

BOTANICAL INVENTORY OF KANAHA BEACH, MAUI

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INTRODUCTION

This survey reports on the vegetation of Kanaha Beach, Maui, Hawai'i. Our objectives were to document the current vegetation, to locate any rare or endangered plants, to locate any invasive plants, and to identify native plants useful in coastal dune restoration.

Kanaha Beach is located along the north shore of Maui just east of downtown Kahului on the makai (ocean) side of Amala Pl. (Beach Rd.) between the sewage treatment facility and Kanaha Beach Park. Kanaha Beach can be broken into three main parts, from the sewage treatment plant to the concrete canal (phase I), the inside of the concrete canal from the beach to the automobile bridge (canal), and from the concrete canal to Kanaha Beach Park (phase II). We also included information on the open-walled structure near the coast in phase II (Girl Scout Pavilion).

In old Hawai'i, Kanaha Pond was one of two ponds used extensively for food, bathing, and salt collection. The Kanaha Beach dunes did, and still do, separate the pond from the ocean. During World War II, the area was taken over by the navy and construction of buildings and roads occurred, remnants of which can still be seen today. Currently the area is used mostly for recreation, by fishermen, kiteboarders, and general beach-goers.

METHODOLOGY

We did walk-through surveys of Kanaha Beach during the month of August, 2001. Plants encountered were identified to species, and frequency noted. Pictures were also taken to visually document the current vegetative status and for use in a pictorial guide to the common plants. Vegetation maps were drawn on aerial photographs and ground corrected for current conditions.

RESULTS

Kanaha Beach is dominated by wind-swept coastal vegetation. The area is predominantly open low-lying dune vegetation on the western end and forest on the east. During the survey, we encountered a total of 77 species of plants. Of these, twenty were native and fifty-seven were non-native. It should be noted that this survey was done at the end of summer during one of the longest droughts to ever hit the state of Hawai'i. There would probably be more species encountered in a wet year.

PHASE I

The western end of Kanaha Beach , phase I, is comprised of rolling sand dunes on the western half and compacted basalt soil on the eastern half. The entire length of the beach has a row of trees lining the coast. Behind this are large mats of mostly low-growing native dune vegetation which in turn grades into small shrubs near the road.

CANAL

The concrete canal in between phase I and phase II is filled with sand on one side and is currently comprised of low-lying coastal wetland vegetation and scattered young trees. Sedges line the margin of the sand area in the canal, and many seedlings that have presumably been washed down stream can be seen germinating in the areas of dry sand. Aerial photographs from an earlier date show the sandy area in the canal was less vegetated than it is today.

PHASE II

The eastern end, phase II, contains sand dunes near the coast and hard packed basalt near the road. As with phase I, there is a row of mixed trees that line the coast. Behind this phase II is mostly covered with forest. Near the road is a long, narrow, low-lying area where only wetland plants are able to survive.

GIRL SCOUT PAVILION

The girl scout pavilion is near the coast in phase II. The building itself is fronted by low-growing windswept coastal plants, and is surrounded by large trees with an understory of grasses. Heading inland is a band of shrubs that grades into low-lying wetland vegetation, and then back into shrubs where it meets the road.

VEGETATION TYPES

***Tournefortia* / Milo (*Thespesia*) Forest**

Directly above the high tide line and comprising the majority of the dune closest to the ocean along the entire length of Kanaha Beach is a line of trees that make small groves five to fifteen meters in height of predominantly tree heliotrope (*Tournefortia argentea*) and milo (*Thespesia populnea*). There are also occasional ironwood (*Casuarina equisetifolia*), kiawe (*Prosopis pallida*), and hau (*Hibiscus tiliaceus*) trees growing in the coastal groves. The understory is comprised of common coastal strand plants such as naupaka (*Scaevola sericea*), 'aki 'aki (*Sporobolus virginicus*), 'akulikuli (*Sesuvium portulacastrum*), pohuehue (*Ipomoea pes-caprae*), saltbush (*Atriplex semibaccata*), and 'aweoweo (*Chenopodium oahuense*). In phase II, this vegetation type is dominated by kiawe and also contains pickleweed (*Batis maritima*) and Christmas berry (*Schinus terebinthifolius*).

Pohuehue (*Ipomoea*) Herbland

Large stands of pohuehue (*Ipomoea pes-caprae*), a prostrate purple flowered morning glory vine, carpet the sandy dunes, especially in phase I. Many of the common dune plants can be found growing in and amongst the vines including 'aki'aki, golden crown beard (*Verbesina encelioides*), 'akulikuli, chinese violet (*Asystasia gangetica*), *Pluchea* spp., 'aweoweo, Bermuda grass (*Cynodon dactylon*), Guinea grass (*Panicum maximum*), and saltbush.

