

# Forest Health

## 2023 highlights

○ PACIFIC ISLANDS  
○ MARCH 2024

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### 2023 Summary

- The **coconut rhinoceros beetles (CRB)** (*Oryctes rhinoceros*) was recorded for the first time in the Republic of the Marshall Islands (RMI) on Majuro Atoll. A national state of emergency was declared to manage the new infestation.
- Detection, monitoring and management of CRB continues on Guam and Rota (Commonwealth of the Northern Mariana Islands, CNMI).
- **Little fire ant (LFA)** (*Wasmannia auropunctata*) management and monitoring continues on American Samoa, Federated States of Micronesia (Yap), and Guam.
- Citrus trees in RMI have been negatively impacted by an unidentified species of whitefly for several years. This year, that pest was identified as the **citrus blackfly**, *Aleurocanthus woglumi*, an insect that may impact urban and agro-forestry significant plants.
- Monitoring, management, and eradication of **invasive plant species** specific to each island continue on Yap and Federated States of Micronesia (Kosrae); CNMI (Saipan and Rota); and American Samoa (Tutuila).
- The USDA Forest Service awarded two Bipartisan Infrastructure Law, Invasive Species competitive grants in the United States Affiliated Islands of the western Pacific. Those grants will help to hire a project coordinator to support the Regional Invasive Species Council (RISC), an advisory body to the Micronesian Islands Forum (MIF), and to create a biosecurity framework for American Samoa.
- Kosrae Island Resource Management Authority (KIRMA) hired a new forest health specialist, Annie Esau.

### 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.

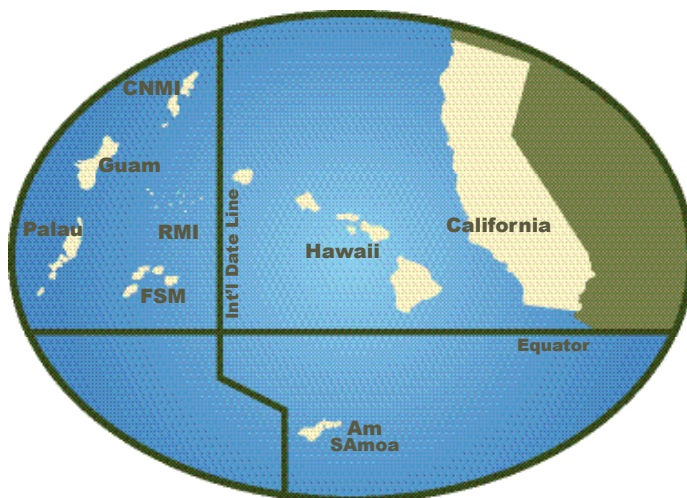


Figure 1. U.S. Forest Service, Region 5

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.

### Insect Activity

#### Coconut rhinoceros beetle (CRB), *Oryctes rhinoceros* Republic of the Marshall Islands (RMI)

The Republic of the Marshall Islands Ministry of Natural Resources and Commerce (MoNRC) detected coconut rhinoceros beetle (CRB) at the Amata Kabua International Airport (Majuro Atoll) on September 24, 2023. Subsequent ground surveys revealed infested



Figure 2. Coconut rhinoceros beetle trap hanging outside the baggage claim at the Amata Kabua International Airport, Majuro. Photo credit: Stacy Hishinuma, USDA Forest Service)

coconut palm trees in the neighboring town of Ajeltake and a national State of Emergency was declared on October 2, 2023. The MoNRC and other government entities worked together to carry out the protocols described in their CRB emergency response plan. More monitoring traps were deployed and ground surveys continued in Majuro and began in neighboring atolls.

CRB experts from across the Pacific Islands convened to provide support for RMI.

#### Federated States of Micronesia

The Yap Division of Agriculture and Forestry continued their monitoring and surveillance program for CRB. Coconut rhinoceros beetle traps were set up at airports, seaports, post offices, and community centers, covering an area of 2,963 acres. Forestry staff also conducted ground surveys of coconut palms on a regular basis, covering 2,563 acres. No CRB were detected.

On Kosrae, CRB trapping occurred at ports of entry including the airport, Okat and Lelu harbors. Fifty-eight acres were monitored for signs of CRB infestation through ground surveys. No CRB infestations or signs of feeding were observed.

#### Commonwealth of the Northern Mariana Islands (CNMI)

The CRB infestation on the island of Rota has expanded from the initial site at Tweksberry Beach near Prudencio T. Manglona Island Park east across the Sasahaya Bay to Gagani, Talakhay and Okgok, Guaaok. Typhoon activity is the likely cause of the spread.

