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# Forest Health 2019 highlights



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## 2019 Summary

- **Coconut rhinoceros beetles (CRB)** (*Oryctes rhinoceros*) continue to threaten coconut palms on Rota (CNMI) and Guam.
- Work to combat **little fire ant (LFA)** (*Wasmannia auropunctata*) is occurring on American Samoa, Yap (FSM), and Guam.
- A new pest - **Gulf fritillary butterfly (*Agraulis vanillae*)** – was detected on Guam.
- ***Phellinus noxius*** is present on all of the US-affiliated Pacific Island groups. Control measures are being evaluated.
- On Guam, the bacteria *Ralstonia solanacearum* and the fungus *Ganoderma australe* were named as the major causes of widespread **Casuarina dieback**.
- US Department of the Interior and US Forest Service are funding invasive plant work to remove large populations of African tulip and Panama rubber trees on American Samoa.
- Yap's Division of Agriculture & Forestry completed a significant amount of eradication of Imperata grass and Chain-of-love.
- Two-day workshops about coconut rhinoceros beetle and little fire ant are being planned for spring, summer, and fall 2020.

## Forest Resources

The US-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 Bikini Island, the states of Chuuk, Kosrae, Pohnpei, and Yap in the Federated States of Micronesia (FSM), the Republic of Palau and 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 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.

## Coconut rhinoceros beetle (CRB)

### Guam

The US Forest Service cooperated with the National Park Service (NPS) to manage **coconut rhinoceros beetle (CRB)** at a NPS-administered site on Guam during 2019. Asan Beach is a unit of War in the Pacific National Historical Park administered by the National Park Service and attracts large numbers of visitors to the historically and culturally important coconut grove (figure 2; stand of coco trees). The attractive palms, historically, memorialize the site where hundreds of US Marines died establishing a beach head during the liberation of Guam in WWII. Culturally, these multi-purpose trees are the most important plants used by Guam's native Chamorro population. The coconut palm (*Cocos nucifera*), or *trongkon niyok* in the Chamorro language, has two form types on Guam: 'tall' and 'dwarf'. The coconut grove at Asan is made up of 'tall' trees, the type associated with traditional island culture.

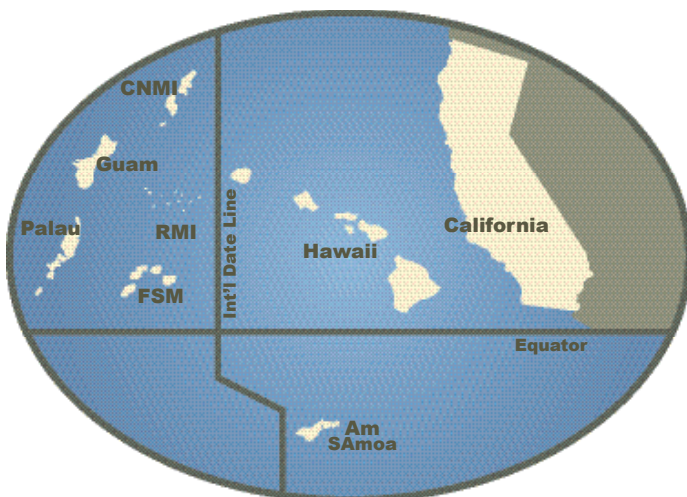


Figure 1. U.S. Forest Service, Region 5



The coconut rhinoceros beetle was first detected on Guam in 2007 (NPS, 2014). It is an invasive species that multiplies quickly and has no known natural enemies. It has rapidly spread around the island, including Asan Beach, where it has damaged or destroyed an ever increasing number of trees. Without control measures, the coconut grove at Asan Beach is unlikely to survive into the future. At present there are few control measures for CRB on Guam. The best hope for long term control is the identification



Figure 2. Coconut grove at Asan Beach, Guam, a popular visitor attraction with cultural and historical significance. Photo credit: Robert Bevacqua, University of Guam



Figure 3. Coconut palm at the War in the Pacific Asan Beach Unit with netting (tekken) wrapped around the base to catch coconut rhinoceros beetles. Photo Credit: Robert Bevacqua, University of Guam

of a virus or fungus disease that can be used as a biological control agent. Until a biological control agent is found, several survey and management techniques are being used on Guam and on other islands including 1) detection trapping, 2) preventing the buildup of green waste that is conducive to CRB development, 3) destruction of green waste material resulting from storm damage or tree maintenance, 4) using netting to prevent adult CRB from using green waste piles as breeding sites and 5) wrapping of palm trunks with netting to entangle adult beetles. These techniques do not provide absolute CRB control, but they can lower CRB populations.

