State of Hawai`i
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Forestry and Wildlife
Honolulu, Hawai`i 96813

June 4, 2008

Chairperson and Members of the Enhancement Subcommittee
Natural Area Reserves System Commission
State of Hawai`i
Honolulu, Hawai`i

NARS Commission Enhancement Subcommittee Members:

SUBJECT: Discussion on the timing of the proposal for the Extension of the Hanawi Natural Area Reserve, as the NARS Commission conducts a study of eligible lands for inclusion into the NARS.

BACKGROUND:
As the NARS Commission establishes a framework for a science-driven analysis of eligible lands, and conducts a study, a discussion on the timing of pending NARS proposals has been requested. The Extension of the Hanawi Natural Area Reserve proposal was submitted to the NARS Commission for recommendation in 2007 (see attachment of the Proposal). Below is a timeline of the history of land use and NAR designation for Hanawi NAR Extension Proposal:

- 1905 Ko`olau Forest Reserve established.
- 1991 East Maui Watershed Partnership (EMWP) formed.
- 1993 EMWP Management Plan released.
- 1993 East Maui Irrigation and DLNR/DOFAW enter into a right-of-entry agreement, permitting public hunters to utilize EMI roads in Ko`olau Forest Reserve.
- 1996 Final Environmental Assessment for fencing project proposed.
- 1997 Field crew hired and fencing began by EMWP with oversight from EMWP partner agencies.
- November 2005 EMWP submits a letter to the Chair of the NARS Commission requesting consideration of the area for NARS designation.
- April 2006 System of fences that included the expansion area completed.
- June 2006 East Maui Watershed Monitoring Review and Recommendations Final Report released.
- July 2006 Go Deep: Accelerated Ungulate Control for the Core East Maui Watershed 3 Year Plan released.
- April 2007 Proposal for the Extension of Hanawi Natural Area Reserve submitted to the NARS Commission.
- July 2007 DOFAW Maui branch/admin meeting discusses proposed Maui NARS – one recommendation is to clarify that the NARS Commission will seek input from DOFAW on NAR proposals.

- April 2008 NARS Commission approves a clarification in the NAR designation process for a 90-day comment period for DOFAW before making a recommendation on a proposal.
- Ongoing: The NARS Commission is undertaking a systematic analysis of eligible lands to prioritize NAR additions.

STAFF ANALYSIS:
Below are issues regarding the Hanawi NAR proposal that relate to the analysis project:

Scientific Value:
Please refer to the proposal for biological and geological information, as well as conservation value. Based on the recommended models that the NARS Commission Subcommittee has recommended to use to measure scientific value, the nominated area:

- Is listed as Critical Habitat for a number of East Maui plant species, and Recovery Habitat for endangered animal species.
- Is in the V1 High quality and/or predominantly native vegetation Vegetative class of the Draft DOFAW Management Guidelines.
- Is comprised of Native dominated natural communities as mapped by HI-GAP 2006.
- Has the highest predicted concentration of endangered bird species (5-6 species out of predicted ranges of 20 species) in all of Maui as mapped by HI-GAP 2006.
- Has the highest predicted concentration of endangered plant species (11-20 species out of predicted ranges of 51 species) in all of Maui as mapped by HI-GAP 2006.
- Is within The Nature Conservancy's native ecosystem and forest bird concentration portfolio for the TNC Ecoregional Plan 2006.

Representativeness:
Please refer to the proposal for a discussion of the representation, conservation value, and rarity, as well as a list of species. Since the proposal was drafted, a study was prepared for The Nature Conservancy in the Ko`olau Forest Reserve. The study area was along the fence line that is the makai boundary of the proposal, and documented around 190 native plant taxa, with 18 of those taxa federally listed. Based on the recommended models that the NARS Commission Subcommittee has recommended to use to measure Representativeness, the nominated area:

- Is the only area below 5,200 feet elevation between Ko`olau Gap and Kipahulu valley that has on-the-ground protection. *Note:* A Final Environmental Assessment to fence adjacent portions of Hanawi NAR has been released (EMWP, 2007).
- Contains high elevation rainforest, which was noted as the type of ecosystem that was most likely to stay intact as climate change occurs (April 21 NARS Commission Workshop on Enhancement).

Management considerations:
Funding for EMWP is inconsistent and non-dedicated. Managing this area to implement the "Go Deep: Accelerated Ungulate Control for the Core East Maui Watershed 3 year Plan, 2006" for the preservation of the native ecosystems is critical for the success of this plan, which crosses land ownership boundaries and encompasses 12,000 acres. This plan seeks to "dramatically reduce ungulates and achieve near zero damage and activity levels within 3 years and set up an

ongoing 'no tolerance' management program that will maintain near zero damage and activity levels" (EMWP, A, 2006) Dedicated staff and resources from the NARS in this area would aid the implementation of this plan both in this proposed expansion area as well as in the surrounding Hanawi NAR and adjacent properties.

-NARS designation would affect game animal control activities by withdrawing the area from Hunting Unit B and adding it to the Hanawi NAR Unit N1.

