

State of Hawai'i
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Forestry and Wildlife
Honolulu, Hawai'i 96813

June 26, 2015

Chairperson and Members
Board of Land and Natural Resources
State of Hawai'i
Honolulu, Hawai'i

Aloha Land Board Members:

SUBJECT: PROGRESS BRIEFING FOR RESEARCH PROJECTS, EDUCATIONAL TOURS AND ADMINISTRATIVE CHALLENGES OF THE HAWAI'I EXPERIMENTAL TROPICAL FOREST HAWAI'I (TMK'S (3) 3-7-001:002; (3) 3-7-001:012; (3) 7-1-001:001; (3) 7-1-001:004; (3) 7-1-001:006; (3) 7-1-001:007; (3) 7-1-002:001; (3) 7-1-002:013; (3) 7-1-002:002; (3) 7-1-002:008)

Background

On January 25, 2007 the Board of Land and Natural Resources granted the U.S. Department of Agriculture, Forest Service (USFS), Pacific Southwest Research Station a non-exclusive 35 year permit to use State lands (Appendix A) situated at Laupāhoehoe and Pu'u Wa'awa'a, Hawai'i for use as the Hawai'i Experimental Tropical Forest (HETF).

The HETF includes two Units: the Laupāhoehoe Wet Forest, totaling 12,343 acres, and the Pu'u Wa'awa'a Dry Forest, totaling 38,885 acres. Unit maps are provided in Appendix A. The HETF overlays existing State of Hawai'i, Department of Land and Natural Resources (DLNR) managed lands and include the following land designations: Forest Reserve and Natural Area Reserve (NAR) in Laupāhoehoe, and Wildlife Sanctuary (*Forest Bird Sanctuary*), Forest Reserve and State Parks in Pu'u Wa'awa'a.

The USFS works with the DLNR – Division of Forestry and Wildlife (DOFAW) and State Parks to manage research and education activities within the HETF. Further information regarding HETF management is outlined in the December 6, 2006 Cooperative Agreement (Appendix B) between the USFS and the State of Hawai'i Board of Land and Natural Resources (referenced throughout this document as "HETF Cooperative Agreement").

In granting the Permit to Use State Lands (Appendix A), the USFS agreed to "consult regularly with the State including:

- a. Providing an annual report on the status of approved new and ongoing research (including the primary investigator, the research topic, the location for the research, dates of field research, date of anticipated results, and contact information for the primary investigator);

- b. Providing an annual report on the number of educational tours and total number of participants, and
- c. Annually reporting on the challenges faced in the administration of the Experimental Forest.”

This submittal provides an overview of HETF administration, a summary of the research and education activities that have occurred within the HETF from 2012-2014, current plans for facilities and the challenges associated with HETF administration. More detailed information can be found within the annual reports available online (<http://www.hetf.us/page/home/>) or hardcopy by request.

Administration

Per the HETF Cooperative Agreement, "owing to the many values and benefits that arise from research, education and demonstration on the HETF and elsewhere, the Parties (*the USFS and the State of Hawai'i*) further agree they will consult and reach agreements with each other to coordinate research, management, and education activities". The HETF Planning Group was established to fulfill this objective and includes the USFS-HETF Line Officer, the USFS-HETF Science Lead, the USFS-HETF Facilities Manager, the Hawai'i Island DOFAW Branch Manager, the Hawai'i Island NAR Program Manager, the Hawai'i Island Forestry Program Manager, East and West Hawai'i Island Wildlife Biologists, the Pu'u Wa'awa'a coordinator, and two to three external partners. The HETF Planning Group is facilitated by the HETF Coordinator (USFS employee) and meets bi-monthly.

Permitting

Permit applications for research and education activities are reviewed by a subset of the HETF Planning Group, the Research Technical Committee (RTC), which includes the USFS-HETF Line Officer, the Hawai'i Island DOFAW Branch Manager, the USFS-HETF Science Lead, the NAR Hawai'i Island Manager, the Forest Reserve Hawai'i Island Manager, East and West Hawai'i Island Wildlife Biologists, and the Pu'u Wa'awa'a coordinator. Permit processing and tracking is coordinated and administered by HETF staff. Signing authority for all permits within DOFAW managed lands lies with the Hawai'i Island DOFAW Branch Manager including the Laupāhoehoe NAR. Permits within State Parks are issued by State Parks Hawai'i Island District Superintendent. All research permits are valid for one year and require an annual report. In Pu'u Wa'awa'a, research permitting for the HETF is limited to land activities. Research activities that take place in water including the tide line are under the jurisdiction of the DLNR-Division of Aquatic Resources.

Community Advisory Councils

Per the HETF Cooperative Agreement, "the Parties will consult with scientists, managers, general citizens, and local community members concerning ongoing research activities. Existing State sanctioned advisory councils may be utilized for this purpose." The Pu'u Wa'awa'a Advisory Council has been in existence since 2002. The Laupāhoehoe Advisory Council was formed in December 2010. Both Councils participate in research permit application review and their comments and/or recommendations are provided to the RTC during the review process.

Planning

In 2012, planning began to outline overall and site specific goals and priorities for research, education, and demonstration within the HETF boundaries. In the Laupāhoehoe Unit, progress was made on drafting the Laupāhoehoe Forest Management Plan. To date, DOFAW and the USFS have solicited feedback on focal areas such as research, education, public access, and infrastructure from the Laupāhoehoe Advisory Council (LAC) during their public meetings. Together the DOFAW, USFS, and LAC have had 10 public meetings between 2012-2014, during which the management plan was developed and discussed. As part of the information gathering activities for the management plan a forest bird survey was also conducted in the spring of 2013. A public draft was released in April 2015 after two internal drafts were reviewed by the aforementioned parties in November 2013 and April 2015.

A Habitat Conservation Plan (HCP) and associated Draft Environmental Assessment are currently being prepared by DOFAW staff and contractors that include the Pu‘u Wa‘awa‘a HETF the Forest Reserve and the Forest Bird Sanctuary sections. The HCP will provide for the protection and restoration of 15 federally endangered plants that have been found to naturally occur across the Plan Area, which includes both Pu‘u Wa‘awa‘a Forest Reserve, and the neighboring Pu‘u Anahulu Game Management Area. To date, significant progress has been made on both the HCP and DEA, and a public draft is expected for release sometime in 2015 or early 2016.

Research Projects

The HETF is utilized for research by universities, government agencies including the USFS, and private organizations, as well as others including non-profits, non-government organizations, and societies (Figure 1).

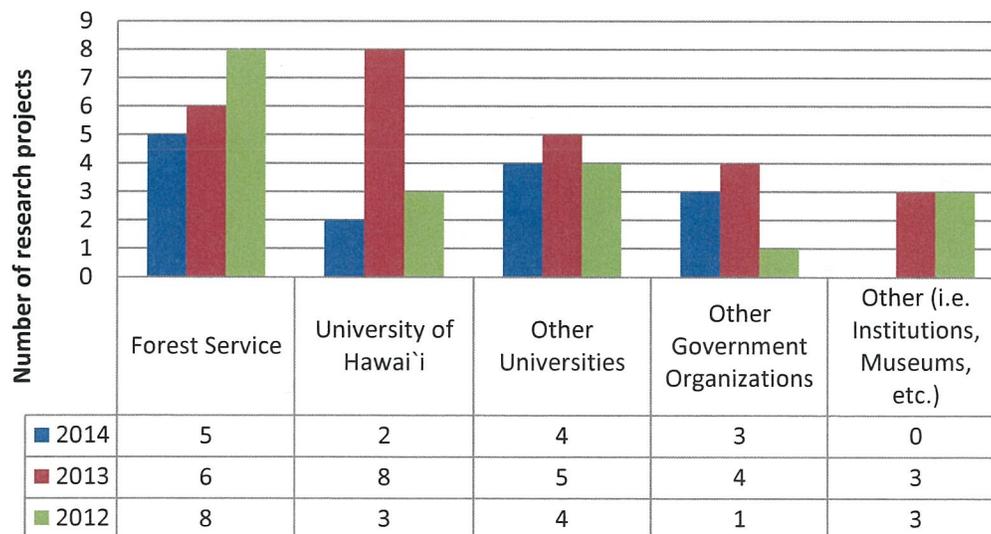


Figure 1: Affiliation for research projects initiated within the HETF from 2012 to 2014.

The HETF supported 19 research projects in 2012, 26 in 2013 and 14 in 2014. Nine of these projects have been or are expected to be long term (5 or more years). Table 1 provides a breakdown of project locations within the HETF Units and yearly project totals. Research project locations may be specific to an HETF Unit or take place within both Units.

Table 1: Total number of research projects initiated in the HETF and grouped by Unit from 2012-2014.

Year	Laupāhoehoe Unit Only	Pu‘u Wa‘awa‘a Unit Only	Both HETF Units	Total # of Projects Initiated
2014	5 (36%)	6 (43%)	3 (21%)	14
2013	14 (54%)	10 (38%)	2 (8%)	26
2012	8 (44%)	9 (50%)	2 (6%)	19
Total	27	25	7	59

From 2012 to 2014, 32 publications were produced from HETF research projects in over 15 different journals, newsletters and technical reports. A selected number of research projects from 2013 and 2014 are briefly described below. Additional detailed information about all research projects including publication citations, are contained within the HETF annual reports available online (<http://www.hetf.us/page/home/>).

- Impacts of strawberry guava management across a density gradient (Laupāhoehoe Unit)*** – Dr. Tracy Johnson (USFS) began a project to measure impacts of strawberry guava invasion on native forest species and evaluate the effectiveness of biological and chemical control as tools for suppressing invasion and maintaining native forest health. This invasive fruiting tree forms dense, nearly impenetrable thickets that crowd native species, break up natural areas, and disrupt native animal communities. Without an effective and sustainable means of control, the invasive tree may eventually invade and degrade nearly half of the state’s total land area. The biological control agent *Tectococcus ovatus*, a natural enemy from the native range of strawberry guava, will be transferred onto mature trees in half of Dr. Johnson’s study plots. The insect generates galls on new leaves, over time suppressing growth and reproduction. After the biological control has established, chemical treatments will be applied to half of the plots with and without biocontrol. The effectiveness of these different treatments will then be evaluated as a function of strawberry guava density and will help managers to develop options for broader application. *Dr. Johnson received a prestigious USDA Secretary’s Honor Award in the category of protecting natural resources. Dr. Johnson led the USFS’s international search to identify insect species for use as host-specific biological control agents against invasive plants in Hawai‘i. His 13 year effort culminated in the release of leaf gall-forming scale insects to help regulate the invasive strawberry guava.*
- Assessing the *Scotorythra paludicola* (Lepidoptera: Geometridae) outbreak on koa: population abundances, rates of parasitism and patterns of spread (Laupāhoehoe Unit)*** – An outbreak of the native koa moth (*Scotorythra paludicola*) was first detected on Hawai‘i Island by DOFAW managers in January 2013. At that time, a large section of koa along the Hamakua Coast had already been defoliated by the koa caterpillar.

