

SEMESTER & SUMMER PROGRAMS



Environmental Field Studies Abroad

AUSTRALIA
BHUTAN
CAMBODIA & VIETNAM
COSTA RICA
KENYA
PANAMA
PERU
TANZANIA
TURKS & CAICOS



Overview

A Legacy of Environmental Leadership

In the early 1980s, some of our nation’s top colleges and universities introduced environmental studies into their curricula, pioneering the notion that effective stewardship of our planet and its finite resources must include not only scientists, but also informed and concerned individuals from all walks of life, and in all professions.

In the summer of 1981, we sent our first group of 75 students into the field. Building on more than three decades of international education and research, The School for Field Studies (SFS) is widely known as the premier environmental study abroad program. At our global network of field stations, students have learned how to collaborate with local community partners and engage in scientific inquiry to address critical environmental problems and create long-term solutions.

Who Studies With SFS?

We encourage students from all disciplines to join our programs around the world—biology, environmental science, history, anthropology, political science, art, drama, education, economics, pre-vet and pre-med, engineering, business, communications, and many others. We welcome a diverse student body and create an atmosphere that is open to different learning styles and perspectives while encouraging students to look beyond the boundaries of their chosen disciplines.

Semester Program Structure

Semester programs run for approximately three months, including a midterm break in most programs. We compress a 16-week semester into 14 weeks, so be prepared for a very intense, but rewarding learning experience! Students enroll in four courses at four credits each—three topical courses and a Directed Research course—and in some programs an additional two-credit culture and language course. Academic activities occur six days a week with at least part of one weekday devoted to community engagement. Students learn through classroom lectures, field lectures and exercises, group projects, and other activities.

Objectives of the SFS Academic Program

Our semester programs help students identify and analyze local environmental issues, explore options for solving problems, and understand the decision-making process for taking action. In the three topical courses, students prepare for the Directed Research projects in the field by learning the conceptual foundations and building technical and analytical skills essential for field research. Research questions are designed in partnership with local stakeholders and are defined in each Center’s Five-Year Research Plan.

Summer Programs

Each of our summer programs consists of a single interdisciplinary course that combines lectures with field exercises, expeditions, and short research projects. The curriculum focuses on issues related to how local communities engage in natural resource management decision-making, and in Kenya with a focus on public health. Students gain four credits in four intense weeks of study, except in our Bhutan course, which is six weeks and carries six credits. Some programs can be taken back-to-back, offering eight credits in eight weeks.

Emphasis on Field Skills

You will learn a suite of skills and analytical techniques used in natural and social science field research. Depending on which program you choose, you will be trained in field methods as varied as species identification, animal behavior observations, habitat assessment and mapping, water quality assessment, ecological restoration techniques, and animal and plant population sampling techniques. You will use quantitative and qualitative social science field research methods, including structured questionnaires, informal interviews, and participant observation. You will also use descriptive and inferential statistics in data analysis and hypothesis testing to answer research questions.

Language Preparation

All SFS courses are taught in English. Where English is not widely spoken, however, your interaction with the local community will be greatly enhanced if you have local language conversation skills. Mekong region, Costa Rica, Peru, Panama, and East Africa semester students will receive two additional credits for our culture and language courses. For the Costa Rica semester program only, you will need at least three years of high school Spanish with high academic achievement or at least one semester of college-level Spanish (or the equivalent test scores).

Safety

The health and safety of our students is of utmost importance to SFS. Our dedicated safety and student life team leads a comprehensive global risk management system, which incorporates the Forum on Education Abroad safety standards and touches every element of an SFS program.

SFS runs structured programs, coordinating itineraries and logistics to protect and enhance the student experience without sanitizing it. Each program is staffed with a full-time residential Student Affairs Manager (SAM) who coordinates logistics, programming, community outreach, student advising and counseling, and on-site risk management, and serves as the primary medical responder. Staff members at each SFS Center are trained in wilderness medicine, as well as the emergency protocols that are relevant to that location. Educating students on accurate expectations, resources, and preventive care is an integral component of our approach. Pre-departure medical screening and student orientation about health and safety procedures upon arrival in the country encourage a positive and successful abroad experience.

Many of our field staff are in-country nationals, providing students with a rich cultural context, as well as helping us to assess risk quickly. We also seek input from a variety of external resources including the U.S. State Department and Overseas Security Advisory Council.

All of these elements enable us to adapt to dynamic changes of the natural and political world to both prevent and respond to risk quickly and soundly. For a more detailed description of our safety model and for contact information, please visit www.fieldstudies.org/safety.



The world needs environmental leaders. Will you be one of them?

Each one of us has a valuable role to play in helping to protect our environment for the present and future of plant, animal, and human life on Earth. We continue to face unprecedented, complex global challenges including climate change, population growth, and biodiversity loss. The next generation of environmental leaders will be charged with developing cleaner sources of energy, safer supplies of food and water, and more equitable and sustainable social, political, and economic institutions.

To meet these challenges, we need “an educated populace and a diverse and competent work force prepared for the rapidly changing world of the 21st century,” according to the National Council on Science and the Environment. Yet, “our scientific knowledge and public and professional understanding of the environment is in many ways inadequate to these challenges. Research and education must be critical elements of a national strategy for environmental protection, a sustainable economy, and a secure society.” The School for Field Studies (SFS), founded more than 30 years ago, addresses this need—giving students hands-on field experience, practical and transferable research skills, and cross-cultural awareness.

SFS students advance their education in an international setting with an interdisciplinary curriculum centered on local environmental issues that are related to sustainable development and biodiversity conservation. Our programs offer a compelling opportunity to engage in field research projects that are designed in collaboration with local stakeholders. By conducting applied, use-inspired research, students learn through experience and contribute to a growing body of knowledge about local issues related to natural resource management.

At SFS, you develop important, transferable skills in research, science communication, teamwork, community living, leadership, and critical thinking that will make you a strong candidate for graduate school and lay the groundwork for almost any professional career, particularly those in conservation, environmental science, and sustainable development. No matter which SFS program you choose, you will acquire a unique perspective on what it really takes to develop long-term solutions to environmental issues.

Our alumni frequently tell us that SFS ignited a passion for their careers. To date, more than 15,000 students have participated in SFS programs, and among these we count leaders at environmental organizations including the World Wildlife Fund, the International Fund for Animal Welfare, and The Nature Conservancy. We also have alumni making significant contributions at multinational corporations including Chevron, Caterpillar, and Alcoa in carbon management, environmental health, and environmental protection.

“I plan to change the world. Thanks for the jump start.” These words, written by an SFS student, illustrate how The School for Field Studies transforms students and shapes their futures. Our programs will challenge and inspire you, and you will leave with valuable skills that will enhance your academic and professional careers. Most importantly, after SFS, you will never view the world—or yourself—the same way again.

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Admissions Requirements and Instructions

APPLY ONLINE NOW

When to Apply

The School for Field Studies (SFS) reviews applications on a rolling basis, and students may apply up to a year in advance. While there is no admissions deadline for most programs, students should apply early to ensure admission to their program of choice and check with their home institution regarding school-specific study abroad application deadlines.

Before You Apply

Due to the field-based nature of our programs, the academic experience will likely be very different from your home school and traditional study abroad programs. Before applying, be sure to read about the SFS program model and learning objectives, and study the documents related to your program of interest. Please contact the SFS Admissions Office with any questions regarding our programs.

Requirements and Policies

You must be at least 18 years of age to participate in an SFS program. You must be in good academic standing and have completed at least one college-level ecology or biology course to be eligible for a semester program. An environmental studies course is also an acceptable prerequisite for the Costa Rica and Panama programs. Applicants for the Costa Rica program must have taken three years of high school Spanish with high achievement or have taken one college-level course in Spanish prior to participation.

Students are encouraged to have taken coursework in statistics, anthropology, international development, and economics. We suggest that students complete one semester of college prior to the start of the program, but gap-year students are welcome to apply, provided they fulfill the prerequisites. For more details, please contact the SFS Admissions Office.

Academic Credit

SFS participants receive academic credit in one of two ways. Students from SFS' Affiliate Institutions usually receive credit directly from their home schools. Students from non-affiliate schools are registered at and receive transcripts from Boston University, which accredits SFS programs.

SFS courses are approved and assigned course numbers by Boston University. Our semester programs in Australia and Turks & Caicos include four courses and carry a total of 16 semester-hour credits in biology or environmental studies. Our semester programs in the Mekong region, Peru, Costa Rica, Panama, and East Africa carry 18 semester-hour credits in biology, environmental studies, and language. Summer courses carry four semester-hour credits in environmental studies or public health, except for our Bhutan program, which offers six credits. Participants receive an official transcript from Boston University approximately eight weeks (four weeks for direct credit Affiliates) after the conclusion of the program.

Students come from more than 300 colleges to attend SFS programs each year and most are able to transfer credit for their participation. The final decision regarding credit and grade transfer rests with your home institution. Check with your academic or study abroad advisor and registrar's office before applying to learn how your SFS coursework will be applicable for credit in your degree program. If you have questions regarding credit transfer, please contact the SFS Admissions Office.

The SFS Affiliate Program

Students from Affiliate institutions receive priority admissions and financial aid based on the availability of space and funds. Affiliate institutions typically provide direct academic credit for SFS participation and have pre-approved our courses. Each Affiliate institution has at least one SFS representative who is available to provide on-campus advising on our programs. Please visit www.fieldstudies.org/advisors/affiliates for an up-to-date listing of Affiliate representatives at your school.

How to Apply

1. Review program information and prerequisites located in the catalog or at www.fieldstudies.org. Please call 800-989-4418 or email us at admissions@fieldstudies.org if you need help deciding which program is right for you.
2. Collect the necessary application materials:
 - **SFS APPLICATION FOR ADMISSION.** You may apply online or download the application PDF from our website.
 - **PARTICIPATION APPROVAL FORM** to be completed by your study abroad advisor. If you attend one of SFS' Affiliate Institutions, the form must be completed by a designated Affiliate representative.
 - **NON-REFUNDABLE APPLICATION FEE OF \$50.** Credit card or check made payable to The School for Field Studies.
 - **CURRENT OFFICIAL TRANSCRIPTS** from all schools attended. It is not necessary for college students to submit high school transcripts after a full academic year of college coursework has been completed.
 - **SFS ACADEMIC REFERENCE FORM** to be completed by a teacher, professor, or academic advisor who is well acquainted with your current academic performance.
 - **SFS CHARACTER REFERENCE FORM** to be completed by someone who knows you well, such as another academic source, a job supervisor, volunteer advisor, athletic coach, etc. It is not appropriate for this reference to be completed by a relative, peer, or family friend.

We encourage you to apply online. If you do submit print application materials, however, please send them to:

The School for Field Studies
100 Cummings Center, Suite 534-G
Beverly, MA 01915-6239

After You Apply

Once we receive your application, we will contact you about missing materials. If your application is incomplete, it is your responsibility to send any remaining materials. We will not begin the application review process until all materials are received. To expedite the completion of your application, we suggest that you submit all of your application materials together. Once your application is complete, we will contact qualified candidates to schedule a short phone interview.

Admissions decisions are generally available within two to four weeks of completing your application. You should apply early to allow sufficient time for your application to be processed. If you would like to check the status of your application materials received by SFS, please log in to your SFS account to view your Admissions Checklist.

Please note that final acceptance to all programs is contingent upon medical approval.

Medical Approval

SFS requires that all students submit a medical review form and a physical examination and authorization form signed by a medical professional within 10 business days of acceptance. To ensure that you will be able to meet the physical challenges of SFS programs without undue risk to yourself or others, the SFS Safety and Student Life Manager reviews all medical forms. Your final acceptance and ability to participate on SFS programs is contingent upon receiving medical approval and you may be disqualified from participating on medical grounds. Students with late medical forms may forfeit their space on a program. Additionally, you will not be permitted to join an SFS program without proof of current medical insurance.

Disability Information

SFS welcomes students with disabilities. If you are requesting accommodations, however, you must notify SFS in writing within 10 business days of acceptance. For accommodations of physical disabilities, please contact the SFS Safety and Student Life Manager. For learning accommodations, please contact the SFS Office of Academic Affairs. Please be aware that the level of accessibility, services, and accommodations to which you may have access at your home campus may not be available overseas. Please call SFS for further assistance.

Dietary Restrictions

Students with medically-related dietary restrictions must contact the SFS Safety and Student Life Manager within 10 business days of acceptance and document the restrictions on the medical review form. Students with special dietary preferences (vegetarian, vegan, kosher, etc.) should discuss these with their Admissions Counselor during the interview process. SFS makes every effort to accommodate dietary needs within the limitations of local supply, availability, cultural practice, and cost. All dietary restrictions require discussion and approval prior to arrival.

Non-discrimination Policy

SFS is an equal opportunity institution. SFS admits students of any sex, religion, race, color, national or ethnic origin, sexual orientation, or economic status to all the rights, privileges, programs, and activities generally accorded or made available to students of SFS. SFS does not discriminate on the basis of sex, religion, race, color, sexual orientation, national or ethnic origin, physical or mental disability, or other protected status in the administration of its educational policies, admissions policies, scholarship loan programs, and other School-administered programs.



Tuition, Financial Aid, and Scholarships

SEMESTER COSTS FALL 2013 – SPRING 2014

Program	Tuition	Room & Board	Total Program Cost
Kenya & Tanzania	\$14,975	\$4,715	\$19,690
Australia	\$14,975	\$4,805	\$19,780
Turks & Caicos Islands	\$14,975	\$4,505	\$19,480
Costa Rica	\$14,975	\$4,505	\$19,480
Panama	\$14,975	\$4,250	\$19,225

Fall 2014 program costs will be announced in March 2014 and posted to the SFS website.

SFS refund policies are available on the website. For complete course budgets, including out-of-pocket expenses, please visit www.fieldstudies.org.

