



ALLIANCE FOR A
**SUSTAINABLE
AMAZON**



Manu Biodiversity Expedition

**‘Gallito de las Rocas’ conservation area
Peruvian Andes-Amazon
July 1-14, 2019**

Edited 11 December, 2018



Expedition Overview

The Gallito de las Rocas conservation area is located in the heart of the most biodiverse region of the planet, where the towering Andes mountains meet the sprawling Amazon basin in Southeastern Peru, near Peru's world-famous Manu National Park. However, despite the region's unmatched biological wealth, we still do not know exactly how many species can be found here. And further, we know almost nothing at all about the biology of most species—for example, how abundant are they? Which species are declining, or being driven to extinction because of climate change? At present we are unable to answer these questions, yet this knowledge is increasingly important as people drive unprecedented change in the rainforest. The goal of this expedition is to fill in major information gaps at Gallito de las Rocas, allowing us to create a long-term plan to manage and protect the area's unmatched biodiversity. Participation in this expedition is open to all those interested in gaining hands-on experience in tropical biodiversity and field biology. Read on for more information about this exciting opportunity!

Contents of this Document

Expedition Overview.....	3
Research Objectives & Methods.....	5
Lepidoptera Team.....	5
Bird Team.....	6
Mammal Team.....	8
Herp Team.....	9
Expedition Details.....	11
How to Apply.....	15
About Gallito de las Rocas.....	16
About Manu National Park.....	18
FAQ.....	23
Packing List.....	27
Contact Info.....	30

Manu Biodiversity Expedition Overview



This expedition is supported by the **Alliance for a Sustainable Amazon (ASA)**, a non-profit organization working to conserve the southeastern Peruvian Amazon rainforest through basic and applied research, and the **Asociación para la Conservación del Valle de Kosñipata** (Kosñipata Valley Conservation Association; APCONK), a Peruvian non-profit dedicated to conservation in the Kosñipata Valley, in and around the world-famous Manu Biosphere Reserve in Peru's Cusco Department. The purpose of the expedition is to explore and survey the biodiversity of 'Gallito de las Rocas' (Cock-of-the-Rock), a newly-established conservation area located in Kosñipata, at the juxtaposition of the Andes mountains with lowland Amazonia. Although Manu is thought to be the most biodiverse place on earth, most of the region remains completely unexplored biologically, and thus one of our goals is to create baseline species inventories from which a

conservation management plan can be established for the study area. A second important goal is the long-term monitoring of population trends, to assess the impacts of climate and other anthropogenic change on the region's plant and animal species. Biodiversity data gathered during the expedition will also contribute to other region-wide and global research and conservation initiatives: for example, in assessing species' global threat status according to IUCN Red List criteria and monitoring the presence and impact of a fungal pathogen that is currently affecting the region's amphibians.

Our focal groups will include Lepidoptera (butterflies and moths), birds, mammals, and herpetofauna (reptiles and amphibians). These groups were chosen due to their unmatched diversity in the Peruvian Andes-Amazon region, poor knowledge of their regional distributions, their representativeness of overall biodiversity, and their great ecological importance. Surveys of each group will be directed by a team leader who is an expert in the field, and each team will focus on surveys of its respective taxonomic group using both traditional and cutting edge



surveying tools and techniques. Expedition participants may choose to assist on one team, all teams, or any combination of teams that sparks their interest.

We are opening this expedition to all those with an interest in tropical biodiversity and field biology, not only to provide the muscle needed for survey work in our challenging conditions, but also to spread awareness of the conservation challenges facing the Manu region and train the next

generation of tropical biologists and conservationists. Expedition participants will help with all aspects of surveys of their chosen taxon (or taxa if interested in multiple groups), including sampling design and setup, as well as collection and management of specimens (where required) and biological data collected in the field.

We will meet first in the city of Cusco, the ancient capital of the Incas high in the Peruvian Andes. From Cusco we will travel overland heading east, passing the colonial Andean city of Paucartambo and then descending down the eastern Andean slopes towards the lowland Amazon through the buffer zone of Manu National Park. Along the way we will pass swirling Amazonian headwaters and traverse an elevational gradient that is the most biodiverse known on earth. Not only is the diversity of plants and animals here unmatched, but the steep Andean slopes draped in lush cloud forest offer one of the planet's most beautiful landscapes. After a day of travel down the so-called 'Manu Road,' we will end in the small town of Pillcopata, our last stop in civilization before we head into the jungle.

From Pillcopata we begin our journey into the Gallito de las Rocas conservation area. The area is very remote—we'll have to hike several kilometers on rough trails, cross zip lines suspended over rushing rivers, and carry all of the gear we'll need for camping and surveying biodiversity in the jungle. Our expedition base will be a basic campsite—rustic shelters for pitching tents and a covered area for eating and working—at the edge of a crystal-clear river, from where we will make daily and nightly excursions into the surrounding forest to conduct surveys. To maximize data collection, days will usually begin early and end late—bird surveys often start even before first light, and herpetology and mammal team members will be spending long hours scouring the rainforest at night for species that are mostly inactive during the day. However, our long hours and hard work will be rewarded with some of the richest and most unique wildlife anywhere in the world.

This is a science-based expedition not to be confused with an ecotourism experience. We will travel far off the beaten path, into an unexplored region of both exceptional beauty and biological diversity and generate important data useful for the study of biodiversity as well as how best to protect as much of it as possible in an age of expanding human influence. Expedition participants should arrive in Peru ready to work very hard, but also to enjoy a unique learning experience in a region that relatively few have the privilege to know so intimately.

Research Objectives & Methodologies

Lepidoptera Team (Butterflies & moths)



The Lepidoptera team will focus its surveys on two groups: butterflies that are active in the day and moths that are active mostly at night. For butterflies, the team will employ a variety of methods including baited traps, strategically-placed baits of other types such as rotting fruit and spit wads (for skippers), and hand nets for species that don't typically visit bait. Moths will be sampled at night using an LED light setup that is designed specifically to attract insects.

This will not only draw in an impressive number and variety of moths but also an incredible diversity of other invertebrates.

All knowledge gained by the Lepidoptera team at Gallito de las Rocas will contribute to an ongoing, region-wide study being conducted by the ASA that aims to document all butterfly and moth species in Peru's Cusco and Madre de Dios regions, their local and regional abundances, and their natural histories. So far ASA researchers have documented hundreds of butterfly species at several sites throughout the region, including several undescribed species, and they have also discovered the host plants for a number of species. Almost all of these hostplant records are new to science, demonstrating the ease with which scientists are able to make exciting discoveries in this biodiverse yet poorly studied region. However, with more than 1,300

butterfly species known from just a *single* site in the lowlands of Manu National Park—and given that the fauna at Gallito de las Rocas is a mix of lowland *and* Andean species—the expedition’s Lepidoptera team certainly will have its work cut out for itself!

Lepidoptera team leader

Geoff Gallice, Ph.D.



