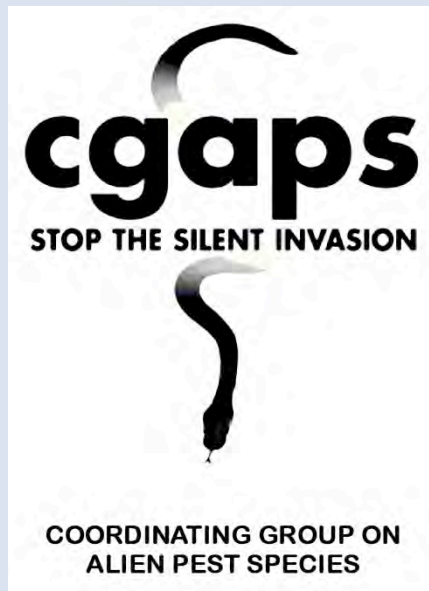


The Silent Invasion: Invasive Species in Hawai'i...

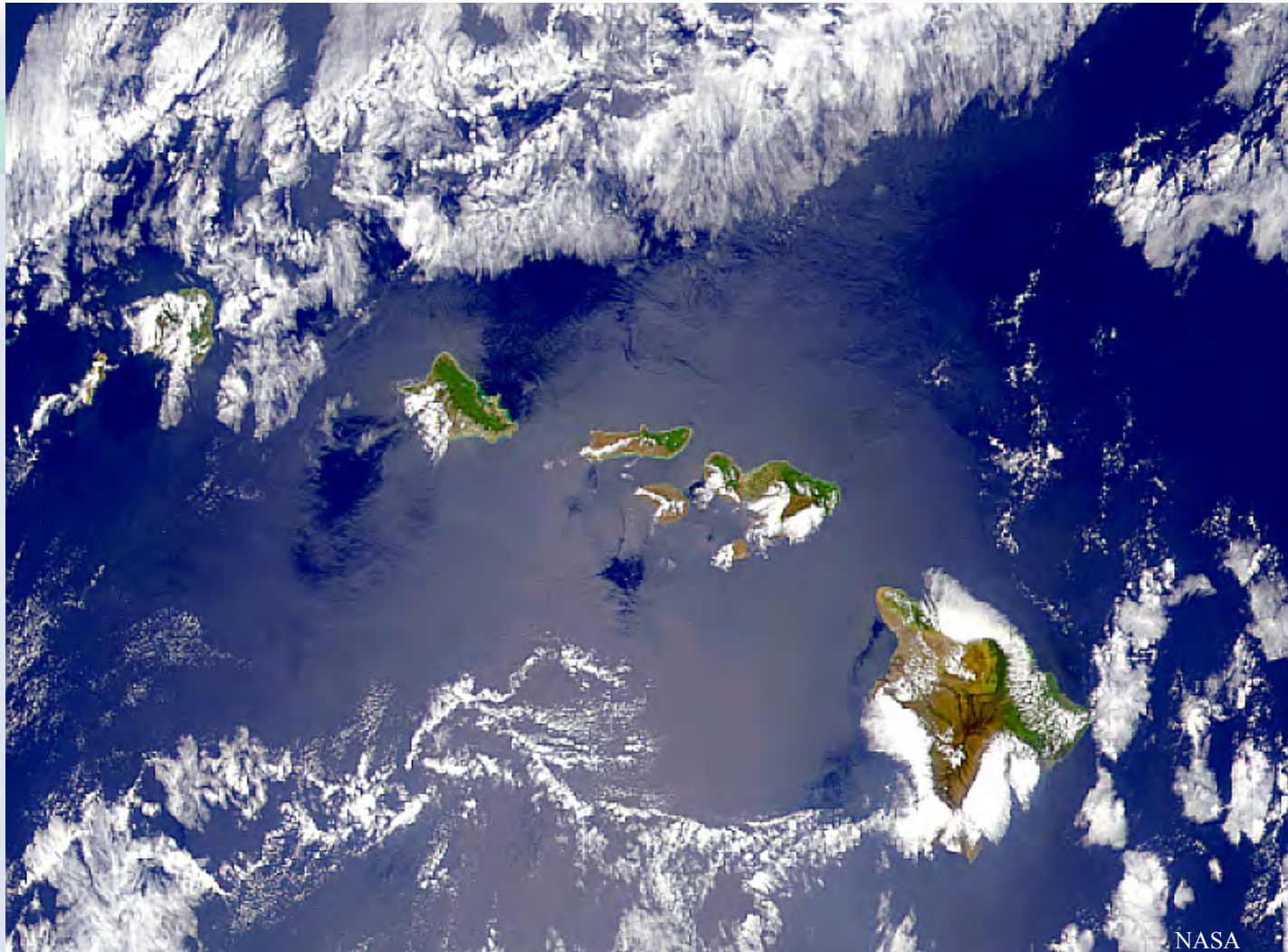


...and the role of Master Gardeners & Green thumbs

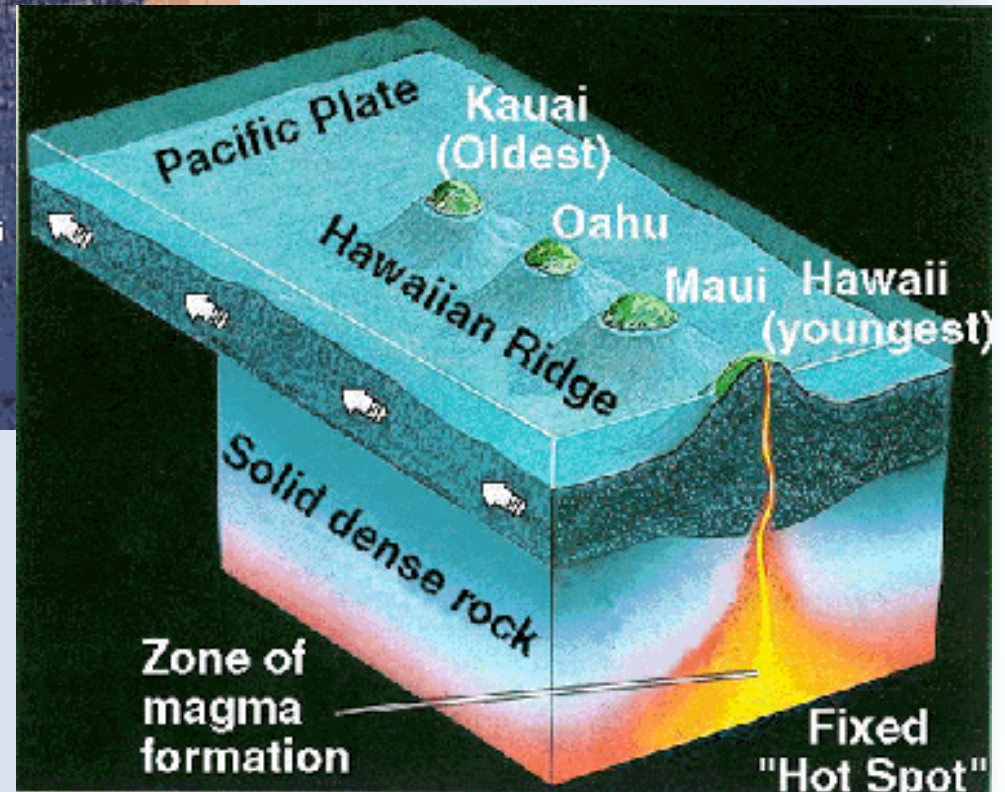
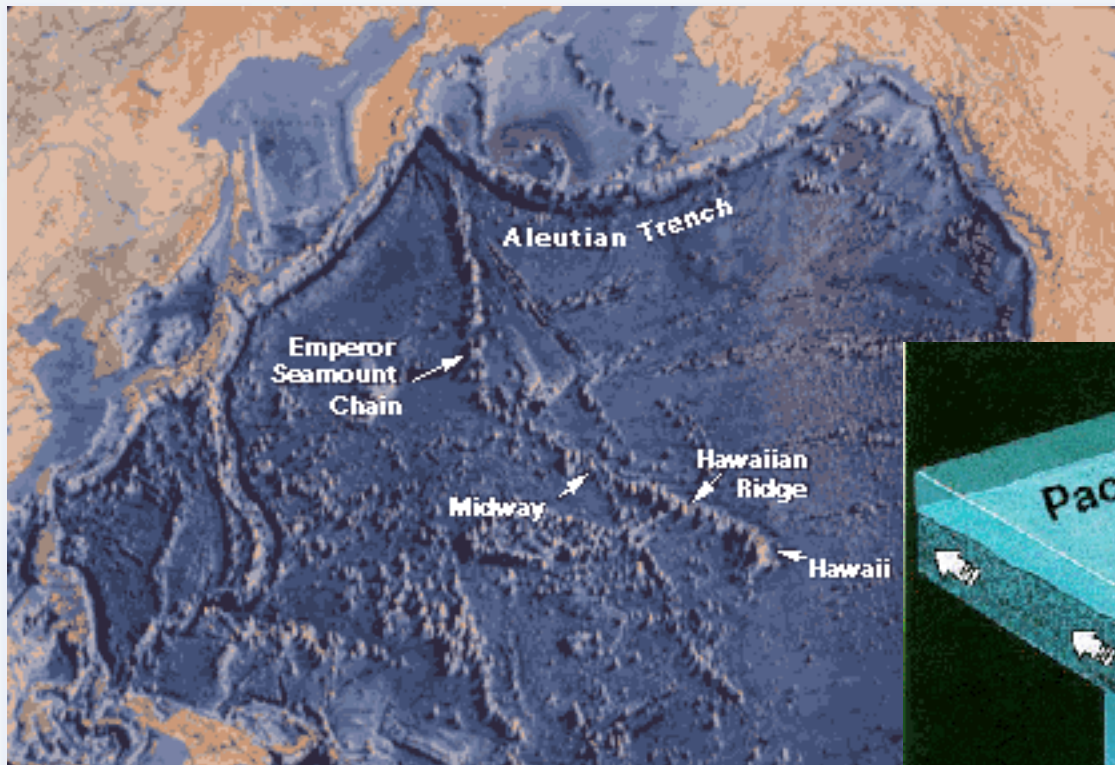
Presented by:

Christy Martin, Public Information Officer
Coordinating Group on Alien Pest Species

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The Hawaiian islands are physically the most isolated islands on Earth. For millions of years, the Pacific ocean has functioned like a moat, keeping out many plants and animals that may be common on continents or other islands.



Islands were formed when lava poured out of a hole in the Pacific plate—a “hot spot”. This has been going on for millions of years.

The Hawaiian island chain was never attached to a continent or close to any island.