Financial Aid

A key component of our mission is to ensure that as many interested and eligible students as possible are able to participate in our programs. Since our founding in 1980, more than 15,000 students have participated in our programs across the globe. **The School for Field Studies awards more than \$330,000 in need-based scholarships each year with roughly one-third of SFS students receiving some type of aid.** We strive to make SFS accessible by offering the following scholarship and loan options to summer and semester students.

SCHOLARSHIPS*

SFS General Scholarship Fund

All SFS applicants are eligible. Awards are determined on the basis of need. SFS awards as much as \$8,000 in scholarship funds for semester programs, \$2,500 for individual summer courses, and up to \$5,000 for sequential summer courses and the six-week Bhutan program.

Andreas Family Foundation Scholarship

These funds are designated for students at public institutions in the United States. The awards are for semester programs only.

ENDOWED SCHOLARSHIPS

Stephen F. Lee Memorial Scholarship

Established in memory of Stephen F. Lee, an SFS alumnus (*Florida '86*), intern (*Hawaii '87, '88*), and faculty member (*Hawaii '89*), this scholarship gives preference to applicants seeking a marine program.

Heather Jo Leibowitz Memorial Scholarship

Honoring the memory of Heather Jo (*Kenya '04*), this scholarship is awarded on the basis of need to applicants to the East Africa program. Preference is given to those who have a commitment, as Heather Jo did, to making a difference in the lives of resource-dependent communities in East Africa.

McKee Scholarship

This endowed scholarship was made possible by the generosity of Charles D. McKee, a member of the SFS Board of Trustees and father of two SFS alumni. It is awarded on an annual basis to a financially deserving student.

SUMMER COSTS 2014

Program	Tuition	Room & Board	Total Program Cost
Australia & New Zealand	\$4,070	\$2,155	\$6,225
Australia	\$4,070	\$1,430	\$5,500
Costa Rica	\$4,070	\$1,330	\$5,400
Turks & Caicos Islands	\$4,070	\$1,330	\$5,400
Kenya Public Health	\$4,070	\$1,330	\$5,400
Tanzania	\$4,070	\$1,920	\$5,990
Bhutan	\$6,025	\$3,400	\$9,425

Tozer Scholarship

This endowed scholarship was made possible through the generosity of former Trustee W. James Tozer, Jr. and his wife, Elizabeth. The Tozer Scholarship is awarded on the basis of need.

Fountain Scholarship

The Fountain Scholarship was established by Trustee Darren Aronofsky (*Kenya '85; Alaska '86*), the film director of *The Fountain*, *The Wrestler*, and *Black Swan*. It provides tuition assistance to SFS applicants who (a) have spent most of their lives in an urban environment whether in the United States or abroad; (b) demonstrate financial need; and (c) demonstrate a commitment to and concern for environmental issues.

*All recipients of scholarship awards must write a report at the end of their term that can be shared with the donors. Some donors also request photos.

LOANS

Zero-Interest Loans

This program was created through the generosity of the Merck Family Foundation. Semester loans must be repaid within two years and summer loans within one year of program completion.

Low-Interest Loans

This low-interest loan program is designed to assist semester students in bridging the gap between current financial resources and total program cost. This loan is set at a competitive market rate with manageable repayment terms.

Many applicants receive aid through their home institutions or other outside sources. You may qualify for SFS assistance even if you are not receiving aid from your home institution, so all students are welcome to apply. You may submit a financial aid application after being admitted to an SFS program. To download an application or for more information, please call the SFS Admissions Office at 800-989-4418 or visit www.fieldstudies.org.

TRAVEL GRANTS

These awards are need-based. A limited number of travel grants have been established to help offset the cost of travel to SFS programs.

SEMESTER STUDENTS: Many schools allow students to take institutional financial aid off campus. Check with your financial aid office to see what aid you can apply to your SFS program. Please look into applying for additional funds, including loans, through your home school prior to applying for SFS aid. Because the credits you earn for your SFS participation will in all likelihood be applied toward your degree, your school should be able to process a Stafford Loan or other federal sources of support to assist your SFS participation.

Deposits and Tuition

Payment of a non-refundable tuition deposit is due 10 business days following acceptance to an SFS program. Semester: \$1000; Summer: \$500. All deposit payments are non-refundable EXCEPT in cases where SFS financial aid is sought.

Students who are accepted on a contingency basis and elect to pay the deposit are NOT eligible for a deposit refund should the student fail to meet the required contingency. Final tuition payment is due no later than 60 days prior to the start of the program.

You must complete and return the financial aid application within 10 business days of acceptance to qualify for refund status on your program deposit. See the SFS website for a complete description of our refund policies.



The Living Mekong

NEW PROGRAM

SEMESTER PROGRAM DATES
COMING FALL 2014



CAMBODIA & VIETNAM

COMING FALL 2014

NEW PROGRAM HIGHLIGHT

The mighty Mekong River, whose headwaters originate in the Tibetan plateau and empty into the massive delta in Vietnam, is the focus of the new SFS program in Southeast Asia. The Mekong, a ribbon of life, provides myriad habitats to threatened species and sustains many millions of people. About two percent of the entire world's catch of fish comes from waters associated with the Mekong; countless fishers, farmers, and merchants owe their livelihoods to the river. The dynamic river and its great lake, Tonle Sap, are home to the Irrawady dolphin, Cantor's giant softshell turtle, and other key species. The Mekong also hosts diverse terrestrial eco-regions, including dry evergreen forests, peat swamps, and estuarine mangroves.

The people living in the many dispersed rural villages rely on the Mekong's productive soils for their farms and rangelands. Their livelihood strategies include subsistence and small-scale commercial farming of rice and other crops. The river system also provides rich grounds for fishing and fish farming. As nature- and culture-inspired tourism in Tonle Sap and the Angkor temples becomes a more dominant economic force, there are increasing opportunities for livelihoods in the service economy.

While there are high levels of biodiversity in the lower Mekong, conservation efforts are only just beginning and environmental policies have yet to be fully developed. Vietnam and Cambodia, both newly emerging post-conflict economies, are engaged in aggressive development. Each country's path toward prosperity will have distinct yet profound effects on the natural and cultural landscapes of the region and the livelihoods of rural residents. Drivers of environmental change in the lower Mekong—whether urban expansion, tourism, or climate change—will influence the development trajectories for current and future generations. A fundamental focus of this program will be identifying these drivers and ways to mitigate the damage to natural systems while maintaining human livelihoods.

PROGRAM CURRICULUM

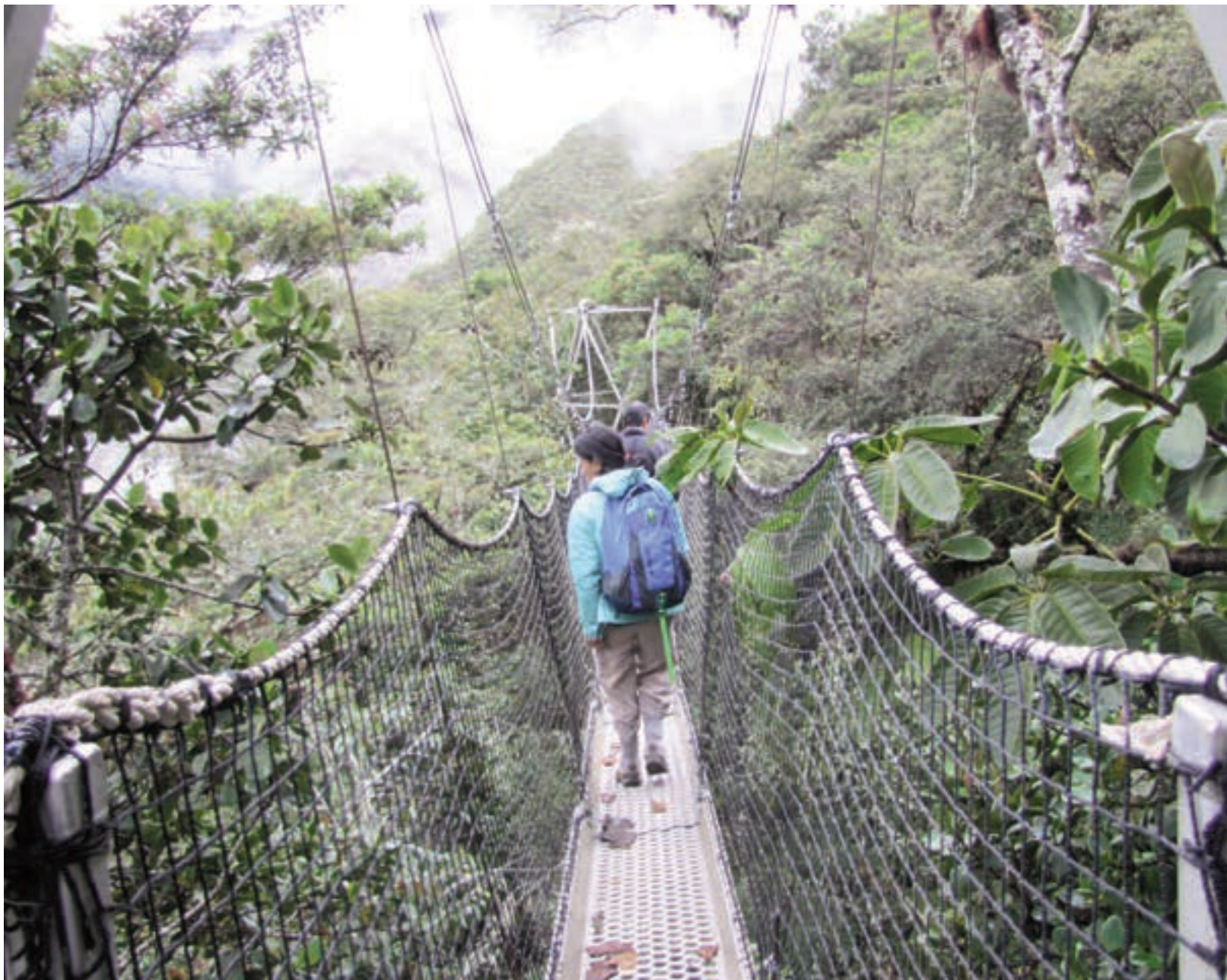
In this two-country program, students will learn about the complexity and fundamental importance of the Mekong River system to the region's ecosystems and socioeconomic systems. In Vietnam, we will introduce students to dynamic hydrology, biodiversity, communities, and governments, with a focus on the role of the river. In Cambodia, through case-specific coursework, field excursions, and Directed Research, we will focus on conservation and rural development. The program will be based in the Siem Reap area adjacent to the ancient ruins of Angkor, Phnom Kulen National Park, and Tonle Sap. It is here that students will engage in research on water resource management, conservation methods and practices, environmental ethics, and socioeconomic development.

FIELD-BASED LEARNING

- Study conservation efforts in the Kratie area of the Mekong River and Phnom Kulen National Park, some of Cambodia's most threatened landscapes
- Visit the Angkor Center for Conservation and Biodiversity and learn how captive endangered species, such as the pileated gibbon, the silvered langur monkey, the slow loris, and the palm civet, are being cared for before reintroduction into the wild
- Participate in establishing baseline measures of biodiversity in the region
- Observe how the Angkor Butterfly Center raises "trophy" species of butterfly that attract lepidopterists from around the world, and also encourages small-scale silk worm harvesting which augments rural family incomes
- Conduct research around Tonle Sap, investigating the health and status of migratory bird species and monitoring the extraction of lake resources
- Study impacts and opportunities of tourism while exploring the resplendent Khmer temple complexes of Angkor

For program updates, please visit: www.fieldstudies.org/mekong





Biodiversity and Development in the Amazon

NEW PROGRAM

SEMESTER PROGRAM DATES
COMING FALL 2014



PERU

COMING FALL 2014

NEW PROGRAM HIGHLIGHT

With its extensive humid tropical rainforest and dramatic elevational gradient upwards to the continental towers of the Andes Mountains, Peru easily earns itself a place among the five most megadiverse countries in the world. The complex topography and array of habitats in this region support diverse flora and fauna and are home to many indigenous groups. Peru is a leading destination for biodiversity enthusiasts, anthropologists, scientists, educators, and students from around the world.

The rich natural resources of the Andes-Amazon region have supported human populations for millennia, including un-contacted and semi-contacted indigenous groups who still live in these forests. Today the region draws people from other parts of the country who engage in both extractive and productive activities including small-scale agriculture, timber and non-timber forest product management, fishing and hunting, and mining. Conservation efforts in the region provide some local residents with alternative livelihoods, resulting in changing perceptions, attitudes, and behaviors in some Amazonian communities. Will this result in sustainable resource management and equitable economic growth?

The ecosystems, habitats, and species of the region are threatened by rapid and unplanned urban and peri-urban development, road installation, destructive logging, unregulated mining, and high-input agriculture. The social fabric of local communities is threatened by gross inequities in socioeconomic development and from environmental degradation associated with these industries. Poverty in rural areas remains high and reaches up to 60 percent in some regions. There are also stark differences in literacy rates and access to water and sanitation. Rapid and unorganized growth in the region threatens biodiversity, cultural integrity, and economic development.

PROGRAM CURRICULUM

This program seeks to understand both the conflicts and synergies of conservation and development. Students will gain a sense of the richness of the Andes-Amazon region—biodiversity, social and cultural diversity, and natural resources—while exploring strategies for sustainable livelihoods in this highly productive and diverse region of South America. The interdisciplinary themes of socio-ecological resilience, environmental justice, and conservation will guide our inquiry. Through coursework, field exercises, and Directed Research, students will study people's dependence on the environment, examine the threats to the environment and to social networks, and explore the tools and strategies for mitigating the threats. A strong component of the program will be examining the ecological patterns and processes that underpin the high diversity of the region.

