Hawaii-Pacific Weed Risk Assessment: Updates and Applications for 2019

Chuck Chimera

PCSU

Funding provided by the Hawaii Invasive Species Council

History and Background of the HPWRA

- A Weed Risk Assessment (WRA) System is a pro-active tool used to identify plants that pose a high risk of causing ecological or economic harm.

Development of WRA system for Hawaii

Several systems were examined for use in Hawai‘i

- The Australian AQIS system was most promising after simple modifications
  - History of the Australian WRA system
    - 1994 Developed & tested in Australia
    - 1995 Modified & tested in New Zealand
    - 1998 Modified & tested for use in Hawai‘i
    - 2001-2002 Further testing for use in Hawai‘i & other Pacific Islands
    - 2002-Present WRA funded by HISC

Journal of Environmental Management (1999) **57**, 239–251
Article No. jema.1999.0297, available online at http://www.idealibrary.com on IDEAL®

A weed risk assessment model for use as a biosecurity tool evaluating plant introductions

P. C. Pheloung†‡, P. A. Williams§*, S. R. Halloy¶

New plant taxa from around the world continue to be imported into Australia and New Zealand. Many of these taxa have the potential to become agricultural or environmental weeds and this risk needs to be assessed before allowing their entry. A weed risk assessment system is described that uses information on a taxon's current weed status in other parts of the world, climate and environmental preferences, and biological attributes. The system is designed to be operated by quarantine personnel via a user-friendly computer interface.

The model was tested against experts' scores for weediness for 370 taxa present in Australia, representing both weeds and useful taxa from agriculture, the environment, and other sectors. The model was judged on its ability to correctly 'reject' weeds, 'accept' non-weeds, and generate a low proportion of taxa which could not be decisively categorised, termed 'evaluate'. More than 70% of the taxa were rejected or accepted. All taxa classified as serious weeds, and most minor weeds, were rejected or required further evaluation, while 17% of non-weeds were rejected. The model was modified to New Zealand conditions and evaluated against the opinions of several groups of experts and against economic measures. The model produced a weediness score very similar to the mean of the experts scores. The latter were highly variable: agriculturalists tended to accept known weeds, conservationists tended to reject most adventive taxa, and only botanists produced scores similar to the model. The model scores also tended to be independent of economic value as measured in this study. The model could be adapted for use as a screening tool in any region of the world.

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Keywords: Australia, New Zealand, weed risk assessment, plant introductions, biosecurity, quarantine, computer model.

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Daehler, C. C., & Carino, D. A. (2000). Predicting invasive plants: prospects for a general screening system based on current regional models. *Biological invasions*, *2*(2), 93-102


