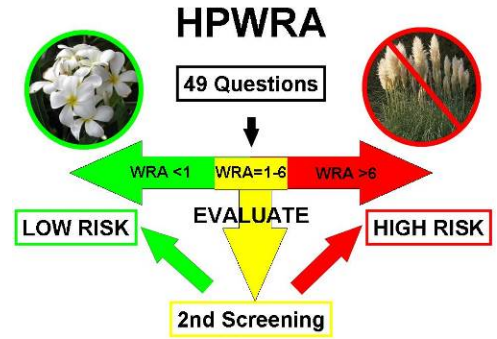


Title: Continued Support of the HPWRA

Organization: Hawaii-Pacific Weed Risk Assessment (HPWRA)

Award(s): \$71,967.10

Introduction: The Hawaii-Pacific Weed Risk Assessment (HPWRA) system is an internationally recognized screening tool that rates a plant's potential to become invasive by answering 49 questions about its biology, ecology and history of invasiveness elsewhere. The answers generate a score that predicts a plant's likelihood to be invasive in Hawaii or other tropical Pacific islands. The HPWRA aids in identification of invasive plants before they impact Hawaii's economy, ecology or human health and supports Goal one of the Prevention working group, to "review risks of pest/invasive species entry into the state". The HPWRA also addresses the Prevention objectives to "develop a comprehensive 'approved planting list' to ensure that invasive species are not being planted in State projects or by any state contractors, e.g. screened by the Weed Risk Assessment protocol" and to "develop collaborative industry guidelines and codes of conduct, which minimize or eliminate unintentional introductions." In accordance with these objectives, a Weed Risk Assessment Specialist has been funded by the Hawaii Invasive Species Council to the amount of \$71,967.10 in 2014.



Achievements in 2014

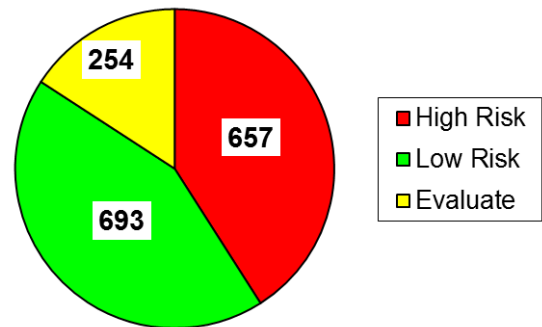
[Deliverable 1] Quarterly and Annual Reports:

Quarterly and annual reports documenting HPWRA progress and accomplishments are publicly available through the HPWRA Project website. A synopsis of daily work activity can also be viewed through a project calendar hosted at the website:

(<https://sites.google.com/site/hpwraproject/>).

[Deliverable 2] 100 New or Revised Assessments:

The HPWRA continues to provide new and update old assessments, both for species already present in the Hawaiian Islands, as well as for new introductions. This information is summarized and disseminated to the requesting individual or agency via direct correspondence, and to the public and land management agencies through technical and general publications, public presentations, and other outreach activities. From January to December 2014, 111 assessment requests were received, and 102 assessments (92 new and 10 revised) were completed.



1,604 Risk Assessments by Category

As of December 31, 2014, 1,604 assessments have been completed and assigned to the following categories:

- High Risk (657 plants): Predicted to become invasive in Hawaii or Pacific Island ecosystems
- Low Risk (693 plants): Not predicted to become invasive
- Evaluate (254 plants): Needs further information to make a prediction of invasiveness

Assessment requests in 2014 originated from both members of the general public as well as individuals associated with island invasive species committees, county, state and federal government agencies,

private businesses, nurseries and botanical gardens, university researchers and extension agents, and international invasive species organizations, among others. The following is a list of highlights and accomplishments during this time period:

Island Invasive Species Committees (ISCs) & Early Detection Teams: The HPWRA produced twenty-three species assessments for the various Invasive Species Committees to aid in early detection and prioritization for control of potential invasive plants. Assessments provide scientifically researched information on a species' potential invasiveness to Hawaii and other Pacific Islands and a concise, consolidated source of current references useful to assist in management decisions. The HPWRA is also utilized as a component of plant species prioritization efforts by the Invasive Species Committee's Early Detection teams. One such assessment, for *Rubus fruticosus* (blackberry), will be used to provide additional justification to convince an Oahu retailer to discontinue sale of this highly invasive, high risk plant.



Maui County Planting Plan, County of Maui: In 2014, the WRA specialist continued work with Ernest Rezens, planting plan coordinator, to review species proposed for use in the revised Maui County Planting Plan, Third Edition. The county government, with input from the Maui County Arborist Advisory Committee, has adopted information and followed guidelines provided by the Hawaii-Pacific Weed Risk Assessment system to promote the use of non-invasive plants in county landscaping projects, and to avoid planting of high risk, or known invasive species. A final review of the plan was provided by the WRA Specialist in July 2014. The plan was completed in the fall of 2014 and will be made available to members of the general public in 2015.