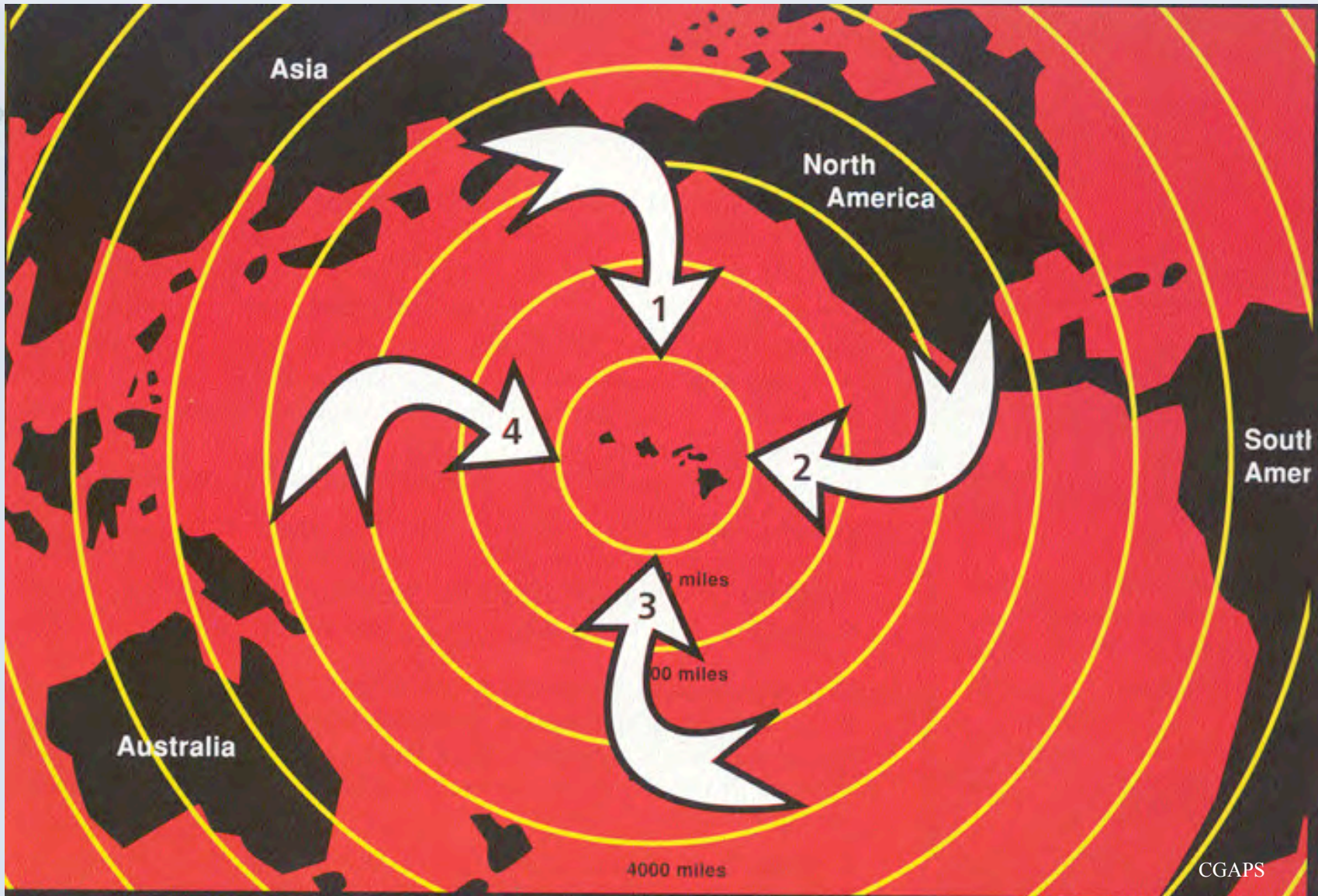


The islands and nearshore environments were a blank slate. There were no seeds in the soil, no animals walking across a land bridge to our islands, and no “living reef”.



So, how did plants and animals get here?

Wind, Wings and Waves.



The plants and animals that arrived came from all over.

Hawaii's first arrivals

Some seeds, spores and insects arrived on the wind.

A few birds flew or were blown off course. In them or stuck to their feathers were more seeds.

Some seeds managed to float here on ocean currents or waves. Ocean currents also carried larval forms of fish, invertebrates, algae, and even freshwater stream species.



Examples of change over time

These honeycreepers are all descended from 2-4 original colonists that flew or were blown across the ocean millions of years ago.

Slowly, over uncountable generations, birds spread out into different areas, different habitats, and they started eating different foods.

With millions of years came slow, incremental changes.



Note the curved bill of the
'i'iwi...



John Caruthers/TNC photo



And the curved flower of the trematolobelia...



They fit perfectly. The curved bill allows it to feed on the nectar, and the plant benefits from being pollinated.

Change over time: The ancestor of this “stink bug” arrived millions of years ago. Over time, these bugs lost the ability to produce a stinky smell because it’s predators weren’t present.

Today, Hawai‘i has stinkless stink bugs, called koa bugs.



Change over time:
This is a mintless
mint. When its
ancestor arrived,
there were none of its
regular predators,
and therefore no
need to produce a
minty flavor.

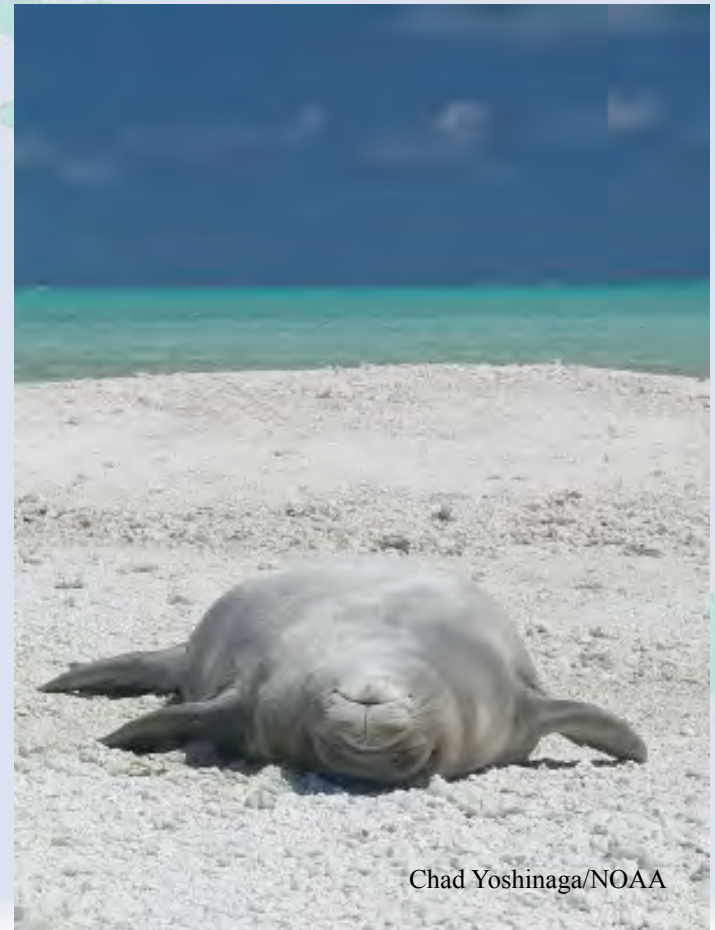
After millions of
years, Hawai'i has
mintless mint. It also
has a curved flower
and is pollinated by
'i'iwi.



TNC photo



Hawaii's native ecosystems are the result of 70 million years of isolation and very slow change.



Chad Yoshinaga/NOAA

And then...

Hawaii got an incurable case of...

HUMANS.



Polynesians arrived in the year 300 A.D. or so.
They brought...

Kalo
Coconut
Kukui
Noni
Moa
Dog
Polynesian pig
Polynesian rat
Geckos
And more...