-NAR designation would direct the management of this area to be "solely and specifically" for native ecosystem preservation, which reflects the directive of DOFAW's Draft Management Guidelines, which have the following levels of management intensity for this area:

- Recreation (R-4): Restricted use, heavily controlled or restricted
- Vegetation (V-1): High quality and/or predominantly native vegetation
- Forest (F-4): Restricted use, harvesting permitted only with compelling public benefit
- Game Animal Management (A-3/A-4): Supervised/Public game animal control due to environmental sensitivity, remoteness and public safety with native plant and watershed protection as the primary objective.

RECOMMENDATION:
That the NARS Commission Enhancement Subcommittee discuss the timing of action on this NARS proposal and make a recommendation to the NARS Commission.

Respectfully submitted,

Emma Yuen, Planner
Division of Forestry and Wildlife

Attachments:

Proposal for the Extension of Hanawi Natural Area Reserve, April 2007.

References:

Department of Land and Natural Resources/Division of Forestry and Wildlife, Accessed 2008. *Draft Management Guidelines*.
http://www.state.hi.us/dlnr/dofaw/guidelines/mg_jw03/index.html

East Maui Watershed Partnership, 1993. *East Maui Watershed Partnership Management Plan*.

East Maui Watershed Partnership, (A) 2006. *East Maui Watershed Go Deep Project Plan*. Unpublished.

East Maui Watershed Partnership (B) June 2006. *East Maui Watershed Monitoring Review and Recommendations Final Report*.

Bily, P., K. Fay, H.L. Oppenheimer, K.R. Wood, 2008. *Summary Report of Botanical Research Ko`olau Forest Reserve East Maui, Hawai`i 844-1375m [2700-4400 ft] Elevation*. Prepared for The Natura Conservancy of Hawai`i

East Maui Watershed Partnership, June 2007. *Final Environmental Assessment: East Maui Watershed Partnership Fence Extensions in the East Maui Watershed*.

Ecoregional Planning Team, The Nature Conservancy Hawai`i, 2006. *An Ecoregional Assessment of Biodiversity Conservation for the Hawaiian High Islands*.

Mitchell, C, C Ogura, EW Meadows, A Kane L Strommer, S Fretz, D Leonard, and A McClung. October 2005. *Hawai`i's Comprehensive Wildlife Strategy.* Department of Land and Natural Resources. Honolulu, Hawai`i.

U.S. Dept of the Interior, US Geological Survey, 2006. *A Gap Analysis of Hawai`i, Final Report*.

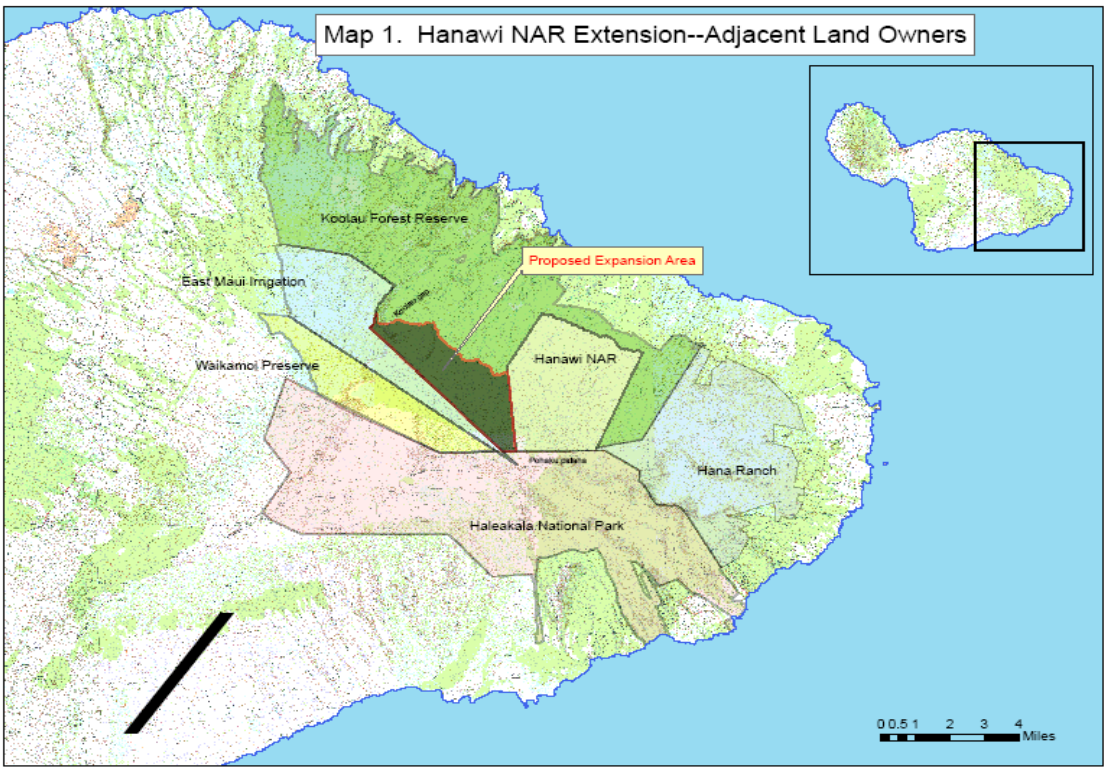
PROPOSAL FOR THE EXTENSION OF
HANAWI NATURAL AREA RESERVE
April 2007

I EXECUTIVE SUMMARY

A 4,250-acre section of the Ko`olau Forest Reserve is proposed for addition to the Hanawi Natural Area Reserve (NAR). The area proposed for addition lies within the southern and most mauka portion of the Ko‘olau Forest Reserve (TMK# 2-1-1-2-2). This area contains valuable natural resources, rare and endangered species, and is a core part of the East Maui Watershed. NAR designation would facilitate on-going and future conservation and scientific efforts conducted by Haleakalā National Park, The Nature Conservancy, the Natural Area Reserves System (NARS), and the East Maui Watershed Partnership.