Other Public and Private Organizations, Individual Plant Growers, and Landscape Professionals: The HPWRA program receives screening requests from plant growers, landscape professionals, and both public and private individuals and institutions including the National Tropical Botanical Garden, Honolulu Botanical Garden, University of Hawaii faculty and students, and others. Assessments are also provided for plants submitted to the Plant Pono liaison on behalf of the landscaping and nursery industries. Fifty-one such assessments were completed in 2014. Of note were the seventeen palm species screened for the CTAHR publication, Palms for Hawai'i Landscapes, thereby providing assessments for all remaining species included in this document. Thorough screening of all species in additional CTAHR publications is planned for 2015. Other assessments of interest include fifteen species screened in collaboration with CTAHR's Sustainable Agriculture Renewable Resources Extension program for a pollinator-beneficial garden project in Manoa, Oahu.



Palms for Hawai'i Landscapes

Melvin Wong, Department of Tropical Plant and Soil Sciences

Palms are important to Hawai'i landscapes because they definitely fit the "tropical" landscape theme. When people first see palms they may get the impression that all palms look alike. With further study you can gain a greater appreciation of each species and can detect the differences.

Palm colors

Palms do not have a great variety of color. But in tropical themes green is often an important color. Palms can be used in the background or as cover for many smaller plants that require moisture and shade. A few palms have exceptional color. *Cyrtosperma ronds* (swelling wax palm, Fig. 1) has a bright, red leaf base but needs shade and wind protection for best results. In Southeast Asia you will see swelling wax palms in the open with no wind protection. But in these locations daily wind velocities are low and humidity is high. Another palm with exceptional color (orange) is *Areca vestertaria* (Fig. 2). This chumping palm will do best with some shade. The following palms are predominantly grey:

- Bismarckia nobilis* (Bismarck palm, Fig. 3)
- Eugenia decaryi* (triangle palm, Fig. 4)
- Lantana loddigiana* (blue lantana palm, Fig. 5)
- Pritchardia hillebrandii* (kaolo leo)

These palms can be used in various ways with other tropical plants that are grey.

Palms and lethal yellow disease

Throughout the tropics and subtropics, coconut palms (*Cocos nucifera*, Fig. 6) are the trees most identified

with a "tropical" theme. In many places over coconut's range, the mycoplasma disease lethal yellow disease most coconut varieties and other palm species with extinction. Because coconut palms provide a valuable landscape theme, lethal yellow disease can have a strongly negative effect on tourism. Florida has battled this disease for decades with some success. Hawai'i is lucky to not be one of the locations that lethal yellow affects. This makes Hawai'i one of the better places to buy palm seed that has no danger of spreading lethal yellow. The Malaysian dwarf coconut, called Samoan dwarf coconut in Hawai'i (Fig. 7), and many other palm species are resistant to lethal yellow. The following palm species are known to be susceptible to lethal yellow:

- Borassus flabellifer* (Palmyra palm)
- Caryota mitis* (fish tail palm, Fig. 8)
- Coccothrinax* (coconut palm)
- Dactyloctenium aegyptium* (grasses palm, Fig. 9)
- Lantana* sp. (lantana palm)
- Leontodon chinensis* (Chinese fan palm)
- Phoenix canariensis* (Canary Island date palm, Fig. 10)
- Phoenix dactylifera* (date palm, Fig. 11)
- Phoenix nieliana* (Savaghi date palm)
- Phoenix sylvestris* (wild date palm)
- Pritchardia affinis*
- Pritchardia pacifica* (Fiji fan palm, Fig. 12)
- Pritchardia thurstonii* (Maui palm, Fig. 13)
- Vactia merrillii* (Maui palm, Fig. 14)
- Vactia montgomeryana* (Montgomery palm).

Bringing palm seeds to Hawai'i is a very serious violation of plant quarantine regulations because of the danger of importing lethal yellow.