FIELD-BASED LEARNING

- Travel from the treeless plains and dry valleys of the Altiplano to steep cloud forests and into the broad expanse of the low-lying Amazon basin
- Study how topographic complexity and evolutionary forces have resulted in an exceptional array of habitats, sustaining a vast number of species and diversity of people
- Explore the lowland tropical rainforest biome with its distinct habitats of palm swamps, oxbow lakes, flooded forests, and upland forests
- Examine urban development and tourism in Puerto Maldonado, a rapidly-growing Amazonian town, which connects Lima to Brazil by road
- Visit local mestizo and indigenous villages to learn about knowledge, attitudes, and perceptions, and study different livelihood strategies

For program updates, please visit: www.fieldstudies.org/peru





Tropical Island Biodiversity and Conservation Studies

SEMESTER PROGRAM DATES
Spring 2014: February 3 – May 8
Fall 2014: September 1 – December 4



PANAMA

SEMESTER PROGRAM

ENVIRONMENTAL ISSUES

Panama is the great connector between two continents, a corridor that links the natural riches of Central America to South America. Few places on Earth can claim the density of species and ecosystem richness that this isthmus can. Bocas del Toro, Panama is a place where forest and shore converge and present almost limitless opportunities to study the ecology and conservation of both the marine and terrestrial realms. It is this dynamic interface between forested islands and life-filled waters that drives our understanding of fragile habitats, natural resource use, and indigenous ways of life based on deep relationships with the environment.

The goal of this program is to assess the state of the archipelago's fragile natural habitats, define the main environmental issues, and understand the community goals in natural resource management. As part of our work in Panama, SFS strives to help islanders maintain balance and harmony between people and nature in this fragile ecosystem.

The recent influx of tourists and expatriate residents has put strains on the natural places of the archipelago. Habitat loss, pollution, and the encroaching recreational practices of humans mean both marine and terrestrial species of the islands have become stressed. At the same time, protection efforts are under way, driven in equal measure by government and resident initiatives. We are assessing which activities are harmful to the flora and fauna, and which support species and habitat conservation, and ultimately, local livelihoods. In addition, as the planet copes with disruptive weather events and changing climatic influences, we are investigating how the local environment and residents of the archipelago are adapting.



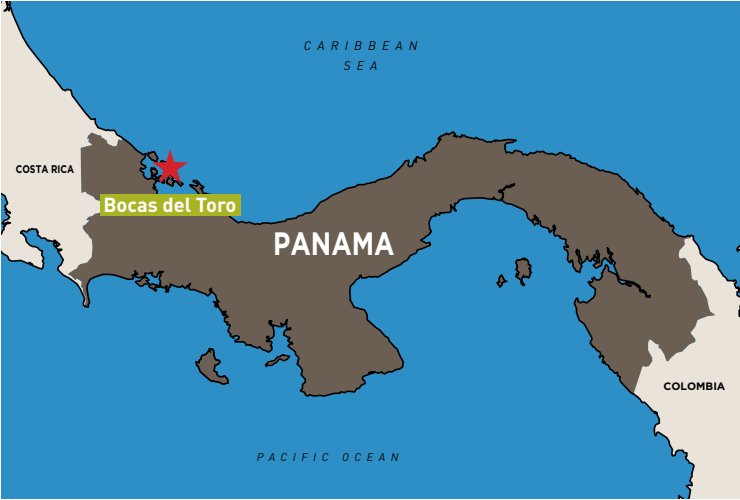
“The beauty of this area isn't just in the reflection of sunsets on smooth waters, it's also in the people that inhabit the archipelago and whose stories, more than anything else, give Bocas its magic.”

— **Niko Alexandre**
Vassar College
Panama Spring '13

SFS IN BOCAS DEL TORO, PANAMA

The field station on the island of Solarte is located less than a 10-minute boat ride from Bocas Town on the vibrant Caribbean waters of Almirante Bay and nestled in the rainforest. The SFS Panama center sits between two indigenous hamlets of the Ngöbe people, giving students a firsthand experience in understanding traditional ways of life. Solarte is a rich learning landscape allowing for total immersion right outside of the center steps.





Panama Program Description

OUR CURRICULUM AND RESEARCH

The curriculum and research program focus on defining key island systems, both natural and human, and how they interface. Key indicators for the status of the habitats, species, and local economies will be developed based on local perceptions and knowledge, accepted research protocols, and local relevance. Through field observations and research, students identify and understand the pressures, both direct and indirect, on the environment and social systems. Students evaluate the responses by local actors and policy-makers aimed at mitigating pressures and restoring balance in the environment.

Our first year of research in Bocas has revealed patterns and processes at the nexus of biodiversity, conservation, and human livelihoods that merit ongoing study. Research on lionfish in the diversity of underwater habitats has revealed a different pattern of invasion than is found in other parts of the Caribbean. Communities of coral, fish, and invertebrates await our assessment and study. Work in the forest environments highlight ecological processes and patterns of biodiversity.

Bocas del Toro is home to several social groups, including Latinos, Afro-Antilleans, indigenous people, and expatriates. Each group occupies a niche in the social and economic systems of the islands, and each has a distinct relationship to the environment. The small indigenous communities located adjacent to our Center allows for a rich immersion in traditional culture; students can interact with locals to gain an understanding of their livelihood strategies and experience the intimate relationship that these communities have with the natural environment.

Studies with local residents about their livelihood strategies, approaches to farming, and use of natural resources help us to assess the sustainability of land and resource use in Bocas. Finally, the vast commercial banana plantations on the mainland provide myriad opportunities to examine how natural systems and human systems are able to mutually exist—but not necessarily without conflict—in a small island region of the rural Caribbean.

Through coursework and research, students gain an understanding of the interdependence of livelihood strategies of island residents, population structure of key species, and habitat arrangements and conditions, and then apply sustainability principles to define potential management strategies. Lectures from Panamanian and international researchers and government environmental officials help students to understand the social, economic, and policy context for environmental management.

Field Experiences and Skills Development

- Snorkel for field research and species identification on coral reefs and other marine habitats
- Shallow water excursions to the fragile intertidal surf zones where giant starfish and spiny sea urchins abound
- Explore dominant stands of old-growth rainforests; viewing giant orchids, colorful macaws, monkeys, and numerous arrow frogs
- Tour large banana plantations on the mainland to understand the impact of the commercial agricultural industry on the local economy and fragile coastal environment
- Visit indigenous villages and observe the livelihoods of traditional farmers, fishers, and forest gatherers
- Visit eco-lodges and resort hotels to understand how development imparts pressures on fragile marine and terrestrial habitats and ecosystems
- Develop field research skills including: marine and terrestrial organism behavioral observations; biodiversity assessment; survey design and interviewing techniques; environmental impact and protected-areas assessment; scientific writing and oral presentation; GIS or remote sensing; habitat assessment and mapping species distributions

Student Directed Research Project Examples

- Status of key species, including corals, lobsters, and reef fish, and the importance of these species to the livelihoods of local fishers
- Condition of marine and terrestrial habitats: coral reef, seagrass, mangrove, and humid forest, and strategies for monitoring changes over time
- Status and distribution of the invasive lionfish into southern Caribbean waters and its effect on native fish population dynamics
- The viability of amphibian species to thrive in fragile ecosystems affected by anthropogenic factors such as habitat loss, land cover changes, and a warming climate
- Habitat changes at the terrestrial-marine interface: receding beaches, destruction of mangroves, siltation of reefs, and pollution-caused degradation due to increased tourism and development
- Livelihood strategies of residents: fisheries, ecotourism, agriculture, ranching, and forestry, and decision-making processes of families that extract natural products for subsistence and income generation
- Perceptions of environment and environmental services by local people and tourists

Get Involved With the Local Community

Conservation, resource use, forest preservation, and marine species monitoring are extremely important to local farmers and fishers, resource managers, and concerned community groups. With the results of our research, we offer data and recommendations that inform decision-makers and build relationships between SFS and the stakeholders involved in tropical island system conservation and management.

SFS students get involved in community volunteer projects and social activities such as:

- Participating in service trips to help local conservation groups and communities, such as monitoring sea turtle nesting and baby sea turtle emergence (seasonal), as well as beautification or recycling efforts
- Meeting with indigenous leaders and elders of the Ngöbe to learn more about their culture and efforts to promote their role in land management and sustainable natural resource use
- Hosting community lectures or demonstrations
- Attending community festivals and sporting competitions, such as baseball and soccer
- Tutoring or mentoring indigenous school children in English language skills or other academic subjects

Panama Program Prerequisites

Applicants for the semester program in Panama must be at least 18 years of age, in good academic standing, and must have completed a college-level course in ecology, biology, or environmental studies. Students are encouraged to have taken coursework in international development, economics, or anthropology prior to participation. Previous coursework in Spanish would be extremely advantageous for the learning experience: at least three years of high school Spanish or one college-level course.

For details and how to apply visit:
www.fieldstudies.org/panama

COURSES		
Semester students are registered in five academic courses accredited through Boston University:		
Course No.	Name	Credits
BI/EE (NS) 379	Tropical Coastal Ecology	04
EE (NS) 374	Principles of Resource Management	04
EE (SS) 302	Environmental Policy and Socioeconomic Values	04
EE 491 or 492	Directed Research	04
LS 207	Language, Culture, and Society of Panama	02
Go to page 40 for course descriptions		

“I feel inspired to use what I’ve learned here in Panama to help address the environmental and social issues at large today... even if I can only contribute a small part.”

It was an amazing three months in Panama. Everything we did—lectures, field exercises and trips, guest speakers, etc.—has contributed to a more inclusive understanding of the environmental, cultural, and social issues of the Bocas del Toro region; but all I have learned is not just applicable to the small world of southern Central America. Being in Panama has allowed me to develop more informed opinions about many of the issues faced every day, whether those are relative to Panama, the U.S., or the world as a whole. I will always remember speaking with indigenous people about their livelihoods, assessing carbon stocks while



considering local resource use, and documenting the progression of the red lionfish invasion and what it means for the future of the local ecology.

Jeff Baldock
University of Washington
Panama Spring '13



Tropical Rainforest Studies

SEMESTER PROGRAM DATES
Spring 2014: February 3 – May 8
Fall 2014: September 1 – December 4



AUSTRALIA

SEMESTER PROGRAM

ENVIRONMENTAL ISSUES

For thousands of years, the tropical rainforests of Far North Queensland, Australia have been home to Aboriginal groups that play a vital role in co-managing the World Heritage Wet Tropics. The forests also are home to numerous plants, birds, and marsupials found nowhere else in the world. The Daintree Rainforest, where the mountains meet the coast, are, in fact, home to some of the oldest living plants on Earth. Giant strangler figs, abundant vines and epiphytes, large pythons, colorful parrots, the giant cassowary, bandicoots, and tree kangaroos fill the Wet Tropics forests with color, sound, and complexity.

Northeastern Queensland’s ancient rainforests preserve millions of years of evolutionary history, though unfortunately, these repositories have been greatly affected by habitat loss, fragmentation, and climate change. The full eastern seaboard of northern Australia once supported extensive rainforests, but logging, mining, and agricultural production over the past two centuries have destroyed and degraded rainforest habitats, disrupting the patterns and processes that keep these forests vibrant. Today, over much of the area, only fragments of the original forests remain.

Along with the loss and fragmentation of tropical rainforest areas due to logging, plantation forestry, and farming, global climate change is very likely contributing to accelerating the loss of plant and animal species. The potentially devastating effect of climate change is playing out in the rainforests of Far North Queensland, where climate models predict a significant rise in local temperatures over the next century. The world-renowned Wet Tropics are often viewed as the “canary in the coal mine,” as a threat of this magnitude could possibly result in the loss of more than half of all Australian bird species and endemic mammals.

Australia continues to be a global front-runner in recognizing the significance of ecosystem services and restoration ecology practices to maintain and ensure healthy rainforests. The country has halted rainforest destruction and established effective protected areas, and is confronting the threat of forest species loss by climate change more aggressively than most tropical countries. Still, the integrity and survival of these ancient, unique, and majestic rainforests hinge upon developing management solutions that consider large-scale and localized impacts on biodiversity, including global climate change, while also providing conditions for economic and social sustainability for the local community.



“Through the field exercises and Directed Research, SFS provided me with more hands-on field work than I could have ever experienced at my undergraduate college.

— **Michael Belitz**
Knox College
Australia Fall ’12



THE SFS CENTER FOR RAINFOREST STUDIES

The Center lies on the edge of the Atherton Tablelands in the heart of the traditional land of the Yidinji people. Protected World Heritage forests and farmland surround the rolling hills covered in tropical foliage. Student cabins are nestled within the rainforest, which comprises the majority of the property’s 153 acres. Sightings of tropical birds, bandicoots, pademelons, musky rat kangaroos, amethystine pythons, and other unique rainforest species are common. The site is alive with the sounds of the rainforest. Students share eight-person cabins with separate shower and bathroom blocks. The main building of the field station houses the classroom, dining area, and a common room.



Australia Program Description

OUR CURRICULUM AND RESEARCH

While representing only a small percentage of the world’s rainforest, the astonishing biodiversity of Australia’s rainforest and the country’s dynamic conservation efforts make Queensland an extraordinary laboratory for studying rainforest management and restoration. Cyclones and other extreme weather events continue to threaten the remaining rainforest fragments, raising questions on how to manage these hyper-disturbed areas in times of change. Management strategies developed here may serve as a model for conserving other rainforests around the world.

The ecological and economic benefits of rainforests are increasingly well understood, but much less is known about rainforest ecosystem dynamics and, particularly in this part of the world, how to effectively restore and manage highly fragmented rainforest habitats. Our goals are to help understand the dynamics of rainforest ecosystems, including potential impacts of global climate change, and in turn, develop rainforest restoration strategies that benefit both ecosystems and human communities.

