

ESTATE THOMAS EXPERIMENTAL FOREST

MANAGEMENT PLAN

ST. CROIX, UNITED STATES VIRGIN ISLANDS



International Institute of Tropical Forestry
USDA Forest Service
Jardín Botánico Sur
1201 Calle Ceiba
San Juan, PR 00926



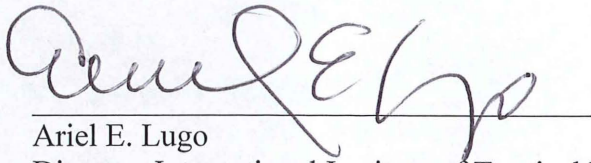
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Prepared By:

Connie Carpenter
Carlos D. Rodríguez-Pedraza
Sonja Lin
Katie Frerker

APPROVAL

In accordance with FSM 4062.5, this management plan for the Estate Thomas Experimental Forest is approved by:



Ariel E. Lugo
Director, International Institute of Tropical Forestry

7.29.2014
Date

INTRODUCTION

The Estate Thomas Experimental Forest (hereinafter Estate Thomas) is the only tropical dry forest owned and administered for this purpose by the United States Department of Agriculture (USDA) Forest Service. It is the easternmost experimental forest in the agency's system of Experimental Forests and Ranges, located 5.4 km west of Christiansted, St. Croix, United States Virgin Islands (Figure 1). The Federal government has owned Estate Thomas since 1934. The Forest Service purchased it from the Virgin Islands Corporation in 1963 for dry tropical forest research, and Forest Service Chief Edward P. Cliff designated it an Experimental Forest on March 11, 1964. Although it is part of the National Forest System, it does not have status as a National Forest. Estate Thomas is administered by the USDA Forest Service, International Institute of Tropical Forestry (the Institute), located in San Juan, Puerto Rico.

MISSION AND GOALS

The Institute manages Estate Thomas under Research Work Unit (RWU) IITF-4151, "Tropical American Forest Conservation." The mission of the Institute's RWU is to develop and disseminate scientifically based knowledge that contributes to the conservation of forests, wildlife, and watersheds of the American Tropics in the context of environmental change.

Supporting the Institute's broader mission, the mission of Estate Thomas is *to provide a subtropical dry forest location where scientists can conduct long-term research and demonstration projects that help managers and decision-makers promote sustainable forest use and where students and the public can experience environmental and cultural education opportunities.*

The primary goal at Estate Thomas is to protect ecological systems, environmental functions, and cultural resources by working collaboratively with others to conduct research and disseminate scientific information in support of sustainable tropical forest management. A second goal is to work with partners and volunteers to provide students and the general public with the tools, experiences and training they need to understand and appreciate the social, ecological, and economic values of the natural systems on Estate Thomas and surrounding areas.

AUTHORITIES

The general provisions of the Organic Administration Act of 1897 (16 USC 551) and the Forest and Rangeland Renewable Resources Research Act of 1978 (16 U.S.C. 1641) authorize the Secretary of Agriculture to designate experimental forests and ranges. This authority is delegated to the Chief of the Forest Service under regulations at 7 CFR 2.60(a).

The Forest and Rangeland Renewable Resources Research Act is the fundamental forest research authority of the Federal government, allowing the Chief to implement a comprehensive program of forest and rangeland renewable research and education, as well as establish and maintain a system of experiment stations, research laboratories, experimental areas, and other forest and

rangeland research facilities. The Act authorizes research activities to encompass international forestry and natural resource issues on a global scale. Implementation of this Act may involve cooperation with international, Federal, State, and other government agencies; with public and private agencies, institutions, universities, and organizations; and with businesses and individuals in the U.S. and in other countries. Research and education priorities listed under the Act include:

- Biology of forest organisms
- Functional characteristics and cost-effective management of forest ecosystems
- Interactions between humans and forests
- Wood as a raw material
- International trade and cooperation.

More recently, the Hawaii Tropical Forest Act (16 U.S.C. 4502(a)) signed in 1992 amends the International Forestry Cooperation Act of 1990 (16 U.S.C. 4502) to authorize the Secretary of Agriculture to provide assistance through the Forest Service to eligible entities in states with tropical forests. The purpose of this Act is to promote sound management and conservation of tropical forests of the United States and to promote the development and transfer of technical, managerial, educational, and administrative skills to managers of tropical forests within or outside the United States. This Act supports research, demonstration, education, training and outreach activities that further these objectives.

Administration of the site is subject to all applicable laws, executive orders, regulations, and rules, and directions established in the USDA Forest Service Manual. Road and trail maintenance may incorporate locally recommended best management practices. Requests to conduct research, demonstration or education projects must be submitted as proposals to the Director of the Institute or designated official (i.e. project leader) for approval. The Director can issue Orders to restrict or close activities or uses to prevent, mitigate, or correct existing or potential resource effects, health and safety issues, regulation enforcement issues, research conflicts or other management concerns. Before beginning any significant manipulative research activity, the area proposed for treatment should be examined as required by the National Environmental Policy Act (NEPA), analyzing both environmental and cultural values and describing appropriate mitigation actions.

