



LUQ-LTER VISITOR INFORMATION

Welcome to the Luquillo Long-Term Ecological Research (LUQ-LTER) site! We are located in the Sierra de Luquillo, a mountainous area in northeastern Puerto Rico, and are excited to welcome you to our facilities. In this guide you will find summary information related to conducting research at LUQ-LTER. For more information, see our Frequently Asked Questions ([FAQs](#)) webpage. For details regarding field safety, expected behavior and reporting conduct violations, see our [safety guide](#) and our [code of conduct](#) webpage.

LUQ-LTER SITE

The [LUQ-LTER](#) site joined the [LTER network](#) in 1988 as the only tropical terrestrial site. Several research programs have been established in our site, all of which are conducted within the Luquillo Experimental Forest (LEF), also known as El Yunque National Forest ([EYNF](#)). In addition to research LUQ-LTER is home to long-term education and outreach initiatives coordinated through the [LUQ-LTER Schoolyard Program](#).

RESEARCH AREAS

LUQ-LTER science is conducted in several distinct locations. El Verde Research Area (EVRA) is approximately 260 acres between Hwy 186 and the El Toro Wilderness Area. EVRA can be accessed from El Verde Field Station ([EVFS](#)), an important site for tropical forest science and ecology since the mid 20th century. Several long-term research plots and associated projects occur in the EVRA, including: Luquillo Forest Dynamics Plot (LFDP), Canopy Trimming Experiment (CTE), Long-Term Elevation Plots (LTEP) along the Sonadora River, the Stream Flow Reduction Experiment (StreamFRE), and the Luquillo Throughfall Exclusion Experiment (LUQTEE). Locations of key research sites can be viewed on the LUQ-LTER [GIS](#) webpage. The [Environmental Sciences](#) Department of the University of Puerto Rico, Rio Piedras Campus ([UPR-RP](#)), administers the station and surrounding research area under a special use permit from the USDA Forest Service (USFS).

Other important LUQ-LTER research areas include the Sabana Field Research Station ([SFRS](#)), managed by the USDA Forest Service-International Institute of Tropical Forestry ([IITE](#)). SFRS is the headquarters for the [TRACE](#) Forest Warming Experiment and the Bisley Experimental Watersheds ([BEW](#)). Pico del Este (East Peak), located in cloud forest at the top of the LEF, is an important site for the study of aerosols and atmospheric chemistry.



RESEARCH

LUQ-LTER research focuses on the effects of natural (e.g., hurricanes, landslides, and drought) and anthropogenic (e.g. deforestation and land use change) disturbances, and long-term climate patterns, on forest dynamics, terrestrial and aquatic organismal communities, and biogeochemical cycling in a tropical montane forest environment. We use monitoring, experimental and modeling approaches to understand changes in biota and biogeochemistry in response to extreme events such as altered storm intensities, decreasing precipitation, increasing temperature, and Saharan dust.

Please see our LUQ-LTER [research framework](#) and [research approaches](#) webpages for detailed information about LUQ-LTER research programs and scope.

SITE DESCRIPTION AND NATURAL HISTORY

Our site is a natural laboratory for understanding ecosystem change in the tropics. The LUQ-LTER is uniquely valuable as a rugged and forested mountainous landscape spanning a range of over 1,000 m in elevation and located in the midst of a Caribbean hotspot of biodiversity and endemism. It is inhabited by more than 1,000 plant species and over 160 vertebrate species, and is home to a variety of endemic birds, reptiles, amphibians, and plants. With an annual rainfall that averages 3500 mm, and not less than 200 mm per month, the site is classified as subtropical wet forest in the Holdridge life zone system and tropical montane in Walsh's tropical climate system. Mean canopy height is about 20m, with the tallest trees reaching 35m in height. The present composition and distribution of trees has been affected by a combination of natural (e.g., hurricanes, landslides, and local tree falls) and anthropogenic disturbances (e.g., selective logging, agriculture, and silviculture) dating back more than 80 years. For more information about our site's history, geography and biodiversity (including species guides), please see our [natural history resources](#) webpage.

LUQ-LTER STAFF AND COMMUNITY

Many individuals work at our site, spanning research programs at El Verde, Sabana/Bisley, Pico del Este and other research areas. This includes administrative personnel, researchers, LUQ-LTER technicians, USDA Forest Service employees, educators, students, and interns. Staff are predominantly based at UPR-RP/El Verde Field Station and IITF/Sabana Field Station. The broader LUQ community comes from many institutions in Puerto Rico, mainland US, and other countries. For a list of who's involved in our community see our [collaborators](#) and [people](#) webpages.



