quality of human life, threats to cultural and biological diversity, operational (on the ground) and institutional mechanisms and biological diversity.

What sets the ICC approach apart from other monitoring methods is its focus on hectare-block land units. Each hectare is ranked on its conservation



The ICC ecological monitoring system has been so successful that Peru is considering its adoption in all national park protected areas. Conservation organizations in Peru, Ecuador and Bolivia have also approached the Field Museum to share the ICC methodology. With continued improvement and dissemination, the ICC is expected to achieve widespread use as an effective, cost-efficient management and planning tool.

status according to adjustable parameters.

The Field Museum is piloting the ICC in partnership with CIMA, a Peruvian NGO, and using the JRS Foundation grant to refine the model, broaden its applicability, distill its knowledge into booklets produced by CIMA for use in Latin America, and create a bilingual website to share ICC with conservation practitioners worldwide.

PERU



Botanical Data for Conservation in the Southwestern Amazon

THE AREAS OF PERU, BRAZIL AND BOLIVIA that make up the Southwestern Amazon region not only share a rich and distinct flora, they also share serious conservation threats and challenges as well as real opportunities, all requiring coordinated regional action.

The plant biology of this conservation hot-spot is poorly understood, not because there is no information on the region's estimated 15,000 plant species but because it exists in various forms, incompatible and unconnected, in about 75,000 collections across four countries.

Equally problematic is the lack of institutional and human resources to handle this data. Communication among the region's eight repositories of specimens and information is poor and there is limited capacity to work with the data they already have or to meet the urgent need for new information about this little-known area.

The JRS Biodiversity Foundation is supporting a New York Botanical Garden project—the first of its kind to cover an entire quadrant of the Amazon—that will assemble the scattered botanical data, institutions and human resources in order to better plan the management and conservation of the region's forests.

Twelve organizations from four countries are involved. Regional herbaria are receiving computer hardware and staff training to document their specimens and data electronically. Specially developed software will speed data entry and geo-referencing and detect and correct errors or discrepancies in taxonomic, nomenclature and geographic data. The goal is to “rescue,” integrate and clean all available data on the region's plant diversity so that it can be accessed by a wide range of users.



By providing hardware, software and training for the powerful Botanical Research and Herbarium Management System, the New York Botanical Garden project supported by JRS will help fill an enormous vacuum in regional biodiversity infrastructure. It will also provide training in digital photography, integrating field images into data-bases and producing field guides.

PERU, BRAZIL AND BOLIVIA



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