ADDENDUM

TO THE

IMPLEMENTATION PLAN

MAKUA MILITARY RESERVATION
ISLAND OF OAHU

January 2005

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Executive Summary

The Final Implementation Plan for Makua Military Reservation, Island of Oahu (May 2003) was prepared to guide conservation efforts that will result in the stabilization of 27 endangered plant taxa and an endangered species of Hawaiian tree snail that could be affected by military training activities at Makua Military Reservation (MMR) in Hawaii. In 1999, the US Fish and Wildlife Service (USFWS) issues a non-jeopardy Biological Opinion for routine military training at Makua Military Reservation with the understanding that the Army would develop a conservation plan to stabilize 27 plant species and one snail species that they identified as being potentially effected by training activities. When stabilization of the 28 species is achieved, restrictions to routine training may possibly be eliminated, following reinitiation of consultation with the USFWS.

The Army has been working with the USFWS and the Makua Implementation Team (IT) to revise the manner in which stability is achieved, to address the logistical difficulties of off-site management, and to reduce the cost of the 2003 IP. The IT is comprised of biologists representing the Army, USFWS, State of Hawaii, Honolulu Board of Water Supply, The Nature Conservancy of Hawaii, Campbell Estate and endangered taxon or ecosystem experts. The Addendum focuses on the bottom-line as stated in the 1999 Biological Opinion, which lead to a plan with an average cost of $3.3M per year instead of the $8M per year required by the 2003 IP. Since the end goal of stabilization is three naturally reproducing population units (PU), the Army will focus on three PUs per taxa instead of the average of six PUs per taxa proposed in the 2003 IP. The Army is now proposing to manage 81 plant and 8 snail populations rather than the 188 plant and 10 snail populations recommended for management in the 2003 IP. This change also resulted in prioritizing the management units according to the selected PUs and resulted in the identification of 2,307 acres of priority habitat. In addition, the Army will collect genetic material for those species most threatened by fire, for which material is needed to augment the PUs, and with very low numbers of individuals to ensure that should the bottom-line management technique not work for all species, there is genetic material available for future efforts.

The 2003 IP provides taxon background summaries describing the biology and current status of the target taxa, methodology and a conceptual framework for the required stabilization, the specific actions required to stabilize each taxon and the habitat they depend upon, and monitoring protocols to evaluate success of the management actions. The stabilization plan for each target taxon outlines specific actions, including threat abatement and reintroductions into appropriate, protected habitat. Threat abatement actions include control of feral ungulates, selected weeds, predators such as small mammals, insect pests, and diseases. In addition to taxon level management of target taxa *in situ* (in the wild), habitat level management, requiring a broader geographic scope and control of threats affecting ecosystem processes, is also included to support the development of stable populations of target taxa. Because of the widespread distribution of the target taxa and the need for maintaining ecosystem processes, 23 management units (MUs) are proposed in the Waianae and Koolau Mountains of Oahu where the most important wild populations of the target taxa occur. These areas encompass the important habitat for *in situ* management and reintroduction efforts that will lead to the stabilization of the target taxa. The proposed MUs occur on Army, State of Hawaii, Honolulu Board of Water Supply, and

private lands, and will require cooperation and memoranda of agreement with the landowners prior to initiation of management actions at these sites. Of the 23 MUs, six are all or partially on Army lands. The Final IP includes taxon actions and MU actions, as well as a timetable and budget for implementation.

The IT will conduct an annual assessment of the results of the management actions through a review of the monitoring data to determine the Army's progress toward achieving stabilization of the target taxa within a reasonable time frame. The assessment will also allow for modification of the IP strategies as needed, using an adaptive management approach.

The timeline for the Addendum to the IP is projected over 20 years. The implementation of the IP is expected to cost an average of approximately $3,256,800 per year, for an estimated total of $66,836,000 over 20 years. This figure is subject to change depending on timing of implementation of actions.

The IP is subject to the availability of funds and nothing in this plan should be interpreted to violate the Anti-deficiency Act. The Army intends to fund the program through its operating funds each year. The IP requires the Army to continue as an active member of regional conservation efforts in support of stabilization of the target taxa and the habitats they depend on. By taking an active role to determine the best available practices and the highest priority threat management needs, the Army's conservation efforts will be in the forefront of species conservation in Hawaii. Successful implementation of the IP assures that the Army will be in compliance with Endangered Species Act and still accomplish its training mission.

UNITED STATES ARMY GARRISON, HAWAII

Addendum to the Implementation Plan,
Makua Military Reservation
Island of Oahu

January 2005

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Addendum to the Makua Implementation Plan

1.0 Introduction and Summary of Changes

Pertinent background and project scope

This document was prepared to guide conservation efforts that will result in the stabilization of 28 endangered plant taxa and an endangered species of Hawaiian tree snail that could be affected by military training activities at Makua Military Reservation (MMR) in Hawaii. In 1998, the U.S. Army (Army) initiated formal consultation under section 7 of the Endangered Species Act (16 U.S.C. 1531 et seq.) with the U.S. Fish and Wildlife Service (USFWS) to determine if routine military training at MMR would jeopardize the continued existence of 41 endangered species. The Army is responsible for maintaining stability of each of these taxa, and applying additional management specified in this plan to those taxa below stability. The consultation used an action area (AA) (area potentially affected by military training), that extended beyond the boundaries of MMR and was based on vegetation types, fire history, natural and human-made barriers, and a consensus of where fire could be stopped by State, Federal, and Army fire-fighting resources. Taxa for which either a significant portion of the populations occur within the AA or for which no populations are stable, hereafter referred to as target taxa, were addressed in the Army's proposed action of military training and conservation measures in such a way as to avoid jeopardy.

In 1999, the USFWS issued a Biological Opinion (BO) (USFWS 1999) concluding that the routine military training and the conservation measures identified by the Army in its Biological Assessment (BA) would not jeopardize the endangered species found within the AA. The conclusion of no jeopardy was based on certain restrictions to military training, preparation and implementation of a wildland fire management plan, implementation of management actions identified in the BA for the 13 endangered species at stability and minimally impacted by Army training, and preparation and implementation of a plan (Implementation Plan) for the additional 27 plant target taxa and one snail target taxon. The Implementation Plan (IP) would identify additional management actions beyond those the Army was already implementing or agreed to implement in the BA to stabilize the 28 target taxa. During the preparation of the IP, the Army decided on additional restrictions to routine military training, four additional taxa were found within the AA, additional populations outside the AA were found for one taxon, and the Federal status of another taxon changed. The Army reinitiated consultation and the USFWS provided a supplement to the BO (USFWS 2001) which determined that the additional four taxa will not be jeopardized by Army training, resulting in a final number of 28 target taxa. When stabilization of all of the target taxa is achieved, restrictions to routine military training may possibly be eliminated, following reinitiation of consultation with the USFWS.

To stabilize the target taxa each taxon must be maintained with sufficient numbers of populations to ensure their long-term viability. Additionally, threats to the managed and reproducing individuals in each population must be controlled, and each taxon must be adequately represented in *ex situ* (out of the wild) collections. Stabilization is only the first step toward eventual recovery of these endangered species. Recovery of these taxa is beyond the Army's responsibilities under the section 7 consultation. Because the implementation of this kind of taxon stabilization effort had never before been attempted in Hawaii, the Army created an Implementation Team (IT) to assist the Army and its contractors in preparing the IP. The IT is comprised of biologists representing the Army, USFWS, State of Hawaii, Honolulu Board of

Water Supply, The Nature Conservancy of Hawaii, Campbell Estate, and endangered taxon or ecosystem experts (Final IP Chapter 3: Implementation Team).

The Final IP was completed in May 2003 and provides the basis for meeting the taxon stabilization requirements of the section 7 consultation. Successful implementation of the IP assures that the Army will be in compliance with the Endangered Species Act and will still be able to accomplish its training mission. These requirements are as follows:

- Identify priority taxa and areas within MMR and in off-site stabilization areas.
- Determine an estimate of the minimum viable population for each taxon considered likely to be jeopardized by Army activities.
- Determine intermediate and final definitions of success for stabilization of each taxon.
- Develop protocols to achieve the highest possible genetic representation that can be collected for each of the target taxa.
- Develop reintroduction and augmentation protocols which include the determination of adequate number of individuals to reintroduce or augment to reach success, number of populations, size or life stage distribution of the population, how to achieve the highest number of individuals possible within a population, contamination issues, timing of reintroduction and augmentation, and site selection.
- Determine habitat management requirements (quality and quantity) for each taxon.
- Identify priority incipient weeds and the areas to be surveyed within MMR and on off-site stabilization areas.
- Develop a method to monitor, integrate and evaluate data, and report results.
- Develop a schedule for completion of implementation actions and a cost estimate for implementation of each identified action.
- Develop a scope of work for each of the implementation actions.

Biological approach

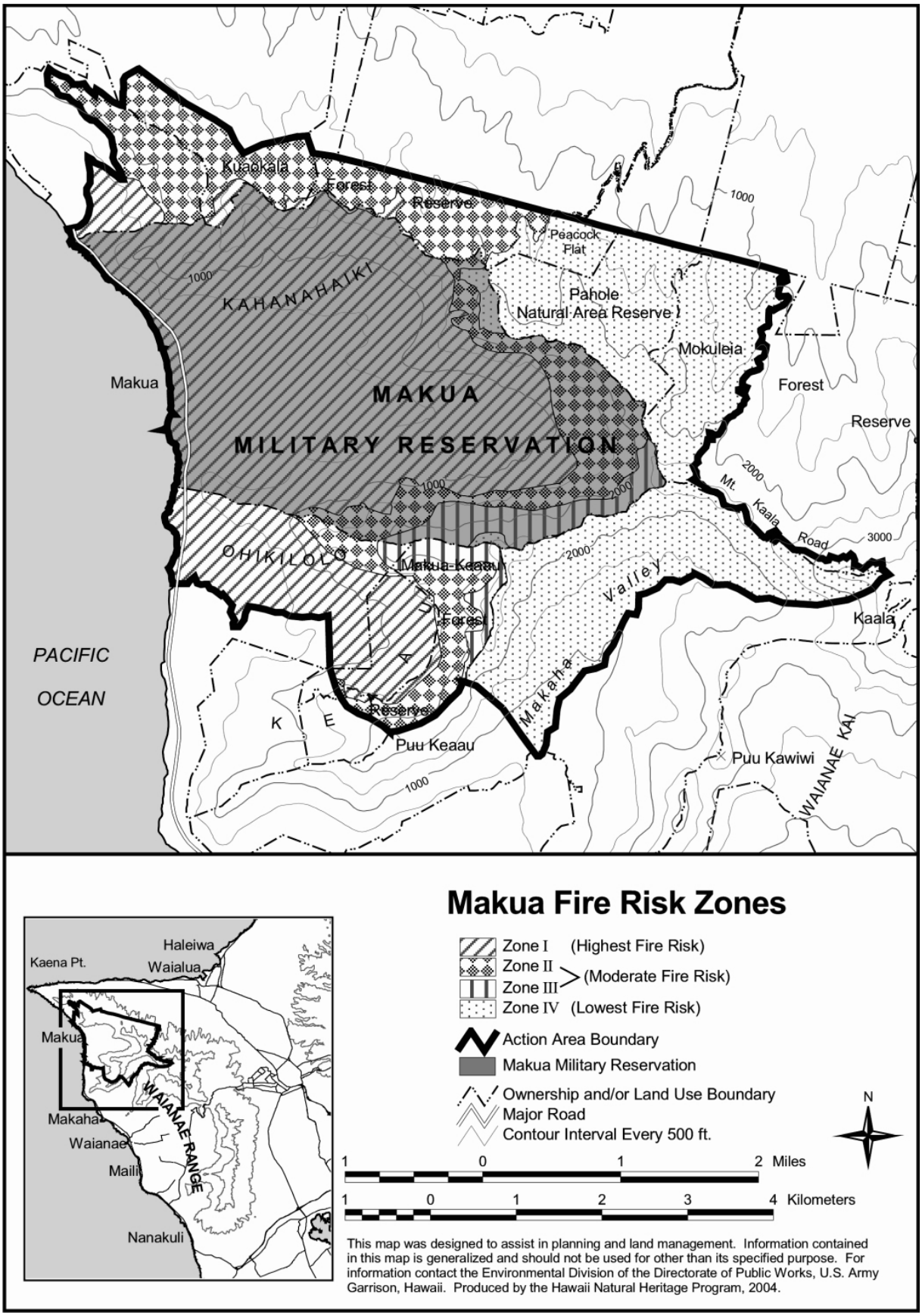
This IP has been developed strictly from a biological perspective. Although primarily taxon-based, an emphasis on habitat restoration and ecosystem processes is recognized, focusing on 1) the intrinsic value of *in situ* biological webs in designated sensitive/special areas, 2) building on habitat restoration and threat removal/control, 3) stabilizing habitat and allowing for natural recovery, and 4) utilizing augmentation and reintroduction of a taxon as needed. The decisions on the specific management actions and the locations of these actions are based primarily on the known biological needs of the target taxa, and are not compromised by other factors such as land ownership, political jurisdiction, or public opinion. By using such an approach, the action priorities in the IP are fully justified on biological grounds.

Related to this biological approach is the recognition that intensive management efforts at taxon and habitat levels can have negative effects on the target taxa, other sensitive taxa, and native ecosystems if not properly implemented. In addition to proposing actions beneficial to the target taxa, the avoidance of negative affects of proposed actions ("do no harm") is an important guiding principle. Following this principle, the IP incorporates protocols designed to minimize negative effects of human activities in native ecosystems such as inadvertent introduction of alien weeds, introduction of pathogens, trampling of vegetation, opening of trails, increased fire risk, and genetic contamination via inappropriate outplantings. These protocols protect not only

the target taxa, but also other sensitive rare and endangered taxon known to occupy the proposed management areas. Careful testing of techniques before large-scale implementation and monitoring for the consequences of management actions also reflect this principle.

Summary of changes

The Army has been working with the USFWS and the Makua Implementation Team (IT) to revise the manner in which stability is achieved, to address the logistical difficulties of off-site management, and to reduce the cost of the Final IP. The Addendum focuses on the bottom-line as stated in the 1999 Biological Opinion, which lead to a plan with an average cost of $3.3M per year instead of the $8M per year required by the 2003 IP. Since the end goal of stabilization is three naturally reproducing population units (PU), the Army will focus on three PUs per taxa instead of the average of six PUs per taxa proposed in the 2003 IP. The Army is now proposing to manage 81 plant and 8 snail populations rather than the 188 plant and 10 snail populations recommended for management in the 2003 IP. This change also resulted in prioritizing the management units according to the selected PUs and resulted in the identification of 2,307 acres of priority habitat. In addition, the Army will collect genetic material for those species most threatened by fire, for those species for which augmentation will be used as a management technique, and for those species with very low numbers of individuals to ensure that should the bottom-line management technique not work for all species, there is genetic material available for future efforts. The revised stabilization plans summaries (Chapter 2) and priority management unit descriptions (Chapter 3) reflect and define these changes.


Kuaokala
Forest
Reserve
Peacock
Flat
1000
KAHANAHAIKI
Pahole
Natural Area Reserve
Mokuleia
Forest
Reserve
Makua
MAKUA
MILITARY RESERVATION
2000
Mt.
Kaala
Road
3000
OHIKILOLO
Makua-Keaau
Forest
Reserve
Valley
Kaala
PACIFIC
OCEAN
Makaha
Puu Keaau
Puu Kawiwi
WAIANAE KAI
Makua Fire Risk Zones
Zone I (Highest Fire Risk)
Zone II
Zone III
(Moderate Fire Risk)
Zone IV (Lowest Fire Risk)
Action Area Boundary
Makua Military Reservation
Ownership and/or Land Use Boundary
Major Road
Contour Interval Every 500 ft.
N
1 0 1 2 Miles
1 0 1 2 3 4 Kilometers
Haleiwa
Kaena Pt.
Waialua
Makua
Makaha
Waianae
Maili
Nanakuli
WAIANAE RANGE
This map was designed to assist in planning and land management. Information contained in this map is generalized and should not be used for other than its specified purpose. For information contact the Environmental Division of the Directorate of Public Works, U.S. Army Garrison, Hawaii. Produced by the Hawaii Natural Heritage Program, 2004.

2.0 Revised Plant Stabilization Plan Summaries

The revised stabilization plan (SP) summaries do not use the Credit System, which was the cornerstone of the Final Implementation Plan (IP) (Section 2, Chapter 2). The decision to move away from this was based on the need to reduce the scope of the Makua Implementation Plan (MIP). These summaries focus on the minimum requirement of stabilizing three populations per taxon. The highest priority populations, which fall into the highest priority management units, were selected to be 'managed for stability'. Management actions other than these may still be pursued but will not be considered top priority. These summaries should be used in conjunction with the detailed outlines for each taxon in the Final IP stabilization plans.

The SP Summary tables include the population unit (PU) name as it appears in the Final MIP. The PUs are grouped by those in the Makua action area (AA), out of the Makua AA and reintroductions. The maps include locations of the selected reintroductions, and the backup reintroductions, as defined in the Final IP (Section 2, Chapter 2). In some cases, small *in situ* PUs have been grouped into one larger PU. For all PUs with boundary changes there is justification in the text section below the table entitled ' Justification for Management Designations'. The next column in the table lists the management designation for each PU from the MIP. Column three lists the current management designation for each PU. If smaller PUs were merged into one large one this is indicated in the current management designation column. In future reports related to the MIP column two will be dropped and only column three will be used to simplify this table. The fourth column in the table lists the number of plants from the Final MIP, mature and immature plants. The next column lists the most complete Army Natural Resource Staff (NRS) count of plants from each PU, mature and immature plants. This number is not always a complete count of plants in the entire PU. When this number has greatly decreased an explanation presented in the 'Justification for Management Designations' section. Only major number changes are discussed in this report. For more details about changes in population status see the Makua Implementation Plan Status Report. The last column indicates if a PU has been augmented and if so how many mature and immature individuals there are currently.

Priority management units (MUs) were designated in this addendum (see Chapter 2 for more details on priority MUs). In some cases, not all of the plants in a 'manage for stability' PU are within the boundaries of the priority management units. These individuals are still considered part of the same 'manage for stability' PU, and will receive a higher level of management than plants designated as 'genetic storage collection'.

The 'Justification for Management Designations' section is meant to explain and justify any deviations from the Final MIP. As stated above, if PUs were grouped this is explained biologically. In most cases with additional surveys the habitat between PUs was found to be more continuous than was previously thought. Also, the number of PUs in the AA versus out of the AA is justified. If two PUs are slated for management in the AA then one of these must fall within the mid-credit area. If this is not the case, justification is provided. In some cases management decisions are contingent on fuel modeling for areas within the action area. Based on fuel modeling results, management designations will be revisited. The category 'manage as a propagule source' is no longer used. Protection measures required to collect propagules for genetic storage or as a propagule source are similar. The genetic stock used at each augmentation/reintroduction is not discussed in this section

as it changes frequently with new information. Another issue not addressed is the status of genetic storage. Extensive discussions about these PU details are included in the Makua Implementation Plan Status Report 2004.

The stabilization actions in the summaries have been included in Chapter 3.3: Detailed Cost Estimates, which provides a detailed summation of the actions and resources needed for the total stabilization effort.

2.1 *Achatinella mustelina*

***Achatinella* Stabilization Plan Summary**

Long Term Goals:

- Manage snail populations at 8 field locations to encompass the extant range of the species and to include all 6 genetically defined evolutionarily significant units (ESUs).
- Achieve at least 300 snails per population.
- Maintain captive populations for each of the 6 recognized ESUs.
- Control all threats at each managed field location.

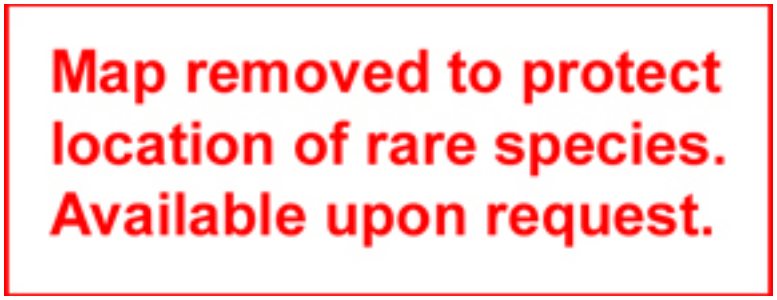
The results of genetic analysis conducted on *Achatinella mustelina* populations since the finalization of the Makua IP indicated the presence of six ESUs, rather than the eight reported in the Final IP. Two of the units, ESUs B and D (see Map 2.1), span distinctly different habitat zones. Based on the new data, stabilization of *A. mustelina* requires that the Army stabilize 8 field populations (one each from ESUs A, C, E, and F; and two each from ESUs B and D) that are geographically spread throughout the Waianae Range to protect the maximum genetic diversity of the species.

Table 1 Field Sites for Stabilization Efforts

New ESU	Old ESU	Site No.	Location	# of Snails in the Final MIP	Final MakualP Year 1 Recommended Actions	Revised Year 1 Recommended Actions
A	A	1	Kahanahaiki	55	Manage for stability (choose between Kahanahaiki and Pahole)	Manage for stability (together with Pahole)
A	A	2	Pahole	50+	Manage for stability (choose between Kahanahaiki and Pahole)	Manage for stability (together with Kahanahaiki)
A	A	3	Kapuna	~25	None	None
B	B	4	Ohikilolo	300+	Manage for stability; Collect for captive propagation	Manage for stability
B	B	5	Central Makaleha (culvert 39)	81	Select one of 3 candidate sites for management (site # 5, 6 or 7)	None
B	B	6	East Makaleha (culvert 45)	29	Select one of 3 candidate sites for management (site # 5, 6 or 7)	None
B	B	7	East Makaleha (culvert 67)	40	Select one of 3 candidate sites for management (site # 5, 6 or 7)	None
B	N/A	N/A	East Makaleha (culvert 69)	83	None	Manage for stability

New ESU	Old ESU	Site No.	Location	# of Snails in the Final MIP	Final Makua IP Year 1 Recommended Actions	Revised Year 1 Recommended Actions
C	C	8	Schofield West Range/ Haleauau	18	Manage for stability; Collect for captive propagation	Manage for stability
C	D	9	Alaiheihe	25	Survey; Collect for captive propagation	None
C	E	10	Palikea Gulch	7	Survey; Collect for captive propagation	None
C	N/A		Manuwai Gulch	?	None	Survey for substantial population for management. If found abandon Hale`au`au.
D	F	11	Waianae Kai (2 sites)	12	Survey for manageable population	None
D	F	12	Waianae Kai	20	Survey for manageable population	None
D	F	14	Puu Hapapa	36	None	None
D	F	15	Schofield South Range	32	Select one of 2 candidate sites for management (site # 15 or 16)	None
D	F	16	Kaluaa and Waieli	50	Survey for manageable population; Select one of 2 candidate sites for management (site # 15 or 16)	Manage for stability
D	N/A	19	Makaha	17	Determine management after genetics analysis is completed	Manage for stability
D	N/A	20	Mohiakea	10+	Determine management after genetics analysis is completed	None
D	N/A	21	Puu Kumakalii	~20	None	None
D	N/A	22	Central and North Kaluaa	5 (seen incidentally)	Determine management after genetics analysis is completed	None
E	G	17	Puu Kaua (Ekahanui)	12	Survey for manageable population; Collect for captive propagation	Manage for stability
E	N/A	23	Huliwai	30+	Determine management after genetics analysis is completed	None
F	H	18	Puu Palikea	~40	Manage for stability; Collect for captive propagation	Manage for stability

Map 2.1 Grouping of 18 *A. mustelina* sampling sites into 6 ESU's. ESU's A through F show the relative positions of each in the Waianae Mountains of western Oahu. The threshold of genetic distance separating the ESUs was set at 1%. Each population within a given ESU has a pairwise genetic distance to all other populations with the same ESU of 1% or less. Note that the exact shape and extent of each ESU is unknown and therefore the contours depicted are partially theoretical.



2.2 *Alectryon macrococcus* var. *macrococcus*

Requirements for stability:

- 3 population units (PUs)
- 50 reproducing individuals in each PU (long-lived perennial with reproductive problems)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature /immature)
In AA					
Kahanahaiki	Propagule source	**Manage for stability**	2	**43/4**	**0/6**
Kapuna	Propagule source		6		
Pahole	Manage for stability		7		
West Makaleha	Manage for stability		40/4		
Makua	Propagule source	Genetic storage	3	17/0	None
Makua	Manage for stability		12		
South Mohiakea	Propagule source	Genetic storage	16/1	15/1	None
Out of AA					
Central Kaluaa (to Central Waieli)	Manage for stability	**Manage for stability**	50-55/3	**50/1**	None
Makaha	Manage for stability	**Manage for stability**	75+/2	**35/0**	None
Waianae Kai	Genetic storage	Genetic storage	16	16/0	None
Reintroductions					
None					

Justification for Management Designations:
The largest populations in the best habitats were chosen for management for stability. Very few individual plants within each PU produce fruit. Therefore larger PUs that capture more fruit-producing trees may increase management success. Kahanahaiki to Kapuna to Pahole to West Makaleha is one contiguous area and will be treated as one effort. Further surveys in this region have found that there is no break in appropriate habitat. Not all individuals within the Central Kaluaa to Central Waieli PU will be protected within an ecosystem scale fence. For those individuals outside fences, NRS will collect stock for use in augmenting sites within fences.


Map removed to protect
location of rare species.
Available upon request.

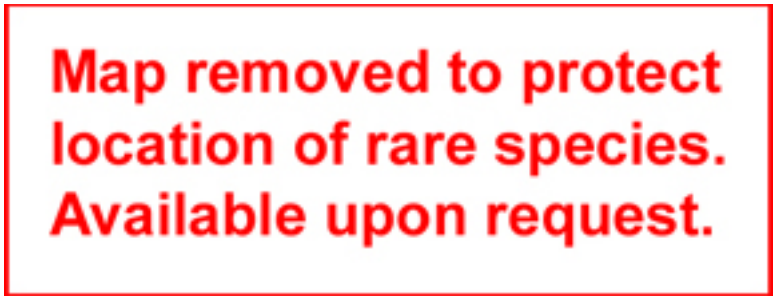
2.3 *Alsinidendron obovatum*

Requirements for Stability:

- 3 population units (PUs)
- 100 reproducing individuals in each PU (short-lived perennial which is prone to large fluctuations)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS number of plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Kahanahaiki	Manage for stability	**Manage for stability**	0	**0**	**65/25**
Pahole	Manage for stability		0		
Keawapilau	Manage for stability	**Manage for stability**	0	**21/12**	None
NW Makaleha	New population		N/A		
West Makaleha	Manage for stability		3		
Reintroductions:					
Makaha	Manage for stability	**Manage for stability**	N/A	**N/A**	N/A

Justification for Management Designations:
The remaining extant populations, all of which occur in the AA, were chosen for management. There is continuous habitat between Kahanahaiki and Pahole and this will therefore be considered one effort. The same is true for the Keawapilau, North West Makaleha and West Makaleha PUs. Makaha received the highest score as a Northern Waianae reintroduction site in the Final MIP.


Map removed to protect
location of rare species.
Available upon request.

2.4 *Cenchrus agrimonioides* var. *agrimonioides*

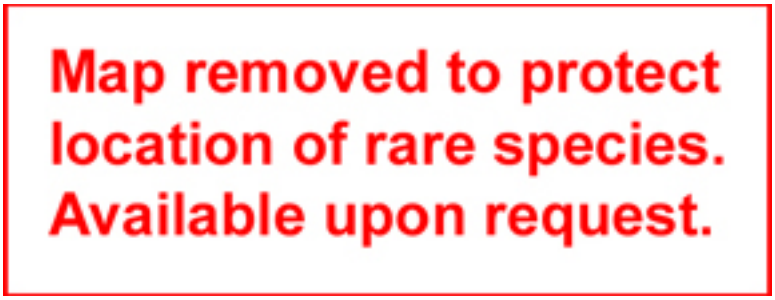
Requirements for Stability

- 3 population units (PUs)
- 50 reproducing individuals in each PU (short-lived perennial)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Kahanahaiki and Pahole	Manage for stability	**Manage for stability**	28/9	**66/23**	**182/57**
Out of AA					
Makaha and Waianae Kai	Manage for stability	**Manage for stability**	5/3	**9/2**	None
Waianae Kai	Propagule source		4		
Central Ekahanui	Manage for stability	**Manage for stability**	20	**30/3**	None
South Huliwai	Manage for stability	Genetic storage	27	18/0	None
Reintroductions					
none					

Justification for Management Designations:

The largest populations in the best habitat were chosen for management, with the exception of the Huliwai PU, which was not included as 'manage for stability' because it occurs in very degraded habitat. For the Makaha/Waianae Kai population, management will be conducted on the Makaha side of Kumaipo Ridge *in situ*, and augmented with Waianae Kai stock.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location of rare species.
Available upon request.

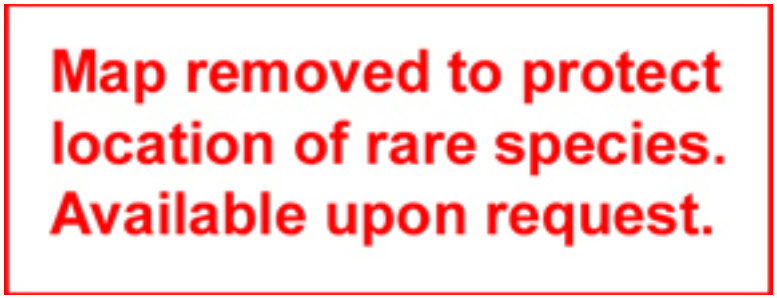
2.5 *Chamaesyce celastroides* var. *kaenana*

Requirements for Stability:

- 3 population units (PUs)
- 25 reproducing individuals in each population (long-lived perennial)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Makua	Manage for stability	**Manage for stability**	36/4	**55/57**	None
East Kahanahaiki	Genetic storage	Genetic storage	2	2/0	None
Kaluakauila	Genetic storage	Genetic storage	17/1	12/7	None
North Kahanahaiki	Genetic storage	Genetic storage	218	177/0	None
Puaakanoa	Genetic storage	Genetic storage	147/10	145/10	None
Out of AA					
Kaena (East of Alau)	Manage for stability	**Manage for stability**	21/5	**21/4**	None
Kaena and Keawaula (Kaena)	Manage for stability	**Manage for stability**	300-450	**300/0**	None
Kaena and Keawaula (Keawaula)	Genetic storage	Genetic storage	69/6	24/1	None
Waianae Kai	Manage for stability	Genetic storage	48-58	33/0	None
Reintroductions					
none					

Justification for Management Designations:
The largest population units in manageable terrain (not on steep cliffs) were chosen for management. The only exception to this was for the Kaena and Keawaula (Keawaula) PU which was not chosen because its habitat is severely degraded.


Map removed to protect
location of rare species.
Available upon request.

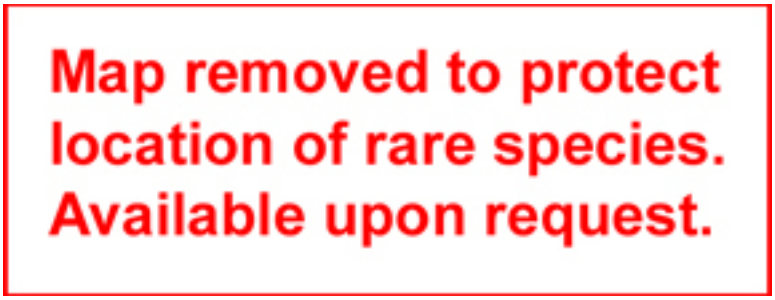
2.6 *Chamaesyce herbstii*

Requirements for Stability:

- 3 population units (PUs)
- 25 reproducing individuals in each PU (long-lived perennial)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Kapuna	Manage for stability	**Manage for stability**	110	**52/3**	None
Pahole	Manage for stability		60		
Out of AA					
South Branch of South Ekahanui	Manage for stability	Genetic storage	0	0	None
Reintroductions					
West Makaleha	Reintroduction	**Manage reintroduction for stability**	N/A	N/A	N/A
Central and East Makaleha	Reintroduction	**Manage reintroduction for stability**	N/A	N/A	N/A

Justification for Management Designations:
The only extant population from Kapuna to Pahole will be managed. These two sites were combined since the Final MIP since supplemental surveys were conducted that revealed appropriate habitat between the two. The Ekahanui PU is no longer extant and there is no stock from this PU. If any stock from the Southern Waianae Mountains is discovered, management designations will be revisited and changed to include the new PU. West Makaleha was not scored as a reintroduction site in the Final MIP because the population was possibly still extant. Since the Final MIP it has been determined that this site no longer has plants. As a reintroduction site, West Makaleha scored a 19. The two highest-ranked reintroduction sites from the Northern Waianae were selected for management.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location of rare species.
Available upon request.

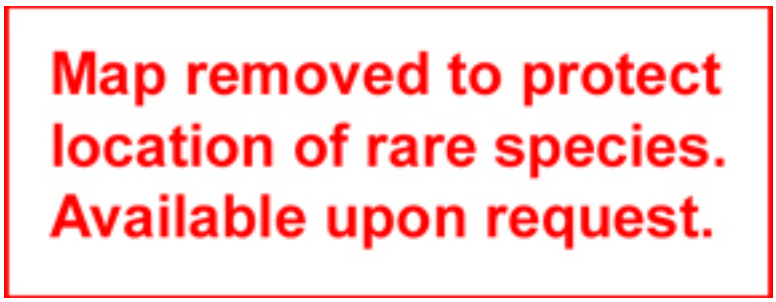
2.7 *Cyanea grimesiana* subsp. *obatae*

Requirements for Stability:

- 3 population units (PUs)
- 100 reproducing individuals in each PU (short-lived perennial with large fluctuations in population size and recent history of decline)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Pahole	Manage for stability	**Manage for stability**	5/1	**7/3**	**14/19**
West Makaleha	Manage for stability		3/4		
Out of AA					
Palikea (South Palawai)	Manage for stability	**Manage for stability**	3/25	**8/7**	**0/35**
Central Kaluaa	New population	**Manage for stability**	N/A	**1/0**	**None**
North Branch of South Ekahanui	Manage for stability	Genetic storage	5	0	0/9
Palikea Gulch	Manage for stability	Genetic storage	0/1	0/1	None
South Kaluaa	Propagule source	Genetic storage	2	1/0	None
Reintroductions					
none					

Justification for Management Designations:
The largest extant populations with mature plants will be managed. Since population numbers as a whole have dropped for this taxon, management designations have changed accordingly. Pahole and West Makaleha will be treated as one effort because there is appropriate habitat for this taxon between the two where mixed augmentation can be conducted. One unique requirement for this taxon is that the holotype stock from South Kaluaa be maintained separately from other stocks. A separate reintroduction site with South Kaluaa stock will be managed within the Central Kaluaa exclosure.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location of rare species.
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2.8 *Cyanea longiflora*

Requirements for Stability:

- 3 population units (PUs)
- 75 reproducing individuals in each PU (short-lived perennial with fluctuating population numbers and trend of local decline)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Kapuna and Keawapilau	Manage for stability	**Manage for stability**	63	**40/0**	None
West Makaleha	Manage for stability		3		
Pahole	Manage for stability	**Manage for stability**	114	**50/0**	None
Out of AA					
Makaha and Waianae Kai	Manage for stability	**Manage for stability**	4	**3/8**	None
Waianae Kai	(part of 'Makaha and Waiane Kai' PU)	Genetic storage	N/A	1/0	None
Reintroductions					
none					

Justification for Management Designations:
The largest extant populations will be managed for stability. *C. longiflora* once occurred as a continuous population between Kapuna and West Makaleha and there is appropriate habitat for this taxon between the two PUs. These populations were previously separated because of discontinuous habitat but following additional surveys the sites are considered connected via appropriate habitat. Although there are two separate efforts planned for this area and Pahole, the ultimate goal of the management for these two PUs will be to re-establish a continuous population. The Makaha side of the Makaha/Waianae Kai population will be managed, and will be augmented with Waianae Kai stock.


Map removed to protect
location of rare species.
Available upon request.

2.9 *Cyanea superba* subsp. *superba*

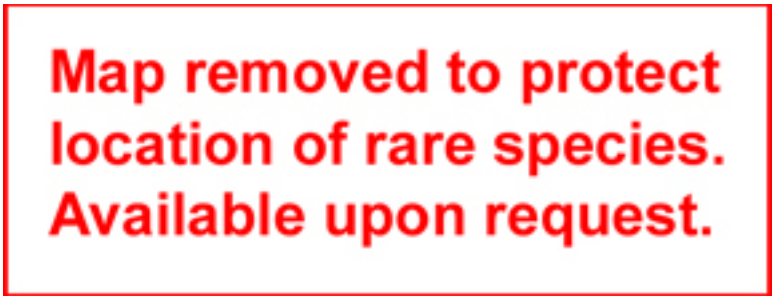
Requirements for Stability:

- 3 population units (PUs)
- 50 reproducing individuals in each PU (long-lived perennial with a history of precipitous decline, nearly extirpated in the wild, and extremely low genetic variability)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Kahanahaiki	Manage for stability	**Manage for stability**	1	**0***	**2/149**
Reintroductions					
Pahole	Reintroduction	**Manage reintroduction for stability (with Kahanahaiki)**	N/A	**0**	**31/139**
Kapuna	Reintroduction		N/A		
Central and East Makaleha	Reintroduction	**Manage reintroduction for stability**	N/A	N/A	N/A
Makaha	Reintroduction	**Manage reintroduction for stability**	N/A	N/A	N/A

*all the wild plants have died. This site is being augmented using Kahanahaiki stock.

Justification for Management Designations:
There are no remaining wild populations. Kahanahaiki to Pahole to Kapuna is one contiguous area and will be treated as one effort. Reintroductions will be conducted at sites with appropriate intact habitat. Makaha was chosen over West Makaleha as a reintroduction site because it is off site. Although Mt. Kaala NAR received a higher reintroduction ranking in the Final MIP than Makaha, the Makaha score was reconsidered and the sites are considered of equal ranking.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location of rare species.
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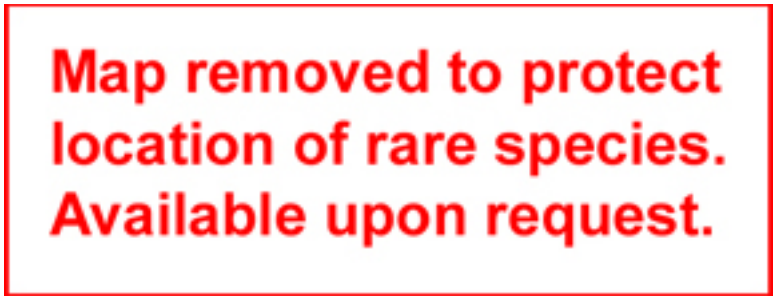
2.10 *Cyrtandra dentata*

Requirements for Stability:

- 3 population units (PUs)
- 50 reproducing individuals in each PU (short-lived perennial)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Kahanahaiki	Manage for stability	**Manage for stability**	52/45	**156/6**	None
Pahole to Kapuna to West Makaleha	Manage for stability	**Manage for stability**	300	**478/470**	None
Out of AA					
Opaeula (Koolaus)	Manage for stability	**Manage for stability**	21/5	**21/12**	None
Kawaiiki (Koolaus)	Manage for stability	Genetic storage	50	21/33	None
Reintroductions					
none					

Justification for Management Designations:
The Kahanahaiki and Pahole to West Makaleha populations are the largest populations, and are stable with good recruitment. These two Waianae populations were selected over the Kawaiiki PU because they better capture the center of abundance for this taxon. Opaeula will be managed rather than Kawaiiki because Opaeula is more manageable terrain and there are many other rare species in the Opaeula proposed management unit.


Map removed to protect
location of rare species.
Available upon request.