Geoff is a research associate in Lepidoptera at the Florida Museum of Natural History in Gainesville, Florida. The museum is home to the McGuire Center for Lepidoptera and Biodiversity, and houses one of the largest collections of butterflies and moths in the world. Geoff’s current research, which relies heavily on the extensive McGuire Center collections, aims to understand patterns in the ecology, evolution, and threat status of Neotropical butterflies, with a particular focus on the clearwing butterflies (Nymphalidae: Ithomiini). He is also active in applied conservation, leading the research-focused non-profit organization Alliance for a Sustainable Amazon based in southeastern Peru and collaborating with researchers at several universities in Peru, the USA, and Europe. His applied conservation work aims to understand the negative environmental effects of road expansion and other infrastructure development in the Peruvian Amazon.

Bird Team



The bird team’s main goal is to document patterns in avian species richness and abundance along a 500-meter elevational gradient in the Gallito de las Rocas conservation area. This is done in three ways: first, the team will conduct point-count and walking-transect surveys to look and listen for birds. Second, since many rainforest species are cryptic and difficult to detect with standard aural-visual surveys, the team will also deploy mist-nets to capture and band birds. Banded birds have the added benefit of providing researchers with a means to track individuals



over time, and data collected from such studies helps shed light on the relationships between life history, survival, and local movements. And finally, ARUs—autonomous recording units—will be deployed in the forest to record bird calls that can be identified and analyzed later. ARUs are advantageous because they can detect birds, including cryptic species, over long periods of time, greatly increasing our effective sampling effort.

Very little is known about the distribution and abundance of birds in the Manu region—and almost nothing regarding the biology of most species—so we are well-poised to make important discoveries regarding bird biology at Gallito de las Rocas during this expedition, and also as the study continues into future years.

With over 1100 species registered in Manu National Park, the team can expect to have their surveying and identification skills put to the test, yet they will be rewarded by some of the best birding anywhere in the world.

Bird team leaders

Julian Heavyside (Graduate student, University of British Columbia)



Julian fell in love with tropical biodiversity in 2013 when he spent an undergraduate semester banding birds in Manu National Park. He has continued to study birds from the cloud forests of Colombia to the lowland jungles of Peru, and has worked with migratory birds back home in British Columbia, Canada. Julian is currently conducting his graduate research on life history evolution of freshwater fishes in British Columbia and continues to collaborate on bird projects in his free time. In between field seasons in South America and northern British Columbia, Julian works as a bird bander in Vancouver, BC where he helps aspiring biologists develop the skills required to conduct research on wild birds. Bird banding is a wonderful gateway into tropical ecology and Julian is eager to share his excitement for birds and all things tropical!

Gloria Jilahuanco (APCONK)



Gloria is from Pillcopata, Peru, from where she manages the Gallito de las Rocas concession that she and her family founded several years ago. Gloria has an academic background in ecotourism and a keen interest in birds, and is currently working to promote bird-focused tourism in and around Pillcopata, including in the concession. In addition to her work at Gallito, Gloria also travels extensively throughout Peru and neighboring Ecuador, where she participates in and runs birding expeditions, and co-leads academic field courses spanning tropical biology and conservation.

Mammal Team



Mammals are abundant in the rainforest but, due to the density of vegetation and the cryptic nature of many species, finding them can be a challenge. Luckily, researchers can study these elusive animals with new research tools. The mammal team will employ traditional aural-visual surveys for diurnal species such as monkeys and, at night, mist net surveys to capture and release bats. Given the ecological importance of Neotropical bats and the high

species richness at Gallito de las Rocas, a large portion of time each day will be allocated to studying these fascinating animals. In addition to ground and canopy mist nets, we will use ultrasonic bioacoustics monitors to passively detect insectivorous bats that are otherwise difficult

to study. We will also deploy camera traps to document larger species such as jaguar, puma, ocelot, Andean bear, tapir, peccaries, and ungulates. Mammal team participants will work hard, day and night, to gather distributional records but will be rewarded with exciting discoveries of a diversity of both Andean and lowland Amazonian species.

Mammals, both large and small, are vital components of rainforest ecosystems. In particular, they are among the most important seed dispersers of trees, and so their ecological impact goes all the way to the very structure and species composition of the forest. Monkeys, for instance, spread larger seeds far from the parent tree where they are more likely to survive; bats, on the other hand, are important dispersers of smaller seeds, especially those that colonize disturbed areas and thus these animals are important factors in forest regeneration. Documenting the composition of the mammal community at Gallito de las Rocas, therefore, is an important first step in understanding the dynamics of the rainforest and the role these animals have in the processes that keep it healthy and high in biodiversity.

Mammal team leader



Patrick Burke

Patrick has worked with mammals across North America and in the Madre de Dios region of Peru. He has a particular fondness for bats, which reach global species richness extremes in the Neotropics. Patrick leads research on the population effects of an invasive fungal disease on bats in British Columbia, on ecosystem services provided by bats in agricultural lands, and on the effect of climate-mediated wildfire on large mammals in protected areas. He is passionate about biodiversity, collaboration, and creative approaches to conservation challenges.

Herp Team (Reptiles & amphibians)



Surveying reptiles and amphibians is relatively straightforward but, due to the cryptic nature of many species, long hours are required to build a site inventory. Thus, the herp team will spend



significant time in the jungle searching for frogs and snakes, especially at night, when these animals tend to be most active. But, no fear, this effort will be greatly rewarded with a unique mix of both Andean and Amazonian species. The herpetofauna of Gallito de las Rocas has not been extensively assessed, so we are sure to have some exciting finds and new records!

Tropical reptile and amphibian species are facing serious threats, including habitat loss and declining populations due to illegal trade and disease. In particular, the fungal pathogen Chytridiomycosis has taken a major toll on amphibian populations worldwide, including in Peru, with many species in critical decline or even extinct as a result of the disease. Unfortunately, during our first expedition to Gallito de las Rocas in 2018 we detected the

chytrid fungus in several amphibian species. Data gathered by the herp team, therefore, will be useful in understanding both the impacts of this and other threats over time, as well as how we can protect as many of these unique species as possible.

Herp team leader

Anton Sorokin, M.Sc.



Anton has worked with poison frogs in the *Ranitomeya* genus both in the field in Peru and in the lab. His research delves into the evolution of behavior in poison frogs. Specifically, he is investigating how they navigate and respond to changes within their territories, as well as their spatial memory as they move through their dynamic home ranges. Anton has extensive field experience in the tropics and is especially passionate about the Neotropics. Besides research, Anton is very involved with nature photography and has contributed to various photography initiatives, magazines, and books.