The program curriculum and research agenda address a critical local and regional environmental problem—loss and fragmentation of once extensive rainforests—and examine environmental policies related to the issue on local and national levels. SFS staff and students, in collaboration with local landholders and stakeholder organizations, focus on enhancing the condition of tropical rainforests, as well as determining how to regenerate and restore the rainforest on the Atherton Tablelands.

Students learn field research techniques as they collect data on topics as diverse as potential responses of biotic communities to global climate change, habitat use and animal behaviors, resilience to cyclonic events, land use, local resident involvement in restoration projects, and cost-effective and ecologically beneficial methods of restoration. Student work represents a vital contribution toward broader studies on global climate change, ecological integrity of rainforest fragments, and developing restoration practices to maximize rates of plant growth and colonization by fauna. Students are also actively involved in either replanting initiatives or restoration site maintenance with local land-care groups.

Field Exercises and Skills Development

- Chillagoe: Camp in the Outback and explore caves, rock formations, remnant dry rainforests, and eucalypt savannah
- Cape Tribulation and the Daintree Rainforest: Walk through lowland rainforests, giant pandans with peppermint stick insects, mangrove forests, and palm forests; traverse the Daintree River, famous for its crocodiles; visit the canopy tower at the Daintree Discovery Centre; sample and examine an array of forest types across the landscape
- Lend a hand at the TREAT (Trees for the Evelyn and Atherton Tablelands Inc.) nursery
- Assess local residents’ and tourists’ attitudes toward nature and restoration
- Learn about the geology and historical biogeography of the Atherton Tablelands
- Assess seedling recruitment of restored tropical rainforest at revegetation sites
- Examine growth and mortality of tropical rainforest species
- Examine fauna in endangered plant communities
- Develop field research skills including: GIS; rainforest management strategies; seedling propagation; social science research methods; data recording and analysis; research design; restoration techniques; and climate modeling

Student Directed Research Project Examples

- Using plant functional traits to predict drought and cyclone resistance
- Climate modeling and rainforest corridor plantings and restoration
- Examining patterns of colonization of restored rainforest by vertebrates
- Using scats and scratch marks to investigate habitat use by tree kangaroos
- Determining carbon sequestration values of rainforest restoration
- Evaluating policy instruments that are used to tackle environmental problems
- Assessing nature-based tourism and its role in the Wet Tropics
- Studying long-term effects and recovery of forest from selective logging

SFS at Work

Understanding local views on the ecological and socioeconomic challenges facing the community of Far North Queensland is key to our mission. Our ongoing research and close ties with community stakeholders allow students to make meaningful contributions including:

- Assisting community members with planting more than 15,000 trees over the last few years, some of which were grown from seed at our field station, to restore degraded forests, improve water quality, and sequester carbon
- Assessing tree seedling recruitment and growth, working toward recommending best practices for achieving a successful restoration
- Helping community members with restoration of more than one mile of rainforest from grassland along the lower Peterson Creek
- Assisting in developing biodiversity management action plans for species such as the Lumholtz’s Tree Kangaroo
- Instigating environmental education exchanges in partnership with Parks and Wildlife Service Rangers

Get Involved With the Local Community

Conservation, resource use, and rainforest restoration are extremely important to local farmers, resource managers, and concerned community groups. With the results of our research, we offer advice to local decision-makers and create linkages between our staff and the stakeholders involved in rainforest restoration and management. SFS students enjoy getting involved in community volunteer projects and social activities such as:

- Helping local conservation groups and communities plant rainforest trees
- Participating in community fauna surveys
- Attending special lectures on tree kangaroos, spectacled flying fox, rock wallaby, cassowary, and other local wildlife in conjunction with local conservation groups
- Hosting community dinners and participating in short homestays
- Attending bush dances and community festivals, visiting the Malanda theatre, and socializing at the local pubs and sporting competitions, such as lawn bowling with Aussies
- Meeting with Aboriginal elders of the Yidinji and Ngadjon Jii tribes to learn more about their culture and efforts to reclaim their role in land management
- Learning how to make and play didgeridoos

For details and how to apply visit:
www.fieldstudies.org/australia



Field experience was an integral part of our learning program, effectively supplementing lessons in the classroom.

Moreover, this time in the field doubled as great exposure to parts of the Wet Tropics region that I probably would never have seen as a typical tourist. Acclimating to a rigorous six-day work week was challenging, but who could argue with the brilliance of learning about



Australian geology and volcanism and then actually going out and standing at the base of a cinder cone from a volcano of old?

Andrea Moshier
Clark University
Australia Fall ’11



Natural Resource Management and Rainforest Research

SUMMER PROGRAM

SUMMER 2014 PROGRAM DATES

Session I: June 2 – July 1
Session II: July 7 – August 5



AUSTRALIA & NEW ZEALAND

SUMMER PROGRAM

Rainforest ecosystems harbor some of the world’s highest levels of biodiversity. The rainforests of Australia and New Zealand host extraordinary remnants of the world’s oldest species of plants and animals. Large areas of northeastern Queensland were once covered in spectacular tropical rainforests, preserving millions of years of evolutionary history; however, over the centuries, logging, farming, and development have destroyed and disrupted rainforest ecosystems and habitats, leaving fragile fragments that are often too small or isolated to sustain some species.

Though many of Australia’s tropical forests and species are now protected under World Heritage legislation, they are faced with continual threats due to climate change and invasive species. Similarly, only fragments of northern New Zealand’s ancient forests remain to house endemic fauna and flora. At the same time, these rich forests provide food, medicine, and spiritual value to residents and visitors.

SESSION I: RAINFOREST MANAGEMENT STUDIES IN AUSTRALIA AND NEW ZEALAND

Students compare and contrast the ecological, geographical, social, economic, and historical factors that have shaped natural resource management in northeastern Australia and northern New Zealand. These two countries share a similar Gondwanan history; however, European settlement patterns, indigenous histories, and economic development significantly differ between the two countries. In New Zealand, students discover its critically endangered flora and fauna and the impacts that have led to their decline. In Australia, students take their New Zealand experiences and examine similarities and differences in political structure, co-management arrangements, land-use patterns, and biogeography.

Field Expeditions and Exercises

- Examine the influence of fragmentation and other impacts on abiotic and biotic attributes of forest communities in Australia and New Zealand
- Visit the ancient rainforest refugia at Mossman Gorge and Daintree National Park
- Visit the ancient Kauri forests of northern New Zealand
- Examine Aboriginal versus Maori historic land-use practices in Australia and New Zealand

SESSION II: TECHNIQUES FOR RAINFOREST RESEARCH IN AUSTRALIA

Examining the effects of fragmentation in highly endangered rainforest systems, students explore Australia’s tropical rainforests and develop effective field skills while learning about rainforest restoration and conservation. In this second summer session, the emphasis is on learning and practicing field research methods in ecology, resource management, and social science.

Field Expeditions and Exercises

- Learn sampling design, plant identification, forest survey techniques, animal survey methods, and social science research techniques
- Experience largely intact lowland rainforest in the Daintree and contrast with the fragmentation effects impacting the rainforests of the Tablelands

SUMMER COMBINED: SESSIONS I + II

This summer program offers two four-credit courses that may be taken individually or in combination to provide a thorough introduction to biodiversity conservation and the socioeconomic factors influencing land and resource management in two unique areas. Students participating in both sessions are eligible for a \$500 discount.

For details and how to apply visit: www.fieldstudies.org/australia

COURSES

Summer students are registered in one or two academic courses accredited through Boston University:

Course No.	Name	Credits
EE (NS) 354	Rainforest Management Studies in Australia & New Zealand	04
EE (NS) 355	Techniques for Rainforest Research in Australia	04

Go to page 39 for course descriptions



“Before coming to New Zealand, I had never set foot in a rainforest before, let alone explored and studied in it every day. I had of course seen textbook pictures and references of temperate rainforests, but to be able to physically touch, draw, and examine the plants we were studying was an experience that a textbook cannot provide.

— Emily Martin
University of Richmond
Australia & New Zealand Summer '11



Marine Resource Management Studies

SEMESTER PROGRAM DATES

Spring 2014: February 3 – May 8

Fall 2014: September 1 – December 4



TURKS & CAICOS

SEMESTER PROGRAM

ENVIRONMENTAL ISSUES

For the tourists who flock here, the Turks and Caicos Islands (TCI), which lie at the southeastern end of the Bahamian archipelago, are a diving and angling paradise. The clear waters are considered among the world’s top 10 diving destinations, where vibrant coral reefs, a dramatic sea wall, and a deep ocean trench harbor a stunning diversity of sea life, from corals to whales. The charismatic fauna include more than 300 species of fish, many elasmobranchs such as the spotted eagle ray and lemon shark, as well as sea turtles and humpback whales. The colorful and cryptic biota is easily spotted in the warm waters just steps from our field station. Nearby seagrass beds, mangroves, sandy shoals, and reefs lend a patchwork appearance to the miles of shallow blue waters that surround the Islands. But beneath the turquoise waters, a delicate ecosystem is under assault.

The diverse marine environment supports the TCI economy through fisheries and tourism. The beauty and ecosystem functions of island, coastal, and ocean habitats are critical for maintaining the value of these industries. The country has an extensive network of more than 30 established protected areas to promote the sustainability of natural and historic resources, with four marine parks in close proximity to our field station on the island of South Caicos. However, lack of scientific understanding, insufficient environmental stewardship, and underutilized local ecological knowledge and human capital hinder management of marine resources and the effectiveness of these protected areas. Increasing demand for fisheries resources, unregulated coastal development, and the meteorological and biophysical impacts of climate change put enormous pressures on marine and coastal ecosystems and on island-based livelihoods. Without quantitative and qualitative scientific assessments, better facilitated community management, and collaborative environmental education, the existence of many of these ecosystems and resources is threatened.

SFS plays a critical role in supporting the TCI fishers, island residents, and environmental authorities through collaborative research and knowledge-exchange. Together we are working to implement positive change in the social, cultural, and economic spheres, as well as to support and mitigate impacts on the coastal and marine ecosystems.



“I witnessed incredible spectacles during my time in the water, from a massive great hammerhead shark during a dive, to swimming through a sea of bioluminescence on a night snorkel.”

— Scott Miller
Clemson University
TCI Spring '12



THE SFS CENTER FOR MARINE RESOURCE STUDIES

The Center, located just steps from a crystal clear ocean laboratory, is adjacent to Cockburn Harbour, a town of about 1,200 residents. Our self-contained field station sits 40 feet above the water looking directly out to sea. Within a three-mile radius are coral reefs, barrier islands, mangroves, seagrass beds, and carbonate platform flats offering abundant snorkel and dive sites. The facility has a dining area, kitchen, classroom, computer room, and a veranda with spectacular island and ocean views. Students share living quarters in two residence wings. We are fully equipped for marine operations with access to docks, motorboats, an air compressor, and plenty of tanks and weights for SCUBA diving.



Turks & Caicos Program Description

OUR CURRICULUM AND RESEARCH

With so many local residents dependent upon marine resources for their livelihood, along with increasing resource demand by tourists, finding viable options for managing fisheries and conserving marine biodiversity is crucial.

Snorkeling and SCUBA diving in the waters surrounding South Caicos, students learn field research and monitoring techniques to identify and assess the health of a wide range of marine organisms and habitats. Students learn to identify and observe the behavior of marine species, assess coastal and marine habitats, and quantify fisheries resources through hours of training, observation, and study in the water.

In the community, students grapple with the challenges of assessing the rights and needs of local stakeholders and reconciling those with conservation goals. Fisheries management and market engagement require considered analysis of the costs and benefits of species protection, fishing techniques, and market dynamics, all in the context of global and national markets and policies. Assessing the feasibility and ecological viability of resource management and habitat conservation

options, and their associated social and economic implications, brings students face-to-face with the real-life dilemmas for governmental regulators and the residents of South Caicos.

TCI has an extensive network of 34 protected areas, but little is known about their function and effectiveness. With the Admiral Cockburn Land and Sea National Park and East Harbour Lobster and Conch Reserve on their doorstep, students evaluate the concept and practice of marine protected areas (MPAs) as a resource management tool.

The growing tourism industry in the TCI is increasing the demand for reef fish on restaurant menus. Local fishers on South Caicos recognize this market, and commercial sale of select reef fish species is rapidly increasing. Apart from having established “no-take” marine protected areas and a ban on spear fishing, there are few other regulations in place to manage the harvest of reef fish. It is critical for the TCI to establish a comprehensive management plan for reef fish species so they can be harvested in a sustainable manner to avoid population declines.

Through field observation, exercises, and research, students will gain the concepts, skills, and data to understand the marine ecosystem and island community dynamics. Central themes and skills in the curriculum include the following:

- Marine habitats and species, and community dynamics
- Techniques and level of fishing efforts
- Relationship between environment and tourism
- Drivers and causes of marine habitat destruction
- Island community structure and social relationships
- Diversity of local livelihood strategies

Field Exercises and Skills Development

- SCUBA and snorkeling for fish, coral, seagrass, and mangrove identification exercises
- Ecosystem function and anthropogenic impacts
- Habitat enhancement and restoration
- Lecture from Department of the Environment and Maritime Affairs (DEMA) on the TCI government fisheries’ regulations and enforcement
- Site tour from a local tourism developer and discussion on plans for constructing residences and a resort
- Visits to local seafood processing plants and discussions with operators
- Develop field research skills including: marine species identification and behavioral observations; biodiversity assessment; survey design and interviewing techniques; field research ethics; stakeholder facilitation techniques; data management and analysis; scientific writing and oral presentation; snorkel and SCUBA skills; economic valuation methods; habitat assessment and mapping

Student Directed Research Project Examples

- Population size assessment of potential commercial finfish species around South Caicos
- Ecological and social assessments of the impacts of climate change and ocean acidification
- Rapid assessment of density and distribution of invasive lionfish
- Coral reef ecology, including growth, survival, and recruitment
- Baseline biodiversity surveys in critical habitats
- Interactions between mangrove and seagrass faunal communities
- Assessments of local livelihood strategies and human capital, including perceptions of tourism and fishing industries and bottom-up ideas for managing the island’s natural environment
- Assessment of conch population structure and regulation compliance
- Youth empowerment through marine-oriented citizen science
- Elasmobranch ecology

SFS at Work

- Lobster, conch, and finfish stock assessments provide important information, allowing government agencies to establish sustainable fishing rules and guidelines.
- Natural resource workshop with DEMA to provide the TCI government workers with training on coral reefs, lobster biology, marine fishes, turtles, and sharks
- Working with DEMA and local businesses to develop a protocol for coral reef monitoring and queen conch distribution
- Applying baseline data to examine reef health trends, species interactions, and impacts of coral diseases
- Students present findings at the South Caicos Environmental Forum, run and hosted by SFS, to disseminate findings to the local community.

