2024 VOL. 26: 202403

DOI: 10.30427/ecotrop202403

ECOTROPICA

INTERNATIONAL JOURNAL OF TROPICAL ECOLOGY

FIELD STATION PROFILES

LAS PIEDRAS BIODIVERSITY STATION

Patrick Stephane Champagne

Acadia University Biology Department, 33 Westwood Avenue, Wolfville, Nova Scotia, Canada

*** Corresponding Author:** Patrick Champagne, *patrickchampgne@gmail.com*

NAME OF FIELD STATION

Las Piedras Biodiversity Station (LPBS), also known as Alta Sanctuary

GEOGRAPHIC LOCATION

- Peru, Departmento Madre de Dios, Provincia Tambopata
- Lat. 12.06°S, Long. 69.53°W; 442465 Easting, 8667117 Northing, UTM Zone 19; 240-300 m a.s.l.

HABITATS

The Las Piedras Biodiversity Station (LPBS), also known as *Alta Sanctuary*, is located in the central area of the Las Piedras River tributary in the Madre de Dios region of southeastern Peru (Figure 1A, B). The LPBS is a privately protected conservation area ("Area de Conservación Privada"). It covers 589 ha and is surrounded by several larger and sustainably managed Brazil nut, ecotourism, and conservation concessions (ca 20,000 ha) (Payne et al., 2024). The habitat is consistent with the typical characteristics of the lowland Amazon rainforest under 500 m in the Madre de Dios region. The wet season generally spans from October to April and is characterised by almost daily rainfall and high humidity levels (90%) within forested areas. The dry season, typically between May and October, brings warmer temperatures, with highs reaching up to 35°C, while humidity tends to be lower. Annual rainfall and temperature from the airport weather station in Puerto Maldonado indicate that the average annual temperature and precipitation are 29–32°C and 56.8–342.6 mm, respectively (https://www.weather-atlas.com/en/peru/puerto-maldonado-climate). The region experiences cold weather events between May and August, known as "friajes." These events occur when cold winds move in from the south, causing temperatures to plummet to a range of 8-15°C, lasting for up to 8 days.

The station is situated at the top of a steep, tierra firme ridge that extends eastward and abuts the Las Piedras River. Most of the surrounding area contains high terrace

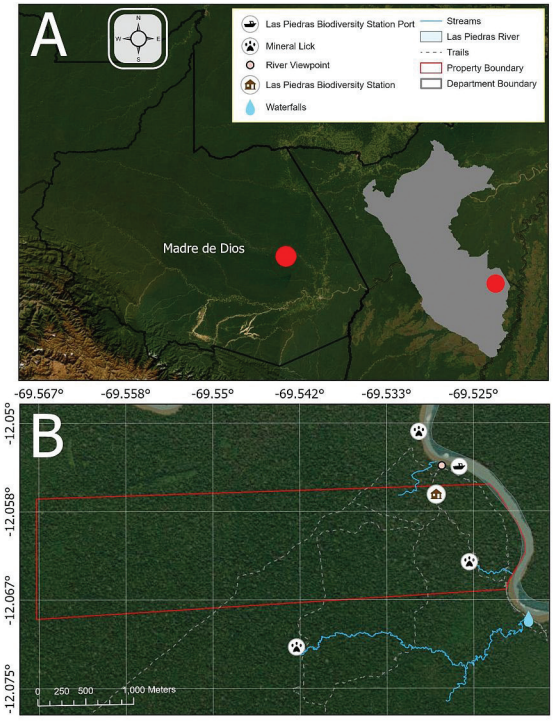

Figure 1. A. Location of the Las Piedras Biodiversity Station within Peru. B. The Las Piedras Biodiversity Station is located on a tierra firme ridgeline near the Las Piedras River, in Madre de Dios, Peru. Maps were prepared using ArcGIS Pro, and satellite imagery was sourced from Maxar through Esri's Imagery Services Layer. Ground tracks of trails and streams produced using Garmin 64S. Maps produced by Patrick Champagne.