DESCRIPTION AND HISTORY

Estate Thomas is located in the West Indies, six latitudinal degrees into the geographic tropical zone. It is rectangular in shape with an area of about 60 ha and is centrally located on the island of St. Croix (21,500 ha). Estate Thomas is in the subtropical dry forest life zone (Ewel & Whitmore 1973). It has a maritime climate with almost constant easterly trade winds. The ambient temperature ranges between 65 and 95 degrees Fahrenheit (18-35 degrees Celsius). Mean annual rainfall near Estate Thomas averages 1,060 cm, with less than 10 cm monthly from December to July (Weaver 2006). Tropical storms and hurricanes are infrequent disturbances that affect the vegetation and human activities. The island has been hit in the last 25 years by six hurricanes with winds of 200 kph or more and torrential rainfall. In 1998, Hurricane Hugo

destroyed 65 percent of the island's buildings and affected a large portion of the experimental tree plantings of *Tectona grandis* (teak) and *Swietenia mahagoni* (small-leaf mahogany), as well as other species. Estate Thomas is steep and rugged except for a valley that bisects the property and two dry streambeds, also known as guts, ghuts, or ephemeral streams. Elevation ranges from 80 to 130 meters above sea level; more than half of the area has a slope of 20 percent or greater. The soil is Kingshill limestone marl over a volcanic base, described as Arawak gravelly loam (Weaver 2006, USDA NCSS 1978).

Estate Thomas contains primarily secondary forests and tree plantations. Deforestation centuries ago and subsequent agricultural land use account for the human footprint on the forest. While much of the land is unsuitable for intensive agriculture, sugar cane was grown on most of the property in the past along with subsistence crops and pasture. The natural vegetative composition prior to colonization is not documented; however, an inventory of the Estate's secondary forest was carried out in 1997 (Francis 2002). The inventory found a forest canopy height of about 8 meters and an average tree stem diameter of about 10 cm. The flora of some 60 tree species is affiliated almost entirely with that of Puerto Rico and with the more extensive forests of Central and South America (Little, Woodbury and Wadsworth 1974). Because of the removal of valuable species like *Guaiacum officinale* (lignum-vitae), *Chlorophora tinctoria* (fustick) and *Bucida buceras* (gre gre), as well as farming and abandonment, introduced species have taken over many vacant lands. During the 1770s, small-leaf mahogany was introduced in the central hills upwind from Estate Thomas. The species can be found growing on about 100 ha in the interior of the island, including Estate Thomas, where it accounts for 2/3 of the total basal area (Francis 2002). Today naturalized and planted mahogany is common at Estate Thomas along with two other introduced species, *Leucaena leucocephala* (tan tan) and *Trifasia trifolia* (spiny sweet-lime). No Federally classified threatened or endangered species are known to occur within Estate Thomas.

Estate Thomas is the only major public forest in the interior of St. Croix and is surrounded by 26 percent of the island's 50,601 inhabitants (Census Bureau 2010). Since acquisition by the Forest Service, Estate Thomas has been used nearly exclusively for research on timber practices. This research has been especially valuable because of the forest's unique representation of vast areas elsewhere in the tropics. Research projects in tropical forest management, especially management of mahogany, were established on Estate Thomas even before it was formally designated as an experimental forest. Later projects included provenance trials of *Swietenia* spp. (mahogany), *Cedrela* spp. (cedar), and *Tectona* spp. (teak). Other studies included species adaptability trials, mahogany silviculture, and planting of the locally rare lignum-vitae. There is very little public use of Estate Thomas.

A history of the land use on St. Croix and Estate Thomas, including past research and potential educational activities, is summarized in a Forest Service technical report (Weaver 2006).

PURPOSE

USDA Forest Service Manual Section 4060 (Research Facilities and Areas) provides direction for the management of FS Research Areas. Based on that direction, this document describes the management guidance for Estate Thomas over the next 10 years. It will be reviewed every 5 years to determine if any updates are required. The purpose of this management plan is to:

- Communicate the purpose and goals of management.
- Develop desired conditions for areas with distinct management needs.
- Provide overall goals for research and management.
- Provide *Guidelines* regarding operational issues and environmental controls.
- Recognize and describe the roles of current cooperators.
- Identify the public input to be observed in developing and scheduling projects for implementation.
- Describe how current resource and management issues can be addressed.

GUIDELINES

1. If conflicts occur, environmental protection and research should take precedence over education and other uses.
2. Public education efforts emphasize the research and demonstration mission of Estate Thomas, natural resource protection, natural and cultural history, safety, and personal responsibility.
3. Ecological, forestry-related research should be conducted following principles of experimental design to encourage appropriate statistical analyses.
4. The demonstration and education value of any manipulative research should be an important consideration.
5. When feasible, research should be replicated on, or coordinated with, studies on other research sites.
6. Partners should help develop, implement, and fund projects.
7. Major capital investments made by the Forest Service would depend on the availability of funds and dependability of partners in the long-term.
8. The road and trail system maintenance should be consistent with direction in the Forest Service Manual and Handbook and incorporate locally recommended best management practices.
9. Non-native, non-naturalized species should not knowingly be brought on the Experimental Forest for any project, landscaping, or other purpose.
10. No unauthorized firewood cutting, plant collecting, and animal collecting should occur.
11. A "carry-in carry-out" trash policy and a "leave no trace" ethic should be promoted.
12. Timber salvage operations following a severe storm or hurricanes should conform to criteria in an approved contingency plan.
13. When appropriate, management should emphasize visitor education on acceptable use of the property over penalties and fines.

