
Annual Report for Fiscal Year 1997

Organization for Tropical Studies



Organización para Estudios Tropicales

*Dedicated to providing leadership in education, research
and the responsible use of natural resources in the tropics.*

The Organization for Tropical Studies is a nonprofit consortium of more than 50 universities and research institutions from the U.S. and Latin America. OTS was established in 1963 to provide leadership in education, research, and the responsible use of natural resources in the tropics.

To address this mission, OTS conducts graduate and undergraduate education, facilitates research, actively participates in tropical forest conservation, maintains three biological stations in Costa Rica, and conducts innovative environmental education programs.

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Message from the Executive Director

I will remember fiscal year 1997 as my first year with OTS and the year we recognized the accomplishments of Don and Bev Stone. Don, now executive director emeritus, and Bev, a former administrative assistant, served OTS for twenty years and had a major influence on many students and researchers in the field of tropical ecology. To honor the Stones we created the Donald and Beverly Stone Endowment for Graduate Research Fellowships in Tropical Biology. Beginning in July with a \$100,000 challenge grant from the Andrew W. Mellon Foundation, we began the process of raising \$200,000 to meet this challenge and to establish a strong base for the endowment.

I announced the Mellon Challenge at the Ecological Society of America meeting in August and throughout the fall focused our fundraising efforts on achieving this goal. In November, we organized a weekend of festivities around the semi-annual Executive Committee meeting held at Duke. This weekend included a Saturday afternoon forum on the future of OTS and an evening banquet honoring the Stones. As MC, President Julie Denslow presided over a group of roasters that included past presidents Jay Savage (U. Miami), Tom Yuill (U. Wisconsin), Peter Raven (Missouri Botanical Garden), and Gordon Orians (U. Washington). Other speakers included Rodolfo Silva from our Board of Visitors and a distinguished member of President Figueres' cabinet in Costa Rica, Dick White, a member of the Board of Visitors and the Dean of Trinity College at Duke University, Lucinda McDade, a board member from Arizona and former OTS staff, Jim Beach, an OTS alum and now a director at NSF, and Tommy Hendrickson, a Board of Visitors member who read a letter honoring the Stones from Vice President Al Gore. As a result of this banquet and the support of many friends and colleagues, we met the Mellon Challenge by February. *However, we continue to build this endowment and are open to additional gifts that help us to provide much needed research fellowships for our graduate program.*

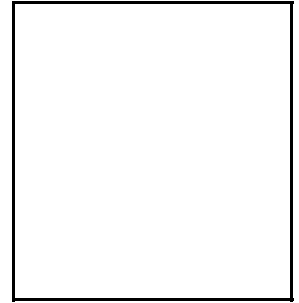
Another exciting aspect of fiscal year 1997 was the implementation of our new undergraduate

program. Though many months in the planning stages, the program came together in August with the hiring of directors Todd Shelly and Ethel Villalobos. Todd and Ethel spent the year at our North American Office and established the curriculum for the program, obtained accreditation for the courses, and met with faculty and study abroad officers at numerous colleges. In June, Todd and Ethel hired instructor Jim Roper and moved to Costa Rica to begin the on-the-ground process of preparing for our first class of students.

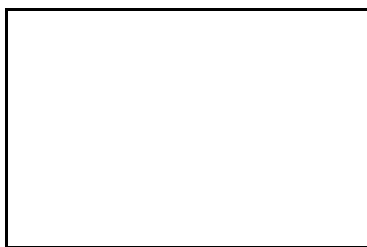
Finally, in fiscal year 1997 we said goodbye to Julie Denslow who stepped down from her post as the President of OTS at the March meeting of the Board of Directors and, thereby, concluded a three-year term that saw a major fire at Las Cruces, a two year recovery process, the implementation of an operations plan, the turning over of key personnel, and my hiring. Pedro León, our new president from the University of Costa Rica, is the first Costa Rican to be elected to this office and is a very capable administrator, world renowned scientist, and long-time friend of OTS. With his arrival we concluded the fiscal year by initiating a strategic planning effort that will take us into the next millennium.

January 1998

Dr. Gary S. Hartshorn
Executive Director



In June, OTS co-sponsored the annual meeting of the Association for Tropical Biology, held for the first time in Costa Rica. Over 600 participants attended the week long session. Pictured above is keynote speaker Gabriel Macaya, President of the University of Costa



The Stone Banquet, held at Duke University in November, was attended by more than 180 people. Proceeds from the event went to the Donald and Beverly Stone Endowment for Graduate Research Fellowships in Tropical Biology.

Consortium Member Institutions

| | |
|---|--|
| University of Arizona | University of Minnesota |
| Arizona State University | University of Missouri-Columbia |
| Auburn University | University of Missouri-St. Louis |
| University of California-Berkeley | Museo Nacional de Costa Rica |
| University of California-Davis | Universidad Nacional Autónoma |
| University of California-Irvine | University of North Carolina |
| University of California-Los Angeles | North Carolina State University |
| University of Chicago | Ohio University |
| University of Colorado | Oregon State University |
| University of Connecticut | Pennsylvania State University |
| Cornell University | University of Pittsburgh |
| Universidad de Costa Rica | University of Puerto Rico |
| Duke University | Purdue University |
| University of Florida | Rutgers University |
| Florida International University | Smithsonian Institution |
| University of Georgia | Southern Illinois University |
| Harvard University | State University of New York-Stony Brook |
| University of Illinois-Urbana/Champaign | University of Tennessee |
| Indiana University | Tulane University |
| Instituto Tecnológico de Costa Rica | Universidad Estatal a Distancia |
| University of Kansas | US Forest Service-Research |
| University of Kentucky | University of Utah |
| Louisiana State University | University of Washington |
| University of Maryland | Washington University |
| University of Massachusetts-Amherst | University of Wisconsin-Madison |
| University of Miami | Yale University |
| University of Michigan | |
| Michigan State University | |

Board of Visitors

| | | | |
|---|---|--|--|
| Joan Slatkin Barton Environmentalist Washington, DC | Stone Container Corporation Chicago, IL | Gordon Orians University of Washington Seattle, WA | Former CR Ambassador to US San José, Costa Rica |
| Michelle Cloud Eli Lilly and Company Indianapolis, IN | Peter Gilmore Dole Foods San José, Costa Rica | Arthur Pappas A.M. Pappas and Associates Research Triangle Park, NC | Bruce Stein The Nature Conservancy Arlington, VA |
| Ida Cortés Nuñez Environmentalist San José, Costa Rica | Thomas Hendrickson Triangle Environmental, Inc. Raleigh, NC | Roger Perry Environmentalist Rye, NY | Stephanie Stone de Feoli CIAPA San José, Costa Rica |
| Russell Faucett Barrington Partners Santa Monica, CA | Thomas Lovejoy The Smithsonian Institution Washington, DC | Tamra Raven Environmentalist St. Louis, MO | Richard White Duke University Durham, NC |
| Christiana Figueres Center for Sustainable Development in the Americas Washington, DC | Joan Martin-Brown The World Bank Washington, DC | Carlos Manuel Rodríguez Lara, Lopez, Matamoros, Rodríguez y Tinoco Abogados San José, Costa Rica | |
| John Foster Harbor Advisory Corporation Marblehead, MA | Alan McGowan American Association for the Advancement of Science Washington, DC | Luis Sequeira University of Wisconsin Madison, WI | |
| Gerald Freeman | Marigold Murry de Genis Hacienda Cachí San José, Costa Rica | Rodolfo Silva | |

Board of Directors

Executive Committee

President: Pedro León (UCR)
Vice President Development: Ross Simons (Smithsonian)
Vice President Education: Don Wilson (Smithsonian)
Vice President Costa Rica Institutions: Oscar Rocha (UCR)
Vice President Finance: Peyton Fuller (Duke - retired)
Secretary: Carol Augspurgen (Illinois)
Treasurer: Hugh Popenoe (Florida)
Past President: Julie Denslow (LSU)
University of Arizona

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Jack Ewel (USDA/USFS)
James Hamrick (Georgia)
Lynn Bohs (Duke)
Alison Power (Cornell)
Catherine Pringle (Georgia)

Lucinda McDade
Larry Venable
Arizona State University
Anthony Brazel
David Pearson
Auburn University
J. Wayne Brewer
John Pritchett
University of California-Berkeley
Harry Greene
Jerry Powell
University of California-Davis
Charles Goldman
Michael Turelli
University of California-Irvine
F. Lynn Carpenter
Bradford Hawkins
University of California-Los Angeles
Henry Hespeneheide III
Peter Narins
University of Chicago
Steve Pruett-Jones
J. Timothy Wootton
University of Colorado
Michael Breed
Yan Linhart
University of Connecticut
Robin Chazdon
David Wagner
Cornell University
Alison Power
Universidad de Costa Rica
Oscar Rocha
Luis Salazar
Duke University
Lynn Bohs
Daniel Richter, Jr
University of Florida
Lauren Chapman
Hugh Popenoe
Florida International University
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University of Georgia
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Catherine Pringle
Harvard University
Michele Holbrook
Peter Stevens
University of Illinois-Urbana/Champaign
Carol Augspurgen
Mark David
University of Indiana
Keith Clay
Donald Whitehead
Instituto Tecnológico de Costa Rica
Juvenal Valerio

Braulio Vilchez A.
University of Kansas
Orley Taylor
Robert Timm
University of Kentucky
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Louisiana State University
Julie Denslow
Bruce Williamson
University of Maryland
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Barbara Thorne
University of Massachusetts-Amherst
Peter Alpert
Curtis Griffin
University of Miami
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Jay Savage
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Garry Brewer
John Vandermeer
Michigan State University
Tom Burton
Peter Murphy
University of Minnesota
Franklin Barnwell
University of Missouri-Columbia
Tim Holtsford
Alan Rebertus
University of Missouri-St. Louis
Bette Loiselle
Victoria Sork
Museo Nacional de Costa Rica
Mariela Bermúdez M.
Melania Ortiz V.
Universidad Nacional Autónoma
Claudia Charpentier E.
Leonidas Villalobos
University of North Carolina
David Pfennig
Seth Reice
North Carolina State University
Martha Groom
Ted Shear
Ohio University
Don Miles
Jan Salick
Oregon State University
Bruce Menge
Phillip Sollins
Pennsylvania State University
Stephen Beckerman
Jack Schultz
University of Pittsburgh
Walter Carson
Billie Dewalt

University of Puerto Rico
James Ackerman
T. Mitchell Aide
Purdue University
Andrew Gillespie
Kerry Rabenold
Rutgers University
Jean Hartman
Richard Lathrop
Smithsonian Institution
David Roubik
Don Wilson
Southern Illinois University
Beth Middleton
John Phelps
State University of New York-Stony Brook
Charles Janson
Patricia Wright
University of Tennessee
Sally Horn
Gary McCracken
Tulane University
Thomas Sherry
Julie Whitbeck
Universidad Estatal a Distancia
Luis Fernando Ramírez
Emma Tuk Mena
US Forest Service-Research
John Ewel
Richard Smythe
University of Utah
Dinah Davidson
Donald Feener, Jr.
University of Washington
Ray Huey
Douglas Schemske
Washington University
P. Mick Richardson
Robert Sussman
University of Wisconsin-Madison
Tom Givnish
Stanley Temple
Yale University
James Bryan
Junhyong Kim

Graduate Education

OTS conducts graduate courses in English, Spanish and Portuguese in pure and applied areas of the natural sciences. Through this program students become more effective teachers and researchers, taking their place as valuable members of the world's scientific community.

