KISC KAUAI INVASIVE SPECIES COMMITTEE	Kauai Status	KISC Status	HPWRA	Invasive Impacts Score	Feasibility Score	Combined Score
Heterotheca grandiflora (telegraph weed)	**Naturalized**	**EARLY DETECTION**	**HIGH RISK (14)**	**6.5**	**7.5**	**14**

Initial Prioritization Assessment Report completed: December 2017
Report updated as of: N/A
Current Recommendation for KISC: Pending Ranking and Committee approval
Knowledge Gaps and Contingencies:

1) Delimiting surveys near the known location are necessary to ensure it hasn't spread beyond its known distribution
2) Discussions with the landowner about seed mix and control around agricultural areas and watercourses are needed.
3) The control crew likely needs to be trained to identify this weed.

Background

Heterotheca grandiflora (Asteraceae) or "telegraph weed" is a large herb sometimes growing over 1m tall that has been accidentally introduced by way of its sticky seeds throughout Hawaii, mainland USA and Australia (Wagner et al. 1999, HPWRA 2015). *H. grandiflora* has not been considered for control by KISC; the purpose of this prioritization assessment report is to evaluate whether KISC should attempt eradication (i.e. accept "Target" status) or joint control with partnering agencies (i.e. accept as "Partnership" species status). This will be informed by scoring and comparing *H. grandiflora* to other "Early Detection" species known to Kauai (See Table 5 in KISC Plant Early Detection Report for status terminology).

Detection and Distribution

Statewide, *H. grandiflora* is considered naturalized on all of the main Hawaiian islands (Wagner et al. 1999, Imada 2012). However, only one herbarium voucher collected in 1971 (Hobdy 261, BISH) designates its presence on Kauai. An apparently small population near Mana was detected during the 2014 Statewide Noxious Invasive Pest Program (SNIPP) Surveys, and again during 2015-2017 Surveys (Figure C24- 1). As most of the population is on a large parcel of private land, the extent of this population is not known and has never been collected for herbaria to verify the identification of this plant or provide record of its spread on Kauai. Approximately 40 plants can be viewed from the roadside. Although this plant was first recorded on Kauai 46 years ago, no other reports or herbarium vouchers show that it has become widespread. Due to its conspicuous silver leaves, erect growth habit and its known tendency to become very common along roadsides, botanists on Kauai are unlikely to have overlooked large populations of this plant. Present data indicates that *H. grandiflora* is naturalized in one judiciary district (Waimea) and one watershed (Hoea) on Kauai.