Beginning in February 2013, Robert Peck (University of Hawai‘i at Hilo), Dr. Paul Banko (U.S. Geological Survey) and Dr. Will Haines (University of Hawai‘i at Mānoa) began studying the outbreak along Blair Road within Laupāhoehoe forest. Caterpillars of the koa moth feed almost exclusively on koa, and at population levels found during outbreaks, often consume all foliage on koa trees. The main goals of the project were to monitor abundances of koa moths and caterpillars over time, track the progression of the outbreak, and examine factors that bring the outbreak under control. Since the onset of the outbreak, extensive sections of koa forest were defoliated along Blair Road on three occasions: early-mid March 2013, early-mid August and mid-late January 2014. The first two defoliations occurred between approximately 800 and 1200 m elevation while the third defoliation was limited to about 845 and 915 m elevation. Measurements of moth populations identified peaks in abundance beginning in mid-April 2013, early September 2013 and late February 2014. The interval between the defoliation and the peaks in moth abundance represents the time that the caterpillars were in the pupal stage. The team was unable to monitor caterpillar abundance and rates at which caterpillars were parasitized because koa foliage was generally too high above the forest floor to sample. Parasitoids known to attack koa caterpillars were collected in malaise traps throughout the study, but data have not yet been analyzed.

- ***Sandalwood sampling (Pu‘u Wa‘awa‘a Unit)*** – Hawai‘i’s once abundant stands of sandalwood are mostly gone today with only remnants surviving on public and private land. Commercial logging of Hawaiian sandalwood is legal and does occur on private land. A study conducted by Paul Chang and the Clark R. Bavin Forensics Laboratory of the US Fish and Wildlife Service, Office of Law Enforcement, obtained sandalwood samples from Pu‘u Wa‘awa‘a Forest Reserve that are needed to create a baseline standard upon which samples from commercial shipments can be compared. Although legal sandalwood logging on public land no longer occurs, the significant value of the wood continually provides incentive for obtaining wood illegally. Modern forensics can test for unique characteristics in heartwood to determine the species of wood down to the sawdust level. For example, a sample of wood chips (taken from a shipment leaving a port in Hawai‘i) can be compared to an established standard to determine the species in the shipment. Currently there is no standard available for the three species of Hawaiian sandalwood focused on during this study. This effort will hopefully provide those standards. Two of the three species, *S. paniculatum* and *S. ellipticum*, occur on Hawai‘i Island. Establishing a standard to test sandalwood samples from commercial shipments will allow for improved monitoring of the volume and types of sandalwood being exported.
- ***Movement ecology of Hawai‘i forest birds (Laupāhoehoe Unit)*** - Hawai‘i’s forest birds are believed to move over large areas of the forest, although little is known about how often, how far, and exactly where these birds move. If the birds are moving over large areas, then they are using lands managed by many different entities, and may encounter threats (such as disease in low elevation forests) that can impact even protected populations. Dr. Eben Paxton, (U. S. Geological Survey), is trying to understand how birds move across the landscape. Dr. Paxton is currently tracking forest birds, i‘iwi and apapane, across the forests of Hakalau Forest National Wildlife Refuge (HFNWR). He is attempting to track birds that may move from HFNWR to Laupāhoehoe Forest. Using

small radio transmitters attached temporarily to birds, and towers that automatically track the direction of the radio transmitters, he can follow birds as they move about the forest. The information will be combined across all locations to reconstruct movement patterns over a large geographic area. This will help land managers understand where they should focus their conservation efforts, what threats the birds may be facing, and to what degree land managers need to work together to protect birds that are moving across their lands. It is critical to understand these movements and the threats they face, and develop conservation plans that are at a geographic scale that matches the birds' scale. To date, research has indicated long-distance movement, including movement from HFNWR to Laupāhoehoe Forest. Late 2014 telemetry antennas were placed above the forest canopy on the existing climate station in Laupāhoehoe Forest, which should allow the detection of birds from high elevation forest moving into the lower portions of Laupāhoehoe Forest. Detecting long-distance movements provides important information on the ecology of the forest birds, and is important for developing effective conservation strategies.

- ***Linking local ecological knowledge, ecosystem services and climate change (Pu'u Wa'awa'a Unit)*** - Dr. Tamara Ticktin of the Botany Department at the University of Hawai'i at Mānoa is studying the complex inter-linkages of human and natural systems. Understanding how these 'social-ecological' systems are resilient to climate change is one of the most pressing problems of our world today. This is especially true for coastal communities in the Pacific Islands, which are extremely vulnerable to the effects of climate change. Dr. Ticktin is leading an interdisciplinary team, partnering with other scientists (working in marine ecology, anthropology, economics, and climate change modeling), resource managers, and community members to study social-ecological resilience to climate change in Hawai'i and Fiji. Using a combination of long-term existing social and ecological datasets, new data and experiments, and state-of-the-art climate and ecosystem service models, the research team is asking: How will different land and ocean uses affect social-ecological resilience and ecosystem services in linked ridge-reef settings, under different climate change scenarios? To answer this question, their research focuses on three watersheds - Ha'ena (Kauai), Pu'u Wa'awa'a/Ka'ūpūlehu (Hawai'i), and Kubulau (Vanua Levu, Fiji). In Pu'u Wa'awa'a, Dr. Ticktin and team tagged and measured all native and non-native trees, naturally occurring, as well as ground cover in 5 m X 5 m nested subplots. The information gathered in this study will be used to calculate indicators of ecological resilience (including species and functional diversity, heterogeneity, and invasive species cover) and some ecosystem services (provisioning, regulating, cultural) now and under climate change scenarios. The team will use this information to examine trade-offs and synergies between ecosystem services, indicators of resilience and economic costs under different land use scenarios (for example, different restoration scenarios) and different ocean use scenarios. The goal is to inform sustainable management of resources in the future.

Research Infrastructure/Databases

Long term climate monitoring equipment has been installed in both Units and the Laupāhoehoe Unit also includes hydrology monitoring equipment. The HETF climate stations are part of the EPSCoR-ENDER (Experimental Program to Stimulate Competitive Research - Environmental Dynamics and Ecosystem Responses) Climate Network, an island-wide network of climate stations at locations across Hawai'i Island.

Laupāhoehoe Unit equipment includes a stream gauge in Manowai‘ōpae Stream (outside the forest boundary and managed by the USFS) and a free standing aluminum weather station located within the Forest Reserve. The purpose of the stream gauge is to measure natural stream flows, water quality, and sediment in a non-destructive manner. The weather station, installed in 2009, extends 10 feet (3 m) above the forest canopy and collects daily rainfall, temperature, relative humidity, wind-speed, solar radiation (sunlight), soil moisture, soil temperature, and wind direction.

The Pu‘u Wa‘awa‘a Unit hosts multiple weather stations including three in the Forest Reserve, and one in the Forest Bird Sanctuary. See the HETF climate page for more information on climate stations - <http://www.hetf.us/page/climate/>. The Pu‘u Wa‘awa‘a Unit is also a location for a National Ecological Observatory Network (NEON) satellite site and locations for the two NEON station sites are currently being vetted with DOFAW and USFS staff.

Long term vegetation plots are available in both Units including:

- The Hawai‘i Permanent Plot Network (HIPNET), <http://www.hippnet.hawaii.edu/>
- Forest Inventory and Analysis (FIA), <http://www.fia.fs.fed.us/>

Additionally, State management infrastructure (fencing) to protect plants is found within both Units. Detailed information regarding this infrastructure is found within the management plans.

- Pu‘u Wa‘awa‘a Management Plan - <http://dlnr.hawaii.gov/forestry/files/2014/06/PuuWaaWaaplanv6.pdf>
- Pu‘u Wa‘awa‘a Draft Habitat Conservation Plan and Draft EA – a draft habitat conservation plan is available at http://dlnr.hawaii.gov/wildlife/files/2013/09/ITEM-3_ESRC-Draft-NKGHCP-18March15.pdf and a draft environmental assessment is currently in progress.
- Laupāhoehoe Draft Management Plan- Public draft released April 2015 and available at <http://dlnr.hawaii.gov/ecosystems/nars/hawaii-island/laupahoehoe-2/> .

Education

Both HETF Units are used for education and outreach activities. Table 2 contains annual data for educational trips and participants. Activities are categorized as education, service, education/service (this is when an education trip also includes a service portion) and other (which includes trainings, surveys (engineer, archaeological, plot, or private) as well as site visits, tours, media visits and Hawaiian cultural practices such as Ho‘olaule‘a).

Table 2: Total number of education trips initiated in the HETF and grouped by Unit from 2012-2014.

Year	Laupāhoehoe Unit		Pu‘u Wa‘awa‘a Unit	
	# of participants	# of trips	# of participants	# of trips
2014	109	9	635	25
2013	13	2	500	22
2012	3	1	481	26
Total	125	12	1616	73

Some examples of educational activities from 2013 and 2014 are highlighted below. More detailed information on all education activities can be found within the HETF annual reports available online (<http://www.hetf.us/page/home/>).

