

# **APPENDIX D: Background and Distribution Data for Other Species of Interest to KISC**

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(These species have not received Prioritization Assessments)

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	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Artabotrys hexapetalus</i> (ylang ylang)</p>	ADVENTIVE?	REMOVE FROM SURVEY LIST?	LOW RISK (-1)	<p><b>Widely cultivated and present in nurseries, likely not suitable for KISC Target designation; likely not suitable for Pono PHASE OUT list because of “Low Risk” status; continue to document naturalization and impacts incidentally.</b></p>

### Background

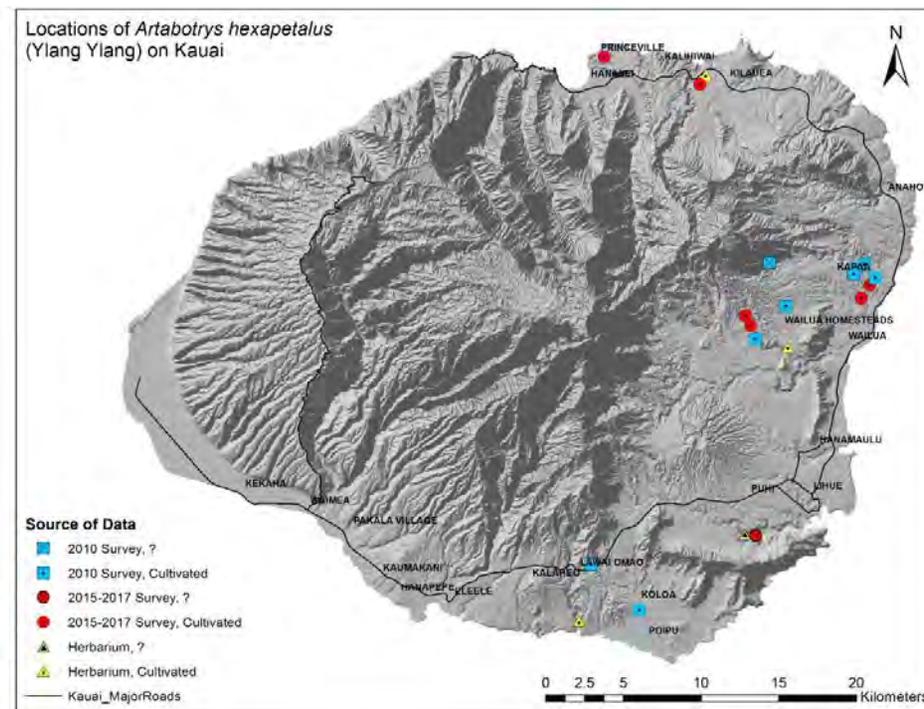
*Artabotrys hexapetalus* (Annonaceae), or “ylang ylang”, is a climbing vine that is cultivated as an ornamental. This species was mapped during 2010 surveys to inform KISC Target selection (i.e. accept “Target” status) and eradicate this plant from Kaua’i. 2015-2017 surveys served to supplement this information.



Above: *A. hexapetalus* growing along Huleia River.

### Detection and Distribution

The first record of *A. hexapetalus* on Kaua’i is a herbarium voucher collected from a cultivated plant in Kapaa in 1987 (L. Hume 425, PTBG). Statewide, *A. hexapetalus* is known to be naturalized on O’ahu, Maui and Hawai’i islands (Imada 2012). ***A. hexapetalus* appears to be commonly cultivated on Kaua’i** (see figure below). It is possible that it is naturalizing along the Huleia River (K. Brock 796; PTBG), but signs of human presence (lawn chairs, rope swing other cultivated plants) bring this into question. **Another survey in this region would be useful to confirm naturalization.** Current data indicates that plants are distributed throughout all house districts (14, 15,16), all judiciary districts except Waimea, 8 watersheds (Lawai, Waikomo, Huleia, Wailua, Kapaa, Moikeha, Kalihiwai, Waileia), 20 TMKS and 3 pop ref polygons containing PEP plants ( Huleia-HUL, Kapaa-KAP, Kalihiwai-KLW).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Arundo donax</i> (giant reed)</p>	NATURALIZED?	TARGET	HIGH RISK (12)	<b>Conduct full prioritization assessment to consider potential invasive impacts and feasibility of eradication. Use outreach strategies to inform people cultivating this plant.</b>

**Background**

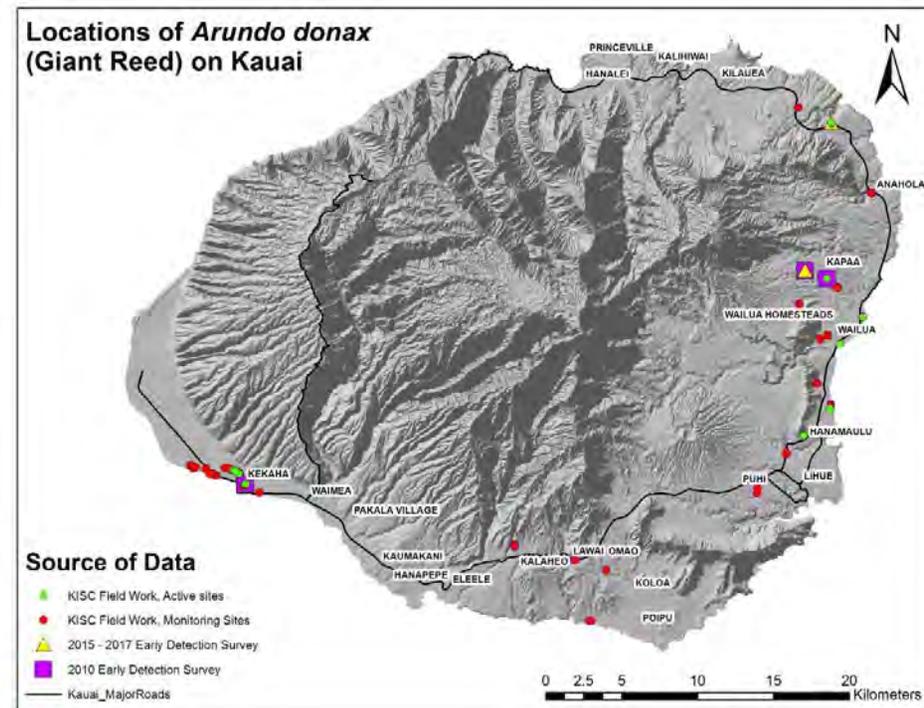
*Arundo donax* (Poaceae), or “giant reed”, is a grass that is cultivated as an ornamental. This species **has been a KISC Target since 2002**. It was **mapped during 2015-2017 surveys to supplement previous distribution data and inform the prioritization assessment process** used to evaluate whether KISC should continue to attempt eradication (i.e. keep “Target” status) of this plant from Kaua’i.



Above: Variegated *A. donax* regenerating in a nursery in Moloaa.

**Detection and Distribution**

The first record of *A. donax* is a herbarium voucher collected from Kekaha in 1985 (T. Flynn 1188, PTBG). Statewide, *A. donax* is known to be naturalized on Kaua’i, O’ahu, Lanai, Maui and Hawai’i islands (Imada 2012). **Two additional sites of cultivation were noted during 2015-2017 surveys, including one in a nursery**. Current data indicates that these plants have been distributed throughout all house districts (14, 15,16), all judiciary districts, 14 watersheds (Hoea, Paua, Kapilimao, Waikomo, Aepo, Puali, Hanamaulu, Kawailoa, Wailua, Waikaea, Moikeha, Anahola, Moloaa, Waipake), 53 TMKs and 2 popref polygons containing PEP plants (Hanamaulu-ULU, Kapaa-KAP) However, many of these sites have been removed by KISC (see figure below).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Barleria repens</i> (coral creeper)</p>	NATURALIZED	PONO PHASE OUT LIST?	HIGH RISK (16)	Not a likely candidate for KISC Target designation because it has widely naturalized; consider for Pono PHASE OUT list; continue to record invasive impacts incidentally.

### Background

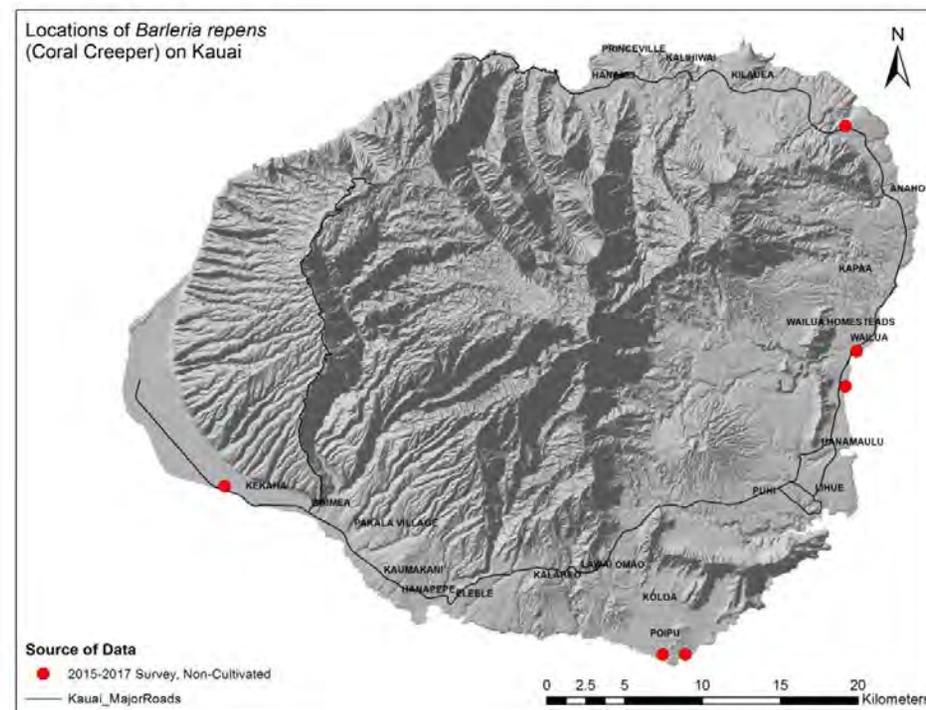
*Barleria repens* (Acanthaceae), or “coral creeper”, is a low shrub that is cultivated as an ornamental. Some non-cultivated instances of this plant were **mapped during 2015-2017 surveys because naturalized populations were detected, making it a new naturalization record for Kaua’i**. However, **cultivated instances of this plant were not mapped** and as this plant is widely naturalized across Kaua’i, **only large, well-established infestations were mapped** to provide evidence that it has naturalized.



Above: *B. repens* naturalized in coastal area with *Rivina humilis* (Pigeon berry) under *Casuarina equisetifolia* (ironwood).

### Detection and Distribution

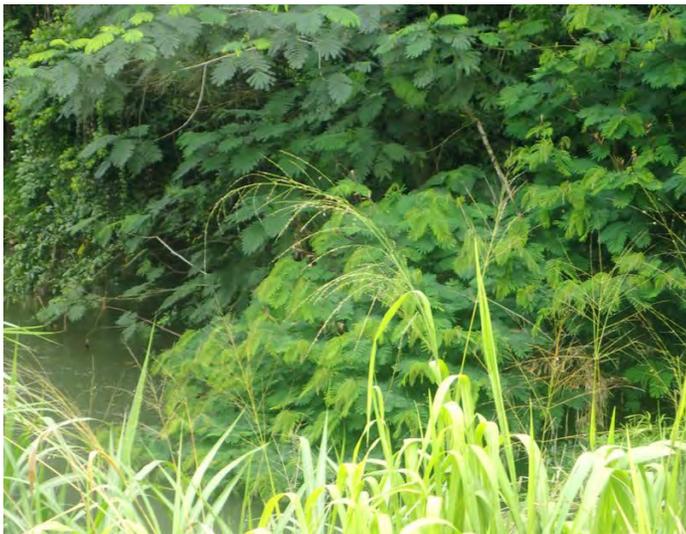
The first record of *B. repens* on Kaua’i is a herbarium voucher collected in Kalaheo in 1993 (T. Flynn, PTBG). Statewide, *R. laevigata* is known to be naturalized on O’ahu, Lanai and Maui (Imada 2012). Although other herbaria vouchers also indicate that *B. repens* has naturalized, 2015-2017 surveys confirm that *B. repens* is **widely distributed throughout Kaua’i**. It often forms an alien species assemblage with *Casuarina equisetifolia* (iron wood) and *Rivina humilis* (Pigeon berry) in coastal forested areas. Many more naturalized points exist on Kaua’i, but current data indicates that plants are naturalized within all house districts (14,15,16), and 4 judiciary districts (Waimea, Koloa, Lihue, Kawaihau).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Calliandra houstoniana</i> var. <i>calothyrsa</i> (calliandra)</p>	NATURALIZED	BORDERLINE EARLY DETECTION	HIGH RISK (12)	Forestry planting appears large, distribution may not be considered limited unless it is removed with landowner collaboration. Once surveyed/removed, conduct full prioritization assessment to consider invasive impacts vs. feasibility of eradication. Use outreach strategies to inform people cultivating this plant.

### Background

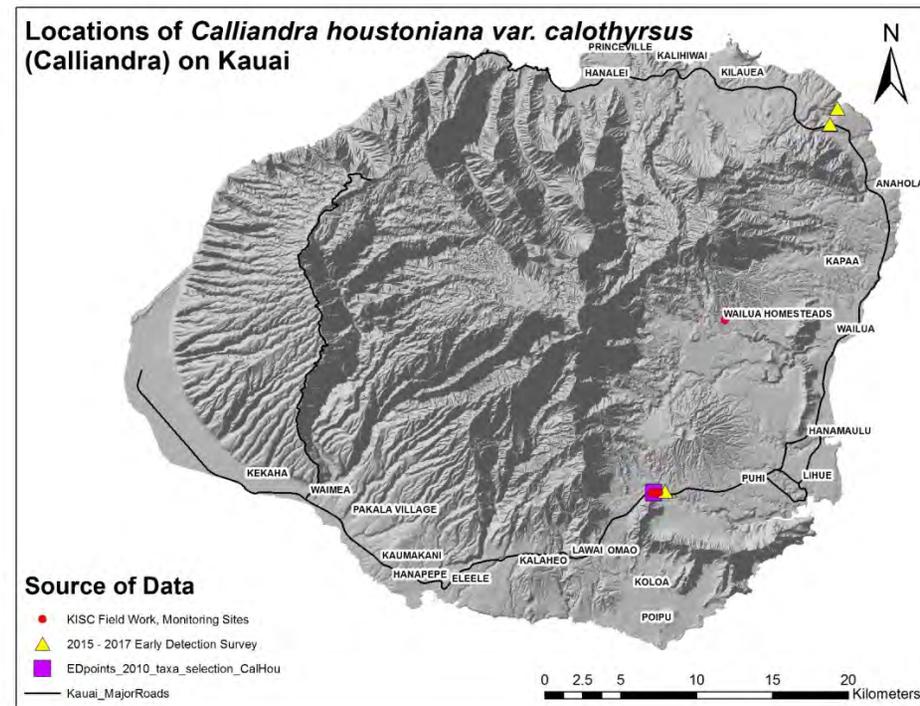
*Calliandra houstoniana* var. *calothyrsa* (Fabaceae), or “calliandra”, is a small tree that is cultivated as an agro-forestry species. This species **was mapped during 2015-2017 surveys to supplement previous distribution data and inform the prioritization assessment process** used to evaluate whether KISC should continue to attempt eradication (i.e. keep “Target” status) of this plant from Kaua’i. Additionally, **2015-2017 surveys documented some potential environmental impacts resulting from this plant.**



Above: Variegated *C. houstoniana* var. *calothyrsa* colonizing the banks of Huleia stream

### Detection and Distribution

The first record of *C. houstoniana* var. *calothyrsa* is a herbarium voucher collected from a forestry planting west of Puhi in 2000 (T. Flynn 6725, PTBG). Statewide, *C. houstoniana* var. *calothyrsa* is known to be naturalized on Kaua’i, Lanai, Maui and Hawai’i islands (Imada 2012). The **population spreading from the known forestry planting west of Puhi appears to be growing quickly** and it can now be observed **forming dense patches along the Huleia river** (see photo). Additionally, this plant was **observed in cultivation in a yard in Moloaa and in a nursery** (K. Brock 807, PTBG). Current data indicates that plants are naturalized within 2 house districts (14, 15), 2 judiciary districts (Lihue, Kawaihau), 4 watersheds (Huleia, Wailua, Waikaea, Moloaa), 7 TMKs and 1 popref polygon containing PEP plants (Huleia-HUL).



 <b>KISC</b> <small>KAUAI INVASIVE SPECIES COMMITTEE</small>	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<i>Callitris columellaris</i> (white cypress pine)	NATURALIZED	REMAIN ON SURVEY LIST	EVALUATE (4)	<b>Not a likely candidate for KISC Target designation because of large forestry planting and “evaluate” WRA ranking; continue to collect data on population distribution and impacts to inform HPWRA.</b>

**Background**

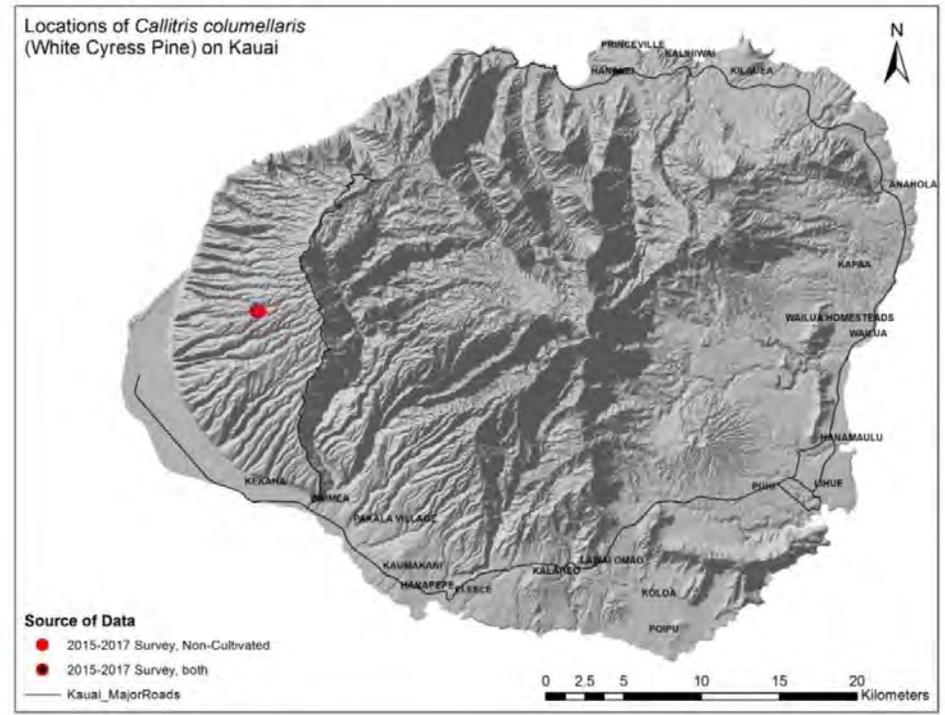
*Callitris columellaris* (Cupressaceae), or “white cypress pine”, is a tree that is sometimes cultivated as a forestry tree. Some non-cultivated instances of this plant were **mapped during 2015-2017 surveys because naturalized populations were detected, making it a new naturalization record for Kaua’i.** Cultivated instances of this plant were not mapped.



Above: *C. columellaris* forestry planting.

**Detection and Distribution**

The first record of *C. columellaris* on Kaua’i is a herbarium voucher collected in Kokee in 2006 (D.H. Lorence 9505, PTBG), but these trees have been planted throughout Hawai’i by the Forest Service between 1910-1960 (Skolmen 1980)—although no planted record could be uncovered for Kaua’i. Nonetheless, *C. columellaris* was found **naturalizing from a large forestry planting on Kaua’i.** Naturalized individuals were found sparingly naturalized **in the understory of adjacent forestry plots and on open, grassy hillsides and disturbed slopes** over 500m from its original planting site (K. Brock 1042, PTBG). Statewide, *C. columellaris* was known to be naturalized on O’ahu and Maui (Imada 2012) prior to the collection of these data. Our data shows that plants are naturalized (and cultivated) within at least 1 house districts (16), 1 judiciary districts (Waimea), 1 watershed (Nahomalu), 2 TMKs and 1 popref polygons containing PEP plants (Kahoaloha-KHL).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Calotropis procera</i> (small crownflower)</p>	NATURALIZED	REMOVED FROM SURVEY LIST	HIGH RISK (15)	<b>Not a likely candidate for KISC Target designation because it is widespread inside and outside of cultivation; collect data on invasive impacts incidentally, if encountered.</b>

**Background**

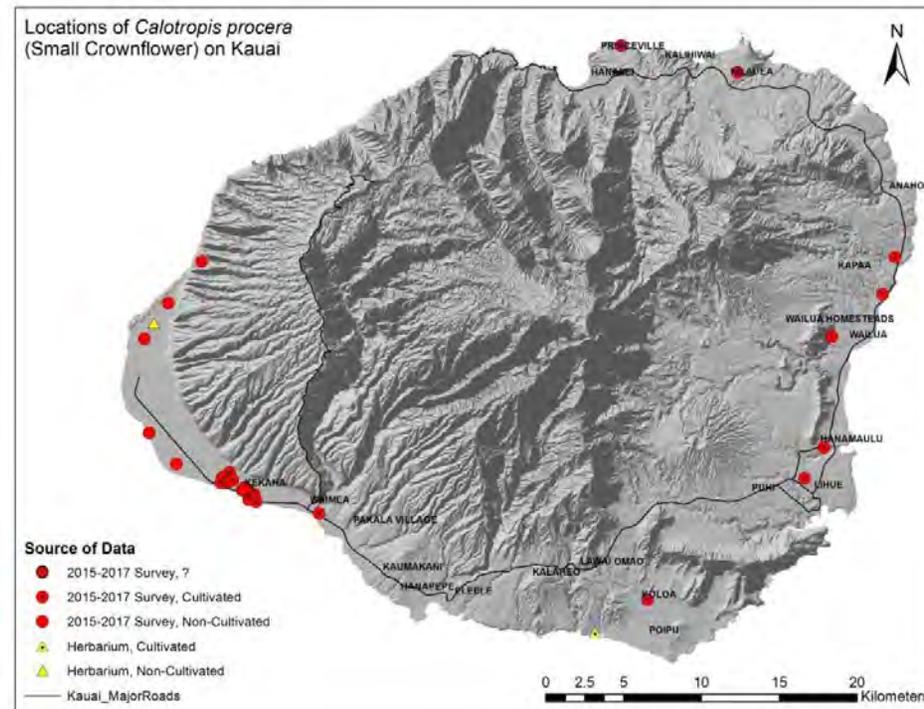
*Calotropis procera* (Apocynaceae), or “small crownflower”, is a shrub that is cultivated as an ornamental and used to make leis. This plant has been considered during early detection surveys by KISC in the past and members of the public and KISC partners inquire about it frequently. This species **was mapped during 2015-2017 surveys to confirm that *C. procera* is too widespread to eradicate** from Kaua'i. **Not all incidences were mapped**, as the number of populations/individuals present on the island made this too time consuming.



Above: Naturalized *C. procera* in field near Polihale.