Get Involved With the Local Community

We are dedicated to helping the community conserve its natural resources and develop sustainably. Students become involved with the community, learning about the Caribbean culture and island society. Community activities may include:

- Providing swimming lessons and environmental education for local children
- Reading, tutoring, and volunteer projects at the local library and grade school
- Teaching English to Haitian and Dominican residents
- Collaborating with local youths and NGOs to conduct beach clean-ups to raise environmental awareness

SCUBA Certification

It is not necessary to use SCUBA to participate in our program—many students choose to snorkel instead. If you intend to use SCUBA you must be certified before arrival. Divers and snorkelers must bring their own SCUBA and snorkeling equipment (with certification, insurance, etc.). Weights and tanks are provided on-site at no cost. Please contact the SFS Admissions Office if you have any questions.

For details and how to apply visit:
www.fieldstudies.org/tci



“My semester at the Center for Marine Resource Studies gave me experiences and training I could not have gotten anywhere else

and I am infinitely grateful that I was able to take advantage of this unique opportunity. Now I can pursue a career in marine conservation



with enough tools in my belt and enough knowledge in my head to really make a difference, and I will use the lessons learned on South Caicos everywhere I go.

Cassie Raker
Colby College
TCI Spring ’12



Marine Protected Areas: Management Techniques and Policies

SUMMER PROGRAM

SUMMER 2014 PROGRAM DATES

Session I: June 2 – July 1
Session II: July 7 – August 5



TURKS & CAICOS

SUMMER PROGRAM

The turquoise waters of the Turks and Caicos Islands (TCI) are abundant with marine life and provide the perfect laboratory for marine studies. The relatively healthy marine and coastal ecosystems support much of the community on the island of South Caicos, with fisheries providing the primary source of livelihood. The small island community embraces the challenge of balancing economic development with environmental conservation. Having a sound understanding the ecology of key fisheries species and their habitats provides the foundation for achieving this balance through resource management and conservation.

The environment is changing, however, as pollution, climate change, and the unsustainable extraction of precious marine resources, coupled with a growing tourism industry, will likely threaten the island’s fragile ecosystems. Depletion of key resources would also have a dramatic impact on the social systems of South Caicos by putting pressure on food security and employment prospects. Developing sustainable fisheries is essential if this resource-dependent coastal community is to thrive.

Curriculum and Research Focus

Students explore the effectiveness of marine protected areas (MPAs) in maintaining biodiversity and critical habitats, enhancing stocks of queen conch and spiny lobster, and contributing effectively to the socioeconomic sustainability of the local community. They also consider how climate change may impact the ecosystems, and what the implications are and may be for the social and economic systems. Students support the work of our clients and stakeholders, from local fishers to members of key government agencies. Our goal is to conduct relevant field research that can be used to develop effective environmental policies, MPA management plans, and community projects.

Field Expeditions and Exercises

The spectacular reefs, turquoise waters, and island community of South Caicos serve as the laboratory for our studies and field work. Students snorkel or SCUBA, gaining valuable field experience using transects and other techniques for population sampling and long-term monitoring, and learn interview and other stakeholder engagement techniques to examine social questions. Potential research sites, field exercises, and trips in our summer programs include:

- Protected areas, including East Harbour Lobster and Conch Reserve, Bell Sound Nature Reserve, and Admiral Cockburn Land and Sea National Park
- Fringe and island mangrove ecosystems
- Tours of current coastal development projects, including high-end residential sites and tourist accommodations
- Tours of seafood processing plants
- Fisheries enforcement exercise, casting students as “marine police”
- Face-to-face cultural and knowledge-exchange encounters with marine resource managers, local fishers, and tourism workers
- Skills workshops, including stakeholder facilitation techniques and science dissemination practice

For details and how to apply visit: www.fieldstudies.org/tci

COURSES

Summer students are registered in one academic course accredited through Boston University:

Course No.	Name	Credits
EE (NS) 351	Marine Protected Areas: Management Techniques and Policies	04

Go to page 39 for course descriptions



“Even going out to the lobster condos to catch lobster and measure their carapaces turned out to be an amazing experience—getting to learn about their anatomy right in front of my eyes instead of in a textbook.

— Caitlin McNally
University of San Diego
TCI Summer '12



Sustainable Development Studies

SEMESTER PROGRAM DATES
Spring 2014: February 3 – May 8
Fall 2014: September 1 – December 4



COSTA RICA

SEMESTER PROGRAM

ENVIRONMENTAL ISSUES

Costa Rica is internationally recognized for its efforts to ensure biodiversity conservation and protect natural resources. The country supports more than five percent of the world’s biodiversity and boasts 230 protected areas—about 26 percent of the land area of the country. The cloud forests, rainforests, volcanoes, coastal environments, and mountaintops shelter as many as 9,000 plant species, including at least 1,500 species of orchids alone. More than 1,000 species of butterflies and 883 species of birds, such as quetzals, toucans, hummingbirds, and scarlet macaws, are found throughout Costa Rica’s various tropical ecosystems. This remarkable biodiversity provides a rich platform for nature-based tourism, which is one of the country’s primary economic drivers. The diverse landscape mosaic of forests, pastures, coffee farms, and agricultural fields, and the stunning beaches and extensive mangroves, offer residents and tourists alike a natural haven for good food, rich culture, and exploration of tropical biodiversity.

The Costa Rican paradise is increasingly threatened by population growth, urban development, inappropriate waste disposal, and monoculture expansion. The rapid conversion of rural agricultural landscapes into urban areas, the consequent loss and fragmentation of forests, and the increased demand for water in developed areas provoke future social conflict and environmental degradation. These extensive and rapid changes are threatening the country’s sustainable development efforts. Finding solutions in sustainable practices is imperative for Costa Rica’s future.



“Studying sustainable development feels a lot more meaningful when you’re interviewing farmers about the impact of tourism on their community than it does when you’re listening to a lecture in a classroom in Massachusetts.”

— Devyn Powell
Tufts University
Costa Rica Fall '12



THE SFS CENTER FOR SUSTAINABLE DEVELOPMENT STUDIES

The Center, located an hour from the capital city of San José, comprises a campus facility integrated with a small Rainforest Alliance Certified™ mango and orange farm overlooking the fertile Central Valley. The organic waste is recycled as compost, and our free-range chickens, pigs, and cows contribute to the production of fertilizer. We eat what we grow, and recycle what we can. Integrating sustainable farming practices at the Center is part of the student learning and living experience.

Our campus is part of the small neighborhood of La Presa/Los Angeles. The friendly town of Atenas is only three miles from campus, while Costa Rica’s tropical forests, beaches, mountains, and volcanoes are within a day’s travel. Our facilities include a dormitory and cafeteria, a small laboratory, indoor and outdoor classrooms, an organic garden and greenhouse with organoponics, a soccer field, a basketball court, and a swimming pool.





Costa Rica Program Description

OUR CURRICULUM AND RESEARCH

Costa Rica is currently undergoing a period of rapid economic and social change. As this resource-rich, wonderfully biodiverse country continues along a path of rapid development, it is increasingly influenced by globalized markets and policies, such as free-trade agreements with the United States, China, Canada, Mexico, and Chile, among others.

Costa Rica’s economy has shifted from one based chiefly on agriculture to one driven by services, such as ecotourism and industrial exports. At the same time, rapid rural-to-urban conversion is straining natural resources in ecologically fragile areas. The country is at a critical juncture as resource management decisions are being made in an effort to keep pace with competitive global markets.

Our goal is to analyze different development and resource management models that protect the biodiversity of Costa Rica’s ecosystems while promoting socioeconomic benefits for its people. Students will examine the effects of globalization on development issues such as agriculture, biodiversity protection, economic development, urban sprawl,

population growth, waste management, and water quality. Students can see if the SFS farm measures up to other sustainable farms in the region through an assessment of ecosystem services in the agricultural landscape.

This program focuses on evaluating the actual success of Costa Rica’s world-renowned conservation systems and developing alternative strategies for economic development and biodiversity conservation, such as land-use planning, organic agriculture, and conservation outside of protected areas. Visits to cloud forests, dry forests, volcanoes, lowland rainforests, farms, and plantations offer opportunities to examine management schemes, identify benefits of protected areas, and determine which systems offer the best options for economic development, the maintenance of cultural norms, and the preservation of biodiversity. Understanding the priorities for Costa Rica’s policies, within the context of environmental changes, is crucial as students analyze potential sustainable solutions for Costa Rica and the Central American region.

COURSES		
Semester students are registered in five academic courses accredited through Boston University:		
Course No.	Name	Credits
EE (NS) 377	Tropical Ecology and Sustainable Development	04
EE (SS) 303	Economic and Ethical Issues in Sustainable Development	04
EE (NS) 374	Principles of Resource Management	04
EE 491 or 492	Directed Research	04
LS 205	Language, Culture, and Society of Costa Rica	02
Go to page 40 for course descriptions		

Field Experience and Skills Development

- Compare and contrast development and resource use issues during an extended field expedition to Nicaragua, Panama, or remote Costa Rican locations (conditions permitting)
- Explore rare and threatened tropical dry forest ecosystems while camping in the national parks of the Guanacaste Province and studying one of the most successful management models for protected areas in Latin America
- Visit national parks to investigate the pressures of ecotourism on small gateway communities and learn about cloud forest ecology
- Learn about bio-indicators of ecosystem health and rainforest ecology
- Develop management policies by continuing our long-term bird monitoring programs and analyzing the impact of the road as a barrier and source of mortality for the fauna in Carara and Santa Rosa National Parks
- Conduct social science research using surveys, interviews, and other investigative methods to better understand people’s perceptions about their surrounding environment
- Visit Monteverde Cloud Forest Reserve, a protected area rich in biodiversity and cultural significance
- Develop field research skills including: ecological sampling for plants, birds, and invertebrates; habitat assessment and mapping; species identification; infrastructure assessment in protected areas; and survey and interview techniques

Student Directed Research Project Examples

- Investigation of Carara National Park’s management practices in response to increased tourism
- Evaluation of the socioeconomic benefits of Costa Rica’s national parks for neighboring communities
- Impact of road traffic noise on the avifauna of national parks
- Measurement of ecosystem services, such as biodiversity conservation and carbon sequestration, in agroforestry systems such as shade-grown coffee farms
- Evaluation of the impacts of artificial feeders on the ecology of hummingbirds in Monteverde
- Assessment of public perceptions on the problems and solutions associated with environmental impacts resulting from climate change, urbanization, or management of solid wastes
- Assessment of community capitals around protected areas

SFS at Work

- Completion of the Management Plan of the Cerro Atenas Protected Zone, an evaluation of the ecological status of freshwater springs
- Evaluating the impact of invasive species on plant diversity at the Municipal Forest of Atenas
- Biophysical assessment of micro-watersheds for local authorities such as Ministry of Environment and Ministry of Health offices and the Atenas municipality
- Monitoring of visitation in national parks of the Central Volcanic Range Conservation Area (ACCV)

Get Involved With the Local Community

Conversations and collaborations with local residents, small business owners, and farmers to better understand their perspectives and needs provide the framework for SFS research plans. Activities might include:

- Monitoring and maintaining trail infrastructure at the Municipal Forest with local schools and conservation organizations
- Helping to restore a local stream by integrating many community actors
- Engaging in long-term community projects: U.S. culture and English taught in the elementary schools; environmental education at the Municipal Forest; and recycling projects
- Establishing nurseries of native tree species, and reforestation and watershed conservation projects with local organizations
- Participating in soccer games, community festivals, and short homestays

Costa Rica Program Prerequisites

Applicants for the semester program in Costa Rica must be at least 18 years of age, in good academic standing, and must have completed a college-level course in Spanish (or three years of high school Spanish), as well as ecology, biology, or environmental studies, and are encouraged to have taken coursework in international development, economics, or anthropology prior to participation.

For details and how to apply visit:
www.fieldstudies.org/costarica



“Wow. That is the first word that comes to me when I reflect on my semester spent with SFS in Costa Rica.

The eye-opening experiences, the intriguing lectures, the intelligent and engaging professors, and my amazing fellow students all made this past semester one of the most enriching experiences of my life.



Hayden Shea
Middlebury College
Costa Rica Fall '11



Sustaining Tropical Ecosystems

SUMMER PROGRAM

SUMMER 2014 PROGRAM DATES

Session I: June 2 – July 1
Session II: July 7 – August 5



COSTA RICA

SUMMER PROGRAM

Costa Rica is known worldwide for its conservation efforts, which have attracted millions of tourists to the country and especially to its natural protected areas and sustainable coffee farms. Accelerated economic growth and urban development are taking place in the absence of coordinated land-use planning, consideration of water and energy sustainability, and waste management systems. These oversights, in combination with climate change impacts, constantly challenge the sustainable development goals of the country and threaten its biodiversity.