RESEARCH PERMISSION AND PERMITS

Research requests and questions about permitting are received by our Program Manager Juan García-Cancel (juan.garcia5@upr.edu) and evaluated by the LUQ-LTER leadership.

- Activities in EVRA must be consistent with conditions established under a Special Use Permit with the Forest Service. If the proposed activities exceed the permitted conditions and cannot be modified, applications will be referred to EYNF to request a separate permit. Any proposed research that will occur outside EVRA's permit boundary but still within EYNF/LEF will need a separate permit from EYNF. Requests for permits should be communicated to Rosendo Ramos at: Rosendo.RamosSerrano@usda.gov.
- For research activities occurring at SFRS or Bisley please contact IITF staff: Iana.GrullonPenkova@usda.gov

Research involving the collection or transport of living plants or vertebrates must follow the Puerto Rico Commonwealth regulations, which require a specimen collection permit from the Puerto Rico Department of Natural and Environmental Resources ([DRNA](http://drna.pr.gov); for more information contact Marylin Colón, mcolon@drna.pr.gov). Any research involving marking or manipulating vertebrates requires an Institutional Animal Care and Use Committee ([IACUC](http://iacuc.upr.edu)) from UPR or the researcher's home institution.

Drones: Currently, there is a Flight Avoidance zone over the entire El Yunque National Forest, which is tied to the Endangered Species Act and El Toro Wilderness area. A special use permit from the Forest Service is required to fly a drone (or any other aircraft) for any recreational or scientific purposes. To get this permit you must present a flight plan with coordinates, including potential dates and estimated time for flights. Also include drone type and pilot credentials and contact information, as applicable. This information can be compiled and emailed to Rosendo Ramos at: Rosendo.RamosSerrano@usda.gov. Permit requests should be submitted a minimum of 3 weeks before planned fly dates so the Forest Service can review and complete a formal consultation with USFWS.

Permit approval takes time and applications should be submitted as early as possible. Advanced planning and frequent communication with the relevant agency is advised.



FACILITIES

An overview of LUQ-LTER facilities and their locations within the LEF can be viewed on our [facilities](#) webpage. The details of each are provided below.

○ EL VERDE FIELD STATION AND STREAM HOUSE

Field Station: El Verde Field Station is located within EYNF and provides access to El Verde Research Area via research trails. Facilities include a primary complex with a parking area, office, and laboratory facilities, dormitory rooms with bunk beds, and a kitchen and dining area. A secondary complex includes two-bedroom apartments, a kitchen area, and additional parking

The station's facilities are currently out of service due to the damage caused by Hurricane María in September 2017 as the electrical lines that supplied power were affected. A diesel generator is used when it is necessary to power the station, and wi-fi is intermittently available. We are currently working on a plan to restore the station to full operation.

Coordinates: [18.321279, -65.819605](#)

Physical Address: Carretera 186, KM 19.5 Rio Grande, PR 00745-9601

Stream House: This is a two-story building located two miles north of the main station facilities and outside the boundaries of EYNF. The Stream House has relatively stable power/internet and has access to the Espiritu Santo River. Facilities available for visitor use include a second-floor unit with 3 bedrooms, 2 bathrooms, and a kitchen; a limnology lab equipped with balances, drying ovens, and stirrer/hot plates; and a dry room on the first floor, where staff offices are located.

Coordinates: [18.341933, -65.824669](#)

Physical Address: Carretera 186, KM 22.4 Rio Grande, PR 00745-9601

RESERVATIONS:

To reserve station or Stream House facilities, whether for day or overnight use, visit the [rates and fees](#) and [reservations](#) webpages of EVFS. It is strongly recommended that you communicate with the facilities manager, Francisco Pérez (Francisco.perez17@upr.edu), for detailed information about the amenities included with your reservation. Visitors are expected to abide by the [safety rules](#) on the EVFS webpage.