Skills & knowledge gained by expedition participants

In addition to gathering biodiversity data that can be used for biological study and applied conservation in the Peruvian Andes-Amazon region, a second important goal—and an integral part of the mission of the Alliance for a Sustainable Amazon—is to inspire and train the next generation of tropical biologists and conservationists. Expedition team members, therefore, can expect to gain the following knowledge, skills, and experiences through their participation in the biodiversity survey at Gallito de las Rocas:

- Methods used in the survey of tropical biodiversity, including sampling, collection, and/or field observation skills used to study Lepidoptera (butterflies and moths), birds, mammals, and herpetofauna (reptiles and amphibians)
- Methods for the collection and management of biological data in the field
- Skills used to facilitate field studies in the tropics, including the use of compass and GPS to navigate off trail, the collection and analysis of spatial data, the collection and proper field curation of biological samples
- Build a network of like-minded peers and professionals in tropical field biology
- Natural history and identification of plant and animal species in the Peruvian Andes-Amazon region
- Field photography techniques used to document biodiversity in the tropics, and to conduct outreach across a variety of social media and other platforms
- Knowledge of the major conservation challenges facing biodiversity and communities in the Andes-Amazon region of Peru

Expedition Details

Dates

July 1 – 14, 2019

The expedition starts and ends in the city of Cusco, Peru. Participants should arrive in Cusco on or before July 1 (any flight), and depart on or after July 14 (any flight). We will meet team members at the Cusco airport (CUZ) when they arrive on the first day of the expedition and also provide return transportation for the departing flight on the last expedition day. While we do not organize flights directly, our partner STA Travel can help you make travel plans from your home country to Cusco on a recommended flight.

Application & payment deadline

May 31, 2019

Cost

\$1,650

What's included?

The expedition fee covers all project-related local transportation and all accommodations, including transfer to and from the airport (or bus terminal) in Cusco, all other transportation to and from the field site, all lodging (hotels in Cusco and Pillcopata, as well as a basic campsite that will be set up and maintained by field staff), and all food in the field (3 meals per day, plus coffee, tea, and snacks, except meals in Cusco). All field equipment related to biodiversity surveys (insect traps and nets, specimen storage equipment, GPS units, mist nets, etc.) will also be provided.

What's *not* included?

The fee does not include international or domestic airfare (*i.e.*, from your home country to Lima, and then on to Cusco), meals in Cusco, or personal expenses in Peru (e.g., souvenirs, alcoholic beverages, etc.). Personal gear and equipment, including binoculars, are not provided. See the expedition [packing list](#) for items to bring with you.

Please note that an application fee of \$150 is due after registering for the Manu Biodiversity Expedition, which reserves your spot on the expedition and is non-refundable. Although we anticipate having a full expedition, teams must have a minimum of 3 participants each; in the event that a team does not reach 3 members participants will be provided the option of joining another team(s); otherwise, any fees paid to the ASA will be reimbursed to the participant, including the \$150 application fee. Confirmation of the expedition teams will be provided just after the application deadline (May 31, 2019). Please read our [Cancellation Policy](#), as well as our [Terms and Conditions](#) before making a payment. You will be given payment options upon completion of the online application form.

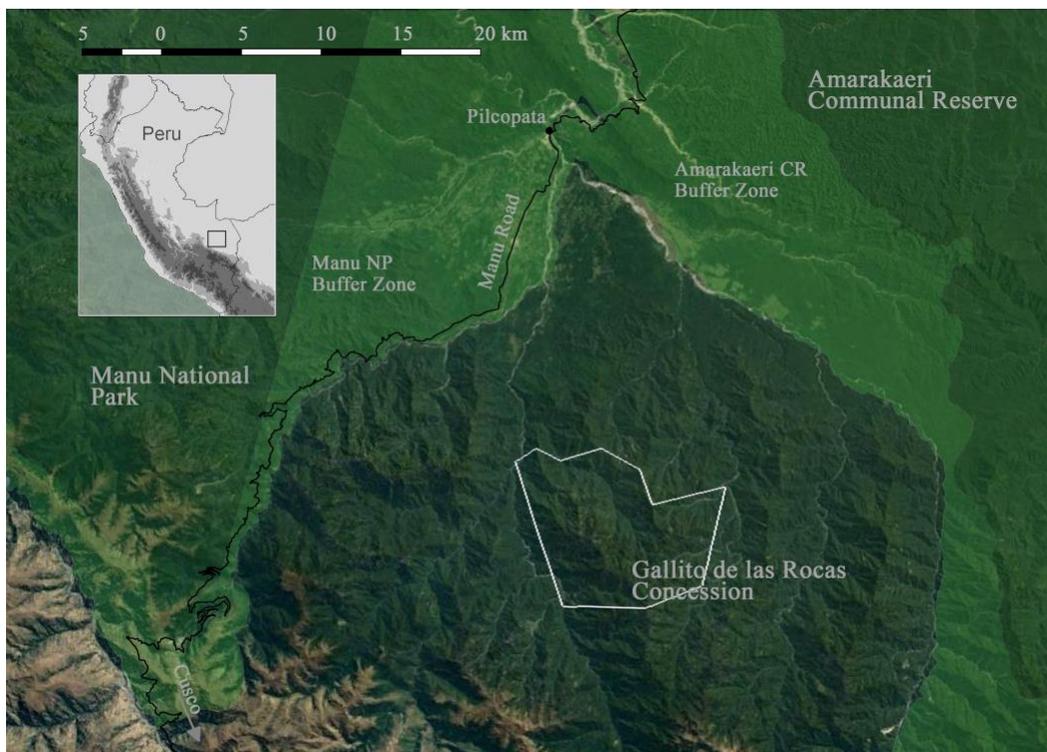
Expedition location



Aerial view of the expedition base camp.

The expedition will take place at the Gallito de las Rocas conservation area located in Peru's Cusco Department, in the country's southeast, where the Andes mountains meet the Amazon rainforest (basecamp roughly 900 meters above sea level). After meeting in the city of Cusco (capital of the department of Cusco) we will work our way overland down the eastern Andean slopes to the foothills at Pillcopata, and then by foot deep into the jungle to the expedition base camp. After concluding field work in Gallito

de las Rocas the team will return to Cusco, where the expedition will conclude.



Map of the Gallito de las Rocas conservation area in southeastern Peru.

Accommodations

The first night of the expedition will be spent at a mid-range hotel in Cusco. The following night will be spent at Hotel Gallito de las Rocas, the only mid-range accommodation in Pillcopata. Rooms at both hotels will be shared and are basic with shared or private bathrooms. Meals in Cusco will be taken as a group at nearby restaurants; in Pillcopata the group will eat meals at the hotel's restaurant.

During the survey period in Gallito de las Rocas we will be camping at a rustic campsite with very basic facilities at the edge of a river. Expedition members should each plan to bring a tent (or share with another team member), a sleeping pad, and a light sleeping bag. The expedition chef will cook and serve meals at the campsite, under the rain forest canopy and a brilliant jungle night sky.

Itinerary

Date(s)	Activities	Overnight
1 July	Group arrives in Cusco Expedition overview & safety briefing	Cusco
2 July	Travel overland from Cusco to Pillcopata	Pillcopata
3 July	Travel from Pillcopata to campsite #1	Camp 1
4 July	Hike from Camp 1 to base camp	Base camp
5-11 July	Biodiversity surveys -Lepidoptera -Birds -Mammals -Herps	Base camp
12 July	Hike from base camp to camp 1 & return to Pillcopata Expedition review, process specimens & photos	Pillcopata
13 July	Travel from Pillcopata to Cusco	Cusco
14 July	Expedition concludes	

Eligibility Requirements

1. At least 18 years old at time of expedition (unless accompanied by a parent or guardian)
2. Proof of medical and travel insurance
3. Excellent physical condition
4. Valid passport or ability to travel to/within Peru. Citizens from most countries (including the USA and Canada) receive a visa at the international airport in Lima, usually for 90 days but check this with the immigration official that admits you. Passport must be valid at least 6 months from the end of the expedition. Please note that immigration officials may request proof of departing flight from Peru before granting entry to foreign citizens.
5. No formal training or education is required; we invite people from all background to assist our biodiversity surveys. However, a healthy curiosity for tropical nature, a positive attitude in the face of challenging field conditions, and a willingness to work with people from a variety of backgrounds to achieve a common goal are essential.