- *Cindy Navarro-Bowman of Honoka'a High & Intermediate School* and students installed student designed watering systems in the rare plant outplanting area inside the reservoir enclosure at Pu'u Wa'awa'a. Students returned regularly throughout 2013 to collect data on plantings and document reforestation progress. Other topics discussed during their visits: species identification; dry forest ecology; conservation; and the natural history of the area.
- *Jon Hayashi of the Boy Scouts of America, Aloha Council Troop 1078* spent 3 days and 2 nights at Pu'u Wa'awa'a with a group of 25 participants. Participants took part in a reconnaissance hike of the Forest Reserve area and discussed the impact of non-native mammals on the ecosystem. Participants also learned orienteering/map reading skills used in conjunction with visible landmarks and the troop participated in an outplanting led by Pu'u Wa'awa'a coordinator Dr. Elliott Parsons.
- *Orlando Oxiles of the DLNR, Division of Conservation and Resource Enforcement* conducted the 2013 Hawai'i Conservation Wilderness Education Project (HCWEP) at Pu'u Wa'awa'a. This is a camp for youths between the ages of 10 and 13 years old. The camp expands upon the basic DLNR hunter education course by involving the students in hands-on activities in each of the HCWEP course segments which include: nature walks, orienteering with compass/GPS, archery, 22 rifle, shotgun, muzzle loader, firearms cleaning, practice/mock hunting and motivational speaking.
- *Retired Senator Daniel Akaka* toured Laupāhoehoe Forest and the Laupāhoehoe Forest and Science and Education Center (Center), a significant visit because Senator Akaka was instrumental in creating the HETF, through the passing of the Hawai'i Tropical Forest Recovery Act in 1992 and providing support for HETF establishment. During his visit to the forest, he shared his thoughts on the environment, Hawaiian culture, and the vision behind the Hawai'i Tropical Forest Recovery Act. Staff and students welcomed the Senator with an oli (Hawaiian chant) and lots of questions about his career. He shared his passion for conservation of Hawai'i's native ecosystems and culture. The visit ended with the Senator helping to plant an 'ōhi'a tree at the Center. The ceremonial planting was both moving and inspirational, ending with the Senator sharing his life-long commitment to connecting Hawai'i's people to her forests.
- *Dr. Peter Vitousek of Stanford University* led a day trip into the Laupāhoehoe Unit with a group of Stanford University students on a 10 week Hawai'i Island field studies course. Students visited his long-term research plot where they observed native Hawaiian vegetation and soil and discussed ecosystem development. Dr. Vitousek has been studying soil fertility across the Hawaiian Island chain, including his site within the Laupāhoehoe Unit, since 1990.

Facilities

Laupāhoehoe Unit

HETF support facilities for the Laupāhoehoe Unit are present in two locations within the town of Laupāhoehoe but outside the forest boundary. The Laupāhoehoe Science and Education Center (Center) is located on 55 acres of old sugar cane lands within the Laupāhoehoe community,

approximately four miles from the HETF boundary. Facilities include a bunkhouse, kitchen, restrooms, and classroom/meeting space. The facility site offers opportunities for research, education, and demonstration. A weather station, installed in 2009, is located onsite. The Center is currently open for day use via reservations as of January 2014. Overnight use is expected to be operational by September 2015.

Additionally, there are plans to build a covered pavilion with restrooms and parking on a three acre fenced parcel directly below the Laupāhoehoe forest boundary. This site would serve as a stepping stone for education and outreach into the forest with the potential for restoration and other forest activities within the three acre fenced area. The potential date of construction for the facilities is unknown.

Pu'u Wa'awa'a Unit

There are plans to build dedicated HETF facilities including a bunkhouse with kitchen, restrooms and classroom/meetings space for Pu'u Wa'awa'a. Facility locations have changed through time as information is gathered and USFS fiscal policies change. Two sites were considered in 2014 for HETF facilities, either the decommissioned landing strip located within the DLNR Forest Reserve or a DLNR Land Division site located just outside the Forest Reserve within the community of Pu'u Anahulu. After hearing community feedback about concerns related to the Land Division parcel, the focus site for the future HETF facilities at Pu'u Wa'awa'a has been moved to the landing strip location. Non-exclusive use of specific DOFAW owned buildings are available for HETF related meetings and activities.

Partner Funding and In-kind Support

21st Century Conservation Service Corps (21CSC) – The 21CSC is a bold national effort to put thousands of America's young people and veterans to work protecting, restoring, and enhancing America's great outdoors. Member organizations who meet 21CSC specified criteria are eligible to receive funding support through the program. In 2014, the HETF received \$77K in funds and helped to enroll 3 new member organizations into the 21CSC program. Mauna Kea Watershed Alliance (MKWA) received \$21K to support two field positions. Big Island Invasive Species Committee (BIISC) received \$19K to leverage other existing funding to support 2-3 positions to eradicate albizia, and the DLNR received \$37K to assist in the support of a field technician at Pu'u Wa'awa'a and an additional temporary position with the Big Island NARS team.

Youth Conservation Corps (YCC) – The experimental forest designation allows the USFS to apply for YCC funding through the national forest system. From 2012-2014 the HETF received \$154K from Region 5 and State & Private Forestry and an additional \$26K from 21CSC to support Hawai'i YCC programs. To date this funding has supported 40 members in the YCC Gateway summer team program. Gateway program members gained introductory experience in all aspects of natural resource management, working in both HETF Units, as well as other conservation areas managed by agency partners, such as the DOFAW, MKWA, Hakalau National Wildlife Refuge, Office of Mauna Kea Management and the Nature Conservancy. As a result of the program's success, the USFS received KUPU's Site of the Year Award in both 2012 and 2013.

Starts with a Seed Program (SWAS) – Initiated in 2011, the Starts with a Seed Program (SWAS)

continues to get kids out of the traditional classroom and into the great outdoors. SWAS is successfully connecting forests, schools, and conservation organizations to each other while providing access and knowledge on forests for students in Hawai'i. In 2012, the SWAS hosted 11 trips with 473 participants visiting various sites across Hawai'i Island. On a trip to Pu'u Hulu Hulu, 27 students removed invasive mullein, ivy and fireweed, learned about layers of the forest and how to identify plants and birds, and discussed native and invasive species. The USFS donated in-kind contributions to the SWAS program, including facility use for two teacher workshops at the Laupāhoehoe Center, as well as equipment, personnel, and vehicle use.

'Imi Pono no ka 'Āina – In 2012 and 2013, the USFS provided equipment support to multiple 'Imi Pono no ka 'Āina programs within and outside the HETF.

American Forests Global ReLeaf - Waihou Forest Restoration Project – In 2012, the USFS purchased equipment (\$1007.02) for the Three Mountain Alliance and DOFAW led American Forests Global ReLeaf outplanting project. The goal of this project was to plant 6000 trees within the 204 acre Waihou enclosure within the HETF Pu'u Wa'awa'a Unit. This outplanting project was coordinated and facilitated by DOFAW staff, Dr. Elliott Parsons and Lyman Perry.

Manaulu Manowai'ōpae – The USFS is a partner with Laupāhoehoe Community Public Charter School (LCPCS) and works with the school's teachers and administration on ways to integrate curriculum with hands on experience both in and out of the classroom. Graduate student James Akau has been working with the LCPCS to increase student exposure to local natural and cultural resources, and teach conservation and restoration through the Manaulu Manowai'ōpae program. Most of the program activities occur within the Laupāhoehoe Unit, the Laupāhoehoe Science and Education Center, and on the LCPCS campus. Manaulu Manowai'ōpae also provides additional resources (i.e. transportation, equipment, guest speakers, etc.) to support ongoing programs that occur at the school and within the community. Values of *aloha 'āina* (love for the land), long-term *kokua* (help; aid), *kako 'o* (support) and *laulima* (many hands) are practiced when restoring the land.

Laupāhoehoe Forest Management Plan - In addition to USFS staff time focused on the development of the draft Laupāhoehoe Forest Management Plan, \$47,265 was expended on personnel dedicated to data collection, gathering, and summarization for the draft plan as well as the production and distribution of outreach materials related to species found in Laupāhoehoe Forest.

Awards and Accomplishments

Human Diversity Award

The USFS received the Organization of Biological Field Station's (OBFS) Human Diversity Award in 2013. The OBFS Human Diversity Award provides recognition for unique activities, programs, or approaches (funded or unfunded) that increases the involvement, engagement, and sustainability of underrepresented groups in field science. Founded in 1963, the OBFS is a non-profit multinational organization representing field stations and research centers around the globe (www.obfs.org).

Kupu Site of the Year Award

The IPIF received a Site of the Year Award in 2012 and 2013 for its conservation education work with Hawaiian youth from Kupu, a nonprofit community organization that administers AmeriCorps programs in Hawai‘i (kupuhawaii.org). The IPIF has hosted AmeriCorps members through three of Kupu’s Hawai‘i Youth Conservation Corps sub-programs (the Gateway, Frontiers, and Extended Internship programs) since 2010.

HETF Administrative Challenges

Concerns, comments and challenges associated with HETF administration are provided internally by HETF Planning Group members and other USFS and DOFAW staff and externally by community members and/or research permit holders when they file annual reports.

Current Concerns, Comments and Challenges

Laupāhoehoe Unit

Submitted by researchers via annual reports:

- Challenges stem from safely accessing the remote regions in the HETF.
 - *This project was installing randomized plots across the landscape and the terrain and remoteness of some of the plot locations were too challenging for plot installation.*
- Researchers in the Laupāhoehoe Unit had field sites vandalized, gear had been moved and/or removed, and guylines had been cut off poles at one site. Also there was one attempted theft of gear from the back of a researcher’s vehicle.
 - *Researchers are advised to not leave items unattended in the back of a vehicle.*
- HIPNET researchers have made significant progress on communication with the Laupāhoehoe community by actively engaging in dialogue about the relevance of their work at LAC meetings as well as making compromises through removal of rebar in the plot. All known rebar associated with the HIPNET plot has been removed as of October 2010.
- Terrain is hard to navigate within the Laupāhoehoe Unit.
- Getting through all four gates by oneself can be cumbersome.
- Other researchers apparently have made collections in the area of our core site, as evidenced by litter screen on the surface and changes in the structure of the soil pit.
- Logistical challenge encountered was inaccessibility to the site due to heavy rains that washed out the river crossing on Blair Road just below several residences and the Eucalyptus belt. We did not know if the crossing was overflowing until we drove out there to see it, so this resulted in the loss of staff time and additional costs in fuel. An informational phone recording or email to researchers regarding road conditions would be helpful in eliminating lost time and resources.