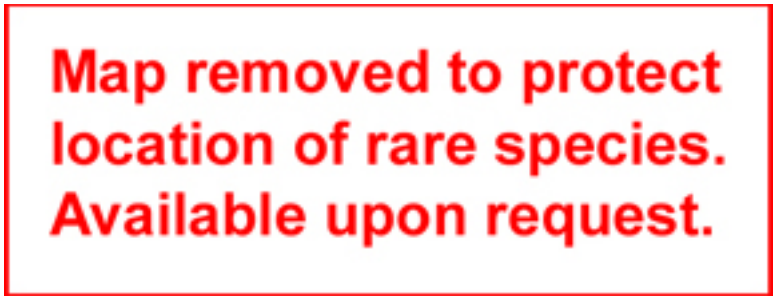
2.11 *Delissea subcordata*

Requirements for Stability:

- 3 population units (PUs)
- 100 reproducing individuals in each PU (short-lived perennial with population fluctuations and local declines, potentially an obligate out-crosser)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Kahanahaiki	Manage for stability	**Manage for stability**	0/1	**5/0**	**24/1**
Kapuna and Keawapilau	Manage for stability		9		
Pahole	Manage for stability		6		
South Mohiakea	Propagule source	Genetic storage	2	1/1	None
Out of AA					
Ekahanui	Manage for stability	**Manage for stability**	14	**3/1**	**0/44**
Kaluaa	Manage for stability	**Manage for stability**	1	**1/1**	**43/0**
Huliwai	Manage for stability	Genetic storage	7	0	None
Kaawa	Propagule source	Genetic storage	2	0	None
Palawai	Propagule source	Genetic storage	1	2/3	None
Palikea Gulch	Manage for stability	Genetic storage	2	2/0	None
Haili	New population	Genetic storage	N/A	7/0	None
Reintroductions					
none					

Justification for Management Designations:
The larger extant populations in good habitat and at suitable sites for management were chosen for management for stability. With the discovery that introduced birds may be dispersing the fruit of this taxon, the Kahanahaiki, Kapuna and Keawapilau and Pahole PUs were combined. The Palawai population is in a small patch of native forest surrounded by invasive species, therefore it was not selected for management. This population has been fenced and will be monitored and managed for genetic storage collection. The Haili PU was not selected for management because it falls within the Kuaokala Game Management Area. Haili stock will be collected and reintroduced into a sub-site of Kahanahaiki.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location of rare species.
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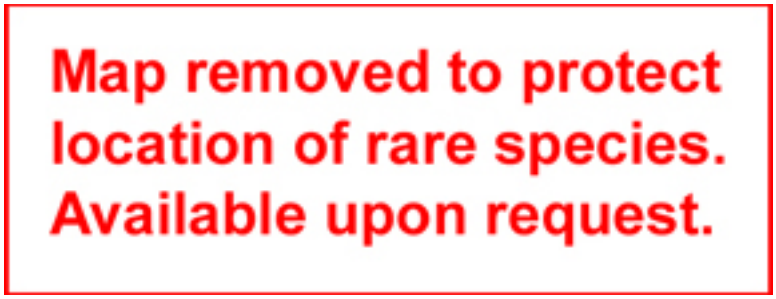
2.12 *Dubautia herbstobatae*

Requirements for Stability:

- 3 population units (PUs)
- 50 reproducing individuals in each PU (short-lived perennial)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Ohikilolo Makai	Manage for stability	**Manage for stability**	**700+**	**357/0**	None
Ohikilolo Mauka	Manage for stability	**Manage for stability**	**1300+**	**267/20**	None
Keaau	Manage for stability	Genetic storage	70 - 120	70 - 120	None
Out of AA					
Kamaileunu	Manage for stability	Genetic storage	1	0	None
Waianae Kai	Propagule source	Genetic storage	5	5/0	None
Reintroductions					
Makaha	Reintroduction	**Manage reintroduction for stability**	N/A	N/A	N/A

Justification for Management Designations:
The two largest populations at Ohikilolo will be managed because they represent the center of abundance for this taxon. Both of these PUs have stable numbers of individuals, and both of these PUs are in the action area. However, because of their widespread distribution on Ohikilolo, it is very unlikely one catastrophic event could wipe out both PUs. A revised fire threat model is being run for Makua Valley, and it is expected that the Ohikilolo Mauka PU will have a lower fire risk. When the fire model is complete, management designations will be reconsidered. A reintroduction will be conducted off-site at Makaha using Waianae Kai and Kamaileunu stock. This reintroduction is proposed instead of managing the other natural populations because the natural populations are located within a State Public Hunting Area.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location of rare species.
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2.13 *Flueggea neowawraea*

Requirements for Stability:

- 3 population units (PUs)
- 50 reproducing individuals in each PU (long-lived perennial, dioecious, low to no reproduction, all senescent, major pest problems)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Kahanahaiki to Kapuna	Manage for stability	**Manage for stability**	6	**8/0**	**0/26**
West Makaleha	Manage for stability	Genetic storage	3	3/0	None
Mohiakea **	Genetic storage	Genetic storage	1	0	None
Ohikilolo	Manage for stability	Genetic storage	2	2/0	None
Ohikilolo	Propagule source		1		
Out of AA					
Central and East Makaleha	Manage for stability	**Manage for stability**	6	**6/0**	None
Makaha	Manage for stability	**Manage for stability**	4	**8/0**	None
Halona	Genetic storage	Genetic storage	2	2/0	None
Kauhiuhi	Genetic storage	Genetic storage	1	1/1	None
Waianae Kai	Propagule source	Genetic storage	1	0	None
Mikilua	Genetic storage	Genetic storage	1	0	None
Mt. Kaala NAR	Manage for stability	Genetic storage	4	4/0	None
Nanakuli (South Branch)	Genetic storage	Genetic storage	1	1/0	None
North Kaluaa	Genetic storage	Genetic storage	1	0	None
Reintroductions					
none					

Justification for Management Designations:
The largest populations in the best habitat were chosen for management. Populations can be augmented with any Waianae stock.

Map removed to protect location of rare species. Available upon request.

2.14 *Hedyotis degeneri* var. *degeneri*

Requirements for Stability:

- 3 population units (PUs)
- 50 reproducing individuals in each PU (short-lived perennial)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Kahanahaiki	Manage for stability	**Manage for stability**	**11**	**40/0**	None
Pahole	Manage for stability		**150**		
Out of AA					
Alaiheihe and Manuwai	Manage for stability	**Manage for stability**	**60+**	**60/0**	None
East Branch of East Makaleha	Manage for stability	**Manage for stability**	**10**	**10/0**	None
Central Makaleha and West Branch of East Makaleha	Manage for stability	Genetic storage	47+	35/3	None
Reintroductions					
none					

Justification for Management Designations:
The largest populations in the best habitat were chosen for management. Kahanahaiki to Pahole is one contiguous area with appropriate habitat in between and will be treated as one effort. A portion of the Alaiheihe to Manuwai PU will be managed and augmented with stock from the rest of the PU.


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location of rare species.
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2.15 *Hedyotis parvula*

Requirements for Stability:

- 3 population units (PUs)
- 50 reproducing individuals in each PU (short-lived perennial)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Ohikilolo Makai	Manage for stability	**Manage for stability**	**50**	**78/12**	None
Ohikilolo Mauka	Manage for stability		**16/1**		
Out of AA					
Halona	Manage for stability	**Manage for stability**	**64-79**	**12/0**	None
Reintroductions					
Central and East Makaleha	Reintroduction	**Manage reintroduction for stability**	N/A	N/A	N/A

Justification for Management Designations:
All remaining *in situ* populations will be managed. Ohikilolo is the center of abundance for this taxon, and both PUs on Ohikilolo will be managed. A revised fire threat model is being run for Makua Valley, and it is expected that the Ohikilolo Mauka portion of the PU will have a lower fire risk. When the fire model is complete, NRS will reconsider how fire threat impacts the proposed management of this species. If fire models show that the Ohikilolo PU has a lower fire threat, it may not be necessary to reintroduce into Central and East Makaleha. The portion of the Halona population that is on State land will be managed, and the portion on Navy land will be monitored.


Map removed to protect
location of rare species.
Available upon request.

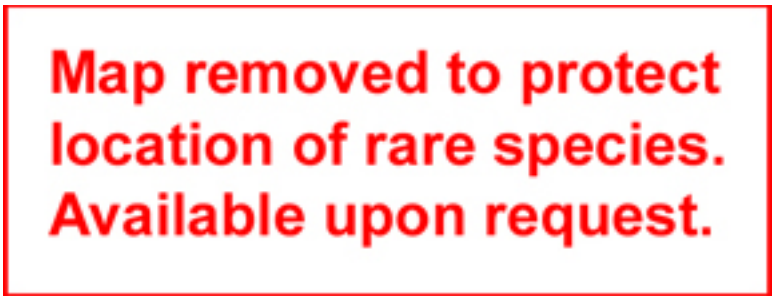
2.16 *Hesperomannia arbuscula*

Requirements for Stability:

- 3 population units (PUs)
- 75 reproducing individuals in each PU (long-lived perennial but with low seed set, and recent severe population declines)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Kapuna	Manage for stability	**Manage for stability**	7	**1/0**	None
Out of AA					
North-north Palawai	New population	**Manage for stability**	N/A	**6/0**	None
Makaha	Manage for stability	**Manage for stability**	13/1	**8/0**	None
Kaaikukai	Manage for stability	Genetic storage	1	0	None
North Palawai	Manage for stability	Genetic storage	5/2	1/0	None
Waianae Kai	Manage for stability	Genetic storage	9/1	5/1	None
Reintroductions					
none					

Justification for Management Designations:
The largest remaining populations will be managed with the exception of Waianae Kai. The state will likely be fencing the Waianae Kai population this year. Extensive management within Waianae Kai is not possible since it is a heavily used public hunting area.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location of rare species.
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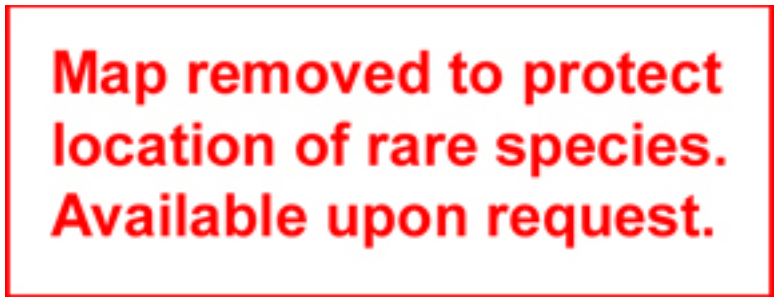
2.17 *Hibiscus brackenridgei* subsp. *mokuleianus*

Requirements for Stability:

- 3 population units (PUs), one of each type
- 50 reproducing individuals in each PU (short-lived perennial)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Makua	Manage for stability	**Manage for stability**	4/3	**18/8**	None
Out of AA					
Haili to Kawaiu	Manage for stability	**Manage for stability**	3/1	**1/22**	None
Kaimuhole and Palikea Gulch	Manage for stability	**Manage for stability**	3/5	**7/230**	None
Kaumoku Nui	Manage for stability	Genetic storage	0/2	2/750	None
Kihakapu	Propagule source	Genetic storage	1/2	6/316	None
Reintroductions					
None					

Justification for Management Designations:
One population of each of the types (tall, medium, and short) will be managed. Reintroductions may be done into more manageable areas for the medium type because it is found on cliffs in unmanageable terrain.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location of rare species.
Available upon request.

2.18 *Lipochaeta tenuifolia*

Requirements for Stability:

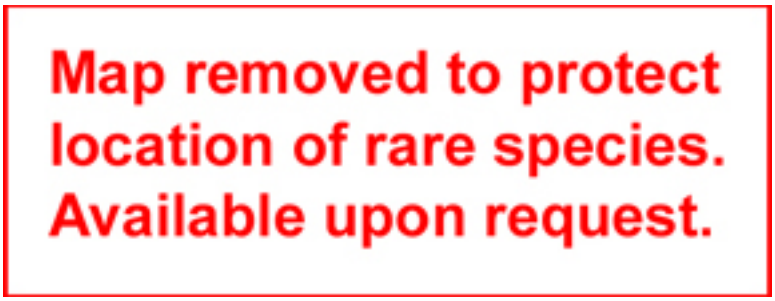
- 3 population units (PUs)
- 50 genetically unique individuals in each PU (short-lived perennial with tendency to reproduce vegetatively)*
- Threats controlled
- Complete genetic representation of all PUs in storage

* It is difficult to distinguish genetic individuals, since vegetative reproduction creates adjacent clonal plants of identical genetic make-up. Genetic studies suggest that plant material separated by >2 m is genetically distinct.

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Ohikilolo Makai	Manage for stability	**Manage for stability**	8/8	**2008+**	None
Ohikilolo Mauka	Manage for stability		2000+		
Kahanahaiki	Manage for stability	Genetic storage	300+	73/23	None
Kaluakauila	Genetic storage	Genetic storage	113	64/20	None
Keawaula	Genetic storage	Genetic storage	20/20	20/20	None
Out of AA					
Kamaileunu and Waianae Kai	Manage for stability	**Manage for stability**	880-1320+	**796/269**	None
Mt. Kaala NAR	Manage for stability	**Manage for stability**	250+	**250**	None
Reintroductions					
none					

Justification for Management Designations:

Two populations were selected out of the AA and one in. The Ohikilolo Mauka PU was combined with the Ohikilolo Makai PU because they were once probably one continuous PU and to ensure that the unique makai site receives some management. This site is at an extremely low elevation for *L. tenuifolia*, which is drier than most other populations of this species. The Makaha portion of the Kamaileunu and Waianae Kai population will be managed.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location of rare species.
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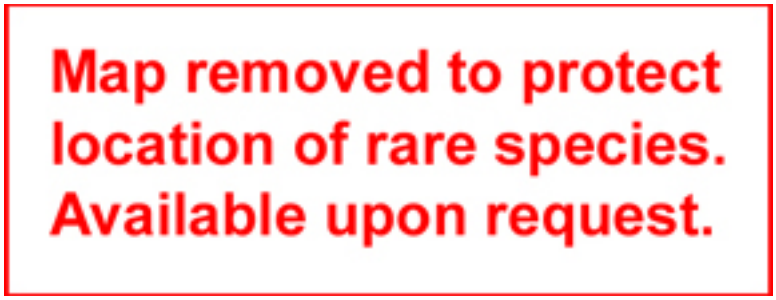
2.19 *Neraudia angulata*

Requirements for Stability:

- 3 population units (PUs) (if pure var. *angulata* is found, 4 populations will be managed)
- 100 reproducing individuals in each PU (short-lived perennial, dioecious, prone to large declines or fluctuations in population size)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Makua	Manage for stability	**Manage for stability**	29/2	**12/61**	**0/20**
Kapuna	Manage for stability	Genetic storage	1	1/0	None
Out of AA					
Makaha	Manage for stability	**Manage for stability**	56/14	**7/4**	None
Waianae Kai Makai	Genetic storage	**Manage for stability**	4	**45/35**	None
Manuwai	Manage for stability	Genetic storage	12	0/2	None
Leeward Puu Kaua	Propagule source	Genetic storage	3	2/0	None
Halona	Propagule source	Genetic storage	15	15/0	None
Waianae Kai Mauka	Manage for stability	Genetic storage	21/25	49/4	None
Reintroductions					
none					

Justification for Management Designations:
The largest populations in the best habitat will be managed. Kapuna and Manuwai stock is the var. *dentata* type and will be represented *ex situ* and in the Kaluakauila reintroduction but not at the wild sites because the habitat is severely degraded at both sites. The number of plants at the Makaha PU is much lower than the Final MIP numbers but this may represent seasonal fluctuations typical of this taxon. The Waianae Kai Mauka PU was not chosen for management because it is located in a public hunting area and would require extensive fencing to protect the site. Fences are not favored in public hunting areas.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location of rare species.
Available upon request.

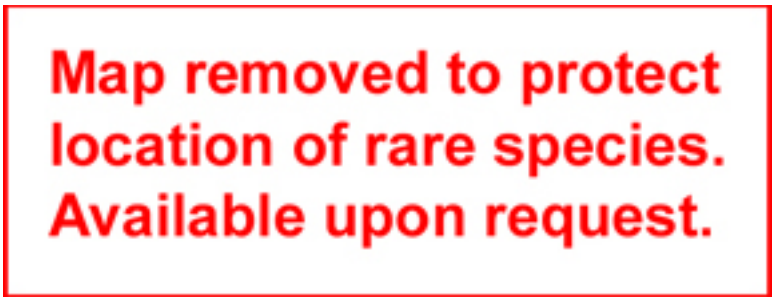
2.20 *Nototrichium humile*

Requirements for Stability:

- 3 population units (PUs)
- 25 reproducing individuals in each PU (long-lived perennial)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Kaluakauila	Manage for stability	**Manage for stability**	200-400	**200+/0**	None
Makua (South Side)	Manage for stability	Manage for stability	120-140	56/1	0/18
Keaau	Genetic storage	Genetic storage	21-31	21-31	None
Keawaula	Genetic storage	Genetic storage	200/30	200/30	None
Makua (East Rim)	Genetic storage	Genetic storage	1	1/0	None
Kahanahaiki	Genetic storage	Genetic storage	140	32/2	None
Punapohaku	New population	Genetic storage	N/A	152/14	None
Out of AA					
Makaha	**Genetic storage**	**Genetic storage**	**159**	**159/0**	None
Waianae Kai	Manage for stability	**Manage for stability**	200-320+	**200/0**	None
Kaimuhole and Palikea Gulch	Manage for stability	Genetic storage	48/6	8/3	None
Kealia	Genetic storage	Genetic storage	3	3/0	None
Keawapilau	Genetic storage	Genetic storage	9/1	5/0	None
Kolekole (East Side)	Genetic storage	Genetic storage	13	13/0	None
Nanakuli	Genetic storage	Genetic storage	5	5/0	None
Puu Kaua (Leeward Side)	Genetic storage	Genetic storage	12	12/0	None
Reintroductions					
none					

Justification for Management Designations:
The largest populations in the best habitat were chosen for management. Only one is located within the AA. The Keawaula and Punapohaku PUs are overrun with *Panicum maximum* from past fires, and thus are very fire threatened. The Waianae Kai PU is located in a steep, deep gulch that goats have not yet entered. Limited strategic fencing will need to be constructed to protect this site. This PU is in a public hunting area, but management will likely be approved for this PU since the site is not a heavily used portion of the hunting area.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location of rare species.
Available upon request.

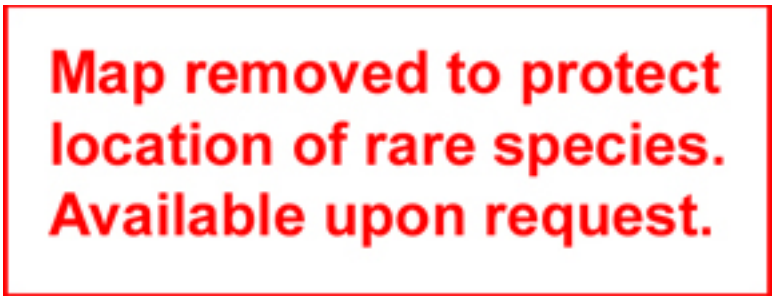
2.21 *Phyllostegia kaalaensis*

Requirements for Stability:

- 3 population units (PUs)
- 50 genetically unique, reproducing individuals in each PU (short-lived perennial, seems to be primarily a vegetatively reproducing taxon)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Kapuna	Manage for stability	**Manage for stability**	2	**0**	**20/0**
Keawapilau	Manage for stability		2		
Pahole	Manage for stability		10-15		
Out of AA					
Palikea Gulch	Manage for stability	Genetic storage	10	0	None
Waianae Kai	Propagule source	Genetic storage	6/2	0	None
Reintroductions					
Manuwai	Reintroduction	**Manage reintroduction for stability**	N/A	N/A	N/A
Makaha	Reintroduction	**Manage reintroduction for stability**	N/A	N/A	N/A

Justification for Management Designations:
All known populations of this taxon have been extirpated in the last five years. The historical sites will be augmented with stock collected from wild plants at those sites. Kapuna to Keawapilau to Pahole is treated as one PU since it is one contiguous area with good habitat in between. The intention at this PU is to establish plants across this range. The two highest ranking reintroduction sites from the reintroduction ranking table in the Final MIP were selected for this taxon.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location of rare species.
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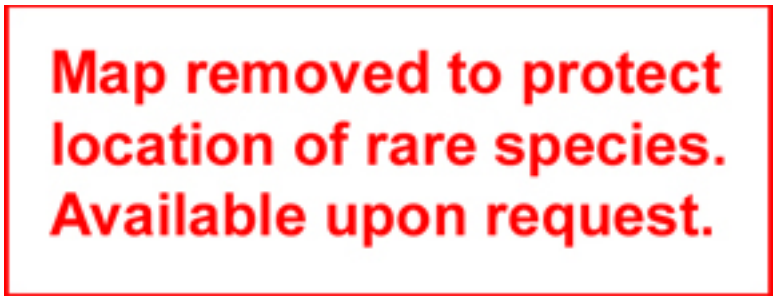
2.22 *Plantago princeps* var. *princeps*

Requirements for Stability:

- 3 population units (PUs)
- 50 reproducing individuals in each PU (short-lived perennial)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Ohikilolo	Manage for stability	**Manage for stability**	14	**22/0**	None
North Mohiakea	Manage for stability	Genetic storage	20/10	20/3	None
Pahole	Genetic storage	Genetic storage	12	2/2	None
Out of AA					
Ekahanui	Manage for stability	**Manage for stability**	16/7	**33/50**	None
Waiawa (Koolaus)	Manage for stability	**Manage for stability**	2/40	**16/17**	None
Halona	Manage for stability	Genetic storage	50-100	50-100	None
North Branch of North Palawai	Propagule source	Genetic storage	7	2/2	None
South Branch of North Palawai	Manage for stability	Genetic storage	25	0	None
Kaneohe (Koolaus)	New population	Genetic storage	N/A	40/5	None
Reintroductions					
none					

Justification for Management Designations:
Robust populations in the best habitat were chosen for management. Both Waianae and Koolau Mountain populations will be represented. The Halona PU is very difficult to access, therefore it was not selected for management. The North Mohiakea PU will not be managed for stability because it is difficult to gain access to the site in Schofield Barracks, West Range. The Pahole PU was not chosen for management because there is limited habitat for this taxon in Pahole.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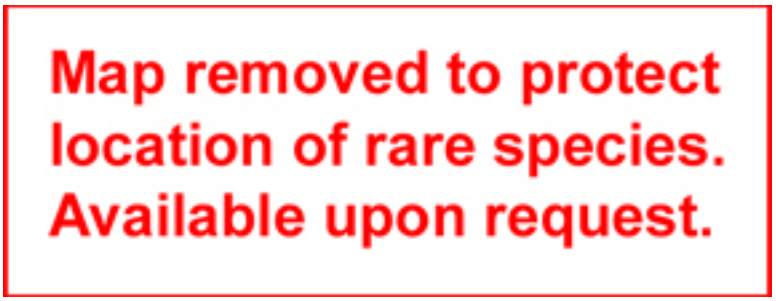
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location of rare species.
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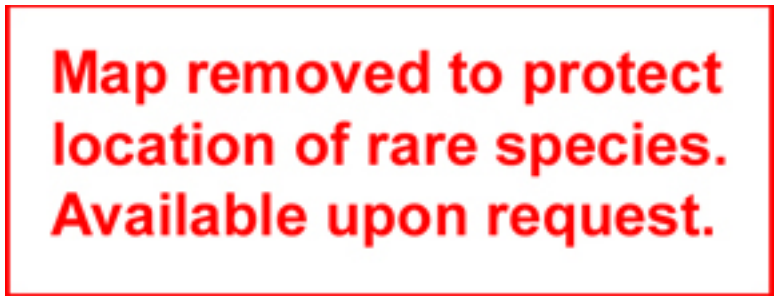
2.23 *Pritchardia kaalae*

Requirements for Stability:

- 3 population units (PUs)
- 25 reproducing individuals in each PU (long-lived perennial)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Ohikilolo	Manage for stability	**Manage for stability**	65/100	**72/3**	**0/308**
Out of AA					
Makaleha to Manuwai	Manage for stability	**Manage for stability**	138/3	**39/3**	None
Makaha	Genetic storage	Genetic storage	1	1/0	None
Waianae Kai	Genetic storage	Genetic storage	7/2	7/2	None
Reintroductions					
Ohikilolo East and West Makaleha	None	**Manage reintroduction for stability**	N/A	N/A	**0/75**

Justification for Management Designations:
Pritchardia kaalae is found in large numbers in two regions in the Waianae Mountains, Ohikilolo Ridge and Makaleha Gulch to Manuwai Gulch. The Makua Implementation Team (MIT) determined that these remaining sites are parts of what once was a population that stretched from Ohikilolo Ridge to the Kalena-Kaala Ridge. Therefore, the MIT established a modified goal for this taxon of 3 groupings, with 25 individuals each, spread across this historical belt of habitat. This means managing at least 25 mature individuals at each of the Ohikilolo and Makaleha to Manuwai PUs, and also establishing a third site of 25 individuals between these two. This third site has been established at the boundary between Mokuleia Forest Reserve and Makua via reintroductions at West Makaleha and East Ohikilolo. The separation between PUs that was required for other taxa was waived for this species to avoid creating an artificial separation that the MIP does not believe existed historically. Protection of *P. kaalae* across this broad area affords it protection from one single catastrophic event.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location of rare species.
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2.24 *Sanicula mariversa*

Requirements for Stability:

- 3 population units (PUs)
- 100 reproducing individuals in each PU (short-lived perennial with infrequent, inconsistent flowering)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Keaau	Manage for stability	**Manage for stability**	**16/125**	**7/100**	None
Ohikilolo	Manage for stability	**Manage for stability**	**34/109**	**1/62**	**0/19**
Out of AA					
Kamaileunu	Manage for stability	**Manage for stability**	**26**	**13/22**	None
Puu Kawiwi	Manage for stability	Genetic storage	2	0/32	None
Reintroductions					
none					

Justification for Management Designations:
The largest *in situ* populations will be managed. Two of the three populations slated for *S. mariversa* management are located in the Makua action area and one is located off-site, at Kamaileunu. The U.S. Fish and Wildlife Service expressed concern that two populations are located within the highest fire threat area of the AA. From natural resource staff's (NRS's) perspective, neither the Keeau nor the Ohikilolo *Sanicula* populations should be within the highest fire threat area. Both populations are buffered from fire threat by at least two barriers: first a large band of thick forest, and second, large, sparsely vegetated cliffs. NRS will continue with plans to protect the three selected populations and will reconsider this decision only if the fuel modeling being conducted by Colorado State University Staff for the AA indicates that both these populations are truly at high fire risk.

Map removed to protect location of rare species. Available upon request.

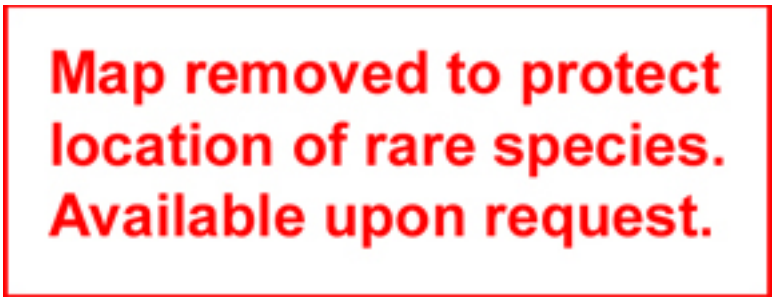
2.25 *Schiedea kaalae*

Requirements for Stability:

- 3 population units (PUs)
- 50 reproducing individuals in each PU (short-lived perennial)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Pahole	Manage for stability	**Manage for stability**	3	**1/0**	None
Out of AA					
North Branch of South Ekahanui	Manage for stability	**Manage for stability**	3	**5/0**	**0/75**
South Branch of South Ekahanui	Manage for stability		7		
Kahana	New population	**Manage for stability**	N/A	**11/0**	None
Huliwai	Propagule source	Genetic storage	1-2	0	None
Kaipapau	New population	Genetic storage	N/A	2/0	None
Maakua (Koolaus)	Genetic storage	Genetic storage	4	4/0	None
Makaua (Koolaus)	Genetic storage	Genetic storage	2	2/0	None
Mohiakea	New population	Genetic storage	N/A	1/0	None
North Kaluaa	Manage for stability	Genetic storage	2	0	0/53
North Palawai	Manage for stability	Genetic storage	1	1/0	None
Reintroductions					
none					

Justification for Management Designations:
The largest Waianae and Koolau Mountain populations were chosen for management. The Ekahanui populations will be treated as one effort because additional surveys have been conducted and appropriate habitat exists between the two sites, and they are not >1000 meters apart.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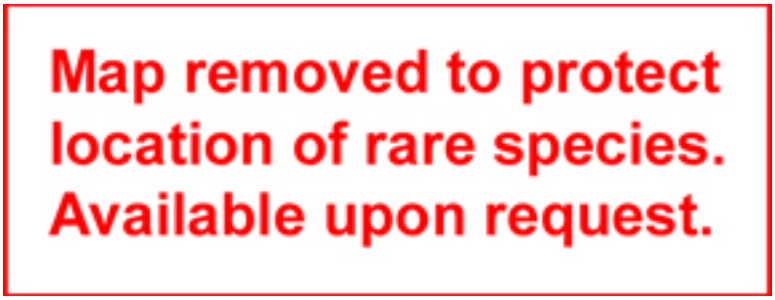
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location of rare species.
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2.26 *Schiedea nuttallii*

Requirements for Stability:

- 3 population units (PUs)
- 50 reproducing individuals in each PU (short-lived perennial)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Kahanahaiki	Manage for stability	**Manage for stability**	21/12	**31/8**	**13/5**
Pahole	Manage for stability		14-15		
Kapuna – Keawapilau Ridge	Manage for stability	**Manage for stability**	2/1	**3/0**	None
Reintroductions					
Makaha	Reintroduction	**Manage reintroduction for stability**	N/A	N/A	N/A

Justification for Management Designations:
All of the remaining *in situ* populations will be managed. Kahanahaiki to Pahole is treated as one single PU since there is appropriate habitat for this taxon between the two sites. With additional surveys, more appropriate habitat for this taxon was discovered in Makaha. Therefore, the score assigned to the reintroduction site increased and is now equal to the Central and East Makaleha reintroduction site.

Map removed to protect location of rare species. Available upon request.

2.27 *Tetramolopium filiforme*

Requirements for Stability:

- 3 population units (PUs)
- 50 reproducing individuals in each PU (short-lived perennial)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Ohikilolo Mauka	Manage for stability	**Manage for stability**	2500+	**2500+**	None
Ohikilolo Makai	Manage for stability	**Manage for stability**	2500+	**2500+**	None
Kahanahaiki	Manage for stability	Genetic storage	50	34/0	None
Keaau	Manage for stability	Genetic storage	25	16/4	None
Out of AA					
Puhawai	Manage for stability	**Manage for stability**	6/6	**2/0**	None
Waianae Kai	New population	Genetic storage	20/2	20/2	None
Reintroductions					
None					

Justification for Management Designations:
There are two PUs selected for management in the AA. The Ohikilolo Mauka PU is located within the lowest fire threat zone of the AA. The Mauka and Makai PUs represent the center of distribution for this taxon, and are widespread enough that both PUs would not be wiped about by a single catastrophic event. The Keaau PU was not selected for management because it is not considered much different genetically than the Ohikilolo PUs and is also in the AA. The Waianae Kai PU is not manageable because it is located on large inaccessible cliffs.


Map removed to protect
location of rare species.
Available upon request.

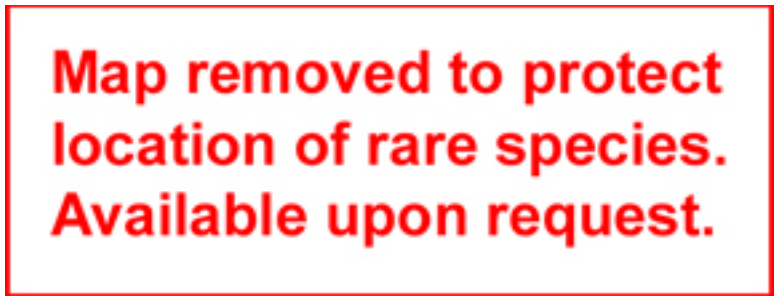
2.28 *Viola chamissoniana* subsp. *chamissoniana*

Requirements for Stability:

- 3 population units (PUs)
- 50 reproducing individuals in each PU (short-lived perennial)
- Threats controlled
- Complete genetic representation of all PUs in storage

Population Unit	Management designation in final IP	Current Management Designation	No. of plants in final IP (mature/ immat.)	NRS monitored plants (mature/ immature)	Augmen-tation (mature/ immature)
In AA					
Ohikilolo	Manage for stability	**Manage for stability**	250	**250/0**	None
Puu Kumakalii	Manage for stability	**Manage for stability**	19/1	**53/0**	None
Out of AA					
Makaha	Manage for stability	**Manage for stability**	50	**50/0**	None
Kamaileunu	Manage for stability	Genetic storage	38	38/0	None
Halona	Propagule source	Genetic storage	3	32/3	None
Puu Hapapa	Manage for stability	Genetic storage	10/3	10/0	None
Keaau	New population	Genetic storage	N/A	40/10	None
Reintroductions					
None					

Justification for Management Designations:
The largest populations in the most manageable habitat were chosen for management for stability. Two of the three populations are located within AAs. The Ohikilolo PU is in the Makua AA, and is included within the high fire risk area designated in the MIP. NRS does not believe there is a high fire threat to this PU. The Puu Kumakalii PU is located in the Schofield Barracks AA far south of the direction of training fire and there are large stands of *Schinus terebinthifolius* between the PU and the impact area. Although it is in the AA, NRS believe that the site is not at high risk from training. Therefore, NRS prefers not to replace either one of these on-site PUs with an off-site population. Fuel modeling is underway for the Makua AA, which will determine the true risks from fire to sites within Makua. If the *V. chamissoniana* PUs are determined to be at high risk from military fire, NRS will reconsider the management approach for this taxon. The Kamaileunu PU is located in very inaccessible terrain. The Keaau PU is located within a State Game Management Area and therefore cannot be managed for stability.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3.0 Priority Management Units

The Final Implementation Plan (IP) included 31 MUs based on locations of the *in situ* populations of the target taxa and their potential reintroduction areas. One of the MUs was on the island of Kauai, and 30 were on the island of Oahu. At the March 29, 2004 Implementation Team (IT) meeting, the MUs were revised by the IT to reduce the amount of weed-dominated acreage included in MUs, to consolidate efforts into the best, most manageable habitat, and to take into consideration landowner concerns. Twenty-three MUs were designated as 'priority MUs'. All of the priority MUs will be fenced, and management-unit scale weed control will take place. All of the priority MUs are on the island of Oahu. The priority MUs are spread across the landscape in order to capture a diversity of different habitat types. The MUs that were not included in this designation will serve as back-up management areas that will be utilized if needed based on adaptive management and the recommendations of the IT.

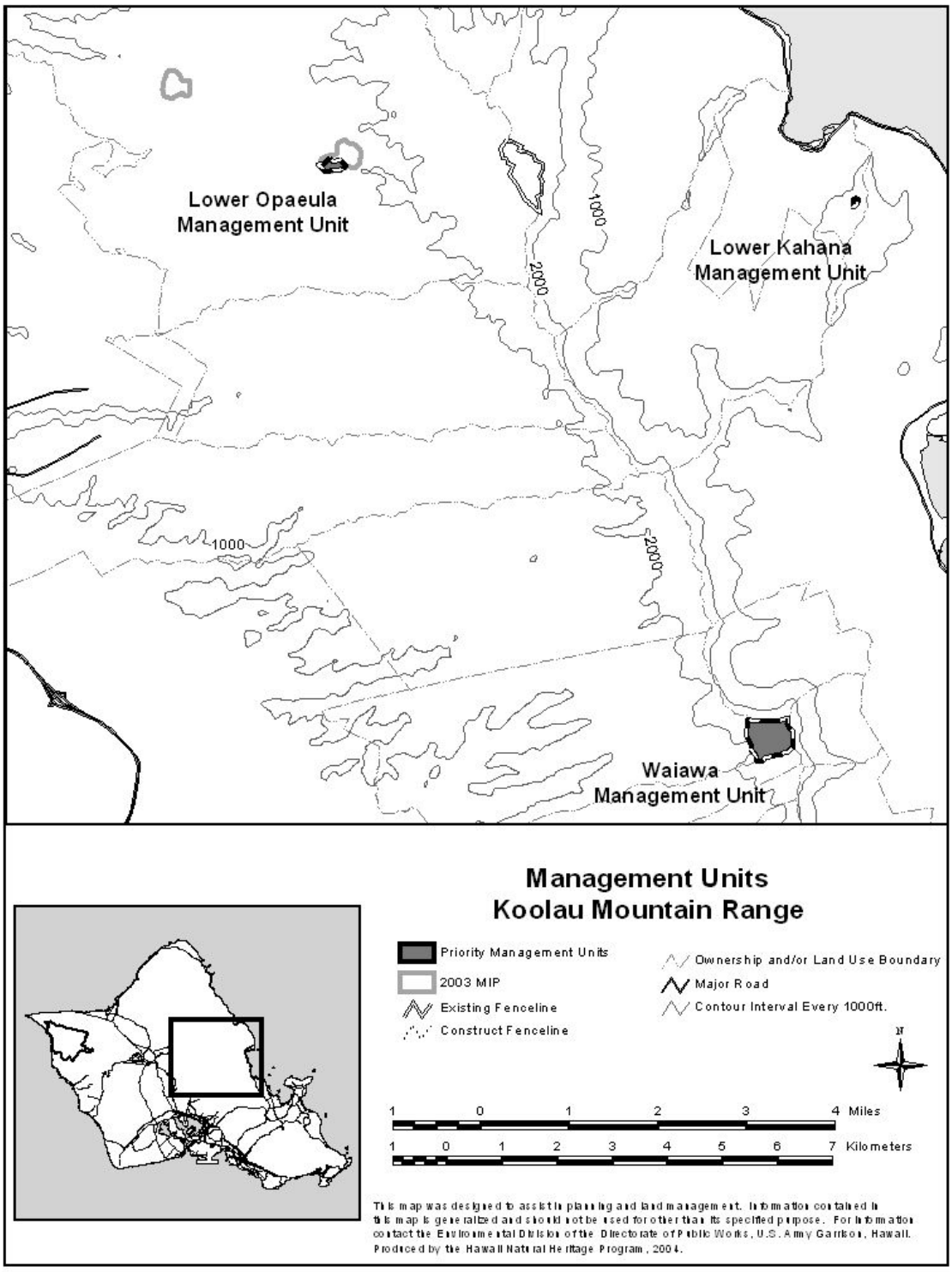
Detailed descriptions of MU management can be found in the Final Implementation Plan, Section 2, Chapter 3.

The priority management units (MUs) occur on U.S. Army, State of Hawaii, Honolulu Board of Water Supply, and private lands, and will require cooperation and memoranda of agreement with the landowners, as spelled out in scopes of work prior to initiation of management actions at these sites.

MU maps and summary tables describing the MUs are found in the subsections of this chapter. All selected reintroduction sites, all *in situ* populations designated as manage for stability, and all *in situ* populations designated as genetic storage collection are included on the tables. *In situ* populations designated as no management, and all backup reintroduction sites, can be found on the stabilization tables (Addendum Chapter 3).

Makua IP Priority Management Units

No.	Management Unit	Acres	Region
1	East Makaleha	231	Waianaes
2	Ekahanui	203	Waianaes
3	Haili to Kealia	30	Waianaes
4	Kaena	52	Waianaes
5	Kahanahaiki	94	Waianaes
6	Kaimuhole	100	Waianaes
7	Kaluaa and Waieli	127	Waianaes
8	Kaluakauila	104	Waianaes
9	Kamaileunu	5	Waianaes
10	Keaau and Makaha	5	Waianaes
11	Lower Kahana	3	Koolaus
12	Lower Ohikilolo	70	Waianaes
13	Lower Opaeula	17	Koolaus
14	Makaha	162	Waianaes
15	Manuwai	166	Waianaes
16	Ohikilolo	200	Waianaes
17	Pahole	215	Waianaes
18	Palikea	45	Waianaes
19	Puu Kumakalii	28	Waianaes
20	Upper Kapuna	182	Waianaes
21	Waianae Kai	9	Waianaes
22	Waiawa	124	Koolaus
23	West Makaleha	93	Waianaes
	Total acreage	**2,307**	


Lower Opaeula
Management Unit
Lower Kahana
Management Unit
Waiawa
Management Unit
1000
2000
1000
2000
Management Units
Koolau Mountain Range
Priority Management Units
2003 MIP
Existing Fenceline
Construct Fenceline
Ownership and/or Land Use Boundary
Major Road
Contour Interval Every 1000ft.
N
1 0 1 2 3 4 Miles
1 0 1 2 3 4 5 6 7 Kilometers
This map was designed to assist in planning and land management. Information contained in this map is generalized and should not be used for other than its specified purpose. For information contact the Environmental Division of the Directorate of Public Works, U.S. Army Garrison, Hawaii.
Produced by the Hawaii Natural Heritage Program, 2004.