tierra firme forests ("bosque de terraza") (Encarnación, 1985), dominated by Brazil nut trees and lowland floodplain forests. In lower terrain, riverine successional forests exist along the river with extensive areas dominated by bamboo (*Guadua* sp.) and wild cane (*Gynerium sagittatum*). The interior and western half of the property have remained relatively undisturbed since the station was founded, and most of the trail system covers the eastern half of the property. Towards the center of the property, the trails pass through an elevated palm (*Mauritia flexuosa*) swamp system ("aguajal") and enter the adjacent Brazil-nut concession to the southwest. At the height of the dry season, several of the palm swamp pools retain water, however, are isolated (Patrick Champagne, unpublished observations 2012, 2013, 2015, 2017). Five small tributaries derive from the LPBS property ridgeline near the research cabins, and eventually empty into the Las Piedras River. Three larger stream systems are nearby, one 4.3 km southeast and downriver, the Loboyoc (12.07°S, 69.49°W), and two 3.8 km north and upriver, the Loreto (12.02°S, 69.52°W), and Loretillo (12.02°S, 69.52°W). Near the property's southern border is a stream system (*Waterfall stream,* WS) that culminates with two waterfalls on the Las Piedras River. It derives from a stream valley formed by the elevated plateau that the station is situated on. A second, tannin-stained black water branch of WS (12.07°S, 69.52°W) flows from a palm-dominated wetland, southwest of the property and in the adjacent Tambopata Expeditions S.A.C Ecotourism concession.

Several mineral salt licks occur on and near the property. Two relatively large and active mammal licks are accessible by trail and within a one-hour hike from the station. The stream valley central to the property has remained relatively undisturbed by sampling since 2013, and several small mineral licks have occurred in the area and on embankments of the WS's springs. An active parrot mineral lick is two hundred and seventy meters upriver from the LPBS port (Figure 1B). An observation area is cleared and accessible by a trail immediately across the river from the LPBS port.

FAUNA

Consistent with national parks and other regional research areas, biodiversity observed at the station and the surrounding area is high. A dynamic list of herpetofauna presented by the Alliance for Research and Conservation in the Amazon (*https://conservetheamazon.org/peru-rainforest-species-herpetofauna-amphibians-reptiles-snakes-frogs-caiman-turtles*), reports 78 amphibians and 99 reptiles occurring on concessions and properties in the central Las Piedras area (as of January 2024). Fifty-nine species of frogs and 11 species of reptiles are confirmed to occur specifically on the LPBS property (Champagne et al. 2015, 2021, 2024; Champagne 2022; Turrell et al. 2016; von May et al. 2009; Figure 2B). However, a comprehensive review including reptile diversity on the property has not been published. Sixty non-volant mammal species, including 12 primates, have been reported from the concessions surrounding the station (Payne et al. 2024). Bats and small rodents have not been sampled in the area. One hundred and forty-four species of fish have been found on the Las Piedras River and its sub-tributaries (Carvalho et al., 2012). Although sampling was relatively close to LPBS, occurrence records of fish from the property do not appear to exist. Red and green macaw (*Ara chloropterus*) and blue-headed parrot (*Pionus menstruus*) historically are the most frequently observed species at the mineral lick on the river (Hamer and Tatum Hume- Biosphere expedition reports 2002: https://www.biosphere-expeditions.org/expedition-reports-archive; (Patrick Champagne, unpublished observations 2012, 2013, 2015, 2017), and at least 12 other species of bird visit the lick regularly, albeit in smaller numbers. Rarely reported and protected species such as the short-eared dog (*Atelocynus microtis*), bushy-tailed opossum (*Glironia venusta*), banded galliwasp (*Diploglossus fasciatus*), and black-faced spider monkey (*Ateles chamek*) have been observed at LPBS and adjacent properties (Champagne et al. 2024; Lange and Robson 2019; O'Donnell 2020; Payne et al. 2024b; Rushford and Glynn 2023).

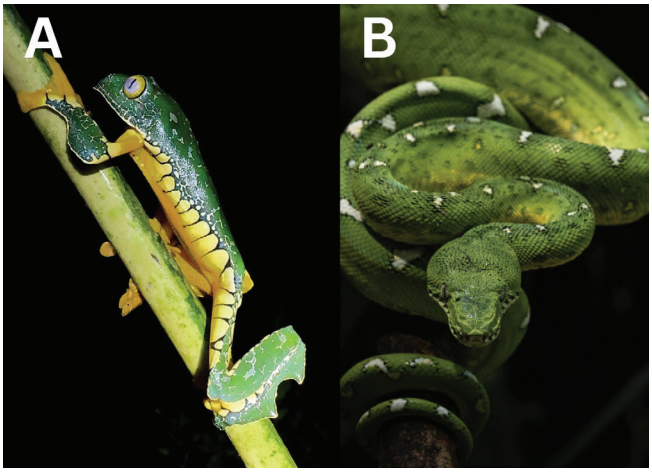

Figure 2. Rarely observed, canopy-dwelling herpetofauna such as the fringed leaf tree frog (A) (*Cruziohyla craspedopus*) and the Amazon basin emerald tree boa (B) (*Corallus batesii*) occur at the Las Piedras Biodiversity Station (Photographs provided by Paul Rosolie).