II INTRODUCTION (General)

The proposed expansion of the Hanawī NAR is located on the northern slope of East Maui, in the Ko‘olau Forest Reserve. The figure below (Map 1) provides a map of the approximately 4,250-acre proposed expansion area.



The proposed area lies within the protective sub-zone of the Conservation District and has an elevation range between 2,800ft-7,600 ft. Adjacent land parcels include Haleakalā National Park, Haleakalā Ranch Company's Waikamoi Preserve (managed by The Nature Conservancy and participant in the State of Hawai'i DLNR's Natural Area Partnership Program), and private land owned by East Maui Irrigation Company (EMI). The Hanawī NAR is immediately to the east. The proposed expansion area is dominated by a rich assemblage of native flora and fauna and includes at least 4 distinct vegetation types, all of which have a restricted range. Over 70 rare and/or endangered plant and animal species are known to occur here or in nearby areas containing similar habitats. In addition, the proposed area:

- Is classified as critical habitat by the U.S. Fish and Wildlife Service USFWS) for a number of east Maui plant species, including *Argyroxiphium sandwicense, Geranium multiflorum, Cyanea mceldowneyi, Cyanea hamatiflora, and Cyanea copelandii.*
- Lies within the recovery area for 2 listed endangered forest birds, 'Akohekohe (*Palmeria dolei*) and Maui Parrotbill (*Pseudonestor xanthophrys*), and contains habitat suitable for assisting with the recovery of several other endangered forest bird species, Poÿouli (*Melamprosops phaeosoma*), Nukupu''u (*Hemignathus lucidus affinis*), and Akepa (*Loxops coccineus ochraceus*), should they be rediscovered and the Maui Creeper (*Paroreomyza montana*), listed as Endangered under the International Union for Conservation of Nature.
- Constitutes the upper reaches of 5 major east Maui drainages and numerous tributaries whose waters provide important habitat for native species. At lower elevations, the water is harvested to support Maui's large-scale agricultural industry and via the County of Maui's Department of Water Supply distribution system, the domestic and agricultural users from Haiku to Kanaio.

In 1997, partner agencies in the East Maui Watershed Partnership (EMWP) initiated the first on-the ground-actions to control threats to biological resources and watershed health in the expansion area. In 2006, the 10-mile fencing project was completed and enclosed a 12,000-acre project site. The site includes the proposed 4,250-acre expansion site, Waikamoi Preserve and lands owned by EMI and under a fence and control easement with the EMWP. The staff of the EMWP, with guidance provided by the partners, in particular the State DLNR/DOFAW, Haleakalā National Park and The Nature Conservancy, continues to be the primary manager for the area today.

Expanding the Hanawī NAR to include this area would:

- Significantly increase the acreage of NAR-protected native forest and its associated rare and endangered species on the north slope of Haleakalā;
- Create a contiguous link between the conservation lands of Waikamoi, Haleakalā National Park, EMI and the Hanawī NAR;
- Facilitate on-going and future research in the region, and further secure long-term management of the East Maui Watershed, the largest single source of surface water in Hawai`i.

Ownership and Access
The proposed area is owned by the State of Hawaiʻi. With the exception of the lower portions of the Koʻolau Forest Reserve, the area is too far removed from roads, trails, and other infrastructure to be regularly accessed by the public. Limited 4-wheel drive road access in the lower regions of the Koʻolau Forest Reserve is done via a vehicular access agreement between the State of Hawaiʻi DLNR and EMI.

III BACKGOUND/HISTORY

Past Land Use
The portion of the Koʻolau Forest Reserve being proposed for inclusion in the Hanawī NAR is extremely rugged and remote and it is unlikely that this area was regularly accessed or used by the public for any purpose other than infrequent hunting. In 1991, the East Maui Watershed Partnership (EMWP) was formed to preserve and protect watersheds and native resources on the windward slopes of Haleakalā. In 1997, with oversight from EMWP partner agencies, a field crew was hired and began constructing ungulate proof fences at the 3,600ft elevation, just west of Koʻolau gap. Since then, EMWP project staff, including staff from The Nature Conservancy, Haleakalā National Park and the Division of Forestry and Wildlife, Natural Area Reserves System have had a continued presence implementing resource management objectives.

