

CEER-T-150

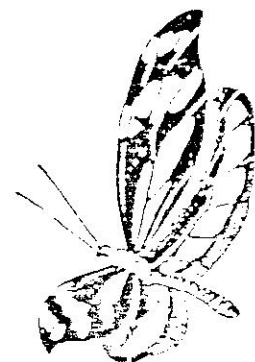
EL VERDE FIELD STATION



CENTER FOR ENERGY AND ENVIRONMENT RESEARCH
UNIVERSITY OF PUERTO RICO - U.S. DEPARTMENT OF ENERGY

CENTER FOR ENERGY AND ENVIRONMENT RESEARCH (CEER)

UNIVERSITY OF PUERTO RICO



EL VERDE FIELD STATION

The Field Station is located on the northwest slope of the Luquillo Mountains in northeast Puerto Rico (latitude 18°19'N, longitude 65°45'W), 45 minutes driving time from San Juan along paved roads. The 150 ha research area is located on land under federal control and is occupied under a use agreement with the U.S. Forest Service. The history of ecosystem research at the site goes back to 1963 and the Rain Forest Project under the direction of Howard Odum. The research area ranges from 250 to 500 m above sea level and has a mean annual rainfall of 3456 mm (136 in) and mean monthly temperatures between 21-25°C (70-77°F). The forest at El Verde is dominated by tabonuco (Dacryodes excelsa), Buchenavia capitata, Inga fagifolia, Guarea trichilioides and Prestoea montana.

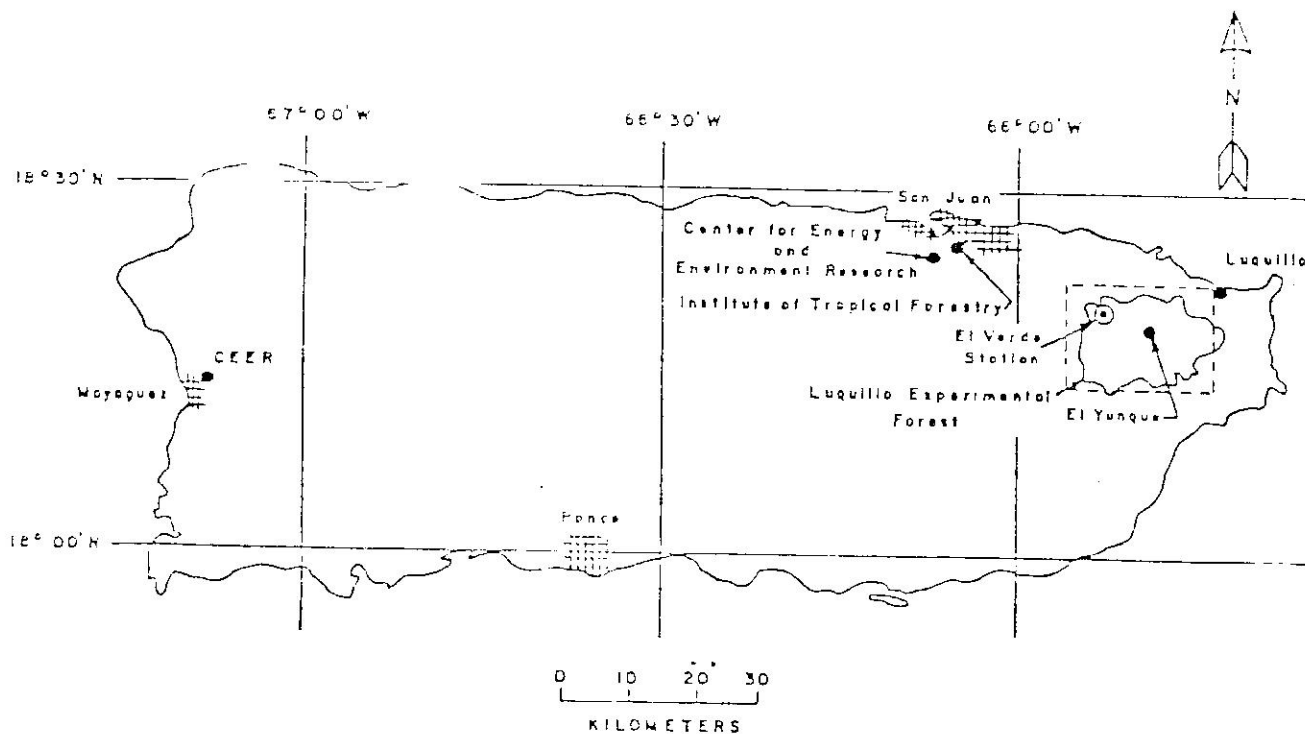


Fig. 1. Map of Puerto Rico showing the location of the Luquillo Experimental Forest, the Institute of Tropical Forestry, and CEER Facilities.

