

Forest

○ PACIFIC ISLANDS
○ MARCH 2022

2022 highlights



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2022 Summary

- Detection, monitoring, and management of **Coconut rhinoceros beetles (CRB)** (*Oryctes rhinoceros*) continues on Guam and Rota (CNMI).
- Work to eradicate **little fire ant (LFA)** (*Wasmannia auropunctata*) is occurring on American Samoa, Yap (FSM), and Guam.
- Monitoring, management, and eradication of **invasive plant species** specific to each island continue on Yap and Kosrae (FSM); Saipan, and Rota (CNMI); and Tutuila (American Samoa).
- “Brown Root Rot Disease caused by *Phellinus noxius* on U-S Affiliated Islands” was published as General Technical Report PNW-GTR-1006.
- Monitoring, management, and eradication of invasive plant species specific to each island continue on Saipan (CNMI) and American Samoa.
- A chapter titled “Rapid Ohi’a Death in Hawai’i” was published as Chapter 15 in *Forest Microbiology: Forest Tree Health* (Vol. 2). Elsevier Press.
- The University of Guam, Micronesia Conservation Trust, and the USDA Forest Service partnership to increase capacity of forestry professionals and programs in the Micronesian Islands expanded to include facilitation and coordination by Forest Solutions.
- Kylie Roy was recently hired to be the Pacific Islands forest Entomologist for Forest Health Protection (S&PF).

Forest Resources

The United States Affiliated Islands of the western Pacific span an area larger than the continental United States, with a total land mass of 965 square miles. The area includes the Territories of American Samoa and Guam, the states of Chuuk, Kosrae, Pohnpei, and Yap in the Federated States of Micronesia (FSM), the Republic of Palau, the Republic of the Marshall Islands (RMI), and the Commonwealth of the Northern Mariana Islands (CNMI). Approximately 325,000 acres are forested. Forests in the Pacific are host to a variety of insects and pathogens and are subject to natural and human-caused disturbances which adversely affect forest health. Forest health issues vary widely among islands, and most pest issues result from

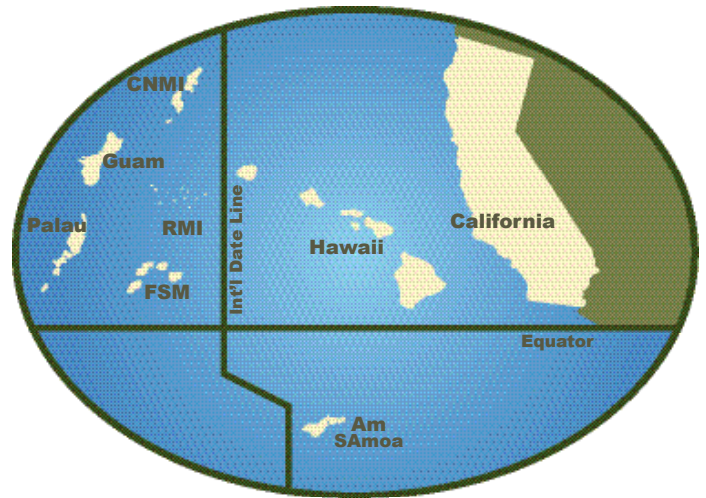


Figure 1. U.S. Forest Service, Region 5

introductions via multiple pathways due to the increase in travel and trade throughout the Pacific. Invasive plants remain one of the greatest forest health issues on the islands, most of which have active invasive plant survey and control programs. Invasive insect introductions are becoming more frequent, increasing the need for early detection and novel integrated pest management tools.