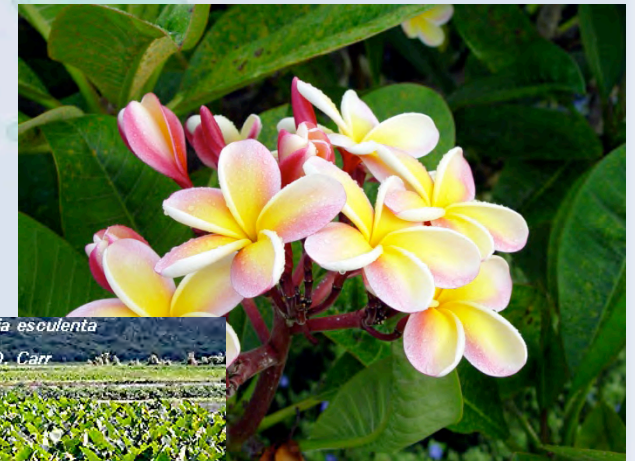
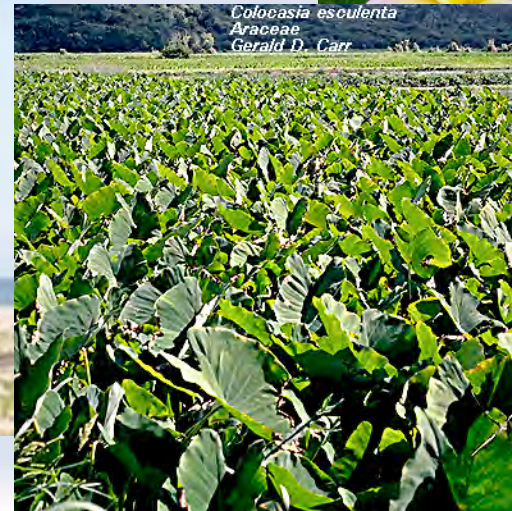


These are the first Alien (brought by people) species...

Some Terms...

Alien species: plants or animals that were brought to a place by humans or through human activity

Alien = exotic = introduced = non-native





Non-native (Alien) species
= 34

...a few, like rats, proved to
be Invasive

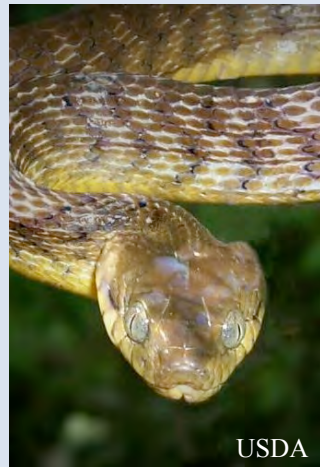


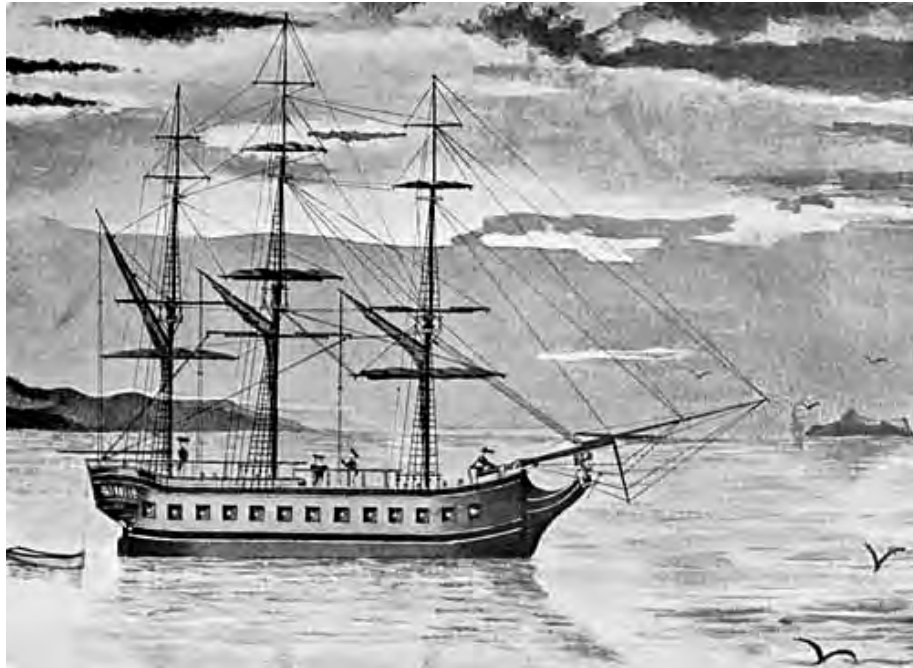
▲
1500 Years Ago

Some Terms...

Invasive species: alien plants or animals that don't stay put; they reproduce quickly, spread easily, take over and cause harm

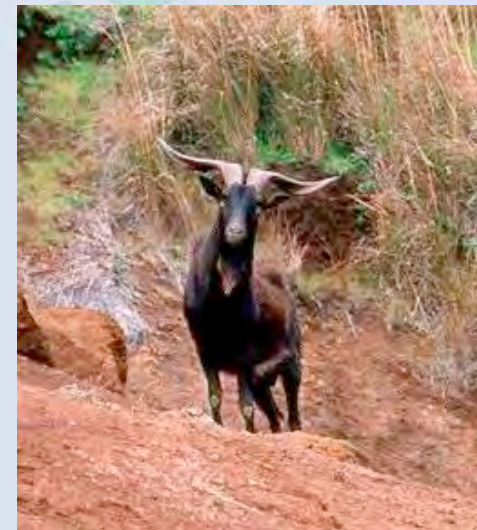
Invasive = pest = nuisance species





Non-native (Alien)
species = 500?

...a few of these,
including goats and
mosquitoes, proved to
be invasive



226 Years Ago



Non-native (Alien) species = 5000?

- 343 new marine/brackish water species
- Hawaii went from 0 to 40 land reptiles
- 0 to 6 amphibians (including coqui)

- 20+ insects/year

- 10,000+ plant species introduced; 1,200 spread to natural areas; 200+ damaging ecosystems and natural resources

2 Years Ago

Are all aliens BAD???



No!

But we should be
concerned about
invasive species

Invasive species are...

An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health (President Clinton Exec. Order 13112)

