

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Forestry and Wildlife
Honolulu, Hawai'i 96813

November 10, 2022

Chairperson and Members
Board of Land and Natural Resources
State of Hawai'i
Honolulu, Hawai'i

Board Members:

SUBJECT: AUTHORIZE THE DIVISION OF FORESTRY AND WILDLIFE TO CONDUCT PUBLIC HEARINGS ON THE ISLANDS OF KAUAI, OAHU, MOLOKAI, MAUI, AND HAWAII TO SET ASIDE LANDS AS FOREST RESERVES, NATURAL AREA RESERVES, AND WILDLIFE SANCTUARIES STATEWIDE:

FOREST RESERVES ON:

KAUAI: 444001002, 454002026, 456002001

OAHU: 148013013, 169001004, 191017158, 199010052, 199011002

MOLOKAI: 257005026, 257005031, 258003023, 258015007, 258015009

MAUI: 211001001, 211001021, 211001031, 211001052, 211002005, 211002006, 211002007, 211008001, 211008005, 212001039, 213003017, 213006007, 214011003, 214011004, 214012019, 215002004, 215008004, 215010008, 215011007, 215011012, 215011014, 215011015, 215011029, 216002009, 217002011, 217002044, 217003013, 224016001, 229001020, 229001033, 229002012, 229010008, 229010009, 229010012, 229010022, 229011008, 229011013, 229013004, 229013012, 229013014, 229013016, 229013017, 229013018, 229013020, , 231001001, 231001021, 231001029, 231006003, 236001014 (por), 244004002, 244004006, 244004009, 244004011, 244004019, 244007006, 245021004, 245021023, 248001001 (por), 248002002, 248002008, 248003008 (por), 248003040, 248003040, 248002039

HAWAII: 324008035, 351001006, 387014015, 396007002

NATURAL AREA RESERVES ON:

MOLOKAI: 261001002 (por)

MAUI: 218001005, 221003050 (por), 221004075, 221004110, 221006010,
221006077, 221006078

WILDLIFE SANCTUARIES ON:

MAUI: 231002011, 231001014

BACKGROUND:

On May 27, 2022, The Board authorized a memorandum of understanding between the Division of Forestry and Wildlife and the Land Division for increased collaboration and assistance. This included the following agreement:

The parties will collaborate on the Land Division Strategic Plan to identify parcels ... that can provide areas for conservation, preservation, recreation, and sustainable forest products; areas to be transferred to DOFAW for management; and parcels that have other resource or public recreational value, such as for public access easements.

The Division of Forestry and Wildlife has identified parcels that are appropriate to set aside as Forest Reserves and Natural Area Reserves (NARs). A set aside will establish the long-term management proposed for these areas, subject these areas to the rules for their respective designation, and provide DOFAW the authority to manage these areas directly. Exhibit 1 lists these parcels and summarizes the proposed designation and justification. Exhibit 2 includes the proposals for Natural Area Reserves that were recommended by the Natural Area Reserves System Commission on August 18, 2022. Due to the large number of individual parcels, the Division has created an interactive public web-map where viewers can locate the parcels: <https://arcg.is/1ieizz>. Viewers can also click on each individual parcel and see a summary of the resource values and proposed management that is listed in Exhibit 1.

Pursuant to Sections 183-12 and 195-4, Hawaii Revised Statutes, public hearings must be held on proposed set asides to Forest Reserves and Natural Area Reserves. While public hearings are not required to set aside Wildlife Sanctuaries, the Division will also collect testimony for the Board on the proposed Sanctuary as well. Hearings will be held on each affected island. After the hearings are held, the Division will return to the Board to present the public testimony and seek final approval from the Board.

Prior to set aside, survey maps will be required per the Department of Accounting and General Services Survey Division. No subdivisions will be required.

CHAPTER 343 - ENVIRONMENTAL ASSESSMENT:

Pursuant to Section 343 HRS, administrative actions such as conducting a public hearing are *de minimis* and an environmental assessment is not required. Inasmuch as the Chapter 343,

environmental requirements apply to the Division's use of the lands, the Division shall be responsible for compliance with Chapter 343, HRS, as amended.

RECOMMENDATIONS: That the Board:

1. Authorize the Division of Forestry and Wildlife to conduct public hearings on the islands of Kauai, Oahu, Molokai, Maui, and Hawaii regarding the designation of the subject lands as Forest Reserves or Natural Area Reserves. Further, authorize the Chairperson to:
 - A. Set the dates, locations, and times of the public hearings; and
 - B. Appoint hearing masters for the public hearings.

Respectfully Submitted:

for *Robert Hauff*

David G. Smith, Administrator

APPROVED FOR SUBMITTAL:

Suzanne D. Case

Suzanne D. Case, Chairperson

Attachment

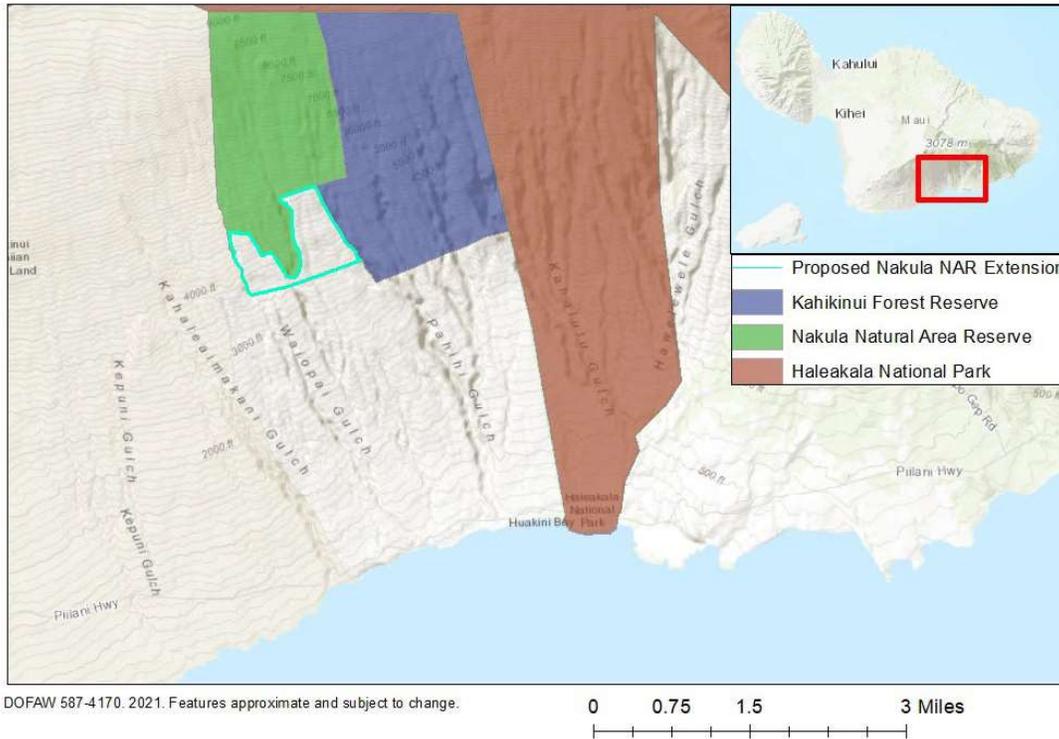
Proposal	Island	TMK	Justification	Acres
Proposed Forest Reserve	Oahu	148013013	Add to Waiahole FR	0.1
Proposed Forest Reserve	Oahu	169001004	Designate as FR; parcel contains dry forest remnants; cultural sites; high fire threat.	650.9
Proposed Forest Reserve	Oahu	191017158	Potential baseyard site and plant sanctuary (abutilon)	34.8
Proposed Forest Reserve	Oahu	199010052	Cultural Sites; Hunting Area; FR	15.0
Proposed Forest Reserve	Oahu	199011002	Parcel contains forest resources, cultural sites; could be a potential hunting area.	2,563.9
Proposed Forest Reserve	Maui	211001001	Parcel provides summit to sea connectivity, shoreline access, forest reserve access, stream connectivity, reserve connectivity, very high value coastal vegetation, seabird nesting, trails and access, recreation.	28.4
Proposed Forest Reserve	Maui	211001021	Parcel provides summit to sea connectivity, endangered species critical habitat, cons district, shoreline access, forest reserve access, stream connectivity, reserve connectivity, high value coastal vegetation, seabird nesting, trails and access	19.9
Proposed Forest Reserve	Maui	211001031	Parcel provide summit to sea connectivity, shoreline access, forest reserve access, stream connectivity, reserve connectivity, very high value coastal vegetation, seabird nesting, trails and access, recreation.	86.8
Proposed Forest Reserve	Maui	211001052	Parcel provides summit to sea connectivity, endangered species critical habitat, conservation district, shoreline access, forest reserve access, stream connectivity, reserve connectivity, very high value coastal vegetation, seabird nesting, trails and access	87.8
Proposed Forest Reserve	Maui	211002005	Parcel provides summit to sea connectivity, endangered species critical habitat, conservation district, shoreline access, forest reserve access, stream connectivity, reserve connectivity, very high value coastal vegetation, seabird nesting, alaloe, trail	10.0
Proposed Forest Reserve	Maui	211002006	Forest reserve access, conservation district, stream and estuary, reserve connectivity, trails and access, recreation.	8.1
Proposed Forest Reserve	Maui	211002007	Parcel provides summit to sea connectivity, endangered species critical habitat, cons district, shoreline access, forest reserve access, stream connectivity, reserve connectivity, high value coastal vegetation, seabird nesting, alaloe, trails and access	30.6
Proposed Forest Reserve	Maui	211008001	Shoreline access, conservation district, reserve connectivity, high value coastal vegetation, recreation.	168.0
Proposed Forest Reserve	Maui	211008005	Forest reserve access, conservation district, stream, reserve connectivity, trails and access, recreation, hunter access.	142.2
Proposed Forest Reserve	Maui	212001039	Endangered species critical habitat, conservation district, Shoreline access, reserve connectivity, very high value coastal vegetation, seabird nesting, trails and access, recreation	35.0
Proposed Natural Area Reserve	Maui	213003001	Parcel contains high value coastal hala forest ecosystem, conservation district, shoreline access, and historic Ke Alaloe O Maui (Piilani Trail) and access. Protection as a NAR provides connectivity to adjacent conservation lands of Kahanu Garden.	291.8
Proposed Forest Reserve	Maui	213003017	Forest reserve access, reserve connectivity, trails and access, recreation, hunter access.	555.7
Proposed Natural Area Reserve	Maui	213003026	Parcel contains high value coastal hala forest ecosystem, endangered species critical habitat, conservation district, shoreline access, and historic Ke Alaloe O Maui (Piilani Trail) and access.	241.5
Proposed Natural Area Reserve	Maui	213005002	Parcel contains high value coastal hala forest ecosystem, anchaline pools and caves, endangered species critical habitat, conservation district, shoreline access, and historic Ke Alaloe O Maui (Piilani Trail) and access.	180.8
Proposed Forest Reserve	Maui	213006007	Coastal hala forest, conservation district, shoreline access, coastal vegetation, trails and access, recreation	260.8
Proposed Forest Reserve	Maui	214011003	Parcel connects forest reserve and stream summit to sea, hunter access, trails and access	18.9
Proposed Forest Reserve	Maui	214011004	Parcel connects forest reserve and stream summit to sea, hunter access, trails and access	40.4
Proposed Forest Reserve	Maui	214012019	Parcel connects forest reserve and stream summit to sea, hunter access, trails and access	4.5
Proposed Forest Reserve	Maui	215002004	Parcel connects forest reserve and stream summit to sea, hunter access, trails and access	14.5
Proposed Forest Reserve	Maui	215008004	Connects forest reserve and stream summit to sea, conservation district, forest reserve access, trails and access, recreation, hunter access.	104.3
Proposed Forest Reserve	Maui	215010008	Shoreline access, connects forest reserve and stream summit to sea, conservation district, forest reserve access, trails and access, recreation, hunter access, very high value coastal vegetation, seabird nesting.	16.2
Proposed Forest Reserve	Maui	215011007	Forest reserve connectivity, NPS connectivity, FR access	70.7
Proposed Forest Reserve	Maui	215011012	Connectivity to forest reserve, potential hunter access	17.4
Proposed Forest Reserve	Maui	215011014	Connectivity to forest reserve, potential hunter access	19.6
Proposed Forest Reserve	Maui	215011015	Shoreline access, potential connectivity to forest reserve, potential hunter access	8.1
Proposed Forest Reserve	Maui	215011029	Connectivity to forest reserve, potential hunter access, brings access closer to public highway	20.8
Proposed Forest Reserve	Maui	216002009	Forest reserve connectivity, FR access, NPS connectivity	40.3
Proposed Forest Reserve	Maui	217002011	Forest reserve access, dry forest restoration, reserve connectivity, potential trails and access, recreation, erosion management	281.2
Proposed Forest Reserve	Maui	217002044	Possible connectivity from public highway, possible stream management, possible connectivity to mauka parcel located adjacent to forest reserve	0.4
Proposed Forest Reserve	Maui	217003013	Possible connectivity to shoreline, possible stream management	2.3
Proposed Natural Area Reserve	Maui	218001005	Lands adjacent to the Na Kula NAR where native forest restoration is in progress. Contains endangered species critical habitat and potential opportunities for trails and access and recreation.	402.9
Proposed Natural Area Reserve	Maui	221003050 (por)	Dryland forest restoration potential, regional invasive species control. See proposal.	504.4
Proposed Natural Area Reserve	Maui	221004075	Lands and waters near Ahihi-Kinau NAR containing cultural sites, historic Hoapili trail, conservation district, and shoreline access.	15.4
Proposed Natural Area Reserve	Maui	221004110	Lands and waters near Ahihi-Kinau NAR containing cultural sites, historic Hoapili trail, conservation district, and shoreline access.	5.2
Proposed Natural Area Reserve	Maui	221006010	Proposed NAR for connectivity and improved management of Ahihi Kinau NAR.	4.0
Proposed Natural Area Reserve	Maui	221006077	Connectivity to NAR, historic Hoapili Trail, conservation district, Shoreline access, reserve connectivity, trails and access, recreation	1.1
Proposed Natural Area Reserve	Maui	221006078	Parcel is adjacent to lands and waters of Ahihi-Kinau NAR, including conservation district and shoreline access. High visitor use impacts NAR resources. Inclusion in the NAR will improve management of impacts to NAR resources.	0.3
Proposed Forest Reserve	Maui	224016001	Koa silviculture, reforestation, forest reserve access, reserve connectivity, trails and access, recreation, hunter access	171.6
Proposed Forest Reserve	Maui	229001020	Shoreline access to historic Hoolawa Landing, stream corridor and estuary, riparian habitat, high value coastal vegetation, recreation.	10.8
Proposed Forest Reserve	Maui	229001033	Shoreline access to historic Hoolawa Landing, stream corridor and estuary, riparian habitat, high value coastal vegetation, recreation.	1.8
Proposed Forest Reserve	Maui	229002012	Shoreline access to historic Hoolawa Landing, stream corridor and estuary, riparian habitat, high value coastal vegetation, recreation.	2.2
Proposed Forest Reserve	Maui	229010008	Parcel provides summit to sea connectivity, shoreline access, forest reserve access, stream connectivity, reserve connectivity, trails and access, recreation.	2.3
Proposed Forest Reserve	Maui	229010009	Parcel provide summit to sea connectivity, shoreline access, forest reserve access, stream connectivity, reserve connectivity, very high value coastal vegetation, seabird nesting, trails and access, recreation.	1.5
Proposed Forest Reserve	Maui	229010012	Parcel provide summit to sea connectivity, shoreline access, forest reserve access, stream connectivity, reserve connectivity, very high value coastal vegetation, seabird nesting, trails and access, recreation.	21.5
Proposed Forest Reserve	Maui	229010012	Parcel provide summit to sea connectivity, shoreline access, forest reserve access, stream connectivity, reserve connectivity, very high value coastal vegetation, seabird nesting, trails and access, recreation.	1.8
Proposed Forest Reserve	Maui	229010022	Parcel provide summit to sea connectivity, shoreline access, forest reserve access, stream connectivity, reserve connectivity, very high value coastal vegetation, seabird nesting, trails and access, recreation.	11.1
Proposed Forest Reserve	Maui	229011008	Shoreline access, forest reserve access, stream connectivity, reserve connectivity, very high value coastal vegetation, seabird nesting, trails and access, recreation, public hunting	26.8