SESSION I: SUSTAINING TROPICAL ECOSYSTEMS: BIODIVERSITY, CONSERVATION, AND DEVELOPMENT

Students explore and address key features of sustainable development strategies in Costa Rica and the most pressing challenges at the intersection between conservation and economic development. Understanding historical and current aspects of sustainable development strategies in Costa Rica, coupled with knowledge of tropical ecosystem function and connectivity, allows students to understand the impacts of development on the environment and on society. Field exercises and lectures introduce students to models of economic development and biodiversity conservation in and around Costa Rica's protected areas. A short field research project provides a practical introduction to research design and methods for achieving conservation goals.

Field Expeditions and Exercises

- Explore the biological diversity of the rainforests of Braulio Carrillo National Park in the Volcanic Cordillera Conservation Area; compare and contrast biodiversity protection in examples of conventional and organic agriculture in the Caribbean lowlands
- Evaluate tourism services and park management practices in Poás Volcano National Park
- Analyze the challenges of the ecotourism project of El Sur community near Carara National Park; hike through the rainforest; and interact with local schoolchildren through outreach projects

SESSION II: APPLIED RESEARCH TECHNIQUES AND STRATEGIES TOWARD SUSTAINABILITY

Students learn about the ecological, natural resource management, and socioeconomic factors impacting protected areas and surrounding communities and farms in Costa Rica. In this research-intensive program, the focus is on developing relevant research questions that address local issues related to sustainability. Students are involved in designing and conducting field research on a topic of immediate relevance to local clients and proposing alternative approaches toward sustainable development in an effort to help address challenges to conservation goals.

Field Expeditions and Exercises

- Explore Poco Sol Biological Station within the Children's Eternal Rainforest to quantify forest dynamics
- Hike the oak forest and páramo ecosystems of the highlands of Cerro de la Muerte, and participate in the restoration project of the Quebrada Matías watershed
- Visit Arenal Volcano National Park and evaluate the human capital of La Fortuna in an effort to inform park managers about opportunities to foster better relationship with surrounding communities

SUMMER COMBINED: SESSIONS I + II

This summer program offers two four-credit courses that may be taken individually or in combination to provide a thorough introduction to the sustainability of tropical ecosystems, as well as field research techniques for addressing conservation questions. Students participating in both sessions are eligible for a \$500 discount.

For details and how to apply visit: www.fieldstudies.org/costarica

COURSES

Summer students are registered in one or two academic courses accredited through Boston University:

Course No.	Name	Credits
EE (NS) 352	Sustaining Tropical Ecosystems: Biodiversity, Conservation, and Development	04
EE (NS) 493	Applied Research Techniques and Strategies Toward Sustainability	04

Go to page 39 for course descriptions



“The firsthand experience of living and learning in a rapidly developing country showed me the difficulty of solving environmental issues brought on by economic growth, but also gave me better foresight of how to address the problem. I will continue on with my education and personal efforts with a determination to guide sustainable development worldwide.

— **Mindy Zhao**
University of California, Los Angeles
Costa Rica Summer '11



Himalayan Forests, Watersheds, and Rural Livelihoods

SUMMER PROGRAM

SUMMER 2014 PROGRAM DATES

For details and dates, visit:
www.fieldstudies.org/bhutan



BHUTAN

SUMMER PROGRAM

Bhutan is nestled in the remote and rugged eastern Himalayas, a mountainous area characterized by some of the world’s highest peaks, extraordinary biodiversity, and deep cultural and religious history etched into the landscape. As one of the major biodiversity hot spots in the world, Bhutan is home to a beautiful array of birds, butterflies, and rhododendrons. The takin, snow leopard, golden langur, blue sheep, and tiger are among Bhutan’s diverse and charismatic fauna.

In this Buddhist kingdom, rich cultural traditions and social and political institutions reflect Buddhist principles of The Middle Path, integrating people and nature, traditional knowledge and modern science, and balancing economic growth and collective happiness.

In 2008, Bhutan shifted from an absolute monarchy to a constitutional democracy with the enactment of the kingdom’s first constitution. Because the majority of Bhutanese people still reside in rural areas and practice small-scale agriculture and forest product extraction, sustainable management of local natural resources is critical for achieving the four pillars of development in Bhutan: conservation of environment, good governance, equitable social and economic growth, and preservation and promotion of culture.

Course Content

In this course, we explore the question of what role environmental services and natural resources play in rural livelihood and national development. The interdisciplinary curriculum integrates elements of Bhutanese culture and society, ecology, resource management, and rural development. With the central district of Bumthang as our classroom, and treks across valleys and ridges and through villages, students gain an intimate knowledge of local environments and rural livelihood strategies. We study and conduct research on Bhutan’s primary environmental concerns and conservation strategies.

Research Focus

SFS partners with the Ugyen Wangchuck Institute for Conservation and Environment (UWICE), an international research and training facility in Bhutan. SFS students contribute to the advancement of the Institute’s research agenda in several priority areas, including sustainable forestry, watershed management, and rural development. We address questions related to water scarcity and flooding, community and private forestry, and changing livelihoods and socioeconomic values.

Field Exercises and Expeditions

- Observe changes in major vegetation zones on the journey from the capital city to the field station
- Visit the stunning Punakha Dzong and Bumthang monasteries
- Overnight in Phobjikha valley, an important wetland conservation area for the black-necked crane
- Visit community forestry projects, micro-hydropower stations, and rural farms
- Trek through villages and relict forests to 14,000 feet elevation

Note: The program operates in rugged and rural environments where we live and study at altitude (around 10,000 feet elevation). Our work takes us (often by foot) to higher altitudes. The trek and field work require participants to be in excellent physical condition. Our facilities and other rural infrastructure are rustic, and the Bhutanese diet is fairly simple. Flexibility and patience are equally important attributes for a successful participant.

For details and how to apply visit: www.fieldstudies.org/bhutan

COURSES

Summer students are registered in one academic course accredited through Boston University:

Course No.	Name	Credits
EE (NS) 358	Himalayan Forests, Watersheds, and Rural Livelihoods	06

Go to page 39 for course descriptions



“Our classroom followed our group to wherever we traveled. While on morning walks, and on our trek, we worked on plant IDs. Around campfires, traditional dances and songs were shared with us. While visiting a dzong, we learned about the meanings of paintings in the temple walls. During homestay with a local family, we learned how to cook traditional dishes. I have never taken so much new knowledge away from a program.

— **Theresa Wondra**
University of St. Thomas
Bhutan Summer '12



Wildlife Management Studies

SEMESTER PROGRAM DATES
Spring 2014: February 3 – May 11 & February 4 – May 12
Fall 2014: September 1 – December 7 & September 2 – December 8



KENYA & TANZANIA

SEMESTER PROGRAM

ENVIRONMENTAL ISSUES

Current conservation and rural development practices in the Maasai steppe, in the southwestern region of Kenya and northern Tanzania, are influenced by changing land-use patterns and socioeconomic shifts occurring among the Maasai, Iraqw, and other ethnic groups.

The traditional nomadic, pastoral lifestyle of the Maasai has helped to maintain the integrity of open grasslands that serve as critical migration corridors and dispersal areas for wide-ranging wildlife species, such as elephant, wildebeest, giraffe, and zebra. The progressive changes in traditional lifestyle from nomadic pastoralism to a more sedentary, agro-pastoral one in both countries is posing a challenge to long-term conservation of wildlife and other natural resources. Permanent homesteads, land sub-division, and extensive agriculture exert more pressure on the region’s natural resources, including water, productive grasslands, and wildlife populations.

Increasing competition for land and other scarce resources in this semi-arid region has ecological, social, and economic costs, including fragmentation of critical wildlife dispersal areas, breakdown in land administration, disparities in land ownership, and human-wildlife conflict. Even protected areas, such as national parks and community wildlife sanctuaries, no longer provide a safe haven for wildlife with climate change causing unforeseen shifts in hydrology and habitat. Habitat destruction, uncontrolled tourist activities, and poaching endanger biodiversity. Negative impacts of these drivers of change on the region’s wildlife threatens safari tourism, which is an important revenue generator for the governments and local communities in both Kenya and Tanzania.

SFS strives to identify and assess the drivers of habitat degradation and land-use change and the implications for wildlife conservation and local and regional economies. Students will evaluate and promote the management of wildlife populations and their critical dispersal areas, productive grazing lands, reliable water points, and safe homesteads to help wildlife survive and the local communities to meet current and future livelihood needs.



“The School for Field Studies experience is an invaluable means for many students to understand a different culture, gain important knowledge about field research, and expand an understanding of environmental issues.

— Ian Christopher Easterling
Elon University
East Africa Spring '12



THE SFS CENTER FOR WILDLIFE MANAGEMENT STUDIES

The Center operates in two locations in southwestern Kenya and northern Tanzania.

In Kenya, SFS students live at our Kilimanjaro Bush Camp (KBC), near the town of Kimana, and situated in the remote foothills of Mount Kilimanjaro in the Amboseli-Tsavo ecosystem. The camp is nestled within a lush zone of yellow acacia trees, giving a perfect view of the magnificent mountains in the distance. Students sleep in thatched-roof *bandas* and enjoy the main building or *chumba*, which houses a dining room, kitchen, and classroom. Ample space at camp allows for outdoor games and exploration.

In Tanzania, students live at Moyo Hill Camp (MHC) located in the Tarangire-Manyara ecosystem between Lake Manyara National Park and the famous Ngorongoro Conservation Area. This wonderfully scenic area is world-renowned for its beauty, geography, history, and wildlife. MHC comprises part of a small community where students can enjoy daily interaction with neighbors. Walking, jogging, soccer, and socializing outside of the camp round out daily life at MHC.



Kenya & Tanzania Program Description

OUR CURRICULUM AND RESEARCH

Northern Tanzania and southern Kenya offer a tightly packed hub for wildlife tourism. The area is home to world-famous national parks, such as Amboseli, Tsavo, Tarangire, Lake Manyara, Kilimanjaro, Serengeti, and the Ngorongoro Conservation Area. This extremely scenic area, which is the center of tourism in East Africa, has been the home of the Maasai, Iraqw, and other groups for centuries. The two regions share some bio-physical characteristics and cultural elements, but subtle and distinct differences in conservation and development policy, soil and vegetation composition, water resource availability, and culture provide an opportunity for comparing and contrasting approaches to wildlife management and livelihood strategies of the local people.

Despite the seemingly negative trends of availability and quality of habitat and resources for wildlife and livestock on the Maasai steppe, there are many opportunities for effective conservation, natural resource management, and rural development. Wildlife uses the diverse habitats surrounding the SFS field stations as migration corridors and seasonal dispersal areas.

The Maasai, and now other settlers, depend on these same areas as communal grazing grounds for livestock and for growing food. As a result, they often face economic hardship due to crop damage from migrating wildlife, loss of livestock, and resource depletion and competition.

Agricultural expansion, pollution, and climate change threaten the already strained water supply and the health of people, livestock, and wildlife alike. Thus, the Center’s research is framed by the needs of both human communities and wildlife conservation goals in the region. Our curriculum and research focus on how changes in land use and resource availability in the Maasai steppe ecosystems can be managed to foster the well-being of local communities while safeguarding and promoting biodiversity conservation.

In this two-country program, students will compare and contrast the socioeconomic, policy, and environmental drivers and implications of demographic change and land reform for wildlife conservation and rural development between Kenya and Tanzania.

Students begin the program at one field station, gaining knowledge of the wildlife in the region, the agro-pastoralist lifestyle, and approaches to conservation. Just shy of the halfway point in the semester, students travel overland to the other field station to apply the foundational knowledge of wildlife ecology and management to the specific issues in that region. The Directed Research projects are conducted in the final month of the program at the second field site. Students visit multiple protected areas and communities in both countries.

Field Experiences and Skills Development

- Visits to cultural *manyatta*, a rare opportunity to glimpse Maasai and Iraqw cultures, including rural settlements not usually visited by tourists: musical ceremonies, demonstrations in fire-making, dances by Maasai *morans* (warriors), and lessons in spear-throwing
- Amboseli and Lake Nakuru National Parks: Multi-day excursions illustrating the management implications of high concentrations of animals in a confined area
- Lake Manyara National Park: Visits to learn large mammal identification, baboon ecology, threats to wetlands from tourism, land-use changes, and local resource uses
- Tarangire National Park: Excursions on animal counting, wildlife management, lion ecology and behavior, conservation models, and preservation of corridors
- Ngorongoro Conservation Area: Day trip to learn integrated management, inclusion of indigenous communities in conservation and management of natural resources, large mammal ecology, animal identification, and the role of volcanism in species diversity
- Serengeti National Park: Multi-day field expedition to learn about wildlife management issues, large mammal ecology, large mammal diseases, and large mammal migrations
- Develop field research skills including: habitat assessment and mapping, species identification, research design, data collection, valuation methods, social surveys, wildlife census techniques, GIS, transect and patch sampling, animal behavior observations, geology, and soil identification

Student Directed Research Project Examples

- Local community strategies for coping with variation in water availability
- Assessment of attitudes and awareness on wildlife conservation among the Iraqw and the Maasai communities
- Influence of ecological and social factors on the distribution of African elephants in Tanzania’s Tarangire-Manyara ecosystem
- Animal density differences between areas of differing protection levels
- Importance of habitat quality and heterogeneity on wildlife sanctuary viability
- An evaluation of the effects of land-use changes on the water resources in the Nooltresh River system and its potential implications to public health
- The role of government in human-wildlife conflict resolution in Kenya’s Amboseli ecosystem

SFS at Work

- Working with community members to assess the biodiversity and tourism potential of privately owned wildlife sanctuaries to empower local communities to benefit from, as well as conserve, wildlife on their land
- Assessing water-use competition to make appropriate recommendations for water resource conservation, management, and sustainable use
- Evaluating the status of the Buger community forest to understand the challenges and opportunities for joint forest management
- Working with local communities to assess human-wildlife conflicts and provide the best strategies for conflict mitigation
- Assessing the abundance and distribution of large mammalian species and habitat characterization for Manyara Ranch Conservancy to establish long-term trends and advise best range management options for the ranch

Get Involved With the Local Community

- Visit local markets and a neighboring *boma* (Maasai homestead) for traditional Maasai celebrations, a lecture on culture and artifacts, jewelry-making with Maasai mamas, and conducting interviews for research work
- Visit and stay with Iraqw and Maasai communities during homestay in Tanzania and Kenya
- Community service work in local schools, hospitals, orphanages, and with a local women’s group
- Presentations of research findings to community stakeholders

For details and how to apply visit:
www.fieldstudies.org/eastafrica



“The program helped me to better understand a lot of aspects of conservation that I would otherwise not be able to comprehend through classes at a typical university.

