

Abutilon menziesii 2008-2009 Status Report



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I. Introduction

A population of *Abutilon menziesii* was discovered in late 1996 at Kapolei in the Ewa area, island of Oahu, on former sugarcane land. *Abutilon menziesii* has been a federally listed species since 1986. This population is located within the proposed footprint of a Department of Transportation road and as a result, a Habitat Conservation Plan (HCP) for *Abutilon menziesii* at Kapolei was completed to mitigate for the effects of development on this population (November 2003). The HCP outlines the measures planned over the next 20 years. The goal of the HCP is to initiate and sustain a program which would result in an overall net gain in the number of *Abutilon menziesii* on Oahu. The end goal is the establishment of three protected off-site populations on Oahu from the single degraded Kapolei population. This 2009-2010 status report serves as a way of monitoring the progress towards this end goal.

To date, *Abutilon menziesii* has been outplanted at twelve different sites: Diamond Head, Honouliuli Wildlife Refuge, Kaena Point, Kealia Trail, Kaena Point, Ka Iwi, Ewa Villages Gold Course, Contingency Reserve Area, Kuaokala, Pouhala Marsh, Pahole Nike Site, and Koko Crater Botanical Garden. The entire Kaena Point outplanting site was lost to a fire on August 15, 2007. The Ka Iwi and Pahole Nike Site microsites failed and will not be pursued further, however, the sites as a whole may be pursued in the future. Two of the remaining sites will be used towards the goal of establishing three self-reproducing populations (Diamond Head and Honouliuli Wildlife Refuge). The third site is yet to be identified or established. Pouhala Marsh has potential to be the third site. The Koko Crater Botanical Garden and Ewa Villages Golf Course populations will function as protected repositories for the full genetic stock of the Kapolei population. The Kealia Trail, Kuaokala, and Pouhala Marsh are experimental sites meant to test the biological requirements of the plant. The main focus for 2008-2009, was to continue to represent the full genetic stock available for this species at each of the reintroduction sites, monitor for seedling establishment, and to look for potential sites for future outplantings.

II. Population Summaries

A. Diamond Head

In 2004, an MOU was established with the Hawaii State Parks and the Hawaii Army National Guard to establish an *Abutilon menziesii* population. One-hundred and four plants were outplanted in September 2004 representing 65 percent of the genetics from the Kapolei population. A low flow, low maintenance irrigation system is in place that utilizes the municipal water supply. The planting strategy used at this site was to plant the plants close together with high rates of fertilization and water to help the plants out compete the weeds and fill the area with a continuous stand of *Abutilon menziesii*. This has resulted in a very healthy population of *Abutilon menziesii*. The thought behind this strategy is that by getting the plants off to a healthy start, a seed bank will be established early on in the process. A firebreak was established around the perimeter of the population using plants that were present in the nursery in excess numbers. Groundcover was established for fire and weed control purposes using the following native species: *Vitex rotundifolia*, *Rauvolfia sandwicensis*, *Lipochaeta lobata*, *Sida fallax*, and *Sesbania tomentosa*.

In 2008-2009, two new plants were outplanted to fill in missing genetic stock. There are now 109 total plants at Diamond Head representing 71 percent of the Kapolei population. This site is currently monitored and weeded once every other week. Twenty-eight seedlings were recorded during the 2007-2008 and 2008 and 2009 reporting period. Of those, sixteen are still alive. In addition, there is

one seedling that is 2 years old. The goal for 2009-2010 is to increase the genetic representation at this site and expand the planting area.

B. Koko Crater Botanical Garden

The plants at Koko Head Botanical Garden are thriving. Originally, there were 62 plants representing 46 lineages at this site. Currently, there are 75 plants representing 59 lineages. The plants located at Koko Head are an invaluable source of working material for the program (i.e. cuttings, seeds, etc). This is a good example of how botanical gardens and various forestry programs can and should work together towards recovery of rare species. During 2008-2009 one plant was outplanted to fill in missing genetic stock.

C. Honouliuli

The Honouliuli outplanting site is located along the western edge of the West Loc of Pearl Harbor. This site is within three to four miles of the original population and is very well protected. The site itself is part of the Oahu National Wildlife Refuge Complex. The refuge consists of about 20 acres of fenced land, much of which is occupied by two ponds. The land itself is still under Navy ownership but USFWS has a cooperative agreement with the Navy to manage the site as a refuge in perpetuity. There are two separate areas being used for outplanting within the refuge. The first consists of a narrow strip, approximately 20 by 600 feet, while the second site is approximately 60 by 300 feet.