'Aki 'Aki (*Sporobolus*) Grassland

Large stands of this low-growing vigorous native dune grass can be seen on the open sandy dunes and in the sandy areas under the kiawe trees. This vegetation type is most common in the western portion of phase I, in the canal, and in the more coastal areas of phase II. The common dune plants found growing in association with pohuehue herblands can also be seen growing in 'aki'aki grasslands.

'Aweoweo (*Chenopodium*) Shrubland

The area closest to the road in phase I is dominated by 'aweoweo (*Chenopodium oahuense*), a native shrub that gets a little over one meter tall. Growing in and amongst the 'aweoweo are many common coastal plants such as kiawe, Bermuda grass, slender mimosa (*Desmanthus virgatus*), haole koa (*Leuceana leucocephala*), sour grass (*Digitaria insularis*), buffel grass (*Cenchrus ciliaris*), *Verbesina*, *Asystasia*, and swollen finger grass (*Chloris barbata*). This is the area where most of the coconuts (*Cocos nucifera*) were planted. Young kiawe becomes a more conspicuous component in the eastern part of phase I. There is a newly described species of endemic long horned beetle (*Plagithmysus* sp.) which uses 'aweoweo as an obligate host plant to raise its young in.

Kiawe (*Prosopis*) Forest

Most of phase II is covered with a dense kiawe forest ten to twenty meters in height. The understory is predominantly bare ground or patches of buffel and Guinea grass in the western portion of phase II, pickleweed (*Batis maritima*) in the middle section of phase II, and 'akulikuli, 'aki'aki, or *Pluchea* spp. in the eastern section of phase II.

'Akulikuli (*Sesuvium*) Herbland

Moist, saline areas that occasionally flood are often carpeted by the succulent 'akulikuli. 'Akulikuli can also form large mats on sand dunes near the coast. Other plants commonly found in this vegetation type include nena (*Heliotropium currasavicum*), *Pluchea* spp., Bermuda grass, 'aki'aki, and, especially in phase II, pickleweed.

***Pluchea* Shrubland**

Open areas of phase II that are not dominated by kiawe, tend to be covered by three closely related weedy shrubs, Indian fleabane (*Pluchea indica*), sourbush (*P. odorata*), and a hybrid between the two (*P. x fosbergii*). Not much grows directly under *Pluchea* plants. Growing on margins of *Pluchea* are 'aki'aki, 'akulikuli, kiawe, haole koa, Bermuda grass, 'aweoweo, buffel grass, and Guinea grass.

Kaluha (*Bolboschoenus*) Wetland

The vegetation in the canal separating phase I and phase II is predominantly 'aki'aki on the dry sand areas and kaluha (*Bolboschoenus maritimus*) on the margins of the perpetually flooded stream. Also on the sandy emergent areas of the drainage are pohuehue, 'akulikuli, beach pea (*Vigna marina*), 'ae 'ae (*Bacopa monniera*), *Paspalum vaginatum*, nena (*Heliotropium curassavicum*), *Pluchea* spp., date palms (*Phoenix dactylifera*), kiawe and ironwoods. One Chinese banyan (*Ficus microcarpa*) is growing on the foot bridge that crosses the canal.

Hard-Packed Basalt Soil

Large areas are covered with deposits of basaltic dirt and rocks that have been brought in, presumably during military occupation or during the hardening of the shoreline with basalt rock groins. These hard-packed basalt soil areas are much more likely to harbor weeds and plants unable to tolerate the unconsolidated sand dunes such as creeping indigo (*Indigofera spicata*), *Malvastrum coromandelianum*, *Ipomoea obscura*, haole koa, slender mimosa, and *Boerhavia coccinea*.

Calcareous Beach Sand

The beaches are composed of yellow, calcareous sand on which nothing is able to grow. The lower portion of the beach is often covered in a thick mat of limu (seaweed), especially the non-native *Hypnea musciformis*.

ENDANGERED OR THREATENED PLANTS

No endangered or threatened plants were observed to occur at Kanaha beach during this survey. Kauna'oa (*Cuscuta sandwichinana*), an endemic parasitic vine that grows on beach morning glory is probably the rarest naturally occurring plant at Kanaha. It is known from the west end of phase I and is regularly harvested for lei. Plants that are currently rare on Maui that have recently been planted at Kanaha Beach include hunakai (*Ipomoea imperati*), hinahina (*Heliotropium anomalum* var. *argenteum*), and pua pilo (*Capparis sandwichiana*).