Present Land Use
The area proposed is located in the Conservation District and is part of the Koʻolau Forest Reserve. The Forest Reserve is administered by the State of Hawaiʻi DLNR/DOFAW and managed as a public hunting area. Limited recreational opportunities are permitted but visitation is virtually non-existent as it is extremely difficult to access and generally does not contain high numbers of game animals. Pursuant to DLNR/DOFAW's Draft Management Guidelines, the proposed project site has the following levels of management intensity:

- Recreation (R-4): Restricted use, heavily controlled or restricted
- Vegetation (V-1): High quality and/or predominantly native vegetation
- Forest (F-4): Restricted use, harvesting permitted only with compelling public benefit
- Game Animal Management (A-3/A-4): Supervised/Public game animal control due to environmental sensitivity, remoteness and public safety with native plant and watershed protection as the primary objective.

Since fence construction began in 1997, threat abatement and control programs, aimed at reducing populations of feral animals and invasive plant species have been ongoing. The EMWP continues to maintain a management presence and continues to addresse ungulate and weed threats in the area. Management actions are conducted in accordance in DLNR/DOFAW's Technical Report 07-01 Review of Methods and Approaches for Control of Non-Native Ungulates in Hawaiʻi.

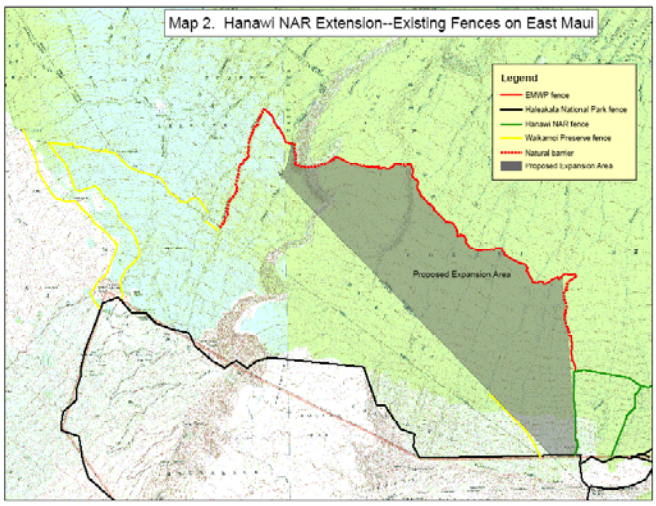
Cultural uses

No records were found for traditional cultural uses of this specific area. However, because of the abundance and diversity of native flora and fauna found in the region it is likely that, in the past, this area was used for harvesting culturally important forest resources.

Conservation history

The Ko‘olau Forest Reserve was created in 1905 by the Territory of Hawai`i Board of Agriculture and Forestry "…to protect the native forest now covering the watersheds of the streams on the windward side of Maui…" (Hosmer, 1905). Designation as a Forest Reserve afforded the area some small level of protection as it prohibited the introduction of domestic animals. However feral animals, especially pigs, have dispersed to, and persist in, many habitats throughout the forested areas of east Maui. For the most part, active conservation efforts within the proposed expansion area were non-existent until the latter part of the last century. In 1980, the United States Fish and Wildlife Service (USFWS) installed and began monitoring a system of transects throughout east Maui. These were designed to detect rare species, especially birds, and provide a gross assessment of vegetation characteristics, native component species and ungulate and weed threats. Four of these transects, USFWS Transects 4, 5, 6, and 7 lie within the expansion area and have been monitored 6 times since being installed (Transect 7 was monitored a total of 8 times). These very limited surveys have identified several endangered taxa within the expansion area.

In 1991, the County of Maui and six landowners/managers of East Maui recognized the importance of the East Maui Watershed as an "invaluable resource for the island of Maui" and formed the East Maui Watershed Partnership (EMWP Management Plan, 1993). Partners in the EMWP include the State of Hawai‘i DLNR/DOFAW, the County of Maui, East Maui Irrigation Company, Haleakalā National Park, Haleakalā Ranch, Hāna Ranch Partners LLC, and The Nature Conservancy. The Partnership was formed to manage approximately 100,000 acres of east Maui in recognition that "proper management of this forested watershed area and native ecosystems is needed to protect the usefulness and value of the watershed into perpetuity" (EMWP Management Plan, 1993). In 1997, EMWP hired staff, began constructing ungulate-proof fences and addressing threats to portions of the watershed area**.** The entire area proposed for the expansion of the Hanawī NAR has since been protected with a system of fences and natural barriers and threat control and biological monitoring is on-going. Map 2 depicts fences in the East Maui Watershed Partnership project site.