3.1 Management Unit Summary: East Makaleha

Management Unit/Subunit Name		**Area (acres)**
Central and East Makaleha (Waianaes, Oahu)		231 acres
Topography	Elevation range 1,040-3,800 ft.; windward ridge and gulch systems running up to the Waianae summit crest. Moderate to steep-sided ridge slopes, gentle to moderate gulch bottoms, with steeper slopes near summit.	
Ownership	State of Hawaii.	
Existing land management	State Forest Reserve, State Public Hunting Area.	
Natural communities	Dry-mesic to wet native forest and shrubland; alien-dominated dry-mesic to wet-mesic shrubland and forest.	
Fire history	Only lower elevations with seasonal fire risk; mesic to wet-mesic sections considered low to medium fire risk.	
Human use	Hunting trails, access to western and upper portions via a paved road.	
Fences	**Length (m)**	**Status**
MU perimeter fence	4,360 m	Construct in Year 4

***In situ* PUs:**

Subunit	**Target taxon**
N/A	*Achatinella mustelina* *Flueggea neowawraea* *Hedyotis degeneri* var. *degeneri* *Pritchardia kaalae*

Genetic Storage Collection PUs:

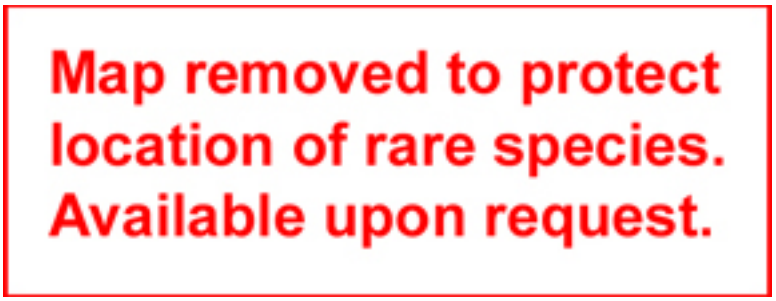
Subunit	**Target taxon**
N/A	None

Reintroductions:

Subunit	**Target taxon**
N/A	*Chamaesyce herbstii* *Cyanea superba* subsp. *superba* *Hedyotis parvula*

Other important taxa:

Alsinidendron trinerve	*Gouania vitifolia* (historical)
Caesalpinia kavaiensis	*Labordia cyrtandrae*
Colubrina oppositifolia	*Phyllostegia mollis* (historical)
Cyanea acuminata	*Phyllostegia parviflora* var. *lydgatei* (historical)
Delissea sinuata (historical)	*Tetramolopium lepidotum* subsp. *lepidotum* (historical)
Gardenia brighamii (historical)	*Vigna o-wahuensis* (historical)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location of rare species.
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3.2 Management Unit Summary: Ekahanui

Management Unit/Subunit Name			**Area (acres)**
Ekahanui (Waianaes, Oahu)			203 acres (total)
Subunit I			44 acres
Subunit II			159 acres
Topography	Elevation range 1,720-3,127 ft.; windward ridge and gulch systems running up to the Waianae summit crest. Moderate to steep-sided ridge slopes, gentle to moderate gulch bottoms and ridgetops, with steeper slopes near summit.		
Ownership	Campbell Estate (leased to The Nature Conservancy of Hawaii).		
Existing land management	Biodiversity Preserve.		
Natural communities	Mesic alien-dominated forest and shrublands, but with some mesic to wet native-dominated areas, including forest dominated by *Metrosideros* and *Acacia koa*; and *Metrosideros* shrubland.		
Fire history	No significant fire history, mesic setting is considered low to medium fire risk.		
Human use	Hunting and hiking trails, including the Honouliuli Contour Trail.		
Fences		**Length (m)**	**Status**
Subunit I		1,877 m	Existing
Subunit II		3,100 m	Construct in Year 3

***In situ* PUs:**

Subunit	**Target taxon**
I	*Achatinella mustelina* *Schiedea kaalae*
II	*Achatinella mustelina* *Cenchrus agrimonioides* var. *agrimonioides* *Delissea subcordata* *Plantago princeps* var. *princeps* *Schiedea kaalae*

Genetic Storage Collection PUs:

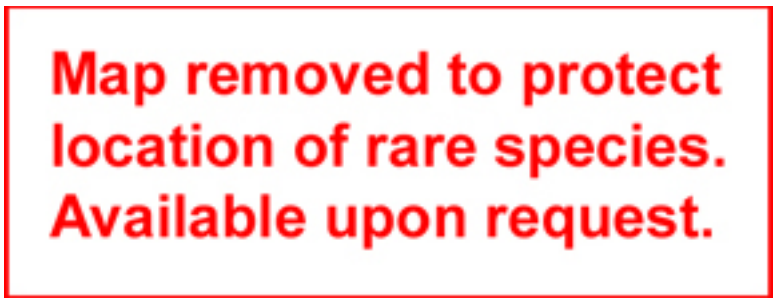
Subunit	**Target taxon**
I	*Chamaesyce herbstii* (extirpated) *Cyanea grimesiana* subsp. *obatae* (extirpated)

Reintroductions:

Subunit	**Target taxon**
I	None
II	None

Other important taxa:

Diellia unisora	*Tetramolopium lepidotum* subsp. *lepidotum*
Phyllostegia mollis	*Urera kaalae*
Phyllostegia parviflora var. *lydgatei*	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location of rare species.
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3.3 Management Unit Summary: Haili to Kealia

Management Unit/Subunit Name			**Area (acres)**
Kawaihapai and Kealia (Waianaes, Oahu)			30 acres
Subunit I			20 acres
Subunit II			10 acres
Topography	Elevation range 200-1,240 ft.; cliff and ridge-gulch systems. Steep slopes on cliffs, moderate to steep on ridge-gulch systems above cliffs.		
Ownership	State of Hawaii, Federal.		
Existing land management	None.		
Natural communities	Alien grassland, shrubland and forest, some remnant lowland dry forest and shrubland, with dominants such as *Erythrina*, *Sapindus*, *Psydrax*, and *Dodonaea;* dry cliff communities.		
Fire history	Low elevation very dry region adjacent to military reservation (Dillingham Military Reservation) and air field. Considered to be a high fire risk.		
Human use	A popular hiking trail passes through the western end of the proposed management unit (MU).		
Fences		**Length (m)**	**Status**
None		N/A	N/A

***In situ* PUs:**

Subunit	**Target taxon**
I	*Hibiscus brackenridgei* subsp. *mokuleianus*
II	None

Genetic Storage Collection PUs:

Subunit	**Target taxon**
I	None
II	None

Reintroductions:

Subunit	**Target taxon**
I	None
II	None (augmentation site for *Hibiscus brackenridgei* subsp. *mokuleianus*)

Other important taxa:

None


Map removed to protect
location of rare species.
Available upon request.

3.4 Management Unit Summary: Kaena

Management Unit/Subunit Name		**Area (acres)**
Kaena (Waianaes, Oahu)		52 acres
Subunit I (Kaena Point)		16 acres
Subunit II (East of Alau)		36 acres
Topography	Elevation range 0-1,240 ft.; flat to gentle coastal zone adjacent to moderate talus slopes below steep to vertical cliffs.	
Ownership	State of Hawaii.	
Existing land management	Natural Area Reserve, Hawaii State Park, Kuaokala Game Management Area.	
Natural communities	A variety of coastal and lowland dry shrublands and grasslands, largely alien-dominated, but significant sections dominated by natives such as *Sida*, *Myoporum*, *Scaevola*, *Heliotropium*, *etc*., and including one rare natural community: *Myoporum sandwicense* Coastal Dry Shrubland.	
Fire history	Significant fire history in Keawaula. Generally dry and sometimes windy conditions throughout the region, coupled with frequent human use, create high fire risk.	
Human use	4WD roads frequently used for fishing and recreational access to area; hiking trails in State Park and Natural Area Reserve.	

Fences	**Length (m)**	**Status**
None	N/A	N/A

***In situ* PUs:**

Subunit	**Target taxon**
I	*Chamaesyce celastroides* var. *kaenana*
II	*Chamaesyce celastroides* var. *kaenana*

Genetic Storage Collection PUs:

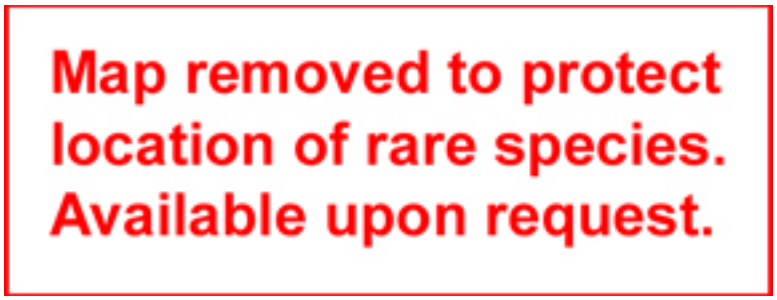
Subunit	**Target taxon**
I	None
II	None

Reintroductions:

Subunit	**Target taxon**
I	None
II	None

Other important taxa:

Scaevola coriacea (historical)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3.5 Management Unit Summary: Kahanahaiki

Management Unit/Subunit Name			**Area (acres)**
Kahanahaiki (Waianaes, Oahu)			94 acres (total)
Subunit I			63 acres
Subunit II			31 acres
Topography	Elevation range 1,600-2,400 ft.; gentle to steeply sloped ridges and gulches. Gentle to moderately sloped plateau adjacent to steep-sloped rim of Makua Valley.		
Ownership	U.S. Army.		
Existing land management	Conservation.		
Natural communities	A mix of alien-dominated mesic forest, and native-dominated forest and shrubland; native dominants include *Metrosideros, Acacia*, and *Diospyros*.		
Fire history	In the Makua action area, but only low to medium fire risk due to the mesic conditions, forest cover, and cliffs separating it from the valley bottom.		
Human use	Occasional hunters and land managers. Restricted military area.		
Fences		**Length (m)**	**Status**
Subunit I		2,891 m	Existing
Subunit II		927 m	Construct in Year 1

***In situ* PUs:**

Subunit	**Target taxon**
I	*Achatinella mustelina* *Alsinidendron obovatum* (extirpated) *Cenchrus agrimonioides* var. *agrimonioides* *Cyrtandra dentata* *Delissea subcordata* *Flueggea neowawraea* *Schiedea nuttallii*
II	*Achatinella mustelina* *Alectryon macrococcus* var. *macrococcus* *Cenchrus agrimonioides* var. *agrimonioides* *Cyanea superba* subsp. *superba* (extirpated) *Flueggea neowawraea* *Hedyotis degeneri* var. *degeneri*

Genetic Storage Collection PUs:

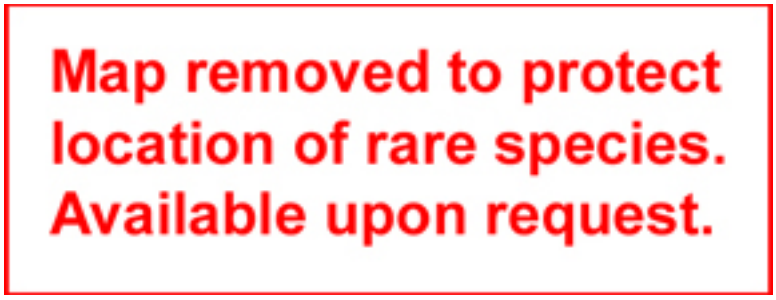
Subunit	**Target taxon**
I	*Nototrichium humile*
II	None

Reintroductions:

Subunit	**Target taxon**
I	None
II	None

Other important taxa:

Euphorbia haeleeleana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3.6 Management Unit Summary: Kaimuhole

Management Unit/Subunit Name			**Area (acres)**
Alaiheihe to Palikea Gulch (Kihakapu) (Waianae Mountains, Oahu)			100 acres
Topography	Elevation range 440-1,840 ft.; lower elevation windward gulches and ridges adjacent to Mt. Kaala Natural Area Reserve. Slopes are gentle to moderate on ridge tops and gulch bottoms, with moderate to steep gulch sides.		
Ownership	Dole Food Company, Inc.		
Existing land management	None.		
Natural communities	Alien dominated dry to mesic forest and shrublands; native dry forests dominated by *Erythrina sandwicensis* and *Diospyros* spp.		
Fire history	No recent fires, but lower elevations seasonally dry and considered high risk.		
Human use	Hunting trails.		
Fences		**Length (m)**	**Status**
MU perimeter fence		2,842 m	Construct in Year 6

***In situ* PUs:**

Subunit	**Target taxon**
N/A	*Hibiscus brackenridgei* subsp. *mokuleianus*

Genetic Storage Collection PUs:

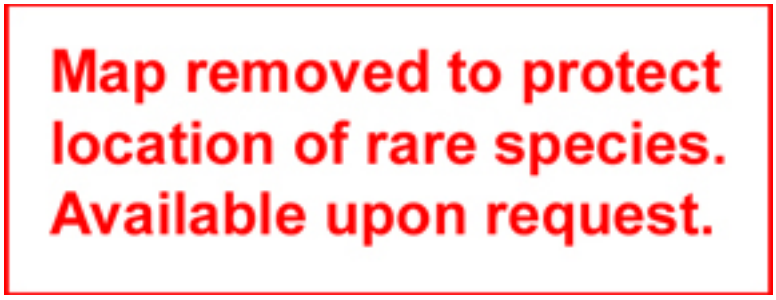
Subunit	**Target taxon**
N/A	*Nototrichium humile*

Reintroductions:

Subunit	**Target taxon**
N/A	None

Other important taxa:

Eugenia koolauensis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3.7 Management Unit Summary: Kaluaa and Waieli

Management Unit/Subunit Name	**Area (acres)**
Kaluaa and Waieli (Waianaes, Oahu)	127 acres
Subunit II A	9 acres
Subunit II B	11 acres
Subunit II C	8 acres
Subunit III	99 acres

Topography	Elevation range 1,520-2,850 ft.; windward ridge and gulch systems running up to the Waianae summit crest. Moderate to steep-sided ridge slopes, gentle to moderate gulch bottoms and ridgetops below the summit.
Ownership	The Estate of James Campbell (leased to The Nature Conservancy of Hawaii).
Existing land management	Biodiversity Preserve
Natural communities	Alien-dominated forest and shrublands, but with some native-dominated areas, including forest dominated by *Metrosideros* and *Acacia koa*.
Fire history	No significant fire history, mesic setting is considered low to medium fire risk.
Human use	Hiking trails, including the Honouliuli Contour Trail.

Fences	**Length (m)**	**Status**
Subunit II A	886 m	Construct in Year 10
Subunit II B	985 m	Construct in Year 10
Subunit II C	324 m	Construct in Year 10
Subunit III	2,576 m	Existing

***In situ* PUs:**

Subunit	**Target taxon**
II A	*Achatinella mustelina* *Alectryon macrococcus* var. *macrococcus*
II B	*Alectryon macrococcus* var. *macrococcus*
II C	*Alectryon macrococcus* var. *macrococcus*
III	*Achatinella mustelina* *Alectryon macrococcus* var. *macrococcus* *Cyanea grimesiana* subsp. *obatae* *Delissea subcordata*

Genetic Storage Collection PUs:

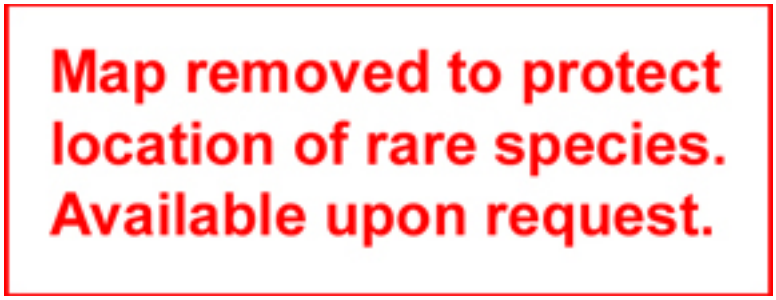
Subunit	**Target taxon**
II A	None
II B	None
II C	*Schiedea kaalae* (extirpated)
III	None

Reintroductions:

Subunit	Target taxon
II A	None
II B	None
II C	None
III	None

Other important taxa:

Cyanea pinnatifida (extirpated)	*Stenogyne kanehoana*
Phyllostegia mollis (historical)	*Tetramolopium lepidotum* subsp. *lepidotum* (historical)
Solanum sandwicense (historical)	*Urera kaalae*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3.8 Management Unit Summary: Kaluakauila

Management Unit/Subunit Name			**Area (acres)**
Kaluakauila (Waianaes, Oahu)			104 acres
Topography	Elevation range 160-1,800 ft.; steep to moderate gulch slopes; steep to vertical cliffs.		
Ownership	State of Hawaii, U.S. Army.		
Existing land management	Conservation and Public Hunting Area.		
Natural communities	Dry alien grasslands and shrublands, with patches of native lowland dry forest, including dominants such as *Erythrina*, *Diospyros*, and *Sapindus*.		
Fire history	In Makua action area and in an extremely dry, high fire risk area.		
Human use	Restricted human access (military training area) to most of the management unit (MU); the State-controlled portion has hunting.		
Fences		**Length (m)**	**Status**
MU perimeter fence		3,598 m	Constructed as part of Urgent Actions

***In situ* PUs:**

Subunit	**Target taxon**
N/A	*Nototrichium humile*

Genetic Storage Collection PUs:

Subunit	**Target taxon**
N/A	*Lipochaeta tenuifolia*

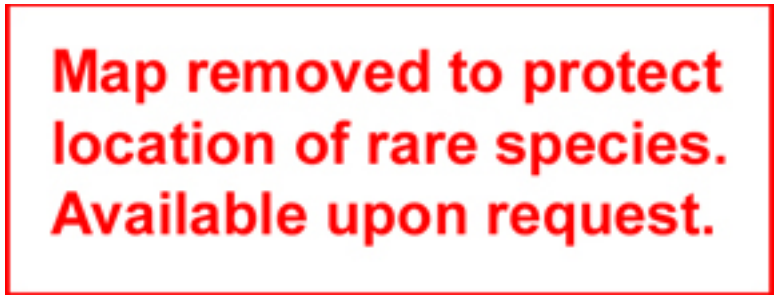
Reintroductions:

Subunit	**Target taxon**
N/A	None

*Note: Army Natural Resources staff have reintroduced three taxa into this management unit outside the requirements of the MIP: *Hibiscus brackenridgei* subsp. *mokuleianus, Neraudia angulata,* and *Abutilon sandwicensis.*

Other important taxa:

Bonamia menziesii	*Euphorbia haeleeleana*
Bobea sandwicensis	*Schiedea hookeri*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3.9 Management Unit Summary: Kamaileunu

Management Unit/Subunit Name			**Area (acres)**
Kamaileunu (Waianaes, Oahu)			2 acres
Topography	Elevation range 3,270 ft.; dry leeward ridge crest.		
Ownership	City and County of Honolulu (Board of Water Supply).		
Existing land management	None.		
Natural communities	Alien mesic forest, shrubland and grassland; native mesic cliff community.		
Fire history	Adjacent to extremely dry high fire risk area, some protection from sparse cliffs.		
Human use	Rough hiking/hunting trail, relatively little human use.		
Fences		**Length (m)**	**Status**
None		N/A	N/A

***In situ* PUs:**

Subunit	**Target taxon**
N/A	*Sanicula mariversa*

Genetic Storage Collection PUs:

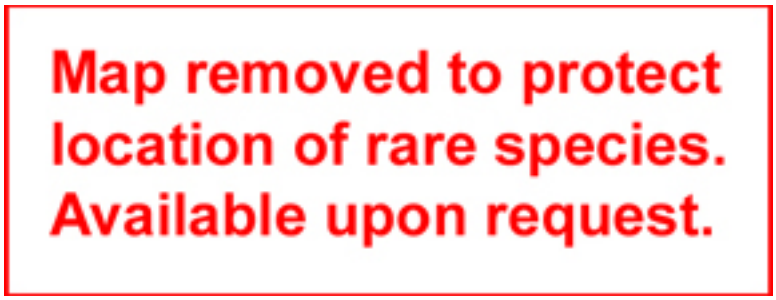
Subunit	**Target taxon**
N/A	None

Reintroductions:

Subunit	**Target taxon**
N/A	None

Other important taxa:

None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3.10 Management Unit Summary: Keaau and Makaha

Management Unit/Subunit Name			**Area (acres)**
Keaau and Makaha (Waianaes, Oahu)			5 acres
Topography	Elevation range 2,450-2,700 ft.; moderate slopes on each side of the saddle ridge between Keaau and Makaha.		
Ownership	State Forest Reserve, Game Management Area, Board of Water Supply (Makaha).		
Existing land management	State Public Hunting Area (Keaau).		
Natural communities	Alien dominated grassland and low shrubland, with a few remnant native plants.		
Fire history	Dry-mesic to mesic setting with no recent significant fire history, however dry setting and adjacent military action area create medium to high fire risk.		
Human use	Private land restricting most human use; some hunting access.		
Fences		**Length (m)**	**Status**
MU perimeter fence		671 m	Construct in Year 5

***In situ* PUs:**

Subunit	**Target taxon**
N/A	*Sanicula mariversa*

Genetic Storage Collection PUs:

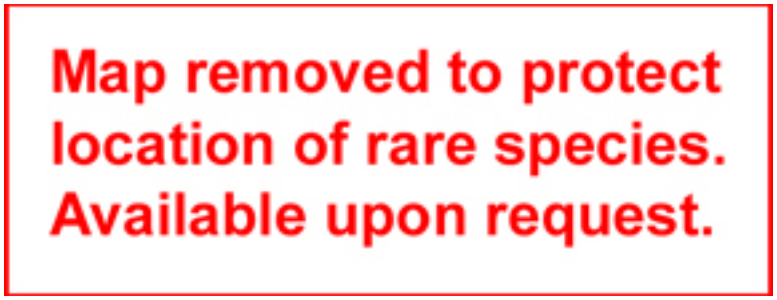
Subunit	**Target taxon**
N/A	None

Reintroductions:

Subunit	**Target taxon**
N/A	None

Other important taxa:

None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3.11 Management Unit Summary: Lower Kahana

Management Unit/Subunit Name			**Area (acres)**
Kahana (Koolaus, Oahu)			3 acres
Topography	Elevation range 1,200 to 1,400 ft.; encompasses portion of gulch bottom of deep, steep-sided gulch.		
Ownership	Kualoa Ranch (John Morgan)		
Existing land management	None		
Natural communities	Wet native forest and shrubland, including areas dominated by *Metrosideros*, *Dicranopteris*, and mixed fern and shrub assemblages. Lowland mesic forest dominated by *Pisonia*, *Charpentiera* and *Hibiscus arnottianus* riparian forest.		
Fire history	Very wet area considered low fire risk.		
Human use	Infrequent unauthorized hunting.		
Fences		**Length (m)**	**Status**
MU Perimeter fence		424 m	Construct in Year 9

***In situ* PUs:**

Subunit	**Target taxon**
N/A	*Schiedea kaalae*

Genetic Storage Collection PUs:

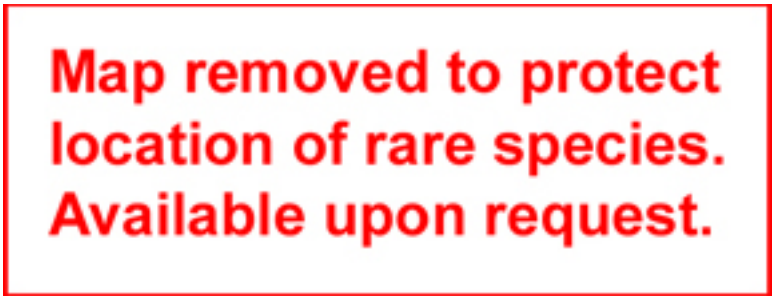
Subunit	**Target taxon**
N/A	None

Reintroductions:

Subunit	**Target taxon**
N/A	None

Other important taxa:

Cyanea acuminata	*Cyanea truncata*
Cyanea crispa	*Cyrtandra waiolani*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3.12 Management Unit Summary: Lower Ohikilolo

Management Unit/Subunit Name			**Area (acres)**
Lower Ohikilolo (Waianaes, Oahu)			70 acres
Topography	Elevation range 320-800 ft.; gentle to vertical slopes. At the seaward terminus of Ohikilolo Ridge.		
Ownership	U.S. Army.		
Existing land management	Conservation.		
Natural communities	Sparse lowland dry cliff community and adjacent alien grassland.		
Fire history	Part of an extremely high fire risk military training area.		
Human use	Restricted military training area.		
Fences		**Length (m)**	**Status**
Ohikilolo ridge fence		1,486 m	Existing
Strategic fence		266 m	Constructed as part of Urgent Actions

***In situ* PUs:**

Subunit	**Target taxon**
N/A	*Chamaesyce celastroides var. kaenana* *Hibiscus brackenridgei subsp. mokuleianus* *Lipochaeta tenuifolia*

Genetic Storage Collection PUs:

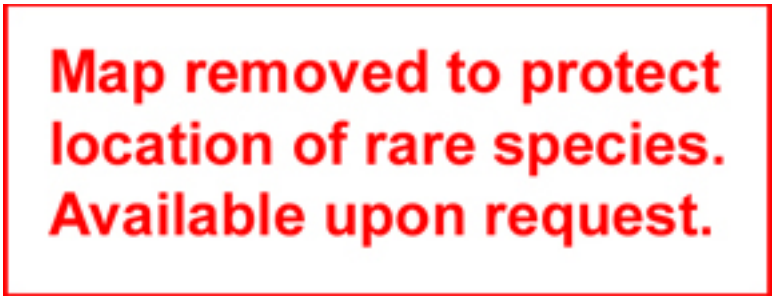
Subunit	**Target taxon**
N/A	None

Reintroductions:

Subunit	**Target taxon**
N/A	None

Other important taxa:

None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3.13 Management Unit Summary: Lower Opaeula

Management Unit/Subunit Name		**Area (acres)**
Lower Opaeula (Koolaus, Oahu)		17 acres
Topography	Elevation range 2,100-2,500 ft.; moderate and steep-sided gulches. Complex gulch and ridge systems in the north-central Koolau Mountains.	
Ownership	B. P. Bishop Estate Trustees.	
Existing land management	Some natural resources management.	
Natural communities	Wet native forest, dominated by *Metrosideros* and *Dicranopteris*.	
Fire history	No significant fire history, but fires possible, especially during drought. Potentially affected by fires started by military training outside the management unit (MU). Medium fire risk.	
Human use	Military training area. Light training history in the MU, but frequent training in the lower elevations west of the MU. Occasional hunters and hikers, but the area is rarely visited.	
Fences	**Length (m)**	**Status**
MU perimeter fence	1,240 m	Construct in Year 1

***In situ* PUs:**

Subunit	**Target taxon**
N/A	*Cyrtandra dentata*

Genetic Storage Collection PUs:

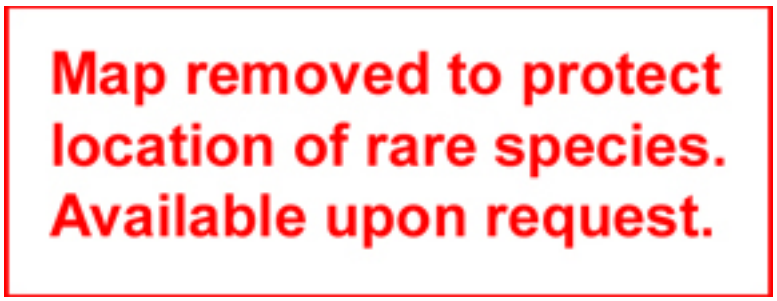
Subunit	**Target taxon**
N/A	None

Reintroductions:

Subunit	**Target taxon**
N/A	None

Other important taxa:

Achatinella sowerbyana	*Melicope lydgatei*
Gardenia mannii	*Phyllostegia hirsuta*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3.14 Management Unit Summary: Makaha

Management Unit/Subunit Name			**Area (acres)**
Makaha (Waianaes, Oahu)			163 acres (total)
Subunit I			96 acres
Subunit II			66 acres
Subunit III			1 acre
Topography	Elevation range 1,200-3,040 ft.; gradual to moderate valley bottom and sides, sweeping up to steep sided amphitheater adjacent to Waianae Kai Valley. Steep to vertical cliffs.		
Ownership	Board of Water Supply.		
Existing land management	None.		
Natural communities	Mixed alien forest and shrublands at lower elevations, but native dominated forest and shrublands above; dominants such as *Acacia, Metrosideros, Diospyros,* and *Dicranopteris*; mesic cliff associations, and the rare Oahu diverse lowland mesic forest.		
Fire history	No significant fire history; mesic region creates relatively low fire risk.		
Human use	Hunting and hiking trails.		
Fences		**Length (m)**	**Status**
Subunit I		2,890 m	Construct in Year 0
Subunit II		2,480 m	Construct in Year 5
Subunit III		223 m	Construct in Year 5

***In situ* PUs:**

Subunit	**Target taxon**
I	*Achatinella mustelina* *Alectryon macrococcus* var. *macrococcus* *Flueggea neowawraea* *Hesperomannia arbuscula* *Lipochaeta tenuifolia* *Viola chamissoniana* subsp. *chamissoniana*
II	*Achatinella mustelina* *Cenchrus agrimonioides* var. *agrimonioides* *Cyanea longiflora*
III	*Neraudia angulata* *Nototrichium humile*

Genetic Storage Collection PUs:

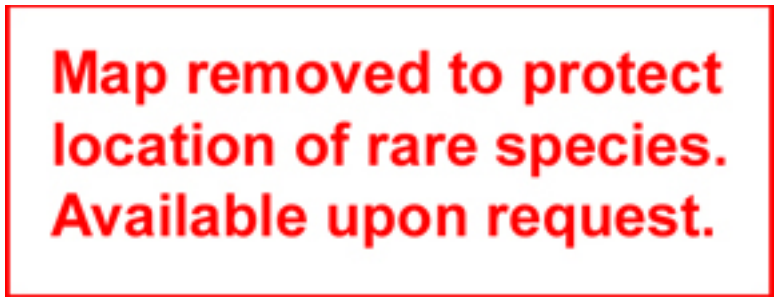
Subunit	**Target taxon**
I	None
II	None
III	None

Reintroductions:

Subunit	***Target taxon***
I	*Alsinidendron obovatum* *Cyanea superba* subsp. *superba* *Dubautia herbstobatae* *Phyllostegia kaalaensis*
II	*Schiedea nuttallii*

Other important taxa:

Abutilon sandwicensis	*Hedyotis degeneri* var. *coprosmifolia*
Eragrostis fosbergii	*Melicope makahae*
Chasiempsis sandwicensis ibidis	*Sicyos lanceoloideus*
Gouania meyenii	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3.15 Management Unit Summary: Manuwai

Management Unit/Subunit Name			**Area (acres)**
Manuwai (Waianaes, Oahu)			166 acres
Topography	Elevation range 1,400-2,600 ft.; windward ridge and gulch systems running up to ridge crest. Moderate to steep sided ridge slopes, gentle to moderate gulch bottoms, with steeper slopes near summit.		
Ownership	State of Hawaii.		
Existing land management	Natural Area Reserve.		
Natural communities	Dry-mesic to mesic alien forests and mesic native forests typically dominated by *Diospyros*, *Metrosideros*, *Acacia koa.* One rare natural community: *Sapindus oahuensis* Lowland Dry Forest.		
Fire history	No recent fires, but lower elevations seasonally dry and considered high risk.		
Human use	Hunting trails.		
Fences		**Lenth (m)**	**Status**
MU perimeter fence		3,563 m	Construct in Year 8

***In situ* PUs:**

Subunit	**Target taxon**
N/A	*Hedyotis degeneri* var. *degeneri* *Lipochaeta tenuifolia* *Pritchardia kaalae*

Genetic Storage Collection PUs:

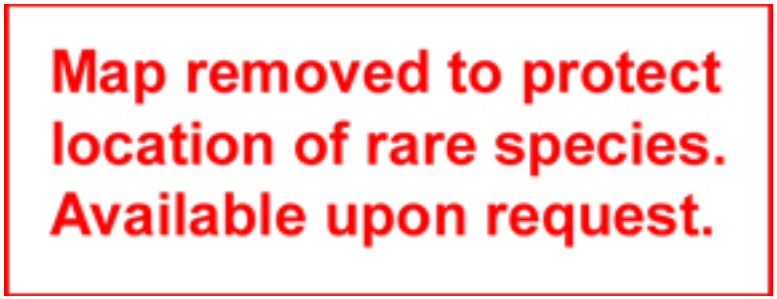
Subunit	**Target taxon**
N/A	*Flueggea neowawraea*

Reintroductions:

Subunit	**Target taxon**
N/A	*Phyllostegia kaalaensis*

Other important taxa:

Abutilon sandwicensis	*Tetramolopium lepidotum* subsp. *lepidotum* (historical)
Caesalpinia kavaiensis	*Hedyotis degeneri* var. *coprosmifolia* (historical)
Colubrina oppositifolia (historical)	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3.16 Management Unit Summary: Ohikilolo

Management Unit/Subunit Name			**Area (acres)**
Ohikilolo (Waianaes, Oahu)			200 acres (total)
Topography	Elevation range 800-3,052 ft.; steep sided wall of Makua Valley, leading to crest ridge between Makua and Keaau-Makaha. Ridge top slope gradual to moderate.		
Ownership	U.S. Army, Board of Water Supply.		
Existing land management	Some conservation management.		
Natural communities	Native dry cliff vegetation, ridgetop with mesic native shrubland and forest, including areas dominated by *Dodonaea* and *Metrosideros*, and including one rare natural community*: Pritchardia kaalae* Lowland Mesic Forest.		
Fire history	In the Makua action area, considered very high fire risk area.		
Human use	Restricted military area.		
Fences		**Length (m)**	**Status**
Ohikilolo ridge fence		5,142 m	Existing
Lower Makua fence		1,200 m	Construct in Year 7

***In situ* PUs:**

Subunit	**Target taxon**
N/A	*Achatinella mustelina* *Dubautia herbstobatae* (Mauka) *Dubautia herbstobatae* (Makai) *Hedyotis parvula* (Mauka) *Hedyotis parvula* (Makai) *Lipochaeta tenuifolia* *Neraudia angulata* *Plantago princeps* var. *princeps* *Pritchardia kaalae* *Sanicula mariversa* *Tetramolopium filiforme* (Makai) *Tetramolopium filiforme* (Mauka) *Viola chamissoniana* subsp. *chamissoniana*

Genetic Storage Collection PUs:

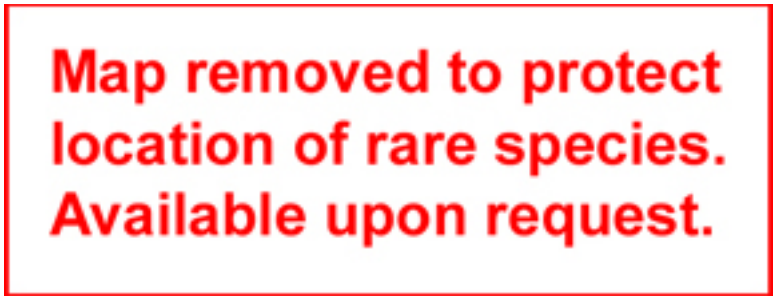
Subunit	**Target taxon**
N/A	*Alectryon macrococcus* var. *macrococcus* *Flueggea neowawraea* *Nototrichium humile*

Reintroductions:

Subunit	**Target taxon**
N/A	*Pritchardia kaalae*

Other important taxa:

Melicope makahae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3.17 Management Unit Summary: Pahole

Management Unit/Subunit Name			**Area (acres)**
Pahole (Waianaes, Oahu)			215 acres
Topography	Elevation range 1,560-2,400 ft.; moderate to steep upper ridge and gulch systems leading to the summit crest of the Waianae Mountains.		
Ownership	State of Hawaii.		
Existing land management	Natural Area Reserve.		
Natural communities	Mix of native and alien forests; including native forests dominated by *Acacia*, *Metrosideros*, and *Dicranopteris*; one rare natural community: Oahu Diverse Lowland Mesic Forest.		
Fire history	Within Makua action area, part of somewhat lower-risk zone, but fire risk still considered medium to high.		
Human use	Access restricted to land managers, hikers, hunters; 4WD access.		
Fences		**Length (m)**	**Status**
MU perimeter fence		4,042 m	Existing

***In situ* PUs:**

Subunit	**Target taxon**
N/A	*Achatinella mustelina* *Alectryon macrococcus* var. *macrococcus* *Alsinidendron obovatum* (extirpated) *Cenchrus agrimonioides* var. *agrimonioides* *Chamaesyce herbstii* *Cyanea grimesiana* subsp. *obatae* *Cyanea longiflora* *Cyrtandra dentata* *Delissea subcordata* *Flueggea neowawraea* *Hedyotis degeneri* var. *degeneri* *Phyllostegia kaalaensis* (extirpated) *Schiedea kaalae* *Schiedea nuttallii*

Genetic Storage Collection PUs:

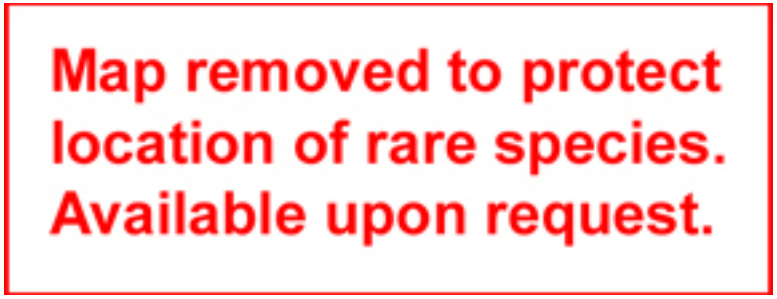
Subunit	**Target taxon**
N/A	*Plantago princeps* var. *princeps*

Reintroductions:

Subunit	**Target taxon**
N/A	*Cyanea superba* subsp. *superba*

Other important taxa:

None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location of rare species.
Available upon request.

3.18 Management Unit Summary: Palikea

Management Unit/Subunit Name	**Area (acres)**
Palikea (Waianaes, Oahu)	45 acres (total)
Subunit IA	21 acres
Subunit IB	11 acres
Subunit IV	9 acres
Subunit V	4 acres

Topography	Elevation range 2,880-3,093 ft.; upper ridge and gulch system of Waianae Mountains.
Ownership	The Estate of James Campbell (leased to The Nature Conservancy of Hawaii).
Existing land management	Biodiversity Preserve.
Natural communities	Native forest and shrubland including vegetation dominated by *Acacia, Metrosideros,* and *Dicranopteris*; some mesic cliff communities.
Fire history	Mesic to wet setting creates low fire risk.
Human use	Management and public outreach trails.

Fences	**Length (m)**	**Status**
Subunit IA	1,506 m	Construct in Year 5
Subunit IB	998 m	Construct in Year 5
Subunit IV	N/A	Will not be fenced
Subunit V	N/A	Will not be fenced

***In situ* PUs:**

Subunit	**Target taxon**
IA	*Achatinella mustelina* *Cyanea grimesiana* subsp. *obatae*
IB	*Hesperomannia arbuscula*
IV	*Hedyotis parvula*
V	*Hedyotis parvula*

Genetic Storage Collection PUs:

Subunit	**Target taxon**
IA	None
IB	*Hesperomannia arbuscula*
IV	*Plantago princeps* var. *princeps*
V	*Viola chamissoniana* subsp. *chamissoniana*

Reintroductions:

Subunit	**Target taxon**
IA	None
IB	None
IV	None
V	None

Other important taxa:

Amastra rubens	*Sicyos lanceoloideus*
Diellia unisora	*Silene perlmanii* (extirpated)
Phyllostegia mollis	*Solanum sandwicense* (extirpated)
Phyllostegia parviflora var. *lydgatei*	*Urera kaalae*
Pritchardia sp. *nov.*	


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location of rare species.
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3.19 Management Unit Summary: Puu Kumakalii

Management Unit/Subunit Name		**Area (acres)**
Puu Kumakalii (Waianaes, Oahu)		28 acres
Topography	Elevation range 2,400-2,880 ft.; moderate to steep upper windward and leeward slopes of Waianae summit crest.	
Ownership	U.S. Army, U.S. Navy.	
Existing land management	None.	
Natural communities	Mesic cliff communities, shrubland and forest.	
Fire history	No significant fire history, but adjacent to military training area; considered medium fire risk area.	
Human use	Generally inaccessible, rarely visited.	

Fences	**Length (m)**	**Status**
None	N/A	N/A

***In situ* PUs:**

Subunit	**Target taxon**
N/A	*Tetramolopium filiforme* *Viola chamissoniana* subsp. *chamissoniana*

Genetic Storage Collection PUs:

Subunit	**Target taxon**
N/A	None

Reintroductions:

Subunit	**Target taxon**
N/A	None

Other important taxa:

None


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location of rare species.
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3.20 Management Unit Summary: Upper Kapuna

Management Unit/Subunit Name		**Area (acres)**
Upper Kapuna (Waianaes, Oahu)		224 acres (total)
Subunit I		182 acres
Subunit II		42 acres
Topography	Elevation range 1,520-2,550 ft.; moderate to steep upper ridge and gulch systems leading to the summit crest of the Waianae Mountains.	
Ownership	State of Hawaii.	
Existing land management	Natural Area Reserve.	
Natural communities	Mix of native and alien forests; including native forests dominated by *Acacia*, *Metrosideros*, and *Dicranopteris*; one rare natural community: Oahu Diverse Lowland Mesic Forest.	
Fire history	Within Makua action area, part of somewhat lower-risk zone, but fire risk still considered medium to high.	
Human use	Hunting and hiking trails.	