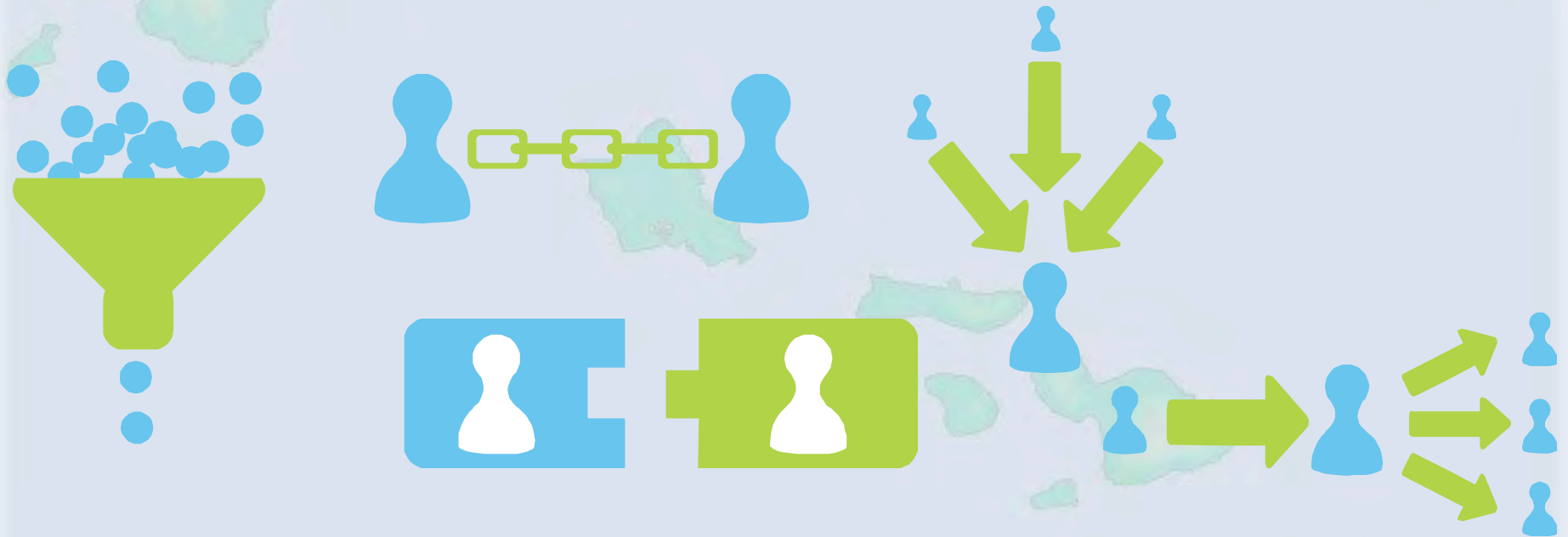
The greatest threat to Hawaii's native species and ecosystems is invasive species.





**In the effort to protect Hawai'i from
Invasive Species,
how important are Master Gardeners?**

Master Gardeners are Crucial!



- Master Gardeners are highly trained. You take in a lot of scientific information and organize it so it is usable
- You have a strong network, you are linked
- You connect with the public in ways that others can't
- People come to you for advice and information
- You are the agencies' and scientists' link with the public

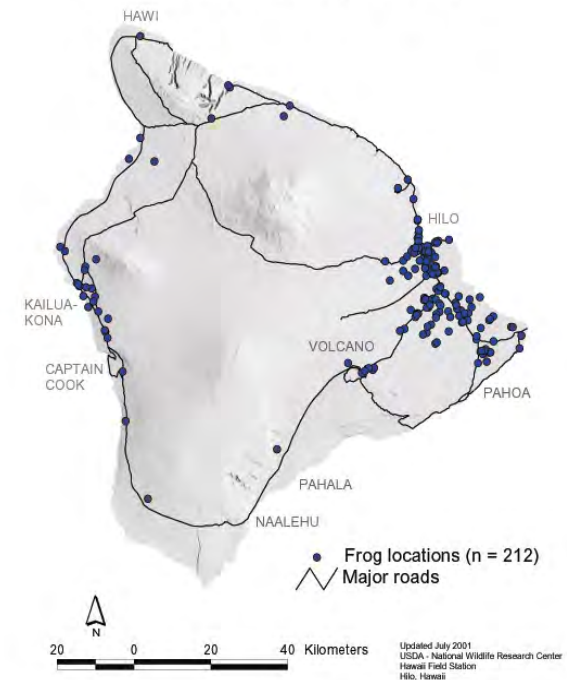
Coqui Frogs

Eleutherodactylus coqui

- Native to Puerto Rico, arrived hidden in plants in the late 1980s
- Can reach densities of 10,000 per acre, eat 40,000 insects a night
- Eat native insects
- Loud (70-90 decibels). Reduces property values; affect visitor industry; health effects (noise exposure correlated to increase in cardiovascular disease)



All verified and reported Caribbean frog (*Eleutherodactylus* spp.) locations on the Island of Hawaii, 1997 - 2001



How can you help?

- Still moving on or with plants.
- Quarantine your newly-bought plants for a few days in a contained area, listen at night for bird-like calls.
- Also moving on vehicles and other items that have been sitting in coqui-infested areas.
- On any island except the Big Island, report coqui to 643-PEST.



Little Fire Ant (LFA)

Wasmannia auropunctata

- Small stinging ants native to Central and South America, accidentally introduced as hitchhikers on nursery plants
- Infests yards, agricultural fields, and nurseries, where they damage crops, and sting people.
- Also known to sting eyes of pets and other animals, causing blindness
- Infestations known on the windward side of the Big Island. One small infestation on Kaua'i and Maui (recent)

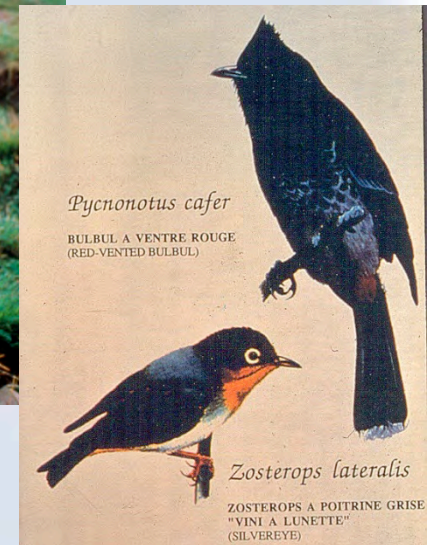


How can you help?

- Many pests move on or with plants.
- Quarantine your newly-bought plants for a few days in a contained area.
- Test for little fire ants by placing a chopstick dipped in a little peanut butter in and around the plants.
- Visit www.littlefireants.com to help you ID the ants. Ask experts, and when in doubt, call 643-PEST.