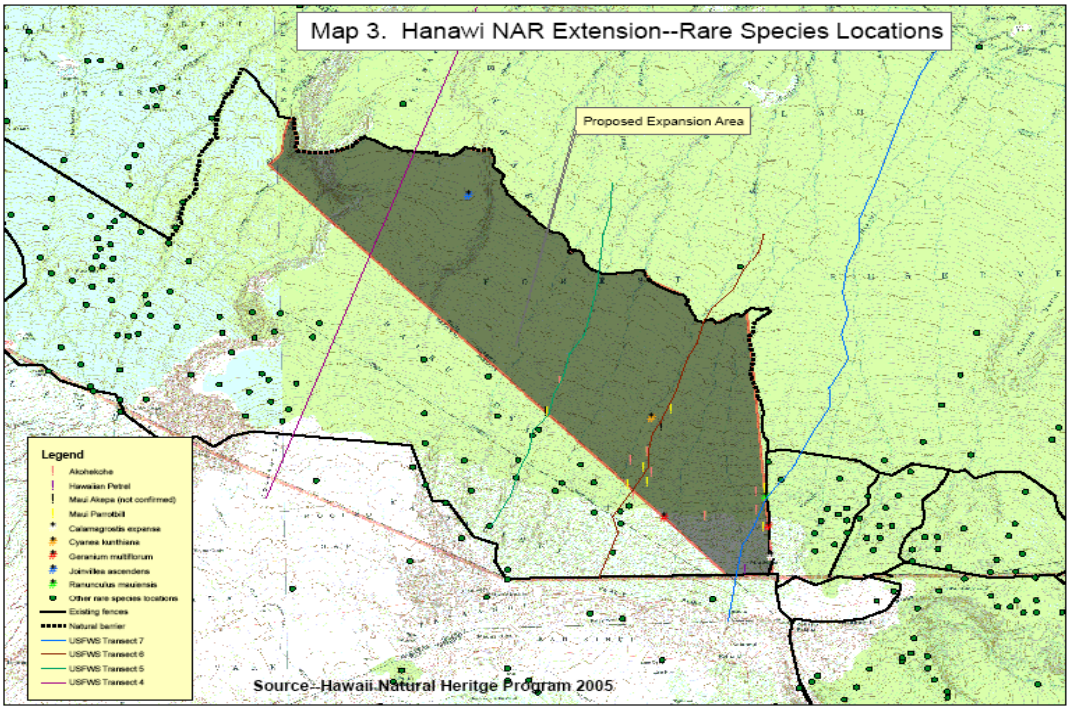


In addition, the Nature Conservancy, Haleakalä National Park and the Maui NARS' resource management programs continue to contribute greatly to the protection of natural and watershed resources on adjacent lands. In July 2006, an accelerated ungulate control program was initiated in the proposed area

for expansion to the Hanawï NAR and throughout the entire 12,000-acre project site to "dramatically reduce ungulates and achieve near zero damage and activity levels within 3 years and set up an ongoing 'no tolerance' management program that will maintain near zero damage and activity levels." (Go Deep: Accelerated Ungulate Control for the Core East Maui Watershed 3 year Plan, 2006).

Previous Studies

The most recent biological surveys into the area include a summary report of botanical research of East Kopili'ula (Wood et. al., 2005 unpublished), a survey into Honomanu makai prepared by P. Bily (Bily, 2004 unpublished), and a summary report of a survey conducted in the upper portion of West Wailuanui drainage (Wood et. al., 2002 unpublished). Other studies and sources of information which help characterize the area include the Hawai'i Natural Heritage Program Database, 2005, The Nature Conservancy's Biological Summary and Land Use History for the East Maui Watershed Area, 1996; and surveys conducted into the Ainahou bowl and Honomanu regions (Bily 2003 unpublished, Wood et. al., 2000 unpublished). Refer to the list of references at the end of the document for more information. The figure below (Map 3) provides locations of rare species in the proposed site for expansion to the Hanawī NAR.



IV JUSTIFICATION

Scientific Value

The Scientific value of the proposed addition is High:

1. It provides habitat for several rare and Federally listed Endangered bird species including 'Akohekohe (*Palmeria dolei*) and Maui Parrotbill (*Pseudonestor xanthophrys*), which have been the subject of ongoing management and research efforts;

2. It is encompasses a large area within the East Maui Watershed which allows for future research into the characteristics of managed versus unmanaged watersheds and water quality;
3. It includes clear transition zones between native-dominated and newly invaded forest systems, which facilitates the future study of natural and disturbed vegetation interactions.

Conservation value

The Conservation value of the proposed addition is High:

1. It lies within the Recovery area for 2 Listed Endangered forest birds, ʻAkohekohe (*Palmeria dolei*) and Maui Parrotbill (*Pseudonestor xanthophrys*), and contains habitat suitable for assisting with the recovery of several other Endangered forest bird species, Poʻouli (*Melamprosops phaeosoma*), Nukupuʻu (*Hemignathus lucidus affinis*) and `Äkepa (*Loxops coccineus ochraceus*), should they be rediscovered and the Maui Creeper (*Paroreomyza montana*), listed as Endangered under the International Union for Conservation of Nature;
2. The system of existing fences and threat abatement programs protects resources within the proposed area as well as adjacent parcels and the greater east Maui Watershed region;
3. It is designated as Critical Habitat for a number of east Maui plant species; including *Argyroxiphium sandwicense, Geranium multiflorum, Cyanea mceldowneyi, Cyanea hamatiflora, and Cyanea copelandii;*
4. It contains the upper reaches of streams which provide habitat for downstream native flora and fauna as well as provide water for domestic and agricultural use on east Maui.

