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**A SURVEY OF
UNITED STATES GOVERNMENT
FUNDED ACTIVITIES SUPPORTING
BIODIVERSITY RESEARCH AND
CONSERVATION IN COSTA RICA**

**United States Agency for
International Development,
San Jose, Costa Rica**

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ACRONYMS

USAID	Agency for International Development
CAPS	Central American Peace Scholarship
LAC	Latin American and Caribbean
ESP	Environmental Support Program
PIP	Parks in Peril
NMBP	Neotropical Migratory Bird Program
ROCAP	Regional Office for Central America and Panama
PROCACAO	Regional Agricultural Technologies Network
RAHE	Regional Agricultural Higher Education
RENARM	Natural Resources Management Project
G/R&D/R	Global/Research and Development/Research
PSTC	Program in Science and Technology Cooperation
CDR	Cooperative Development Research Program
G/R&D/ENR	Global/Research and Development/Environment and Natural Resources
NSF	National Science Foundation
BSP	Biodiversity Support Program
ICBG	International Cooperative Biodiversity Groups
ABSP	Agricultural Biotechnology for Sustainable Productivity
CRSP	Collaborative Research Support Program
USFWS	U.S. Fish and Wildlife Service
PRMVS	Regional Wildlife Management Program for Mesoamerica and the Caribbean
BIODOC	Biological Documentation Center
NPS	National Park Service
NOAA	National Oceanic and Atmospheric Administration
IAI/IC	Inter-American Institute for Climate Change Research
OES	Bureau of Oceans and International Environment and Science
NFWF	National Fish and Wildlife Foundation
EPA	Environmental Protection Agency
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
ARS	Agricultural Research Service
NIH	National Institutes of Health
NCI	National Cancer Institute
NIUSAID	National Institute of Allergy and Infectious Diseases
NIMH	National Institute of Mental Health
OTS	Organization for Tropical Studies
INBio	National Biodiversity Institute
CATIE	Center for Tropical Agricultural Research and Education
EARTH	Escuela de Agricultura de la Region Tropical Humeda
FORESTA	Forest Resources for a Stable Environment
BOSCOSA	Forest Conservation and Management
REFORMA	Regulation of Forest Management
TNC	The Nature Conservancy
MIRENEM	Ministry of Natural Resources, Energy and Mines
WWF	World Wildlife Fund
CCC	Caribbean Conservation Corps
UNA	Universidad Nacional de Costa Rica

INTRODUCTION

Costa Rica has often been cited as a leading country, regionally and globally, for biodiversity research and conservation - the "Cadillac of Central American biodiversity research" as one of the respondents in this survey put it. A multi-year study on U.S. biodiversity investment in developing countries by World-Resources Institute listed Costa Rica as receiving the highest levels of combined U.S. Government, NGO and private funding for the years 1987 and 1989, and fourth highest level for 1991 - globally. In all three years, the U.S. Government, primarily the U.S. Agency for International Development and the National Science Foundation, provided the bulk of U.S. funding (Abramovitz, 1991,1993).

The WRI report findings, along with the general awareness on the part of the USAID mission that "there is a LOT going on out there" raised questions about the size and nature of the U.S./Costa Rica biodiversity research relationship. There was a general agreement that this relationship was very strong - but no documentation existed that showed how strong. And, while Costa Rica is host to one of the world's largest concentrations of biodiversity - five to seven percent of all plant and animal species currently identified are found in Costa Rica, it is not considered a biodiversity "hotspot" and does not cover a large area compared to "hotspot" countries such as Brazil, Madagascar or Ecuador (McNeely, Miller, Reid, et al, 1990). Why, then, such a high comparative level of investment?

If one were to read the WRI figures as investment directed solely toward conserving Costa Rica's biodiversity on a dollar/hectare basis without looking at the myriad of other regional and global benefits of this investment, it might appear that there is over-investment in Costa Rica's biodiversity. Many people argue that quite the opposite is true - that, as the world's largest center for tropical research, Costa Rica is the source of model institutions and programs which are being applied throughout the tropical world to promote the conservation of biological resources. And, therefore, there is a crucial need to continue and increase funding levels, not only to stem the rapid extinction of Costa Rica's remaining biodiversity, but also so that the momentum of many years of building scientific capacity can be harnessed to provide returns on the investment that will benefit science, conservation, medicine, agriculture, and many other sectors on a global level.

This question - of Costa Rica's role in the global biodiversity research and conservation effort - is becoming important as many of the USAID programs funding biodiversity activities in Costa Rica face the U.S. Government budget guillotine. In the very near future, the majority of USAID programs listed in this survey will be discontinued or drastically reduced. The USAID Mission

Costa Rica will close in 1996. These actions will have a large impact on biodiversity research and conservation in Costa Rica.

Another important question vis a vis the U.S./Costa Rica bilateral relationship specifically, and U.S. post-cold war foreign policy in general, is the role of collaborative science in U.S. foreign policy. A 1992 Carnegie Commission report on Science and Technology in U.S. International Affairs points out that serving the interests of the United States at home and abroad calls for a sharply improved incorporation of scientific and technological insight into U.S. foreign policy and that the international research base needs cooperation if it is to grow and prosper. As global environmental issues such as climate change and loss of biodiversity increasingly move to the center of the foreign policy stage, the need for a strong scientific underpinning for policy making, as called for in AGENDA 21, will increase.

In light of these questions, it became evident to the USAID Mission in Costa Rica that a survey of U.S. Government activities supporting biodiversity research and conservation in Costa Rica would be an extremely useful document for examining both where the U.S./Costa Rica biodiversity relationship is and where it is going. Foundation and Nongovernmental Organization funding is an important element of the U.S./Costa Rica biodiversity relationship and many grants programs listed in this survey require parallel financing. This survey, however, focuses exclusively on U.S. Government funding. Collaborating foundations and NGOs for individual projects are listed in the appendix. The Consultative Group on Biological Diversity is currently undertaking a similar exercise that will document Foundation funding for biodiversity in Costa Rica.

The survey was carried out over a period of five weeks by Anne Hambleton, an International Relations Specialist and Presidential Management Intern (PMI) from the National Oceanic and Atmospheric Administration's National Environmental Satellite, Data, and Information Service (NOAA/NESDIS), while on a PMI rotational assignment with the USUSAID Mission in Costa Rica. Thirty two U.S. Government programs supporting one hundred and fourteen biodiversity research and conservation activities are described along with dollar figures for the length of the program, 1992 and 1993 where available. In addition, interviews were conducted with a number of individuals in Costa Rica. These included: Daniel Janzen of the University of Pennsylvania; Rodrigo Gamez and Anna Sittenfeld of INBio; Chuck Schnell and Rebecca Butterfield of the Organization for Tropical Studies (OTS); David Heesen, Anne Lewandowski and Enrique Barrau of the Costa Rica USAID Mission, and Mario Boza, Father of the Costa Rican National Park System.

Through the many discussions with these individuals, representatives from donor agencies, and scientists working in the field, it became clear that Costa Rica is indeed an

international center for tropical research and that many of the research and conservation efforts in Costa Rica are looked to as models for work both regionally and globally. A serendipitous set of inputs, including: unique natural and political environments; a high concentration of world-class scientists; a strong institutional capacity; a few visionary individuals; and a generally high awareness on the part of Costa Ricans of the many values of biodiversity all combine to make biodiversity Costa Rica's "comparative advantage", contributing to a number of vitally important economic sectors from tourism to pharmaceuticals to agriculture, and providing a global "laboratory" for innovative scientific research.

Equally clear, however, was the precariousness of this designation. While one of Costa Rica's strengths is a strong human capacity and institutional base, much of the development and maintenance of this base is dependent on external donors - who rarely communicate with each other and are themselves subject to the winds and tides of constantly changing policy priorities.

Costa Rica continues to have the highest rate of deforestation in Central America. Between 1950 and 1985, one third of the country's natural forest cover disappeared. Rapidly increasing land values and government policies that still encourage "improving" land by clearing it for pasture or cultivation are destroying important biological corridors. Most research activity is conducted in national parks and conservation areas which are becoming islands of biodiversity. Some research takes place at private reserves and research centers, mostly foreign-owned, but these areas face the same pressures.

Tourism, also, could make Costa Rica a victim of its own success. Indirectly through tourism, a large portion of which depends on Costa Rica's National Parks, biodiversity is already one of the country's leading earners of foreign exchange. As the second largest foreign exchange earner after banana exports, tourism, primarily "ecotourism", is in the midst of a boom. Biodiversity research efforts promote nature based tourism by generating comprehensive plant, bird and animal guidebooks and adding to Costa Rica's reputation as a fascinating place where tropical natural areas are accessible. Increased numbers of tourists, however, are exceeding carrying capacity for many of the parks. Uncontrolled, these increased numbers result in degradation of the parks and erosion of the natural resources base - the draw for the tourists in the first place. In addition, an influx of new large, mass tourism beach resorts is adding additional strain on the delicate coastal and mangrove ecosystems.

While Costa Rica's scientific capacity is relatively strong, there is room for improvement. Better communication between researchers and conservationists would better serve the interests of both. Better communication of the research findings of foreign researchers to the Costa Rican science community would

strengthen the Costa Rican science base.

Biodiversity is a huge U.S. foreign policy interest area that is articulated constantly by U.S. researchers, conservationists and others, but is overlooked as an element, arguably the most important element, of the U.S.- Costa Rica bilateral relationship. ~~Costa Rican biodiversity influences U.S. business,~~ science, conservation, agriculture, tourism, education, medical research and environmental activities.

The following descriptions of U.S. Government activities, the case studies and the list of biodiversity investment by each agency raise questions about the importance of the U.S./Costa Rica biodiversity research and conservation relationship. It is hoped that this list will provide the base for a more in-depth examination of the questions it raises, namely: 1) What is the nature of the U.S./Costa Rica biodiversity relationship? 2) What is Costa Rica's role in the "big picture" of regional and global biodiversity conservation? 3) Is there a need for more resources to support Costa Rican efforts? 4) What would be the most effective use of new resources? 5) How will USAID budget cuts affect relationship? 6) What importance does Costa Rica's biodiversity and research institutions hold for the U.S.? The world? and, 7) What role should collaborative science play in U.S./Costa Rica bilateral relations?

METHODS

For the purposes of this survey, "biodiversity research and conservation" encompasses a very broad definition of activities relating to the study of biodiversity and the management of natural resources that make up habitat areas. An attempt has been made to list all U.S. Government funded activities that have a direct positive and stated impact on the knowledge of and protection of biodiversity in Costa Rica. These activities include:

- 1) species and ecosystem conservation;
- 2) support for protected areas;
- 3) sustainable forestry and forest conservation;
- 4) environmental education and training in agriculture and natural resource management; and;
- 5) policy planning and analysis

Previous efforts to quantify U.S. investment in Costa Rica by the World Resources Institute (Abramovitz, 1991,1993) reveal significantly lower figures. This is most likely due to a narrower definition of "biodiversity conservation" by Abramovitz. The definition in this survey was broad enough to include support for two agricultural institutions in Costa Rica, EARTH and CATIE, both recipients of a number of large grants from USAID.

Most of the programs and projects described herein are currently active. Exceptions are for projects funded by grants programs that are less than five years old and large impact grants such as those made in recent years to EARTH and CATIE.

The figures quoted are intended to give a general sense of the size of the relationship. The numbers in this report do not represent the actual U.S. total investment because collaborative efforts are diverse, scattered, and, often unquantifiable. For example, no specific numbers are available for most Park Service or Smithsonian activities - agencies that both have (and have had for a long time) a very active collaborative relationship with Costa Rica.

In other instances, such as EPA and NOAA, investment in Costa Rica is part of a large regional grant or agreement and the actual numbers, efforts, and benefits for individual countries cannot be determined. Regional education and capacity building investments in Costa Rica, such as USAID's large investments in EARTH and CATIE, and the Fish and Wildlife Service's support of PRVMS also create distortions since the funding contributes toward capacity building in the entire region rather than just Costa Rica.

In other cases, still, individual grants and programs complement each other and are often based on the result of cumulative efforts. An example is the complex cooperation between research efforts by Dan Janzen at Guanacaste, parataxonomists in other parts of the country, several long term research projects at OTS, scientists at INBio (see Appendix 2 - INBio case study), and scientists at USDA - where combined resources provide a "compounded interest" on the investment and new research depends on a cumulative thirty year base of information funded by an assortment of grants from the National Science Foundation, USAID, the National Fish and Wildlife Foundation, Several Universities, a number of foundations and some NGOs.

Some of the figures (with asterisks) represent approximate figures. In most cases these were derived by dividing a length of project figure by the number of years of the project, or, in the case of USAID/ROCAP/RENARM, dividing a yearly regional figure by the number of countries involved. Some of the figures for 1993, such as those for NSF research grants are not complete because of processing time lags. USAID projects are notoriously difficult to track in terms of the difference between amounts of money obligated vs spent during a specific time period. This often depends on the project implementor and how the money is spent. Wherever possible USAID figures in this survey represent the fiscal year (10/1 - 9/30) in which they were obligated.

Finally, this survey is not a complete listing of all U.S. government activities. No environmental activities of the U.S. Department of Defense (eg; Office of Naval Research, etc.) were included. Nor was the Department of Energy contacted about possible activities. Due to the limited time and difficulties obtaining information, details about Costa Rica activities by the USDA Office of International Development and Cooperation, Agricultural Research Service, and the Inter-American Foundation were also not included. There may be more programs that have been overlooked.

- Dept 7 Dy.
- Dept. 7 Energy
- USDA
- Smithsonian
- IAF

U.S. GOVERNMENT BIODIVERSITY INVESTMENT IN COSTA RICA

AGENCY	PROGRAM	LOP	1992	1993
USAID	MISSION/VARIOUS	96550000	8715860	2405700
	MISSION/CAPS	UNAVAILABLE	455000	585000
	LAC/ESP	480242	0	76525
	LAC/PIP	157699	60269	81552
	LAC/NMBP	296535	0	296535
	LAC/TECH	UNAVAILABLE	UNAVAILABLE	UNAVAILABLE
	ROCAP/PROCACAO	357142		
	ROCAP/RAHE	27854924		
	ROCAP/RENARM	6840000	1140000	1140000
	G/R&D/R/PSTC(90-93)	1402938	749521	0
	G/R&D/R/CDR(90-93)	545350	146560	202540
	G/R&D/ENR/AID/NSF	1464645	181182	536277
	G/R&D/ENR/BSP	169896	65792	14560
	G/R&D/ENR/ICBG		0	228000
	G/R&D/ENR/FRMI&II		35000	101000
	G/R&D/AGR/ABSP	724200	120700	120700
	G/R&D/AGR/CRSP		0	49512
USAID TOTAL		136843571	11669884	5837901
INTERIOR	USFWS/SMALL GRAN	115849	16500	41000
	USFWS/PRMVS/BIOD	1094870	79000	111000
	NPS	750000	UNAVAILABLE	UNAVAILABLE
INTERIOR TOTAL		1960719	95500	152000
NOAA	IAI/IC	UNDECIDED	0	0
STATE	OES	10000	0	10000
PEACE CORPS		UNAVAILABLE	UNAVAILABLE	UNAVAILABLE
SMITHSONIAN		UNAVAILABLE	UNAVAILABLE	UNAVAILABLE
NFWF		350000		350000
EPA		UNAVAILABLE	0	UNAVAILABLE
USDA	FS/TFP	475945	108070	335875
	FS/IF	60000	20000	40000
	OICD	UNAVAILABLE	UNAVAILABLE	UNAVAILABLE
	ARS	UNAVAILABLE	UNAVAILABLE	UNAVAILABLE
USDA TOTAL		535945	128070	375875
NSF	GRANTS (92-93)	3790275	3160025	630250
	ICBG		0	709250
NSF TOTAL		3790275	3160025	709250
NIH	ICBG		0	166666
TOTAL		143490510	15053479	7601692

U.S./COSTA RICA BIODIVERSITY RESEARCH AND CONSERVATION RELATIONSHIP

The U.S. Government/Costa Rica biodiversity research and conservation relationship is remarkably broad and deep. This survey considers four key elements that make up this relationship: 1) U.S. Government programs; 2) collaborators in Costa Rica; 3) research and conservation activities; and; 4) individual personalities.

Perhaps the most important aspect of the relationship, however, is the mutual benefit to both partners stemming from the study and conservation of Costa Rica's biodiversity. The values of biodiversity study and conservation -- both tangible values such as improved agricultural techniques, ecosystem services or species preservation; and intangible values, such as the national and personal empowerment that accompanies intellectual growth derived from academic study or the spiritual comfort stemming from a close connection with the natural environment, are immensely important yet impossible to quantify.

Thirty three U.S. Government programs were identified by this survey as engaging in biodiversity research or conservation in Costa Rica - with seventeen within USAID. ~~Over one hundred and fourteen activities~~ in Costa Rica are supported by these thirty three programs. Costa Rica is host to a number of world class research facilities, academic institutions and nongovernment organizations - all of whom collaborate with U.S. Government programs. The activities themselves encompass a broad range of topic areas from conserving sea turtles to advising on forestry policy. Finally, personalities are at the heart of the relationship. The relationship is nurtured by American and Costa Rican individuals with long standing ties, a deep commitment to the conservation of Costa Rica, and an awareness of the importance of, and vision for the future of, Costa Rica's role in global biodiversity conservation.

1. U.S. Government (USG) Programs

Almost every USG agency with a mandate for environmental research, protection, stewardship or foreign policy is involved with Costa Rica in one way or another. Efforts range from National Science Foundation (NSF) funded basic research, to "bioprospecting" efforts by the National Cancer Institute, to forest management training by the USDA Forest Service, to graduate level wildlife management training by the U.S. Fish and Wildlife Service, to a Climate Change Vulnerability Study by the Environmental Protection Agency (EPA). Many of these, such as the National Oceanic and Atmospheric Administration (NOAA) or EPA, are recent arrivals. Others, like Smithsonian and NSF have been involved with Costa Rica since the turn of the century or the 1960's. A number of programs have been developed in response to the fairly recent (1980's) recognition on the part of the U.S.

Government of the importance of biodiversity.

According to the Carnegie Commission on Science, Technology and Government, "every major U.S. governmental unit labeled 'national'-e.g., the Science Foundation, the Institutes of Health-now has a responsibility for 'global' activities. In addition, virtually every national R&D program has had to take into account international trends. The result has been a checkerboard of international programs, centers offices and exchanges" (Carnegie Commission Report on Science and technology in International Affairs, 1992). Thus, almost every U.S. Government agency with a mission for natural resource management or research sponsors some biodiversity research or conservation activity in Costa Rica.

The Agency for International Development (USAID) currently provides the highest levels of biodiversity funding in Costa Rica with \$11,669,884 in 1992. The largest portfolio, \$9,370,860, belonged to the Costa Rica Mission and included \$6 million for the agricultural college, EARTH. Also part of USAID, the Regional Office for Central America and Panama RENARM project contributed approximately \$1,140,000 in 1992. Of the seventeen current USAID programs and projects, at least seven will be discontinued by 1996. Others will be severely reduced.

The National Science Foundation is the second largest funding agency is the with \$3,160,025 in grants for 1992. Other contributing agencies include: The Department of Interior's U.S. Fish and Wildlife Service(DOI/USFWS) and National Park Service (DOI/NPS), NOAA, the Department of State Bureau of Oceans, and International Environment and Science (OES), Peace Corps, Smithsonian, the National Fish and Wildlife Foundation, EPA, the U.S. Department of Agriculture Forest Service, Agricultural Research Service, and Office of International Cooperation and Development, and, the National Institutes of Health.

2. Collaborators in Costa Rica

Costa Rica is the home of a number of world class research facilities, academic institutions and nongovernment organizations. As a result of this concentration, the scientific capacity is quite strong. Notable research facilities include: the 30 year old, internationally respected, Organization of Tropical Studies (see Case Study), host of a myriad of long and short term basic research projects at its three field stations; the young, innovative and cutting edge, National Biodiversity Institute (INBio) (see case study) where taxonomic work is contributing to a national biodiversity inventory and efforts to find pharmaceutical products from Costa Rica's biodiversity are revealing some of the many values of Costa Rica's biodiversity to the pharmaceutical industry; and The Tropical Science Center, host to many important research efforts in Monteverde and source of much of the scientific underpinning for Costa Rican Government policy planning efforts.

Academic Institutions and Museums in Costa Rica also have strong programs devoted to science and natural resource management and receive funding from the U.S. Government. These include the University of Costa Rica, National University of Costa Rica, CATIE, EARTH, University of Peace, and the Instituto Tecnologica de Costa Rica, and the Costa Rica National Museum.

Some USG agencies work directly with the Costa Rican Government. Examples of this are the collaboration in parks management training and forestry training between the U.S. Park Service and Forest Service, Peace Corps and MIRENEM, the Ministry of Natural Resources, Energy and Mines. NOAA, also, is collaborating with the National Meteorological Institute to develop a regional research network of centers dedicated to the study of global change.