Tropical Biology: An Ecological Approach (OTS 97-1), the first of two offerings of this fundamentals course on theory and methods of tropical ecology, took place January 10 through March 14, 1997. This course was led by Dr. Deedra McClearn, OTS Tropical Biology Instructor, Dr. Brad Boyle, Co-coordinator, and Mario Blanco, Teaching Assistant. The 22 students, selected from 38 applications, included two native Spanish speakers, three alumni from the Peace Corps, a former jet pilot in the U. S. Army and three students with field experience in the Old World tropics. This eclectic group displayed remarkable tolerance, cooperation and maturity, which made the eight weeks in the field a highly rewarding experience for all. The course traveled to Santa Rosa, Palo Verde, La Selva, Poás Volcano, Las Cruces and Corcovado National Park in Costa Rica. More than 21 short- and long-term resource people participated in the course, including Drs. Dan Janzen, Eric Olson, Doug Gill, Bob Timm, Deborah Clark, Egbert Leigh, and Allison Snow. Post-course fellowships were awarded to 10 students, a testament to the caliber of participants. Nine students pursued research at La Selva, funded by Turner Fellowship funds, and one student pursued research at Las Cruces. *Special funding for this course came from the Andrew W. Mellon Foundation.*

Coordinator: **Dr. Deedra McClearn**, OTS
Co-coordinator: **Dr. Brad Boyle**, Missouri Botanical Garden
Teaching Assistant: **Mario Blanco**, U. Costa Rica

Amanda S. Allen, Purdue U.
Louise M. Armstrong, U. Mass-Amherst
Timothy G. Carr, Cornell U.
Camilla Carroll, U. Maryland
Sandi R. Copeland, Rutgers U.
Bradley F. Dickey, U. Kentucky
Tracy S. Feldman, U. Florida
Anne M. Gearhart, U. Maryland
James V. Hamilton, Auburn U.
Derek M. Johnson, U. Miami

Laura L. Lundquist, U. Colorado
Christiana J. Manville, Indiana U.
James G. March, U. Georgia
Charles E. Mitchell, U. Minnesota
Manuel A. Morales, U. Connecticut
Joshua H. Ness, U. Georgia
Cesar R. Nufio, U. Arizona
Kara J. O'Keefe, Duke U.
James R. Peters, Jr., U. Wisconsin-Madison
Gregory S. Pryor, U. Florida
Gregor W. Schuurman, U. Minnesota
Adrienne G. Tossas, U. Puerto Rico

Ecología Tropical y Conservación (OTS 97-2), the Spanish fundamentals course that emphasizes theories and methods of tropical ecology, took place January 17 through March 4, 1997 under the expert leadership of Dr. Alejandro Farji and

MSc. Federico Chinchilla, coordinators for the past three years, and Laura May, Teaching Assistant. Alejandro and Federico continue to receive rave reviews. The course was also blessed with academic contributions of visiting professors from the Costa Rican scientific community and from Argentina, Colombia, Mexico, Panama, and the United States. Notable among them were Dr. Rodolfo Dirzo, eminent Mexican ecologist and professor at the Universidad Nacional Autónoma de México (UNAM), ornithologist Dr. Bette Loiselle (U. Missouri-St. Louis), STRI entomologists Dr. Bill Wicslo and Dr. William Eberhard, UCR entomologist Dr. Paul Hanson, ecologist Dr. Carolina Murcia of Colombia, botanist Dr. Marcelo Aizen of Argentina, Monteverde biologists Dr. Frank Joyce, Dr. Edgardo Arévalo and MSc. Johnny Rosales, and La Selva's Orlando Vargas and Dr. David Clark. This year's 22 students from 11 Latin American countries were selected from 155 applications -- the largest number of applicants ever received. The course visited numerous sites in Costa Rica over a seven week period, including Parrita, Rara Avis, Cerro de la Muerte, Punta Morales, Palo Verde and La Selva. *Special funding for this course came from the Andrew W. Mellon Foundation.*

Tropical Biology (97-1) students learn canopy ascension techniques at Palo Verde Biological Station. Safe techniques for work in the canopy require common sense, good equipment and special training. Most students find their first climb to be an exhilarating experience.

Coordinator: **Dr. Alejandro Farji**,
Universidad del Comahue, Argentina
Co-Coordinator: **MSc. Federico Chinchilla**,
Universidad Nacional, Costa Rica
Teaching Assistant: **Laura May**
Henry Arias, Costa Rica
Clara Bohórquez, Colombia
María del Carmen Samame, Perú
Jorge Celi, Ecuador
Paola Contreras, México

James Coronado, Panamá
Fabrizio Díaz, Nicaragua
José Gerley Díaz, Colombia
Betty Flores, Bolivia
Norberto Giannini, Argentina
Gustavo Gómez, Colombia
Omar Gordillo, México
Daniela Kolhy, Brasil
Eloisa Lasso, Panamá
Catalina Murillo, Costa Rica

María Elena Naranjo, Venezuela
Patricia Ortíz, Ecuador
Erwin Palacios, Colombia
María Laura Ponssa, Argentina
Adriana Rodríguez, Colombia
Federico Villalobos, Costa Rica
Julio Cesar Voltolini, Brasil

Tropical Biology: An Ecological Approach (OTS 97-3), the summer offering of the fundamentals course, took place June 22 through August 16, 1997. The course was led by Dr. Deedra McClearn, OTS Tropical Biology Instructor, Dr. Theresa Singer, Co-coordinator, and Victor Carmona, Teaching Assistant. The 22 students, selected from 41 applicants, were from varied backgrounds, including two with Peace Corps experience, three from Latino backgrounds, and several with extensive field experience outside the U.S. The course traveled to Guanacaste, Palo Verde, Monteverde, La Selva, Cerro de la Muerte and Las Cruces in Costa Rica, with 17 students traveling to Barro Colorado Island (BCI) in Panama as a post-course activity. More than 40 resource people from Costa Rica, Panama, Germany, Colombia, and the U.S. shared their expertise with the course. Although few students could apply for post-course awards because of the start of their fall classes, two students were awarded post-course fellowships for research at La Selva. *Special funding for this course came from the Andrew W. Mellon Foundation.*

Coordinator: **Dr. Deedra McClearn**, OTS
Co-coordinator: **Dr. Theresa Singer**, U.
Arkansas
Teaching Assistant: **Victor Carmona**, OTS
Eric J. Baack, U. California-Davis
Mark A. Beilstein, U. Utah
Roberto E. Bello, U. California-Berkeley
Bryan A. Daley, Cornell U.
Susan M. Davidson, U. Maryland

Roland C. de Gouvenain, U. Connecticut
Rebecca C. Fuller, Michigan State U.
Eileen A. Hebets, U. Arizona
Christine M. Jarzomski, Michigan State U.
Amy E. Kaplan, U. Florida
Lucia G. Lohmann, U. Missouri-St. Louis
Kendra K. McLauchlan, U. Minnesota
Karen A. Ober, U. Arizona
Christopher J. Paciorek, Duke U.

Lori L. Pommerenke, U. Minnesota
Juan M. Posada, U. Missouri-St. Louis
Jennifer B. Pramuk, U. Kansas
Elizabeth F. Smith, U. Kansas
Mark E. Suarez, U. Maryland
Heather L. Throop, SUNY-Stony Brook
Geetanjali Tiwari, Penn State U.
Susan K. Willson, U. Missouri-Columbia

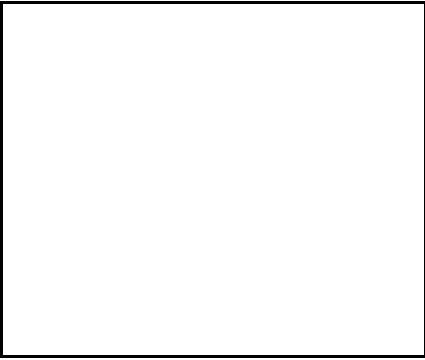
Agroecología (OTS 97-7) took place from June 19 through July 30, 1997 with the participation of 20 students representing 13 countries. Veteran co-coordinators Dr. Mickie Swisher, Dr. José Manuel Mora and Teaching Assistant Juan Carlos Rodríguez led the very successful course as it progressed through a series of modules that provided hands-on training in field research and analysis of tropical agroecosystems. Among sites visited in Costa Rica, a week was spent at La Selva examining biodiversity and two weeks were spent at Las Cruces for independent projects. The interaction of European, U.S. and Latin American colleagues in the course created a favorable environment for intellectual and cultural exchange. *Special funding for this course came from the General Service Foundation with additional assistance from World Wildlife Fund - Central America.*

Co-coordinators:
Dr. Mickie Swisher, U. Florida
Dr. José Manuel Mora, U. Costa Rica
Teaching Assistant: **Juan Carlos Rodríguez**, U. Florida

Arodys Alonso, Cuba
Adriana Bonilla, Costa Rica
Fátima Calero, Nicaragua
Sonia Carabajo, Ecuador
Kristen Conway, USA
Marvin Fonseca, Costa Rica
Jorge Galindo, Guatemala
Marieke Heemskerck, Holland
Ellen Huntley, USA
Luis Daniel Llambi, Venezuela
Enrique Meza, México

José Bernardo Ramírez, Colombia
Daniela Inés Rode, Argentina
Amalia Ruiz, Costa Rica
Mirna Santana, Panamá
Evandro do Nascimento Silva, Brasil
Daniel di Giorgi Toffoli, Brasil
Omar Tremont, Venezuela
Isabel María Valdivia, Cuba
Gloria Villamil, Colombia

**Agroecología (OTS 97-7) students
take soil samples in study of land
use capability on a farm in San
Carlos.**



Tropical Biology (97-3) students use La Selva classroom facilities to catch up on papers from previous sites and research projects. During the course, students design research projects, collect and analyze data, and write results. Some of these short-term projects provide the pilot data for longer projects or even for thesis research. All projects are published in the official course book and become ideas for other OTS students on future courses.

Tropical Biodiversity (OTS 97-10) was in the field in Costa Rica August 3 through August 24, 1997 with a full complement of 21 participants under the leadership of veteran Coordinator Dr. Devon Graham (96-10 Co-coordinator) and Dr. Gerald Urquhart. The students came from six countries and included advanced undergraduates, graduate students and professionals from the fields of education, public policy and forestry. The fast paced 3-week course visited all three OTS field stations and studied the biological diversity and approaches to conservation at the contrasting sites (dry forest, cloud forest, and lowland rain forest). Along the way, the course met 17 resource faculty, some of whom led field problems that ran the gamut from park management issues to lepidopteran faunal assessments. Course leaders Graham and Urquhart left their marks on the course: Devon was especially noted for his encyclopedic knowledge of Costa Rican natural history, while Gerald was the catalyst for discussions of the economic and political factors underlying habitat and biodiversity loss in the region.

*Coordinators: **Dr. Devon Graham** and **Dr. Gerald Urquhart** (U. Michigan)*

Michael E. Baltz, U. Missouri-Columbia
James B. Belsher, Humboldt State U.
Mary E. Canfield, Indiana U.
Maria G. Fadiman, Tulane U.
Joey L. Fry, College of William and Mary
Wilson E. Harris, Purdue U.
Kirsten E. Heckmann, Colorado College
Kevin C. Holston, U. Illinois
Candice D. Jones, U. Tennessee
Raymond J. King, Emory U.

James M. Lammers, Miller Creek Middle School
Nicole M. Leotaud, Instit. of Environmental Science
Michael N. Marchand, U. Massachusetts
Vincent T. Marshall, U. Missouri-Columbia
Pantaleo K. Munishi, NC State U.
Tanya M. Rehse, U. Washington
Dino Renvert, U. Bonn
Irene M. Solér, American U.
Vanessa A. Sorensen, NC State U.
John R. Stinchcombe, Duke U.
William L. Whitlow, U. Michigan

Ecología da Floresta Amazônica (OTS 97-12) took place July 14 - August 15, 1997 in the Brazilian Amazon in conjunction with the Instituto Nacional de Pesquisas da Amazonia (INPA), the Smithsonian Institution, and the Universidade Estadual de Campinas (UNICAMP). Of the 46 applicants, 20 students were selected: 15 students from eight different Brazilian institutions with the five remaining students coming from institutions outside Brazil. Emphasis was on the tropical ecology of Amazon rainforests, including the terra firme forests near Manaus and the flooded forests of Río Amazonas and the Río Negro. In addition to Drs. Rita Mesquita, course Coordinator, and Carlos Araújo Lima, Co-coordinator, the course was assisted by 17 visiting professors including Drs. Jonathan Coddington, Bruce Williamson, Claude Gascon, and Mike Hopkins. *Special funding for this course came from USAID/Brasilia.*

*Coordinator: **Dr. Rita Mesquita**, INPA/BDFFP*

*Co-coordinator: **Dr. Carlos Lima**, INPA*

*Teaching Assistant: **Leandro Ferreira***

Isabel de Andrade Pinto, UNICAMP, Brasil
Silvia H. C. Brilhante, UFAC, Brasil
Paula Cabral Eterovick, UNICAMP, Brasil
Simone Dantas Montenegro, Sec. Mun. Meio Amb.-Acre, Brasil
Pedro F. Develey, USP, Brasil
Eleneide Doff Sotta, INPA - Silvicultura, Brasil
Luz Fernanda Jimenez S., UNIANDES, Colombia
Guilherme Fraga Dutra, UNICAMP, Brasil
Adriano Jerzolimski, USP - São Paulo, Brasil
Suzana M. Ketelhut, Museo Goeldi - Belém, Brasil

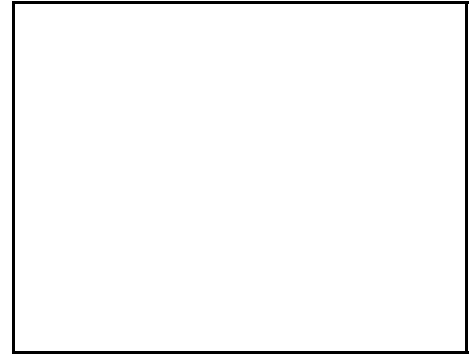
James Komarov Aparicio Effen, Museo Nac. Historia Natural, Bolivia
Andrea Leme da Silva, USP -São Paulo, Brasil
Marcelo G. Lima, INPA - Ecologia, Brasil
Danitza Moscoso Zambrano, Univ. Nac. San Antonio Abad, Perú
Ursula M. Neira Mendonza, Univ. Fed. Fluminense, Brasil
Fabiana Pinto Gomes, USP, Brasil
Carlos Eduardo Rittl, INPA - Ecologia, Brasil
Diego Tirira Saa, Univ. Católica del Ecuador
Marcela Santamaria Gomez, UFMG, Colombia
Rafael Silva Oliveira, UNB, Brasil

Undergraduate Education

The OTS Undergraduate Semester Abroad Program (USAP) is a rigorous, semester-long curriculum of tropical ecology, environmental issues, culture, and language instruction. The program includes field trips, research, lectures, and independent projects. The OTS graduate study model, in which students learn about science by doing science, is used to introduce undergraduate students to key questions in modern tropical biology.

