

## CER-T-150 EL VERDE FIELD STATION - CENTER FOR ENERGY AND ENVIRONMENT RESEARCH

### CENTER FOR ENERGY AND ENVIRONMENT RESEARCH - PUERTO RICO FIELD STATION - UNIVERSITY OF PUERTO RICO

The station is located in the northern mountains of northeast Puerto Rico (latitude 18.18). It is approximately 45 minutes driving time from San Juan along a paved road. The research area is located on land spanning 50 hectares under federal control and is occupied under a use agreement with the U.S. Forest Service.

The history of ecosystem research at the site dates back to 1865 with the Rain Forest Project under the direction of Howard G. The research area ranges from 260 to 500m above sea level and has a mean annual rainfall of 3656 mm (143 inches) and mean temperatures of 0°C (32°F).

Fig. 1. Map of Puerto Rico showing the location of the Luquillo Experimental Forest, the Institute of Tropical Forestry, and CER Facilities.

The field station is situated within the 11,339-hectare Luquillo Experimental Forest, which is congruent with the Caribbean National Forest. This area was declared a forest reserve in 1903 and has been managed by the U.S. Forest Service since 1917.

The Luquillo Mountains reach an elevation of 1075 m above sea level and serve as the headwaters for six major rivers. The forest contains four life zones: subtropical wet forest, subtropical rain forest, lower montane wet forest, and lower montane rain forest under the Holdridge system of classification.

In addition to its designation as an Experimental Forest, the Caribbean National Forest is also a Biosphere Reserve and contains a Research Natural Area. A wealth of background information is available, including a good understanding of the taxonomy of most plant and animal groups, 80 years of climatic observations, 30 years of data on forest growth and composition changes, complete vegetation, soil, and ecological maps, and 20 years of intense study of the Tabonuco forest around the field station.

In addition to the El Verde Research Area, many other sites in the Caribbean National Forest and Commonwealth forests are also available for research.

Available for study and accessible from the field station, FLORAL AND FAUNAL DIVERSITY, Puerto Rico stands as the fulcrum between the east-west arm of the Greater Antilles and the north-south arm of the Lesser Antilles. The Flora and Fauna of the island contain elements of both regions. While the insular pattern of reduced richness of the biota is evident in Puerto Rico, the island still has 587 native species of trees, 13 species of bats, 208 species of birds, 41 species of reptiles, and 22 species of amphibians. The Caribbean National Forest contains 225 tree species, 83 vertebrate species, and a wide variety of invertebrates.

## RESEARCH AREA

Well-marked trails link eight plots currently being studied by CER and U.S. Forest Service personnel. Two plots are covered by a grid system: a 2 ha plot marked at 30m intervals and a 1 ha plot marked at 10m intervals. Access to other areas of the forest is by trails maintained by the Forest Service. Four randomly-chosen 1 ha plots were established in 1980 for permanent study, and the areas used by Odum in the 1960s are still under observation. Trees 10 cm or greater in diameter are tagged in the four 1 ha plots and many other trees are marked from earlier studies. A 22m walk-up (Fig. 2) extending above the canopy has been in place for 15 years, and a tower and walkway system is projected for construction in 1983. Nearby, Forest Service plantations of pine and mahogany offer the opportunity for comparative study of natural and managed forests.

## RESEARCH FACILITIES

The recently remodeled field station has two laboratory buildings. The older building has three air-conditioned laboratory rooms, an open-air cage and terrarium, and two experimental rooms in which illumination, photoperiod, temperature, and humidity can be controlled. One of the latter rooms has a one-way window for behavioral observations.

The new laboratory contains seven office/laboratories, a storage area, and an air-conditioned herbarium housing reference collections of plants, invertebrates, reptiles, and amphibians. Laboratories are equipped with water and electricity, refrigerator/freezers, drying ovens, balances, and dissecting microscopes. Equipped electrical and machine shops are also maintained. Other available equipment includes a D-vac suction sampler, three bicycles, and a portable leaf area meter.