○ SABANA FIELD RESEARCH STATION



At the SFRS there are multipurpose buildings, a research laboratory, and a dormitory. The analytical laboratory is equipped with drying ovens, freezers, chemical hood, balance, micro-centrifuge, and a ball mill grinder, and is ideal for soil, vegetation, and mycology studies. In addition, a nursery and herbarium are available for research and education purposes. The dormitory is equipped with bunk beds, a full kitchen, a common area, and shared bathrooms, and it can host researchers, interns, volunteers, students, and professors. For more information please contact Iana.GrullonPenkova@usda.gov.

o EAST PEAK STATION

The Pico del Este (East Peak) facilities, also known as PDE cloud forest station, was founded in 2004, and is operated by the University of Puerto Rico and the Brookhaven National Laboratory. The station is located in a montane cloud forest at an elevation of 1,050 m above sea level. The site is exposed to a wide variety of air masses of diverse origins year-round, which makes it an ideal site for atmospheric and climate change studies. Pico del Este is an hour drive from the University of Puerto Rico, Rio Piedras campus, which makes it accessible for sensor maintenance, calibration, and troubleshooting. There are three hurricane-proof steel shipping containers in the station: (i) the Aerosol and Cloud Analysis System (ACAS), (ii) the aerosol observing system (twin of the system located at the Cape San Juan atmospheric observatory), and (3) the office/laboratory container. There is a variety of instrumentation available for atmospheric and hydrologic research at Pico del Este. See the [Luquillo Critical Zone Observatory](#) and [USDA FS - Pico del Este](#) webpages for more information about the site, and contact the Program Manager (juan.garcia5@upr.edu) for a list of the instruments available for research. Data collection at Pico del Este may require a separate permit from the Forest Service (see Research Permission and Permits, above).

SAFETY GUIDELINES

Resources:

We have developed a LUQ-LTER Field Safety Guide in [English](#) and [Spanish](#). Visitors are expected to familiarize themselves with safety concerns and prepare accordingly. We recommend keeping a screenshot of the first few pages (emergency contacts, addresses, medical facilities) readily accessible on your phone in case of emergencies while visiting LUQ.

All visitors are expected to comply with the [code of conduct](#) on our webpage. The same page contains information on how to report code of conduct violations.

**Key concerns:**

The forest is generally safe, but several site-specific hazards and preventative measures are important to consider:

- Be mindful of the weather conditions when planning fieldwork and crossing rivers/streams as rain and thunderstorms can develop rapidly and result in flash floods.
- A physical or digital map and compass are important for navigating the site. Get acquainted with the trails before heading out without experienced staff.
- Be aware of your surroundings, take your time when moving through the forest, and watch your step on uneven, wet, slippery, or muddy terrain.
- The sap of some plants can cause severe rashes (similar to poison ivy). For more information, please see the USFS [poisonous plants](#) page for EYNF.
- Bees, wasps, ants, termites, centipedes, and scorpions are found in the forest and may cause allergic reactions if you get bitten or stung; visitors must bring their own medicines.
- Keep your distance from mongooses as this exotic species often carries rabies.

Be sure to alert staff if you notice a dangerous situation or someone in distress. Criminal behavior, including harassment, should be reported to your supervisor and local authorities for immediate response.

Preparation:

Each research team is responsible for their own safety. Supervisors (including academic advisors, educators, trip leaders, and field crew leaders) should be familiar with potential field hazards and emergency procedures.

- Be aware of medical conditions and collect emergency contact information for your field teams
- Make sure to discuss site hazards and preventive measures and have a plan for responding to emergency situations (e.g., getting lost, injury or medical emergency, sexual harassment).
- Every crew should carry their own first aid kit
- Cell phone service is intermittent at El Verde and poor at Sabana. Those with field sites farther from field stations should consider alternative communications and carry a map and compass.
- Make sure to report any incidents that occur during fieldwork or at facilities



WEATHER

It is highly important to be aware of the weather conditions when planning fieldwork at our site. Rainstorms develop rapidly resulting in flash floods in some areas. See the weather forecast using your website or application of choice and monitor the hourly forecast for the day. If planning fieldwork after a heavy rain, it is a good idea to monitor the level and flow rate of the rivers in the area. This is particularly important if your plan involves crossing or working near streams.

- A good option for weather forecasts is Weather Underground. Zarzal Station, located in Río Grande, is closest to El Verde and Mata de Plátano Station, located in Luquillo, is closest to Sabana.
- River flow rate information can be found on the [USGS water-data](#) website. The nearest USGS water-data station to EVFS is station [50064200](#) for Río Espiritu Santo.
- In case of a tropical storm or hurricane advisory, see the [National Hurricane Center](#) website. For news on approaching storms, you can also follow meteorologists Ada Monzón and Deborah Martorell on Facebook, Instagram, or X.