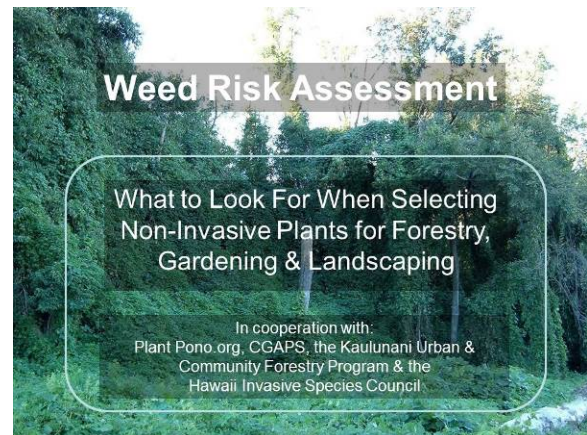
All palms assessed as of August 2014

[Deliverable 3] Testing and transition to the new web-based WRA database: In collaboration with staff of the Hawaii Biodiversity Information Network (HBIN), the new web-based weed risk assessment database began testing in February 2014. Evaluation, modifications and debugging of the database continued through the end of April 2014. The new database provides an improved interface for data entry and generates more professional reports of the completed assessments. The new database also addresses shortcomings with the previous program, and will provide greater accessibility to information through enhanced query features, in development for 2015. It is anticipated that HPWRA content, through queries, will eventually be made available to members of the general public.

[Deliverable 4] Public presentations and Outreach:

To promote awareness and encourage use of the HPWRA system, the WRA Specialist is involved in additional outreach activities with partner agencies and interested parties. The following highlights outreach activities and efforts from January 2014 – December 2014:

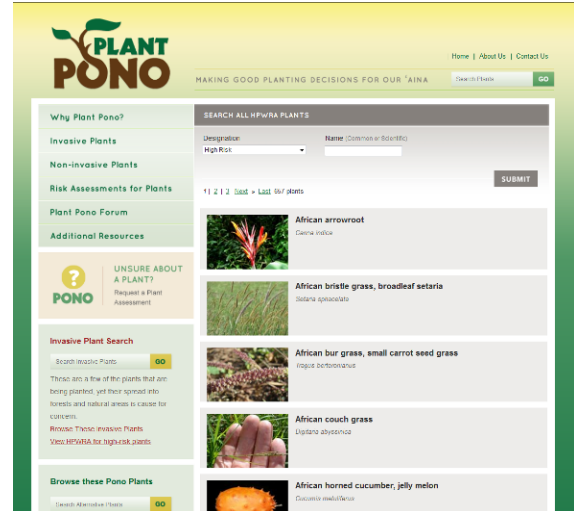
- 11 Feb: Native plant presentation to Kona Master Gardeners class, Kona, HI (20 attendees)
- 11 Feb: WRA & invasive plant presentation to Kona Master Gardeners class, Kona, HI (20 attendees)
- 25 Mar: Invasive plant presentation to the East Hawaii Master Gardeners class, Hilo, HI (18 attendees)
- 22 Jul: Invasive Plants - Hawaii's Growing Problem & What we can do about it. Maui Association of Landscape Professionals Monthly Meeting, Kahului, HI (40 attendees)
- 19 Nov: Conducted WRA Workshop at Kauai Community College, Lihue, HI (8 participants)
- 20 Nov: WRA & invasive plant presentation to Kauai Conservation Alliance, Lihue, HI (20 attendees)
- 20 Nov: WRA & invasive plant presentation to the Kauai Landscape Industry Council, Lihue, HI (25 attendees)



KCA Presentation, Nov. 20

One outreach activity of note was the WRA workshop conducted at Kauai Community College, Lihue, HI on November 19, in partnership with the Plant Pono liaison and with funding provided by the Kaulunani Urban and Community Forestry Program. Participants from the National Tropical Botanical Garden, the Division of Forestry & Wildlife, Natural Area Reserve System and the U.S. Fish & Wildlife Service were instructed in the background, history and utilization of the weed risk assessment system so that they might incorporate and implement the screening process in their respective programs and utilize the results to guide and prioritize management decisions.

[Deliverable 5] hpwra.org & Partner Website Updates: All new and previously completed assessments continue to be posted at hpwra.org. This site allows users to download individual assessments, as well as a regularly updated list of all assessments completed to date. From January 1, 2014 to December 31, 2014, the website received 1,941 visits and 4,897 page views, demonstrating continued interest and need for risk assessment predictions to make informed planting decisions. In addition, all 1600+ assessments to date have been uploaded and posted to the Plant Pono website, a more user-friendly, non-academic planting site with HPWRA-generated content.



WRA Page (www.plantpono.org)

Summary of website developments (January 2014 – December 2014):

- 1,604 assessments posted to hpwra.org (<https://sites.google.com/site/weedriskassessment/home>)
- 1,604 assessments posted to Plant Pono (www.plantpono.org/)
- 233 plant mages uploaded to Plant Pono website
- HPWRA Project website (<https://sites.google.com/site/hpwraproject/>) provides access to the work calendar, quarterly and annual reports, and other HPWRA-related documentation.