Submitted by USFS staff:

- Feedback received from the Laupāhoehoe Advisory Council (LAC) and other community members highlight the need to increase community outreach activities for Laupāhoehoe Forest and to communicate the value and findings of scientific research to the community.
 - *In 2013 two research projects in Laupāhoehoe Forest were discussed during LAC meetings with concerns relating to using nails as markers in trees and bird mist netting and banding. LAC review is part of the research permitting process. To address those concerns speakers involved with the research presented an overview of their work and were available to answer questions and address concerns. For the HIPNET research*

project which uses nails as identifying points for long term re-measurement, Dr. Becky Ostertag (UH-Hilo) and Dr. Christian Giardina (USFS) attended the November 13, 2013 meeting. For bird mist netting and banding, Dr. Eben Paxton with the US Geological Survey attended the September 11, 2013 meeting. In addition, Dr. Tracy Johnson (USFS) presented at the July 10, 2013 LAC meeting to introduce his project to monitor the release of a bio-control agent to combat strawberry guava infestation as his permit was being reviewed.

- Feedback received from the LAC and other community members also included concerns that research related trash is being left in the forest. There is a long history of research activity in Laupāhoehoe Forest that pre-dates the establishment of the HETF. There are both historical and what appears to be more recent research related items that have been abandoned in the forest.
 - *The USFS and DOFAW are working to address these concerns in three ways that will apply to both Pu‘u Wa‘awa‘a and Laupāhoehoe:*
 - 1) *Clean Up: Agency personnel are cleaning up remnants from completed or abandoned research projects when such sites are located. Site locations are reported from forest users as well as historical study site locations being surveyed by agency staff. An example includes several long pieces of window screening used to collect leaf litter reported by both a research user and members of the hunting community. USFS staff located and removed the screening on July 19, 2013. In 2014, USFS staff did site reconnaissance to locate and GPS several study sites installed in the 1970's and survey the need for cleanup. While various research related activities have since occurred in those plots they were no longer part of any active research permits. Infrastructure primarily includes old fenced units, some of which are still intact, but many of which have downed trees breaching the fences. USFS staff has begun removal of the known infrastructure and removal should be completed by 2016.*
 - 2) *Updating the HETF research application including the adoption of a responsible research statement: Suggestions to further highlight expectations for research permittees in regards to good stewardship have been offered by community members as well as HETF Planning Group members and these have been incorporated into the most current revision of the HETF permit application. There are plans to also include a responsible research statement as part of the permit application.*
 - 3) *Creating a forest protocol video: A desire to produce a video that outlines appropriate forest protocol has been discussed since HETF establishment. The completion of such a video would offer an additional avenue to promote forest stewardship and address the concern of any trash being left in the forest. The viewing of such a video could be part of the research permit application guidelines though this would be hard to ensure. USFS staff will pursue such a video. Completion date to be determined.*
 - *It is possible that in spite of the efforts to correct this issue, abandonment of research infrastructure may still occur from time to time. The USFS and DOFAW are committed to following through on any outlined repercussions for such behavior, continuing to promote good stewardship protocols for all research activities and cleaning up study sites as needed.*

Pu'u Wa'awa'a Unit

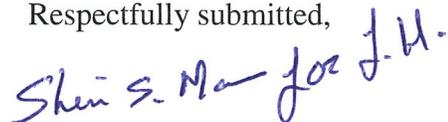
Submitted by researchers via annual reports:

- Challenges stem from safely accessing the remote regions in the HETF.
 - *This project was installing randomized plots across the landscape and the terrain and remoteness of some of the plot locations were too challenging for plot installation.*
- Prolonged drought conditions were a challenge to some researchers.
 - *DOFAW staff work to reduce fire loads in areas on roads and parking areas but in times of extreme fire danger the Forest Reserve may be closed.*
- Routine natural challenges encountered include accessing cave entrances, avoiding native vegetation when traversing the flows, not disturbing bird bones and other features in the caves while surveying, and working within constraints imposed by poor weather, property closures due to fire danger and drought, and other HETF constraints on access.
- Dangerous road conditions along the Southeastern Forest Bird Sanctuary boundary fence that was very steep and muddy and our truck slid backwards off the road and almost down into an embankment.
 - *Road sign installation is in progress that will make road travel more efficient on routes that are safer for travel, but there are roads particularly in the Forest Bird Sanctuary that should be avoided when road conditions are wet. Researchers accessing 4 wheel drive roads should consider using mud/snow tires when driving in semi-steep areas.*
- Difficulty collecting data from plants that are exposed to ungulates.
 - *The State is currently writing a Habitat Conservation Plan to address the impacts of ungulates on native plants.*

Submitted by USFS/DOFAW staff:

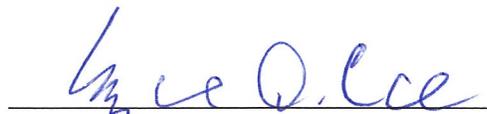
- Remnants from completed or abandoned research projects and trash from uncontrolled public use of Kīholo have been found in the Pu'u Wa'awa'a Unit.
 - *In 2013, USFS and DOFAW staff cleaned up and removed a couple of large garbage bags of trash at Kīholo while working on a USFS research project.*

Respectfully submitted,



LISA J. HADWAY
Administrator

APPROVED FOR SUBMITTAL:



Suzanne D. Case, Chairperson
Board of Land and Natural Resources

Attachments

Appendix A - Permit to Use State Lands

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR

DEAN NAKANO
ACTING DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LINES
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

PERMIT TO USE STATE LANDS

Pursuant to the authority granted by the Board of Land and Natural Resources at its meeting of January 25, 2007, (Item C-2), the U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station, ("USDA Forest Service" or "Permittee"), is hereby granted a non-exclusive permit to use State lands situated at Laupāhoehoe and Pu'u Wa'awa'a, Hawai'i, identified by tax map key parcel numbers: (3) 3-7-001:002; (3) 3-7-001:012; (3) 7-1-001:001; (3) 7-1-001:004; (3) 7-1-001:004; (3) 7-1-001:006; (3) 7-1-001:007; (3) 7-1-002:001; (3) 7-1-002:013; (3) 7-1-002:002; (3) 7-1-002:008, and as shown on the attached maps, for use as the Hawai'i Experimental Tropical Forest (Laupāhoehoe and Pu'u Wa'awa'a units), in compliance with the herein referenced Cooperative Agreement. The USDA Forest Service is acting through the Institute of Pacific Islands Forestry located in Hilo, Hawaii.

Definitions:

"Assigns" means the employees, contractors, agents, and consultants.

"Cooperative Agreement" means the Cooperative Agreement between the State of Hawaii, Board of Land and Natural Resources and the U.S. Department of Agriculture, Forest Service, dated December 12, 2006.

"Hazardous Material" means any pollutant, toxic substance, hazardous waste, hazardous substance, or oil as defined in pursuant to applicable federal law, including, but not limited to, the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. §§ 9601, et seq., the Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901, et seq., the Clean Water Act, 33 U.S.C. §§ 1251, et seq., Clean Air Act, 42 U.S.C. §§ 7401, et seq., the Safe Drinking Water Act, 42 U.S.C. §§ 300f, et seq., the Oil Pollution Act, 33 U.S.C. §§ 2701, et seq., the Toxic Substances Control Act, 15 U.S.C. §§ 2602, et seq., and the Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. §§ 136, et seq., or any state law or regulation promulgated pursuant to such federal law.

This Permit is subject to the following conditions:

1. This permit to use State lands shall be effective from the last date shown below and extend for thirty-five years from December 12, 2006, the date the parties entered the Cooperative Agreement.
2. This permit to use State lands is a non-exclusive authorization for the USDA Forest Service and its assigns to occupy and use the Hawaii Experimental Tropical Forests for

the purpose of research, education, demonstration, and related purposes. This permit shall be effective for the following general purposes:

- a. To conduct long-term ecological, forestry, hydrological, and other natural resources-related research;
- b. To conduct long-term studies at scales from the plot to the watershed on forestry, conservation biology, endangered species, and invasive species;
- c. To conduct baseline studies and monitor results and benefits of forest management practices on important issues facing Hawaii including but not limited to: weed control, invasive pest control, forest restoration, aquatic ecology, hydrology, ungulate management, forest recreation, recreational hunting, fire control, cultural subsistence gathering, and protection and reintroduction of native plants and animals;
- d. To conduct studies on forest silviculture and sustainable management and to develop new commercial forest products;
- e. To conduct global climate change research;
- f. To attract and conduct multidisciplinary research studies by scientists from federal and state agencies, non-governmental organizations, and universities;
- g. To provide for environmental education and demonstration for groups ranging from school children to continuing education for land managers, natural resource professionals, and the general public;
- h. To form a management/research partnership where information needs and new findings are freely exchanged between the USDA Forest Service and the State; and
- i. To construct, maintain, and improve needed infrastructures, including: a new field station facilities at Laupāhoehoe and renovation of existing structures for use as a field station at Pu'u Wa'awa'a consisting of dormitories, work areas, demonstration/education buildings, and storage facilities, gaging stations in streams, weather stations, eddy covariance towers, and similar devices, maintenance of the existing trail system and development of new trails for access, and maintenance and improvement of existing roads.
- j. To engage in the specific activities listed on Exhibit A to this permit.

Research or activities requiring additional Federal, State, or county permits or approvals, including but not limited to environmental assessments or conservation district use permits, will be subject to the procedures in effect for obtaining such permits or authorizations.

The USDA Forest Service must obtain the prior written consent of the Board before construction of infrastructure or making any major improvements, as outlined in section IV.I of the Cooperative Agreement. Any major improvements, including but not limited to buildings and fences, erected on or moved onto the Premises by the USDA Forest Service shall remain the property of the USDA Forest Service and the USDA Forest Service shall have the right, prior to the termination or revocation of this Permit, or within an additional period the Board in its discretion may allow, to remove the improvements from the Premises.

3. This permit to use State lands constitutes an authorization for the USDA Forest Service and its assigns to conduct activities described herein as authorized under the Cooperative Agreement. For activities conducted by entities other than the USDA Forest Service and its assigns permits to conduct those activities shall be secured as outlined in Sections III and VI through IX of the Cooperative Agreement. The permit or any rights hereunder shall not be sold, conveyed, leased, mortgaged, or otherwise transferred or disposed of. Persons acting under this permit shall carry a copy of the permit or a signed authorization from the USDA Forest Service indicating their name, purpose, and dates of authorization with them at all times while in the permit area and

shall, upon request, show the permit or signed authorization to any law enforcement officer, or the authorized representative of the Board of Land and Natural Resources.

