

Timeline and Checklist

In preparing for your upcoming Earthwatch expedition, please ensure that you:

Immediately

- Read this Expedition Briefing and all enclosed materials thoroughly
- Book an appointment with your doctor; you'll need them to sign your health form
- Make sure you understand and agree to Earthwatch policies and participant responsibilities

At least 90 days prior to your expedition start date

Complete and return your volunteer forms. **Below are the specific forms required for this expedition:**

- | | |
|---|---|
| <input type="checkbox"/> Personal Profile | <input type="checkbox"/> Travel Details Form |
| <input type="checkbox"/> Health Form | <input type="checkbox"/> Liability Release Form |

European volunteers can download volunteer forms on: earthwatch.org/europe/volunteerforms

US/North American volunteers can download volunteer forms at: earthwatch.org/volunteerforms

Australian volunteers can download forms on earthwatch.org/australia/expeditions/volunteer_forms/

Japanese volunteers can download forms on www.earthwatch.jp/getinvolved/condition/formdownload-i.html

- Pay any outstanding balance on the minimum contribution for your expedition
- Book travel arrangements (see the *Rendezvous* sections for details)
- If you plan to purchase additional travel insurance, note that some policies require purchase when your expedition is booked (see the *Insurance* section for more information)
- If traveling internationally, make sure your passport is current and obtain a visa for your destination country (if necessary) (see the *Passports and Visas* section for more details)
- Make sure you have all the necessary vaccinations for your project site (see the *Health Information* section)
- Purchase a guide book for your destination country
- Bring your level of fitness up to the standards required (see the *Project Conditions* section)

At least 60 days prior to your expedition start date

- Review the packing list, ensuring you have all the clothing and any special equipment needed
- Obtain any necessary prescription medications that will be needed for your travels

Up to 30 days before you leave for the expedition

- Read any required reading or websites recommended by the Earthwatch scientist(s) for your expedition
- Make sure you have enough personal funds for your expedition (see the *Travel Planning* section)
- Leave the Earthwatch emergency contact number with a friend or relative (see the *Emergencies in the Field*)
- Leave a copy of your passport, visas and airline tickets with a friend or relative
- Confirm your travel arrangements

Note: If you have signed up for an expedition within 90 days of the start date, you must return your fully completed volunteer forms as soon as possible.

Climate Change and Caterpillars

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General Information

Project title	Climate Change and Caterpillars	
Earthwatch scientists	Lee Dyer, PhD , Associate Professor, Department of Biology, University of Nevada, Reno Angela Smilanich, PhD , University of Nevada, Reno	
Research site	La Selva Biological Station and Tirimbina Rainforest Center	
Expedition length:	11 days	Minimum age of participation: 18 years of age*
Team Size Max:	12 participants	
*Note: It may be possible for 16- and 17-year-olds to participate on standard teams if accompanied by a parent or guardian. Contact Earthwatch for more information and see <i>Volunteers Under 18 Years of Age</i> in the <i>Passports and Visas</i> section for traveling advice for minors.		

Emergency Contacts

Emergency contact number at Earthwatch headquarters in the:

US +1 978 461-0081

(800) 776-0188 (Please note that the 800-number works as a toll free call *only* for calls placed within the US.)

After business hours, leave your message with our live answering service. State that you have an emergency communication and leave a clear message with the name of the field program, your name, location from which you are calling, and if possible, a phone number where you can be reached. An Earthwatch staff person will be contacted and will respond to your call within one hour.

Emergency medical and evacuation assistance provider

To contact International SOS in the event of an emergency, dial:

- For assistance **within the US**: ISOS Philadelphia, +1 215 942 8459
- For assistance **outside the US**: ISOS London, +44 (0) 208 762 8550
- For assistance **within Australia**: ISOS Australasia, + 61 (0) 2 9372 2468

State that you are on an Earthwatch expedition. The following information must be provided:

1. The Insured Person's name
2. The Assured is **EARTHWATCH**, the Certificate No: **GP 0010214** and SOS reference **#14ACPA000075**
3. The telephone number and facsimile number where the Insured Person can be reached
4. The Insured Person's address abroad
5. The nature of the emergency



Dear Earthwatcher,

Welcome to Earthwatch! We greatly appreciate your decision to contribute to hands-on environmental science and conservation. As an Earthwatch volunteer, you have the opportunity to create positive change. Each year we send thousands of people just like you into the field to understand and help an array of species, habitats, and cultures on approximately 65 research projects in more than 35 countries. These projects focus on: **Climate Change, Cultural Heritage, Ecosystem Services, and Oceans.**

We place great importance on the health and safety of all those involved in our activities anywhere in the world. Although risk is an inherent part of the environments in which we work, careful risk management and diligent planning mean that all participants can have educational and inspirational Earthwatch experiences. We've been providing worldwide experiences **for more than 35 years**, so you're in good hands.

It is essential that you carefully read your Expedition Briefing and complete the volunteer forms so that you are fully prepared. Your Expedition Briefing includes important logistical information such as instructions for reaching the project site, what to pack, what immunizations you need, how to physically prepare for your expedition, and more. It also explains the research being conducted on the project, why it's important, and what role you'll play as an Earthwatch volunteer.

Well-prepared volunteers are better able to enjoy the unique and exciting experiences that an Earthwatch expedition offers and will be more helpful to the scientists' important work. Open-mindedness, ability to work on a team, and a desire to learn are keys to a successful and enjoyable Earthwatch experience. We hope this expedition will inspire you to get more involved in conservation and sustainable development priorities—not just out in the field but also when you return home. We encourage you to share your experiences with others, to transfer your skills and enthusiasm to environmental conservation efforts in your workplace, in your community and at home.

If you have questions as you prepare for your expedition, contact your Earthwatch office. Thank you for your support, and enjoy your expedition!

Sincerely,

A handwritten signature in cursive script, appearing to read "Anne T. Ogilvie".

Anne T. Ogilvie
International Director of Field Management



College of Science
University of Nevada, Reno

Dear Earthwatch Volunteer,

Welcome to the *Climate Change and Caterpillars in Costa Rica* expedition! I hope that the coming weeks will be interesting, challenging and fun for everyone involved with the project. Before you delve into the Expedition Briefing, I'd like to tell you a little about why I think this project and your help are important.

This is part of a larger project with sites from Brazil up to Canada, and a large number of collaborators, all focused on understanding interactions between plants, caterpillars and parasitoids in forests from Brazil to Canada. The collaborators on this project are naturalists as much as we are basic researchers, and we all have a passion for the wild lands we have visited. Although we have spent a good deal of time doing research in forests, we are also big fans of alpine, desert, cliff and aquatic communities. Most of us have been involved in local and global environmental issues, and it was partly our concern about the disappearing wild areas of the world that caused us to focus our research efforts on our dwindling forests.

The other attribute that attracted us to the project's study sites is what attracts most naturalists, ecologists and entomologists to complex ecosystems: biodiversity. The diversity of the forest and desert that comprise our sites in Ecuador is remarkable. My assistants and I will have plenty of opportunities to point out some of our favorite organisms at the field site, and I am sure you will leave the project with a long list of unique sightings.

This multi-site caterpillar project was started as a result of many discussions in the field, at meetings, and at social gatherings. Two questions that tended to dominate discussions among the collaborative group were how predation and parasitism levels vary among caterpillars with different defenses and how parasitism differs at different sites. With respect to the latter question, we have found some interesting patterns of parasitism across rainfall and temperature gradients and decided that a comparative approach could answer many interesting questions about how forests respond to abiotic change. This is a particularly important area of research given the impending impacts of global climate change. Biotic, geographic and climatic variation in parasitism has now become the major theme of this project. Of course, there are many other questions that have fueled our work and a good portion of this Expedition Briefing goes into these questions and their underlying ecological theory.

The fieldwork for this project is very simple and enjoyable. We collect caterpillars, take care of them and see if they are parasitized. Finding caterpillars isn't too hard, but finding more than a very few of any particular caterpillar species can be quite difficult, depending on the species. Since we want to look at caterpillar species in several different types of forests in different countries, from deserts to primary forests that have been around for hundreds of years, we will need as much help as we can get. Of course, the work entails more than just collecting and caring for caterpillars, and past volunteers have found a good mix of jobs to keep their interest piqued.

We are going to be in the field a great deal (with some time in the caterpillar shed, caring for caterpillars and entering data), hiking along roads and on trails, searching off-trail, and experiencing various adventures. The best part about working in the field is, of course, that we are working in one of the most diverse spots on Earth and will see much more than just caterpillars and plants.

I look forward to working with you in Ecuador.

Sincerely,

Lee Dyer, Earthwatch scientist

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The Research

Climate Change and Caterpillars

The *Climate Change and Caterpillars* project is an ongoing ecological investigation dedicated to studying and disseminating ecological information on caterpillars, their host plants, and the parasitic wasps and flies (parasitoids) that kill caterpillars. Well over half the described organisms in the world are involved in plant-insect-enemy interactions and research on these diverse interactions has provided the basis of our understanding of fundamental issues in ecology and evolutionary biology. Nevertheless, most biodiversity inventories focus on static species lists, and prominent theories of diversity still ignore trophic interactions. The lack of a simple interaction metric that is analogous to a species count is one reason why diversity of interactions is not examined as a response or predictor variable in diversity studies. Using Earthwatch data on plant-herbivore-enemy trophic chains, we developed a simple metric of diversity in which diversity indices are calculated with links as the basic unit rather than species. Interactions include all two-link (herbivore-plant and enemy-herbivore) and three-link (enemy-herbivore-plant) chains found in a study unit. We have used Earthwatch data to examine this diversity measure and have demonstrated that it can provide important insight into hypothesized relationships between climate change, diversity, stability, productivity, and ecosystem services. One main focus of this Earthwatch project is to test specific hypotheses about how diversity of interactions varies across major environmental gradients.