MANAGEMENT CATEGORIES

For planning purposes, land in the Estate Thomas is assigned to two management categories: (1) Developed Areas and (2) Areas for Research, Education, and Management.

DEVELOPED AREAS

Current Conditions

Estate Thomas was surveyed in 2010 and a new map was certified and filed with the USVI Office of the Lieutenant Governor Cadastral Section – Survey & Deeds (Figure 2). An open-air pavilion, compost bathroom, and a small parking area were constructed in 2011 with funding provided through the American Recovery and Reinvestment Act of 2009 (Figure 3). These facilities are located on an old building site on the north side of the internal Estate road (Figure 4). An old well is located on the south side of this same road, approximately 200 m from the western boundary of the property. The 75-m well provides water suitable for animals but not human consumption. The fence surrounding the property has been replaced in its totality and new signs were installed. As of 2011, 79 tracts adjoined Estate Thomas.

A gate and parking area are located on Insular Road 811 along the southern boundary of the property. A small portion of Insular Road 811 encroaches onto ETEF land at the southeast corner (Figure 2). An internal dirt road runs through the middle of Estate Thomas from west to east, splitting into two roads toward the eastern side of the property (Figure 4). This road belongs to ETEF as certified by the Surveyor in May 2010. The south fork of the road on the eastern boundary has a gate where it intersects private property. The north fork was previously used by the Forest Service to access research plots and, subsequently, by an adjacent property owner to traverse Estate Thomas. Gates are installed on the internal road at the western and north fork entrances. Another 4.9 kilometers of roadbeds are currently impassable (Figure 5). Power and telephone lines run parallel to the internal road and are maintained by the Water and Power Authority (WAPA) of the USVI.

Desired Conditions

Developed areas on Estate Thomas support research and education. Active use of the site for these purposes is supported by infrastructure that meets basic user needs and safety requirements. Site operating principles are documented in formal agreements with local organizations and/or government agencies and include mutually agreed upon terms of use between the Forest Service and the Cooperator.

User access to the pavilion and other developed areas is on foot, although authorized vehicles may be used for maintenance, safety, research, and to accommodate individuals with disabilities. The north fork of the internal road is used as a hiking trail but is maintained at a standard that accommodates Forest Service and emergency vehicle use. The remaining roads and trails are maintained as necessary to accommodate ecological and recreational needs; moreover, utility

corridors are maintained to prevent environmental deterioration. Parking is permitted only in designated parking areas.

Environmentally friendly, safe, and clean day use facilities are provided. Meeting space is available (by reservation) to accommodate research groups or groups involved in student or community education activities. Space is available for students and researchers to process and label field samples and conduct simple tests. Storage space is made available to temporarily store research samples for off-site processing and to store field and educational equipment to be used onsite. Interpretive stations and markers provide educational opportunities for individuals. An observation tower is constructed at one of the high points on Estate Thomas to provide vistas of the island, as well as a site for scientific instrumentation such as a weather/climate station. Low impact, nature-based recreation occurs in this area during the day in designated use areas such as interpretive trails, picnic areas, and scenic viewpoints.

Before developing new facilities proposals are publicly announced, in compliance with the National Environmental Policy Act, and demonstrated to be fiscally responsible and financially feasible.

RESEARCH, EDUCATION, AND MANAGEMENT AREAS

Current Conditions

The Forest Service purchased Estate Thomas for dry tropical forest research primarily to gain knowledge about timber production potential. A comprehensive look at past research activities can be found in a recent technical report (Weaver 2006). Figure 4 includes past and present research sites on the property.

More recent activities at Estate Thomas have included experimental plantings by the University of the Virgin Islands Agriculture Experiment Station, as well as measurement of a long-term forest plot that was established in 2004 near the main gate on Route 811 for educational purposes (Figure 4). This plot was monitored by local students in cooperation with the St. Croix Environmental Association. In addition, Forest Service Forest Inventory and Analysis (FIA) program has been collecting data throughout the Virgin Islands, with a high density of long-term plots located at Estate Thomas. The University of Wisconsin-Madison is currently working on a research project examining how different successional trajectories and recent land-use histories affect plant and microbial communities to better understand how alternative fates after agricultural abandonment affect ecosystem structure and function.

Desired Conditions

Estate Thomas Experimental Forest is a highly visible location with a forest management program that includes research, technology transfer, and educational activities. Research and management activities are relevant to forest conservation, watershed protection, native plant protection, and wildlife habitat improvement in a subtropical dry forest ecosystem. Before beginning any significant manipulative research or demonstration activity, the area proposed for treatment will be examined as required by the NEPA. Proposals for new research, education, and

management projects consider the impact on existing and historical research sites. Timber salvage operations following severe storms or hurricanes conform to criteria in an approved contingency plan.