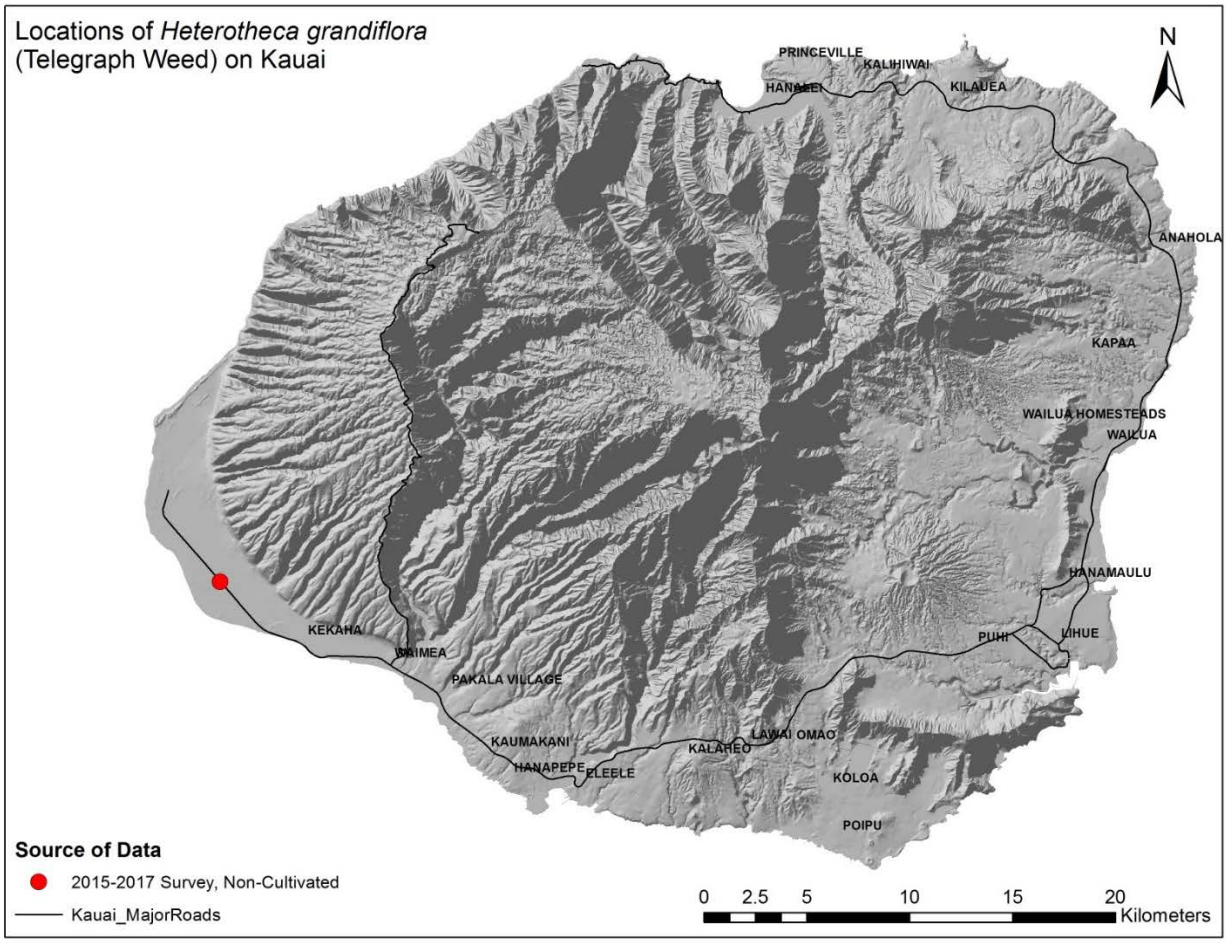

Figure C24- 1. Known locations of *H. grandiflora* on Kauai.

Hawaii Pacific Weed Risk Assessment (HPWRA) Score

H. grandiflora is designated as "High Risk", receiving a score of 14 (Daehler et al. 2004, HPWRA 2015). Traits contributing to this status are listed below according to whether they pertain to the likelihood a plant will invade vs. the consequences of the invasion, according to Daehler and Virtue (2010). Categorization of traits in this manner more accurately informs invasive impact potential scoring and prioritization of species that are already established on Kauai.

Likelihood of Invasion	*Consequences of Invasion*
• Well suited to climates in Hawaii • Naturalized in Hawaii and areas with comparable climates • Forms dense thickets • Produces viable seed • Self-compatible • Matures in less than 1 year • Propagules dispersed unintentionally by people • Propagules dispersed by water • Propagules dispersed by animals (fruit sticks to fur)	• A known environmental weed • A congeneric weed, sharing a genus with the known weed *H. subaxillaris* (i.e. implies inheritance of tendencies to inflict invasive impacts) • Unpalatable to grazing animals

Refer to the full Weed Risk Assessment for *H. grandiflora* at https://sites.google.com/site/weedriskassessment/assessments/Download-Assessments.