A host of international and Costa Rican nongovernment organizations (NGOs) implement projects in Costa Rica. The list is too long to include here. NGOs receiving U.S. Government funding in 1992/1993 include: CARE, Fundacion Neotropica, FUNDECOR, Caribbean Conservation Corps, CEDARENA, the Monteverde Conservation Corps, Rainforest Alliance, World Wildlife Fund, The Nature Conservancy Costa Rica Audubon and Fundacion pro Iguana Verde.

3. Activities

The one hundred and fourteen U.S. Government supported research and conservation activities listed in this survey (see Appendix one) are topically diverse, range in size from the micro (studying mites) to the macro (study of the regional effects of climate change), range in length from a few weeks to many years, and range in cost from \$1,000 for a small scale environmental education project to \$2 million dollars for bioprospecting work ~~to \$66 million to build an academic institution~~. Some small activities, such as \$100,000 for a training course for parataxonomists, end up generating the momentum for much larger projects - such as establishing a national institution and undertaking a national biodiversity survey.

With a few exceptions, such as money given for debt swaps, land acquisition or buildings, the activities listed in this survey come under the following subcategories:

- 1) species or ecosystem conservation;
- 2) support for protected areas;
- 3) sustainable forestry and forest conservation;
- 4) environmental education and training in agriculture and natural resource management; and;
- 5) policy planning and analysis

4. Personalities

Finally, the individuals who develop and nurture the individual connections make up perhaps the most important aspect of the U.S.

Government/Costa Rica biodiversity relationship. The history of the collaborative research relationship is filled with individuals who have made important contributions to science and society based on research conducted in Costa Rica. Scientists, students, foresters, peace corps volunteers, donors, writers of field guides, founders of research stations, visionaries such as Mario Boza and Alvarro Ugalde who masterminded the creation of the National Parks System and Dan Janzen and Rodrigo Gamez who turned the idea of INBio from a vision into a world class facility, and many others too numerous to mention here all contribute to, and benefit from, this multifaceted and deep relationship. It is the commitment, energy and vision on the part of the many individuals involved that make this relationship so unique.

CONCLUSIONS AND RECOMMENDATION

Conclusions: Through the course of documenting the U.S. Government/Costa Rica biodiversity research and conservation relationship, two conclusions became dramatically clear. The first, that the relationship is very broad and deep is illustrated by the following list of USG programs. The second, that the relationship is an important one and ought to be viewed as an integral element of the U.S.- Costa Rica bilateral relationship, is the subject of the following recommendation.

Recommendation: That USAID/W Center for Development Information and Evaluation consider leading an intergovernmental (USAID/DOI/USDA/Smithsonian/NSF/ETC.) evaluation of the impact and effectiveness of USG funded biodiversity research and conservation efforts over the past twenty five years. This evaluation could be used as a starting point for characterizing and planning the future bilateral relationship between Costa Rica and the United States. It will also provide insight into future directions for hemispheric environmental policy planning and examining the role of collaborative science in U.S. foreign policy.

AGENCY/DIVISION

U.S. AGENCY FOR INTERNATIONAL
DEVELOPMENT (USAID)
COSTA RICA MISSION

PROGRAM

NORTHERN ZONE
FORESTA
TORTUGUERO
BOSCOSA
NATIVE TREE REFORESTATION
REFORMA
EARTH

To address the challenge of conserving biodiversity in Costa Rica, the USAID Mission in Costa Rica manages a number of projects that have the end goal of preserving the natural forest habitat. The two USAID mission focus areas for preservation efforts are: 1) improve the management and integrity of the national park system, and, 2) support the adoption of sustainable forest management practices.

USAID supports the national park system by supporting Costa Rican efforts to 1) increase and utilize revenues generated from the parks themselves to finance park management and protection costs, 2) institute cost effective protection programs, and, 3) stabilize the natural environment in buffer zones surrounding the parks. USAID also assists the government of Costa Rica and the private sector in instituting a legal, market and price environment conducive to sustainable private forestry. Specific forest protection projects include: FORESTA, BOSCOSA, NATIVE TREE REFORESTATION, and REFORMA. Other projects, such as NORTHERN ZONE CONSOLIDATION, TORTUGUERO and EARTH focus on environmental education and more general support for natural ecosystems.

The NORTHERN ZONE CONSOLIDATION project includes approximately \$1,245,000 for an environmental management element managed by a resident environmental advisor. Activities include: 1) an environmental education program which include curriculums, courses and libraries for schools, environmental publications, and billboards and the development of a botanical garden; 2) reforestation; and; 3) technical assistance for solid waste management, mitigative measures for road building, pest management, land use and water quality work, and environmental impact studies.

*Forest
Prog.*

FOREST RESOURCES FOR A STABLE ENVIRONMENT (FORESTA) is a 7 year, \$22,500,000 project that provides technical and financial assistance to promote improved management of protected areas, and sustainable land uses in the buffer zones of the protected areas of the Central Volcanic Cordillera Conservation Area (ACVC). Through this project, the USAID Mission works with a Costa Rican NGO, FUNDECOR, to develop forestry and agroforestry as economically appropriate land uses in the buffer zones of selected national parks of the ACVC. FORESTA has two components: 1) Area-wide activities; and, 2) Specific subproject activities

which include: a) management of protected areas, b) management of natural forests for production, and, c) integration of trees on farms. Approximately \$10,000,000 supports a trust fund which will provide a core budget for FUNDECOR once the Foresta project ends in 1996. FUNDECOR currently has 8,000 hectares of primary and secondary forest under management. By the end of 1995, it is expected that this area will increase to 20,000 hectares.

TORTUGUERO CONSERVATION AND DEVELOPMENT promotes sound ecological preservation in a sea turtle nesting area. The goals of this project are to develop the region into a major natural history tourism attraction, to ensure the perpetuity of the sea turtle rookery and to support management in the protected area. Specific goals are: 1) to create a corridor extension between the Tortuguero National Park and Barra del Colorado Wildlife Refuge that will protect wet tropical lowland biota and the region's biodiversity, 2) to develop an environmental education program, and 3) to support research on the endangered green sea turtle.

FOREST CONSERVATION AND MANAGEMENT (BOSCOSA) supports improved long-term sustainability of the natural resource base by helping to maintain forest cover on the OSA Peninsula. BOSCOSA's goals are to develop and demonstrate natural forest management, sustainable agriculture, ecotourism and biodiversity activities which are economically productive and contribute to the natural forest cover. Activities include: the establishment of a regional training center; preparation of a natural forest management plan; a trust fund to channel grants for sustainable development projects to owners of small and medium plots; support for forestry nurseries; incentive creation for natural forest conservation; development of a Geographic Information System (GIS) for the area; training in para-forestry; establishment of a regional chamber of tourism for the Osa and ecotourism office and guide for the area; and; technical assistance in agroforestry.

The **NATIVE TREE REFORESTATION** project supports the long term sustainability and development of forest resources by developing the capability to plant native trees in the Terraba river valley. The project stimulates reforestation with native tree species by: 1) evaluating the usefulness of native and exotic species on a wide range of growing sites, 2) stimulating improved nursery management in the region's tree nurseries, and, 3) evaluating the effects of native tree species on watersheds and degraded soils.

REGULATION OR FOREST MANAGEMENT (REFORMA) will assist the Government of Costa Rica, particularly the Ministry of Natural Resources, Environment and Mining (MIRENEM) and its Directorate General of Forestry (DGF) to promote sustainable forestry management practices by improving the content, administration and enforcement of the government's own forest regulatory regime.

REGIONAL AGRICULTURAL HIGHER EDUCATION financed the creation (physical plant and academic program) of a four year regional agricultural college, Escuela de Sgricultura de la Region Tropical Humeda (EARTH), that focuses on training agriculturalists to work in humid tropical zones. The goal of the project is to produce a professional human resource base with the practical and educational experience needed to address agricultural problems specific to lowland humid tropics of Latin America. EARTH graduated its first class in December, 1993. Currently 340 students from 16 countries are enrolled at EARTH.

* USAID MISSION PROJECTS WILL BE COMPLETED BEFORE MISSION CLOSE OUT IN 1996

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PROJECTS LISTED IN APPENDIX 1

	<u>LOP</u>	<u>1992</u>	<u>1993</u>
NORTHERN ZONE:	\$ 1,245,000		
FORESTA:	\$ 22,500,000	\$1,709,860	\$2,030,700
TORTUGUERO:	\$ 550,000		
BOSCOSA:	\$ 1,850,000	\$ 300,000	\$ 300,000
EARTH:	\$ 66,705,000	\$6,705,000	
REFORMA:	\$ 3,200,000		
NATIVE TREES:	\$ 500,000		\$ 75,000
MISSION TOTAL:	\$ 96,550,000	\$8,715,860	\$2,405,700

AGENCY/DIVISION

U.S. AGENCY FOR INTERNATIONAL
DEVELOPMENT (USAID)
COSTA RICA MISSION

PROGRAM

CENTRAL AMERICAN PEACE
SCHOLARSHIP (CAPS I&II)

Since 1985, USAID has funded a scholarship program for Central American students to obtain higher degrees, technical high school degrees, and short term technical training at U.S. institutions. The goal of the program is to equip a broad base of leaders and potential leaders with technical skills, training and academic education.

During the first phase, CAPS I, over 1,950 Costa Rican received scholarships - a number for advanced degrees in biology, agriculture and natural resource management. During CAPS II (1990 - 1993), over 340 total Central American trainees received scholarships.

Since 1991, sixteen USAID sponsored Costa Rican graduate students out of a total of sixty three have pursued higher degrees in biology, agriculture, or natural resource management.

* PROJECT IS DISCONTINUED

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	<u>LOP</u>	<u>1992</u>	<u>1993</u>
CAPS		\$455,000	\$585,000

AGENCY/DIVISION

U.S. AGENCY FOR INTERNATIONAL
DEVELOPMENT (USAID)
Bureau for Latin America
and the Caribbean (LAC)

PROGRAM

ENVIRONMENTAL SUPPORT
PROGRAM (ESP)

The Environmental Support (formerly Development of Environmental Management Systems) project of the USAID LAC Bureau funds a biodiversity small grants program which supports pilot projects and studies directly related to the conservation of biodiversity in the LAC region. In order to qualify, projects must have parallel financing and show substantial involvement of host country researchers or institutions. The pilot projects and studies provide seed money for important and innovative initiatives in biodiversity conservation which, are often able to expand through additional funding from other sources.

Highest priority is given to host country conservation organizations and to organizations working closely with these groups. Proposals are judged on the degree of human threat, the intrinsic vulnerability of the species or community, the level of species endemism and habitat richness, the importance of the habitat in maintaining species diversity in other regions, the relevance of the natural ecosystem to human needs, the usefulness of the species or ecosystem as indicators of environmental change, and the degree to which the project addresses policy and economic disincentives to maintenance of biodiversity.

Since 1987, four projects in Costa Rica have been funded:

- 1) A course for Latin American policy makers held at the Organization for Tropical Studies (OTS);
- 2) Establishment of Biodiversity Survey Centers in Five Costa Rican National Parks through the training of parataxonomists;
- 3) Development of an Environmental Interpretation and Extension Center for Tortuguero National Park - a site famous as the largest rookery for endangered green sea turtle encompassing pristine tropical rainforest, wetland, and coastal habitats; and;
- 4) The Central American Biodiversity Legal Project, which enhances on-going legal research supporting regional approaches to the conservation of biological diversity in Central America.

* PROJECT IS DISCONTINUED

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PROJECTS LISTED IN APPENDIX 1

	<u>LOP</u>	<u>1992</u>	<u>1993</u>
LAC/ESP:	\$480,242	\$ 0	\$ 76,525

AGENCY/DIVISION

U.S.AGENCY FOR INTERNATIONAL DEVELOPMENT (USAID)
Bureau for Latin America and the Caribbean (LAC)

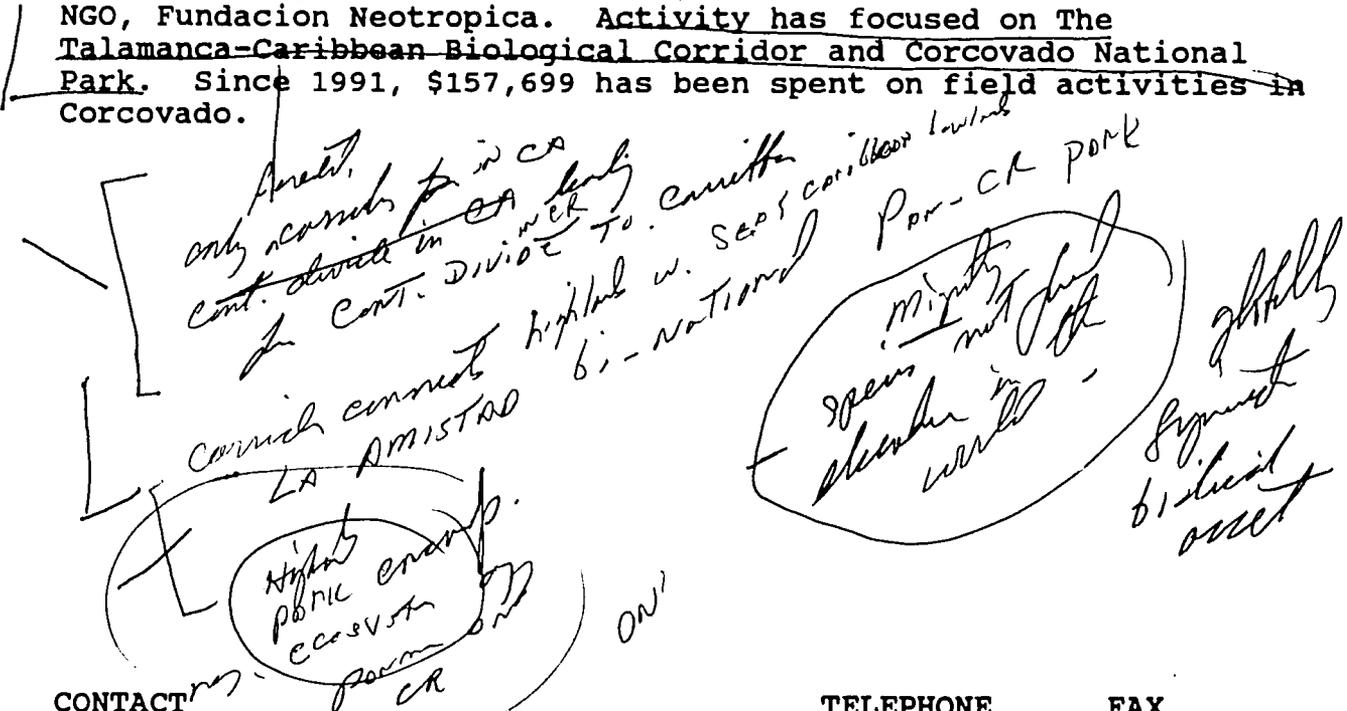
PROGRAM

PARKS IN PERIL

Established in 1990, the Parks in Peril Program (PIP) is funded by USAID/LAC and managed by The Nature Conservancy (TNC). PIP helps to maintain biodiversity and tropical forests in LAC region countries by improving the protection of critically threatened national parks which harbor ecosystems and species of global ecological significance.

Through this program TNC provides direct grant-support to host country non-governmental organizations (NGOs) to assist in the management of protected areas. Project objectives are to:
1) build basic protection infrastructure in priority PIP sites;
2) promote local communities' participation and benefits from the establishment and management of protected areas; 3) strengthen local NGO's capacity to manage protected areas, and; 4) develop long term mechanisms for financial sustainability.

PIP works with 55 national parks in the Latin America and Caribbean region. In Costa Rica, TNC works with a Costa Rican NGO, Fundacion Neotropica. Activity has focused on The Talamanca-Caribbean Biological Corridor and Corcovado National Park. Since 1991, \$157,699 has been spent on field activities in Corcovado.



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PROJECT LISTED IN APPENDIX 1

LAC/PIP: LOP
\$157,699

1992 \$ 60,269 1993 \$81,552

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AGENCY/DIVISION

U.S. AGENCY FOR INTERNATIONAL
DEVELOPMENT (USAID)
Bureau for Latin America
and the Caribbean (LAC)

PROGRAM

NEOTROPICAL MIGRATORY
BIRD PROJECT

Through a cooperative agreement with the National Fish and Wildlife Foundation, USAID/LAC provides funding in the form of challenge grants (under \$150,000) to NGO's, government agencies, and independent researchers to carry out activities in Latin America and the Caribbean that address the decline in neotropical migratory birds, and, through these efforts, encourage the preservation and sustainable use of the natural resource base.

Activities must support project objectives of: 1) improving and coordinating monitoring of neotropical migratory birds; 2) research; and; 3) related training and education programs. In order to qualify, grantees must have matching funds or matching in-kind contributions.

Since the project's beginning in 1991, four grants have been approved for work in Costa Rica:

- 1) Conservation of Migrant Habitat in Tropical Buffer Zones: A Pilot Project to design and Protect Forest Corridors.
- 2) A Migratory Bird Exhibit.
- 3) Finca Los Cusingos: Preserving the Legacy of Dr. Alexander Skutch.
- 4) Establishment of a Neotropical Migratory Bird Monitoring and Training Program.

*Also see NATIONAL FISH AND WILDLIFE FOUNDATION

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PROJECTS LISTED IN APPENDIX 1

	<u>LOP</u>	<u>1992</u>	<u>1993</u>
LAC/NTMBP:	\$296,535		\$296,535

AGENCY/DIVISION

U.S. AGENCY FOR INTERNATIONAL
DEVELOPMENT (USAID)
Bureau for Latin America
and the Caribbean (LAC)

PROGRAM

AGRICULTURE AND NATURAL
RESOURCE MANAGEMENT
TECHNICAL SERVICES
PROJECT (LAC TECH)

The Agriculture and Natural Resources Management Technical Services (LAC TECH) Project is a regional technical support project that provides services to USAID missions and the LAC bureau in agriculture and natural resource management.

Begun in 1989, LAC TECH offers short-term advisory services that focus on agricultural strategy; program and project design and evaluation; agriculture and natural resource policy reform; monitoring program impact; sector and subsector assessments; technical workshops, seminars, and conferences; and identifying specialized expertise.

Long and short term advisors based in Washington, D.C. cover the following technical areas: agricultural policy, food security, natural resources policy and management, agribusiness and trade, agricultural research, extension, and education, plant quarantine, financial policy, and land tenure.

LAC TECH has provided short term advisors to the Costa Rica mission for the Inter-American Institute for Cooperation in Agriculture/Center for International Forestry Research /International Food Policy Research Institute workshop to establish policy research priorities and effective institutional mechanisms for conducting research and disseminating results for the Latin America and Caribbean region. LAC TECH-supported advisors have also designed case studies on timber price and trade policy and assisted in project design in Costa Rica.

In 1994, LAC TECH will support the participation of Costa Rican policy makers in an international workshop which examines policies driving forest conversion.

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AGENCY/DIVISION

U.S. AGENCY FOR INTERNATIONAL
Regional Office for Central
America and Panama (ROCAP)

PROGRAM

PROCACAO
RAHE
RENARM

USAID's Regional Office for Central America and Panama has supported three projects that address biodiversity conservation by focusing on environmentally sound and efficient practices of natural resource management. These projects are: 1) the Regional Agricultural Technologies Project (PROCACAO); 2) the Regional Higher Agricultural Education Project (RAHE); and; 3) the Regional Environmental and Natural Resource Management Project (RENARM) (see next page). Implicit in these three projects is the recognition that science is basic to addressing environment and natural resources challenges, and that science required to solve Central American problems is most properly generated in Central America. As ROCAP projects are regional, it is difficult to quantify expenditures and benefits on a per country basis. For example, support for training at an institution in one country may yield benefits for another country by producing qualified natural resource managers.

The **REGIONAL AGRICULTURAL TECHNOLOGIES NETWORKS (PROCACAO)** project, which began in 1987 and ended in 1992, developed and disseminated improved technologies for the production of cacao with special attention to improved cultural practices, germ plasm improvement, and disease control. Project components in Costa Rica included: network management (coordination of activities among participating countries); supplementing cacao research activities in the Center for Tropical Agricultural Research and Education (CATIE); and, training/technology transfer of personnel in production, research and extension by CATIE, the Honduran Foundation for Agricultural Research (FHIA), the Interamerican Institute for Cooperation on Agriculture (IICA), and the Panamerican Development Foundation (PADF).

The **REGIONAL AGRICULTURAL HIGHER EDUCATION (RAHE)** project has been successful in expanding the Central American human resource base devoted to environmentally sound natural resource management. RAHE support has gone to CATIE to develop the staff, curriculum and instruction, and the expansion in physical plant necessary for CATIE to become a fully functional, quality post-graduate training institution. As a result, RAHE has effected improvements in the quality of masters level training in scientific fields relating to agriculture and natural resource management, has improved the physical infrastructure to carry out this training, and has been responsible for an increase in the number of students graduating from CATIE with Masters degrees - one quarter of CATIE's thousand graduates since 1947 graduated during the project's six year period. RAHE has also provided \$19,600,000 to EARTH.

