

Abutilon menziesii Fiscal Year 2018 Status Report



Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife
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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 was located within the footprint of a Department of Transportation (HDOT) 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 2017-2018 status report serves as a way of monitoring the progress towards this end goal.

Last year the conclusion was drawn that this project would not ultimately meet the success criteria outlined in the original HCP, specifically regarding seedling recruitment and survivorship at the required 3 populations. There are speculative biologic and abiotic factors contributing to the lack of wild site germination and survivorship. These include the lack of consistent and sufficient rainfall, the possibility of seed predation, and the heavy intrusion of nonnative weeds at wild planting sites. Due to this realization, the main focus for 2017-2018 was to begin to incorporate the restoration of this species within State Department of Land and Natural Resource ongoing projects that have long-term funding. The sites were located at Hamakua Marsh, Makua Keaau Forest Reserve, and Waianae Kai Forest Reserve.

Over the next year the focus for 2018-2019 is to expand the Hamakua Marsh site, replace the plants burned at Makua Keaau, and Waianae Kai, and continue to balance the founders at all outplanting sites.

Propagation of select rare coastal species continued during this reporting period. Cooperative outplanting projects were completed in coordination with US Fish and Wildlife Service, Oahu Plant Extinction Prevention Program, and Division of Forestry and Wildlife.

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% of the genetics from the Kapolei population. A low flow, low maintenance irrigation system is in place that utilizes the municipal water supply. The only plants on irrigation are new outplantings. 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*.

During 2017-2018, no new plants were outplanted. There are a total of 68 plants at Diamond Head representing 55% of the Kapolei genetic stock. This site is currently monitored once a month and

selectively weeded (i.e. weeding only the high threat species). This weeding strategy emphasizes control versus elimination. There was one new seedling during the reporting period. Of the seedlings seen during previous reporting periods, 12 have survived for more than five years. Two seedlings from previous reporting years died during this reporting period.

B. Koko Crater Botanical Garden

The plants at Koko Head Botanical Garden are thriving. There are 68 plants representing 62% of the Kapolei genetic stock. No new plants were outplanted during the reporting period. During 2017-2018, the focus of work was to produce air layers and outplant additional founders at Hamakua Marsh. 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 2018-2019, work will continue to expand the founders, maintain the vegetation around the plants, and replace any plants that senesce.

C. Honouliuli

The Honouliuli outplanting site is located along the western edge of the West Loc of Pearl Harbor and was established in 2002 and 2003. 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 37 acres of fenced land, much of which is occupied by two ponds. The land 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. 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.

Both locations have been removed from irrigation. 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 once a month and weeded as needed. Access is an issue at this site due to bird nesting and the usage by school groups for outdoor education. There were no new seedlings during the report period. Currently, there are 128 seedlings at the site from previous years. There are 100 seedlings that have survived longer than five years. This site has reached capacity; therefore, the only plantings planned in the future are for replacement of plants that die. Although all plants at this site produce seeds, a large percentage of the plants are also reproducing vegetatively by mounding (i.e. lower branches root on contact with the ground). As of 2018, there are a total of 75 adult plants representing 58% of the genetic stock available.

D. 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. This site is monitored once a month. This site is also used for airdlayers for new outplantings. There are currently 68 total plants at this site representing 58% of the genetic stock available.

E. Contingency Reserve Area

During 2005-2006, 35 plants were moved to the Contingency Reserve Area (CRA). Only one plant was lost during the move. Once the plants were moved, a perimeter fence was installed by the Department of Transportation contractors around the CRA site. A firebreak was also installed prior to the construction of the fence. The firebreak consists of a weed free gravel barrier. The perimeter fence and firebreak require regular and consistent weed control. During 2006-2007, one of the plants that had been previously moved to the CRA died. Unfortunately, this was one of the new plants located in 2002 and it is not represented in any of the outplanting sites or in genetic storage.