The field station is within the 11,330 ha Luquillo Experimental Forest, which is congruent with the Caribbean National Forest. The 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, 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, soils, and geologic 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 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 547 native species of trees, 13 species of bats, 209 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.

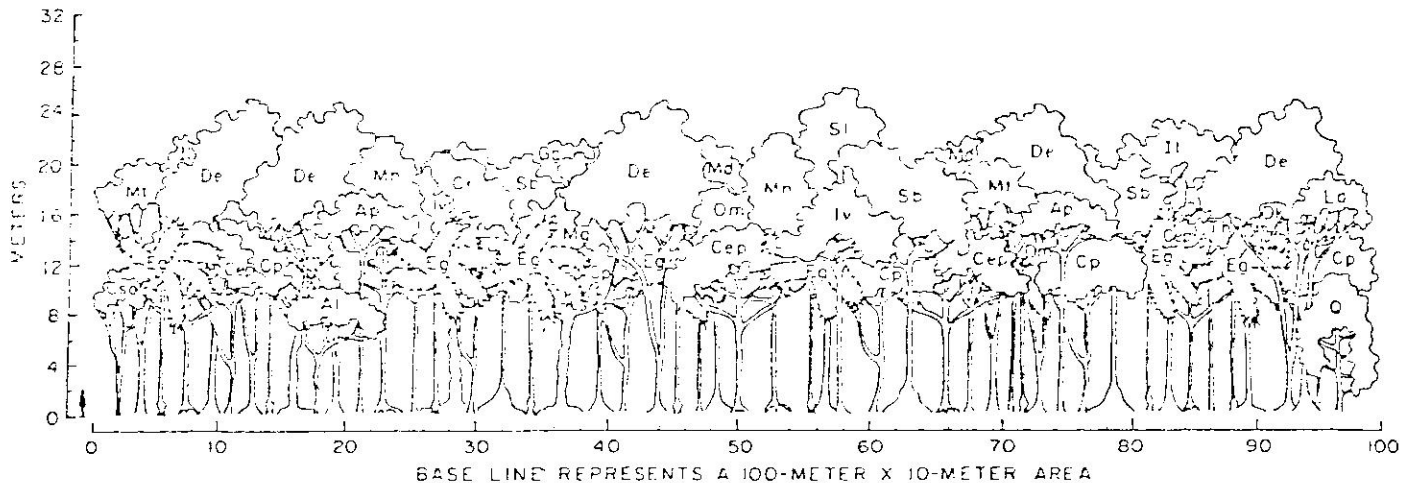


Fig. 2. Profile diagram for the forest at El Verde. The diagram is a composite of species from various microenvironments.

Eg	<i>Prestoea montana</i>	Iv	<i>Inga vera</i>	Csq	<i>Calycogonium squamulosum</i>
Cp	<i>Croton poecilanthus</i>	Ap	<i>Alchorneopsis portoricensis</i>	Al	<i>Alchornea latifolia</i>
De	<i>Dacryodes excelsa</i>	Nd	<i>Natayba domingensis</i>	Ld	<i>Linociera domingensis</i>
Cep	<i>Cecropia peltata</i>	Tl	<i>Inga fagifolia</i>	Th	<i>Tabebuia heterophylla</i>
Sb	<i>Sloanea berteriana</i>	Q	<i>Quararibea turbinata</i>	Sl	<i>Sapium laurocerasus</i>
Mn	<i>Manilkara bidentata</i>	Ok	<i>Ormosia krugii</i>	Gg	<i>Guarea trichilioides</i>
Mt	<i>Miconia tetrandra</i>	Dm	<i>Didymopanax morototoni</i>	Om	<i>Ocotea moschata</i>
Mg	<i>Micropholis garciniaefolia</i>	Cr	<i>Cyrilla racemiflora</i>		

RESEARCH AREA

Well-marked trails link eight plots currently being studied by CEER and U.S. Forest Service personnel. Two plots are covered by a grid system, a 9 ha plot marked at 30 m intervals and a 1 ha plot marked at 10 m 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 1960's are still under observation. Trees 10 cm or greater dbh are tagged in the four 1 ha plots and many other trees are marked from earlier studies. A 22 m walk-up tower (Fig. 3) 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 animal house with cages and terraria, 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 oven, balances, and dissecting microscopes. Equipped electrical and machine shops are also maintained. Other available equipment includes a D-vac suction sampler, tree bicycles, and a portable leaf area meter.