The other major focus of our Earthwatch research is to examine more closely the relationships between climatic variability and multitrophic interaction diversity. Insect outbreaks are expected to increase in frequency and intensity with projected changes in global climate through direct effects on insect populations and through disruption of community interactions. While there is much concern about mean changes in global climate, the impact of climatic variability itself on species interactions has been less explored. Using data from all of our Earthwatch sites, we compared caterpillar-parasitoid interactions across a broad gradient of climatic variability and found that among fifteen geographically dispersed databases parasitism levels decrease as climatic variability increases. Specialized wasp enemies (parasitoids) drive this pattern, suggesting that climatic variability impairs the ability of specialized parasitoids to track host populations. Given the important role of parasitoids in regulating insect herbivore populations in natural and managed systems, we predict an increase in the frequency and intensity of herbivore outbreaks through a disruption of enemy-herbivore dynamics as climates become more variable. Models of climate change have predicted greater frequency and duration of droughts in some areas, increased periods of high precipitation in others, and a widespread increase in the frequency of extreme weather events. Increased unpredictability and variability in regional climates, particularly with regard to precipitation, should have large impacts on interaction diversity, yet there is still a great deal of uncertainty about the potential effects of increased extreme weather events on biotic communities. Interaction diversity will decline during extreme weather events because of stochastic local extinction of small populations resulting from greater desiccation and caterpillar seasonality. This will lead to unstable ecosystems and decreases in ecosystem services.

Why is measuring interaction diversity important for biodiversity research? An interaction diversity approach to ecological research can contribute to all of the major theoretical and applied issues in biodiversity research, including the following:

- 1) the latitudinal gradient in diversity,
- 2) neutral theory,
- 3) diversity-stability relationships,
- 4) biodiversity and ecosystem function,
- 5) specialization,
- 6) latitudinal and elevational range size, and
- 7) effects of climate change on biodiversity.

Hypotheses relevant to these issues have generated a considerable number of empirical and theoretical studies, but reviews of this literature acknowledge that there are substantive questions that remain unresolved for all of these diversity patterns and hypotheses. For many relationships, such as correlations between biodiversity, stability, and ecosystem function, interaction diversity is a more intuitive variable for understanding mechanistic relationships. It is easier to explain or model the consequences of loss of interaction diversity than it is to understand the loss of species diversity. For example, much of the historical and current debate concerning the relationship between diversity and stability of ecological communities is concerned with the number of trophic links (i.e., connectance) and their relative strength. Our plan to extend analyses of these issues beyond species diversity and abundances by examining interaction diversity will provide considerable insight into the ecosystem consequences of climate change as well as the mechanisms involved.

Project Goals

- Determine the effects of climate change on interaction diversity of plants, caterpillars, and associated parasitoid hymenoptera and diptera.
- Disseminate this information with publications in peer reviewed literature, popular literature, and via a searchable database publicly accessible through the internet and available worldwide.
- Work with teachers, students, and local communities to increase awareness of the importance of biodiversity.

Methods

The project focuses on coordinated sites across the Americas, including Costa Rica, Ecuador, Arizona, Louisiana, and the Great Basin/Sierra Nevada. The research will be conducted by the Earthwatch scientists, Earthwatch volunteers, and a full research crew. We will collect thousands of species of externally feeding or shelter-building caterpillars in 10 m diameter plots and rear out adult moths or the parasitoids that have attacked them. Adult specimens will be pinned and curated using standard techniques, and our network of collaborating scientists will identify known species and provide descriptions for new species. Plant-caterpillar-parasitoid affiliations will be determined from our plot data and we will quantify diversity of interactions. Data will be used to test these hypotheses about relationships between climate change, interaction diversity, and ecosystem stability and services.

Impacts

Contributions from Earthwatch volunteers will allow us to:

- Develop a new approach to studying biodiversity that enhances our ability to test prominent and controversial hypotheses that require long-term and large-scale comparative data sets.
- Coordinate with similar ongoing surveys to provide a more comprehensive data set across the Americas, resulting in important ecological and conservation publications.
- Disseminate the results via the Internet (on www.caterpillars.org).
- Produce bilingual literature of use to ecologists, educators, and the general public.
- Provide employment to locals at all of our sites and increase the involvement of locals and land managers.

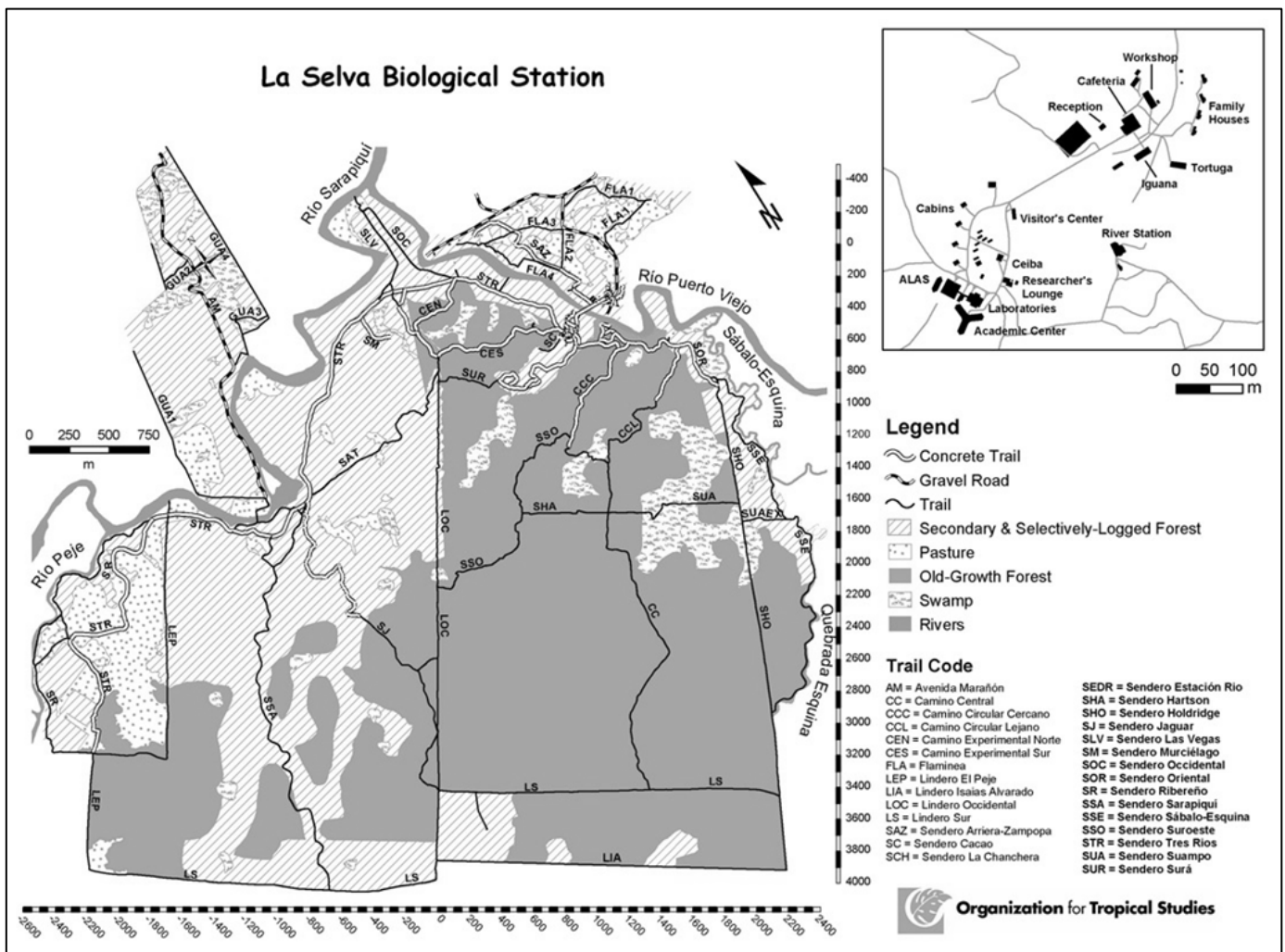
We plan to continue working with teachers, locals, and land managers in conjunction with our Earthwatch funded work. Our Earthwatch proposal utilizes several approaches to unite workers from Costa Rica, Ecuador, United States, Brazil, and other countries to maximize the effectiveness of interaction databases in the Americas. The education and employment of students and local workers on our projects enhances the credibility of conservation projects and provides research opportunities for local students and paraecologists and our results should continue to generate considerable interest from the popular media. Conservation issues cannot wait for a complete understanding of biotic community assemblages. Our proposed interaction diversity metric should form a basis for developing realistic measures of community structure for comparative purposes applicable to conservation. Marrying natural history, ecology, and conservation through the quantified sampling of interaction diversity is one way forward to understanding the evolution, maintenance, and preservation of rapidly dwindling biodiversity.

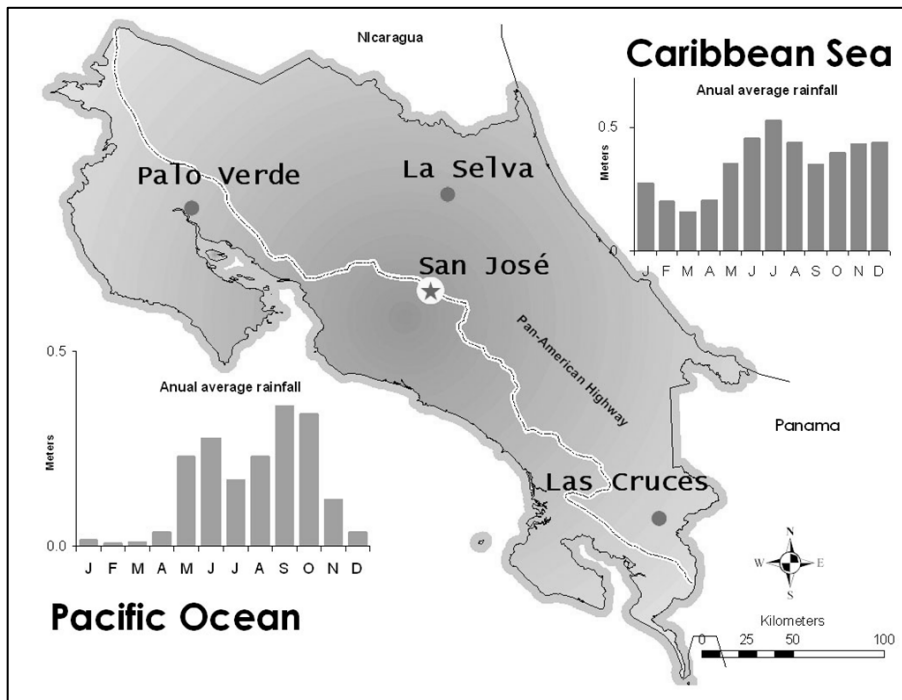
Research Area

La Selva and Tirimbina are located in the Caribbean lowlands of Costa Rica near the town of Puerto Viejo de Sarapiquí in Heredia province. The area is at the confluence of two rivers, Rio Sarapiquí and Rio Puerto Viejo. La Selva is composed of 3,795 acres of primary forest (62%), secondary forest (11%), and abandoned plantations (8%). Tirimbina is just 840 acres in area but has been declared a Costa Rican National Wildlife Refuge and has primary and secondary forest as well as abandoned pasture and cacao plantations.