Insect Activity

Coconut rhinoceros beetle, *Oryctes rhinoceros* (CRB)

CNMI - Rota

An eradication program has been ongoing in Rota following the initial CRB detection near West Dock in 2017. The Cooperative Forest Health Program in CNMI continued to monitor coconut rhinoceros beetle (CRB) on the island of Rota where it has spread from Tweksberry Beach to nearby areas such as Talakhaya, Gagani, and Okgok, Guaaok. As in previous years, infested and dead coconut palms were cut and burned or sprayed with cypermethrin insecticide. Cut material and lures were also used to bait CRB traps. Treatments and trapping occurred on a weekly basis at Tweksberry and the new infestation sites in Gagani, Talakhaya, and Okgok, Guaaok.

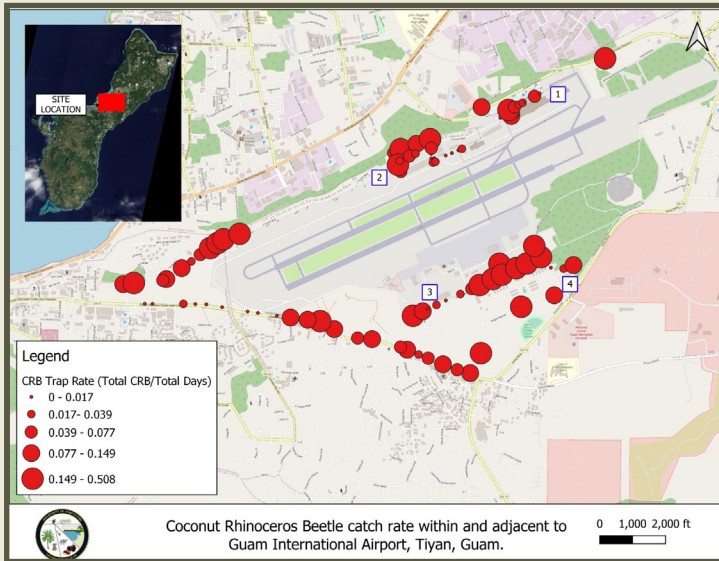


Figure 2. CRB panel trap placement (red circles) and rate of daily trap catch (represented by circle radius) around the Guam International Airport and surrounding areas. Map Credit: Glenn Dulla, University of Guam

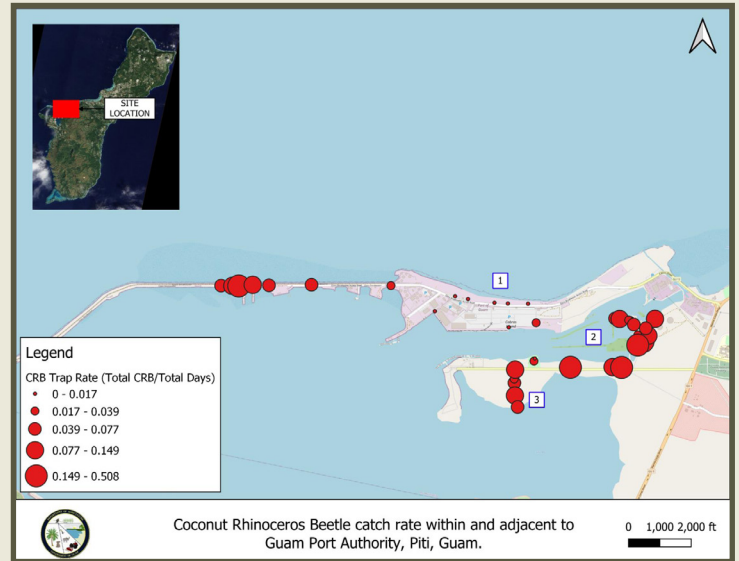


Figure 3. CRB panel trap placement (red circles) and rate of daily trap catch (represented by circle radius) around Port Authority properties. Map Credit: Glenn Dulla, University of Guam

Efforts to contain and mitigate the impacts of CRB on Rota continued to be collaborative. Forest health managers on CNMI continued to work closely with collaborators such as the Department of Land and Natural Resources Invasive Species coordinator and entomologists at the University of Guam (UoG) for training and biosecurity discussions.