The **NATURAL RESOURCES MANAGEMENT PROJECT (RENARM)** supports an array of regional biodiversity research and conservation projects in Central America united by a common theme: the introduction of economically attractive activities that require the wise use of natural resources. RENARM works through close relationships with Central American research and educational institutions, international environmental NGOs, U.S. Government technical agencies such as the USDA Forest Service and Environmental Protection Agency (EPA), and, Central American Governments and NGOs. RENARM activities include:

TECHNICAL ASSISTANCE: RENARM foresters and pest management specialists have helped the Costa Rica USAID Mission design projects and work plans, select consultants, and draft concept papers in support of forestry projects and conservation area management, and provided training in pest management.

SUPPORT FOR PACA: PACA, a consortium comprising CARE and the Nature Conservancy, aims to strengthen the capacity of Central American institutions to plan, implement, and sustain effective biodiversity and natural resource management programs. In Costa Rica, PACA works with two Non-government organizations, AGUADEFOR and FUNDACION NEOTROPICA, on a variety of activities. These include: developing an operational plan for wetlands protection and management; environmental education; agro-forestry extension activities; fire control and prevention courses; wetlands management; and, conservation information through a "Data Repatriation Project".

SUPPORT FOR PASEO PANTERA: PASEO PANTERA, a regional consortium of Wildlife Conservation International and the Caribbean Conservation Corporation, aims to preserve, and, where necessary, recreate, the biotic corridor that once existed in Central America by creating a continuum of protected areas throughout the Central American Isthmus. PASEO PANTERA'S approach is to preserve the biodiversity of Central America through 1) research; 2) ecotourism; 3) biologically sound buffer zone management; 4) environmental education; and 5) development of a regional strategy. ROCAP funds a competitive small grants program through Paseo Pantera which supports research in Costa Rica, Belize, Honduras, Guatemala, Nicaragua, El Salvador, and Panama, exclusively. Three grants have been given to Central American scientists in Costa Rica under this program.

NATURE CONSERVANCY FELLOWSHIP PROGRAM: RENARM currently supports two Costa Rican conservation fellows working in Nature Conservancy partner organizations.

TRAINING AND TECHNICAL ASSISTANCE FOR PEACE CORPS SUPPORTED E/NR PROJECTS: Through an agreement with the USDA's Office of International Cooperation and Development, RENARM has provided

training funds for environmental projects undertaken by five Central American Peace Corps offices. In Costa Rica, support has gone to: environmental education training workshops for Costa Rican public school teachers and Peace Corps Volunteers (PCVs); forest management training workshops for forest service technicians and PCVs; and; buffer zone management and agroforestry courses for Costa Rican representatives and PCVs at the University of Peace.

CATIE COURSES: RENARM has provided technical and financial support for CATIE courses in watershed management, tree crop dissemination, production from natural forests, and plant protection. In addition, eight Costa Rican Master's Degree students at CATIE's program in Plant Protection are supported by RENARM.

PESTICIDE MANAGEMENT: RENARM'S Pesticide Management Program enhances the general use of, and educates users on public and private sector pesticide management through three programs: 1. Awareness and Education; 2. Private Sector Support; and 3. Public Sector Support. RENARM pesticide management activities are carried out by EPA, FDA, USDA/OICD, the Peace Corps, INCAP, and the Pan American Agricultural School at Zamorano, Honduras.

LONG TERM TRAINING IN ENVIRONMENT AND NATURAL RESOURCE POLICY FORMATION AND REFORM: In 1990, two Costa Rican natural resource professionals attended a RENARM-sponsored eight month course on policy challenges facing sustainable resource management in Central America held at Duke University's Institute of Policy Sciences and Public Affairs.

SHORT TERM TRAINING IN ENVIRONMENTAL SCIENCE AND POLICY FOR LATIN AMERICAN DECISION MAKERS: In 1990, Costa Rican representatives from the Ministry of Natural Resources (MIRENEM), the Instituto de Desarrollo Agrario (IDA), the legislative assembly, and the Ministry of Planning and Economic Policy attended a RENARM/USAID/LAC-supported course in ecological principles for policy makers conducted by the Organization for Tropical Studies.

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PROJECTS LISTED IN APPENDIX 1

	<u>LOP</u>	<u>1992</u>	<u>1993</u>
PROCACAO:	\$ 357,142*		
RAHE:	\$ 8,300,000*		
RENARM:	\$ 6,840,000*	\$1,140,000*	\$1,140,000*

ROCAP TOTAL: \$15,497,142

* APPROXIMATE FIGURES

AGENCY/DIVISION

PROGRAM

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
Bureau for Research and Development/Office of Research

The Office of Research manages two programs that fund new and innovative scientific research leading to solutions of development problems in USAID host countries - the Program in Science, Technology, and Cooperation (PSTC) and the Cooperative Development Research Program (CDR). Proposals for both programs are evaluated on their scientific merit, relevance to international development, innovation, and the potential to enhance the capacity of developing countries to conduct innovative research.

AGENCY/DIVISION

PROGRAM

U.S. AGENCY FOR INTERNATIONAL
DEVELOPMENT (USAID)
Bureau of Research and Development
Office of Research (G/R&D/R)

Program in Science
Technology and
Cooperation (PSTC)

The Program in Science and Technology Cooperation was created by Congress in 1981 with the goal of supporting cutting edge research on development problems. During its early years, USAID split the administration of PSTC with the National Research Council's Board on Science and Technology for International Development (BOSTID). Since 1988, USAID has managed all PSTC projects and obtains research and support services through a cooperative agreement with BOSTID.

The PSTC Program has seven research modules. These include: Biotechnology/Immunology; Plant Biotechnology; Chemistry for World Food Needs; Biomass Conversion Technology; Integrated Pest Management; and Engineering Technology. Under its Diversity of Biological Resources module, the program funds research that addresses terrestrial or aquatic ecosystems and animal, plant, or microbial species. While surveys and taxonomic studies are not normally funded as the sole or principal objective, they are frequently funded as an integrated part of a project. The maximum award for a PSTC grant is \$150,000. Highest priority for funding is given to applicants in USAID target developing countries. Researchers from middle income countries may also apply. Cooperation with U.S. scientists is strongly encouraged but not required. Since 1981, twenty four projects in Costa Rica have been funded, with ten between 1990 - 1993.

* PROJECT DISCONTINUED

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PROJECTS LISTED IN APPENDIX 1

	<u>1990-1992</u>	<u>1992</u>	<u>1993</u>
PSTC:	\$1,402,938	\$ 749,521	

AGENCY/DIVISION

U.S. AGENCY FOR INTERNATIONAL
DEVELOPMENT (USAID)
Bureau of Research and Development
Office of Research (G/R&D/R)

PROGRAM

COOPERATIVE DEVELOPMENT
RESEARCH PROGRAM (CDR)

In 1985, Congress established the U.S.- Israel Cooperative Development Research Program (CDR) which draws on the expertise of the Israeli scientific community. The CDR promotes research to develop new knowledge and technology for solving development problems in developing countries. The CDR also encourages host-country institutions to develop the sustainable capacity to carry out this innovative research.

The CDR provides funding for Israeli and target country scientists to cooperate in joint research. The goal is to allow scientists from host countries to benefit from access to Israeli technology and from collaboration with Israeli researchers. Researchers may be from the private sector, universities, or government laboratories. The CDR program emphasizes areas in which Israeli technology and expertise (such as arid-lands and saline agriculture, irrigation and hydrology, and biological control of insects) could be of particular value to host countries, but projects concerning conservation of biological resources are also given special attention. The maximum award is \$200,000.

Since 1985, twelve CDR projects have been funded in Costa Rica with four between 1990 - 1993.

CONTACT

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PROJECTS LISTED IN APPENDIX 1

	<u>1990-1993</u>	<u>1992</u>	<u>1993</u>
CDR:	\$ 545,350	\$ 146,560	\$202,540

AGENCY/DIVISION

U.S. AGENCY FOR INTERNATIONAL
DEVELOPMENT (USAID)
Research and Development Bureau/
Office of Environment and Natural
Resources (G/R&D/ENR)

PROGRAM

CONSERVATION OF
BIOLOGICAL DIVERSITY
PROJECT: USAID/NSF
COLLABORATIVE PROGRAM
ON BIODIVERSITY

USAID's Office of Environment and Natural Resources, through its Conservation of Biology Program, cooperates with the National Science Foundation to fund collaboration with host country scientists in biodiversity research conducted by U.S. investigators. Proposals with a significant element related to the study or conservation of biodiversity in USAID host countries are eligible for funding from the joint program.

USAID funds may be used to enhance the ability of scientists in the host countries to conduct research in biodiversity and to strengthen the host country infrastructure beyond that possible using NSF funds alone. This includes support of scientists, graduate students, and other personnel in the host countries, the purchase of equipment to remain in those countries, the maintenance of the scientific infrastructure (including museum supplies and equipment, specimens, and databases), and the purchase of supplies and services in-country. Host-country counterparts are expected to be substantive participants in the research program.

Since 1990, eleven research projects in Costa Rica have been funded.

CONTACT

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PROJECTS LISTED IN APPENDIX 1

	<u>1990-1993</u>	<u>1992</u>	<u>1993</u>
USAID/NSF:	\$1,464,645	\$181,182	\$536,277

AGENCY/DIVISION

U.S. AGENCY FOR INTERNATIONAL
DEVELOPMENT (USAID)
Research and Development Bureau/
Office of Environment and Natural
Resources (G/R&D/ENR)

PROGRAM

CONSERVATION OF
BIOLOGICAL DIVERSITY
PROJECT: BIODIVERSITY
SUPPORT PROGRAM SMALL
RESEARCH GRANTS AND
PILOT DEMONSTRATIONS

The Conservation of Biological Diversity Project of USAID's Office of Environment and Natural Resources funds, through a cooperative agreement with the World Wildlife Fund (WWF), the Biodiversity Support Program (BSP), a consortium of WWF, The Nature Conservancy, and the World Resources Institute. The 10-year BSP agreement (1988-1994) includes core funding from USAID's Bureau of Research and Development. Additional funds for programs and activities come from USAID overseas missions and other USAID bureaus in Washington.

BSP promotes efforts to conserve biological diversity while enhancing human livelihoods in developing countries through improved conservation and use of biological resources. The project has five major components; 1) technical assistance for USAID missions, host country institutions, local PVO's and Peace Corps; 2) training focusing on building the capacity of host country scientists and institutions; 3) information networking and evaluation; 4) pilot demonstration projects; and, 5) a small research grants program.

BSP's pilot demonstration projects support innovative approaches to conservation. Five Pilot demonstration projects have been funded in Costa Rica including an INBio Parataxonomist training course and environmental assessments, evaluations, and technical assistance for the USAID/Costa Rica BOSCOA project.

BSP's small research grants program funds research addressing specific issues relevant to USAID's conservation and natural resource management activities. Research must be carried out in USAID-assisted countries and must show substantive involvement of host-country researchers and/or institutions. Five projects have been funded for collaborative work with Costa Rica.

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PROJECTS LISTED IN APPENDIX 1

	<u>LOP</u>	<u>1992</u>	<u>1993</u>
BSP:	\$169,896	\$ 65,792	\$ 14,560

AGENCY/DIVISION

U.S. AGENCY FOR INTERNATIONAL
DEVELOPMENT (USAID)
Research and Development Bureau
Office of Environment and Natural
Resources (G/R&D/ENR)

PROGRAM

CONSERVATION OF
BIOLOGICAL DIVERSITY
PROJECT: INTERNATIONAL
COOPERATIVE BIODIVERSITY
GROUPS (ICBG) PROGRAM

NATIONAL SCIENCE FOUNDATION

NATIONAL INSTITUTES OF HEALTH
Fogarty International Center
National Cancer Institute
National Institute of Allergy and Infectious Diseases
National Institute of Mental Health
National Heart, Lung and Blood Institute

The ICBG program is a collaborative effort among USAID, the National Science Foundation (NSF), and the National Institutes of Health (NIH) which addresses the interdependent issues of biodiversity conservation, sustainable economic growth, and human health by supporting efforts to find and produce new drugs from plants and animals in the developing world while preserving biodiversity-rich areas. The program encourages collaborative initiatives among U.S. and developing country scientists and institutions, pharmaceutical companies, universities, and NGOs that will advance sustainable development through capacity building and by ensuring that equitable economic benefits from the drug discoveries accrue to the country of origin and to the local communities.

Support for this program will total \$2.5 per year worldwide over the next five years shared among NIH, NSF and USAID. The Fogarty International Center of the NIH both administers the program and contributes to it along with the National Cancer Institute, the National Institute of Allergy and Infectious Diseases, the National Institute of Mental Health, and the National Heart, Lung and Blood Institute.

Projects include the selection and acquisition of natural products derived from biological diversity as potential therapeutic agents for diseases of concern to both developed and developing countries, such as USAIDS, cancer, parasitic diseases, and heart disease. Other important components include the examination of traditional medical practices, development of long term strategies to ensure sustainable harvesting, biodiversity inventories and surveys, training and infrastructure support for host country institutions, and long term funding for biodiversity conservation in the host countries. Through these efforts, the program fosters long term scientific communication, improves the scientific infrastructure of host countries, and provides tangible incentives for conservation of biological diversity.

Intellectual property agreements have been negotiated among participating institutions so that economic benefits from these discoveries are equitably shared and accrue to local communities and indigenous peoples involved in the discovery of the natural product. Contributions from pharmaceutical companies include screening for therapeutic potential, training opportunities, equipment donations, financial support, and a percentage of royalties from the sales of products developed from this program.

In Costa Rica, a five year grant has been awarded for collaboration between Costa Rica's National Biodiversity Institute (INBio), Cornell University, University of Costa Rica, and Bristol-Meyer Squibb Pharmaceutical Research Institute for "Chemical Prospecting in a Costa Rican Conservation Area". This effort will look at tropical insects as potential sources of new drugs using the biological resources of Guanacaste Natural Area.

Biological samples will be collected, extracts prepared, and a national biodiversity database established for conservation management. Research and screening of the extracts will be conducted, including screening of extracts for anti-malarial properties. Additionally, through agreements with Bristol-Meyer Squibb and Cornell that ensure that a portion of any resulting benefits will flow back into the country, INBio hopes to show that sustainable use of wildland biology can contribute to biodiversity conservation and economic development.

CONTACT

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PROJECT LISTED IN APPENDIX 1

	<u>LOP</u>	<u>1992</u>	<u>1993</u>
ICBG:			\$ 228,000

AGENCY/DIVISION

U.S. AGENCY FOR INTERNATIONAL
DEVELOPMENT (USAID)
Research and Development Bureau
Office of Environment and Natural
Resources (G/R&D/ENR)

PROGRAM

FOREST RESOURCES
MANAGEMENT I & II

The Forest Resources Management Project (FRM), seeks to ensure a sustainable forest and natural resource base in developing countries. It has two main components, the Forestry Support Program (FSP), and USAID/Peace Corps Collaboration. The project was initiated by USAID in 1980 as a ten year effort. A ten year, \$25 million follow up, FRM-II began in 1991. The broad goals of FRM II are to: 1) promote the contribution of trees to sustainable development, especially in key USAID countries throughout the world, and 2) strengthen the capacity of forestry and natural resources management institutions in developing tropical countries.

The Forestry Support Program (FSP) (see also **USDA FOREST SERVICE**) provides technical consultation to USAID's bureaus and mission, as well as research support, forestry training, forestry program studies, and technical reference services. The program also manages a roster of expert consultants in forestry and natural resources and provides technical support to the Peace Corps Programs in forestry and natural resource management. The FSP is jointly managed by two branches of the U.S. Department of Agriculture (USDA)- the Forest Service (FS) and the Office of International Cooperation and Development (OICD).

In Costa Rica, USDA Forest Service law enforcement specialists provided technical assistance to the USAID mission and Costa Rican Government to write a report entitled "Findings and Recommendations for Forestry Law Enforcement and Control of Illegal Logging and Log Transport". This report is being used for policy planning by the Costa Rican Government. In addition, FSP has provided 3 forestry consultants to the USAID Costa Rica Mission to assist a Costa Rican NGO, FUNDECOR with the implementation of the USAID FORESTA project.

USAID/PEACE CORPS COLLABORATION (see also **PEACE CORPS**). For 30 years, USAID and its predecessor agencies have been collaborating with the Peace Corps on projects related to Natural Resource Management. In 1980, USAID signed a Participating Agency Service Agreement (PASA) with Peace Corps in forestry and the environment. The agreement's objective include:

- developing and promoting the use of techniques for tropical reforestation and natural resource conservation;
- providing material support for forestry, environmental education, and biological diversity projects;
- strengthening cooperation between USAID, the Peace Corps, the

World Bank, PVOs, and NGOs working in community natural resource projects supported by PL 480 food aid;

- expanding the number of trained Peace Corps volunteers serving in forestry and biodiversity projects; and;
- increasing the number of volunteers assigned to biodiversity projects, such as wildlife protection and environmental education.

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George Mahaffy	Peace Corps

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PROJECTS LISTED IN APPENDIX 1

FRM II:	<u>LOP</u>	<u>1992</u>	<u>1993</u>
		\$ 35,000	\$101,000

John - A product of this project, as I understand it, is greater willingness of the U.S. private sector to share proprietary technologies w. LDC researchers

AND
INSTITUTIONS.
KEY TO
who is
A policy
ENVIRONMENT
That would
go beyond
protecting
U.S. private
sector
commercial
interest
to
actually
ENCOURAGING
it

AGENCY/DIVISION

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT (USAID)
Bureau for Research and Development
Office of Agriculture (G/R&D/AGR)

PROGRAM

AGRICULTURAL BIOTECHNOLOGY FOR SUSTAINABLE PRODUCTIVITY ABSP

The Agricultural Biotechnology for Sustainable Productivity (ABSP) is a six year, \$6 million, project begun in 1991 that seeks to link public and private U.S. institutions with partners in developing nations in Africa, Asia, and Latin America.

Currently, labs in Indonesia, Kenya, and Costa Rica are working with public and private laboratories in the U.S. to apply biotechnology techniques such as gene recombination, plant tissue culture and plant culture with the goal of developing environmentally compatible, improved sources of germplasm on a variety of agriculturally important crops in each of these areas. Overall, ABSP aims to strengthen the ability of both U.S. and developing world institutions to use and manage biotechnology research.

The main focus crops are maize, potato, sweet potato and cucurbits, which are targeted for applications of genetic engineering for pest and pathogen resistance; and coffee, pineapple, banana, and ornamental palm, which are the subject of improved tissue culture techniques to produce high quality stocks of planting materials. The latter of these approaches is specifically geared to the private sector involvement in these three countries, including Costa Rica.

Costa Rica Collaborators include, in the private sector, Agrobiotecnologia de Costa Rica which focuses on tissue culture of coffee, banana, pineapple and ornamental palms, and, in the public sector, University of Costa Rica - Centro de Investigacion en Biologia Celular y Molecular.

Of the \$6,035,000 total ABSP funding, approximately \$1,800,000 has been designated specifically for technology transfer initiatives with Costa Rica. This includes support for research, commercialization, networking, policy training and consultation specifically in the areas of intellectual property protection and biosafety.

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PROJECTS LISTED IN APPENDIX 1

	<u>LOP</u>	<u>1992</u>	<u>1993</u>
ABSP:	\$ 724,200	\$ 120,700*	\$ 120,700*

* APPROXIMATE FIGURE

AGENCY/DIVISION

U.S. AGENCY FOR INTERNATIONAL
DEVELOPMENT (USAID)
Bureau for Research and Development
Office of Agriculture

PROGRAM

Collaborative Research
Support Programs

The Collaborative Research Support Programs (CRSPs) were created in 1975 in response to Title XII of the Foreign Assistance Act, which was enacted to strengthen the role of land grant and other U.S. universities in programs of sustainable agriculture and natural resource management that help developing countries to produce adequate food, fiber, fuel and shelter materials. CRSPs form a global community of active research partnerships of U.S. and developing country scientists, Government Departments and Ministries of Agriculture, public and private research institutions and organizations, small-scale farm families, local entrepreneurs and rural and urban consumers.

The CRSP model focuses on developing mutually beneficial collaborative research between U.S. and overseas institutions. Eight CRSPs are currently in effect; Bean/Cowpea; Fisheries Stock Assessment; Small Ruminant; Peanut; Sorghum/Millet; Pond Dynamics/Aquaculture; Nutrition; and; Soil Management. These are funded by USAID/G/R&D/AGR with major financial and in kind contributions from over twenty five U.S. institutions and twenty seven developing countries.

