

**Department of Transportation's
Habitat Conservation Plan
For
Abutilon menziesii
2004-2005 Status Report**



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I. Introduction

A population of the state and federally listed Endangered plant, *Abutilon menziesii*, was discovered in late 1996 in the Ewa/Kapolei area, on the island of Oahu. *The ko'oloa'ula* was found on former sugarcane land, within the proposed footprint of the Department of Transportation's (DOT) North-South Road. Movement of this rare plant away from construction of the road corridor was the basis of creating a Habitat Conservation Plan (HCP) by DOT to mitigate the effects of development on the Kapolei population (November 2003). The HCP outlines conservation actions planned the plant over the next 20 years, resulting 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 2004-2005 status report serves as a means of monitoring progress towards this goal.

To date, *Abutilon menziesii* has been outplanted at five sites on Oahu: Diamond Head State Park, USFWS Honouliuli Wildlife Refuge, Na Ala Hele's Kealia Trail, Kaena Point State Park, and City of Honolulu's Koko Crater Botanical Garden. Three of these sites will be used towards the goal of establishing three self-sustained wild populations (Diamond Head, Honouliuli Wildlife Refuge, and Kaena Point). The Koko Crater Botanical Garden population functions as a protected repository for the Kapolei population. The Kealia Trail site was an experimental site to test the biological requirements of the plant. The main focus for the past year has been to outplant additional plants at the Honouliuli site and to establish a population at Diamond Head. Time was also spent on investigation of outplanting near the original Kapolei site (the Ewa golf course) this year.

II. Population Summaries

A. Diamond Head State Park

In 2004, an MOU was established with the Department of Land and Natural Resources, State Parks Division, and the Hawaii Army National Guard to establish an *Abutilon menziesii* population. Groundwork for this site involved six days of clearing the site of trees, digging the holes for outplanting, soil testing, plus outplanting. One hundred and four plants were established in September 2004, representing 65 percent of the genetics from the Kapolei population (Figures 1 and 2). A low flow, low maintenance irrigation system is in place, utilizing the municipal water supply. The planting strategy used at this site was to plant closely 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 method has resulted in a very healthy population of the plant. The thought behind this strategy is that by giving the plants a healthy start, a seed bank will be established early in the HCP 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*. This site is currently monitored once a week. The

main maintenance issue at this site will be weed control. The goal for the next year is to ensure that all available genetic stock from the Kapolei site is fully represented at Diamond Head.



Figure 1. Diamond Head Population, Dec. 2004



Figure 2. Diamond head Population, May 2005

B. Kaena Point State Park

This population was established in the fall of 2000. A total of 62 plants representing 46 lineages were outplanted at this site. As of the winter of 2002, there was recruitment of three *Abutilon* seedlings. Of these initial recruits one plant has survived to maturity. This population does not receive supplemental water at this point and appears to be stable. DLNR Forestry staff has been trying to reduce the time spent on this location in an effort to determine if the population can survive on its own without continuous maintenance. As a result of this reduced maintenance the weeds have established themselves in areas not dominated by natives (i.e. *Sida fallax*, *Vitex rotundifolia*, *Dodonea viscosa*, *Sesbania tomentosa*, etc.). The *Abutilon* seems to be competing with the Guinea grass and other weeds with no apparent detriment to its health. The cohorts (i.e. naio and milo) planted at the site are maturing and also compete well with the weeds. The population is monitored every couple months. This site has inherent issues such as vandalism, off-road vehicles, and fire. Twelve plants were lost in the August 2003 fire; however, the remaining plants have recovered from this event.

C. City and County of Honolulu's 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 56 plants representing 44 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. This year, air layers were employed as a new propagule source. This has proven to be a very successful method of collection. Better communication needs to be established with the Garden employees to ensure that the State maintains management of the plants within the garden. In an effort to establish this control, equipment for maintenance of Koko Crater Botanical Garden will be purchased and donated to in lieu of cash compensation.

D. USFWS Honouliuli Wildlife Refuge

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 part of the Oahu National Wildlife Refuge Complex. The site consists of approximately 20 acres of fenced land (much of which is occupied by two ponds), with two separate areas being for outplanting. 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.

The first area consists of a narrow strip, approximately 20 by 600 feet, while the second site is approximately 60 by 300 feet. The first planting (Figure 3) commenced on March 15, 2002 in the 20 by 600 foot site. Forty-one plants were installed at that time, with 32 healthy robust plants remaining. The loss of plants after outplanting can be attributed to the high salt levels present within the soil at one end of the site. Surprisingly, there has been no seedling recruitment at this location, although the threat from weeds is minimal.

Work at the second outplanting location (Figure 4) began January of 2003. The new location is about 500 yards south of the first outplanting site. There are currently a total of 46 plants at the second site. This outplanting is a mix of cuttings and seedlings removed from the wild population at Kapolei. Many of the plants have grown substantially over the past year and the site is showing promise. Both locations are on an irrigation system and are managed entirely by Hawaii's Forestry & Wildlife staff.