Like the rest of Costa Rica, biological diversity is very high at the reserves. This diversity includes thousands of species of insects, over 2,000 species of plants, and hundreds of species of birds and mammals. During a typical walk in the area, a visitor will see peccaries, coatis, sloths, monkeys, toucans, parrots, and at least a dozen species of butterflies. The lucky visitor may see an ocelot, jaguar, or other cat species in the forest. The 300 species of caterpillars with which the project will work are only a fraction of the estimated 5,000 species that occur at La Selva (about 4,500 moth species and 500 butterfly species).

This rainforest environment is typically very warm and humid and receives about four meters (thirteen feet) of rain each year. For more information on the conditions of the research area, including potential hazards, see the *Project Conditions* section.





Research Achievements

To effectively protect and manage diminishing natural ecosystems, the project needs as much information as possible about the organisms that live there and how they interact, particularly organisms as diverse and important as parasitoids. Therefore, any study in a rainforest, cloud forest, desert, or diverse temperate forest that increases general natural history knowledge, as this project has done, is a benefit to everyone who wishes to protect them (and even to those who do not). The project's most significant accomplishment is the compilation of natural history data

related to approximately 5,000 combined species of caterpillars, plants and parasitoids. The project has been able to share its natural history information with locals and scientists alike. The researchers have given talks in Spanish to Costa Rican and Ecuadorian students, naturalists and local workers, and feel that these talks have increased their audiences' awareness and respect for the diversity of caterpillars around them. Many of the naturalist guides at La Selva now point out caterpillars in their tourist walks and discuss the role they play in the forest. We are also sharing these data with anyone who has Internet access by slowly publishing all of it on caterpillar webpages at www.caterpillars.org as well as gusanos.org.

Managers of banana plantations and other agricultural systems who are attempting to control pests without using pesticides will benefit from increased knowledge of the parasitoid community. There are two ways that this can occur:

- 1) The project can find new species of parasitoids that may be useful in controlling pests of nearby plantations
- 2) The project can guide existing biocontrol programs by predicting which types of enemies are likely to be the most successful for controlling a particular pest

For the first objective, the project found at least 10 new species of parasitoids in the families Braconidae and Tachinidae that are currently being treated by taxonomists. For the second objective, the project used prey defensive characteristics as predictors of successful pest eradication by predators versus parasitoids. Predictions derived from models explained 53% of the variation in success of biocontrol efforts. Earthwatch volunteers have enhanced the project database to the point that it is almost able to construct similar predictive models to determine which families of parasitoids are the best for pests with given characteristics, which is the next goal. Eventually, we plan to start working with local farmers or individuals near the Ecuador and Arizona sites as we have already done in Costa Rica, where we work with investigators at CORBANA (a cooperative for small banana farmers) and at EARTH (Escuela de Agricultura de la Region Tropical Humeda) facilities near Gaupiles (Costa Rica) to attempt to put the new parasitoid information and model predictions to practical use.

The project benefits the local communities by supporting the research stations and by continuing collaborations with local naturalists and scientists. Many of the research projects benefit the local community by providing excellent employment opportunities that are not destructive to the forest and by boosting the local economy. At the Costa Rica site, we have been able to provide long-term employment to local naturalists, and plan to continue hiring as many local naturalists as possible.

Additionally, the project has benefitted schools through the participation of school teachers and high school students as volunteers who then incorporated ideas learned from this project into their classes. The larger educational community has also benefited because the research addresses basic theoretical questions in ecology.

In the past two decades, ecological research on natural enemies of insects that eat plants has increased dramatically because there are many important issues in ecology and evolutionary biology that required closer scrutiny of the interactions between insects and their natural enemies. These issues include: hypotheses about the importance of top-down versus bottom-up forces in regulating insect communities, hypotheses about predation and plant chemistry as selective forces in the evolution of dietary specialization, and questions about the utility of natural enemies in integrated pest management. One particularly interesting and useful result is that caterpillars can affect plant species diversity in the understory of the wet forest at La Selva. Since very little is known about what factors are important determinants of understory plant diversity, we plan to explore this issue further.

PROJECT STAFF

Earthwatch scientists

Dr. Lee Dyer is an ecologist who has worked with a variety of organisms in the tropics for the past 17 years and in temperate areas for the past 21 years. He received a BS in biochemistry and English from the University of California at Santa Barbara and a PhD in ecology from the University of Colorado, Boulder. Lee was a professor for five years at Mesa State College in Colorado, where he established the Western Colorado Center for Tropical Research. He is now a professor in the Biology Department at the University of Nevada, Reno. Lee spends his free time hanging out with his son, rock climbing, listening to music and reading books. He will be in charge of all aspects of the project, and his specialties relevant to the project are statistical modeling, community ecology, caterpillar natural history and basic natural products chemistry.

Dr. Angela Smilanich is an ecologist who has worked with lepidopteran larvae (caterpillars!) for the past 10 years. Starting as an undergraduate majoring in biology at Mesa State College in Colorado, she has pursued a career studying how and why a caterpillar chooses to eat certain plants and not others. She received her PhD in 2008 from Tulane University in New Orleans, Louisiana, enduring yearly hurricanes and Mardi Gras. Her dissertation work focused on the causes of variation in the caterpillar's immune system. Her most recent research as a postdoctoral scholar at Wesleyan University in Connecticut focuses on the self-medication behavior of woolly bear caterpillars. In her free time, Angela enjoys running, reading, traveling and eating delicious chocolate. Angela will be in charge of team activities, field work and lab work on the caterpillar immune system.

Earthwatch field staff

Andrea Glassmire is currently a graduate student at the University of Nevada, Reno, working toward a PhD in ecology, evolution and conservation biology in Lee Dyer's laboratory. She began her path in academia as an undergraduate at the University of Pittsburgh, where she earned a BS in ecology and evolution. While she has studied herbivore-plant interactions of invasive species, her research interests now lie in nutrient cycling between plants, herbivores and their natural enemies and resource allocation towards plant chemical defense. Andrea has helped lead an Earthwatch team in Costa Rica. In her free time, Andrea enjoys reading, backpacking, traveling, fishing and meeting new people.

Humberto Garcia is a Costa Rican naturalist and *gusanero* (caterpillar collecting/rearing expert). He grew up in Sarapiquí and has been rearing caterpillars for this project for the last eight years. When he's not finding and

caring for caterpillars, Humberto enjoys playing the guitar and spending time with his family. He will be in charge of all caterpillar rearing.

Logistics Staff La Selva Biological Station has a very large and excellent staff that will take care of all logistical concerns, including meals. At Tirimbina Rainforest Center, volunteers will participate in cooking.

Staffing Schedule (Subject to Change)

All Earthwatch scientists and field staff will be present for Team 6.

DAILY LIFE IN THE FIELD

VOLUNTEER TRAINING AND ASSIGNMENTS

Training

The team will be divided into groups, with the composition changing frequently to allow everyone to get to know each other. The tasks are varied enough that each volunteer usually finds a niche and feels satisfied with his or her contribution to the team effort. When the team is not working, there are many events that contribute to team development. At La Selva and Tirimbina, project staff members are friends with people in the local community and with other investigators, and participate in the many events that usually occur in town and at the stations. Volunteers are always encouraged to participate in these events, which may include music, dancing, *majenga* (pickup soccer), lively discussions at meals, barbecues and parties. Also, each evening there will be time for discussions about the progress of the research and feedback from the volunteers. In addition, many of the researcher events at La Selva are open to Earthwatch volunteers.

All field training will be conducted in the first two days at the field station. The team will go on an orientation hike with the Earthwatch scientist(s) or a staff member and will spend some time in the laboratory learning all of the techniques to be used; then volunteers will practice the various jobs under staff supervision. The researchers are confident that the team will collect quality data because past field training has been very successful. There were no statistical differences between data collected by different teams or between data collected by the project staff versus volunteers.

The researchers will give at least three informal lectures, with topics including:

- Introduction to caterpillars, the theory behind the project, the methods to be used and the plan of action (second night)
- Natural history and ecology of parasitoids (third night)
- Caterpillar taxonomy (fifth night)

Usually one or two extra lectures are added if requested by volunteers. Any other talks will be optional and will be open to other researchers and visitors to the stations. It is very common for researchers to present lectures on their projects, so you will have the opportunity to learn about other ecological research.

The Earthwatch scientist(s) will give a more detailed onsite project briefing when you arrive.

Assignments

Volunteers will be involved with most aspects of the project. The work includes helping in the field as well as the laboratory. No special skills are needed, but a minimal knowledge of Spanish is helpful. The project welcomes anyone with skills in chemistry.