How to Apply

1. Make sure you meet the eligibility requirements (see above section)
2. If you have any questions, please review the [FAQs](#). You can also [contact us](#).
3. When you're ready to apply, just fill out the form located at the following link:
<https://www.sustainableamazon.org/manu-biodiversity-2019-register>
4. You will receive a message with instructions on how to make your payment and secure your spot.

About the Gallito de las Rocas Conservation Area



Andean cock-of-the-rock (*Rupicola peruviana*), or ‘gallitos de las rocas’, as they’re known in Spanish. Males gather daily at a ‘lek’ site where they display to impress females. *Photo:* Geoff Gallice.



From left: Geoff Gallice, Gloria Jilahuanco, Teodocio Jilahuanco. *Photo:* Geoff Gallice & taken on an exploratory backcountry trip, 2014.

‘Gallito de las Rocas’ is the Spanish term for the Andean cock-of-the-rock (*Rupicola peruviana*), both Peru’s national bird and an iconic symbol of the unique biodiversity found in the cloud forests of the eastern Andes. The birds are most famous for their lekking behavior, in which males gather daily at the lek site and display—a raucous show of color and song—in order to impress and win the right to mate with a female. This extraordinary behavior is a major draw for birdwatchers and ecotourists to the Manu region, with visitors coming from the world over to witness one of the most fascinating shows in nature.

Most of the publicly-owned land in the Peruvian Amazon, which covers nearly 70 percent of the national territory, is divided into ‘concessions,’ the majority of which are designated for logging, mining, or the extraction of fossil fuels. However, several years ago Peru took the bold step of opening up vast tracts of these public lands to private management, not for the extraction of natural resources, but rather for their conservation. The world’s first conservation concession was granted, in 2001, to a Peruvian non-governmental organization, which was given rights to

manage the 150,000 hectare (~370,000 acres) Los Amigos Conservation Concession for a period of 40 years. Since then, the number of conservation concessions has proliferated, making an enormous contribution to Peru's protected area network, and thus the protection of biodiversity in this mega-diverse country.

Gallito de las Rocas is a ca. 10,000 hectare concession dedicated to the conservation of biodiversity, strategically located where the towering Andes Mountains meet the sprawling Amazon basin. It is bordered by several other protected areas, including the territory of the indigenous Q'eros community and the >1,500,000 hectare Manu National Park, one of the largest and most remote tropical wilderness areas remaining on the planet. This unique geography is an important reason for the concession's



Aerial view of the Gallito de las Rocas conservation area. *Photo: Geoff Gallice*

nearly unmatched biodiversity—here, spectacled bears from the Andean cloud forests roam the same area as jaguars from the lowland rainforest, as do myriad other plant and animal species; the region's extensive forest cover also allows the persistence of healthy wildlife populations that are not possible in landscapes that have been fragmented by human activity. Although it is widely accepted that the region harbors more diversity of life than almost anywhere else on earth, detailed distributional data and information regarding natural history remain unavailable for the vast majority of species in the region, making basic biological inventories of key importance in efforts to understand patterns in biodiversity and how best to protect it.

The concession is managed by the Asociación para la Conservación del Valle de Kosñipata (APCONK), a Peruvian non-profit organization dedicated to the conservation of biodiversity in the Kosñipata Valley that is based in the Kosñipata district capital of Pillcopata. In addition to restricting access to the protected area by illegal loggers, hunters, and other illicit resource extractors, APCONK is working to promote science and ecotourism as alternatives to unsustainable resource extraction. This expedition is part of both APCONK's and the Alliance for a Sustainable Amazon's long-term strategy to achieve biodiversity conservation in the Manu region.

About Manu National Park



Overview

Manu National Park is the gem in Peru's network of protected areas—located at the biogeographic crossroads of the hyper-diverse western Amazon and Andes ecosystems, the park's alpine grasslands, montane and lowland rainforests, and aquatic habitats shelter more species of plants and animals than almost anywhere else on Earth. Manu owes this extraordinary biological wealth in part to its unique geography—this is the only park in all of South America that protects the entire watershed of a major Amazonian tributary. The park's boundaries, therefore, range from the high Andes down through the lowland rainforests of the Amazon basin, sheltering a staggering variety of plant and animal communities in between. In fact, Manu is essentially the only large remaining tract of land at the juxtaposition of the Andes with lowland Amazonia where plant communities, including those at or near the tree line, are free to move up

mountainsides as the global climate is altered by human activity. Almost everywhere else throughout the tropical Andes fire, cattle grazing, and other human activities prevent this. As a result, the importance of Manu to the maintenance of biodiversity and evolutionary processes in the Andes-Amazon region cannot be overstated.

At nearly 1.7 million ha, Manu's large size and wilderness character mean the park is also home to large, charismatic, and wide-ranging vertebrate species that are rare or declining elsewhere in Amazonia. Groenendijk and colleagues, for instance, determined that the protection of Manu's vast floodplain was a key factor in the stabilization of the region's population of the endangered giant otter (*Pteronura brasiliensis*) after decades of overhunting. Manu also forms the core of one of the region's most important Jaguar Conservation Units which, together with two others, may sustain as many as 6,000 individual jaguar.

While dominated by the massive Andes mountains, Manu National Park's geography is also characterized by its remoteness and, until very recently, its relative inaccessibility. To the west and south, the Andes rise to more than four kilometers above the Manu River floodplain in the park's Amazonian lowlands; impassable rapids along the Beni and Madeira Rivers to the southeast (into which the Manu River flows via the Madre de Dios) historically prevented movement into the region by boat. To the north lies a pass that severs river access to the Manu River drainage from that of the Ucayali system. This isolation is largely responsible for the park's impressive wildlife populations, which have thrived in the relative absence of large-scale and commercial hunting. Manu's isolation has also largely prevented the incursion—from Incan times through the colonial and modern periods—of outsiders (with the conspicuous exception of the rubber boom era, see below). There are, to this day, several groups of semi-nomadic peoples that shun all contact with the outside world and live as hunter-gathers entirely within Manu's rainforests, a lifestyle that has become obsolete after contact in almost all other native societies.