The first planting commenced on March 15, 2002 in the 20 by 600 foot site. There has been no recruitment of juveniles at this location, although the threat from weeds is minimal. Work at the second location began January of 2003. The new location is about 500 yards south of the first outplanting site. The plants at Honouliuli are healthy and the site is showing promise. During 2005-2006, one keiki appeared and was looking healthy but did not make it past a year.

Both locations are on an irrigation system and are managed entirely by the State of Hawaii Forestry and Wildlife staff. Efforts are being made to adjust the conditions of the soil at both sites so that they are more favorable for regeneration and growth. This site is monitored twice a month. Access is an issue at this site due to bird nesting and the usage by school groups for outdoor education. In addition, tree trimming was conducted to create more favorable growing conditions for *Abutilon*. During 2008-2009, fifteen additional plants were outplanted to fill in missing genetic stock. Two seedlings were observed during the 2007-2008 reporting period. Both seedlings survived past one year. During the 2008-2009 reporting period 26 additional seedlings were observed. The seedlings will be followed and their survival monitored. There are currently 85 plants representing 67% of the genetic stock available. No additional outplantings will be done at this site because there is no more room.

D. Ka Iwi

During 2006, a special use permit was issued by the State Parks to DLNR for use of Ka Iwi State Park as an outplanting site for *Abutilon*. Ka Iwi is located along the road just before Makapuu Beach Park. The Ka Iwi population was established down slope of the Makapuu Lighthouse in a natural drainage. Most of the plants at this site died during the first year. During the 2007-2008 reporting period, this site was monitored and determined to be unfavorable for this species because it is prone to flooding. The goal for 2008-2009 was to look for a possible alternate site at this location for future outplantings, however, none were found to be suitable. No work is planned for this site in 2009-2010.

E. Ewa Villages Golf Course

The Ewa Villages Golf Course is located adjacent to the original wild *Abutilon* site. The Ewa Villages Golf Course population is located within 125 yards of the original wild site; which was the primary reason for choosing this location. Even though this is not a “wild” situation, it is an undisturbed, protected site with favorable conditions, much like the original wild site. Irrigation is present at this site. Weeds will be an issue at this site as well. This site is monitored twice per month. Fourteen additional plants were installed at this site during the 2007-2008 reporting period in order to balance the founders. No outplanting were added during the 2008-2009 reporting period. There are currently 69 total plants at this site representing 58% of the genetic stock available. The goal for 2008-2009 is to increase the genetic representation with additional number of outplantings.

F. Wild Site/Ewa/Kapolei

The Contingency Reserve Area (CRA) was set up in 2005-2006. During the 2007-2008 reporting period, substantial time was spent maintaining the firebreak around the CRA. In addition, weeding was conducted around the plants. Time was also spent working with the City and County Fire Department to address access concerns. Finally, the last remaining wild plants were moved to the CRA. During 2008-2009, selected woody invasive species were thinned. The goal for 2009-2010 is to start outplanting additional plants and continue habitat restoration.

G. Kealia Experimental Sites

In 2003, there were approximately twenty-five plants at two sites located near the top of Kealia Trail. There are currently 18 plants at this site. This site proved unfeasible because of weeds and adequate space. During 2006-2007, a new site was established in a less exposed area within a drainage. In February 2007, eleven plants were outplanted to this site. This is an experimental site with no irrigation. No work, other than monitoring, was conducted at this site during this reporting period. The plants are still alive but are not thriving. The goal for 2009-2010 is to continue monitoring the plants.