INVASIVE PLANTS

Widespread invasive plants at Kanaha Beach include *Pluchea* spp., kiawe, buffel grass, pickleweed, *Verbesina*, Chinese violet, Guinea grass, and saltbush. There are many more weedy plants, but few gain dominance like the above species. There are also a few invasive plants which are limited in area. A small patch of *Bassia hyssopifolia*, a pest in alkaline soils, is growing near the ammunition bunkers in phase II. A single young chinese banyan or strangler fig, a tree capable of destroying even the largest of structures, grows on the pedestrian bridge that crosses the canal. Tree tobacco plants can be found scattered about Kanaha Beach, especially the western part of phase I. These straggly non-native shrubs are invasive in California and Hawai'i, but ironically are also a host plant for the endangered Hawaiian hawk moth (*Manduca blackburni*) and are therefore generally allowed to persist.

RESTORATION PLANTS

All of the native plants currently occurring at Kanaha Beach would be useful in restoration efforts at Kanaha Beach and other coastal areas in Hawai'i. The core coastal dune restoration plants, all of which are still naturally occurring at Kanaha Beach, include 'aki 'aki, pohuehue, 'akulikuli, 'aweoweo, and naupaka. Native coastal dune plants recently planted at Kanaha Beach include pa'u o Hi'iaka (*Jacquemontia ovalifolia*), hunakai (*Ipomoea imperati*), koali 'awa (*Ipomoea indica*), hinahina (*Heliotropium*

anomalum var. *argenteum*), 'ohelo kai (*Lycium sandwicense*), and pohinahina (*Vitex rotundifolia*). Other native plants well suited for dune situations, some of which occur at Kanaha Beach, include kauna'oa, nena, hau, 'ilima (*Sida fallax*), popolo (*Solanum nelsonii*), 'ohai (*Sesbania tomentosa*), dwarf naupaka (*Scaevola coriacea*), nohu (*Tribulus cistoides*), *Gnaphalium sandwicense*, 'alena (*Boerhavia repens*), 'akoko (*Chamaesyce degeneri*), and 'anaunau (*Lepidium bidentatum* var. *o-waihiense*).

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Plants Observed at Kanaha Beach -- August 2001

Scientific name	Common name	Status	Phase I	Canal	Phase II	Girl Scout Pavilion
<i>Aloe vera</i>	Aloe	Non-Native	Rare	--	--	--
<i>Alternanthera pungens</i>	Khaki	Non-Native	Occasional	--	Occasional	--
<i>Amaranthus spinosus</i>	Spiny amaranth	Non-Native	--	Rare	--	--
<i>Asystasia gangetica</i>	Chinese violet	Non-Native	Common	--	Common	Occasional
<i>Atriplex suberecta</i>	Saltbush	Non-Native	Common	Rare	--	--
<i>Bacopa monniera</i>	Ae 'ae, bacopa	Native	--	Common	--	--
<i>Bassia hyssopifolia</i>	Bassia	Non-Native	--	--	Rare	--
<i>Batis maritima</i>	Pickle weed	Non-Native	--	--	Common	--
<i>Bidens pilosa</i>	Spanish needles	Non-Native	--	Rare	--	--
<i>Boerhavia coccinea</i>	Four o'clock	Non-Native	Rare	--	--	--
<i>Bolboschoenus maritimus</i>	Kaluha, makai sedge	Native	--	Common	--	--
<i>Brachiaria mutica</i>	California grass	Non-Native	--	--	Rare	--
<i>Casuarina equisetifolia</i>	Ironwood	Non-Native	Occasional	Common	Occasional	Occasional
<i>Cenchrus ciliaris</i>	Buffel grass	Non-Native	Common	Occasional	Common	Occasional
<i>Chamaesyce hirta</i>	Hairy spurge	Non-Native	--	Rare	--	--
<i>Chamaesyce hypericifolia</i>	Graceful spurge	Non-Native	--	Rare	--	--
<i>Chenopodium murale</i>	Lamb's quarters	Non-Native	Occasional	Rare	Occasional	--
<i>Chenopodium oahuense</i>	'Aweoweo	Native	Common	--	Common	Occasional
<i>Chloris barbata</i>	Swollen fingergrass	Non-Native	Occasional	Rare	--	--
<i>Cocos nucifera</i>	Coconut	Polynesian	Common	--	--	--
<i>Cordia subcordata</i>	Kou	Native	--	--	Rare	--
<i>Cuscuta sandwichiana</i>	Kauna'oa	Native	Occasional	--	--	--
<i>Cynodon dactylon</i>	Bermuda grass	Non-Native	Common	Common	Common	Common
<i>Cyperus rotundus</i>	Nut sedge	Non-Native	Rare	--	--	--
<i>Desmanthus virgatus</i>	Slender mimosa	Non-Native	Occasional	Occasional	--	--
<i>Digitaria insularis</i>	Sourgrass	Non-Native	Occasional	--	--	--
<i>Eclipta alba</i>	False daisy	Non-Native	--	Common	--	--
<i>Eleusine indica</i>	Goosegrass	Non-Native	Occasional	--	--	--
<i>Eragrostis sp.</i>	Love grass	Non-Native	Rare	--	--	--