**Detection and Distribution**

*C. procera* was first recorded on Kaua'i via a herbarium voucher from a non-cultivated plant in 2005 (K.R. Wood 11614, PTBG). Statewide, *C. procera* is known to have naturalized on Lehua, Kaua'i, Lanai, Maui, Kahoolawe and Hawai'i islands (Imada 2012). Plants are said to be **preferred for lei making** (R. Kahaunaele pers. comm.) and are **widely cultivated** throughout Kaua'i. It has been observed for sale in nurseries. *C. procera* is **naturalized and common throughout the west side of Kaua'i** (K. Brock 783, PTBG), especially around Kekaha where it is frequently cultivated. Current data indicates that plants are distributed throughout all house districts, all judiciary districts, over 15 watersheds, 40 TMKs and within 3 popref polygons containing PEP plants (Kapaa-KAP, Waimea Lower-WML, Kilauea-KIL).



	<i>Kaua'i Status</i>	<i>KISC Status</i>	<i>HPWRA</i>	Current Recommendation for KISC:
<p><i>Cenchrus setaceus</i> (fountain grass)</p>	NATURALIZED	TARGET?	HIGH RISK (26)	Perform species specific survey in the Kalaheo-Hanapepe and Haena areas; conduct full prioritization assessment to consider potential invasive impacts and feasibility of eradication.

**Background**

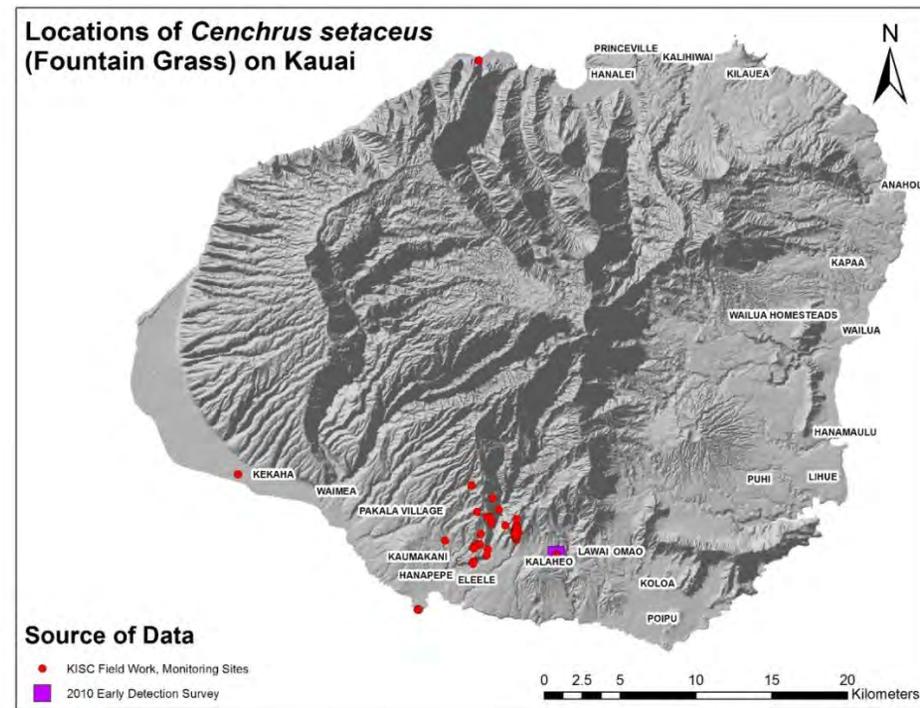
*Cenchrus setaceus* (Poaceae), or “fountain grass”, is a grass that is cultivated as an ornamental. **This species has been a KISC Target since 2004, however a greater understanding of the size of this infestation and its location on private land (with access permission issues) and cliff sides has led KISC to question whether it is eradicable from Kaua’i. 2015-2017 surveys served to supplement already existing data to inform future prioritization assessments.**



Above: *C. setaceus* in Kekaha in 2016

**Detection and Distribution**

The first record of *C. setaceus* is a herbarium voucher collected from a naturalized patch near Salt Pond in Hanapepe in 1998 (K.R. Wood 7401, PTBG). Statewide, *C. setaceus* is known to be naturalized on Kaua’i, O’ahu, Lanai, Maui, Kahoolawe and Hawai’i islands (Imada 2012). The population between Hanapepe and Kalaheo is believed to be large, but KISC has not delimited this infestation recently. Although difficult to identify from a distance, some plants appear to be growing on a cliff face in Haena and may be spreading significant distances eastward. 2015-2017 surveys detected *C. setaceus* in Kekaha, which represents a significant westward range expansion into ideal habitat (K. Brock 857, PTBG see figure below). It is possible that plants may be common but undetected on private land between Kalaheo and Kekaha. Current data indicates that plants are naturalized within 2 house districts (14, 16) 3 judiciary districts (Waimea, Koloa, Hanalei), 6 watersheds (Paua, Kaumakani, Hanapepe, Wahiawa, Lawai, Manoa), 25 TMKs and 1 popref polygon containing PEP plants (Hanapepe-EPE).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Centrosema molle</i> (butterfly pea)</p>	NATURALIZED	ON SURVEY LIST	HIGH RISK (11)	<b>Gather more distribution information; if distribution is limited, conduct full prioritization assessment to consider potential invasive impacts and feasibility of eradication.</b>

### Background

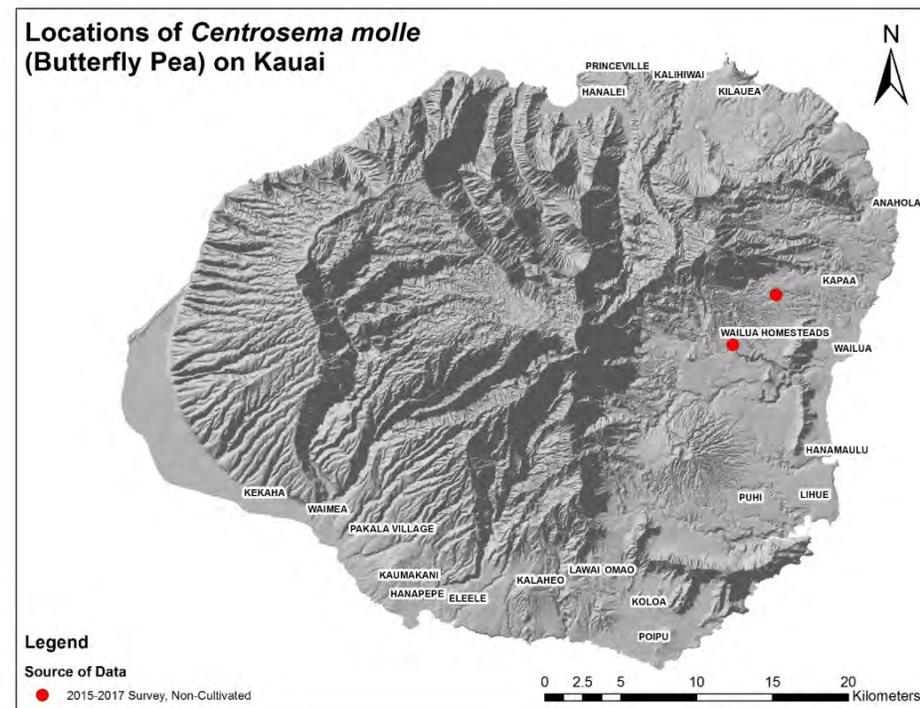
*Centrosema molle* (Fabaceae), or “butterfly pea”, is a herbaceous vine that was likely introduced as a tropical forage. This species **was mapped during 2015-2017 surveys to inform the prioritization assessment process** used to evaluate whether KISC should attempt eradication (i.e. keep “Target” status) of this plant from Kaua’i. **Additionally, 2015-2017 surveys documented some potential agricultural impacts resulting from this plant.**



Above: *C. molle* in Wailua Homesteads.

### Detection and Distribution

The first record of *C. molle* is a herbarium voucher collected from a plant in Kalaheo in 1986 (T. Flynn 1958, PTBG). Statewide, *C. molle* is known to be naturalized on Kaua’i, O’ahu and Maui (Imada 2012). **Dense blankets of this plant, similar to other Fabaceae vines on Kaua’i (e.g. *Neontonia wightii*), have been observed climbing over trees and along irrigation ditches in Wailua Homesteads (K. Brock 1076, PTBG).** The discovery of additional herbarium vouchers not represented in the figure below in Anahola and Kalaheo suggest that **it may be more widely distributed than currently known**. As there are many trifoliolate Fabaceae vines on Kaua’i, it is possible that multiple sites were missed during surveys. Current data (including herbarium vouchers not represented below) indicates that plants are naturalized within 2 house districts (14, 16), and 2 judiciary districts (Kawaihau, Koloa).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Cereus uruguayanus</i> (Peruvian apple)</p>	NATURALIZED	PONO PHASE OUT LIST?	HIGH RISK (10)	<b>Not suggested for KISC Target designation because of large distribution, cultivation status and its presence in nurseries; consider for Pono PHASE OUT list.</b>

**Background**

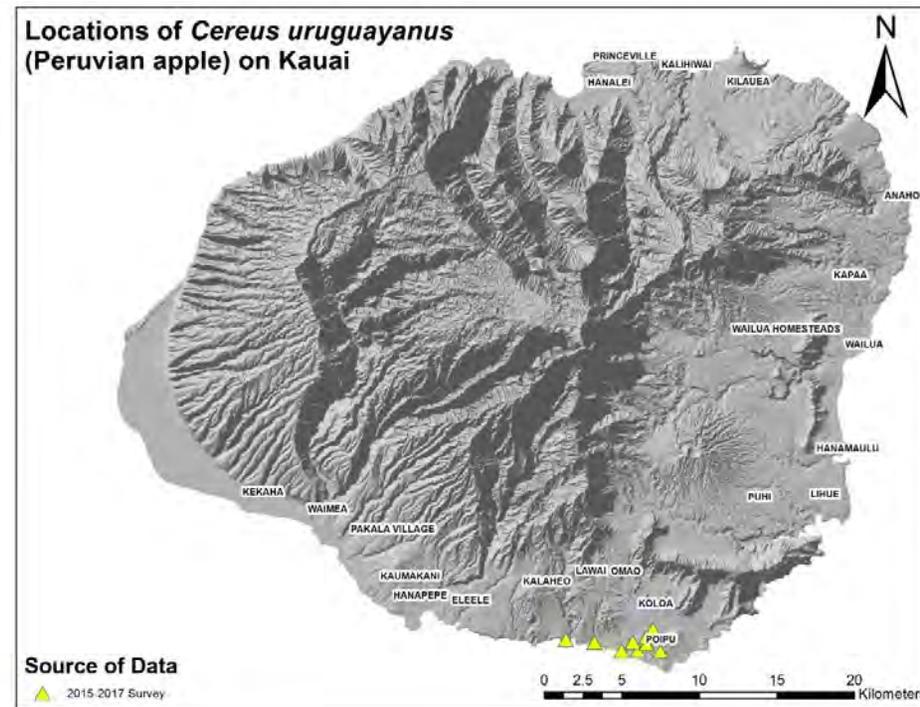
*Cereus uruguayanus* (Cactaceae), or “Peruvian apple”, is a large succulent that is cultivated as an ornamental. **2015-2017 surveys detected potential agricultural impacts and thus, large infestations with evidence of impacts were noted.**



Above: *C. uruguayanus* impacting pastureland.

**Detection and Distribution**

The first record of *C. uruguayanus* is a herbarium voucher collected from Koloa in 1959 (C.N. Forbes s.n., BISH ). Statewide, *C. uruguayanus* is known to be naturalized on Kaua’i and Maui (Imada 2012). This plant is becoming very common around Koloa, forming a commonly observed community complex with *Leucaena leucocephala*, but it **appears to become most dense in heavily grazed pasture** (see photo). These densities appear to **be impacting pasture yields and grazing ease for livestock**. Cattle were observed grazing around dense stands of *C. uruguayanus*, but notably seemed to choose less infested areas to lie down. It is possible that this plant **could become a very serious pest in the future** and will likely continue to spread westward along dry-mesic leeward habitats. Current data indicates that plants are naturalized within 1 house district (16), 1 judiciary district (Koloa). Although, it has been **noted in yards island-wide and was detected during nursery surveys.**



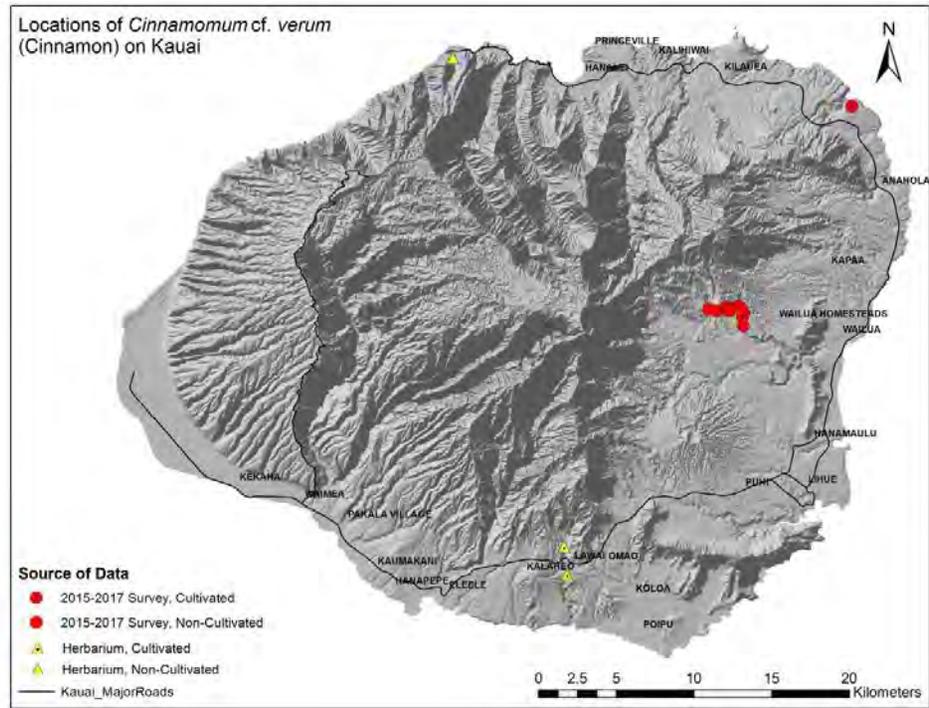
	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<b><i>Cinnamomum cf. verum</i></b> (cinnamon)	NATURALIZED	EARLY DETECTION?	HIGH RISK (10)	<b>Resolve identification issues and decide if prioritization assessment is needed; keep on survey list.</b>

**Background**

*Cinnamomum verum* (Lauraceae) is a tree cultivated for the cinnamon spice. This species **was mapped during 2015-2017 surveys to inform the prioritization assessment process** used to evaluate whether KISC should attempt eradication (i.e. accept “Target” status) of this plant from Kaua’i. However, **the identification of plants naturalizing around the Kaua’i Agricultural Research Center (KARC) in this report are uncertain** (hence the “cf.” qualifier denoting taxonomic uncertainty), **inhibiting our ability to conduct a prioritization assessment.** *C. verum* (true cinnamon) is considered naturalized on Kaua’i (Wagner et al. 1999), but *C. cf. verum* naturalizing around KARC has some notable morphological differences. A Lauraceae specialist from Missouri Botanical Garden was sent *Cinnamomum* material from a cultivated plant at KARC ((T. Flynn 3365), and although he could not verify the identification of the specimens, he advised that *C. japonicum* was a possible, but unconfirmed identification. Since then, additional taxonomic work on the genus for the Flora of China (Xi-wen et al. 2008) has been completed and more vouchers have been collected from KARC that emphasize that these plants do not precisely fit species descriptions for either *C. japonicum* or *C. verum* (K. Brock 797, 884, PTBG). However, *C. verum* seems to differ from KARC plants in mostly vegetative characters, while *C. japonicum* varies in both vegetative and floral/fruit characters. As *C. verum* is one of the more commonly cultivated members of the genus, it is possible that these plants represent a unique cultivar of *C. verum*. Collaboration with taxonomists will continue in hopes to resolve the identity of Kaua’i plants.

**Detection and Distribution**

*C. verum* was first recorded on Kaua’i from a naturalized population in Limahuli Valley in 1972 (E. Earle 6, PTBG). Statewide it is known as naturalized on Kaua’i, O’ahu, Maui and Hawai’i islands (Imada 2012). However, **unsolved ID issues prevent our ability to determine whether this plant is widespread.** The population at KARC is the only known location of morphologically distinct plants, and if these plants are finally identified as a separate species, it may be eradicable from Kaua’i (see figure below). All other points in the figure represent plants with more stereotypical *C. verum* characteristics. However, the population around KARC is getting large (at least 250 ha/615 acres) with **monotypic stands in moist areas.** Assuming all plants are *C. verum*, current data indicates that plants are distributed within 2 house districts (14, 15), 3 judiciary districts (Hanalei, Kawaihau, Koloa), 4 watersheds (Lawai, Limahuli, Moloaa, Wailua), 11 TMKs and 1 popref polygons containing PEP plants (Limahuli –LIM).



	<i>Kaua'i Status</i>	<i>KISC Status</i>	<i>HPWRA</i>	<i>Current Recommendation for KISC:</i>
<p><i>Cissus verticillata</i> (princess vine)</p>	NATURALIZED	REMOVED FROM SURVEY LIST	HIGH RISK (12)	<b>Not a likely candidate for KISC Target designation because infestation is large and dense, climbing hazardous infrastructure (eg. utility lines) and chemical control is ineffective; continue to record invasive impacts incidentally.</b>

### Background

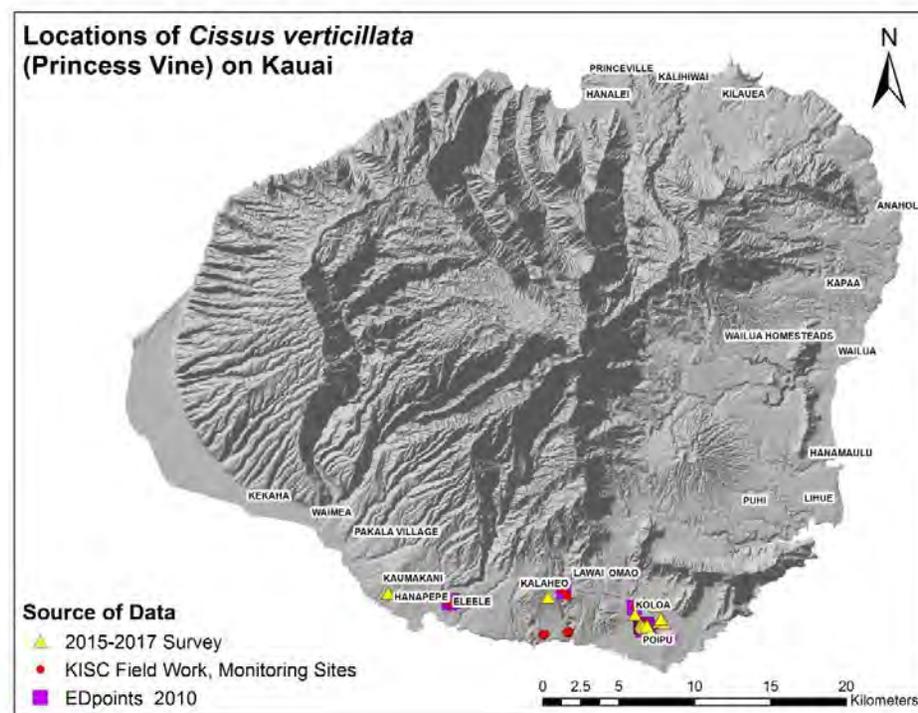
*Cissus verticillata* (Vitaceae), or “princess vine”, is a vine that has been cultivated as an ornamental. This species **was mapped in 2010 when it was recommended as a potential KISC Target**. Control efforts were investigated, but no herbicide application techniques have been effective. **2015-2017 surveys sought to supplement previous distribution data. Additionally, 2015-2017 surveys detected potential impacts to agriculture and infrastructure.**



Above: *C. verticillata* climbing over a shed (does not appear to be in use) and along a fence at the old Koloa sugar mill.

### Detection and Distribution

Herbarium vouchers indicate that *C. verticillata* has been present on Kaua’i since at least 1986 (T. Flynn 1933, PTBG). Statewide, *C. verticillata* is known to have naturalized on Kaua’i and O’ahu (Imada 2012). *C. verticillata* is **common throughout Koloa and was observed forming thick mats of vegetation over fruit trees, pastures, buildings and fences (see photo) and up utility lines** (K. Brock 954, PTBG). Comparisons between 2010 and 2015-2017 survey data indicate that this plant has become more common and dense in 5-7 years. Current data indicates that plants are distributed throughout house district 16, 2 judiciary districts (Koloa, Waimea), 6 watersheds (Waihiawa, Lawai, Waikomo, Mahaulepu, Kaumakani), 23 TMKs and within 2 popref polygons containing PEP plants (Mahaulepu-MAH, Hanapepe-EPE).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Citharexylum caudatum</i> (fiddlewood)</p>	NATURALIZED	PONO PHASE OUT LIST?	HIGH RISK (15)	<b>Not a candidate for KISC Target designation because it is widely naturalized; consider for Pono PHASE OUT list; continue to collect data on invasive impacts incidentally.</b>

**Background**

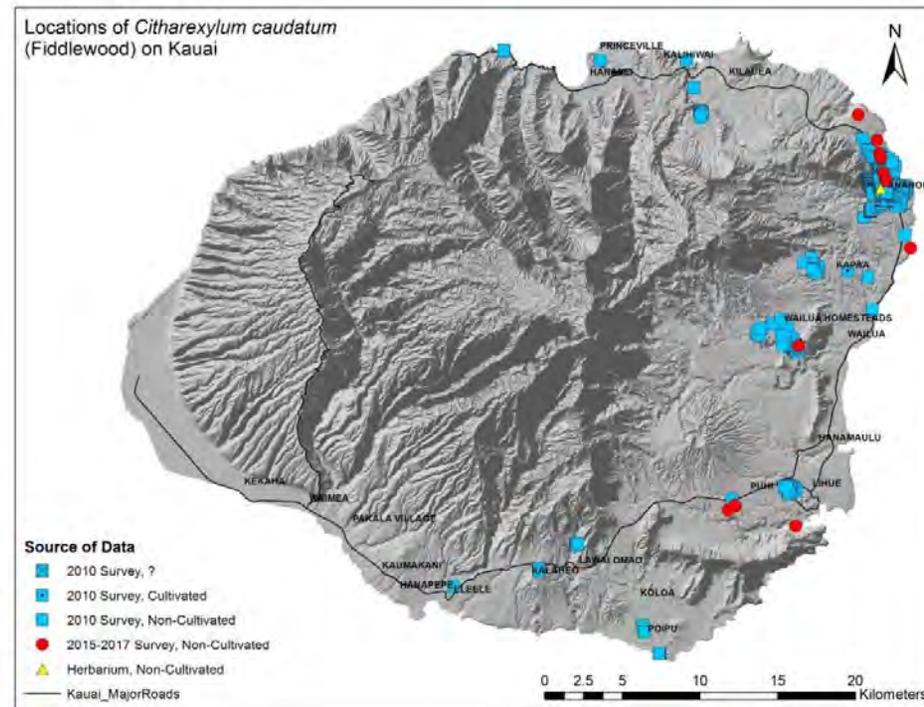
*Citharexylum caudatum* (Verbenaceae), or “fiddlewood”, is a shrub or small tree that is cultivated as an ornamental. This plant has been considered during early detection surveys by KISC in the past and members of the public and KISC partners inquire about it frequently. This species **was mapped thoroughly in 2010, revealing that it is too widespread to eradicate from Kaua'i. 2015-2017 surveys detected potential agricultural and environmental impacts and thus, large infestations with evidence of impacts were noted.**



Above: *C. caudatum* forming dominant stands near Anahola.