Fences	**Length (m)**	**Status**
Subunit I	3,956 m	In construction by DOFAW
Subunit II	1,120 m	Construct in Year 2

***In situ* PUs:**

Subunit	**Target taxon**
I	*Alectryon macrococcus* var. *macrococcus* *Alsinidendron obovatum* (extirpated) *Chamaesyce herbstii* *Cyanea longiflora* *Cyrtandra dentata* *Delissea subcordata* *Flueggea neowawraea* *Hesperomannia arbuscula* *Phyllostegia kaalaensis* (extirpated) *Schiedea nuttallii*
II	*Alectryon macrococcus* var. *macrococcus* *Delissea subcordata*

Genetic Storage Collection PUs:

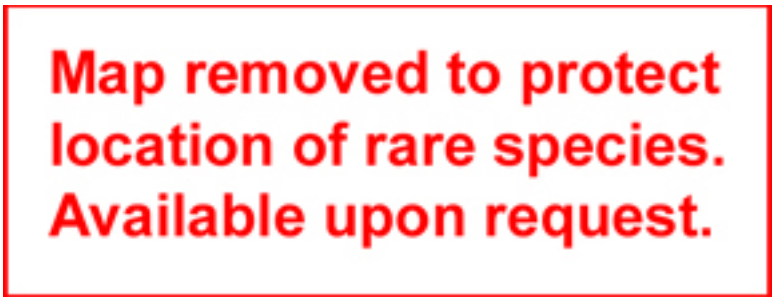
Subunit	**Target taxon**
I	None
II	None

Reintroductions:

Subunit	**Target taxon**
I	*Cyanea superba* subsp. *superba*
II	None

Other important taxa:

None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3.21 Management Unit Summary: Waianae Kai

Management Unit/Subunit Name		**Area (acres)**
Waianae Kai (Waianaes, Oahu)		9 acres
Topography	Elevation range 1,800-2,200 ft.; steep ridge sides, steep to vertical cliffs.	
Ownership and acreage	State of Hawaii.	
Existing land management	State Forest Reserve, State Game Management Area.	
Natural communities	Mixed alien forest and shrublands at lower elevations, but native dominated forest and shrublands above, with dominants such as *Acacia, Metrosideros, Diospyros, Sapindus,* and/or *Dicranopteris*; dry and mesic cliff associations, and stands of the rare Oahu Diverse Lowland Mesic Forest community.	
Fire history	Recent fires have affected areas below 1,000 ft. Sparsely vegetated cliffs, forested areas, and moist conditions in the majority of the management unit create a lower fire risk.	
Human use	Hunting and hiking trails run from the lower valley to the ridge between Waianae Kai and Makaha.	
Fences	**Length (m)**	**Status**
Small fence	771 m	Construct in Year 6

***In situ* PUs:**

Subunit	**Target taxon**
N/A	*Neraudia angulata* *Nototrichium humile*

Genetic Storage Collection PUs:

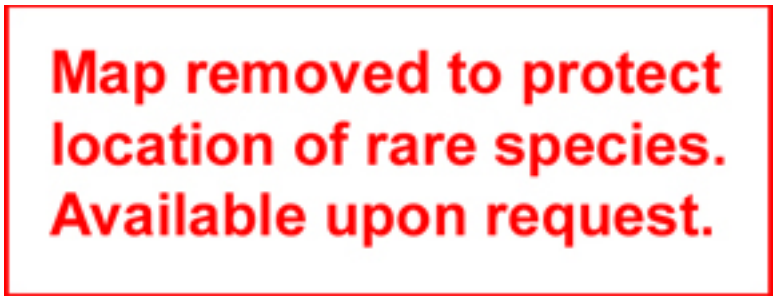
Subunit	**Target taxon**
N/A	None

Reintroductions:

Subunit	**Target taxon**
N/A	None

Other important taxa:

None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3.22 Management Unit Summary: Waiawa

Management Unit/Subunit Name			**Area (acres)**
Waiawa (Koolaus, Oahu)			124 acres
Topography	Elevation range 1,800-2,725 ft.; complex gulch and ridge systems of the upper central Koolau Mountains. Moderate and steep-sided gulch sides.		
Ownership	B. P. Bishop Estate Trustees.		
Existing land management	None.		
Natural communities	Wet native forest and shrubland, including areas dominated by *Metrosideros*, *Dicranopteris*, and mixed fern and shrub assemblages.		
Fire history	Very wet area considered low fire risk.		
Human use	Hiking trail along the boundary; rest of area rarely visited.		
Fences		**Length (m)**	**Status**
MU perimeter fence		2,936 m	Construct in Year 9

***In situ* PUs:**

Subunit	**Target taxon**
N/A	*Plantago princeps* var. *princeps*

Genetic Storage Collection PUs:

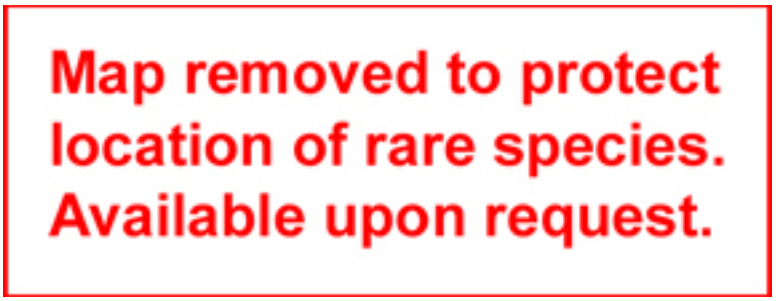
Subunit	**Target taxon**
N/A	None

Reintroductions:

Subunit	**Target taxon**
N/A	None

Other important taxa:

Chamaesyce rockii	*Lobelia gaudichaudii* subsp. *koolauensis*
Cyanea calycina	*Lobelia oahuensis*
Cyanea humboldtiana	*Tetraplasandra gymnocarpa*
Cyanea stjohnii	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location of rare species.
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3.23 Management Unit Summary: West Makaleha

Management Unit/Subunit Name			**Area (acres)**
West Makaleha (Waianaes, Oahu)			93 acres
Topography	Elevation range 1,620-2,800 ft.; windward ridge and gulch systems extending up to the Waianae summit crest. Moderate to steep-sided ridge slopes, gentle to moderate gulch bottoms and ridgetops, with steeper slopes near summit.		
Ownership	State of Hawaii.		
Existing land management	State Forest Reserve, State Public Hunting Area.		
Natural communities	Alien-dominated forest and shrubland at lower elevations, but upper elevations with stands of native mesic forest and shrubland, including areas dominated by *Acacia*, *Metrosideros*, *Dicranopteris*, and *Diospyros*.		
Fire history	No significant recent fire history, but lower elevations seasonally dry, creating a medium fire risk.		
Human use	Hunting and hiking trails.		
Fences		**Length (m)**	**Status**
MU perimeter fence		1,600 m	Construct in Year 2

***In situ* PUs:**

Subunit	**Target taxon**
N/A	*Alectryon macrococcus* var. *macrococcus* *Alsinidendron obovatum* *Cyanea grimesiana* subsp. *obatae* *Cyanea longiflora* *Cyrtandra dentata*

Genetic Storage Collection PUs:

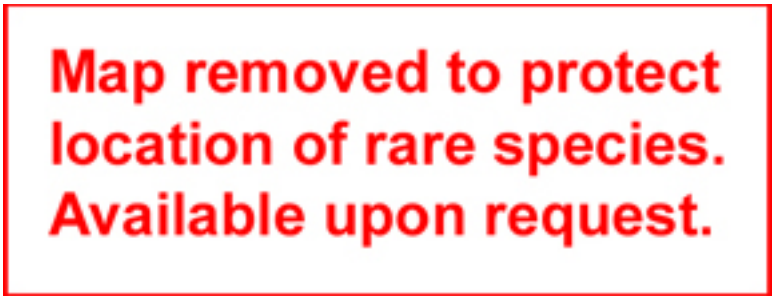
Subunit	**Target taxon**
N/A	*Flueggea neowawraea*

Reintroductions:

Subunit	**Target taxon**
N/A	*Chamaesyce herbstii* *Pritchardia kaalae*

Other important taxa:

Delissea sinuata (historical)	*Phyllostegia parviflora* var. *lydgatei* (historical)
Gouania vitifolia (historical)	*Tetramolopium lepidotum* subsp. *lepidotum* (historical)
Phyllostegia mollis (historical)	*Vigna o-wahuensis* (historical)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Chapter 4.1 Cost Estimates Assumptions

Cost Estimates Assumptions (CEA) – Reference List

General caveats:

- Cost estimates are based on the current requirements of the Biological Opinion (USFWS 1999) and Supplement to the Biological Opinion (USFWS 2001) addressing 27 plant species, and one snail species, and may change according to future assessments.
- Cost estimates were developed with the intention of providing an order of magnitude projection of cost to carry out the Makua Implementation Plan over 20 years. Although these estimates terminate at year 20, the actions themselves are not terminated but continue as long as determined necessary through the IT review process to maintain stable populations.
- Through monitoring and adaptive management, new information will continually be fed back into the plan and actions will be adjusted accordingly. For this reason, actions and cost estimates will be re-evaluated annually for the purposes of budgeting for the coming year(s) and will likely differ from the current projections.
- For many actions, the cost required to implement the action will be affected by a multitude of factors (e.g., population unit size/distribution, topography, degree of threats in the area, habitat quality, geographic distribution of actions). The ability to determine an accurate estimate is limited by current knowledge of a geographic site, the fact that some of these factors are variable over time, and the unprecedented scale of this project. All estimates were based on best available knowledge and derived with input from Implementation Team members and persons knowledgeable and experienced in the relevant subject. Estimates were assigned as *averages*, in anticipation that due to unforeseen factors some population units or sites will require less, while others will require more, than the allotted funds.
- Salary estimates for all positions include benefits and overhead typical of contracted positions.
- Budget items do not include any inflationary factors. Attempting to account for inflation would be too speculative over the course of the proposed implementation schedule.

	Description	Assumptions
1	**Monitoring Specialist** Oversees the entire monitoring program. *Annual Cost:* Monitoring Specialist (55 k/yr):	This position requires a masters degree with at least 3 years of monitoring experience. The specialist will work with NRMs to manage monitoring in the MUs, and will report progress in the annual report. The monitoring specialist will also develop new monitoring methods specific to the types of conditions encountered by NRMs, such as monitoring plants on cliffs while on rappel. **77 k/yr** includes benefits and overhead

	Description	Assumptions
2	**Implementation Coordinators** Includes management and coordination of all Natural Resource Managers, implementation actions, and preparation of annual reports for IT review. *Annual cost:* Implementation coordinators (2 @ 64 k/yr):	Assume one coordinator for every 4 NRMs. **180 k/yr** = (2) (90 k/yr w/ benefits/overhead)
3	**Administrative Assistants** Manage all human resources aspects, including salary and benefits (vacation, medical insurance, sick leave), and training certifications. *Annual Cost:* Administrative Assistant (@ 31.1 k/yr):	Assume 1 assistant for every 20 personnel (administrators, support staff and natural resource staff). **42 k/yr** (w/ benefits and overhead) per every 20 staff
4	**Army Environmental Field Staff** Natural Resource Manager (NRM) (36.7 k/yr): Natural Resource Specialists (NRS): (NRS3) (31.1 k/yr): (NRS2) (28.4 k/yr): (NRS1) (25.3 k/yr): Natural Resource Worker (NRW) (25.3 k/yr):	RCUH staff will be hired and trained. **49 k/yr = 0.236 k/day** (w/benefits & overhead) **42 k/yr = 0.202 k/ day** (w/benefits & overhead) **38 k/yr = 0.183 k/ day** (w/benefits & overhead) **34 k/yr = 0.163 k/day** (w/benefits & overhead) **29 k/yr = 0.14 k/ day** (w/benefits & overhead) Where: 1 year = 208 work days Although NRS salaries will range from NRS1 to NRS3, the salary for an NRS2 was used as an average for all actions requiring an NRS.

	Description	Assumptions
5	**Preparation of Programmatic NEPA Document** *One-time cost:* Programmatic NEPA document:	Assumes preparation of a single programmatic NEPA document. Cultural surveys and Section 106 consultation will be completed by Army archaeologists. A separate NEPA document will not be prepared for urgent actions. Supplemental NEPA documents will be prepared for individual MUs if necessary. **100 k**
6	**Preparation of Conservation District Use Applications (CDUAs) for MUs** CDUAs will be obtained for all MUs on conservation district land for which it is anticipated a fence and/or fire break will be constructed. A CDUA will not be pursued for MUs falling entirely within military owned lands; the military has claimed sovereign immunity on this issue in the past and it is assumed that they will continue to do so. Based on the above, CDUAs will not be obtained for Puu Kumakalii, Kahanahaiki, Pahole, and Ohikilolo. A CDUA may be pursued for Kaena and Keawaula if fire breaks must be created.	Assume the government Natural Resource Manager will prepare CDUAs at no additional cost to the Army. The cost of each CDUA is 0.3k / application ($50 application fee and an estimated $250 reproduction fee for the required 20 copies of each application + attachments). Based on the given assumptions, 19 CDUAs will be pursued. **5.7 k** = (0.3 k/application) (19 applications)
7	**Development of MU Alien Species Control Strategies** Includes development of MU- and population-level alien species control strategies for each MU (excluding ungulates). Data to be updated annually and included in the annual report. *Annual cost:* NRM (0.25 mos/yr):	Calculated for each MU allowing 1 NRM, 0.25 months of report preparation time per MU. Assumes data needed to develop and update the control strategy will be gathered and provided by the Natural Resource staff conducting population-level management and monitoring. **23.5 k** = (1/12)(0.25 mos)(49k/year)(23 MUs)

	Description	Assumptions
8	**Development of MU Ungulate Control Strategies** Includes development of MU- and population-level ungulate control strategies for each MU. Data to be updated annually and included in the annual report. *Annual cost:* NRM (0.25 mos/yr):	Calculated for each MU allowing 1 NRM, 0.25 months of report preparation time per MU. Assumes data needed to develop and update the control strategy will be gathered and provided by the Natural Resource staff conducting population-level management and monitoring. **23.5 k** = (1/12)(0.25 mos)(49k/year)(23 MUs)
9	**Development of Fire Management Plans (FMPs)** Includes fuels studies. Excludes costs associated with implementation of the FMP (pre-suppression and suppression actions). *One-time cost:* Overall FMP and 10 Annexes:	Based on FMP estimates obtained from Fire Protection Specialist Gayland Enriques from Schofield Barracks, Integrated Training Area Management (ITAM). A single Fire Management Plan will be written for all areas involved in the Implementation Plan to which separate annexes will be appended for each of 10 Fire Management Units (FMUs). FMUs contain a grouping of MUs for which a similar fire management approach may be taken based on geographic proximity, fuel types, fire history and access routes (roads/trails). **See Attachments 1 and 2:** Wildland Fire Management Plan Cost Estimate and Fire Management Units **100 K**
10	**Implementation of FMP Actions** Includes pre-suppression actions (development of dip ponds, helicopter support, wildfire training of Natural Resource staff, development and maintenance of fuel breaks). *One-time and annual costs:*	Assumes the Army will assist landowners in maintaining existing roads that serve as fuel breaks, and other fire break maintenance. Suppression: Assumes some NR personnel will be certified as wildlands fire fighters and will support suppression efforts. **See Attachment 1:** Wildland Fire Management Plan Cost Estimate

	Description	Assumptions
11	**Fire Protection Barriers** Includes establishment and maintenance of fuel breaks (weed cutting) along the perimeter of all MUs located in dry habitat.	Locations for establishment of fuel breaks are speculative at this time and subject to change when the Fire Management Plan is written. Estimates are based on the cost of maintaining the Lower Ohikilolo fire break, 23 NRS days/acre of fuel management
	Includes maintenance of existing roads that function as fuel breaks where existing roads are not currently being maintained. Creation and maintenance of fuel breaks around dry habitat MUs will be funded by the Army. For any roads indicated as fuel breaks, Army will coordinate with landowners to support 50% of efforts toward fuels control.	Assumes ~20-ft wide fuel breaks, or roads with a 10-foot corridor on each side, will be maintained 2 times a year. **See Attachment 3:** Fire Protection Barriers
	Fuel break road maintenance:	**$318/mile** for roadside weed clearing
	Maintenance of MU fuel break:	Assumes 1.1 months NR effort per acre of MU fuels break, of which 0.33 months is NRM time and 0.75 months is NRS time.
	NRM (0.25 mos/yr) NRS (3.5 mos/yr)	**1.34 k/yr** = (1/12)(49k/yr)(0.33 mos) **2.4 k/yr** = (1/12)(38k/yr)(0.75 mos) **3.74 k/yr per acre of fuel break**
12	**Road maintenance:** Road mowing and repair will need to be conducted on an ongoing basis. The Army will coordinate with landowners to cover 50% of the cost.	Cost of monthly lease of vehicles is covered under CEA 50. Estimate $318/mile for road maintenance. Work to be contracted out. **See Attachment 3:** Fire Protection Barriers

	Description	Assumptions
13	**Fenceline Scoping** Thorough evaluation of fenceline routes to determine exact on-the-ground placement, with special attention to avoid any threatened & endangered species. Explosive ordnance disposal (EOD) specialists will accompany personnel in areas with unexploded ordnance (UXO) issues.	Scoping will be conducted by two NRMs. Days required to scope each MU fenceline are MU-specific and based on MU size, topography and existing knowledge of the area. See **Attachment 4:** Fencing Estimates
14	**Fenceline Clearing and Grading** Clear a corridor of vegetation no more than 6 ft wide, with special attention to avoid any threatened & endangered species. Perform grading in areas as needed. Explosive ordnance disposal (EOD) specialists will accompany personnel in areas with unexploded ordnance (UXO) issues. *One-time cost:* Contract clearing and grading:	Clearing and grading will be conducted by a contractor and under the supervision of an NRM. Contractor's estimates were based on urgent actions estimates of clearing 10,415 ft/225 days = 46 ft/day. Assuming an NRW(1) @ 29 k/yr can clear 46 ft/day: (29 k/208 days) (1 day/ 46ft) = $3.03/ ft. **$9.45 /m** = ($3.03/ ft) (3.12 ft/m) = $3.03 /ft See **Attachment 4:** Fencing Estimates
15	**Fence Construction** Excludes fenceline scoping, clearing and grading but includes all labor, material and helicopter support involved in actual fence construction. Moderate (0-45 degree slope, forested areas with primarily soil substrate): Medium (45-70 degree slope and rock substrate):	One-time fencing costs were calculated for each MU based on GIS linear footage estimates for MU and subunit fences. Unit costs are based on urgent action cost estimates which were adjusted for variable topography and substrate: **$10/ ft = $33/m** **$20/ ft = $66/m**

	Description	Assumptions
	Extreme (Steep areas with some 70-90 degree slopes and rocky substrate):	**$45/ ft = $148/m** See **Attachment 4:** Fencing Estimates
16	**Fence Repair and Replacement** Labor for fence monitoring and maintenance to be covered by NRS's as part of ungulate monitoring/control. *Annual cost:*	Assume small fence repairs will be ongoing. Larger fence replacement projects will contracted out at a cost of approximately 50% of the initial construction cost. Assume fences will need to be replaced every 12 years. Materials for fence repair and maintenance = **20 k/year**
17	**Small-scale Fencing** Includes materials (hog wire, T-posts, barbed wire, skirts) for a 200m small-scale fence to protect *in situ* populations if ungulate threat is evident. Excludes labor (covered under 'manage for stability' time). Small-scale fences (47):	Assumes a 200m fence (@ 1.4 k/population) will be constructed for all small managed *in situ* populations until higher management is initiated. Small-scale fences need not be built for *Flueggea neowawraea* populations and PUs occurring in existing fences. All small-scale fences to be completed in urgent actions. **65.8 k** = (33%)(141 PUs)(1.4 k/PU)

	Description	Assumptions
18	**Manage for Stability for species requiring a high level of work** All actions needed to increase population levels to achieve stabilization criteria, including monitoring of populations, ungulate management over MU, management of aggressive weeds (<25% cover over 50 m radius beyond PU perimeter), control of other threats (rodents, slugs, human, etc.) as needed for population stability, collection for genetic storage and propagation, and augmentation. *Annual Cost:* NRM (0.57 mos/yr): NRS2 (3.43 mos/yr):	While the need for augmentation is based on monitoring results, for the purposes of cost estimates, it is anticipated that all populations requiring a **high** level of work will require augmentation. A proportion of the MU acreage around these populations will also be managed. See CEA #29 - MU Threat Management. Assumes 4 months of NR effort, of which ~ 1/7 of the effort is a NRM's time and ~ 6/7 of the effort is a NRS2's time: 2.33 k/yr = (1/12) (49 k/yr)(0.57 mos) 10.86 k/yr = (1/12) (38 k/yr) (3.43 mos) **13.19 k/yr**
19	**Manage for Stability for species requiring a medium level of work** All actions needed to increase population levels to achieve stabilization criteria, including monitoring of populations, ungulate management over MU, management of aggressive weeds (<25% cover over 50 m radius beyond PU perimeter), control of other threats (rodents, slugs, human, etc.) as needed for population stability, collection for genetic storage and propagation, and augmentation. *Annual Cost:* NRM (0.29 mo/yr): NRS2 (1.71 mo/yr):	While the need for augmentation is based on monitoring results, for the purposes of cost estimates, it is anticipated that all populations requiring a **medium** level of work will require some level of augmentation. Assumes 2 months of NR effort, of which ~ 1/7 of the effort is a NRM's time and ~ 6/7 of the effort is a NRS2's time: 1.18 k/yr = (1/12) (49 k/yr) (0.29 mos) 5.41 k/yr = (1/12) (38 k/yr) (1.71 mos) **6.59 k/yr**

	Description	Assumptions
20	**Manage for Stability for species requiring a low level of work** All actions needed to maintain populations levels, includes monitoring of populations, ungulate management around the PU, management of aggressive weeds (<25% cover over 50 m radius beyond PU perimeter), control of other threats (rodents, slugs, human, etc., as needed), and collection for genetic storage and propagation. *Annual Cost:* NRM (0.14 months/yr): NRS2 (0.86 months/yr):	While the need for augmentation is based on monitoring results, for the purposes of cost estimates, it is anticipated that populations requiring a **low** level of work will not require augmentation. Assumes 1 month of NR effort, of which ~ 1/7 of the effort is a NRM's time and ~ 6/7 of the effort is a NRS2's time: 0.57 k/yr = (1/12) (49 k/yr) (0.14 mos) 2.72 k/yr = (1/12) (38 k/yr) (0.86 mos) **3.29 k/yr**
21	**Surveying** Includes field time, mapping of survey and plant locations, collection of specimens, taxonomic determination and completion of Rare Plant Field Data forms (digital). *One-time cost:*	Based on Hawaii Natural Heritage Program (HINHP) taxon- or site-specific estimates of field and support time. HINHP will subcontract National Tropical Botanical Gardens (NTBG) to participate in all surveys involving cliff species (rappelling) as indicated. **181.612 k** See **Attachment 5:** Survey estimates

	Description	Assumptions
22	**MU Threat Management** Includes ecosystem-wide threat control of all alien species. Includes assisting with ungulate control, fenceline monitoring and minor fence repairs. *Intensive Alien Species Threat Management:* NRM (1.71 mos/yr): NRS2 (6.86 mos/yr): NRW (3.43 mos/yr):	Total MU acreage subject to ecosystem-level threat control excludes the total area within a 50m radius of all manage for stability *in situ* populations and reintroductions (this area will be managed on the PU-level). Areas with greater than a 55 degree slope were also excluded as they are very difficult to manage. **See Attachment 6:** Acres Eligible for MU-Level Threat Management Assumes that for 300 acres, 12 months of NR effort, of which ~1/7 is an NRM's time, ~4/7 is an NRS2's time and ~2/7 is an NRW's time: 7.0 k/yr = (49 k/yr)(1 yr/12 mos)(1.71 mos) 21.6 k/yr = (38 k/yr)(1 yr/12 mos)(6.86 mos) 8.26 k/yr = (29 k/yr)(1 yr/12 mos) (3.43 mos) 36.86 k/ yr per 300 acres = **0.123 k /acre per year**
23	**MU Ungulate Control Specialist** Ungulate control specialist will coordinate hunting and snaring operations in MUs with fences. Will also conduct fenceline monitoring and minor fence repairs. *Annual cost:* (45 k/yr):	MU ungulate control will begin upon construction of the MU. Intensive ungulate control efforts will be conducted for one year inside new fences, after which time ungulate monitoring and smaller-scale control efforts will take place. Intensive ungulate control is not needed in MUs that have existing fences (e.g., Pahole, Kahanahaiki – subunit I, etc.). **63 k/yr** (w/benefits & overhead)
24	**MU Monitoring** Includes ecosystem-wide monitoring of all MU or subunits as scheduled. The monitoring team will provide information for development of MU plans and threat control strategies, and will assist in conducting ungulate control maintenance in MUs as needed.	MU-level monitoring will be conducted over the entire MU or subunit at the time fenceline clearing begins. Assumes 16 NRS days per MU per year. NRS's conducting monitoring will be supervised by the monitoring specialist (see CEA 1). Includes road surveys and corridor monitoring. Assume 2 NRS days per 10 km of road per

	Description	Assumptions
	Excludes population-level monitoring of *Manage for Stability* plant populations. Road surveys: NRS2 (0.58 mos/yr): MU monitoring: NRS2 (0.46 mos/yr per MU):	year. There are approximately 50 km of road monitored annually. **1.83 k/yr** = (38 k/hr)(1 yr/12 mos)(0.58 mos) 1.45 k/yr = (38 k/yr)(1 yr/12 mos)(0.94 mos) **2.98 k/ yr per MU**
25	***Achatinella mustelina* Genetics Analysis** Includes sampling time in the field. *One-time cost:* Sampling for genetics analysis: Genetics testing:	NRS2 (2) will each sample 3 days / population. Testing estimates are based on the cost for microsatellites genetics analysis already conducted (@ 29 k/16 populations = 1.81 k/population). **1.1 k/population** = (0.183 k/day)(6 days/ population) **14.5 k total** (assumes 8 populations will be tested although only 5 are known to need testing at this time)
26	***A. mustelina* Exclosure Construction** Includes labor and materials for an average 60m x 80m = 4800 sq. meter exclosure. *One-time construction cost:* Each exclosure (4800 sq. m): Exclosure Maintenance supplies:	Based on average construction cost of existing Pahole and Kahanahaiki exclosures of 4 k/ 1200 sq. meters (30m x 40m). Assumes dimensions of new exclosures will be approximately twice that of existing exclosures and of improved construction. Contractors will be hired to construct exclosures and will work under the supervision of an NRM. A maximum of 10 exclosures will be constructed. **10 k** per exclosure. (One new exclosure per year will be constructed.) Exclosure repair and maintenance (of the solar battery, salt trough, etc.) will be included in NRS time (see CEA 27). **1 k** per year per exclosure

	Description	Assumptions
27	***A. mustelina* Management for Stability** Includes monitoring, threat management, collection, exclosure maintenance and mark-recapture studies (1 time/yr) for populations designated for management. *Annual cost:* NRM (28 days/yr): NRS (28 days/yr):	Assumes two (2) NR personnel will make monthly monitoring, threat management, and exclosure maintenance visits (1 day each/month), and 1 mark-recapture study per year (2 days each/yr) for a total of 14 days/yr per population for each NR (28 person days/yr total). Assume ~1/7 of the effort will be conducted by an NRM and ~6/7 of the effort by an NRS2. 0.94 k/yr = (1/7) (28 days/year) (0.236 k/day) 4.39 k/yr= (6/7) (28 days/year) (0.183 k/day) **5.33 k/yr** per population or exclosure
28	***A. mustelina* Captive Propagation Collection** Excludes collection from *Manage for Stability* populations (will be carried out by staff managing those populations). Any subsequent collections to refresh captive stock will be covered by NR staff managing populations for stability. *One-time cost:* Captive propagation collection: Helicopter support:	For each of 2 NRMs: Allow 3 days/population per year for each of two years with some allowance for helicopter support. **1.416 k/yr per population** = (0.236 k/day) (6 days/population) **7.5 k** = (0.5 k/ population)(15 populations)
29	**Genetic Storage: Collections (Plants)** Excludes collections from *Manage for Stability*, *in situ* populations (will be conducted by staff doing management of these populations). *Annual cost:* NRM (1): NRS2 (1):	Assumes two (2) NR personnel (1 NRM and 1 NRS2) will visit each population 2 times/year every other year to refresh the collection stock. 0.47 k/yr = (0.236 k/day)(1 days/trip)(2 trips/yr) 0.37 k/yr = (0.183 k/day) (1 day/trip)(2 trips/yr) **0.84 k/yr per population**

	Description	Assumptions
30	**Genetic Storage: Seed Storage** Excludes genetic storage of seed, genetic storage via live plants and testing of alternative storage methods (tissue culture or cuttings). Supplies and Equipment: 1 refrigerator, 1 freezer (to supplement urgent actions refrigerator and freezer): Supplies, cleaning equipment for 4, 000 individuals): Supplies: Full-time Technician (1):	Based on estimates from Lyon Arboretum seed storage specialist. Based on Lyon Arboretum Seed Storage Specialist medium-term seed storage facility estimate for urgent action storage: (1 refrigerator: 0.5 k; freezer: 0.576 k) **2.2 k** 16.2 k = (4,000 individuals)(1.42 k/350 individuals) 16.2 k/year 35 k/year **51.2 k/ yr**
31	**Genetic Storage: Tissue Culture** Includes tissue culture testing as recommended in the Implementation Plan and for target taxa found to have seeds that are not orthodox. Includes annual storage and maintenance of plants stored in tissue culture and germination of immature seeds. *Annual cost:* Tissue Culture materials: Tissue Culture Assistant (1):	Assumes tissue culture facility will be housed in the newly constructed Lyon Arboretum genetic storage and tissue culture facility. Based on estimates from Lyon Arboretum Tissue Culture Specialist: 12.5 k/ yr 35.0 k/ yr **47.5 k/ yr**
32	**Genetic Storage via Living Collections** Collect from unique populations (geographically isolated, morphologically distinct or located in unique habitat) with fewer than 5 mature individuals and establish living collections *(ex situ* or *inter situ),* from seeds or cuttings from each individual.	Assumes additional visits by an NRM (1) and an NRS2 (1) to unique populations will be made. Time required to collect from unique populations is taxon-specific. Assumes each living collection will consist of a maximum of 12 individuals (3 representatives of each wild individual) and will be maintained annually by a botanic garden (National Tropical Botanic Garden, Waimea or Lyon Arboretum) at a cost of 0.5 k / yr.

	Description	Assumptions
	One-time cost: Collections: *Annual cost:* Maintain *ex situ* or *inter situ* collection:	 See **Attachment 7:** Justifications for Special Collections and Establishment of Living Collections **0.5 k / year** per living collection (12 plants)
33	**Propagation Facility: Repair, Improve and Expand Existing Facility** Includes modifications to upgrade sanitation standards at existing Pahole facility, and construction of a new greenhouse facility. *One-time cost:* Propagation facility upgrades: Shadehouse benches, watering system and gravel base for new facility:	Assumed facility should have a maximum capacity of 2000 plants to accommodate propagation for reintroduction and augmentation needs. Estimate ~ 1 ft^2/plant = 2000 ft^2 facility. Add 400 ft^2 for aisle space. Urgent action funding for propagation facility improvements necessary to carry out urgent action reintroductions. **47.38 k** **15 k**
34	**Plant Propagation: Facility and Staff** *One-time cost:* Electrostatic sprayer(1) + protective gear: Permanent label printer (1): *Annual costs:* Supplies: Systemic and conventional pesticides: Pots, potting media: Permanent labels:	 3.50 k <u>3.50 k</u> **7.0 k** Estimates for supplies are based on current Nike Site usage per plant/year. Assume an average of 2000 plants outplanted (reintroduction/augmentation) each year. $10 per plant/year $ 4 per plant/year <u>$ 2 per plant /year</u> **$16 per plant/year** For 2000 plants/year, annual greenhouse supplies cost: **32 k**

	Description	Assumptions
	Two full-time people to manage the propagation program in compliance with sanitation protocols. Horticulturist will also oversee propagation testing, seed viability testing from herbarium sheets and the quarantine facility. Horticulturist (48 k/yr): Assistant (28 k/yr): **95.2 k/ yr**	Assumes horticulturist and assistants will also manage the quarantine facility. **67.2 k/ yr** (includes overhead) **39.2 k/ yr** (includes overhead)
35	**Quarantine Greenhouse: Facility and Staff** Includes construction material, back-up power for climate control, fog spray pesticide applicator, re-circulation fans and automated irrigation. *One-time cost:* Facility construction: *Annual cost:* Supplies:	Facility estimates were adjusted upward from Bill Garnet's urgent action quarantine greenhouse estimate to reflect an increase in required floor area to accommodate a maximum of ~500 plants. **50 k** **5 k/ yr** U.S. Forest Service or State Department of Agriculture extension agent to work cooperatively with horticulturist.
36	***A . mustelina* Captive Propagation: Facility and Staff** Includes estimates for environmental chambers, supplies and a facility assistant. *One-time costs:* Chambers (2): *Annual costs:* Full-time assistant (1): Supplies: Utilities: **50.5 k/yr**	Assumes an existing space can be found to house the expanded facility. Estimates are based on and include Mike Hadfield's urgent actions estimate for collection and maintenance. **16.0 k** = (8.0 k/chamber)(2 chambers) 49.0 k 0.5 k 1.0 k

	Description	Assumptions
37	**Staff Facilities: Oahu Rentals** Includes office space for all administrators and NRMs, shared office space and meeting space for all NRSs and NRWs, and storage space for field equipment and supplies (including firearms storage for ungulate control program). *Annual costs*: One facility:	Assumes existing facilities will be rented on Oahu to house staff. A single facility will house 30 administrative and field staff. Assumes 4k/month per facility (3 k/month for facility rental, 1k/month for utilities [water, sewer, electricity and telephone]). **48k k/yr**
38	**Office Furniture, Machines and Supplies** Includes desks and chairs for all administrative staff. NRMs will be provided desks and chairs; NRSs will share desks (2 NRSs per desk). *One-time cost:* Administrative staff: Office furniture (6 desks and chairs): Fax machine (Canon Laser Class 9000S): Telephone system (for 30): Printer (HP Color Laser Jet 4550DN): Copier (lease) Field crew: (5 NRMs, 2 horticulturists, 1 ungulate specialist, 19 NRSs and NRWs): Office furniture (18 desks and chairs): Office furniture initial purchase: *Annual Costs:* Copier for Administrative Facility (lease includes maintenance & supplies): Office supplies (Administrative staff): Office supplies (field staff):	Assumes the administrative facility will have a high-level copier (leased), fax machine, laser-jet printer and telephone system. Excludes computer and field technology (see CEAs #42-43). 4.2 k = (0.7 k) (6) 4 k 10 k 4 k (see below under annual costs) 9 k= (0.5 k)(18) **31.2 k** 8 k/yr 10 k/yr 3 k/yr **21 k/yr**

	Description	Assumptions
39	**Database System: Development, Maintenance and Staff** Includes database entry of all existing Army Rare Plant Monitoring form data as well as management of all future monitoring, collection and propagation information. *One-time cost:* Development of a Monitoring, Collection and Propagation Database: Development of a Seed Storage Database: *Annual costs:* GIS Specialist/Analyst (with 3 years programming experience) 60k/year:	Costs for development of the database are based on the urgent action cost proposal and cost estimate quote from Hawaii Natural Heritage Program, and include USGS, USACE and RCUH overheads. **138.4 k** **25.0 k** **84 k/yr (includes benefits and overhead)**
40	**Helicopter Support** *Annual cost:* Includes helicopter support for all implementation actions except fence construction, captive propagation collection and genetic storage collection:	Based on commercial rates of $686 /hour of flight time. **214 k/ yr** (allows 6 hours flight time/week)
41	**Vehicles** Includes fuel, maintenance and mud tires. No insurance needed (government is self-insuring). *Annual cost:* Vehicle maintenance and fuel: Vehicle purchase (4WD truck/SUV):	Four-wheel drive vehicles will be purchased through the contracting agency. Estimate 1 vehicle to transport every 4 NR field crew. Estimate 2 vehicles for other staff (IP coordinators, monitoring specialist, horticulturist, etc.). Purchase one new 4WD vehicle per year until needs are met (approximately 8 vehicles will be needed). Estimate $3k/ year per vehicle. Annual cost will vary with the number of vehicles. Estimate vehicles will need to be replaced every 8 years. **55k/year**

	Description	Assumptions
	A tractor with a mower and a bulldozer will be used for road maintenance. Cost of monthly equipment rental:	The Army will coordinate with landowners to support 50% of the cost of road maintenance. Estimate one tractor will mow 23 miles of road/month. **6k/month** or **0.26k/mile**
42	**Computer Systems for Administrators and Field Staff** Includes office computers (software and hardware). *One-time costs:* GIS computer systems: General office computer systems: Replacement costs:	Computer systems: Assumes 1 computer system for each of 7 administrative/support positions: Implementation coordinators (2) Monitoring director (1) GIS specialist/analyst (1) Administrative assistant (1) Horticulturist (1) Community outreach coordinator (1) 1 computer will be provided per NRM (5). Additional computers will be shared amongst NRS staff. No computers will be provided for NRWs. One-third of the computers purchased will be GIS-compatible. **See Attachment 8:** Technological Support Systems **6.5 k** (3.5k/computer)(4 new computers needed) **14 k** Replace all computers every 6 years ArcView software upgrade every other year (approximately 0.8 k each) for GIS computer. Assume on average 2 new computers will be needed each year.