Proposed Forest Reserve	Maui	229011013	Parcel provide summit to sea connectivity, shoreline access, forest reserve access, stream connectivity, reserve connectivity, very high value coastal vegetation, seabird nesting, trails and access, recreation.	40.6
Proposed Forest Reserve	Maui	229013004	Parcel provides summit to sea connectivity, shoreline access, forest reserve access, stream connectivity, reserve connectivity, trails and access, recreation.	1.2
Proposed Forest Reserve	Maui	229013012	Parcel provide summit to sea connectivity, shoreline access, forest reserve access, stream connectivity, reserve connectivity, very high value coastal vegetation, seabird nesting, trails and access, recreation.	57.7
Proposed Forest Reserve	Maui	229013014	Parcel provide summit to sea connectivity, shoreline access, forest reserve access, stream connectivity, reserve connectivity, very high value coastal vegetation, seabird nesting, trails and access, recreation.	93.6
Proposed Forest Reserve	Maui	229013016	Corridor, need to access across for shoreline access, forest reserve access, stream connectivity, reserve connectivity, trails and access	1.1
Proposed Forest Reserve	Maui	229013017	Parcel provides summit to sea connectivity, shoreline access, forest reserve access, stream connectivity, reserve connectivity, trails and access, recreation.	7.0
Proposed Forest Reserve	Maui	229013018	Shoreline access, forest reserve access, stream connectivity, reserve connectivity, very high value coastal vegetation, seabird nesting, trails and access, recreation, public hunting	0.7
Proposed Forest Reserve	Maui	229013020	Corridor, need to access across for shoreline access, forest reserve access, stream connectivity, reserve connectivity, trails and access	0.1
Proposed Forest Reserve	Maui	231001001	Forest reserve access, reserve connectivity, trails and access, recreation. Approve set aside upon expiration or termination of current lease.	194.5
Proposed Wildlife Sanctuary	Maui	231001014	Endangered species critical habitat, shoreline access, reserve connectivity, very high value coastal vegetation, seabird nesting, trails and access, recreation	95.9
Proposed Forest Reserve	Maui	231001021	Shoreline access, forest reserve access, stream connectivity, reserve connectivity, trails and access, recreation, erosion control	107.3
Proposed Forest Reserve	Maui	231001029	Forest reserve access, stream connectivity, reserve connectivity, trails and access, recreation, erosion mitigation. Approve set aside upon expiration or termination of current lease.	47.7
Proposed Wildlife Sanctuary	Maui	231002011	Shoreline access, endangered species critical habitat, conservation district, seabird nesting area	100.8
Proposed Forest Reserve	Maui	231006003	Conservation district, forest reserve access, reserve connectivity, trails and access, recreation	158.2
Proposed Forest Reserve	Maui	236001014 (por)*	Endangered species critical habitat, conservation district, forest reserve access, reserve connectivity, trails and access, recreation, very high fire risk, very high erosion problem, dry forest restoration. Set aside to exclude wind turbine lease area.	3,325.2
Proposed Forest Reserve	Maui	244004002	Forest reserve access, dry forest restoration, reserve connectivity, trails and access, recreation, erosion management	268.8
Proposed Forest Reserve	Maui	244004006	Forest reserve access, dry forest restoration, reserve connectivity, trails and access, recreation, erosion management	68.1
Proposed Forest Reserve	Maui	244004009	Forest reserve access, dry forest restoration, reserve connectivity, trails and access, recreation, erosion management	156.1
Proposed Forest Reserve	Maui	244004011	Forest reserve access, dry forest restoration, reserve connectivity, trails and access, recreation, erosion management	11.8
Proposed Forest Reserve	Maui	244004019	Forest reserve access, dry forest restoration, reserve connectivity, trails and access, recreation, erosion management	6.9
Proposed Forest Reserve	Maui	244007006	Mahinahina Section (West Maui Forest Reserve) access & NAR, conservation district, dry forest restoration, reserve connectivity, trails and access, recreation, erosion management	194.2
Proposed Forest Reserve	Maui	245021004	Forest reserve access, dry forest restoration, reserve connectivity, trails and access, recreation, erosion management.	773.0
Proposed Forest Reserve	Maui	245021023	Forest reserve access, dry forest restoration, reserve connectivity, trails and access, recreation, erosion management	309.4
Proposed Forest Reserve	Maui	248001001 (por)*	Endangered species critical habitat, conservation district, forest reserve access, reserve connectivity, trails and access, recreation, very high fire risk, very high erosion problem, dry forest restoration. Set aside to exclude wind turbine lease area.	2,205.9
Proposed Forest Reserve	Maui	248002002	Forest reserve access, dry forest restoration, reserve connectivity, trails and access, recreation, erosion management	210.5
Proposed Forest Reserve	Maui	248002008	Forest reserve access, dry forest restoration, reserve connectivity, trails and access, recreation, erosion management	452.3
Proposed Forest Reserve	Maui	248002039	Forest reserve access, dry forest restoration, reserve connectivity, trails and access, recreation, erosion management	6.4
Proposed Forest Reserve	Maui	248003008 (por)	Forest reserve access, dry forest restoration, reserve connectivity, trails and access, recreation, erosion management. Set aside portion to exclude the disjunct linear segment along the hwy.	712.6
Proposed Forest Reserve	Maui	248003040	Forest reserve access, dry forest restoration, reserve connectivity, trails and access, recreation, erosion management	143.3
Proposed Forest Reserve	Molokai	257005026	Forest reserve access, stream connectivity, reserve connectivity, trails and access, recreation, hunter access, erosion mitigation	156.6
Proposed Forest Reserve	Molokai	257005031	Forest reserve access, stream connectivity, reserve connectivity, trails and access, recreation, hunter access, erosion mitigation	69.3
Proposed Forest Reserve	Molokai	258003023	Set side to connect mauka Forest Reserve to makai.	0.3
Proposed Forest Reserve	Molokai	258015007	Forest reserve access, stream connectivity, reserve connectivity, trails and access, recreation, public hunting, erosion mitigation	950.1
Proposed Forest Reserve	Molokai	258015009	Forest reserve access, stream connectivity, reserve connectivity, trails and access, recreation, public hunting, erosion mitigation	629.5
Proposed Natural Area Reserve	Molokai	261001002 (por)	Adjacent to Puu Aalii NAR, high quality stream, native wet cliff and coastal vegetation.	545.3
Proposed Forest Reserve	Hawaii	324008035	Adjacent to Forest Reserve	1.1
Proposed Forest Reserve	Hawaii	351001006	Transfer to FR, Good for waterbirds	151.4
Proposed Forest Reserve	Hawaii	387014015	Access to FR	32.7
Proposed Forest Reserve	Hawaii	396007002	Forest Reserve Connectivity	235.3
Proposed Forest Reserve	Kauai	444001002	Parcel is forested and surrounded by other Forest Reserves.	418.6
Proposed Forest Reserve	Kauai	454002026	Designate as FR; provides option for alternate access into Hanalei valley.	15.6
Proposed Forest Reserve	Kauai	456002001	Adjacent to existing Forest Reserve, could provide good hunting and public access opportunities if access issue is resolved.	807.3