On October 31, 2005, a small fire occurred in the CRA taking out approximately one acre. The fire was quickly contained and no *Abutilon* were damaged. A meeting was held with the Waipahu/Ewa Fire Department at the CRA site to determine possible wildfire issues and to familiarize them with the site. At this time, more than three quarters of the perimeter of the CRA is protected by a green firebreak.

Weeds are a huge problem at this site. During 2015-2016, time was spent planting common natives to complete the green firebreak and controlling grass. Over 400 plants were planted in an effort to complete the green firebreak. Species include *Dodonea viscosa* (aalii), *Gossypium hirsutum* (mao), and *Myoporum sandwicense* (naio).

During the 2017-2018 reporting period, the site was monitored, weeded and the firebreak was maintained. There are a total of 68 plants representing 57% of the genetic stock at this site. No new plants were outplanted during this reporting period. Outplanting of thousands of common native species has taken place over the past few reporting periods. The idea was to add additional plants to the habitat to reduce the incoming light to reduce weed pressure. The hope was that this would increase seedling success. Unfortunately, there has been no *Abutilon* seedling recruitment at this site for many years.

F. 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 this report no new plants were outplanted. Currently, there are 63 plants representing 59% of the Kapolei population genetics. There were no new seedlings during this reporting period. The plants are, however, reproducing vegetatively at the site. 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. 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.

G. Kahuku

The decision was made in 2017 to abandon the Kahuku site. Therefore, it will be removed from all further reporting. No work has taken place on the site since 2017.

Sites H, I, J were newly established over the past year in the attempt to bring this species conservation efforts into current DOFAW projects with long-term project investment by the Oahu branch. The hope is that by infusing this species within these already established efforts that more long-term progress can be made at little to no added cost of expansion and maintenance efforts.

H. Hamakua Marsh

The Hamakua Marsh outplanting site is located on the windward side of Oahu on State Department of Land and Natural Resource land in an area currently managed for wetland birds. The site contains an active dry shrubland restoration site that involves DOFAW staff and community support from volunteers and school groups. The suggestion to add *Abutilon menziesii* to this site was made during an informal ESRC visit in 2017. During the 2017-2018 reporting period, 65 plants were planted on site. Work this year involved all prep work required to outplant the plants (i.e. grubbing, weeding, and planting). There are currently 54 plants on site representing 39% of the genetic stock. After the initial outplanting, heavy rains occurred at the site that caused flooding that killed 11 plants. Work during the 2018-2019 reporting period will involve additional outplanting to the site and maintenance of the current outplanted individuals.



Figure 1. Newly planted *Abutilon menziesii* at Hamakua Marsh.

I. Makua Keaau Forest Reserve

During this reporting period, ten plants were outplanted into the Division of Forestry and Wildlife's rare plant enclosure located in Makua Keaau on the West side of Oahu. The plants were not on irrigation, however water by catchment is available on site. This is an experimental outplanting to see if the plants will survive at this location. All ten plants were lost in the fire in August 2018. During 2018-2019, additional plants will be outplanted into the enclosure.



Figure 2. Watering newly outplanted *Abutilon menziesii* at Makua Keaau dry forest.

J. Waianae Kai

The final new site for 2017-2018 was initiated within the Waianae Mountains Watershed Partnership (WMWP) restoration area in Waianae Kai. This site is well established with a variety of native dry shrubland species and is actively managed and funded by DOFAW forestry for its restoration efforts. The site is regularly weeded and monitored by WMWP volunteer groups and WMWP staff as well as DOFAW staff. The site received 40 new *Abutilon menziesii* plants this year. Approximately 5 were burned in fires in early August 2018; however, the other 35 are doing well. Thirteen percent of the genetic stock is represented at this site.



Figure 3. School volunteers working with WMWP at Waianae Kai.

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. 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 contains 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. During 2017-2018, typical greenhouse upkeep included building and road maintenance, such as repairing the watering system and weeding.