GAME OF WEEDS
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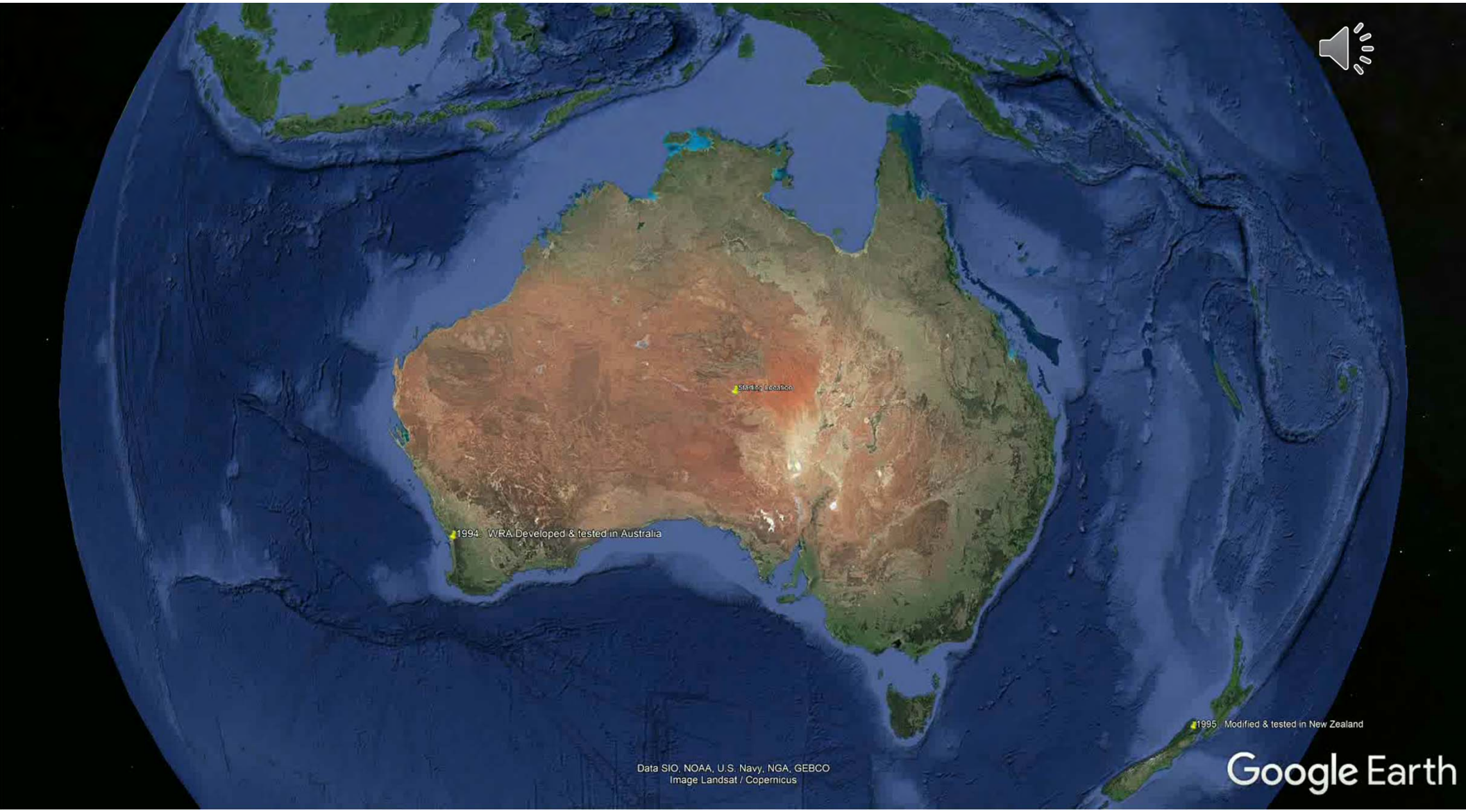
