# Abstracts for O'ahu Weed Workshop 2015

**Tibouchina *control at Poamoho and pampas grass control in the upper Ko'olaus***

**Julia Parish, OISC**

The O'ahu Invasive Species Committee (OISC), the Hawai'i Department of Land and Natural Resources Division of Forestry and Wildlife Native Ecosystem Protection and Management Program (NEPM), and the Ko'olau Mountains Watershed Partnership (KMWP) recently began implementing an eradication program for the highly invasive plant, cane ti (*Tibouchina herbacea*), in Poamoho at the summit of the Ko'olau mountain range. Cane ti threatens priority watershed habitat in Poamoho, a region that hosts 11 animals and 18 plants with federal status. The O'ahu Army Natural Resources Program (OANRP) discovered cane ti (*Tibouchina herbacea*) in this region in 2008. A preliminary management strategy was developed to eradicate cane ti after conducting literature reviews and speaking with partner agencies and organizations including UH CTAHR cooperative extension staff. The management goal is to prevent reproduction of cane ti until the seed bank is exhausted, resulting in eventual island-wide eradication. The 2015 management strategy aimed to survey areas within 400 meters of all controlled plants. The components of the control strategy were to delimit the population by creating an initial 200m survey buffer around known populations, and continually expanding this buffer until plants were no longer detected along the buffer's far edge. The stream survey buffer extends 1,600m from the edge of the 400m survey buffer. Streams are a priority, as plants are dispersing via waterways. Terrain too steep to survey by ground is surveyed aerially or by binocular. Plants are controlled either manually or chemically using a foliar application of aminopyralid and triclopyr. The initial 200m survey area is almost completed, which allows for better understanding of the population distribution and dispersal pathways. Some key management challenges that need to be addressed are: 1. What is the optimal survey buffer distance; 2. What is the best survey strategy in this densely native region; 3. Definition of mature plant; 4. Which expanded survey areas should be prioritized first; 5. What is the most effective control method; 6. How frequently should the known plant locations be revisited for treatment and monitoring; 7. How long should we monitor, e.g. is a seed trial needed?

***Waimea Valley Native Forest Restoration Project***

**Laurent Pool, Waimea Valley**

Waimea Valley's natural resource objectives are to improve the native integrity within the 15 -acre mesic forest restoration site. Within the ungulate-free site are many areas dominated by a diverse set of native plants. Also within the site are areas completely inundated with ecosystem-altering and aggressive invasive weeds. In early 2014, we scaled back our efforts and did not expand our work into new areas within the site. Due partly to the low frequency of our, we underestimated the work load within the site. At this point, with 4 crew members, we have been able to greatly increase our time in the site and have a better grasp on the native and exotic recruitment and strategy within the site. The 5-mile (each way) "backwoods" commute has been hard on the road and many hours have been devoted to filling holes and mud pits. Our current resources include: a 6-seater UTV with tank sprayer, chainsaws, brush cutters, on-site rain catchment tanks, volunteers, plant nursery, botanical surveys, Gigapan imagery, aerial imagery, and secure funding for salaries.

Our main weed control challenges lie with *Chrysophyllum oliviforme*, basket grass, strawberry guava, and a slew of other herbaceous weeds and grasses. Scheduling mauka time, other projects, data collection, and funding are also issues that we continue to deal with. Our strategy in some of the mixed vegetative areas could use some review.

Our 2015 goals are to schedule more mauka days, more systematic and detailed weeding, and IPA and seed-longevity trials for *Chrysophyllum oliviforme*. Systematic targeting of outlying invasive plants with the use of Gigapan imagery and scopes will also be implemented. Alternate routes/baseyards, better data collection, and alternate sources of income will also be explored.

***Controlling weeds while maintaining microclimate conditions suitable for rare Hawaiian tree snail survival***

**David Sischo, DLNR-DOFAW, Snail Extinction Prevention Program Coordinator**

Predator-proof exclosures continue to be the only method available to prevent predation of endangered Hawaiian tree snails by all known invasive molluscivores. There are currently five such exclosures in the Wai‘anae and the Ko‘olau Mountains of O‘ahu, with more slated for construction. Hawaiian tree snails need specific microclimate conditions to survive, which often include high humidity and protection from sun exposure. A continuing challenge in regards to managing exclosure structures is maintaining these microclimate conditions suitable for snail survival, while also reducing the presence of weeds and promoting native plant regeneration. Invasive weeds, such as Christmasberry and strawberry guava, are often present inside exclosures, and provide significant contributions to canopy cover. While canopy cover is good for maintaining humidity and reducing direct sun exposure, these same weeds also prevent native plant recruitment, a “catch-22” situation. We are currently experimenting with selective pruning and use of strategic clip-and-drip herbicide applications to slowly phase out the invasive weeds, while encouraging native plant recovery. We will describe our current efforts, and hope to receive feedback and new ideas through discussion.