**Detection and Distribution**

Herbarium vouchers indicate that *C. caudatum* has been present on Kaua'i since at least 1990 (D.H. Lorence 6439, PTBG). Statewide, *C. caudatum* is known to have naturalized on Kaua'i, O'ahu, Maui, and Hawai'i islands (Imada 2012). *C. caudatum* is **widely naturalized** in mesic to moist-mesic ecosystems in the lowlands of Kaua'i (K. Brock 877, PTBG; see figure below). It forms dominant stands in some areas, and will likely **continue to spread and become a substantial component of Kaua'i's lowland vegetation. It was detected during nursery surveys.** Current data indicates that plants are distributed throughout all house districts, all judiciary districts except Waimea, over 18 watersheds, 250 TMKs and within 7 popref polygons containing PEP plants (Huleia-HUL , Kapaa-KAP, Aliomanu-ALI, Papaa-PAP, Kilauea-KIL, Kalihiwai-KLW, Wainiha-WNH).





	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Clerodendrum buchananii</i> (red clerodendrum)</p>	NATURALIZED?	ON SURVEY LIST	HIGH RISK (7)	<p><b>Not a candidate for KISC Target designation because it is widely cultivated; continue to collect data on nursery presence and invasive impacts incidentally to inform future recommendation for the Pono PHASE OUT list.</b></p>

### Background

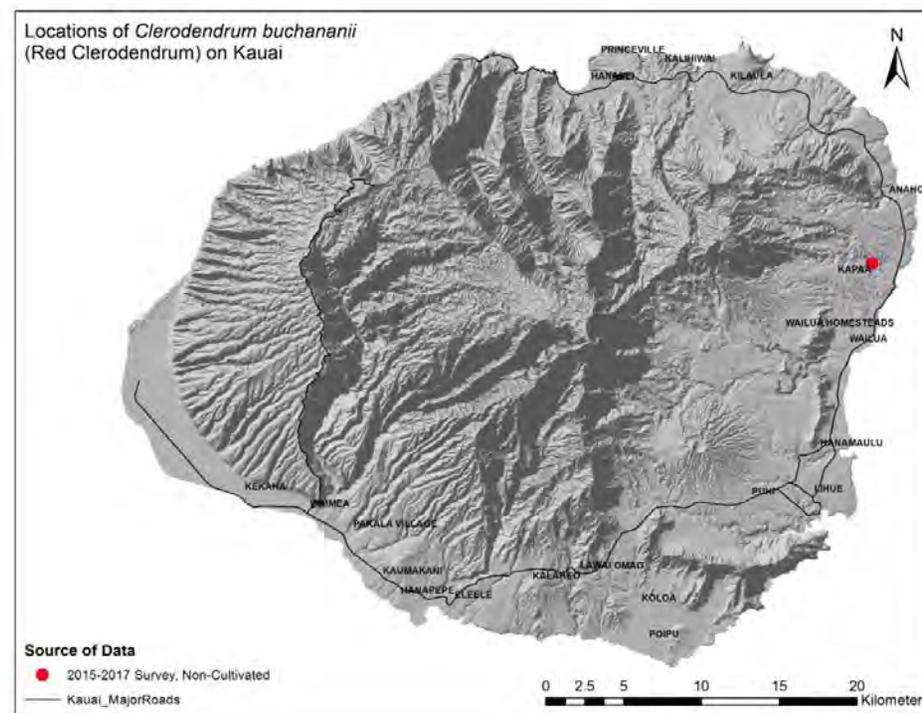
*Clerodendrum buchananii* (Verbenaceae), or “red clerodendrum” is a mid-sized shrub that is cultivated as an ornamental. One non-cultivated instances of this plant were **mapped during 2015-2017 surveys because a naturalized population was detected, making it a new naturalization record for Kaua’i. Cultivated instances of this plant were not mapped** in 2015-2017 as this plant is commonly sold in nurseries and planted in landscaping throughout Kaua’i.



Above: *C. buchananii* growing in a field.

### Detection and Distribution

2015-2017 surveys yielded the first record of *C. buchananii* on Kaua’i (K. Brock 983, PTBG), although it has likely been cultivated before 2015 as **it is a common ornamental**. Approximately 6 adult flowering plants and 10 immature plants were observed in a treed agricultural field between Kapaa stream and an unnamed road. No gardens or landscaped areas were located in the immediate vicinity. Not including data from 2015-2017 surveys, *C. buchananii* is known to have naturalized on Maui and Hawai’i islands and is considered adventive on O’ahu (Imada 2012). Current data indicates that plants are naturalized within 1 house district (14), 1 judiciary district (Kawaihau), 1 watersheds (Kapaa), 1 TMK and 1 popref polygon containing PEP plants (Kapaa - KAP).





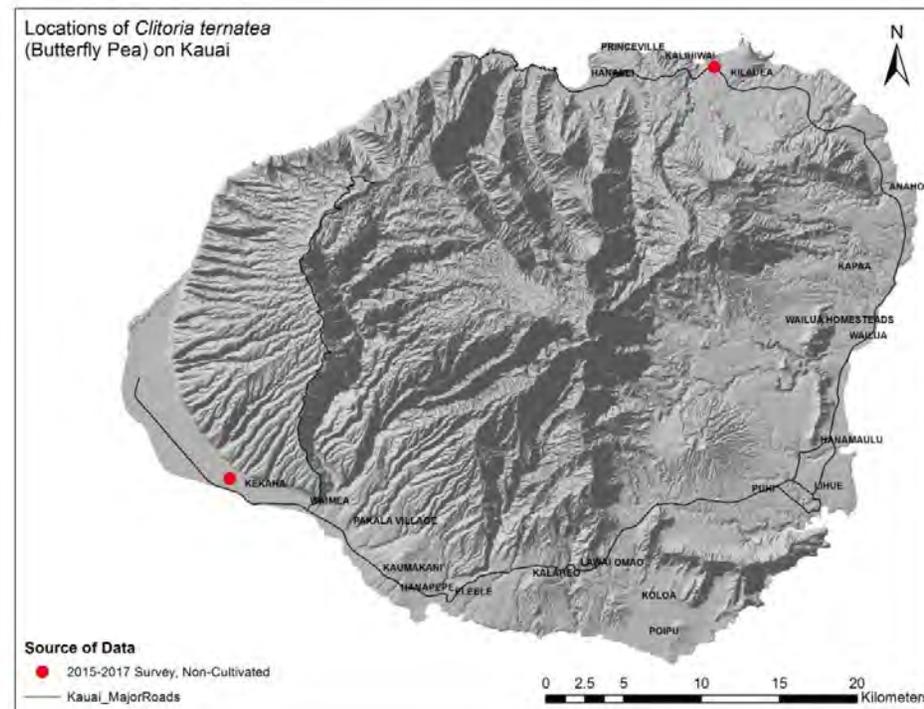
	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Clitoria ternatea</i> (butterfly pea)</p>	NATURALIZED	ON SURVEY LIST	HIGH RISK (11)	<b>Not a likely candidate for KISC Target designation because it is actively sold in nurseries; continue to collect data on invasive impacts incidentally to inform Pono PHASE OUT list</b>

### Background

*Clitoria ternatea* (Fabaceae), or “butterfly pea” is a herbaceous vine that is cultivated as an ornamental. Non-cultivated instances of this plant were **mapped during 2015-2017 surveys because a naturalized population was detected, making it a new naturalization record for Kaua’i. Cultivated instances of this plant were not mapped** in 2015-2017 because it was detected in two nurseries, and thus, was thought to likely be widespread in cultivation. However, it was not commonly noticed during neighborhood surveys so it is possible that this plant has not been widely distributed yet.

### Detection and Distribution

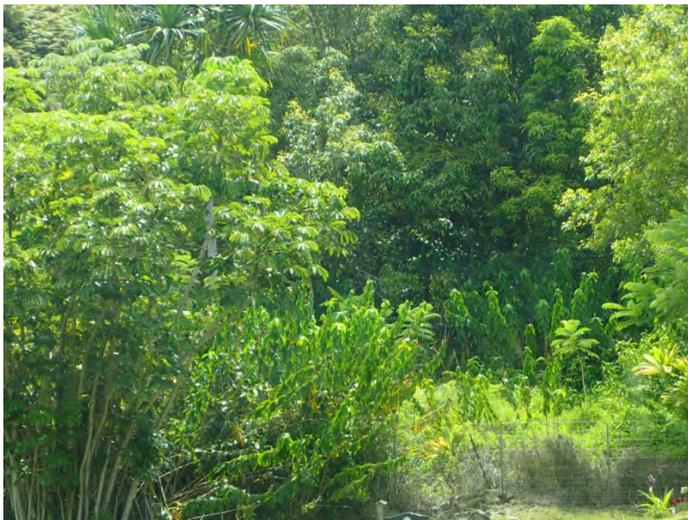
Herbarium records indicate that *C. inerme* has been present on Kaua’i at least since 1988 (T. Flynn 3114, PTBG). Herbaria vouchers documenting its naturalization on Kaua’i were collected during 2015-2017 surveys (K. Brock 739, PTBG). *C. inerme* is also known as naturalized on O’ahu, Lanai and Maui (Imada 2012). It was observed naturalizing near Kekaha where it grew amongst alien grasses alongside an irrigation ditch. These plants **formed a loose, vining mat (not smothering) and were scattered occasionally along the ditch**. It was also **detected during nursery surveys**. Current data indicates that plants are present within 2 house districts (14, 16), 2 judiciary districts (Waimea, Hanalei), 2 watersheds (Paua, Puukumu), 2 TMKs and 1 popref polygon containing PEP plants (Kilauea-KIL).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Costus woodsonii</i> (red button ginger)</p>	NATURALIZED	ON SURVEY LIST	HIGH RISK (8)	<p><b>Not a candidate for KISC Target designation at this time because distribution is unknown; keep on Botanical Survey List, collect data on nursery stock/ invasive impacts to inform Pono PHASE OUT list</b></p>

### Background

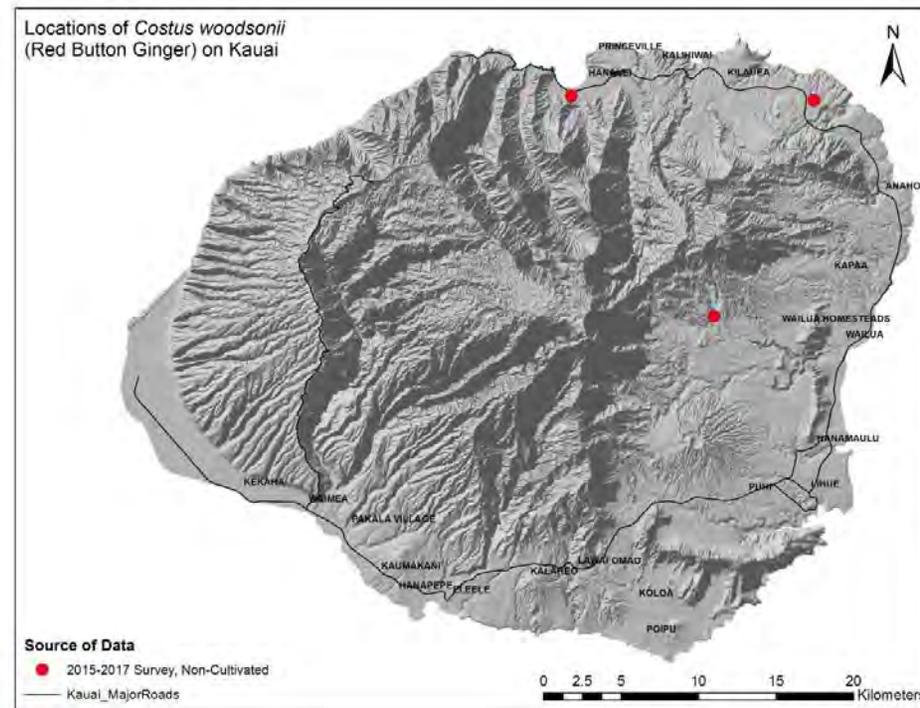
*Costus woodsonii* (Costaceae), or “red button ginger” is a tall herb that is cultivated as an ornamental. Some Non-cultivated instances of this plant were **mapped during 2015-2017 surveys because a naturalized population was detected, making it a new naturalization record for Kaua’i. Cultivated instances of this plant were not mapped** because it was confused with the widely naturalized *C. scaber* during the earliest portions of 2015-2017 surveys and assumed to be common.



Above: *C. woodsonii* naturalizing in a wet field near Hanalei.

### Detection and Distribution

Herbarium records indicate that *C. woodsonii* has been present on Kaua’i at least since 1996 (D.H. Lorence 7780, PTBG). Vouchers documenting its naturalization on Kaua’i were collected during 2015-2017 surveys (K. Brock 1047, PTBG; see figure below). However, the site at Moloaa may be considered adventive rather than naturalized. *C. woodsonii* is also known as naturalized on O’ahu and Maui (Imada 2012). The **population at Hanalei consists of many plants in a wet, open field, within a cemetery and along the ditch** of a single road. Current data indicates that plants are present within 2 house districts (14, 15), 2 judiciary districts (Waimea, Hanalei), 3 watersheds (Wailua, Waioli, Waipake), 3 TMKs and 1 popref polygon containing PEP plants (Kilauea-KIL). There are likely other cultivated and naturalized populations on Kaua’i.



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Cotoneaster pannosus</i> (cotoneaster)</p>	NATURALIZED	BORDER LINE EARLY DETECTION	HIGH RISK (11)	<b>May not be a candidate for KISC Target designation because infestation is dense with cultivated plants; keep on survey list, gauge partnership agency support, and decide if prioritization assessment is needed.</b>

### Background

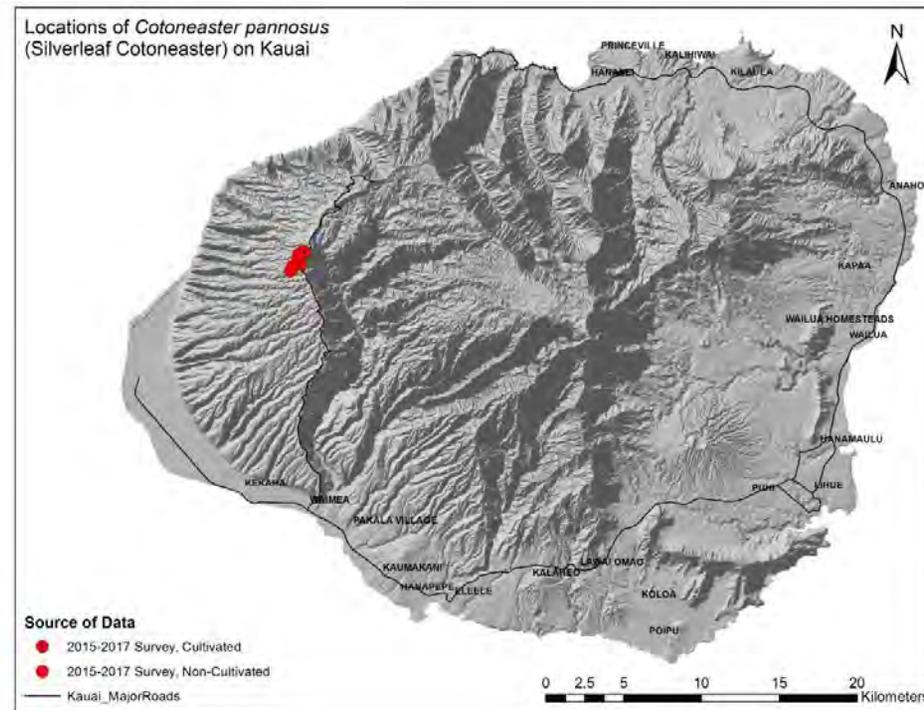
*Cotoneaster pannosus* (Rosaceae), or “cotoneaster”, is a shrub that is cultivated as an ornamental. This species **was mapped during 2015-2017 surveys to inform the prioritization assessment process** used to evaluate whether KISC should attempt eradication (i.e. accept “Target” status) of this plant from Kaua’i. Current distribution data and reports from the public suggest that an additional round of surveying is needed before proceeding to the prioritization assessment stage.



Above: *C. pannosus* naturalizing under a forestry plantation.

### Detection and Distribution

Herbarium vouchers indicate that *C. pannosus* has been present on Kaua’i since at least 1974 (J.J. Fay 236, PTBG). Statewide, *C. pannosus* is known to have naturalized on Kaua’i, Maui, and Hawai’i islands (Imada 2012). *C. pannosus* has **naturalized under forestry plantings, around cabins and along roadsides** in Kokee (see figure below). Although it 2015-2017 data suggests that it is limited in distribution, it is **common where it has naturalized and is currently cultivated in yards**. Additionally, one member of the public (who has done invasive species work in the past) **reported that they’ve seen it naturalizing north of the detected population** indicated in the figure below. Current data indicates that plants are distributed throughout 1 house districts (16), 1 judiciary district (Waimea), 3 watersheds (Hikimoe, Kauhao, Waimea), 5 TMKs and within 1 popref polygon containing PEP plants (Waimea Upper /Puu Ka Pele—WMU).









 <b>KISC</b> KAUI INVASIVE SPECIES COMMITTEE	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<b><i>Dombeya cf. x cayeuxii</i></b> (Mexican rosetree)	NATURALIZED?	EARLY DETECTION	LOW RISK (-7)	<b>Resolve identification issues and decide if Prioritization Assessment is needed; keep on Botanical Survey List.</b>

### Background

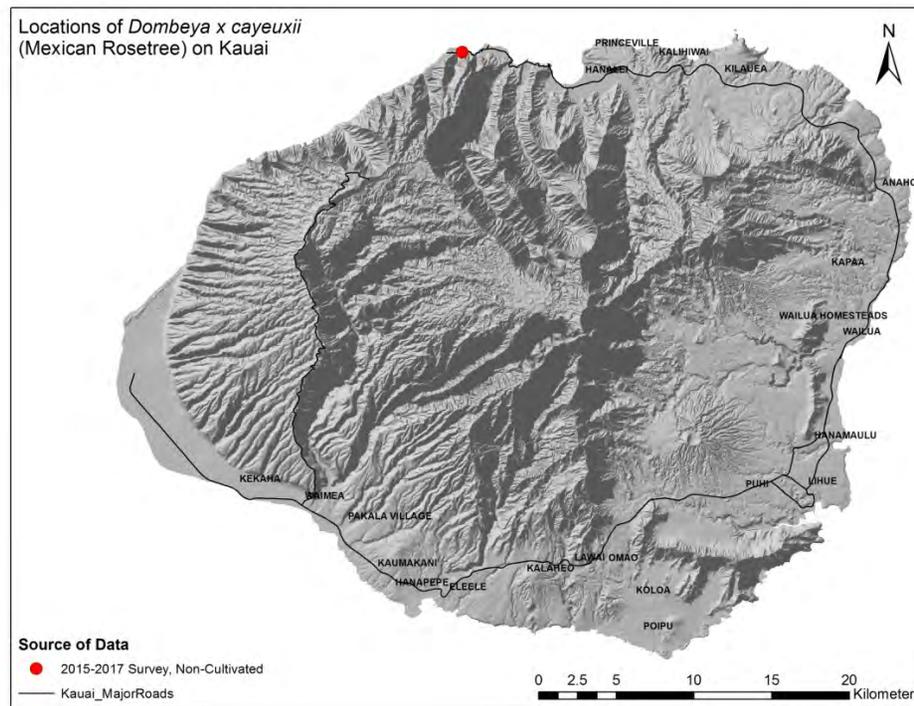
*Dombeya cf. x cayeuxii* (Malvaceae) is a tree cultivated as an ornamental. This species **was mapped during 2015-2017 surveys to inform the prioritization assessment process** used to evaluate whether KISC should attempt eradication (i.e. accept "Target" status) of this plant from Kaua'i. However, **the identification of plants in this report are uncertain** (hence the "cf." qualifier denoting taxonomic uncertainty), **inhibiting our ability to conduct a prioritization assessment.** *Dombeya x cayeuxii* is supposedly a sterile hybrid, inviting questions of how invasive this plant will become. Yet, Kaua'i plants appear to be densely naturalizing along both sides of the roadside in in Limahuli. Plants from Kaua'i may actually be a closely related species/ parent, but most closely resembled *Dombeya x cayeuxii* vouchers at the Bishop Museum herbarium.



Above: *Dombeya cf. x cayeuxii* naturalizing along roadside.

### Detection and Distribution

*D. cf. x cayeuxii* was **first recorded as naturalizing on Kaua'i during 2015-2107 surveys** (K.Brock 981, PTBG), although the identification of this plant is questionable (see Background Section). Statewide, no *Dombeya* species are known to be naturalized (Imada 2012). The **population at Limahuli is small**, spreading along both sides of less than 50 m of roadside (see figure below). Current data indicates that plants are naturalized within 1 house district (14), 1 judiciary district (Hanalei), 1 watersheds (Limahuli), 1 TMK and 1 popref polygon containing PEP plants (Limahuli –LIM). Herbaria records show that additional plants may be present in cultivation.



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Eleagnus cf. angustifolia</i> (Russian olive)</p>	CULTIVATED	EARLY DETECTION	HIGH RISK (13)	Resolve identification issues and decide if Prioritization Assessment is needed; keep on Botanical Survey List.

### Background

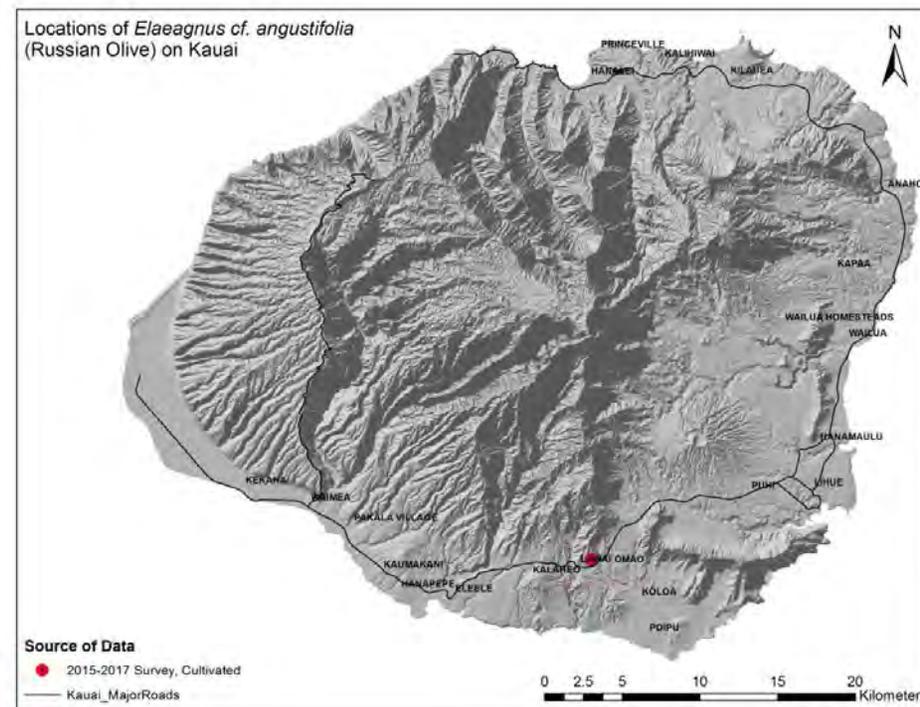
*Eleagnus cf. angustifolia* (Eleagnaceae), or “Russian olive”, is a shrub that is occasionally cultivated as an ornamental. This species was mapped during 2015-2017 surveys to inform the prioritization assessment process used to evaluate whether KISC should attempt eradication (i.e. accept “Target” status) of this plant from Kaua’i. However, the identification of plants in this report are uncertain (hence the “cf.” qualifier denoting taxonomic uncertainty), inhibiting our ability to conduct a prioritization assessment.