*The proposed set aside excludes the approximately 226-acre encumbrances to Kaheawa Wind Power LLC (GLs 5731 and 6004)

PROPOSAL FOR THE EXTENSION OF THE NAKULA NATURAL AREA
RESERVE
2022

Nakula Natural Area Reserve
Proposed Extension



I EXECUTIVE SUMMARY

An approximately 361-acre parcel in leeward Haleakalā on the island of Maui, is proposed for inclusion in the State of Hawai'i Natural Area Reserve System (NARS). This area is adjacent to the existing Nakula NAR, and designation will expand a successful reforestation project that will benefit water recharge, carbon sequestration, and protection of endangered plants and wildlife.

II INTRODUCTION (General)

This State land is within the montane mesic *koa-`ōhi`a* climatic zone with fertile soils and good potential for reforestation. Since being fenced from hooved animals in 2012, the adjacent Nakula NAR and Kahikinui Forest Reserve have had extensive reforestation success. More than 450,000 trees have been planted, and countless more seedlings have naturally regrown after hooved animals were removed from the area. Additionally, endangered seabirds have also begun to recolonize the restoration area, and predator control efforts are resulting in nesting success for this rare species. While this proposed extension has been extensively grazed and is primarily composed on non-native grasslands, DOFAW intends to fence and replant it, mirroring the success of the adjacent lands above. Fences exist along the north and eastern boundary of this area, so protecting this area will require relatively small amounts of new infrastructure.

Leeward Haleakala's *koa* forest is a unique resource that is rapidly disappearing, and extending the NAR and area managed for restoration will protect a significant portion of what remains.