The US Forest Service collects FIA data and collaborates with universities, government agencies, and other organizations on projects at Estate Thomas. New research projects may include, but are not limited to: effects of disturbances and environmental change on biodiversity, biogeochemistry, and ecosystem services; soil ecology; carbon dynamics; dry forest succession and restoration; biodiversity assessment; ecosystem services quantification; ephemeral stream functioning and connectivity; silviculture activities such as even- and uneven-aged systems, prescribed fires, mechanical site preparation, and mechanical and/or chemical control of vegetation; and collaboration with the National Earth Observation Network (NEON) long-term monitoring project. Research projects may include activities such as digging soil pits, increment coring, and cutting trees for stem analysis. Automated monitoring stations may also be located on the Experimental Forest.

Valuable new studies include long-term, ongoing studies on mahogany growth and yield which have greatly added to our knowledge about timber production in dry tropical forests. Selective harvesting of small amounts of small-leaf mahogany through demonstration and educational projects are made available for the local production of high-value furniture and handicrafts by the islands artisans.

Well-publicized demonstration projects are used to transfer technology developed at Estate Thomas and other applicable research or management principles to the general public. Management demonstrations may involve timber sales.

Working with partners on school science programs and community group activities are a priority among educational activities on Estate Thomas. The forest serves as an "outdoor classroom" with activities linked to curriculum learning objectives for local schools. The permanent forest plots are monitored regularly by students, introducing them to careers in forestry and related fields that they may otherwise have been unaware of.

Low impact, nature-based recreation occurs in this area during the day. Most of the activity will take place in designated use areas such as interpretive trails, picnic areas, and scenic viewpoints. However, activities such as bird watching and photography may lead visitors to less accessible areas. Establishing interpretive sites and paths that describe the site's cultural and environmental history, research activities, ecological processes, and value to the local community would allow for independent learning and promote more active use of Estate Thomas for educational purposes.

RESOURCE AND MANAGEMENT ISSUES

BOUNDARIES

We will continue to maintain the boundary fence and signs to avert trespass.

SAFETY AND SECURITY

The relative isolation of the site raises concerns regarding the safety of visitors, the theft of belongings in unattended vehicles and facilities, and vandalism. Illegal deer hunting has also been occurring on the property, posing a safety risk to potential visitors.

In the near term, to reduce the vulnerability of visitors and property, the Institute will promote group activities by reservation over solitary uses of the forest, work toward establishing a day use only policy and prohibiting unauthorized vehicles. The ability to address the issue of security satisfactorily in the long term will have a major effect on the development of the site, including decisions on whether to invest in capital improvements.

After a visit with Forest Service Law Enforcement Officers (LEO) in 2010 and interviews with National Park Service LEO and Drug Enforcement Administration (DEA) Agents, we were advised of drug trafficking close to Estate Thomas.

GARBAGE DUMPING

Garbage dumping occurs when vehicles have access to the property. Past problems with garbage dumping were reduced when gates were installed on the internal Estate road and another along Insular Road 811. Future plans will continue to control access to the site.

WATERSHED HEALTH

Groundwater recharge is an important function provided by the land on Estate Thomas, especially as the amount of development surrounding the property continues to increase. Many private and community wells for water extraction and consumption exist on St. Croix, yet awareness about the function of ephemeral streams and their connectivity to watersheds and recharge areas for groundwater reservoirs is limited. The presence of ephemeral streambeds provides opportunities for research and education and will be considered when developing any other infrastructure and in future management decisions. Activities will be designed to retain the watershed values of the tract.

WILDLIFE HABITAT

Estate Thomas is a relatively large contiguous block of undeveloped land that is locally important for wildlife and internationally important as habitat for Neotropical migratory bird species. In addition, several butterfly species have been recorded on the Estate. Habitat improvement and/or habitat preservation (i.e., as a designated area within Estate Thomas) are management considerations.

THREATENED AND ENDANGERED SPECIES

There are no Federally designated Threatened, Endangered or Sensitive species known to exist on Estate Thomas. However, St. Croix has listed two trees, *Maytenus cymosa* (no common

name) and *Guaiacum officinale* (lignum-vitae), as state endangered tree species. *Maytenus cymosa* occurs naturally within the Estate. The Forest Service planted about 140 lignum-vitae on Estate Thomas in 1969. Their survival, growth, and reproduction have been satisfactory. Both species will be considered in future management decisions.

HERITAGE RESOURCES

The southwestern corner of Estate Thomas may have been used in the past to confine animals and possibly contain other human structures. Moreover, stone walls are evident in several places on the Estate. These resources will be considered in the development of interpretative materials. Heritage resources will be located and protected from modification until assessments have been conducted.

PLAN IMPLEMENTATION AND PUBLIC DISCLOSURE

Activities on the Experimental Forest are subject to meeting the requirements of the National Environmental Policy Act (NEPA). The extent of NEPA work will be determined by the complexity and effects of the project. Complex projects with possible significant effects would require an Environmental Impact Statement. Less intense projects that would not have any significant effects would require an Environmental Assessment, and some limited projects may be accomplished under a Categorical Exclusion. Potential research, education, and nature-based recreation activities on Estate Thomas, including some small-scale timber removal, may be categorically excluded from full NEPA documentation but require public scoping for issues. Projects not categorically excluded would generally require an Environmental Assessment and public disclosure of any environmental effects and associated mitigation measures. No projects are contemplated that would trigger a full scale Environmental Impact Statement.