Fieldwork

Work in the field (about 70% of total time) will be divided between four different tasks:

- 1) Searching for caterpillars (40%)
- 2) Collecting host plants (30%)
- 3) Conducting chemistry bioassays (20%)
- 4) Maintaining experiments (10%)

All of these tasks need to be done continuously, so volunteers can choose to do particular ones more frequently if preferred. Searching for caterpillars in the forest is very straightforward, and all volunteers will be given plenty of instruction and tips on successfully finding caterpillars. Host plant collection involves hiking to previously located sites of host plants and gathering leaf material for caterpillars being reared in the laboratory. The bioassays involve simple laboratory or field experiments with caterpillars or ants.

Laboratory Work

Work in the laboratory (about 30% of total time) will include five different tasks:

- 1) Making extracts from plants and caterpillars (5%)
- 2) Conducting laboratory chemistry or experiments (5%)
- 3) Entering data (20%)
- 4) Working on computer tasks (10%)
- 5) Caring for caterpillars in the project's "zoo" (60%)

Again, all of these tasks need to be done continuously, so volunteers can choose to do particular ones more frequently. The laboratory chemistry and experiments involve making artificial diets for caterpillars, injecting caterpillars with imitation parasitoid eggs, and performing caterpillar dissections. Rearing caterpillars consists of moving the caterpillars into clean bags, checking them for parasitoids, moving pupae to different bags and collecting adults or parasitoids from the bags. Adults are either released or preserved for further identification. There are several established labs at La Selva, including the project's own caterpillar rearing laboratory, which is reached via a two-mile walk through the forest. The caterpillar rearing labs all have lines for hanging caterpillar bags, tables for processing and observing caterpillars, and great views.

TEAM ITINERARY AND DAILY SCHEDULE

Be aware that schedules can and do fluctuate as weather and work conditions can affect the daily schedule. Should this situation arise, your cooperation and understanding are appreciated.

Day 1

Arrival, introductions, dinner

Day 2

Travel to La Tirimbina Rainforest Reserve, orientation walk, evening talk followed by planning

Days 3 – 4

Time of Day	Activity
7:30 – 8:30 a.m.	Breakfast
9:00 a.m. – 12:00 p.m.	Fieldwork
12:00 – 1:00 p.m.	Lunch
1:00 – 3:30 p.m.	Fieldwork for half of the team, lab work for the other half
3:30 – 6:00 p.m.	Recreational time (excellent time for birding, swimming, playing soccer, hiking, etc.)
6:00 p.m.	Dinner
7:30 – 8:30 p.m.	Discussion and planning time
8:30 p.m.	Recreational time

Days 5 - 6

One-and-a-half recreational days (these days are not fixed).* On Day 6 the team will travel from La Tirimbina to La Selva Biological Station.

Days 7 - 9

Time of Day	Activity
7:30 – 8:30 a.m.	Breakfast
9:00 – 12:00 p.m.	Fieldwork
12:00 – 1:00 p.m.	Lunch
1:00 – 3:30 p.m.	Fieldwork for half of the team, lab work for the other half
3:30 – 6:00 p.m.	Recreational time (excellent time for birding, playing soccer, helping with other researchers' projects, hiking, etc.)
6:00 p.m.	Dinner
7:30 – 8:30 p.m.	Discussion and planning time
8:30 p.m.	Recreational time (good time for night walks, talking to other biologists or visitors, trips into town or the local bar, and catching up on emails)

Day 10

Finish all projects and prepare labs for maintenance by staff, travel to San Jose

Day 11

Departure

*Volunteers are encouraged to consult staff at the research station, local residents, or guidebooks about ideas for activities on the recreational days. While the Earthwatch scientists will not be arranging group excursions or activities for recreational days, one or two activity options will be provided to choose from, including taking a taxi to Volcan Arenal (La Fortuna) to spend the night. There are also many things to do at Tirimbina. Most day excursions will cost US\$50-300 (including transportation), while staying at the station and enjoying the forest is free.

Earthwatch Recreational Time Policy

Earthwatch will generally accompany participants from the rendezvous to the end of the expedition except for recreation time.

- For days when no research activities are scheduled, referred to as recreational days, Earthwatch scientists will offer either a planned team activity or a range of recreational activities that have been vetted and comply with Earthwatch standards. Participants will also have the option of remaining at camp or project accommodations to rest.
- Participants who are determined to pursue options other than those recommended by the project staff will be required to sign a release before doing so. If there is a period of time during a regular research day when no research activities are scheduled, adult participants may have the opportunity to leave the project site on their own; they will be asked to sign out of the project giving their intended destination. Not appearing for the next scheduled activity will trigger the Emergency Response Plan (ERP) regarding missing people. Earthwatch will assess the general risks of adult participants leaving the project site on their own at night after work hours but cannot guarantee participant safety or an awareness of all issues.
- In some cases, due to local conditions, it may be advisable to restrict adult participants to the project camp or accommodation after dark. This will be clearly communicated in the on-site safety briefing. However, if the local conditions are such that adult participants can go out at night under their own recognizance there will be a sign-out process through which participants should state their proposed destination and estimated return time. Participants will be given 24-hour contact information for project staff should assistance be needed. The sign-out is informational only and will not be used to enforce a curfew on adult participants. Adult participants should understand that unless contacted for help, project staff will not start a search for a missing participant unless he/she fail to appear the following morning or for the next scheduled research activity.

ACCOMMODATIONS



Tirimbina Rainforest Center. Photo courtesy of www.caterpillars.org.

The team will start out at **Tirimbina Rainforest Reserve**. Tirimbina is a small station, and the Earthwatch team members will likely be the only researchers using the accommodations. Single rooms are not available. Couple rooms may be requested (but are not guaranteed) by contacting Earthwatch before the start date of the team. The team will hike through the forest (luggage will be brought in by car) to reach cabins with a gorgeous view. This area has solar power to provide electricity in the evenings, but there are no computers or phones. At the station, volunteers will put their culinary skills to the test to help with cooking as there is no staff to prepare meals. The bedrooms are new with two single-gender bunk beds per room, and linens are provided. Additional attributes at this site include a small private *futbol* field for friendly games, a covered outdoor area away from the rooms for evening festivities, and a fantastic swimming hole to cool off after a long day in the field.

Halfway through the expedition, we will move to **La Selva Biological Station**. La Selva is a larger and very modern research facility, and the accommodations are considered luxurious by most tropical biologists (bear in mind that a tropical biologist's idea of luxury may not match your own). Normal accommodations are bunk beds in single gender, dormitory-style rooms that house 2-5 individuals. The beds are comfortable, and sheets and towels are provided. Each room has electricity (120 volts, US-type plug), a fan, and a lockable cabinet for valuables. Bathrooms are unisex and shared. They have flush toilets and private shower stalls with changing anterooms. Showers have electric hot water heads that usually work, while the sinks have only cold water. Tap water throughout La Selva is potable. Laundry facilities (washers and dryers) are available in the afternoons free of charge. Free Internet access is usually available. There are also public telephones; international phone cards can be purchased at the station's gift shop. The station is a one-mile walk from the caterpillar lab, down a paved trail through the forest. Not all volunteers will need to walk to this lab every day.

Note: you are advised to bring a headlamp for reading in bed when the overhead room lights go out, which is whenever the first person in your room asks that they be turned off.

FOOD

Volunteers will help with cooking at Tirimbina, whereas at La Selva, the food will be cooked by staff. Food at both sites will be varied due to the international crew of researchers; however at La Selva it will consist mainly of typical Latin American meals. The cooks are amazing and meals are always enjoyable. Everyone eats together in a large dining room. It is also possible to walk into town (45-minute walk) and eat at any of several good restaurants. For long field days, bagged lunches consist of sandwiches, fruit, juice, and cookies.

Below are examples of the foods you might expect in the field. Please bear in mind that variety depends on availability. This list is intended to provide a general idea of food types, but it is very important that volunteers be flexible.

Breakfast: Beans, rice, eggs, fruit, cereal, coffee

Lunch/Dinner: Beans, rice, soup, potatoes, salad, meat (substitute for vegetarians), vegetables, fruit, dessert

Snacks/Other: Cookies, ice cream and yogurt available for sale at La Selva

Beverages: Water, fruit juices (beer and soft drinks available at La Selva at your own expense)

Water: Tap water at Tirimbina and La Selva is potable

Special Dietary Requirements

Please alert Earthwatch to any special dietary requirements (e.g. diabetes, lactose intolerance, nut or other serious food allergies) as soon as possible, and note them in the space provided on your Volunteer Forms. Accommodating special diets is not guaranteed and can be very difficult due to availability of food, location of field sites, and other local conditions.

Special note to vegans and strict vegetarians: Please be aware that it is often difficult to accommodate strict vegetarians and vegans. It may be possible to get meatless meals but vegans and strict vegetarians may have a problem avoiding animal products altogether. If this poses a problem, then participation on this Earthwatch expedition should be seriously reconsidered.

Project Conditions

Please show this section to a doctor when he/she is completing your health form. Be sure to discuss inoculation requirements with the doctor well in advance of your departure date. See the Health Information section for inoculation information.

To the doctor:

This patient has volunteered to join a field research team that has specific physical demands of which you and he/she should be aware. **We need your accurate evaluation of this patient's ability to meet the conditions detailed below in order to care for his/her health and safety and assess that he/she can participate fully and effectively.**

General Conditions

You will be working in a tropical wet forest that receives about four meters of rain each year. It is usually very warm and humid, with average temperatures varying from 25°C/77°F in January to 27°C/83°F in August. The trails can be hilly and muddy, and off-trail terrain is usually steep, muddy, and densely vegetated.

The weather is expected to vary within the limits below.

Conditions during December/January

Humidity	70%	to	100%
Temperature range	21°C/ 70°F	to	29°C/ 85°F
Altitude	183 m/ 600 ft	to	305 m/ 1,000 ft
Annual Rainfall	122 cm/ 48 in	to	472 cm/ 186 in

Physical Demands

Searching for caterpillars involves a good deal of hiking in the forest, through plenty of mud and up and down numerous hills. It is very important to have a good, comfortable pair of rubber boots (also known as Wellingtons or gumboots) for hiking in the mud and an additional pair of shoes or boots for hiking on roads and cement trails. The hiking can be as strenuous or easy as each volunteer feels is appropriate, since the caterpillars occur all over the reserves.