For example, I was able to see why the human element is just as important as studying the ecology of wildlife in order to preserve the environment. I came to realize that conservation requires constant effort to balance the needs of humans and the needs of the environment. It was astonishing to see how people in certain areas are required by law to protect the wildlife that causes them so much hardship on a daily basis. Talking with people who live in situations like this is something that cannot be communicated through coursework. Experiencing this sort of human-wildlife conflict firsthand has truly developed my understanding of what conservation is.

— Paige Yager
University of Massachusetts Amherst
East Africa Spring ’12



Wildlife Management and Conservation and Techniques for Wildlife Field Research

SUMMER PROGRAM

SUMMER 2014 PROGRAM DATES
Session I: June 2 – July 1
Session II: July 7 – August 5



TANZANIA

SUMMER PROGRAM

Northern Tanzania, home of world-famous national parks such as Tarangire, Lake Manyara, Kilimanjaro, Serengeti, and the Ngorongoro Conservation Area, offers a tightly packed hub for wildlife conservation and tourism opportunities amid a growing human population and development activities. This magnificent setting on the Maasai steppe is our learning laboratory. Expeditions to the national parks and other protected areas are frequent and form a significant opportunity to experience hands-on learning of environmental issues and a suite of strategies for resolving them.

Both sessions take a multi-disciplinary approach to study that reflects the complex realities of balancing ecological, economic, and socio-cultural factors in sustainable wildlife conservation and management studies. Students will learn about the many perspectives on wildlife management and conservation from SFS faculty and guests who have extensive field experience and knowledge of the area. We visit key national parks and other protected areas in northern Tanzania.

SESSION I: WILDLIFE MANAGEMENT AND CONSERVATION

Students learn about wildlife management practices and the complex issues involving sustainable wildlife conservation in the Tarangire-Manyara ecosystem of Tanzania. The course combines concepts and principles of ecology, natural resource management, and socioeconomics, all of which are central to effective and sustainable wildlife conservation. During the course, students develop field skills to explore the ecology, social organization, and behavior of common African large mammals.

Central to this first summer session is the understanding and evaluation of protected areas in the region, and students learn methods to examine the complexities of conserving wildlife in protected areas amidst a rapidly changing socioeconomic and political environment. In addition, students learn about constraints to the conservation of wildlife among resource-poor rural populations and identify key aspects of human-wildlife conflicts.

SESSION II: TECHNIQUES FOR WILDLIFE FIELD RESEARCH

In this second session, students learn a suite of field research techniques and methods routinely used to study wildlife ecology and assess management policies and practices in East Africa. The focus is on the Tarangire-Manyara ecosystem, where we practice field techniques in multiple areas, including national parks, community ranches, and in villages.

Students learn foundational field skills in observation and evaluations of wildlife, as well as interactive methods used for assessing local community attitudes and behaviors toward conservation efforts, and apply these techniques to advance long-term research goals at our Center.

Examples of techniques that are taught include effective species identification; sampling and data analysis methods for flora and fauna; large mammal behavioral study methods; remote and on-ground sensing and spatial mapping; social survey design and interviewing skills; and communication skills.

SUMMER COMBINED: SESSIONS I + II

This summer program offers two four-credit courses that may be taken individually or back-to-back to provide a thorough introduction to wildlife management and the research methods routinely used to assess wildlife ecology. Session I may also be taken in combination with Public Health and Environment in Kenya (Session II). Students participating in two sessions are eligible for a \$500 discount.

For details and how to apply visit: www.fieldstudies.org/eastafrica

COURSES

Summer students are registered in one or two academic courses accredited through Boston University:

Course No.	Name	Credits
EE (NS) 350	Wildlife Management and Conservation	04
EE (NS) 357	Techniques for Wildlife Field Research	04

Go to page 39 for course descriptions



“No matter how much time we spent sitting and watching or driving to find a cheetah, the experience filled me with a sense of purpose. We could take what we observed and apply it to the classroom. Our lectures on conservation, on the interaction of animal and man, and the steps we’re taking toward creating a harmonious world, were more than informative ... they were presenting fulfilling career options and life purposes.

— **Diana Beck**
Queens College
Tanzania Summer '12



Field Practicum in Public Health and Environment

KENYA SUMMER PROGRAM

SUMMER 2014 PROGRAM DATES
Session II: July 7 – August 5

Land tenure reform, emerging economic opportunities, and expansion of agriculture are driving fundamental changes in access to water and food, exposure to health risks, and social networks. As the traditionally nomadic, pastoral Maasai in southern Kenya adapt to more sedentary, agro-pastoral lifestyles, their healthcare needs and health-seeking behaviors are changing. Poor exposure to public healthcare and networks for community action has brought about new health problems for the Maasai, including an escalation in sanitation-related and water-borne diseases, infant and childhood diseases, and HIV/AIDS.

Curriculum and Research Focus

SFS has been conducting health-related research in the region since 2007, focusing on establishing baseline data on issues ranging from water and sanitation, access to health care, and general health indicators. Our aim is to provide the Kenya health officers with data on the most prevalent health issues in households and villages, as well as assessments of the effectiveness of the community-level health services, in order to enhance preventive measures to minimize health concerns.

This course introduces students to rural health issues and healthcare systems in Kenya, emphasizing the links between health and environment, and community-based healthcare and modern medicine. Students participating in this course provide, through field research, a vital link between the challenges and health needs of the local Maasai communities and Kenya’s national health strategy. Students also gain invaluable experience with designing and implementing a field assessment project in public health. The program is particularly applicable to those considering a major or concentration in global health, public health, nursing, pre-med, or medical and health sciences programs, but it is open to all majors.

Field Expeditions and Exercises

- Learn about the socioeconomic, cultural, and environmental issues related to public health and health care services in rural Kenya
- Visit Maasai villages and group ranches, local health clinics and dispensaries, and HIV/AIDS clinics
- Safari in Amboseli National Park to learn about the region’s environmental context and observe wildlife
- Assess and analyze health issues and report findings and recommendations to public health officials and local residents

SUMMER COMBINED: WILDLIFE MANAGEMENT AND PUBLIC HEALTH

This course may be taken independently or in combination with the Wildlife Management and Conservation course in Tanzania (Session I). Students participating in two sessions are eligible for a \$500 discount.

For details and how to apply visit: www.fieldstudies.org/publichealth

COURSES		
Summer students are registered in one academic course accredited through Boston University:		
Course No.	Name	Credits
HS 407	Field Practicum in Public Health and Environment	04
Go to page 39 for course descriptions		



“This program has significantly helped in my pursuit for the academic and professional experience required for graduate school.

— Danny Ramon
Cal State San Bernardino
Kenya Public Health Summer ‘12

Summer Course Descriptions

AUSTRALIA AND NEW ZEALAND

These courses can be taken individually or back-to-back.

EE (NS) 354 RAINFOREST MANAGEMENT STUDIES IN AUSTRALIA & NEW ZEALAND (SESSION I) compares and contrasts the ecological, geographical, social, economic, and historical factors that have shaped natural resource management in Australia and New Zealand. Students gain an understanding of the drivers of species extinctions and current conservation problems including management of endangered species. In both countries, students examine the influence of fragmentation on abiotic and biotic attributes of forest communities during field exercises and will be able to identify management techniques with regard to biological systems, national boundaries, and political structures.

EE (NS) 355 TECHNIQUES FOR RAINFOREST RESEARCH IN AUSTRALIA (SESSION II) includes a wide range of lectures and hands-on field activities that concentrate on developing management recommendations for reforestation practices on the Tablelands of Australia. We explore the ecological roles, environmental services, and economic benefits of tropical rainforests. Students examine the structure and function of Australian tropical rainforests and the roles that humans have played, and are playing, in current forest dynamics. We examine reforestation applications on the Tablelands: the goals, techniques, successes, and the failures. Finally, we develop and maintain an actual rainforest restoration project.

BHUTAN

EE (NS) 358 HIMALAYAN FORESTS, WATERSHEDS, AND RURAL LIVELIHOODS is an interdisciplinary, field-based course where students get to know a country in a region that is recognized worldwide for its dramatic mountain landscapes and rich flora and fauna. We travel in Bhutan, learning about how environmental issues and rural development goals intersect. Trekking across valleys and ridges and through villages, students gain an intimate knowledge of the local environments and rural livelihoods. Students develop skills in assessing environmental problems, defining research questions, conducting field research, and communicating results. They gain an appreciation of the complexity of identifying and addressing conservation issues in a rapidly developing region.

COSTA RICA

These courses can be taken individually or back-to-back.

EE (NS) 352 SUSTAINING TROPICAL ECOSYSTEMS: BIODIVERSITY, CONSERVATION, AND DEVELOPMENT (SESSION I) provides students with practical field skills necessary to develop and participate in ongoing, long-term community and tropical ecosystem-based research projects. Students are introduced to the ecological, economic, and natural resource management issues that surround protected areas and tourism management, parks and people relations, and biodiversity assessment and protection in national parks and surrounding areas with the intent of exploring sustainable development and management strategies.

EE (NS) 493 APPLIED RESEARCH TECHNIQUES AND STRATEGIES TOWARD SUSTAINABILITY IN COSTA RICA (SESSION II) applies the scientific process in a field research project that addresses a local environmental issue. Students help to design a field research project: collect, manage, and analyze data; and communicate research results.

KENYA

This course can be taken individually or in combination with the Wildlife Management and Conservation course in Tanzania.

HS 407 FIELD PRACTICUM IN PUBLIC HEALTH AND ENVIRONMENT (SESSION II) introduces students to rural health issues in Kenya, emphasizing the links between health and environment, and community-based health care and modern medicine. Students gain experience in assessing and analyzing public health and environmental concerns in Maasai communities in partnership with local community-based health organizations.

TANZANIA

These courses can be taken individually or back-to-back. Wildlife Management and Conservation may also be taken in combination with the Field Practicum in Public Health and Environment course in Kenya.

EE (NS) 350 WILDLIFE MANAGEMENT AND CONSERVATION (SESSION I) exposes students to wildlife management practices and the complex issues involving sustainable wildlife conservation in the Tarangire-Manyara ecosystem of Tanzania. The course combines concepts and principles of ecology, natural resource management, and socioeconomics, which are central to effective and sustainable wildlife conservation.

EE (NS) 357 TECHNIQUES FOR WILDLIFE FIELD RESEARCH (SESSION II) exposes students to a suite of wildlife field techniques and methods routinely used to assess wildlife ecology and management policies and practices in East Africa, with specific application to the Tanzania Tarangire-Manyara ecosystem conservation areas. The focus is multi-disciplinary and reflects the complex realities of balancing ecological, economic, and socio-cultural factors in sustainable wildlife conservation and management studies. Students learn foundational skills in observation and evaluations of wildlife, as well as interactive methods used for assessing local community attitudes and behaviors toward conservation efforts and apply these techniques to advance long-term research goals at our Center.

TURKS & CAICOS ISLANDS

EE (NS) 351 MARINE PROTECTED AREAS: MANAGEMENT TECHNIQUES AND POLICIES (SESSION I OR SESSION II) focuses on lectures, field exercises, and other activities that enable us to understand how the Caicos Bank ecosystem works, its resource development potential, the threats facing these resources, and the role of marine parks in protecting and enhancing these resources and their critical habitats. Particular emphasis is given to commercially important resources such as conch and lobster stocks. Our project findings contribute toward developing marine parks policy, management plans, and innovation and technology transfer to assist in the management of marine protected areas.

