 KISC KAUAI INVASIVE SPECIES COMMITTEE	Kauai Status	KISC Status	HPWRA	Invasive Impacts Score	Feasibility Score	Combined Score
<i>Coccinia grandis</i> (ivy gourd)	Naturalized	TARGET	HIGH RISK (21)	6	5	11

Initial Prioritization Assessment Report completed: January 2017

Report updated as of: N/A

Current Recommendation for KISC: REMAIN AS TARGET

Knowledge Gaps and Contingencies:

- 1) This Prioritization and Feasibility of Control report emphasizes *C. grandis*'s potential effects on natural and agricultural systems. However, populations are numerous and large and obstacles to control have been illuminated since adopting this plant as a Target in 2002. The Feb 2, 2017 roundtable discussion should focus on strategies to overcome these obstacles (eg. increase control intensity at Mahaulepu site) and discuss whether eradication is feasible.

Background

Coccinia grandis (Cucurbitaceae) is a climbing perennial vine that can mature rapidly, progressing from seedling to fruit within three months if conditions are ideal (Salunkhe and Kadam 1998). This species is dioecious, with female plants producing fleshy fruits that are spread by birds and rats. Seeds do not exhibit dormancy (Motooka et al. 2003), although seeds can persist in the soil for over two years if germination conditions are unfavorable, with viability declining within one year (Salunkhe and Kadam 1998, Holstein 2015). *C. grandis* climbs aggressively over adjacent vegetation and structures in dry to mesic environments, making it a particular threat to agriculture, urban areas, archeological sites (e.g. Heiau), coastal vegetation, and native dry and mesic forests on Kauai (Starr et al. 2003).

Detection and Distribution

A cultivated specimen of *C. grandis* was first vouchered (and subsequently removed) on Kauai in Kalaheo in 1990 (D. H. Lorence 7119, PTBG). The first naturalized individual was collected in Lihue near Ahukini Road (N. Tangalin 2468, PTBG) in 2010. It is considered naturalized on Midway, Oahu, Lanai, Maui and Hawaii islands and has not been reported as naturalized on Kauai (Imada 2012).

C. grandis was adopted as a KISC Target in 2002. There are 30 known locations in Kauai, with most sites in lowland areas (Figures C12-1 to C12-4). The distribution of this plant is widespread, with locations found in all five of Kauai's judiciary districts (Figure C12- 1). Most location information is derived from early detection and delimiting survey data and invasive species reports. Due to its use as a food and medicinal plant, it is likely that it was planted on Kauai for food purposes (Salunkhe and Kadam 1998). The following maps show *C. grandis*' distribution on Kauai (Figures C12-1 to C12-4) with Figures C12- 2-4 showing sites at a finer scale because they are perceived by KISC as problematic for control.