Other field efforts, such as the bioassays, are not very physically demanding but could be difficult since staying steady and recording data while being eaten by dozens of species of insects is no easy feat.

Some visitors to tropical forests have also needed to come to terms with their phobias of spiders and snakes. Both are ubiquitous in the forest, and can also appear in the laboratories and rooms.

Below are the expected demands of the project, but please keep in mind that conditions may change and the project could potentially be more or less strenuous than the chart indicates.

Activity	Workload/Intensity
Sitting	For 2-3 hours per day on 8 days
Bending	For 1 hour per day on 8 days
Walking	1-3 miles per day on 8 days

POTENTIAL HAZARDS

There are a number of health hazards associated with working in the tropics, such as bot flies, hook worms, various body fungi and leishmaniasis, but most of the hazards are minimal and only result in minor discomforts. There are good doctors and pharmacies in Puerto Viejo, which is 10 minutes away by car. The nearest full-facility hospital is about 30 minutes away. If you feel sick after the trip, remember you've been in the tropics and search for a doctor that knows about tropical diseases. The most common daily hazard will be simple dehydration. See the chart for potential hazards associated with the project and research area.

Hazard Type	Associated Risks and Precautions
Transportation	The bus that takes volunteers from San Jose to La Selva travels on a wet and winding paved mountain road that is subject to minor landslides.
Terrain	The terrain at La Selva and Tirimbina is very hilly and some trails are quite steep. The cement and wood trails can get very slippery, and the mud trails are sometimes difficult to navigate due to water and deep mud. Walking slowly and carefully can avoid injury. Bring appropriate footwear and remember that the hiking can be as strenuous or easy as you feel is appropriate.
Animals/Plants	There are poisonous snakes, some irritating plants, and plenty of biting and stinging insects. Snakebites are not common at La Selva, but the use of tall rubber boots in the field and flashlights at night are necessary precautions. Insect repellent can be used to ward off mosquitoes, chiggers, biting flies, and other insects. Most of the plants are harmless to people, but there are some plants that are poisonous and can cause rashes, and these will be pointed out to the volunteers.
Climate/Weather	There will be a lot of rain, so please bring appropriate rain gear. When it is not raining, the sun will be very intense; therefore a wide-brimmed hat, sunscreen (SPF 30 or higher) and staying well hydrated are critical.
Project Tasks/ Equipment	Volunteers will use pruning clippers, which can cause injuries. You will be instructed in their proper use to minimize the risk of injury.
Personal Security	Some volunteers have had items stolen that they stored at the hotel or left unsecured in their rooms at the station. Please remember to leave valuables at home where possible, or properly secured while at the hotel or research site.
Swimming	Be aware that swimming may be possible during recreational time and typical water-related risks will be present. A certified lifeguard will not be available. Volunteers should not swim alone—always inform staff when swimming.
Disease	Please consult a travel doctor before leaving to discuss immunizations and precautions to take against tropical diseases. See the <i>Health Information</i> section.
Traveler's diarrhea	Traveler's diarrhea affects 20-50% of all international travelers. Always wash your hands with soap and water or a hand sanitizer before eating, and drink filtered or bottled water. You should also carry an over-the-counter anti-diarrheal medication in your personal first aid kit. Speak to your doctor about other options for treating traveler's diarrhea and see the ISOS or CDC websites for advice on avoiding this condition.

HEALTH INFORMATION

See www.internationalosos.com for information on the current health conditions in Costa Rica. At the homepage, enter Earthwatch’s member identification number: 14ACPA000075. Under “Select Resource” choose “English Country Guide,” and then select Costa Rica from the list.

Routine Immunizations

All volunteers should make sure to have the following up-to-date immunizations: DPT (diphtheria, pertussis, tetanus), polio, MMR (measles, mumps, rubella) and varicella (if you have not already had chicken pox). Please be sure your tetanus shot is current.

Project Inoculations

Medical decisions are the responsibility of each volunteer and the following are recommendations only. While Earthwatch can provide details regarding suggested inoculations, we are not a medical organization and decisions about which inoculations to receive should be made between you and your doctor. Health conditions around the world are constantly changing, so keep informed and consult your physician, a local travel health clinic, the US Center for Disease Control (www.cdc.gov), the World Health Organization (www.who.int), and International SOS (see above) for the latest health information for travelers. Please consult your physician for guidance on inoculations if you intend to travel to other parts of the country.

	Required for Entry	Recommended for Health Reasons
Typhoid		X
Yellow fever	X - if traveling from countries or region where it is endemic, a Certificate of Vaccination is required.	
Hepatitis A		X
Hepatitis B		X

Advice Regarding Diseases

- *Malaria*: Though not known to be present at La Selva or Tirimbina, it is in other parts of Costa Rica. The CDC advises taking an anti-malarial prophylactic. Please speak with your doctor.
- *Rabies*: Vaccinations are generally recommended for this expedition due to the uncertainty of post-exposure vaccinations in Costa Rica. The rabies pre-exposure vaccination consists of three doses over a 28-day period. Please be sure to consult your doctor or travel health clinic well in advance to ensure you have time for the full vaccination series. If you have previously been vaccinated, you must have a medical professional check your antibody levels; a booster shot may be required. Rabies is a fatal disease. Treatment after rabies exposure requires immediate care (within 24 hours), and this type of rapid response will not be available to volunteers on this project due to the remote locations. Pre-exposure vaccination does not eliminate the need for post-exposure medical attention and treatment, but it does provide additional protection against the disease in event of a delay in treatment. In addition, any bites or scratches should be immediately and thoroughly washed with soap and clean water and a topical povidone-iodine solution or ethanol.
- *Tuberculosis*: The WHO estimates that one-third of the world’s population is infected with the bacterium (*M.tuberculosis*) that causes tuberculosis (TB). Incidence of tuberculosis is higher in developing countries, particularly in Asia, Africa, the Caribbean and Latin America. In general, approximately 10% of persons infected with *M. tuberculosis* are at risk for developing active TB during their lifetimes. TB is considered highly treatable with medications that are of relatively low toxicity and cost. Volunteers returning from developing countries are encouraged to have a (PPD)-tuberculin skin-test to screen for potential infection.

- *Dengue fever*: Dengue fever is endemic in Costa Rica and in more than 100 countries in Africa, the Americas, the eastern Mediterranean, Southeast Asia and the western Pacific, and can occur throughout the year. Globally there has been a 30-fold increase in the number of reported cases of dengue. Dengue fever is a flu-like virus spread primarily by day-biting mosquitoes. It is characterized by fever, headache, rash, vomiting and severe muscle pains. There is no vaccine, and mosquito bites should be avoided whenever possible. Insect repellent and long sleeves and pants are highly recommended. There is no treatment for standard dengue fever other than acetaminophen (avoid aspirin), fluids and rest. It is usually resolved after about two weeks. However, hemorrhagic dengue fever, characterized by bleeding and shock, can occasionally occur and requires medical care.

MEDICAL CONDITIONS OF SPECIAL CONCERN

Condition	Concerns and Precautions
Limited mobility	Conditions that limit agility, mobility, or ability to hike for extended distances or balance on unstable or slippery surfaces should be considered carefully.
Sensitivity to heat	It can be very hot and humid at the research site; volunteers who have problems in such climates should be aware of this.
Phobias	Phobias of any insects or animals or a fear of heights (there is a very high suspension bridge that must be crossed daily) may prove difficult for some.
Impaired hearing	Because of the high humidity, those persons using a hearing aid device may find it doesn't work properly. You should consider purchasing a hearing aid dehumidifier. See http://www.shopmash.com/AIDS_TO_DAILY_LIVING/HEARING_ASSIST_DEVICES/HEI400587/product.aspx for one example.
Sleep apnea or conditions that require use of C-PAP machine	Volunteers must be able to do without C-PAP machines for the length of the project as this project may not have a reliable source of electricity throughout the night
Pregnancy	This project site is remote with limited emergency response in case of medical concerns. If you are pregnant, you should discuss with your physician prior to considering this project.

Additional Health Information Resources

- Travel health website: www.mdtravelhealth.com
- The Travel Doctor: www.tmvc.com.au
- Australian Department of Health and Aging: www.health.gov.au
- Hospital for Tropical Diseases: www.thehtd.org
- Travellers Healthline Advisory Service Tel: 020 7950 7799
- MASTA Travelers' Healthline (UK) Tel: 0906 8 224100 (within UK)

EMERGENCIES IN THE FIELD

Proximity to Medical Care

Nearest clinic	Clinica del Seguro Social de Puerto Viejo de Sarapiquí Puerto Viejo Tel: 2 766-63-07 Time to reach from the station: 15 minutes
Nearest hospital	Guapiles (full service hospital) Time to reach from the station: 30 minutes

COMMUNICATIONS

Emergency Communications in the Field

At La Selva phone and email are available for emergency communications; no field communication devices are available. There are no phones or email facilities at Tirimbina.

The emergency contact number at Earthwatch in the US is +1 978 461-0081. After business hours, leave your message with the live answering service. State that you have an emergency communication and leave a clear message with the name of the expedition, your name, location from which you are calling, and if possible, a phone number where you can be reached. An Earthwatch staff person will be contacted and will respond to your call within one hour.

Personal Communications

At La Selva, volunteers can be reached in the field by phone, fax and email (see chart below). Email is the most reliable. Cell phones don't work at the stations. There are pay phones in the dining hall area at La Selva; cards for these phones are sold at the gift shop. International calling cards are not always functional. Phones and email access will not be available at Tirimbina.

Family and friends of Earthwatch volunteers should be aware that personal communication with outsiders is not always possible while participating in an expedition. Earthwatch encourages volunteers to minimize outgoing calls; likewise, family and friends should restrict calls to urgent messages only. Measures have been taken to ensure that appropriate communication tools are available in cases of emergency.

All volunteers are asked to remember that Earthwatch expeditions offer a rare chance to unplug from hearing ringing phones and having to hear others' phone conversations, and to regulate their cell-phone with respect for fellow volunteers and staff.