The Peruvian government created Manu National Park in 1973. Four years later, in 1977, UNESCO recognized Manu as a Biosphere Reserve, a place where biological conservation would be balanced with sustainable development and the needs of local communities, at least ostensibly. In 1987, UNESCO also recognized Manu as a World Heritage site, a place of outstanding cultural and natural importance. The National Park itself is considered the core area of the biosphere reserve and is known in Peru as the 'Intangible Zone.' Currently only a few scattered Matsigenka, Yora, and Quechua indigenous communities and several small bands of voluntarily isolated Mascho-Piro—fewer than several thousand people in total—reside within this 1.5 million ha core area, and access to others is strictly controlled. The southeastern edge of the park is bordered by the 'Cultural Zone,' an area which is meant to serve as a buffer to the core area, and where colonization, development, and limited resource extraction are allowed (and occur). The park's other borders are shared with large expanses of sparsely populated, inaccessible rainforest and several other protected areas, including Alto Purus National Park to the northeast and the Amarakaeri Communal Reserve to the southeast, opposite the Alto Madre de Dios River and Manu's Cultural Zone.

Historically, the Manu region's isolation has kept it and its indigenous inhabitants relatively safe from the effects of logging, industrial agriculture, mining, illicit drug cultivation, and uncontrolled colonization that have devastated rainforests and biological and cultural diversity in other areas of Peru and the Amazon in general. The construction of the so-called 'Manu Road,' however, which began in the 1960s and which currently traverses the buffer zones of both Manu National Park and the Amarakaeri Communal Reserve, has greatly increased access to the region. The population of Andean migrants in particular along the road and in adjacent areas has grown as a result, and with this swollen population has come increased pressure on the region's natural resources.

History of the Manu Region

Incan and colonial periods

Travel and trade along the path of what is today known as the Manu Road began at least as early as the height of the Inca empire in the late sixteenth century. The ninth Inca ruler, Pachakuti Inca Yupanki, was the first to lead his military into the *Antisuyo*—the Incan name for the eastern,

jungle portion of their realm—both to expand and protect the empire from hostile neighboring tribes and to gain access to the west Amazonian rainforest and its products. Pachakuti's campaign led the Incas into the Cosñipata (also written Kosñipata) Valley, which includes the headwaters of the Yanatile, Paucartambo, Yavero, and Alto Madre de Dios rivers. After a rebellion by the native tribes of Cosñipata against Pachakuti's son, Topa Inca Yapanqui, the tenth Inca ruler led a second massive military campaign in the region, eventually subduing the native tribes and conquering the region for the Incan empire.

The conquest of Cosñipata provided the Inca in the high Andes with access to jungle products ranging from live animals, skins, and feathers to foods such as cacao, vanilla, cassava, and peanuts to medicinal plants, dyes, and tropical hardwoods. For these goods, the Inca traded items such as copper and bronze weapons with the pacified native tribes. The Inca also established coca plantations in the region, which ensured a steady supply of the plant's leaves for ceremonial use by elites in Cusco. Trade was facilitated by the construction of a road leading from Pisac to Paucartambo and then onwards, down the eastern Andean slopes of Cosñipata to the outpost of Pilcopata, at the edge of the Incas' domain in the west Amazonian lowlands.

Although Incan trade routes also extended into all of the major headwaters of the Manu River in the eastern Andean foothills, the route leading into the Cosñipata valley was the one that penetrated deepest into the southern Peruvian Amazon, as well as the most important. This was also the only route in southern Peru that would continue to see trade after the Spanish conquest of the Incan empire in the late sixteenth century.

In 1760, King Charles III of Spain ordered the construction of a bridge across the Mapacho River, to consolidate access to the goods coming from Pilcopata further east. The first major effects of the construction of road infrastructure along the route can be seen during the nearly two-decade period following construction of the bridge, as residents of the surrounding area began to populate what would become the colonial city of Paucartambo. For nearly the next two centuries, this remained one of the most important routes for trade between Spanish colonial Peru and later the Republic and the native tribes of the western Amazon.

Carlos Fitzcarrald and the rubber boom era

Despite sporadic explorations and a pair of failed attempts at conquest in the rainforests downstream of Pilcopata and in the Manu River basin, interest in the region throughout the colonial period and during the years following Peruvian independence remained low. However, Charles Goodyear's discovery of the process of vulcanization in 1839 and the subsequent invention of the pneumatic tire by Dunlop caused an explosion in the global demand for rubber, changing the situation in the country's Amazon region rapidly. The Manu area, covered in vast, impenetrable forests and home to fierce Indian tribes, was also tremendously rich in *Hevea* trees, the polymer-rich latex from which the new commodity was manufactured. Supplied with investment capital, savvy, and small armies of indentured rubber tappers, Indian slaves, and mercenary soldiers, hundreds of entrepreneurial rubber barons descended upon the Peruvian Amazon in search of their fortunes.

Among the most influential of the Peruvian barons was Carlos Fitzcarrald who, after hearing rumors of a pass between the Urubamaba River basin and another unexploited large rainforest

watershed, gained notoriety by having a European steamship dismantled and portaged, piece by piece, over eight miles of remote rainforest into this new watershed. Fitzcarrald thought that he had entered the headwaters of the Purus River, but in fact had discovered a pass to the upper Manu basin. This fact was made apparent to him upon discovering the name of Coronel Faustino Maldonado—who led a survey of the Madre de Dios River thirty years earlier—etched into a tree where that river met the Tambopata, several hundred kilometers downstream from where his steamship entered the Manu headwaters. Fitzcarrald is said to have named the site Puerto Maldonado, which today is the bustling economic hub and capital of Peru's Madre de Dios department.

Although the South American rubber boom of which Fitzcarrald was a key player did not last long—the period began in earnest in 1879 and ended abruptly in 1912 when British plantations were established in Malaysia with smuggled *Hevea* seeds—the global demand for rubber and the rush to satisfy it in Amazonia had dramatic and lasting effects on the region's human geography. The nature of latex extraction, from widely-scattered rubber trees spread across vast tracts of sparsely populated natural rainforest, required a large workforce to be assembled quickly. A report by Casement (1911) suggested that as many as 30,000 Indians were enslaved, tortured, raped, or killed at the hands of the rubber barons throughout the region during only 12 years. In Peru, Fitzcarrald's pioneering voyage down the Manu River met with intense resistance by native tribes, at one point losing 50 men in a single attack by a group known as the Maschos. Fitzcarrald launched a brutal reprisal attack, killing as many as 300 Maschos, effectively marking the end of a settled Indian presence in Manu for decades to come.

Beginning in the 1970s, small groups of nomadic, Piro-speaking peoples have made appearances along the banks of the Manu River and in several other locations throughout the region, thought to be driven by the incursion into their lands by illegal loggers and hydrocarbon companies. These are most likely descendants of the Maschos that were slaughtered by Fitzcarrald's men over a century ago, a few of which survived the massacre by Fitzcarrald and his company. Although often referred to as 'uncontacted,' these people are, rather, living as hunter-gatherers in a state of voluntary isolation, having abandoned agriculture and a sedentary lifestyle in order to escape the violence inflicted upon them by outside resource extractors.