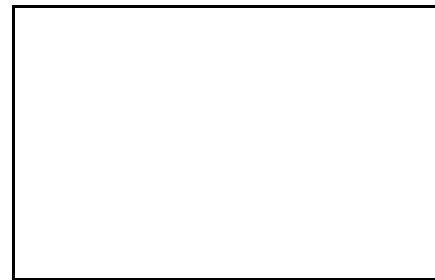
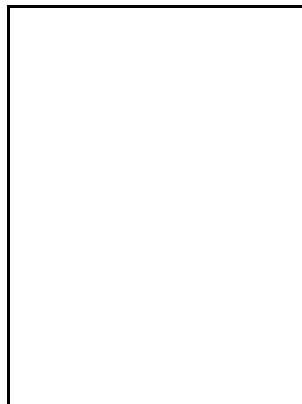
The 1997 fiscal year was spent laying the ground work for the first semester of the OTS Undergraduate Semester Abroad Program, which began in September 1997.

- ◆ Dr. Todd Shelly, Director of the program, spearheaded the efforts for the program to gain academic structure. Four courses were developed by OTS and approved for academic accreditation by Duke University. The courses include two biology classes (*Fundamentals of Tropical Biology* and *Field Methods in Tropical Biology*), one class in Environmental Science (*Environmental Science and Policy of the Tropics*), and one class in Romance Studies (*Spanish Language and Latin American Culture*).
- ◆ Three faculty were hired for the program, biologists Dr. Ethel Villalobos and Dr. James Roper and Language Instructor, Mía Gallegos.
- ◆ Todd focused on recruiting efforts by visiting nearly 30 college campuses in the fall and winter and meeting with faculty, study abroad officers, and students to market the program.
- ◆ The undergraduate program received a second grant from the A. W. Mellon Foundation for \$175,000 over a three year period. This grant is particularly important as it will subsidize operations during the initial years of growing enrollment.



Fourteen students enrolled for the Fall 1997 semester: four from Duke, two from Bowdoin, and one each from Swarthmore, Tufts, Bates, Carleton, Kenyon, Reed, Maryland, and Louisville. By reaching students early in their education, more students are likely to choose careers in tropical biology.

In the field methods course, students design and implement ecological research projects in tropical habitats and learn basic concepts in statistical analysis, sampling techniques, experimental design and hypothesis testing.



The OTS Undergraduate Semester Abroad Program staff was completed in fiscal year 1997. The staff includes (from l to r), Dr. James Roper, Biology Instructor, Mía Gallegos, Language Instructor, Dr. Ethel Villalobos, Associate Director, and Dr. Todd Shelly, Director.

Research Awards

In fiscal year 1997, OTS awarded 49 fellowships totaling \$51,979 to U.S. and Latin American graduate students who were either enrolled in degree programs at OTS member institutions or were OTS course alumni. In addition, OTS made 9 awards totaling \$153,763 to senior researchers through the Stanley Smith Horticultural Fellowship and the Mellon OTS/STRI Tropical Research Awards.

Donald and Beverly Stone Graduate Fellowship Awards

| | | |
|-------------------|------------------------|--|
| Terrence McGlynn | University of Colorado | Community factors regulating populations of invasive species |
| Shellee Morehead | University of Utah | Geographic variation in host location cues of a dipteran parasitoid; Behavioral mechanisms in host-specificity in a dipteran parasitoid of ants |
| Scott Pohlman | University of Georgia | From outreach to action: expanding the Adopt-a-Stream Program in Puerto Viejo de Sarapiquí |
| Martin Schlaepfer | Cornell University | Long-term effects of habitat fragmentation on populations of Costa Rican amphibians & reptiles |
| Joshua Ness | University of Georgia | An initial survey of the extent and constraints of the <i>Eumaeus godartii</i> (Lycaenidae) and <i>Nomutis lateralis</i> (Languridae) relationship |

Andrew W. Mellon Graduate Fellowship Awards

| | | |
|--------------------|---------------------------------|--|
| Anurag Agrawal | University of California-Davis | Rapid induced responses in the <i>Cecropia-Azteca</i> system |
| Amy Faivre | University of Arizona | Evolution of the heterostylus syndrome from an ontogenetic perspective |
| Ricardo Felipe Sol | Universidad de Costa Rica | Prehispanic settlements in the La Selva Biological Reserve |
| Eileen Helmer | Oregon State University | Tropical forest succession: Identification and dynamics within the biophysical and socioeconomic landscape |
| Alexander Krings | North Carolina State University | Exploration of the liana community of Las Cruces Biological Station, San Vito de Java |

Andrew W. Mellon, OTS/STRI Tropical Research Awards

| | | |
|------------------|--------------------------|--|
| Walter Carson | University of Pittsburgh | On the ecological significance of herbivores and lianas to tropical forest diversity in Panama and Costa Rica: A comparative experimental approach |
| James Hamrick | University of Georgia | Comparative population genetics of two tropical tree species from BCI, Panama, and Palo Verde, Costa Rica |
| Douglas Schemske | University of Washington | The evolution of floral characters and reproductive isolation in Neotropical <i>Costus</i> (Costaceae) |
| John Werren | University of Rochester | Distribution and diversity of Rickettsia in neotropical arthropods |

Andrew W. Mellon, OTS/STRI Exploratory Awards

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|---------------------|--|---|
| Michael Breed | University of Colorado | What ecological factors influence the number of queens in a social insect colony? |
| Deborah Clark | University of Missouri-St. Louis | Tropical trees with broad geographic ranges: a comparative study of life history characteristics in wet and moist neotropical forests |
| Lee Dyer | University of California-Santa Cruz | Larval defensive mechanisms in two different tropical forests |
| Bettina Englebrecth | University of Darmstadt | Specialization to light and soil moisture regimes in <i>Piper</i> species: consequences for their distribution and coexistence |
| Alejandro Farji | Universidad del Comahue | Seed banks in <i>Atta</i> nests |
| Michael Kaspari | University of Arizona | Causes of litter ant patchiness at the m ² scale: studying effects of rainfall and plant diversity |
| Terrence McGlynn | University of Colorado | Community level regulators of invasive species |
| Clark Ovrebo | University of Central Oklahoma | Preliminary investigation of the fleshy fungi of Barro Colorado Island |
| Melissa Panger | University of California-Berkeley | Effects of postural regulation on land-use patterns of <i>Cebus capucinus</i> across variable habitats |
| Fredric Vencel | State University of New York-Stony Brook | Chemical ecology of a fecal shield defense |

Peace Frogs Graduate Fellowships for Amphibian Research Awards

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|-----------------|-------------------|--|
| Paul Buttenhoff | Auburn University | Does prior experience play a role in prey avoidance? |
|-----------------|-------------------|--|

Turner Graduate Fellowship Awards

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|-----------------------------|-------------------------------------|--|
| Laura Aldrich-Wolfe | Cornell University | Comparative diversity of mycorrhizal fungi in pastures and adjacent forest remnants, Coto Brus, Costa Rica |
| Amanda Allen | Purdue University | A comparison of the wing morphology between foraging guilds of bats in tropical dry and tropical rain forests of Costa Rica |
| Mariamalia Araya | Universidad de Costa Rica | Nest predation in forest fragments surrounded by banana plantations near La Selva |
| Douglas Barraza & José Díaz | Instituto Tecnológico de Costa Rica | Forestry plantation sites in two counties of the Atlantic Zone of Costa Rica for five species: <i>Hyeronima alchorneoides</i> , <i>Vochysia guatemalensis</i> , <i>Vochysia ferruginea</i> , <i>Virola koschnyi</i> and <i>Terminalia amazonia</i> |
| Mario Blanco | Universidad de Costa Rica | Descriptive and functional morphology of stems of <i>Bauhinia</i> lianas |
| Timothy Carr | Cornell University | Positive and negative interactions within a complex of mutualists |
| Camilla Carroll | University of Maryland | Mammals of La Selva |
| Manish Desai | University of California-Berkeley | Plant diversity & insect herbivory: Potential for biological control in an agroforestry system |
| Phaedra Doukakis | Yale University | Euglossine bees in forest fragments around Las Cruces |
| Tracy Feldman | University of Florida | An assessment of the costs and benefits of nectar robbery of <i>Passiflora vitifolia</i> by <i>Trigona</i> spp. |
| Anne Gearhart | University of Maryland | Pollination competition between <i>Passiflora vitifolia</i> and <i>Heliconia</i> sp. |
| John Janovec | Texas A&M University | Field observation and collection of the genus <i>Neea</i> |
| Derek Johnson | University of Miami | Modeling the spatial dynamics of the rolled-leaf Hispine beetle, <i>Cephaloleia dilaticolis</i> , on <i>Calathea crotalifera</i> |
| Jordan Karubian | University of Chicago | Dimorphism in tanagers |
| Rebecca Klaper | University of Georgia | The variation in arthropod species composition across several types of edges at the La Selva Biological Station |
| Susan Lambrecht | University of Michigan | Colonization of understory plant leaves by epiphylls in the canopy |
| Eloisa Lasso de Paulis | STRI | Effect of nectar consumption and pollen removal on reproductive success of <i>Hamelia patens</i> |
| Silvana Martén | Universidad de Costa Rica | Effects of phenology, density and plant size on the reproduction of <i>Geonoma epetiolata</i> , Rara Avis, Sarapiquí, Costa Rica |
| Juan Manuel Morales | Universidad de Tucumán | Effects of the structure of micro-habitats on the community of spiders in the understory forest at La Selva |
| Debra Murray | Louisiana State University | Systematics and evolution of Euptychiine Wood Nymph Butterflies (Lepidoptera: Nymphalidae: Satyrinae) |
| María Elena Naranjo | Universidad de Los Andes, Venezuela | Effect of nectar consumption and pollen removal on reproductive success of <i>Hamelia patens</i> |
| Cesar Nufio | University of Arizona | Mortality of <i>Pentaclethra macroloba</i> seedlings |
| James Peters | University of Wisconsin-Madison | Co-distribution of bryophytes and bromeliads: Does the presence of bryophytes on the substrate improve conditions for bromeliad seedling establishment and survival? |
| Elizabeth Smith | University of Kansas | Division of labor and genetic composition of colonies in <i>Ectatoma ruidum</i> (Formicidae: Ponerinae) |
| Mark Suarez | University of Maryland | Collection and identification of termites and their commensals and parasites in the Dictyoptera and Acaraea taxa in collaboration with the ALAS project at La Selva |
| Adrienne Tossas | University of Puerto Rico | Flocking behavior of tanagers in a neotropical lowland forest |
| Heather Wells | University of Georgia | What factors control the abundance of <i>Atta cephalotes</i> at La Selva? |
| Jane Whitehill | University of Missouri-St. Louis | Will reproductive systems in Araceae vary under different land use regimes at Las Cruces? |

Stanley Smith Horticultural Fellowship Awards

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|-----------------|---------------------------|---|
| Danny Beath | University of Aberdeen | Curated part of the aroid collection (Philodendroideae) of the Wilson Botanical Garden |
| Isidro Chacón | INBio | Documented the host-plants of the rich butterfly fauna of Las Cruces and the River Trail of the Wilson Forest Reserve, Las Cruces |
| Charles Hubbuch | Fairchild Tropical Garden | Identified part of the palm collection, Wilson Botanical Garden |
| Joshua Ness | University of Georgia | Documented the natural history of the cycad collection at WBG, particularly the native <i>Zamia fairchildiana</i> |
| Jane Whitehill | Missouri Botanical Garden | Worked on the Colocasioideae group of aroids, Wilson Botanical Garden |

La Selva Biological Station

With its state-of-the-art laboratories, on-line geographic information system, extensive trails, and large forest reserve bordering Braulio Carrillo National Park, La Selva is one of the world's most important sites for tropical forest research. La Selva is located in the Caribbean lowlands of Costa Rica and comprises 1,513 hectares (3,739 acres) of old growth and disturbed wet forests.