Invasive Impacts Score

1. Impact on natural community structure and/or composition

Score: 2.5 = Moderate-High impacts

H. grandiflora was assigned a score of 2.5 because of documented impacts to native ecosystems in both Hawaii and Australia. In Australia it is known to dominate sand dunes as well as dry, disturbed areas where control efforts are currently underway to eradicate or contain this plant (Csurhes 2009). Thus, sand dune habitats containing rare species as well as coastal, native-dominated ecosystems on Kauai will likely be impacted by the invasion of this plant. Additionally, Kauai's dry habitats such as *Myoporum* shrublands and open, eroded cliff sides in Waimea canyon and along the Na Pali coast may provide ideal habitat. Spread of this plant can be rapid: an infestation in Australia that comprised only a few hectares when it was first detected grew to encompass 300-400 hectares in 10-15 years (Flint 1977, Andersen 1992, Csurhes 2009.). However, due to the shade-intolerant nature of this plant, it is unlikely to become very common in habitats with high cover of shrubs, trees or very tall grasses on Kauai (Csurhes 2009). Conservationists in Hawaii have documented this plant forming dense stands that invade and prevent regeneration of native plants, including the endangered *Schiedea hawaiiensis* on Hawaii Island. However, documentation of invasive impacts in Hawaii are derived from field observations in habitats over 2000m above sea level, which perhaps more closely reflects this species' temperate native range in California (Medeiros et al. 1998, Daehler 2005). As Kauai lacks an alpine and sub-alpine zone, potential invasive impacts will more likely mirror those experienced in coastal Australia at near-tropical latitudes.

Figure C24- 2. *H. grandiflora* in Australia (Photo credit: S. Navie).

2. Impacts to Agriculture, Culture and other Human Systems

Score: 2 = Moderate impacts

H. grandiflora was assigned a score of 2 in this category because its ability to colonize disturbed areas will likely make it at least a minor-moderate weed of agriculture, although no impacts to agricultural yields have been reported (Wagner et al. 1999, Csurhes 2009.). *H. grandiflora* is generally regarded as unsightly, being characterized as a tall weed (> 1m tall) with hairy, gray leaves that exude a sticky substance (Headrick et al. 1997). The leaves emit a foul odor which has earned it the common name of "stink daisy" in some areas (Csurhes 2009). As some of the most popular tourist sights of Kauai provide ideal habitat for this plant (beaches, Na Pali Coast, Waimea Canyon), invasion of this plant could threaten tourism. In ideal habitats it is known to form a "nearly continuous hedge" along roadsides (Smiley 1922). Control efforts in Australia along the heavily visited Gold Coast are partially justified by this plant's potential to impact tourism (Willsher et al. 2008).

Figure C24- 3. *H. grandiflora* in California, showing habit (Photo credit: C. M. Vadheim).

3. Impacts to biotic and abiotic processes

Score: 2 = Moderate Impacts

H. grandiflora was given a score of 2 because assessments of vegetation type and home loss due to fire in California indicate that presence of this species may increase the intensity and likelihood of wildfire (FIREWISE 2014). However, experiments testing the relative flammability of *H. grandiflora*-invaded ecosystems or investigating the mechanism underlying its flammability have not been conducted.

TOTAL INVASIVE IMPACTS SCORE: 6.5

Feasibility of Control Score

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

Delimiting Survey:

Score: 3 = Minor Effort

Feasibility of a delimiting survey for *H. grandiflora* was given a score of 3 because only one site was detected in a single TMK and the open habitat is easy to traverse relative to other sites in Kauai. However, the small stature of this plant and its spread within private land prohibited an accurate estimation of population size. Thus, this score may be downgraded once delimiting surveys are conducted. The majority of the plants were located along water tanks installed for shrimp farming and along an irrigation ditch. It is suspected that spread of this plant in Arizona may be due to contaminated seed mix that was sown after construction or maintenance operations (Spence 2005). The landowner should be asked if seed mix was sown and if it was used elsewhere on the property or on the island. Surveying crews will likely need to be trained to recognize this plant, as its immature basal rosettes can be confused with other common weeds.