III BACKGROUND AND HISTORY

Past Land Use

This area was historically part of a *koa-`ōhi`a* forest that stretched around Haleakalā mountain, covering 40,000 acres from Makawao to Kaupō. Unfortunately over 95% of this forest has disappeared, so efforts to expand existing forests are critical for regaining the benefits of this forest. Native Hawaiian forests are far better at collecting moisture than grasslands in these upland, cloudy areas due to their thick vegetation condensing passing cloud moisture.^{1,2} Ancient Hawaiians observed that the forest affected weather patterns and generated clouds, that would then be blown to the island of Kaho`olawe on the *naulu* wind along a “cloud bridge,” thus making these forests in leeward Haleakalā important for bringing rain and cloud moisture to that dry island.³ The ability for these forests to collect moisture is reflected in an ancient Hawaiian proverb: *Hahai no ka ua i ka ululā`au* (The rain follows the forest). This ancient proverb shows how early Hawaiians clearly understood that water – and their survival – depended on the forests. In the late 1800s, this proverb was proven true after widespread clearing and enormous herds of wild cattle, goats, sheep, and pigs destroyed vast tracts of forests. The result: rivers and springs dried up, followed by water shortages, devastating droughts, and fires.

Correspondence dating from the early 1900s repeatedly mentions that large herds of feral goats, as well as cattle, were considered a critical threat to the survival of this forest. During that time, lands above approximately the 3,500' elevation were designated Forest Reserves and efforts to protect these lands from feral hooved animals were conducted. However, this parcel, which is also above that 3,500' elevation, was excluded from the Forest Reserve, and was designated as part of the agricultural district. This proposed NAR has been grazed under a revocable permit. Under the grazing permit, the lands were not available to public hunting or access.

Prior to the 1990s, within the existing Nakula NAR and Kahikinui Forest Reserve, some level of goat control was achieved through public hunting; primarily via a road and trail that started near the lower Skyline Trail above Polipoli State Park and ended at

Waiopai Gulch 3.5 miles away. Access was managed and maintained by DOFAW through a cooperative agreement with the Department of Hawaiian Homelands (DHHL) that established the Kahikinui Game Management Area. In 1984, 8,747 acres of DHHL land was withdrawn from the Forest Reserve in accordance with Attorney General opinion No. 75-3, dated March 21, 1975.

In 1994, the DHHL rescinded its access and management agreement with DOFAW. While the intent of this action was to allow DHHL to manage forest lands for the benefit of settlers on Hawaiian Homelands, it has restricted DOFAW's ability to manage State lands at Nakula and Kahikinui since the only feasible hunter access to these areas involves crossing DHHL lands by jeep and foot trail. After the withdrawal, this access was closed to the general public. Nakula and Kahikinui have become landlocked, and public hunting has essentially ceased again leaving goats and other feral animals in the region to be largely left uncontrolled.

Results from the decade of management of the adjacent NAR and Forest Reserve indicate what recovery could occur in this proposed extension. In 2012, State Capitol Improvement Project funds for the Watershed Initiative supported construction of fences that protected approximately 2,700 acres across the NAR and Forest Reserve from hooved animals, directly upland (*mauka*) of the proposed extension. After removal of the feral cattle, deer, goats, and pigs from that unit around 2014, extensive recovery began. DOFAW applied for Federal funds from the U.S. Forest Service, which supported large outplanting efforts. Outplanting survivorship was high in most species, exceeding 80% after two years in five of seven species.⁴ After having just small pockets of trees remaining, within four years of extensive outplanting, vegetation surveys indicated over 40% native species cover.⁵

Nakula NAR was proposed as an area to translocate the *kiwikiu*, an endangered forest bird (*Pseudonestor xanthophrys*). Unfortunately, birds that were released there largely succumbed to avian malaria, which was prevalent at much higher elevations than expected, likely due to increasing temperatures expanding the range of mosquitoes.

Endangered seabird recovery has been successful in the reserve. Seabird monitoring began in 2016, where there were five burrows detected of the critically endangered *ua`u* (Hawaiian petrel, *Pterodroma sandwichesis*). That year, only one of these nests resulted in a successful fledging. However, later results after predator control and restoration led to increasing success, and in 2019, 67 burrows were located and twenty of those successfully fledged.

In DHHL lands to the west, community interest in forest restoration has also occurred. In 1995, the Kahikinui Forest Partnership Working Group submitted a community forest management plan to the DHHL. This group later took the name Living Indigenous Forest Ecosystems (LIFE) and assumed a lease over a portion of the DHHL owned forest lands. Their goal is to involve settlers on Hawaiian Homelands with the stewardship of the Kahikinui Forest. One ongoing LIFE project involves construction of a fence to protect the most intact forested area on DHHL lands. This project is adjacent to the proposed Nakula NAR extension.

In 2003, ten land owners, including the State of Hawai`i, signed a memorandum of understanding for the Leeward Haleakala Watershed Restoration Partnership. The intent of the partnership is to support restoration of native ecosystems [primarily *koa*

forests] on 43,000 acres of leeward Haleakala above 3500' elevation, creating framework for regional cooperation and fund raising.

Present Land Use

The proposed extension is currently under a month-to-month revocable permit for grazing, and DOFAW is working with the permittee to negotiate a transfer of this land that is supported by the permittee. The NAR designation would only occur after the permit ended.

Cultural/Recreational Uses

An archaeological reconnaissance study and cultural practices assessment occurred in adjacent areas, documenting no historic sites. The report also states that due to the steep terrain and high elevation in the area, it would be "expected to contain few sites, especially given the rugged topography of the area. If present, sites would include rock shelters, cairns, quarry sites, petroglyphs, ridge trails or other temporary-use sites." No ongoing cultural practices were identified.

The area is extremely remote, and there is no public access across the private and leased lands that surround it. DOFAW does not maintain check stations or other means to monitor hunting or other activity in the area.

The region continues to have an abundance of game animals, primarily goats as was noted from the 1920's. Currently, ingress and reproduction of Axis deer (*Axis axis*) is becoming more of an issue. There are no developed trails or roads to the area; it can only be traversed by following rugged cross-country routes.

Previous Studies

Biological surveys have been conducted in adjacent areas. Medeiros, et al. (1986) surveyed Nakula as part of a larger survey of South Haleakala's native vegetation. Over the course of his career, Robert Hobdy, retired Maui Forester, often spent time in the area and documented numerous rare plants. No inventory of the area specifically proposed for NAR designation has been conducted. The gulches, not so easily impacted by ungulate foraging, will contain the most native Hawaiian plant species.

