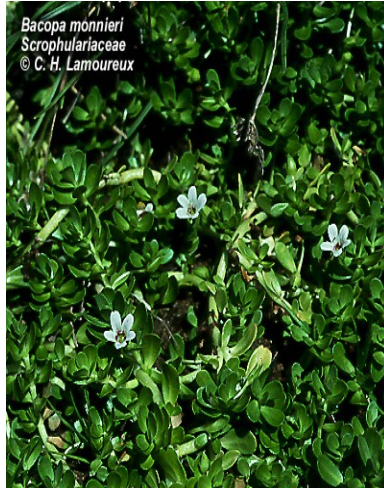


'Ae'ae *Bacopa Monnieri*

- Indigenous
- Found near streams or brackish water, it grows best when its roots are wet and can form thick aquatic mats
- Leaves are small, succulent, spatula shaped and light green
- Flowers are pale blue to white



Alahe'e *Psydrax Odoratum*

- Endemic
- Leaves are dark green and glossy, small white fragrant flowers, ripe fruits are green to black
- The dense wood was used to make digging sticks and handles for adze blades. The leaf and fruits were used to make a black dye for kappa.



'Akia *Wikstroemia uva-ursa*

- Hawaiian endemic
- Found in dry to alpine zones
- Grey-green to dark green leaves, clusters of tiny yellow flowers, fruits are orange to red
- Ancient Hawaiians made a pulp of the roots to act as a fish poison and used medicinally as a laxative



Carex *Carex wahuensis*

- Native sedge with no known Hawaiian name
- Stalks of yellow seeds somewhat resemble small corn cobs Leaves are narrow and long, leaf edges can be sharp
- Used for ground cover and erosion control



Koki'o ke'oke'o *Hibiscus Arnotianus*

- Hawaiian endemic
- Small shrub growing 6-8 feet tall
- Flowers are white with a red center or stamen
- Blooms year-round
- Ancient uses included chewing of flower bud bases by a mother and given to infants as a laxative.



Koki'o ula *Hibiscus clayi*

- Hawaiian endemic
- Small, compact shrub
- Red flowers bloom year-round and petals appear droopy



'Ihi'ihilauakea *Marsilea villosa*

- Endemic
- Fern-like spreading plant
- Found naturally in vernal pools and will go dormant in extended periods of drought



Kalo *Colocasia esculenta*

- A highly prized staple food and also revered in Hawaiian culture
- Leaves are large and heart shaped, stalks connect to the middle of the leaf
- Grown primarily for its edible corms
- Nearly 100 varieties of differing color patterns exist today



Kupukupu *Nephrolepis Cordifolia*

- Indigenous
- Fronds are bright green and are usually 16-24 inches long and up to 4 inches wide
- Fronds are erect
- Can grow well among rocks or as an epiphyte
- Also known as 'fishbone fern'



Kupukupu konahuanui

Nephrolepis cordifolia var. konahuanui

- This variety of Kupukupu is found on the peak of the Ko'olau mountain range named Konahuanui.
- This variety has fronds much longer than the common kupukupu.
- Fronds grow up to 3 ft. long and drape over surrounding landscape



Laukahi *Cyclosorus hudsonianus*

- Common endemic fern
- Growth similar to tree ferns like hapu'u,
- Laukahi will grow to approximately 3 feet tall with a 4 foot frond spread
- Round spores are found under leaves
- Prefers shaded and moist habitats



Na'u *Gardenia brighamii*

- Endemic
- This tall shrub can grow 10-15 feet tall with an equally wide canopy
- Produces white, fragrant flowers year-round
- Leaves are dark green, waxy and about 4 inches long
- Plants can tolerate drought like conditions
- Monthly watering is sufficient
- prone to ants, scale, mealybugs, thrips, spider mites and aphids



‘Olona *Touchardia latifolia*

- Endemic flowering shrub in the nettle family
- Alternate leaves whose shape greatly varies
- Flowers between the months of May through December
- Cultivated for cordage
- Intertwining strands makes it one of the strongest natural fibers on earth



Pili *Heteropogon contortus*

- Indigenous grass
- Grows in clumps up to 2 feet tall
- Seeds pods become intertwined in large mats
- Seeds seem to twist when wet
- Traditionally used as thatch for house roofing and sides



Pu‘uka‘a *Cyperus trachysanthos*

- Endemic, Hawaiian sedge
- Erect stems grow up to 2 feet tall and are sticky at the base
- Flowers are in clusters at the tips of the stalks
- Thrives in marginally wet sites and partial shade
- Leaves are waxy and not as sharp as other sedges



Ti *Cordyline fruticosa*

- An upright evergreen shrub with slender single or branched stems,
- Grows up to 10 feet tall
- Leaf clusters are arranged in close spirals
- Leaves are 1-2 feet long, smooth, flexible, glossy
- Foliage may be green, red, pink, purple, maroon, yellow, orange or variegated
- Propagated easily from stem cuttings.