Visitation and Research Highlights

Fiscal year 1997 was characterized by unusually low usage during the low season (June through December) and unusually high usage during the peak season (January through May). Overall, day and overnight visitation decreased 3% compared to fiscal year 1996. International courses increased 11%, while individual student and senior researcher use declined 12%. Although several major research projects came to an end in fiscal year 97, researcher use continues to be significant. Several of the major ongoing NSF-funded projects include the limnological studies of Cathy Pringle (University of Georgia) on geothermal springs and stream chemistry, the work of David and Deborah Clark (University of Missouri-St. Louis) on measuring carbon fluxes in old growth forest, and the inventorying of arthropods supervised by Rob Colwell (University of Connecticut), John Longino (Evergreen State University) and Henry Hespeneheide (UCLA).

Overall Visitation by Source



Researchers, students and natural history visitors don't have to go far from the dining hall to experience the biodiversity. Here, visitors locate one of the resident Three-Toed Sloths that spends much of its time in a nearby treetop.

Facilities

The National Science Foundation reaffirmed its support for the maintenance of the station by awarding a new operations grant in fiscal year 1997. The five-year grant is for \$550,000 per year for the first three years, then \$525,000 in year 4 and \$500,000 in year 5. The panel review of the proposal emphasizes that in the next 5 years OTS needs to diversify its funding base, create an endowment for La Selva and improve data management infrastructure.

Facilities improvements over the year included new steel-frame shade houses, four new steel bridges on backcountry trails, an additional 500 meters of paved trail, and a greatly expanded local area network in the labs. The CARBONO project also built a 42-meter walk-up tower for their research on carbon dioxide fluxes.

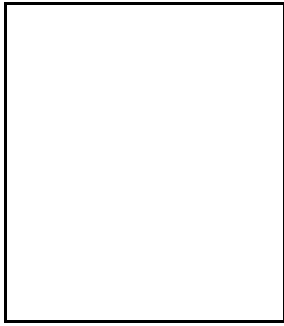
Conservation

OTS signed a Memorandum of Understanding with the Central Volcanic Range Conservation Area, the governmental organization responsible for management of Braulio Carrillo National Park, to promote research and educational use of the transect that links La Selva in the lowlands to the 2,900-meter Barva Volcano. This agreement paved the way for a major conservation initiative, funded by the British Government, in the La Selva-Braulio Carrillo reserve complex. This project repaired guard stations and trails, provided equipment and a vehicle to a volunteer group that helps enforce wildlife laws, and monitored populations of endangered bird species. Renewed funding continues to support these activities and improve environmental education in communities surrounding the reserve.

Research Projects at La Selva

| | | |
|---|--|--|
| Anurag Agrawal | U. California-Davis | Rapid induced responses in the <i>Cecropia-Azteca</i> system |
| Jennifer Apple | U. Utah | Ant attendance at extrafloral nectaries of <i>Passiflora</i> : The effects of nectary attributes and ant behavior on patterns in facultative ant-plant mutualism |
| Mariamalia Araya, Ethan Sadacca, Frank Wolff | U. Costa Rica, Occidental College, UCR | Nest predations in fragments of forests surrounded by banana plantations |
| Elizabeth Arnold, Bobby Bascomb, Candice Kelley, Terrence McGlynn, Lloyd Rowland, Mark Springer | Duke, Southampton, Maharishi U. of Management, U. Colorado, Virginia Tech, OTS | Community ecology of exotic ant species |
| Marcela Arguedas, Elizabeth Braker, Virginia Guerrero, Sarah Henshaw, Walter Marín, Robert Marquis, Raúl Medina, Alonso Mora, Pembe Sowers | Occidental College, UCR, U. Missouri-St. Louis | Population response of insect herbivores and pathogens to native tree plantations |
| Pablo Arroyo, Jeremy Haggart | OTS, ICRAF-Mexico | Alternatives for reforestation with native trees in Sarapiquí |
| David Askov, Jenny Juarez | OTS, U. Costa Rica | Design of a Geographical Information System and database system for La Selva |
| David Baker | Oregon State U. | Tropical wood quality |
| Rohini Balakrishnan, Ron Buttner, Katja Ueberschaer, Dagmar and Otto von Helversen, Lothar Winkler | U. Erlangen (Germany) | Behavior of nectar-feeding bats |
| Rosibel Barrantes, Deborah Leal, Isa Torrealba, Johnny Villareal | UNA | Home range & feeding habits of Collared Peccaries (<i>Tayassu tajacu</i>) in a tropical wet forest |
| Jorge Barquero, Tania Brenes, Roy Elizondo, Jaime Quesada, Jose Pablo Quesada, Lisseth Sandoval | UCR, UCR, Max Plank Institute, MPI Für Chemie, UCR, UNA | Rain water samples in the North Plains |
| Laura Baumgartner, Michael Breed, Erin Stocker, Stephanie Vargas | U. Colorado | Stingless bee ecology |
| Rachel Beck-King, Carol Horvitz, Matthew Slocum | U. Miami | Forest regeneration after cacao removal |
| Andrea Beeler, Claire Harston, Maura Maple, Amy McComb, Lisa McLeod, Ed Tunstall | U. Kentucky, U. New Brunswick | Parental effects on offspring fitness in <i>Dendrobates pumilio</i> |
| Oliver Behr, Thomas Himstedt, Susanne Wurst | UNA | Successive areas and their plants |
| Gitanjali Bodner, Valerie Behan-Pelletier, Danilo Brenes, Robert Colwell, Glavis Edwards, Paul Hanson, Henry Hespeneheide, Lawrence Kirkendall, Evert Lindquist, Jack Longino, Ronald Ochoa, Eugenie Phillips, Charles and Susan Staines, Ronald Vargas | U. Florida, Agriculture Canada, U. Arizona, OTS/INBio, U. Conn, U. Florida, U. Bergen, Agriculture Canada, Evergreen State College, UCLA, U. Michigan, Oregon State, OTS/INBio | Arthropod diversity in a lowland tropical rain forest |
| Victoria Boed | Occidental College | Ecotourism: The Costa Rican quest for sustainable development |
| Mario Blanco | U. Costa Rica | Functional and descriptive morphology of stems of <i>Bauhinia</i> lianas |
| Meredith Broberg | OTS | Experience in art about tropical biology |
| Anne Brooke | U. Tennessee | Behavioral ecology of La Selva bats |
| Brian Brown | Natural History Museum | Systematics and behavior of <i>Acocephalus</i> |
| Daniel Bunker | U. Pittsburgh | Comparative reproduction of <i>Pithecellobium</i> at La Selva and BCI |
| Leslie Burlingame | Franklin & Marshall College | Historical analysis of the development of environmental conservation in Costa Rica |
| Paul Buttenhoff | Auburn U. | Amphibian behavior |
| Marcela Caceres | U. Federal Pernambuco | Diversity of epiphytes in tropical forests |
| Catherine Cardelus, Adrienne Nicotra | U. Connecticut | The functional ecology of dioecy in <i>Siparuna tonduziana</i> |
| Catherine Cardelús | Columbia U. | Host specificity of bromeliads |
| Camilla Carrol | U. Maryland | Mammal census |
| Marvin Castillo | I.T.C.R. | Dynamics of regeneration in wet tropical secondary forests (BOSQUES II) |

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|--|---|---|
| Marvin Castro, Robin Chazdon, Julie Denslow, Juan Dupuy, Silvia Iriarte, Katherine Miller, Rebecca Montgomery, Braulio Vilchez | ITCR, Tulane U., U. Conn | Environmental heterogeneity and woody plant diversity in tropical secondary forests |
| Hazel Cerdas | U. Wisconsin | Ecotourism in Costa Rica |
| Renee Chester, Matthew Denton, Buce Young | OTS | Nesting success of birds in forests and fragments |
| Miguel Cifuentes, Jack Ewel, Marco Gutierrez, Ankila Hiremath, Matthew Kelty | ITCR, US Forest Service, UCR, U. Florida, U. Mass | Design of sustainable agroforestry ecosystems for the tropics |
| David Clark, Deborah Clark, Jane Read | U. Missouri-St. Louis, U. Missouri-St. Louis, OTS, Louisiana State U. | Phenology & reproductive biology of a rain forest cycad; Demography & ecophysiology of regeneration of tropical rain forest trees |
| David Clark, Deborah Clark, David Hollinger, Hank Loescher, Steve Oberbauer, Joseph O'Brien | OTS, OTS, USDA Forest Service, U. Florida, Florida International U. | Current and future carbon budgets for tropical rain forests: a cross-scale analysis |
| Jim Cope | | Species diversity of neotropical Cerambycidae |
| Diane Davidson | U. Utah | Evolutionary trajectories of tropical plants (<i>Cecropia</i>) and ants (<i>Myrmelachista</i>) |
| Selva Durai Dayanandan | U. Mass-Boston | Conservation genetics of tropical forest trees |
| Carsten Dense | U. Erlangen (Germany) | The cost of harem maintenance in the bat <i>Saccopteryx bilineata</i> |
| Carsten Dense, Marco Tschapka | U. Erlangen (Germany) | Ecology of nectar feeding bats |
| Manish Desai | U.C.-Berkeley | Biocontrol in agroforestry |
| Sara Dewalt, Stefan | U. Pittsburgh | Density, diversity, and size class distribution of lianas at La Selva |
| Cuong Doan, Melissa McMahon, Roderick Morrison, Robert Sanford | U. Denver | Land-use history of La Selva (biogeochemistry) |
| Craig Dodson | Mesa State College | <i>Piper</i> chemistry |
| Jacqueline Donnelly, Karen Harrell | Barnard College, U. Denver | Ecological land use history at La Selva |
| Lee Dyer, Karen Harvey, Sheri Klas, Raquel Krach, Deborah Letourneau, Amanda Lewis, Angela Shelton, Jennifer Sorenson, Christina Squassoni | U.C.-Santa Cruz, Mesa State College | <i>Piper</i> -ant plants and trophic cascades |
| Bettina Engelbrecht | Tec. Hochschule Darmstad | <i>Piper</i> species in the understory of primary forests |
| Amy Faivre | U. Arizona | Heterostyly in Rubiaceae and Acanthaceae: A comparison of the development of incompatibility systems of heterostylus flowers in Rubiaceae |
| Alejandro Farji, Claudia Medina | CRUB-UNC, U. del Valle-Calif | Seed banks in <i>Atta</i> nests |
| Steffen Forster | U. Braunschweig | Behavioral ecology of Central American dragonflies |
| Nico Franz | U. Costa Rica | Pollination of Cyclanthaceae |
| Lilliana Gaviria, Florencia Montagnini, Ileana Moreira, Carlos Porras, Shawna Swantz | ITCR, Yale | Impact of native trees on soil properties in the Atlantic lowlands |
| Grant Gentry | UCLA | Parasitoids as protective mutualists of a neotropical extra floral nectary plant |
| Arthur Gibson | UCLA | Ecophysiology of understory and gap herbs |
| Eugenio González | OTS | Experimental forestry with native & exotic tree species |



Pictured at left is the forty-two meter walk-up tower built by the CARBONO project (current and future carbon budgets for tropical rain forests: a cross-scale analysis). The tower will be used to monitor carbon dioxide fluxes through the forest profile and with the above-forest atmosphere.