Semester Course Descriptions

BI/EE (NS) Students choose to register for either Biology or Environmental Studies credit

EE (NS) Environmental Studies (Natural Science)

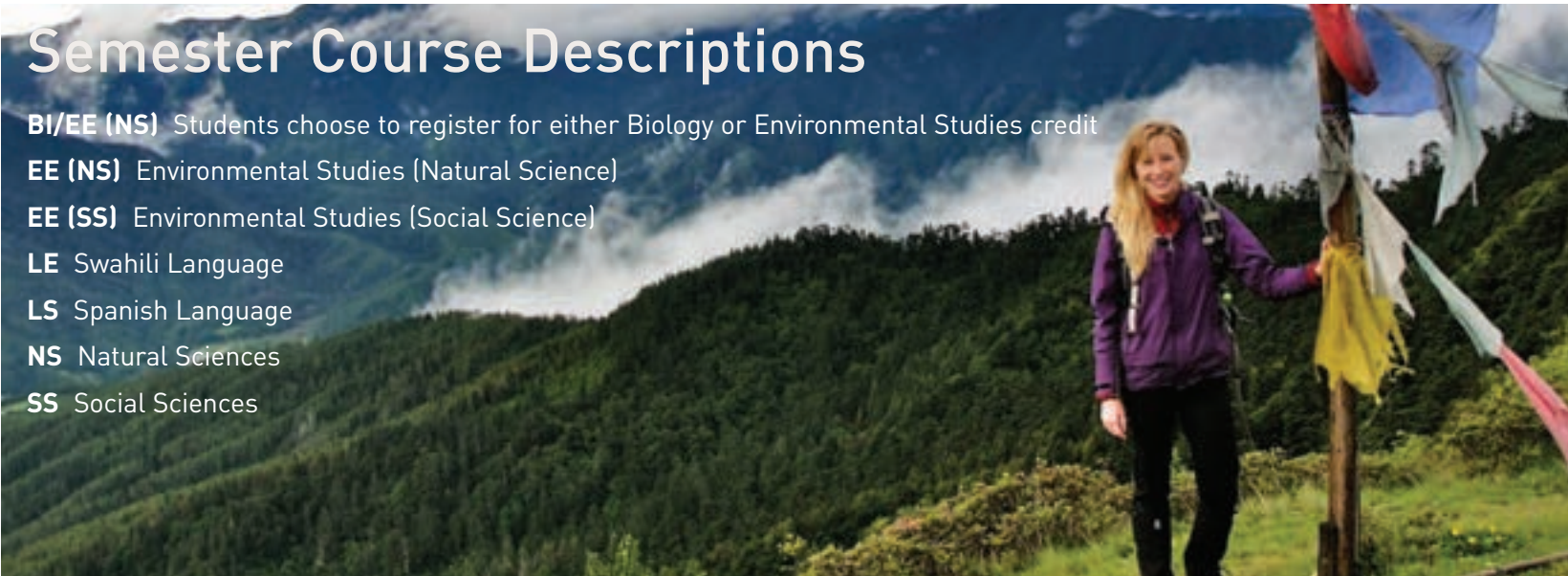
EE (SS) Environmental Studies (Social Science)

LE Swahili Language

LS Spanish Language

NS Natural Sciences

SS Social Sciences



AUSTRALIA

BI/EE (NS) 369 RAINFOREST ECOLOGY introduces structure and function of tropical rainforests including floral and faunal components. Ecological processes that maintain biodiversity and the evolutionary processes that generate it will be presented. We will examine the dynamic relationships between plants and animals, including pollination and seed dispersal. On a larger scale, we will examine tropical vegetation patterns along climatic gradients and discuss mechanisms for preserving and restoring tropical ecosystems.

EE (NS) 370 PRINCIPLES OF FOREST MANAGEMENT presents the ecological and analytical tools used in the management of terrestrial, living resources. We will use examples from the tropics to stress the theories and skills that provide the foundation for land management worldwide. The assessment and minimization of adverse environmental impacts caused by resource development, as well as the restoration and rehabilitation of areas suffering from chronic human-induced disturbances, provide key foci for applying principles learned.

EE (SS) 302 ENVIRONMENTAL POLICY AND SOCIOECONOMIC VALUES provides insight into the broad social context surrounding natural resources to determine effective approaches to resource management. Objectives are to understand socio-cultural context including hierarchies and power structures; formal and informal decision-making processes; value systems relevant to natural resources, including religious factors and environmental ethics; past and present uses of natural resources; economic factors (local, regional, external); ownership patterns; attitudes and other factors that affect change and their historical basis; and legal basis for enforcement of environmental policy. Students are introduced to major constituencies that effect conservation (NGO conservation groups, economic interests, etc.) and their underlying philosophies.

EE 491 (FALL) EE 492 (SPRING) DIRECTED RESEARCH prepares students to distinguish hidden assumptions in scientific approaches and separate fact from interpretation, cause from correlation, and advocacy from objectivity. Specific tools will include experimental design, field techniques, basic descriptive statistics, and parametric and non-parametric quantitative analysis. Succinct scientific writing, graphic, and tabular presentation of results, and effective delivery of oral presentations will be emphasized.

COSTA RICA

EE (NS) 377 TROPICAL ECOLOGY AND SUSTAINABLE DEVELOPMENT examines the ecological impact of human activity, especially agriculture in a tropical country. The agro-ecology of important crops will be studied, with emphasis on biodiversity as the source of production means and materials. Students will identify renewable and non-renewable resources and examine their historical use. We will study the long-term and large-scale impact of local agricultural and other practices on the national and global environment (e.g., water pollution, waste management, climate change). Options for alternative resources use, land restoration, and preservation will be examined from ecological, socio-political, and economic viewpoints. Factors that constrain or promote particular options will be included. Basic field techniques and measurements will also be covered.

EE (NS) 374 PRINCIPLES OF RESOURCE MANAGEMENT is designed to examine the connection between society and natural resources and how application of management tools can lead to biodiversity conservation and sustainable livelihoods. This course introduces underlying concepts and practical tools used in addressing complex environmental problems, including protected area planning and management, guidelines for ecologically sustainable development, and environmental impact assessment. Local case studies will be examined using the theory and practice learned in this course.

EE (SS) 303 ECONOMIC AND ETHICAL ISSUES IN SUSTAINABLE DEVELOPMENT addresses the principles and applications of ecological economics, or the scientific and management aspects of sustainability. Allocation, distribution, and scale will be presented as parameters to assess the sustainability of development models (at macro and micro levels). Basic concepts of ecological economics cost-benefit valuation techniques will be presented and applied. The roles of local people, government, and private, national, and bilateral aid agencies will be examined as constraints for the implementation of sustainable development models. The empowerment of local people and their reaction to non-local proposals for sustainable development will be examined through the review of specific case studies.

EE 491 (FALL) EE 492 (SPRING) DIRECTED RESEARCH prepares students to distinguish hidden assumptions in scientific approaches and separate fact from interpretation, cause from correlation, and advocacy from objectivity. Specific tools will include experimental design, field techniques, basic descriptive statistics, and parametric and non-parametric quantitative analysis. Succinct scientific writing, graphic, and tabular presentation of results, and effective delivery of oral presentations will be emphasized.

LS 205 LANGUAGE, CULTURE, AND SOCIETY OF COSTA RICA contains two distinct but integrated modules. The Spanish language module offers listening, oral, and written practice of the Spanish language at beginner, intermediate, and advanced levels of proficiency. Students will engage in oral and written grammar and vocabulary exercises, and develop Spanish language skills and tools required for their research projects. The socio-culture module helps students to develop a more refined understanding of Costa Rican culture and the various communities with which we work. Students participate in lectures, field exercises, and other activities including a homestay—all of which teach them strategies and skills for working with people in a community-based research context and help them to assist with community extension projects.

KENYA & TANZANIA

BI/EE (NS) 371 TECHNIQUES IN WILDLIFE MANAGEMENT introduces students to the questions, principles, and tools used by resource managers in the East Africa savanna ecosystem. Students study habitat assessment, plant and animal identification, associations and distributions, and other approaches to evaluating the savanna ecosystems. Behavioral, physiological, and social responses of animals to a changing environment will be examined. Field and laboratory techniques for monitoring ungulate populations and optimizing management practices will be presented. Decision-making processes, on which wildlife management programs are based, will be addressed.

BI/EE (NS) 372 WILDLIFE ECOLOGY presents students with the information and conceptual background necessary to understand the underlying ecological principles of the East Africa savanna ecosystem. We will focus on the fundamental processes and inter-relationships between the biotic and abiotic environment. We begin with basic ecological principles, setting them against the background of East Africa. Factors underlying distributions, population biology, and behavioral ecology will be examined, along with competition and predation using African examples. Theoretical models will be discussed in light of our observations on field trips.

EE (SS) 302 ENVIRONMENTAL POLICY AND SOCIOECONOMIC VALUES provides insight into the broad social context surrounding natural resources to determine effective approaches to resource management. Objectives are to understand socio-cultural context, including hierarchies and power structures; formal and informal decision-making processes; value systems relevant to natural resources, including religious factors and environmental ethics; past and present uses of natural resources; economic factors (local, regional, external); ownership patterns; attitudes and other factors that affect change and their historical basis; and legal basis for enforcement of environmental policy. Students will be introduced to major constituencies that effect conservation (NGO conservation groups, economic interests, etc.) and their underlying philosophies.

EE 491 (FALL) EE 492 (SPRING) DIRECTED RESEARCH prepares students to distinguish hidden assumptions in scientific approaches and separate fact from interpretation, cause from correlation, and advocacy from objectivity. Specific tools will include experimental design, field techniques, basic descriptive statistics, and parametric and non-parametric quantitative analysis. Succinct scientific writing, graphic, and tabular presentation of results, and effective delivery of oral presentations will be emphasized.

LE 205 INTRODUCTION TO SWAHILI LANGUAGE AND EAST AFRICAN TRIBAL COMMUNITIES contains two distinct but integrated modules. The Swahili language module offers listening, oral, and written practice of the Swahili language, at a basic level of proficiency, to increase students' communication and comprehension skills. Much of the Maasai population does not speak Swahili, but it is the national language in Kenya and Tanzania—this phenomenon will be explained in the second course module. The socio-cultural aspects of East African tribes module emphasizes understanding of, and direct contact and interaction with, the native communities with which SFS works, primarily the Maasai. This exposure to culture and language will be reviewed and processed through lectures, field exercises, and classroom discussion. The socio-cultural module is designed to help students experience intense immersion in the culture and be therefore more adept at working effectively in their community-based Directed Research efforts.

PANAMA

BI/EE (NS) 379 TROPICAL COASTAL ECOLOGY introduces students to the ecology of coastal and marine ecosystems as well as terrestrial systems that affect the marine environment. Students will learn to identify species in these habitats. The concept of island biogeography will help to frame the examination of the status and delicate nature of tropical island systems. Climate change and its impacts on small islands will be addressed. Field exercises will be held in forests and coastal waters where students will encounter mud and monkeys one second, damselfish and moray eels the next.

EE (NS) 374 PRINCIPLES OF RESOURCE MANAGEMENT examines fisheries management (commercial and artisanal) focusing on local fisheries, including finfish, lobster, and sport fish. We will study the environment from the lens of tourism, examining the impact of tourism on fragile habitats. Another theme of the course will be land use and land cover change—especially in regard to increasing pasture land and plantation land under cultivation (mostly banana) in close proximity to the ocean and important watershed habitats. Additional themes will be climate change and how this affects natural resources and livelihood on land, sea, and forest resources, including timber and non-timber forest products.

EE (SS) 302 ENVIRONMENTAL POLICY AND SOCIOECONOMIC VALUES provides a critical look at the livelihood strategies of island residents, the land use and environmental regulations in place, and actual or recommended responses by society (including government, civil society, and individuals) aimed at mitigating pressures and restoring balance in the environment. Students will gain an understanding of the local perceptions of conservation of natural resources and the pressure points between development and preservation. The economic importance of tourism may be measured and examined against habitat degradation. Common property issues will be addressed in relation to land use of indigenous islanders and new property owners wishing to build on once sovereign land. Gauging environmental awareness and literacy of tourists will help students to understand their impact on the future of endangered island ecosystems that will be put under continuous pressure with the climbing number of visitors.

EE 491 (FALL) EE 492 (SPRING) DIRECTED RESEARCH prepares students to distinguish hidden assumptions in scientific approaches and separate fact from interpretation, cause from correlation, and advocacy from objectivity. Specific tools will include experimental design, field techniques, basic descriptive statistics, and parametric and non-parametric quantitative analysis. Succinct scientific writing, graphic, and tabular presentation of results, and effective delivery of oral presentations will be emphasized.

LS 207 LANGUAGE, CULTURE, AND SOCIETY OF PANAMA contains two distinct but integrated modules. The Spanish language module offers listening, oral, and written practice of the Spanish language at beginner, intermediate, and advanced levels of proficiency. Students will engage in oral and written grammar and vocabulary exercises, and develop Spanish language skills and tools required for their research projects. The socio-cultural module helps students to develop a more refined understanding of Panamanian culture and the various communities with which we work. Students participate in lectures, field exercises, and other activities including a homestay—all of which teach them strategies and skills for working with people in a community-based research context and help them to assist with community extension projects.

TURKS & CAICOS ISLANDS

BI/EE (NS) 373 TROPICAL MARINE ECOLOGY discusses the interactions that determine the distribution and abundance patterns of tropical marine organisms, with emphasis on the ecology of near-shore areas. Basic principles of ecology are integrated with an understanding of the sea as a habitat for life. Physical, chemical, and geological oceanography are discussed. Major groups of dominant marine organisms of the region are examined in the field. Major near-shore marine habitats are examined, along with their associated biotic communities. Coral reef ecosystems are emphasized to illustrate basic concepts. Applications to the management of indigenous marine resources are discussed and demonstrated.

EE (NS) 374 PRINCIPLES OF RESOURCE MANAGEMENT is designed to examine the connection between society and natural resources and how application of management tools can lead toward biodiversity conservation and sustainable livelihoods. This course introduces underlying concepts and practical tools used in addressing complex environmental problems, including protected area planning and management, guidelines for ecologically sustainable development, and environmental impact assessment. Local case studies will be examined using the theory and practice learned in this course.

EE (SS) 302 ENVIRONMENTAL POLICY AND SOCIOECONOMIC VALUES provides insight into the broad social context surrounding natural resources to determine effective approaches to resource management. Objectives are to understand socio-cultural context, including hierarchies and power structures; formal and informal decision-making processes; value systems relevant to natural resources, including religious factors and environmental ethics; past and present uses of natural resources; economic factors (local, regional, external); ownership patterns; attitudes and other factors that affect change and their historical basis; and legal basis for enforcement of environmental policy. Introduction of major constituencies that affect conservation (NGO conservation groups, economic interests, etc.) and their underlying philosophies.

EE 491 (FALL) EE 492 (SPRING) DIRECTED RESEARCH prepares students to distinguish hidden assumptions in scientific approaches and separate fact from interpretation, cause from correlation, and advocacy from objectivity. Specific tools will include experimental design, field techniques, basic descriptive statistics, and parametric and non-parametric quantitative analysis. Succinct scientific writing, graphic, and tabular presentation of results, and effective delivery of oral presentations will be emphasized.



100 Cummings Center, Suite 534-G
Beverly, MA 01915-6239 USA

P 800.989.4418
F 978.922.3835

admissions@fieldstudies.org
www.fieldstudies.org



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