Activities in Costa Rica are currently being managed through the Soil Management and Bean/Cowpea CRSPs.

The Bean and Cowpea CRSP is a collaborative effort between Michigan State University and the University of Costa Rica. The project works to improve total digestability; research focus is on the carbohydrate and protein indigestible fractions of dry bean seeds. Traditional plant breeding, molecular biology, and food technology approaches are used to achieve CRSP goals. Six Costa Rican researchers and twelve U.S. researchers are currently working on the project.

CONTACT

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PROJECTS LISTED IN APPENDIX 1

	<u>LOP</u>	<u>1992</u>	<u>1993</u>
CRSP:		\$ 0	\$49,512

AGENCY/DIVISION

PROGRAM

INTERIOR (DOI)
U.S. Fish and Wildlife Service (USFWS)
Office of International Affairs
Western Hemisphere Program

VARIOUS

The U.S. Fish and Wildlife Service collaborates with Costa Rica in a number of areas under the 1940 Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere. The USFWS relationship with Costa Rica began in the early 1980's after the ratification of the endangered species act - with the bulk of activity after 1984 when USFWS supported the establishment of the Regional Wildlife Management Program for Mesoamerica and the Western Caribbean (PRMVS) (see next page).

Ongoing activities include: support for PRMVS; training for regional nature reserve managers at RESERVA in Mexico; exchange programs for staff at PRMVS in Costa Rica and other centers in Venezuela, Brazil and Argentina; international exchange programs for regional protected area managers at Hopper National Wildlife Refuge in California; international exchange programs at University of Massachusetts for regional fish and wildlife managers; support for conferences such as the International Wildlife Management Congress held in 1993 in San Jose (\$25,000); and; a small (under \$10,000) grants program for environmental education and training. Small grants projects in Costa Rica have included:

- 1) A grant to Fundacion Iguana Verde for integration of wildlife management and to establish an education center;
- 2) A video documentary;
- 3) Environmental education in Simon Bolivar Zoological Park;
- 4) A regional course for park wardens;
- 5) A grant for Rainforest Alliance's tropical Conservation News Bureau for environmental education;
- 6) Publication and distribution of a regional tropical technical wildlife journal for wildlife managers, Vida Silvestre;
- 7) Sponsorship of a conference on "Latin America Themes: The Role of Higher Education" for heads of regional educational institutions;

CONTACT

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PROJECTS LISTED IN APPENDIX 1

	<u>LOP</u>	<u>1992</u>	<u>1993</u>
USFWS AD HOC:	\$115,849	\$ 16,500	\$ 41,000

AGENCY/DIVISION

INTERIOR (DOI)
U.S. Fish & Wildlife Service (USFWS)
Office of International Affairs
Western Hemisphere Program

PROGRAM

REGIONAL WILDLIFE
MANAGEMENT PROGRAM FOR
MESOAMERICA AND THE
CARIBBEAN (PRMVS)

One of USFWS' major Western Hemisphere initiatives is the Regional Wildlife Management Program for Mesoamerica and the Caribbean (PRMVS), formed in 1984 with funding from the USFWS and the World Wildlife Fund-U.S. (WWF) in collaboration with the Organization of American States and the National University of Costa Rica (UNA). USFWS provides continuous funding to the program and is the major donor.

The PRMVS provides scholarships for long term masters level training, support for institutions, and a resource clearinghouse. The mission is to provide a body of well-trained professionals in the wildlife-biodiversity-natural resources field who will plan, develop, and carry out research, extension (outreach), teaching and management projects in Latin America.

Three regional priorities are: 1) training at the graduate level "in situ", 2) developing model wildlife-biodiversity projects, and, 3) outreach through regional information and technology transfer, including a wildlife documentation center. Since 1987, 52 students from 15 Latin American countries have entered the program. Graduates are now involved with cutting edge conservation work from Mexico to Patagonia as directors of governmental wildlife agencies, university professors, heads of NGOs, etc.

Outreach efforts include a biological documentation center, BIODOC, which was established in 1987 with assistance from the USFWS. Biodoc's general objective is to recover and systemize the existing wildlife literature (including "grey" literature) in Latin America and make it available to users.

Since 1987, 18 donors have contributed a total of \$3,050,350 to PRMVS's efforts. Donors include USFWS, UNA, WWF, Foundations, multilateral organizations and NGOS. During this time, USFWS has contributed \$705,000 in scholarships, salaries, research, services, residence, and equipment.

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PROJECTS LISTED IN APPENDIX 1

	<u>LOP</u>	<u>1992</u>	<u>1993</u>
USFWS:	\$1,094,870	\$ 79,000	\$111,000

AGENCY/DIVISION

DEPARTMENT OF THE INTERIOR (DOI)
National Park Service (NPS)
Office of International Affairs

PROGRAM

TRAINING

The National Park Service has maintained an active partnership with the Government of Costa Rica since the early 1970's. This relationship has had a large impact on the development of the Costa Rica National Park System. Approximately three quarters of a million dollars over twenty years has supported over fifty workshops and long and short term parks management training programs addressing topics ranging from general management to environmental education to operations and planning. Park Service funding has also allowed a number of Costa Rican parks management personnel to come to the U.S. for training.

The relationship, which includes international parks management seminars in addition to training of parks managers, is being used as a regional model for both park development and training. In October, 1991, a Memorandum of Understanding was signed between the Park Service of the U.S. Department of the Interior of the United States, and the National Park Service of the Ministry of Natural Resources, Energy and Mines, of Costa Rica (MIRENEM).

NPS also has a Migratory Bird Watch Program which promotes research, population monitoring and the development of environmental education materials.

CONTACT

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NPS: LOP
\$750,000* over 20 years

*APPROXIMATE FIGURE

AGENCY/DIVISION

DEPARTMENT OF COMMERCE (DOC)
NATIONAL OCEANIC AND ATMOSPHERIC
ADMINISTRATION (NOAA)
Office of Global Programs

PROGRAM

INTER-AMERICAN INSTITUTE
FOR CLIMATE CHANGE
RESEARCH

The U.S., Costa Rica, and other countries in Latin America have joined together in a cooperative effort to develop a regional research network of centers dedicated to the study of global change and its impact on society. In May, 1992, in Montevideo, eleven countries, including the U.S. and Costa Rica, became founding parties by signing an agreement establishing the Inter-American Institute for Climate Change Research. The institute is envisioned as a distributed network which will include a directorate and IAI research centers throughout the region which will conduct and sponsor research on global change processes of special importance to the Americas. The following will be the initial research foci for the IAI's science agenda:

- The Study of Tropical Ecosystems and Biochemical Cycles
- The Study of Impacts of Climate Change on Biodiversity
- The Study of ENSO and Interannual Climate Variability
- The Study of Ocean/Land/Atmosphere Interactions in the Intertropical Americas
- Comparative Studies of Temperate Terrestrial Ecosystems
- Comparative Studies of Oceanic, Coastal, and Estuarine Processes in Temperate Zones
- The Study of High Latitude Processes

NOAA's Office of Global Programs is the U.S. representative to the IAI/IC. The Instituto Meteorologico Nacional represents Costa Rica. An intergovernmental implementation committee (IAI/IC) has been working to develop the scientific agenda and identify training and education opportunities. The IAI/IC has met several times with the second meeting in San Jose, Costa Rica. Costa Rica further demonstrated its interest in collaborative regional global change research by organizing and convening an International Workshop on Climate Variability in March, 1993.

The agreement to establish the IAI will enter into force sixty days after the ratification of six signatory nations. As of November, 1993, six nations have ratified and several others are expected to complete the process soon. National Science Foundation and Smithsonian Tropical Research Institute are also involved with the IAI.

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NOAA INVESTMENT: to be decided in early 1994.

AGENCY/DIVISION

PROGRAM

DEPARTMENT OF STATE
BUREAU OF OCEANS AND INTERNATIONAL
ENVIRONMENTAL AND SCIENTIFIC AFFAIRS (OES)

The Department of State's Bureau of Oceans and International Environmental and Scientific Affairs (OES) occasionally provides funding to special projects that support international environmental issues and policy problems through OES SPECIAL FUND appropriations.

One project in Costa Rica, the final phase of A Manual to the Plants of Costa Rica, a collaboration between the Missouri Botanical Garden and INBio, has received \$10,000 from OES through this fund. The project also receives funding from NSF, USDA and USAID.

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PROJECTS LISTED IN APPENDIX 1

	<u>LOP</u>	<u>1992</u>	<u>1993</u>
STATE/OES:	\$10,000		\$10,000

AGENCY/DIVISION

PEACE CORPS (PC)
* also see USAID/FRM I & II

PROGRAM

FORESTRY
EXTENSION

Peace Corps Forestry Extension volunteers address the biodiversity loss/deforestation problem in Costa Rica by promoting reforestation and agroforestry techniques in critical zones in Costa.

Forestry extension efforts were initiated in 1980, and, in 1983, PC/CR established a forestry extension program in nine agricultural high schools. For over 10 years, PC/CR has had an average of 15 volunteers per year working in forestry extension with 19 in 1992 and 26 in 1993. Forestry volunteers are involved in: the establishment of community forestry nurseries; forest plantations/management; seed collection; establishment of agroforestry systems; forest protection and management; training of farmers/counterparts; extension work; and; environmental awareness to prevent deforestation and destruction of natural resources. Environmental education volunteers have developed a teacher's guide and give workshops and seminars to train teachers on how to teach environmental education in schools.

Over 90% of Forestry PCV's are involved with reforestation incentives, which include project design and implementation. Research is also being carried out on working with native species and nitrogen fixing trees. Collaborators include: local schools; country agricultural centers; cooperatives, community groups, and the Ministry of Natural Resources. In kind support (workshops, transportation and technical materials) is also provided by the Dutch and Finnish governments. Project goals are to, by 1997:

- 1) increase by 50% the amount of land reforested by the 20,000 beneficiaries of the reforestation incentives program in the Northern Atlantic and Southern Pacific of Costa Rica.
- 2) improve the skills and practices of 5,000 beneficiaries in the areas of soil conservation and agroforestry systems in the referenced regions.
- 3) increase the institutional capacity of 60 community groups to provide technical assistance to the small and medium scale farmer.

CONTACT

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PROJECT LISTED IN APPENDIX 1

PEACE CORPS:	<u>LOP</u>	<u>1992</u>	<u>1993</u>
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AGENCY/DIVISION
SMITHSONIAN

PROGRAM
VARIOUS

Seven research bureaus of the Smithsonian conduct most of the environmentally oriented research: the National Air and Space Museum (NASM); The National Museum of American History (NMAH); the National Museum of Natural History (NMNH); the National Zoological Park (NZP); the Smithsonian Astrophysical Observatory (SAO); the Smithsonian Environmental Research Center (SERC), and the Smithsonian Tropical Research Institute (STRI). Most of these bureaus have research small grants programs.

Smithsonian has had an active research collaboration relationship with Costa Rica since the beginning of the century. It was a founding member of the Organization for Tropical Studies (OTS) in 1963. Most collaborative activities between Smithsonian and various institutions in Costa Rica, however, are not programmatic line items. Informal exchanges between Costa Rican scientists and U.S. counterparts at Smithsonian, such as the close relationship between taxonomists at INBio and the Museum of Natural History, are frequent, personal and dynamic. Non-programmatic scientific exchange occurs through individual research projects, training for Costa Rican scientists at Smithsonian, and, participation in courses at held at OTS and University of Costa Rica by Smithsonian scientists as visiting professors. In addition, some long term research efforts by Smithsonian scientists, such as the 25 year old study of Arenal Volcano, obtain support from a number of different sources including Smithsonian's Associates Research Program which provides researchers with groups of volunteers for short term project assistance.

Collaborative biodiversity research projects are most commonly supported by NZP, STRI, and SERC, which list four projects in Costa Rica in 1992-93. Smithsonian is also a member of the Man and Biosphere Program, an interagency program that has supported past research in Costa Rica, most recently in projects in 1987.

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PROJECTS LISTED IN APPENDIX 1

AGENCY/DIVISION
NATIONAL FISH & WILDLIFE
FOUNDATION (NFWF)

PROGRAM
GRANT PROGRAM

The National Fish & Wildlife Foundation was created by Congress in 1984 as a nonprofit organization dedicated to the conservation of natural resources, specifically fish, wildlife, and plants. NFWF goals include: habitat protection and conservation, sound resource management and applied conservation, and education and leadership training for natural resource professionals. NFWF meets these goals by forging partnerships between the public and private sectors and by supporting conservation activities.

The foundation awards challenge grants using federally appropriated funds to leverage private sector funds. Priority areas for NFWF are: Wetland Conservation; Conservation Education and Leadership Training; Fisheries; Neotropical Migratory Bird Conservation; Fisheries and Wildlife Assessment; and, Wildlife and Habitat.

Activities in Costa Rica are supported through two grants programs, the Neotropical Migratory Bird Program with USAID which funds four projects in Costa Rica (see USAID/LAC Neotropical Migratory Bird Program), and, the primary NFWF challenge grant program which supports six activities in Costa Rica.

These include: a voluntary program to develop environmental standards for banana plantations; salaries for computer technicians working to computerize INBio collections; conservation journalism training for Latin American and U.S. journalists; a workshop to develop bird monitoring goals and teach monitoring techniques; training for female INBio parataxonomists; and land acquisition for the Organization for Tropical Studies.

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PROJECTS LISTED IN APPENDIX 1

	<u>LOP</u>	<u>1992</u>	<u>1993</u>
NFWF:	\$350,000		\$350,000

AGENCY/DIVISION

ENVIRONMENTAL PROTECTION AGENCY (EPA)

PROGRAM

COUNTRY STUDIES
INITIATIVE

EPA is the lead agency for the Country Studies Initiative - an interagency technical assistance effort designed to help target developing countries assess the state of their natural resources and the potential effects of climate change on these resources. This effort will ultimately help these countries to develop strategies to meet their commitments under the Framework Convention on Climate Change. Studies include greenhouse gas inventories, mitigation strategies, and vulnerability and adaptation assessments. USAID, Department of Energy (DOE), and EPA head the management team while funding or in kind contributions come from the NOAA, NASA, NSF, Dept. of Agriculture, Dept. of Interior, Smithsonian, and the Dept. of Defense.

A two year, \$800,000 regional Country Study for Central America will be based in Costa Rica. Experts from EPA and other U.S. technical agencies will collaborate with the Costa Rican Executive Committee for Hydrologic Resources and the Central American Committee on Environment and Development in carrying out the study. The focus of the study will be on vulnerability assessments - particularly in sectors such as agriculture, forestry, sea level rise, and infrastructure.

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COUNTRY STUDIES INVESTMENT: Portion of \$800,000 earmarked for regional vulnerability assesment

AGENCY/DIVISION

U.S. DEPARTMENT OF AGRICULTURE (USDA)
U.S. FOREST SERVICE (USFS)
OFFICE OF INTERNATIONAL FORESTRY
PROGRAMS

PROGRAM

TROPICAL FORESTRY PROGRAM
SISTER FOREST PROGRAM
FORESTRY SUPPORT PROGRAM
NATURAL FOREST MANAGEMENT
PILOT PROJECT NETWORK

The no longer operational **TROPICAL FORESTRY PROGRAM** was managed by the staff of USDA Forest Service's Office of International Forestry. Through the TFP, USDA Forest Service cooperated with other natural resource conservation organizations to develop, fund, and implement projects that do one or more of the following:

1. Reduce deforestation in the tropics, reduce loss of biodiversity, and/or reduce global climate change;
2. Increase the knowledge of tropical forest ecosystems and of economically sustainable ways to manage or restore them.
3. Increase the contribution of all forest resources to the economic, social and cultural well-being of people in tropical developing countries.

Projects were either technical assistance, training, or support to international organizations. Research projects were not included, however projects that apply research results or transfer technology to the field were eligible.

Between 1990 and 1993, TFP contributed a total of \$475,945 to Costa Rican training institutions for regional and Country-specific courses. Of this, the following courses have been funded: five Silviculture courses at CATIE, three courses in agroforestry and sustainable land use at the University of Peace, and one course at the Organization for Tropical Studies (OTS).

The Tropical Forestry Program was also one of the supporters of an International Wildlife Congress held in San Jose in 1993.

SISTER FOREST PROGRAM

The Office of International Forestry has recently been working with the Government of Costa Rica to establish Talamanca Biological Corridor as a "sister forest" with George Washington National Forest in Virginia. Based on the idea that conservation of biological diversity requires cooperation from the local to the international level, USDA FS's Sister Forest Program provides technical assistance and approximately twenty to twenty five thousand dollars in seed money to facilitate international partnerships between two forests to exchange information, resources, and ideas for mutual benefit.

The **FORESTRY SUPPORT PROGRAM (FSP)** (see also **USAID/ENR/FRM I&II**) is a partnership among the USDA Forest Service, the U.S. Agency for International Development (USAID), and the USDA Office of International Cooperation and Development (OICD). Since it began in 1981, the purpose of the partnership has been to link USAID natural resource projects with a pool of professional and technical forestry expertise in the United States.

In Costa Rica, USDA Forest Service law enforcement specialists provided technical assistance to the USAID mission and Costa Rican Government to write a report entitled "Findings and Recommendations for Forestry Law Enforcement and Control of Illegal Logging and Log Transport". This report is being used for policy planning by the Costa Rican Government. In addition, FSP has provided 3 forestry consultants to the USAID Costa Rica Mission to assist a Costa Rican NGO, FUNDECOR with the implementation of the FORESTA project.

The Three year old **NATURAL FOREST MANAGEMENT PILOT PROJECT Network** is managed through the World Wildlife Fund (WWF) and supported through an agreement between WWF, USDA FS International Forestry (IF) and a number of foundations. Through the project, WWF provides: 1) technical support; 2) training and education; and; 3) information networking/dissemination to support community forestry efforts for the sustainable management of natural forests in a number of developing countries. IF has provided \$481,000 to WWF for the project with approximately \$60,000 to fund efforts in Costa Rica. Two projects in Costa Rica have been funded: an evaluation of the BOSCOA project, and a series of courses for community forest managers.

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PROJECTS LISTED IN APPENDIX 1

	<u>LOP</u>	<u>1992</u>	<u>1993</u>
TFP:	\$475,945	\$108,070	\$335,875
NFMPPN:	\$ 60,000*	\$ 20,000*	\$ 40,000*

*Approximate figure

AGENCY/DIVISION

PROGRAM

U.S. DEPARTMENT OF AGRICULTURE (USDA)
AGRICULTURAL RESEARCH SERVICE (ARS)
OFFICE OF INTERNATIONAL RESEARCH PROGRAMS

The Agricultural Research Service supports international agricultural research by ARS scientists that benefits U.S. Agriculture. ARS scientists are encouraged to: strengthen contributions to U.S. Agriculture by seeking out new developments in foreign countries; become knowledgeable of technical development at home and abroad; consider technical advances overseas in planning and conducting research; use base funds to facilitate cooperative international research which will assist in the solution of U.S. agricultural problems; and document international collaboration as part of the normal management and approval process.

The Office of International Research Programs coordinates and documents international collaboration; supervises and manages all ARS overseas laboratories; seeks out and negotiates cooperative linkages with foreign governments and organizations; and; serves as a point of contact for international issues. A number of agricultural researchers are currently involved in work in Costa Rica.

Currently, eight scientists from the Systematic Entomology Laboratory are involved in biodiversity research. One researcher is researching snout moth biodiversity as part of an INBio project. Another is working in the same capacity on the same project, only concentrating on hover flies. Both have taught courses in Costa Rica as part of the project. Three other USDA ARS researchers have each completed chapters for a book on the bees and wasps of Costa Rica. Another is serving as the collaborator for biodiversity research on cockroaches for the "Arthropods of La Selva" project. Yet another has worked extensively on the fly parasites of moths in Costa Rica as part of a biodiversity study. Another still has taught two courses in Costa Rica on the identification of tephritid fruit flies as part of a project to monitor the diversity of fruitflies in Costa Rica.

The Systematic Entomology Laboratory in general provides several hundred identifications each year for Costa Rica.

CONTACT

Office of International
Research Programs

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ARS INVESTMENT: LOP

1992

1993

AGENCY/DIVISION

NATIONAL SCIENCE FOUNDATION

PROGRAM

RESEARCH GRANTS

The National Science Foundation (NSF) promotes the study of biodiversity by supporting research that focuses on the survey and inventory of the world's biota, the origin and phyletic history of taxa, adaptation and change within populations, differentiation of communities and ecosystems, and variation within the physiological process. As Costa Rica is a major center for the study of tropical ecosystems and biodiversity, and a high level of NSF funded research occurs in the country, NSF has had an important influence on biodiversity research in Costa Rica.