Representation

At least 4 natural communities are represented within the proposed expansion area, all of which are considered to have a restricted range (Jacobi, 1989). These include ʻōhiʻa Montane Wet Forest, ʻōhia Subalpine Mesic-Dry Forest, Pukiawe Subalpine Dry Shrubland and Mixed Fern/Shrub Montane Wet Cliff. As a result of on-going management efforts undertaken by EMWP and other conservation entities in the region, all of these communities are relatively intact. Although these natural communities are represented in the presently delineated Hanawī NAR, management within the NAR is limited to the protected (fenced) areas above 5,200 ft. In the entire 100,000-acre East Maui Watershed area, with the exception of the proposed expansion area, there currently exists no on-the ground protection of forests below 5,200 ft. between Koʻolau Gap and Kīpahulu Valley.

Rarity

Four endangered species: ʻAkohekohe (*Palmeria dolei*); Maui Parrotbill (*Pseudonestor xanthophrys*); Hawaiian Dark-rumped Petrel (*Pterodroma sandwichensis*); Hinahina (*Geranium multiflorum*) and 4 Candidate species or Species of Concern: *Calamagrostis expansa*, Oha (*Cyanea kunthiana*); `Ohe (*Joinvillea ascendens subs. ascendens*); Makou (*Ranunculus mauiensis*) have been identified from the expansion area (see map 3). The Maui ʻAkepa (*Loxops coccineus ochraceus*) an endangered bird species represented by only 2 populations on Maui, may have also been detected within the area but this has not been confirmed. Extensive surveys have not yet been conducted and, in light of the fact that over 70 Federally recognized Threatened, Endangered or Rare species have been identified from similar habitats on east Maui,

it seems likely that some of these species occur within the area as well. Table 1 list all rare species found within the proposed area. Table 2 lists other rare species known from east Maui.

Table 1

Species	Common Name	Status
Geranium multiflorum	Hinahina, Nohoanu	Endangered
Calamagrostis expansa		Candidate
Cyanea kunthiana	‘ōhā, hāha, ‘ōhawai	Candidate
Joinvillea ascendens subsp. ascendens	‘Ohe	Candidate
Loxops coccineus ochraceus	Maui ‘Akepa, ‘Aeakepeu‘i	Endangered
Palmeria dolei	Crested Honeycreeper, ‘Akohekohe	Endangered
Pseudonesotor xanthophrys	Maui Parrotbill	Endangered
Pterodroma sandwichensis	Hawaiian Petrel, ‘U‘au	Endangered
Ranunculus mauiensis	Makou	Candidate

Table 2

Species	Status	Species	Status	Species	Status
Acacia koaia	SOC	*Cyanea obtusa*	E	*Partulina porcellana*	SOC
Adenophorous periens	E	*Cyanea pohaku*	SOC	*Peperomia subpetiolata*	C
Argyroxiphium sandwicensis subsp. macrocephalum	T	*Cystopteris douglassii*	SOC	*Peperomia subpetiolata*	C
Argyroxiphium virescens	SOC	*Deparia kaalaana*	SOC	*Perdicella carinella*	SOC
Asplenium fragile var insulare	E	*Diplazium molokaiense*	E	*Phllostegia imminuta*	C
Asplenium schizophyllum	SOC	*Dissochondrus biflorus*	SOC	*Phyllostegia manii*	E
Bidens campylotheca subsp. pentamera	C	*Exocarpus gaudichaudii*	SOC	*Phyllostegia pilosa*	E
Bidens campylotheca subsp. waihoiensis	C	*Gardenia remyi*	C	*Phyllostegia racteata*	C
Bidens micrantha ssp kalealaha	E	*Geraneum arboreum*	E	*Phyllostegia rockii*	SOC
Branta sanvicensis	E	*Geranium hanaense*	SOC	*Plantago princeps var. laxiflora*	SOC
Clermontia oblongifolia subsp. mauiensis	E	*Hedyotis elatior*	SOC	*Platanthera holochila*	E
Clermontia peleana subsp. Singulifora	E	*Heimgnathus lucidus affinis*	E	*Ranunculus hawaiensis*	C
Clermontia samuelii subsp. Hanaensis	E	*Lagenifera maviensis*	SOC	*Rubus macraei*	SOC
Clermontia samuelii subsp. Samuelii	E	*Lasiuris cinereus semotus*	E	*Schiedea diffusa*	C
Clermontia tuberculata	SOC	*Mariscus pennatiformis subsp.*	E	*Schiedea haleakalaensis*	E

Species	Status	Species	Status	Species	Status
		Pennatiformis			
Clermontia tuberculata	SOC	*Megalagrion nestiotes*	C	*Sicyos cucumerinus*	E
Cyanea arborea	SOC	*Megalagrion pacificum*	C	*Sicyos macrophyllus*	C
Cyanea asplenifolia	C	*Melamprosops phaesoma*	E	*Silene degeneri*	SOC
Cyanea copelandii subsp. haleakalaensis	E	*Melicope balloui*	E	*Solanum incompletum*	E
Cyanea glabra	E	*Melicope haleakalae*	SOC	*Stenogyne angustifolia*	E
Cyanea grimeseana subsp. Grimeseana	E	*Melicope ovalis*	E	*Stenogyne haliakalae*	SOC
Cyanea hamataflora subsp. Hamataflora	E	*Nothocestrum latifolium*	C	*Thelypteris boydiae*	C
Cyanea horrida	SOC	*Ochrosia haleakala*	C	*Wikstroemia villosa*	SOC
Cyanea longissima	SOC	*Partulina dolei*	SOC		
Cyanea mceldowneyi	C	*Partulina natii*	SOC		