IV. Conclusions

Last year several conclusions were drawn about this project and acknowledged by all parties involved (DLNR DOFAW, ESRC, HCP planners, and HDOT). The first, that this project would not meet all of the success criteria required in the original HCP regarding natural seedling recruitment and survivorship at the required 3 sites by the end of the Incidental Take License (ITL) term in 2021. Secondly, the existing project funds will be expended prior to the end of the ITL (potentially as early as late 2019), and that there are no opportunities identified to acquire additional funds beyond the existing project funds. Finally, that there should be a way to transition the work done by this HCP into the natural course of work for DLNR DOFAW.

The lack of seedling recruitment and survivorship at the several wild population sites established is still of great concern to DOFAW. We are actively trying to address this issue by researching other projects involving this species, researching the seed viability, by the continued addition of common native associate species into current populations to relieve weed pressure, etc. And although we do not have time left in the HCP to meet the success criteria of seedling establishment at our current sites, we have learned a significant amount about this species and believe we can achieve a level of success that is sufficient to preserve this species within DOFAW managed sites in the long term. DOFAW has been encouraged to work on a stabilization type plan for this species to act as a guide to managers working with this species and this document is currently in draft form.

Regarding funding, this year the funds that were believed to be lost in an accounting mix up in general funds were recovered by DLNR DOFAW Administrative staff. However, due to the current rate of spending at approximately 80k/year, all funds will be expended approximately by the close of 2019. DOFAW and HCP Staff met with HDOT in October 2017 to discuss the lack of remaining funding and the status of the HCP compliance. HDOT was regretful but unable to offer any additional funding.

Therefore, this past year represented a change in direction for the efforts associated with this HCP. In addition to continuing the ongoing weed maintenance, outplanting of additional mature plants, and additions of common native associate species at the previously established sites, DOFAW staff established three new conservation sites for *Abutilon menziesii* within areas that have a nexus for long term conservation work to support and enhance the persistence and expansion of newly established populations of this species. The three new sites are within Hamakua Marsh, Makua Keaau Forest Reserve, and Waianae Kai Forest Reserve.

While working on the transition for this species from HCP to DOFAW stabilization, it has become blaringly apparent that there is a lack of large scale dry forest restoration work on Oahu. The projects mentioned above (Hamakua, Makua Keaau, and Waianae Kai) are relatively new and still developing long term goals and only Makua Keaau harbors any native dry forest remnants. The other two sites are attempts to reclaim a dry forest/shrubland from 100% nonnative cover. Unlike Maui and Hawaii islands, where there are comparatively large areas of dry forest that contain many native components and have active restoration efforts, Oahu has very little native dry forest remaining due to conversions to housing, agriculture, and the effects of fire. Much of the remaining dry forest area on Oahu are on steep or vertical slopes that are difficult to access and conducting restoration efforts at these sites is challenging. The August 2018 fire that consumed nearly 8,000 acres from Waianae, Makaha, to Makua Keaau burned some of the largest and last remaining fragmented dry forest habitat on Oahu. Any future endeavors to restore *Abutilon menziesii* on Oahu should include a plan for restoration of dry forest habitat.

IV. Summary

Table 1. Status of *Abutilon menziesii* populations

Tracking Measures	Wild Sites			Other Sites					Total
	Diamond Head	Honouliuli Reserve	Pouhala Marsh	Ewa Villages	CRA	Koko Head	Hamakua Marsh	Waianae Kai	
Initial Outplants	104 (2004)	22 (2002)	63 (2007)	57	35	62	65 (2017)	40 (2017)	343
Initial Outplant Genetic Representation	65%	21%	61%	47%	34%	45%	38%	13%	100%
2018 Mature (Reproductive) Plants	68	75	63	68	68	68	54	35	499
2018 % Genetic Representation	55%	58%	59%	58%	57%	62%	38%		100%
2018 Seedlings	1	0	0	0	0	0	0	0	1
Seedlings surviving at least 5 years (as of 2016)	12	100	0	0	0	0	0	0	112
Date Irrigation Ceased	2012	2011	2017	Ongoing	Ongoing	Ongoing	N/A	N/A	N/A
Reproductive Plants Present After Irrigation Ceased (best 5 year average)	71	73	63	N/A	N/A	N/A	N/A	N/A	N/A