Research in biological diversity receives funding from a number of different sources in NSF, with the majority based in the directorate for Biological Sciences (BIO). Within this directorate, biodiversity research is supported by the following programs:

Division of Environmental Biology
Systematic and Population Biology Cluster
Ecological Studies Cluster
Long term projects in Environmental Biology Cluster
Animal Behavior
Biochemistry and Molecular Structure and Function
Cell Biology
Cellular Biochemistry
Developmental Biology
Functional and Physiological Ecology
Genetics and Nucleic Acids
Neurosciences
Physiology and Behavior

Programs in other directorates - such as the Directorate for Social, Behavioral and Economic Sciences which houses the Division of International Programs, programs in Cultural Anthropology, Geography and Regional Science, and Economics; and the Directorate for Geosciences, which houses programs in Biological Oceanography, Geology, Paleontology, and Polar Biology and Medicine, also provide support for biodiversity research.

Currently most species-level research on biodiversity is funded through the Biotic Surveys and Inventory Program, the only competition devoted exclusively to the study of Biodiversity. This program supports the collection of taxa in regions or habitats that are poorly known.

NSF's division of International Programs (INT) provides support to advance the international exchange of scientific knowledge and to foster international scientific cooperation. Because the maintenance of biodiversity is vital to the global environment and the international economy, scientists from the U.S. are encouraged to pursue cooperative arrangements with institutions

and scientists from other countries in order to study the indigenous biodiversity and its conservation in those countries. INT supports: short term visits to plan new research collaborations; joint seminars and workshops to identify mutual research priorities and generate collaborative research proposals; the incremental costs of linking with international partners in new cooperative research projects; and postdoctoral and dissertation research involving close collaboration with a foreign institution.

NSF has been awarding grants for scientific research in Costa Rica for over 30 years. These grants, in turn, have often laid the groundwork for the innovative and strong research and conservation efforts in Costa Rica today. NSF-supported long term research projects form the core of research at key institutions such as OTS, INBio, and the University of Costa Rica. In addition to research grants, NSF has provided infrastructure (buildings and equipment) support to both OTS and INBio.

In 1990, NSF's Division of Environmental Biology collaborated with USAID in response to the Congressional Biodiversity Foreign Assistance Act biodiversity earmark to create a jointly funded program that focuses on biodiversity issues in developing countries. The research supported by these grants must enhance the infrastructure of the host country by involving host country scientists, supporting scientific training, and contributing infrastructure equipment and supplies.

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Integrative Biology and Neuroscience	703-306-1420	
Molecular and Cellular Biosciences	703-306-1440	
Earth Sciences	703-306-1557	
Ocean Sciences	703-306-1580	
International Programs	703-306-1710	
Polar Programs	202-357-7894	
Social, Behavioral and Economic Sciences: Social, Behavioral & Economic Research	703-306-1760	

PROJECTS LISTED IN APPENDIX 1

	<u>1991</u>	<u>1992</u>	<u>1993</u>
NSF/GRANTS	\$2,988,970	\$3,191,829	\$ 691,281
	26 awards	42 awards	5 awards

AGENCY/DIVISION

NATIONAL INSTITUTES OF HEALTH (NIH)
Fogarty International Center
National Cancer Institute
National Institute of Allergy and
Infectious Diseases
National Institute of Mental Health
National Heart, Lung, and Blood Institute

PROGRAM

INTERNATIONAL
COOPERATIVE BIODIVERSITY
GROUPS (ICBG) PROGRAM

NATIONAL SCIENCE FOUNDATION (NSF)

U.S. AGENCY FOR INTERNATIONAL
DEVELOPMENT (USAID)

* SEE USAID PAGE 27 FOR MORE DETAILED INFORMATION

The ICBG program is a collaborative effort among the U.S. Agency for International Development (USAID), the National Science Foundation (NSF), and the National Institutes of Health (NIH), which addresses the interdependent issues of biodiversity conservation, sustainable economic growth, and human health by supporting efforts to find and produce new drugs from plants and animals in the developing world while preserving biodiversity-rich areas.

The program encourages collaborative initiatives among U.S. and developing country scientists and institutions, pharmaceutical companies, universities, and NGOs that will advance sustainable development through capacity building and by ensuring that equitable economic benefits from the drug discoveries accrue to the country of origin and to the local communities.

SEE USAID PAGE 26 FOR MORE DETAILED INFORMATION

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PROJECT LISTED IN APPENDIX 1

	<u>LOP</u>	<u>1992</u>	<u>1993</u>
NIH/NCI:			\$120,000
NIH/NIUSAID:			\$ 30,000
NIH/NIMH:			\$ 16,666
TOTAL:			\$166,666

APPENDIX ONE
USAID/COSTA RICA MISSION

TITLE	Northern Zone Consolidation
START/FINISH	8/88-9/94
GRANT/PROJECT	
USG FUNDING	\$ 1,145,000 USAID/COSTA RICA
OTHER FUNDS	\$ 100,000 USAID ESF generated Colones
U.S. RESEARCHER/INSTITUTION	AGRIDEC
C.R. RESEARCHER/INSTITUTION	
TITLE	FORESTA
START/FINISH	4/89-3/96
GRANT/PROJECT	5150243
USG FUNDING	\$ 7,500,000 USAID/COSTA RICA
OTHER FUNDS	\$15,000,000 USAID ESF generated Colones
U.S. RESEARCHER/INSTITUTION	
C.R. RESEARCHER/INSTITUTION	FUNDECOR, MIRENEM
TITLE	Tortuguero Conservation and Development
START/FINISH	3/89-3/94
GRANT/PROJECT	5150249
USG FUNDING	\$550,000 USAID/COSTA RICA
OTHER FUNDS	\$125,000 USAID/LAC/ESP
U.S. RESEARCHER/INSTITUTION	\$355,000 Caribbean Conservation Corps
C.R. RESEARCHER/INSTITUTION	Caribbean Conservation Corps
TITLE	BOSCOSA
START/FINISH	3/87-3/96
GRANT/PROJECT	5150255
USG FUNDING	\$1,900,000 USAID/COSTA RICA
OTHER FUNDS	VARIOUS WWF,TNC,WRI,Other U.S. and C.R. NGOs
U.S. RESEARCHER/INSTITUTION	VARIOUS
C.R. RESEARCHER/INSTITUTION	Fundacion Neotropica
TITLE	Native Tree Reforestation
START/FINISH	
GRANT/PROJECT	5150262.00G
USG FUNDING	\$ 500,000 USAID/COSTA RICA
OTHER FUNDS	\$ 150,000 VARIOUS
U.S. RESEARCHER/INSTITUTION	Duke University
C.R. RESEARCHER/INSTITUTION	Organization of Tropical Studies, ITCR
TITLE	REFORMA
START/FINISH	8/93-9/97
GRANT/PROJECT	5150263.00G
USG FUNDING	\$2,000,000 USAID/COSTA RICA
OTHER FUNDS	\$1,200,000 USAID PL480 and ESF generated local currency
U.S. RESEARCHER/INSTITUTION	
C.R. RESEARCHER/INSTITUTION	MIRENEM, DGF, FUNDATEC

USAID/COSTA RICA MISSION (cont.)

TITLE Regional Agriculture Higher Education/EARTH
START/FINISH 9/85-9/95
GRANT/PROJECT 5960129.01/02/03
FUNDING \$ 6,705,000 USAID/COSTA RICA
\$60,000,000 USAID ESF generated Colones
\$19,600,000 USAID/ROCAP

OTHER FUNDS
U.S. RESEARCHER/INSTITUTION
C.R. RESEARCHER/INSTITUTION EARTH

USAID/LAC/ESP SMALL GRANTS

TITLE Conservation of Tortuguero National Park
START/FINISH 9/88-3/94
GRANT/PROJECT 598-0605
FUNDING \$125,000 USAID/LAC
OTHER FUNDS \$550,000 USAID/COSTA RICA for Expansion of Tortuguero National Park.
\$355,000 in Matching funds from Caribbean Conservation Corporation for related conservation activities.

U.S. RESEARCHER/INSTITUTION Caribbean Conservation Corporation
C.R. RESEARCHER/INSTITUTION

TITLE Organization for Tropical Studies Field Course: Ecological Principles for Latin American Environmental Decision Makers
START/FINISH 4/87-12/92
GRANT/PROJECT # 598-0605
FUNDING \$153,717 USAID/LAC
OTHER FUNDS \$ 75,000 Tinker Foundation
\$ 21,000 Jesse Smith Noyes Foundation

U.S. RESEARCHER/INSTITUTION Organization for Tropical Studies
C.R. RESEARCHER/INSTITUTION

TITLE Establishment of Biodiversity Survey Centers in Five Costa Rican National Parks
START/FINISH 9/88-9/89
GRANT/PROJECT # DEMS 597-0035
FUNDING \$125,000 USAID/LAC
OTHER FUNDS \$140,000 Private/Foundation
\$ 21,000 Government of Costa Rica
U.S. RESEARCHER/INSTITUTION Dan Janzen/University of Pennsylvania
C.R. RESEARCHER/INSTITUTION Fundacion Neotropica

TITLE Central America Biodiversity Legal Project
START/FINISH 10/93-3/94
GRANT/PROJECT # 598-0780
FUNDING \$76,525 USAID/LAC
OTHER FUNDS \$46,800 North/South Center
\$35,200 Ford Foundation
\$25,000 Macarthur Foundation
\$20,000 PACA Consortium
\$24,000 University of Florida
U.S. RESEARCHER/INSTITUTION University of Florida College of Law
C.R. RESEARCHER/INSTITUTION Centro de Derecho Ambiental y de los Recursos Naturales (CEDARENA)

USAID/LAC PARKS IN PERIL

TITLE Parks in Peril
START/FINISH 9/90-9/97
GRANT/PROJECT # 598-0782
USG FUNDS \$157,699 USAID/LAC
OTHER FUNDS various
COUNTERPART ORGANIZATION The Nature Conservancy

USAID/LAC/NFWF NEOTROPICAL MIGRATORY BIRD PROJECT

TITLE Conservation of Migrant Habitat in Tropical Buffer Zones
START/FINISH 1993
GRANT/PROJECT # 14-18-0009-93-1280
USG FUNDS \$125,000 USAID/LAC
OTHER FUNDS \$150,000 RARE Center, Missouri Botanical Garden, Monteverde Conservation League, National Geographic
U.S. RESEARCHER/INSTITUTION Yale University, Missouri Botanical Garden, RARE Center for Tropical Conservation
C.R. RESEARCHER/INSTITUTION Monteverde Conservation League Tropical Science Center

TITLE Finca Los Cusingos: Preserving the Legacy of Renowned Ornithologist Dr. Alexander Skutch
START/FINISH 1993
GRANT/PROJECT # 14-18-0009-93-1280
USG FUNDS \$22,000 USAID/LAC
OTHER FUNDS \$48,000 Tara Foundation, The Nature Conservancy, Weeden Foundation, Tropical Science Center
U.S. RESEARCHER/INSTITUTION
C.R. RESEARCHER/INSTITUTION Tropical Science Center

TITLE Neotropical Migratory Bird Monitoring and Training Program
START/FINISH 1993
GRANT/PROJECT # 14-18-009-93-1280
USG FUNDS \$125,000 USAID/LAC
OTHER FUNDS \$170,000 Fundacion Pro Iguana Verde, National Museum of Costa Rica, Programa Regional V.S.
U.S. RESEARCHER/INSTITUTION U.S. National Park Service, U.S. Fish and Wildlife Service
C.R. RESEARCHER/INSTITUTION Pro Iguana Verde Foundation, National Museum of Costa Rica, National University of Costa Rica (UNA) Training Program in Wildlife Management (BIODOC)

TITLE Migratory Bird Exhibit
START/FINISH 1993
GRANT/PROJECT # 14-18-009-93-1280
USG FUNDS \$24,535 USAID/LAC
OTHER FUNDS \$24,535
U.S. RESEARCHER/INSTITUTION Smithsonian Migratory Bird Center
C.R. RESEARCHER/INSTITUTION Audubon de Costa Rica

USAID/ROCAP

TITLE Regional Agricultural Technologies Networks
START/FINISH 9/87-12/92
GRANT/PROJECT # 596-0127
USG FUNDS \$2,500,000 USAID/ROCAP (for region)
OTHER FUNDS
COUNTERPART INSTITUTION IICA, CATIE, FHIA, PADF

TITLE Regional Agricultural Higher Education
START/FINISH 9/85-6/91
GRANT/PROJECT # 596-0129
USG FUNDS \$ 8,254,424 USAID/ROCAP (for region)
OTHER FUNDS \$19,600,000 USAID/ROCAP for EARTH
COUNTERPART INSTITUTION CATIE, EARTH

TITLE Regional Environmental and Natural Resources
Management
START/FINISH 2/89-9/95
GRANT/PROJECT # 596-0150
USG FUNDS \$50,200,000 USAID/ROCAP (for region)
OTHER FUNDS Various
COUNTERPART INSTITUTION CATIE, EAP, CARE/TNC, WCI/CCC, Associated C.A. NGOs
Cultural Survival, Peace Corps, INCAP, EPA,
FDA, USDA

USAID/ROCAP/RENARM PASEO PANTERA SMALL GRANTS - 1993

TITLE Creation of Tropical Wildlife Habitat from
Pasture Ecosystems
START/FINISH 5/93-9/93
GRANT/PROJECT #
USG FUNDS \$ 5,330 . USAID/ROCAP
OTHER FUNDS
C.R. RESEARCHER/INSTITUTION F.L. Carpenter and M. Cordero

TITLE Home Range and Feeding Habits of Collard
Peccaries in a Costa Rican Tropical Humid Forest
START/FINISH 5/93-8/93
GRANT/PROJECT #
USG FUNDS \$ 2,222 USAID/ROCAP
OTHER FUNDS
C.R. RESEARCHER/INSTITUTION I. Torrealba and J. Rau Acuna, University
of Costa Rica

TITLE Conservation and Management of Tarpon: Life
History Studies
START/FINISH 1991 - 1993
GRANT/PROJECT #
USG FUNDS
OTHER FUNDS
U.S. RESEARCHER/INSTITUTION J. Dean, E. Cyr, R. Crabtree, W. McLarney,
University of South Carolina
C.R. RESEARCHER/INSTITUTION ANAI

USAID/G/R&D/R PROGRAM IN SCIENCE & TECHNOLOGY
COOPERATION 1990-1993

TITLE	Identification of Resistance in Banana to Races of the Fusarial Wilt Fungus
START/FINISH	8/90-10/94
GRANT/PROJECT #	9.093
USG FUNDS	\$144,195 USAID
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	R.Ploetz, University of Florida
C.R. RESEARCHER/INSTITUTION	University of Costa Rica
TITLE	Natural Systems as Reservoirs of Agriculturally Important Plant Viruses and Microplasms
START/FINISH	8/90-8/94
GRANT/PROJECT #	10.736
USG FUNDS	\$150,000 USAID
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	M.Irwin, University of Illinois
C.R. RESEARCHER/INSTITUTION	University of Costa Rica
TITLE	Somatic Embryos for Germplasm Storage and Clonal Propagation
START/FINISH	8/90-8/93
GRANT/PROJECT #	10.278
USG FUNDS	\$149,625 USAID
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	D.Gray, University of Florida
C.R. RESEARCHER/INSTITUTION	CATIE
TITLE	Molecular Genetic Analysis of Valuable Native Timber Species
START/FINISH	5/91-5/95
GRANT/PROJECT #	10.105
USG FUNDS	\$149,998 USAID
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	D.Clark, Duke University
C.R. RESEARCHER/INSTITUTION	University of Costa Rica
TITLE	Fertilizer Losses by Bypass Flow in Well-Aggregated Humid Tropical Soils: Evaluation and Strategies for Prevention
START/FINISH	91-8/96
GRANT/PROJECT #	11.243
USG FUNDS	\$149,599 USAID
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	R.A.Radulovich, Cornell
C.R. RESEARCHER/INSTITUTION	University of Costa Rica
TITLE	Theobroma Cacao: DNA Analysis for Fungal Resistance
START/FINISH	5/92-7/96
GRANT/PROJECT #	10.117
USG FUNDS	\$150,000 USAID
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	P.Fritz, Penn State
C.R. RESEARCHER/INSTITUTION	CATIE

USAID/G/R PROGRAM IN SCIENCE & TECHNOLOGY COOPERATION
1990-1993 (cont.)

TITLE	Detection and Replication of Cucumber Mosaic Virus
START/FINISH	7/92-7/97
GRANT/PROJECT #	10.326
USG FUNDS	\$149,983 USAID
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	G.Macaya, Oklahoma State University, Cornell University
C.R. RESEARCHER/INSTITUTION	
TITLE	Internet Project
START/FINISH	
GRANT/PROJECT #	12.061
USG FUNDS	\$149,945 USAID
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	F.Teramond, University of Delaware
C.R. RESEARCHER/INSTITUTION	University of Costa Rica
TITLE	Gap Analysis Mapping of Diversity of Biological Resources
START/FINISH	5/92-5/97
GRANT/PROJECT #	12.343
USG FUNDS	\$149,994 USAID
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	T.Lacher, Clemson University
C.R. RESEARCHER/INSTITUTION	University of Costa Rica
TITLE	Herbivorous Insect Populations in Native Tree Plantations in the Atlantic Lowlands of Costa Rica
START/FINISH	5/92-5/97
GRANT/PROJECT #	12.421
USG FUNDS	\$149,599 USAID
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	R.Marquis, University of Missouri
C.R. RESEARCHER/INSTITUTION	Instituto Tecnologico de Costa Rica

**USAID/G/R&D U.S. ISRAEL COOPERATIVE DEVELOPMENT
RESEARCH PROGRAM 1990-1993**

TITLE	A Traffic Monitoring and Driver Behavior Modification System
START/FINISH	8/90-8/94
GRANT/PROJECT #	C8-043
USG FUNDS	\$200,000 USAID
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	P.Slater, Hebrew University, Jerusalem College of Technology
C.R. RESEARCHER/INSTITUTION	
TITLE	Isolation, Characterization and Neutralization of Hemorrhagic Toxins from the Venom of the Snake Bothrops Asper
START/FINISH	8/91-8/96
GRANT/PROJECT #	C11-004
USG FUNDS	\$198,790 USAID
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	M.Ovadia, Tel Aviv University
C.R. RESEARCHER/INSTITUTION	University of Costa Rica
TITLE	Introduction of the New Technology of Modified Atmosphere Packaging in Plastic Film in Order to Reduce Spoilage and Exte
START/FINISH	9/92-9/96
GRANT/PROJECT #	C11-076
USG FUNDS	\$146,560 USAID
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	Ben-Yehoshua, The Volcani Center
C.R. RESEARCHER/INSTITUTION	University of Costa Rica
TITLE	Ecological Assesment of the Nicoya Peninsula
START/FINISH	8/93-8/97
GRANT/PROJECT #	C13-109
USG FUNDS	\$ 202,540
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	
C.R. RESEARCHER/INSTITUTION	Universidad Nacional de Costa Rica

**USAID/G/R&D/ENR CONSERVATION OF BIOLOGICAL DIVERSITY
PROJECT - USAID/NSF GRANTS**

TITLE	Population Biology of Tropical Rain Forest Trees
START/FINISH	1990
GRANT/PROJECT #	BSR-9000063
USG FUNDS	\$ 37,000 USAID \$266,000 NSF
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	Kamaljit S. Bawa, University of Massachusetts - Boston
C.R. RESEARCHER/INSTITUTION	Organization of Tropical Studies
TITLE	A Manual to The Plants of Costa Rica Phase Two
START/FINISH	11/90-11/93
GRANT/PROJECT #	BSR-9006449
USG FUNDS	\$244,185 USAID \$110,000 NSF
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	Barry Hammel, Missouri Botanical Garden
C.R. RESEARCHER/INSTITUTION	INBio
TITLE	An Inter-Institutional Database of Fish Biodiversity in the Neotropics (Brazil, Costa Rica, Venezuela)
START/FINISH	9/91-9/94
GRANT/PROJECT #	BSR-9024797
USG FUNDS	\$ 56,000 USAID \$206,000 NSF
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	Scott Schaefer, The Academy of Natural Sciences of Philadelphia
C.R. RESEARCHER/INSTITUTION	Various
TITLE	Arthropod Diversity in a Lowland Tropical Rainforest
START/FINISH	7/91-7/94
GRANT/PROJECT #	BSR 9025024
USG FUNDS	\$175,284 USAID \$210,445 NSF
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	Donald Stone, Duke University
C.R. RESEARCHER/INSTITUTION	Organization for Tropical Studies INBio
TITLE	Effects of the 1982-83 El Nino Event on Tropical, Eastern Pacific Coral Reefs: Disturbances, Causes, Recovery and Retrospective Analysis - Costa Rica, Panama, Ecuador
START/FINISH	3/91-3/94
GRANT/PROJECT #	OCE 9018392
USG FUNDS	\$112,000 USAID \$439,109 NSF
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	Peter W. Glynn
C.R. RESEARCHER/INSTITUTION	University of Costa Rica

USAID/NSF (cont.)