Contact Information

In the event of an emergency, the Earthwatch scientist may be reached at a number provided in the print version of this document. Contact your Earthwatch office.

Travel Planning

Note: Earthwatch Institute's international emergency medical and evacuation assistance provider, International SOS, has a wealth of useful information available at their website, including visa, passport, currency, medical, etc. information for the country in which this project takes place. See www.internationalsos.com and enter Earthwatch's member identification number: 14ACPA000075. Under "Select Resource" choose "English Country Guide," and then select this project's country from the list.

You are encouraged to register your travel itinerary with your embassy. For information on embassies around the world see www.embassyworld.com

- Citizens of Australia may register online at: www.orao.dfat.gov.au.
- British citizens may register online at: www.fco.gov.uk/en/travel-and-living-abroad/staying-safe.
- Citizens of the United States may register online at: travelregistration.state.gov.
- Citizens of other countries are encouraged to check with their appropriate embassy or consulate regarding registration.

RENDEZVOUS

The rendezvous information for this project has been removed from this web version of the Expedition Briefing. Please do not make any travel arrangements to join an expedition on this project without having full and up-to-date rendezvous information from Earthwatch. Full rendezvous details including places and times are available from Earthwatch upon request prior to registration for an expedition. Please use the "Contact Us" button on the top right hand corner of our website to get in touch with us and we will be very happy to help you. This information is provided in the printed version of this Expedition Briefing.

PASSPORTS AND VISAS

Passport Information

Most volunteers traveling from outside the host country will require a passport valid for at least six months beyond the dates of travel.

Visa Information

Citizens of the US, EU, Australia, Canada and Japan **do not** need a tourist visa for entry. Citizens of other countries should check with their travel agent or a visa agency for specific visa and entry requirements. Travelers are advised to check visa regulations well in advance of traveling.

Note: If you are traveling from outside the US to Canada, Mexico, Latin America, South America, The Bahamas, or the Caribbean and have a stopover in the US, you are required to register through the ESTA program.

Electronic System for Travel Authorization (ESTA)

Online registration is now mandatory for all visitors traveling to the United States without a visa. The Electronic System for Travel Authorization (ESTA) is used to screen short-term visitors who are citizens of the 36 countries eligible for the US Visa Waiver Program (for a list of participating countries, see travel.state.gov/visa/temp/without/without_1990.html#countries).

Visitors are required to complete ESTA **at least three days before traveling to the US**. Once approved, the authorization will be valid for up to two years if the individual’s passport does not expire in the meantime. Applications can be submitted through the ESTA website esta.cbp.dhs.gov/esta. **Note:** As of September 2010 ESTA will cost approximately US\$14.00.

Citizens of countries covered by the Visa Waiver Program (VWP) traveling to the US for tourism or business for 90 days or less do not need to obtain a visa provided they have a valid passport. (For exceptions see the VWP Quick Reference Guide on travel.state.gov/pdf/VWP-QuickReferenceGuide.pdf).

Essential Information for Volunteers Requiring Visas

Type of Visa	Volunteers requiring a visa must get a TOURIST VISA .
Where to Get a Visa	Contact the nearest Costa Rican embassy or consulate to find out how to apply for your visa. Please note that this process can take weeks or more. We strongly recommend using a visa agency , which can both expedite and simplify the process. See below for a list of visa agencies.
Required Information	You will need to send your passport (valid for at least six months beyond your stay), a Visa Application and Immigration Form, 2-4 passport-size photos plus payment to the embassy or visa agency (if applicable). Please be sure that your passport is valid for at least six months beyond your stay.
Contact Information	You may be required to list the following contact information on your Visa Application and Immigration Form: This information is available in the print version of the briefing.
Cost of a Visa	Generally between US\$40-100, but varies from country to country and can potentially cost up to US\$180 . A visa agency will charge an additional fee.

Reminder: The purpose of your visit is for vacation, holiday or travel. Foreign immigration officials do not always understand the concept of a “working vacation” or even “volunteering.” Words such as “working,” “volunteering,” “research” or “scientific expedition” can raise questions concerning the country’s foreign labor laws and/or prompt questions about official scientific research permits and credentials, etc., to which volunteers on their own will not be equipped to respond. All required research permits for the project are in place and have been approved by the proper authorities.

Visa Agencies

In the United States

Travisa*
290 5th Avenue, 4th Floor
New York, NY 10001
Tel: (212) 613-2223
Fax: (212) 613-2287
Hours: 9:00 AM to 5:00 PM EST
Web: www.travisa.com
(*See the website for additional offices)

In Europe

CIBT, Inc. UK
25 Wilton Road
Lower Ground Floor
Victoria SW1V 1LW
Tel: 0844 736 0211
Fax: +44 (0) 207 828 5411
Calling from Europe outside UK:
+44 (0)207 802 1000
Email: info@uk.cibt.com
Web: www.uk.cibt.com (has alternate address for urgent requests)

In Australia

Ask your travel agency if they can send your visa application on your behalf.

Additional Passport and Visa Resources

- For Japanese citizens: www.rainbowt.jp/travel/visa_top.html
- For Australian citizens: www.passports.gov.au and www.dfat.gov.au/visas/index.html
- For US citizens: www.passportvisasexpress.com
- Travel Document Systems: www.traveldocs.com/index.htm

Volunteers Under 18 Years of Age

Entry to Foreign Countries

It may be possible for 16- and 17-year-olds to participate on standard Earthwatch teams *if* accompanied by a parent or guardian. However, in an effort to prevent international child abduction many governments have initiated procedures at entry/exit points to protect minors. Thus, if a minor will be traveling with only one guardian or if for any reason they will be traveling alone (such as for a Teen Team), it may be necessary to have a notarized letter from all legal guardians stipulating that they may travel unaccompanied or in the presence of a single guardian. This letter must give an explanation for why only one parent or someone other than a parent is signing the letter. For example, if one parent is deceased, only one parent has legal guardianship, or someone other than the parents are legal guardians, the letter should state that.

Airline Documentation Requirements

Airlines may also have documentation requirements for unaccompanied minors. Parents of minors are responsible for checking with each airline that their child will be flying to ensure that sufficient documentation is provided. This could include a copy of a birth certificate or a notarized letter stating that the minor has his or her parent's permission to travel alone or with only one parent.

Important Note: Requirements by specific countries and airlines vary and change frequently. You MUST keep informed of the requirements on your own to avoid problems at immigration. If a letter is not available, the volunteer under 18 can be refused entry into the country or on a flight. There is nothing Earthwatch Institute can do to help in this circumstance.

INSURANCE

MedEvac assistance, advice and insurance are included in the contribution you pay to Earthwatch. It covers your travel medical risks, including medical expenses and emergency medical evacuation, while you are traveling, as well as trip cancellation insurance (see www.earthwatch.org/downloads/Insurance/post15Jan_TravelFAQs.pdf for more details), and baggage and personal money insurance. It doesn't provide personal liability insurance. This coverage is valid in the country of your Earthwatch expedition and during travel to and from your expedition (**Note:** For US volunteers, the coverage is valid only when the expedition is over 100 miles from your place of residence). Please see [the FAQ](#) for information about when coverage starts and ends.

If you have additional vacation time before and/or after your Earthwatch Expedition that forms part of your overall time away from your place of residence, this additional vacation time is not covered under this policy. If you are in any doubt as to whether your travel plans before and/or after your Earthwatch expedition constitute additional vacation time please contact Michelle Ralph at Sutton Winson at michelle.ralph@swib.co.uk.

This insurance policy is secondary to your existing health insurance policy (e.g. the NHS in the UK).

If you signed up through Earthwatch UK/Europe, or Earthwatch Japan:

Details of this insurance policy are included in your expedition briefing pack and can be found at www.earthwatch.org/europe/expeditions/insuranceinfo. Please refer all queries regarding this policy to Michelle Ralph at Sutton Winson in the UK. You can email her at michelle.ralph@swib.co.uk or call her at +44 (0)1444-251164 (fax: +44 (0) 1444-251250).

Information about additional insurance available to UK residents for coverage before or after your Earthwatch project can be found at www.earthwatch.org/europe/insuranceinfo. Should you have any questions about whether you require coverage for your travel plans please contact Michelle Ralph at Sutton Winson (contact info above). Earthwatch is not authorized by the FSA to give advice on any additional travel insurance you require.

If you signed up through Earthwatch US:

Details of the US insurance policy can be found at www.earthwatch.org/expedition/insurance. Please refer any queries regarding this policy to Michelle Ralph at Sutton Winson in the UK, michelle.ralph@swib.co.uk. Or, from the US, dial +011 (44) 1444-251164 (fax: +011 (44) 1444-251250). Please note the time difference between the US and the UK, and call during UK business hours, which are from 08:45 to 17:00 GMT (from November to April) and GMT +1 (from April to November). You may also leave a message and request that she call you back.

Information about additional insurance can be found on www.earthwatch.org/expedition/volunteerresources.

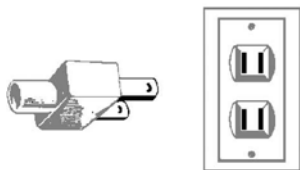
Emergency Medical and Evacuation Assistance (For All Volunteers)

Emergency medical and evacuation assistance is available for all Earthwatch participants from International SOS (ISOS), a 24-hour, independently-operated international emergency medical and evacuation service. Please see the contact information and card on the *General Information* page. Participants should carry the card with them on the expedition.

ADDITIONAL TRAVEL INFORMATION

- *General packing considerations:* Do not bring more luggage than you can carry and handle on your own. If traveling by air and checking your luggage, you are advised to pack an extra set of field clothing and personal essentials in your carry-on bag in case your luggage is lost and/or takes several days to catch up with you. Many airlines have strict baggage policies. Please check with your airline(s) on baggage weight limits, liquid restrictions, fees for checked baggage, etc.
- *Checking luggage:* Please note that if you will be taking an international flight that has one or more connections within the country of your destination, it will be necessary to collect any checked bags at the airport where you first arrive in the destination country. After proceeding through customs, you will have to recheck your luggage before flying on to your final destination.
- *Local currency:* Costa Rican colones. See the International SOS website and www.xe.com/ucc for currency information and exchange rates.
- *Airport Fees and/or Departure Taxes:* Costa Rica airport tax is currently \$26 and is paid at the airport when leaving the country payable in US\$, Costa Rican colones or with a VISA card/
- *Language:* Spanish. All project staff members speak English and the project will be conducted in English.