IV JUSTIFICATION (Specifics)

Scientific Value

The primary reason for designation of the Nakula NAR is to restore the leeward Haleakala *koa* dominated forest.

Leeward *koa* dominated forests on slopes of the larger Hawaiian volcanoes are unique in that the forest depends largely on precipitation and fog drip from afternoon clouds created by convection and diurnal heating. They differ markedly from *koa* forest that occurs on the windward slopes of the islands (an example is present at Hanawi NAR). Those forests are affected by the trade winds, and are much wetter, with a different suite of associated species.

Another important natural attribute of the proposed NAR are the numerous small gullies that incise the mountain slope. These sheltered gulches provide moist, shady

habitat for several rare plant species in what is otherwise a harsh, dry environment. The steep walls of the gulches have provided refuges in which the plants have been saved from goat browsing till now, but may not last for much longer.

The proposed NAR supports several different native habitats that could serve as reintroduction sites for rare plants.

Invertebrates in the area are poorly studied, but it is likely to be important habitat for native insects. For example, the mesic *koa* forest is habitat for native Carabid beetles. Recent surveys of relict *koa* elsewhere on Haleakala revealed surprising beetle diversity, including new species and rediscoveries of insects thought to be extinct. The *koa* at Nakula, which has never been inventoried, has a potentially rich beetle fauna as well.

Representativeness

While the often severe alteration of natural conditions in some areas might be seen as a reason to preclude NAR designation, the potential for recovery makes this parcel desirable for inclusion.

HRS Chapter 195 specifically allows for the preservation of areas “as relatively unmodified as possible”, and “as natural a condition as practicable.” Given that the Nakula tract contains the best potential for restoration of a unique ecosystem as yet unprotected on Maui, some level of degradation can be accepted. All of the lands within the NAR system can be said to be altered from their natural condition to some degree.

Natural Communities and their Status

Plant community classifications follow Gagne and Cuddihy in Wagner et al., 1999.

A few scattered trees remain from an area that used to be *koa/`ōhi`a* montane mesic forest. Due to ungulate grazing, the natural forest understory has been largely eliminated and replaced by introduced pasture grasses. The *olopua* montane mesic forest is found in a very small area at the lower extent of the proposed Reserve; within the canyon of Wailaulau gulch.

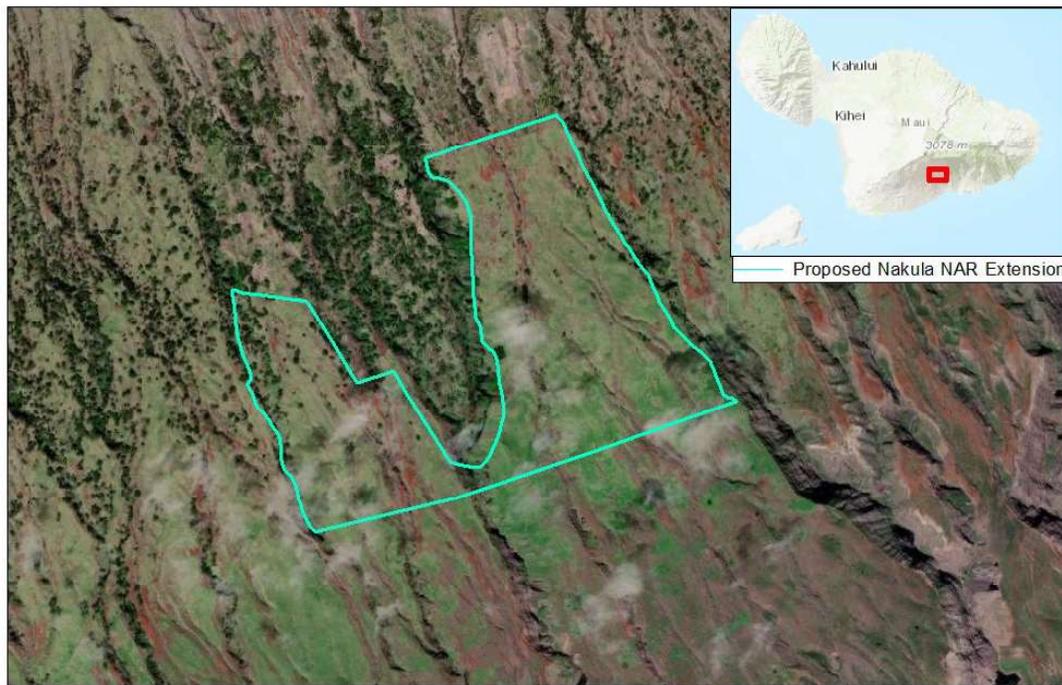
Rarity

See table 1 and 2 for a list of plants and wildlife found in areas adjacent to the proposed NAR.

Biological/Ecological Design

The boundaries of the proposed Nakula NAR follow the extent of a parcel that surrounds the existing NAR. The proposed new area will provide an excellent buffer, boundary to the existing more intact forested location of the NAR. This will allow for contiguous vegetation to begin natural spreading outwards and downslope of the existing forest resources enhancing the Nakula ecosystem.

Nakula Natural Area Reserve Proposed Extension - Aerial Imagery



DOFAW 587-4170. 2021. Features approximate and subject to change.

0 0.25 0.5 1 Miles

Location and Size, Administrative

The proposed Nakula NAR extension is located on the southern slope of Haleakala on Maui in the Hana District, and includes approximately 361 acres. The area is identified as (2) 1-8-001:005. The parcel spans from approximately 3,500' to 5,000' above sea level.

Threats (Human/Biological)

The greatest immediate threat to the proposed Nakula NAR extension is continued grazing and trampling by feral ungulates, including goats, cattle, deer and pigs.

Secondary threats include fire, and invasion by non-native weeds, including pasture grasses, as well as trees such as *Bocconia*, and *Grevillea*.

Tertiary threats include the loss of genetic diversity as population of native plants, birds and invertebrates decline.

Present Level of Protection

The land is within the agricultural district and has little regulatory protections.

Long-term Ecological Viability

Despite being degraded by years of cattle and goat activity, the forest has great potential for natural regeneration. This has been demonstrated in the existing efforts to expand the "lei" of forest that is being restored back to leeward Haleakalā.