Uki‘uki *Dianella sandwicensis*

- Indigenous
- Found as undergrowth from dry shrubland to wet forests.
- Leaves are narrow and up to 100cm long with a keel-like midrib
- Flowers are white to blue with yellow stamens
- Fruits are dark blue to purple and were used by early Hawaiians as a dye for kapa.



‘Ulei *Osteomeles anthyllidifolia*

- Indigenous to most of the main Hawaiian islands
- Found from sea level to about 4000 feet elevation
- ‘Ulei is a small sprawling evergreen, flowers are small, white and 5-petaled, fruits are light purple
- Ancient Hawaiians used the flexible stems to make scoop net handles.



Some Common Weeds in Hawaii
Jari Sugano, Steve Fukuda & Ted Radovich
University of Hawaii, College of Tropical Agriculture



Nut Grass
Cyperus rotundus



Cheese Weed
Malva parviflora



Ivy Gourd
Coccinia grandis



Spanish Needle
Bidens pilosa



Spiny Amaranth
Amaranthus spinosus



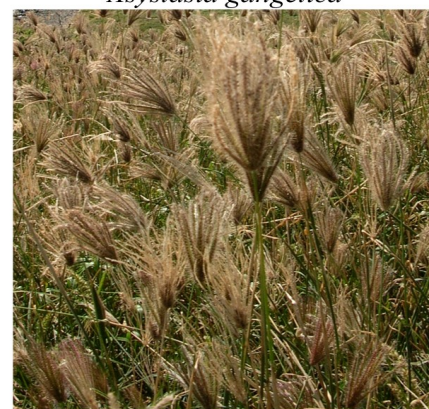
Chinese Violet
Asystasia gangetica



Morning Glory
Ipomoea obscura



Sandbur
Cenchrus echinatus



Swollen Finger Grass
Chloris barbata



California Grass
Brachiaria mutica



Johnson Grass
Sorghum halapense



Guinea Grass
Panicum maximum

Hui o Ko'olaupoko Site Maintenance Data Sheets

Site:

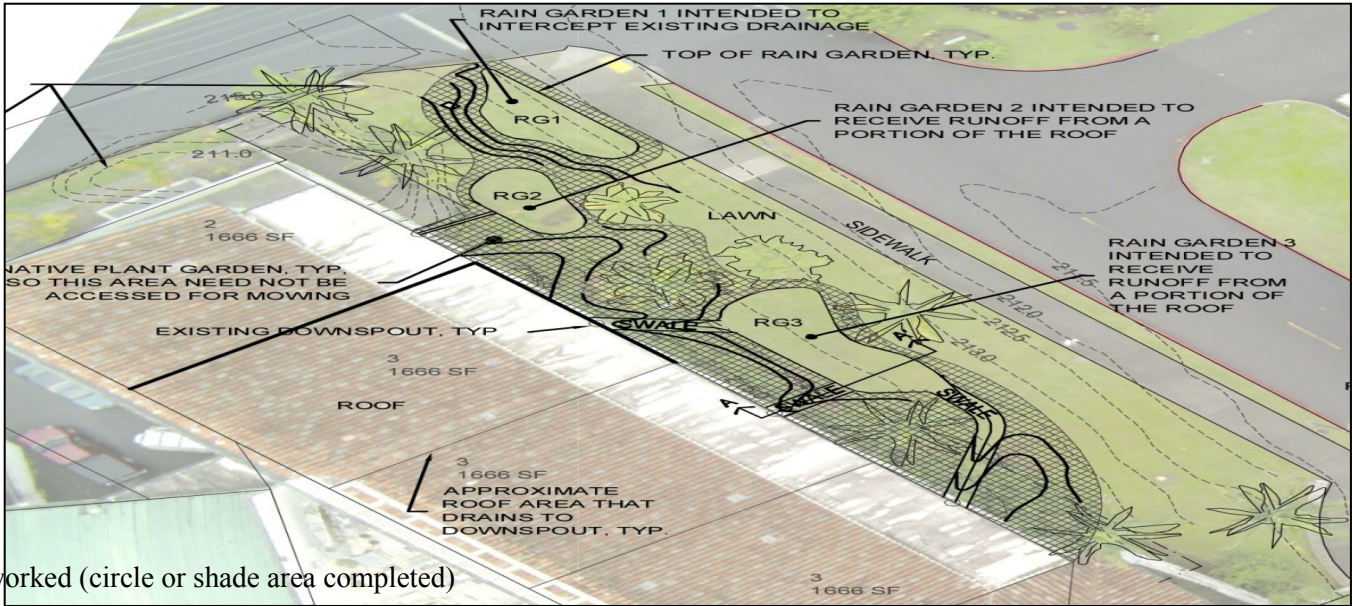
Lead Organizer:

Date:

Number of Participants:

Start Time:

End Time:



Tasks completed in this area:

Overall plant health and abundance for entire rain garden:

Next Tasks:



Windward Community College Rain Garden at Hale 'Imiloa

1051 Keolu Dr. # 208
Kailua, HI 96734
808-277-5611 (p)
www.huihawaii.org

In urban areas, increased infrastructure and development has led to increased runoff, which in turn can lead to downstream pollution, loss of habitat, decreased re-charge of underground aquifers, and flooding. Rain gardens are common best management practices (BMP) that can reduce downstream pollution by capturing storm water; promoting evapotranspiration; filtering contaminants and other toxic materials; reducing flooding; recharging local groundwater; and in some cases, providing beneficial wildlife habitat. Windward O'ahu, Hawai'i has some of the highest rainfall records on island.

Hui o Ko'olaupoko (HOK) and Windward Community College (WCC) partnered to install approximately 3,000 square feet of rain gardens and native vegetation in front of Hale 'Imiloa Science Building at the WCC campus. This Low Impact Retrofit (LIR) is designed to capture storm water run-off from over 18,000 square feet of impervious surface from the roof, road and parking lots. The rain gardens trap and infiltrate the storm water run-off before it has a chance to carry pollutants into nearby Kea'ahala Stream and Kāne'ohe Bay.

Construction of the site began the week of March 10th, 2014 with excavation and formation of the rain garden basins and berms. Planting of native species took place during the first week of April 2014. Students, professors and community members helped install over 2,000 individual native plants (18 different species) on the site.

Maintenance and monitoring is critical to the effectiveness of the rain gardens. Frequent monitoring of a rain garden can help determine if it is functioning as intended or if maintenance is needed. Maintenance and monitoring data is critical to long-term effectiveness and will provide future caretakers a platform for scheduling as well as notes on most practical/effective methods, it also provides valuable information for future rain garden design/build projects.

Maintenance should begin Summer 2014 or immediately following the installation of the rain gardens. Maintenance activities should continue according to a monitoring schedule as described in the table below, or a similar schedule as developed by WCC. The agreed upon schedule should be adhered to as closely as possible in order to ensure proper functionality and aesthetics of the rain garden.

Maintenance Schedule

Frequency	Duration	Parameters	Responsible
Weekly	Begin June 2014	Impromptu weeding, structural integrity, visual vegetation monitoring.	WCC
Monthly	June 2014 – June 2015	Organized weeding, structural integrity, swale clearing	WCC
Quarterly	June 2015 –	Organized weeding, structural integrity, swale clearing, pruning and replace plants	WCC

Weekly maintenance activity should include ensuring that planted trees are upright with support, that 'ae'ae in roadway swale is securely rooted, and conduct 'weed sweeps' as often as possible to remove weeds before they mature and begin to flower. These weed sweeps can be as simple as a quick walk around the perimeter of the garden and once through the interior to pull and newly emerging and aggressive weeds, especially vines and should take no more than 15 minutes.

Monthly maintenance should occur for at least the first year of the project to ensure that native vegetation has a chance to become established and that structural integrity of the gardens are sufficient. These monthly/quarterly maintenance events should focus on conducting organized weed sweeps in which multiple people form a line across the garden and work through sections at a time ensuring a thorough weeding of an area before moving on. Native vegetation can be pruned along garden borders or from encroaching on another species. Additional monthly/quarterly maintenance should include cleaning debris from the swale along the northern roadway that leads into rain garden 1, checking all downspouts and drain pipes for clogs, maintain the rock border and check the structural integrity of each rain garden for overflow issues, erosion or berm failure.

Use of herbicide, pesticide and fertilizer should be extremely limited. All chemicals used should be applied following the label instructions and with special attention to weather conditions (potential storm events). Every effort should be made to use natural products such as NEEM, Dr. Bronner's Peppermint soap or any OMRI labeled products. Herbicide should be limited to spot spraying the cut stumps of aggressive grasses, weeds and vines. If at any time, the health of a particular species is suffering, HOK should be notified and every effort will be made for an HOK staff member to assess the problem and make suggestions to remedy the situation.