Above: *Eleagnus cf. angustifolia* cultivated in Lawai

### Detection and Distribution

*E.cf. angustifolia* was first recorded on Kaua’i during 2015-2107 surveys (K.Brock 971, PTBG), although the identification of this plant is questionable (see Background Section). Statewide, no *Eleagnus* species are known to be naturalized (Imada 2012). A single cultivated plant was detected in Lawai (see figure below). Current data indicates that plants are located within 1 house district (16), 1 judiciary district (Koloa), 1 watersheds (Waikomo), 1 TMK and 0 popref polygons containing PEP plants.





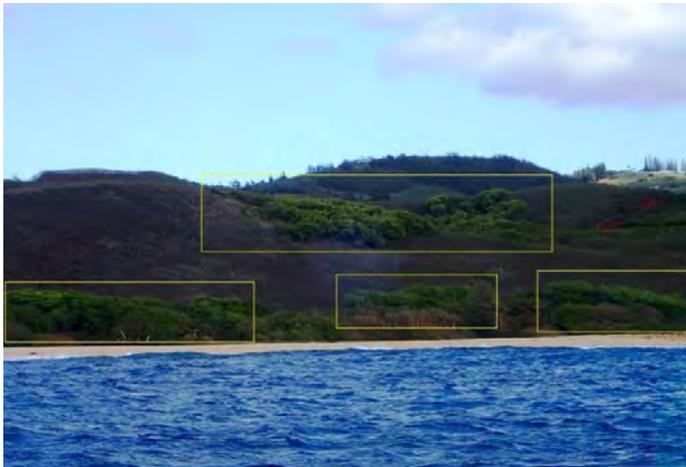
 <b>KISC</b> <small>KAUAI INVASIVE SPECIES COMMITTEE</small>	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<i>Euphorbia tirucalli</i> (pencil tree)	NATURALIZED	PONO PHASE OUT LIST?	HIGH RISK (11)	Common in nurseries; Consider for Pono "phase-out" list

### Background

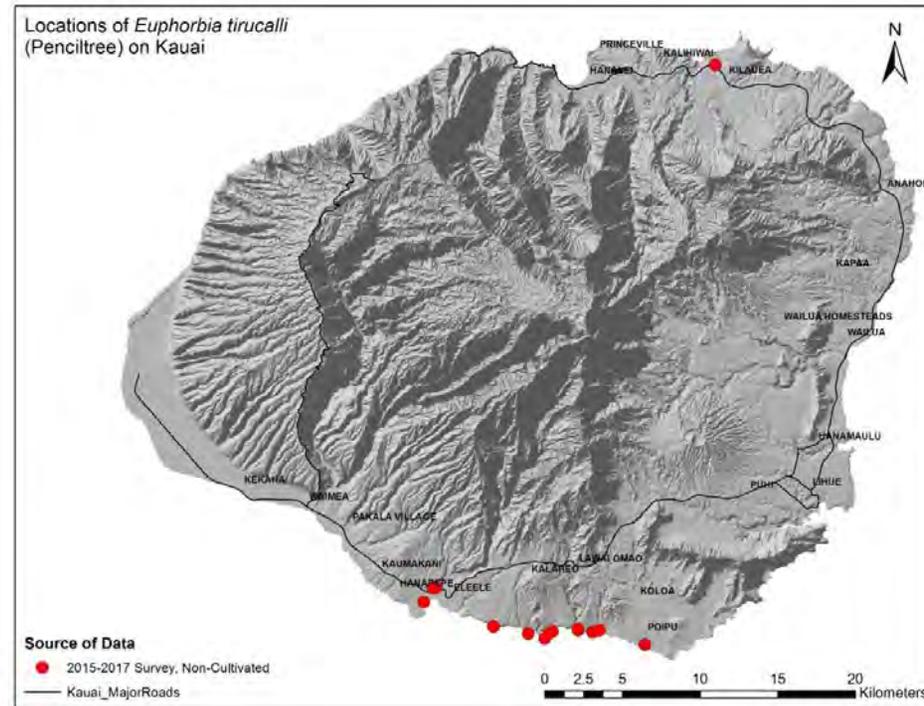
*Euphorbia tirucalli* (Euphorbiaceae), or "pencil tree" is a tree that is cultivated as an ornamental. Naturalized or invasive occurrences of this plant were **mapped during 2015-2017 surveys to inform recommendations to KISC's Pono Endorsement program**. Additionally, **invasive impacts were noted**. Cultivated instances of this plant were not mapped.

### Detection and Distribution

Herbarium vouchers indicate that *E. tirucalli* has been present on Kaua'i since at least 1988 (T. Flynn 3133, PTBG). Statewide, *E. tirucalli* is known to have naturalized on Kaua'i and Hawai'i islands (Imada 2012). *E. tirucalli* was observed naturalizing in dry habitats and appears to have become a **serious invader of pastures and coastal strand vegetation** from Koloa landing to Eleele, where it **forms dense stands**. It is **commonly cultivated on Kaua'i and sold in nurseries**. Current data indicates that plants are naturalized in throughout 2 house districts (14,16), 3 judiciary district (Waimea, Koloa, Hanalei).



Above: A landscape view of *E. tirucalli* (outlined in yellow) naturalizing along a coastline and in pasture between Koloa landing and Eleele.



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Euphorbia tithymaloides</i> (devil's backbone)</p>	NATURALIZED	PONO PHASE OUT LIST?	HIGH RISK (7)	Common in nurseries; Consider for Pono "phase-out" list

### Background

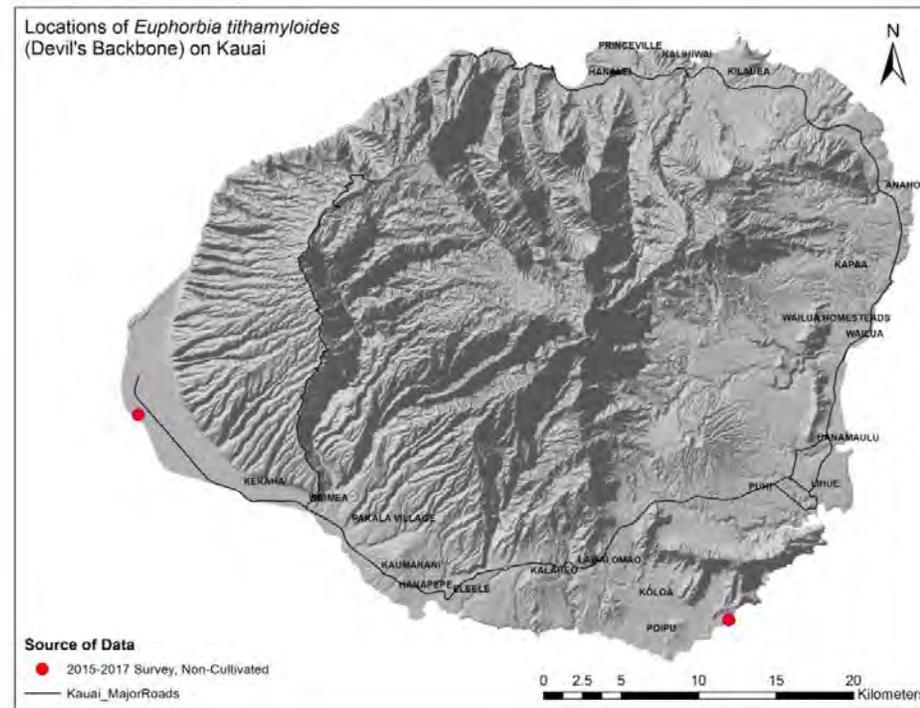
*Euphorbia tithymaloides* (Euphorbiaceae), or "devil's backbone" is a shrub that is commonly cultivated as an ornamental. **Non-cultivated instances were mapped during 2015-2017 surveys because a naturalized population was detected, making it a new naturalization record for Kaua'i.** Additionally, **invasive impacts were noted** and this data will **inform recommendations to KISC's Pono Endorsement program.** Cultivated instances of this plant were not mapped.



Above: *E. tithymaloides* forming a dense stand in a coastal area and under *Leucaena leucocephala* shrubland at Mahaulepu.

### Detection and Distribution

The first record of *E. tithymaloides* is a herbarium voucher from Mahaulepu in 1986 (T. Flynn 1879, PTBG). Statewide, *E. tithymaloides* is known to have naturalized on O'ahu (Imada 2012), although 2015-2017 data indicate that **it should be considered naturalized on Kaua'i** as well. Naturalized populations of this plant were observed in two locations on Kaua'i. The westmost population is small, consisting of approximately 20 mature plants. However, the population at Mahaulepu is large, with **hundreds of plants forming the dominant vegetation cover along the coast alongside *Lycium sandwicense* (ohelo kai) and *Scaevola taccada* (naupaka) and beneath *Leucaena leucocephala* (haole koa) further away from shore.** This plant is commonly sold in nurseries. Current data indicates that plants are naturalized in throughout 1 house district (16) and 2 judiciary districts (Waimea, Koloa).





	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Gladiolus dalenii</i> (flag flower)</p>	NATURALIZED	REMOVE FROM SURVEY LIST	NOT ASSESSED (?)	<b>Awaiting HPWRA ranking (requested); continue to record invasive impact data incidentally; HPWRA or more impact data needed to warrant Pono “phase-out” list status.</b>

**Background**

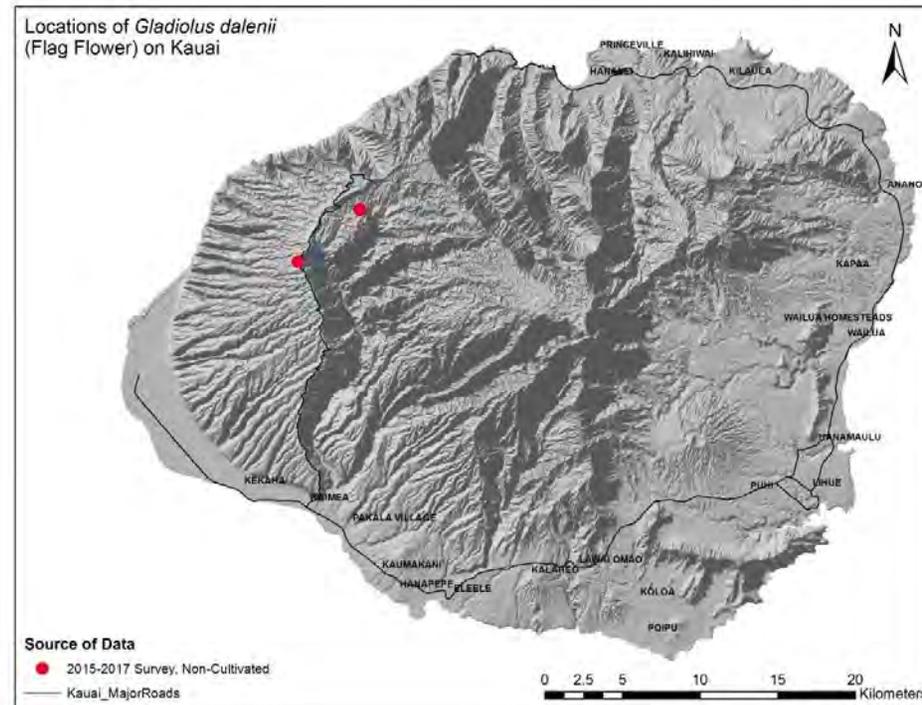
*Gladiolus dalenii* (Iridaceae), or “flag flower” is a herb that is cultivated as an ornamental. **Non-cultivated instances were mapped during 2015-2017 surveys because a naturalized population was detected, making it a new naturalization record for Kaua’i.** Additionally, this data will inform recommendations to KISC’s Pono Endorsement program. Cultivated instances of this plant were not mapped.



Above: *G. dalenii* (peach flower) growing along a roadside with other weeds in Kokee.

**Detection and Distribution**

The first record of *G. dalenii* on Kaua’i was collected during 2015-2017 surveys in Kokee (K. Brock 1035, PTBG), although it appears to have been cultivated for quite some time in the area. Statewide, *G. dalenii* is known to have naturalized on Maui and Hawai’i islands (Imada 2012), although 2015-2017 survey data suggest that it **should be considered naturalized on Kaua’i.** *G. dalenii* was observed naturalizing along the roadside on Camp 10 road in Kokee as well in disturbed area surrounding cabins. Current data indicates that plants are naturalized in throughout 1 house district (16) and 1 judiciary district (Waimea).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Grevillea banksii</i> (red silk oak)</p>	NATURALIZED	ON SURVEY LIST?	HIGH RISK (8)	Likely too difficult to eradicate, partnership and additional resources would be necessary; keep on Botanical Survey List, gauge partnership agency support, and decide if prioritization assessment is required.

### Background

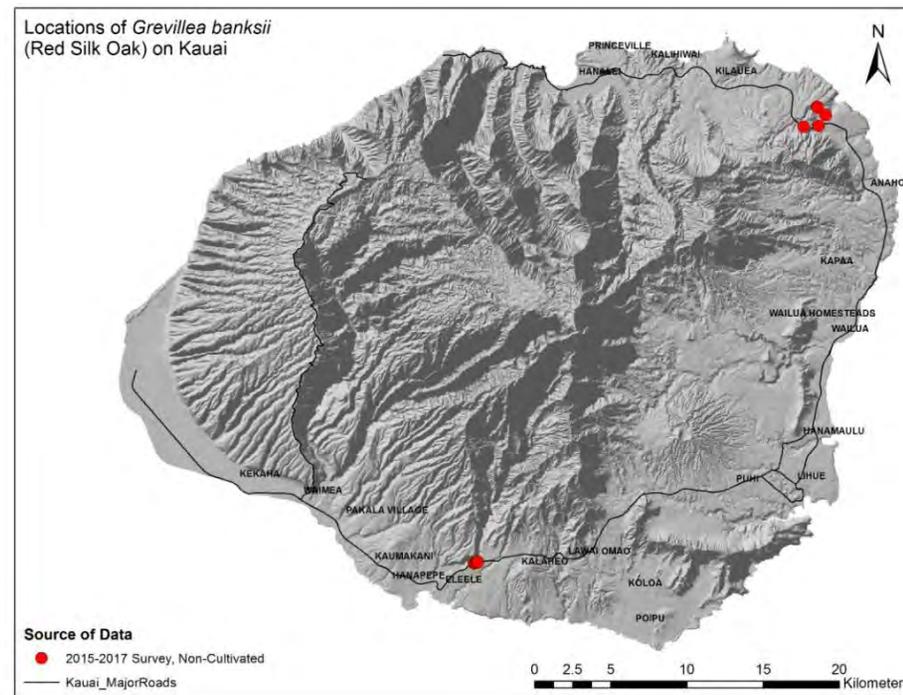
*Grevillea banksii* (Proteaceae), or “red silk oak”, is a shrub that is considered a **noxious weed** in Hawai’i by the United States Department of Agriculture. This species **was mapped during 2015-2017 surveys to inform the prioritization assessment process** used to evaluate whether KISC should attempt eradication (i.e. accept “Target” status) or should partner with other agencies (i.e. accept “Partnership” status) to remove this plant from Kaua’i.



Above: *G. banksii* infestation near Moloaa.

### Detection and Distribution

Herbarium vouchers indicate that *G. banksii* has been present on Kaua’i since at least 1968 (D.R. Herbst 1069, BISH). Statewide, *G. banksii* is known to have naturalized on Ni’ihau, Kaua’i, O’ahu, Moloka’i, Maui, and Hawai’i islands (Imada 2012). Although this plant is only known from **two populations on Kaua’i, they appear quite large** (cumulatively 325 ha /775 acres visible from roadsides alone) **and dense, forming the dominant or co-dominant vegetation cover where it invades** (see figure below). Additionally, the population near Hanapēpē appears to have **descended down steep, inaccessible cliffs near the Hanapēpē valley lookout**. Invasion of this plant appears to be limited by rainfall, and thus the Hanapēpē infestation **is likely to spread westward into the ideal habitat on the leeward side** of Kaua’i. Current data indicates that plants are distributed throughout 2 house districts (14,16), 2 judiciary districts (Koloa, Kawaihau), 2 watersheds (Hanapepe, Moloaa), 8 TMKs and within 1 popref polygon containing PEP plants (Hanapepe-EPE).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<i>Justicia spicigera</i> (Mexican indigo)	NATURALIZED	ON SURVEY LIST	HIGH RISK (8)	Nursery presence not known; keep on Botanical Survey List

### Background

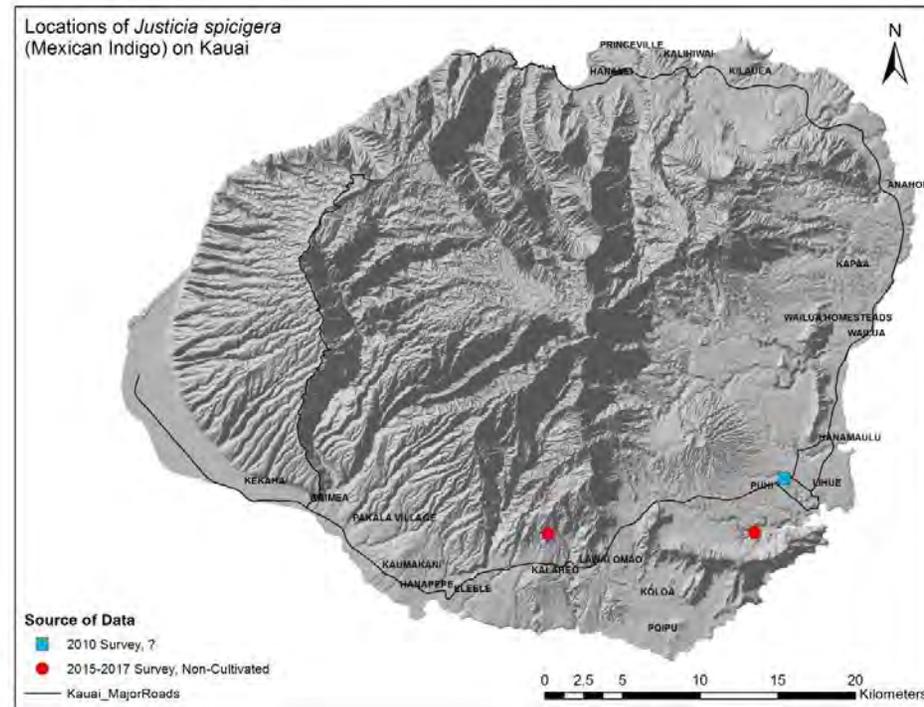
*Justicia spicigera* (Acanthaceae), or “Mexican indigo”, is a shrub that is cultivated as an ornamental. **Non-cultivated instances were mapped during 2015-2017 surveys because a naturalized population was detected, making it a new naturalization record for Kaua’i.** Additionally, this data will inform recommendations to KISC’s Pono Endorsement program. Cultivated instances of this plant were not mapped.



Above: *J. spigera* naturalizing along the Huleia river with *Hibiscus tileaceus* (hau), *Pluchea coronlinensis* (pluchea) and *Coffea arabica* (coffee).

### Detection and Distribution

Herbarium vouchers indicate that *J. spicigera* has been present on Kaua’i since at least 1986 (T. Flynn, PTBG). Statewide, *J. spicigera* is known to have naturalized on O’ahu and Moloka’i (Imada 2012), although 2015-2017 surveys suggest that it **should also be considered naturalized on Kaua’i.** It has been observed naturalizing in the understory of alien forest and **becoming somewhat common along one section of the Huleia river** (see figure below). It was not detected in nurseries during 2015-2017, but is readily moved through the trade in Hawai’i. Current data indicates that plants are naturalized in 2 house districts (15,16) and 2 judiciary districts (Koloa, Lihue).



 <b>KISC</b> <small>KAUAI INVASIVE SPECIES COMMITTEE</small>	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<i>Leucaena leucocephala</i> subsp. <i>glabrata</i> <small>(giant leucaena)</small>	CULTIVATED	ON SURVEY LIST- map naturalized points only	HIGH RISK (10)	Keep on Botanical Survey List to collect data on invasive status.

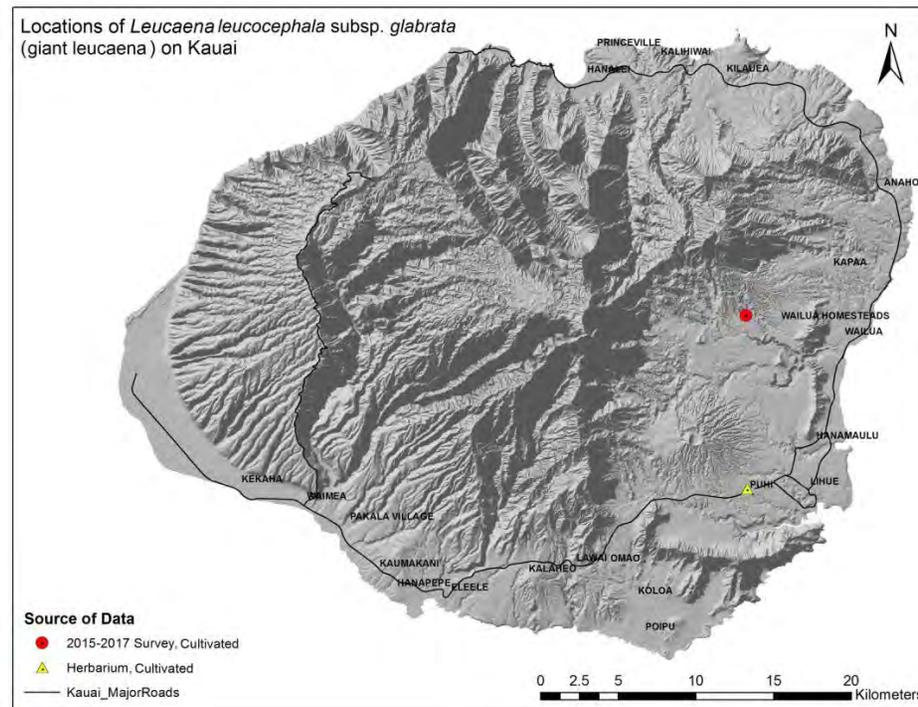
## Background

*Leucaena leucocephala* subsp. *glabrata* (Fabaceae), or “giant leucaena”, is a tree growing to 13 m (40 feet) that has been gaining popularity in agricultural cultivation over *L. leucocephala* subsp. *leucocephala*, a well-known invasive shrub throughout Hawai‘i. This species **was mapped during 2015-2017 surveys to document its presence on Kaua‘i**. Despite it being a subspecies of *L. leucocephala*, subsp. *glabrata* markedly differs in its morphological traits and reportedly has a different invasive potential when compared to the subsp. *leucocephala* (Walton 2003). As agricultural research experiments on this plant have been conducted on Kaua‘i, and seed has been made widely available through the University of Hawai‘i’s Seed Program, this plant is not a likely candidate for KISC Target designation. However, collection of field data to determine its potential to naturalize and cross with the other subspecies may help inform widespread invasive species control efforts directed by KISC’s partners.