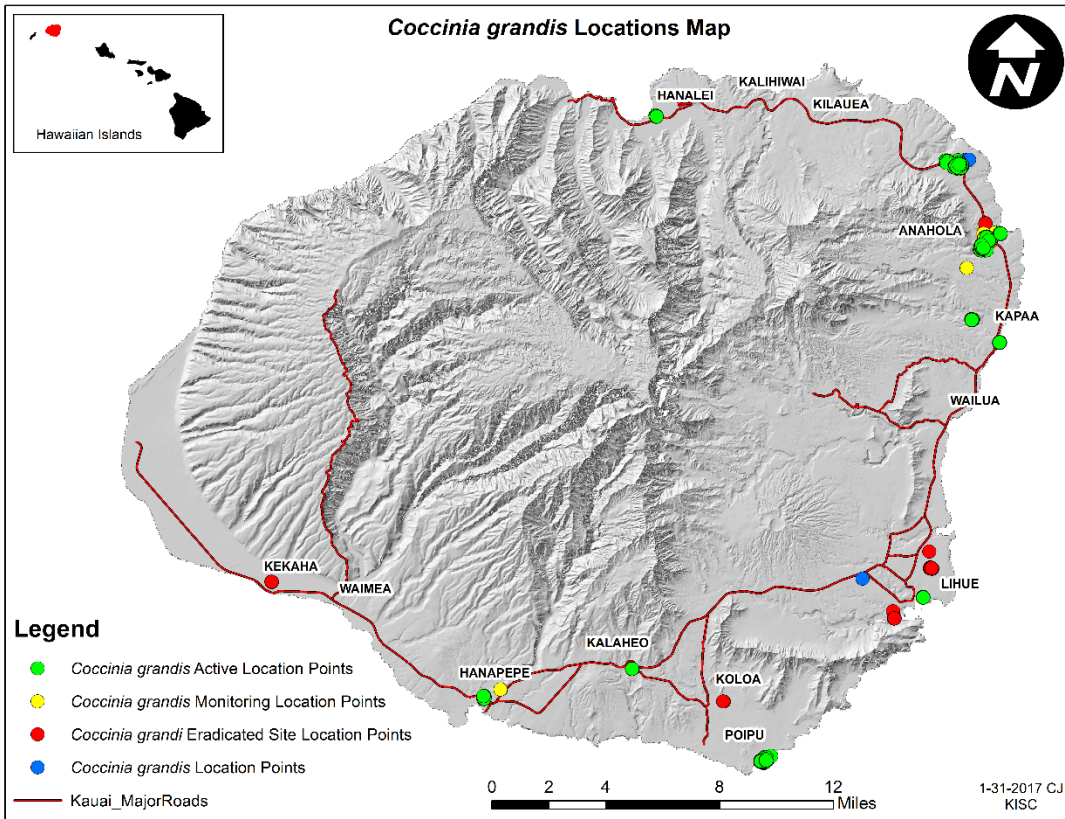


Figure C12- 1. Locations of *C. grandis* on Kauai with green circles representing sites treated 2015-2017 (likely an active site) and red circles locations treated prior to 2015 (perhaps corresponding to successfully removed plants).

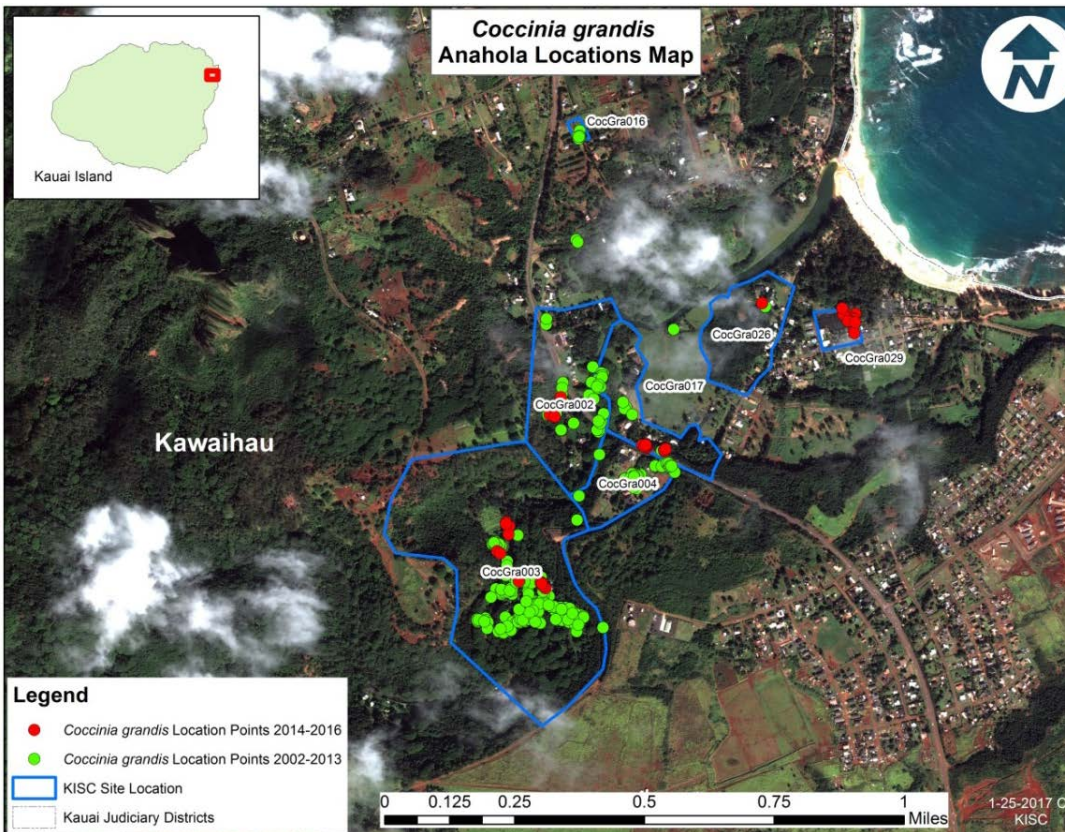


Figure C12- 2. Locations of *C. grandis* near Anahola with green circles representing plants treated 2015-2017 and red circles representing plants that were treated prior to 2015.