Guam

Aubrey Moore, Assistant Professor of Entomology at UoG, continued working with partners to evaluate a method to locate CRB breeding sites by radio-tagging and releasing CRB adults and then tracking them using harmonic radar equipment. The harmonic radar equipment is a hand-held device designed for ground-based location of tags. However, harmonic radar transceivers mounted on drones performed well in preliminary tests. Additionally, field releases of tagged-CRB occurred this year over a two-week period.

In 2021, Guam’s Department of Agriculture received a USDA Forest Service and National Association of State Foresters, State Urban Forest Resilience (SUFRR) grant. Objectives included 1) maintaining CRB panel traps and palm damage surveys around ports of entry on non-federal public lands, 2) conducting baited ant surveys around ports of entry, 3) conducting visual surveys and trapping of forest pests present in high-risk areas, and 4) replanting native trees at airport, seaport, and surrounding parks where dead and dying palms serving as active or potential breeding sites were removed. USDA Forest Service funds were supplemented by additional biosecurity personnel and support from the Guam Invasive Species Council and the Forestry and Soil Resources Division (FSRD).

In 2022, CRB trapping occurred at the Guam International Airport Authority (GIAA) (Figure 2) and the Port of Authority of Guam (PAG) properties (Figure 3). Panel traps caught over 3,000 CRB adults at GIAA and over 700 CRB adults at PAG properties. As in 2021, both the daily trap catch rate and total CRB adults trapped are progressively increasing.

Coconut palm damage assessments were conducted by classifying tree crowns into 5 damage categories with a numerical value; 0=no damage, 1=50% frond damage, 4=>95% frond damage to dead. The amount of crown damage seems to occur in a seasonal pattern, but the cause of this is not yet understood.



Figure 4. Proposed diagram of tree planting at Port Authority Beach Park. Map Credit: PJ San Nicolas, DOAG-FSRD



Figure 5. Head of a coconut rhinoceros beetle. Photo Credit: Mike Boehne, USDA Forest Service

Replanting of native trees at the sites most severely impacted by CRB continued this year during the rainy season. To ensure survivability of planted trees, new trees were to be placed in regularly landscaped areas. This left few options as maintained areas were largely populated with mature trees. In July, trees were planted around the Port Authority Main Facility (three trees) and at a planting event at Port Authority Beach Park. During the planting event, 89 native and fruit trees were proposed (Figure 4) to be planted utilizing the 50 Department of Youth Affairs summer youth interns assigned to Department of Agriculture. Heavy rains and flooding postponed the event but plans to reschedule are ongoing.

At the GIAA, large concrete planter boxes will be redesigned and planted. All non-native and invasive species will be replaced with native plants. Planters will center around Chiute (*Cerbera dilatata*), a small to medium sized tree, surrounded by gausali (*Bikkia tetrandia*), a medium sized bush producing white trumpet-shaped flowers. Agatelang (*Eugenia palumbus*), a small to medium bush that produces small white flowers leading to orange-red fruit, will also be planted. Plants will be sourced from the FSRD native plant nursery and Agricultural Development Services nursery.

A [Forest Insect and Disease Leaflet](#) providing information about coconut rhinoceros beetle is currently under development and should be available in the near future.

Little Fire Ant (LFA), *Wasmannia auropunctata*

Guam

Little fire ant was detected in November 2011 at a green waste repository in Yigo, a northern village of Guam. Since then, LFA has been recorded at over 35 widely dispersed sites throughout Guam. Previous LFA infestations in the Pacific Basin include those of the five major islands of Hawaii, New Caledonia, French Polynesia, and Northern Queensland, Australia.

As previously reported, a 70-acre area within the Cotal Conservation Forest (CCF) in Santa Rita was infested with LFA, prompting management action (Figure 6). This forest is managed by the Forestry and Soil Resources Division (FSRD) of Guam Department of Agriculture. USDA Forest Service funded a project to eradicate LFA from the CCF and establish and maintain a perimeter/buffer zone to prevent further infestation from surrounding areas.