Proposed capital improvement projects must meet Forest Service engineering requirements. A preliminary project analysis (PPA) must be conducted as outlined in Forest Service Handbook 7309.11. A PPA provides a review of all viable project alternatives through a screening and analytical evaluation process. Engineering studies and investigative work must be commensurate with the scope of the proposed project and the issues to be decided. The planning process for any proposed development on an undetermined site within Estate Thomas would need to consider site location, lease versus construction options, and other equally viable alternatives.

Research proposals will be evaluated on a case by case basis as they are submitted. A program of educational and related management activities will be developed by the Institute in conjunction with cooperators. A list of previously proposed activities can be found in Appendix A along with a determination of their consistency with the desired future conditions identified in the plan.

COOPERATORS

Current cooperators are listed below. We will continue to develop local partnerships to support the mission and goals of Estate Thomas Experimental Forest.

U.S. VIRGIN ISLANDS DEPARTMENT OF AGRICULTURE

The Virgin Islands Department of Agriculture works in partnership with the Institute to identify research needs and educational opportunities suited to ETEF and to implement the Cooperative Forestry Assistant Act programs throughout the island. They have long facilitated operations and assisted with the security and maintenance of the site. They are the primary point of contact for St. Croix residents and visitors.

U.S. VIRGIN ISLANDS NATIONAL GUARD

The U.S. Virgin Islands National Guard, as part of their Individual Readiness Training program (IRT) is cooperating with the Forest Service to clear vegetation along roads and in the pavilion lawn at Estate Thomas and has the potential to assist with any future projects requiring engineering or carpenter services.

CENTRAL SEVENTH-DAY ADVENTIST CHURCH PATHFINDER CLUB

The Pathfinder club was organized to provide a balance of social, emotional, and spiritual experience for youth on St. Croix between the ages of 10-15 years old. The Club provides decision-making and leadership building skills. The Forest Service collaborates with the Club by allowing them to use Estate Thomas facilities for conservation and environmental education activities.

ST. CROIX ENVIRONMENTAL ASSOCIATION

The St. Croix Environmental Association (SEA) mission is to promote the conservation of environmental resources, provide education, and to advocate for environmentally responsible actions that benefit the island of St. Croix. The Institute has worked with SEA to provide forest based educational activities in conjunction with local schools such as forest plot monitoring and forest field days.

UNIVERSITY OF THE VIRGIN ISLANDS AGRICULTURAL EXPERIMENT STATION.

The University of the Virgin Islands Agriculture Experiment Station has conducted research at Estate Thomas in the past and we will continue to work with them on future research opportunities.

UNIVERSITY OF WISCONSIN-MADISON

Erika Marín-Spiotta (Assistant Professor) and Emily Atkinson (PhD student) from the BioGeoLab at the University of Wisconsin's Department of Geology are working on a project examining the effects of different land-use trajectories on microbial and plant community dynamics in post-agricultural ecosystems in St. Croix. The Virgin Islands Department of Agriculture, St. Croix Environmental Association, University of the Virgin Islands, The Nature Conservancy, and private landowners have been involved in this project as well.

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Figure 1. Location of Estate Thomas Experimental Forest on St. Croix.