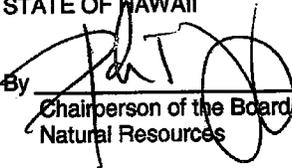
4. USDA Forest Service shall insure that in the exercise of this permit to use State lands, it shall comply with all laws, statutes, ordinances, rules and regulations of the Federal, State, and county governments affecting the permit area. In addition, prior to activities in Laupāhoehoe Natural Area Reserve, USDA Forest Service shall ensure that proposed activities are to be performed in a manner which is consistent with NARS management objectives, HRS § 195-1 and in consultation with the Hawaii Island Natural Area Reserves System Area Manager to ensure that proposed activities remain consistent with NARS objectives and management actions. Prior to activities in Pu'u Wa'awa'a, USDA Forest Service shall ensure that proposed activities are to be performed in a manner consistent with the Pu'u Wa'awa'a Management Plan and in consultation with the Pu'u Wa'awa'a Coordinator.
5. In the event any unanticipated sites or remains such as bone or charcoal deposits, human burials, rock or coral alignments, pavings or walls are encountered USDA Forest Service, its contractors, and consultants shall immediately stop work and contact the State Historic Preservation Division in Kapolei at (808) 692-8015.
6. USDA Forest Service agrees to consult regularly with the State, including the appropriate DLNR land manager, on proposed and ongoing activities within the permit area, to ensure open and full communication and to minimize conflicts and maximize benefits between planned and ongoing research projects and between research projects and land management.
7. USDA Forest Service, through the Hawaii Experimental Tropical Forest Research Committee established under the Cooperative Agreement, agrees to consult regularly with the State, including:
 - a. Providing a copy of the annual report submitted to Congress as required by section 607 of the International Forestry Cooperative Act of 1990, as amended by the Hawaii Tropical Forest Recovery Act;
 - b. Providing an annual report on the status of approved new and ongoing research (including the primary investigator, the research topic, the location for the research, dates of field research, date of anticipated results, and contact information for the primary investigator);
 - c. Providing an annual report on the number of educational tours and total number of participants; and
 - d. Annually reporting on the challenges faced in the administration of the Experimental Forest.
8. The USDA Forest Service will maintain the improvements on the land that are being used by the Forest Service or its assigns. The USDA Forest Service will keep the permit area and improvements in a clean, sanitary, and orderly condition. Disturbance of native vegetation and native wildlife shall be avoided as much as possible. The USDA Forest Service will not make, permit, or suffer, any waste, strip, spoil, nuisance or unlawful, improper, or offensive use of the permit area. Precautions shall be taken to prevent introductions of plants and animals not naturally present in the permit area, including inspection and cleaning of clothing, equipment, and vehicles. At all times with respect to the permit area, USDA Forest Service will use due care for public safety and will use appropriate precautions and measures to minimize inconveniences to surrounding residents, landowners, lessees, and the public in general.

9. The State will remain primarily responsible for normal land management functions, including but not limited to control of public access, fire suppression, law enforcement, regulation of hunting and grazing activities, invasive species management, and forest disease, insect, and ungulate control. The Board will be responsible for maintenance of all improvements not used, built or placed on the land by the USDA Forest Service. The Board reserves the right for its employees, agents or representatives to enter or cross any portion of the permit area at any time.
10. Liability for any loss, damage, claim, demand, or action, caused by, arising out of or connected with the operations authorized by the Cooperative Agreement shall be governed by applicable State and Federal law. To the extent that the USDA Forest Service requires third parties, including but not limited to its contractors or consultants, to procure liability insurance or to indemnify the Forest Service, the USDA Forest Service shall also require such third parties to insure and indemnify the State.
11. This permit may be modified at any time by mutual agreement of the Director, Institute of Pacific Islands Forestry, USDA Forest Service, and the Board of Land and Natural Resources.
12. Permittee and its assigns shall not cause or permit the escape, disposal or release of any hazardous materials except as permitted by applicable federal and state law. Proposed use of hazardous materials in research activities will be disclosed to the State through the research review and approval procedures of the Hawaii Experimental Tropical Forest Research Committee and the processes for activities authorizations prescribed by the Cooperative Agreement. Permittee and its assigns shall store and use hazardous materials only as prescribed by federal law. Liability for release of a hazardous material shall be in accord with applicable Federal and state law.

To the extent that the Permittee requires its contractors or consultants to indemnify, defend, and hold the Permittee harmless from any damages and claims resulting from the release of hazardous materials on the permit area occurring while Permittee or its contractors are in possession of the permit area, or elsewhere if caused by Permittee's contractors acting for or on Permittee's behalf, Permittee shall also require such contractors or consultants to indemnify the State. These covenants shall survive the expiration or earlier termination of this permit.
13. In the event of an alleged violation of this permit, the State will contact the Director of the Institute of Pacific Islands Forestry (or other designated official of the USDA Forest Service) with notice of such violation and a reasonable time permitted to cure the violation.
14. Disputes shall be resolved by the Station Director, Pacific Southwest Research Station, USDA Forest Service, and the Board of Land and Natural Resources. Disputes involving Laupāhoehoe Natural Area Reserve shall be taken to the Natural Area Reserve System Commission first for their recommendation to the Board of Land and Natural Resources.

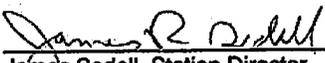
IN WITNESS WHEREOF, the STATE OF HAWAII, by its Board of Land and Natural Resources, has caused the seal of the Department of Land and Natural Resources to be hereunto affixed and the parties hereto have caused these presents to be executed the day, month and year first above written.

STATE OF HAWAII

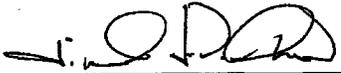
By  _____
Chairperson of the Board of Land and
Natural Resources

Approved by the Board of
Land and Natural Resources
at its meeting held on JAN 26 2007

USDA FOREST SERVICE

 _____
James Sedell, Station Director
Pacific Southwest Research Station

APPROVED AS TO FORM:

 _____
Deputy Attorney General
State of Hawaii

Dated: 1/26/07

Exhibit A to Permit

The following activities, when undertaken by the Forest Service or its assigns pursuant to actions authorized in accordance with the provisions of the Cooperative Agreement for research between the State of Hawaii and the Forest Service, are authorized by this Permit. For purposes of this Exhibit A, "nondestructive" means an activity that does not destroy or harm the object of analysis.

1. Operations and maintenance of buildings, dormitories, work areas, demonstration/education buildings, storage facilities, and management structures on experimental forest lands or other state lands encumbered under lease, license or permit.
2. Minor modification of existing buildings, work areas, demonstration/education facilities, and storage facilities to improve their usefulness as per the cooperative agreement, or to provide for public and worker safety.
3. Maintenance or modification of landscaping and other minor land and vegetation improvements around buildings, work areas, storage facilities on experimental forest lands to improve site use or public safety, including cutting and/or removal of vegetation, and use of pesticides and herbicides to maintain landscaping.
4. Cutting and/or removal of exotic/nonnative vegetation and animals or use of pesticides and herbicides to control or prevent the establishment or spread of invasive species.
5. Maintenance and operation of all facilities and improvements that are used by the U.S. Forest Service or its assigns, or those installed under research permits as per agreement of the Forest Service.
6. Maintenance of existing roads to facilitate access and diminish ecological damage from roads in poor condition, including the cutting or removal of roadside vegetation, and use of herbicides and pesticides in road right-of-way.
7. Maintenance of the existing trail system facilitate access, minimize trampling damage and insure safety of users, including the cutting or removal of roadside vegetation, and use of herbicides and pesticides in the trail corridor.
8. To participate in or conduct hikes, nature study, or other passive recreational activities.
9. Non-destructive inventory and monitoring of basic resources of experimental forest lands.
10. To lead site tours or provide access to school children, land managers, natural resource professionals, and the general public for forest education purposes and demonstration projects.

11. Installation and maintenance of directional and informational signs for worker, visitor, and public use and safety.
12. Monitoring of public use and environmental conditions in and around public use facilities, including placement of temporary electronic devices for environmental monitoring or sampling (for periods ≤ 36 months), and the sampling of air and gasses (plant and soil respiration) within the experimental forest.
13. Use of motorized or unmotorized vehicles and equipment off established roads and trails or other designated vehicle-areas for approved management and research plan activities or to respond to emergency situations.

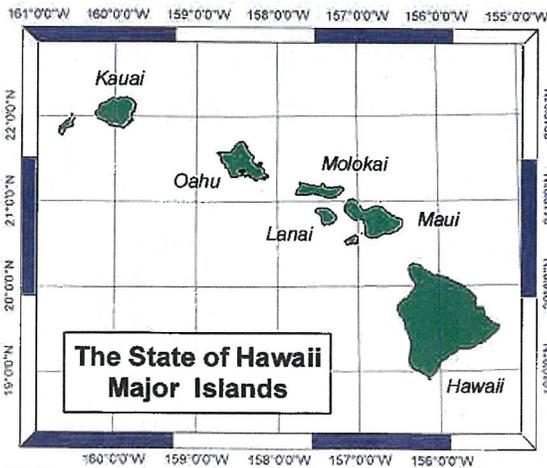
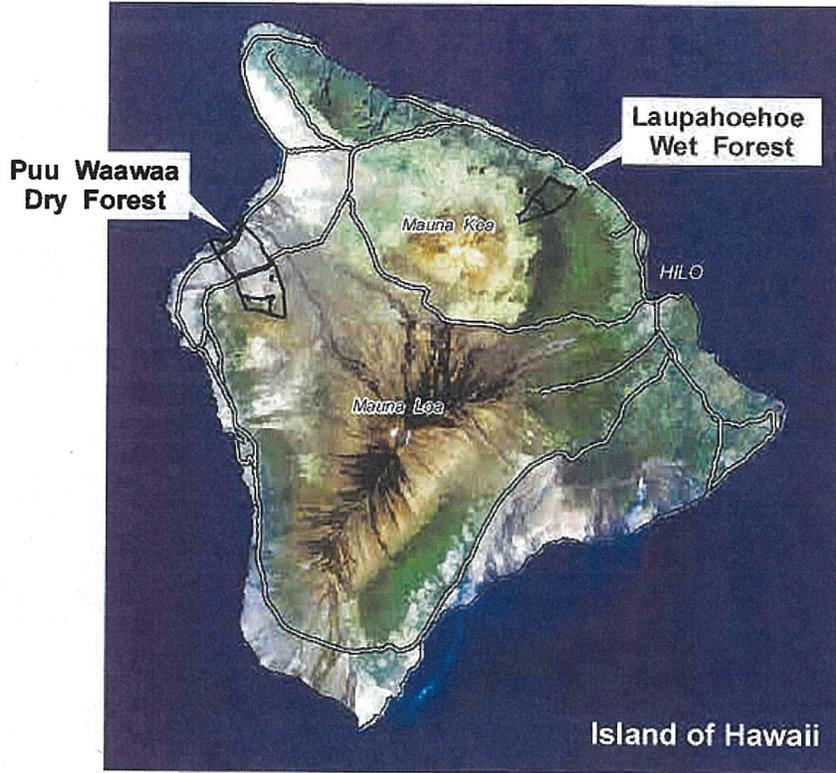
The following eleven activities are also authorized by this permit when undertaken by the Forest Service or its assigns pursuant to research actions authorized by the Hawaii Experimental Tropical Forests Research Committee in accordance with the provisions of the Cooperative Agreement for research between the State of Hawaii and the Forest Service.