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| William Grauel, Ed Veldkamp, Antje Weitz | OTS | Effects of land use change on soil trace gas emissions |
| Andrew Gray | Manchester U. | Aspects of natural history/reproductive behavior and development of <i>Agalychnis</i> species |
| Manuel Guariguata | CATIE | Silviculture and ecology of secondary forests |
| Virginia Guerrero, Walter Marín | U. Costa Rica | Foliage diseases in <i>Virola koschnyi</i> |
| Bruce Haines | U. Georgia | Population dynamics of leaf-cutting ant <i>Atta cephalotes</i> |
| Robert Hamilton | U. Loyola | Attelebidae & Rhynchilidae of La Selva (Coleoptera: Curculionidae) |
| Gary Hartshorn, Ben Jarvis, Diane and Milton Lieberman | OTS, Ecologde San Luis, U. North Dakota | Tree seedling dynamics in primary lowland rain forest |
| Gerald Heckel, Birgit Reuter, Christian Voigt | U. Erlangen (Germany) | Reproductive success in the bat <i>Saccopteryx bilineata</i> |
| León German Hernández, Eduardo Lepiz | U. Boston | Phenology of <i>Pithecellobium elegans</i> and <i>Carapa nicaraguensis</i> |
| Minor Hidalgo, Catherine Pringle, Alonso Ramírez | OTS, U. Georgia | Effects of volcanic processes on tropical streams |
| Erick Holscher, Jill Paldi | Los Angeles County Museum | Systematics of <i>Apocephalus</i> |
| Nisa Horn | Yale U. | A study of mulch effectiveness on maize of four indigenous tree species of Costa Rica |
| Anya Illes, Bruce Young | OTS | Seasonal variation in the blood parasites of Scarlet-rumped Tanagers |
| Brian Inouye, Stephen Laubach | Duke U. | Coexistence of insects in the fruits of <i>Apeiba membranacea</i> |
| Bryan Inouye | Duke U. | Insect interaction on ripe fruits |
| John Janovec, Amanda Neill | Texas A&M/Smithsonian | Field observation and collection of the genus <i>Neea</i> (Nyctaginaceae) |
| Laurent Jean Pierre, Stanley Sessions | Hartwick College | Ecological correlates of nucleotypic variation in plants |
| Derek Johnson | U. Miami | Dispersal of the rolled leaf beetle <i>Cephaloleia</i> on <i>Calathea crotolifera</i> |
| Jordan Karubian | U. Chicago | Sexual dimorphism in <i>Rhamphocelus</i> tanager |
| Karolyn King, Ann Strieby | California State U. | Study of frog calling sites in a multispecific neotropical community |
| Scott Kirksey | U. Florida | Behavioral ecology of ground ants |
| Brian Kirpes, Lori Koll | Eastern Washington | Relative effectiveness of various pollinators |
| Rebecca Klaper | U. Georgia | Edge effects and species cross-over |
| Jette Knudsen | U. Aarhus (Denmark) | Floral scent, chemical composition, plant reproductive ecology and evolution |
| Susan Lambrecht | U. Michigan | The colonization of understory plant leaves by epiphylls in canopy gaps at La Selva |
| Louis LaPierre | UCLA | Leaf-mining beetles on Cecropiaceae; Insect herbivore community structure and diversity on the Cecropiaceae |
| Christopher Leary | Auburn U. | The effects of size, chorus density and predator density on satellite behavior in <i>Hyla ebraccata</i> |
| Twan Leenders | Senckenberg Museum (Frankfurt) | Biogeography of the herpetofauna of the Braulio Carrillo complex |
| Edith Leiner | UCR | Pollination of different flowers at La Selva |
| Francisco Lopez | U. Complutense | Soundscapes of the rain forest |
| Silvia Lobo | U. Costa Rica/MNCR | The effect of herbivorous mammals on the regeneration of <i>Dipteryx panamensis</i> and <i>Pentaclethra macroloba</i> |

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| Andrea and Robert Lucking | U. Ulm | Diversity maintenance of lichens and foliicolous fungi in a tropical forest |
| Jeff Luvall | NASA | Global position of La Selva |
| Silvio Marchini | Smithsonian I. | Effect of seed predation by vertebrates on seedling recruitment |
| Steve Marquardt | U. Washington | Natural history of the Banana Industry |
| Greg Massa | U.C. Santa Cruz | The role of tree architecture in structuring spider communities; Distribution and host preferences of <i>Marcgravia serrae</i> |
| Deedra McClearn | OTS | Activity patterns of canopy mammals |
| Lucinda McDade | U. Arizona | Demography of the endemic <i>Aphelandra storkii</i> (Acanthaceae) |
| Christina McElroy, Klaus Nuesslein | Michigan State U. | Influence of environmental factors on the composition of soil microbial communities |
| Kristen Michaelides | Yale School of Forestry | The implications of understory vegetation composition for forest restoration and agroforestry |
| Rebecca Montgomery | U. Connecticut | Modeling the consequences of heterogeneous light environments for seedling performance in tropical wet forests |
| Traci Morris, Stanley Sessions | Hartwick College | Parasitism and sexual selection in <i>Ameiva festiva</i> |
| Debra Murray | Louisiana State U. | Systematics and evolution of <i>Euptychnia</i> : Satyrinae |
| Thomas Mowbray, Robert Wilbur | Salem College, Duke | Flora of La Selva |
| Josh Ness | U. Georgia | Investigation of parasitoids and altered levels of herbivory in lepidopteran hosts |
| Barry O'Connor | U. Michigan | Systematics, ontogeny and ecology of mites of the family Acaridae (Acari: Astigmata) |
| John Pickering | U. Georgia | Insect diversity |
| Scott Pohlman, Stacey Smith | U. Georgia | Adopt a stream |
| Jennifer Powers | OTS/World Bank | The catalytic effect of tree plantings on the rehabilitation of native forest diversity on degraded tropical lands: Nutrient cycling across soil fertility gradients |
| Helga Rodríguez | Yale | Contribution to the knowledge about secondary forest and its diversity |
| Rachel Rodríguez | Occidental College | Extrafloral nectaries and activity on a neotropical tree (<i>Pentaclethra macroloba</i>) |
| Dennis Rogers | OTS | Bird population changes at La Selva |
| Rosa Sandoval | U. Costa Rica | Architecture of <i>Pithecellobium elegans</i> |
| Louis Santiago | U. Hawaii | Transpiration in evergreen and deciduous trees at La Selva and Barro Colorado Island |
| Steran Schnitzer | U. Pittsburgh | The ecology of lianas |
| Beth Shapiro | U. Georgia | A chronological survey of the diversities of generalist versus specialist parasitic wasps (Hymenoptera, Ichneumonidae) |
| Brian Shelley | College of Holy Cross | Survey of tropical stream mosses |
| Daniel Shepherd | Yale U. | Mixed species tree plantations in the humid tropics: An alternative for carbon sequestration |
| Michael Singer | U. Texas-Austin | Natural history & community ecology of Satyrid butterflies |
| Felipe Sol | U. Costa Rica | Prehispanic settlement at La Selva |
| Mario Sousa | U. Connecticut | Systematics and reproductive biology of the Genus <i>Witheringia</i> (Solanaceae) |
| Susan Stevens | Oregon State | Ecology and management of <i>Cordia alliodora</i> in pastures and plantations of Sarapiquí |
| Shana Strongin | Yale | Impacts of native tree plantations on abundance & diversity of leaf litter arthropod families |
| Rainer Thiele | U. Tubingen | Bee pollination of trees in tropical wet forests |
| Braulio Vilchez | ITCR | Spatial and temporal dynamics of secondary forests; Environmental heterogeneity and woody plant diversity in tropical secondary forest |
| Christian Voigt | U. Erlangen | The reproductive costs in the bat <i>Saccopteryx bilineata</i> |
| Megan Wamberg | U. Georgia | Diversity of parasitic wasps (Ichneumonidae) in Neotropical forests |
| Heather Wells | U. Georgia | What factors control the abundance of <i>Atta cephalotes</i> at La Selva? |
| Kevyn Wightman | NCSU | Improved nursery production techniques for 5 native tree species |
| Steve Yanoviak | U. Oklahoma | Community structure of water filled tree holes |
| Mika Zipusch | Occidental College | Parasitic interactions between lepidopterans and hymenopteran |
| Jim Zook | OTS | Monitoring of endangered bird species in Braulio Carrillo - La Selva |

Las Cruces Biological Station

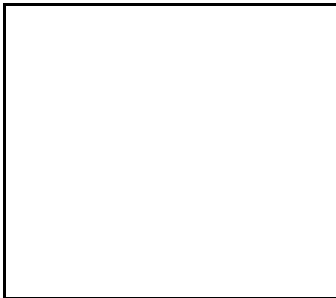
Las Cruces is located on Costa Rica's southern Pacific slope and is OTS' 235-hectare (587 acre) reserve of mid-elevation rain and cloud forest. Las Cruces is also home to the Robert and Catherine Wilson Botanical Garden, a 10-hectare (25 acre) managed area consisting of the most important living botanical collections in Central America.

Visitation and Research Highlights

Overall, Las Cruces enjoyed a 22% increase in visitation over the previous year. Formal education and research activity attracted 60% of the visitors, while natural history guests accounted for 40%.

Educational tours for visiting academic groups and special educational programs for natural history visitors were further developed in 1997 with the aid of a full-time resident biologist added to the staff early in the year. In addition to numerous studies on the basic biology of particular plant and animal species, two long-term, larger scale research projects based at Las Cruces continued through 1997. Gretchen Daily and Paul Ehrlich (Stanford University) in concert with graduate students from the Center for Conservation Biology at Stanford, intensified their work in country side biogeography and the future of biodiversity in human-dominated landscapes. Bruce Haines and Christopher Peterson (University of Georgia) and assistants studied rates and patterns of forest regeneration in recently abandoned pasture.

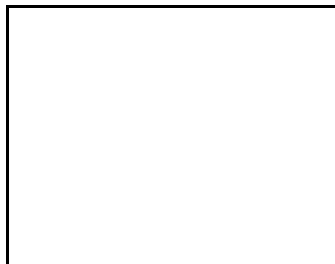
Overall Visitation by Source



Eulaema and Euglossa bees collecting oils from wild Anthurium formosum inflorescences. Bees convert the oils into nesting materials and sex pheromones. Education on the role of animals in plant pollination is an important element of natural history experiences in the Wilson Garden.

Facilities

In December 1996, little more than two years after the devastating fire of 1994, the reborn field station served its first meal in the new dining hall, centerpiece of an expanded general services building. Students, biologists and natural history visitors are delighted with the open air terrace and sheltered views from the balcony looking north to the Talamanca Mountains. The Mildred Mathias Reading Room, named for the distinguished botanist and past president of OTS, was christened at the same time with lectures, slide shows, and many contributed books. In May, the Station Directors were able to move back to the OTS grounds when the new Director's Residence was completed. In addition to the rebuilt facilities, optical fiber and underground lines now interconnect all facilities and provide greater communications services for field station users.



The new dining hall can accommodate 72 guests, offering lovely vistas of forested slopes in the distance.