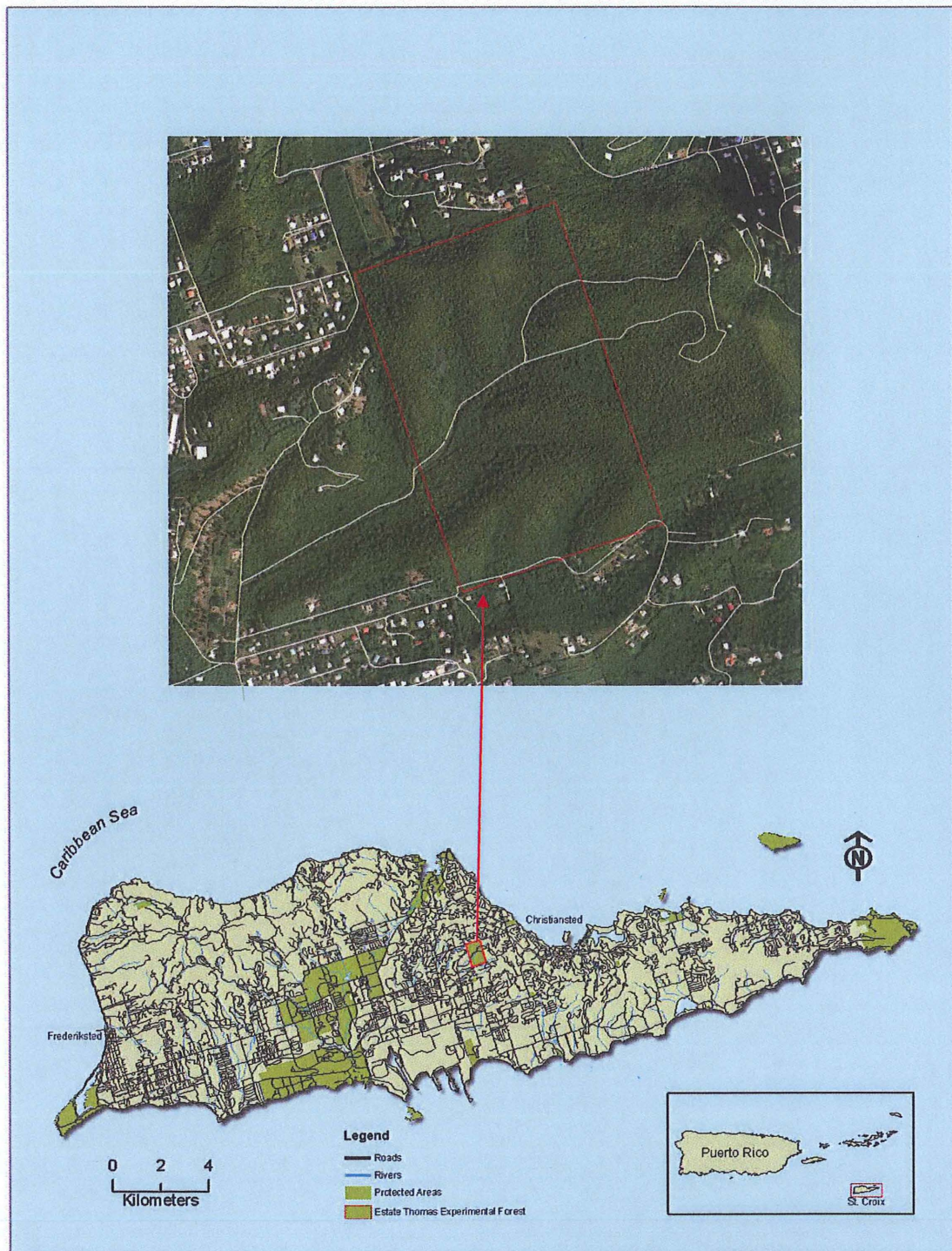


Figure 2. Estate Thomas Survey Plat, 2010. Full-size copy available in print.