	Description	Assumptions
43	**Technological Support Systems for Field Staff** Includes global positioning systems (GPSs), personal data assistants (PDAs) and digital cameras. GPS Devices: Field-hardened digital cameras: New plotter (should be replaced every 6 years): Replacement cost:	Assumes field systems will be provided for 1/3 of total number of field staff (NRMs and NRSs). 2.15 k/ system 0.8 k/camera **2.95 k/ 3 NR staff** **10 k** See **Attachment 8:** Technological Support Systems Replace all devices every 6 years
44	**Field Equipment and Supplies** *One-time costs:* Weed, ungulate control (includes firearms only) and vegetation-clearing equipment (handsaws, chainsaws, weed eaters, backpack sprayers, clippers): 24 NR staff: Camping gear (includes backpacks [day and overnight packs]): 24 NR staff: Hand-radios, cell phones, binoculars: 28 staff:	Assumes field crew (NRM, NRS, NRW) will *not* be able to sign out battle dress uniform (BDU) from Central Issues Facility to use as daily field wear. Initial purchase will be for 24 field staff. **21.6 k** = (0.9 k) (24 people) Assumes day and overnight packs will be provided for each field staff member. Camping gear will be shared 0.3 k per person for camping gear 0.275 k per person for packs **13.8 k** Assumes binoculars, hand-radios, cell phones and pagers will be provided to all NRM and NRS staff, horticulture staff and monitoring and ungulate specialists: **35 k** = (1.25 k per person)

	Description	Assumptions
	Annual costs:	
	Replacement of hand-radios, cell phones, binoculars (each phase):	Assume 1/5 of the equipment will need to be replaced each year: **7 k /year** = (35 k)(1/5)
	Replacement of threat control equipment:	Assume 1/5 of the equipment will need to be replaced each year. **4.32 k/year**
	Annual replacement of camping gear and backpacks:	Assumes approximately 1/5 of the camping gear and packs will need to be replaced annually due to wear-and-tear: **2.76 k/yr** = (13.8 k/year) (1/5)
	Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves) and snares. 24 NR staff:	Based on current Army Environmental estimates of 15k /year for 10 staff. **36 k/year** = (1.5 k /person)(24 staff)
	Cell phone and pager service: 28 staff:	Assumes cell phone and pager service all NRMs and NRSs in each phase at the rate of $600/yr for phone service and $100/yr for pager service: **19.6 k/yr** = (28 staff) (0.7 k/yr)
	Annual allowance of $350 / field person to be used toward footwear and raingear: 28 staff:	Based on current allowance of 0.35 k/ yr per person. **9.8 k/year** = (28 staff)(0.35 k/year)
45	**Training and Certification of Field Staff** State certification for handling of pesticides/herbicides for all field crew (NR staff including horticulture, ungulate and monitoring staff):	Assumes $20/field person for state certification for handling of pesticides/ herbicides. Certification to be renewed every 5 years. **1.6 k** = (0.02 k) (24 people)
	Chainsaw training:	One-week long S212 course. Certification is good for 3 years. **4.8 k** = (0.2 k)(24 NR staff)

	Description	Assumptions
	Annual cost: Annual CPR, first aid training, physicals for all field crew. Includes annual firearms training for NRS and NRA conducting ungulate control programs: CPR and first aid: Firearms training: Annual rappel training: Physicals: Conservation conference: Helicopter and sling load training:	Assumes $300 per field person for CPR and first aid certification (NR staff including horticulture, ungulate and monitoring staff), and $20 for National Rifle Association firearms training per year. Assumes half of all NRMs and NRSs will be involved in ungulate control. **8.4 k** = (0.30 k/yr)(28 people) **0.24 k** = (0.02 k/yr)(12 people) Assumes all NRMs and 50% of NRSs will be certified in rappeling each year. **4.55 k** = (0.325 k/yr per person)(14 staff) **4.8 k** = (0.2 k)(24 staff) Assumes all managers, NRMs, and half of NRS will attend annual conference. **3.45 k** = (0.15 k)(23 admin and field staff) NR staff including horticulture, ungulate and monitoring staff will take these courses. Training is currently provided at no cost.
46	**Summer Internship Program** The intent of this program is to provide early experience for college undergraduate students such that they may transition into full time Natural Resource positions in the future. Annual summer interns:	Summer interns will be hired in addition to (not in replacement of) the required Natural Resource staff. Three summer interns will be hired per year, at the rate of $8=10/hr ($12.50/hr with overhead) @ 40 hrs/week for 12 weeks/year. 6.0 k/intern = ($12.50/hr)(40hrs/wk)(12 weeks) **18.0 k** = (3 interns)(6.0 k/intern)
47	**Community Outreach Coordinator** Interface with the community on natural resource protection projects, with a focus on those issues related to fencing. Community Outreach Position (36.7 k/yr)	 **49 k/yr** (includes benefits and overhead)

	Description	Assumptions
48	**Research** Research will be contracted out to the USGS or other government agency. Researchers will coordinate with other agencies and toxicant working groups (dedicated to planning toward toxicants registration efforts) from the onset, particularly for area-wide threat control research.	Estimate *each* of six (6) area-wide threat control research projects will cost approximately $1 million based on Registration of Diphacinone for Aerial Dispersal funding proposal. Assume Army will work in conjunction with other agencies and will share costs for research on each of the following topics: Rat control via aerial dispersal Black twig borer control Two-spotted leaf hopper control Chinese rose beetle control *Euglandina rosea* control Alien mollusc control
49	**IT Annual Review** Includes 2 weeks of IT time: 1 week of meetings, and 1 week for prep and follow up. *Annual cost:*	 **35.75 k/yr**
50	**Production of Annual Progress Reports for IT Review** Annual progress reports will be organized by taxon. Annual reports will be prepared for all taxa to report on both stabilization and interim population-level measures. Reports should focus on results and conclusions, and not include raw data. *Annual cost:* Annual report (30 copies):	Assumes reports will be prepared by Implementation Plan coordinators at no additional cost. Reproduction costs: 30 copies of the annual report will be produced: **1.98 k /yr** = (0.066 k/annual report) (30 copies)

	Estimates
1. Wildland Fire Management Plan	
Write Overall FMP with Annexes (10)	
Contract out plan writing (10K /FMP)	$100K
Printing (B/W and Color) of Drafts/Final	$15K
2. Annual Implementation/Execution of WFMP	
Fire management for Army lands covered by Range Division	
For non-Army lands, the Army will assist in fuel-break maintenance costs	See Attach. 3
3. Pre-suppression Costs	
Dip Pond/Tank Construction	
(one dip pond in the Waianae Mts.)	$165K/pond
Dip Tank Annual Maintenance and Water Hauling Service Contracts	$10K/yr
Fire Protection Barriers (creation and maintenance of fuel breaks/roads)	See Attach. 3
4. Fire Suppression	
Several of the Natural Resource Specialists will be trained in wildland fire-fighting and will assist firefighters in the event of a fire.	
Fire-fighting equipment and supplies, fire-fighting training	$20K
Replacement/renewal every 5 years	$10K

Fire Management Unit (FMU)	Landowner(s)	Acres Rounded	Total Acres Rounded	Remarks
FMU-1				
Kaluakauila	U.S. America/State of Hawaii	104		Utilize weather data from Makua Military Reservation Remote Area Weather Station (RAWS)
Kahanahaiki	U.S. America	94		
Ohikilolo	U.S. America/City & County of Honolulu	200		
Lower Ohikilolo	State of Hawaii	70	468	
FMU-2				
Makaha	C&C Honolulu	163		
Kamaileunu	C&C Honolulu	5		
Waianae Kai	C&C Honolulu/State of HI	9	177	
FMU-3				
Kaena and Keawaula	State of Hawaii	52	52	Utilize weather data from Kaena Point AFS
FMU-4				
Haili to Kealia	State of Hawaii /U.S. America	30	30	Utilize RAWS (1) in Dillingham Military Reservation Fire Management Plan (FMP) Standard Operating Procedures (SOP)
FMU-5				
Kaimuhole	Dole Food/State of Hawaii	100		Possibly obtain weather data from Mt Kaala
Manuwai	State/US America/Dole Food	166	266	
FMU-6				
Keaau and Makaha	C&C Honolulu/State of HI	5	5	
FMU-7				
Puu Kumakalii	U.S. America	28	28	
FMU-8				
Pahole	State of Hawaii	215		
Upper Kapuna	State of Hawaii	224		
East Makaleha	State of Hawaii	231		
West Makaleha	State of Hawaii	93	763	

Fire Management Unit (FMU)	Landowner(s)	Acres Rounded	Total Acres Rounded	Remarks
FMU-9				
Kaluaa and Waieli	Estate of J. Campbell /U.S. America	127	375	
Ekahanui	Estate of J. Campbell /State of HI	203		
Palikea	Estate of J. Campbell /U.S. America/State of Hawaii	45		
FMU-10 (Koolaus)				
Lower Kahana	Kualoa Ranch	3	144	
Lower Opaeula	Kamehameha Schools	17		
Waiawa	Kamehameha Schools	124		

The following are only predictions for the purpose of cost estimates and are subject to change upon development of the Fire Management Plan.

MU Name	MU Perimeter (m)	Portion Assumed to be Grasses	Length to Manage for Grasses (m)	Area to be managed (acres)*	Annual Cost (1000s)**
Kaluakauila	3,598	0.50	1,799	2.71	20.27
Lower Kahanahaiki	1,000	0.50	500	0.75	5.63
Haili to Kawaihapai	2,000	0.50	1,000	1.51	11.26
Upper Kapuna	3,500	0.15	525	0.79	5.91
Mt. Kaala NAR	2,000	0.25	500	0.75	5.63

Road Name***	Road length (m)	Portion requiring fuels control	Length to mow (m)	Cost per mowing ($198/km)	Annual Cost (1000s)
Nike Site Road	10,480	1.00	10,480	2.07	4.14
Makaha Road	8,100	1.00	8,100	1.60	3.20
Honouliuli Contour Trail/Road	22,000	1.00	22,000	4.35	8.70
Lower Kaala NAR Access Road	5,000	0.66	3,300	0.65	1.30
Waiane Kai Road	2,538	0.66	1,675	0.33	0.66

*Assumes weed cutting a 20-ft corridor.

** Fuel break to be cut twice a year. See CEA 11 for cost justification.

*** Assumes roads not listed (e.g., Lualualei) will continue to be sufficiently maintained by the landowner.

				SCOPING			CLEARING			TERRAIN							COSTS					
MU Name	**Subunit**	**Construction Start Year**	**Total Proposed Length (m)**	No. of Days Required NRM (1)	**Scoping Cost (1000s) (NRM @ 0.236 k/day)**	**EOD Escort Cost (1000s)** (@ $655 / day)	**Fenceline Clearing - Grading Cost (1000s) (contracted at $9.45/m)***	No. of EOD Person Days Required (assumes 14m/day per worker and a team of 2 workers/1 EOD)	**EOD Escort / Subsurface Clearance Cost (1000s) (1 person / team @ $655 / day)**	% Moderate	% Medium	% Extreme	Total Length (m)**	Length (m) - moderate	Length (m) - medium	Length (m) - extreme	**EOD Subsurface Clearance Cost (1 person @ $655 / day)**	Construction Cost - Moderate (1,000s) ($33/m)	Construction Cost - Medium (1,000s) ($66/m)	Construction Cost - Extreme (1,000s) ($148/m)	**Total Construction Cost (1,000s)**	**Total Fencing Cost (1,000s) (Scoping, Clearing, Construction)**
Makaha	Subunit I	0	2,890	22	5.192		27.3			25%	60%	15%	2,890	723	1,734	434		23.8	#####	64.2	202.445	**234.947**
Kahanahaiki	Subunit II	1	927	12	2.832		8.8			0%	70%	30%	927	0	649	278		0.0	42.83	41.2	83.986	**95.578**
Lower Opaeula		1	1,240	10	2.36		11.7			0%	100%	0%	1,240	0	1,240	0		0.0	81.84	0.0	81.840	**95.918**
Upper Kapuna	Lower subunit	2	1,120	15	3.54		10.6			25%	75%	0%	1,120	280	840	0		9.2	55.44	0.0	64.680	**78.804**
West Makaleha		2	1,600	20	4.72		15.1			25%	60%	15%	1,600	400	960	240		13.2	63.36	35.5	112.080	**131.920**
Ekahanui	Subunit II	3	3,100	15	3.54		29.3			25%	35%	40%	3,100	775	1,085	1,240		25.6	71.61	183.5	280.705	**313.540**
East Makaleha		4	4,360	30	7.08		41.2			0%	40%	60%	4,360	0	1,744	2,616		0.0	#####	387.2	502.272	**550.554**
Keaau and Makaha		5	671	8	1.888		6.3			0%	100%	0%	671	0	671	0		0.0	44.31	0.0	44.308	**52.540**
Makaha	Subunit II	5	2,480	21	4.956		23.4			40%	60%	0%	2,480	992	1,488	0		32.7	98.21	0.0	130.944	**159.336**
Makaha	Subunit III	5	223	6	1.416		2.1			0%	60%	40%	223	0	134	89		0.0	8.83	13.2	22.032	**25.556**
Palikea	Subunit IB	5	998	12	2.832		9.4			25%	50%	25%	998	250	499	250		8.2	32.93	36.9	78.094	**90.357**
Palikea	Subunit IA	5	1,506	15	3.54		14.2			0%	50%	50%	1,506	0	753	753		0.0	49.70	111.4	161.142	**178.914**
Kaimuhole		6	2,842	15	3.54		26.9			20%	40%	40%	2,842	568	1,137	1,137		18.8	75.03	168.2	262.032	**292.429**
Waianae Kai		6	771	15	3.54		7.3			0%	15%	85%	771	0	116	655		0.0	7.63	97.0	104.625	**115.451**
Ohikilolo		7	1,200	15	3.54	9.825	11.3	171	112.29	65%	35%	0%	1,200	780	420	0	112.3	25.7	27.72	0.0	53.460	**302.736**
Manuwai		8	3,563	30	7.08		33.7			20%	20%	60%	3,563	713	713	2,138		23.5	47.03	316.4	386.942	**427.692**
Waiawa		9	2,936	24	5.664		27.7			0%	100%	0%	2,936	0	2,936	0		0.0	#####	0.0	193.776	**227.185**
Lower Kahana		9	424	6	1.416		4.0			0%	50%	50%	424	0	212	212		0.0	13.99	31.4	45.368	**50.791**
Kaluaa and Waieli	IIA	10	886	4	0.944		8.4			0%	25%	75%	886	0	222	665		0.0	14.62	98.3	112.965	**122.282**
Kaluaa and Waieli	IIB	10	985	10	2.36		9.3			0%	100%	0%	985	0	985	0		0.0	65.01	0.0	65.010	**76.678**
Kaluaa and Waieli	IIC	10	324	6	1.416		3.1			0%	0%	####	324	0	0	324		0.0	0.00	48.0	47.952	**52.430**
Kaluakauila		UA1	3,598	30	0		34.0			25%	50%	25%	3,598	900	1,799	900		29.7	#####	133.1		constructed in Urgent Actions 1
Lower Ohikilolo		UA1	150	8	0		1.4			0%	40%	60%	150	0	60	90		0.0	3.96	13.3		constructed in Urgent Actions 1
			39 km		**$73.396**	**$9.825** (EOD)	**$366.606**		**$112.29** (EOD)								**$112.29** (EOD)				**3,036.657**	**3,675.637**

* Fencelines will be scoped in preparation for submittal of CDUAs.

**KMWP = Koolau Mountains Watershed Partnership

Trigger Action Description	Trigger Action*	start year	target end year	Taxon / Taxa	MU Comments	Number of Days: Survey work	Number of Days: Office work	Number of Days: Admin support	Number of Days: Project manage-ment	Labor Cost fully burdened (subtotal)	Per Diem for days in the field	Labor + Per Diem (fully burdened)	Air Fare	Mileage
Check Makua Rim population site for germination from seed bank, Alsinidendron obovatum	plant surveys	UA2	UA2	Alsobo		5	1.25	0.50	0.25	$3,041.62	$480.00	$3,521.62		
Survey Palehua site for Alsinidendron obovatum	plant surveys	UA2	UA2	Alsobo	Not in MU's	5	1.25	0.50	0.25	$3,041.62	$480.00	$3,521.62		
Survey for additional plants, Cenchrus agrimonioides, Kanaio (E. Maui)	plant surveys	UA3	UA3	Cenagragr	Not in Management Units: Kanaio	2	0.50	0.20	0.10	$1,216.65	$192.00	$1,408.65	$300.00	
Survey for historical populations in E. Makaleha, Makaha (valley bottom) and Pualii, Cenchrus agrimonioides	plant surveys	UA3	UA3	Cenagragr	Not in Management Units: Makaha (valley bottom) and Pualii.	4	1.00	0.40	0.20	$2,433.30	$384.00	$2,817.30		
Survey in and out of AA for additional populations (including historic SE Koolau population [Niu]), Chamaesyce celastroides kaenana	plant surveys	UA1	UA1	Chacelkae	Not in Management Units: Niu.	0	0.00	0.00	0.00	$0.00	$0.00	$0.00		
Resurvey for Ekahanui population, and other potential habitat, Chamaesyce herbstii	plant surveys	UA3	UA3	Chaher		4	1.00	0.40	0.20	$2,433.30	$384.00	$2,817.30		
Survey for presence of N. Kaluaa population, Cyanea grimesiana obatae	plant surveys	UA2	UA2	Cyagrioba		5	1.25	0.50	0.25	$3,041.62	$480.00	$3,521.62		
Survey for additional individuals along Kamaileunu Ridge	plant surveys	UA3	UA3	Dubher	Some not in MU's	2	0.50	0.14	0.10	$1,200.63	$192.00	$1,392.63		
Survey for Molokai plants (Waianui and nearby gulches as well as other appropriate habitat elsewhere on Molokai), Flueggea neowawraea	plant surveys	UA3	UA3	Fluneo	Not in MU's	3	0.75	0.30	0.15	$1,824.97	$288.00	$2,112.97	$600.00	
Survey for Hibbra on Molokai	plant surveys	UA2	UA2	Hibbramok		6	1.50	0.60	0.3	$3,649.94	$576.00	$4,225.94		
Survey appropriate habitat in the Waianae Mountains for more Hibiscus brackenridgei mokuleianus prior to determining management unit boundaries and reintroduction sites	plant surveys	UA2	UA2	Hibbramok	Some not in MU's	25	6.25	2.50	1.25	$15,208.10	$2,400.00	$17,608.10		
Survey for populations of Neraudia angulata (all varieties) prior to initiating in situ management. Reevaluate reintroduction sources if no new populations found	plant surveys	UA3	UA3	Nerangang	Some not in MU's	5	1.25	0.60	0.25	$3,068.32	$480.00	$3,548.32		
Survey for Nerangden (in/out of AA, relocate / visit known populations, additional populations)	plant surveys	UA1	UA1	Nerangden		0	0.00	0.00	0.00	$0.00	$0.00	$0.00		

*Survey assumptions: Joel Lau to conduct surveys. Army to supply a person to accompany Joel on survey work. HINHP to administer project.

Trigger Action Description	Trigger Action*	start year	target end year	Taxon / Taxa	MU Comments	Number of Days: Survey work	Number of Days: Office Work	Number of Days: Admin support	Number of Days: Project manage-ment	Labor Cost fully burdened (subtotal)	Per Diem for days in the field	Labor + Per Diem (fully burdened)	Air Fare	Mileage
Survey for Maui population (Lualailua, Maui) and collect propagules if rediscovered, Nototrichium humile	plant surveys	UA1	UA1	Nothum		0	0.00	0.00	0.00	$0.00	$0.00	$0.00		
Survey for Phyllostegia kaalaensis at Honouliuli	plant surveys	UA3	UA3	Phykaa		4	1.00	0.40	0.20	$2,433.30	$384.00	$2,817.30		
Survey at Puu Kanehoa, Sanicula mariversa	plant surveys	UA3	UA3	Sanmar		2	0.50	0.20	0.10	$1,216.65	$192.00	$1,408.65		
Survey for additional populations (includes Koolau sites), Schiedea kaalae	plant surveys	UA3	UA3	Schkaa		5	1.25	0.75	0.25	$3,108.38	$480.00	$3,588.38		
Survey historical occurrences, Schiedea nuttallii: Koolau Mountains	plant surveys	UA2	UA2	Schnut	Some not in MU's	32	8.00	3.20	1.60	$19,466.37	$3,072.00	$22,538.37		
Survey appropriate habitat on Kamaileunu Ridge (Waianae Kai and Makaha sides), Tetramolopium filiforme	plant surveys	UA2	UA2	Tetfil		5	1.25	0.50	0.25	$3,041.62	$480.00	$3,521.62		
Survey to determine morphological variability between and within populations (and in hybrids if any are found), Tetramolopium filiforme	plant surveys	UA1	UA1	Tetfil		0	0.00	0.00	0.00	$0.00	$0.00	$0.00		
Total Days						**114**	**29**	**12**	**6**	**$69,426.37**	**$10,944.00**	**$80,370.37**	**$900.00**	**$1,004.40**

*Survey assumptions: Joel Lau to conduct surveys. Army to supply a person to accompany Joel on survey work. HINHP to administer project.

$82,274.77 HINHP Total Cost, including air fare, per diem, mileage, and administration costs.

Attachment 6 Acres for MU-Level Threat Management

Acres to be managed for threats on an MU level were calculated by taking the total MU acreage and subtracting the area that will be managed on a population unit level (i.e., the area within a 50m radius around all 'manage for stability' population units).

ISLAND	MU name	SUB_UNIT	MU TOTAL	PU managed acres	MU managed acres
Oahu	East Makaleha		231	8	223
Oahu	Ekahanui	Sub Unit I	44	4	40
Oahu	Ekahanui	Sub Unit II	159	10	149
Oahu	Haili to Kealia	Sub Unit I	20	2	18
Oahu	Haili to Kealia	Sub Unit II	10	0	10
Oahu	Kaena	Sub Unit I	16	2	14
Oahu	Kaena	Sub Unit II	36	2	34
Oahu	Kahanahaiki	Sub Unit I	63	14	49
Oahu	Kahanahaiki	Sub Unit II	31	12	19
Oahu	Kaimuhole		100	2	98
Oahu	Kaluaa and Waieli	Sub Unit IIA	9	4	5
Oahu	Kaluaa and Waieli	Sub Unit IIB	11	2	9
Oahu	Kaluaa and Waieli	Sub Unit IIC	8	2	6
Oahu	Kaluaa and Waieli	Sub Unit III	99	8	91
Oahu	Kaluakauila		104	2	102
Oahu	Kamaileunu		5	2	3
Oahu	Keaau and Makaha		5	2	3
Oahu	Lower Kahana		3	2	1
Oahu	Lower Ohikilolo		70	6	64
Oahu	Lower Opaeula		17	2	15
Oahu	Makaha	Sub Unit I	96	12	84
Oahu	Makaha	Sub Unit II	66	6	60
Oahu	Makaha	Sub Unit III	1	4	0
Oahu	Manuwai		166	6	160
Oahu	Ohikilolo		200	26	174
Oahu	Pahole		215	28	187
Oahu	Palikea	Sub Unit IA	21	4	17
Oahu	Palikea	Sub Unit IB	11	2	9
Oahu	Palikea	Sub Unit IV	9	2	7
Oahu	Palikea	Sub Unit V	4	2	2
Oahu	Puu Kumakalii		28	4	24
Oahu	Upper Kapuna	Sub Unit I	182	20	162
Oahu	Upper Kapuna	Sub Unit II	42	4	38
Oahu	Waianae Kai		9	4	5
Oahu	Waiawa		124	2	122
Oahu	West Makaleha		93	10	83
	TOTAL ACREAGE:		**2,307**	**224**	**2,086**

Taxon	Collection Days (NRM/NRS)	Notes	Living Collection Recommended ?	Justification for taxa not being considered for living representation of small populations *	Justification for taxa considered for living collections and the populations recommended for representation
Alectryon macrococcus var. macrococcus	16	predator control	No	Plants on a given volcano all morphologically and ecologically alike. Plants dying off slowly.	
Alsinidendron obovatum	4		No		Short-lived species West Makaleha Plants at Bill Garnett's greenhouse (There are a couple of clones there of unknown origin that look very different from the Kahanahaiki ones. They should be maintained until we can be sure that the stocks they represent are secure in the wild or elsewhere.) [Kahanahaiki – no need for living representation since there are lots of backup plants in the ground in Kahanahaiki]
Cenchrus agrimonioides var. agrimonioides	8		Yes		Short-lived species. Propagate plants for seed production for storage.
Chamaesyce celastroides kaenana	8		No	Ecological variation (coastal vs. inland cliffs) already represented by sizeable populations. Long-lived. Plants tough. No history of rapid decline. Even small populations would not go out suddenly.	
Chamaesyce herbstii	8		No		
Cyanea grimesiana obatae	6		No		
Cyanea longiflora	6		No		Cyaneas in general can decline quickly. Makaha and Waianae Kai
Cyanea superba ssp. superba	6	predator control	No	The known genetic material is already secure.	
Cyrtandra dentata	8		No	Ample material from both the Waianaes and Koolaus available. Population structure in the wild is good, so not much fear of populations dying off quickly.	

Taxon	Collection Days (NRM/NRS)	Notes	Living Collection Recommended ?	Justification for taxa not being considered for living representation of small populations *	Justification for taxa considered for living collections and the populations recommended for representation
Delissea subcordata	6		Yes		Short-lived species Ekahanui, Kaluaa, Palawai, Kahanahaiki, Palikea Gulch, South Mohiakea
Dubautia herbstobatae	3	easy to propagate from cuttings	Yes		Short-lived species, centered in Makua AA: Kamaileunu (material from the single plant already in cultivation; no need to recollect unless more plants are found) Waianae Kai
Flueggea neowawraea	16	may need cross pollination	Yes	Plants dying out slowly. No sudden downswings seen. (For neighbor islands, see right)	
Hedyotis degeneri degeneri	8		No	Immature plants are present in fair numbers, therefore no rapid declines expected.	
Hedyotis parvula	8		Yes		Short-lived species No populations recommended at this time
Hesperomannia arbuscula	8		Yes		Except for the West Maui population units (since they are probably going to end up as H. arborescens) (Can decline rapidly it seems. Seed big, seemingly not too likely to be able to be stored).
Hibiscus brackenridgei ssp. mokuleianus	3	easy to propagate from cuttings	Yes		If a lot of seed is found, then there is no need to have living representatives growing. If only non-fertile plants are found, then living representatives will be needed, but maybe only until seed can be obtained from the living plants: Makua Kaumoku Nui Kaimuhole and Palikea Gulch Kihakapu Kealia Propagate plants for seed production for storage.
Lipochaeta tenuifolia	3	easy to propagate from cuttings	Yes		Very poor germination rate [see Stab Plan]) Ohikilolo Makai Storage plants in micropropagation.
Neraudia angulata	16	unpredic-table	Yes		Waianae Kai Makai (These are the only strict var. angulata known outside the AA.) Kapuna (These are the only strict var. dentata plants known.) Puu Kaua [Halona material would be okay to use on Puu Kaua] Propagate plants for seed production for storage.

Taxon	Collection Days (NRM/NRS)	Notes	Living Collection Recommended ?	Justification for taxa not being considered for living representation of small populations *	Justification for taxa considered for living collections and the populations recommended for representation
Nototrichium humile	8	really easy to grow from cuttings	No		Store plants in micropropagation.
Phyllostegia kaalaensis	3	unknown flowering times but easy to grow from cuttings	Yes		Store plants in micropropagation.
Plantago princeps var. princeps	12		Yes		Short-lived species Waiawa (Only Koolau ones known. Habitat very different from the rest.) [North branch of North Palawai – not important since they are pretty close to the south branch ones.] Propagate plants for seed production for storage.
Pritchardia kaalae	16	pred control	No	Long-lived. Numbers declining very slowly.	
Sanicula mariversa	6		No		
Schiedea kaalae	16	unpredic-table but easy to grow from cuttings	No		
Schiedea nuttallii	8	easy to propagate from cuttings	Yes		Short-lived species, currently centered in Makua AA): Kapuna and Keawapilau Ridge
Tetramolo-pium filiforme	8		Yes		Short-lived species, centered in Makua AA: Puhawai (Wettest of all T. filiforme). Waianae Kai Propagate plants for seed production for storage.
Viola chamisso-niana ssp. chamisso-niana	8	easy to propagate from cuttings	No		Propagate plants for seed production for storage.

* If new significant populations comes to light, then there may have to be some reconsideration (e.g. if new *Cyanea superba* is found)

Units	Description	Cost per Unit (1000s)	Total (1000s)
Computer Systems			
1	GIS Computer Systems	3.70	
	2 Ghz or higher		
	500+ MB Ram		
	250 GB hard drive		
	CD-RW		
	Internal Zip Drive		
	21" Monitor		
	128 MB Video RAM		
1	1 Roll Paper and 1 extra ink	0.30	
1	Misc. Support Software	1.50	
1	ArcView 3.X or 8.X Software	1.00	
	Total (1 GIS computer system)	**6.50**	
1	Computer System (general office use)	1.7	
	19” Monitor		
1	1 Roll Paper and 1 extra ink	0.30	
1	Misc. Support Software	1.50	
	Total (1 general computer system)	**3.5**	
Field Equipment			
1	Hand Held PDA (Palm Pilot or other)	0.55	
1	Add CF memory cards & adapters	0.25	
1	Software: ArcPad or Terrasync	0.50	
1	Digital Cameras 5+ Mega pixel	0.70	
1	Add CF memory cards	0.15	
	Total (1 field system)	**2.15**	
Trimble Systems			
1	Trimble Geoexplorer GPS	4.00	
1	Trimble Pocket Pathfinder	0.50	
Server			
1	HP DesignJet Plotter	10.00	10.00
	160 MB RAM		
1	Dell 4400 PowerEdge Server	12.00	12.00
	Dual Xeon 1 Ghz		0.00
	4.6 GB RAM		
	2 36.2 MB SCSI hard drives		
1	Backup DLT	2.00	2.00
2	Firewall Software	1.00	2.00
2	Servlet Exec (2 CPU)	1.30	2.60
2	Misc. cables, etc.	1.80	3.60
	Total (1 server / plotter system)	**28.10**	**32.2**

Personnel		w/out benefits	w/ benefits
1	GIS specialist / analyst (with 3 years programming experience)	60.00	78.00
1	Database Manager	45.00	58.50
2	Data Technicians (2)	60.00	78.00
	Total (technology support staff)	**165.00**	**201.50**

Chapter 4-2 Summary of Major Cost Estimates by Year

Annual Cost (1000s)

Year	0*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total (1000s)
Administrative Personnel and Staff																						
Administrators																						
Implementation Coordinators (2) Monitoring Specialist (1)	180	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	**5,320**
Administrative Assistants (1)	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	**882**
Army Environmental Field Staff																						
NRM (variable numbers)	196	225	235	230	235	245	240	235	245	245	245	240	240	240	240	240	240	240	240	240	240	**4,978**
NRS (variable numbers)	456	703	714	730	726	737	749	752	768	783	783	783	783	783	783	783	783	783	783	783	783	**15,728**
NRW (variable numbers)	0	29	35	38	44	46	49	49	52	58	58	58	58	58	58	58	58	58	58	58	58	**1,038**
Support Staff																						
Horticulturist (1) and Assistant (1)	67	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	**2,195**
GIS/Database Specialist (1)	0	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	**1,680**
Achatinella Captive Propagation Assistant (1)	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	**1,061**
Seed Storage assistant (1)	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	**1,071**
Tissue culture assistant (1)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	**998**
Community Outreach Coordinator (1)	0	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	**980**
Ungulate control specialist (1)	0	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	**1,260**
Summer Interns																						
Summer Internship Program (3)	12	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	**372**
Fire Management																						
Fire Management Plan Development		100																				**100**
Fire Management Actions (Fire cache supplies)		20					10					10					10					**50**
Road Maintenance (for contract road maintenance)		32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	**640**
Fencing																						
Initial Clearing, Grading and Construction for MU Fences Starting in Year 11: Fence wire and post replacement	200	192	193	313	551	507	408	303	428	278	251	149	101	83	88	140	251	209	183	139	194	**5,161**
MU Fence Maintenance		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	**400**
Snail Exclosures, construction and maintenance		12	14	16	17	18	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	**197**
CDUA and NEPA document production		1	0.6	0.3	0.3	0.9	0.6	0.3	0.3	0.6	0.3											**5**
Facilities																						
Staff Facilities (Rentals)	0	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	**960**
Greenhouse (Quarantine and Growing Facility) Construction and equipment		55	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	**245**
Additional Support Systems																						
Transportation																						
Helicopter Support		214	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214	**4,280**
Vehicles (purchases, repairs, and maintenance)	55	67	73	76	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	**1,614**

Year	0*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total (1000s)
Technological Support																						
Computer Systems (hardware and software) Initial purchase & replacement costs	12	24	7	7	7	7	7	17	7	7	7	7	7	7	17	7	7	7	7	7	7	**189**
Field Systems (GPS, palm pilots, etc) Initial purchase and replacement costs		24	6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	**84**
Equipment and Supplies																						
Field Communications and Service	10	55	20	23	27	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	**599**
Threat Control Equipment and Supplies (includes safety equipment) (initial purchase and replacement)		16	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	**82**
Field supplies (initial purchase and replacement)		77	50	41	41	43	43	43	45	45	45	45	45	45	45	45	45	45	45	45	45	**923**
Annual Allowance for Field Staff	9	10	10	10	10	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	**222**
Office Furniture, Machines, Supplies	0	52	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	**451**
Plant Propagation Facility Annual Supplies	10	47	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	**665**
Staff Training																						
Annual Safety Trainings (First Aid, CPR, hunter safety, power tool use, helicopter operations, rappel, etc.)	15	27	25	26	25	27	27	27	28	28	28	28	28	28	28	28	28	28	28	28	28	**564**
Hawaii Conservation Conference	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	**78**
Other																						
Research																						
Area-wide Threat Control Research			100			100			100			100			100			100			100	**700**
Annual Implementation Team Review																						
Annual IT meetings and review	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	**752**
Production of Annual Reports	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	**42**
EOD support for management in UXO areas:																						
EOD contract:			30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	**561**
Total Cost Estimate of Staff:	**1,102**	**1,726**	**1,753**	**1,766**	**1,773**	**1,797**	**1,806**	**1,805**	**1,833**	**1,854**	**1,854**	**1,849**	**1,849**	**1,849**	**1,849**	**1,849**	**1,849**	**1,849**	**1,849**	**1,849**	**1,849**	**37,563**
Total Cost Estimate of Major Items:	**351**	**1,133**	**949**	**966**	**1,209**	**1,276**	**1,077**	**971**	**1,190**	**941**	**914**	**921**	**763**	**745**	**860**	**802**	**923**	**971**	**845**	**801**	**955**	**19,562**
Total Cost Estimate:	**1,453**	**2,858**	**2,702**	**2,732**	**2,982**	**3,073**	**2,883**	**2,776**	**3,023**	**2,795**	**2,768**	**2,771**	**2,612**	**2,594**	**2,710**	**2,652**	**2,772**	**2,821**	**2,695**	**2,650**	**2,805**	**57,125**
TOTAL ANNUAL COST (with 17% contracting agency overhead):	**1,700**	**3,344**	**3,161**	**3,196**	**3,489**	**3,595**	**3,373**	**3,248**	**3,537**	**3,270**	**3,238**	**3,242**	**3,057**	**3,035**	**3,170**	**3,102**	**3,244**	**3,300**	**3,153**	**3,101**	**3,281**	**66,836**

Calculations including 4% Salary Increase:																						
Total Cost Estimate of Staff with 4% Increase:	---	**1,726**	**1,822**	**1,908**	**1,991**	**2,095**	**2,188**	**2,274**	**2,393**	**2,510**	**2,611**	**2,710**	**2,818**	**2,931**	**3,048**	**3,170**	**3,297**	**3,429**	**3,566**	**3,709**	**3,857**	**54,055**
Total Cost Estimate (including salary increase):	---	**2,858**	**2,741**	**2,844**	**3,171**	**3,341**	**3,235**	**3,216**	**3,554**	**3,421**	**3,495**	**3,602**	**3,552**	**3,646**	**3,879**	**3,943**	**4,191**	**4,371**	**4,382**	**4,480**	**4,783**	**72,706**
TOTAL ANNUAL COST (with overhead and 4% annual salary increase):		**3,344**	**3,207**	**3,328**	**3,710**	**3,909**	**3,785**	**3,763**	**4,158**	**4,003**	**4,089**	**4,214**	**4,156**	**4,266**	**4,539**	**4,613**	**4,903**	**5,114**	**5,127**	**5,242**	**5,596**	**85,066**

***** In year 0, key administrative and support staff will be hired to direct program initiation in year 1.

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
1	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
1	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
1	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
1	Construct exclosure, Achatinella mustelina, one of 6 identified ESU locations (Schofield West Range).	construct exclosure	Achmus	1 exclosure	1	10	10.0	See CEA 26	10.0				
1	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	maintenance	Achmus	1 exclosure	3	1	3.0	See CEA 26		3.0			
1	Kahanahaiki, subunit II fence, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		95.6	See CEA 14 and CEA 15	95.6				
1	Scope Fence, Kahanahaiki, subunit II	fence	multiple	1 day	12	0.236	2.832	See CEA 13 (costs included in fence building total)			0.058		
1	Lower Opaeula fence, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		95.9	See CEA 14 and CEA 15	95.9				
1	Scope Fence, Lower Opaeula	fence	multiple	1 day	10	0.236	2.36	See CEA 13 (costs included in fence building total)			0.048		
1	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
1	Write and submit CDUA for fence construction	plan development	multiple	1 application	3	0.3	0.9	see CEA 6	0.9				
1	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	28	0.7	19.6	see CEA 44		19.6			
1	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement)	equipment and supplies	multiple	1 person	26	0.6	15.6	See CEA 44		15.6			
1	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	26	1.5	39.0	see CEA 44		39.0			
1	Field supplies, initial purchase (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	26	1.475	38.4	see CEA 44	38.4				
1	Communications equipment, initial purchase (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	28	1.25	35.0	see CEA 44	35.0				
1	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	28	0.35	9.8	see CEA 44		9.8			
1	Fire fighting equipment and supplies	fire management	multiple	1 cache	1	20	20.0	see CEA 10		20.0			
1	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
1	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
1	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
1	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
1	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
1	Development of fire management plans for 10 fire management units	fire management	multiple	1 FMP	10	10	100.00	see CEA 9	100.00				
1	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
1	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
1	Initial office furniture purchase	equipment and supplies	multiple	1 facility	1	31.2	31.2	see CEA 38	31.2				
1	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
1	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	Achmus	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
1	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	Alemacmac	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	Alemacmac	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	Alemacmac	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	Alsobo	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	Alsobo	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	Alsobo	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	Cenagragr	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	Cenagragr	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	Cenagragr	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	Chacelkae	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	Chacelkae	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	Chacelkae	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	Chaher	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	Chaher	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	Chaher	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	Cyagrioba	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
1	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	Cyagrioba	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	Cyagrioba	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	Cyalon	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage for stability, Cyanea longiflora, Pahole	manage for stability	Cyalon	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	Cyalon	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	Cyasupsup	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	Cyasupsup	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	Cyasupsup	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	Cyrden	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	Cyrden	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	Cyrden	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	Delsub	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	Delsub	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	Delsub	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	Dubher	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	Dubher	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	Dubher	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	Fluneo	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	Fluneo	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	Fluneo	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	Heddegdeg	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	Heddegdeg	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	Heddegdeg	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Hedyotis parvula, Halona	manage for stability	Hedpar	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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1	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	Hedpar	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	Hedpar	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	Hesarb	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	Hesarb	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	Hesarb	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	Hibbramok	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	Hibbramok	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	Hibbramok	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	Lipten	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	Lipten	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	Lipten	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	Nerang	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	Nerang	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	Nerang	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	Nothum	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	Nothum	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Nototrichium humile, Makaha	manage for stability	Nothum	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	Phykaa	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	Phykaa	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	Phykaa	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	Plapripri	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	Plapripri	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	Plapripri	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	Prikaa	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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1	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	Prikaa	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	Prikaa	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Sanicula mariversa, Keaau	manage for stability	Sanmar	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
1	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	Sanmar	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
1	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	Sanmar	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
1	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	Schkaa	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	Schkaa	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Schiedea kaalae, Pahole	manage for stability	Schkaa	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	Schnut	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	Schnut	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
1	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	Schnut	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	Tetfil	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	Tetfil	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	Tetfil	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	Manage for stability, Viola chamissoniana, Makaha	manage for stability	Viochacha	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	Viochacha	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
1	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	Viochacha	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
1	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
1	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	11	2.98	32.8	See CEA 24		32.8		0.863	
1	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
1	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			
1	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
1	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
1	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
1	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
1	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
1	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
1	Greenhouse benches, watering system for new facility	equipment and supplies	multiple		1	15	15.0	See CEA 33	15.0				
1	Plant Quarantine House construction	facility	multiple	1 facility	1	50	50.0	See CEA 35	50.0				
1	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
1	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
1	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
1	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
1	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
1	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
1	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
1	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
1	Equipment rental for road maintenance	equipment and supplies	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
1	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
1	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
1	Technological support for field staff, GPS and digital cameras - initial purchase	technology	multiple	1 field system	8	2.95	23.6	see CEA 43	23.6				
1	Technological support for field staff, GIS plotter	technology	multiple	1 plotter	1	10	10.0	see CEA 43	10.0				
1	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), initial purchase	technology	multiple	1 computer	4	3.5	14.0	See CEA 42	14.0				
1	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
1	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
1	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
1	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
1	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
1	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086

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1	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
1	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
1	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
1	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
1	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
1	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
1	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
1	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
1	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
1	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
1	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	30	0.5	15.0	See CEA 45		15.0			
1	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	14	0.02	0.3	See CEA 45		0.3			
1	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	30	0.22	6.6	See CEA 45		6.6			
1	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	24	0.15	3.6	See CEA 45		3.6			
1	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	15	0.325	4.9	See CEA 45		4.9			
1	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
1	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
1	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	4	3	12.0	see CEA 41		12.0			
x	**Revised Cost of Year 1 actions**								**574.555**	**2,282.006**	**4.6**	**18.5**	**1.0**
2	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
2	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
2	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
2	Construct exclosure, Achatinella mustelina, one of 6 identified ESU locations (Makaha).	construct exclosure	Achmus	1 exclosure	1	10	10.0	See CEA 26	10.0				
2	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	maintenance	Achmus	1 exclosure	4	1	4.0	See CEA 26		4.0			
2	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
2	Upper Kapuna, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		119.1	See CEA 14 and CEA 15	78.8				
2	Scope Fence, Upper Kapuna	fence	multiple	1 day	15	0.236	3.54	See CEA 13 (costs included in fence building total)			0.072		
2	West Makaleha fence, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		113.9	See CEA 14 and CEA 15	113.9				
2	Scope Fence, West Makaleha	fence	multiple	1 day	20	0.236	4.72	See CEA 13 (costs included in fence building total)			0.096		
2	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
2	Write and submit CDUA for fence construction	plan development	multiple	1 application	2	0.3	0.6	see CEA 6	0.6				
2	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	28	0.7	19.6	see CEA 44		19.6			
2	Field supplies, replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	2	1.475	3.0	see CEA 44		3.0			
2	Equipment (camping gear, theat management gear, telecommuncations gear - annual costs)	equipment and supplies	multiple	1 person	24	0.6	14.4	See CEA 44		14.4			
2	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	24	1.5	36.0	see CEA 44		36.0			
2	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	28	0.35	9.8	see CEA 44		9.8			
2	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
2	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
2	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
2	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
2	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
2	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
2	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
2	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
2	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	Achmus	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	