Guam Department of Agriculture used treatment techniques developed by the University of Hawaii-Hilo Ant Lab and adapted them for aerial drone use. Drones allowed for faster and safer treatment of technically challenging areas such as the forest canopy, dense jungle, or other inaccessible terrain. Both manual and drone treatments resulted in the successful eradication of LFA from the CCF by July of 2022 (Figure 7).

Continued maintenance of the LFA-free zone in the CCF will be done by the Biosecurity Division of Guam Department of Agriculture. Bi-annual monitoring will occur, and spot treatments of infestations will continue as needed.

Coordinated LFA management of surrounding residential areas is crucial to the continued success of the eradication project within the CCF. Although regularly scheduled preventative treatments of the CCF lands bordering residential areas will cease, efforts were made to assist local communities with managing LFA. Education and outreach occurred this year within the neighboring communities, including door-to-door outreach and assistance.

Guam's Department of Agriculture continued to survey for invasive ants at Guam International Airport Au-

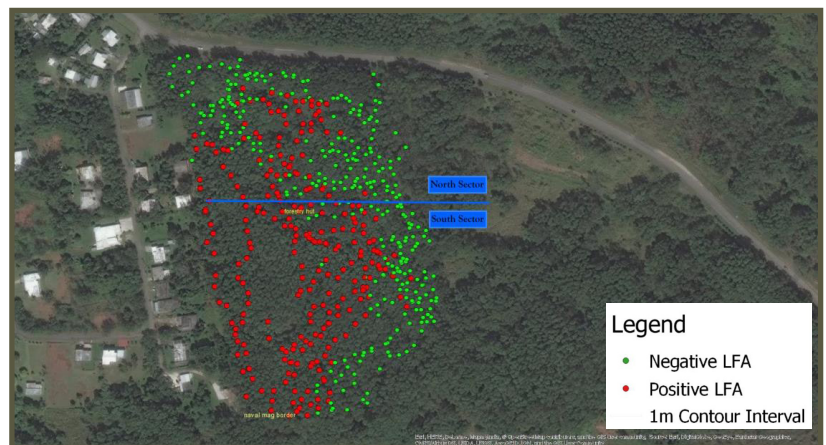


Figure 6. Delineation survey map depicting the presence of little fire ant (red dots) within the Cotal Conservation Forest in June 2018. Negative points are shown in green. The blue line delineates the North Sector from the South Sector. Data was collected by the University of Guam. Map Credit: Glenn Dulla, University of Guam