Research Projects at Las Cruces

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| David Brzoska | U. Kansas | Tiger beetles of Costa Rica: Taxonomy, ecology and distribution throughout Costa Rica |
| Julio Calvo | ITCR | Ensayos forestales Zona Sur III |
| J. Corrales | INBio | Hongos Entomógenos de Costa Rica |
| F. Coyle | W. Carolina U. | Biology and natural history of <i>Ummidia</i> (Arachnida: Ctenicidae) |
| Gretchen Daily | Stanford U. | Biodiversity assessment; Distribution of biodiversity in forest patches and the agricultural landscape |
| Paul R. Ehrlich | Stanford U. | Conservation of biodiversity in tropical moist forest fragments |
| Ernest Franzgrote | | A monograph of Trochilidae (Aves) |
| Luis Diego Gómez | OTS | Cycad toxins and <i>Aulacoscelis costaricensis</i> |
| Bruce Haines | U. Georgia | Research toward sustainable land use and biodiversity in a mosaic of agriculture and tropical forest |
| Kurt Haberyan | NW Missouri State U. | Lake, lake sediments and environmental history in Costa Rica; Diatomea of Costa Rica |
| Sally Horn | U. Tennessee | Paleoecology of the Las Cruces area |
| C. Hubbuch | Fairchild Botanical Garden | Taxonomy of Palmae at Las Cruces Biological Station |
| Derek Johnson | U. Miami | Biology of hispid beetles |
| H. Liuba Kisimova | U. Tübingen | Resupinate fungi of Costa Rica |
| Alexander Krings | NC State U. | A field guide to tendrillate lianas of a Costa Rica cloud forest and a floristic analysis of their community composition |
| Catherine Lindell | Ball State U. | Avian diversity in the agroscape; Birds in coffee plantations |
| Karen Lips | St. Lawrence College | Mass mortality of the anuran fauna at upland sites in Costa Rica and western Panamá |
| Denise McKinney | Hiram College | The effect of phosphorus addition and inoculation (<i>Rhizobium</i>) on nodulation of <i>Canavalia ensiformis</i> |
| Deborah Murray | Louisiana State U. | Biology of Orthoptera of Fila Cruces |
| Joshua Ness | U. Georgia | An initial investigation of the relationship between <i>Eumaeus godartii</i> and Languriid beetles |
| Paul Rich | U. Kansas | Conservation biology of a fragmented forest |
| David Roubik | STRI | Impact of honeybees in pollination fruit set & crop yield of coffee |
| Isidor Ruderfer | U. Georgia | Phosphorus release and conservation in the litter of a modified Costa Rica slash-mulch bean production system |
| John Schelhaus | Cornell U. | Cultural and attitudinal aspects of forest fragments |
| Mario Sousa-Pena | U. Connecticut | Systematics and reproductive biology of the genus <i>Witheringia</i> L'Hér. (Solanaceae) |
| Edmund Stiles | Rutgers U. | Nutrients in fruits eaten by birds and mammals |
| Diane S. Srivastava | U. British Columbia | Aquatic fauna of bromeliads: species loss and cascading effects |
| Gordon Ward | U. Georgia | Cyanoglucosides in <i>Passiflora</i> spp. |
| Tammy Woodcock | Royal Botanical Gardens - Kew | Horticulture of <i>Heliconia</i> |

The living collections at the Wilson Botanical Garden continue to attract and inform botanists and horticulturists. Pictured here are Luis Diego Gómez, Las Cruces Station Director, Ellen Leue, Director of Bedding Plants with the Pan American Seed Company, and Claude Hope, renowned plant breeder.

Palo Verde Biological Station

Unique in its richness of scenery and wildlife, Palo Verde National Park contains one of the most extensive marshes and some of the oldest patches of dry forest remaining in Central America. The OTS facilities are in the heart of Palo Verde National Park, located in the northwest Costa Rican lowlands of Guanacaste Province.

Visitation and Research Highlights

Overall, visitation was 25% less than in the previous year. All visitor categories showed a decrease, with the exception of natural history groups. The drop in students and researchers is considered a temporary aberration due to changing course offerings and research patterns. Long-term research at Palo Verde includes the core-sampling project of Sally Horn (University of Tennessee) to determine historical land use patterns, the study of marsh management by Michael McCoy (Universidad Nacional de Costa Rica) and the study of mangrove stands on the Río Tempisque by Jorge Jiménez (OTS).

Overall Visitation by Source

Facilities

The construction of new buildings began in May 1996 and was completed in January 1997. New structures include a kitchen/dining hall, a dormitory for researchers, a laboratory building and new bathrooms for the student dorms. Remaining funds from a NSF facilities improvement grant were used to remodel the old station into a facility for education groups. The new and remodeled facilities can accommodate a dozen individual scientists and a large course simultaneously with reliable power, communications, and lab space. The fourteen solar panels, originally installed in April 1996, and the generator were rewired to improve the yield of the system. Also, in coordination with the Instituto Meteorológico de Costa Rica, two modest weather stations were set up to monitor rain and temperature.



The new dining hall hosts researchers and students on short- and long-term stays as well as natural history visitors experiencing Palo Verde for

Research Projects at Palo Verde

| | | |
|--|-----------------------------|--|
| Gerardo Barboza | MINAE | The use of cattle to control fires and restore the tropical dry forest of Palo Verde National Park |
| Victoria Apsit, Jim Hamrick, Dorset Trapnell | U. Georgia | Gene flow into tropical forest fragments |
| William Burnidge | U. Michigan | The role of cattle in wetland vegetation management for waterfowl habitat at Palo Verde National Park |
| Michael McCoy and Arnoldo Paniagua | U. Nacional de Costa Rica | The effect of cattle grazing on a seasonal marsh at Palo Verde National Park |
| Eugenio González and Jorge Jiménez | OTS | Dynamic and spatial distribution of primary dry forest |
| Sergio Chavez, Maureen Sanchez, Sally Horn | U. Costa Rica, U. Tennessee | Ancient human activities at Palo Verde National Park |
| Ellen Helmer | Oregon State U. | Tropical forest succession: Identification and dynamics within the biophysical and socioeconomic landscape |
| Jenny Pérez | OTS | Compilation and classification of environmental and biophysic information of the Tempisque lowlands |

Environmental Policy and Education

The Environmental Policy Program features decision-makers courses designed for professionals who devise and implement policies that affect tropical resources but who often have minimal training in environmental sciences. Through these courses policymakers from the U.S. and Latin America experience the same intensity of learning through immersion that is the OTS trademark in graduate education.

Principios Ecológicos para el Desarrollo Sostenible en América Latina (OTS 97-6), a.k.a. the Latin American Decision-Makers Course, took place April 26 through May 10, 1997 with 19 participants from 10 Latin American countries. Raúl Solórzano, Director of Natural Resources, Ministry of the Environment and Energy (MINAE), and OTS Board of Visitor Carlos Manuel Rodríguez (Lara, Lopez, Matamoros, Rodríguez y Tinoco Abogados) were the coordinators who led the course to La Selva Biological Station, Santa Rosa National Park, Monteverde Biological Reserve, and Puntarenas. *Many thanks to the U.S. Fish and Wildlife Service, the course's primary sponsor, and to World Wildlife Fund-Central America, The Nature Conservancy's Costa Rica-Panama Program and the Inter-American*

Elky Griselle Alvarado Medina, Fiscal de Medio Ambiente, Ministerio Público, Honduras

Marcela Alejandra Alvarez, Min. de Asuntos Agrarios, Argentina

Daniel Benoit Marchetti, Consultoría Jurídica Ambiental, Chile

Rosa Esmeralda Blanco Matamoros, Tribunales de Justicia, CR

Freddy Cabrera Pinto, Instituto Nacional de Recursos Naturales (INRENA), Ministerio de Agricultura, Perú

Silvio César Casagrande May, Planeación Corporación para el Desarrollo Sostenible del Archipiélago (CORALINA), Colombia

Fernando Francisco Castro Carrera, Pontificia Univ. Católica del Ecuador

Zenaída Pinto Castro, Congreso de la República de Venezuela

Celso Curi Paucarmaita, Alcalde, Municipalidad Provincial de Tahuamanu, Perú

Hugo Chavarría Oviedo, Ministerio de Salud, Costa Rica

Raúl Alberto Gasteazoro Lacayo, Ministerio de Planificación y Política

Económica, Panamá

Juan Miguel Juárez Rosales, Fiscalía General de la República de El Salvador

Carlos Enrique Maradiaga Melara, Instituto Hondureño de Turismo, Honduras

Rafael A. Molina Sánchez, Ministerio del Ambiente y de los Recursos Naturales Renovables (MARNR), Venezuela

Mireya Quiel Castillo, Comisión de Población, Ambiente y Desarrollo, Asamblea Legislativa de Panamá

Mario Ruales Carranza, Secretaría General de Planificación, Ecuador

Elder Francisco Sánchez Abrego, Asistente Vicepresidente Ejecutivo

Fundación Ecologista "Héctor R. Pastor Fasquelle", Honduras

Tannia Solano Ortíz, Asamblea Legislativa de Costa Rica

Irma Suárez Gómez, Secretaría General de Planificación, Ecuador

Interdependence: Economic Development and Environmental Concerns in Tropical Countries (OTS 97-8), a.k.a. the U.S. Decision-Makers Course, took place February 16-23, 1997 with 20 participants. Participants included staff from the Executive Office of the President and from other parts of the Executive Branch, staff of Congress people, members of congressional committees, and representatives from non-governmental organizations. Dr. Jorge Jiménez (OTS), Lic. Olga Corrales (World Bank) and Dr. Alex Moad (USDA Forest Service) led the one-week course to Palo Verde Biological Station, Playa Grande, La Fortuna and La Selva Biological Station. *Many thanks to the W. Alton Jones Foundation and the National Fish and Wildlife Foundation for financial support of this course.*

Laura K. Anderson, Office U.S. Trade Representative

Alison Berkes, U.S. House Commerce Committee

Linda G. Davis, Creative Campaign Consultants

Natalie DiNicola, Office of Rep. Sherwood Boehlert

Kellie Donnelly, U.S. Fish and Wildlife Service

Dianne Dumanoski, Independent Journalist & Author

Erika Feller, Office Rep. Wayne Gilchrest

Katharine S. Fisher, Office of Rep. John Porter

Kate Grant, USAID

Anne Hambleton, Center for Sustainable Development in the Americas

Linda Lance, Council on Environmental Quality, Executive Office of the President

John Lawrence, House Committee on Resources

Kathleen McGinty, Council on Environmental Quality

Margaret Mellon, Union of Concerned Scientists, Director of Agriculture and Biotechnology Program

James Robert Minter, The Southern Company, Manager, Environmental Policy

Jeffery T. More, Water Resources & Environment Subcommittee/Office of Rep. Boehlert

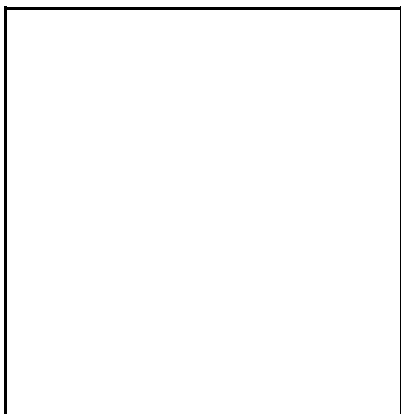
Patrick O'Keefe, Office of Rep. Dan Schaefer

Donald Pryor, Office of Science and Technology Policy (OSTP)-Executive Office of the President, Liaison from NOAA

William Smith, House Committee on Science

Ned Strong, LASPAU: Academic and Professional Programs for the Americas, American University

The OTS Environmental Education Program works with communities surrounding the biological stations to promote sustainable development activities. In fiscal year 1997 OTS' environmental education program included the following:



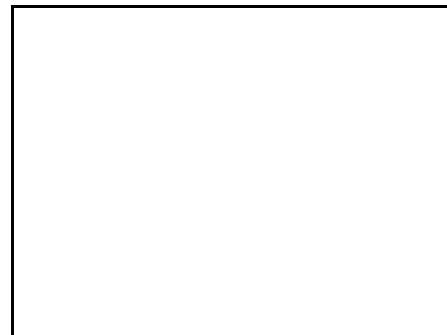
**José "Paco" Madrigal,
La Selva Naturalist,
guides a group of local
students and teachers.
The La Selva SERC
(Educational Services &
Community Relations)
staff oversaw the visits
of 4329 people in 190
educational groups.**

- ◆ *Traditional Nature Walks.* More than 100 groups of students, community organizations, and local residents visited OTS biological stations to learn about biodiversity and the significance of science in protecting tropical forests.
- ◆ *Celebration of National Tree Day.* OTS donated over 400 native tree seedlings, as well as technical expertise, to the students of the Puerto Viejo community for reforestation activities during this year's celebration of National Tree Day. The trees were selected from results of the TRIALS project, a long-term research project at La Selva that analyzes native tree species for reforesting degraded lands.
- ◆ *Mistnet Program and International Bird Festival.* OTS conducted educational activities about bird migrations and the importance of protecting their habitats. This program reached students in the schools near the La Selva Biological Station.
- ◆ *Trash Management and Recycling Activities.* These activities were implemented in communities surrounding La Selva and involved collecting waste products and finding ways to recycle or reuse them. For example, plastic products were recycled at nearby Earth University and aluminum cans were sent to the local Red Cross, which made a profit by selling the cans to a recycling company.
- ◆ *Adopt-A-Stream Project.* This project was initiated several years ago to help educate the Puerto Viejo community near La Selva about the impact that growing populations have on water supply and quality issues and their significance for human health and the local stream ecosystems. Through OTS fellowships in fiscal year 1997, Latin American and North American students worked together to continue and strengthen the project.