The netting is typically used in fishing. Popularly known by the Chamorro name, *tekken*, the netting is made of monofilament fiber and is used to capture fish by their gills. The netting is loosely tied on the palms as a belt or band at breast height (Figure 3: coco palm trunk with tekken netting). Though CRB is capable of flying directly to the canopy to feed, entomologists have observed adults flying to the base of the tree and walking up the trunk and becoming entangled in the netting.

Guam Department of Agriculture, Biosecurity Division is also removing standing dead palms and other CRB breeding sites around the ports of entry on Guam.

### Commonwealth of the Northern Mariana Islands

A few scattered larvae resembling CRB were first discovered by the Marianas Visitors Authority field maintenance crew while clearing a fallen coconut tree at the Twerksberry Beach Coconut Grove, a popular tourist attraction adjacent to the west harbor and marina on the island of Rota, Commonwealth of the Northern Mariana Islands, on the 5th of October 2017.

The crew supervisor immediately reported the beetle larvae detection to the Division of Agriculture Quarantine Service. That same day a quarantine officer along with the Resident Department Head



Figure 4. Destruction of coconut rhinoceros beetle host material on Rota, 2019. Photo Credit: James Manglona, CNMI Department of Lands and Natural Resources



Figure 5. Surveying for life stages of CRB on Rota, 2019. Photo Credit: James Manglona, CNMI Department of Lands and Natural Resources

for the Department of Lands & Natural Resources (DLNR) conducted an assessment. Alerts went out to federal (USDA-APHIS and Forest Service) and local/regional partners (Mayor of Rota, Secretary-Department of Natural Resources-Saipan, Director of Agriculture-Saipan, Quarantine & Forestry Services-Saipan, Northern Marianas College-Cooperative Research, Extension & Education Service-Saipan and the University of Guam-College of Natural and Applied Science) of the CRB find. The area was immediately closed off to guided tours, public recreation, and harvesting of coconut tree materials. Financial resources were diverted to conducting surveys to determine the extent of the infestation and to initiate sanitation work. Ten standing dead trees were removed on the first day, garnering the collection of 21 adult beetles (males and females), countless eggs and over 400 larvae. All of the specimens were sent to APHIS for official identification and CRB strain determination, which resulted in the subsequent determination that the CRBs found on Rota were the same aggressive CRB-G strain originally discovered on Guam.

Because of the severity and destructiveness of this pest, the Government of the CNMI continues to receive funding from the U.S. Department of Interior, Office of Insular Affairs. They have also received tremendous support – training, supplies & materials, etc. – from partner agencies, including the US Forest Service. Our ultimate hope is that it will not spread beyond its original detection location or, worse yet, to other neighboring islands.

### **Little fire ant (LFA)**

#### Guam

The **little fire ant (LFA)**, *Wasmannia auropunctata*, was detected on Guam in late 2011 by staff of the Guam Coconut Rhinoceros Beetle Eradication Project as they were being bitten by the ants while unloading plant material at the dump. Management of and surveying for LFA on Guam are being supported by the US Forest Service and local funding. LFA is considered among the top 100 most serious invasive insect pests in the world. Previous LFA infestations in the Pacific Basin include those on the five major islands of Hawaii, New Caledonia, Northern Queensland, Australia, Yap (see below) in the Federated States of Micronesia (FSM) and American Samoa (see below). These LFA-infested regions all have air and sea connections to Micronesia, many of which pass through Guam. The devastating effects of LFA on agriculture and forest ecosystems observed in LFA-infested areas in Hawaii, Australia, and New Caledonia are being repeated on Guam and have the potential to occur on any other Micronesian island infested by LFA. LFA's spread to and throughout Guam is most likely due to human transport of infested plant material.