H. Pouhala Marsh

The Pouhala Marsh population is located on City and County property in Waipahu. During April 2007, 63 plants were outplanted, of which half were lost due to tidal fluctuations within the marsh. During 2008-2009, 21 additional *Abutilon menziesii* were outplanted. Currently, there are 56 plants representing 59% of the Kapolei population genetics. A hard line was installed that connect to City and County water during 2008-2009; therefore, water no longer has to be trucked to the plants. Weeds are not really a major problem at this site. The benefit of this site is the opportunity for community involvement and education because the site is so accessible. Common native and endangered plants (*Solanum nelsonii*, *Sesbania tomentosa*, *Capparis sanwichianum*, *Achyranthes splendens*, and *Cyperus trachysanthos*) were supplied to school groups during 2008-2009 for educational outplanting events. Management of this site is a cooperative effort between various Division of Forestry and Wildlife Branches and the Research Corporation of the University of Hawaii staff. The goal for 2009-2010 is to continue to increase the representation of the Kapolei plants at this site.

I. Kuaokala

The Kuaokala site is located on State Division of Forestry of Wildlife Lands located above Kaena Point on the West side of Oahu. This site was established in November 2008. There are only 6 surviving plants. This site will not work as a population and no further work will be done here.

III. Greenhouse

A. Construction

The greenhouse established for *Abutilon menziesii* is located near the base of the Kealia Trail head, just behind the western end of Dillingham Airstrip in Mokuleia. The initial structure was completed in December 2002. All work on this structure was done in-house mainly by the DLNR horticulturist, Greg Mansker. Installation of the water and electrical systems was completed in 2003. The greenhouse is 130 feet long by 40 feet wide by 12 feet tall. It is divided into an upper and a lower section along the entire length and has gravel floor. The site contain two separate Matson container type storage facilities, one is used as office space. The site also contains an additional raised 8-foot by 32 foot storage facility was completed inside the greenhouse structure. The storage building is built with framed enclosed walls on 3 sides, with a portion on one side remaining open for easy access. In addition to the storage area, at one end of the building a 6-foot by 10 foot covered (roofed) open walled work area was constructed. The open walled work area provides an escape from the sun and rain when work needs to be done. The building is utilized for the storage of growing/potting supplies. The close proximity of the potting supply storage area to the mixing and potting area is ideal and minimizes the time spent moving heavy and bulky materials. It should be noted that the above mentioned storage area was built over a sloped area which otherwise would have been unusable greenhouse space. This area was recaptured using creative and thoughtful construction means. During 2008-2009, typical greenhouse upkeep included building maintenance, such as repairing the watering system, repainting and weeding. Upkeep of the site included maintenance of drainage structures and road maintenance, including re-graveling the access route to the greenhouse. Due to the heavy rains during December 2008 and January 2009, a tractor had to be rented to fix a washout that occurred along the access road.

During 2008-2009, 7 additional benches were installed. These benches will be used for propagation of common and rare coastal species to be used in restoration projects on Oahu and the offshore islands around Oahu. In addition, a portable bathroom was installed.

B. Propagation

Propagation of select rare coastal species including *Sesbania tomentosa*, *Scaevola coriacea*, *Achyranthes splendens*, *Solanum nelsonii*, *Capparis sandwichiana*, and *Cyperus trachysanthos* is ongoing.

One-hundred and forty two *Sesbania tomentosa* were outplanted this year, seventy-eight in the stretch between Army Beach and the Kaena Point parking lot; twenty within the Kaena Point Natural Area Reserve; thirty-three on the offshore islands (Mokulua North, Mokulua South, and Mokuauia Islands); two at the Kuaokala *Abutilon* site; and nine at Pouhala Marsh. Three hundred and fifty two *Sesbania tomentosa* plants from previous outplantings at Kaena Point Natural Area Reserve were monitored and GPSd by Division of Forestry and Wildlife and Research Corporation of University of Hawaii staff. *Sesbania tomentosa* recruitment was monitored on Mokuauia Island and about 12 plants were found from seed scatter experiments from previous years.

A total of twenty-six *Capparis sandwichiana* were propagated and outplanted this year, sixteen at the Kaena Point Natural Area Reserve; one on Kaohikapu Island; four on Mokuauia Island; three on Mokulua North Island; and two at Pouhala Marsh. A total of four *Scaevola coriaceae* were propagated and outplanted this year, one at Kaohikapu Island and three onto Mokulua North Island. A total of four *Achyranthes splendens* were propagated and outplanted at the Kaena Point Natural Area Reserve. A total of thirty-five *Solanum nelsonii* were propagated and outplanted this year, two at Army Beach; nine on Kaohikapu Island; five on Mokuauia Island; thirteen on Mokulua North Island; and six at Pouhala Marsh. A total of ten *Cyperus trachysanthos* were propagated and planted at Kawainui Marsh.