**LIVING ACCOMMODATIONS:** A separate dormitory building contains four rooms, each with a connecting bathroom and shower. Sufficient bunk beds are available to accommodate 12 people. Bedding is provided. A kitchen with a refrigerator, stove and dishes is shared communally, and a washing machine and dryer are available.

**STATION CHARGES:** A modest station charge includes room, limited access to laboratory facilities, and the cost of power and gas. Effective October 1, 1982: Daily \$7.50/person, weekly \$40.00/person, Monthly \$125.00/person.

Use of extensive laboratory space requires prior approval and may incur a separate charge.

**TRANSPORTATION:** The San Juan International Airport is 40 minutes from El Verde by car. American, Capitol, Delta, Eastern, Pan American and major overseas airlines service Puerto Rico, with inexpensive direct flights offered from major cities on the mainland. For visiting scientists arriving between 0900-1400 on workdays, transportation to the field station can be arranged in advance at the cost of \$10/person one-way. Otherwise, effective taxis and rental cars are available at the airport.

**COMMUNICATIONS:** Communication between the field station and CEER facilities in San Juan is by short wave radio. Pay telephones are available a short drive from the field station. Correspondence can be sent care of the Terrestrial Ecology Division address and is delivered to

the field station once or twice a week.

**EQUIPMENT AND SUPPLIES:** Research equipment must be supplied by the individual researcher. Long-term use of station equipment or

Laboratory space must be arranged beforehand. Baggage on flights arriving from the mainland United States is not subject to examination by Customs, but plant and animal material leaving the island is scrutinized by the U.S.D.A.

**LANGUAGE:** Most transactions in Puerto Rico are conducted in Spanish, but English is commonly spoken. A working knowledge of Spanish will make your stay more enjoyable.

**HEALTH:** Malaria and yellow fever are absent from Puerto Rico, but dengue fever and Schistosomiasis are present in lowland areas. Neither is much of a problem in the Caribbean National Forest. Rabies shots are recommended for those having occasion to handle mammals. No dangerous snakes occur in Puerto Rico. Tarantulas, centipedes, scorpions, and stinging plants are present but are of nuisance value only. The sap of some plants (e.g., *Conocladia glabra*) can cause a severe reaction similar to poison ivy. Falls from slippery rocks or trees are a danger, and care should be taken in choosing footwear.

Emergency medical care is not easily available. Persons with serious health problems should make station personnel aware of emergency procedures, and should bring needed medications along.

**CLOTHING AND MISCELLANEOUS:** The high temperature, rainfall, and humidity should be borne in mind when selecting clothing. Proper footwear should be waterproof (or easily dried) and provide adequate traction on moss-covered rocks. Umbrellas are preferred over waterproof ponchos because of the humidity and temperature. As an alternative, a plastic garbage bag worn or hung over a palm leaf provides shelter and is easy to carry. While light clothing is recommended, a long-sleeved shirt or sweater may be needed at night or in air-conditioned rooms. Flashlights and batteries are necessary items and should be brought by the researcher.

**VISITORS:** The station is open to researchers and short-term visitors. Class visits are discouraged because of space limitations and the need to protect research sites. Reservation requests should be submitted in advance.

At least 30 days ahead of arrival to: Dr. Robert B. Keide, Head, Terrestrial Ecology Division, Center for Energy and Environment Research, G.P.O. Box 3682, San Juan, Puerto Rico 00936. Terrestrial Ecology telephones are (803) 767-0334 or 767-0254. New investigators should include a brief research proposal in their reservation requests and describe general objectives, methods, duration, dates, space needs, and other special requirements. The Caribbean National Forest is controlled by the U.S. Forest Service and any permanent requires prior approval. Birds are protected under the Migratory Bird Treaty Act, and appropriate collecting permits for animals and plants should be obtained in advance.

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