- *Telephone dialing codes:* When calling Costa Rica from another country, dial the country's international dialing code, followed by (506) and the number. When calling within Costa Rica, omit the (506) and dial the number. When calling another country from Costa Rica, dial (00), followed by the other country's country code and the number. **PLEASE NOTE:** All landlines in Costa Rica are preceded by a 2 and all Costa Rican cell phones are preceded by an 8 (following the country code if necessary). *You should check with your cell phone provider to obtain any carrier-specific dialing codes you may need; many providers have dialing procedures that may differ in whole or in part from these directions.*
- *Electricity:* 120 volts, 60 hertz, plugs with two flat prongs (some also have a third round grounding pin).



Plug Type A



Plug Type B

- *Time zone:* GMT/UTC -6.
- *Personal funds:* You should bring some cash for snacks, extra beverages (e.g. beer or soda) and any trips you may plan for the recreational days. Most day excursions will cost US\$50-300 (including transportation). Cash is better than traveler's checks but cash machines (ATMs) are not easily accessible. You are advised to change money at the hotel on the first evening. You can pay for your taxi from the airport in US dollars or take colones out of an ATM at the airport. Tips are normally included in restaurant bills, so it is not customary to leave an extra tip after eating out.
- *Traveling in San Jose:* San Jose is a large city, and as in all big cities, one should be aware of his/her surroundings while walking around. During the day, it is safe to travel alone in the city, but at night you are advised to go out with other volunteers and to take taxis between destinations.
- *Cultural Considerations:* Costa Rica is a tourist destination and the capital city is very modern, so there are no major cultural concerns when it comes to packing. Western-style swimsuits are fine.

Country Information

- UK Foreign and Commonwealth Office: www.fco.gov.uk/knowbeforeyougo
- Country information from around the world: www.countryreports.org
- National Geographic Map Machine: plasma.nationalgeographic.com/mapmachine
- US State Department: www.state.gov
- Online unit conversions: www.onlineconversion.com
- Worldwide weather: www.wunderground.com or www.tutiempo.net/en
- ATM locator: visa.via.infonow.net/locator/global/jsp/SearchPage.jsp or www.mastercard.com/atmlocator/index.jsp

RECOMMENDED READING

Below are additional recommended materials for those interested in further preparing for the expedition.

Scientific Media

Books

- Dyer, L.A. and A.N. Palmer. 2004. *Piper*. A model genus for studies of evolution, chemical ecology, and trophic interactions. Kluwer Academic Publishers, Boston.

Articles

Available at wolfweb.unr.edu/~ldyer/papers.htm:

- Dyer, L.A., Letourneau, D.K., Vega Chavarria, G. and D. Salazar Amoretti. 2010. Herbivores on a dominant understory shrub increase local plant diversity in rain forest communities. *Ecology* 91: 3707-3718.
- Dyer, L.A., T.R. Walla, H.F. Greeney, J.O. Stireman III, and R.F. Hazen. 2010. Diversity of interactions: A metric for studies of biodiversity. *Biotropica* 42: 281-289 (invited manuscript).
- Dyer, L.A., M.S. Singer, J.T. Lill, J.O. Stireman III, G.L. Gentry, R.J. Marquis, R.E. Ricklefs, H.F. Greeney, D.L. Wagner, H.C. Morais, I.R. Diniz, T.A. Kursar, and P.D. Coley. 2007. Host specificity of Lepidoptera in tropical and temperate forests. *Nature* 448: 696-699.
- Stireman III, J.O., L.A. Dyer (corresponding author), D.H. Janzen, M.S. Singer, J.T. Lill, R.J. Marquis, R.E. Ricklefs, G.L. Gentry, W. Hallwachs, P.D. Coley, J.A. Barone, H.F. Greeney, H. Connahs, P. Barbosa, H.C. Morais, and I.R. Diniz. 2005. Climatic unpredictability and caterpillar parasitism: implications of global warming. *Proceedings of the National Academy of Sciences* 102: 17384-17387.
- Dyer, L.A. 1995. Tasty generalists and nasty specialists? A comparative study of antipredator mechanisms in tropical lepidopteran larvae. *Ecology* 76: 1483-1496.
- Gentry, G.L. and Dyer, L.A. 2002. On the conditional nature of neotropical caterpillar defenses against their natural enemies. *Ecology* 83: 3108-3119.
- Dyer, L.A., M.S. Singer, J.T. Lill, J.O. Stireman III, G.L. Gentry, R.J. Marquis, R.E. Ricklefs, H.F. Greeney, D.L. Wagner, H.C. Morais, I.R. Diniz, T.A. Kursar, and P.D. Coley. 2007. Host specificity of Lepidoptera in tropical and temperate forests. *Nature* 448: 696-699.
- Dyer, L.A., T.R. Walla, H.F. Greeney, J.O. Stireman III, and R.F. Hazen. 2010. Diversity of interactions: A metric for studies of biodiversity. *Biotropica* 42: 281-189.

Popular Media

Books

- Janzen. 1983. *Costa Rican Natural History*. University of Chicago Press.
- Kricher. 1990. *A Neotropical Companion*. Princeton University Press.
- McDade *et al.* 1994. *La Selva: Ecology and Natural History*. University of Chicago Press.

Field Guides

- DeVries. 1987. *Butterflies of Costa Rica*. Princeton University Press.
- Stiles and Skutch. 1989. *A Guide to the Birds of Costa Rica*. Cornell.
- Wagner, D.L. 2005. *Caterpillars of Eastern North America: A Guide to Identification and Natural History*. Princeton University Press.
- Robinson, H. 2006. *Costa Rica: An Ecotraveller's Guide*. Chastleton Travel.

Project Field Report

Each Earthwatch Institute-supported project submits a report on the past year's research and results to Earthwatch, generally on an annual basis. The most recent field report for this project is available online through http://www.earthwatch.org/FieldReportpdf/Dyer_FieldReport2009.pdf.

Project-related Websites

- The caterpillar website: www.caterpillars.org and gusanos.org
- La Selva Biological Station: www.ots.duke.edu/en/laselva
- Tirimbina Biological Station: www.tirimbina.org

HELPFUL RESOURCES

Please see Earthwatch's Volunteer Resources pages for additional information on:

- Travel agencies with whom Earthwatch volunteers can get preferential rates
- Recommended kit and clothing providers
- Recommended travel booksellers

For volunteers who sign up through our US office: www.earthwatch.org/expedition/volunteerresources.

For volunteers who sign up through our UK office: www.earthwatch.org/europe/expeditions/volunteerresources.

Earthwatch Institute Policies & Participant Rights and Responsibilities

This section contains important information concerning Earthwatch Institute policies and participant rights and responsibilities for inclusion on an Earthwatch expedition. Please read this document thoroughly and sign the enclosed liability release form to indicate that you understand and accept the risks inherent to your expedition and the policies, rights, and responsibilities enumerated in this document. Participants will not be permitted to partake in an expedition until Earthwatch has received the signed release form.

Intellectual Property Rights

It is permissible to share photos, videos, and stories of your expedition with family, friends, local media, and in a public forum. Sharing your new perspectives and experiences is welcomed and encouraged; however, please recognize that all information, data, and images shared or gathered in the course of your expedition's field work become the intellectual property of the Earthwatch scientist (ES). Co-opting or plagiarism of data, images, or information gathered during an expedition for use in a scientific thesis, masters or PhD work, or for profit or the academic or business use of a third party without the permission of the ES is strictly prohibited. Please be aware that data gathered during the interviewing of local people becomes the intellectual property of the ES. Earthwatch scientists have the right to place additional restrictions on your ability to share data or certain research-related images.

Conversely, an Earthwatch scientist may give written permission to use data and images for academic or profitable activity. Please be sure to ask what is acceptable to the Earthwatch scientist.

Fellows or scholarship recipients are sometimes required to submit a written report reflecting what they have learned on a project, sometimes as a step toward developing a curriculum. Earthwatch scientists have the right but not obligation to review and edit materials involving information gathered on one of their expeditions.

Discrimination

Earthwatch does not discriminate on the basis of race, religion, ethnicity, national origin, gender, sexual orientation, or any other reason prohibited by applicable law and respects participants' right to privacy. However, you must be aware that local laws in countries in which Earthwatch operates may not be anti-discriminatory and that the possibility exists that local residents may not have an awareness of the best practices regarding discrimination.

Discrimination on the basis of race, religion, ethnicity, or sexual orientation will not be tolerated on Earthwatch teams. Disruptive behavior or verbal, physical, or any other type of abuse or harassment will also not be tolerated. Violation of Earthwatch's non-discrimination policy is grounds for expulsion from the program without a refund.

Intimate relationships

Earthwatch scientists, their staff, their colleagues, and their associates are prohibited from becoming romantically involved with participants during the entire duration of the period that the team is in the field. Romantic relationships that may otherwise seem permissible may eventually create an unpleasant or unproductive work environment and are therefore strongly discouraged for the duration of an Earthwatch project.

Sexual Harassment

Please recognize that the relationship that exists between Earthwatch scientists and staff and participants is analogous to the student-teacher relationship. Therefore, please be aware of the following policies:

Sexual harassment of participants by the Earthwatch scientist or Earthwatch staff is prohibited. Likewise, sexual harassment of other participants, Earthwatch field staff, or local people by participants is also prohibited.

Sexual harassment infringes on an individual's right to an environment free from unsolicited and unwelcome sexual overtones of conduct either verbal or physical. Sexual harassment does not mean occasional compliments of a socially acceptable nature.

