Propagule Management and Genetic Storage

Schofield Barracks Landfill Kahua Seed Propagation Site

Introduction: The Army is required to stabilize numerous endangered species under U.S. Fish and Wildlife Service issued Biological Opinions (BOs), and the majority of these taxa are endangered plants. To meet stabilization goals for managed plant species, these plant populations are represented genetically *ex situ* in seed storage, greenhouses, or as clones in a garden-style living collection. In an effort to reduce greenhouse space for the living collections of some species, as well as reduce field time needed for seed collection, a fence was constructed in March of 2017 at the now decommissioned site of the former Schofield Barracks Landfill. This fence and surrounding area will be referred to as the Kahua Site (Figure 1). The fenced space is used to plant some of the living collection species in a seed-orchard setting. The surrounding area outside the fence will be planted with common natives, with the goal of producing seed for long term storage and habitat restoration. This fenced are may be extended in the future if the initial outplantings are successful.

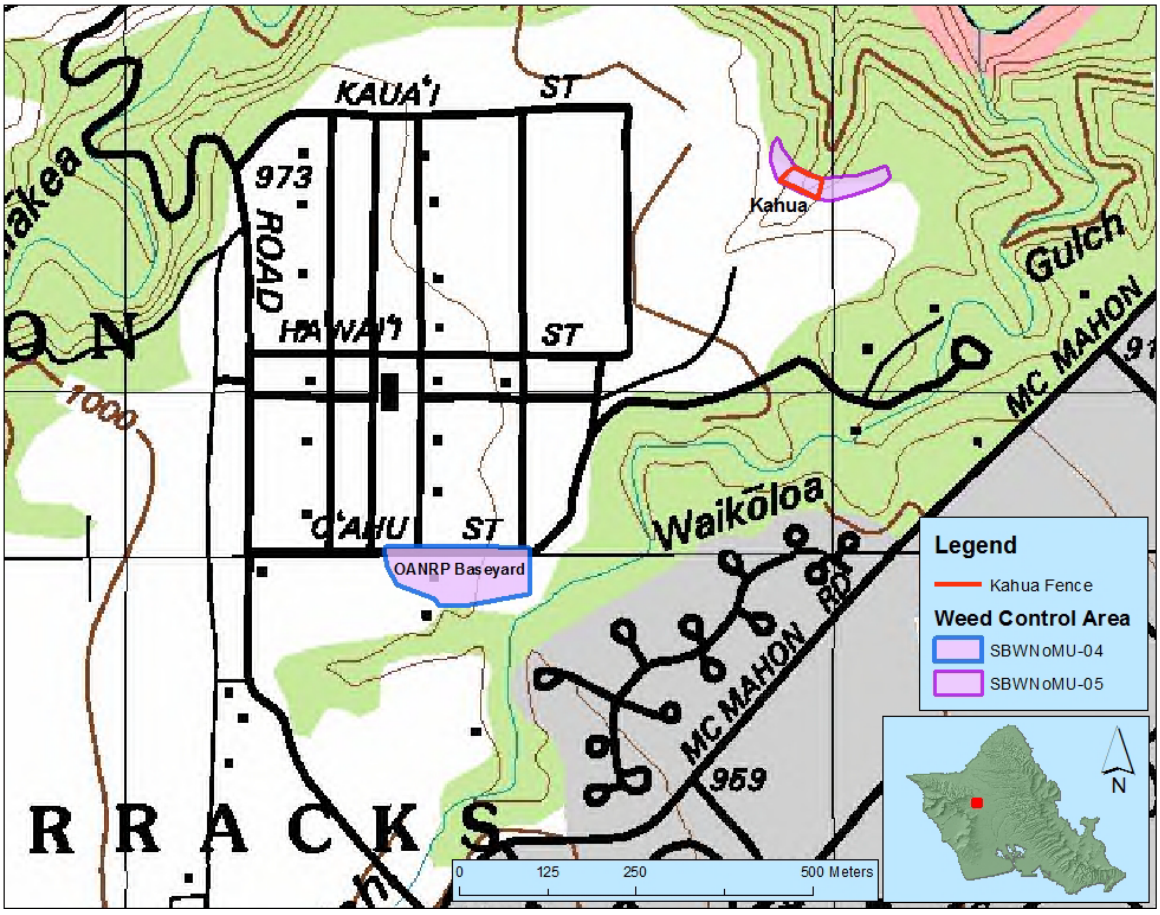

Figure 1. GIS map of Kahua fence (red outline)

Kahua Site

The Kahua site is a north facing slope on the edge of the former landfill, and is approximately 1.9 acres in size (Fig. 2 and 3). A 400 gallon water tote catchment was constructed near the fence to provide water for new plantings (Fig. 4). Currently, Natural Resource Program living collections exist on greenhouse benches at the Natural Resource Program baseyard. Limitations of the greenhouse setting include: limited production space, time consuming to maintain, and plants may not reproduce due to restricted growth in greenhouse pots. The benefit of the Kahua site are numerous and include: increased spacing between plants, reduction in time spent watering, and increased plant size as the roots are not restricted to pots. Potential downsides of the site include weed control, but this is being mitigated by the use of weed mat and mulch around outplants and fenced area. Currently, *Hibiscus brackenridgei* subsp. *mokuleianus*, *Neraudia angulata*, and *Nototrichium humile* are present at the Kahua site, and were planted in April, 2017. (Figs. 5-8).

Figure 2. Slope of landfill site showing Kahua fence location in red.

Figure 3. Kahua fence from bottom corner looking upslope.

Figure 4. Water catchment system at Kahua site.

Figure 5. Top fenceline and grass control area surrounding the fence. Rare plants are near the bottom of the fence and include: *Hibiscus brackenridgei* subsp. *mokuleianus, Neraudia angulata, and Nototrichium humile*.

Figure 6. *Neraudia angulata* planted at Kahua fence.

Figure 7. *Hibiscus brackenridgei* subsp. *mokuleianus* planted at Kahua fence.

Figure 8. *Nototrichium humile* planted at Kahua fence.

Future outplantings

We plan to expand the Kahua site in the future to include numerous species of rare plants, depending on the survival of currently planted species (Table 1). Currently there are 85 total plants from three different rare species planted at the site. Additionally, common native species will be incorporated into the area for use as windbreaks, as well as for future seed collection to be used in restoration efforts. Following planting, maintenance activities will include controlling invasive grasses and shrubs using herbicide and hand tools, and applying approved insecticides to control insect pests. Once plants begin to flower and fruit, the collection of propagules for seed storage and use in reintroductions will commence.

Table 1. Current rare plants in Kahua fence and potential species for future plantings.

Rare plant species	Population Unit	Number of Plants Outplanted	Current genetic storage goals of all founders(% complete)	Propagule Founder Source	Number of Potential Founders for PU
Neraudia angulata	Makua	27	42	MMR-A	54
Hibiscus brackenridgei subsp. *mokuleianus*	Keaau	15	86	KEA-A	7
Nototrichium humile	Kaimuhole and Palikea Gulch	43	100	ALI-A/ ALI-C	42
**Euphorbia celastroides var. kaenana*	Puaakanoa	100*	56	MMR-E/ G/ H/ I	124
**Cenchrus agrimonioides var. agrimonioides*	Kahanahaiki and Pahole	150*	28	MMR-A -MMR-K/ PAH-A –PAH-F	104
**Eugenia koolauensis*	Pahipahialua	75*	38	PHI-A	42

* =Future outplantings