14. Non-destructive inventory, measurements, censuses, and monitoring of trees, ferns, understory plants, birds, mammals, insects, and aquatic organisms where there is no harm to the organisms (includes both ground-based and remotely sensed measures).
15. Non-destructive inventory, measurements, and monitoring of the forest floor, dead and downed wood, and soils.
16. Non-destructive inventory, measurements, and monitoring of streams, ponds, and other aquatic ecosystems.
17. Nondestructive hydrological and geomorphic studies which do not involve the erection of structures or long term placement of equipment.
18. Erection of small protective fences and barriers ≤ 10 acre in area (and the removal of exotic species within such plots).
19. Construction of temporary blinds and field observation structures.
20. Soil and plant nutrient cycling research.
21. Biocontrol research to control invasive plants and animals - manipulate densities of state and federally permitted biocontrol agents through redistribution and experimental methods, including caging plants or parts of plants.
22. Introduction and use of carbon, oxygen, nitrogen and other isotopes for research.

23. Non-destructive collection of plant material (excluding all listed T&E plants), soils, and water samples for laboratory analysis.

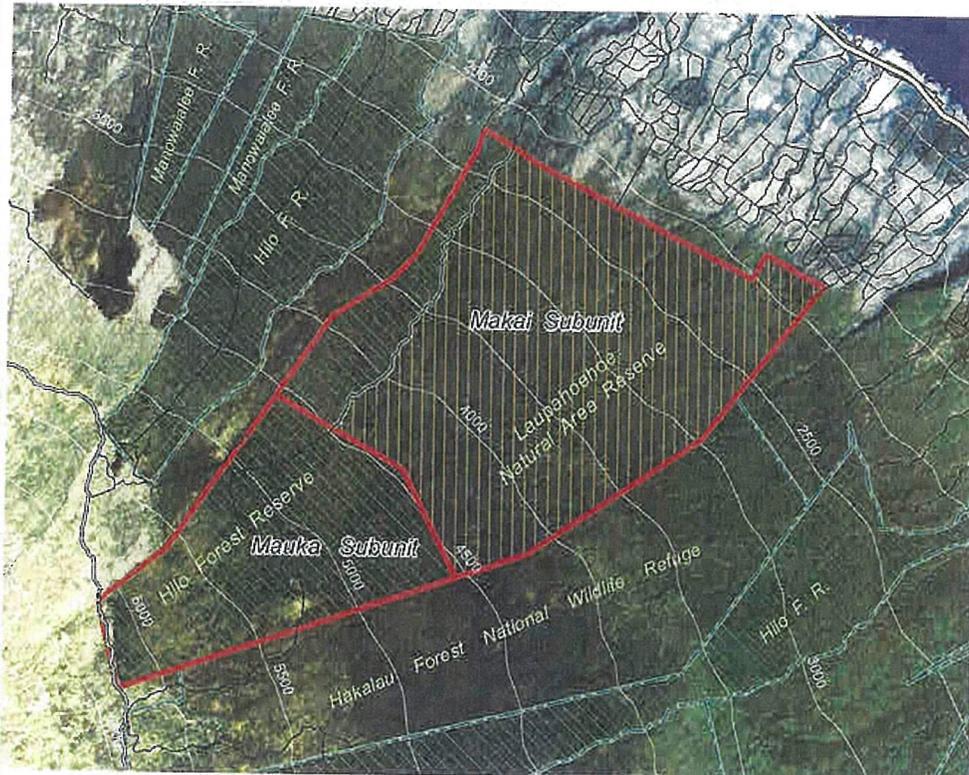
24. Collection of plant and insect samples that are from common, exotic, and abundant taxa for laboratory, greenhouse, or herbarium sampling (excluding all listed T&E species).

MAP 1. Location



State of Hawaii
Department of Land and Natural Resources
Division of Forestry and Wildlife
Map No. FW - 0669 (08/2006)
Contact: Ronald Cannarella
Telephone: (808) 383-3077
Email: Ronald.J.Cannarella@hawaii.gov

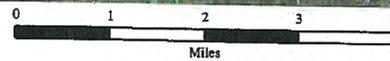
MAP 2. Laupahoehoe Wet Forest : Subunits and Geography



Legend

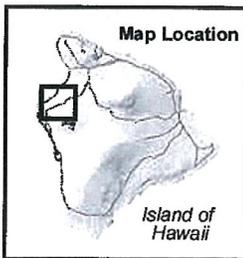
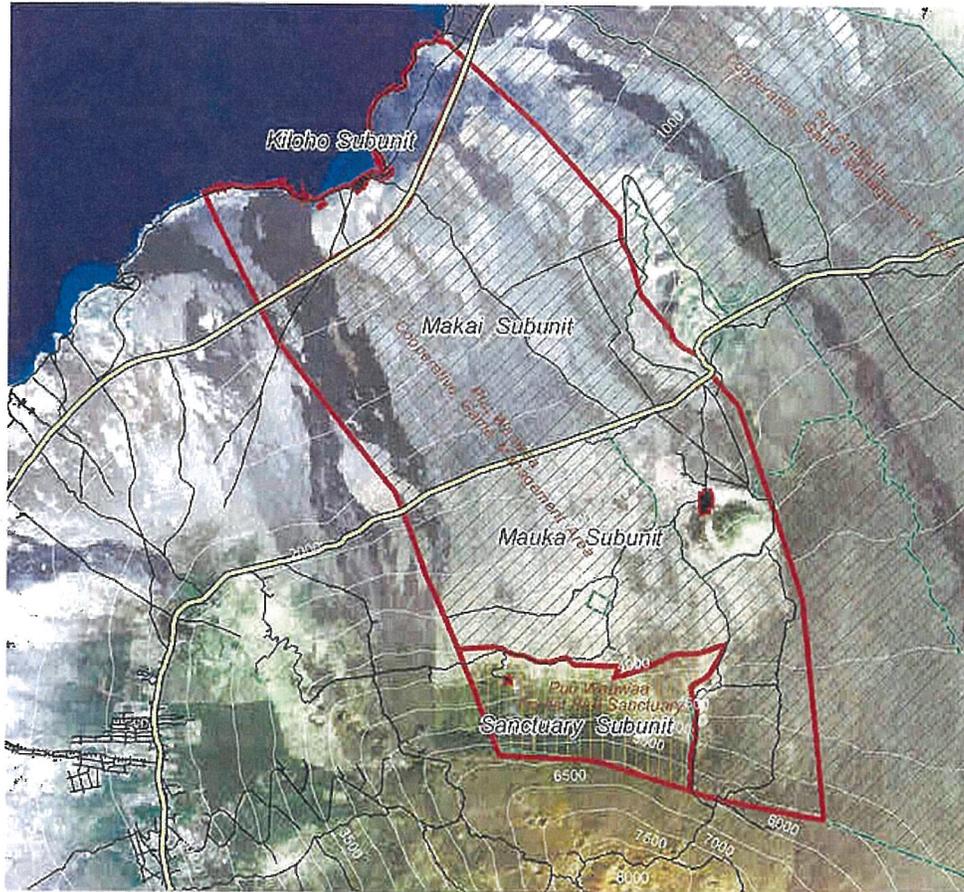
-  HETF Boundary
-  Forest Reserve
-  Natural Area Reserve
-  Major Road
-  Secondary Road
-  Minor Road and Trail
-  Stream
-  500-Foot Contour

Data Source : Landsat, State of Hawaii GIS.



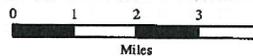
State of Hawaii
 Department of Land and Natural Resources
 Division of Forestry and Wildlife
 Map No. FW-0670 (08/2006)
 Contact: Ronald Cannarella
 Telephone: (808) 383-3077
 Email: Ronald.J.Cannarella@hawaii.gov

MAP 3. Puu Waawaa Dry Forest : Subunits and Geography



Legend

- HETF Boundary
- Game Management Area
- Bird Sanctuary
- Major Road
- Minor Road and Trail
- Stream
- 500-Foot Contour



State of Hawaii
 Department of Land and Natural Resources
 Division of Forestry and Wildlife
 Map No. FW - 0673 (08/2006)
 Contact: Ronald Cannarella
 Telephone: (808) 383-3077
 Email: Ronald.J.Cannarella@hawaii.gov

Data Source : Landsat; State of Hawaii GIS.

Appendix B – Cooperative Agreement

COOPERATIVE AGREEMENT

between the

**UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE**

and the

**STATE OF HAWAII
BOARD OF LAND AND NATURAL RESOURCES**

THIS COOPERATIVE AGREEMENT is between the **United States Department of Agriculture, Forest Service**, hereinafter referred to as the "Forest Service", and the **State of Hawaii**, by its Board of Land and Natural Resources, hereinafter referred to as the "Board". The Forest Service and the Board are jointly referred to as the "Parties".