TITLE	Volcanic Processes Introduce Chemical Discontinuities into Lowland Tropical Streams: Ecological Response to Geothermally-Derived Solutes
START/FINISH	9/91-9/94
GRANT/PROJECT #	BSR 9107772
USG FUNDS	\$122,117 USAID \$191,380 NSF
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	Catherine Pringle, Cornell University
C.R. RESEARCHER/INSTITUTION	Organization of Tropical Studies -
TITLE	Inventory of the Lepidoptera Larvae and Their Parasitoids in a Tropical Dry Forest
START/FINISH	1991
GRANT/PROJECT #	BSR 9024770
USG FUNDS	\$186,923 USAID \$100,000 NSF
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	Daniel Janzen, University of Pennsylvania
	La Selva Biological Station, University of Costa Rica
TITLE	Declining Amphibian Population in Lower Central America: Evaluation of the Phenomenon and its Possible Causes (Panama and Costa Rica)
START/FINISH	7/92-7/95
GRANT/PROJECT #	DEB 9200081
USG FUNDS	\$115,872 USAID \$209,111 NSF
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	Jay Savage, University of Miami
TITLE	Flora Costaricensis; Orchidaceae
START/FINISH	3/92-3/95
GRANT/PROJECT #	DEB 9200812
USG FUNDS	\$65,310 USAID \$93,760 NSF
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	John Atwood, Marie Selby Botanical Gardens
TITLE	Agaricales of Costa Rican Quercus Forests
START/FINISH	5/93-5/96
GRANT/PROJECT #	DEB 9300798
USG FUNDS	\$219,993 USAID \$181,024 NSF
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	Gregory Mueller, Chicago Field Museum of Natural History, New York Botanical Garden
C.R. RESEARCHER/INSTITUTION	Organization of Tropical Studies, Julieta Carranza-Morse, University of Costa Rica
TITLE	A Manual to the Plants of Costa Rica Final Phase
START/FINISH	9/93-9/96
GRANT/PROJECT #	DEB 9300814
USG FUNDS	\$129,961 USAID \$280,024 NSF \$ 10,000 STATE/OES
U.S. RESEARCHER/INSTITUTION	Barry Hammel, Missouri Botanical Garden
C.R. RESEARCHER/INSTITUTION	INBio, National Museum of Costa Rica

**USAID/G/R&D/ENR BIODIVERSITY SUPPORT PROGRAM SMALL
GRANTS AND PILOT PROJECTS**

TITLE Species Diversity and Genetic Variation of
Plants Growing in Gardens of Chibchan
Amerindians Living in Costa Rica. A Model for
In Situ Conservation of Biological Diversity.
START/FINISH 1/94-12/94
GRANT/PROJECT # 583707
USG FUNDS \$14,560 USAID
OTHER FUNDS In Kind Matching Funds University of Costa Rica
C.R. RESEARCHER/INSTITUTION Dr. Ramiro Barrantes/University of
Costa Rica

TITLE Erin Workshop on Database Management
START/FINISH 2/92-3/93
GRANT/PROJECT # 580354
USG FUNDS \$10,441 USAID/R&D and USAID/ASIA
\$10,608 USDA
OTHER FUNDS INBio
U.S. RESEARCHER/INSTITUTION
C.R. RESEARCHER/INSTITUTION INBio

TITLE INBio Paratoxonomists Course
START/FINISH 1/90-3/92
GRANT/PROJECT # PD895A
USG FUNDS \$100,168 USAID/LAC
\$ 40,000 USAID/S&T
OTHER FUNDS \$300,000 Pew Charitable Trust
The \$140,168 from USAID was used to buy \$214,477
in dollar denominated bonds through a debt swap.
U.S. RESEARCHER/INSTITUTION Daniel Janzen, University of Pennsylvania
C.R. RESEARCHER/INSTITUTION INBio

TITLE Boscosa Evaluation
START/FINISH 5/92-11/92
GRANT/PROJECT # PD9204
USG FUNDS \$35,000 USAID/Costa Rica Mission
OTHER FUNDS
U.S. RESEARCHER/INSTITUTION World Wildlife Fund, U.S. Forest Service
C.R. RESEARCHER/INSTITUTION Fundacion Neotropica

TITLE Environmental Impact Assessment
START/FINISH 7/92-8/93
GRANT/PROJECT # PD9209
USG FUNDS \$56,309 USAID/Costa Rica Mission
OTHER FUNDS World Wildlife Fund, U.S. Forest Service
U.S. RESEARCHER/INSTITUTION Fundacion Neotropica
C.R. RESEARCHER/INSTITUTION

TITLE Proposal Design Technical Assistance
START/FINISH 11/92-3/93
GRANT/PROJECT # PD9209-01
USG FUNDS \$ 5,294 USAID
OTHER FUNDS World Wildlife Fund, U.S. Forest Service
U.S. RESEARCHER/INSTITUTION Fundacion Neotropica
C.R. RESEARCHER/INSTITUTION

TITLE Environmental Assessment
START/FINISH 10/92-9/93
GRANT/PROJECT # PD9209-02
USG FUNDS \$40,958 USAID
OTHER FUNDS World Wildlife Fund
U.S. RESEARCHER/INSTITUTION Fundacion Neotropica
C.R. RESEARCHER/INSTITUTION

**USAID/G/ENR BIODIVERSITY SUPPORT PROGRAM SMALL GRANTS
AND PILOT PROGRAMS (cont.)**

TITLE	Butterfly Farming
START/FINISH	1990
GRANT/PROJECT #	RE9001
USG FUNDS	\$15,000 USAID
OTHER FUNDS	950,000 Colones/ National Museum of Costa Rica
U.S. RESEARCHER/INSTITUTION	World Wildlife Fund/Nature Conservancy
C.R. RESEARCHER/INSTITUTION	INBio, National Museum of Costa Rica
TITLE	Valuation of Non-Priced Amenities Provided by the Biological Resources Within the Monteverde Cloud Forest Preserve
START/FINISH	5/91-11/92
GRANT/PROJECT #	RE9001
USG FUNDS	\$15,000 USAID
OTHER FUNDS	Private Matching Funds
U.S. RESEARCHER/INSTITUTION	Development Strategies for Fragile Lands
C.R. RESEARCHER/INSTITUTION	Tropical Science Center
TITLE	The Importance of Forest Fragments to the Maintenance of Regional Biodiversity Surrounding a Tropical Reserve
START/FINISH	11/90-12/92
GRANT/PROJECT #	RE9001
USG FUNDS	\$14,250 USAID
OTHER FUNDS	\$ 2,000 Lincoln Park Zoo \$ 6,000 Wildlife Conservation International \$ 6,000 Yale School of Forestry and Environmental Studies
U.S. RESEARCHER/INSTITUTION	Carlos Guidon, Yale School of Forestry
C.R. RESEARCHER/INSTITUTION	Monteverde Conservation League
TITLE	Sea Turtles and Conservation of Biodiversity in Costa Rica: A Local Solution
START/FINISH	
GRANT/PROJECT #	RE9001
USG FUNDS	\$14,393 USAID
OTHER FUNDS	In kind matching funds University of Costa Rica
U.S. RESEARCHER/INSTITUTION	F.Paladino, Purdue University, E.Standora, SUNY, Buffalo
C.R. RESEARCHER/INSTITUTION	A.Chaves, University of Costa Rica

**INTERNATIONAL COOPERATIVE BIODIVERSITY GROUPS PROGRAM
 U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT (USAID/G/R&D/ENR)
 NATIONAL INSTITUTES OF HEALTH
 NATIONAL SCIENCE FOUNDATION**

TITLE Chemical Prospecting in a Costa Rican
 Conservation Area
START/FINISH 7/93 - 6/98
GRANT/PROJECT # 001 TW/CA00312-01
USG FUNDS Total USG funds year one \$473,660.00
 year two \$403,556.00
 year three \$403,556.00
 year four \$403,556.00
 First year breakdown as follows:
 \$ 228,000 USAID
 \$ 120,000 NCI
 \$ 79,000 NSF
 \$ 30,000 NIUSAID
 \$ 16,666 NIMH
OTHER FUNDS Bristol-Meyers Squibb, Cornell
 University, INBio
U.S. RESEARCHER/INSTITUTION Jerry Meinwald, Cornell University
C.R. RESEARCHER/INSTITUTION Daniel Janzen, University of Pennsylvania
 Anna Sittenfeld, INBio

* See National Science Foundation, National Institutes of Health

USAID/G/AGR R&D/APSP

TITLE Agricultural Biotechnology for Sustainable
 Productivity
START/FINISH 9/91 - 9/97
GRANT/PROJECT # 936-4197
USG FUNDS \$ 724,200 USAID
OTHER FUNDS \$ 560,300 DNA Plant Technology
 \$ 122,800 Agrobiotecnologia de Costa Rica
 \$1,374,300 Michigan State
 \$ 141,000 Cornell
 \$ 66,000 Texas A&M
U.S. RESEARCHER/INSTITUTION Michigan State/Cornell/Texas A&M
 DNA Plant Technology
C.R. RESEARCHER/INSTITUTION University of Costa Rica
 Agrobiotecnologia de Costa Rica

USAID/CRSPs

TITLE Bean/Cowpea CRSP: Improved Digestibility and
 Nutritional Quality of Common Bean Through
 Traditional Breeding, Molecular Biology,
 Genetics and Food Technology
START/FINISH
GRANT/PROJECT #
USG FUNDS \$ 49,512
OTHER FUNDS
U.S. RESEARCHER/INSTITUTION Michigan State
C.R. RESEARCHER/INSTITUTION University of Costa Rica

USFWS/SMALL GRANTS 1990-1993

TITLE	Video Documentary
START/FINISH	1990
GRANT/PROJECT #	90-1202
USG FUNDS	\$ 6,134 USFWS
OTHER FUNDS	
C.R. RESEARCHER/INSTITUTION	Fundacion de Educacion Ambiental
TITLE	Environmental Education
START/FINISH	1990
GRANT/PROJECT #	90-1243
USG FUNDS	\$ 7,215 USFWS
OTHER FUNDS	
C.R. RESEARCHER/INSTITUTION	Simon Bolivar Zoological Park
TITLE	Regional Course for Park Rangers
START/FINISH	9/92-10/92
GRANT/PROJECT #	91-1271
USG FUNDS	\$10,500 USFWS
OTHER FUNDS	
C.R. RESEARCHER/INSTITUTION	Costa Rica National Park Service
TITLE	Environmental Education
START/FINISH	1992
GRANT/PROJECT #	92-1330
USG FUNDS	\$ 6,000 USFWS
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	Rainforest Alliance
C.R. RESEARCHER/INSTITUTION	
TITLE	Production and Distribution of Proceedings "Conference on Environmental Themes in Central America: The Role of Higher Education"
START/FINISH	1993
GRANT/PROJECT #	93-1265
USG FUNDS	\$ 8,000 USFWS
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	
C.R. RESEARCHER/INSTITUTION	UNA
TITLE	Publication of Technical Journal, "Vida Silvestre"
START/FINISH	1993
GRANT/PROJECT #	93-1266
USG FUNDS	\$ 8,000 USFWS
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	
C.R. RESEARCHER/INSTITUTION	UNA/PRMVS
TITLE	Environmental Education
START/FINISH	1994
GRANT/PROJECT #	
USG FUNDS	\$ 10,000 USFWS
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	Rainforest Alliance
TITLE	International Wildlife Management Congress
START/FINISH	1993
GRANT/PROJECT #	
USG FUNDS	\$ 25,000 USFWS
OTHER FUNDS	VARIOUS

USFWS/PMVS/BIODOC 1984-1994

TITLE Central American Graduate Program in
Biodiversity Conservation (PMVS)
Biodocumentation Center (BIODOC)
1984-

START/FINISH
GRANT/PROJECT #
USG FUNDS \$1,094,870 USFWS (1984-1994)
OTHER FUNDS World Wildlife Fund
OAS
Wildlife Conservation International
Jessie Smith Noyes Foundation
Macarthur Foundation
Central American Universities Superior Council
USFWS

U.S. RESEARCHER/INSTITUTION
C.R. RESEARCHER/INSTITUTION Universidad Nacional de Costa Rica (UNA)

DEPARTMENT OF STATE/OCEANS AND INTERNATIONAL ENVIRONMENTAL AFFAIRS

TITLE A Manual to the Plants of Costa Rica
Final Phase

START/FINISH 9/93-9/96
GRANT/PROJECT # DEB 9300814
USG FUNDS \$129,961 USAID
\$280,024 NSF
\$ 10,000 STATE/OES

U.S. RESEARCHER/INSTITUTION Barry Hammel, Missouri Botanical Garden
C.R. RESEARCHER/INSTITUTION INBio, National Museum of Costa Rica

PEACE CORPS

TITLE Forestry Extension

START/FINISH 3/80-1/97
GRANT/PROJECT # 515-EN-01
USG FUNDS \$ PEACE CORPS/CR
\$ PEACE CORPS PARTNERSHIP PROGRAM
OTHER FUNDS \$ in kind MIRENEM/County Agricultural
Centers and Cooperatives/Dutch and
Finnish Governments

SMITHSONIAN

TITLE Habitat Use and Foraging Behavior of
Prothonotary Warblers in Costa Rican Mangrove

U.S. RESEARCHER/INSTITUTION Ian Warkentin, Smithsonian National
Zoological Park

TITLE Reproductive Biology of Mediterranean Fruit
Flies

U.S. RESEARCHER/INSTITUTION William G. Eberhard, Smithsonian
Tropical Research Institute
C.R. RESEARCHER/INSTITUTION F. Pereira, University of Costa Rica

TITLE Evolutionary Diversification of Plethontid
Salamanders in the New World Tropics

U.S. RESEARCHER/INSTITUTION James Lynch; David Wake, University
of California, Berkeley, Smithsonian
Environmental Research Center

SMITHSONIAN (cont.)

TITLE Restoration of Eastern Pacific Coral Reefs
(Costa Rica, Panama, and Columbia) - An Approach
to Maintain Regional Biodiversity

U.S. RESEARCHER/INSTITUTION Hector Guzman, STRI, World Wildlife
Fund Biodiversity Support Program

NATIONAL FISH AND WILDLIFE FOUNDATION

* See USAID/LAC/NFWF NEOTROPICAL MIGRATORY BIRD PROGRAM

TITLE Banana Amigo
START/FINISH 1993
USG FUNDS \$40,000 NFWF
OTHER FUNDS \$80,000 Private matching funds
U.S. RESEARCHER/INSTITUTION Rainforest Alliance

TITLE Guanacaste Conservation Area
START/FINISH 1993
USG FUNDS \$75,000 NFWF
OTHER FUNDS \$225,000 Private matching funds
C.R. RESEARCHER/INSTITUTION INBio

TITLE Crosstraining for NGO's and Journalists
START/FINISH 1993
USG FUNDS \$40,000 NFWF
OTHER FUNDS \$80,000 Private matching funds
U.S. RESEARCHER/INSTITUTION Rainforest Alliance

TITLE Costa Rica Monitoring Workshop
START/FINISH 1993
USG FUNDS \$15,000 NFWF
OTHER FUNDS \$30,000 Private matching funds
U.S. RESEARCHER/INSTITUTION American Birding Association

TITLE Costa Rica Biodiversity Education
START/FINISH Training for Female Parataxonomists
GRANT/PROJECT # 1993
USG FUNDS \$80,000 NFWF
OTHER FUNDS \$80,000 Private matching funds
C.R. RESEARCHER/INSTITUTION INBio

TITLE Migratory Bird Habitat in Costa Rica
START/FINISH 1993
GRANT/PROJECT #
USG FUNDS \$100,000 NFWF
OTHER FUNDS \$450,000 Private matching funds
U.S. RESEARCHER/INSTITUTION
C.R. RESEARCHER/INSTITUTION Organization for Tropical Studies

INTERAGENCY COUNTRY STUDIES INITIATIVE

<i>TITLE</i>	Central America Country Study
<i>START/FINISH</i>	1992-1994
<i>GRANT/PROJECT #</i>	
<i>USG FUNDS</i>	\$800,000 various USG agencies - EPA lead
<i>OTHER FUNDS</i>	
<i>U.S. RESEARCHER/INSTITUTION</i>	EPA and USG technical agencies
<i>C.R. RESEARCHER/INSTITUTION</i>	Committee on Hydrolic Resources Central American Committee on Environment and Development
<i>NOTES</i>	Project is for all countries of Central American region

USDA FOREST SERVICE

<i>TITLE</i>	Tropical Forestry Program
<i>START/FINISH</i>	1990-1993
<i>GRANT/PROJECT #</i>	
<i>USG FUNDS</i>	\$475,945 USDA/FS
<i>OTHER FUNDS</i>	
<i>U.S. RESEARCHER/INSTITUTION</i>	CATIE, University of Peace, OTS
<i>C.R. RESEARCHER/INSTITUTION</i>	
<i>TITLE</i>	Natural Forest Management Pilot Project
<i>START/FINISH</i>	
<i>GRANT/PROJECT #</i>	
<i>USG FUNDS</i>	\$60,000* USDA/FS
<i>OTHER FUNDS</i>	WWF, Foundations
<i>U.S. RESEARCHER/INSTITUTION</i>	WWF

NATIONAL SCIENCE FOUNDATION
1992-1993

TITLE	Alkaloids of Importance in Plant-Insect Interactions
START/FINISH	1992
GRANT/PROJECT #	CHEM 9023608
USG FUNDS	\$20,000 NSF
U.S. RESEARCHER/INSTITUTION	F.Stermitz, Colorado State
TITLE	Dental Microwear and Diet in Live, Wild-Trapped Alouatta From Costa Rica
START/FINISH	1992
GRANT/PROJECT #	DB5 9118876
USG FUNDS	\$80,997 NSF
U.S. RESEARCHER/INSTITUTION	M.Teafor, Johns Hopkins University
TITLE	Environmental Discourse and Practice: Costa Rican Peasantry
START/FINISH	1992
GRANT/PROJECT #	DB5 9215760
USG FUNDS	\$8,858 NSF
U.S. RESEARCHER/INSTITUTION	L.Lamphere, University of New Mexico
TITLE	Habitat Structure, Ontogeny and Modes of Mobility in Howler Monkeys
START/FINISH	1992
GRANT/PROJECT #	DB5 9202823
USG FUNDS	\$8,999 NSF
U.S. RESEARCHER/INSTITUTION	R.Clochon, University of Iowa
TITLE	Dental Microwear and Dist. in Live, Wild-Trapped Alouatta From Costa Rica
START/FINISH	1992
GRANT/PROJECT #	DB5 9118876
USG FUNDS	\$3,994 NSF
U.S. RESEARCHER/INSTITUTION	M.Teafor, Johns Hopkins University
TITLE	Physical and Biotic Observations of Eastern Pacific Reef Coral During the 1992 El Nino
START/FINISH	1992
GRANT/PROJECT #	OCE 9218197
USG FUNDS	\$12,110 NSF
U.S. RESEARCHER/INSTITUTION	P.Glynn, University of Miami
TITLE	Systematics and Phylogenetics of Temperate Polypodium
START/FINISH	1992
GRANT/PROJECT #	DEB 9106764
USG FUNDS	\$47,299 NSF
U.S. RESEARCHER/INSTITUTION	C.Haufler, University of Kansas
TITLE	Molecular Genetics of Morphological Convergence in the Drosophilidae
START/FINISH	1992
GRANT/PROJECT #	DEB 9107369
USG FUNDS	\$77,100 NSF
U.S. RESEARCHER/INSTITUTION	R.Desalle, American Museum of Natural History

NATIONAL SCIENCE FOUNDATION (cont.)

TITLE	Pollen Export and the Evolution of Diatly: Tests of a Model
START/FINISH	1992
GRANT/PROJECT #	DEB 9122762
USG FUNDS	\$ 6,832 NSF
U.S. RESEARCHER/INSTITUTION	J. Thompson, SUNY at Stony Brook
TITLE	Biosystematic Analysis of the Pleopeltis Macrocarpa Complex
START/FINISH	1992
GRANT/PROJECT #	DEB 9122855
USG FUNDS	\$ 8,240 NSF
U.S. RESEARCHER/INSTITUTION	C.Haufler, University of Kansas
TITLE	The Pollination Ecology of Calyptrogyne Sarapiquerensis
START/FINISH	1992
GRANT/PROJECT #	DEB 9122958
USG FUNDS	\$ 8,076 NSF
U.S. RESEARCHER/INSTITUTION	R.Colwell
TITLE	Consequences of Avian Seed Dispersal for Understory Plants in Primary Forest in Lowland Costa Rica
START/FINISH	1992
GRANT/PROJECT #	DEB 9123052
USG FUNDS	\$ 7,687 NSF
U.S. RESEARCHER/INSTITUTION	D.McKay, University of Miami
TITLE	Role of Light in Determining the Costs and Benefits of Extrafloral Nectar Production in Two Costa Rican Passiflora Species
START/FINISH	1992
GRANT/PROJECT #	DEB 9123066
USG FUNDS	\$ 6,280 NSF
U.S. RESEARCHER/INSTITUTION	D.McKay, University of Miami
TITLE	Declining Amphibian Populations in Lower Central America: Evaluation of the Phenomenon and its Possible Causes
START/FINISH	1992
GRANT/PROJECT #	DEB 9200081
USG FUNDS	\$209,111 NSF \$115,872 USAID
U.S. RESEARCHER/INSTITUTION	J.Savage, University of Miami
TITLE	Survey of the Dynastic Beetles of Costa Rica and Panama.
START/FINISH	1992
GRANT/PROJECT #	DEB 9200760
USG FUNDS	\$ 61,015 NSF
U.S. RESEARCHER/INSTITUTION	B.Ratcliffe, University of Nebraska
TITLE	Flora Costaricensis: Orchidaceae Phase II
START/FINISH	1992
GRANT/PROJECT #	DEB 9200812
USG FUNDS	\$ 93,760 NSF \$ 65,310 USAID
U.S. RESEARCHER/INSTITUTION	J. Atwood, Marie Selby Botanical Garden

NATIONAL SCIENCE FOUNDATION (cont.)