CRB management continued on Rota as a collaborative effort led by the Department of Lands and Natural Resources' (DLNR) Invasive Species Coordinators (ISC) Frank Aldan/Floyd Masga (acting) and Mark Manglona, the CRB field supervisor. Partners include the CNMI Division of Agriculture, Forest Health program (Michelle Sablan-Togawa), Mariana Islands Nature Alliance (MINA) (Becky Furey), and the University of Guam (UoG) (Ross Miller, Robert (Bob) Bevacqua and Roland Quitugua). Management of CRB on Rota involved sanitization of coconut palm waste (burning and piling for traps), baited trapping, pruning of palm trees, and treatment of trees using insecticides. The CRB field team continued to quickly identify dead and dying coconut palms for sanitization and used the green waste to create traps for adult beetles by covering the piles with tekken netting. Difficulties with equipment repair temporarily halted insecticide treatments and tree pruning.

Ross Miller (University of Guam) visited CNMI to help develop CRB workshops with the DLNR Forest Health Program, Northern Marianas College faculty and staff, CNMI customs, and others. The workshops focused on the biology, taxonomy, mitigation for, and trapping of CRB.



Figure 3. University of Guam and Republic of the Marshall Islands Quarantine and Forestry staff setting up a baited coconut rhinoceros beetle trap at the airport in Majuro. Photo credit: Stacy Hishinuma, USDA Forest Service



Figure 4. Tekken netting being secured to a wire fence to catch adult coconut rhinoceros beetles. Photo credit: Stacy Hishinuma, USDA Forest Service



Figure 5. Larval coconut rhinoceros beetle pulled from a standing dead coconut palm tree. Photo credit: Stacy Hishinuma, USDA Forest Service



Outreach materials on CRB were provided across CNMI for different target groups and educational programs occurred at the Bureau of Environmental and Coastal Quality Environmental Expo and at the Chalan Kanoa school.

The CNMI DLNR completed a Biosecurity Plan that addressed invasive species, including CRB.

## Guam

Aubrey Moore (University of Guam) continued to investigate *Oryctes rhinoceros nudivirus* (OrNV), a natural enemy and potential control for CRB populations. Nematodes associated with CRB were detected for the first time on Guam from the dorsal surface of the abdomen of a dead beetle. The nematode species and its potential as a biological control agent is unknown.

Monitoring for CRB damage using automated roadside image surveys in Guam continued. Roadside image surveys use smartphone-collected imagery taken from the outside of a vehicle to analyze and recognizes CRB damage on coconut palm fronds along roadsides using custom-designed artificial intelligence software.

## **Cycad Aulacaspis Scale (CAS), *Aulacaspis yatsumatsui***

Cycad aulacaspis scale (CAS) is an insect native to Southeast Asia that feeds on *Cycas* spp.. It is now widespread in Micronesia where it threatens the endemic Micronesian cycad (*Cycas micronesica*). A working group of >35 stakeholders met monthly to discuss CAS management in Micronesia.

CAS was found on Guam in 2003 and has caused substantial die-off of the Micronesian cycads (fadang) in Guam's forests. While some options for control of CAS exist for individual plants, biological control agents are needed for landscape-scale control of CAS and the survival of the Micronesian cycad. A USFS, Forest Health Protection, Biological Control of Invasive Forest Pests grant was awarded to US Fish and Wildlife Service this year to survey CAS and its natural enemies at Guam National Wildlife Refuge. Understanding the established natural enemy community on Guam is the first step in understanding what biological control agents are needed to protect *Cycas micronesica* and native forests throughout Micronesia.

## **Little Fire Ant (LFA), *Wasmannia auropunctata***

### Yap – Federated States of Micronesia

Little fire ant monitoring occurred at the seaport, airport, post office, Blue Lagoon store, and at a waste disposal site. No LFA was detected at those sites.

Management of LFA on Yap has been ongoing since its detection in late August 2017. Control efforts for LFA include using granular baits and insect growth regulator sprays. Infested sites were treated with insecticides monthly. With the help of local communities involved in an education and outreach campaign, eleven new LFA-infested sites were discovered in the Rull, Fanif, Gagil, and Tamil municipalities. A total 23 sites within 119.31 acres, spanning five municipalities are currently under LFA management. The USDA Forest Service continues to provide funds to combat these infestations.

Despite management efforts, LFA is slowly spreading through natural dispersal from infested areas and rapidly spreading through movement of infested plants.