In addition to the killing and displacement perpetrated against native peoples directly by the rubber barons, the presence of the barons and their legions of rubber tappers in Madre de Dios attracted others with different ambitions, but who nevertheless also reshaped the region's cultural layout. Dominican missionaries, for instance, established the mission of San Luis del Manu at the confluence of the Manu and Alto Madre de Dios Rivers, at the height of the rubber boom. Although the mission was abandoned with the departure of the majority of the region's residents at the collapse of the Peruvian rubber industry, the outpost survives today as the village of Boca Manu, the latest destination in the renewed push for the expansion of the frontier in the southern Peruvian Amazon region.

The virtual emptying of Manu National Park's resident population during the rubber boom also precipitated a dramatic reshuffling of the park's indigenous cultural layout as newcomers arrived to fill the void left with the massacre of the Mashcos by Fitzcarrald. Matsigenka people from the Ucayali River system to the northwest, for example, crossed the Isthmus of Fitzcarrald—a low,

narrow ridge that separates the Ucayali system from that of the Manu—and established settlements throughout the region, as did groups of Yine from the Purus region to the northeast. Thus, the indigenous people of Manu today form a complex mosaic of widely scattered settlements that are largely a legacy of earlier incursions into the region to extract natural resources.

Modern history

By the 1960s the first modern road penetrated into the lowland rainforest surrounding Manu, having been constructed piecemeal and haphazardly by a variety of Peruvian authorities and local municipalities. Although this road was narrow, unpaved, and often not passable during the annual rainy season, the town of Pilcopata quickly grew at the road's end as colonists from the Andean departments of Cusco and Puno arrived to exploit natural resources—timber, in particular—that had been made newly accessible. Soon after, the road was extended to the outpost of Salvación, roughly 15 km away, in the hope that the region's vast tracts of 'unoccupied' land could alleviate the social and economic problems that recent land reforms had caused in the Andes. Officials from the Peruvian Ministry of Agriculture, along with technicians from the United States' Alliance for Progress, identified as many as 500,000 hectares of land suitable for agriculture and cattle ranching. This marked a renewed interest in the economic prospects for the southern Peruvian Amazon, as well as a new push for development in Manu, decades after the collapse of the rubber economy.

Meanwhile, as road development and agricultural expansion proceeded towards Manu from the foothills near Pilcopata, loggers began to move into the Manu River floodplain to remove big-leaf mahogany (*Swietenia macrophylla*) and Spanish cedar (*Cedrela* spp.) that grew in abundance there. A sawmill was setup in the vicinity of Boca Manu and an airstrip cleared to allow logs to be flown to Cusco. Hunters also began to move into the area to exploit wildlife that had rebounded spectacularly after the withdrawal of the rubber tappers—giant otter, jaguar, and black caiman skins were being exported from Peru in the thousands annually, and Manu promised to make up for declining harvests elsewhere due to overhunting.

The creation of Manu National Park and Biosphere Reserve

Prompted by the pillaging of natural resources that he had witnessed during his explorations of the Manu River basin, in 1964 Celestino Kalinowski, a Peruvian of Polish descent, wrote a letter to Don Felipe Benavides, the then-president of the government agency in Lima concerned with conservation in the country, explaining to him the situation in Manu. He proposed that the entire watershed of the Manu River, from its headwaters at the Isthmus of Fitzcarrald to the sawmill at its confluence with Madre de Dios, should be declared a Reserved Zone, initiating the development of a national park system in Peru. Despite his insistence that the region's natural resources were being dangerously over-exploited and could be completely lost, his warnings went unheeded.

However, three years later, in 1967, Benavides held a meeting with Major Ian Grimwood, an English naturalist that was in the country precisely to address the question of the formation of Peru's first national park. Having surveyed the country and found little in the way of healthy wildlife populations, Grimwood was set to leave Peru without recommending a location for the

placement of its first park. During a chance meeting in Lima, however, Kalinowski convinced Grimwood to accompany him to Manu, where Grimwood had not visited during his survey of the country; upon their return to Lima, Grimwood emphatically recommended that Manu be protected immediately. A year later, the Peruvian government declared the entire Manu watershed a National Reserve, prohibiting hunting and timber extraction immediately. Four years later, on May 29, 1973, Manu National Park was created by Supreme Decree No. 644-73-AG, granting the area's 1,532,806 hectares stronger legal status and greater protection. Then, in 1977, the United Nations (UN) recognized Manu National Park and a 2,570 km² buffer zone—the Zona de Amortiguamiento (AKA the 'Cultural' Zone)—as a Biosphere Reserve under the auspices of the Man and the Biosphere Programme, managed by the UN's specialized agency UNESCO. The final major legal distinction granted upon Manu was its declaration in 1987 as a World Heritage Site by UNESCO. Thus, the biosphere's 1,881,200 hectares (18,812 km²) today protect a vast area of staggering biological and cultural diversity in permanence, while also permitting the sustainable development of the indigenous and colonist communities living at its periphery.

Frequently Asked Questions (FAQ)

Traveling to Peru

How do I get there?

The Biodiversity Survey begins and ends in the city of Cusco, located in the high Andes of Peru's Cusco Department. There are two ways you can travel to Cusco: overland (i.e., by bus) or by air. A bus from Lima usually takes just over 20-25 hours; a direct flight from Lima is about 1 hour. The Cusco airport (CUZ) is serviced by Latam, Avianca, and Star Peru, each of whom have daily flights from Lima, but you can also purchase flights through international carriers that are operated by one of these local airlines. You might find it more convenient or cheaper to purchase a flight to Lima from your home city, and then a separate flight onward to Cusco. Note that Latam and Avianca are the most reliable airlines, but charge higher rates for foreign (i.e., non-Peruvian) travelers. If coming by bus, we recommend either Cruz del Sur or Tepsa; these are the most reliable companies that have service to Cusco, and both have excellent safety records.

Do I need a visa to enter Peru?

Citizens of the United States do not need to apply in advance for a visa to enter Peru for stays of 90 days or less; a visa will be granted at the international airport in Lima upon entering the country (or at the border with a neighboring country). Requirements for citizens of other

countries vary, and we recommend that you check these with the website of your country's embassy in Peru.

What about money in Peru?

Peru's currency is the Nuevo Sol, usually referred to simply as the 'sol' (plural 'soles'). The exchange rate as of Oct. 2018 was about S/. 3.25 to US \$1, and this has been stable for several months. ATMs are widely available in most major Peruvian cities, including Cusco, many of which dispense either soles or US dollars. You will receive a slightly better exchange rate at a currency exchanger (available in Cusco) than at an ATM when withdrawing soles. We recommend that you avoid changing money at airports, as the rate will be fairly poor.

How much money you will need while in Peru (and not with the Expedition) will depend on your taste and spending habits. As a rule, you can eat at a fancy restaurant in Cusco for about \$10-20 (S/. 30-65); cheaper places (e.g., set lunch or 'menu' restaurants) will obviously be much less. Prices for hotels also vary—backpacker hostels may charge S/. 30 per night, whereas nicer hotels will charge as much as S/. 200-300 per night; high-end tourist lodges might be as much as \$100-300 per person, per night.

What's the weather like in the Andes and Amazon?

