

Overview of Invasive Species Issues on Guam

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<https://github.com/aubreymoore/PESC-OIA-overview/raw/main/guam-overview.pdf>

Hafa Adai



How bad is Guam's invasive species problem?

- Guam has 33 species listed in **100 of the World's Worst Invasive Species**
- Guam has 5 species listed in the **Top 10 World's Most Costly Invasive Species**.
- Guam's natural ecosystems, especially Guam's forests, are rapidly being destroyed by invasive species.

How bad is Guam's invasive species problem?

Dominant Trees in Guam's Forests are Threatened by Asian Cycad Scale (ACS) and Coconut Rhinoceros Beetle (CRB)

| Threat | Species | Status | Tree count ¹ | % of total tree count |
|--------|------------------------------|------------|-------------------------|-----------------------|
| ACS | <i>Cycas micronesica</i> | endemic | 1,571,556 | 16% |
| CRB | <i>Cocos nucifera</i> | native | 1,162,494 | 12% |
| CRB | <i>Heterospathe elata</i> | introduced | 1,075,552 | 11% |
| | <i>Vitex parviflora</i> | introduced | 902,990 | 9% |
| | <i>Leucaena leucocephala</i> | introduced | 890,217 | 9% |

Tree census data source: J. A. Donnegan et al. 2004. Guam's Forest Resources, 2002. Available from:

http://www.fs.fed.us/pnw/pubs/pnw_rb243.pdf

Priority Issue 1: Brown treesnake



Courtesy of USGS

Forest Birds before BTS



Forest Birds after BTS



Priority Issue 1: Brown treesnake - Impacts

- Following predation by BTS, Guam's forest bird species are either extinct or on the endangered species list.
- Forest health is severely impacted by the ecosystem services that these birds provided: seed dispersal, insect control, pollination, etc.
- Restoration of Guam's avifauna is unlikely without control of BTS populations.

Priority Issue 1: Brown treesnake - Current status

- Arrived in the late 1940s.
- Guam is the only place in the world where BTS has established as an invasive species
- Millions of dollars per year are spent on preventing BTS from leaving Guam.
- Some funds are being used for control methods development: snake-proof barriers and "pinkies on parachutes".
- Attempts at eradicating BTS from Cocos Island have not yet succeeded.

Priority Issue 2: Asian Cycad Scale



Priority Issue 2: Asian Cycad Scale



Priority Issue 2: Cycad aulacaspis scale - Impacts

- Cycad aulacaspis scale, and other invasive species, have killed about 90% of Guam's endemic *Cycas micronesica* plants and the population is not recovering because natural reproduction is not occurring.
- *C. micronesica* went from being the most numerous tree in Guam's forests in 2002 to being placed on the National Endangered Species list in 2016

Priority Issue 2: Cycad aulacaspis scale - Current status

- Established in Hawaii, CNMI, Palau; Cycad population on Yap at great risk.
- Cycad aulacaspis scale is partially controlled by introduced predators and parasites on Guam, but almost all seeds and seedlings are being killed by the scale insect.

Priority Issue 3: Coconut rhinoceros beetle



Priority Issue 3: Coconut rhinoceros beetle - Impacts



Priority Issue 3: Coconut rhinoceros beetle - Impacts

- A severe, uncontrolled outbreak of coconut rhinoceros beetle (CRB) on Guam is damaging and killing coconut palms and other palms.
- Island-wide, roadside damage surveys indicate that about 20% of coconut palms show visible CRB damage.
- Pheromone trap data and damage surveys have shown no significant upward or downward trend in the past 2 years and trees continue to be killed.

Priority Issue 3: Coconut rhinoceros beetle - Current status

- Coconut rhinoceros beetle (CRB) is currently established in American Samoa, Palau, Guam, Hawaii (Oahu), and the CNMI (Rota)
- Palau, Guam, Hawaii, and CNMI have a virus-resistant strain, CRB-G, which does not respond to *Oryctes rhinoceros* nudivirus which was previously a highly effective self-sustaining biological control agent
- Much of the current effort on Guam is directed at reducing risk of accidental export of CRB by attempts to reduce populations in proximity of ports and to increase outgoing biosecurity

Priority Issue 4: Little fire ant



Priority Issue 4: Little fire ant - Impacts

- Coming soon.

Priority Issue 4: Little fire ant - Current status

- Coming soon.

Challenges

Human Resources

- Professional scientific/technical capacity is low
- Guam suffers from the *taxonomic impediment*
- Guam does not have a terrestrial biodiversity inventory

Funding

- Invasive species projects on Guam are funded by many relatively small short-term competitive grants. Project management overhead (proposal writing and report writing) is very high, leaving little time to actually do the work.

Funding sources

- Department of Interior - Office of Insular Affairs
- USDA - Forest Service
- USDA - APHIS
- DOD
- Government of Guam - Invasive Species Tarrif

National/Territorial Invasive Species Plans

- Guam Invasive Species Management Plan <https://www.sprep.org/attachments/VirLib/Guam/nissap-2017-2019.pdf>
- Regional Biosecurity Plan for Micronesia and Hawaii
<https://pacific.navfac.navy.mil/About-Us/Regional-Biosecurity-Plan-for-Micronesia-and-Hawaii/>

Next steps

- Implement action items in the Guam Invasive Species Management Plan and the Regional Biosecurity Plan for Micronesia and Hawaii

The End - Thanks for listening.

**Invasive species aren't all bad.
They provide job security for biologists.**