Miconia calvescens

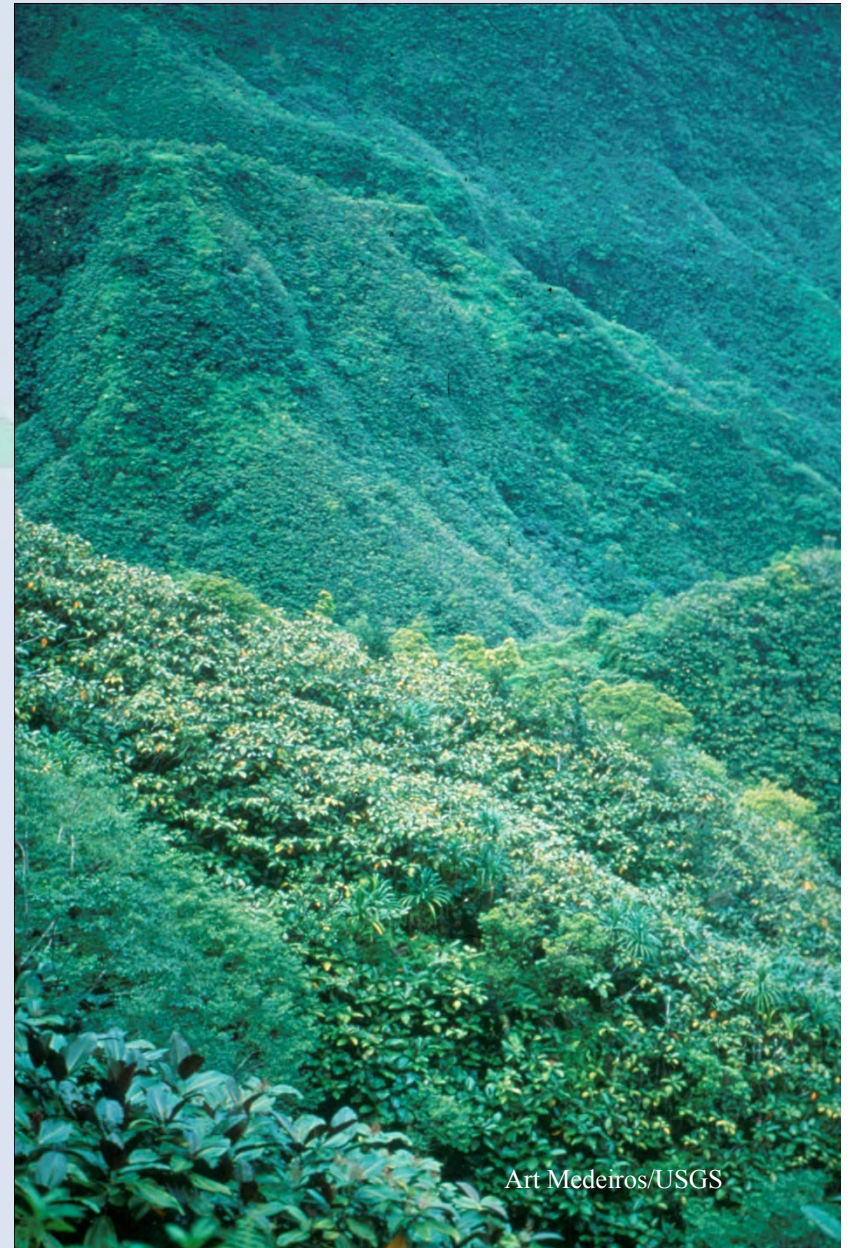


- 30-50 ft. tall tree
- Native to Central and South America
- Each tree can produce millions of seeds per year
- Sand-grain sized seeds spread by birds

Proven Pest in Tahiti



- Introduced in 1937 to two locations
- Nearly 70% of native forests overwhelmed
- 40+ species are now endangered or threatened with extinction due to *Miconia*



Threat to native forests and watersheds



Art Medeiros/USGS



Art Medeiros/USGS

- Grows close together forming dense, 100% Miconia forests
- Deep shade eliminates other plants and prevents water from reaching the forest floor and soaking into the watershed