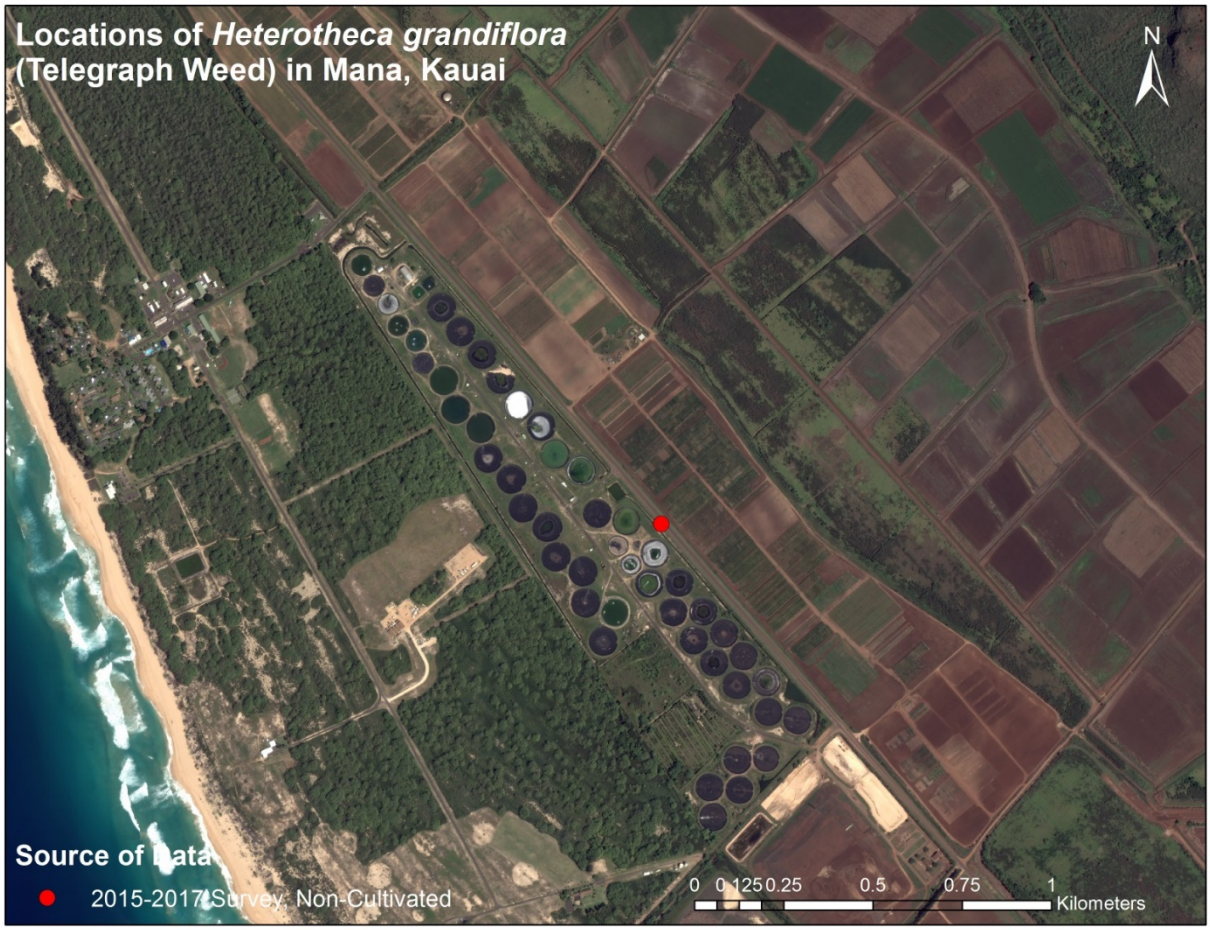

Figure C24- 4. Map of *H. grandiflora* location near Mana, Kauai adjacent to a shrimp farm.

Initial control:

Score: 2.5 = Moderate-Minimal Effort

Feasibility of initial control for *H. grandiflora* was given a score of 3 because control efforts from Australia indicate that this plant is well-controlled by herbicides (Csurhes 2009). However, plants that are located next to a ditch or shrimp tanks may have to be manually removed to prevent contamination. Additionally, immature plants consisting of low basal rosettes are likely hard to detect so multiple visits may be necessary to control all plants. This score estimates the population to be <200 plants; this score may be downgraded if delimiting surveys reveal the population to be larger.

Monitoring:

Score: 2 = Moderate Effort

No information is available to predict how long *H. grandiflora* seeds can persist in the soil, preventing an accurate estimation of how long monitoring efforts are required. One study indicates that this plant exhibits some dormancy and viable seeds of unknown age can be retrieved from the soil (Flint 1977). However, other plants within the Asteraceae produce short seed banks less than 3 years (Kaeser and Kirkman 2012). Because this plant matures within one year (HPWRA 2015), revisit intervals would need to be short (perhaps every 3-4 months until germination ceases), to make progress towards eradication.

FEASIBILTY OF CONTROL SCORE: 7.5

COMBINED SCORE: 6.5 + 7.5 = 14

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