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2	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	Alemacmac	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	Alemacmac	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	Alemacmac	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	Alsobo	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	Alsobo	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	Alsobo	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	Cenagragr	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	Cenagragr	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	Cenagragr	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	Chacelkae	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	Chacelkae	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	Chacelkae	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	Chaher	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	Chaher	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	Chaher	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	Cyagrioba	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	Cyagrioba	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	Cyagrioba	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	Cyalon	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage for stability, Cyanea longiflora, Pahole	manage for stability	Cyalon	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	Cyalon	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	Cyasupsup	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	Cyasupsup	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	Cyasupsup	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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2	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	Cyrden	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	Cyrden	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	Cyrden	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	Delsub	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	Delsub	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	Delsub	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	Dubher	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	Dubher	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	Dubher	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	Fluneo	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	Fluneo	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	Fluneo	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	Heddegdeg	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	Heddegdeg	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	Heddegdeg	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Hedyotis parvula, Halona	manage for stability	Hedpar	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	Hedpar	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	Hedpar	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	Hesarb	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	Hesarb	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	Hesarb	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	Hibbramok	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	Hibbramok	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	Hibbramok	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
2	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	Lipten	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	Lipten	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	Lipten	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	Nerang	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	Nerang	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	Nerang	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	Nothum	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	Nothum	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Nototrichium humile, Makaha	manage for stability	Nothum	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	Phykaa	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	Phykaa	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	Phykaa	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	Plapripri	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	Plapripri	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	Plapripri	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	Prikaa	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	Prikaa	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	Prikaa	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Sanicula mariversa, Keaau	manage for stability	Sanmar	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
2	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	Sanmar	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
2	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	Sanmar	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
2	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	Schkaa	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	Schkaa	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Schiedea kaalae, Pahole	manage for stability	Schkaa	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	Schnut	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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2	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	Schnut	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
2	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	Schnut	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	Tetfil	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	Tetfil	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	Tetfil	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	Manage for stability, Viola chamissoniana, Makaha	manage for stability	Viochacha	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	Viochacha	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
2	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	Viochacha	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
2	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
2	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	13	2.98	38.7	See CEA 24		38.7		1.019	
2	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
2	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			
2	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
2	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
2	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
2	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
2	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
2	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
2	Greenhouse benches and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33	5.0				
2	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
2	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
2	Research on threat control methods	research	multiple	1 year	1	100	100.0	see CEA 48	100.0				
2	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
2	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			

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2	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
2	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
2	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
2	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
2	Equipment rental for road maintenance	equipment and supplies	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
2	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
2	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
2	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
2	Technological support for field staff, GPS and digital cameras - initial purchase	technology	multiple	1 field system	2	2.95	5.9	see CEA 43	5.9				
2	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
2	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
2	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
2	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
2	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
2	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
2	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
2	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
2	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
2	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
2	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
2	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
2	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
2	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
2	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
2	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154

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2	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
2	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079
2	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
2	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	28	0.5	14.0	See CEA 45		14.0			
2	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	12	0.02	0.2	See CEA 45		0.2			
2	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	28	0.22	6.2	See CEA 45		6.2			
2	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	23	0.15	3.5	See CEA 45		3.5			
2	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	14	0.325	4.6	See CEA 45		4.6			
2	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
2	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
2	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	6	3	18.0	see CEA 41		18.0			
x	**Revised Cost of Year 2 actions**								**376.224**	**2,316.488**	**4.8**	**18.8**	**1.2**
3	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
3	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
3	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
3	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
3	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	29	0.7	20.3	see CEA 44		20.3			
3	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	2	1.25	2.5	see CEA 44	2.5				
3	Equipment (camping gear, theat management gear, telecommuncations gear - annual costs)	equipment and supplies	multiple	1 person	5	0.6	3.0	See CEA 44		3.0			
3	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	25	1.5	37.5	see CEA 44		37.5			
3	Field supplies, initial purchase (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	2	1.475	3.0	see CEA 44	3.0				
3	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	29	0.35	10.2	see CEA 44		10.2			
3	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
3	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
3	Greenhouse benches and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33	5.0				
3	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
3	Construct exclosure, Achatinella mustelina, one of 6 identified ESU locations (Puu Kaua).	exclosure construction	Achmus	1 exclosure	1	10	10.0	See CEA 26	10.0				
3	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	6	1	6.0	See CEA 26		6.0			
3	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
3	Ekahanui, subunit II, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		313.5	See CEA 14 and CEA 15	313.5				
3	Scope Fence, Ekahanui, subunit II	fence	multiple	1 day	15	0.236	3.54	See CEA 13 (costs included in total fence building cost)			0.072		
3	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
3	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
3	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
3	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
3	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
3	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
3	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
3	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	Achmus	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
3	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	Alemacmac	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	Alemacmac	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	Alemacmac	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	Alsobo	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	Alsobo	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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3	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	Alsobo	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	Cenagragr	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	Cenagragr	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	Cenagragr	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	Chacelkae	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	Chacelkae	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	Chacelkae	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	Chaher	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	Chaher	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	Chaher	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	Cyagrioba	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	Cyagrioba	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	Cyagrioba	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	Cyalon	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage for stability, Cyanea longiflora, Pahole	manage for stability	Cyalon	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	Cyalon	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	Cyasupsup	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	Cyasupsup	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	Cyasupsup	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	Cyrden	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	Cyrden	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	Cyrden	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	Delsub	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	Delsub	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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3	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	Delsub	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	Dubher	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	Dubher	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	Dubher	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	Fluneo	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	Fluneo	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	Fluneo	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	Heddegdeg	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	Heddegdeg	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	Heddegdeg	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Hedyotis parvula, Halona	manage for stability	Hedpar	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	Hedpar	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	Hedpar	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	Hesarb	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	Hesarb	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	Hesarb	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	Hibbramok	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	Hibbramok	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	Hibbramok	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	Lipten	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	Lipten	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	Lipten	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	Nerang	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	Nerang	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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3	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	Nerang	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	Nothum	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	Nothum	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Nototrichium humile, Makaha	manage for stability	Nothum	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	Phykaa	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	Phykaa	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	Phykaa	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	Plapripri	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	Plapripri	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	Plapripri	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	Prikaa	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	Prikaa	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	Prikaa	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Sanicula mariversa, Keaau	manage for stability	Sanmar	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
3	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	Sanmar	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
3	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	Sanmar	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
3	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	Schkaa	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	Schkaa	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Schiedea kaalae, Pahole	manage for stability	Schkaa	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	Schnut	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	Schnut	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
3	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	Schnut	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	Tetfil	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	Tetfil	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	

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3	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	Tetfil	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	Manage for stability, Viola chamissoniana, Makaha	manage for stability	Viochacha	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	Viochacha	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
3	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	Viochacha	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
3	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
3	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	14	2.98	41.7	See CEA 24		41.7		1.098	
3	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			
3	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
3	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
3	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
3	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
3	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
3	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
3	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
3	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
3	Write and submit CDUA for fence construction	plan development	multiple	1 application	1	0.3	0.3	see CEA 6	0.3				
3	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
3	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
3	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
3	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
3	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
3	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
3	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
3	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			

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3	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
3	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
3	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
3	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
3	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142
3	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
3	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
3	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
3	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
3	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
3	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
3	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
3	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
3	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
3	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
3	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
3	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
3	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
3	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
3	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
3	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
3	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079
3	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	29	0.5	14.5	See CEA 45		14.5			
3	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	13	0.02	0.3	See CEA 45		0.3			
3	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	29	0.22	6.4	See CEA 45		6.4			

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3	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	15	0.325	4.9	See CEA 45		4.9			
3	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	24	0.15	3.6	See CEA 45		3.6			
3	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
3	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
3	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	7	3	21.0	see CEA 41		21.0			
x	**Revised Cost of Year 3 actions**								**399.240**	**2,332.210**	**4.7**	**19.2**	**1.3**
4	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
4	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
4	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
4	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
4	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	29	0.7	20.3	see CEA 44		20.3			
4	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	5	1.25	6.3	see CEA 44		6.3			
4	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	5	0.6	3.0	See CEA 44		3.0			
4	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	25	1.5	37.5	see CEA 44		37.5			
4	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	2	1.475	3.0	see CEA 44		3.0			
4	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	29	0.35	10.2	see CEA 44		10.2			
4	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
4	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
4	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			
4	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
4	Construct exclosure, Achatinella mustelina, one of 6 identified ESU locations (Puu Palikea).	exclosure construction	Achmus	1 exclosure	1	10	10.0	See CEA 26	10.0				
4	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	7	1	7.0	See CEA 26		7.0			

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4	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
4	East Makaleha, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		550.6	See CEA 14 and CEA 15	550.6				
4	Scope Fence, East Makaleha	fence	multiple	1 day	30	0.236	7.08	See CEA 13 (costs included in total fence building cost)			0.144		
4	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
4	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
4	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
4	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
4	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
4	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
4	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
4	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
4	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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4	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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4	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	
4	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	

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4	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
4	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
4	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
4	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
4	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
4	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
4	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
4	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	15	2.98	44.7	See CEA 24		44.7		1.176	

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4	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			
4	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
4	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
4	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
4	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
4	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
4	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
4	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
4	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
4	Write and submit CDUA for fence construction	plan development	multiple	1 application	1	0.3	0.3	see CEA 6	0.3				
4	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
4	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
4	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
4	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
4	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
4	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
4	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
4	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
4	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
4	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
4	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
4	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
4	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038

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4	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142
4	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
4	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
4	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
4	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
4	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
4	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
4	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
4	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
4	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
4	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
4	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
4	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
4	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
4	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
4	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
4	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
4	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079
4	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	29	0.5	14.5	See CEA 45		14.5			
4	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	13	0.02	0.3	See CEA 45		0.3			
4	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	29	0.22	6.4	See CEA 45		6.4			
4	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	15	0.325	4.9	See CEA 45		4.9			
4	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	24	0.15	3.6	See CEA 45		3.6			
4	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
4	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
4	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			
x	**Revised Cost of Year 4 actions**								**625.800**	**2,351.129**	**4.8**	**19.1**	**1.5**
5	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
5	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
5	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
5	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
5	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	30	0.7	21.0	see CEA 44		21.0			
5	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	6	1.25	7.5	see CEA 44		7.5			
5	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	6	0.6	3.6	See CEA 44		3.6			
5	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	26	1.5	39.0	see CEA 44		39.0			
5	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	3	1.475	4.4	see CEA 44		4.4			
5	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	30	0.35	10.5	see CEA 44		10.5			
5	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
5	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
5	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			
5	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
5	Construct exclosure, Achatinella mustelina, one of 6 identified ESU locations (East Makaleha).	exclosure construction	Achmus	1 exclosure	1	10	10.0	See CEA 26	10.0				
5	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	8	1	8.0	See CEA 26		8.0			
5	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
5	Keaau and Makaha, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		52.5	See CEA 14 and CEA 15	52.5				
5	Scope Fence, Keaau and Makaha	fence	multiple	1 day	8	0.236	1.888	See CEA 13 (costs included in total fence building cost)			0.039		

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
5	Makaha, subunit II, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		159.3	See CEA 14 and CEA 15	159.3				
5	Scope Fence, Makaha subunit II	fence	multiple	1 day	21	0.236	4.956	See CEA 13 (costs included in total fence building cost)			0.101		
5	Makaha, subunit III, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		25.6	See CEA 14 and CEA 15	25.6				
5	Scope Fence, Makaha subunit III	fence	multiple	1 day	6	0.236	1.416	See CEA 13 (costs included in total fence building cost)			0.029		
5	Palikea, subunit IB, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		90.5	See CEA 14 and CEA 15	90.5				
5	Scope Fence, Palikea subunit IB	fence	multiple	1 day	12	0.236	2.832	See CEA 13 (costs included in total fence building cost)			0.058		
5	Palikea, subunit IA, cost of materials, helicopter, clearing, and construction (to be done by contractor)				1		178.9	See CEA 14 and CEA 15	178.9				
5	Scope Fence, Palikea subunit IA				15	0.236	3.54	See CEA 13 (costs included in total fence building cost)			0.072		
5	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
5	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
5	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
5	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
5	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
5	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
5	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
5	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
5	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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5	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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5	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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5	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	
5	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
5	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
5	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
5	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
5	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
5	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
5	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
5	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
5	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	17	2.98	50.7	See CEA 24		50.7		1.333	
5	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			
5	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
5	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
5	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
5	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
5	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
5	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
5	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
5	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
5	Write and submit CDUA for fence construction	plan development	multiple	1 application	3	0.3	0.9	see CEA 6	0.9				
5	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
5	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
5	Research on threat control methods	research	multiple	1 year	1	100	100.0	See CEA 48	100.0				
5	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
5	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
5	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
5	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
5	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			

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5	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
5	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
5	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
5	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
5	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
5	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
5	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142
5	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
5	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
5	MU Threat management, Keaau and Makaha	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
5	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
5	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
5	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
5	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
5	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
5	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
5	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
5	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
5	MU Threat management, Makaha, Sub Unit II	threat management	multiple	1 acre	60	0.123	7.4	see CEA 22		7.4	0.028	0.114	0.057
5	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
5	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
5	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
5	MU Threat management, Palikea IA	threat management	multiple	1 acre	17	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
5	MU Threat management, Palikea IB	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
5	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023

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5	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
5	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
5	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079
5	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	30	0.5	15.0	See CEA 45		15.0			
5	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	14	0.02	0.3	See CEA 45		0.3			
5	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	30	0.22	6.6	See CEA 45		6.6			
5	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	16	0.325	5.2	See CEA 45		5.2			
5	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	25	0.15	3.8	See CEA 45		3.8			
5	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
5	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
5	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			
x	**Revised Cost of Year 5 actions**								**682.700**	**2,375.142**	**5.0**	**19.4**	**1.6**
6	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
6	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
6	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
6	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
6	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	30	0.7	21.0	see CEA 44		21.0			
6	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	6	1.25	7.5	see CEA 44		7.5			
6	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	6	0.6	3.6	See CEA 44		3.6			
6	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	26	1.5	39.0	see CEA 44		39.0			
6	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	3	1.475	4.4	see CEA 44		4.4			
6	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	30	0.35	10.5	see CEA 44		10.5			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
6	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
6	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
6	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			
6	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
6	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	8	1	8.0	See CEA 26		8.0			
6	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
6	Kaimuhole, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		292.4	See CEA 14 and CEA 15	292.4				
6	Scope Fence, Kaimuhole	fence	multiple	1 day	15	0.236	3.54	See CEA 13 (costs included in total fence building cost)			0.072		
6	Waianae Kai, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		115.5	See CEA 14 and CEA 15	115.5				
6	Scope Fence, Waianae Kai	fence	multiple	1 day	15	0.236	3.54	See CEA 13 (costs included in total fence building cost)			0.072		
6	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
6	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
6	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
6	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
6	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
6	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
6	Fire fighting equipment and supplies	fire management	multiple	1 cache	0.5	20	10.0	see CEA 10	10.0				
6	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
6	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
6	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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6	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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6	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
6	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	
6	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
6	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
6	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
6	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
6	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	

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6	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
6	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
6	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
6	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	19	2.98	56.6	See CEA 24		56.6		1.490	
6	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			
6	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
6	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
6	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
6	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
6	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
6	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
6	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
6	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
6	Write and submit CDUA for fence construction	plan development	multiple	1 application	2	0.3	0.6	see CEA 6	0.6				
6	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
6	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
6	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
6	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
6	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
6	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
6	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
6	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			

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6	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
6	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
6	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
6	MU Threat management, Kaimuhole	threat management	multiple	1 acre	98	0.123	12.1	see CEA 22		12.1	0.046	0.186	0.093
6	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
6	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
6	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142
6	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
6	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
6	MU Threat management, Keaau and Makaha	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
6	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
6	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
6	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
6	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
6	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
6	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
6	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
6	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
6	MU Threat management, Makaha, Sub Unit II	threat management	multiple	1 acre	60	0.123	7.4	see CEA 22		7.4	0.028	0.114	0.057
6	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
6	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
6	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
6	MU Threat management, Palikea IA	threat management	multiple	1 acre	17	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
6	MU Threat management, Palikea IB	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
6	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023

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6	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
6	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
6	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079
6	MU Threat management, Waianae Kai	threat management	multiple	1 acre	5	0.123	0.6	see CEA 22		0.6	0.002	0.009	0.005
6	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	30	0.5	15.0	See CEA 45		15.0			
6	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	14	0.02	0.3	See CEA 45		0.3			
6	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	30	0.22	6.6	See CEA 45		6.6			
6	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	16	0.325	5.2	See CEA 45		5.2			
6	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	25	0.15	3.8	See CEA 45		3.8			
6	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
6	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
6	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			
x	**Revised Cost of Year 6 actions**								**483.430**	**2,393.771**	**4.9**	**19.7**	**1.7**
7	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
7	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
7	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
7	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
7	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	30	0.7	21.0	see CEA 44		21.0			
7	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	6	1.25	7.5	see CEA 44		7.5			
7	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	6	0.6	3.6	See CEA 44		3.6			
7	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	26	1.5	39.0	see CEA 44		39.0			
7	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	3	1.475	4.4	see CEA 44		4.4			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
7	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	30	0.35	10.5	see CEA 44		10.5			
7	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
7	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
7	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			
7	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
7	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	8	1	8.0	See CEA 26		8.0			
7	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
7	Ohikilolo (Lower Makua), cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		302.7	See CEA 14 and CEA 15	302.7				
7	Scope Fence, Ohikilolo (Lower Makua)	fence	multiple	1 day	15	0.236	3.54	See CEA 13 (costs included in total fence building cost)			0.072		
7	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
7	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
7	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
7	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
7	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
7	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
7	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
7	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
7	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
7	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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7	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	
7	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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7	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
7	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
7	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
7	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
7	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	

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7	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
7	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
7	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
7	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	20	2.98	59.6	See CEA 24		59.6		1.568	
7	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			
7	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
7	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
7	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
7	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
7	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
7	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
7	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
7	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
7	Write and submit CDUA for fence construction	plan development	multiple	1 application	1	0.3	0.3	see CEA 6	0.3				
7	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
7	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
7	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
7	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
7	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
7	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
7	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
7	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
7	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
7	Technological support for field staff, GIS plotter	technology	multiple	1 plotter	1	10	10.0	see CEA 43	10.0				

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7	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
7	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
7	MU Threat management, Kaimuhole	threat management	multiple	1 acre	98	0.123	12.1	see CEA 22		12.1	0.046	0.186	0.093
7	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
7	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
7	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142
7	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
7	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
7	MU Threat management, Keaau and Makaha	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
7	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
7	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
7	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
7	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
7	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
7	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
7	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
7	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
7	MU Threat management, Makaha, Sub Unit II	threat management	multiple	1 acre	60	0.123	7.4	see CEA 22		7.4	0.028	0.114	0.057
7	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
7	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
7	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
7	MU Threat management, Palikea IA	threat management	multiple	1 acre	17	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
7	MU Threat management, Palikea IB	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
7	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023

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7	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
7	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
7	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079
7	MU Threat management, Waianae Kai	threat management	multiple	1 acre	5	0.123	0.6	see CEA 22		0.6	0.002	0.009	0.005
7	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	30	0.5	15.0	See CEA 45		15.0			
7	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	14	0.02	0.3	See CEA 45		0.3			
7	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	30	0.22	6.6	See CEA 45		6.6			
7	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	16	0.325	5.2	See CEA 45		5.2			
7	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	25	0.15	3.8	See CEA 45		3.8			
7	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
7	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
7	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			
x	**Revised Cost of Year 7 actions**								**377.990**	**2,396.751**	**4.8**	**19.8**	**1.7**
8	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
8	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
8	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
8	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
8	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	31	0.7	21.7	see CEA 44		21.7			
8	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	6	1.25	7.5	see CEA 44		7.5			
8	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	6	0.6	3.6	See CEA 44		3.6			
8	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	27	1.5	40.5	see CEA 44		40.5			
8	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	3	1.475	4.4	see CEA 44		4.4			
8	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	31	0.35	10.9	see CEA 44		10.9			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
8	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
8	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
8	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			
8	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
8	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	8	1	8.0	See CEA 26		8.0			
8	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
8	Manuwai, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		427.7	See CEA 14 and CEA 15	427.7				
8	Scope Fence, Manuwai	fence	multiple	1 day	30	0.236	7.08	See CEA 13 (costs included in total fence building cost)			0.144		
8	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
8	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
8	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
8	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
8	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
8	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
8	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
8	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
8	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
8	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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8	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	
8	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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8	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
8	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
8	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
8	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
8	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
8	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	

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8	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
8	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
8	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	21	2.98	62.6	See CEA 24		62.6		1.647	
8	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			
8	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
8	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
8	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
8	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
8	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
8	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
8	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
8	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
8	Write and submit CDUA for fence construction	plan development	multiple	1 application	1	0.3	0.3	see CEA 6	0.3				
8	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
8	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
8	Research area-wide threat control	research	multiple	1 year	1	100	100.0	See CEA 48	100.0				
8	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
8	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
8	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
8	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
8	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
8	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
8	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
8	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
8	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
8	MU Threat management, Kaimuhole	threat management	multiple	1 acre	98	0.123	12.1	see CEA 22		12.1	0.046	0.186	0.093
8	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
8	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
8	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142
8	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
8	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
8	MU Threat management, Keaau and Makaha	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
8	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
8	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
8	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
8	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
8	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
8	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
8	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
8	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
8	MU Threat management, Makaha, Sub Unit II	threat management	multiple	1 acre	60	0.123	7.4	see CEA 22		7.4	0.028	0.114	0.057
8	MU Threat management, Manuwai	threat management	multiple	1 acre	160	0.123	19.7	see CEA 22		19.7	0.076	0.303	0.152
8	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
8	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
8	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
8	MU Threat management, Palikea IA	threat management	multiple	1 acre	17	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
8	MU Threat management, Palikea IB	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
8	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
8	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
8	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
8	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079
8	MU Threat management, Waianae Kai	threat management	multiple	1 acre	5	0.123	0.6	see CEA 22		0.6	0.002	0.009	0.005
8	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	31	0.5	15.5	See CEA 45		15.5			
8	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	15	0.02	0.3	See CEA 45		0.3			
8	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	31	0.22	6.8	See CEA 45		6.8			
8	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	17	0.325	5.5	See CEA 45		5.5			
8	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	26	0.15	3.9	See CEA 45		3.9			
8	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
8	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
8	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			
x	**Revised Cost of Year 8 actions**								**592.940**	**2,423.176**	**5.0**	**20.2**	**1.8**
9	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
9	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
9	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
9	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
9	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	31	0.7	21.7	see CEA 44		21.7			
9	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	6	1.25	7.5	see CEA 44		7.5			
9	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	6	0.6	3.6	See CEA 44		3.6			
9	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	27	1.5	40.5	see CEA 44		40.5			
9	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	3	1.475	4.4	see CEA 44		4.4			
9	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	31	0.35	10.9	see CEA 44		10.9			
9	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
9	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
9	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			
9	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
9	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	8	1	8.0	See CEA 26		8.0			
9	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
9	Waiawa, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		227.2	See CEA 14 and CEA 15	227.2				
9	Scope Fence, Waiawa	fence	multiple	1 day	24	0.236	5.664	See CEA 13 (costs included in total fence building cost)			0.116		
9	Lower Kahana, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		50.8	See CEA 14 and CEA 15	50.8				
9	Scope Fence, Lower Kahana	fence	multiple	1 day	6	0.236	1.416	See CEA 13 (costs included in total fence building cost)			0.029		
9	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
9	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
9	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
9	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
9	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
9	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
9	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
9	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
9	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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9	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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9	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
9	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
9	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
9	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
9	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
9	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
9	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
9	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
9	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
9	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	23	2.98	68.5	See CEA 24		68.5		1.804	
9	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			
9	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
9	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
9	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
9	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
9	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
9	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
9	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
9	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
9	Write and submit CDUA for fence construction	plan development	multiple	1 application	2	0.3	0.6	see CEA 6	0.6				
9	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
9	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
9	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
9	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
9	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
9	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
9	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
9	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
9	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			

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9	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
9	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
9	MU Threat management, Kaimuhole	threat management	multiple	1 acre	98	0.123	12.1	see CEA 22		12.1	0.046	0.186	0.093
9	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
9	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
9	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142
9	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
9	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
9	MU Threat management, Lower Kahana	threat management	multiple	1 acre	1	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
9	MU Threat management, Keaau and Makaha	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
9	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
9	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
9	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
9	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
9	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
9	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
9	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
9	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
9	MU Threat management, Makaha, Sub Unit II	threat management	multiple	1 acre	60	0.123	7.4	see CEA 22		7.4	0.028	0.114	0.057
9	MU Threat management, Manuwai	threat management	multiple	1 acre	160	0.123	19.7	see CEA 22		19.7	0.076	0.303	0.152
9	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
9	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
9	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
9	MU Threat management, Palikea IA	threat management	multiple	1 acre	17	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009

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9	MU Threat management, Palikea IB	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
9	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
9	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
9	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
9	MU Threat management, Waiawa	threat management	multiple	1 acre	122	0.123	15.0	see CEA 22		15.0	0.058	0.231	0.116
9	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079
9	MU Threat management, Waianae Kai	threat management	multiple	1 acre	5	0.123	0.6	see CEA 22		0.6	0.002	0.009	0.005
9	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	31	0.5	15.5	See CEA 45		15.5			
9	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	15	0.02	0.3	See CEA 45		0.3			
9	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	31	0.22	6.8	See CEA 45		6.8			
9	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	17	0.325	5.5	See CEA 45		5.5			
9	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	26	0.15	3.9	See CEA 45		3.9			
9	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
9	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
9	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			
x	**Revised Cost of Year 9 actions**								**343.531**	**2,445.249**	**5.0**	**20.6**	**2.0**
10	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
10	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
10	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
10	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
10	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	31	0.7	21.7	see CEA 44		21.7			
10	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	6	1.25	7.5	see CEA 44		7.5			
10	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	6	0.6	3.6	See CEA 44		3.6			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
10	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	27	1.5	40.5	see CEA 44		40.5			
10	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	3	1.475	4.4	see CEA 44		4.4			
10	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	31	0.35	10.9	see CEA 44		10.9			
10	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
10	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
10	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			
10	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
10	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	8	1	8.0	See CEA 26		8.0			
10	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
10	Kaluaa and Waieli, subunit IIA, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence	multiple	fence	1		122.3	See CEA 14 and CEA 15	122.3				
10	Scope Fence, Kaluaa and Waieli, subunit IIA	fence	multiple	1 day	4	0.236	0.944	See CEA 13 (costs included in total fence building cost)			0.019		
10	Kaluaa and Waieli, subunit IIB, cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence		fence	1		76.7	See CEA 14 and CEA 15	76.7				
10	Scope Fence, Kaluaa and Waieli, subunit IIB	fence		1 day	10	0.236	2.36	See CEA 13 (costs included in total fence building cost)			0.048		
10	Kaluaa and Waieli, subunit IIC,cost of materials, helicopter, clearing, and construction (to be done by contractor)	fence		fence	1		52.4	See CEA 14 and CEA 15	52.4				
10	Scope Fence, Kaluaa and Waieli, subunit IIC	fence		1 day	6	0.236	1.416	See CEA 13 (costs included in total fence building cost)			0.029		
10	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
10	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
10	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
10	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
10	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
10	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
10	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
10	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
10	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
10	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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10	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	
10	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
10	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
10	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	

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10	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
10	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
10	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
10	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
10	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	23	2.98	68.5	See CEA 24		68.5		1.804	
10	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			
10	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
10	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
10	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
10	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
10	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
10	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
10	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
10	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			

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10	Write and submit CDUA for fence construction	plan development	multiple	1 application	1	0.3	0.3	see CEA 6	0.3				
10	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
10	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
10	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
10	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
10	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
10	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
10	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
10	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
10	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
10	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
10	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
10	MU Threat management, Kaimuhole	threat management	multiple	1 acre	98	0.123	12.1	see CEA 22		12.1	0.046	0.186	0.093
10	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
10	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
10	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142
10	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
10	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
10	MU Threat management, Lower Kahana	threat management	multiple	1 acre	1	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
10	MU Threat management, Keaau and Makaha	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
10	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
10	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
10	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
10	MU Threat management, Kaluaa and Waieli, small subunits	threat management	multiple	1 acre	20	0.123	2.5	see CEA 22		2.5	0.009	0.038	0.019
10	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
10	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003

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10	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
10	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
10	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
10	MU Threat management, Makaha, Sub Unit II	threat management	multiple	1 acre	60	0.123	7.4	see CEA 22		7.4	0.028	0.114	0.057
10	MU Threat management, Manuwai	threat management	multiple	1 acre	160	0.123	19.7	see CEA 22		19.7	0.076	0.303	0.152
10	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
10	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
10	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
10	MU Threat management, Palikea IA	threat management	multiple	1 acre	17	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
10	MU Threat management, Palikea IB	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
10	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
10	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
10	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
10	MU Threat management, Waiawa	threat management	multiple	1 acre	122	0.123	15.0	see CEA 22		15.0	0.058	0.231	0.116
10	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079
10	MU Threat management, Waianae Kai	threat management	multiple	1 acre	5	0.123	0.6	see CEA 22		0.6	0.002	0.009	0.005
10	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	31	0.5	15.5	See CEA 45		15.5			
10	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	15	0.02	0.3	See CEA 45		0.3			
10	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	31	0.22	6.8	See CEA 45		6.8			
10	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	17	0.325	5.5	See CEA 45		5.5			
10	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	26	0.15	3.9	See CEA 45		3.9			
10	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
10	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
10	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			
x	**Revised Cost of Year 10 actions**								**316.640**	**2,447.709**	**5.0**	**20.6**	**2.0**

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
11	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
11	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
11	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
11	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
11	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	31	0.7	21.7	see CEA 44		21.7			
11	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	6	1.25	7.5	see CEA 44		7.5			
11	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	6	0.6	3.6	See CEA 44		3.6			
11	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	27	1.5	40.5	see CEA 44		40.5			
11	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	3	1.475	4.4	see CEA 44		4.4			
11	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	31	0.35	10.9	see CEA 44		10.9			
11	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
11	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
11	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			
11	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
11	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	8	1	8.0	See CEA 26		8.0			
11	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
11	Kaluakauila, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		140.8	See CEA 14 and CEA 15	140.8				
11	Lower Ohikilolo, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		8.6	See CEA 14 and CEA 15	8.6				
11	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
11	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
11	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
11	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
11	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	

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11	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
11	Fire fighting equipment and supplies	fire management	multiple	1 cache	0.5	20	10.0	see CEA 10	10.0				
11	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
11	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
11	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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11	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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11	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	
11	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
11	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	

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11	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
11	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
11	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
11	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
11	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
11	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	23	2.98	68.5	See CEA 24		68.5		1.804	
11	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			
11	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
11	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
11	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
11	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
11	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
11	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
11	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			

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11	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
11	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
11	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
11	Research area-wide threat control	research	multiple	1 year	1	100	100.0	See CEA 48	100.0				
11	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
11	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
11	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
11	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
11	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
11	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
11	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
11	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
11	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
11	MU Threat management, Kaimuhole	threat management	multiple	1 acre	98	0.123	12.1	see CEA 22		12.1	0.046	0.186	0.093
11	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
11	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
11	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142
11	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
11	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
11	MU Threat management, Lower Kahana	threat management	multiple	1 acre	1	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
11	MU Threat management, Keaau and Makaha	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
11	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
11	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
11	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
11	MU Threat management, Kaluaa and Waieli, small subunits	threat management	multiple	1 acre	20	0.123	2.5	see CEA 22		2.5	0.009	0.038	0.019
11	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
11	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
11	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
11	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
11	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
11	MU Threat management, Makaha, Sub Unit II	threat management	multiple	1 acre	60	0.123	7.4	see CEA 22		7.4	0.028	0.114	0.057
11	MU Threat management, Manuwai	threat management	multiple	1 acre	160	0.123	19.7	see CEA 22		19.7	0.076	0.303	0.152
11	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
11	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
11	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
11	MU Threat management, Palikea IA	threat management	multiple	1 acre	17	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
11	MU Threat management, Palikea IB	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
11	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
11	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
11	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
11	MU Threat management, Waiawa	threat management	multiple	1 acre	122	0.123	15.0	see CEA 22		15.0	0.058	0.231	0.116
11	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079
11	MU Threat management, Waianae Kai	threat management	multiple	1 acre	5	0.123	0.6	see CEA 22		0.6	0.002	0.009	0.005
11	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	31	0.5	15.5	See CEA 45		15.5			
11	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	15	0.02	0.3	See CEA 45		0.3			
11	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	31	0.22	6.8	See CEA 45		6.8			
11	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	17	0.325	5.5	See CEA 45		5.5			
11	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	26	0.15	3.9	See CEA 45		3.9			
11	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
11	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
11	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			

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x	**Revised Cost of Year 11 actions**								**324.390**	**2,447.709**	**4.9**	**20.6**	**2.0**
12	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
12	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
12	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
12	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
12	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	31	0.7	21.7	see CEA 44		21.7			
12	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	6	1.25	7.5	see CEA 44		7.5			
12	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	6	0.6	3.6	See CEA 44		3.6			
12	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	27	1.5	40.5	see CEA 44		40.5			
12	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	3	1.475	4.4	see CEA 44		4.4			
12	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	31	0.35	10.9	see CEA 44		10.9			
12	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
12	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
12	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			
12	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
12	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	8	1	8.0	See CEA 26		8.0			
12	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
12	Makaha subunit I, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		101.2	See CEA 14 and CEA 15	101.2				
12	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
12	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
12	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
12	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
12	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	

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12	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
12	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
12	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
12	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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12	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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12	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	
12	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
12	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
12	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
12	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
12	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
12	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
12	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
12	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	23	2.98	68.5	See CEA 24		68.5		1.804	
12	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			
12	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
12	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
12	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
12	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
12	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
12	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
12	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
12	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
12	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
12	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
12	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
12	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
12	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
12	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
12	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
12	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
12	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
12	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
12	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
12	MU Threat management, Kaimuhole	threat management	multiple	1 acre	98	0.123	12.1	see CEA 22		12.1	0.046	0.186	0.093
12	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
12	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
12	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142
12	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
12	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
12	MU Threat management, Lower Kahana	threat management	multiple	1 acre	1	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
12	MU Threat management, Keaau and Makaha	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
12	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
12	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
12	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
12	MU Threat management, Kaluaa and Waieli, small subunits	threat management	multiple	1 acre	20	0.123	2.5	see CEA 22		2.5	0.009	0.038	0.019
12	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097

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12	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
12	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
12	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
12	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
12	MU Threat management, Makaha, Sub Unit II	threat management	multiple	1 acre	60	0.123	7.4	see CEA 22		7.4	0.028	0.114	0.057
12	MU Threat management, Manuwai	threat management	multiple	1 acre	160	0.123	19.7	see CEA 22		19.7	0.076	0.303	0.152
12	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
12	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
12	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
12	MU Threat management, Palikea IA	threat management	multiple	1 acre	17	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
12	MU Threat management, Palikea IB	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
12	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
12	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
12	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
12	MU Threat management, Waiawa	threat management	multiple	1 acre	122	0.123	15.0	see CEA 22		15.0	0.058	0.231	0.116
12	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079
12	MU Threat management, Waianae Kai	threat management	multiple	1 acre	5	0.123	0.6	see CEA 22		0.6	0.002	0.009	0.005
12	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	31	0.5	15.5	See CEA 45		15.5			
12	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	15	0.02	0.3	See CEA 45		0.3			
12	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	31	0.22	6.8	See CEA 45		6.8			
12	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	17	0.325	5.5	See CEA 45		5.5			
12	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	26	0.15	3.9	See CEA 45		3.9			
12	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
12	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
12	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			

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x	**Revised Cost of Year 12 actions**								166.150	2,447.709	4.9	20.6	2.0
13	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
13	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
13	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
13	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
13	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	31	0.7	21.7	see CEA 44		21.7			
13	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	6	1.25	7.5	see CEA 44		7.5			
13	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	6	0.6	3.6	See CEA 44		3.6			
13	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	27	1.5	40.5	see CEA 44		40.5			
13	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	3	1.475	4.4	see CEA 44		4.4			
13	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	31	0.35	10.9	see CEA 44		10.9			
13	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
13	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
13	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			
13	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
13	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	8	1	8.0	See CEA 26		8.0			
13	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
13	Kahanahaiki, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		42.0	See CEA 14 and CEA 15	42.0				
13	Lower Opaeula, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		40.9	See CEA 14 and CEA 15	40.9				
13	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
13	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
13	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
13	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	

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13	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
13	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
13	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
13	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
13	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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13	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
13	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	
13	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	

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13	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
13	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
13	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
13	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
13	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
13	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
13	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	23	2.98	68.5	See CEA 24		68.5		1.804	
13	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			
13	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
13	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
13	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
13	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
13	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
13	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
13	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
13	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
13	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
13	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
13	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
13	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
13	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
13	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
13	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
13	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
13	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
13	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
13	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
13	MU Threat management, Kaimuhole	threat management	multiple	1 acre	98	0.123	12.1	see CEA 22		12.1	0.046	0.186	0.093
13	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
13	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
13	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142
13	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
13	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
13	MU Threat management, Lower Kahana	threat management	multiple	1 acre	1	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
13	MU Threat management, Keaau and Makaha	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
13	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
13	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
13	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
13	MU Threat management, Kaluaa and Waieli, small subunits	threat management	multiple	1 acre	20	0.123	2.5	see CEA 22		2.5	0.009	0.038	0.019
13	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097

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13	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
13	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
13	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
13	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
13	MU Threat management, Makaha, Sub Unit II	threat management	multiple	1 acre	60	0.123	7.4	see CEA 22		7.4	0.028	0.114	0.057
13	MU Threat management, Manuwai	threat management	multiple	1 acre	160	0.123	19.7	see CEA 22		19.7	0.076	0.303	0.152
13	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
13	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
13	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
13	MU Threat management, Palikea IA	threat management	multiple	1 acre	17	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
13	MU Threat management, Palikea IB	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
13	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
13	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
13	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
13	MU Threat management, Waiawa	threat management	multiple	1 acre	122	0.123	15.0	see CEA 22		15.0	0.058	0.231	0.116
13	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079
13	MU Threat management, Waianae Kai	threat management	multiple	1 acre	5	0.123	0.6	see CEA 22		0.6	0.002	0.009	0.005
13	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	31	0.5	15.5	See CEA 45		15.5			
13	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	15	0.02	0.3	See CEA 45		0.3			
13	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	31	0.22	6.8	See CEA 45		6.8			
13	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	17	0.325	5.5	See CEA 45		5.5			
13	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	26	0.15	3.9	See CEA 45		3.9			
13	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
13	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
13	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			

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x	**Revised Cost of Year 13 actions**								**147.860**	**2,447.709**	**4.9**	**20.6**	**2.0**
14	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
14	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
14	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
14	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
14	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	31	0.7	21.7	see CEA 44		21.7			
14	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	6	1.25	7.5	see CEA 44		7.5			
14	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	6	0.6	3.6	See CEA 44		3.6			
14	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	27	1.5	40.5	see CEA 44		40.5			
14	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	3	1.475	4.4	see CEA 44		4.4			
14	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	31	0.35	10.9	see CEA 44		10.9			
14	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
14	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
14	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			
14	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
14	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	8	1	8.0	See CEA 26		8.0			
14	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
14	Upper Kapuna, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		32.3	See CEA 14 and CEA 15	32.3				
14	West Makaleha, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		56.0	See CEA 14 and CEA 15	56.0				
14	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
14	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
14	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
14	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
14	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
14	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
14	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
14	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
14	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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14	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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14	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	
14	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	

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14	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
14	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
14	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
14	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
14	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
14	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
14	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	23	2.98	68.5	See CEA 24		68.5		1.804	
14	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			
14	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
14	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
14	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
14	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
14	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
14	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			

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14	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
14	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
14	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
14	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
14	Research area-wide threat control	research	multiple	1 year	1	100	100.0	see CEA 48	100.0				
14	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
14	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
14	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
14	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
14	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
14	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
14	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
14	Technological support for field staff, GIS plotter	technology	multiple	1 plotter	1	10	10.0	see CEA 43	10.0				
14	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
14	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
14	MU Threat management, Kaimuhole	threat management	multiple	1 acre	98	0.123	12.1	see CEA 22		12.1	0.046	0.186	0.093
14	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
14	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
14	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142
14	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
14	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
14	MU Threat management, Lower Kahana	threat management	multiple	1 acre	1	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
14	MU Threat management, Keaau and Makaha	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
14	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
14	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
14	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
14	MU Threat management, Kaluaa and Waieli, small subunits	threat management	multiple	1 acre	20	0.123	2.5	see CEA 22		2.5	0.009	0.038	0.019
14	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
14	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
14	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
14	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
14	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
14	MU Threat management, Makaha, Sub Unit II	threat management	multiple	1 acre	60	0.123	7.4	see CEA 22		7.4	0.028	0.114	0.057
14	MU Threat management, Manuwai	threat management	multiple	1 acre	160	0.123	19.7	see CEA 22		19.7	0.076	0.303	0.152
14	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
14	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
14	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
14	MU Threat management, Palikea IA	threat management	multiple	1 acre	17	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
14	MU Threat management, Palikea IB	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
14	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
14	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
14	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
14	MU Threat management, Waiawa	threat management	multiple	1 acre	122	0.123	15.0	see CEA 22		15.0	0.058	0.231	0.116
14	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079
14	MU Threat management, Waianae Kai	threat management	multiple	1 acre	5	0.123	0.6	see CEA 22		0.6	0.002	0.009	0.005
14	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	31	0.5	15.5	See CEA 45		15.5			
14	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	15	0.02	0.3	See CEA 45		0.3			
14	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	31	0.22	6.8	See CEA 45		6.8			
14	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	17	0.325	5.5	See CEA 45		5.5			
14	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	26	0.15	3.9	See CEA 45		3.9			
14	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
14	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
14	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			
x	**Revised Cost of Year 14 actions**								**263.290**	**2,447.709**	**4.9**	**20.6**	**2.0**
15	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
15	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
15	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
15	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
15	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	31	0.7	21.7	see CEA 44		21.7			
15	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	6	1.25	7.5	see CEA 44		7.5			
15	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	6	0.6	3.6	See CEA 44		3.6			
15	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	27	1.5	40.5	see CEA 44		40.5			
15	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	3	1.475	4.4	see CEA 44		4.4			
15	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	31	0.35	10.9	see CEA 44		10.9			
15	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
15	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
15	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			
15	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
15	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	8	1	8.0	See CEA 26		8.0			
15	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
15	Ekahanui, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		140.4	See CEA 14 and CEA 15	140.4				
15	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
15	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
15	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
15	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
15	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
15	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
15	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
15	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
15	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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15	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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15	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	
15	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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15	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
15	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
15	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
15	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
15	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
15	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
15	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
15	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	23	2.98	68.5	See CEA 24		68.5		1.804	
15	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			
15	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
15	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
15	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
15	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
15	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
15	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
15	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
15	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
15	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
15	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
15	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
15	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
15	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
15	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
15	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
15	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
15	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
15	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
15	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
15	MU Threat management, Kaimuhole	threat management	multiple	1 acre	98	0.123	12.1	see CEA 22		12.1	0.046	0.186	0.093
15	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
15	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
15	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142
15	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
15	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
15	MU Threat management, Lower Kahana	threat management	multiple	1 acre	1	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
15	MU Threat management, Keaau and Makaha	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
15	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
15	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018