[Deliverable 6] Respond to public inquiries directed to Maui Invasive Species Committee (MISC) about invasiveness of plants: The WRA Specialist, stationed on Maui, responded to 34 plant-related calls, providing information on identification, impacts and control of invasive, non-native plants.

Other Activities in 2014

The WRA Specialist has participated in or contributed to a number of activities pertaining to invasive species and conservation in the Hawaiian Islands, including the following:

- 10 Jan: Attended HISC/CGAPS Strategic Planning Workshop
- 15 Jan: Co-author of paper published in Pacific Science. Medeiros, A. C., Allmen, E. V., & Chimera, C. G. (2014). Dry Forest Restoration and Unassisted Native Tree Seedling Recruitment at Auwahi, Maui. Pacific Science, 68(1), 33-45.
- 08 Feb: Led MISC native garden tour to members of the Native Hawaiian Plant Society, Makawao, HI (15 participants)
- 21 Feb: Attended Nāhelehele Dryland Forest Symposium
- 18 Mar: Meeting with Haleakala Ranch board members to discuss weed control in restoration sites
- 25 Mar: Nursery survey with Big Island Invasive Species early detection botanists
- 16 Apr: Provided peer review for biofuel manuscript submitted to BioEnergy Research

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January 2014

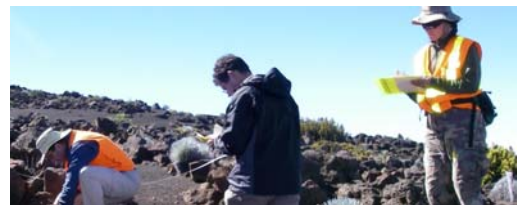
- 24 Apr: Provided peer review for biofuel manuscript submitted to Invasive Plant Science & Management
- 29 Apr: CPR/1st Aid Training
- 09 May: Conference call on Off-Shore & Incipient Plant Project
- 13 May: Attended meeting on Off-Shore & Incipient Plant Project (Oahu)
- 13 May: Waimanalo nursery visit to discuss invasive tree ferns & Plant Pono
- 17 Jun: Attended HISC Proposal Meeting
- 20 Jun: Attended MISC meeting
- 29 Jun: A-100 Basic Aviation Safety training
- 07-10 Jul: Attended the Island Biology Conference, Honolulu, HI (chaired Conservation Session on Wednesday, July 9th)
- 08 Jul: Co-author on Island Biology presentation: Drake, D. (presenter), K. McConkey, C. Chimera, A. Shiels, and K. Thompson. 2014. How might the loss of native seed dispersers and their replacement by novel species affect Polynesian forests?
- 12-13 Jul: Organized & co-led field trips into Haleakala National Park & Waikamoi Preserve in conjunction with the Island Biology Conference
- 27 Jul: Reviewed & edited Maui County Planting Plan
- 31 Aug: Collected *Bocconia frutescens* seeds for collaboration with Greg Murray, Hope College, to assess seeds for potential toxicity & seed bank longevity
- 05 Sep: Provided native & non-invasive plant recommendations for Hawaii Nature Center's sensory garden
- 08 Sep: Reviewed MISC manuscript on mitred conure control efforts
- 11 Sep: Participated in backcountry field survey for *Cortaderia jubata* with MISC staff in Hanawi, East Maui
- 12 Sep: Provided comments on non-native pollinator seed mix for Master Gardener program
- 14 Sep: Screened entries for East Maui Watershed Partnership art show (to verify native status & exclude entries depicting non-native species)
- 29 Sep: Prepared invasive biofuel literature summary for Dave Robichaux, Hawaii Biofuel Foundation
- 02 Oct: Meeting with Leeward Haleakala Watershed Restoration Partnership to discuss monitoring protocols for invasive plants & native plant recovery
- 07 Oct: Staffed MISC information booth at Maui County Fair
- 13 Oct: Reviewed proposal & provided comments on a Hawaii Biofuel Foundation proposal
- 15 Oct: On-line participation in HISC Resources WG Strategic Planning Meeting
- 01 Nov: Participated in silversword monitoring at Haleakala National Park with UH Botany staff
- 10 Nov: Phone interview with Lisa Rey on OEQC and State Environmental Council annual report regarding invasive species threatening wetlands
- 13 Nov: Meeting with David Harry, Terviva, regarding *Pongamia pinnata* cultivation & potential



Bocconia seed study, Aug 31



Pampas Grass Survey, Sep 11 (Image: F&K Starr)



Silversword Monitoring, Nov 01

risks as a biofuel feedstock

- 17 Nov: Attended MISC Meeting
- 24 Nov: On-line participation in webinar: Bioenergy & Invasive Species: Implementation of the Renewable Fuel Standard hosted by the National Invasive Species Council

For more information, please contact: hpwra@yahoo.com or visit hpwra.org