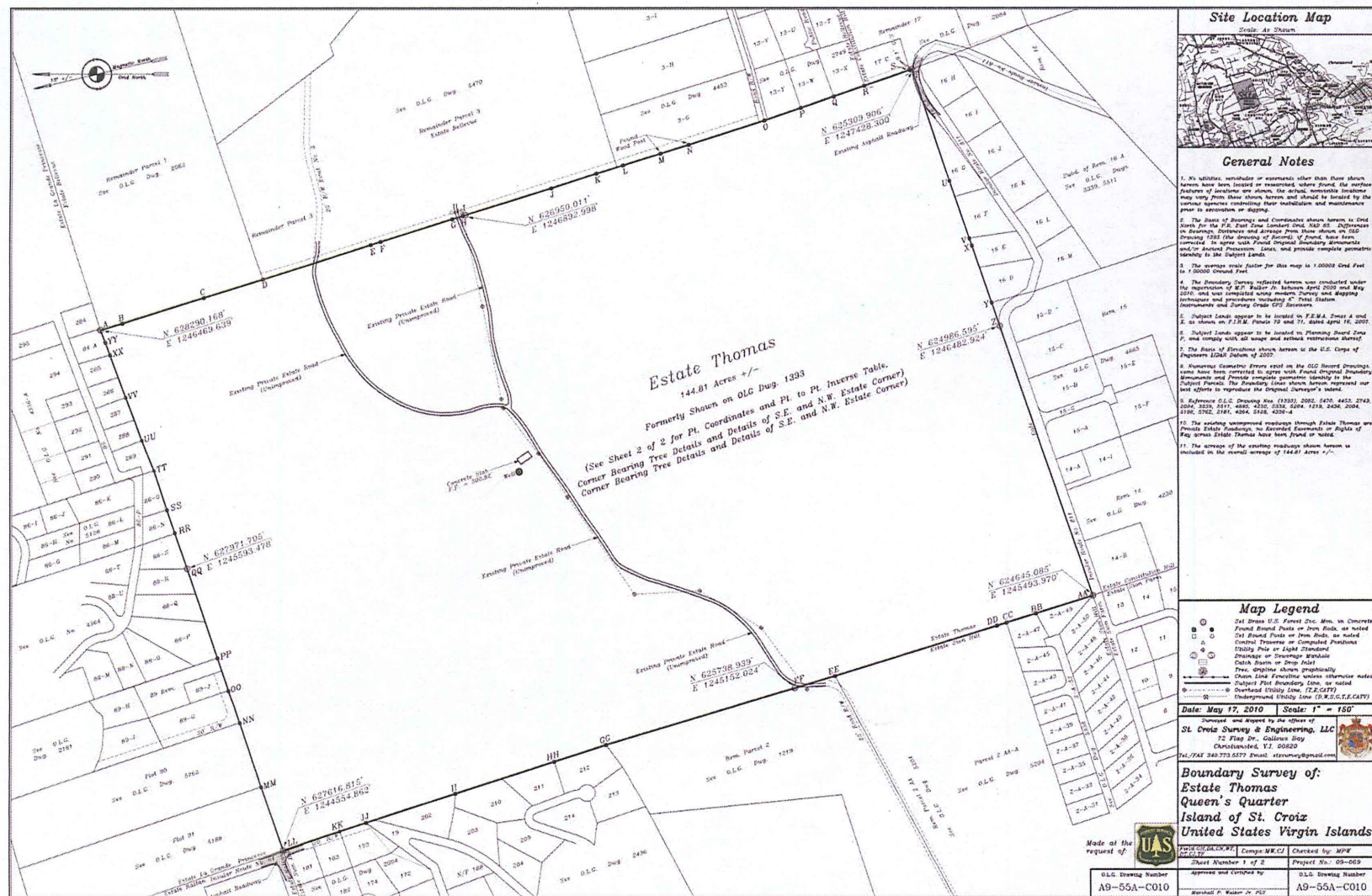
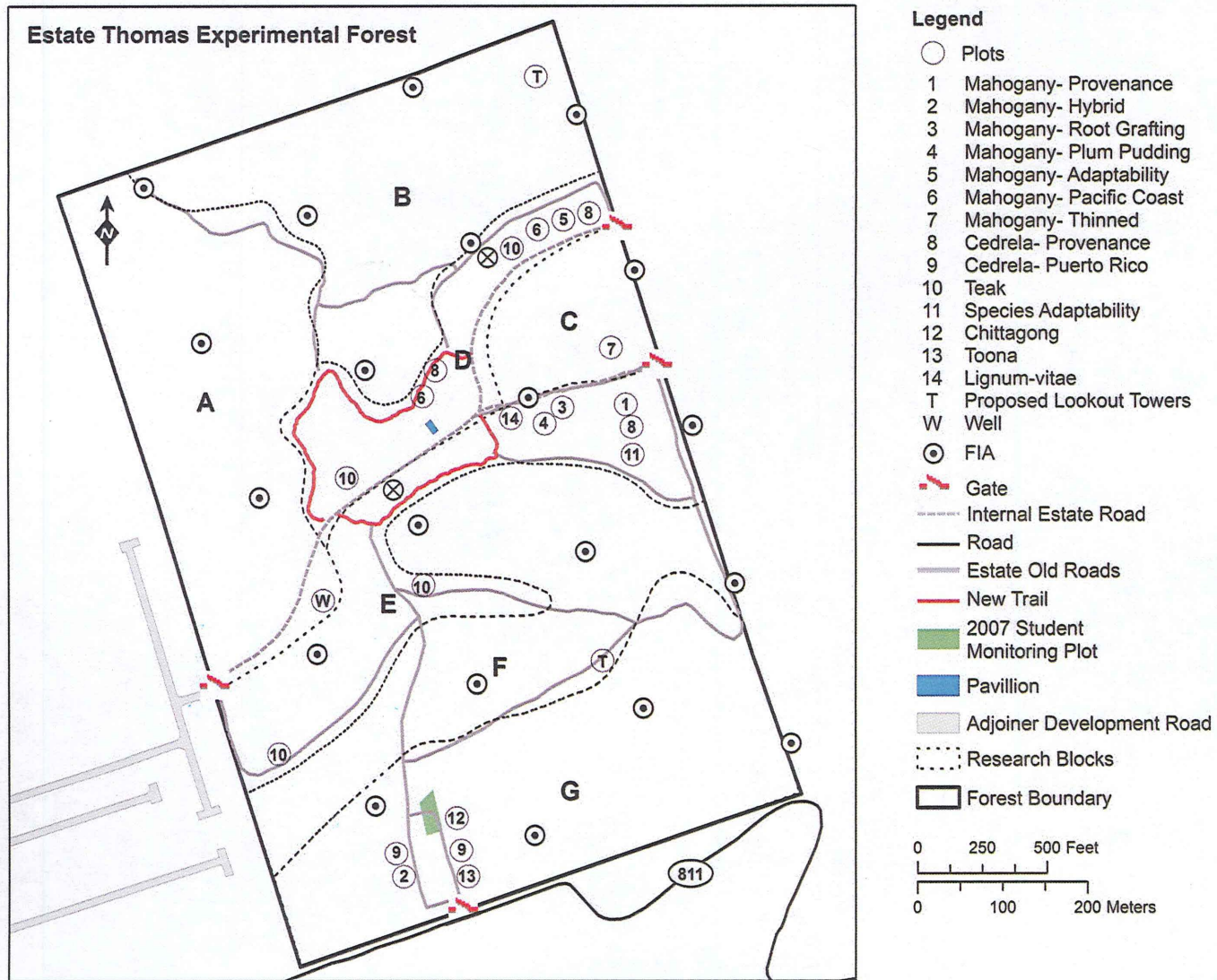


Figure 3. New facilities at Estate Thomas.