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15	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
15	MU Threat management, Kaluaa and Waieli, small subunits	threat management	multiple	1 acre	20	0.123	2.5	see CEA 22		2.5	0.009	0.038	0.019
15	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
15	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
15	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
15	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
15	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
15	MU Threat management, Makaha, Sub Unit II	threat management	multiple	1 acre	60	0.123	7.4	see CEA 22		7.4	0.028	0.114	0.057
15	MU Threat management, Manuwai	threat management	multiple	1 acre	160	0.123	19.7	see CEA 22		19.7	0.076	0.303	0.152
15	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
15	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
15	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
15	MU Threat management, Palikea IA	threat management	multiple	1 acre	17	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
15	MU Threat management, Palikea IB	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
15	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
15	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
15	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
15	MU Threat management, Waiawa	threat management	multiple	1 acre	122	0.123	15.0	see CEA 22		15.0	0.058	0.231	0.116
15	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079
15	MU Threat management, Waianae Kai	threat management	multiple	1 acre	5	0.123	0.6	see CEA 22		0.6	0.002	0.009	0.005
15	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	31	0.5	15.5	See CEA 45		15.5			
15	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	15	0.02	0.3	See CEA 45		0.3			
15	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	31	0.22	6.8	See CEA 45		6.8			
15	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	17	0.325	5.5	See CEA 45		5.5			

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15	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	26	0.15	3.9	See CEA 45		3.9			
15	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
15	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
15	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			
x	**Revised Cost of Year 15 actions**								**205.300**	**2,447.709**	**4.9**	**20.6**	**2.0**
16	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
16	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
16	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
16	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
16	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	31	0.7	21.7	see CEA 44		21.7			
16	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	6	1.25	7.5	see CEA 44		7.5			
16	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	6	0.6	3.6	See CEA 44		3.6			
16	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	27	1.5	40.5	see CEA 44		40.5			
16	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	3	1.475	4.4	see CEA 44		4.4			
16	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	31	0.35	10.9	see CEA 44		10.9			
16	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
16	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
16	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			
16	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
16	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	8	1	8.0	See CEA 26		8.0			
16	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
16	Central and East Makaleha, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		251.1	See CEA 14 and CEA 15	251.1				

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
16	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
16	Fire fighting equipment and supplies	fire management	multiple	1 cache	0.5	20	10.0	see CEA 10	10.0				
16	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
16	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
16	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
16	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
16	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
16	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
16	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
16	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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16	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
16	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	
16	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
16	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
16	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
16	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
16	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
16	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
16	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
16	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
16	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	23	2.98	68.5	See CEA 24		68.5		1.804	
16	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			
16	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
16	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
16	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			

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16	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
16	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
16	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
16	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
16	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
16	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
16	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
16	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
16	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
16	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
16	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
16	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
16	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
16	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
16	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
16	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
16	MU Threat management, Kaimuhole	threat management	multiple	1 acre	98	0.123	12.1	see CEA 22		12.1	0.046	0.186	0.093
16	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
16	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
16	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142
16	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
16	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
16	MU Threat management, Lower Kahana	threat management	multiple	1 acre	1	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009

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16	MU Threat management, Keaau and Makaha	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
16	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
16	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
16	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
16	MU Threat management, Kaluaa and Waieli, small subunits	threat management	multiple	1 acre	20	0.123	2.5	see CEA 22		2.5	0.009	0.038	0.019
16	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
16	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
16	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
16	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
16	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
16	MU Threat management, Makaha, Sub Unit II	threat management	multiple	1 acre	60	0.123	7.4	see CEA 22		7.4	0.028	0.114	0.057
16	MU Threat management, Manuwai	threat management	multiple	1 acre	160	0.123	19.7	see CEA 22		19.7	0.076	0.303	0.152
16	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
16	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
16	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
16	MU Threat management, Palikea IA	threat management	multiple	1 acre	17	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
16	MU Threat management, Palikea IB	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
16	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
16	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
16	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
16	MU Threat management, Waiawa	threat management	multiple	1 acre	122	0.123	15.0	see CEA 22		15.0	0.058	0.231	0.116
16	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079
16	MU Threat management, Waianae Kai	threat management	multiple	1 acre	5	0.123	0.6	see CEA 22		0.6	0.002	0.009	0.005
16	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	31	0.5	15.5	See CEA 45		15.5			
16	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	15	0.02	0.3	See CEA 45		0.3			

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16	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	31	0.22	6.8	See CEA 45		6.8			
16	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	17	0.325	5.5	See CEA 45		5.5			
16	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	26	0.15	3.9	See CEA 45		3.9			
16	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
16	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
16	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			
x	**Revised Cost of Year 16 actions**								**326.090**	**2,447.709**	**4.9**	**20.6**	**2.0**
17	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
17	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
17	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
17	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
17	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	31	0.7	21.7	see CEA 44		21.7			
17	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	6	1.25	7.5	see CEA 44		7.5			
17	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	6	0.6	3.6	See CEA 44		3.6			
17	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	27	1.5	40.5	see CEA 44		40.5			
17	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	3	1.475	4.4	see CEA 44		4.4			
17	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	31	0.35	10.9	see CEA 44		10.9			
17	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
17	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
17	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			
17	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
17	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	8	1	8.0	See CEA 26		8.0			
17	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
17	Keaau and Makaha, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		22.2	See CEA 14 and CEA 15	22.2				
17	Makaha subunit II, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		65.5	See CEA 14 and CEA 15	65.5				
17	Makaha subunit III, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		11.0	See CEA 14 and CEA 15	11.0				
17	Palikea, subunit IB, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		30.0	See CEA 14 and CEA 15	30.0				
17	Palikea, subunit IA, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		80.6	See CEA 14 and CEA 15	80.6				
17	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
17	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
17	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
17	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
17	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
17	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
17	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
17	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
17	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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17	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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17	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	
17	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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17	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
17	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
17	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
17	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
17	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
17	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
17	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
17	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	23	2.98	68.5	See CEA 24		68.5		1.804	
17	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			

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17	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
17	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
17	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
17	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
17	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
17	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
17	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
17	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
17	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
17	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
17	Research area-wide threat control	research	multiple	1 year	1	100	100.0	See CEA 48	100.0				
17	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
17	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
17	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
17	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
17	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
17	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
17	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
17	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
17	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
17	MU Threat management, Kaimuhole	threat management	multiple	1 acre	98	0.123	12.1	see CEA 22		12.1	0.046	0.186	0.093
17	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
17	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
17	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142

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17	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
17	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
17	MU Threat management, Lower Kahana	threat management	multiple	1 acre	1	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
17	MU Threat management, Keaau and Makaha	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
17	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
17	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
17	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
17	MU Threat management, Kaluaa and Waieli, small subunits	threat management	multiple	1 acre	20	0.123	2.5	see CEA 22		2.5	0.009	0.038	0.019
17	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
17	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
17	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
17	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
17	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
17	MU Threat management, Makaha, Sub Unit II	threat management	multiple	1 acre	60	0.123	7.4	see CEA 22		7.4	0.028	0.114	0.057
17	MU Threat management, Manuwai	threat management	multiple	1 acre	160	0.123	19.7	see CEA 22		19.7	0.076	0.303	0.152
17	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
17	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
17	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
17	MU Threat management, Palikea IA	threat management	multiple	1 acre	17	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
17	MU Threat management, Palikea IB	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
17	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
17	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
17	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
17	MU Threat management, Waiawa	threat management	multiple	1 acre	122	0.123	15.0	see CEA 22		15.0	0.058	0.231	0.116
17	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
17	MU Threat management, Waianae Kai	threat management	multiple	1 acre	5	0.123	0.6	see CEA 22		0.6	0.002	0.009	0.005
17	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	31	0.5	15.5	See CEA 45		15.5			
17	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	15	0.02	0.3	See CEA 45		0.3			
17	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	31	0.22	6.8	See CEA 45		6.8			
17	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	17	0.325	5.5	See CEA 45		5.5			
17	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	26	0.15	3.9	See CEA 45		3.9			
17	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
17	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
17	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			
x	**Revised Cost of Year 17 actions**								**374.200**	**2,447.709**	**4.9**	**20.6**	**2.0**
18	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
18	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
18	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
18	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
18	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	31	0.7	21.7	see CEA 44		21.7			
18	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	6	1.25	7.5	see CEA 44		7.5			
18	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	6	0.6	3.6	See CEA 44		3.6			
18	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	27	1.5	40.5	see CEA 44		40.5			
18	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	3	1.475	4.4	see CEA 44		4.4			
18	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	31	0.35	10.9	see CEA 44		10.9			
18	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
18	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
18	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
18	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
18	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	8	1	8.0	See CEA 26		8.0			
18	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
18	Kaimuhole, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		131.0	See CEA 14 and CEA 15	131.0				
18	Waianae Kai, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		52.3	See CEA 14 and CEA 15	52.3				
18	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
18	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
18	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
18	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
18	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
18	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
18	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
18	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
18	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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18	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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18	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	
18	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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18	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
18	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
18	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
18	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
18	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
18	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
18	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
18	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	23	2.98	68.5	See CEA 24		68.5		1.804	
18	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
18	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
18	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
18	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
18	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
18	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
18	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
18	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
18	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
18	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
18	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
18	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
18	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
18	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
18	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
18	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
18	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
18	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
18	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
18	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
18	MU Threat management, Kaimuhole	threat management	multiple	1 acre	98	0.123	12.1	see CEA 22		12.1	0.046	0.186	0.093
18	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
18	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
18	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
18	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
18	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
18	MU Threat management, Lower Kahana	threat management	multiple	1 acre	1	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
18	MU Threat management, Keaau and Makaha	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
18	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
18	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
18	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
18	MU Threat management, Kaluaa and Waieli, small subunits	threat management	multiple	1 acre	20	0.123	2.5	see CEA 22		2.5	0.009	0.038	0.019
18	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
18	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
18	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
18	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
18	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
18	MU Threat management, Makaha, Sub Unit II	threat management	multiple	1 acre	60	0.123	7.4	see CEA 22		7.4	0.028	0.114	0.057
18	MU Threat management, Manuwai	threat management	multiple	1 acre	160	0.123	19.7	see CEA 22		19.7	0.076	0.303	0.152
18	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
18	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
18	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
18	MU Threat management, Palikea IA	threat management	multiple	1 acre	17	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
18	MU Threat management, Palikea IB	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
18	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
18	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
18	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
18	MU Threat management, Waiawa	threat management	multiple	1 acre	122	0.123	15.0	see CEA 22		15.0	0.058	0.231	0.116
18	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
18	MU Threat management, Waianae Kai	threat management	multiple	1 acre	5	0.123	0.6	see CEA 22		0.6	0.002	0.009	0.005
18	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	31	0.5	15.5	See CEA 45		15.5			
18	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	15	0.02	0.3	See CEA 45		0.3			
18	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	31	0.22	6.8	See CEA 45		6.8			
18	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	17	0.325	5.5	See CEA 45		5.5			
18	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	26	0.15	3.9	See CEA 45		3.9			
18	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
18	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
18	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			
x	**Revised Cost of Year 18 actions**								**248.280**	**2,447.709**	**4.9**	**20.6**	**2.0**
19	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
19	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
19	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
19	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
19	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	31	0.7	21.7	see CEA 44		21.7			
19	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	6	1.25	7.5	see CEA 44		7.5			
19	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	6	0.6	3.6	See CEA 44		3.6			
19	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	27	1.5	40.5	see CEA 44		40.5			
19	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	3	1.475	4.4	see CEA 44		4.4			
19	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	31	0.35	10.9	see CEA 44		10.9			
19	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
19	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			
19	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
19	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
19	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	8	1	8.0	See CEA 26		8.0			
19	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
19	Ohikilolo (Lower Makua), cost of replacing fence wire and posts (to be done by contractor, includes cost of EOD escort)	fence	multiple	fence	1		139.0	See CEA 14 and CEA 15	139.0				
19	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
19	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
19	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
19	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
19	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
19	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
19	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
19	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
19	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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19	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

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19	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	
19	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
19	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
19	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
19	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
19	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
19	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
19	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
19	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
19	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	23	2.98	68.5	See CEA 24		68.5		1.804	
19	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
19	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
19	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
19	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
19	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
19	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
19	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
19	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
19	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
19	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
19	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
19	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
19	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
19	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
19	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
19	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
19	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
19	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
19	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
19	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
19	MU Threat management, Kaimuhole	threat management	multiple	1 acre	98	0.123	12.1	see CEA 22		12.1	0.046	0.186	0.093
19	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
19	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
19	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
19	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
19	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
19	MU Threat management, Lower Kahana	threat management	multiple	1 acre	1	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
19	MU Threat management, Keaau and Makaha	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
19	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
19	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
19	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
19	MU Threat management, Kaluaa and Waieli, small subunits	threat management	multiple	1 acre	20	0.123	2.5	see CEA 22		2.5	0.009	0.038	0.019
19	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
19	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
19	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
19	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
19	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
19	MU Threat management, Makaha, Sub Unit II	threat management	multiple	1 acre	60	0.123	7.4	see CEA 22		7.4	0.028	0.114	0.057
19	MU Threat management, Manuwai	threat management	multiple	1 acre	160	0.123	19.7	see CEA 22		19.7	0.076	0.303	0.152
19	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
19	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
19	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
19	MU Threat management, Palikea IA	threat management	multiple	1 acre	17	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
19	MU Threat management, Palikea IB	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
19	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
19	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
19	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
19	MU Threat management, Waiawa	threat management	multiple	1 acre	122	0.123	15.0	see CEA 22		15.0	0.058	0.231	0.116
19	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
19	MU Threat management, Waianae Kai	threat management	multiple	1 acre	5	0.123	0.6	see CEA 22		0.6	0.002	0.009	0.005
19	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	31	0.5	15.5	See CEA 45		15.5			
19	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	15	0.02	0.3	See CEA 45		0.3			
19	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	31	0.22	6.8	See CEA 45		6.8			
19	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	17	0.325	5.5	See CEA 45		5.5			
19	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	26	0.15	3.9	See CEA 45		3.9			
19	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
19	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
19	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			
x	**Revised Cost of Year 19 actions**								**203.950**	**2,447.709**	**4.9**	**20.6**	**2.0**
20	Administrative Assistants	administrative	multiple	1 person	1	42	42.0	See CEA 3 variable (1 per 20 staff)		42.0			
20	Army Implementation Coordinators	administrative	multiple	1 person	2	90	180.0	See CEA 2		180.0			
20	Monitoring Specialist	administrative	multiple	1 person	1	77	77.0	See CEA 1		77.0			
20	EOD support for management in areas with unexploded ordnance	EOD support	multiple	1 day	45	0.655	29.5	Support for access to all UXO areas		29.5			
20	Cell phone and pager service (for field communication only)	equipment and supplies	multiple	1 phone and pager service/ year	31	0.7	21.7	see CEA 44		21.7			
20	Communications equipment, replacement (includes radios, cellular phones, binoculars.)	equipment and supplies	multiple	1 person	6	1.25	7.5	see CEA 44		7.5			
20	Equipment (camping gear, theat management gear, telecommuncations gear - annual replacement costs)	equipment and supplies	multiple	1 person	6	0.6	3.6	See CEA 44		3.6			
20	Field supplies, annual supplies purchase (Pesticides, herbicides, rat control (traps and diphacinone bait), salt, batteries, flagging, safety equipment (respirators, Tyvek suits, gloves and snares).	equipment and supplies	multiple	1 person	27	1.5	40.5	see CEA 44		40.5			
20	Field supplies, gear replacement (includes handsaws chainsaws, etc., camping gear.)	equipment and supplies	multiple	1 person	3	1.475	4.4	see CEA 44		4.4			
20	Personal gear for field crew (annual allowance for footwear and rain gear)	equipment and supplies	multiple	1 person	31	0.35	10.9	see CEA 44		10.9			
20	Annual Office copy machine rental and supplies costs	equipment and supplies	multiple	1 copier + supplies	1	21	21.0	see CEA 38		21.0			
20	Annual greenhouse supplies (pesticides, pots, fertilizer, etc.)	equipment and supplies	multiple	1 plant	2000	0.016	32.0	See CEA 34		32.0			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
20	Greenhouse benches, replacement shadecloth, replacement plumbing, and equipment	equipment and supplies	multiple		1	5	5.0	See CEA 33		5.0			
20	Plant Quarantine House supplies and maintanence	equipment and supplies	multiple	1 year	1	5	5.0	See CEA 35		5.0			
20	Annual exclosure maintenance for existing exclosures, Achantinella mustelina.	exclosure maintenance	Achmus	1 exclosure	8	1	8.0	See CEA 26		8.0			
20	Staff facilities, rental space to accommodate 30 administrative and support staff	facilities	multiple	1 facility	1	48	48.0	see CEA 37		48.0			
20	Manuwai, cost of replacing fence wire and posts (to be done by contractor)	fence	multiple	fence	1		193.5	See CEA 14 and CEA 15	193.5				
20	Fence maintenance	fence	multiple	1 year's supplies	1	20	20	See CEA 16		20.0			
20	Establish and maintain fuel break, Haili to Kawaihapai MU	fire management	multiple	1 acre	1.5	3.74	11.29	see CEA 11		11.29	0.070	0.205	
20	Establish and maintain fuel break, Kaluakauila MU	fire management	multiple	1 acre	2.7	3.74	20.27	see CEA 11		20.27	0.126	0.368	
20	Establish and maintain fuel break, Lower Kahanahaiki MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
20	Establish and maintain fuel break, Mt. Kaala NAR MU	fire management	multiple	1 acre	0.8	3.74	5.61	see CEA 11		5.61	0.035	0.102	
20	Establish and maintain fuel break, Upper Kapuna MU	fire management	multiple	1 acre	0.8	3.74	5.91	see CEA 11		5.91	0.037	0.107	
20	Collect propagules for living collection (ex situ or inter situ) or genetic storage collection (seeds storage or micropropagation) for all populations.	genetic storage-living collection	multiple	1 population	47.5	0.84	39.9	see CEA 29		39.9	0.407	0.525	
20	Manage for stability, Achatinella mustelina, Kahanahaiki and Pahole, Ohikilolo, Schofield West Range, E. Makaleha, Puu Hapapa, Makaha, Puu Kaua, Puu Palikea.	manage for stability	8	1 population	8	5.33	42.6	see CEA 27		42.6	0.154	0.923	
20	Manage for stability, Alectryon macrococcus, Central Kaluaa to Central Waieli	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Alectryon macrococcus, Makaha, subunit I	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Alectryon macrococcus, Kahanahaiki to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage for stability, Alsinidendron obovatum, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage for stability, Alsinidendron obovatum, Keawapilau to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage reintroduction for stability, Alsinidendron obovatum, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Cenchrus agrimonioides, Kahanahaiki and Pahole	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Cenchrus agrimonioides, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Cenchrus agrimonioides, Central Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Chamaesyce celastroides kaenana, Kaena (East of Alau)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage for stability, Chamaesyce celastroides kaenana, Kaena and Keawaula	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

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20	Manage for stability, Chamaesyce celastroides kaenana, Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage for stability, Chamaesyce herbstii, Pahole to Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage for stability, Chamaesyce herbstii, reintroduction at West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Chamaesyce herbstii, reintroduction at Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Cyanea grimesiana obatae, Pahole to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage for stability, Cyanea grimesiana obatae, Palikea (south Palawai)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Cyanea grimesiana obatae, Central Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Cyanea longiflora, Kapuna to West Makaleha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage for stability, Cyanea longiflora, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Cyanea longiflora, Makaha and Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Cyanea superba, Kahanahaiki. Manage reintroduction for stability, Pahole and Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage reintroduction for stability, Cyanea superba superba, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage reintroduction for stability, Cyanea superba superba, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Cyrtandra dentata, Kahanahaiki (subunit I)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Cyrtandra dentata, Opaeula (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Cyrtandra dentata, Pahole to West Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Delissea subcordata, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Delissea subcordata, Kahanahaiki to Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage for stability, Delissea subcordata, Kaluaa	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage reintroduction for stability, Dubautia herbstobatae, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Dubautia herbstobatae, Ohikilolo mauka	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Dubautia herbstobatae, Ohikilolo makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Flueggea neowawraea, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Flueggea neowawraea, Central and East Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
20	Manage for stability, Flueggea neowawraea, Kahanahaiki to Kapuna	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Hedyotis degeneri degeneri, Alaiheihe and Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Hedyotis degeneri degeneri, East branch of East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Hedyotis degeneri degeneri, Kahanahaiki to Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Hedyotis parvula, Halona	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage reintroduction for stability, Hedyotis parvula, Central and East Makaleha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Hedyotis parvula, Ohikilolo Mauka and Ohikilolo Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Hesperomannia arbuscula, North North Palawai	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage for stability, Hesperomannia arbuscula, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage for stability, Hesperomannia arbuscula,Kapuna	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage for stability after augmentation, Hibiscus brackenridgei mokuleianus, Haili to Kawaiu	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage for stability after possible augmentation, Hibiscus brackenridgei mokuleianus, Kaimuhole & Palikea Gulch	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage for stability, Hibiscus brackenridgei mokuleianus Makua (Lower Ohikilolo)	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage for stability, Lipochaeta tenuifolia, Kamaileunu and Waianae Kai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Lipochaeta tenuifolia, Mt. Kaala NAR	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Lipochaeta tenuifolia, Ohikilolo Makai and Ohikilolo Mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Neraudia angulata, Makua (Ohikilolo)	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Neraudia angulata, Makaha (subunit I)	manage for stability	1	1 population	1	0	0.0	Backup site		0.0	0.000	0.000	
20	Manage for stability, Neraudia angulata, Waianae Kai Makai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Nototrichium humile, Waianae Kai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Nototrichium humile, Kaluakauila	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Nototrichium humile, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Phyllostegia kaalaensis, Pahole to Keawapilau	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage reintroduction for stability, Phyllostegia kaalaensis, Makaha	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
20	Manage reintroduction for stability, Phyllostegia kaalaensis, Manuwai	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Plantago princeps princeps, Ekahanui	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Plantago princeps princeps, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Plantago princeps princeps, Waiawa (Koolau)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Pritchardia kaalae, Makaleha to Manuwai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Pritchardia kaalae, Ohikilolo	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage for stability, Pritchardia kaalae, Ohikilolo East and West Makaleha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Sanicula mariversa, Keaau	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
20	Manage for stability, Sanicula mariversa, Kamaileunu	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
20	Manage for stability, Sanicula mariversa, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Medium (see CEA 19)		3.3	0.012	0.071	
20	Manage for stability, Schiedea kaalae, South Ekahanui	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage reintroduction for stability, Schiedea kaalae, Kahana	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Schiedea kaalae, Pahole	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Schiedea nuttallii, Kapuna - Keawapilau Ridge	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Schiedea nuttallii, Kahanahaiki, and Pahole	manage for stability	1	1 population	1	13.19	13.2	High (see CEA 18)		13.2	0.048	0.286	
20	Manage reintroduction for stability, Schiedea nuttallii, Makaha	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Tetramolopium filiforme, Ohikilolo mauka	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	Manage for stability, Tetramolopium filiforme, Ohikilolo Makai	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Tetramolopium filiforme, Puhawai (Puu Kumakalii)	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Viola chamissoniana, Makaha	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Viola chamissoniana, Ohikilolo	manage for stability	1	1 population	1	3.29	3.3	Low (see CEA 20)		3.3	0.012	0.071	
20	Manage for stability, Viola chamissoniana, Puu Kumakalii	manage for stability	1	1 population	1	6.59	6.6	Medium (see CEA 19)		6.6	0.024	0.143	
20	MU monitoring, road, LZ, and corridor surveys	monitoring	multiple	50 km	1	1.83	1.8	See CEA 24		1.8		0.048	
20	MU and MU subunit monitoring, ecosystem level monitoring	monitoring	multiple	1 MU	23	2.98	68.5	See CEA 24		68.5		1.804	
20	Full-time research associate (1), Achatinella mustelina, captive propagation program + annual utilities cost	personnel	Achmus	1 person	1	50.5	50.5	see CEA 36		50.5			

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
20	Community Outreach Position	personnel	multiple	1 person	1	49	49.0	see CEA 47		49.0			
20	GIS Specialist/Database Analyst	personnel	multiple	1 person	1	84	84.0	see CEA 39		84.0			
20	Horticulturist to head Army Environmental plant propagation facility in compliance with sanitation protocols, and oversee propagation testing, seed viability testing and quarantine facility	personnel	multiple	1 person	1	67.2	67.2	See CEA 34		67.2			
20	Horticultural assistant (1) for propagation of endangered plants, in compliance with sanitation protocols	personnel	multiple	1 assistant	1	39.2	39.2	See CEA 34		39.2			
20	Seed storage testing and seed storage - annual storage maintenance costs and staffing.	personnel	multiple	1 year	1	51.2	51.2	see CEA 30		51.2			
20	Tissue culture: Personnel to experiment with storing plants in tissue culture for medium to long term storage, for all taxa for which seed are found to be recalcitrant. Includes time and materials to maintain tissue cultures.	personnel	multiple	1 year	1	47.5	47.5	See CEA 31		47.5			
20	Summer Internship Program	personnel	multiple	1 person	3	6	18.0	see CEA 46		18.0			
20	Ungulate control specialist, to conduct management-unit level ungulate control.	personnel	multiple	1 person	1	63	63.0	see CEA 23		63.0			
20	Develop MU alien species control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 7		23.5	0.479		
20	Develop MU ungulate control plan and include status update in annual report	report writing	multiple	1 MU report	23	1.02	23.5	See CEA 8		23.5	0.479		
20	Research on area-wide threat control	research	multiple	1 year	100	1	100.0	See CEA 48	100.0				
20	Annual progress report for IT review (production costs)	review	multiple	1 copy	30	0.066	2.0	see CEA 50		2.0			
20	Implementation Team (IT) Annual Review	review	multiple	1 review	1	35.75	35.8	see CEA 49		35.8			
20	Equipment rental for road maintenance	road maintenance	multiple	1 km	46	0.16	15.0	see CEA 41. Army pays 50% of cost of maintenance 4x per year		15.0			
20	Honouliuli Contour Trail/Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	22	0.198	4.4	see CEA 12		8.7			
20	Lower Kaala NAR Access Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	3.3	0.198	0.7	see CEA 12		1.3			
20	Nike Site Road maintenance (conduct 2x per year)	road maintenance	multiple	1 km	10.48	0.198	2.1	see CEA 12		4.2			
20	Maintain Makaha access road (conduct 2x per year)	road maintenance	multiple	1 km	8.1	0.198	1.6	see CEA 12		3.2			
20	Technological support for Army Environmental staff - in office (general office computers [hardware and software]), replacement computers	technology	multiple	1 computer	2	3.5	7.0	See CEA 42	7.0				
20	Technological support for field staff, GPS and digital cameras - replacement	technology	multiple	1 field system	1	2.95	3.0	see CEA 43	3.0				
20	MU Threat management, Kaimuhole	threat management	multiple	1 acre	98	0.123	12.1	see CEA 22		12.1	0.046	0.186	0.093
20	MU Threat management, East Makaleha	threat management	multiple	1 acre	223	0.123	27.4	see CEA 22		27.4	0.106	0.423	0.212
20	MU Threat management, Ekahanui, Sub Unit I	threat management	multiple	1 acre	40	0.123	4.9	see CEA 22		4.9	0.019	0.076	0.038
20	MU Threat management, Ekahanui, Sub Unit II	threat management	multiple	1 acre	149	0.123	18.3	see CEA 22		18.3	0.071	0.283	0.142

Year	Trigger Action Description	Trigger Action	Taxon	Unit	Number of Units	Unit Cost (1,000s)	Cost (subtotal) (1,000s)	Assumptions	One-Time Prorated Costs (1,000s)	Annual Costs (1,000s)	No. of NRM per Year	No. of NRS2 per Year	No. of NRW per Year
20	MU Threat management, Haili to Kealia	threat management	multiple	1 acre	28	0.123	3.4	see CEA 22		3.4	0.013	0.053	0.027
20	MU Threat management, Kaena	threat management	multiple	1 acre	48	0.123	5.9	see CEA 22		5.9	0.023	0.091	0.046
20	MU Threat management, Lower Kahana	threat management	multiple	1 acre	1	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
20	MU Threat management, Keaau and Makaha	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
20	MU Threat management, Kahanahaiki, Sub Unit I	threat management	multiple	1 acre	49	0.123	6.0	see CEA 22		6.0	0.023	0.093	0.047
20	MU Threat management, Kahanahaiki, Sub Unit II	threat management	multiple	1 acre	19	0.123	2.3	see CEA 22		2.3	0.009	0.036	0.018
20	MU Threat management, Kaluaa and Waieli, Sub Unit III	threat management	multiple	1 acre	91	0.123	11.2	see CEA 22		11.2	0.043	0.173	0.086
20	MU Threat management, Kaluaa and Waieli, small subunits	threat management	multiple	1 acre	20	0.123	2.5	see CEA 22		2.5	0.009	0.038	0.019
20	MU Threat management, Kaluakauila	threat management	multiple	1 acre	102	0.123	12.5	see CEA 22		12.5	0.048	0.193	0.097
20	MU Threat management, Kamaileunu	threat management	multiple	1 acre	3	0.123	0.4	see CEA 22		0.4	0.001	0.006	0.003
20	MU Threat management, Lower Ohikilolo	threat management	multiple	1 acre	64	0.123	7.9	see CEA 22		7.9	0.030	0.121	0.061
20	MU Threat management, Lower Opaeula	threat management	multiple	1 acre	15	0.123	1.8	see CEA 22		1.8	0.007	0.028	0.014
20	MU Threat management, Makaha, Sub Unit I	threat management	multiple	1 acre	84	0.123	10.3	see CEA 22		10.3	0.040	0.159	0.080
20	MU Threat management, Makaha, Sub Unit II	threat management	multiple	1 acre	60	0.123	7.4	see CEA 22		7.4	0.028	0.114	0.057
20	MU Threat management, Manuwai	threat management	multiple	1 acre	160	0.123	19.7	see CEA 22		19.7	0.076	0.303	0.152
20	MU Threat management, Ohikilolo	threat management	multiple	1 acre	174	0.123	21.4	see CEA 22		21.4	0.083	0.330	0.165
20	MU Threat management, Pahole	threat management	multiple	1 acre	187	0.123	23.0	see CEA 22		23.0	0.089	0.355	0.178
20	MU Threat management, Palikea (small units)	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
20	MU Threat management, Palikea IA	threat management	multiple	1 acre	17	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
20	MU Threat management, Palikea IB	threat management	multiple	1 acre	9	0.123	1.1	see CEA 22		1.1	0.004	0.017	0.009
20	MU Threat management, Puu Kumakalii	threat management	multiple	1 acre	24	0.123	3.0	see CEA 22		3.0	0.011	0.046	0.023
20	MU Threat management, Upper Kapuna, subunit I	threat management	multiple	1 acre	162	0.123	19.9	see CEA 22		19.9	0.077	0.307	0.154
20	MU Threat management, Upper Kapuna, subunit II	threat management	multiple	1 acre	38	0.123	4.7	see CEA 22		4.7	0.018	0.072	0.036
20	MU Threat management, Waiawa	threat management	multiple	1 acre	122	0.123	15.0	see CEA 22		15.0	0.058	0.231	0.116
20	MU Threat management, West Makaleha	threat management	multiple	1 acre	83	0.123	10.2	see CEA 22		10.2	0.039	0.157	0.079

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20	MU Threat management, Waianae Kai	threat management	multiple	1 acre	5	0.123	0.6	see CEA 22		0.6	0.002	0.009	0.005
20	Annual training for field staff (physicals, first aid and CPR)	training	multiple	1 person	31	0.5	15.5	See CEA 45		15.5			
20	Training of Army Environmental Staff (firearms use for ungulate control)	training	multiple	1 person	15	0.02	0.3	See CEA 45		0.3			
20	Training of Army Environmental Staff (chainsaw and pesticide certification)	training	multiple	1 person	31	0.22	6.8	See CEA 45		6.8			
20	Annual rappel training for all NRMs and half of all NRSs	training	multiple	1 person	17	0.325	5.5	See CEA 45		5.5			
20	Registration for the conservation conference. Managers, coordinators, NRMs, and half of all NRS will attend.	training	multiple	1 person	26	0.15	3.9	See CEA 45		3.9			
20	Helicopter support	transportation	multiple	6 hours	52	4.116	214.0	see CEA 40		214.0			
20	Vehicle purchase for NR field staff	transportation	multiple	1 vehicle	1	55	55.0	See CEA 41	55.0				
20	Annual vehicle maintenance. Includes fuel, maintenance mud tires; (government vehicles are self-insured).	transportation	multiple	1 vehicle	8	3	24.0	see CEA 41		24.0			
x	**Revised Cost of Year 20 actions**								**358.420**	**2,447.709**	**4.9**	**20.6**	**2.0**

Appendix 1: MIT Meeting Notes

Meeting notes
Makua Implementation Team meeting
March 29, 2004

- Introductions
  - Attendees:

Dan Sailer	Nature Conservancy
Jim Jacobi	USGS
Talbert Takahama	State of Hawaii DOFAW
Brent Liesemeyer	State of Hawaii DOFAW
Michelle Mansker	U.S. Fish and Wildlife Service
Patrice Ashfield	U.S. Fish and Wildlife Service
Joel Godfrey	U.S. Army Garrison Hawaii
Kapua Kawelo	U.S. Army Garrison Hawaii
Leilani Durand	Contractor, U.S. Army Garrison Hawaii
Joby Rohrer	Contractor, U.S. Army Garrison Hawaii
Amy Tsuneyoshi	Board of Water Supply
Dwight Matsuwaki	Hawaii Natural Heritage Program
Joel Lau	Hawaii Natural Heritage Program

- Urgent actions update:
  - Leilani: [handed out a summary sheet of all the urgent action fence requirements and their status]. We've been focusing on the small populations, many of which have disappeared.
  - Jim: but that's the idea, it's a bridge until the plan is fully funded. Why aren't we focusing on the larger populations and the whole plan yet?
  - Kapua: we aren't fully funded, and that's part of our frustration. That's why we're here, to discuss how we can focus our efforts on better populations in better habitat, and work with more willing landowners. We're here to discuss our focusing on three populations proposal. Focusing on the populations that have the best chance of becoming stable. We'll then focus our management units in better habitat.
  - Dan: one of the things not on the urgent actions list is that we've hired a person to work at TNC who will focus on writing EAs for fences, which is a really important step.
  - Kapua: we want to build an ecosystem fence each year, in good habitat where we can focus on more stable populations.
  - Jim: we put together the IP in what we considered to be the minimum configuration to keep the no jeopardy consideration. How does USFWS look at this? To have spent so much time putting something together that we felt was biologically sound, we agreed to scale it down after the first round, but I felt that was the bottom line in terms of no jeopardy. I can't see how we can proceed and

- keep that no jeopardy. If this is a salvage situation, it's very different from a jeopardy/no jeopardy.
- Kapua: some things that probably would have changed anyway include taking out some of the really degraded habitat from some of the management units. With field expertise as we go along, we've been able to refine the size of the MUs to just focusing on the best habitat. That's one thing we learned in the first year is that a lot of the land we included in the MUs is really degraded. The second thing is that places like Waianae Kai are going to be really difficult to work in. We also have no MOU with Dole or Dillingham Ranch landowners. But this isn't as significant as not having full funding.
- Jim: it's a question of where the line is being drawn in terms of jeopardy/no jeopardy.
- Kapua: I think it's one thing to manage 20 people, and thinking about going to 200 people is crazy. We always threw out these numbers, but when you put that into reality, it's pretty scary. That's not to say it can't be done, but I think having implemented some of the actions, my reality check comes into play.
- Jim: the bottom line isn't effort, it's effect. The longer it takes to get into full-fledged effort, the harder it is. It's big because we knew it would take a lot of effort and we knew there would be problems. To me it needs to be clarified if the continuation is still under the realm of no jeopardy. I don't see how that can be unless the rules have changed.
- Patrice: I'm confused because first we were talking about UAs, so your concern is more than UAs it's the funding issue?
- Jim: urgent actions was supposed to be a short bridge to get to a certain point, and now we're in urgent actions 3. We haven't gotten the funding, we're scaling down, and the question is where are things are really going?
- Patrice: we were going to run through some of the problems they had been encountering, and I thought specific examples would be brought up. I knew funding had been a concern, the size it is at right now is what keeps getting discussed in Washington. Part of the question is: could we scale down on the funding and still keep the integrity and biological stability of the plan? I'm hoping there is a way that that can be done. The end result is we need to stabilize the plants, and is there a way we can do that. The jeopardy question is important; the USFWS is very concerned with the Army's conformance with the biological opinion. We're out of step right now with the BO. I was thinking we would take a look at modifications, but the bottom line would always be maintaining a non-jeopardy BO.
- Kapua: (to Joel Godfrey who just came in) UAs were just intended to tide us over until we fully implemented the plan, but we're not fully funding the plan. Jim is wondering how we can not fully fund the plan and remain in a non-jeopardy scenario.
- Joel G: the cost sent sticker shock throughout the Army. Not just locally, but nationally. If fully funded at $8 million per year as an average, it would be about 25% of the Army's nationwide endangered species budget. This would make Makua the most expensive military base in the nation in terms of conservation. We need to know if there is a way to reach the stabilization goal at less cost?

- Jim: that makes total sense in terms of economics, but we put the plan together strictly on a biological basis, it's not based on how many dollars per species. What the plan does is say we know there are an awful lot of risks involved in terms of stabilization, so we're totally focusing on the biology. Ultimately it has to come down to an interpretation of how it fits into the BO. There is a good reasonable probability that there will be success. So we're dealing with two different sets of currency. That's the dilemma we have to deal with.
- Talbert: the Army doesn't want to pay for the full plan. As I understood it, what was ironed out was the bottom line, most basic plan to keep the Army out of jeopardy.
- Leilani: but the BO says we have to have three stable populations, and the plan has a lot of buffer built into it that we may not need.
- Kapua: if you look in the BO, the credit system is a recommendation. Three stable populations is our goal. (Kapua read from the BO the paragraph on the credit system). The cost may be scaled back by 75% if we focused on trying to stabilize three populations per species. If we look at the species we've had a lot of success with that, we can just work on three populations per species and we know we'll have success. But this would mean a huge change to the premise of the plan.
- Joel G: as a general overview of where the Army is looking at training, if you look at transformation, the areas they look at requiring are agricultural land. I think the Army is still looking at the potential cost to train in conservation lands, it's hard to justify that cost. They're currently looking at ways to move training from conservation lands.
- Jim: when we built the plan, we knew we didn't have all the answers to start with. We were clear that if success comes early that's great. The credit system was devised to ensure that the three populations were reached. Early success doesn't change things at all. It's the one where we know we'll have problems that we need the credit system. There's also Oahu IP, and PTA, if there's sticker shock right now, what will it be later? I left the IP meetings feeling we'd really put something together that makes a lot of sense. But I don't want to preclude that by walking away.
- Kapua: we want to focus on the best habitat and the areas with the most overlap between species so the cost is reduced, and we'll get full genetic storage from all of the populations. We want to take that approach first, trying to get three solid populations from all of the species, and trying to get collections. That's a better way to me to approach the populations. If we're able to do that we'd get closer to our goal earlier on, rather than waiting until Phase C to work on some of the populations. What would fall out would be the non-native portions of the existing population units. Without changing the credit system, just based on what people on the ground implementing the plan think about the way to stabilize things the fastest. The plan has stretched things out too far. We can do so much with reintroductions, early on we were wary of augmentation, but now I think we can get really far using reintroductions and augmentation. In this last year of working with the plan, I'm leaning toward more reintroductions into good habitat rather than trying to protect populations on the brink in poor habitat.