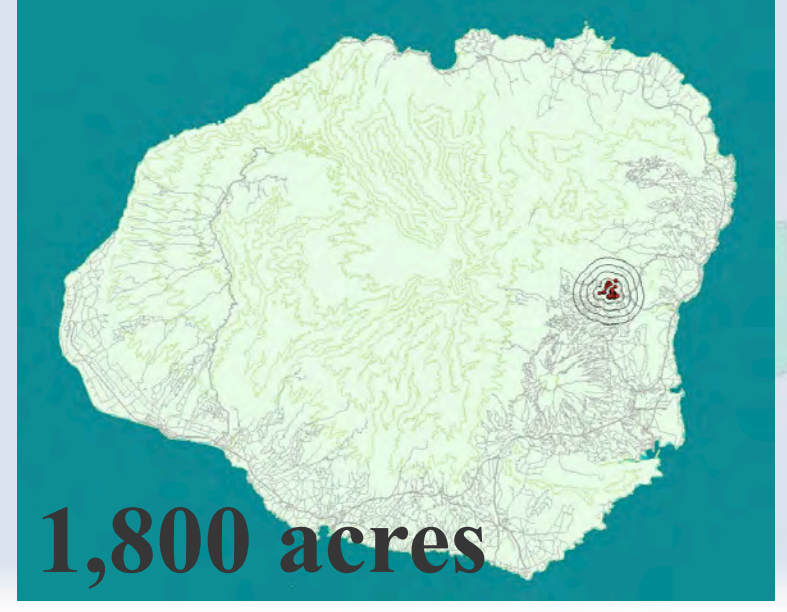
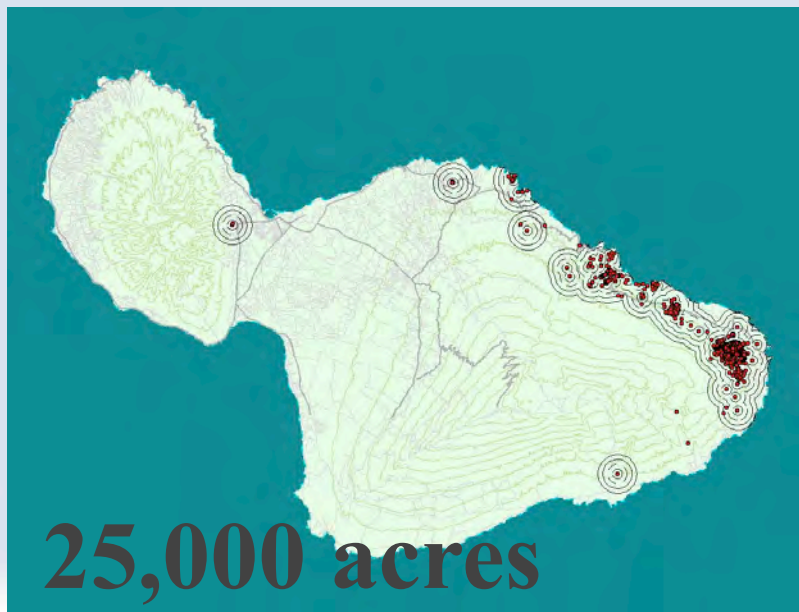
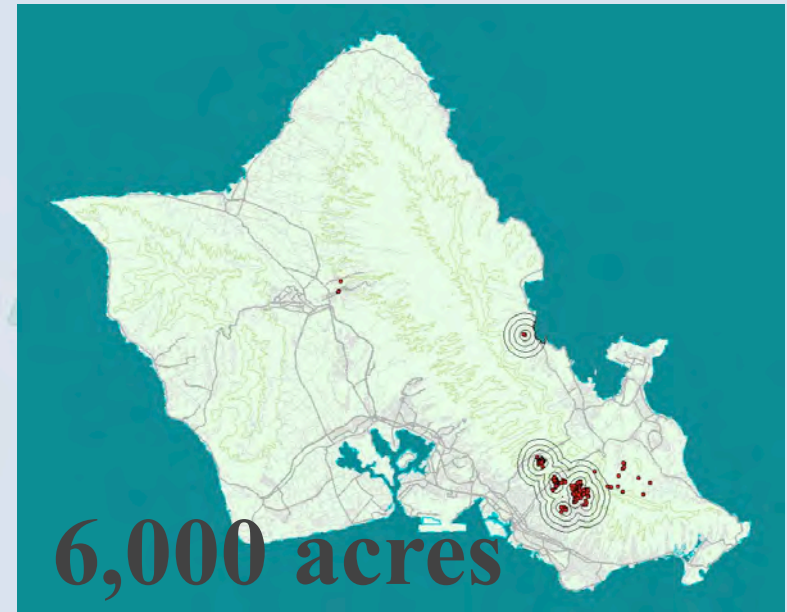
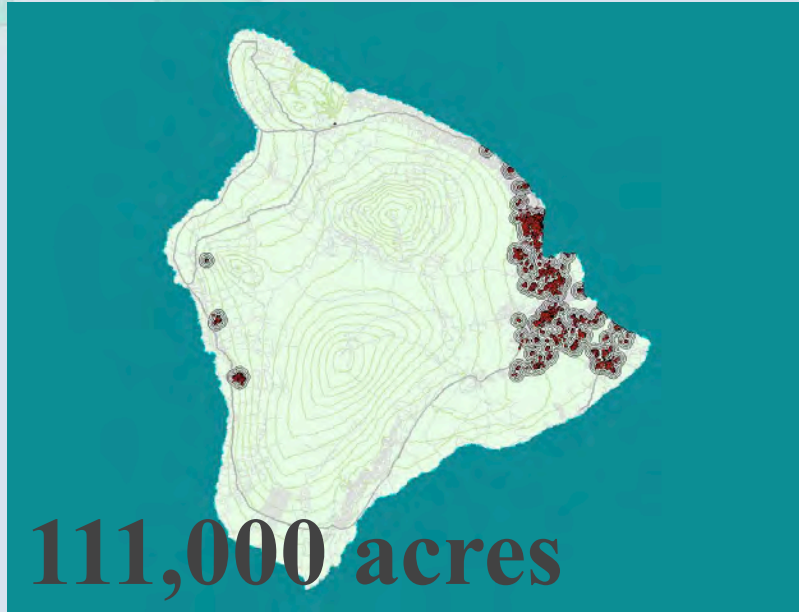
Proven Pest in Tahiti



- Declared emergency too late—1937- mid 1980's. 50 years of uncontrolled spread
- Watersheds and agriculture impacted
- Irreversible impacts- eradication impossible



Miconia in Hawai'i...introduced and spread as an ornamental



Strawberry guava

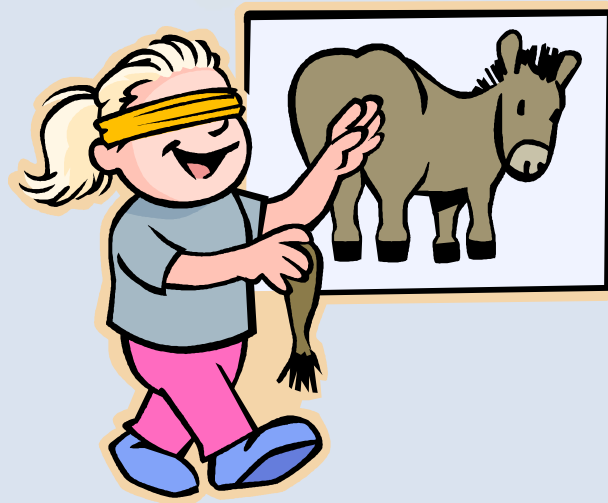
(*Psidium cattleianum*)



- Shrub or tree up to 60' tall, introduced as an ornamental
- Outcompetes and replaces other vegetation
- Spread by animals
- Compared with native 'ōhi'a forests, strawberry guava-infested forests lose 27% more water, with the difference rising to 53% during dry periods.