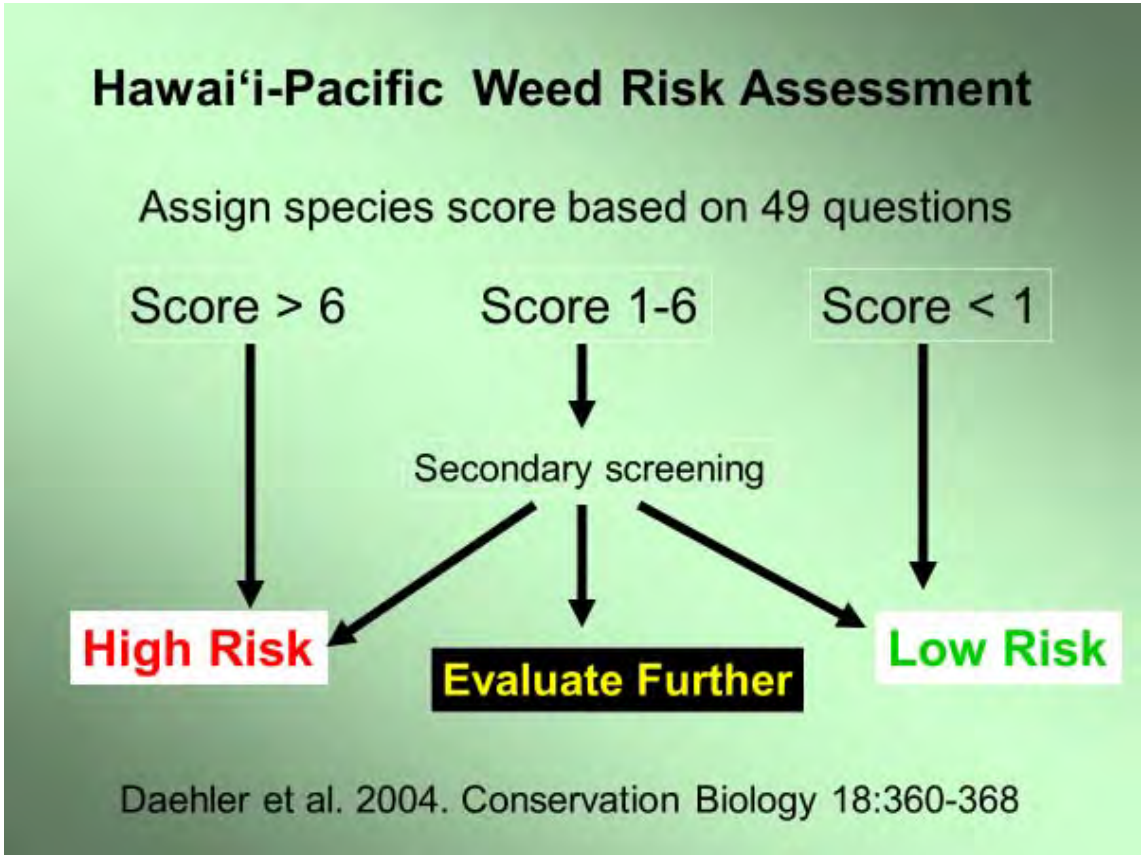
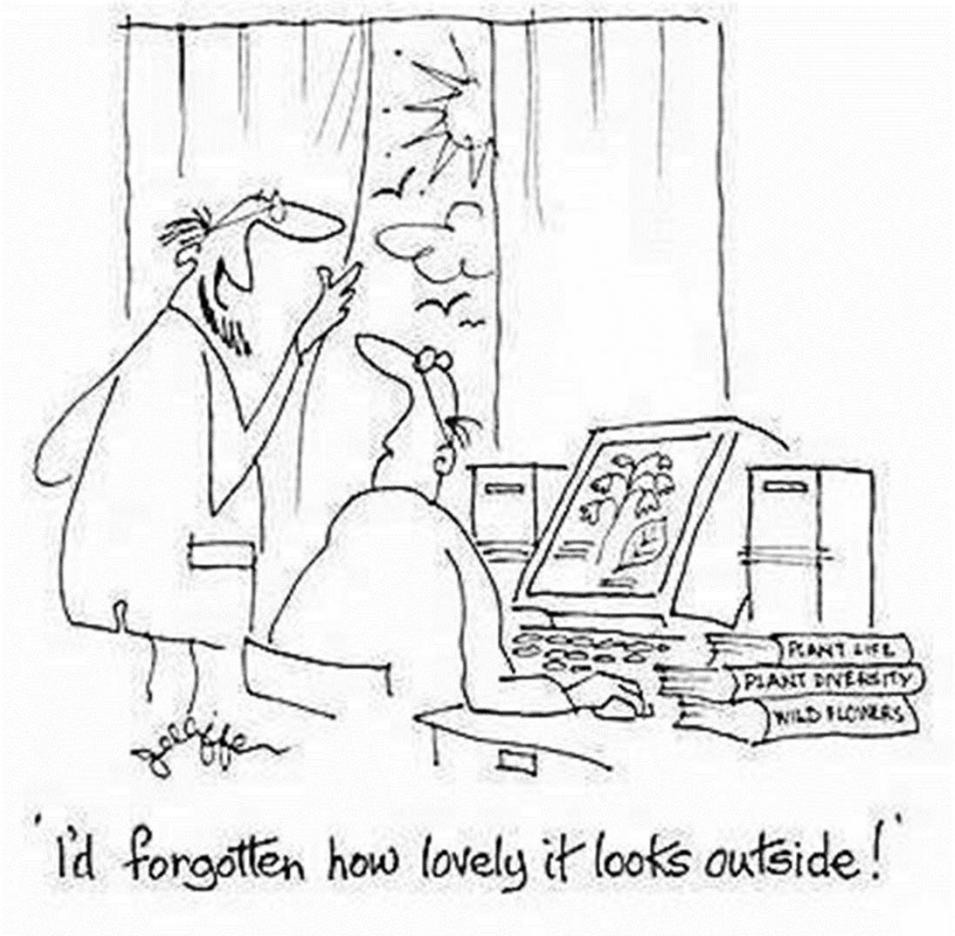