The expedition begins in the city of Cusco, where temperatures are generally mild during the day and cooler at night (average high in January 11°C (52°F), average low in July 7°C (45°F). During summer months (June-August) temperatures can drop below freezing, especially at night, so make sure to bring one change of clothing to keep you warm before heading to the jungle.

The expedition base camp is located where the Andes mountains meet the Amazon rainforest, and thus the climate is something between these two extremes—days can be hot, or cool if it is cloudy or raining, and evenings generally are cooler still (summer months average roughly 17-30°C/60-90°F). Summer also brings 'frijajes,' which are cold snaps resulting from a cold front moving north from Patagonia along the Andes mountains. Temperatures during frijajes can drop below 10°C (into the 40s Fahrenheit), so keep your set of Cusco clothes handy just in case. Although we'll be in Manu during the region's dry season, it can still rain torrentially any day of the year, so you should also be prepared with rain gear (see the packing list in the following section).

What clothing and gear should I bring?

We will provide all of the gear and equipment that will be used for our field surveys (e.g., collecting and surveying equipment, etc.). Everything else is your responsibility.

The Expedition involves camping in the rainforest, thus there are several items that you will have to bring with you in addition to your clothes, toiletries, etc. Each team member must have a tent (or arrange to share one with another participant), a sleeping pad, and a light sleeping bag or something else to sleep with, as well as several other items. Please see the packing list for a complete list of what to bring to Peru.

How do I stay healthy in the rainforest?

Despite some of the stories and exaggerated tales from past explorers in the Amazon, the rainforest is not as dangerous or scary a place as many people think. Nevertheless, we take the safety of our team members very seriously and offer a number of recommendations to help ensure that you have a safe and enjoyable stay in Peru.

Perhaps the greatest nuisance to humans in our study region is posed by biting insects, including mosquitos and biting sand flies. These are also the vectors of several rare, but potentially serious, tropical diseases.

Malaria is rare in the study region but does occur. It is more of an issue in larger towns, though, since at remote sites such as ours there aren't enough people to serve as constant reservoirs for the disease. We are unaware of any cases of Malaria at any of our field sites, but your decision of whether or not to take a malaria prophylaxis is entirely up to you and your travel doctor.

Dengue is slightly more common in the region in general, especially in towns and cities, where there are many potential reservoirs and *Aedes aegypti*—the mosquito that transmits the disease—is more common. There is no vaccine for dengue, but there are treatments. However, as with all insect-vectored tropical diseases, avoiding insect bites is your best protection. Although it can be unpleasant, DEET is very effective at keeping these and other biting insects from biting you and transmitting the disease in the first place.

Leishmaniasis is endemic to our study region. It is transmitted by bites of small sand flies (family Psychodidae), which are active mostly at dawn and dusk, and at night. The disease itself is usually not serious or painful but can become serious if left untreated for long periods or if the patient has a compromised immune system. Therefore, if a team member has a bite or small wound that does not heal in a week, we will recommend that they get tested locally. Again, this, as with all other insect-vectored tropical diseases, are best avoided through the prevention of insect bites. Covering up while in the forest (e.g., pants, long sleeves) and at camp in the evenings, as well as sleeping in a tent or under a mosquito bed net (provided at all of our non-camping sites), are your best protection.

Zika. This disease has received much attention in the news lately and has infected large numbers of people across Latin America. Although the symptoms of infection with the virus are typically rather mild (e.g., fever, rash, etc.) and only about 20% of those infected exhibit even mild symptoms, there is a possible link between infection during pregnancy and a condition known as microcephaly in newborns. We know that the Zika virus is transmitted by *A. aegypti* (the same mosquito that transmits dengue), but much of the rest of the disease's biology remains a mystery. We follow the U.S. Centers for Disease Control (CDC) guidelines, and recommend that women who are pregnant, or who may become pregnant during or soon after the Expedition, exercise extreme caution while in Peru. The CDC has a very informative webpage regarding this disease: <http://www.cdc.gov/zika/index.html>.

Do I need any vaccinations?

We recommend that all travelers to the Amazon region have their updated Yellow Fever vaccine, as well as all other standard vaccines and boosters (e.g., hepatitis, typhoid, measles mumps & rubella, tetanus, etc.). Please note that we do not intend to dispense medical advice here; any

medical decisions you make, including those regarding vaccinations or other health precautions, are between you and your travel doctor.

How can I stay safe in Peru?

As with anywhere else in the world, you should exercise caution and common sense while traveling in Peru. Don't walk alone late at night in larger towns and cities, for instance, and avoid ingesting substances from people you don't know and trust. In addition, you should try to travel only with official taxis, as unofficial 'pirate' taxis (just unmarked cars) have been implicated in robberies. Although violent crime directed to foreigners is relatively uncommon in Peru, it is not unknown, and a good dose of caution will help you to avoid any trouble.

Petty crime, especially opportunistic thievery, is more common in Peru than violent crime. Don't leave valuables (cash, cell phones, tablets, wallets, etc.) in visible or easily accessible, public places at hotels or hostels; instead, check these with your hotel's safe deposit box or put them in a locker. Also be careful when traveling on long-distance buses—leave your backpack in the rack above your head while napping and you might wake up to it missing. Wallets in back pockets are also easy targets for pickpockets, especially in large cities. Finally, when in doubt, ask at your hotel which parts of the town or city you should avoid, and at what times, and heed their advice. The vast majority of visitors to Peru have a safe and healthy visit, and with a bit of good judgment you will likely have the same experience.

The field site

What's a typical day like in the field?

Most days start early (e.g., breakfast at 6 or 7 am), so that we can make the most of the shorter tropical daylight hours for surveying biodiversity. Those on the bird team will typically be up earlier, since bird activity peaks just after first light; herpers will be out until late on most nights, so will require a bit more time to sleep in. Lunch and dinner are generally taken together as a group, around 1pm and 6pm, respectively, and field work is conducted in between meal times. We take meals very seriously—surveying biodiversity in the rainforest is hard work!

What's the food like in the field?

In Cusco we'll have a wide selection of restaurants to choose from, ranging from local Andean and Peruvian cuisine to international fare, and spanning all budgets. At the expedition base camp in Gallito de las Rocas we will have three healthy meals daily, which will be prepared onsite and served by the expedition chef. Meals are always produced with fresh, local ingredients, some of which come right from the fields outside of Pillcopata. Hot water for coffee and tea, as well as snacks, will be available at all times.

We are happy to accommodate any special diets or food restrictions (e.g., allergies, etc.) with advanced notice.

What is phone and internet service like?

There is good cell coverage in Cusco (discuss international rates and plans with your home carrier), and limited reception at in Pillcopata. Once we depart for the Gallito de las Rocas

concession, however, there will be no cell coverage. Internet use will be limited to Cusco, including through the cell network or the hotel wifi.

How do I do laundry at the field sites?

In the field, we wash clothes by hand. We recommend that you bring laundry soap (preferably biodegradable) with you. Otherwise, you can purchase soap and/or detergent in Cusco or Pillcopata.

Packing List

Clothing

Long-sleeved shirts: Several, for protection against insect bites and other jungle hazards. I prefer old, button-down dress shirts that are cheap and easily found at thrift shops.