Sexual harassment refers to conduct which is offensive, which harms morale, or which interferes with the effectiveness of Earthwatch expedition teams; such conduct is prohibited. Lewd or vulgar remarks, suggestive comments, displaying derogatory posters, cartoons or drawings, pressure for dates or sexual favors, and unacceptable physical contact or exposure are examples of what can constitute harassment. No one should be touched in areas that otherwise would be covered by a bathing suit. It is important to realize that what may not be offensive to you may be offensive to participants, the local population, and Earthwatch field staff.

Any individual who feels subjected to sexual harassment or has any knowledge of such behavior should report it at once to his or her PI or to Earthwatch staff members. All Earthwatch scientists and field team leaders (FTLs) will notify Earthwatch immediately when an accusation of sexual harassment or abuse is made or witnessed.

All reports of sexual harassment will be handled with discretion and will be promptly and thoroughly investigated. Any participant who is found to have engaged in conduct constituting sexual harassment will be immediately removed from the expedition at his or her own expense. If a minor is immediately involved in allegations of sexual harassment, his or her parents will be contacted.

Drugs

Laws on drug use in most countries are severe and may carry lengthy imprisonment or death penalties. I understand and accept that the manufacture, possession, use, purchase and/or sale of illegal drugs or other illegal substances while on an Earthwatch expedition is strictly prohibited. Prescription drugs may only be purchased and used by the individual indicated on the prescription in keeping with their intended use guidelines.

Alcohol

Local statutes, customs, practices, ordinances and regulations with regard to the use, possession, sale, or purchase of alcohol are applicable to all participants and project staff in Earthwatch expeditions. Participants and project staff on Earthwatch expeditions must comply with the law of the country in which a project is located regarding the minimum age required to consume alcohol. In addition, restriction on the use, possession, sale, or purchase of alcohol may be set by the Earthwatch scientist. Any restrictions on the consumption of alcohol should be clearly outlined by the project staff in the briefing to participants at the start of the project, and in the Expedition Briefing.

Consumption/possession of alcohol or smoking is not permitted on any Earthwatch Teen Team, regardless of local law.

Excessive consumption of alcohol by staff or participants is not acceptable on any Earthwatch project. Intoxication can jeopardize personal safety, in addition to the safety of the team. It can also cause delay and hinder response in the event of a crisis or emergency situation.

Earthwatch staff and the Earthwatch scientist have the discretion to remove individuals from the project who consume alcohol in a time and manner that endanger the safety and/or productivity of the expedition.

Minors

Earthwatch considers participants under eighteen (18) years of age to be minors. Minors are not permitted to participate on any of Earthwatch's standard teams unless accompanied by a parent or legal guardian, in which case the minimum age is sixteen (16). Minors on regular teams do not receive additional guidance or supervision from Earthwatch beyond what is offered to the adult participants. The number of minors on regular teams is limited to two (2) per team. Earthwatch has developed teams specifically for 16 and 17 year olds ("Teen Teams"), as well as teams specifically for families ("Family Teams"), with children as young as 10 years old. These teams focus on the same research activities and have the same expectations as our regular teams, but with more facilitation and support. Exceptions for some projects are made at the discretion of Earthwatch and the Earthwatch scientist. Due to a more in-depth screening process for certain programs that select candidates based on school year rather than age, there may be 18 year olds fielding on the same team as 16 and 17 year olds. Please be aware that some Earthwatch projects do not allow participation by minors in any circumstance.

Participants and Driving

Participants are not allowed to drive project vehicles or aircraft during an expedition. In select circumstances, participants may be able to drive boats under the direct supervision by project staff. These circumstances are pre-determined by project staff in collaboration with Earthwatch. Participants must respect the restrictions for boat driving in place for each project.

If a project environment is such that participants can drive their own vehicles to the rendezvous, those who have driven themselves to the project may not drive their own vehicles to, from or for project activities, including the transport of project equipment after arriving at the site.

Participants who have driven themselves to the project may choose to utilize their own vehicle during recreational time, but project staff will brief them on the driving restrictions. All driving during recreational time is done at your own risk.

Please be advised that the only exception to the above driving restrictions is emergency situations.

Riding in other participants' vehicles is not covered under the participants' insurance policy for the expedition. Riding in another participant's vehicle is done at a participant's own risk.

In the Event of an Emergency

In the event of emergencies, judgments must be made by Earthwatch field staff and participants. While Earthwatch makes an effort to ensure that qualified people make the most informed decisions possible, occasionally first aid may be administered and other immediate steps taken by expedition participants who are not licensed medical providers.

Each Earthwatch expedition has safety protocols and emergency procedures in place. Earthwatch encourages team members (the field staff and participants) to exercise their best judgment with regard to their own safety and the safety of other team members. Other participants may perform "good Samaritan" actions, or actions taken to assist fellow participants during emergency situations in the field. However, Earthwatch does not encourage or expect you to jeopardize your own safety or that of others in attempting to rescue or assist your fellow team members.

Right of Refusal

Earthwatch reserves the right to refuse an applicant's participation on Earthwatch projects at any time and to terminate any work being done by a participant and require the participant to vacate the project site if any of the Earthwatch Expedition Team in his or her absolute discretion considers it appropriate. In this event, the participant (and his/ her parent/ guardian, if appropriate) will be responsible for arranging and paying for any accommodation, travel or other arrangements which may be necessary following the termination of a participant's involvement in a project, for whatever reason, and may not be eligible for a refund.

Earthwatch and the project staff may not refuse a participant for discriminatory reasons (race, religion, ethnicity, national origin, sexual orientation, or any other reason prohibited by applicable law). Earthwatch will make reasonable efforts to accommodate participants with disabilities and the organization endeavors to find appropriate expeditions for those participants that have physical limitations. Refusal of a participant is an unusual event and is generally due to either an applicant's failure to meet the essential eligibility requirements of a particular project, or in the interest of team compatibility. In the event that an applicant is refused participation, Earthwatch will refund in full any deposit or payment made toward the expedition.

Earthwatch scientists have the right to refuse special requests, such as media visits (film, photography or print), special groups or teams (students, donors, etc.), if they conflict with Earthwatch scientist schedules, safety, research objectives or general performance of the team.

Any participant found in violation of any of the policies described in this section ("Earthwatch Institute Policies & Participant Rights and Responsibilities") is subject to removal from the team at their own expense. By signing the liability release form, participants are indicating that they have read and understand the policies in this document. Removal of a participant from a team is at the discretion of the Earthwatch scientist or field team leader and Earthwatch staff. In addition, Earthwatch will support the right of the scientist to send participants away from a project once in the field should their behavior compromise the safety, research objectives or general performance of the team, or if the participant has violated a stated policy. In the event that a minor is dismissed from a project, Earthwatch will contact the participant's parents or legal guardian prior to their dismissal. Should a participant be removed from a team, he/she is responsible for any or all costs associated with departure from the team and will receive no refund of the share of costs of the expedition nor any expenses incurred in participation on the expedition.

(November 2010)

Expedition Packing Checklist

Required Items

- This Expedition Briefing
- Photocopies of your passport, flight itinerary and credit cards in case the originals are lost or stolen; the copies should be packed separately from the original documents
- Passport and/or visa (if necessary)
- Certification of inoculation (if necessary)
- Calling card/mobile phone (with international calling capabilities)
- Credit card that may be used (internationally) in the event of an emergency (travel delays, etc.)

Clothing/Footwear for Fieldwork

Note: Light- or neutral-colored clothing attracts fewer insects than dark colors.

- Be sure to bring your Earthwatch t-shirt and remember to wear it, as appropriate, throughout your expedition
- Lightweight, quick drying, long-sleeved shirts
- Lightweight, quick drying pants/trousers (jeans do not work well in the field)
- T-shirts
- Shorts
- Teva-like water shoes
- Knee-high rubber boots or Wellingtons/gumboots (fancy leather hiking boots are not advised)
- Lots of socks
- Swimsuit
- Soft (foldable) hat with a broad brim to protect against sun and rain
- Rain poncho/jacket (rain pants are also useful but not required)

Clothing/Footwear for Leisure

- Sandals for relaxation around the research stations
- One set of warm clothes for cool evenings
- One nice set of clothing for evening in town or to keep clean for end of expedition

Field Supplies

- Small daypack/rucksack
- Drybag or plastic sealable bags (good for protecting equipment such as camera from dust, humidity, and water)
- Insect repellent
- Headlamp (preferred) or flashlight with extra batteries and bulbs (essential for fieldwork at night, to find your way to your room, and to avoid snakes and other hazards)
- Waterproof wristwatch
- Well worn-in (NOT brand new) comfortable walking shoes or hiking boots
- Camera, film/digital memory storage, extra camera batteries (rechargeable batteries are preferred as there are no disposal facilities for used batteries)

- Pocket knife (pack in checked luggage, not carry-on)
- At least two one-liter water bottles
- Umbrella
- Sunscreen lotion with SPF 30 or higher (waterproof/sweatproof advised)

Bedding and Bathing

Note: Sheets and towels will be provided at the research site accommodations.

Personal Supplies

- Personal toiletries (biodegradable soaps and shampoos are encouraged)
- Roll of toilet paper
- Antibacterial wipes or lotion (good for cleaning hands while in the field)
- Personal first aid kit (e.g. anti-diarrhea pills, antibiotics, antiseptic, itch-relief, pain reliever, bandages, blister covers, etc.) and personal medications
- Quick drying, highly packable towel

Miscellaneous

- Spending money in colones (see *Additional Travel Information* in the *Travel Planning* section.)
- Traveler's checks (for the city only, as cash is much easier to use than traveler's checks once the team has left San Jose)
- Travel guide
- Waterproof alarm clock (battery operated or digital watch with alarm works best)
- Favorite snack foods
- Sunglasses with retainer strap
- Compass

Optional Items

- Earplugs
- Books, games, journal, art supplies, etc. for recreational/rest time and travel
- Binoculars (waterproof are best)
- Blank CD or DVD for sharing digital photographs at the end of the expedition
- Guidebooks, especially bird books for Costa Rica
- Some duct tape (this is always handy, but a whole roll is not necessary)