Starting Location
1994 - WRA Developed & tested in Australia
1995 - Modified & tested in New Zealand
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
Google Earth

The Weed Risk Assessment process



Characteristics of the Hawaii Pacific Weed Risk Assessment System

- Objective
- Science-based
- Repeatable
- Transparent
- Reliable



Characteristics of the Hawaii Pacific Weed Risk Assessment (HPWRA) System

Designed to identify all types of pest plants

- invaders of natural areas
- weeds of agriculture & forestry
- nuisance species

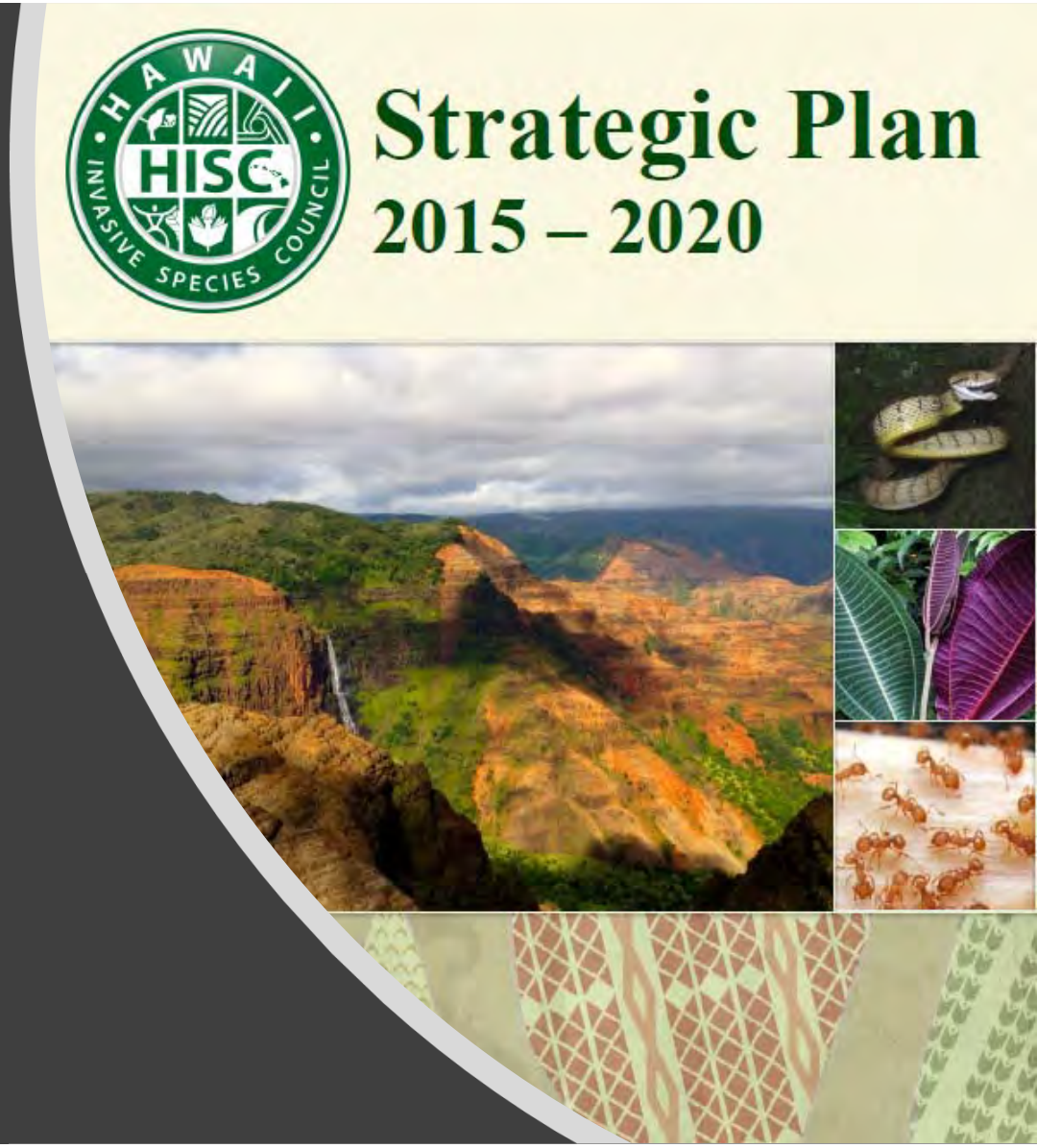
Don’t need to answer all 49 questions

Assessment can be done quickly (within 1-2 days)

The WRA system is NOT a field evaluation of current distribution & current impacts, although it may include this information if documented

HISC Strategic Plan 2015 – 2020

- **Prevention Goal 2: Risk assessments are developed and utilized for all priority taxa**
  - *"Risk assessments are a critical tool in prioritizing prevention and response activities. Having these tools in place provides consistent methodologies across agencies, reliable pathway and impact analysis, and data for meaningful prioritization of management activities."*



WRA Highlights: Jan 2018-Present

- 2029 species screened
  - 893 High Risk (44%)
  - 834 Low Risk (41%)
  - 302 Evaluate (15%)
- Information used by government, public, industry & conservation groups statewide & internationally

Rosa rugosa (High Risk)