Since 2011 the University of Guam's Entomology Laboratory has identified more than 30 sites infested by LFA, ranging from small colonies in residential areas to entire watersheds covering hundreds of acres of forest and beachfront. Insecticide treatments continued in 2019 with infested sites being treated with a water-resistant granular formulation of Siesta®, followed a week later by Tango® applied to the upper boles of trees within a gel matrix. A week following the granular applications another detailed delimiting survey is performed. This sequence is repeated every six weeks at each site for at least eight treatment cycles and is supported with funding from the US Forest Service.

Funding is also being provided by the U.S. Department of the Interior, Office of Insular Affairs to eradicate the little fire ant infestation in the 502-acre Cotal Conservation Area in the Santa Rita area of Guam which borders residential areas and military land. Nearly 70 acres are infested with LFA in the Conservation Area. Guam Department of Agriculture, Biosecurity Division, is implementing the project. The Biosecurity Division also has set up a LFA website for the public and others to obtain additional information and report new infestations (<https://stoplfa.guam.gov/>).

#### Yap, Federated States of Micronesia

Since the detection of LFA on Yap in late August 2017, eradication efforts have been ongoing. In addition, public outreach and education by local officials has engaged local communities in helping to detect additional infested locations. The US Forest Service continues to provide funds to combat the infestations.

#### American Samoa

The little fire ant was first detected on American Samoa in October 2018 in the village of Tefata, a residential area in the western part of Tutuila Island. LFA had likely been there for quite a while based on the density and extent of the infestation. Through extensive outreach and education to communities after the initial LFA detection, local officials received 55 calls from residents requesting detection surveys for suspected infestations. From among these 55 sites – and additional sites – investigated based on initial information, an additional six LFA infested sites were identified. These additional infestations were very small, ranging from a single small nest up to infestations about ~1 acre in size. The U.S. Forest Service continues to provide funds to combat the infestations. Infestations require about a 1-year program of multiple treatments. Experts from the Hawaii Ant Lab have also provided much-appreciated assistance. Also, with the assistance of a GIS specialist from American Samoa Community College, Forestry staff obtained aerial imagery to assist with delimiting the LFA infestation in Aloaou (16 acres) and Mapusaga (24 acres).



## Lobat lac scale

**Lobat lac scale** (*Paratachardina pseudolobata*), a pest of woody trees, was found in 2018 on hibiscus and joga trees at the University of Guam's Yigo Experiment Station and has continued to spread. Based on information provided by staff from Guam's Department of Agriculture, Biosecurity Division, the scale has spread throughout most of the island including onto young acacia trees in the Cotal Conservation Area.

## New insect detections

The Guam Department of Agriculture, Biosecurity Division confirmed that Gulf fritillary butterfly (*Agraulis vanillae*) is now present on Guam. In Florida, females lay small yellow eggs singly on or near leaves, stems or tendrils of purple passionflower (*Passiflora incarnata* L.), corksystem passionflower (*Passiflora suberosa* L.), yellow passionflower (*Passiflora lutea* L.) and several other passionflower vines. Some species of passionflower occur on Guam but it is unknown at this time what species this butterfly is using as hosts.

## Local Capacity Building

### Land Manager Workshops for Management of Coconut Rhinoceros Beetle and Little Fire Ant

At a regional invasive species council working meeting held in May, 2019 on Guam, forest health managers and administrators from Guam, the Marshall Islands, Yap, Kosrae, Palau, and Pohnpei discussed holding a CRB/LFA workshop. A separate meeting was also held with Marianas Conservation Trust personnel in February and in CNMI in May with personnel from the Department of Forestry. In these various meetings, Dr. Ross Miller, University of Guam, explained the need for and plans to hold a series of two-day workshops on each of the islands during the spring, summer, and fall of 2020. US Forest Service is providing the funding to support these upcoming workshops.

### PIFC Conference

Eighty foresters from across the Pacific met for the three-day Pacific Island Forestry Conference at the University of Hawaii (Manoa Campus), where they learned from leading experts about 12 of the most pressing forest health problems.

# Disease Activity

## *Phellinus noxius*

All of the US Affiliated Island groups in the Western Pacific have infection centers of *Phellinus noxius*, an exceptionally aggressive root rot. Surveys, collection of samples of this fungus, and molecular genetics techniques have shown that the disease can spread quickly by a number of means (e.g., root to root, by spores colonizing wounds, and by movement of infected seedlings) and can kill over 400 tree species, so there is interest in controlling the disease on these islands; however, the effectiveness of these methods has been insufficient or difficult to assess. A trip was made to Taiwan to learn from scientists there about what they know about *P. noxius* and the methods they have been using to cope with this disease since it was discovered there about 40 years ago.