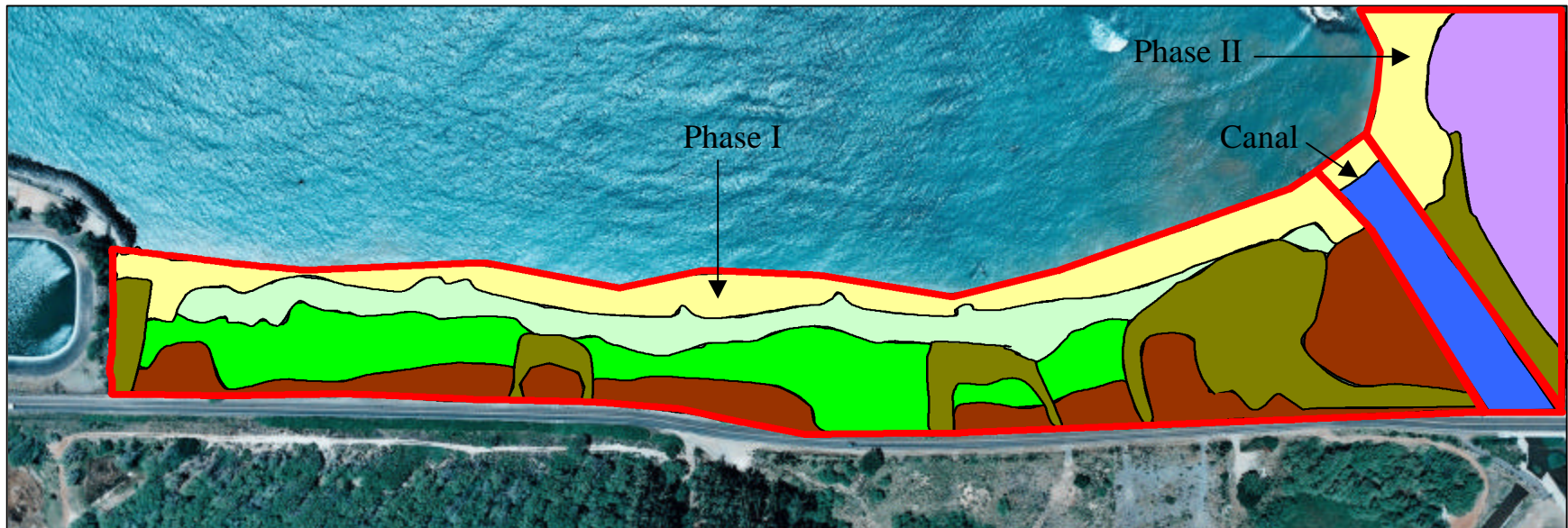
Plants Observed at Kanaha Beach -- August 2001