## Detection and Distribution

*L. leucocephala* subsp. *glabrata* was first vouchered on Kaua‘i during 2015-2017 surveys at the Kaua‘i Agricultural Research Centre (K. Brock 945, PTBG). It is likely that these plants were planted as part of an agricultural research trial conducted on *Leucaena* species and hybrids during the 1970s, although it is somewhat unclear if these are purposefully planted as they are located in an overgrown area.

Approximately 6 mature trees (>10m) are present at KARC (See figure below), producing seed with many young seedlings (< 10cm) present. No mid-sized seedlings were observed immediately around mature trees. Older saplings were observed in the immediate area, but were too young to be definitely identified as *L. leucocephala* subsp. *glabrata* vs. *L. leucocephala* subsp. *leucocephala*. Additionally, another *L. leucocephala* subsp. *glabrata* is known from Kaua‘i Community College (T. Flynn 8723, PTBG), although it has never been observed setting fruit and may represent a unique cultivar or hybrid. Presently, these are the only locations of *L. leucocephala* subsp. *glabrata* known on Kaua‘i, but **other plants and potentially crosses with subsp. *leucocephala* are likely present elsewhere**. It is unclear whether *L. leucocephala* subsp. *glabrata* has naturalized on other Hawai‘ian islands as subspecies are not differentiated on Hawai‘i’s vascular plant checklist (Imada 2012). Current data indicates that plants are located within 1 house district (14), 2 judiciary districts (Kawaihau, Lihu‘e).



 <b>KISC</b> <small>KAUAI INVASIVE SPECIES COMMITTEE</small>	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<i>Macaranga mappa</i> (bingabing)	NATURALIZED?	TARGET	HIGH RISK (11)	Conduct prioritization assessment

### Background

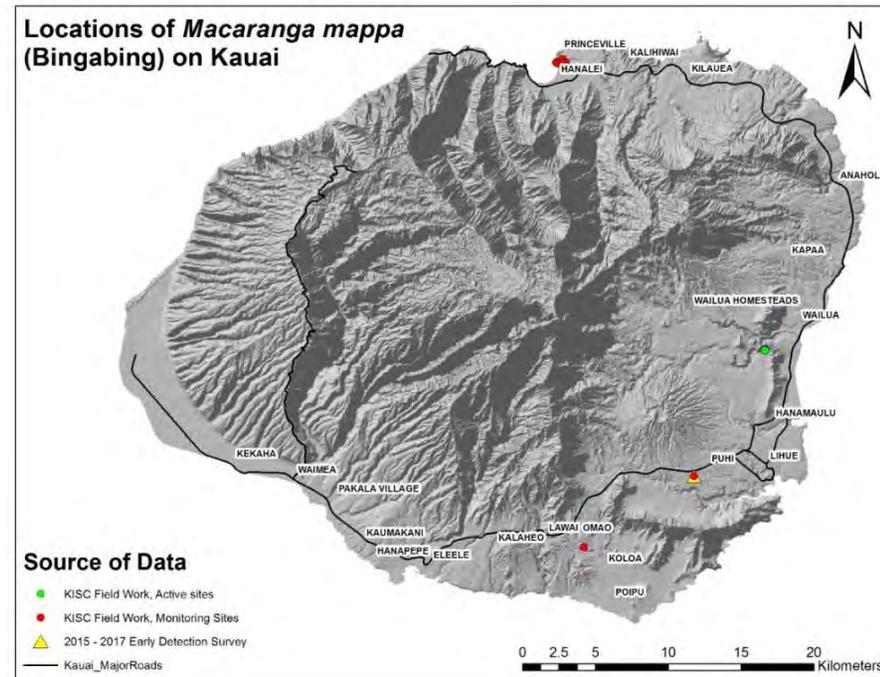
*Macaranga mappa* (Euphorbiaceae), or “bingabing”, is a tree that is a known weed on other Hawaiian islands and has been a KISC Target since 2011. **2015-2017 surveys served to supplement existing data to inform future prioritization assessments.**



Above: *M. mappa* cultivated at a nursery.

### Detection and Distribution

Herbarium vouchers indicate that *M. mappa* has been present on Kaua'i since at least 1993, although this specimen is from a cultivated individual (i.e. does not represent naturalized populations; T. Flynn 5270, PTBG). Statewide, *M. mappa* is known to have naturalized on O'ahu and Hawai'i islands (Imada 2012). The KISC crew reports that the large **population at Hanalei has naturalized** as well although it has not been recorded as naturalized because vouchers have not yet been collected. *M. mappa* is not mentioned in forestry planting records from 1910 – 1960 (Skolmen 1980), although about 80 *M. grandifolia* were supposedly planted in 1928, which may represent a misidentification. Four known locations of this plant exist on Kaua'i: one large, uncontrolled population in Hanalei, one controlled population near the Wailua River, a single cultivated plant at NTBG and a single cultivated plant from a nursery (since removed). Current data indicates that plants are distributed over 2 house districts (14, 15), 3 judiciary districts (Koloa, Lihue, Hanalei), 5 watersheds (Waikomo, Huleia, Wailua, Waileia, Hanalei), 17 TMKs and within 3 popref polygons containing PEP plants (Huleia-HUL, Princeville-PRI, Hanalei-HAN).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Macfadyena unguis-cati</i> (cat's claw)</p>	NATURALIZED	PONO PHASE OUT LIST?	HIGH RISK (6)	Keep on Botanical Survey List to determine its presence in nurseries, Consider for Pono "phase-out" list

### Background

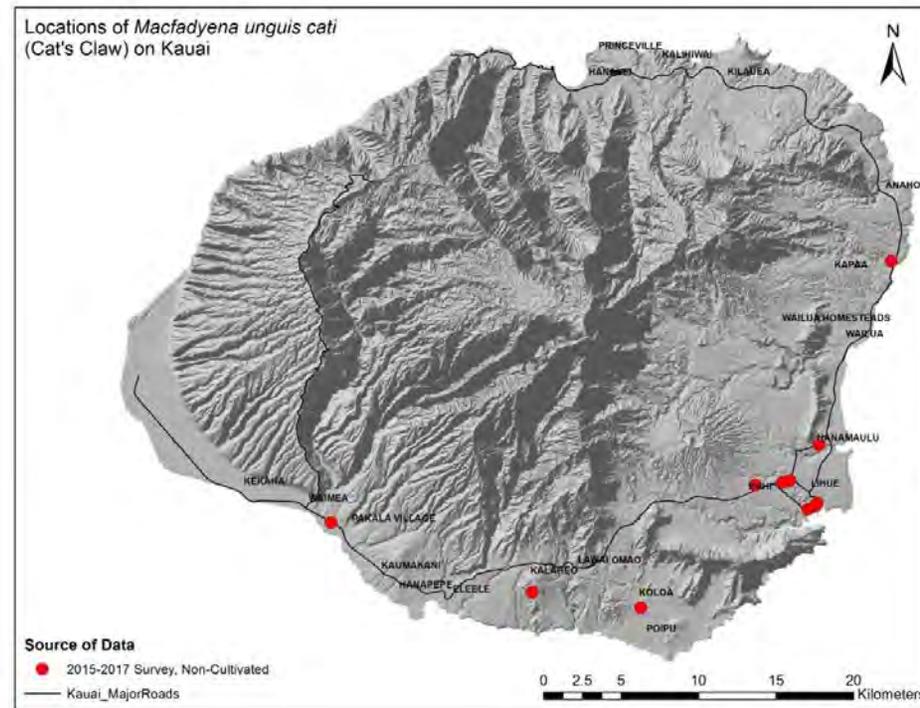
*Macfadyena unguis-cati* (Bignoniaceae), or "cat's claw", is a vine that is cultivated as an ornamental. Members of the public and KISC partners inquire about it frequently. **This plant was mapped to determine whether this plant would be a suitable candidate for eradication (eg. KISC Target).** Additionally, **impacts to agriculture, horticulture and human infrastructure were noted.**



Above: *M. unguis-cati* climbing eucalyptus trees in Kalaheo.

### Detection and Distribution

Herbarium vouchers indicate that *M. unguis-cati* has been present on Kaua'i since at least 1986 (T. Flynn 1620, PTBG). Statewide, *M. unguis-cati* is known to have naturalized on Kaua'i, O'ahu, Lanai, Maui and Hawai'i islands (Imada 2012). 2015-2017 surveys confirm that this plant **has become widespread on Kauai, with major infestations** in Lihue, Kalaheo and near Waimea. It was observed **growing along multiple utility lines, over fruit trees** and has been reported verbally by the public as a **major nuisance of landscaped areas**. A single individual was detected during nursery surveys conducted from 2015-2017, although it was not in the sale area. Current data indicates that plants have naturalized in all 3 house districts (14, 15, 16) and 4 judiciary districts (Waimea, Koloa, Lihue, Kawaihau).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Megaskepasma erythroclamys</i> (red cloak)</p>	NATURALIZED	PONO PHASE OUT LIST?	HIGH RISK (6)	Keep on Botanical Survey List to determine its presence in nurseries, Consider for Pono "phase-out" list

### Background

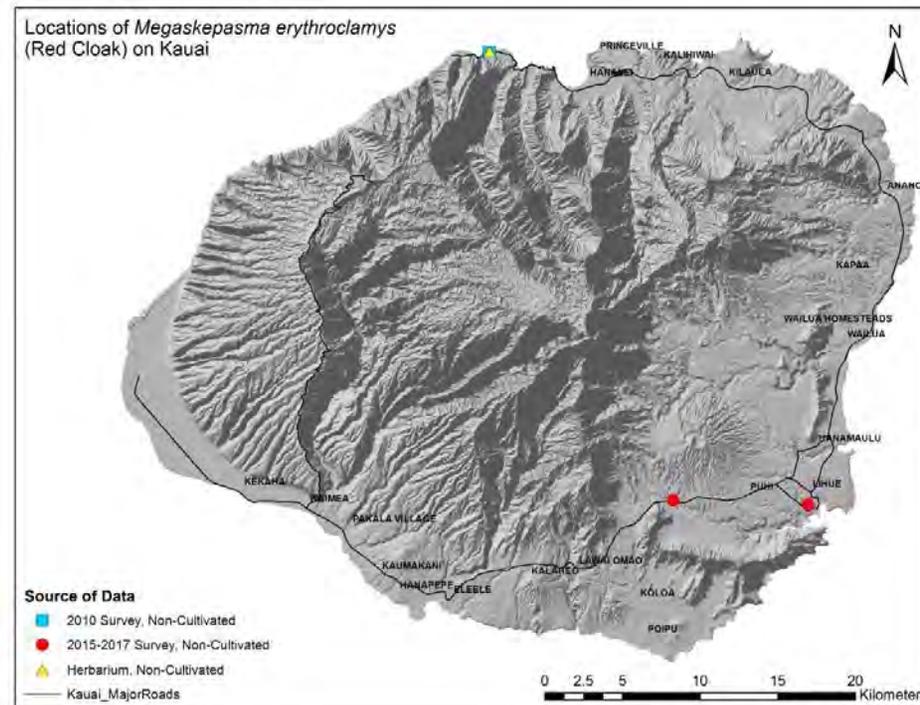
*Megaskepasma erythroclamys* (Acanthaceae), or "red cloak", is a shrub that is cultivated as an ornamental. **Non-cultivated instances were mapped during 2015-2017 to inform recommendations to KISC's Pono Endorsement program.** Cultivated instances of this plant were not mapped.



Above: *M. erythroclamys* forming the dominant understory beneath *Syzigium cumini* (java plum) near Nawiliwili.

### Detection and Distribution

Herbarium vouchers indicate that *M. erythroclamys* has been present on Kaua'i since at least 1983 (T. Flynn 497, PTBG). Statewide, *M. erythroclamys* is known to have naturalized on Kaua'i, O'ahu, and Hawai'i islands (Imada 2012). This plant has been reported naturalizing on Kaua'i, and was observed **forming the dominant understory beneath alien forest near Nawiliwili** (K. Brock 737, PTBG; see figure below). It was not detected during nursery surveys between 2015-2017. Current data indicates that plants have naturalized in 2 house districts (14, 15) and 2 judiciary districts (Lihue, Hanalei).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<b><i>Miconia calvenscens</i></b> (miconia)	NATURALIZED	TARGET	HIGH RISK (14)	Conduct prioritization assessment to identify obstacles to eradication

### Background

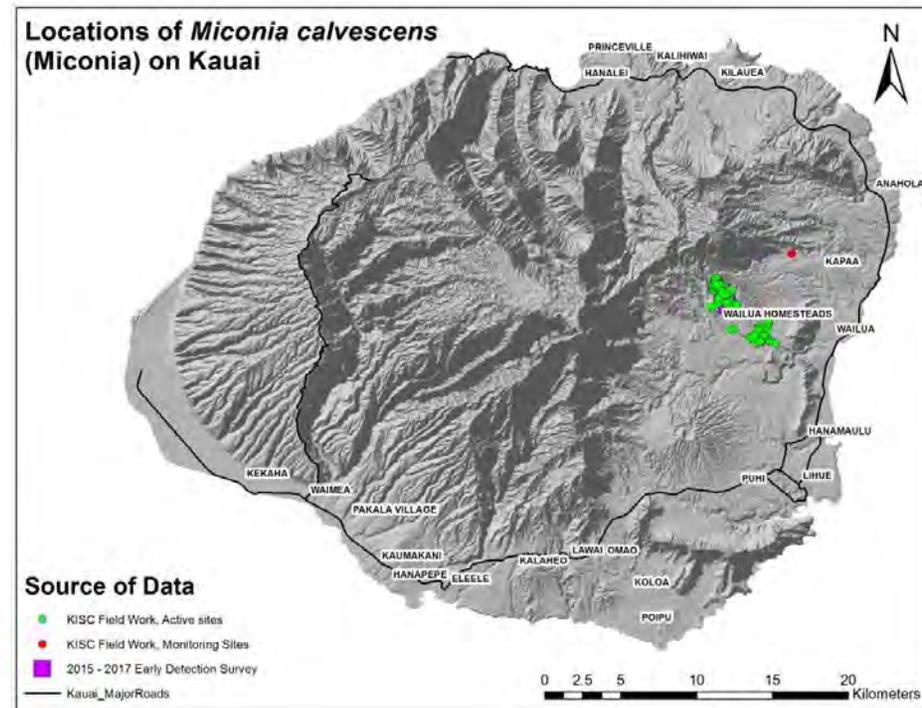
*Miconia calvenscens* (Melastomataceae), or “miconia”, is a tree that has been cultivated as an ornamental. *M. calvenscens* has been a KISC Target since 2001, when KISC was formed. This species was mapped during 2015-2017 surveys to supplement previous distribution data, contributing towards eradication of this plant from Kaua’i.

### Detection and Distribution

Herbarium vouchers indicate that *M. calvenscens* has been present on Kaua’i since at least 1995 (D.H. Lorence 7715, PTBG). Statewide, *M. calvenscens* is known to have naturalized on Kaua’i, Oahu, Maui, and Hawai’i islands (Imada 2012). On Kauai, this plant has **naturalized around Wailua Homesteads and remains at low densities**, which is likely due to control efforts by KISC. Current data indicates that plants are distributed along the border of 2 house districts (15,16) and 2 judiciary districts (Lihue, Kawaihau), and within 1 watershed (Wailua), and 26 TMKs.



Above: A mature *M. calvenscens* at the bottom of a gully under *Falcataria moluccana* (*Albezia*) canopy.



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Molineria capitulata</i> (weevil lily)</p>	NATURALIZED	PONO PHASE OUT LIST?	EVALUATE (6)	<p><b>Common in cultivation/nurseries; continue to record naturalized populations and invasive impact data incidentally; collaborate with HPWRA to inform ranking; consider for Pono “phase-out” list status.</b></p>

### Background

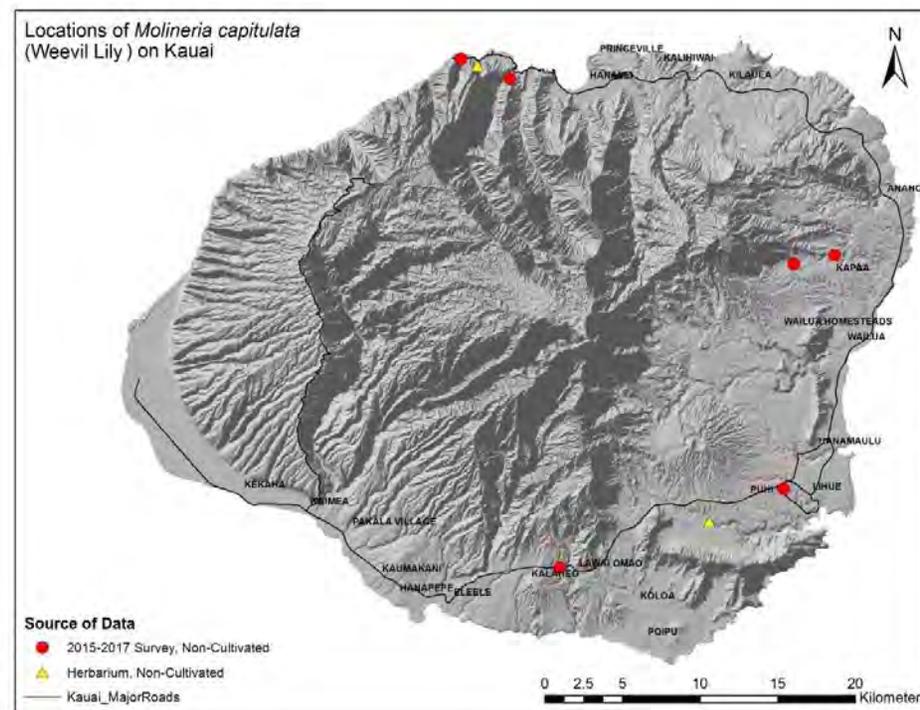
*Molineria capitulata* (Hypoxidaceae), or “weevil lily”, is a herb that is cultivated as an ornamental. **Non-cultivated instances were mapped during 2015-2017 to inform recommendations to KISC’s Pono Endorsement program.** Cultivated instances of this plant were not mapped.



Above: *M. capitulata* forming the dominant herb understory in Haena State Park.

### Detection and Distribution

Herbarium vouchers indicate that *M capitulata* has been present on Kaua’i since at least 1988 (D.H. Lorence 5838, PTBG). Statewide, *M capitulata* is not known to have naturalized any other Hawaiian islands other than Kaua’i (Imada 2012). This plant is **widely planted on Kauai and is sold in nurseries**. It has **naturalized in disturbed, lowland alien forest, where it often forms the dominant herb layer** (see figure below). It can occasionally be found along streams as well. Current data indicates that plants have naturalized in all house districts (14, 15,16) and in 4 judiciary districts (Koloa, Lihue, Kawaihau, Hanalei).





	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Phoenix</i> sp. (date palm)</p>	NATURALIZED	REMOVE FROM SURVEY LIST	NEED ID BEFORE ASSESSMENT REQUEST (?)	<b>Resolve identification issues, request HPWRA ranking; consider for Pono “phase-out” list status; widespread, not a likely candidate for KISC Target designation; continue to record invasive impact data incidentally.</b>

### Background

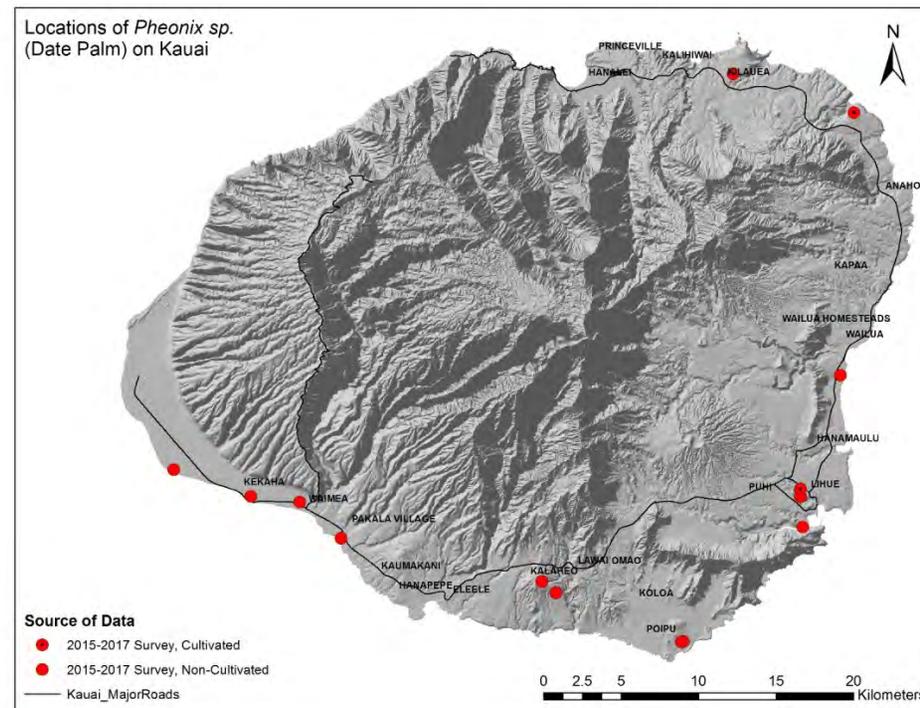
*Phoenix* sp. (Arecaceae), or “date palm”, is a shrub that is cultivated as an ornamental and for its edible fruits. This species **was mapped during 2015-2017 surveys to inform the prioritization assessment process** used to evaluate whether KISC should attempt eradication (i.e. accept “Target” status) of this plant from Kaua’i. The identification of this plant has not been thoroughly investigated, although the habit is indicative of a hybrid according to Staples and Herbst (2005). Although this palm has clearly naturalized on Kaua’i, it has not yet been reported as such due to taxonomic confusion as well as difficulties collecting fruit and leaf voucher material from mature plants.



Above: *Phoenix* sp. naturalizing on Kalepa ridge (Photo credit Adam M. Williams).

### Detection and Distribution

Due to the taxonomic uncertainty surrounding this plant, it’s difficult to determine which herbarium vouchers represent plants naturalizing across the island, but at least one voucher denoting a hybrid was collected in 1998 (M.H. Chapin 41, PTBG) and another collection mentions its naturalized status in 2017 (A.M. Williams 359; PTBG – ID’d as *Phoenix* sp.). A record for “*Phoenix* hybrid” is mentioned in the Bishop Museum Checklist as naturalized on Maui and potentially naturalized on Oahu and Molokai (Imada 2012). *Phoenix* sp. is **widely naturalized on Kauai throughout dry-mesic areas**, especially along slopes and in coastal areas. It is becoming common on Kalepa and Haupu ridges and around Waimea. Current data indicates that plants are distributed throughout all 3 house districts and all 5 judiciary districts (Waimea), although naturalized individuals have not been noted in north Kauai.