- Joel G: if the three populations aren't working, we'll be making reports on a yearly basis and reevaluating our success. This is a fluid plan. We want to move forward and get the kind of support we need. Someone from Ft. Shafter assessed the funding needed, and really the first couple years you're looking at $5 million, and those last years you're looking at $12 million. The plan really ramps up in the last phase.
- Brent: the first time we revised the plan we did so mostly because of sticker shock. The state's questions all along were 'is this implementable'? If the Army had given us a price range early on we wouldn't have had to come back to revise this plan again. For the State to agree to a big thing and have to scale back to a year-to-year plan is difficult.
- Kapua: in starting with three populations we'd be able to do an EA for the whole plan. I don't think we'd be compromising what the Army needs to do.
- Joel G: we're now spending $1.5 to $2 million a year on the plan. It's easier to fund one-time costs than yearly, so sometimes we're able to get more money for specific projects. If other projects come down the line we're able to get more money for those.
- Jim: I think that's tremendous, and I have no doubts about the current efforts.
- Kapua: I think what we're looking at in the short term is that we're maxed at the building we're at now. If we stay here and get TNC and the State more people, that would be easier for us.
- Joel G: If we could partner, there are a lot of things that come into play when you start expanding your work force.
- Kapua: in terms of how much more money, we're not sure yet, but we sat down and looked at the IP and reordered our priorities based on the best populations and the best habitat. A lot of effort would be focused on TNC land and in the NARs and on Army land.
- Jim: even though sticker shock motivated the scaling back, it was still based on biology. The revision was to phase things, and phasing was based on risk management. I do have some concerns in terms of turning that around. We run into the jeopardy of losing some of those small populations. One thing that was never really clear to me, it doesn't mean you back off other populations when one is stable. But if things aren't going well, then when does USFWS get concerned? But they're still populations that count even if they're in more jeopardized areas.
- Kapua: I think one thing that's been hard for the Army to swallow, the IP currently is more than the three populations that are required, and it's also lots of habitat to work in. To actually get an MU under control, it has to be reasonably sized. If there are populations in marginal habitats and we don't manage them, it would have been the least successful of our efforts anyway. But, there are also some areas we want to include because of the nativeness of the habitat.
- Kapua: for some species it's really easy to get to three populations that are stable, for other populations, like *Flueggea*, it's a lot of effort and it's not the Army's fault that black twig borer attacks these trees.
- Joel G: (ACUB program summary.)

Stabilization plans discussion:

- Talbert: how many of the populations that you are working with have now reached stability?
- Kapua: one, *Cenchrus* in Kahanahaiki. But we have not been focusing on PUs in the best habitat off-site, therefore we'd expect our success rate to be low.

- Starting with Alemac, going through the PUs to look at the PUs we've chosen to focus on
  - Alemac:
    - Assumptions: chose largest populations in best habitat.
    - Jim: need to research black twig borer to try to stabilize this species
    - Jim: is the area of your proposed MUs big enough for the population to expand?
    - Kapua: the trees can grow close together, so yes.
  - Alsobo:
    - Assumptions: Chose remaining extant populations, and augmentations into historical sites.
    - Kapua: working on collecting from the reintroductions. Have lots in seed storage.
    - Jim: what about the current status of management for all of your populations? What is the current status of management?
    - Leilani: I can send you a spreadsheet with what we've done so far this year.
    - Jim: I'm interested in when the IT will be meeting to do adaptive management? When will we be having those meetings?
    - Joel G: we can discuss that later.
    - Talbert: good to augment in Kapuna/Keawapilau area. You guys should treat the NARs as yours for the using.
  - Cenagr:
    - Assumptions: Chose biggest populations in the best habitat (except Huliwai because habitat is very degraded).
    - Jim: Why is Huliwai being dropped out?
    - Dan: TNC has its own stabilization plans, so we are doing work there on *Cenchrus*.
    - Jim: what about Ekahanui? The in situ population is pretty large.
    - Kapua: we're proposing to build a fence around those plants. We should change that in the stabilization plan, we'll manage those for stability and augment throughout Ekahanui.
    - Dan: we've done two introductions of *Cenchrus* in Kaluaa, and I've done two seed sowing experiments in Kaluaa.
    - Kapua: we've got almost 200 reintroduced individuals of *Cenchrus*. We've met our stability goal for reproductive individuals. It's really hard to keep track of which individuals are from which adults, but we do have recruitment.
    - Jim: it would be good to mark plants that you can follow through the different stages. That would be really useful.
    - Kapua: we've marked juveniles but no seedlings.

- Jim: take some sort of random sample of seedlings and flag them and track their fate. That would be a useful way of tracking attrition.
- Joby: we did that for two years, and have some idea what the seedling survivorship to juveniles is.
- Dan: TNC is doing reintroductions in Pualii and Kaluaa. They're part of another grant program so don't include them in the IP.

Adaptive management discussion:

- Patrice: we want to take this back for Marie to review.
- Kapua: if she had input she needed to make it at the meeting. It would be really difficult to discuss this with her after the fact. We'd have to redo this whole meeting.
- Jim: I'm not comfortable agreeing to anything today. If we're making major changes, or even if we're just talking adaptive management, it would be very useful for me to have a sheet for each species that summarizes what's been happening. Even for just continuing on for the same strategy, that's what I need to be able to put meaningful input into this. This is a major discussion of a change in strategy. If I don't have all that, I don't feel I have a place on the team.
- Talbert: if this is the Army's counteroffer, then I agree with Jim, there should be a species by species report in the form of a narrative. A summary, like your year-end summary. Explain where you're having success and where you're not, and follow along your line of reasoning why contraction of the plan is justified.
- Kapua: I think we're talking about a couple different things here. It's really hard to call an IT meeting, logistically and cost-wise. So the way we've been doing it up until now, for issues on TNC land we meet with Dan. For issues on BWS land we talk to Amy. We have Joel Lau under contract for other surveys. I think it's hard to sit down and go over the whole thing. Some things will be more species overarching, but it's much easier to have casual communications with land managers on a frequent basis. Our RCUH report will address status, and our proposal of moving to three populations will help us make things clearer. We can talk about the populations that we're focusing on now, and we can discuss progression of management at a later date.
- Talbert: I'm not recommending any more meetings. I have no problems working with you guys on day-to-day management. But this is a higher level of decision making, and I need additional information about species that applies to state land. I know what we're doing with *Cenchrus* on our land, but I don't know what you're doing on other lands, and it would have a bearing on what I do.
- Joel G: it's important to get everyone's input. But the final decision rests with the Army and the USFWS. We want the input of biologists, but the final decision isn't with the IT.
- Jim: that was my understanding all along, that the USFWS made the final decision.
- Joby: what is driving the USFWS has changed since the plan started to be written. It makes me uncomfortable that things could change again in two years.
- Kapua: and that's why we haven't tried to ramp up, we don't want to hire a lot of people and then have to fire them.
- Joel G: we've seen steady funding, and that should remain that way. We've asked for more money. And in my short time here things seem to be steady.
- Joby: they're not in a mode where they've said that's a lot of money; it seems to be in stasis.

- Jim: there are two perspectives, one that's dollars and cents, and one that's biological. We need to make sure we integrate the two of those, but don't have one of those drive the other. We can put this on the table, but USFWS decides if it's jeopardy or no jeopardy.
- Patrice: I'm hoping that money is not the ultimate driver to this plan and any changes. I have not heard any direction that says the plan has to be under x dollars. The direction we have is to work with the Army and the IT to try to reduce the cost while maintaining the biological integrity of the plan. This is an incredible plan, but my understanding right now is that basically what we're looking at is starting with three populations rather than whittling down to three. I think that going up to our regional director and showing that this will pare down the cost and is in conformance with the ESA is the bottom line. My understanding was that today we'd look at the details and then take it back and think about it and discuss it with Marie and other people who know about the plan.
- Kapua: the way the plan is now many actions are put off until year 23, and I think we might be more successful in this approach because we're working with better populations early on.
- Jim: we did put in a system of monitoring all populations regardless and of doing more management if needed. I think that the real strength of making modifications is by having a very active discussion. I think we're all looking at the same thing, the biological reality of achieving those goals. I see this in the realm of adaptive management, but it's a little bit bigger steps than I would have foreseen.
- Joel G: we're running into struggles with landowner involvement.
- Kapua: another issue we should discuss is the fire.
- Joel G: the Army under the current commander will not conduct any more prescribed burns.
- Jim: relative to the issue of risk management, fire happens. And so you do need to buffer. That's an issue that is pertinent to new strategies. There are some pieces in there that we thought had a lower level of risk.
- Joel G: and the Army feels that the risk from training is lower than that of the prescribed burn. In terms of risk management, fuel and fuel loads are going to be a problem. Fuel is always going to be a big issue, and there needs to be some sort of fuel management, and the Army is looking some alternative methods to keep fuels down.

Return to stabilization plans discussion:

- Chacel:
  - Assumptions: Lower Ohikilolo population is recruiting, so the population is growing and doing well. Also manage Kaena and Kaena/Keawaula. Other populations are on vertical cliffs and not manageable. Add Waianae Kai as a backup, say we'll monitor annually.
  - Jim: why not include the populations that are stable on the cliffs? All you need to do is monitor those populations and then you get credit.
  - Kapua: monitoring them would be extremely difficult.
  - Brent: Betsy Gagne, and Sheila Conant's class want to look at what you're doing at Kaena on the *Chamaesyce*.
  - Michele: are you planning to keep on doing fuel reduction around Lower Ohikilolo?
  - Kapua: yes, and it's in the stabilization plan as the 'Makua' PU.

- Joby: Punapohaku is also a large population, but it burned in the fire.
- Kapua: it's also less native there, and in an ordnance area.

- Chaher:
  - Assumptions: We chose all extant in situ populations, and the highest scored reintroduction site. Reintroductions will be into habitat closest to the source populations. We're not lumping Pahole and Kapuna, so we may want to add another credit and lump those like we did for other species.
  - Talbert: could we substitute a West Makaleha reintro for Central and East Makaleha. That would help consolidate actions.
  - Kapua: does anyone else have feelings about that? Central and East is very native and that's why we chose it for a reintro. We could lump Pahole and Kapuna as one effort, and do both reintros.
  - Talbert: sounds good.

- Cyagri:
  - Assumptions: Chose all remaining in situ populations with mature plants.
  - Joel L: need a population of purely South Kaluaa stock.
  - Dan: we've already been reintroducing using the South Kaluaa stock.
  - Joby: can still take South Kaluaa stock and put it somewhere discrete in Central Kaluaa.
  - Dan: if you really wanted to do genetic analysis, could do that on the new Central Kaluaa plant.
  - Jim: when dealing with this many plants, you have to mix stock, you don't have a choice.
  - Kapua: we would augment Pahole to West Makaleha using mixed stock.

- Cyalon:
  - Assumptions: Pahole and Kapuna/Keawapilau are separate. Chose extant populations to manage. Would only manage Makaha side of Makaha/WK populations.
  - Talbert: I think augmenting into W. Makaleha is important.
  - Kapua: Should we add W. Makaleha?
  - Jim: depends on your capacity to produce outplants.
  - Agreed to add W. Makaleha as manage for stability, and treat Pahole and Kapuna/Keawapilau as one effort.
  - Kapua: this population would benefit just from fencing.

- Cyasup:
  - Assumptions: Manage the historical sites. Kahanahaiki to Kapuna is one, then Central and East Makaleha (highest ranking reintroduction site) and Makaha (good manageability) reintros. Reintros at top of ranking were chosen, but the Mt. Kaala NAR reintro was not included.

- Jim: there are already lots of outplanted individuals in Pahole. It's really important to know how many outplanted individuals because we're looking at the scorecard of how things are doing.
- Kapua: we're no longer proposing any work in Mt. Kaala NAR, but we'd like to still fence one area of good habitat to protect in order to have a good spread throughout the Waianaes.
- Talbert: access is a problem. We'd need to solve this problem to do any ecosystem wide management work. Smaller fences may be better.
- Jim: The Army should work with the State and the NARS commission to determine its value and see if it's worth fencing and doing co-management.
- Kapua: let's keep Kaala NAR in mind as we go forward. The problem is the PUs are scattered across that vast tract, so it would mean doing reintroductions and focusing our efforts in a smaller area.

o Cyrden:
- Assumptions: Kahanahaiki, Pahole to West Makaleha, are stable populations. Good recruitment, doing well. Lower Opaeula, going to fence that with Koolau MWP, and its expected to do well when fenced. Kawaiiki was not included because it represented a special effort for Cyrden, and Opaeula overlaps with many other species.

o Delsub:
- Assumptions: picked larger populations. Most of the populations are decreasing in size. We'll work with TNC on the Palawai population, its fenced, but in a small patch of natives surrounded by christmasberry.
- Kapua: Haili is a new population found on unencumbered state land. The habitat is highly degraded, but it's worth putting a small fence around those plants. Talbert has already collected so plants are in storage.
- Dan: there was a population in Ekahanui that died, but stock from those plants has been reintroduced into the Ekahanui fence.
- Kapua: What stock should be used for the Kaluaa PU?
- Jim: one plant isn't an adequate founder.
- Kapua: We'll use Kaluaa stock and put South Mohiakea stock in there as well.
- Jim: in the populations that are now zero, were those collected from?
- Kapua: no, they were gone before we started urgent actions.
- Jim: is the propagation database up and running?
- Kapua: yes, and we're trying to update the seed storage portion of that database.

o Dubher:
- Assumptions: manage the two largest populations at Ohikilolo, do one Makaha reintro. The species has a limited range. Use Waianae Kai stock for the Makaha reintro. We are representing the center of abundance and the outlier population.

- Kapua: focusing on Ohikilolo should be our top priority, and it's the center of abundance for the species. We didn't include Keaau because it is just a similar but smaller site.

- Fluneo:
  - Assumptions: We chose good sized populations. These populations overlap with other species.
  - Joby: we set up lots of air-layers this year, but we haven't had much success with them. Plants are growing better from cuttings.
  - Jim: you should try to get interest into researching a biocontrol for the black twig borer.
  - Joby: Seeing how slow the aerial rat baiting efforts have progressed we'd better start now. By the end of this winter we'll have a better idea of how many of the air layers survive. We also planted some trees at Waimea Botanical Garden, so it'll be interesting to see how they do down there.
  - Jim: this should be a call for trying to up the ante on the biocontrol research, and the Army should be pushing for that. This really is a roadblock to success, so it may be something to kick up to a higher level.
  - Joel L: if you find a good planting site, you should be able to have plants survive without applying an insecticide or watering them. The plant in my yard survived without herbicides and there is a lot of twig borer and rose beetle around.
  - Joel L: we should choose sites with streams, and plant the trees by the streams. There are some nice areas in West Makaleha.
  - Talbert: I like the idea Joel's generating, which is trying to get more *Flueggea* propagation for outplanting rather than trying to save them in the wild.
  - Joby: why don't we do another reintroduction in a gulch bottom, where we grow them and walk away.

- Heddeg:
  - Assumptions: we picked the largest populations in the best habitat, but we passed over Kaala NAR because it's steep and difficult to access.
  - Talbert: I don't have a favorite site for doing a Mt. Kaala NAR fence.
  - Kapua: let's keep our selected PUs like we have it now, and maybe build an Alaiheihe fence.
  - Jim: monitoring is an issue, we need to keep an eye on all of the populations. Even though there may be threats to the habitat, they may not be threatening the plants that are there.
  - Talbert: are you now going to be doing collections from all of the populations?
  - Kapua: yes. We collected Makaleha cuttings, but we're not sure what their status is.

- Hedpar:

- Assumptions: Center of abundance is Ohikilolo ridge, so we're managing those populations. Also Halona, which is on Navy land, which may present some problems. But we're managing all of the in situ populations.
- Jim: how soon will you know if you can do work on Navy land?
- Michele: I don't think it'll happen. Their policy nationwide is no reintroductions or augmentations on their lands at all.

- Hesarb:
  - Assumptions: We're managing the largest extant in situ populations, except for Waianae Kai. The State may fence the Waianae Kai population.
  - Kapua: the *Hesperomannia* in Makaha is suffering from pigs, we tried to get permission to build a fence but the State wanted a CDUA. They wouldn't allow us to go through the faster process of doing a departmental permit even though this would be a small fence because the area is in a protective subzone. So we were waiting for a watershed partnership between BWS and the state to get into place which would allow us to speed the permit process.
  - Talbert: you could fence the one plant in Kapuna. It has air-layers on it now.
  - Joel L: establish the Waianae Kai stock on the eastern extension of Makaha.
  - Jim: You should do more reintroductions, you need more buffer for this species.
  - Kapua: it's not a question of reintroducing or not, it's a matter of getting stock so we can.

- Hibbra:
  - Assumptions: We chose populations to represent the three types. We will need to work with Joel Lau to find appropriate sites for each type.
  - Joel will work with Matt Keir to find a fence site at Mt. Kaala NAR below the road.
  - Kapua: the species represents some challenges because the medium type is on cliffs and in unmanageable areas.
  - Joel L: the only way to work at the Dillingham site would be to augment around the corner. Still steep, but less rocks falling.
  - Kapua: this population is easy to grow and store, it's just hard to find sites where we can do management.
  - Jim: you are having success in Makua?
  - Kapua: yes.
  - Talbert: so the grass might not be an obstacle? The idea is then to get into these accessible areas.
  - Kapua: we'll need to do some on the ground surveys to find a management unit for each type. We'll manage and do reintroductions at one site for each type.
  - Joel: so one site will be chosen from Kaimuhole to Kaumokunui?

- Kapua: yes. Right now we have no participation from Dole, but maybe if we go to them with a smaller MU proposal they might agree to work with us. We've represented the Makua short type at Range Control at Makua, and it's being grown at many ex situ sites.
- Joby: what about Kaluakauila?
- Kapua: we'll maintain the reintroduction but it's not a requirement.

- Lipten:
  - Assumptions: Ohikilolo centered distribution. We will protect those PUs because they are unique from each other. Both are fenced. We will also work with the Makaha portion of Kamaileunu/Waianae Kai PU.
  - Jim: why not Kahanahaiki? It seems like you have three stable populations with that.
  - Kapua: mostly because we wanted to represent Ohikilolo Makai.
  - Jim: are there threats to Kahanahaiki that you need to manage?
  - Kapua: fire. Some of those plants burned in the fire this summer.
  - Jim: Kahanahaiki is stable, so take advantage of what's there. Just monitor that PU to make sure it's still stable and you have a stable PU. So don't walk away from it.
  - Kapua: another one we might think of including is the Kaala NAR population.
  - Kapua: the only one we need to actively manage is Ohikilolo Makai. The other populations are already stable.

- Nerang:
  - Assumptions: Makua population now stable. Makaha population smaller, Waianae Kai population is in great shape. Kaluakauila reintroduction, can do with Lower Kapuna stock and Manuwai stock (right now only Kapuna).
  - Kapua: the Waianae Kai population is doing really well, but we're not sure we can do anything in Waianae Kai.
  - Kapua: the Makaha population has crashed, and it's in a really steep area.
  - Brent: go ahead and write a proposal to fence the Waianae Kai plants. It's not an actively hunted area, and you never know.
  - Leilani: we'll finishing scoping the fence and send a letter to you.
  - Kapua: It's easy to grow, and we've been collecting cuttings for seed production.

- Nothum:
  - Assumptions: picked the largest populations in manageable habitat.
  - Kapua: MK thinks we should fence the Waianae Kai population, but right now no threats from ungulates.
  - Kapua: in whichever *Hibiscus* population is chosen below the road at Mt. Kaala NAR we want to be sure we can get *Nototrichium* into that MU. We haven't been very successful getting seeds when we've collected.

- Joby: difficult to get the numbers of seeds. Most plants have some mature seed but not enough for a complete collection.

- Phykaa:
  - Assumptions: manage historical sites and do reintroductions. May be more appropriate to do Manuwai reintro rather than Makaleha.
  - Kapua: it's extinct in the wild, and may be very susceptible to drought. But we have stock and it's easy to grow from cuttings.
  - Kapua: Currently no destination for the Palikea Gulch stock, but we could do a reintro into a Mt. Kaala NAR fence.
  - Jim: what are the genetic differences between the plants?
  - Kapua: not sure. Plants from each site could be one clone, so may not be a lot of genetic diversity. It's easy to grow and would be easy to reintroduce.

- Plapri:
  - Assumptions: We chose populations that are robust and manageable, and in more native habitat. We also have both Waianae and Koolau populations represented.
  - Kapua: we should visit the Halona *Plantago* to see what the population is like. We could manage it if it's robust.
  - Brent: it's probably on state land, state land runs from cliff to cliff above Lualualei.
  - Joel: if you do a thorough search now at Palawai, you may find more plants.
  - Kapua: Waiawa is a good site because we could do a partnership to fence it. There are also lots of Oahu IP species up there.

- Prikaa:
  - Assumptions: We will continue to manage the large populations, but do more reintroductions so don't need to build as much fence.
  - Jim: but your management isn't related to fences anyway, it's rats, right?
  - Kapua: both. Goats eat seedlings.
  - Talbert: how long until you have germination?
  - Joby: it takes about two years. But from the outplantings it takes a long time. The plants to grow, produce seed, germinate, it's probably 20 years.
  - Talbert: there are some easily accessible areas with these plants in Makaleha. Good place to build a fence and do rat control.

- Sanmar:
  - Assumptions: Manage the three largest in situ populations.
  - Kapua: need to build a fence around the Kamaileunu stock to protect it from all the goats.
  - Joby: we wanted to fence the Kawiwi plants so we can collect from them.
  - Joel: Kamaileunu is different, it's drier. Just go straight with Kamaileunu stock for augmentations at Kamaileunu.

- Schkaa:
  - Assumptions: picked largest Waianae populations, and will do a reintroduction at the highest ranked site.
  - Leilani: there is only one plant left on the action area, and more plants are being found outside the action area, so does the Army still need to stabilize this species?
  - Patrice: it's based on your baseline in the BA. We can talk to Tap and see what she says.
  - Kapua: this would apply to Phykaa, Schkaa, and Cyasup.
  - Jim: but this could have something to do with the Army's actions or inactions. It's not a simple thing. You have to be very careful not to simply look at it that way.
  - Kapua: it's difficult to look at species that were never even in MMR and die out from other than military training and say that the Army still has to stabilize them.

- Schnut:
  - Assumptions: we're managing all of the in situ populations and doing one reintroduction in Makaha.
  - Kapua: Makaha is a lower ranked site, so maybe we should do the reintro elsewhere?
  - Joel: I think Makaha is fine.
  - Talbert: West Makaleha is fine for doing a reintro if we need to do one there, too.

- Tetfil:
  - Assumptions: We chose the largest in situ populations that were in manageable areas. We're working in center of abundance in Ohikilolo.
  - Kapua: with Puhawai, we want to reintroduce plants into Army land just over the crest of the ridge from the Navy land.
  - Dan: TNC had success with seed scattering and getting plants to grow.
  - Joel: visited the Keaau *Tetramolopium*. It's seems to be different morphologically from the Ohikilolo plants. It's not a hybrid, closer to *lepidotum*. I'd like to do something to preserve that.
  - Kapua: we would collect the stock.
  - Joel: it looks different from any others. I don't know what it is, but it seems to be distinctively different.
  - Kapua: we'll collect from those plants.

- Viocha:
  - Assumptions: We chose the largest populations to manage in good habitat, and also the most manageable sites.
  - Kapua: Kamaileunu ridge is not in good condition, and it's helicopter accessible only. It may be too steep for goat threats.
  - Jim: you may be able to manage it by monitoring.

- Kapua: Except the other populations are on Army land so it's just easier to do management. And Makaha is a willing partner.
- Jim: Keaau, is it so steep that ungulates are not an issue? You should try to take advantage of the largest populations that require less management if possible.
- Kapua: Keaau and Kaimaileunu are not much bigger than the PUs that are chosen and not stable.

Talbert drew a recommended West Makaleha fence boundary.

Species status discussion:

- Jim: there are 10 species that are looking good, but there are 10 that are really challenging. There are 5 that could go either way. I feel more comfortable with the discussion of this strategy because I don't feel it's a major issue at this point and I feel it's doable.
- Kapua: and we have protection across the habitat.
- Jim: I'm concerned about those 15 species that are challenging. That's where I get really concerned.
- Kapua: the challenges are from the threats we don't know how to control. And I think we can put more effort and energy into researching that if we're just working on three populations.
- Jim: but it's still going to cost a lot of money. One of the things that concerns me, it doesn't seem like you have a good monitoring program going. It seems this shift in strategy isn't really a major shift in strategy, and if you're going to be saving some money, you need to take at least 10% of that and put it into a really good monitoring program. You shouldn't be comfortable without it. It's really a key component of this program.
- Kapua: it's difficult to do with so many populations, easier to do with fewer.
- Jim: you need to monitor all of the populations. If you're cutting the margins so thin by focusing on three populations, you don't have much of a fallback, so you need a good monitoring program for the ones you manage and some of the ones you're not managing.
- Kapua: I think that focusing on three allows us to flood the market up front and monitor so we're sure we're meeting our set goal.
- Jim: and I think you as a team need to look at what the research needs are. You need to look at what research items are a high priority for funding.
- Kapua: we should put out heads together on that, that's our weakest point.
- Jim: you also need to consider biocontrol for slugs and black twig borer.
- Joel G: this leads right into what the role of the IT is. Ultimately the issue of are we in compliance will be between the Army and the USFWS. Ideas like this about research and how to better our success, these are things we need the team to help us with. In terms of the funding issue, there will be money available for research.
- Jim: even the issue of compliance, the team built on the ideas of the HPPRCC. The team still has some valuable input into that, but the final decision is between the Army and USFWS. For helping define that, the process of the team is helpful.
- Kapua: would you share with us what species you felt were easy to manage?

- Jim: I can give you a copy of the list. Nothing I did was any different from what we did as a group, and fits into the a,b,c phasing we originally came up with.

Species with reduced populations or no longer in the action area:

- Kapua: so the USFWS will ask about those species that were never in MMR but were in the action area and aren't any more?
- Patrice: the AA was set up years ago, and that delineation was based on influences from Army training and was set years ago, so even if those species are gone, that responsibility still falls to the action agency. But we'll take this back to Tap and see what she says.
- Jim: was there a reinitiation with the fire?
- [Leilani handed out the Makua post-fire memo summarizing the impacts of the fire.]
- Patrice: prescribed burns are not covered under the BO. We did an LAA that said it's unlikely to have an effect. But in the BO, if a fire goes out of the firebreak road there would be a reinitiation, but we have learned that that should not have been added to the BO, we should be using triggers under section 7.
- Michelle: so they reinitiated based on critical habitat.

Off-island collections:

- Leilani: we're facing some complications with doing collections off-island. Most of the collections would be from plants on state land, and right now we don't have a collection permit.
- Jim: the ideal would be to work with the State to help them do collections off-island.
- Kapua: since we're not bringing the genetic stock to Oahu, do we need to do the collections?
- Jim: if it's that important, the state should partner up with the Army to do those collections. I think those collections off-island could be dropped.
- Brent: the IT decided these collections were needed?
- Kapua: yes. And Vicki decided we need to keep the propagules on the island they were collected from. If we were to revise the application to remove off-island collections it would make things easier.
- Patrice: you didn't think the propagules would ever come back to Oahu?
- Jim: it was a back-up back-up, assuming there would be some huge catastrophe in the Waianaes, and this was to be sure the species would never be lost. Originally we were going to stabilize populations off island, and then we pulled away from that.
- Kapua: we originally had MUs on other islands.
- Jim: we later realized we could meet our goals with just the on-island work.
- Patrice: you've moved from off-island work to none in the final IP?
- Kapua: there is the Kauai *Flueggea*, but we're no longer planning on working with that.
- Patrice: so the thought is now there would be no collections off-island and no storage off-island. Is that acceptable to the IT?
- Jim: it would be a good collaboration, but if it's a big process I think it's not necessary.
- Kapua: and the state is doing a lot of this work already.
- Jim: and this is why tracking it through a database is really important.
- Michelle: NTBG is trying to get collection groups. GSN projects should be taking place on each island.

Oahu IP:

- Kapua: we're going to try to do the Oahu IP with subcommittees. Since the foundation is already here, we'll streamline the process. One person will be the consistency between all of those groups. We anticipate the approach being really different than Makua. It might be pretty different from the Makua actions. On-site populations could get to stability without being threatened by training.
- Jim: one thing that is important is trying to still spread actions between the action area and off-site. We kind of broke that, and even in our discussions today we had a couple that were all in the action area. But it's different from what I think the BO was written as to start with.
- Joel G: in terms of fire risk, we're currently looking at that. Andy Beavers is looking at the fuels map with grasses as the primary fuel, and looking at different weather scenarios.
- Kapua: for the Oahu IP we would probably say it's okay to have all three populations on site because the risk from training is so low.
- Alvin Char: we want to reduce our reliance on other landowners. I think it's good to work with willing landowners, but working with for-profit landowners is really tough.
- Jim: there are some situations where you can't get away from that.
- Alvin Char: if we could reduce the fire risks so we could get more credits on our land that would help.
- Jim: it is one thing to put together the plan, and what happens after that is another thing. I think you can short-circuit some of the process of writing the plan, but consider what happens after it's written? You need to have other than self-review of the plan. This will make the plan stronger and more biologically sound. Monitoring is critical. You have to get data, review data, and react to data.

Future meetings:

- Kapua: we will try to have a meeting after the RCUH report is done. We'll have all of the numbers in the reintroduction tables at that time.
- Jim: it is important for each stabilization plan have a step-down outline showing the tasks to see what your status is. You also need to have monitoring protocols set. You will use them in the field and for the annual review.
- Talbert: or just send out a summary report for us to review so we don't have to meet.

Consensus on proposed changes to the IP:

- Joel G: is there a consensus, at least in principal, that this is a valid approach?
- Kapua: it's ultimately up to the Army and the USFWS.
- Joel G: right, but I want to make sure everyone agrees.
- Jim: I don't see drastic changes that pull away from populations. You're getting more risk this way, and we all need to see data to see what's happening. But I'm okay with it.
- Talbert: The thing I like about you Kapua is that you don't spin things. At first you offered me all the ice cream and now I get just three scoops. But I think this version of the plan is more practical. It refocuses the work into more native areas.
- Brent: I agree with Talbert. I also think the re-ordered plan will probably be more palatable to the state administration.

- Dan: we should make sure the populations we've selected have captured the different sorts of landscapes the species grow in.
- Joby: If the Army is looking to fund only a percentage of the project, and this project is now bottom line do we get full funding? I think this version is very doable given the expertise we have now. I'm concerned that the USFWS isn't being consistent through this project.
- Joel L: I have no problems with these changes. A lot of the areas that came out were unmanageable because they were too steep already.
- Patrice: we will take this back to our field supervisor for review.

Lower portion of the Kapuna fence:

- Brent: the state could use your help, we don't have enough money to build the lower portion of the Kapuna fence. We need the Army to help out. *Hesperomannia* is there, and other rare species, so we should try to partner to get that built.

Appendix 2: USFWS Meeting Notes

Meeting notes
October 14, 2004

Attendees:

Marie Brueggman	U.S. Fish and Wildlife Service
Patrice Ashfield	U.S. Fish and Wildlife Service
Michelle Mansker	U.S. Army Garrison Hawaii
Kapua Kawelo	U.S. Army Garrison Hawaii
Leilani Durand	Contractor, U.S. Army Garrison Hawaii

Marie: Status of monitoring coordinator?
Kapua: We're working with Tamara Ticktin from UH on Makaha monitoring, she did a pilot study.
Marie: need to work more on what are the results of weeding projects (just reporting that we did weeding and what species, but need monitoring in weeded areas). Main measure of compliance will be showing habitat impacts.
Kapua: we'd need a monitoring specialist
Marie: yes, should hire one

Marie: we haven't addressed in monitoring what you do when you need to do management in all areas and can't have controls. Need to hire someone to work out these details.
Kapua: for ungulates, not a lot of data is needed to prove positive impact of fencing.
Marie: just need to prove nothing has gotten in the fence.

Patrice: how does it work with funding? Isn't there a lag time?
Kapua: It's my fault that we haven't done more monitoring, I'm management focused, I'd rather spend money on management than monitoring. But we have enough people now to spend a small portion of our time monitoring, but we need someone to direct that.

Kapua: we need to get a special use permit to work in NARS. Jim presented about Makua IP at NARS meeting.
Marie: what about other State lands?
Kapua: Talbert is saying we need permission to go to all State lands, not just NARS. The Poamoho *A. apexfulva* issue.
Marie: will that take the place of an MOU or cooperative agreement?
Kapua: no, we still need that. After BO4 finalized we can take new version of MIP to Paul Conry and ask for an MOU.

Marie: should call addendum a 'draft' until it's finalized. Also, I'd feel better if IT had a chance to look at final changes.
Kapua: what's the timeline for BO4?

Michelle: re-initiate next month.
Patrice: timeline is contingent upon all info being available before the clock starts. We have to initiate.
Kapua: our report serves as info for reinitiation,
Michelle: as well as coming to an agreement on the addendum. We'll modify that.
Marie: also need Andy Beavers' report before re-initiation.
Patrice: there are various components: Andy's report, AA may get changed. Then Army would come to service with justifications for changes pursuant to Andy's new modeling, and we'd have to assess that. And we have to discuss weaponry, and what the project description will be.
Michelle: we will never get over coming to you with a new project description halfway through the project. The trainers/command always have new ideas about training, then we have to propose it to you. Tom Siskal is the go-to guy for the Colonel for everything Makua related, and he doesn't back down from new training ideas until Service says 'no'.
Marie: would it help for our office to come in and talk to the command?
Michelle: yes, we should explain to colonel the process of doing a new biological opinion. Need to explain that every time you add an incendiary device you're upping the number of actions and cost of the MIP.
Patrice: I told Joel he needs to set up a meeting with the colonel, Jeff and Gina. I thought we could shoot for the end of this month, but definitely they need to meet. NEPA process is a public disclosure process, so it should come first, and section 7 should come 2nd.
Michelle: we're already a year overdue on that EIS. I don't want them telling me section 7 is slowing the process down. If they had the EIS finished, then we'd come to you with that project description, and it's a much easier process than what we're doing now.
Marie: the more they want us to use incendiary devices, the more I'm uncomfortable about cutting the MIP back.
Patrice: it's good we're talking today, but the AA could still change.
Kapua: seems backwards to add more weapons AND shrink the action area.
Michelle: simulations are based on fire danger rating system and when fires might start. If you increase the use of inflammable devices you increase you change of fires. It's a probability analysis. Fire break or no, the problem isn't what's in the fire break it's what's just outside because that's how fires get out of control.
Marie: first BO had something about living fire break, what happened to that?

Kapua: this could be a starting place, and we could always increase if there's more training. We don't need you to agree that we'll only ever do those 3 management units. The 3 management units are 'priority' management units. And we can always increase if necessary.
Marie: and we need to make sure we don't make decisions that preclude us from going bigger if we need to. The whole collection issue…
Kapua: I think the species that are the rarest, we're going to collect from all of the plants. They wouldn't necessarily be in genetic storage, but the stock would be protected and available in the future if we needed to reestablish those populations.
Marie: we also need to revisit the ones that are threatened by fire.

Kapua: that's the approach we want to talk to the MIT about. Talk about the general concept, we're not changing the plan, we're just focusing on these priority areas, and we're covering our bases in case we need to backtrack and protect more populations
Marie: those populations you that be collected from need to be monitored on a regular basis.
Kapua: I think for Makua that makes sense.
Marie: it is in the IP that the Army is only required to do the first round of collection from the populations. It's not going back every five years and renewing it.
Patrice: this would also fit in with the plants that are really rare…
Kapua: we did implement UAs to protect small populations of the really rare species. But for species like Delsub we protected everything we could, and we've collected and we're going to propagate and have a living collection rather than just storage. It's more guaranteed that way.
Marie: 'manage as a propagule source' is just to protect plants until sufficient collections are made. It's just you need to get the first round of genetic storage collections.
Marie: the other option would be just to get stuff in living collections somewhere. In the long run seed storage would be cheaper, so it may be spending more money up front to maintain populations while you test seeds for storage… and the other thing is that reintroduced plants have a much reduced time to maturity than wild plants.
Kapua: what do we call it? DRAFT ADDENDUM?
Michelle: say in executive summary this doesn't take place of the other document, this is how we're prioritizing our management actions.
Marie: we've cut back probably over 50% on what's going to be done, but does it still take 33 years to get to full implementation?
Kapua: no, it's 10 years. All fences in the revision would be done by year 10, and reintroductions would go in as fences go in. So monitor, collect seed, grow in greenhouse, fence area for reintro's, then plants go out in the field.
Kapua: and a lot of this is based on our work over the last couple years.
Marie: we could be in trouble because we don't have the monitoring data to back up decisions.
Kapua: I think our first tier of data, PU-level data, is good. If there's not a positive trend, if it's on the decline it's your first indicator. Weed control is important, but it's more difficult to get to that question.
Marie: but what we want to do is make sure we're not missing something and just throwing plants out there and they're not doing okay on their own.
Kapua: we need to discuss with the IT monitoring of populations that are really big. Maybe we could set up a field day to go with Jim Jacobi. Like Chacel at Kaena, they're huge plants and they're delicate, so we don't want to walk too close to them, so need a methodology for sampling a subset of the population. Another example is Cyrden, and we went to Pahole looking for other species, and we counted close to 500 plants. So we need to determine how to do sampling, and how frequently.
Marie: it would be useful to get Jim's input on that.
Kapua: collections from reintroduced plants…we'll discuss it in the text.
Marie: I think where it's more of a problem if there's stock where you could control the founder and you're not doing it.

Marie: I'd like to take this species back to review your species update (Alsobo) and comment on it.
Kapua: look at it from perspective of what you need for the BO. And we'd like to finish these by the end of November, so hopefully there won't be huge changes.
Patrice: so you'll send it out to us and the IT?
Kapua: yes
Marie: you might want to explain in the executive summary what some of the general concepts were that you were using to make decisions. Have a general discussion in beginning and then more for each species. Need to beef up assumptions section, why populations that were chosen were chosen.
Marie: the other thing that would be helpful to explain would be where there are changes in number, whether those are actual declines. Put those numbers in the addendum.
Kapua: do we really need an addendum report, or can we state which priority management areas we've chosen?
Marie: because they're such big changes you need to write it all out with justifications and maps.
Michelle: in other reports you need to justify your adaptive management strategies
Kapua: this annual update format.
Michelle: Sean at PTA is using his IP as the natural resource section of the INRMP.
Kapua: the INRMP is useless, nothing is must fund.
Michelle: we have to re-write the INRMP soon, so we need to make the IP's resource management section.

Marie: from reading the minutes discussion (from the March 2004 IT meeting) of off-island collections, there doesn't seem to be much information in terms of why it's not necessary. In the introduction you should expand on that.
Kapua: yes, everyone just agreed, so we can include more discussion.
Marie: and another thing is that it was hard to make any interpretation of where we were in genetic storage.
Michelle: You could just reference the annual update, and include it as an attachment.
Leilani: that would be great so we don't have to duplicate the annual report.
Marie: sure, that would work.
Marie: and you need to include better maps with existing fences.

Kapua: this report shouldn't necessarily be place to discuss status changes…only if it influenced management, otherwise see the annual report.
Marie: one alternative might be to include a column of habitat quality in the SP table.
Kapua: could pull it out of background summaries.

Marie: I have some general MU comments.

- Some of the MUs are broken into small ones instead of one big one, and you need to be able to justify why.
- Maps showing existing fences would be helpful.
- It would be helpful if MU summary had another section called 'notes' where you justify the changes.

- Might be good to add to cost estimates something about the shortened time frame for everything to be started. Could add to the executive summary, and to general caveats about cost assumptions, everything will be started in first ten years.

Patrice: are the urgent actions finalized?
Leilani: yes, the final status has been given to you.
Patrice: what were the 3 fire management plans in the BO?
Kapua: Lower Ohikilolo, Kaluakuila, and Kahanahaiki.
Patrice: so those need specific fire management plans and fuel reduction. We also need to look at revegetation and how that would be approached.
Marie: I wonder if you could contract someone to do that?
Kapua: it's not something I know very well. And we have to deal with the Army to look at what's feasible, with UXO presence, planting logistics. Joel should be working on that.
Marie: any other big things?
Patrice: that was kind of it, to start collecting seeds of other species for revegetation.

Marie: any new word on the South Range proposition?
Kapua: I think it's going.
Marie: as part of that aren't they supposed to control ungulates throughout the region?
Kapua: yes. The fence would go down the ridgeline, it wouldn't be an exclosure
Marie: better to do Schofield without a mid-credit line, because then you have to place it and justify it.
Kapua: but Andy already came up with a mid-credit line. So let's think about it, only a few species would be affected, just *Labordia* and *Viola*. Maybe Andy could develop the justification for that.