During 2004, effort was made to ensure a Hawaii Rare Plant Restoration Group monitoring form was completed for each plant at the Honouliuli site. This year, 14 kiawe trees were removed and chipped, freeing space for 60 new plants, about half of which will be installed in June 2005. A new water pump was installed this year. The site is monitored twice a month and requires frequent weed control. Access is an issue at this site due to bird nesting and the usage by school groups for outdoor education. During the nesting season, work can only be accomplished at this site before 9 am.



Figure 3. Honouliuli Population, Apr. 2002



Figure 4. Honouliuli Population, Spring 2005

E. Wild Site -Ewa/Kapolei

Ken Nagata discovered *Abutilon menziesii* at the Ewa site in 1996. Subsequent surveys by Char and Associates recorded a total of 88 plants. Since its discovery in 1996, the population has fluctuated with rainfall levels (Figure 5). Through natural senescence and accidental take, the number of plants has declined to 25 plants. However, 28 new plants have been discovered since 2002. The most recent discovery was a plant on the City and County parcel giving a total of six plants now found on this parcel. These plants are not fully represented in off-site collections at this point, making this a goal to accomplish within 2005.

The Kapolei population is monitored once a month. This monitoring includes collecting seeds, occasional watering, fertilizing, and recording the general fitness of the plants. During 2004, the Kapolei population Rare Plant Monitoring forms were completed to reflect the remaining extant individuals. This includes the new plants and the City and County individuals.

A more permanent method of marking the location of the existing plants at the Kapolei site was also established during 2004. In the past, flagging was used to mark the plants. This method was somewhat lacking for the following reasons:

- 1) Flagging deteriorates quite rapidly, leaving very little visible material to relocate the plants.
- 2) During the rainy season, vegetation often grows quite tall and dense, thus obscuring the flagging and often the plants themselves.
- 3) Although many of the plant locations have been recorded with a Global Positioning System (GPS) unit, the device available for use was not accurate enough to locate specific plants.

In an effort to alleviate these problems, extant plant were marked with a 7 to 8 foot marking stick. The marking stick consists of a ½ inch 7 to 8 foot tall PVC pipe, which is inserted into the ground to a depth of 3 to 4 feet alongside steel rebar. This provides an easily seen method of locating the plants anytime of the year and should provide a visible clue alerting any construction workers that an *Abutilon* plant is located in the area.

During 2004, a Right of Entry was established with the City and County of Honolulu to access the plants on their lands. Several meeting were held with the Department of Transportation (DOT) consultants, contractors, and employees in an effort to establish the Contingency Reserve Area (CRA), the firebreak for the CRA, and other boundaries in relation to the existing plants. Most of the illegal activities that have been a problem at this site in the past have stopped and there is no evidence of any current threats posed by this issue. The focus for 2005 will be to prepare for transplanting the extant individuals within construction areas to the CRA.



Figure 5. Kapolei Population, Apr. 2004

F. Kealia Experimental Sites (2003)

In 2003, approximately twenty-five plants at two sites were located near the top of Kealia Trail. There are currently 18 plants at this site. This site was not a focus during 2004 because it does not show promise based on past observations.

III. Greenhouse

A. Construction

The greenhouse established for *Abutilon menziesii* and for propagation of other rare lowland rare plant species is located near the base of the Kealia Trail head, just behind the western end of Dillingham Airstrip in Mokuleia. The initial structure (jointly funded by the Department of Transportation, the Housing Corporation and Development of Hawaii, and Section 6 funding from the U.S. Endangered Species Act) was completed in December 2002. All work on this structure was done in-house mainly by the DLNR horticulturist, Greg Mansker, assisted occasionally by other DLNR/DOFAW staff. The greenhouse is 130 feet long by 40 feet wide by 12 feet tall and is divided into an upper and a lower section along the entire length and has gravel floor. Installation of the water and electrical systems was completed in 2003.

The site contain two separate Matson container type storage facilities, one is used as office space, the other for equipment and storage. During the month of July 2004, an additional raised 8 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. The building is being utilized for the storage of growing/potting supplies (Figure 6). In addition to the storage area, a 6 by 10 foot covered (roofed) open walled work area was constructed (Figure 7). The open walled work area will provide an escape from the sun and rain exposure when working in the greenhouse area. The close proximity of the storage area to the mixing and potting area is ideal and will minimize 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.

Four additional greenhouse benches were also completed in July 2004 along with the framework required to hold tall pots upright. Drip irrigation lines were also installed for individual pots.

Painting of the greenhouse site was completed in August 2004. Most surfaces are now a shade of light green, blending the structure into the surrounding area while reflecting heat. Painting will likely be a regular maintenance issue for the nursery due to the harsh conditions and close proximity to the ocean's salt spray.