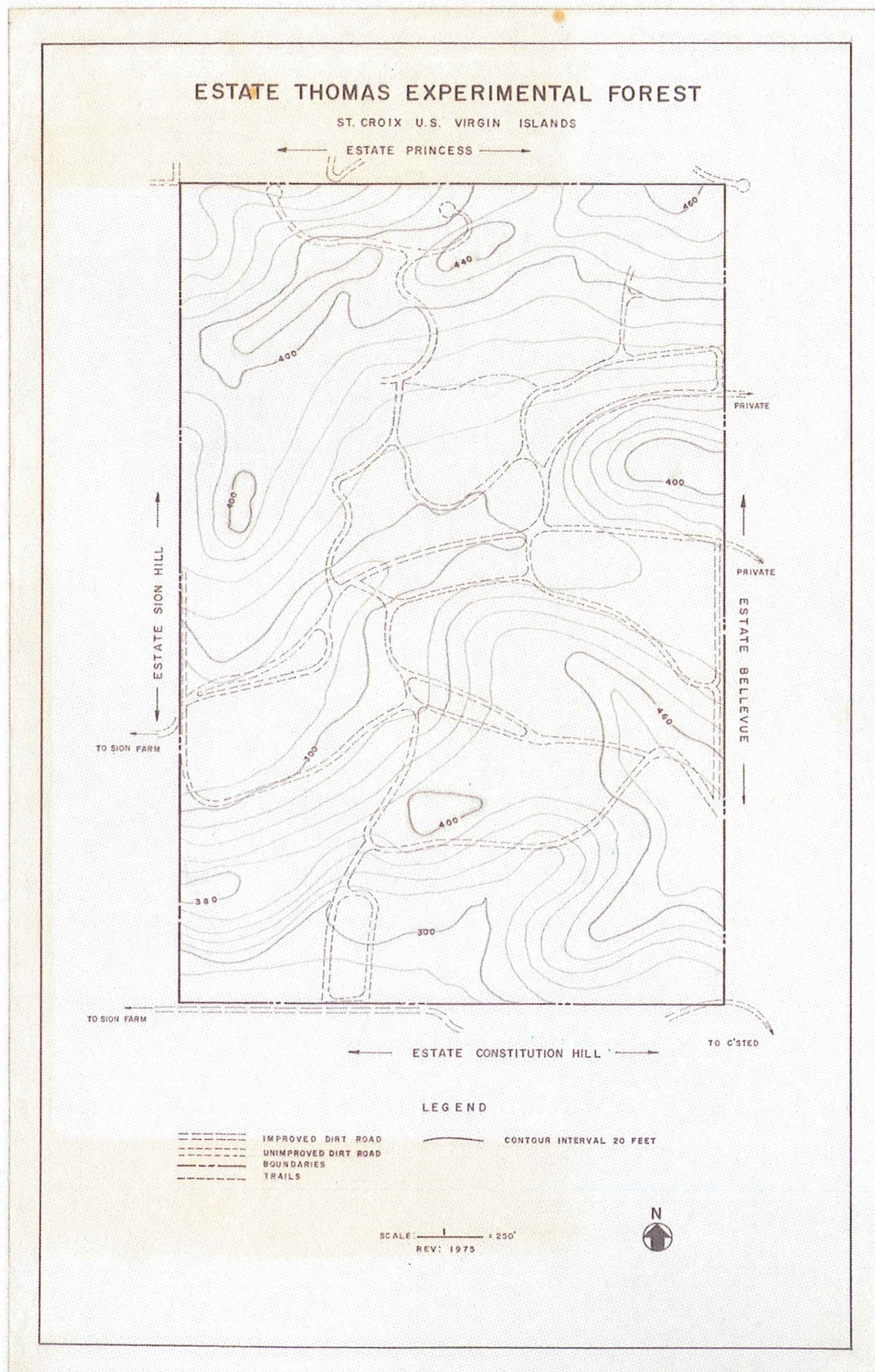


Figure 4. Estate Thomas Experimental Forest map with sites of interest, including locations of experimental activities since 1963.



Note: Estate Thomas was originally partitioned into blocks to facilitate management of research activities. Blocks A, B, C, F, and 85 percent of G are hilly and dominated by small-leaf mahogany. Blocks D, E, and 15 percent of G are in drainages and are comparatively level, thus favoring experimental plantings.

Figure 5. Old roads in Estate Thomas, 1975.



Appendix A

List of potential projects that were proposed for Estate Thomas Experimental Forest during two stakeholder¹ meetings in May 2008. A suitable project may or may not be financially feasible or possible to implement in the short-term.

Projects	Suitable
Facilities	
Laboratory for students and visiting researchers	Yes
Bunkhouse for visiting researchers	Yes
Meeting space	Yes
Parking areas	Yes
Toilet facilities	Yes
National Environmental Observation Network Station	Yes
Interpretive stations and markers (e.g., historical, cultural, local research sites, hurricane effects and recovery)	Yes
Scenic viewing tower	Yes
Education	
Student plots	Yes
Lectures	Yes
Identification of natural features, plants, and animals	Yes
Collection of plants, animals, and insects with permission	Yes
Butterfly garden	Yes
Instruction on forestry techniques	Yes
Demonstration Projects	
Tree propagation, planting, and care	Yes
Appropriate harvest techniques	Yes
Timber salvage techniques	Yes
Recreation	
Hiking	Yes
Scenic viewing	Yes
Picnicking	Yes
Public Camping	No
Bird watching	Yes
Wildlife viewing	Yes
Mountain biking	No
All-terrain vehicle use	No
Hunting	No
Horse riding	No
Research	
Hurricane response	Yes
Effects of drought, fire, insects, disease, and urbanization	Yes
Carbon cycling	Yes
Sampling and collection of plants, animal, and insect specimens with an approved research plan.	Yes

¹ We gratefully acknowledge the input from individuals who attended the May 2008 meetings and provided initial input on the development of the Estate Thomas management plan. Meeting participant lists are available upon request.