TITLE	The Vascular Flora of La Selva
START/FINISH	1992
GRANT/PROJECT #	DEB 9200894
USG FUNDS	\$144,190 NSF
U.S. RESEARCHER/INSTITUTION	R. Wilbur, Duke University
TITLE	Mangrove Detritus: Sink or Link
START/FINISH	1992
GRANT/PROJECT #	DEB 9207813
USG FUNDS	\$ 91,166 NSF
U.S. RESEARCHER/INSTITUTION	C. Epifanio, University of Delaware
TITLE	Glycoalkaloids of Solanaceous Fruits: Significance as Mediators of Interactions Among Fruiting Plants and Their Frugivores
START/FINISH	1992
GRANT/PROJECT #	DEB 9207920
USG FUNDS	\$ 60,627 NSF
U.S. RESEARCHER/INSTITUTION	J. Levy, University of Florida
TITLE	Environmental Heterogeneity and Woody Species Diversity in Low-elevation Tropical Secondary Forests
START/FINISH	1992
GRANT/PROJECT #	DEB 9208031
USG FUNDS	\$179,000 NSF
U.S. RESEARCHER/INSTITUTION	D. Stone, Duke University
TITLE	Effects of Ecological Factors on Facultative Mutualisms
START/FINISH	1992
GRANT/PROJECT #	DEB 9211965
USG FUNDS	\$ 3,771 NSF
U.S. RESEARCHER/INSTITUTION	E. O. Wilson, Harvard University
TITLE	Diversification of Populations and Species of Bacillus
START/FINISH	1992
GRANT/PROJECT #	DEB 9214040
USG FUNDS	\$115,357 NSF
U.S. RESEARCHER/INSTITUTION	K. Duncan, University of Arizona
TITLE	Mangrove Deterius: Sink or Link?
START/FINISH	1992
GRANT/PROJECT #	DEB 9219071
USG FUNDS	\$ 33,833 NSF
U.S. RESEARCHER/INSTITUTION	L. Cirventes, Texas A&M University
TITLE	Arthropod Diversity in a Lowland Tropical Rainforest
START/FINISH	1992
GRANT/PROJECT #	DEB9025024
USG FUNDS	\$ 54,497 NSF
U.S. RESEARCHER/INSTITUTION	D. Stone, Duke University
C.R. RESEARCHER/INSTITUTION	OTS

NATIONAL SCIENCE FOUNDATION (cont.)

TITLE Dynamic Demography of Ant and Bird Dispersed
Herbs: Divergent Responses to Tropical Forest
Gap-Phase Regeneration
START/FINISH 1992
GRANT/PROJECT # DEB 8906637
USG FUNDS \$ 80,000 NSF
U.S. RESEARCHER/INSTITUTION C. Horvitz, University of Miami

TITLE Systematics and Mechanisms of Speciation in
Mites
START/FINISH 1992
GRANT/PROJECT # DEB 8906228
USG FUNDS \$43,058 NSF
U.S. RESEARCHER/INSTITUTION R. Colwell, University of Connecticut

TITLE The Caddisflies or Trichoptera of Costa Rica
START/FINISH 1992
GRANT/PROJECT # DEB 8917684
USG FUNDS \$ 41,580 NSF
U.S. RESEARCHER/INSTITUTION R. Holzenthal, University of Minnesota

TITLE Systematics and Ecology of Social Insects
START/FINISH 1992
GRANT/PROJECT # DEB 8915314
USG FUNDS \$ 42,000 NSF
U.S. RESEARCHER/INSTITUTION E.O. Wilson, Harvard University

TITLE The Role of Canopy Subsystems in Tropical Forest
Nutrient Cycles: Mechanisms and Models
START/FINISH 1992
GRANT/PROJECT # DEB 9296023
USG FUNDS \$ 79,940. NSF
U.S. RESEARCHER/INSTITUTION N. Nadkarni, Marie Selby Botanical Gardens

TITLE CRB: Plant Longevity and Life-form Diversity in
Reconstructed Tropical Ecosystems
START/FINISH 1992
GRANT/PROJECT # DEB 9000089
USG FUNDS \$ 165,000 NSF
U.S. RESEARCHER/INSTITUTION J. Ewal

TITLE Flow Regime and the Structure and Productivity
of Macroinvertebrate Communities in Tropical
Streams
START/FINISH 1992
GRANT/PROJECT # DEB 9007843
USG FUNDS \$ 95,000 NSF
U.S. RESEARCHER/INSTITUTION Academy of Natural Sciences

TITLE Manual to the Plants of Costa Rica Phase 2
START/FINISH 1992
GRANT/PROJECT # DEB9006449
USG FUNDS \$ 50,000 NSF
U.S. RESEARCHER/INSTITUTION USAID
C.R. RESEARCHER/INSTITUTION B. Hammel, Missouri Botanical Garden
INBio

NATIONAL SCIENCE FOUNDATION (cont.)

TITLE	Molecular Systematics of Epilobaeae
START/FINISH	1992
GRANT/PROJECT #	DEB 9020055
USG FUNDS	\$ 101,721 NSF
U.S. RESEARCHER/INSTITUTION	K. Sytsma, University of Wisconsin
TITLE	Collaborative Research: Soil Organic Matter in the Tropics: Determinants and Consequences
START/FINISH	1992
GRANT/PROJECT #	DEB 9006999
USG FUNDS	\$160,000 NSF
U.S. RESEARCHER/INSTITUTION	C.Palm, North Carolina State University
TITLE	Collaborative Research: Soil Organic Matter in the Tropics: Determinants and Consequences
START/FINISH	1992
GRANT/PROJECT #	DEB 9007881
USG FUNDS	\$100,000 NSF
U.S. RESEARCHER/INSTITUTION	W. Parton, Colorado State University
TITLE	Relatedness and Altruism in Neotropical Wasps
START/FINISH	1992
GRANT/PROJECT #	DEB 9021514
USG FUNDS	\$ 88,000 NSF
U.S. RESEARCHER/INSTITUTION	D. Queller, William Marsh Rice University
TITLE	Long-term, Intersite Experiments of Leaf and Fine Root Decomposition
START/FINISH	1992
GRANT/PROJECT #	DEB 9108329
USG FUNDS	\$ 47,965 NSF
U.S. RESEARCHER/INSTITUTION	M. Harmon, Oregon State University
TITLE	Volcanic Processes Introduce Chemical Discontinuities into Lowland Tropical Streams: Ecological Response to Geothermally-derived Solutes
START/FINISH	1992
GRANT/PROJECT #	DEB 9107772
USG FUNDS	\$ 61,273 NSF USAID
U.S. RESEARCHER/INSTITUTION	C. Pringle, Cornell University
C.R. RESEARCHER/INSTITUTION	OTS, University of Costa Rica
TITLE	Flora Costaricensis: Orchidaceae Phase II
START/FINISH	1992
GRANT/PROJECT #	DEB 9200812
USG FUNDS	\$ 63,310 NSF USAID
U.S. RESEARCHER/INSTITUTION	J. Atwood, Marie Selby Botanical Gardens
TITLE	Administration, Maintenance and Development of La Selva Biological Station
START/FINISH	1992
GRANT/PROJECT #	BIR 8822713
USG FUNDS	\$373,203 NSF
U.S. RESEARCHER/INSTITUTION	Donald Stone, Duke University
C.R. RESEARCHER/INSTITUTION	OTS, La Selva

NATIONAL SCIENCE FOUNDATION (cont.)

TITLE	Social Learning in a Cooperatively Breeding Bird
START/FINISH	1992
GRANT/PROJECT #	IBN 9120789
USG FUNDS	\$ 85,626 NSF
U.S. RESEARCHER/INSTITUTION	S. Vehrencamp, University of California
TITLE	Physiology and Behavior of Endangered Marine Vertebrates
START/FINISH	1992
GRANT/PROJECT #	IBN 9124014
USG FUNDS	\$ 168,000 NSF
U.S. RESEARCHER/INSTITUTION	D. Owens, Texas A&M University
TITLE	Dynamics of Tropical Forest Sand Banks: Seed Predators as Determinants of Community Structure and Plant-Frugivore Coevolution
START/FINISH	1993
GRANT/PROJECT #	DEB 9208229
USG FUNDS	\$ 76,603 NSF
U.S. RESEARCHER/INSTITUTION	K. Murray, Hope College
TITLE	Systematics and Phylogenetics of Temperate Polypodium
START/FINISH	1993
GRANT/PROJECT #	DEB 9106764
USG FUNDS	\$ 53,630 NSF
U.S. RESEARCHER/INSTITUTION	C. Haufler, University of Kansas
TITLE	Agaricales of Costa Rican Quercus Forests
START/FINISH	5/93-5/96
GRANT/PROJECT #	DEB 9300798
USG FUNDS	\$181,024 NSF \$219,993 USAID
U.S. RESEARCHER/INSTITUTION	G. Mueller, Chicago Field Museum of Natural History, New York Botanical Garden
C.R. RESEARCHER/INSTITUTION	Organization of Tropical Studies, J. Carranza-Morse, University of Costa Rica
TITLE	A Manual to the Plants of Costa Rica Final Phase
START/FINISH	9/93-9/96
GRANT/PROJECT #	DEB 9300814
USG FUNDS	\$129,961 USAID \$280,024 NSF \$ 10,000 STATE/OES
OTHER FUNDS	
U.S. RESEARCHER/INSTITUTION	B. Hammel, Missouri Botanical Garden
C.R. RESEARCHER/INSTITUTION	INBio, National Museum of Costa Rica

INTERNATIONAL COOPERATIVE BIODIVERSITY GROUPS PROGRAM
U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
(USAID/G/R&D/ENR)
NATIONAL INSTITUTES OF HEALTH
NATIONAL SCIENCE FOUNDATION

TITLE	Chemical Prospecting in a Costa Rican Conservation Area
START/FINISH	7/93 - 6/98
GRANT/PROJECT #	001 TW/CA00312-01
USG FUNDS	
Total USG funds year one	\$473,660.00
year two	\$403,556.00
year three	\$403,556.00
year four	\$403,556.00
	First year breakdown as follows:
	\$ 228,000 USAID
	\$ 120,000 NCI
	\$ 79,000 NSF
	\$ 30,000 NIAID
	\$ 16,666 NIMH
OTHER FUNDS	Bristol-Meyers Squibb, Cornell University, INBio
U.S. RESEARCHER/INSTITUTION	Jerry Meinwald, Cornell University
	Daniel Janzen, University of Pennsylvania
C.R. RESEARCHER/INSTITUTION	Anna Sittenfeld, INBio

* See AGENCY FOR INTERNATIONAL DEVELOPMENT

APPENDIX TWO

CASE STUDIES: MODELS FOR REGIONAL AND GLOBAL BIODIVERSITY RESEARCH AND CONSERVATION

NATIONAL INSTITUTE OF BIODIVERSITY (INBIO)

ORGANIZATION FOR TROPICAL STUDIES (OTS)

I. COSTA RICA NATIONAL INSTITUTE OF BIODIVERSITY (INBio)

The Costa Rican National Institute of Biodiversity (INBio) is a private, non-profit institution created in 1989 to promote the conservation of the country's enormous biotic wealth, through knowing and using it. INBio focuses its attention on achieving two related objectives: 1) understanding and cataloging Costa Rica's biodiversity, and, 2) demonstrating the economic value of biodiversity.

INBio serves as a biodiversity information center, and, as such, supports a wide array of conservation activities. Currently INBio is conducting a ten year national inventory to taxonomically identify and locate the nation's estimated 500,000 species located within Costa Rica's National Park System. This inventory is the first attempt to catalog a country's biodiversity on a national scale.

INBio also conducts research to identify medically and agriculturally useful properties of plants, insects and microbes. Academic research collaborations exist with Cornell University, The National Cancer Institute, the Smithsonian Institution, the British Museum, the University of Costa Rica and the Strathclyde Institute for Drug Research in Scotland among others.

INBio addresses the need to find economic uses for biodiversity by entering into collaborative arrangements with pharmaceutical industry leaders such as Merck and Bristol Meyer-Squibbb. Profits generated from INBio's industry collaborations are reinvested in conservation efforts in Costa Rica.

In addition to these activities, INBio is actively trying to educate other sectors - tourism, business, education, agriculture - to the importance of biodiversity. A new challenge is information management - how to give information to these other sectors on what INBio is doing in a form that addresses the needs of the users in these sectors.

INBio sees itself as the catalyst/broker for a "web of partnerships" extending to these different sectors. According to Rodrigo Gamez, president of INBio, this partnership model recognizes every partner, from the rural "parataxonomist" to the multimillion dollar drug company, as an equally valuable element of the INBio equation. On a daily basis this web connects

parataxonomists, technicians, collection managers, curators, researchers, international experts and counterparts in places like the Smithsonian Museum or the USDA Agricultural Research Service. The web facilitates effective scientific exchange, profits all involved both financially and intellectually, and, makes biodiversity meaningful by placing science into the hands of the people.

PARATAXONOMIST COURSES AND THE BEGINNING OF INBIO

INBio began as a vision - with an auspicious set of inputs at time that was ripe - and has evolved into a model that has gained worldwide attention. The vision - articulated by Rodrigo Gamez, head of the biodiversity office at the Costa Rican Ministry of Natural Resources at the time, and Daniel Janzen, renowned biologist, conservationist and professor at the University of Pennsylvania, was to create an institute that would give Costa Rica a knowledge of its biological resources through the undertaking of a national biodiversity inventory, and demonstrate the economic value of these resources.

This vision was based the "use it or lose it" theory of conservation which argues that tropical biodiversity will be conserved to the extent that it is known and used. Therefore, if Costa Rica's biodiversity is to survive, it must be made usable for both intellectual and economic gain of sufficient magnitude that Costa Rica's society will aggressively conserve it (Janzen, 1992).

The inputs for the creation of INBio included: a thirty year base of (mostly National Science Foundation supported) research in the Guanacaste area of Costa Rica; a positive attitude toward conservation on the part of the Costa Rican Government - evidenced by the establishment of a national system of conservation areas encompassing 27% of the national territory; and; the willingness of donors to support innovative programs such as the USAID/ESF and USAID/BSP supported parataxonomist courses and National Science Foundation (NSF) funded taxonomic research.

Timing was another important factor. International attention at the time focused on the deliberations leading up to the signing of the Biodiversity Convention at the UN Conference on Environment and Development in Rio. Many of the issues being discussed - use of biological resources, intellectual property rights, and the need for scientific capacity building to provide a strong underpinning for policy decisions - were directly addressed by this vision.

According to Rodrigo Gamez, the success of the first parataxonomist course was the "first solid step forward" for INBio. It provided the spark for the creation of INBio and set the tone and style - of INBio's "network of partnerships" model that continues to expand and become increasingly sophisticated. Dan Janzen, also, attributes the parataxonomist courses as a

motivating force for INBio and holds that a direct line can be traced from the initial investments in the courses by USAID and the research at Guanacaste by NSF to the new International Cooperative Biodiversity Groups bioprospecting arrangement between INBio, Cornell, Bristol-Meyer Squibb, USAID, NSF, and the National Institutes of Health (NIH).

The first Parataxonomist course, held during the Winter/Spring of 1989, was the brainchild of Daniel Janzen who had been conducting research in the Guanacaste Conservation Area (GCA) since 1965 and wanted to organize an inventory of GCA to support conservation activities there. The course began with a grant from USAID LAC Bureau's Environmental Support Program Small Grants Fund for a course in how to do biological inventory work for local, bright people with little formal education employed by or living close to national protected areas. These areas included: Guanacaste Conservation Area, Amistad, Carara, Tortuguero, Corcovado and Brauillo Carillo - now the core parts of the Costa Rican Conservation Area System. Matching funds from the Stroud foundation supported the construction of a field research station at Guanacaste where the course was taught.

Janzen contributed his intimate knowledge of the area. The buildings, vehicles and field stations of the Guanacaste Conservation Area provided the logistic support, and the Costa Rica National Park Service contributed salaries for its employees taking part in the course. The approach of using "parataxonomists" represented a radical departure from traditional ways of conducting scientific research and proved to be a major success - the enthusiasm and motivation of the parataxonomists surpassed all expectations.

By March of 1989, the parataxonomists had generated enough samples to warrant the official beginning of INBio. Rodrigo Gamez moved from the Ministry of Natural Resources to head the newly created non-government organization and INBio was born. By the end of 1989, INBio was attracting the attention of academic institutions, foundations and bilateral donors, like the government of Sweden which engineered a debt-for-nature swap which provided operational funds.

In 1990, a second Parataxonomist course was funded by the USAID Biodiversity support program and the Pew Charitable trust. This course provided intensive training for fifteen more parataxonomists, bringing the total to 31. In early 1991, NSF entered the picture with funding for advanced training for the parataxonomists who were collecting more in one month than researchers in Costa Rica had collected in 130 years. Also in 1991, USAID and NSF helped to outfit new entomology and botany labs at INBio headquarters.

The third parataxonomist course, held January-June, 1992, trained ten female parataxonomists and received support from the Liz Claiborne and Art Ortenburg Foundation, the National Fish and Wildlife Foundation, the Moriah Fund, the Conservation, Food and

Health Foundation, the Swedish Government, and the Pew Endowment.

INBio's cadre of parataxonomists currently form the core of its national inventory and bioprospecting activities. In addition, they have been involved with other USAID and NSF- supported research efforts being conducted jointly with INBio. These include: the Manual of the Flora of Costa Rica being conducted by the Missouri Botanical Garden, the study of the Arthropod Diversity in a Lowland Tropical Rainforest being conducted by the Organization for Tropical Studies, and the Inventory of Lepidoptera Larvae and Their Parasitoids in a Tropical Dry Forest being conducted by Daniel Janzen.

NATIONAL BIOLOGICAL INVENTORY

In 1993, INBio began conducting a ten year National Biodiversity Inventory with the goal of using and monitoring Costa Rica's biodiversity in a systematic manner. Current estimates indicate that only 16.7% of Costa Rica's estimated 505,000 species have been described to date (Sittenfeld and Villers, 1993).

Based out of 29 field offices scattered throughout the National System of Conservation Areas, over 50 parataxonomists work closely with the national curators at INBio and a network of international taxonomic experts abroad. On a regular basis they bring mounted specimens and logged data to INBio where specimens are identified by national curators and international specialists from places like Smithsonian and USDA's Systematic Entomology Laboratory. Information on the specimen's taxonomy, the time of year and location of collection, the collector's name and other field notes are then recorded in INBio's computer database.

Physical specimens with bar codes referring to their computer file locator number are then separately processed and placed in INBio's reference collection. All of INBio's accumulated information on the identity, geographic distribution, and natural history of species are in the public domain. In less than three years, INBio has managed to collect, organize and record more than 1.5 million insect specimens. (Sittenfeld and Villers, 1993)

This inventory serves as the informational infrastructure for conservation, education, science, and higher value-added economic activities such as ecotourism, drug and agrochemical research discovery programs.

BIODIVERSITY INFORMATION

In addition to its growing databases of plant and arthropod species, INBio also manages a growing conservation database with information ranging from endangered species lists to the boundaries and legislation affecting Costa Rica's National Parks. This information is formatted and made available to a multitude of INBio users, ranging from the National Parks System to farmers and schools (Sittenfeld and Villers, 1993)

In 1992 INBio entered into a joint venture with the Intergraph corporation to develop a state of the art Biodiversity Management System using Geographic Information System (GIS) technology to link database information to graphic files including drawings, photographs, and maps of organism distributions and conservation areas. The goal of the venture is to collect and manipulate information about Costa Rica's biodiversity in a goal-directed manner for a wide variety of intellectual and commercial users.