Figure 6. Coconut palm trees at Twerksberry Beach park (Rota, CNMI). Piles of dead palm stems and fronds are covered with tekken netting to catch adult coconut rhinoceros beetles. Photo Credit: Stacy Hishinuma, USDA Forest Service



Figure 7. Micronesian cycad with infestation of cycad aulacaspis scale on Rota. Numerous white, scale covers are seen on the top of the leaves. Photo Credit: Stacy Hishinuma, USDA Forest Service



Figure 8. Little fire ant informational brochure developed for American Samoa Community College by the Western Forestry Leadership Coalition



### Little Fire Ant (LFA), continued

#### Commonwealth of the Northern Mariana Islands (CNMI)

Ross Miller (University of Guam) held a workshop in Saipan on the identification, biology, mitigation, and trapping of LFA alongside DLNR Forestry staff, Northern Marianas College faculty and staff, CNMI customs, and other agriculturalists.

#### American Samoa

Little fire ant was first detected in American Samoa in late 2018. The American Samoa Community College Division of Agriculture, Community and Natural Resources' (ASCC-ACNR) has worked to monitor, map and control LFA infestations. They continued to educate the public on the threat LFA pose to American Samoa's agriculture and environment and stressed the need to immediately report any suspected infestations. The ASCC-ACNR Forestry Program collaborated with the ASCC-ACNR entomologist and team to control LFA. The Communications Director for the Western Forestry Leadership Coalition, Sara Goodwin, worked closely with the ASCC ACNR Forestry Program, entomology team, and the ASCC-ACNR media specialist to develop LFA brochures and handouts.

#### Guam

Little fire ant infestations have spread on Guam in the wake of Typhoon Mawar (May 24th, 2023). The need for rapid green waste debris disposal after the typhoon complicated the management and delimitation of LFA. New recommendations for LFA buffer zones around green waste disposal sites and using pre-typhoon LFA infestations as criteria for movement of green waste are being considered.

## New Detection

### Citrus blackfly, *Aleurocanthus woglumi*

Citrus trees in the Republic of the Marshall Islands have suffered from heavy infestations of an unidentified whitefly for several years. This year, the insects were identified by the Hawai'i Department of Agriculture as the citrus blackfly. Citrus blackfly is native to Southeast Asia and has been introduced to many citrus-producing areas around the world, including Hawai'i. While this species has largely been considered a pest of citrus its host range includes over 300 plant species that include urban forest and agroforestry plants such as mango, avocado, coffee, pear, plum, pomegranate, and guava. Citrus blackfly has several natural enemies effective at controlling populations in Florida and Hawai'i.



Figure 9. Citrus blackfly eggs (yellow) and nymphs (black and white) on the underside of a citrus leaf in the Republic of the Marshall Islands. Photo credit: Stacy Hishinuma



Figure 10. Citrus blackfly infestation on the underside of a lime leaf in the Republic of the Marshall Islands. Tree also has secondary infestation of other scale insects and infection with sooty mold. Photo credit: Stacy Hishinuma

## Invasive Plants

### American Samoa

American Samoa continued work on invasive plants in 2023 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, has 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 and Nu'uuli project sites, treating over 300 seedlings, saplings, and trees in 2023. The Forestry Program also located and treated more Tamaligi and African Tulip saplings and trees growing wild in the northern areas of Maloata, A'asu, and Asili, totaling 40 Tamalgi and nearly 900 African Tulip saplings and seedlings.



Figure 11. American Samoa Community College (ASCC) Forestry Program and volunteers at the Fua Lautele invasive plant mitigation site. Photo credit: ASCC Media Team

Interns and volunteers from the American Samoa Forestry Program, along with local landowners and American Samoa National Park Service staff, were able to monitor, identify, and remove more than 17 acres of Fue Lautele (*Merramia peltate*) from five villages in 2023. The Forestry Program hosted an outreach and education presentation on the identification and management of invasive species at an Environmental Camp in Masefau, one of the most heavily Fue Lautele infested villages, initiating community engagement and connection to Fue Lautele control efforts.

### Yap – FSM

The Yap Invasive Species Taskforce (YIST) Terrestrial Invasive Species Eradication Program highlighted prioritization for the surveillance and management of Lantana (*Lantana camara*) and African tulip (*Spathodea campanulata*). Utilizing US Forest Service funding, YIST monitored a total of 16 Lantana infested sites in 2023, leading to the treatment and removal of 200 square feet of Lantana. Previously identified African tulip infested sites were visited and sprayed with Garlon® 4 Ultra, treating a total of 31 saplings and 14 mature trees.

### Kosrae – FSM

The Kosrae Island Resource Management Authority (KIRMA) Invasive Program continues monitoring and treatment efforts for *Clerodendrum quadriloculare* and *Leuceanea leucocephala*. A bidding announcement aired through public radio programs for the control of Clerodendrum resulted in 8 volunteer community groups monitoring total of 3,590 acres across 8 known infestation sites. During monitoring, KIRMA staff also surveyed for *Leuceanea leucocephala*, finding no new infestation sites.