Key: "E" = Endangered
"C" = Candidate
"SOC" = Species of Concern
"T" = Threatened

Biological/Ecological Design

Biological features include very high quality native-dominated vegetation that covers the majority of the proposed expansion area. The most common canopy trees are ʻOhia (*Metrsideros*), and ʻOlapa (*Cheirodendron*), which are found throughout the region to approximately 6,500 ft. Subcanopy tree species include Alani (*Melicope*), Kāwaʻu (*Ilex*) Kolea (*Myrsine*), Kanawao (*Broussasia*) Haʻiwale (*Crytandra sp*), ʻAkala (*Rubus*), Naʻenaʻe (*Dubautia*), `Öhäwai (*Clermontia*), and other species typically found in mid-elevation native wet forests. Isolated patches of Loulu (*Pritchardia*) can be found scattered throughout the region. Between approximately 3,000 and 5,000 ft. elevation, a broad band of intertwined uluhe fern (*Dicranopteris, Sticherus, and Diploterygium*) occupies a large percentage of the understory, especially where tree coverage is less dense. This near impenetrable "uluhe belt" appears to help suppress the establishment of weeds by preventing the creation of light gaps and deterring ungulate activity. The larger drainages of Honomanu Stream, Wailuanui Stream, Wailuaiki Stream and Kopiliʻula Stream as well as many of the larger tributaries are somewhat more diverse than the surrounding ridges and contain riparian species such as *Schiedea*, Māmaki (*Pipturus*), Olonā (*Touchardia*), Hāhā (*Cyanea*), and ʻApeʻape (*Gunnera*). The native grass *Deschmpsia nubigena* is also commonly seen in many of the drainage bottoms. Above 6,500 feet, the stature of the forest becomes markedly shorter. This upper region is densely vegetated by Pukiawe (*Styphelia*), ʻOhelo (*Vaccinium*), and ʻAmaʻu (*Sadleria*).

Weeds are present but, with the exception of portions of Koʻolau gap, do not occupy large areas of the proposed expansion area. Weeds seem more concentrated to the west, where their establishment has probably been facilitated by the activities of higher pig populations as well as

a shorter dispersal distance from parent populations. In Koʻolau gap, aggressive weeds including Koster's curse (*Clidemia*), Kahili Ginger (*Hedychium*), Strawberry guava (*Psidium*), Palm grass (*Setaria*) and Cane tibouchina (*Tibouchina*) are relatively common from the 2,800 foot contour fence to approximately 3,600 ft. Koʻolau gap is also the only place within the expansion area where mature African tulip trees (*Spathodea*) can be found. Several species of ecosystem altering weeds also occur in very small numbers along fences, clearings, stream beds and other light gaps.

The most prominent geologic feature in the region is Koʻolau gap, a broad, steep-walled erosional valley which comprises almost a quarter of the expansion area. In addition, 5 major drainages (Piʻinau Stream, Wailuanui Stream, East and West Wailuaiki Stream and Kopiliʻula Stream) and numerous smaller tributaries dissect the region and contribute to its rugged nature.

Administrative

The expansion area is approximately 4,250 acres in size and includes the southern and most mauka portion of Koʻolau Forest Reserve (TMK# 2-1-1-2-2). The northern and lower portions of this parcel would remain in Forest Reserve designation. This roughly pie-shaped piece of land stretches from approximately 2,700 feet just west of Koʻolau gap and east to approximately 7,600 ft. near Pōhaku Pālaha. The proposed area is bounded to the south and west by a private parcel (TMK# 2-2-4-16-4) owned by East Maui Irrigation. This is managed by East Maui Irrigation for domestic water collection and by EMWP for watershed and native forest protection. The southern-most boundary is shared with Haleakalā National Park (TMK# 2-2-3-5-1, TMK#2-1-3-1-3, TMK# 2-1-8-1-7) and to the east it is bound by Hanawī Natural Area Reserve (TMK# 2-1-2-4-7 and TMK# 2-1-2-4-5). The entire expansion area is effectively isolated from the ingress of feral pigs by a system of fences and natural barriers.

There are no trails or roads to this remote area and the only feasible way to gain access is through roads in the Koʻolau Forest Reserve that are owned and maintained by East Maui Irrigation Company. This requires the use of 4-wheel drive vehicles and several hours of off-trail hiking. Permission is coordinated through the Koʻolau Volunteer Hunter Group and via the cooperative agreement between the State of Hawaiʻi DLNR/DOFAW, and East Maui Irrigation Company.

Threats

The primary threats to the proposed area are invasive non-native plants and animals. These are both addressed in more detail in part V of this document.

Present Level of Protection

In April 2006, EMWP staff completed a system of ungulate-proof fences connecting into natural barriers, effectively isolating the 4,250 acre proposed expansion area from the ingress of ungulates. In July 2006, an accelerated ungulate control program, whose goal is to achieve near zero ungulate activity and damage levels and to establish a "no tolerance" management program was initiated by EMWP, TNC and other Partnership agencies. Control of ecosystem-altering weeds and biological monitoring are on-going as well. Resource management activities also take place on adjacent National Park, Nature Conservancy, EMI and State lands.