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><b><i>Piper auritum</i></b> (false kava)</p>	NATURALIZED	TARGET	HIGH RISK (15)	<b>Conduct Prioritization Assessment to assess potential invasive impacts and feasibility of eradication.</b>

**Background**

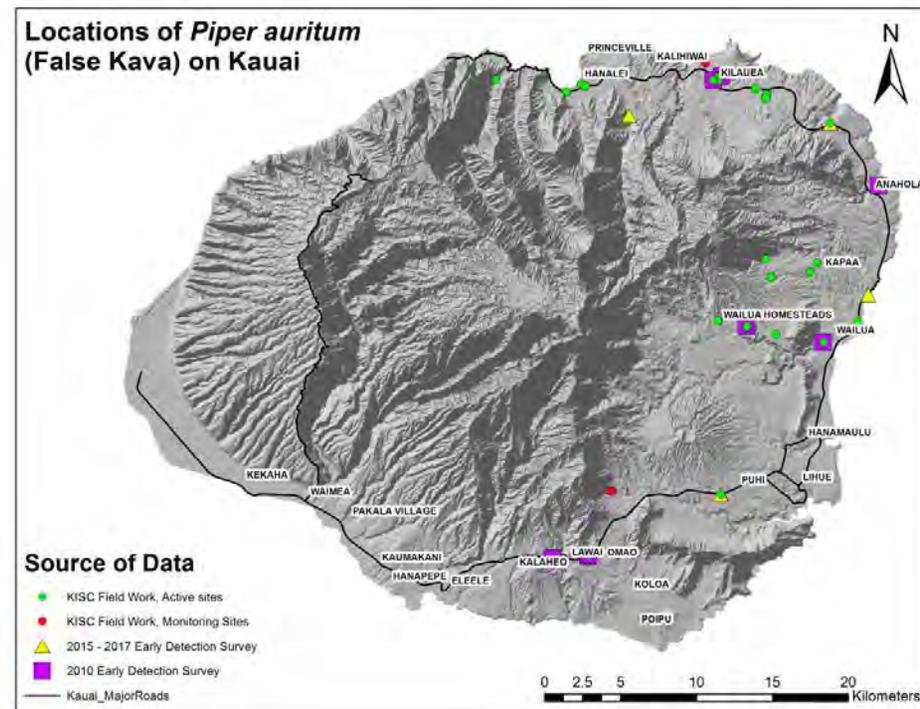
*Piper auritum* (Piperaceae), or “false kava”, is a shrub that has been cultivated as a food plant. This species was mapped during 2015-2017 surveys to supplement previous distribution data, contributing towards eradication of this plant from Kaua’i.



Above: *Piper auritum* naturalized at the end of Ohiki Road near Hanalei.

**Detection and Distribution**

Herbarium vouchers indicate that *P. auritum* has been present on Kaua’i since at least 2001 (D.H. Lorence 8521, PTBG). Statewide, *P. auritum* is known to have naturalized on Kaua’i, Oahu, Maui, and Hawai’i islands (Imada 2012). Only one naturalized population forming a dense stand in moist lowland forest was noted during 2015-2017, which is likely due to eradication efforts by KISC. Otherwise, this plant can still be found occasionally in cultivation and was observed persisting in nurseries, although all known sites are being monitored by KISC (see figure below). Current data indicates that plants are distributed throughout all house districts and in all judiciary districts except Waimea, over 16 watersheds, 5 TMKs and within 6 popref polygon containing PEP plants (Huleia-HUL, Kapaa-KAP, Anahola-ANA, Kilauea-KIL, Hanalei-HAN, Wainiha-WNH). Although, some of these plants may have been removed and are being monitored for regeneration.



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Platyserium bifurcatum</i> (staghorn fern)</p>	NATURALIZED	REMOVED FROM SURVEY LIST	NOT ASSESSED (?)	<b>Awaiting HPWRA ranking (requested); continue to record invasive impact data incidentally; more impact data or HPWRA needed to warrant Pono "phase-out" list status.</b>

**Background**

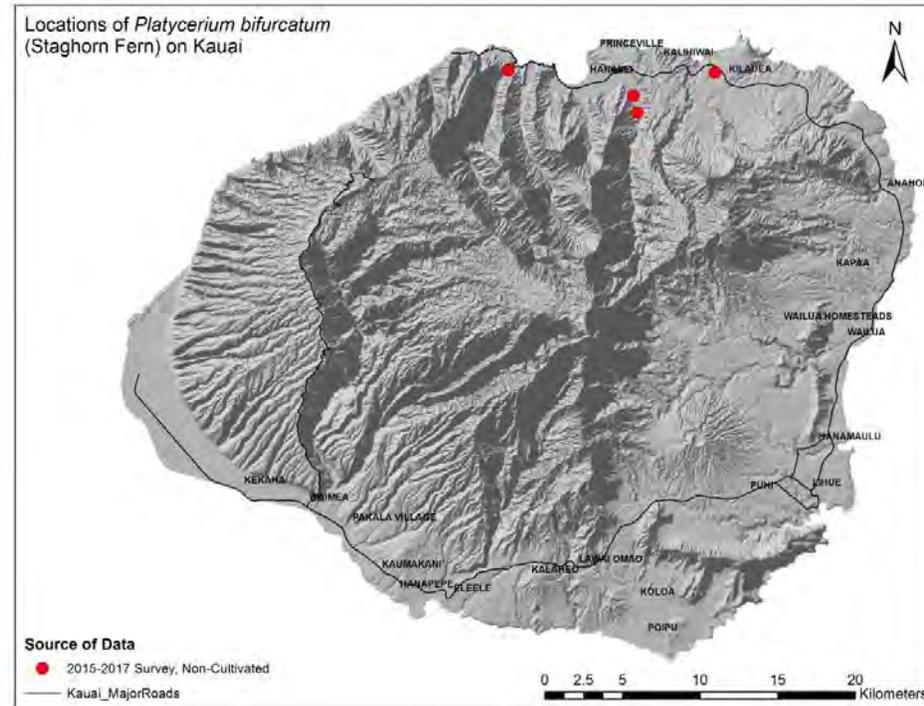
*Platyserium bifurcatum* (Polypodiaceae), or "staghorn fern", is a fern that is cultivated as an ornamental. Non cultivated instances of this plant were **mapped during 2015-2017 surveys because a naturalized population was detected, making it a new naturalization record for Kaua'i**. However, **cultivated instances of this plant were not mapped** as this plant is common in cultivation.



Above: naturalizing *P. bifurcatum* along the Wai Koa Loop trail near Kilauea.

**Detection and Distribution**

Herbarium vouchers indicate that *P. bifurcatum* has been present on Kaua'i since at least 1994 (T. Flynn 5559, PTBG). Statewide, *P. bifurcatum* is known to have naturalized on O'ahu Maui and Hawaii islands (Imada 2012), although 2015-2017 surveys suggest that **it should be considered naturalized on Kauai** as well. Approximately 35 plants were observed **sparingly naturalizing in moist alien forest** on the north side of Kauai (K. Brock 993, PTBG; see figure below). Current data indicates that plants are naturalized within 1 house district (14) and 1 judiciary district (Hanalei).





	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Philadelphus karvinskianus</i> (Mexican mock orange)</p>	NATURALIZED	BORDERLINE EARLY DETECTION	HIGH RISK (7)	May be too widespread/difficult to eradicate; keep on Botanical Survey List, gauge partnership agency support, and decide if Prioritization Assessment is needed.

### Background

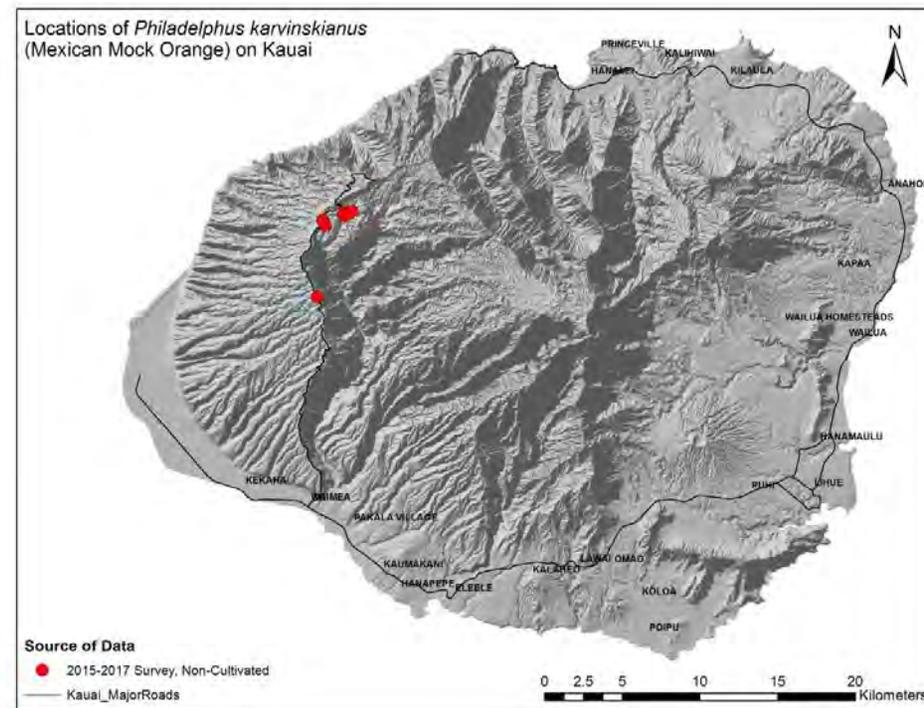
*Philadelphus karvinskianus* (Hydrangeaceae), or “Mexican mock orange”, is a shrub that is occasionally cultivated as an ornamental. This species **was mapped during 2015-2017 surveys to inform the prioritization assessment process** used to evaluate whether KISC should attempt eradication (i.e. accept “Target” status) of this plant from Kaua’i.



Above: *P. karvinskianus* infestation in Kokee growing over utility lines.

### Detection and Distribution

The first record of *P. karvinskianus* is a herbarium voucher collected in 1983 from Kokee (T. Flynn 519, PTBG). Statewide, *P. karvinskianus* is known to be naturalized on Kaua’i and Maui (Imada 2012). **Dense infestations climbing over trees and infrastructure (including utility lines)** persist in Kokee (see figure below). It’s unclear how quickly this plant is spreading as this is the first attempt to map its distribution on Kaua’i (K. Brock 926, PTBG). Current data indicates that plants are naturalized within 1 house district (16), 1 judiciary district (Waimea), 3 watersheds (Nahomalu, Waimea, Makaha), 5 TMKs and 1 popref polygon containing PEP plants (Makaha-MAK).







 <b>KISC</b> <small>KAUAI INVASIVE SPECIES COMMITTEE</small>	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<i>Prosopis juliflora</i> <small>(long-thorn kiawe)</small>	NATURALIZED	TARGET	HIGH RISK (19)	<b>Conduct Prioritization Assessment to assess potential invasive impacts and feasibility of eradication.</b>

### Background

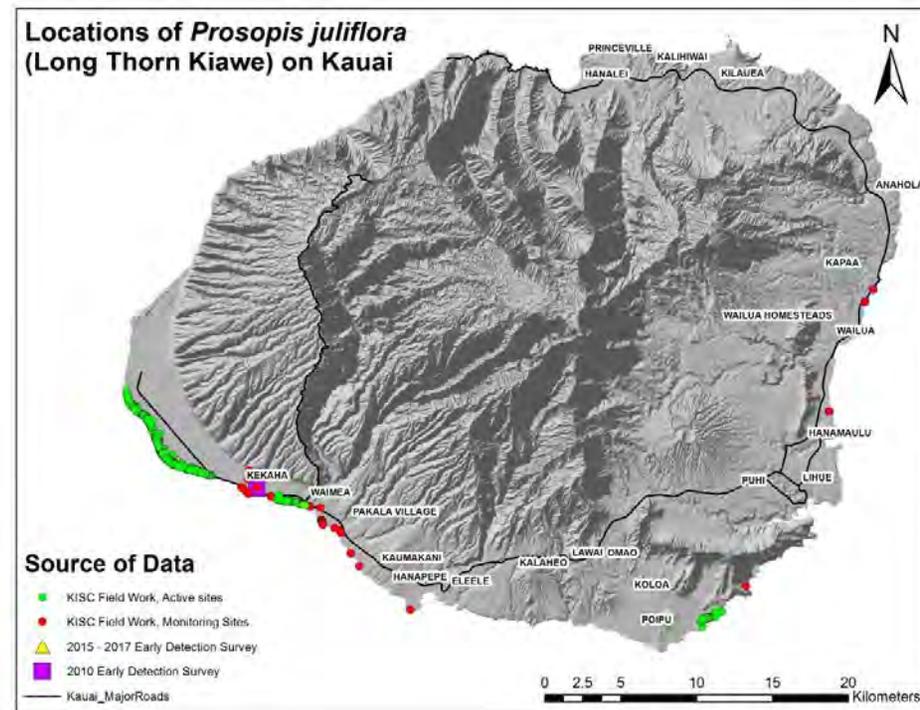
*Prosopis juliflora* (Fabaceae), or “long-thorn kiawe”, is a tree that has been cultivated as an ornamental or barrier plant. This species has been a KISC Target since 2002 and **was mapped during 2015-2017 surveys to supplement previous distribution data**, contributing towards eradication of this plant from Kaua’i.



Above: *P. juliflora* at Pakala point near Waimea.

### Detection and Distribution

Herbarium vouchers indicate that *P. juliflora* has been present on Kaua’i since at least 2000 (N. Matayoshi s.n., BISH). Statewide, *P. juliflora* is known to have naturalized on Kaua’i, Oahu and Lanai (Imada 2012). This plant forms **dense thickets along coasts and dry lowland areas** on Kauai. Current data indicates that plants are distributed throughout all house districts (14, 15, 16), 4 judiciary districts (Waimea, Koloa, Lihue, Kawaihau), 14 watersheds (Kaawaloa, Niu. Hoes, Paua, Kapilimao, Waimea, Waipao, Aakukui, Mahinauli, Kaumakani, Mahaulepu, Kipu Kai, Kawailoa, Moikeha), 42 TMKs and within 4 popref polygons containing PEP plants (Waimea Lower-WML, Hanapepe-EPE, Mahaulepu-MAH, Kapaa-KAP). However, **many mature plants have been removed by KISC**.



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Poranopsis paniculata</i> (bridal bouquet)</p>	NATURALIZED	REMOVED FROM SURVEY LIST	HIGH RISK (8)	Continue to record invasive impact incidentally; consider for Pono “phase-out” list based on nursery surveys, if appropriate.

### Background

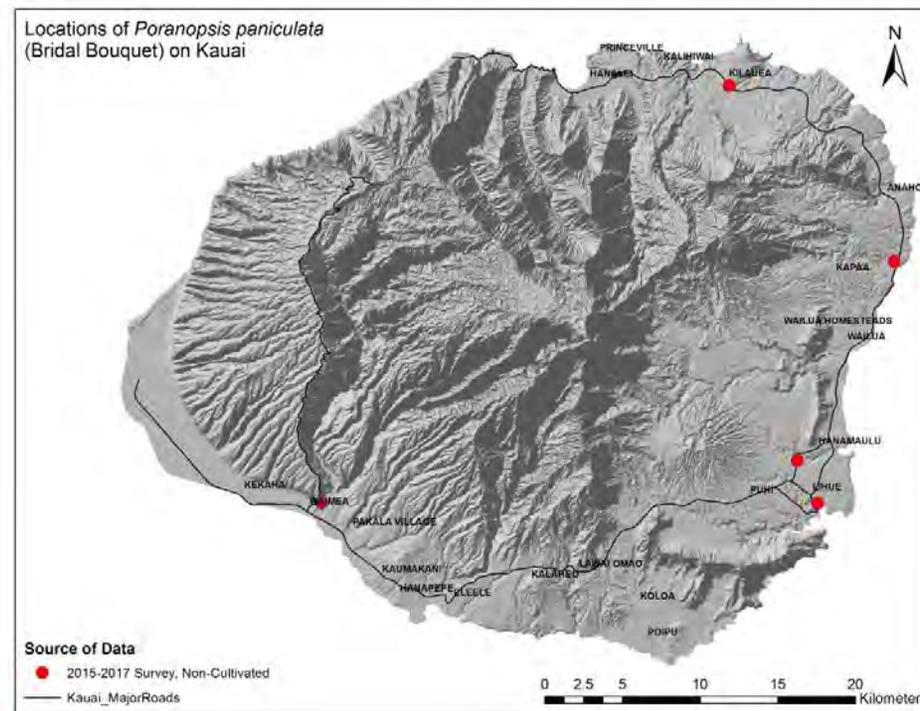
*Poranopsis paniculata* (Lamiaceae), or “bridal bouquet”, is a vine that is cultivated as an ornamental. Non cultivated instances of this plant were **mapped during 2015-2017 surveys because a naturalized population was detected, making it a new naturalization record for Kaua’i.** Additionally, potential impacts to human infrastructure and agriculture were noted.



Above: *P. paniculata* naturalizing in *Leucaena leucocephala* (haole koa) shrubland in Kapaa.

### Detection and Distribution

*P. paniculata* was first recorded on Kaua’i via a herbarium voucher from a 1988 (J. Barton s.n., PTBG). Statewide, *P. paniculata* is considered naturalized on Maui and Hawaii islands (Imada 2012), but 2015-2017 surveys suggest that it should be considered naturalized on Kauai as well. Although this plant **appears to be reproducing vegetatively**, all points denoted in the figure below represent fairly large populations where it is unclear if they were originally cultivated in that location (see figure below). It has been noted **growing over fruit trees (mango) and along utility lines in Lihue**. Current data indicates that plants are naturalized within all house districts (14, 15, 16), and 4 judiciary districts (Waimea, Lihue, Kawaihau, Hanalei).



 <b>KISC</b> <small>KAUAI INVASIVE SPECIES COMMITTEE</small>	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Prunus campanulata</i> (bell-flowered cherry)</p>	NATURALIZED	BORDERLINE EARLY DETECTION	NOT ASSESSED (?)	<b>Probably too widespread and difficult to eradicate; keep on Botanical Survey List, gather more distribution data, and decide if a Prioritization Assessment is appropriate.</b>

**Background**

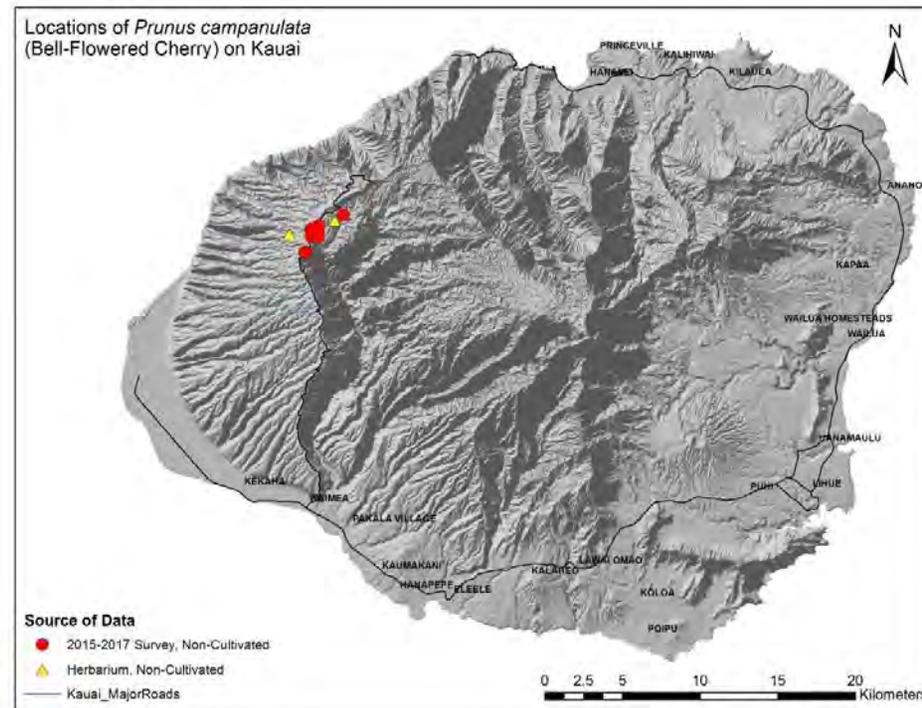
*Prunus campanulata* (Rosaceae), or “bell-flowered cherry” is a tree that is cultivated as an ornamental. This species **was mapped during 2015-2017 surveys to inform the prioritization assessment process** used to evaluate whether KISC should attempt eradication (i.e. accept “Target” status) of this plant from Kaua’i.



Above: *P. campanulata* naturalizing in mesic *Metrosideros* (ohia) forest.

**Detection and Distribution**

The first record of *P. campanulata* Kauai is a herbarium voucher collected in 1994 from a cultivated plant (T. Flynn 5534, PTBG). Statewide, this plant is known to have naturalized on any other Hawaiian islands (Imada 2012). 2015-2017 surveys showed that *P. campanulata* **has become common in Kokee and can be seen naturalizing in relatively undisturbed native forest** (K. Brock 965, PTBG; see figure below). Current data indicates that plants are distributed within 1 house district (16), 1 judiciary districts (Waimea), 6 watersheds (Kauhao, Makaha, Waimea), 7 TMKs and 3 popref polygons containing PEP plants (Kauhao-KAU, Makaha-MAK, Waimea Upper-Puu Ka Pele-WMU).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Prunus persica</i> (peach)</p>	NATURALIZED	REMOVED FROM SURVEY LIST	NOT ASSESSED (?)	<p><b>A commonly cultivated plant, not a good candidate for KISC Target designation; monitor future spread and potential impacts incidentally if they could change HPWRA scoring.</b></p>

**Background**

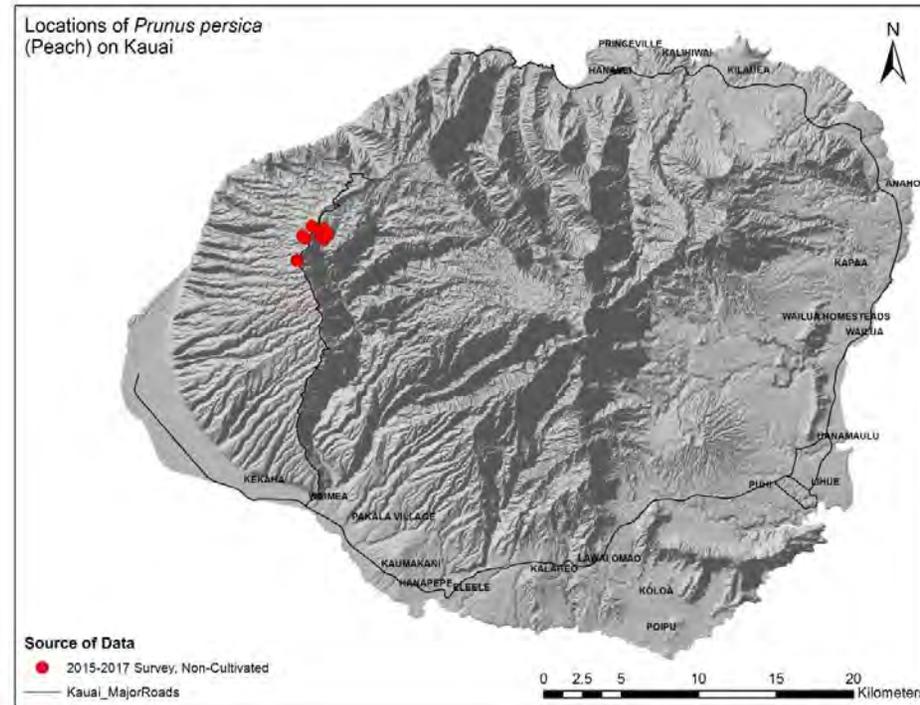
*Prunus persica* (Rosaceae), or “peach” is a tree that is cultivated as an fruit tree. Non cultivated instances of this plant were mapped during 2015-2017 surveys because a naturalized population was detected, making it a new naturalization record for Kaua’i.



Above: *P. persica* naturalizing in mesic *Acacia koa* (koa) forest.