Short-sleeved shirts, T-shirts: Several, for wearing underneath long-sleeves and for camp.

Shorts: For lounging around camp, when bugs aren't bad.

Pants or trousers: At least two, for protection against insects and thorny vegetation. We prefer thicker pants in the jungle, but quick-dry material is also very nice.

Rain jacket or poncho: You will need it! Make sure the jacket is *water proof*, not just *water resistant*. Goretex is the best. We prefer ponchos to rain jackets, since the former are better for keeping packs covered in the rain, but many people prefer jackets, and it's up to you which option you go with. Good ponchos can be purchased cheaply in Cusco or Pillcopata.

Hat, cap, or visor: Nice to have while in the hot tropical sun for long periods.

Socks: At least 5 pairs. Bring as high-quality as you can; thin cotton socks tend to wear out quickly and can cause blisters, especially while wearing rubber boots, which will make hikes no fun.

Sandals: Hiking sandals (Teva, Chaco, etc.) or simple flip-flops. Use as camp shoes or in Pillcopata.

Shoes: A pair of sneakers or running shoes to wear in towns, in camp, etc.

Rubber boots: Essential in the jungle. You can bring your own, but good rubber boots are also available cheaply in Puerto Maldonado. I recommend against bringing hiking boots—they are heavy, they never dry once wet, and they are essentially useless when it's muddy in the jungle. Team members are required to wear rubber boots while in the forest, both on and off trail.

Swim suit: We will camp alongside a beautiful, crystal clear river.

Paper Items

Passport: Keep sealed in a zip-lock bag, to prevent growth of mold.

Photocopy of passport photo-page: Stored separately, for replacement process if passport gets lost or stolen.

Notebook and pencils: For taking notes during the Expedition. These are available in Peru, but not very good in wet environments. Rite-in-the-Rain brand field notebooks are high-quality and waterproof, and widely available online.

Insurance papers: The name and number of your health insurance policy. Compensation forms required by your insurance company.

ATM card and bank phone number: To call in case of loss or theft. Also, you should inform your bank of your travel plans to avoid blocks being placed on transactions.

Equipment

Backpack: The largest size that fits your body, to carry all of your stuff and supplies during our multi-hour hike into Gallito de las Rocas. Should be backpacking style; do not use a duffel bag or anything with wheels.

Daypack: Small enough to bring into the field regularly, with enough space for water, field notebook, and raincoat. Helpful if this fits inside or is part of your larger backpack for the long hike in and out of the concession.

Pack cover: A means of keeping the stuff in your pack dry—a pack cover—or you can put your stuff in plastic bags and put those in your pack. A pack cover will be much easier and will keep the bag itself mostly dry.

Tent: Tents should have capacity for at least one person, although a two-person tent will allow you to organize your belongings and will be more comfortable generally. It will likely rain, so make sure your tent is completely waterproof—this can be achieved by bringing a seam-sealed rainfly that goes all the way to the ground. Please be sure you bring a true backpacking style tent with rainfly. You may opt to share a tent with another team member, but it's up to you to arrange this.

Stuff sacks: To organize items in your backpack and daypack. Or use sturdy plastic bags.

Sleeping bag with stuff sack: Light-weight, compact not bulky, we use sleeping bags primarily for overnight camping. Night temperatures are typically mild in the concession. Sleeping bags rated to 45-55 °F are sufficient. Some people can get away with something thinner and more lightweight, but it's up to you.

Sleeping pad: Inflatable or foam type. If using an inflatable pad, be sure to come equipped with a way to deal with flats.

Binoculars: You will use them almost every day, and you will be disappointed if yours are not adequate. Binoculars are rated by their magnification power and the size of the lens (measure of light-gathering power): 8 x 42 magnify eight times with 42 mm diameter lenses. We recommend these since they have sufficient magnification and light-gathering capacity for the dimly-lit rainforest environment while not being too large and heavy to use comfortably for longer periods. Smaller binoculars are lighter and cheaper, but drastically reduce the amount of light gathered: this makes objects seem dim, colorless, and not sharp. 7 x 25 is minimal, and decent pairs can be found for \$80 - \$100; however, as field naturalists you may want to invest in a slightly better model. Our favorite is the Nikon Monarch series (8 x 42), which run between \$200 - \$300. They're totally worth it!

First aid, personal pharmaceutical, and toiletry supplies: Your choice of items such as moleskin, Band-Aids, antibiotic ointment, ibuprofen, Benadryl, hydrocortisone cream, anti-diarrhea medicine (note that group first aid kit is for injuries, not small stuff). Also, bring any personal care items you need, as we will not be able to re-supply these items regularly and selection in Peru might be different than what you are used to. Don't forget sunscreen, and a roll of toilet paper (often not provided in hotels, boat and car rides, etc.; obtainable in Peru).

Towel: Medium sized, cotton dries slowly, synthetic fabrics dry fast.

Eating kit: This should include a large plate or bowl, reusable eating utensils, and a cup, for taking meals while camping.

Headlamp: Sturdy, compact, good quality, several sets of batteries. I recommend Black Diamond, Petzl, or Princeton Tec brands (My absolute favorite is the Princeton Tec Apex 200: 200 lumens of awesome light output and waterproof). 200 lumens or more is ideal if you want to really see well at night, especially important for herpers; will generally make camping and night hikes immeasurably more fun.

Water bottles or bladder: We prefer bottles; we've had many problems with leaky hydration packs/bladders.

Insect repellent: You want the highest concentration of DEET possible (100% if you can get it); herbal or 'all-natural' repellants don't work very well. Please remember that covering up is the best protection against bites.

Optional Equipment

Colored pencils: These will be useful for illustrating plants and animals in the field journals. Any artists will be happy to have even basic supplies.

Water filter: Pump-type or Steri-Pen. Steri-Pen is a UV water-purification system that is the most convenient; bring plenty of batteries. These will help us reduce the amount of water we carry during our hike into the concession.

Wristwatch: Get going on time.

Travel alarm clock: Lots of early departures. Your smart phone should have this option.

Epi-pens: If you are allergic to bee or wasp stings bring two epinephrine injectors (requires prescription) and an antihistamine such as Benadryl.

Camera: You'll want to take lots of photos!

Waterproof/dry bag or sturdy ziplock bags: Protect camera, etc., in rain.

Biodegradable soap: For washing clothes, dishes, your body.

Sunglasses

Spanish-English dictionary: For help with Spanish, spoken exclusively by locals at most of our field sites. Good apps, including some available off line, are available for smartphones.

AA or AAA batteries: Batteries are available in Peru but price and selection are much better in USA. Make sure to bring all non-AA or AAA batteries with you from home (e.g., CR123, etc.)

Trail mix, trail bars: Packaged snacks are available in Peru, but selection not what you might be used to.

Peanut butter in plastic jar: Rare and expensive in Peru. While this might seem like an odd thing to bring, believe me, you will be glad to have it in the middle of the Andes-Amazon!

Contact Info

Still have questions? Feel free to [send us a message](#), or contact us at info@sustainableamazon.org.