An ongoing goal of the program is to fill in the gaps with regards to genetic representation at Pouhala Marsh, Honouliuli, Diamond Head, the Ewa Golf Course, and Kokohead. Currently, 94% of the genetic stock is represented at at least one site. A goal for 2009-2010 is to increase the representation.

C. Ant Surveys

During this reporting period, Stephanie Joe, Invertebrate Research Specialist with the Oahu Army Natural Resource Program, conducted a survey for ants within the greenhouse. The purpose of the survey was to ensure that plants grown in the greenhouse do not unintentionally introduce new ant species to outplanting sites on Oahu or the offshore islands. She placed 26 index cards with honey/spam/peanut butter bait for one hour, between 2 and 3 pm, throughout the greenhouse. Half of the cards were placed on the ground while half were placed on the benches. Only half of the cards placed on the ground contained ants. Only one of the cards placed on the benches had ants. A single ant species, *Ochetellus glaber*, was present on the cards. This is a common ant species that has been recorded from offshore islands as well as the lower elevations of Mt. Kaala (below 2,500 feet). Overall, she found that the greenhouse was very clean with regards to presence of ants. To ensure the plants remains clean, bench legs will be placed in containers of waters thus creating a physical barrier between the ground and the bench above.

D. Phone line and Computer Access

During this reporting period, a Blackberry was purchased for the Horticulturist to address this ongoing need. An effort was made to get Clearwire, wireless internet access, at the nursery but was unsuccessful.

E. Issues to be Resolved

A new fuel and pesticide storage area needs to be constructed and will be pursued during the 2009-2010 reporting period.

V. Summary

Table 1. Status of *Abutilon menziesii* populations

	Koko Head	Honouliuli Reserve	Ewa Villages	Pouhala Marsh	Diamond Head	Total
Mature	75	85	69	56	109	741
% Genetic Representation	59%	67%	58%	47%	71%	94%
Seedlings 2004 (Natural Regeneration)	N/A	0	N/A	N/A	N/A	0
Seedlings 2005 (Natural Regeneration)	N/A	0	N/A	N/A	N/A	0
Seedlings 2006 (Natural Regeneration)	N/A	1	N/A	N/A	0	1
Seedlings 2006 (Natural Regeneration)	N/A	0	N/A	N/A	0	0
Seedlings 2007 (Natural Regeneration)	N/A	0	0	N/A	6	7
Seedling 2008 (Natural Regeneration)	N/A	2	0	0	28	30
Seedling 2009 (Natural Regeneration)	N/A	26	0	0	16	42
Survival of Seedlings (0 mon.-1 yr.)	N/A	2	N/A	N/A	28	30
Survival of Seedlings (over 1 yr.)	N/A	2	N/A	N/A	16	18

A. Accomplishments for 2008-2009

- Added additional founder to Koko Crater
- Added additional founder to the Ewe Golf Course
- Monitored the second Kealia Trail experimental outplanting site for *Abutilon*
- Monitored the experimental *Abutilon* outplanting site near the Pahole Nike Site
- Monitored and weeded all previous outplanting site
- Air Layers collected from Koko Head, Diamond Head, and Kapolei plants
- Continued collecting and propagating other rare coastal species in the greenhouse
- Purchased a Blackberry to fix the phone/computer access issue
- Surveyed for ants at the greenhouse and installed ant barriers on benches
- Established the Kuaokala outplanting site
- Installed a hard water line at the Pouhala Marsh population

B. Goals for 2009-2010

- Complete the tracking database for the project.
- Ensure that at least one (as many as possible given space availability) of every Kapolei plant is represented at at least one of the outplanting sites.
- Fully represent the Kapolei plants in the Koko Crater, Diamond Head, and Honouliuli populations.
- Continue to monitor and maintain the plants at all sites.
- Continue to survey for and collect from rare coastal species.
- Continue to outplant rare coastal species within the *Abutilon* populations.
- Establish an additional outplanting site (location unknown at this time).
- Expand Mokuleia Nursery facilities to accommodate a pesticide and fuel storage area.
- Expand existing range of *Sesbania tomentosa*.
- Continue to outplant rare coastal species.