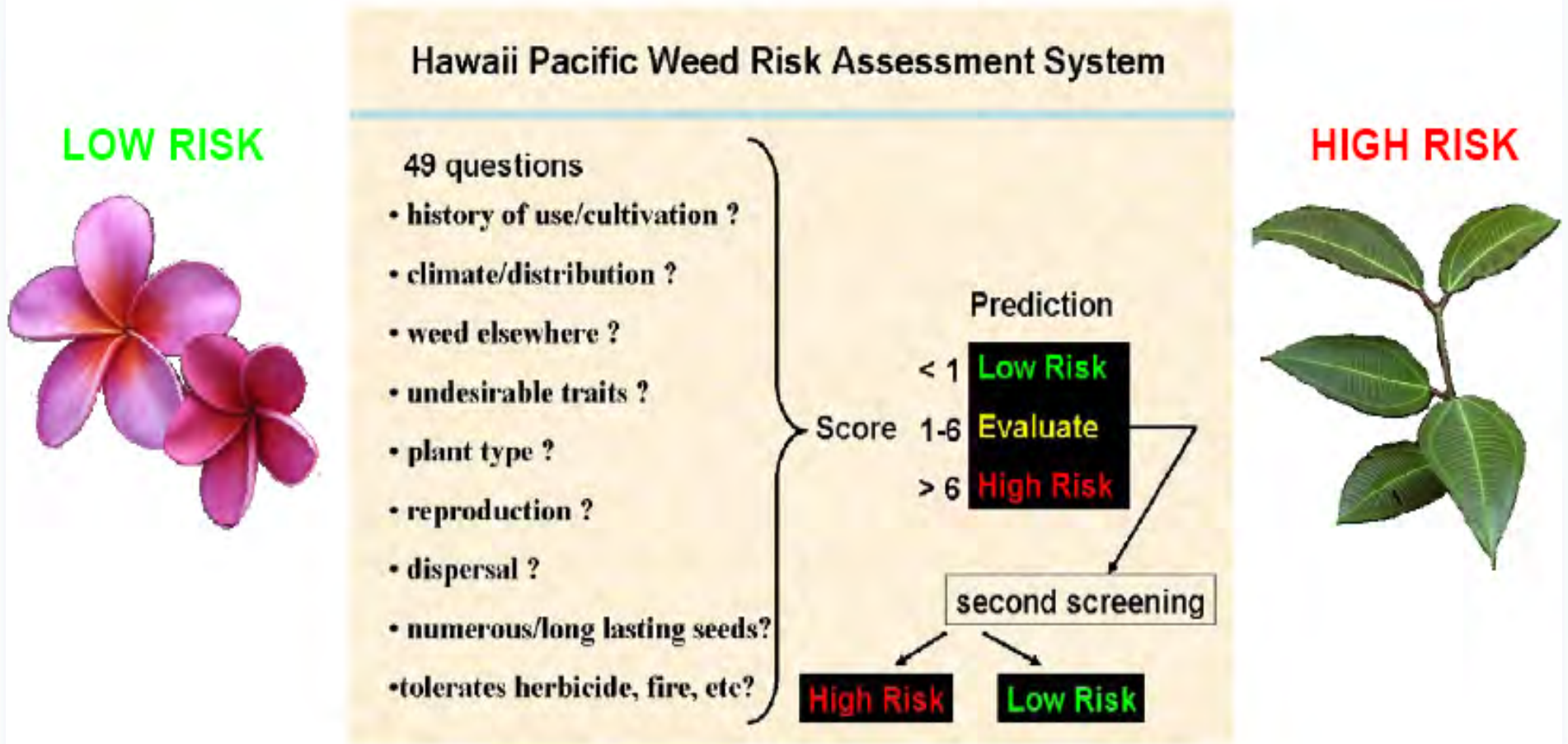
Issue:

It is still LEGAL to import more than 99.9% of the plants that exist on Earth, even if they are known to be invasive.



How can you help?

Use the Hawai'i Pacific Weed Risk Assessment (HPWRA)



- The HPWRA technician uses published information to answer 49 questions about a plant, which results in a prediction.
- Correctly flags 95% of invasive (high risk) plants

Example: HPWRA for Miconia (*Miconia calvescens*)



Score: 14 (invasive)

Designation: H (Hawai'i)—*verified as currently invading*

Why did it score a 14?

- Invading elsewhere (Tahiti, etc.)
- Broad range (0-6000 ft elev.)
- Grows well in shade
- Re-grows after mutilation
- Self-compatible
- Prolific: >1000 seeds per m²
- Spread by birds, other animals; accidental spread by people

Example: HPWRA for Plumeria (*Plumeria rubra*)



Score: -5 (non-invasive)

Designation: L (Hawai'i)—*verified as non-invasive in Hawai'i*

Why did it score a -5?

- Not invasive elsewhere
- Toxic/allergenic sap (+1)
- Grows in a wide range of soil conditions
- Doesn't grow well in shade
- Does not form dense thickets
- Needs a specialist pollinator
- Lacks natural vegetative spread

Better Prevention:

- New pre-entry laws, agreements.
- HDOA Biosecurity Plan: new joint federal-state inspection facilities at each port, funded by the cargo fee. Kahului is the model.
- New rules
- New technology



Surveillance and Rapid Response

Things will always get through.

- Monitoring around ports of entry
- Early detection and rapid response teams
- Citizen monitoring and reporting



Ongoing Control of Widespread Pests

Widespread pests also need management.

- Control of widespread invasive species in special areas like National Parks, preserves, etc.
- Weeding in managed and unmanaged areas; pest control where necessary
- Biocontrol as a tool for mitigating impacts of widespread pests



HDOA

Eurytoma for natural control of wiliwili gall wasp



The fungus *Colletotrichum gloeosporioides* f. sp. *miconiae* for miconia control

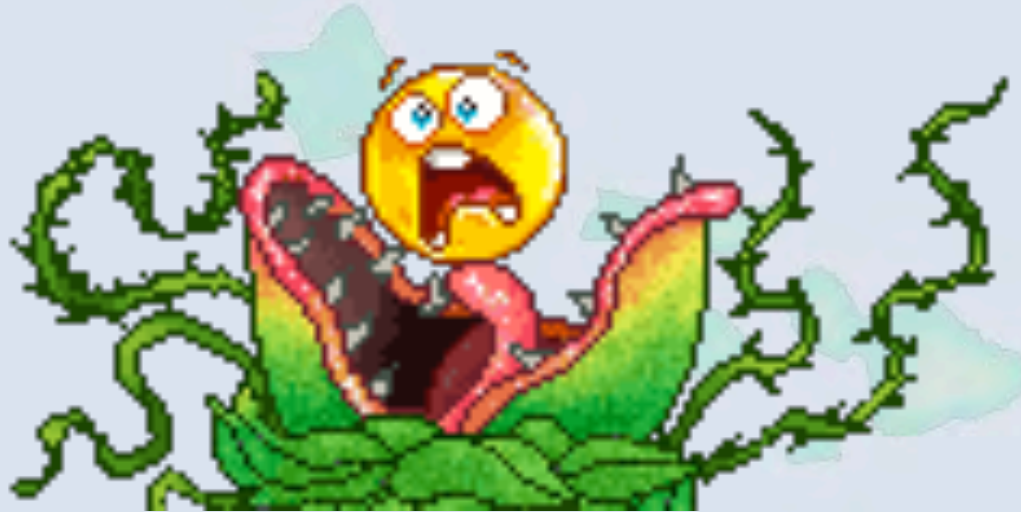
The good news is that people care and are working to Protect Hawai'i



What can we all do?

- Import, buy & plant responsibly. Use native Hawaiian plants or have non-native plants screened with the Weed Risk Assessment. Email hpwra@yahoo.com
- Planting? Check online to see if you're planting a non-invasive plant.
- Quarantine your newly-bought plants for a couple days
- Report suspicious insects, plants and animals. **643-PEST**
- Don't bring in prohibited pets, plants or fruits. When in doubt, declare it
- Reduce the chances of pests spreading interisland
- Get informed and involved...many hands
- Grow local, buy local

Mahalo!



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