Expedition reports that detail Biosphere Expeditions' rapid assessment programs at LPBS (2002-2017) can be found online at their expedition report archive under Amazonia: https://www.biosphere-expeditions.org/expedition-reports-archive. Although limited in duration, these reports are excellent baseline resources for investigators operating out of the LPBS field station and the surrounding area. Furthermore, the reports contain historical occurrence records for select taxa observed on the LPBS property.

INFRASTRUCTURE AND FEES

The station is 70 km from the Padre Aldamiz International Airport in Puerto Maldonado. The property can be accessed entirely by boat, which takes 6 to 8 hours, or partly by vehicle with a shorter boat ride (20-40 minutes) from the port in Lucerna (12.09 S, 69.46 W). The cabin area is accessed from the port by a walking trail; resources and research equipment are transported using a cart on an alternative access trail. The LPBS is a platform-based field station (Figure 3A) that supports a fully functioning field kitchen, field bench station, open-air laboratory, common area (Figure 3B), living quarters, bathrooms, showers, clothing lines, washing areas, and emergency supplies. Water is treated on-site. A field cook is available for all expeditions to the station and can support dietary preferences upon request. Electricity is available daily for predetermined periods by use of generators; however, a near-consistent energy supply for charging small devices is powered by solar panels. Satellite Wi-Fi is available across the station. The port can accommodate multiple boats during all seasons and has a staging area for research vessels and aquatic technology deployment. Well-maintained trail systems provide access to a variety of habitat features (Figure 1B), including several mineral licks and aquatic systems. In addition to the primary research facilities, the station has a sleeping and observation platform secured 40 meters high in the emergent canopy (Figure 3C).

Figure 3. A. The Las Piedras Biodiversity Station is raised off the ground as a single continuous platform. B. The main station is equipped with living quarters for short—and long-term expeditions. C. An additional sleeping and observation platform is secured 40 meters high in the emergent canopy. Photographs provided by Mohsin Kazmi, Stephane Thomas, and Paul Rosolie (In order shown).

Expedition logistics, coordination, and accommodation for the Las Piedras Biodiversity Station/Alta Sanctuary can be coordinated by visiting the Alta Sanctuary webpage:

https://www.altasanctuary.com/

For questions regarding larger research groups and longer intended periods of stay, contact the station to learn more about field station availability and costs.

LEGAL REQUIREMENTS

Depending on your research objectives, you may require one or more authorizations, such as a *Research/Collecting Permit* (*https://www.gob.pe/serfor*), an *Export Permit*, or a *Genetic Resources Contract* (*http://sinia.minam.gob.pe*).

The LPBS property managers and operational entities have relationships with some neighboring concession holders, and parts of these agreements include trail use. Additional memorandums of understanding may be required depending on the research objectives intended to sample those areas. The above list is not necessarily exhaustive in its coverage; always ensure you have reviewed the required and current permitting with both your local and international partners.

KEY RESEARCH

The LPBS has primarily served as an educational center for field courses (e.g., Radford University Amazon Field Expeditions), conservation organization field operations

(Junglekeepers Peru), stakeholder engagement, and eco-tourism. However, it has remained an important infrastructure and service for research in the area for several decades by providing accommodation and, at times, regular services to research groups operating on neighboring projects. Most published literature and historical research from the station and the property have been focused on Herpetofauna. Fauna monitoring occurred for over 20 years at the LPBS, however, little literature has been published on the habitats and fauna of the property and the surrounding area in general. Research and conservation entities (e.g., Alliance for Research and Conservation in the Amazon and Junglekeepers Peru) that are active in the area, including at LPBS, have primarily focused efforts on evaluating the effectiveness and sustainability of land management practices for mitigating disturbances to primary forests.

LPBS underwent significant expansion in 2023 and 2024 to accommodate research priorities while maintaining its educational and eco-tourism roots. Investigator living quarters, including the field kitchen and work areas have been renovated and updated. LPBS is preparing to investigate canopy-dwelling taxa using a new canopy-sleeping platform and observatory. The station has initiated investigations to fill the knowledge gaps remaining on local biogeography by re-assessing existing historical station records in combination with modern environmental DNA sampling techniques.

SELECTED PUBLICATIONS

Payne CJ, Champagne PS, O'Donnell H, Lange LR, Rushford C, Rosolie P, Rosenzweig D (2024) High mammalian diversity on the Las Piedras River tributary of Madre de Dios, Peru: An annotated list of species including comments on biogeography and regional conservation. Check List 20: 152-183. https://doi.org/10.15560/20.1.152.