Long Term Ecological Viability
Inclusion of this area in the NAR system would increase the long-term viability of native forests and resources on east Maui's windward slopes because it would facilitate eco-system-level protection of a contiguous block of native habitat composed of many different forest types stretching from the east fork of Honomanu drainage to Pōhaku Pālaha, a prominent land division feature near the head of Kīpahulu valley. In addition it would promote greater coordination and stewardship between land managing agencies of the region.

Environmental Consequences of No Action
The environmental consequence of No Action would most likely be a lower level of management action and commitment than that afforded to a NAR which would, in turn, result in a more rapid degradation of native species and systems in the proposed area. It would also increase the management costs of adjacent conservation entities including the DLNR, Nature Conservancy, and the National Park as threats to those areas would not be as readily addressed.

Urgency
Invasion and proliferation of non-native plants and animals is a persistent and on-going threat. And while the proposed area is presently being managed by East Maui Watershed Partnership staff, funding for EMWP project work has been inconsistent and non-dedicated. With the recent addition of other Watershed Partnerships the struggle for the limited available funding will continue to be a challenge. The need to include this area within the Natural Area Reserve System is pressing if dedicated management is to continue into the future.

V MANAGEMENT NEEDS

Threats requiring Management:

1. Grazing, trampling, rooting, vectoring of diseases and degradation of water quality by feral pigs and possible cattle and deer;
2. Invasion by non-native plants including Koster's curse (*Clidemia hirta*), Strawberry guava (*Psidium cattlianum*), Kahili ginger (*Hedychium gardnerianum*), Tibouchina (*Tibouchina herbacea*), Pampas grass (*Cortaderia jubata*), Hilo grass (*Paspalum conjugatum*), Palm grass (*Setaria palmifolia*), and African tulip (*Spathodea complanata*).

Protective management of this area would involve:

1. Ungulate management: Maintenance of existing fences, increasing animal control efforts and diversifying ungulate control techniques;
2. Weed management: Control of large populations of weeds in Ko'olau gap and control of incipient ecosystem-altering weedy populations throughout the region.

VI PUBLIC SUPPORT

A list of agencies, organizations and individuals contacted include:

County of Maui / Department of Water Supply
East Maui Irrigation
Haleakalā National Park
Haleakalā Ranch
Hāna Ranch
Kīpahulu Ohana
Koʻolau Volunteer Hunters Group
Natural Resources Conservation Service
State of Hawaiʻi Department of Land and Natural Resources
The Nature Conservancy
Tri-Isle Resource Conservation and Development Council, Inc
United States Fish and Wildlife Service
United States Geologic Survey, Biological Resource Division

VII BIBLIOGRAPHY/REFERENCES

Bily, P. 2004. Honomanu Makai Survey. Unpublished

Bily, P., Wood, K., Chimera., M. 2003. Summary Report of Research, Ainahou Bowl, Upper Keʻanae: Koʻolau Forest Reserve, East Maui (5500-6100 Feet elevation). Prepared for the Nature Conservancy. Unpublished

Department of Land and Natural Resources/Division of Forestry and Wildlife, Draft Management Guidelines

Department of Land and Natural Resources/Division of Forestry and Wildlife, 2007, Technical Report 07-01 Review of Methods and Approaches for Control of Non-Native Ungulates in Hawai`i

East Maui Irrigation Company, Ltd. 1996. The East Maui Watershed Management Plan

East Maui Watershed Partnership. 2006. East Maui Watershed Go Deep Project Plan. (Unpublished)

Hawaiʻi Natural Heritage Program Database. 2005

Hosmer, R.S. 1905. Forest Reserves on Maui and Kauai. *The Hawaiian Forester and Agriculturist*

Jacobi, J.D. 1989. Vegetation Maps of the Upland Plant Communities of the Islands of Hawaiʻi, Maui, Molokai and Lanai. Draft manuscript. U.S. Fish and Wildlife Service, Mauna Loa Research Station, Hawaii Volcanoes National Park, Hawaiʻi

The Nature Conservancy of Hawaii. 1996. Biological Summary and Land Use History for the East Maui Watershed Area

US Fish and Wildlife Service. May 14, 2003, Federal Register Volume 68, No. 93

US Fish and Wildlife Service, 2006, Revised Recovery Plan for Hawaiian Forest Birds.

Wood, K., Bily, P. 2000. Personal Observations and Regional Checklist of Vascular Plants, Honomanu Region, East Maui. Unpublished

Wood, K., Bily, P. 2002. Summary Report of Research, Upper Wailuanui, Ha‘iku Uka, East Maui (4200—5200 Feet Elevation). Unpublished

Wood, K., Bily, P., Fay, K., F. 2005. Summary Report of Botanical Research, East Kopili‘ula, Ko‘olau Forest Reserve, East Maui, Hawaii. (3100-4100 Feet elevation). Prepared for the Nature Conservancy. Unpublished