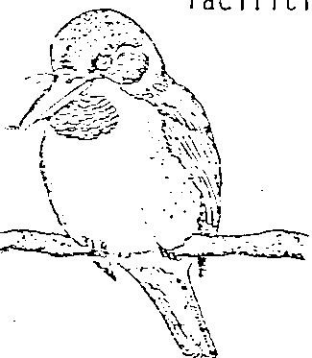
LIVING ACCOMODATIONS

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 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 work days, transportation to the field station can be arranged in advance at the cost of \$10/person one-way. Otherwise, collective 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 materials and 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 here 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. Comocladia 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 give adequate traction on moss-covered rocks and in mud. 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.

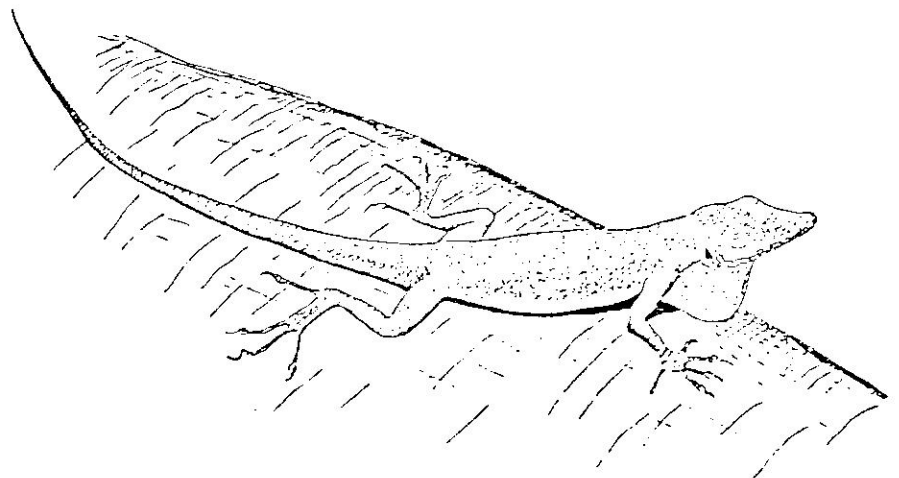
RESERVATIONS

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 at least 30 days ahead of arrival to:

Dr. Robert B. Waide
Head, Terrestrial Ecology Division
Center for Energy and Environment Research
G.P.O. Box 3682
San Juan, Puerto Rico 00936

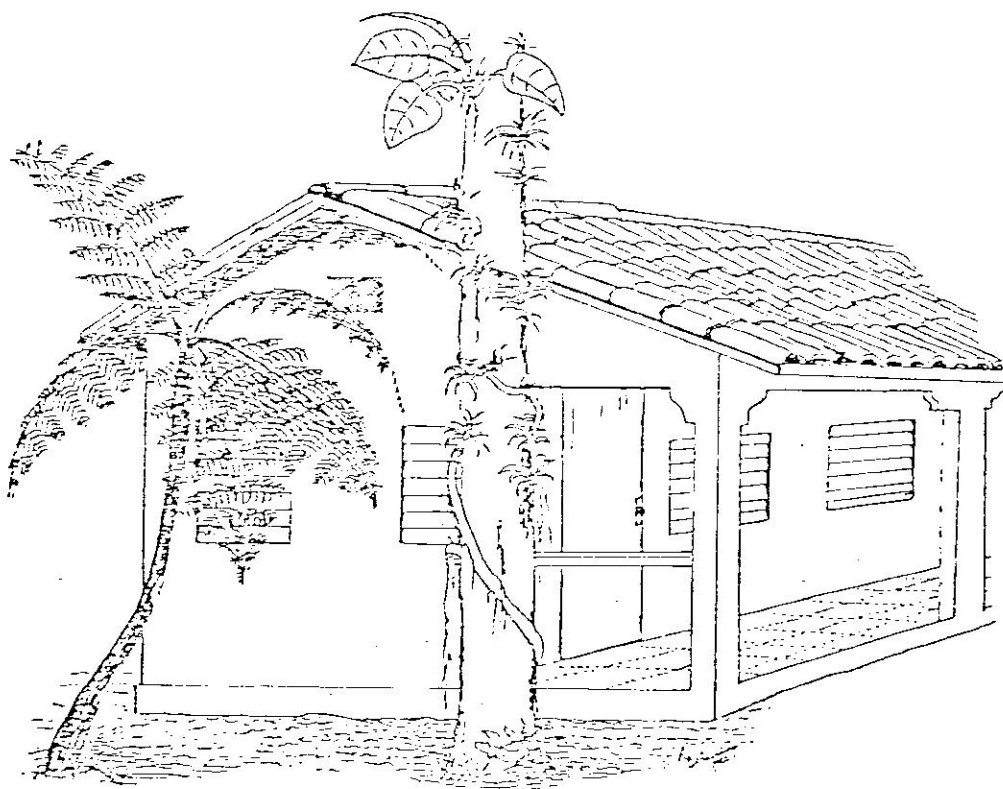
Terrestrial Ecology telephones are (809) 767-0334 or 767-0354.