In 2023, the KIRMA Forestry Program utilized Forest Health Invasive Species funding to increase capacity building and public awareness and outreach efforts. Partnering with Kosrae Conservation and Safety Organization (KCSO) and Pacific Resource for Education and Learning (PREL), a week-long Youth to Youth Awareness Program was established to highlight key environmental issues, including invasive species management and control, and provide field trips to protected areas to 7th grade students. The KIRMA Forestry Program has also welcomed a new Invasive Species Coordinator, who has started surveys on infested areas and promoting an awareness program on invasive protection and control.

### Saipan – CNMI

Since the discovery of velvet bean (*Mucuna pruriens*) in Marpi about 20 years ago, it has spread throughout the northern portion of Saipan, impacting native vegetation and impeding fire-fighting efforts. CNMI Forestry staff, in collaboration with Cooperative Forest Health Program and Invasive Species Team, continue efforts to spot spray known velvet bean infested areas with herbicides (triclopyr ester, glyphosate) and conduct surveys in the northern and southern parts of the island for new infestations. Inspections are currently being done in several sites in Tinian and Rota to monitor for new velvet bean spread.

## Vegetation Mapping in the U.S.-Affiliated Pacific Islands

The United States-affiliated islands and territories (Guam, the Commonwealth of the Northern Mariana Islands (CNMI), the Republic of Palau, American Samoa, the Federated States of Micronesia (FSM), and the Republic of the Marshall Islands (RMI)) are spread across a vast geographic area in the Pacific Ocean, and hold unique importance in the dynamic global ecosystem. The natural resources of these islands, including their native forests, are currently under significant pressure and heavy threat from local population growth, land use and landcover conversion, invasive species, and global climate change. The long-term goal of the Pacific Island Vegetation Mapping (PIVM) project is to provide environmental scientists and resource managers with up-to-date information on land cover and its change over time.

In the last few years, updated maps for Palau and FSM have been published. Updated maps include Babeldaob and Koror in Palau, and Pohnpei and Yap in FSM. Vegetation maps of Chuuk were recently [published](#); Kosrae will be published later in 2024. These will be followed by the Marshall Islands, American Samoa, Northern Marianas and Guam.

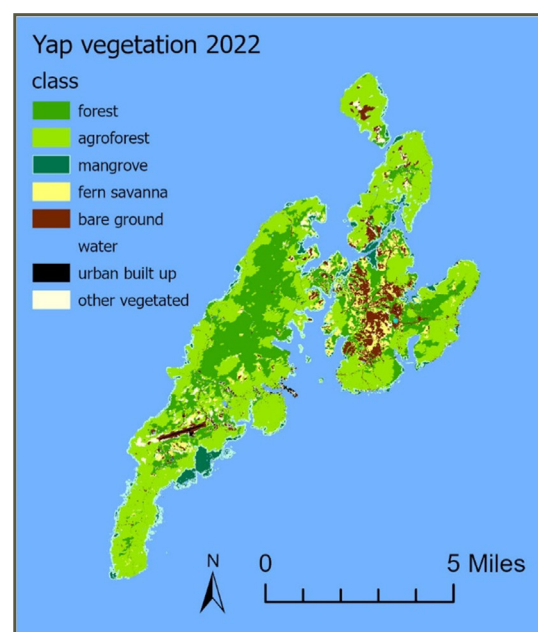


Figure 12. Micronesian Forester newsletter



Figure 13. Micronesian Forester newsletter

The State of Hawai'i Department of Land and Natural Resources received US Forest Service funding in 2023 through the Bipartisan Infrastructure Law, Invasive Species competitive grant program to provide technical assistance to American Samoa to help them create a biosecurity framework and an assessment for preventing and managing priority pests in the area, including little fire ant and coconut rhinoceros beetle.

Jonae Sayama (University of Guam) prepared the quarterly Micronesian Forester newsletter with forest health updates for state foresters and other forestry personnel in Micronesia. For content and contact with the editors, email [micronesian.forester@triton.uog.edu](mailto:micronesian.forester@triton.uog.edu).

Kosrae Island Resource Management Authority (KIRMA) hired a new forest health specialist, Annie Esau.

A Bipartisan Infrastructure Law, Invasive Species competitive grant was awarded to the University of Guam by the US Forest Service to hire a project coordinator to the support the Regional Invasive Species Council (RISC), an advisory body to the Micronesian Islands Forum (MIF). The coordinator will work with international and national partners to gather and disseminate information among the jurisdictions of Micronesia and help procure additional funding to "support invasive species work, write and implement strategic plans such as the Regional Biosecurity Plan for Micronesia, consult with high level Micronesian officials on best practices and best available knowledge and science" (Romina King, Roland Quitagua, UOG).



Figure 14. Kosrae Island Resource Management Authority (KIRMA) forest health program lead, Annie Esau. Photo credit: KIRMA

## 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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