Issues concerning continued water access were resolved with the DOT. A fence was erected to protect the backside of the nursery from rockslides, which occurred during 2004 (Figure 9). A shower was completed to provide for pesticide decontamination. During the rainy season, maintenance of the road will be an issue because of the poor drainage conditions. To remedy this issue, a contractor has been secured to install a drainpipe across the road.



Figure 6. Site of Potting Supply Storage



Figure 7. Container Addition



Figure 8. Propagation in Progress



Figure 9. 2004 Rockslide

B. Propagation

A focus this year was to collect and begin propagation of the *Abutilon menziesii* plants found at the outplanting sites and/or the wild population at Kapolei that were not represented at the Mokuleia nursery. In other words, filling in the gaps between plants on

hand at the nursery and plants in the field, which are not represented in the nursery stock. These gaps are due to the time needed for the construction of the Mokuleia nursery, during which there was no propagation of plants. This was due to the lack of facilities to grow and care for them and the time that was needed to complete the greenhouse and the HCP. Propagation is going well at this time, with a much higher success rate with the cuttings than was ever achieved at the higher elevation Pahole site. The lack of cutting success is no longer the problem it once was! The area around the nursery is being utilized for nursery stock to provide easy access for cutting material.

In August the Mokuleia nursery moved beyond the propagation of just a single species. Propagation of select rare coastal species including *Sesbania tomentosa*, *Lipochaeta remyi*, and *Chamaesyce celastroides* var. *kaenana* is now under way. In an effort to continue the propagation of *Chamaesyce celastroides*, several plants with immature seeds were bagged and the mature seeds harvested. *Sesbania tomentosa* seeds from approximately 20 different individuals were also collected and about 100 plants are in cultivation.

C. Issues to be Resolved

The lack of a restroom facility needs to be resolved. A phone line for computer access needs to be installed. An air conditioning unit needs to be purchased for the office container. The possibility for a major rockslide still exists and should be researched. Permanent access needs to be established to other flat areas in the vicinity of the greenhouse in case the need arises to relocate due to a rockslide.

IV. Miscellaneous Achievements

Roy Kam at Hawaii Natural Heritage Program was contacted to discuss development of a tracking database to be used to track the status of the plants at the different outplanting sites. Roy estimated that he would begin this project in August of 2005 and it is hoped that it will be completed by the beginning of 2006.

V. Summary

Status of *Abutilon menziesii* populations

	Kaena Point	Honouliuli Reserve	Diamond Head	Total
Mature Plants in Population	32	78	103	213
Genetic Representation of Kapolei Population	37%	55%	90%	90%
Genetic Representation of Recently Discovered Kapolei Plants	0	16%	50%	50%
Seedlings Transplanted from Kapolei Population	0	18	9	27
Seedlings 2004 - Natural Regeneration	0	0	N/A	0
Seedlings 2005 - Natural Regeneration	0	0	N/A	0
Seedling Survival (6 mon.-1 yr.)	2	0	N/A	2

A. Accomplishments for 2004-2005

- Diamond Head MOU completed and population started
- Firebreak established around Diamond Head population
- Continuation of monitoring Kaena Point population
- Air layers collected from Koko Head and Kapolei plants
- Kiawe cleared at Honouliuli site and population expanded by 23 plants
- Monitoring forms completed for all plants at Kapolei, Diamond Head, and Honouliuli populations
- Right of Entry established with City and County for access to Kapolei plants
- Assisted Department of Transportation with Contingency Reserve Area (CRA)
- Painted greenhouse and added additional bench space
- Constructed additional storage building and potting area
- Erected barrier fence to protect nursery from rockslides
- Resolved continued water access with the DOT at the Mokuleia greenhouse
- Completed shower at greenhouse for pesticide decontamination purposes
- Started collecting and propagating of other rare coastal species in the greenhouse
- Surveyed several areas on Oahu for rare coastal species
- Marked Kapolei plants with a more visible tool to increase the ease of relocation

B. Goals for 2005-2006

- Establish full genetic representation of the Kapolei population at Diamond Head and Honouliuli populations
- Complete the tracking database *Abutilon* HCP
- Complete monitoring forms for Kaena Point population
- Continue to collect seedlings from Kapolei site and transplant to Honouliuli and Diamond Head populations
- Improve communication and cooperation with Koko Crater Botanical Garden staff
- Continue plant monitoring and maintenance at all sites
- Construction of drain pipe across the access road at the greenhouse to address the drainage issues
- Begin transplanting plants from the Kapolei population to the CRA
- Research possible solutions to rockslide threat at the Greenhouse
- Establish a phone line, restroom, and purchase an air conditioning unit for the greenhouse
- Continue to survey and collect from rare coastal species
- Continue to outplant rare coastal species within the *Abutilon* population