Scientific name	Common name	Status	Phase I	Canal	Phase II	Girl Scout Pavilion
<i>Erythrina variegata</i> var. <i>orientalis</i>	Indian coral tree	Non-Native	--	Occasional	--	--
<i>Ficus microcarpa</i>	Chinese banyan	Non-Native	--	Rare	--	--
<i>Heliotropium anomalum</i> var. <i>argenteum</i>	Hinahina	Native	Rare	--	--	--
<i>Heliotropium currasavicum</i>	Heliotrope, nena	Native	Occasional	Common	Occasional	--
<i>Heliotropium procumbens</i>	Heliotrope	Non-Native	Occasional	Rare	--	--
<i>Hibiscus tilaceus</i>	Hau	Polynesian	Occasional	--	--	--
<i>Indigofera spicata</i>	Creeping indigo	Non-Native	Occasional	--	--	--
<i>Ipomoea imperati</i>	Hunakai	Native	Rare	--	--	--
<i>Ipomoea indica</i>	Koali awa	Native	Rare	--	--	--
<i>Ipomoea obscura</i>	Twining morning glory	Non-Native	Occasional	--	--	--
<i>Ipomoea pes-caprae</i>	Beach morning glory	Native	Common	Occasional	--	--
<i>Jacquemontia ovalifolia</i>	Pa'u o Hi'iaka	Native	Rare	--	--	--
<i>Leuceana leucocephala</i>	Haole koa	Non-Native	Occasional	Occasional	Common	Occasional
<i>Lipochaeta integrifolia</i>	Nehe	Native	Rare	--	--	--
<i>Lycium sandwicense</i>	'Ohelo kai	Native	Rare	--	--	--
<i>Macroptilium atropurpureum</i>	Cow bean	Non-Native	Occasional	--	--	--
<i>Malva parviflora</i>	Cheese weed	Non-Native	Rare	--	--	--
<i>Malvastrum coromandelianum</i>	False mallow	Non-Native	--	--	Rare	--
<i>Nicotiana glauca</i>	Tree tobacco	Non-Native	Common	--	--	--
<i>Panicum maximum</i>	Guinea grass	Non-Native	Common	--	Common	Occasional
<i>Paspalum vaginatum</i>	Knotgrass	Non-Native	--	Occasional	--	--
<i>Passiflora foetida</i>	Poha poha	Non-Native	Rare	--	--	--
<i>Phoenix dactylifera</i>	Date palm	Non-Native	--	Occasional	Rare	--
<i>Pluchea indica</i>	Indian fleabane	Non-Native	Occasional	Common	Common	Common
<i>Pluchea odorata</i>	Sourbush	Non-Native	Common	Occasional	Common	Common
<i>Pluchea x fosbergii</i>	Pluchea hybrid	Non-Native	Occasional	Occasional	Common	Common
<i>Portulaca oleraceae</i>	Pigweed	Non-Native	Occasional	Rare	--	--
<i>Prosopis pallida</i>	Kiawe	Non-Native	Common	Common	Common	Common
<i>Pycnus polystachyos</i>	Sedge	Native	--	Rare	--	--

Plants Observed at Kanaha Beach -- August 2001

Scientific name	Common name	Status	Phase I	Canal	Phase II	Girl Scout Pavilion
<i>Ricinus communis</i>	Castor bean	Non-Native	Rare	Rare	--	--
<i>Scaevola sericea</i>	Naupaka	Native	Rare	--	Occasional	--
<i>Schinus terebinthifolius</i>	Christmas berry	Non-Native	--	Occasional	Occasional	--
<i>Sesuvium portulacastrum</i>	'Akulikuli	Native	Occasional	Common	Common	Common
<i>Setaria verticillata</i>	Bristly fox tail	Non-Native	Occasional	--	--	--
<i>Sida rhombifolia</i>	Cuba jute	Non-Native	Occasional	--	--	--
<i>Sporobolus virginicus</i>	'Aki 'aki	Native	Common	Common	Common	Common
<i>Synedrella nodiflora</i>	Nodeweed	Non-Native	--	--	Rare	--
<i>Terminalia cattapa</i>	False kamani	Non-Native	--	Rare	--	--
<i>Thespesia populnea</i>	Milo	Polynesian	Occasional	Rare	Occasional	--
<i>Thevetia peruviana</i>	Be still tree	Non-Native	--	--	Rare	--
<i>Tournefortia argentea</i>	Tree heliotrope	Non-Native	Common	Occasional	Common	Occasional
<i>Tribulus terrestris</i>	Puncture vine	Non-Native	Rare	--	--	--
<i>Tridax procumbens</i>	Coat buttons	Non-Native	--	Occasional	--	--
<i>Verbesina encelioides</i>	Golden crown beard	Non-Native	Common	Rare	Occasional	Rare
<i>Vigna marina</i>	Beach pea	Native	--	Occasional	--	--
<i>Vitex rotundifolia</i>	Pohinahina	Native	Rare	--	--	--
<i>Waltheria indica</i>	'Uhaloa	Native	Occasional	Occasional	--	--
<i>Xanthium strumarium</i>	Cocklebur	Non-Native	Rare	--	--	--

VEGETATION MAP -- KANAHA BEACH



- Heliotrope (*Tournefortia*) / milo (*Thespesia*) forest
- 'Aki'aki (*Sporobolus*) grassland / pohuehue (*Ipomoea*) herbland
- 'Aweoweo (*Chenopodium*) shrubland
- Kiawe (*Prosopis*) forest

- Wetland vegetation
- Calcareous beach sand
- Hard-packed basaltic soil
- Study areas -- Phase I, Phase II, and Canal