◆ *Teacher Workshops.* Three workshops were conducted for teachers that emphasize the potential of Las Cruces' Wilson Garden as a tool for teaching biodiversity and conservation. In addition, a self-guided, ecologically-oriented activity booklet was developed and issued to each docent visiting the station.

- ◆ *Environmental Dialogue in Rural Communities.* This on-going environmental education program consisted of two Central American training workshops in fiscal year 1997. The first was for campesino and indigenous leaders on Participatory Rural Appraisal held at La Selva. A total of twenty Central American community leaders participated in this workshop and were trained in participatory methodologies. The second workshop was conducted at Palo Verde for journalists. A total of nineteen environmental journalists from Central America took part in discussions on wildlands management and the influence of protected areas on local communities. *Funding for both of these workshops was provided by the Ford Foundation.*

**The U.S. Decision Makers Course is shown here
at a banana plantation discussing environmental quality issues.
This years' course not only provided the participants with a broader
understanding of tropical forest ecology, climate change, community
involvement in environmental issues, and sustainable development,
but also related these issues to specific legislation on Capitol Hill.**



Development

Annual Fund

In fiscal year 1997, OTS received 1,662 gifts to the Annual Fund from 1,414 donors. The total of \$167,520 to the Annual Fund was a 29% increase in income over fiscal year 1996. Of the 1,414 donors, 93% were from the U.S., 29% were natural history visitors, 18% were OTS course alumni, and 79% were repeat donors. As in the past, many donors targeted their contributions to specific program areas: \$75,182 for Las Cruces, \$10,941 for La Selva, \$2,081 for Palo Verde, \$3,375 for education, and \$75,941 for general operations.

Stone Endowment

The Donald & Beverly Stone Endowment for Graduate Research Fellowships was created in fiscal year 1997 to honor Don and Bev Stone for 20 years of service to OTS. The Andrew W. Mellon Foundation made a \$100,000 challenge grant and 283 individual donors, foundations and corporations contributed more than \$234,000 to this endowment. Major contributors to the endowment include Jean Daubenmire, the family and friends of Emily P. Foster, Standard Fruit Company, and the JiJi Foundation.

Named Fellowships

Four named fellowships were created as part of this endowment. The *Emily P. Foster Fellowship* was established by the family and friends of Emily Foster (1967-1994). Emily worked in Costa Rica for a number of years and treasured the beauty and wonder of Costa Rican biodiversity. The *William L. Brown Fellowship* was initiated by the family and friends of William Brown (1922-1997), a distinguished entomologist at Cornell University, ant systematist and evolutionary biologist, who conducted much of his research at the La Selva Biological Station. The *Rexford Daubenmire Fellowship* was created in memory of Rexford Daubenmire (1909-1995). Dr. Rexford Daubenmire was a widely-recognized expert in plant ecology and professor of botany at the University of Idaho and Washington State University. Dr. and Mrs. Daubenmire were also major donors to the Palo Verde Biological Station. The *Dole Foods Fellowship* was funded by Dole Foods Company in Costa Rica. Dole Foods produces more than 150 products, including bananas and pineapples, which are marketed worldwide. The first research awards from these fellowships will be announced in fiscal year 1998.

Contracts and Grants

In the 1997 fiscal year, the following grants were awarded to OTS:

| | | |
|--|----|-----------|
| National Science Foundation (over 5 years) | \$ | 2,675,000 |
| National Science Foundation (over 3 years) | | 340,004 |
| United States Fish and Wildlife Service | | 25,000 |
| National Fish and Wildlife Foundation | | 15,000 |
| British Embassy in Costa Rica | | 30,000 |
| Chiquita Brands Corporation | | 8,000 |
| Conservation International | | 12,500 |
| Faucett Family Trust | | 40,000 |
| Glaxo-Wellcome Central America | | 33,334 |
| General Service Foundation (over 2 years) | | 50,000 |
| Grand Circle Foundation | | 15,600 |
| William and Flora Hewlett Foundation | | 150,000 |
| W. Alton Jones Foundation | | 30,000 |
| Andrew W. Mellon Foundation | | 100,000 |
| Andrew W. Mellon Foundation | | 175,000 |
| Microsoft Corporation | | 50,000 |
| Storer Foundation | | 10,000 |
| Stanley Smith Horticultural Trust | | 20,000 |
| Tinker Foundation | | 43,000 |
| Total | \$ | 3,832,438 |

Donors

OTS would like to thank the following individuals, foundations, corporations and government agencies who contributed to the organization during the 1997 fiscal year. This support was instrumental to our on-going operations, education programs, three field stations and special endowment campaigns.

We most gratefully thank you.

Major Sponsors / Super Campeón (\$10,000 +)

Michelle L. Cloud†
Jean Daubenmire
in memory of Rexford Daubenmire
Eli Lilly & Company Foundation

Russell B. Faucett*†
Family & Friends of Emily P. Foster
in memory of Emily P. Foster
Mr. & Mrs. Benjamin Hammett

Andrew W. Mellon Foundation
Microsoft Corporation
Standard Fruit Company

Sponsors / Gran Campeón (\$5,000 +)

British Embassy

Gilbert & Emily Daniels*
JiJi Foundation
Joan Slatkin Barton†

Stone Container Corporation
Donald & Beverly Stone*
Swarovski Optic

Zeneca Plant Science

Champions / Campeón (\$1,000 +)

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Atlantic Richfield Company
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in honor of Murray Slatkin
Kids for Saving Earth
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Peter & Martha Klopfer
Irving W. Knobloch
Leonard M. Kurz
Bert & Diane Langdon
Jean H. Langenheim
Janet Lanza*
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Roger Perry†
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in memory of Dr. Stephen Preston
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Richard Stoltenberg
Stephanie Stone de Feoli†
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Frederic B. Viaux
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Arthur & Frances Welden
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G. Bruce Williamson*†
Don and Kathleen Wilson*†
Edward O. Wilson
in memory of William L. Brown
York Winter*
Robert W. Winters
Frank G. Witebsky

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(\$500+)**

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Paige Winebarger
W. Scott Woods
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(\$250+)**

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Deborah McMillan
Rogers McVaugh
Brent D. Opell
Pepsi Cola International
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Richard & Norma White†
J. Timothy Wootton & Cathy Pfister*†
George A. Zentmyer
Catherine Ziegler

Notes:

* OTS course alum
† OTS board member

This list constitutes major donors who gave in Fiscal Year 1997: July 1, 1996 to June 30, 1997.

Despite every effort to avoid them, errors may occur in producing this annual report. If your name has been accidentally omitted or misprinted, please notify us and accept our apologies.



*There is a pleasure in the pathless woods,
There is a rapture on the lonely shore,
There is a society, where none intrudes,
by the deep sea, and music in its roar:
I love not Man the less, but Nature more.*

Lord Byron

Financial Highlights

Fiscal year 1997 was a very successful year for the organization. OTS experienced increases across all of its unrestricted and restricted funds. Figures show a growth in total net worth of \$536,451. This is due primarily to two factors - - a build-up in the organization's endowment funds (+\$692,511) and an increase in the capitalization of expenses at Las Cruces and Palo Verde for buildings and infrastructure additions (+\$233,317).

The major changes in OTS revenues from the previous year included \$1.1 million from government sources (compared to \$1.7 million from government sources in fiscal year 96) and \$1.9 million from foundations and individual contributions (compared to \$1.4 million from these sources in fiscal year 96). In addition, researcher and group services showed an increase from just under \$369,000 in fiscal year 96 to more than \$650,000 in fiscal year 97.

Major changes in OTS expenses from the previous year included an increase in education program expenses from just over \$790,000 in fiscal year 96 to more than \$1.2 million in fiscal year 97, which can be attributed in part to the start-up of the new Undergraduate Semester Abroad Program. Fund raising and marketing expenses also saw an increase in fiscal year 97 due to the first full year of new marketing and fund raising positions.

Facilitated research expenses fell from more than \$980,000 in fiscal year 96 to just over \$464,000 in fiscal year 97 and can be attributed to the conclusion of several large research projects that were funded through OTS.

The following financial statements contain two columns of figures - - one for OTS and a second for ESINTRO, the for-profit Costa Rican corporation created in the fall of 1995 to handle OTS sales and related taxable items.

Support and Revenue

Expenses

Audited Financial Statements

Independent Auditors' Report

The Board of Directors
Organization for Tropical Studies, Inc.:

We have audited the accompanying consolidated statement of financial position of the Organization for Tropical Studies, Inc. and subsidiary as of June 30, 1997, and the related consolidated statements of activities and cash flows for the year then ended. These consolidated financial statements are the responsibility of the Organization's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audit.

We conducted our audit in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Organization for Tropical Studies, Inc. and subsidiary as of June 30, 1997, and the changes in their net assets and their cash flows for the year then ended in conformity with generally accepted accounting principles.

Our audit was made for the purpose of forming an opinion on the consolidated financial statements taken as a whole. The supplementary information included in the consolidated statement of financial position and the related consolidated statements of activities and cash flows related to the Organization for Tropical Studies, Inc. and the Estudios E Investigaciones Tropicales S.A. (ESINTRO), collectively "the Organization," is presented for purposes of additional analysis of the consolidated financial statements rather than to present the financial position, changes in net assets and cash flows of the Organization.

October 13, 1997

ORGANIZATION FOR TROPICAL STUDIES, INC.
AND SUBSIDIARY

Notes to Consolidated Financial Statements

1. Organization

The Organization for Tropical Studies, Inc. (the Organization) is chartered as a nonprofit corporation under the laws of the State of Florida for the purpose of furthering education and research in tropical sciences, and is supported by a consortium of institutions of higher education located in North and Central America. The Organization maintains its general office in Durham, North Carolina on the campus of Duke University, an administrative office in San Jose, Costa Rica, and three field stations in Costa Rica (La Selva, Las Cruces and Palo Verde) for instructional and research purposes.

Included in the consolidated financial statements of the Organization is Estudios E Investigaciones Tropicales S.A. (ESINTRO), a for-profit subsidiary of the Organization. ESINTRO was incorporated for sales made to field station visitors of clothing, beverages, and other miscellaneous items. The Organization is the sole stockholder of ESINTRO.

A summary of the financial data applicable to the operations in Costa Rica compared to total operations as included in the consolidated financial statements as of and for the year ended June 30, 1997 is as follows:

| | <u>Costa Rican</u> <u>operations</u> | <u>Total</u> <u>operations</u> |
|-------------------|---|-----------------------------------|
| Total assets | \$ 2,986,966 | 6,705,106 |
| Total liabilities | 52,171 | 1,642,578 |
| Total revenue | 3,909,628 | 5,502,936 |
| Total expenses | 4,291,834 | 4,996,485 |

Funding of the Organization is provided principally by dues from the member institutions, field stations and vehicle rental charges, tuition and fee charges for courses offered by the Organization, grants from the National Science Foundation and various private foundations, and private gifts.

The Organization is exempt from Federal income taxes under Section 501(c)(3) of the Internal Revenue Code.

2. Summary of Significant Accounting Policies

The consolidated financial statements of the Organization have been prepared on the accrual basis of accounting. The significant accounting policies followed are described below to enhance the usefulness of the consolidated financial statements to the reader.

Net assets and revenues, expenses, gains and losses are classified based on the existence or absence of donor-imposed restrictions. Accordingly, net assets of the Organization are classified and reported as follows:

Permanently restricted – Net assets subject to donor-imposed stipulations that they be maintained permanently by the Organization. Generally, the donors of these assets permit the Organization to use all or part of the income earned on related investments for general or specific purposes.

Temporarily restricted – Net assets subject to donor-imposed stipulations that may or will be met either by actions of the Organization and/or the passage of time.

Unrestricted – Net assets that are not subject to donor-imposed stipulations.

Revenues from sources other than contributions are reported as increases in unrestricted net assets. Contributions are reported as increases in the appropriate category of net assets, except that contributions which impose restrictions that are met in the same fiscal year they are received are included in unrestricted revenues. Expenses are reported as decreases in unrestricted net assets. Gains and losses on investments are reported as increases or decreases in unrestricted net assets unless their use is restricted by explicit donor stipulations or by law. Expirations of temporary restrictions recognized on net assets (i.e., the donor-stipulated purpose has been fulfilled and/or the stipulated time period has elapsed) are reported as reclassifications from temporarily restricted net assets to unrestricted net assets. Temporary restrictions on gifts to acquire long-lived assets are considered met in the period in which the assets are acquired or placed in service.

