

Habitat Restoration at Kona Hema Preserve
for 'Alala Reintroduction
Funded by US Fish and Wildlife Service's
Hawaii ESA Community Conservation Initiative Grant

Common Name	Scientific Name	Planted in 2007	Planted in 2008	Planned for 2009
'a'ali'i	<i>Dodonaea viscosa</i>	79	20	200
'akala	<i>Rubus hawaiiensis</i>	1	4	
'ie'ie	<i>Freycinetia arborea</i>		9	
'oha	<i>Clermontia clermontioides</i>	227	161	250
'ohelo	<i>Vaccinium reticulatum</i>	2	5	
'ōlapa	<i>Cheirodendron trigynum</i>	29	60	150
ha'iwale	<i>Cyrtandra hawaiiensis</i>	28	39	100
ho'awa	<i>Pittosporum</i> sp.	57	114	200
kanawau	<i>Broussasia arguta</i>	31	63	50
kawau	<i>Ilex anomala</i>	26	66	200
kolea	<i>Myrsine lessertiana</i>	152	395	200
kopiko	<i>Pyschotria hawaiiensis</i>	16	183	100
loulou	<i>Pritchardia schattaueri</i>		23	50
maile	<i>Alyxia olivaeformis</i>	98	67	200
mamaki	<i>Pipturus albidus</i>	325	101	250
mamane	<i>Sophora chrysophylla</i>	4	18	
manono	<i>Hedyotis terminalis</i>	0	109	
mint	<i>Phyllostegia floribunda</i>	59	110	
naio	<i>Myoporum sandwicense</i>	78	60	250
pilo	<i>Croprosmia</i> sp.	131	685	250
blue-eyed grass	<i>Sisyrinchium acre</i>		25	
	Total	1343	2317	2450

The overall goal of this project is to reestablish the diversity of understory trees which provide a food source for fruit-eating birds such as the 'alala (the endangered Hawaiian Crow). Our outplanting strategy is to utilize the shade of existing stands of trees which contain limited abundance and low diversity of understory species, are too dense for scarification, and are adjacent to scarification sites so as to provide a nearby source of understory tree seeds for colonizing future koa stands. For example, in 2007 we planted understory trees in a 60-acre kipuka containing mature koa and very little else, which is surrounded by an extensive burned site, currently undergoing scarification. This year we focused on a formerly grazed site containing dense stands of regenerating ohia, located adjacent to more open former pasture which is being scarified. We do very little grass control aside from manual removal at the time of planting and applying a thick layer of grass mulch. Survival has been high: greater than 95% in 2007. Mortality appears to be caused mainly by incorrect planting and placement (too much sun), lack of winter precipitation (2008), and occasional uprooting by birds scratching (kalij pheasant and turkeys).

Kona Hema Preserve Fencing Costs

April 17, 2006

Fence Description

Fence alignments were prepared by clearing strips of vegetation (16 feet wide) with a bulldozer. Lava substrates required that almost every fence post hole be drilled using a compressor and rock drill. Bezanole-treated hogwire (1047-6-12-1/2) was attached with wire fasteners to galvanized-dipped steel T-posts (6.5 ft. high) and installed 10-12 feet apart. Fence posts were driven to a uniform depth (5 feet remaining above ground). A single strand of bezanole coated barbed wire was attached below the hog wire to prevent pigs from digging underneath the fence. Two more strands of barbed wire were attached to posts above the hog wire to prevent sheep and goats from jumping over the fence. When necessary, the hog wire was secured to the ground with an anchor. Galvanized gates (16 ft. wide) were hung on galvanized posts.

Honomalino Unit

Entire unit (4,010 ac.) was fenced in 1999. All four boundaries were fenced except for a 1.0 mile section along the southern boundary (Scott Rolles' portion). An existing new fence was already in place there, but volunteers were enlisted to add 2 strands of barbed wire along the top. Bulldozing of the alignment and fence construction was done under contract by Jeff Hanneken, Ranch Services. A total of 10.5 miles of new fence was constructed (the unit perimeter is 11.75 miles). The contract for dozing 10.5 miles of fence alignment and access road was \$29,895.64 including taxes. Contract for fence construction (materials and labor) was \$233,467.37 including taxes. TNC paid for all fencing costs with funds obtained from a donor. No government grants were needed. Transportation and labor costs for the TNC supervisor was minimal, estimated at \$2,000. Total cost of the project in 1999 dollars was as follows:

Dozing contract: \$29,898.64
Fencing contract: \$233,467.37
TNC supervisor: \$2,000

TOTAL COST: \$265,363

Kapua Unit

The unit (1,800 ac.) was fenced in 2003. The fence line was bulldozed by a TNC employee (4 weeks of dozer time) with a machine leased from Sally Rice. The section of fence adjacent to the Honomalino unit was already in place and the upper boundary fence was built by the adjacent landowner (Scott Rolles). However, T-post extensions and 2 strands of barb wire were attached to the fence. This required 2 weeks of labor by 4 TNC employees. A total of 21,120 feet of new fence was constructed (southern, western, and a section of the northern boundary below the Honomalino unit). This work required 3 months to finish and labor was provided by TNC employees (John R. and 4 temporary hires). Fence materials were purchased with funds from a NRCS WHIP grant. Total cost of the project in 2002 dollars was as follows:

Dozer rental: \$6,000
Dozer operator: \$3,616
Dozer hauling: \$1,000
Dozer fuel: \$800
Fencing materials: \$79,992
Compressor rental: \$6,000
Vehicles (2): \$3,000
Vehicle fuel: \$ 1,200
Labor: (John and crew of 4): \$29,673

TOTAL COST: \$131,281

Papa

Entire unit (2,279 ac.) was fenced 2004. Top boundary was fenced by HVNP in exchange for TNC's bulldozer services (Park road construction). The southern boundary fence already existed (Honomalino unit). The northern boundary was cleared (bulldozed) at no cost to TNC by the adjacent Rancher (Yee Hop). The lower boundary (western) and a small section of southern boundary were cleared by a TNC employee using a rented dozer (two weeks of dozing). Sunshine Fencing constructed 4.26 miles (22,500 linear feet) of fence under contract (labor only). An NRCS WHIP grant provided funding for the fencing material. Total cost of the project in 2004 dollars was as follows:

Dozer rental: \$3,951
Dozer hauling: \$1,000
Dozer fuel: \$803
Dozer operator: \$1,920
Fencing materials: \$39,506
Fencing contract (labor only): \$95,940
Vehicle and fuel for TNC supervisor: \$500
Labor: (TNC supervisor) \$1,664

TOTAL COST: \$145,284

Kona Hema Pig Control Costs

Honomalino unit

One TNC employee (Mel) started trapping pigs in 1999. Two full days per week, over four years, were spent baiting traps and removing pigs. In 2003, trapping operations were reduced and hunting with dogs began. This activity continued for 2 full years. Hunting took place one day per week (Mel only) for the first year, but two hunters (Mel and Paul) hunted one day per week the second year. The unit was declared pig free in 2005. A total of 350 pigs was removed from the 4,010 acre management unit after 6 years of effort. Total cost in 1999 dollars was as follows:

Total labor: \$88,800

Traps (15): \$4,500

Snares: \$300

Bait: donated by Mac Farms

Dogs and Vet care: 2 years @ \$4,000/year = \$8,000

Misc. equipment & ammo: 2 years @ \$1,000/year = \$2,000

Vehicle: new 4WD (\$26,284/10 yr. life or \$ 2,684/yr.) Vehicle was used on project 2 days/wk. for 6 years @ \$1,072/yr. = \$6,432

Fuel: \$3,000

Monitoring pig activity transects (twice per year): 2 people for 8 days \$1,600

TOTAL COST: \$114,632 or \$28.60/acre

Kapua unit

In May 2003, a single TNC employee (Mel) started trapping pigs one day per week. Pig control activity increased 6 months later when a second employee (Paul) was hired. At that time, two full days per week were expended on trapping and one day per week was spent hunting with dogs (2 employees working 3 days per week for 2½ years). Animal control activities are currently ongoing at the same level of effort. A total of 406 pigs has been removed to date (April, 2006). It is estimated that fewer than 6 pigs are left in the 1,800 acre unit. These last few animals are the most difficult to remove and snaring as well as hunting may be required. Total cost in 2004 dollars was as follows:

Total labor: \$97,732

Traps: moved from Honomalino to Kapua

Snares: none used yet

Bait: donated by Mac Farms

Dogs and Vet. Care: 2 years @ \$4,000/year = \$8,000

Misc. equipment & ammo: 2 years @ \$1,000/yr. = \$2,000

Vehicle: 4WD was used on project 3 days/wk. for 2 yrs. @ at \$1,608/yr. = \$3,216.

Fuel: \$1,500

Monitoring pig activity transects: 2 people for 4 days: \$800

TOTAL COST: \$113,248 or \$62.92/acre

Cost Comparison: Scarification vs. Planting

Scarification

Bulldozer rental: 3 ha (7 ac) scarified per day @ \$200 per day = \$67/ha (\$29/ac)

Bulldozer operator: 3 ha (7 ac) scarified per 8-hr day @ \$50 per hour = \$133/ha (\$57/ac)

Thinning labor & herbicide: NA

Total (not including thinning labor & herbicide) = \$200/ha (\$86/ac)

Planting

Goal density = 400 trees per ha (planted 800 trees per ha)

Herbicide: 2% Round-up + dye for killing grass in planting sites = \$8/ha (\$3/ac)

Spraying labor: 1 hr, 12-person crew, spray 800 sites/ha @ \$12/hr = \$144/ha (\$58/ac)

Plants: \$0.28/plant, 800 plants/ ha (includes 2 plants per planting site) = \$224/ha (\$91/ac)

Planting labor: 5 hrs, 12-person crew to plant 800 plants @ \$12/hr = \$720/ha (\$291/ac)

Thinning labor & herbicide: NA

Total (not including thinning labor & herbicide) = \$1,096/ha (\$444/ac)