SITE NAVIGATION

For those working in El Verde Research Area: before your arrival, we recommend you download a geo-referenced visitor map that can be printed out or used interactively with the app 'Avenza Maps' on your phone. Please see our [Avenza Maps - How To Guide](#) for instructions on downloading the app, the visitor map, and its supplementary layer with additional site features.

If you are planning to work in the Luquillo Forest Dynamics Plot or in the Long-Term Elevation Plots please contact the research manager, Monique Picón (monique.picon@upr.edu), and the LFDP manager, Jesa Santiago (jesajane63@gmail.com) who can facilitate permissions and provide additional resources. If you would like to work at other monitoring or experimental sites, please contact the lead PI of that project.

ESSENTIAL ITEMS

You are visiting a tropical rainforest that is wet and muddy, and inhabited by a diversity of insects. Here are some basic items you should bring to be prepared to work in the area:



For daily fieldwork:

- Lightweight daypack
- Field clothes: Closed toed hiking footwear (a second pair of field shoes can be nice if your primary pair gets wet), long lightweight field pants, and long lightweight field shirt.
- Rain jacket or poncho, small umbrella
- Field hat or cap
- Water bottle
- Insect repellent
- Eye protection and sunscreen
- Headlamp or flashlight

If staying at the Stream House:

- Portable water filter
- Laundry detergent, dish soap, and toilet paper
- Tupperware for field lunches
- Bug spray
- Bathing suit
- Toiletries & medications

SCIENTIFIC SUPPLIES

Planning ahead for supply purchase, transport, and storage is key. ***It's advisable to gather supplies 2-4 months before starting work in the LEF/EYNF.***

Project Materials: Once on site finding specific materials can be challenging, so it is best to come prepared. If coming from off-island consider flying with everything you need, if possible. Keep in mind conditions on site are very humid and without maintenance your equipment and materials can degrade quickly.

Shipping: If you do need to ship materials, contact staff for the best place to ship and address to use (often varies by supplier/carrier). Track your items closely, ensuring someone can be present to receive them and troubleshooting issues quickly (otherwise items get sent back). ***Shipping items to Puerto Rico can take a long time***, often 3 or more weeks for Amazon deliveries. Anything hazardous can take 2-4 months to get through customs.

Storing equipment: We have very limited storage space, and most is not climate-controlled. Please have a plan for where you'll be storing your materials or equipment between site visits. On-site storage requires approval from the facilities manager and is not guaranteed.



VISITOR RESPONSIBILITIES

A variety of policies and standards are in place to ensure visitor safety and the proper use of facilities and research sites. Here are a few of the most important:

Safety:

- ***Each research team is responsible for their own safety.*** This means adequate preparation: think through communications, first aid, flash flood threats, what to do if lost, and other preparations (see safety guidelines). Know what to do in emergency situations and how to report an incident.
- Be sure to do the following for your student, technician, intern, or group:
 - (1) collect emergency contact information
 - (2) discuss site hazards and preventive measures
 - (3) discuss responses to emergency situations (e.g., medical emergency, bad weather, sexual harassment)

Field Research:

- ***Obtain prior written approval to conduct research at a particular site.*** We ask that you stay within your designated area, avoiding other study sites.
- Obtain approval for any materials or equipment placed in the forest, including to mark plots, transects or locations.
- Refrain from making unauthorized collections or unnecessarily disturbing the natural landscape.
- ***Remove all materials, equipment and marking from the field site as soon as a project is completed.*** Materials left behind turn into trash, damage the forest aesthetic, and can present safety hazards.
- Obtain approval to return to the area after the project has expired.

Facilities:

- Obtain written approval to use a particular facility and complete a site orientation. ***Researchers, team leaders and instructors are responsible for ensuring that all project personnel receive a site orientation.***
- Park only at designated sites and take responsibility for research materials and personal items. LUQ-LTER is in no way responsible for lost, missing, stolen, or damaged items. Be sure to close and lock doors and gates behind you, following facility protocols.
- Abide by the rules and regulations stipulated on each facility's web page. Smoking, pets, alcohol, and overnight guests are strictly prohibited.
- Be considerate of others. Common areas must be kept clean (no food left out!), tidy, and free of equipment. Please respect the work schedules of others by observing quiet hours (9 p.m. – 6 a.m.).