Agricultural / Horticultural Industry

Forestry – forest stewardship management plan on Big Island

Cunninghamia lanceolata **(Evaluate)**

Nursery – Arbor Day tree giveaway on Kauai

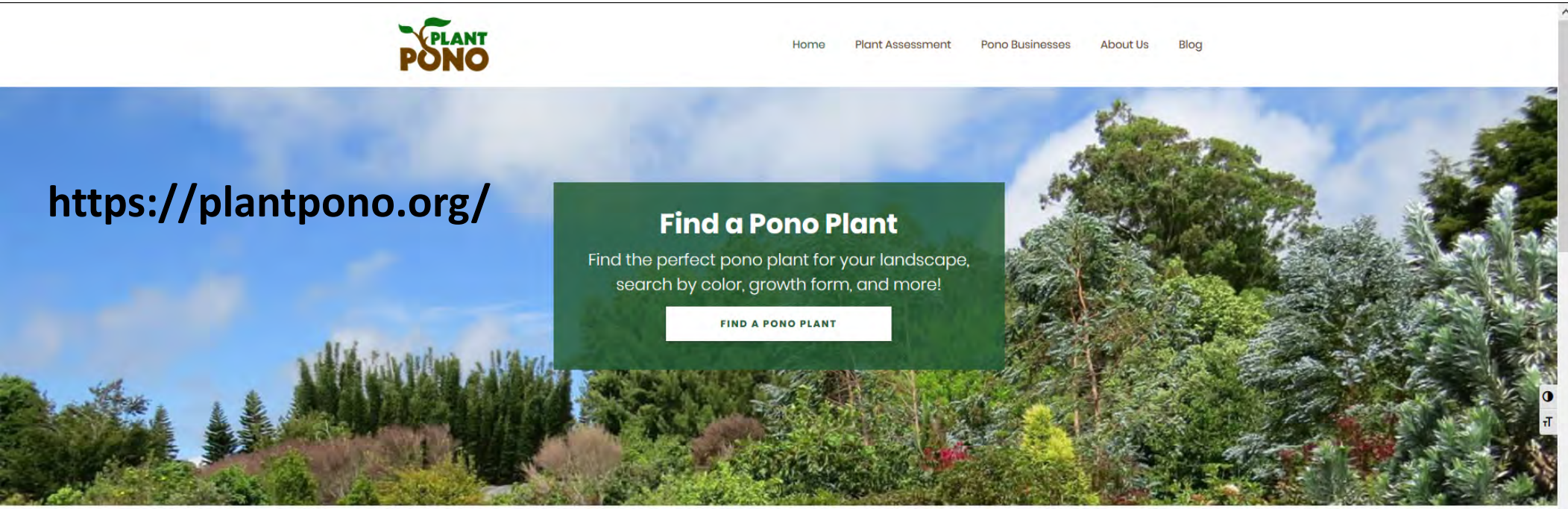
Bulnesia arborea **(Low Risk)**

Agricultural Industry

- Ranching
  - 16 species assessed for use as cover/refuge crops within silvicultural *Acacia koa* groves on a Maui ranch.

Cichorium intybus (High Risk)

https://plantpono.org/



Designation

All Items

Search by Name

Common or Scientific

SUBMIT

RESET

Find a Plant

Abelia x grandiflora

glossy abelia

Designation: Pono Plant (low risk)
Score: -13
Download Assessment

Abelmoschus manihot

bele, edible hibiscus, Tongan spinach, sunset muskmallow, manioc hibiscus


MOLLY MURPHY
BIISC
HOUSE OF PONO
FRANNY BREWER
BIISC
SKY HARRISON
HBIN

Nursery / Horticultural Industry

- Pono Businesses
- Hawaii (21 nurseries)
  - Discontinue use of “No Grow” plants
  - Use WRA
  - Promote non-invasive & native plants
  - Schedule annual visit
  - Follow best management practices
- Kauai (13 nurseries)
  - Avoid use of specific invasive plants
  - Follow best management practices

General Public

- **Assessment Request:** *"I am submitting a request to score a very popular culinary herb, Eryngium foetidum, otherwise known as culantro."*
- **Response to Assessment**: *"I very much appreciate the potential problems this herb could create in areas without much pressure from land mollusks."*

Eryngium foetidum **(culantro)**
High Risk

Botanical Gardens

- National Tropical Botanical Garden

- Honolulu Botanical Gardens

"The City of Hiroshima, Japan would like to donate some seeds to the Honolulu Botanical Gardens as part of a worldwide peace planting initiative."

Aphananthe aspera **(mukutree)**
Low Risk

Liquidambar styraciflua (alligator wood, American storax, American sweetgum, bilsted, hazel pine, redgum, satin-walnut, star-leaved gum)

High Risk

Score

7

Date Screened

February 4, 2019

Synonyms

Liquidambar macrop
Liquidambar styracifl
rotundiloba, Liquidam
styraciflua f. styracifl