Figure 7. A *Serriathes* spp. tree being attacked by *P. noxius* in Saipan. The black sock-like structure climbing up the base of this tree is mycelium of the root- and butt-rotting fungus *Phellinus noxius*.

Photo Credit: Phil Cannon, USFS

### Casuarina dieback

In Guam, the bacteria *Ralstonia solanacearum* and the fungus *Ganoderma australe* were named as the major causes of widespread *Casuarina equisetifolia* dieback.

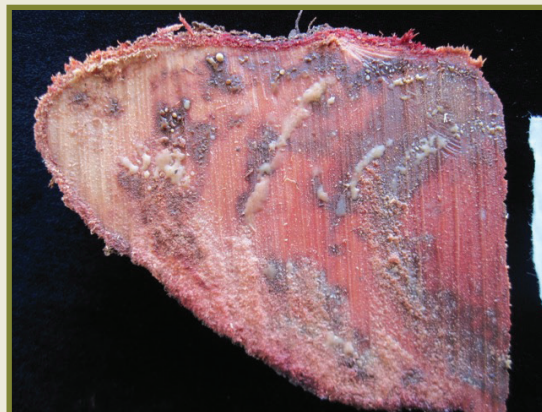


Figure 8. Bacterial ooze caused by *Ralstonia solanacearum*, seen here in the cross-section of a *Casuarina equisetifolia* tree on Guam that had been killed by this pathogen. Photo Credit: Robert Schlub

## Invasive Plants

### American Samoa

The U.S. Department of the Interior, Office of Insular Affairs and US Forest Service are providing funding for invasive plant work to American Samoa to remove large populations of African tulip and Panama rubber tree, both widely recognized as destructive invasive tree species in the Pacific islands. Several large populations of these aggressive tree species were recently discovered in the western and central areas of Tutuila adjacent to the National Park, home to the only paleotropical rainforest in the United States park system. On the northwestern corner of Tutuila Island, both African tulip and Panama rubber tree have already become established in the village of Maloata. Combined, both species infest over 50 acres within this watershed. In an effort to control the spread of these populations to surrounding areas/villages, forestry staff continued to monitor and control Panama rubber tree within 40 infested acres and African tulip within 10 infested acres, as well as conducting surveys in surrounding areas. In addition, the ASCC-ACNR Forest Health Program is utilizing a multi-rotor UAV with multi-spectral sensors to map the location of Panama rubber tree over 20 acres in the Maloata village.

### Federated States of Micronesia (FSM)

#### Pohnpei

Federated States of Micronesia, Pohnpei, Micronesian Conservation Trust, received funding from the U.S. Department of the Interior, Office of Insular Affairs to enhance ecosystems and food security in Pohnpei through the prevention, eradication, control, and management of several invasive plant species prevalent in Pohnpei: false sakau (*Piper auritum*), the chain of love (*Antigonon leptopus*), the scarlet ivy gourd (*Coccinia grandis*), the octopus tree (*Schefflera actinophylla*), the bengal trumpet vine (*Thunbergia grandiflora*), and the Honolulu rose (*Clerodendrum chinense*). The proposed funding will help achieve prioritized actions identified by the Invasive Species Taskforce of the Pohnpei Strategic Action Plan (2018-2022) and the FSM and State's Biodiversity and Strategic Action Plans (2019–2023).

#### Yap

The island of Yap's Division of Agriculture & Forestry's invasive terrestrial program completed 90% eradication on 60 acres for Imperata grass (*Imperata cylindrical*) and completed eradication of Chain-of-love (*Antigonon leptopus*) on 4 acres. Periodic monitoring efforts of these sites will still be needed to ensure that restoration efforts are successful and weed eradication was effective. They also completed a rapid survey for *Lantana* spp. to gauge how widespread it is on the island, with plans to initiate control and eradication efforts next year.

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## Additional Information

### 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](http://www.fs.usda.gov/main/r5/forest-grasslandhealth)

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