- ***Any equipment, materials, or keys borrowed from LUQ must be returned to their original location.*** Please take time before your departure to ensure everything has been returned in good (and clean) condition.
- Clean out designated living/work areas (including refrigerators!) when your project is complete. ***No project materials or other items should remain behind without prior approval from the manager of the facility.***
- Any lost or damaged items, or damage to facilities, must be reported.

VISITOR BEST PRACTICES AND TIPS

Visitors are asked to plan their visits thoroughly, to communicate in a proactive manner, and to respect the norms and cultures at LUQ-LTER sites.

- Plan your visit and fieldwork with time, including reaching out to LUQ-LTER investigators as well as research and facilities managers. They need advanced notice to prepare and to ensure you are properly oriented.
- Think through your scientific supplies (see above) and technical needs in advance, so that you don't end up scrambling to purchase or borrow what you need once you are on site.
- Be considerate of your hosts' time. Staff do not normally work on weekends and holidays. If you are requesting orientation or technician support, it should be during normal work hours. If you are arriving at a facility outside of normal hours, be sure to make arrangements ahead of time. *We kindly ask that staff not be contacted on their personal phones outside of working hours, except in urgent or pre-approved situations.*
- We are a bilingual research program. Though science is primarily communicated in English, regular communication in Spanish is common. Good practice is simply to be communicative about language skills, preferences, and translation needs, and respectful of others' needs and preferences.

A few additional tips for those coming from off island:

- ***Climate:*** The weather is usually hot and humid, and you may need a moment to acclimate. Dehydration and heat strokes can occur in the field; make sure to pack appropriate clothes and enough water. Without proper care your clothes, equipment, and food may quickly grow mold.
- ***Power & Water:*** Due to lack of maintenance of the electrical grid, power outages are common, especially during rainstorms. In rural areas relying on a water pumping system (i.e., Stream House) water service is usually lost after a power outage. We recommend having backup sources of light, water, and phone battery.



- *Holidays*: Puerto Rico celebrates a number of local holidays in addition to U.S. holidays. Planning with staff can help you avoid depending on personnel, businesses, or services on a local holiday.
 - Christmas holidays extend through Three Kings Day, with many institutions (including UPR) and businesses closed until January 11th.
- *Cultural differences*: Even though it has close ties with the US, PR is a distinct country with its own unique culture. It is important to keep an open mind and flexible attitude about how things work in Puerto Rico, and that it may differ from your expectations (e.g., language, customs, food, mannerisms - but also bureaucracy, work culture, and resource availability).

EXTERNAL ACCOMMODATIONS, TRANSPORTATION, AND NEARBY SHOPS

You can find other lodging options on Airbnb, or with a variety of hotels in the area. Taxi services, Uber, and car rental services are also available (although it is difficult/not reliable to get Ubers to or from the field stations). Enterprise car rental has a location in the Wyndham Grand Rio Mar hotel in Río Grande, and another location in the nearby town of Fajardo. The Río Grande location charges a hotel fee.

There are several grocery stores in the area, but Fam-Coop and Ralph's are the closest ones to EVRS and the Stream House facilities. The two closest hardware stores are 'National Lumber and Hardware' and 'True Value' also known as 'Solí Hardware Store'. In addition, there are a variety of restaurants in the nearby area (e.g., towns of Palmer or Luquillo) which you can find on google maps. Remember to check the hours before you go.

WEB RESOURCES

- [Luquillo LTER](#) / [EVFS](#)
- LUQ-LTER [Data Catalog](#) and [Publications](#)
- Compiled [Natural History Resources](#) for EYNF
- [IITF](#) / [Sabana Field Research Station](#) / [TRACE](#)
- Bosque Nacional [El Yunque](#)
- [USGS](#) Caribbean-Florida Water Science Center, [USGS water-data](#) - [50064200](#)

SOCIAL MEDIA

- LUQ: Instagram [@luquillo.lter](#), Facebook [luquillo.lter](#), Twitter [@LUQLTER](#)
- TRACE: Instagram, [@forestwarming](#), Facebook [@forestwarming](#), Twitter [@ForestWarming](#)
- IITF: Instagram [@usfs_iitf](#), Facebook [FSIITF](#), Twitter [@USFS_IITF](#)