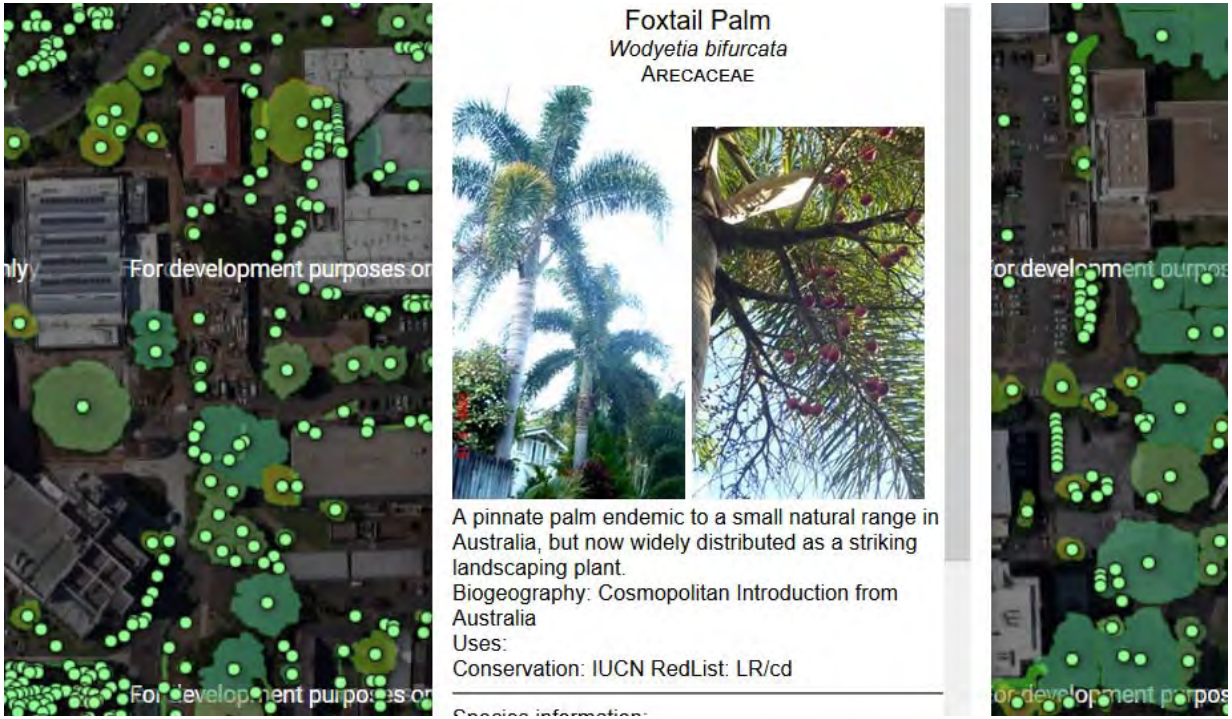
Family

Altingiaceae

Genus

Invasive Species Committees

- Early detection
- Target species prioritization
- Outreach



University of Hawaii

- Academic Uses
  - Frugivory Study
  - Student Research
- Campus Plants Map
  - Will include WRA information

State Government Agencies

- DLNR DOFAW

"I was hoping you could assess *Dietes bicolor* with WRA. We have some researchers who are interested in using this species for companion restoration efforts"

- HDOT
  - SWCA produced brochure for landscaping vendors

***Dietes bicolor* (African iris)**
High Risk

SWCA produced brochure for landscaping vendors

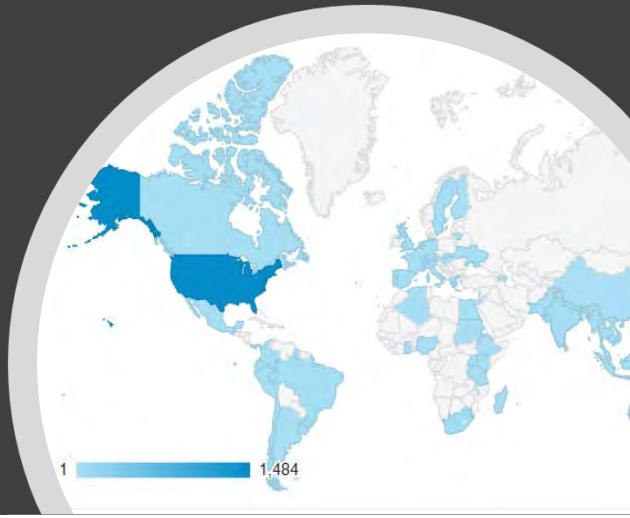
Federal Government

- **USDA NRCS**
  - **Grazing Land Management Specialist (5 pasture species assessments requested)**: *"This is very helpful to me and I sincerely appreciate this service you provide and your thorough, objective assessment."*
- **U.S. Army Garrison**

Urochloa humidicola **(creeping signal grass)**
High Risk

National / International Interest

- Invasive Species Program Coordinator (Lady Bird Johnson Wildflower Center)
  - *“There is interest in cultivating Psophocarpus tetragonolobus in the United States. I can’t find any information about it’s potential for invasiveness. It would be good to have it evaluated.”*



Presentations and Outreach

- Botany Training (MISC)
- WRA/Invasive Plant and Native Plant Presentations (East Hawaii, West Hawaii & Maui Master Gardeners)
- Invasive Species and Climate Change (Hamakua community group)

East Hawaii Master Gardener Class of 2019

WEEDS ARE COMING

FOR MORE INFO CONTACT

HAWAII PACIFIC WEED RISK ASSESSMENT hpwra@hawaii.edu

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