Intergraph is contributing approximately three-quarters of a million dollars in hardware, software, and services. INBio is contributing experience in the collection, management, and use of biodiversity information. While the information in INBio's databases is public domain, profits from any commercially marketable software developed as a result of this relationship will be shared between INBio and Intergraph. In all of INBio's present and future commercial relationships, profits from commercial sales will be divided between Costa Rica's Conservation areas and INBio's operational costs.

BIODIVERSITY PROSPECTING

Changes in drug screening technology and other factors have created a demand for natural samples to screen for chemical compounds in the pharmaceutical and biotechnology industries. Under two new agreements, INBio supplies samples to meet these demands in return for "prospecting fees" which support collection activities and conservation efforts in the national parks, training and equipment, and technology transfer. Intellectual property rights agreements have been signed to ensure an equitable distribution of profits to the Government of Costa Rica if a profitable compound is discovered.

Each of these collaborations has been characterized by a multi-sectoral approach, involving Government, facilitating institutions, academia and industry. Increasingly, INBio is also looking for those collaborations that will help create dynamic comparative advantages in areas where the country may in the future be competitive, such as biotechnical agricultural improvement (Sittenfeld, 1992).

In the first such agreement of its kind, INBio sought and gained a \$1 million collaborative agreement with Merck & Co. in 1991. According to the terms of the two year agreement, Merck received from INBio a limited number of well-identified and documented environmental samples, plant and insect extracts for use in its drug-discovery process (Sittenfeld and Villers, 1993).

Merck assisted INBio by donating the equipment needed to establish an extraction lab within the University of Costa Rica and providing training for Costa Rican scientists at Merck's U.S. based and other labs. Ten percent of the million dollars was donated to the Costa Rica National Park fund. The remainder supports the in-country science and processing infrastructure that produces the samples and continues the inventory for all

users. Fifty percent of the INBio's share of potential royalties will go toward the Costa Rican National Park System and fifty percent will support INBio activities.

In 1993, INBio won a large five year grant from the new international biodiversity groups program - a consortium of USAID, NSF, the National Institutes of Health (NIH), Cornell University, and the Bristol Myers Squibb company - to develop a bioprospecting program that seeks to discover new drug compounds from Arthropods. The new program will involve expanded biochemical and ecological training of field collectors - "para-eco-chemists" who will look for potential chemical indicators in addition to their regular collection activities.

INBio expects this consortium to help introduce arthropods as a new untapped source of potentially valuable drug compounds. As part of the agreement, Bristol Meyer Squibb will provide a direct contribution to conservation areas and limited research funding to INBio as well as extraction laboratory equipment and training for two Costa Rican scientists. Through an agreement between INBio and the Government of Costa Rica, a 10% share of direct research funds to INBio and half of INBio's share of any potential future royalties will be given as a direct donation to the National Parks System to support biodiversity conservation (Sittenfeld and Villers, 1993).

These ground-breaking agreements represent a growing trend pioneered by INBio and show how industry can return a portion of the benefits of pharmaceutical development to the developing country where the chemical compounds originated. Further, they ensure that some of these proceeds will directly finance conservation while the remainder will indirectly finance conservation through biodiversity research and development in association with the national parks. (Reid, Laird, Gamez, et al. Biodiversity Prospecting, WRI, 1993)

INBIO AS AN INTERNATIONAL MODEL

INBio has received a lot of attention from the international community as a creative pilot project that can serve as a model for other high biodiversity developing countries. While it is still a pilot project, it continues to energetically spawn creative ideas. The INBio approach - of multisectoral collaboration working toward a joining of policy, biodiversity surveys, business development and technology access is having a major demonstration effect internationally among countries interested in pursuing economic uses of their biotic wealth (Sittenfeld, 1993).

Mexico recently created a national biodiversity commission modeled after INBio. Indonesia and Kenya both have collaborative agreements with INBio, and Madagascar is in the process of negotiating one. Other countries, such as Nepal and Nicaragua have asked INBio for advice. Increasingly, parataxonomists from other Central American countries are being trained by INBio and

recently, Intergraph and INBio sponsored a data management workshop for Central American participants.

The idea of bioprospecting, for example, has spread throughout the world. Agreements are being engineered by non-profit institutions, for profit firms and government commissions - such as Mexico's National Biodiversity Commission and the proposed Biodiversity marketing and Commercialization Board in Indonesia. In Japan, 24 Japanese corporations have established the Marine biotechnology Institute in Micronesia.

While INBio is a product of Costa Rica's unique biological, political and social environment, the processes that are being fostered at INBio as pilot projects are, however, relevant throughout the tropics. INBio's innovations - its parataxonomists, "web of partnerships", database management, public outreach, and bioprospecting activities can, and are beginning to be, applied in other tropical developing countries.

II. ORGANIZATION FOR TROPICAL STUDIES

The Organization for Tropical Studies is a nonprofit research and education consortium consisting of over fifty universities and research institutions in Latin America and the United States, including four in Costa Rica. OTS was founded in 1963 to provide leadership in education, research and the wise use of the natural resources in the tropics. OTS owns and maintains three research and teaching centers in Costa Rica.

Foremost among them is La Selva Biological Station regarded as one of the world's leading centers of tropical biology. La Selva, Palo Verde Biological Station in the Pacific lowlands, and Las Cruces Biological Station on Costa Rica's Pacific slope, offer students and researchers access to three ecologically different areas. The organization has two headquarters - one in San Jose, and the other at Duke University in Durham, N.C. Education and research form the core of OTS' activities, although in recent years, the organization has become increasingly involved in conservation, policy and community outreach efforts.

OTS education activities consist primarily of courses in tropical ecology for graduate students. During its lifetime, OTS has provided training in tropical biology for more than 2,000 graduate students from more than 30 countries. From this, on-site courses have evolved for political decision makers - U.S. Congressional Aides and Latin American legislators - which have the goal of influencing natural resources conservation and ecological quality. Numerous short courses taught by member institutions are hosted by OTS as are specialized programs for local schoolchildren and visiting natural history tourists.

OTS research facilities also host scientific research. La Selva, OTS' flagship station has been recognized as one of the four premier sites for tropical moist forest research in the world by the National Academy of Sciences. In 1993 it recorded over 17,000 visitor-days, which included over 240 researchers from 26 countries. This research ran the gamut from microbes to ecosystems. Thirty eight of these researchers were Costa Rican. In addition, over 100 educational groups visited La Selva, and of these groups, 55 were Costa Rican.

OTS has also come to play a leading role in the preservation of key areas of Costa Rica's rainforests and has launched research projects that may lead to more ecologically sound uses of forestlands in the tropics. An example of this is OTS research at La Selva on the use of native tree species - results from which could restore degraded pasture land and produce an economically viable and sustainable agroforestry industry for local farmers.

OTS is supported by a variety of sources. Approximately sixty percent comes from member dues (Costa Rican institutions are exempt from dues) and station fees - including fees paid by visiting natural history tourists. Forty percent consists of

grants and contracts. Of this half is from the National Science Foundation who has provided long term support to OTS, and half from a combination of foundations, private donors, and other government agencies such as USAID and the National Fish and Wildlife Foundation.

Finally, OTS promotes scientific exchange. It has had a big impact in both the Costa Rican and U.S. tropical research communities. Many of the course participants continue to conduct research in the tropics throughout their career. Most of today's leading neotropical biologists were either involved in OTS' founding or have taken one of the courses. As these biologists have moved on to a variety of teaching and policy making positions throughout North America and Costa Rica, OTS courses have contributed greatly to today's greater awareness of tropical ecosystems.

E.O. Wilson of Harvard University, one of the founding directors of OTS, claims that "OTS has been responsible for training nearly an entire generation of U.S. tropical biologists (Tangley, BioScience, 1988)". In addition, many of the faculty members of Costa Rican institutions, and members of the Costa Rican environmental and scientific community have either taken OTS courses, been involved with OTS research, or have ties to OTS.

HISTORY OF OTS

The early 1960's marked the beginning of a strong interest in tropical biology in the U.S. science community. In 1961, the National Science Foundation (NSF) funded a series of conferences addressing the study of tropical biology and what facilities were needed. Jay Savage, a herpetologist from the University of Florida, received an NSF grant to coordinate a series of Summer courses, at first for professors and later for graduate students. Daniel Janzen, then at the University of California, Berkeley, participated in one of the first student courses, thus beginning a life long commitment to research in Costa Rica (Tangley, BioScience, 1988).

In 1963, these courses evolved into a nonprofit organization, and OTS was founded as a consortium of six U.S. universities and the University of Costa Rica. The main purpose of the organization, which was funded chiefly by NSF, was to promote research and education in tropical biology.

Janzen was asked to teach the course - and agreed on the condition that he could restructure the course. This course, which introduces students to the tropics, teaches them how to do research in the tropics, and combine that with a solid grounding in ecology and evolutionary biology, became the fundamental course that OTS has offered ever since (Tangley, BioScience 1988).

Now called "Tropical Biology: an Ecological Approach", the 8 week course is offered twice a year to graduate students who compete

for 20 spaces in each class. The course is coordinated by 2-3 researchers and taught by as many as 30 constantly changing short term faculty members.

In 1968 OTS purchased La Selva, a 468 hectare tract of lowland tropical rainforest owned by Dr. Leslie Holdridge, as a site for research and teaching. A little later, OTS built the Palo Verde biological field station in the dry tropical forest of the Guanacaste province. The station lies within Palo Verde National Park in northwestern Costa Rica. Palo Verde National Park comprises more than 19,000 hectares of protected dry forest and wetlands and as part of the Tempisque Conservation Area.

The third station, Las Cruces, which contains the Robert and Catherine Wilson Botanical Garden was donated to the organization in 1972. Located in the hills near the Panamanian border, this 158 hectare (390 acre) field station includes a magnificent collection of tropical plants in addition to areas of tropical forest. Accommodations are available for 30 naturalists, making the field station an attractive base for visitors to the Amistad Biosphere Reserve as well.

For the first few years the tropical ecology course received funding from NSF educational funding as well as support from the Ford and Rockefeller Foundations. In 1977, OTS entered into relationship with Duke University and hired Donald Stone as Executive Director. Stone improved the research facilities at the field stations by making them more accessible and upgrading laboratory facilities.

In the late 1970's and 1980's, as a reaction to escalating deforestation rates in Costa Rica, OTS made an effort to become more integrated into conservation and policy work in Costa Rica. A number of land acquisitions were made either for OTS directly, or for the National Park service with OTS assistance. These increased OTS' visibility in the conservation community and forged closer ties with the Costa Rican government.

In 1981, a major fund raising campaign allowed OTS to acquire a 631 hectare tract known as the Western annex. Since then OTS has participated in other campaigns to raise money for land purchase and management. In particular, in 1986 OTS played a key role in the breakthrough conservation effort to establish Braulio Carrillo National Park. Earlier research by OTS scientists had uncovered 28 new plant species in just 10 days in this biologically important transect stretching from sea level to 3,000 meters. The Government of Costa Rica wanted to acquire the land but lacked sufficient resources.

A challenge grant to the Nature Conservancy by the MacArthur Foundation allocated one million dollars toward the purchase of the land. OTS, TNC, the World Wildlife Fund, the Costa Rica Park service, and the private Fundacion de Parques Nacional joined together and were able to raise matching funds to buy the land. Throughout the 1980's, OTS' increased outreach efforts - such as

environmental education - sought to garner support for conservation among communities close to the stations.

In 1988 OTS made a giant leap forward when NSF made two grants to build and equip modern chemical laboratory at La Selva. Currently, La Selva can host 80 people overnight and has state of the art laboratory buildings and equipment. River or natural park boundaries are around all forested areas of the reserve and the area comprises 1,600 hectares of tropical forest and disturbed land. The adjacent Braulio Carrillo National Park contains more than 46,000 hectares of forest and is the core conservation unit of the 91,000 hectare Cordillera Volcanica Central Biosphere Reserve. OTS has joined with USAID and other organizations to raise a \$1.5 million endowment for the management of the expanded park.

EDUCATION

OTS has now expanded its core course to include more applied courses, courses in tropical agricultural ecology, and more courses in Spanish.

Currently there are three course taught in Spanish: an annual six week course in population ecology - which is similar to the English tropical biology course; an annual six week agroecology course and a three week course for Latin American policy makers. The Latin American policy makers courses were initially funded with a grant from USAID/LAC/ESP and have been taught since 1988.

Courses in English include: two eight week sessions of the tropical biology course; an eight week course in tropical plant systematics, a three week course in tropical diversity, and a week long course in environmental policy for American political decision makers.

In 1991, OTS began a series of activities designed to educate decision makers at the community level which will increase local leader's capacity to deal effectively with regional and national governments. OTS's environmental policy program is currently being extended to journalists and legislators throughout Latin America.

OTS also hosts fifty to seventy short courses a year taught by OTS member institutions. In 1984, OTS began offering basic courses in forest ecology to Costa Rican teachers. And since 1986, hundreds of schoolchildren have visited La Selva to learn about the rainforest. OTS is actively involved in environmental education efforts in neighboring areas and frequently provides outreach programs for schoolchildren, teachers and farmers in an effort to increase local awareness of the environment.

RESEARCH

With a few notable exceptions, OTS does not typically conduct research itself. OTS' role is mainly to promote, develop and

facilitate research. Specifically, OTS provides some direct funding, research facilitates, and help with permits, importing scientific equipment and exporting collections. This "help", however, is highly significant.

During the past 35 years, over 700 articles and theses describing research at La Selva have been published. Currently thirteen NSF long term (over five years) projects and thirty eight NSF funded researchers make use of the facilities. Many more do research at the stations on a short term basis. Eight of the USAID funded projects listed in Appendix one is taking place at, or with researchers connected to, OTS. Seventy percent of the research takes place at La Selva, twenty percent at Las Cruces and ten percent at Palo Verde. OTS' three field stations continue to experience an increase in researchers and student groups. To meet the increased demand, both La Selva and Las Cruces recently opened new housing units with the assistance of the National Science Foundation.

Two OTS research efforts are notable, the Trials project, and "Arthropod Diversity in a Lowland Rainforest". Both of these projects receive support from USAID in addition to NSF and other donors such as the MacArthur Foundation.

The TRIALS project, begun in 1987, is being conducted with an eye toward combatting deforestation and Costa Rica's fuel shortage. The project screens native tree species for their ability to grow in degraded soils. The scientists are looking for species that can restore the fertility and structure of degraded soils, stabilize slopes subject to erosion, and produce products that can be used for food, forage, fuelwood, and timber. They are particularly interested in testing the potential of native species that have never been grown on plantations. The results may help farmers find an economically viable alternative to raising cattle.

The project involves planting and observing test species, planting the most successful species over a diverse area, developing broader genetic bases and producing viable quantities of seed. In addition, it is developing civil and cultural guidelines for reforestation and tree farming. Over the next five years, OTS sponsored researchers will work with local farmers in obtaining and germinating seeds, growing seedlings, and planting native tree species as an alternative to exotic species.

The second notable research project, "Arthropod Diversity in a Lowland Rainforest", is a major biodiversity research project whose researchers work closely with INBio to inventory the arthropods (spiders, mites and insects) of La Selva. This research is contributing to INBio's efforts to catalog Costa Rica's Biodiversity.

OTS' IMPACT ON THE U.S./COSTA RICA RESEARCH RELATIONSHIP

Over the years, OTS has played a tremendous role in fostering scientific exchange and strengthening the research relationship between the U.S. and Costa Rica. Particular in recent years with its increased involvement in conservation and policy.

While the majority of OTS beneficiaries remain in the U.S. science community, the last few years has seen a large increase in Costa Rican researcher and student use of OTS facilities. The Costa Rican member universities and institutions (Universidad de Costa Rica, Museo Nacional de Costa Rica, Universidad Nacional and Instituto Tecnologia de Costa Rica) have been active in guiding the evolution and purpose and activity at OTS. Over the years strong ties have developed between OTS and numerous governmental and private institutions, culminating in 1987 in a formal agreement between the government of Costa Rica and the Organization for Tropical Studies. This agreement outlines four areas of cooperation: technical advice; scientific and educational programs; botanical gardens; and facilitation of international scientific research.

Alvaro Ugalde who played a key role in the establishment of Costa Rica National Parks and served as park service director until 1986, took an OTS course in 1980. According to Ugalde, "the presence of large numbers of biologists in Costa Rica, many affiliated with OTS, has been instrumental in what we have been able to do here". The park service has collaborated with OTS on many projects, generating data to support conservation policies. Ugalde says OTS and biological researchers in general, "have been central to our accomplishments in conservation" (Tangley, Bioscience, 1988)

And, according to Rodrigo Gamez, the president of INBio who had a long association with OTS as the University of Costa Rica representative, "OTS has played a crucial role in providing credibility for conservation in Costa Rica" (Tangley, 1988).

OTS's institutional role - as educator, research facilitator, and ecological policy advisor - is one that can, and should, be replicated in other tropical countries. Not only to build scientific capacity in the country and increase understanding of natural ecosystems, but also to provide a connection between the science community, the public and the policy makers, and thus promote informed decision making based on a strong scientific underpinning.

APPENDIX THREE

**SELECT LIST OF FOUNDATION PROJECTS SUPPORTING
BIODIVERSITY RESEARCH AND CONSERVATION IN COSTA RICA**

YEAR	FOUNDATION	GRANTEE	PROJECT	AMOUNT
1989	C.S. Fund	University of Penn.	Tropical Forest Manual	\$30,000
1989	W.Alton Jones	INBio	General Support	\$100,000
1990-92	John D. and Catherine T.MacArthur	Cornell University, INBio	Chemical Ecology	\$800,000
1990-92	John D. and Catherine T.MacArthur	Instituto Centro Americano de Administracion de Empressas	Research and Teaching	\$240,000
1990-1992	John D. and Catherine T.MacArthur	INBio	Biological Diversity Surveys	\$527,750
1990	Pew Charitable Trust	Cultural Survival	Sustainable Development Small Grants fund	\$225,000
1991	Conservation, Food, and Health Foundation	Rainforest Alliance	Tropical Conservation News-bureau	\$5,000
1991	Conservation, Food, and Health Foundation	University of Mass.	Tropical Deforestation Research	\$14,000
1991	Ford Foundation	OTS	Training for Environmental Policy	\$222,500

YEAR	FOUNDATION	GRANTEE	PROJECT	AMOUNT
1991	Ford Foundation	Environmental and Natural Resources Law Center	Land Tenure Research	\$125,000
1991-95	Homeland Foundation	Amigos of EARTH College	Scholarship	\$26,400
1991	W. Alton Jones Foundation	University of California	Carbon Sequestration Research	\$100,000
1991-1992	John D. and Catherine T. MacArthur	Fundacion Neotropica	Land Capacity Study	\$130,000
1991-1993	John D. and Catherine T. MacArthur	OTS	Tree Trials Project	\$330,000
1991-1992	John D. and Catherine T. MacArthur	Fundacion Neotropica	La Amistad	\$230,000
1991-1993	John D. and Catherine T. MacArthur	Universidad Nacional de Costa Rica	Support for Regional Wildlife Management Program	\$195,000
1991	John D. and Catherine T. MacArthur	Rainforest Alliance	Tropical Conservation News-Bureau	\$40,000
1991	Weeden Foundation	Caribbean Conservation Corps	Tortuguero Reserve Enlargement	\$10,000
1992	Compton Foundation	OTS	Latin American Education	\$60,000
1992	Conservation, Food, and Health Foundation	Natl Fish and Wildlife Foundation/ INBio	Course for Female Parataxonomists	\$10,000
1992-1996	Homeland Foundation	Amigos of EARTH College	Scholarship	\$26,400

YEAR	FOUNDATION	GRANTEE	PROJECT	AMOUNT
1992	Homeland Foundation	Caribbean Conservation Corps	Sea Turtle Conservation	\$5,000
1992	John Merck Fund	RARE Center for Tropical Conservation	Ecotourism Guide Training Center	\$25,000
1992	Moriah Fund	Maryland International Institute for Ecological Economics	Research on Monetary and Social Value of Products and Services Provided by Protected Areas	\$20,000
1992	Rockefeller Foundation	INBio	Biodiversity Prospecting Project	\$99,950
1993-94	Homeland Foundation	RARE Center for Tropical Conservation	Conservation Biology Program	\$300,000
1993	Moriah Fund	The Nature Conservancy INBio	Support for National Biodiversity Inventory	\$40,000
1993	Moriah Fund	RARE Center for Tropical Conservation	Monteverde Buffer Zone Management	\$40,000
1993	Moriah Fund	Rainforest Alliance	Banana Green Seal	\$40,000
1993	Weeden Foundation	Fundacion Ecotropica	Finca La Cangreja Preservation	\$20,000

YEAR	FOUNDATION	GRANTEE	PROJECT	AMOUNT
1993	Weeden Foundation	OTS	Acquisition of Gamboa Forest	\$10,000
1993	Weeden Foundation	RARE Center for Tropical Conservation	Support for Conservation Biology Program	\$5,000
1993	Weeden Foundation	OTS	Preservation of Finca Los Cusingos	\$20,000