Environmental Consequences of No Action

The environmental consequences of no action will likely be the continued degradation and eventual loss of this unique remnant of Maui's natural heritage.

Urgency

Degradation of this area by cattle and goats is well documented and has been happening for almost 200 years.

Sequestering carbon emissions is an urgent global need; this location would provide lands that have a high potential for carbon storage, retaining, and also enhancing biodiversity, if reforested.

V. MANAGEMENT NEEDS

Threats Requiring Management

As noted earlier, threats to the proposed addition to the proposed Nakula NAR extension include:

- Grazing and trampling by feral ungulates, including goats, cattle, deer, and pigs.
- Invasion by non-native plants, including pasture grasses and non-native weeds.
- Fire.
- Loss of genetic diversity.

Protective management would primarily entail the construction of fences (on-going) to exclude feral ungulates from the reserve, and the removal of any animals within the fences.

Weed control would focus primarily on eradicating incipient populations of non-native tree species. Natural regrowth/replanting may provide a natural control for pasture grasses as increased canopy cover may shade them out.

Fire threats could be mitigated by developing fuel breaks or shade belts to slow fire spread, as well as developing infrastructure such as reservoirs and helicopter dip tanks.

Outplanting, predator control, and translocation of native wildlife would address the loss of native biodiversity.

Currently, a Revocable Permit to Haleakala Ranch provides access to a spring on the property. The permit allows the Ranch to maintain a system of pipes and associated infrastructure that carries water to a reservoir on the Ranch's lands to the south of the parcel. DOFAW intends to continue to offer that permitted use under the NAR designation as the water source is beneficial to both agriculture as well as natural resources.

VI. PUBLIC OUTREACH

The following agencies, organizations, and individuals will be notified during a public hearing process that will include a public hearing and legal ad announcing the proposed addition.

Federal

Haleakala National Park
US Fish and Wildlife Service

State

Department of Hawaiian Home Lands
DLNR, Division of Conservation and Resources Enforcement
DLNR, Land Division
DLNR, Aha Kiole Council
Na Ala Hele Advisory Council
Office of Hawaiian Affairs
Representative of the 12th Representative District
Senator of the 6th Senatorial District

County

County of Maui -Planning Department

Organizations

Conservation Council for Hawaii
Environment Hawaii, Inc.
Haleakala Ranch
Kahikinui Game and Land Management `Ohana
Kahikinui Homesteads Association
Kaupo Wildlife Club
Leeward Haleakala Watershed Restoration Partnership
Maui Invasive Species Committee
Sierra Club, Maui Chapter
Ulupalakua Ranch
Friends of Haleakala National Park
The Nature Conservancy, Maui

VII. BIBLIOGRAPHY/REFERENCES

DHHL, Kahikinui Forest Reserve Community Management Conceptual Plan 7/1995

DOFAW, Environmental Assessment for Kahikinui Forest Restoration Fence 2004 Scott Fretz

Herbst, Wagner et al. Manual of The Flowering Plants of Hawai`i. 1999

Hobdy, R. pers. comm. 2005

Liebherr, James K. PhD, pers comm. 2005 email, Cornell University Entomology Dept.

Medeiros, A.C., Loope, L. L., Holt, R. A. 1986 Status of the native flowering plant species on the south slope of Haleakala, east Maui Cooperative National Park Studies Unit, University of Hawai'i Technical Report 59

USFWS Hawai'i Endangered Plant Species List 10/2005 Marie Brueggemann

U.S. Fish and Wildlife Service, 2006. Revised Recovery Plan for Hawaiian Forest Birds. Region 1, Portland Org. 622 pp.

Simon, J.C., T. K. Pratt, K. E. Berlin, and J. R. Kowalsky. 1998. Age and Sex Identification of Akohekohe. Journal of Field Ornithology. 69:654-660.

Perkins, R. C. L. 1903. Vertebrata. Pp. 365-466 in D. Sharp (Editor). Fauna Hawai'iensis. Vol 1, part IV. Cambridge University Press, UK.

Menard, T. 2008. Native Hawaiian Ecosystems Represented in Natural Area Reserves. Powerpoint presentation given to the NARS Commission on April 21, 2008.

Ecoregional Planning Team, The Nature Conservancy Hawai'i. 2006. An Ecoregional Assessment of Biodiversity Conservation for the Hawaiian High Islands. <http://www.Hawai'iecoregionplan.info/home.html>

Appendices

Table 1
Rare Plants Recorded From Vicinity of Proposed Nakula NAR Extension

Scientific Name	Common Name	Federal Status	CH info	Location Info
<u>Argyroxiphium sandwicense ssp. macrocephalum</u>	'ahinahina, Haleakala silversword	E	B	2
<i>Bidens micrantha</i> ssp. kaleaha	ko'oko'olau	E	B	1
<i>Canavalia pubescens</i>	'awikiwiki	C		2
<i>Clermontia lindseyana</i>	'ohawai	E	B	1
<i>Cyanea arborea</i>	haha	SOC		2
<i>Cyanea obtusa</i>	haha	C		2
<i>Cyrtandra bisserata</i>	ha'iwale	SOC		1
<i>Cyrtandra oxybapha</i>	ha'iwale	C		2

Diellia erecta		E	B	2
Diplazium molokaiense		E	B	1
Geranium multiflorum	nohoanu	E	B	2
Huperzia mannii		E	B	2
Neraudia sericea		E	B	2
Ochrosia haleakalae	holei	C		2
Phyllostegia haliakalae		SOC	B	1
Portulaca villosa		SOC		2
Ranunculus mauiensis	makou	C		2
Schidea diffusa ssp. diffusa		SOC		2
Stenogyne haleakalae		SOC		?
Zanthoxylum hawai`iense	‘a‘e	E		2

Federal Status E = Endangered, C = Candidate for Listing, SOC = Species of concern

CH Info Critical plant habitat designated: A = within proposed NAR, B = Adjacent lands with identical habitat

Location info 1 = recently recorded from within proposed NAR, 2 = recently recorded from lands adjacent to proposed NAR with identical habitat; could occur within NAR, ? = possibly extinct, recorded from vicinity of NAR

Table 2

Rare Animals Found in Vicinity of Proposed Nakula NAR Extension

Hawaiian Petrel ‘u‘a‘u, Pterodroma sandwichensis

Hawaiian Goose, *nene*, Nesochen sandwichensis

Hawaiian Bat, ‘ope‘ape‘a, Lasiurus semotus cinereus

Blackburn’s Sphinx Moth, Manduca blackburni



1 The forests of leeward Haleakala have been converted to barren areas or grasslands, largely due to grazing by non-native hoofed animals.