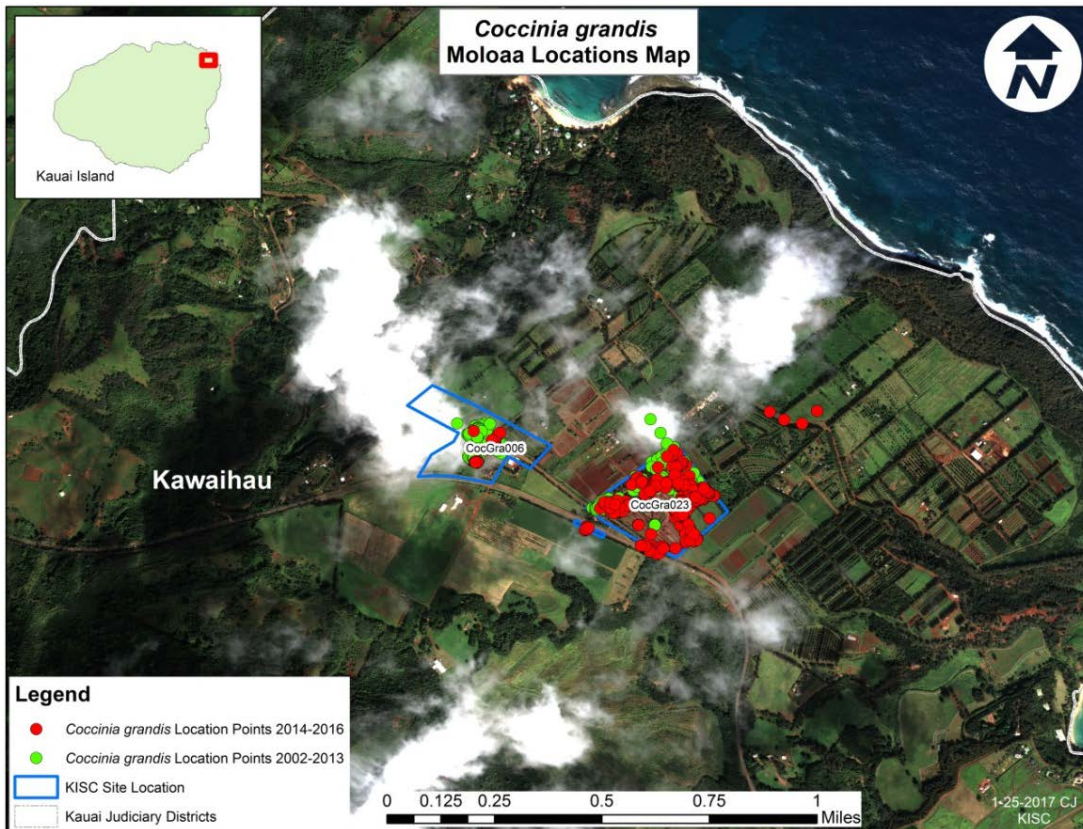


Figure C12- 3. Locations of *C. grandis* near Moloaa with green circles representing plants treated 2015-2017 and red circles representing plants that were treated prior to 2015.