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 alteration 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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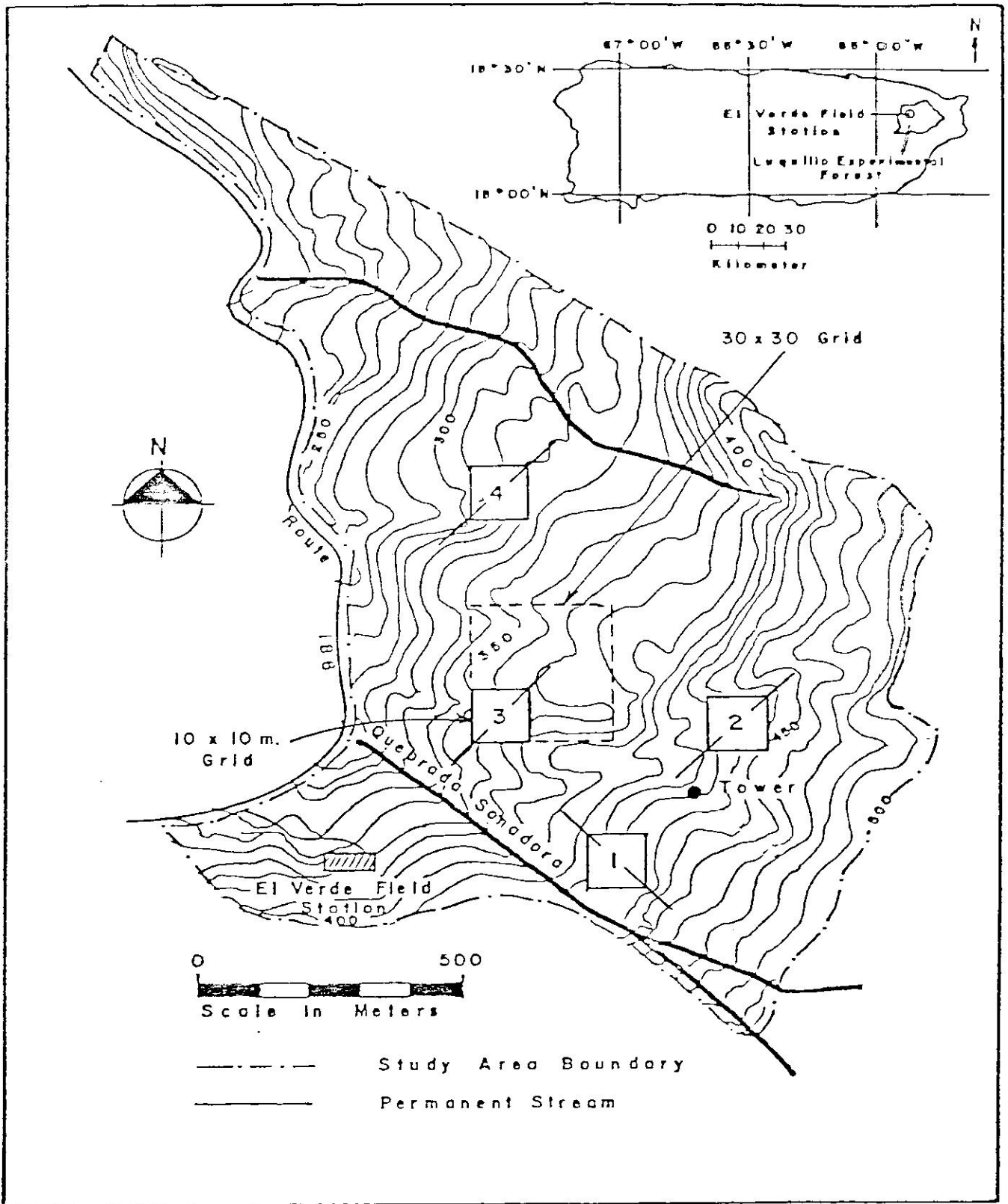


Fig. 3. El Verde Research Area with location of study plots.