Turrell C, Crnobrna B, Smith-Bessen M (2016) Monitoring a population of *Cruziohyla craspedopus* (Funkhouser, 1957) using an artificial breeding habitat. Amphibian & Reptile Conservation 10: 1-6 (e112).

Von May R, Siu-Ting K, Jacobs JM, Medina-Mueller M, Gagliardi G, Rodriguez LO, Donnelly MA (2009) Species diversity and conservation status of amphibians in Madre de Dios, southern Peru. Herpetological Conservation and Biology 4 (1): 14–29.

CONTACT

For inquiries concerning accommodations please see the contact page at Alta Sanctuary's website: *https://www.altasanctuary.com/*. For inquiries concerning historical records at the station, contact Patrick Champagne (*patrickchampgne@gmail.com*).

REFERENCES

Carvalho T, Ortega H, Reis R, Flores J, Espino J, Jerep F, Trevejo G, Albert J (2012) Fishes from the Las Piedras River, Madre de Dios basin, Peruvian Amazon. Check List 8: 973-1019. https://doi.org/10.15560/8.5.973

Champagne PS (2022) Conservation ecology of *Eunectes murinus* (Green Anaconda) in the Madre de Dios region of southeastern Peru using remote sensing techniques and machine learning driven geospatial modeling (MSc dissertation, Acadia University). https://scholar.acadiau.ca/islandora/object/theses:3739/datastream/PDF/file.pdf

Champagne P, Mockford S, Kirkby C (2015) *Paleosuchus trigonatus* (Schneider's Smooth Fronted Caiman). Feeding behavior. Herpetological Review 46: 249

Champagne P, Rosolie P, Payne C (2021) *Drymarchon corais* (Yellow-tailed Creebo). Diet and Ophiophagy. Herpetological Review. 52: 870-871.

Champagne PS, Thomas S, Payne C, Swamy V, Roeder JM (2024) Arboreal preferences contribute to sparse records of the Banded Galliwasp, Diploglossus fasciatus (Gray, 1831), in lowland amazon rainforests. Herpetology Notes. 17: 265-269. https://www.biotaxa.org/hn/article/view/85208/80424

Encarnación, F (1985) Introduction a la flora y vegetacion de la Amazonia peruana: estado actual de los estudios, medio natural y ensayo de una clave de determinacion de las formaciones vegetales en la llanura amazonica. Candollea. 40: 237-252.

Lange LR, Robson NM (2019) Demography, habitat use and activity budget of a wild group of Black-faced Black Spider Monkeys (*Ateles Chamek*) in Las Piedras, south-eastern Peru. Neotropical Primates 25: 21-29. http://dx.doi.org/10.62015/np.2019.v25.88.

O'Donnell H (2020) First record of a short-eared dog scavenging on an armadillo carcass. Canid Biology & Conservation 22: 25-28. http://www.canids.org/CBC/22/Shorteared_dog_scavenging.pdf

Payne CJ, Champagne PS, O'Donnell H, Lange LR, Rushford C, Rosolie P, Rosenzweig D (2024a) High mammalian diversity on the Las Piedras River tributary of Madre de Dios, Peru: An annotated list of species including comments on biogeography and regional conservation. Check List 20: 152-183. https://doi.org/10.15560/20.1.152.

Payne CJ, Pinasco C, Lange LR, Champagne PS, Ten Haaf J (2024b) The great escape: Interspecific interaction and behavioral response to a semi-arboreal predator, the Tayra (Eira barbara), by a group of black-faced spider monkeys (*Ateles chamek*). Food Webs 38: e00335. http://dx.doi.org/10.1016/j.fooweb.2024.e00335

Rushford C, Glynn S (2023) Nocturnal activity and behaviour of the elusive Bushy-tailed Opossum (*Glironia venusta*). Journal of Tropical Ecology 39: E15. https://doi.org/10.1017/s0266467423000032).

Turrell C, Crnobrna B, Smith-Bessen M (2016) Monitoring a population of *Cruziohyla craspedopus* (Funkhouser, 1957) using an artificial breeding habitat. Amphibian & Reptile Conservation 10: 1-6 (e112).

Von May R, Siu-Ting K, Jacobs JM, Medina-Mueller M, Gagliardi G, Rodriguez LO, Donnelly MA (2009) Species diversity and conservation status of amphibians in Madre de Dios, southern Peru. Herpetological Conservation and Biology 4: 14-29.