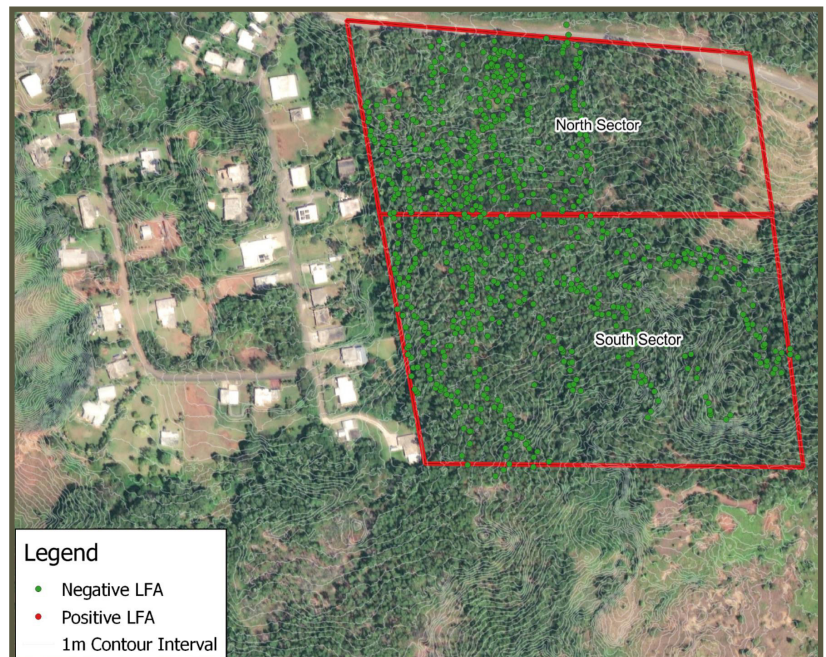


Figure 7. Final delineation survey map indicating eradication of little fire ant (no red dots indicating positive LFA identification) within the Cotal Conservation Forest in July 2022. Negative points are shown in green. Map Credit: Glenn Dulla, University of Guam

thority and the Port Authority of Guam under the previously mentioned SUFR project. Biannual surveys of ants were completed using sugar and protein baits. This year, 870 individual ants were collected and identified. *Anoplolepis gracillipes* (yellow crazy ant), *Pheidole megacephala* (coastal brown ant), and *Wasmannia auropunctata* (LFA) are three ant species noted on the IUCN list for top 100 Worst Invasive Alien Species in the World. One or more of these three ant species were identified in all properties surveyed. Survey areas are anticipated to expand once access is secured.

Little fire ant monitoring efforts on Guam are tracked within an [interactive map](#).

American Samoa

Since LFA's first detection in American Samoa in 2018, the American Samoa Community College Division of Agriculture, Community, and Natural Resources (ASCC ACNR) has worked to detect, map, and control infestations of LFA. Initially, six infested residential sites were identified, but with successful treatment LFA were no longer being detected by mid-2021. Since then, additional infestations have been detected. It is suspected that all but one of these new detections were caused by ants hitchhiking on plant material from the six original infestations prior to treatment. Several of the newly detected infestations are in closed-canopy forests and through steep, uneven terrain. ASCC ACNR is in the process of acquiring the necessary equipment to work in these areas and training pilots to conduct applications using unmanned aerial platforms. ASCC ACNR is also consulting with the American Samoa Environmental Protection Agency to ensure that any future aerial applications are lawful and not hazardous to human health or the environment.

In 2022, ASCC ACNR conducted seven LFA detection surveys across Tutuila Island, and LFA were detected at two of these sites. A delimitation survey has been completed at one of them, and with the addition of this site, known active LFA infestations to be treated on Tutuila Island now total 42 acres in portions of at least seven villages. The delimitation survey is continuing on the second of the two newly detected infestations, and arrangements are being made with families and village leadership in the infested areas to begin the treatment program.

Yap - FSM

Eradication efforts for LFA have been ongoing in Yap since 2018. LFA traps were set at ports of entry and infested sites were treated with insecticides monthly. An education and outreach campaign to engage local communities in reporting LFA resulted in successful location of five new LFA-infested sites over three municipalities. The USDA Forest Service continues to provide funds to combat these infestations.

Invasive Plants

American Samoa

American Samoa continued work on invasive plants in 2022 by using Cooperative Forest Health grants and Bipartisan Infrastructure Law grants to accomplish goals relating to their Forest Action Plan. The Forestry Program, together with its student and adult interns, have been successfully controlling invasive trees (Tamaligi (*Falcataria moluccana*), Pulumamoe (*Castilla elastica*) and African tulip (*Spathodea campanulate*)) through the use of Garlon® 4 Ultra and Milestone® herbicides. The Forestry Program continued to control Pulumamoe in the Maloata project site, treating over 1,000 seedlings, saplings, and trees in 2022. The Forestry Program also located and treated more Tamaligi saplings and trees growing wild up in the northern areas of Maloata, Faga'alu, Malaeloa, and Aua, and treated almost 200 African tulip saplings and trees.