Contributions, including unconditional promises to give, are recognized as revenues in the period received. Contributions received for capital projects or perpetual or term endowment funds and contributions under split-interest agreements or perpetual trusts are reported as nonoperating revenues. All other contributions are reported as operating revenues. Conditional promises to give are not recognized until the conditions on which they depend are substantially met. Contributions of assets other than cash are recorded at their estimated fair value at the date of gift. Contributions to be received after one year are discounted at a rate commensurate with the risk involved. Amortization of the discount is recorded as additional contribution revenue in accordance with donor-imposed restrictions, if any, on the contributions. Allowance is made for uncollectible contributions based upon management's judgment and analysis of the creditworthiness of the donors, past collection experience and other relevant factors.

Principles of Consolidation - All significant intercompany balances and transactions have been eliminated in consolidation.

Cash and Cash Equivalents

Except for \$253,845 in bank accounts in Costa Rica and temporary investments of \$335,476, cash and certain investments are managed by Duke University. Monies managed by Duke University are invested in the University's "Institutional Reinvestment Account" (IRA). The rate earned on

monies invested in the IRA is based on 100% of the 30-day U.S. Treasury Bill rate, regardless of the performance of the IRA's assets. The Organization considers all investments with original maturities of less than 90 days to be cash equivalents.

Land, Buildings and Equipment and Depreciation

Land, buildings and equipment are stated at cost at date of acquisition or fair value at date of donation in the case of gifts. Depreciation of buildings and equipment is provided over the estimated useful lives of the respective assets on the straight-line basis.

Deferred Revenues

Deferred revenues represent exchange transaction proceeds received by the Organization but not yet earned. Unrestricted revenues are recognized and deemed earned in the period in which the Organization has incurred the expenditures in compliance with the specific restrictions.

Investments

Investments in equity securities and debt securities are reported at fair value with unrealized gains and losses reported in the statement of activities.

Translation of Foreign Currencies

Assets and liabilities denominated in Costa Rican colones (all "monetary items") are translated into U.S. dollars at the rate prevailing at the balance sheet date of 232.50 colones to the U.S. dollar. Transactions in colones have been translated into U.S. dollars at rates prevailing at the transaction dates which ranged from 207.20 to 232.50 colones to the U.S. dollar during fiscal 1997. The translation of foreign currencies resulted in a loss of \$3,197 for the fiscal year ended June 30, 1997 which is included in the accompanying consolidated statement of activities.

Use of Estimates

The preparation of consolidated financial statements in conformity with generally accepted accounting principles requires management to make estimates and judgments that affect the reported amounts of assets and liabilities and disclosures of contingencies at the date of the consolidated financial statements and revenues and expenses recognized during the reporting period. Actual results could differ from those estimates.

Comparative Amounts

Comparative amounts for 1996 have been presented in the accompanying consolidated financial statements in order to provide an understanding of changes in the Organization's financial position and operations. Such information does not include sufficient detail with respect to the consolidated statement of activities and footnote disclosures to constitute a presentation in conformity with generally accepted accounting principles. Accordingly, such information should be read in conjunction with the Organization's consolidated financial statements for the year ended June 30, 1996, from which the comparative information was derived.

3. Investments

Temporary investments, which are included in cash and cash equivalents, at June 30, 1997 include the following:

| | |
|---|-------------------|
| Corporate bond | \$ 90,000 |
| Money market account, earning interest at 4.27% | <u>245,476</u> |
| | <u>\$ 335,476</u> |

Investments

Investments at June 30, 1997 consist of the following:

| | |
|------------------|---------------------|
| Bonds: | |
| U. S. Government | \$ 244,192 |
| Corporate | 934,000 |
| Mutual Funds: | |
| Common stocks | 569,824 |
| Corporate bonds | <u>522,870</u> |
| | <u>\$ 2,270,886</u> |

4. Land, Buildings and Equipment

Land, buildings and equipment is summarized at June 30, 1997 as follows:

| | |
|----------------------------|------------|
| Land | \$ 673,585 |
| Land improvements | 424,020 |
| Buildings and improvements | 2,233,168 |
| Motor vehicles | 325,645 |

| | |
|-------------------------------|---------------------|
| Equipment | 1,172,813 |
| Furniture and furnishings | 13,665 |
| Construction in process | <u>19,574</u> |
| | 4,862,470 |
| Less accumulated depreciation | <u>(2,100,588)</u> |
| | \$ <u>2,761,882</u> |

5. Changes in Deferred Revenues

A summary of exchange transactions in deferred revenues for the year ended June 30, 1997 follows:

| | |
|--|---------------------|
| Balance at beginning of year | \$ 1,488,877 |
| Additions: | |
| Grant proceeds | 694,333 |
| Investment income | <u>55,016</u> |
| Total additions | 749,349 |
| Deduction - amounts recognized as revenue and expended | <u>(915,204)</u> |
| Balance at end of year | \$ <u>1,323,022</u> |

6. Net Assets

The Organization has designated certain net assets classified as unrestricted for specific purposes or uses. As a result, substantially all of the net assets classified on the consolidated statement of financial position as unrestricted net assets at June 30, 1997 have been invested in property and equipment or are designated for specific uses.

Unrestricted net assets consist of the following at June 30, 1997:

| | |
|---|---------------------|
| Net investment in property and equipment | \$ 2,761,882 |
| Funds designated by governing board: | |
| Estimated severance pay | 213,155 |
| Asset renewal | 477,510 |
| Funds designated for organizational support | 231,295 |
| Unrestricted and undesignated | <u>374,839</u> |
| | \$ <u>4,058,681</u> |

Temporarily restricted net assets consist of the following at June 30, 1997:

| | |
|--|-------------------|
| Term endowment funds to be used for fellowships | \$ 113,211 |
| Contributions for station improvement, land acquisition and educational programs | <u>104,457</u> |
| | \$ <u>217,668</u> |

Net assets were released from donor restrictions by incurring expenses satisfying the restricted purposes or by the passage of time. Purpose restrictions were accomplished by incurring \$568,073 in expenses for instruction, research, scholarships and operations.

Permanently restricted net assets at June 30, 1997 consist of perpetual endowment funds. The income from these investments in perpetuity is spendable for instruction, scholarships and operations.

7. Functional Allocation of Expenses

The costs of providing the various programs and other activities of the Organization have been summarized on a functional basis in the statement of activities. Accordingly, certain costs have been allocated among the programs and supporting services benefited.

8. Relationship with Duke University and Grantors

The Organization has an agreement with Duke University whereby the University acts as fiscal agent for the Organization. As a result of this agreement, federal and state grants and contracts are made to the University on the Organization's behalf. Private foundation grants and contracts are awarded to the Organization and managed through Duke University. Total amounts reported as revenues and expenses under grants and contracts to the University amounted to \$2,043,600 in fiscal year 1997. Accounts receivable at June 30, 1997 include \$26,597 due from Duke University for amounts expended for grant purposes but not yet reimbursed.

The Organization is provided office space for its North American office by Duke University. During 1997, the University also provided administrative services to the Organization for which the University received a net indirect overhead allocation from the Organization which amounted to approximately \$67,850.

At June 30, 1997, the Organization had the following unexpired grants and contracts:

| <u>Grantor</u> | <u>Purpose</u> | <u>Total award</u> | <u>Total unexpended</u> | <u>Expiration</u> |
|---------------------------------|---|--------------------|-------------------------|-------------------|
| U.S. Government Agencies | | | | |
| NSF | Research data management & connectivity for neotropical field | \$ 170,000 | 130,749 | July 1998 |

| | | | | |
|-----------------------------------|--|---------------------|------------------|----------------|
| NSF | Arthropod diversity at La Selva-Phase II | 365,000 | 1,386 | August 1997 |
| NSF | Administration, maintenance and development of the La Selva Station | 550,000 | 275,000 | January 1998 |
| USDA Forest Service | Soil trace gas emissions | 277,551 | (4,352) | September 1997 |
| <i>Non-Government Agencies</i> | | | | |
| University of Connecticut | Woody species regeneration at La Selva | 143,400 | 143,319 | June 2000 |
| General Service Foundation | Latin American education program | 50,000 | 43,062 | December 1998 |
| Glaxo Holdings-Puerto-Rico | Support for Puerto Rican tropical biology students | 33,333 | 17,645 | No exp. date |
| Grand Circle Foundation | Visitors' gazebo at La Selva Station | 15,600 | 13,622 | December 1997 |
| A.W. Mellon Foundation | Training and research in tropical ecology (1993-1995) | 850,000 | 23,042 | No exp. date |
| A.W. Mellon Foundation | Training and research in tropical ecology (1996-1998) | 850,000 | 408,496 | December 1998 |
| A.W. Mellon Foundation | Clark's ecological research | 150,000 | 1,157 | No exp. date |
| A.W. Mellon Foundation | Clark's ecological research | 200,000 | 201,505 | June 1998 |
| A.W. Mellon Foundation | La Selva-STRI collaboration | 175,000 | 114,824 | June 1998 |
| A.W. Mellon Foundation | Planning for an undergraduate program | 250,000 | 135,006 | No exp. date |
| A.W. Mellon Foundation | Start-up for an undergraduate program | 175,000 | 157,533 | September 1999 |
| George B. Storer | Bird monitoring station at La Selva Station | 10,000 | 5,626 | December 1997 |
| Stanley Smith Horticultural Trust | Curatorial fellowships, internships and documentation of plant records | 40,000 | 12,276 | No exp. date |
| Stanley Smith Horticultural Trust | Curatorial fellowships, internships and documentation of plant records | 20,000 | 18,000 | No exp. date |
| Tinker Foundation | Corporate decision-making in Central America | 43,000 | 32,640 | September 1997 |
| Willowwood Foundation | Las Cruces plant labeling equipment | <u>6,500</u> | <u>3,152</u> | No exp. date |
| | | \$ <u>4,374,384</u> | <u>1,733,688</u> | |

The Organization has received written commitments for the following new grants and additional funding for existing grants subsequent to June 30, 1997:

| <u>Grantor</u> | <u>Purpose</u> | <u>Commitment amount</u> | <u>Expiration</u> |
|--------------------------------------|---|--------------------------|-------------------|
| NSF | Administration, maintenance and development of La Selva Station | \$ 2,125,000 | January 2002 |
| NSF | Arthropod diversity at La Selva - Phase III | 340,004 | July 31, 2000 |
| USDA Forest Service | Soil trace gas emissions | 8,563 | September 1997 |
| Tinker | Corporate decision-making in Central America | 36,000 | December 1997 |
| Raytheon Systems Development Company | U.S. Army Lidar terrain mapping project at La Selva Station | <u>56,481</u> | September 1997 |
| | | \$ <u>2,566,048</u> | |

9. Commitments and Contingencies

Under Costa Rican law, an employee can receive as severance pay the equivalent of one month's salary for every year of employment, up to a maximum of eight years, if it is determined by the courts that his employment was terminated without just cause, plus one additional month's salary. If all employees of the Organization were terminated at June 30, 1997 without just cause, the liability for severance pay would be \$213,155. The Board of Directors has designated a portion of the unrestricted net assets for the estimated contingent severance pay liability. Severance payments will be made from the designated net assets, and an amount equal to each year's increase or decrease in estimated liability will be transferred to or from the designated net assets.

The Organization is involved in claims and legal actions arising in the ordinary course of business. In the opinion of management, the ultimate disposition of these matters will not have a material adverse effect on the Organization's financial position, results of operations or liquidity.

10. Benefit Plans

Duke University employees assigned to the Organization participate in either the University's contributory defined contribution pension plan or the University's noncontributory defined benefit pension plan. The Organization adopted Statement of Financial Accounting Standards No. 106, *Employers' Accounting for Postretirement Benefits Other Than Pensions* (SFAS No. 106), as of July 1, 1995. The cumulative effect of adopting SFAS No. 106 on net assets previously reported as of June 30, 1995 was a reduction of approximately \$75,000. Net pension expense, which is funded annually, amounted to \$44,400 for the year ended June 30, 1997.

The net periodic postretirement benefit cost amounted to \$18,682 for the year ended June 30, 1997 and the associated liability was \$101,340 as of June 30, 1997.

It is not possible to present separately the actuarial present value of benefit obligations or the net assets available for benefits under either the contributory defined contribution or the noncontributory defined benefit pension plans because no determination has been made of the allocation of such amounts between Duke University and the Organization. Furthermore, it is not possible to present separately the actuarially determined accumulated benefit obligation for the Organization for the postretirement benefit plan because no determination has been made of the allocation of such amounts between Duke University and the Organization.

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