***Management options for control of* Batis *within brackish wetlands***

**Katie Doyle, DOFAW-Wildlife**

The State of Hawaii DLNR/Division of Forestry and Wildlife bought the Hamakua Marsh, Kailua management area from Kaneohe Ranch in 1997. The site is part of Kawainui watershed. The marsh is 70% surrounded by fence (not predator-proof), and 30% by Hamakua Stream. The interior mudflats are filled with pickleweed, *Batis maritima,* which is an invasive species. My goal is to control this plant to benefit 3 endangered bird species. Control has occurred since 2005 by spraying the area with the herbicide Habitat. This completely kills the plant and all other plants for about 9 months. This species was the only species present besides milo, *Thespesia populnea*, when I started managing this marsh 4 years ago. I decided in fall of 2013 to run experiments in managing with less herbicide to encourage natives. I ran 3 test plots: 1 was a control where I did not spray or till, 2 was mowed and tilled, and 3 was sprayed and tilled. The results from plot 2 were only native plant regrowth because of flooding, which was the goal. In plots 1 and 3, no native plants returned, only *Batis*. I manage the entire 22 acres

without control of water or flooding, trying to recreate plot 2 results. The marsh has been flooded all year, so I cannot till, and the birds are nesting within all but 3 months. My goal for spring 2015 is a combination of spraying and weedwhacking to control the regrowth until fall when I can hopefully till again.

***Diamond Head State Monument***

**Jacob Fitzpatrick, Diamond Head State Monument**

Diamond Head State Monument's interior and slopes are riddled with alien species. Our objective is to limit the growth of alien species within the crater and its outer slopes, with special focus along our trail corridor and where there is heavy foot traffic. Our priorities include controlling lion's ear (*Leonotis leonurus*), bellyache bush (*Jatropha gossypiifolia*), fountain grass (*Pennisetum setaceum*), and other alien species that outcompete our native species. The strategy we employ for weed control has been manual weeding, spot spraying with herbicide, and weed matting.

The populations of these alien species have not been mapped nor tackled on a large scale. Some challenges we face include having a limited staff (1 park caretaker, 1 interpretive technician, 2 KUPU interns), high frequency of visitors per day, park hours of operation, and a large area of maintenance. The crater encompasses 475 acres and sits in urban Honolulu. The park is open to the public 365 days a year from 6am-6pm and is usually visited by 2,000-5,000 tourists and hikers per day. It has numerous inaccessible areas and is shared with c State Department of Defense and the Hawai'i National Guard. There are also endangered plant species in various locations in and around the crater (*Schiedea adamantis, Doryopteris takeuchii, Marsilea villosa*), which also inhibit our work in controlling the spread of these alien species.

***To weed or not to weed? That is the question. Weed control and restoration work around rare plants.***

***Lara Reynolds, Mandy Hardman and Katie Doyle, Native Ecosystem Protection and Management Program***

Restoring an ecosystem with threatened and endangered (T&E) plants in the vicinity poses numerous challenges. Challenges related to weed control can range from the possible effects of altering light regimes/abiotic conditions following weed control, potential non-target herbicide impacts, and mitigation of future tree falls as treated trees die. In some cases, controlling invasive species may have more negative consequences to T & E plants in a restoration area than not controlling them. All too often the unknown impacts result in the dilemma "to weed or not to weed" - when and how do you make the decision to control weeds around rare plants?

We will present an example of this decision-making process using Oahu DOFAW's weed control efforts around a population of the endangered *Cyperus trachysanthos* (pu'u ka'a) in the Hamakua Marsh. We will also share a stepwise guide to aid in the decision-making process. Following the presentation will be a group discussion of other program's experiences weeding around T&E species and an opportunity to provide feedback and suggestions that can be used to develop a set of guidelines for weed management in proximity to T&E plants.

***Accelerating the restoration trajectory of* Acacia koa *in kikuyu grass–dominated landscapes***

**Anthony S. Davis[1,+], Jeremiah R. Pinto[2,*,+], James J.K. Leary[3,+], and Matthew M. Aghai[1]**

Restoring Hawai'i's native koa (*Acacia koa*, A. Gray) forests are top conservation and forestry priorities, providing critical habitat services and high-value timber products. Efforts to restore koa forests, however, are directly impeded by extensive kikuyu grass (*Pennisetum clandestinum* Hochst. ex Chiov.) swards occupying deforested montane landscapes. In a field study, we implemented a combination of grass suppression and seedling stocktypes to measure outplanting performance in a naturalized site on Ulupalakua Ranch property. Seedlings were grown in a nursery in two different root container sizes (111 and 207 $cm^3$) and subsequently outplanted into grass-dominated plots that were either untreated or suppressed with a high-rate herbicide combination of imazapyr and glyphosate (1.7 kg a.i. ha-1, respectively) 30 days prior to planting. Across all treatments, seedling survival was high (>95%). The larger stocktype was persistently larger and at 30 months after planting was 10% taller with an 18% greater root collar diameter. Concurrently, initial grass suppression resulted in trees that were 34% taller with 66% larger root-collar diameters 30 months after planting. Corresponding to the larger sizes were significantly higher leaf area indices (2.6 vs. 1.8 $m^2$ $m^{-2}$), indicative of higher photosynthetic capacity and canopy closure. Grass suppression increased soil temperature and soil moisture in the first year, followed by a dramatic drop in soil moisture in the second year, which corresponded with an apparent log-phase growth response of koa after the first year in establishment. These results demonstrate how the combination of fundamental silvicultural practices in the nursery and the site can accelerate tree growth to meet restoration goals in shorter time intervals. This is a first report of koa (a leguminous species) tolerance to a high-rate, pre-plant application of the herbicide active ingredient imazapyr.