**Detection and Distribution**

The first record of *P. persica* on Kauai is a herbarium voucher collected in 1989 (T. Flynn 3339, PTBG). Statewide, this plant is known to have naturalized on Maui, and is possibly naturalized on O’ahu and Hawai’i Islands (Imada 2012). However, 2015-2017 surveys showed that *P. persica* should be considered naturalized on Kauai as well. It has sparingingly naturalized in Kokee and is occasionally encountered along ditches, hiking trails and where it has spread from cultivated sites near cabins (K. Brock 1062, PTBG; see figure below). Current data indicates that plants are distributed within 1 house district (16) and 1 judiciary district (Waimea).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Rosa laevigata</i> (Cherokee rose)</p>	NATURALIZED	BORDERLINE EARLY DETECTION	HIGH RISK (16)	<b>May be too widespread to eradicate; keep on Botanical Survey List, gauge partnership agency support, and decide if Prioritization Assessment is needed.</b>

### Background

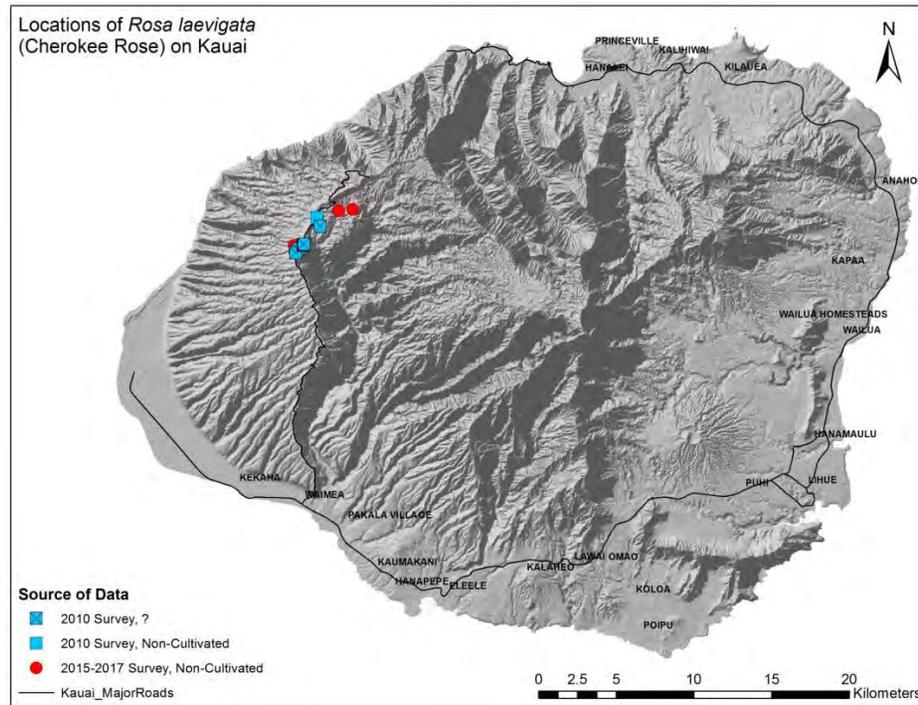
*Rosa laevigata* (Rosaceae), or “Cherokee rose”, is a climbing shrub that is occasionally cultivated as an ornamental. This species **was mapped during 2015-2017 surveys to inform the prioritization assessment process** used to evaluate whether KISC should attempt eradication (i.e. accept “Target” status) of this plant from Kaua’i. Additionally, **2015-2017 surveys detected naturalized individuals, making *R. laevigata* a new naturalization record for Kaua’i**. Restoration projects within the Hawai’i Department of Transportation’s (DOT) roadside right-of-ways are being planned for the future (D. Frohlich pers. comm). As most of the plants are planted/spreading along highway 50’s right-of-way, future efforts to eradicate this plant may be more successful when completed alongside DOT projects.



Above: *R. laevigata* along roadside in Kokee

### Detection and Distribution

The first record of *R. laevigata* is a herbarium voucher collected from a roadside planting from Kokee in 1987 (D.H. Lorence, PTBG). Statewide, *R. laevigata* is known to be naturalized on Lanai and Hawai’i islands (Imada 2012). It is difficult to determine which plants in Kokee represent planted versus naturalized individuals due to its sprawling habit and use as a roadside ornamental. However, recent field data and detection of sporadic plants along Camp 10 road and adjacent disturbed areas indicates that **this plant may be naturalized on Kaua’i** (K. Brock 930, 950, PTBG; see figure below). **Dense blankets of this plant climbing over trees persist along roadsides in Kokee** (see figure below), and it can occasionally be found sparsely entangled with other vegetation in disturbed areas. Current data indicates that plants are naturalized within 1 house district (16), 1 judiciary district (Waimea), 3 watersheds (Hikimoe, Kauhao, Waimea), 8 TMKs and 1 popref polygon containing PEP plants (Kauhao-KAU, Waimea Upper-Puu Ka Pele-WMU).



***Rhynchospora caduca***

(angle-stem beaksedge)

NATURALIZED

REMOVE FROM SURVEY LIST?

NOT ASSESSED (?)

Probably too widespread/difficult to eradicate; continue to document impacts incidentally

**Background**

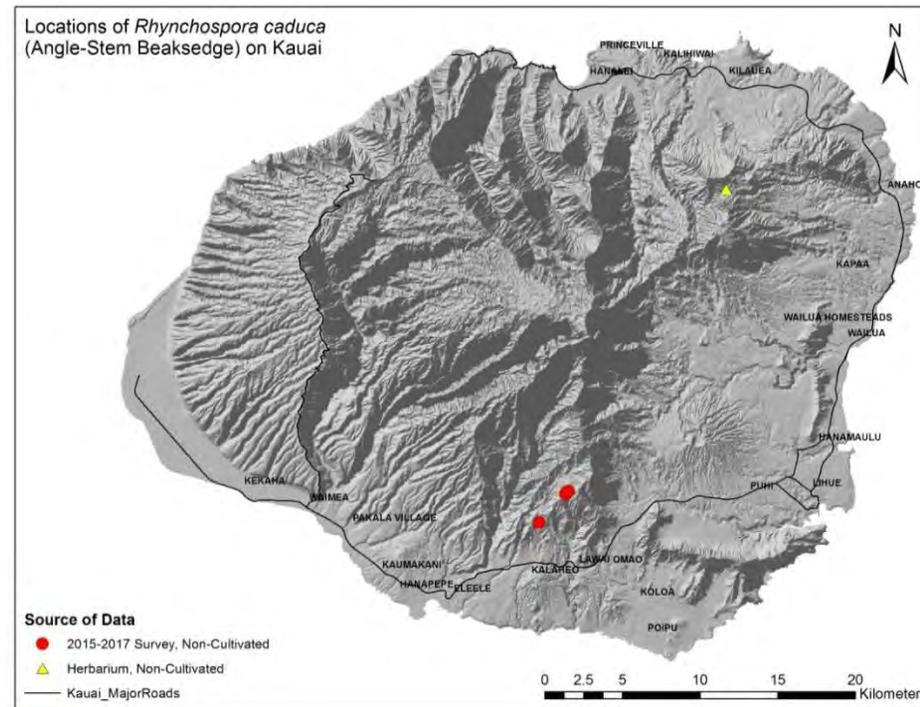
*Rhynchospora caduca* (Cyperaceae), or “angle-stem beaksedge”, is a weedy sedge. This species **was mapped during 2015-2017 surveys to inform the prioritization assessment process** used to evaluate whether KISC should attempt eradication (i.e. accept “Target” status) of this plant from Kaua’i. Additionally, **environmental impacts were noted.**



Above: *R. caduca* co-dominating bog vegetation in an area disturbed by pigs near Kanaele bog.

**Detection and Distribution**

The first record of *R. caduca* on Kauai is a herbarium voucher collected from “a bog mauka of Kilauea” in 1988 (L. Hume 332, PTBG). Statewide, *R. caduca* is known to be naturalized on Kauai, Oahu, Maui, Molokai and Hawai’i islands (Imada 2012). This plant has been observed in Kanaele bog and the road leading to it on Kauai as well as the aforementioned bog near Kilauea (see figure below; note: point for this voucher is approximate and derived from the herbarium label). It appears to be a **potentially serious invader in parts of Kanaele that are disturbed**, especially by pig activity, forming the **dominant or co-dominant cover in otherwise native bog vegetation** (K. Brock 810, PTBG). Current data indicates that plants are naturalized within 2 house districts (14, 16), 2 judiciary districts (Koloa, Kawaihau), 4 watersheds (Kalaheo, Wahiawa, Lawai, Anahola), 4 TMKs and 2 popref polygons containing PEP plants (Wahiawa-WAH, Anahola-ANA). However, due to its ability to colonize remote locations, other undetected locations of this plant may exist.



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Salvinia molesta</i> (salvinia)</p>	NATURALIZED	PARTNERSHIP?	HIGH RISK (29)	<b>Assign Partnership designation?; still cultivated by the public – use outreach to detect cultivated plants on private land; continue to monitor invasive impacts incidentally.</b>

**Background**

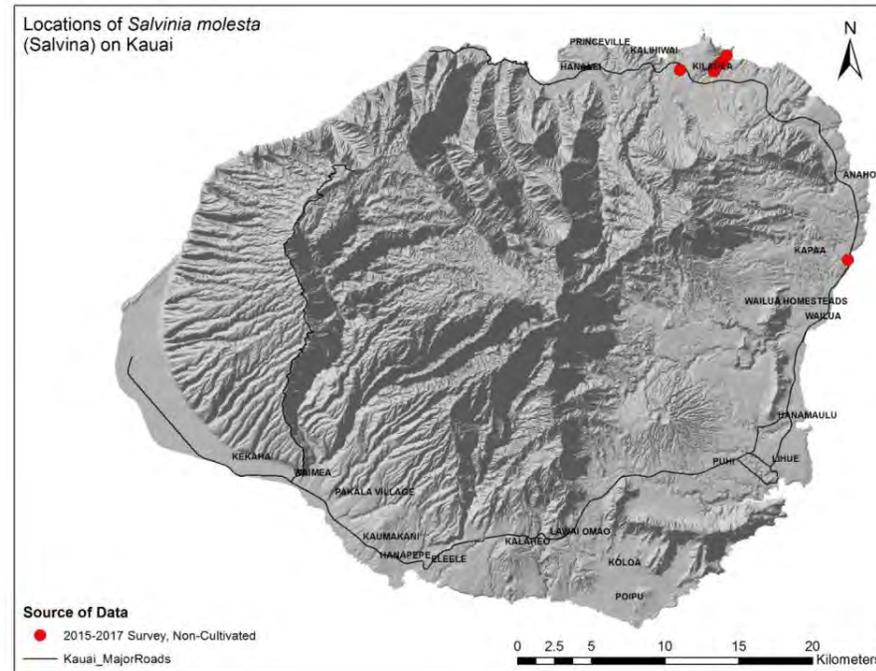
*Salvinia molesta* (Salviniaceae), or “salvinia”, is a floating aquatic fern that is cultivated as an ornamental. This species **was mapped during 2015-2017 surveys to inform the prioritization assessment process** used to evaluate whether KISC should assist partnering agencies attempt eradication (i.e. accept “Partnership” status) of this plant. This plant was differentiated from the rest of the *S. auriculata* complex according to keys provided in (Forno 1983).



Above: *S. molesta* in Puukumu stream.

**Detection and Distribution**

Herbarium vouchers indicate that *S. molesta* has been present on Kaua’i since at least 2003 (C. Kaneshige 0401-0310, BISH). Statewide, *S. molesta* is known to have naturalized on Oahu and Hawai’i islands (Imada 2012), although recent data suggests that it should also be considered naturalized on Kauai (A.M. Williams 217, K. Brock 709, PTBG). This plant has **naturalized in at least three waterways on Kauai** see figure below). Notably, *S. molesta* was observed in the small, quick moving Puukumu stream near Kilauea, which is a significant observation because it is commonly thought to persist in still or slow moving water only. This indicates that it is either capable of colonizing quick-moving waterways or that an infestation is present in slower moving areas upstream. It was observed in the Kilauea river during 2015-2017 surveys forming a dense, persistent mat along the banks that is often anchored to the shoreline by intertwining *Urochloa mutica* (California grass) that encroaches over open water. One recent herbarium voucher (collected in 2017) indicates that this plant is still being cultivated as an ornamental (T. Flynn 8734, PTBG). Current data indicates that plants are naturalized throughout 1 house districts (14), 2 judiciary district (Kawaihau, Hanalei), 6 watersheds (Aepo, Kapaa, Papaa, Kilauea, Puukumu, Kalihiwai).



 <b>KISC</b> <small>KAUAI INVASIVE SPECIES COMMITTEE</small>	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Schefflera arboricola</i> (dwarf umbrella tree)</p>	NATURALIZED	ON SURVEY LIST - document non-cultivated only	EVALUATE (3)	<b>Common in cultivation and detected during nursery surveys; continue to monitor naturalization and invasive impacts to inform HPWRA; consider for Pono phase-out list dependent on future notes of invasive impacts of WRA scoring</b>

### Background

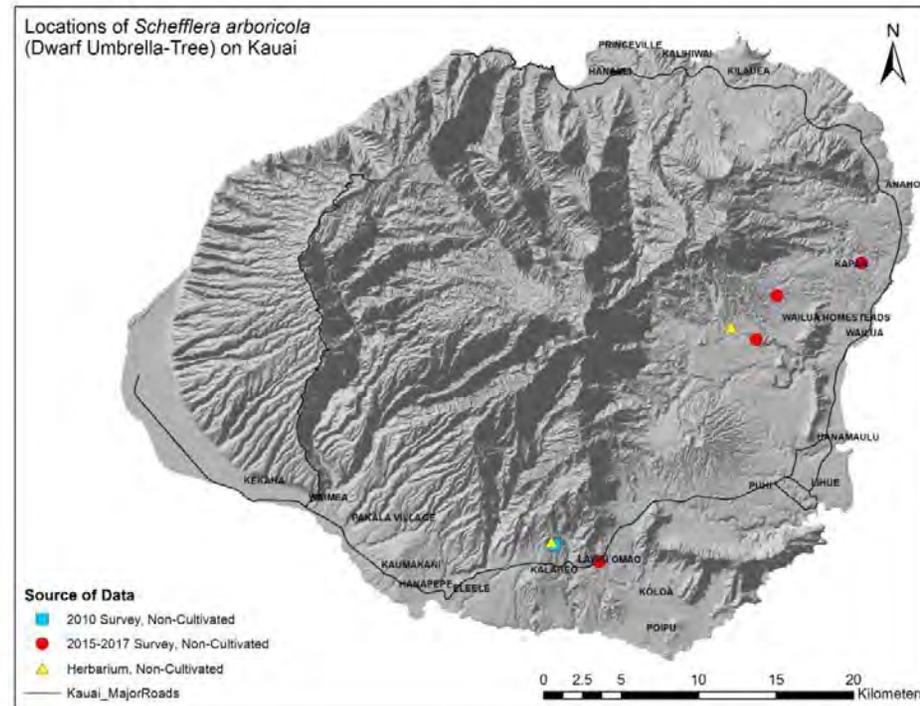
*Schefflera arboricola* (Araliaceae), or “dwarf umbrella tree”, is a shrub that is cultivated as an ornamental. **Non-cultivated instances were mapped during 2015-2017 to inform recommendations to KISC’s Pono Endorsement program.** Cultivated instances of this plant were not mapped.



Above: *S. arboricola* growing as an epiphyte on *Falcataria moluccana* (albezia) near Wailua Homesteads.

### Detection and Distribution

Herbarium vouchers indicate that *S. arboricola* has been present on Kaua’i since at least 1993 (T. Flynn 5293, PTBG). Statewide, *C. pannosus* is known to have naturalized on Kaua’i, Maui, and Hawai’i islands and potentially naturalizing on Oahu (Imada 2012). This plant has been observed **growing on other trees in mesic-moist alien lowland forest long distances from potentially cultivated plants. It is frequently cultivated in yards and commonly sold in nurseries on Kauai.** Current data indicates that naturalized plants exist in 3 house districts (14,15,16) and 2 judiciary districts (Koloa, Kawaihau).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Setaria palmifolia</i> (palm grass)</p>	NATURALIZED	PONO PHASE OUT; REMOVE FROM SURVEY LIST	HIGH RISK (22)	Probably too widespread to eradicate; continue to record invasive impacts incidentally.

### Background

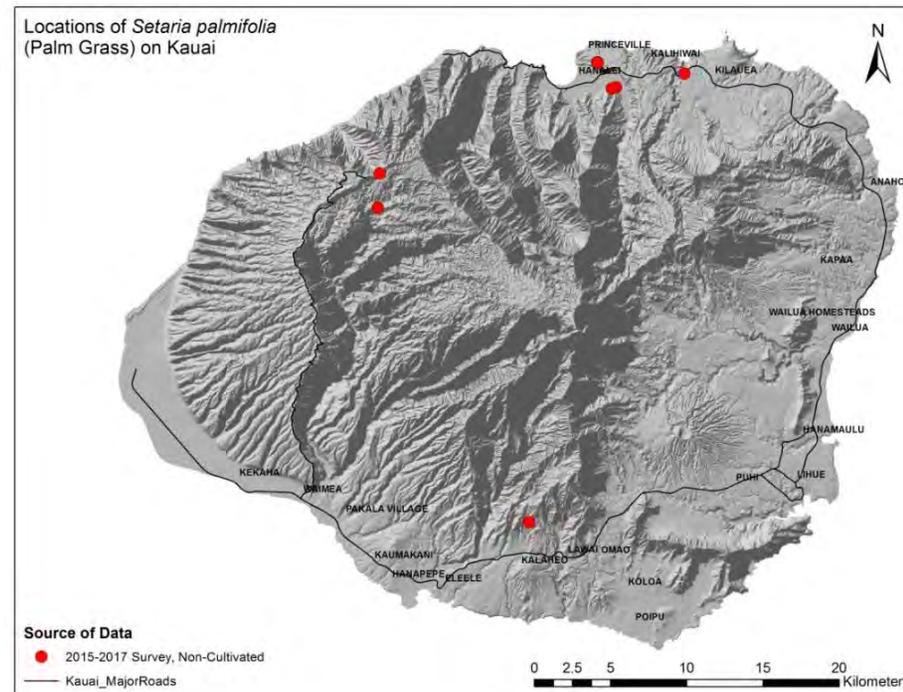
*Setaria palmifolia* (Poaceae), or “palm grass”, is a grass that is occasionally cultivated as an ornamental and members of the public and KISC partners inquire about it frequently. *S. palmifolia* was added to KISC’s Pono Endorsement programs “phase out list” in 2016. This species was mapped during 2015-2017 surveys to inform the prioritization assessment process used to evaluate whether KISC should attempt eradication (i.e. accept “Target” status) of this plant from Kaua’i.



Above: *S. palmifolia* in Princeville.

### Detection and Distribution

The first record of *S. palmifolia* is a herbarium voucher collected from a naturalized population near Princeville in 1986 (T. Flynn 1560, PTBG). Statewide, *S. palmifolia* is known to be naturalized on Kauai, Oahu, Lanai, Molokai, Maui and Hawai’i islands (Imada 2012). Data from 2015-2017 surveys suggest that this plant is **becoming widespread on Kauai**. The figure below shows 2015-2017 survey data, but several herbarium vouchers including **remote areas** have not been included to this map (eg. 100s of individuals from Hanakoa valley; K.R. Wood 16502, PTBG). It is common from Princeville to Kalihiwai in **moist ditches and depressions, occasionally forming the dominant graminoid cover**. It has also been noted above 1000m along the Pihea trail and elsewhere in Kokee, **suggesting that it is tolerant to a wide range of climates**. This plant was **not detected during nursery surveys**, although it is occasionally reported for sale by members of the community; it is possible that it is sometimes confused with *Molinieria capitulata*. Current data indicates that plants are naturalized within 2 house districts (14, 16), 3 judiciary districts (Waimea, Koloa, Hanalei).



 <b>KISC</b> <small>KAUAI INVASIVE SPECIES COMMITTEE</small>	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<i>Solanum torvum</i> (turkeyberry)	NATURALIZED	PARTNERSHIP SPECIES	HIGH RISK (24)	<b>Conduct Prioritization Assessment to assess potential invasive impacts and feasibility of eradication.</b>

### Background

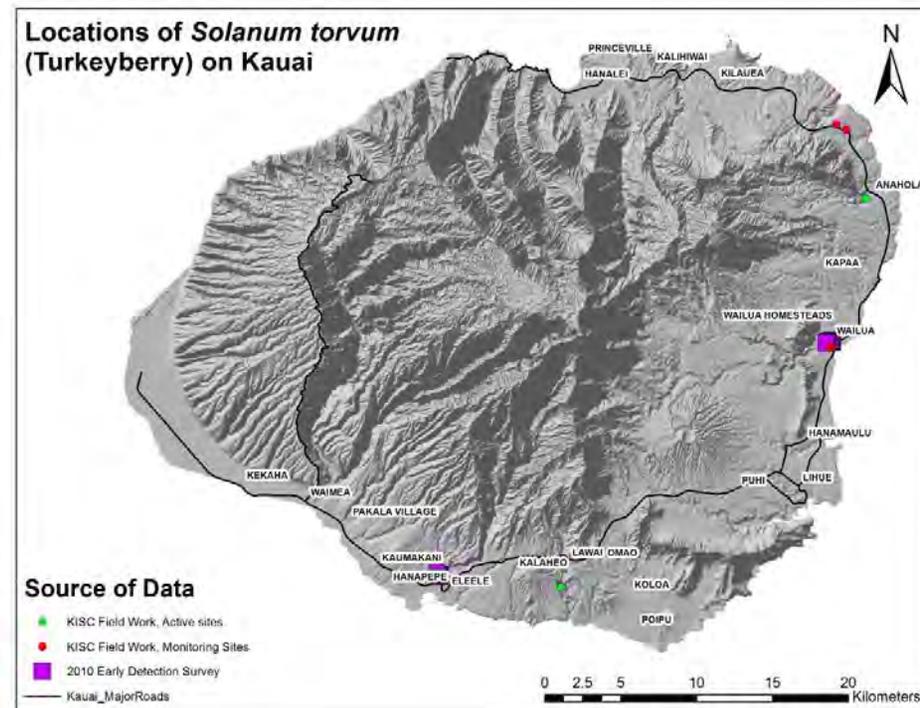
*Solanum torvum* (Solanaceae), or “turkeyberry”, is a shrub used in horticulture as a rootstock and edible plant. Control of this plant by KISC in partnership with the Hawaii Department of Agriculture began in 2014. This species **was mapped during 2015-2017 surveys to supplement previous distribution data**, contributing towards control of this plant on Kaua’i.



Above: *S. torvum* (white flowers) in Wailua in 2017.

### Detection and Distribution

Herbarium vouchers indicate that *S. torvum* has been present on Kaua’i since at least 2006 (K.R. Robinson s.n., PTBG). Statewide, *S. torvum* is known to have naturalized on Kaua’i, Oahu, Maui, and Hawai’i islands (Imada 2012). No new plants were detected during 2015-2017 surveys (see figure below), but the **population at Wailua appears to be growing** beyond its known extent and **other locations may exist** west of Wailua (Tim Flynn, pers. comm). Current data indicates that plants are distributed throughout 2 house districts (14,16), 3 judiciary districts (Waimea, Koloa, Kawaihau), 5 watersheds (Hanapepe, Lawai, Wailua, Anahola, Papaa), 12 TMKs and within 3 popref polygon containing PEP plants (Hanapepe-EPE, Anahola-ANA, Papaa-PAP).