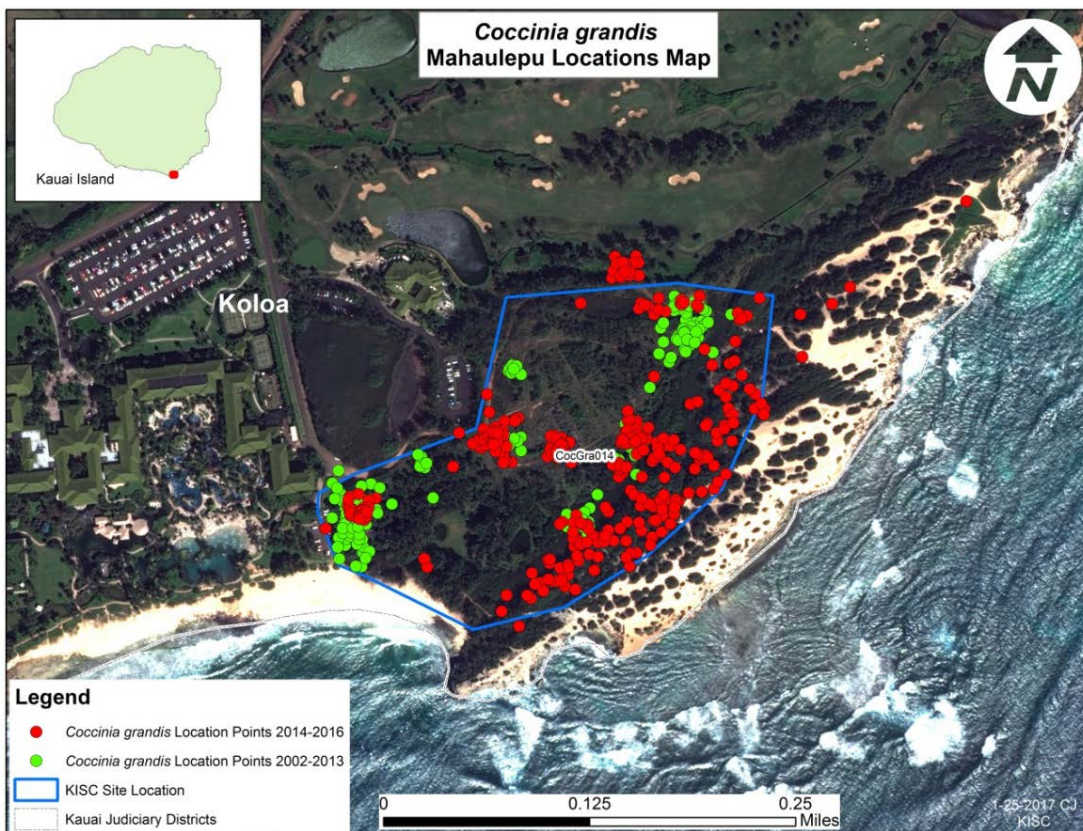


Figure C12- 4. Locations of *C. grandis* in Mahaulepu with green circles representing plants treated 2015-2017 and red circles representing plants that were treated prior to 2015.

Hawaii Pacific Weed Risk Assessment (HPWRA) Score

C. grandis is designated as “High Risk” (HPWRA 2012d), listing the following biological traits as contributors to its high risk status:

Likelihood and Consequences of Invasion

- Naturalized around the world and within Hawaii
 - Smothering habit
 - Major agricultural weed
 - Environmental weed, competing with native vegetation
 - Not easily controlled
 - Reaches maturity in < 1 year
 - Seeds easily dispersed by animals (including rats and birds)
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Refer to the full Weed Risk Assessment for *C. grandis* at <https://sites.google.com/site/weedriskassessment/assessments/Download-Assessments>.

Invasive Impacts Score

1. Impact on natural community structure and/or composition

Score: 2 = Moderate impacts

C. grandis was assigned a score of 2 in the “Impacts to Natural Communities” category due because its ability to form a smothering blanket and its preference for dry, hot areas make it a threat to native dry forest (Medeiros et al. 1993). Locations of *C. grandis* lie with five pop refs also containing PEP plants. A score of 3 was not assigned due to lack of evidence of long term evidence of total exclusion of other plants within an infestation.



Figure C12- 5. Photo of *C. grandis* showing smothering habit.

2. Impacts to Agriculture, Culture and other Human Systems

Score: 3 = Major impacts.

C. grandis received a score of 3 in the “Impacts to Agriculture” category due to its known history as a problematic weed of many crops across the Pacific (Waterhouse 1997, Starr et al. 2003, HPWRA 2012). An inventory of invertebrate and plant pests considered major threats agriculture in the south and western Pacific listed *C. grandis* as one of 35 plant species (Waterhouse 1997). Additionally, this plant is designated as a “noxious weed” by the Hawaii Department of Agriculture (HPWRA 2012d).

3. Impacts to Biotic and Abiotic Processes

Score: 1 = Minor Impacts

C. grandis was assigned a score of 1 in the “Impacts to Biotic and Abiotic Processes” rather than a higher score due to lack of studies measuring changes in abiotic factors associated with *C. grandis*. However, rapid colonization of disturbed sites and dense growth likely cause at least minor impacts to soil nutrient and moisture cycling.

TOTAL INVASIVE IMPACTS SCORE: 6

Feasibility of Control Score

Feasibility of Control Scoring and rationale for *C. grandis* is presented below. Refer to Appendix A for details regarding the Invasive Impact Score.

Delimiting Survey:

Score: 1 = Substantial Effort.

Feasibility of a delimiting survey for *C. grandis* was given a score of 1 because multiple locations exist, many of which have not been fully delimited. Delimitation buffer (distance away from a known plant that requires searching) is potentially a large distance due to bird dispersal. Each of the 30 sites has different challenges, but notably, sites overlap private land belonging to many owners.

Initial control:

Score: 1 = Substantial Effort

Feasibility of initial control for *C. grandis* was given a score of 1 due to presence of several widespread locations, some of which are large. Dense smothering mats of this species makes treatment of each stem leading to an underground tuber hard to locate, requiring multiple visits to ensure each plant is treated. Some locations of this plant are on agricultural land (organic farming) where pesticides use is not permissible.

Monitoring:

Score: 3 = Minimal Effort

Feasibility of monitoring for *C. grandis* was given a score of 3 because KISC crew experience shows that once plants are initially treated, plants do not tend to reestablish often. This, plus limited viability of seeds in the soil (Holstein 2015)

allows for a short monitoring period before sites can be considered more or less eradicated. Rapid maturity into large adult plants also allows the crew to easily detect regenerating plants within a reasonable amount of time since initial control (as opposed to plants remaining as inconspicuous seedlings for many years as in *Miconia*).

FEASIBILITY OF CONTROL SCORE: 5

COMBINED SCORE: 6 + 5 = 11

Literature Cited

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