CNMI - Saipan

Velvet bean (*Mucuna pruriens*) is an invasive annual vine native to Africa and tropical Asia. It poses a high risk to native environments as it easily overgrows shrubs and small trees, and the seed is readily dispersed by birds. CNMI Forestry staff first discovered it in Marpi about 20 years ago. It has since spread throughout the northern portion of Saipan, where the vines are choking out native vegetation and impeding fire-fighting efforts. Hairs on the seed pods and spicules on the calyxes cause severe itching when touched. During 2022, surveys, chemical treatment, and monitoring (i.e. triclopyr ester, glyphosate) continued for *M. pruriens* on the north and south side of Saipan.



Figure 8. Forestry Program staff member Pasia Setu hiking the islands steep slopes to control the *Falcataria moluccana* (Tamaligi) trees.
Photo Credit: DJ Sene, American Samoa Community College

A 100 page book titled “Brown Root Rot Disease caused by *Phellinus noxius* on U-S Affiliated Islands” was written by Phil Cannon, Ned Klopfenstein, Mee-Sook Kim, Jane Stewart, and Chia-Lin Chung and published as General Technical Report PNW-GTR-1006. This book explains 1) how to recognize *Phellinus noxius*, 2) how this fungus is so effective at killing many species of trees in the western Pacific, and 3) which techniques can be used to effectively control this fungus. It has been widely distributed in the Pacific Region.

Considerable progress was made towards understanding and dealing with Rapid Ohia Death which has killed an estimated 1,000,000 ohia (*Metrosideros polymorpha*) trees in Hawai'i. This disease is caused by the fungi *Ceratocystis lukuohia* and *Ceratocystis huliohia*. More than 40 scientists and 15 field technicians have been working on this issue for more than 5 years. In 2022, a chapter titled “Rapid Ohia Death in Hawai'i” was written by 18 of these scientists and published as Chapter 15 in *Forest Microbiology: Forest Tree Health* (Vol. 2). Elsevier Press.

Capacity Building

All 2020-2030 updates of Forest Action Plans for the islands highlighted capacity as a gap in their forestry programs. To begin addressing this gap, the University of Guam, Micronesia Conservation Trust and the USDA Forest Service initiated a partnership in 2021 to increase capacity for forestry professionals and programs in the Micronesian Islands. While this effort initially aimed to develop a forestry-focused curriculum at UoG, the objectives are now to first develop a conceptual framework and best practices to promote workforce development in the Pacific Island Region in forest conservation and related topics. Then, using the Developing a Curriculum (DACUM) approach, curriculum and needs (additional instructors, facilities, student needs) associated with implementing the program will be identified. These needs and curriculum may or may not all be at the college level. This year, Forest Solutions became involved in this project under subcontract to UOG to assess current capacity for building a workforce and facilitate curriculum development.

Kylle Roy joined FHP as a service area entomologist for Hawai'i and the Pacific Islands, and is stationed at PSW's Institute of Pacific Islands Forestry (IPIF) in Hilo, Hawai'i. Kylle is from Honolulu, Hawai'i and has lived in Hilo for ten years. She has a masters in Tropical Conservation Biology and Environmental Science from the University of Hawai'i at Hilo and is a PhD candidate at Purdue University Department of Forestry and Natural Resources. Her expertise is in beetles, especially ambrosia beetles associated with Rapid 'Ōhi'a Death. Kylle enjoys spending her free time with her husband and dogs hiking or at the beach. She welcomed her first child in February.



Figure 9. Kylle Roy, USDA Forest Service Entomologist for Hawai'i and the Pacific Islands. Contact: kylle.roy@usda.gov

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Data Sources

The data sources used for this report include data gathered by US Forest Service, Pacific Southwest Region, Forest Health Protection staff, the Territorial Foresters of the US-affiliated islands (funded in part by Forest Service's Forest Health Programs), the University of Guam, and American Samoa Community College.

The USDA Forest Service's Forest Health Aerial Survey Program is not currently active on the Islands covered in this report.

For more information visit:

USDA Forest Service, Pacific Southwest Region - www.fs.usda.gov/main/r5/forest-grasslandhealth

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