 <b>KISC</b> <small>KAUAI INVASIVE SPECIES COMMITTEE</small>	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<i>Stapelia gigantea</i> (carrion flower)	NATURALIZED	REMOVED FROM SURVEY LIST	LOW RISK (3)	Continue to monitor invasive impacts incidentally

### Background

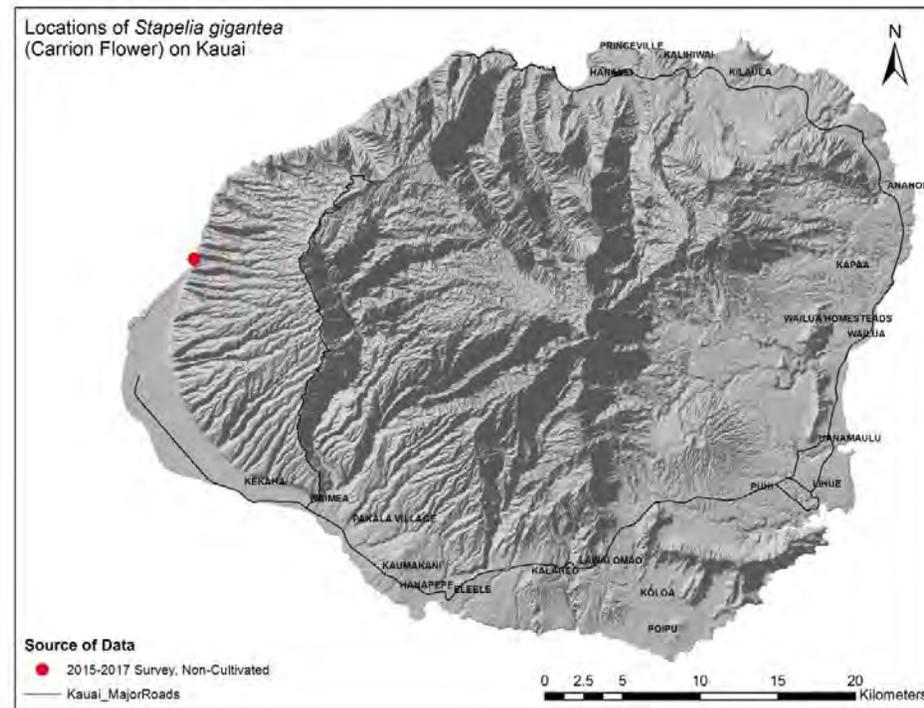
*Stapelia gigantea* (Apocynaceae), or “carrion flower”, is a low succulent plant that is cultivated as an ornamental. One non-cultivated instance of this species **was mapped because 2015-2017 surveys detected naturalized individuals, making this plant a new naturalization record for Kaua’i**. Cultivated plants were not mapped.



Above: *S. gigantea* naturalizing in native *Myoporum sandwicense* (naio) shrubland.

### Detection and Distribution

The first record of *S. gigantea* is a herbarium voucher collected from a naturalized population in 2016 (S.M. Deans 23, PTBG). Statewide, *R. laevigata* is known to be naturalized on Oahu, Molokai, Maui and Hawai’i islands (Imada 2012). However, recent field data indicates that **this plant should be considered naturalized on Kaua’i** (S.M. Deans 23 & 33, PTBG; S. Walsh pers. comm; see figure below). Multiple plants were **observed naturalizing along a steep, dry slope in native shrubland habitat near Polihale**. Additionally, it is **somewhat common in cultivation and is sold at nurseries and farmer’s markets**. Current data indicates that plants are naturalized within 1 house district (16), 1 judiciary district (Waimea).



*Syngonium podophyllum*  
(arrowhead vine)

NATURALIZED

PONO PHASE  
OUT LIST?

HIGH RISK  
(15)

Common in cultivation and detected during nursery surveys; continue to monitor invasive impacts incidentally; consider for Pono "phase-out" list.

**Background**

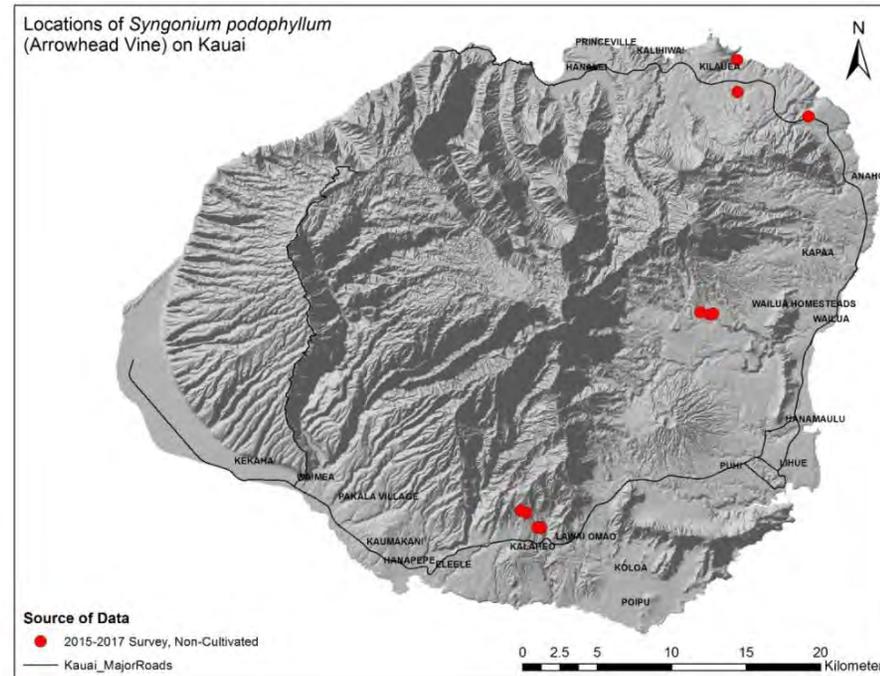
*Syngonium podophyllum* (Araceae), or "arrowhead vine", is a climbing vine that is cultivated as an ornamental. Some non-cultivated instances of this species **was mapped because 2015-2017 surveys detected naturalized individuals, making this plant a new naturalization record for Kaua'i.** Additionally, **potential impacts to horticulture were noted to inform Kaua'i's Pono Endorsement Program.**



Above: *S. podophyllum* growing along Kuamoo road near Wailua homesteads.

**Detection and Distribution**

The first record of *S. podophyllum* on Kauai is a herbarium voucher collected in 1988 (T. Flynn 2767, PTBG). Statewide, *S. podophyllum* is known to be naturalized on Oahu and Maui (Imada 2012), but 2015-2017 surveys suggest that it should also be considered naturalized on Kauai. Although it appears to have spread through Kauai via cultivation and vegetative reproduction, this plant has become **common throughout Kauai's moist – mesic alien lowland forests. It occurs outside of human residential areas**, such as in forest reserves, likely due to the **dumping of yard clippings containing viable fragments.** This plant is often seen growing up large trees, forming large colonies in some areas (e.g. growing along 350m of Kuamoo road). One nursery manager indicated that it is **a nuisance in his nursery because it has to be frequently controlled** where it has volunteered along the edge of his property and produces large amounts of sticky sap. However, it is **commonly cultivated and often sold in nurseries.** Current data indicates that plants are naturalized within all house districts (14, 15, 16) and 3 judiciary district (Koloa, Kawaihau, Hanalei). However, numerous other occurrences of recently escaped "adventive" vines exist on Kauai.



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Themeda villosa</i> (lion grass)</p>	NATURALIZED	REMOVED FROM SURVEY LIST	NOT ASSESSED (?)	Probably too widespread/difficult to eradicate; continue to document impacts incidentally

**Background**

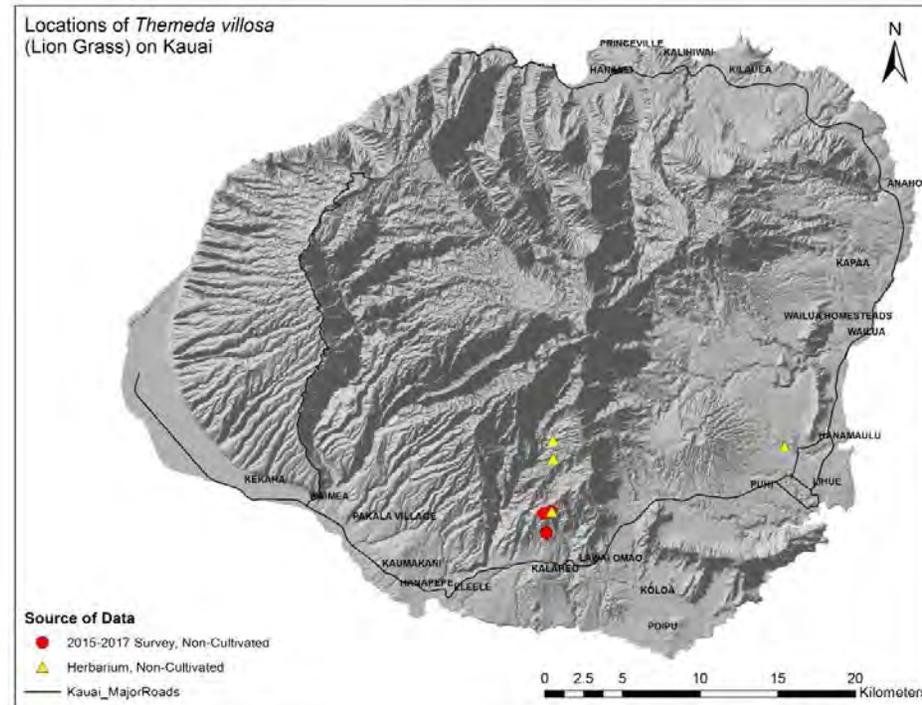
*Themeda villosa* (Poaceae), or “lion grass”, is a climbing shrub that is occasionally cultivated as an ornamental. This species **was mapped during 2015-2017 surveys to inform the prioritization assessment process** used to evaluate whether KISC should attempt eradication (i.e. accept “Target” status) of this plant from Kaua’i.



Above: *T. villosa* near Alexander Reservoir north of Kalaheo.

**Detection and Distribution**

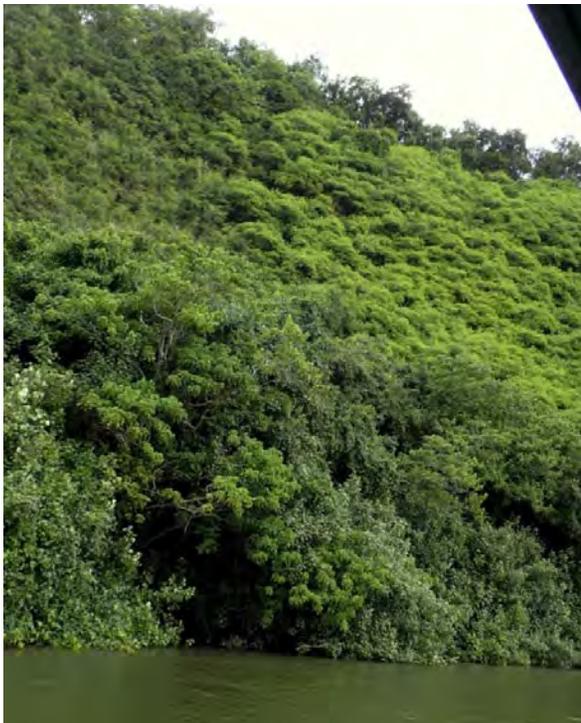
The first record of *T. villosa* on Kauai is a herbarium voucher collected near Hanamaulu in 1936 (E.Y. Hosaka 1655, BISH). Statewide, *R. laevigata* is known to be naturalized on Kauai, Oahu and Hawai’i islands (Imada 2012). This plant was originally mapped to assess its eradicability from Kauai, although the introduction time (although the collector notes that only one clumps existed in the area) suggests that this plant may be further established on Kauai than is indicated in the figure below. This plant occurs **along roadsides north of Kalaheo, and has been observed occasionally establishing in disturbed areas among native vegetation**. Including the herbarium voucher from 1936, Current data indicates that plants are naturalized within 2 house districts (15, 16) and 3 judiciary districts (Waimea, Koloa, Lihue).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Thevetia peruviana</i> (be-still)</p>	NATURALIZED	PONO PHASE OUT LIST?	HIGH RISK (9)	Common in cultivation and detected during nursery surveys; continue to monitor invasive impacts incidentally; consider for Pono "phase-out" list.

### Background

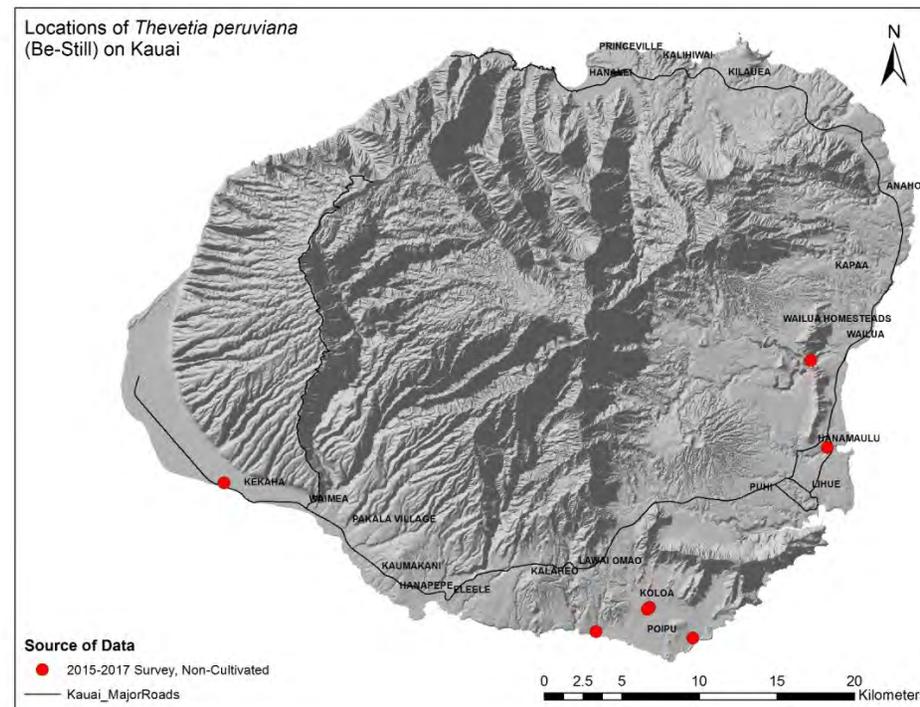
*Thevetia peruviana* (Apocynaceae), or "be-still", is a large shrub that is commonly cultivated as an ornamental. **2015-2017 surveys detected potential environmental, agricultural or cultural impacts and thus, non-cultivated instances where impacts were obvious were mapped to inform KISC's Pono Endorsement Program.** Cultivated occurrences were not mapped.



Above: *T. peruviana* (yellow-green vegetation on upper right side of bank) forming a dense thicket on the banks of the Wailua river.

### Detection and Distribution

The first record of *T. peruviana* on Kauai is a herbarium voucher collected from a naturalized population in Lawai valley in 1971 (F.R. Fosberg 53653, BISH). Statewide, *T. peruviana* is known to be naturalized on Kauai, Oahu, Molokai, Lanai and Maui (Imada 2012). 2015-2017 surveys observed this plant **forming dense stands that exclude other vegetation** in non-cultivated areas (see figure below). This includes **river banks, eroded hillsides, pastures and roadsides in Kauai's dry-mesic lowlands**. Eventually this plant may form a considerable component of the vegetation throughout these areas of Kauai in the future. This plant is **commonly cultivated and often sold in nurseries**. Current data indicates that plants are naturalized within 1 house district (15, 16), 1 judiciary district (Waimea, Koloa, Lihue), 3 watersheds (Hikimoe, Kauhao, Waimea), 8 TMKs and 1 popref polygon containing PEP plants (Kauhao-KAU, Waimea Upper-Puu Ka Pele-WMU).







	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<p><i>Vitex trifolia</i> (blue vitex)</p>	NATURALIZED	REMOVED FROM SURVEY LIST	HIGH RISK (9)	<b>Common in cultivation and detected during nursery surveys; continue to monitor invasive impacts incidentally; could consider for Pono “phase-out” list, but probably not an ideal candidate.</b>

### Background

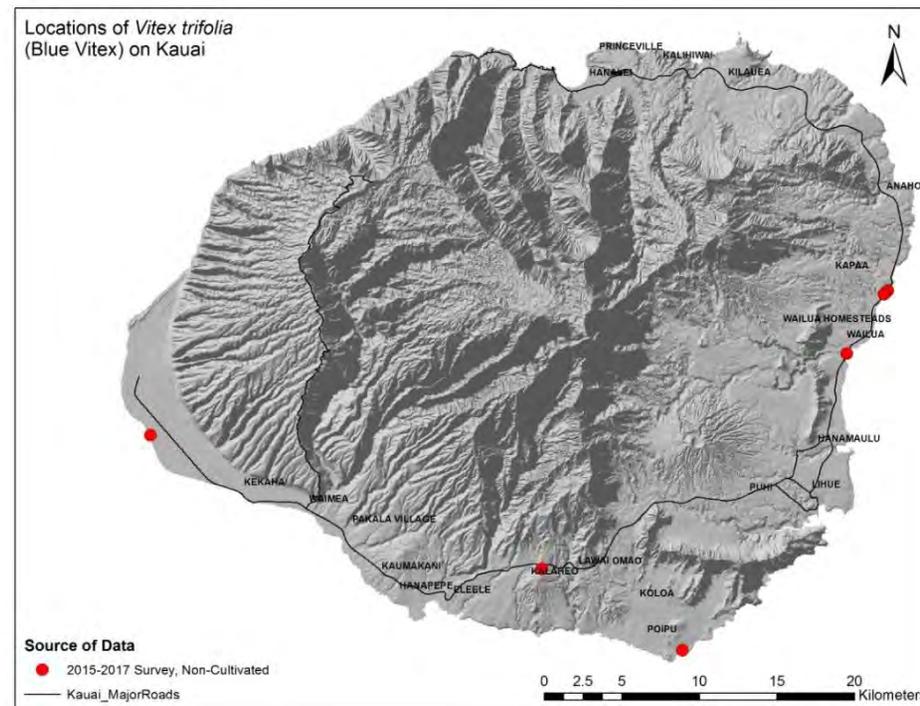
*Vitex trifolia* (Lamiaceae), or “blue vitex”, is a shrub that is commonly cultivated as an ornamental. This species **was mapped because 2015-2017 surveys detected naturalized individuals, making this plant a new naturalization record for Kaua’i.**



Above: *V. trifolia* var. *subtrisecta* colonizing disturbed ground in a coastal area near Kapaa.

### Detection and Distribution

The first record of *V. trifolia* is a herbarium voucher collected from a roadside planting from Kokee in 1974 (J.J. Fay 203, PTBG). Statewide, *V. trifolia* is known to be naturalized on Oahu and Molokai (Imada 2012), although 2015-2017 surveys suggest that **this plant should be considered naturalized on Kauai**. Most points represented in the figure below represent populations that are persisting and spreading after cultivation. However, plants near Kapaa Beach Park were observed **naturalizing in dry, disturbed soil** along approximately 100m of coastline (K. Brock 876; PTBG), and plants were recorded spreading across an entire vacant lot in Kalaheo. Another population at the Pacific Missile Range Facility has become quite large (approximately 40 m by 30 m), spreading into adjacent *Prosopis pallida* (mesquite) forest. This plant is **commonly cultivated throughout Kauai, and is frequently sold in nurseries**. Current data indicates that non-cultivated plants have been observed within 2 house districts (14, 16) and 3 judiciary districts (Waimea, Koloa, Kawaihau).



	Kaua'i Status	KISC Status	HPWRA	Current Recommendation for KISC:
<i>Xyris complanata</i> (yellow-eye grass)	NATURALIZED	REMOVE FROM SURVEY LIST?	NOT ASSESSED (?)	Likely too widespread/difficult to eradicate; continue to document impacts incidentally

### Background

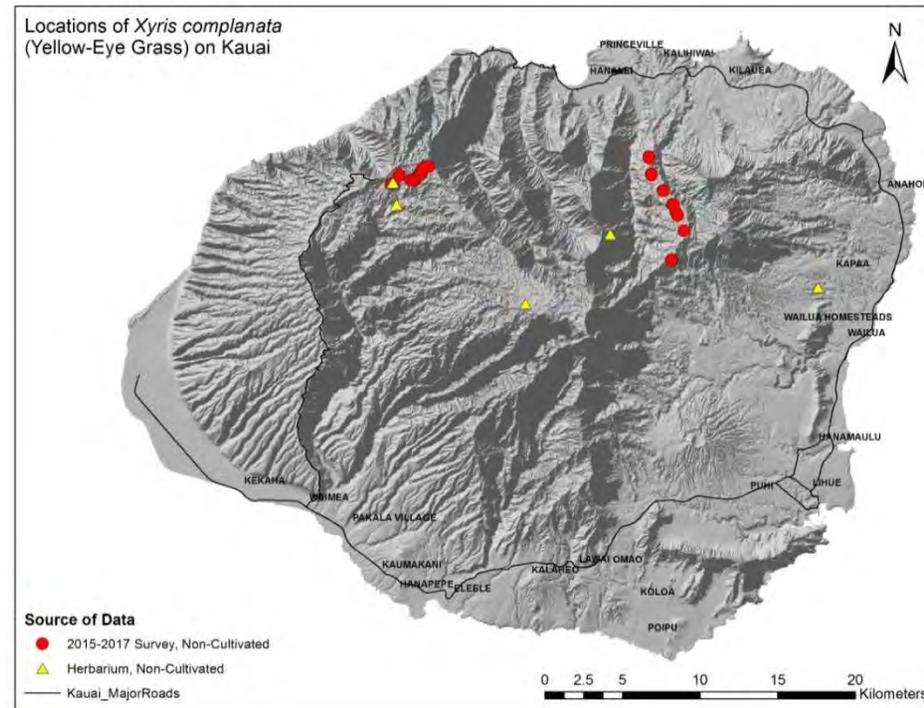
*Xyris complanata* (Xyridaceae), or “yellow-eye grass” is a herb that has been cultivated for cut flower arrangements. KISC’s partners and members of the public inquire about the control of this plant. This species **was mapped during 2015-2017 surveys to inform the prioritization assessment process** used to evaluate whether KISC should attempt eradication (i.e. accept “Target” status) of this plant from Kaua’i. **Additionally, surveys noted environmental impacts.**



Above: *X. complanata* forming a dominant component of open, graminoid patches in a native bog ecosystem.

### Detection and Distribution

The first record of *X. complanata* is a herbarium voucher collected from a naturalized population in 1987 (D.H. Lorence 5538, PTBG). Statewide, *X. complanata* is known to be naturalized on Kauai and Hawai’i islands (Imada 2012). 2015-2017 surveys confirmed that this plant is abundant where it has naturalized in low-lying areas at higher elevations on Kauai (see figure below). This plant appears to **rapidly colonize areas of disturbance including old roadways and hiking trails wherever there is sufficient moisture**. 2015-2017 surveys observed that *X. complanata* **dominates areas that are disturbed** by human traffic or pig activity in bog ecosystems, **but subsequently spreads at high densities into open, relatively undisturbed areas of intact native vegetation** (K. Brock 727 & 916, PTBG). Populations of this plant are said **to have grown substantially in the last few years** (W. Kinoshita, pers. comm.), and will likely continue to threaten Kauai’s bog ecosystems in the future. It was **not observed for sale in nurseries** during 2015-2017 surveys. Current data indicates that plants are naturalized within 2 house districts (14, 16) and 2 judiciary districts (Hanalei, Waimea).



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