RECITALS:

Whereas, the Hawaii Tropical Forest Recovery Act of 1992 (Public Law 102-574) authorizes the establishment of the Hawaii Experimental Forest as a center for long-term research and a focal point for developing and transferring knowledge and expertise for the management of tropical forests.

Whereas, the unique biological diversity, resources, and threats to Hawaii's tropical forests pose a critical need to establish experimental forests in Hawaii, where currently none exist.

Whereas, there are areas of State land which are uniquely suited to the conduct of tropical research and, therefore, for designation as the first two units of the Hawaii Experimental Tropical Forests.

Whereas, the Forest Service, through its Pacific Southwest Research Station and its affiliated Institute of Pacific Islands Forestry in Hilo, Hawaii, is authorized to implement the Hawaii Tropical Forest Recovery Act of 1992 on behalf of the United States Department of Agriculture.

Whereas, the Parties deem a cooperative Federal and State research program to be the best way to effect the purposes of the Hawaii Tropical Forest Recovery Act of 1992 and, to that end, to execute and implement this Cooperative Agreement.

NOW, THEREFORE, in consideration of the mutual benefits of cooperative research and the other terms and conditions of this agreement, the Parties agree as follows:

I. AUTHORITIES.

A. *For the Forest Service:* This Cooperative Agreement is authorized by section 606(d)(1)(B) of the International Forestry Cooperation Act of 1990, as amended by the Hawaii Tropical Forest Recovery Act of 1992 (Public Law 102-574).

B. *For the State:* This Cooperative Agreement is authorized by Hawaii Revised Statutes (HRS) §§ 171-6, 183-1.5, 195-4, and 195-7.

II. HAWAII EXPERIMENTAL TROPICAL FORESTS.

A. Within 90 days of execution of this Cooperative Agreement, the Secretary of Agriculture will designate pursuant to the Hawaii Tropical Forest Recovery Act (Public Law 102-574), two units of the Hawaii Experimental Tropical Forests located on the island of Hawaii, generally depicted on the map appended hereto as Map 1, as follows:

1. Laupāhoehoe Experimental Forest comprising approximately 12,343 acres on the Island of Hawaii and generally depicted on the map appended hereto as Map 2.
2. Pu‘u Wa‘awa‘a Experimental Forest comprising approximately 38,885 acres on the Island of Hawaii and generally depicted on the map appended hereto as Map 3.

B. The Laupāhoehoe and Pu‘u Wa‘awa‘a Experimental Forests are collectively referred to herein as the “Hawaii Experimental Tropical Forests”.

C. The purposes of the Hawaii Experimental Tropical Forests are:

1. To learn how to better restore, preserve, and sustainably manage native tropical forests, streams and entire watersheds of the Pacific, and to provide information to land managers challenged with management of these important landscapes;
2. To be a center for demonstration, education, training, and outreach on tropical forestry, conservation biology, and natural resources research and management;
3. To provide sites dedicated to long term research on tropical forestry, ecology, hydrology, conservation biology, and natural resource management; and

4. To promote research cooperation and collaboration between State, Federal agencies, educational, and other institutions in tropical forestry research in Hawaii.

D. Additional lands may be incorporated into the Experimental Forests with the written concurrence of the Parties in accordance with section 606 of the International Forestry Cooperation Act of 1990, as amended by the Hawaii Tropical Forest Recovery Act of 1992.

III. LAND USE AUTHORIZATION.

On or about the date hereof, the Board of Land and Natural Resources ("Board") will issue to the Department of Agriculture, Forest Service, a permit to use the Hawaii Experimental Tropical Forests in accordance with this Cooperative Agreement.

A. The permit is a non-exclusive authorization for the Forest Service and its assigns to use the Hawaii Experimental Tropical Forests for the purpose of research, education, demonstration, and related purposes.

B. Entities conducting research activities requiring additional federal, state, or county permits or approvals, including but not limited to environmental assessments or conservation district use permits, will be required to acquire those permits through the procedures in effect for obtaining such permits.

C. In the event that the Forest Service needs to build valuable improvements and support facilities in furtherance of activities contemplated under this Cooperative Agreement, then the State shall issue a lease for such purposes on terms and conditions necessary to meet the requirements of 7 U.S.C. § 2250a and HRS §§ 171-95 and 183-11.

D. All research activities to be conducted on the Hawaii Experimental Tropical Forests shall be administered by the Hawaii Experimental Tropical Forests Research Committee as provided in Part VI of this Cooperative Agreement.

IV. COOPERATIVE RESEARCH AND MANAGEMENT.

In furtherance of a long-term philosophy for cooperation at the Hawaii Experimental Tropical Forest and to implement the purposes of the Hawaii Experimental Tropical Forests and Section 606 of the International Forestry Cooperation Act of 1990, as amended by the Hawaii Tropical Forest Recovery Act, the Parties agree:

A. To conduct long term ecological, forestry, hydrological and other natural resources-related, research;

B. To conduct long term studies at scales from the plot to the watershed on forestry, conservation biology, endangered species, and invasive species;

C. To conduct baseline studies and monitor results and benefits of forest management practices on important issues facing Hawaii including but not limited to: weed control, invasive pest control, ungulate management, forest recreation, recreational hunting, fire control, cultural subsistence gathering, protection and reintroduction of native plants and animals, hydrology, and water quality;

D. To conduct studies on forest silviculture, restoration, and sustainable management;

E. To conduct global climate change research;

F. To attract and conduct multidisciplinary research studies by scientists from federal and state agencies, non-governmental organizations, and universities;

G. To provide for forest education and demonstration for groups ranging from school children to continuing education for land managers, natural resource professionals, and the general public;

H. To form a management/research partnership where information needs and new findings are freely exchanged between the Parties; and

I. To construct, maintain and improve needed infrastructure, including:

1. New field station facilities at Laupāhoehoe and renovation of existing structures for use as a field station at Pu'u Wa'awa'a consisting of dormitories, work areas, demonstration/education buildings, and storage facilities on experimental forest lands or other state lands encumbered under lease, license or permit.
2. Gaging stations in streams, weather stations, eddy covariance towers, and similar research structures. Gaging stations can be placed at the lower reaches of Ka'awali'i Stream, Laupāhoehoe Stream, Kilau Stream, Kiwilahiahi stream, Ha'ako'a Stream, and Pahale Stream within the Laupāhoehoe Natural Area Reserve.
3. Development and maintenance of the existing trail system and the development of a limited network of new trails to achieve access, minimize trampling damage and insure safety of users
4. Maintenance and improvement of existing roads to facilitate access and diminish ecological damage from roads in poor condition.

V. CONSULTATION.

A. *In General.* Owing to the many values and benefits that arise from research, education, and demonstration on the Hawaii Tropical Forests and elsewhere, the Parties further agree they will consult and reach agreements with each other to coordinate research, management, and educational activities and to:

1. Jointly develop research and management plans for the Hawaii Experimental Tropical Forests and to update these plans at least every five years;
2. Consult and reach agreement prior to implementing any written policy or plan that may affect the management of or research within the Hawaii Experimental Tropical Forests;
3. Consult and reach agreement during planning for the development of facilities or any major ground disturbing activities;
4. Consult and reach agreement before any major ground disturbing activities that may affect the conduct of research or the biological integrity of the area such as logging, scarification, chemical applications, fencing, etc.

B. *External Consultation.* The Parties will consult with scientists, managers, general citizens, and local community members concerning ongoing research activities. Existing State sanctioned advisory councils may be utilized for this purpose.

VI. HAWAII EXPERIMENTAL TROPICAL FORESTS RESEARCH COMMITTEE.

A. There is hereby established a Hawaii Experimental Tropical Forests Research Committee ("Committee") which will be chaired by the Forest Service. The Committee will consist of one Federal representative and one State representative who will review and recommend for approval research, education, and demonstration activities on lands designated as the Hawaii Experimental Tropical Forests, and recommend such terms and conditions for the conduct of such research as the Committee deems in the public interest consistent with this Cooperative Agreement.

B. The Committee will establish its own procedures and guidelines consistent with this Cooperative Agreement, including the establishment of subcommittees which may be composed of staff or consultants to deal with specific proposals for the Pu'u Wa'awa'a and Laupāhoehoe Experimental Forest Units.

C. The Committee shall be comprised of persons familiar with the on-going management, research, and education activities on the Experimental Tropical Forests:

1. The Director of the Institute of Pacific Islands Forestry in Hilo, Hawaii, or such alternative Federal official as may be named by the Station Director of the Pacific Southwest Research Station, and
2. The Hawaii Island Branch Manager of the Division of Forestry and Wildlife, or such alternative as may be named by the Board of Land and Natural Resources.

D. Additional members of the Committee may be added by mutual agreement by way of an amendment to this Cooperative Agreement.

E. The Committee will act by unanimous agreement to recommend research activities, including any recommended terms and conditions set forth in writing in an agreement with each research proponent. Research and other activities will follow State guidelines and management plans specific for the land area designation and experimental forest where the research will be conducted.

F. The Committee will provide mechanisms for public information and oversight of research activities, and will provide such information to the Secretary of Agriculture for inclusion in the annual reports to Congress as required by section 607 of the International Forestry Cooperation Act of 1990, as amended by the Hawaii Tropical Forest Recovery Act of 1992. A copy of this annual report will also be sent to the Board of Land and Natural Resources and Natural Area Reserves Commission.

G. Committee members shall serve such renewable terms as determined at the pleasure of the Station Director of the Pacific Southwest Research Station and the Board, as the case may be.

VII. AUTHORIZATION OF RESEARCH ACTIVITIES.

A. The Parties agree that the procedures of the Committee in administering, reviewing, and approving research activities, and the State procedures for issuance of permits for State lands should be streamlined and, to the extent possible, consolidated.

B. For areas of the Hawaii Experimental Tropical Forests outside the Natural Area Reserves System (NARS), within 90 days of this agreement, the Board will delegate to its representative on the Committee the authority to approve and issue permits for the use of state lands for research activities approved by the Committee. It is recognized that this delegation will be subject to terms and conditions as the Board may prescribe, and is subject to modification or revocation at the sole discretion of the Board.

C. For areas of the Hawaii Experimental Tropical Forests inside the Natural Area Reserves System, the Parties agree to encourage the NARS Commission to adopt policies and procedures to meet the objectives of paragraph A. It is recognized that any delegation would be subject to terms and conditions as the Commission may prescribe, and is subject to modification or revocation at the sole discretion of the Commission. It is recognized that, as of the date of this Cooperative Agreement, the NARS Commission lacks legal authority to delegate permit approval authority.

D. Forest Service research activities which the State determines to be within the scope of the permit issued pursuant to Part III of this Cooperative Agreement may not require additional authorizations.

VIII. RESEARCH ON THE LAUPĀHOEHOE NATURAL AREA RESERVE.

A. The Laupāhoehoe Experimental Forest will be a site where long term research at the landscape or ahupua'a scale will be made possible. Within this ahupua'a will be a field station on State-leased agriculture lands, a Natural Area Reserve (NAR), and a Forest Reserve (FR).

B. In addition to the other requirements of this Cooperative Agreement, any research conducted on the Laupāhoehoe Natural Area Reserve shall be performed in a manner which is consistent with NARS management objectives, HRS § 195-1.

C. Prior to issuing a recommendation for approval of any proposed research on the Laupāhoehoe NAR, the Committee will consult with the Hawaii Island NARS Area Manager. The Area Manager will be consulted regularly on ongoing research activities to insure research activities remain consistent with NARS objectives and management actions.

IX. RESEARCH ON THE PU'U WA'AWA'A EXPERIMENTAL FOREST UNIT .

A. The Pu'u Wa'awa'a Experimental Forest Unit will be a site where long term research at the landscape or ahupua'a scale will be made possible.

B. In addition to the other requirements of this Cooperative Agreement, any research conducted on the Pu'u Wa'awa'a Experimental Forest Unit shall be performed in a manner which is consistent with or provides information that would improve the Pu'u Wa'awa'a management plan.

X. RESEARCH RESULTS.

A. Unless the Parties agree otherwise on any given project, the rights to publication, patent, or otherwise to any research results shall accrue to the respective party(s) conducting the research.

B. Each agency shall be acknowledged in publications and audiovisuals as a result of this Cooperative Agreement.

C. Within a reasonable period after completion of research or management activities, the Committee shall require that all information be included in an Experimental Forest data base.

D. Metadata including weather and streamflow data will be made available to the Parties as soon as is practically possible.

XI. MANAGEMENT ACTIVITIES ON HAWAII EXPERIMENTAL TROPICAL FORESTS.

A. *Occupancy and Use.* By this Cooperative Agreement and the permit referenced in Section III.A, persons employed by the Forest Service, are authorized general entry upon the Hawaii Experimental Tropical Forests for research, education, demonstration, and related purposes as set forth herein.

B. *Assignees, contractors and cooperators.* Either Party may authorize entry to the Hawaii Experimental Tropical Forests to assignees and contractors to carry out activities authorized under any permit or authorization, insofar as such entry and activities undertaken do not interfere with any ongoing or planned research or management activities. This Cooperative Agreement does not restrict the Forest Service or the Board from participating in similar research activities with other public or private agencies, organizations, and individuals.

C. *Public Access.*

1. If so authorized, public access will be regulated by the Board to accommodate, in a manner compatible with, ongoing research or management activities. The Board will appropriately manage public access so that threats to public safety are minimized.
2. The Board shall be primarily responsible to utilize its authorities under state law to enforce regulations and permit requirements.

D. *State Management.* The Board will be primarily responsible for normal land management functions including, but not limited to, control of public access, fire suppression, law enforcement, regulation of hunting and grazing activities, invasive species management, and

forest disease, insect, and ungulate control. The Parties will consult with each other and reach an agreement prior to implementing any activity which may impede ongoing management or research activities.

E. *Emergencies.* Nothing in this Cooperative Agreement shall be interpreted to impede the State's prerogatives in dealing with immediate emergencies such as fire or other immediate threats to human safety, which may be undertaken without prior consultation with the Forest Service or the Committee.

F. *Environmental Compliance.* The Committee shall assure that all research activities fully comply with the requirements of all applicable state and federal environmental laws and regulations.

G. *Maintenance of Improvements.* Unless the Parties agree otherwise on a case-by-case basis, the Forest Service will maintain the improvements on the land that are being used by the Forest Service or its assigns for research purposes. The Board will be responsible for maintenance of all other improvements.

XII. FUNDING.

A. *No Obligations of Funds.* This Cooperative Agreement is neither a fiscal nor a funds obligation document. Any endeavor involving reimbursement or contribution of funds, transfer of property, services or anything of value between the parties will be handled in accordance with applicable regulations, and procedures including those for Governmental procurement or printing. Such endeavors will be outlined in separate agreements that shall be made in writing by representatives of the parties and shall be independently authorized by appropriate statutory authority. Any contract or agreement for training or other services must fully comply with all applicable procurement procedures.

B. *Anti-deficiency.* All activities and operations of the Forest Service and the Board are subject to the availability of appropriated funds. Nothing in this Cooperative Agreement shall be interpreted as obligating unappropriated funds by either entity.

XIII. LIABILITIES.

The Parties agree that liability for any loss, damage, claim, demand, or action, caused by, arising out of or connected with the operations authorized by this Cooperative Agreement shall be governed by applicable state and federal law. For the Forest Service, tort claims will be governed by the provisions of the Federal Tort Claims Act (28 U.S.C. §§ 2671, *et seq.*).

XIV. TERM, EVALUATION AND MODIFICATION.

A. *Term.* This instrument is executed as of the last date shown below which shall be the commencement date. This instrument will remain in effect for Thirty Five (35) years after which it is renewable at the option of the Parties.

B. *Evaluation.* This Cooperative Agreement may be reviewed, evaluated, and updated at any time, but no later than ten (10) years from the commencement date.

C. *Modification.* This Cooperative Agreement may be modified at any time by mutual agreement of the Parties. Modifications shall be in writing executed by the authorized officer representing the Forest Service and the Board respectively. For purposes of this modification provision, such authorized officers are the Station Director of the Pacific Southwest Research Station, and the Board of Land and Natural Resources for all substantive changes and the Chairperson of the Board for nonsubstantive changes to facilitate processing such changes.

XV. DISPUTES.

A. *Laupāhoehoe Natural Area Reserve.* Disputes that cannot be resolved within the Committee concerning research permission on the NAR will be taken to the Natural Area Reserves System Commission for their recommendation to the Board of Land and Natural Resources.

B. *Other Disputes.* Any other dispute among the parties in implementation of the Permit or this Cooperative Agreement shall be elevated to the Station Director, Pacific Southwest Research Station, and the Board of Land and Natural Resources, State of Hawaii.

XVI. TERMINATION.

Either party, in writing, may terminate the instrument in whole, or in part, at any time before the date of expiration. Unless otherwise by mutual agreement, two years advance notice shall be provided prior to termination.

XVII. PRINCIPAL CONTACTS.

The principal contacts for administering this Cooperative Agreement are:

- A. *U.S. Department of Agriculture:*
Director, Institute of Pacific Islands Forestry
Pacific Southwest Research Station
Department of Agriculture, Forest Service

**Delegation of Selected Permitting Approval Authority for Research Activities
Undertaken on the Hawaii Experimental Tropical Forest**

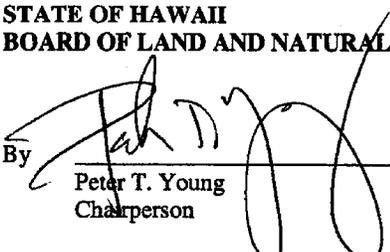
The authority to approve permits and permit terms and conditions for the following research activities conducted on the Hawaii Experimental Tropical Forest is hereby delegated to the Hawaii Island Branch Manager of the Division of Forestry and Wildlife when performing duties as authorized by the Cooperative Agreement for research between the State of Hawaii and the U.S. Forest Service. For purposes of this Exhibit A, "non-destructive" means an activity that does not destroy or harm the object of analysis.

1. Non-destructive inventory, measurements, censuses, and monitoring of trees, ferns, understory plants, birds, mammals, insects, and aquatic organisms where there is no harm to the organisms (includes both ground-based and remotely sensed measures).
2. Non-destructive inventory, measurements, and monitoring of the forest floor, dead and downed wood, and soils.
3. Non-destructive inventory, measurements, and monitoring of streams, ponds, and other aquatic ecosystems.
4. Nondestructive hydrological and geomorphic studies which do not involve the erection of structures or long term placement of equipment.
5. Research involving cutting and/or removal of exotic/nonnative vegetation that does not directly disrupt native forest species, forest composition, or forest structure (limited to test plots ≤ 10 acres in area).
6. Research on the use of pesticides/herbicides/prescribed fire/grazing animals to control invasive species (does not directly disrupt native forest species, composition, or structure, and limited to test plots ≤ 10 acres in area).
7. Erection of small protective fences and barriers ≤ 10 acre in area (and the removal of exotic species within such plots).
8. Construction of temporary blinds and field observation structures.
9. Soil and plant nutrient cycling research.
10. Biocontrol research to control invasive plants and animals - manipulate densities of state and federally permitted biocontrol agents through redistribution and experimental methods, including caging plants or parts of plants.

11. Sampling air and gasses (plant and soil respiration) within the experimental forest.
12. Placement of temporary electronic devices for environmental monitoring or sampling (for periods ≤ 36 months).
13. Introduction and use of Carbon, Oxygen, Nitrogen and other isotopes for research.
14. Non-destructive collection of plant material (excluding all listed T&E plants), soils, and water samples for laboratory analysis.
15. Collection of plant and insect samples that are from common, exotic, and abundant taxa for laboratory, greenhouse, or herbarium sampling (excluding all listed T&E species).
16. Maintenance of a trail system for access.

**STATE OF HAWAII
BOARD OF LAND AND NATURAL RESOURCES**

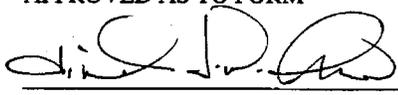
By


Peter T. Young
Chairperson

Date

Approved by the Board of Land and Natural Resources
at its meeting held on DEC 8 2006.

APPROVED AS TO FORM


Deputy Attorney General

Date: 12/8/06