2 Small pockets of native forests exist in gullies where feral animals were less likely to

graze vegetation.



3 Fence crews building fence in the adjacent Nakula NAR in 2012. This fence was the first step towards ecosystem recovery.



4 Before fencing and hoofed animal removal, the Nakula NAR was largely grassland.



5 The same location was photographed four years later, after extensive planting and natural regeneration.



6 Extensive reforestation has occurred in areas that were previously barren or grasslands. The proposed extension is in the bottom right corner of this photo.



7 The fencing and outplanting projects have attracted federal funding to create green jobs and provide job training. Here, youth conservation corps interns learn tree planting skills.



8 In a 2010 aerial image of the center of this proposed NAR, the NAR (on left) is almost indistinguishable from the pasture area. The locations of hoofed animal fences that would be installed later are indicated in red. Photo: Pictometry.



9 In 2020, the same area has restored dramatically after fences (red lines) have been installed. Photo: Pictometry.

¹ Giambelluca, T. W., R. E. Martin, G. P. Asner, M. Huang, R. G. Mudd, M. A. Nullet, J. K. DeLay, D. Foote. 2008. Evapotranspiration and Energy Balance of Native Wet Montane Cloud Forest in Hawai'i. *Agricultural and Forest Meteorology*. DOI:10.1016/j.agrformet.2008.08.004.

² Engott, J. A. 2011. A water-budget model and assessment of groundwater recharge for the Island of Hawai'i: U.S. Geological Survey Scientific Investigations Report 2011-5078.

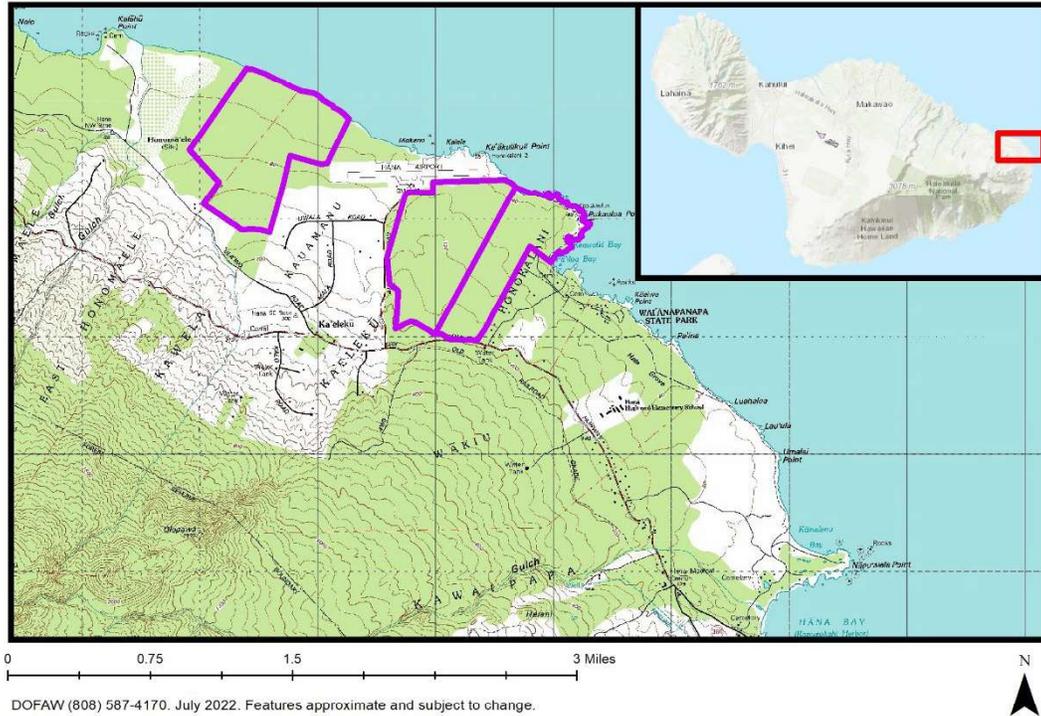
³ Young, P. T. Kaho'olawe – Images of Old Hawaii. <https://imagesofoldhawaii.com/kaho'olawe/>

⁴ Warren, C.C., H.L. Mounce, L.K. Berthold, C. Farmer, D.L. Leonard, and F. Duvall. 2019. Experimental restoration trials in Nakula Natural Area Reserve in preparation for reintroduction of Kiwikiu (*Pseudonestor xanthophrys*). Pacific Cooperative Studies Unit Technical Report #199. University of Hawai'i at Mānoa, Department of Botany. Honolulu, HI. 102 pages.

⁵ Learned, J. 2020. Summary of MNSRP Natural Area Reserve Activities.

PROPOSAL FOR THE KAUMANU NATURAL AREA RESERVE
2022

Proposed Kaumanu NAR  Proposed Kaumanu NAR



I EXECUTIVE SUMMARY

Approximately 620 acres near Hana airport and Waianapanapa State Park on the island of Maui, is proposed for inclusion in the State of Hawai'i Natural Area Reserve System (NARS). Designation is meant to expand protections for a windward coastal forest of hala (*Pandanus tectorius*), a large population of the endangered *Ischaemum byrone* grass, and other native plants and wildlife.

II INTRODUCTION (General)

This unencumbered State land contains a sizable stand of hala-dominated native forest in good condition. While coastal hala forests likely covered most windward shores in Hawai'i before human contact, these accessible areas have been almost entirely replaced by development and agriculture. Few larger tracts of this coastal forest type remain, and many forests that still exist were spared due to their remoteness or by clinging to steep cliffs. This coastal hala forest in Kaumanu provides an opportunity for active management because it is in an accessible and relatively flat. It also presents opportunities for nature education and community co-stewardship to reconnect with and restore plants and animals unique to Hawai'i.

III BACKGROUND AND HISTORY

Past Land Use

This area was historically part of a hala forest that likely stretched around the mesic and wet coastline of Maui. Unfortunately, most of this forest has disappeared.

This area of Waianapanapa was inhabited before European contact, and rich collections of archeological sites remain. The nearby Ohala heiau in the state park is the most prominent, with a platform approximately 110 feet long and 75 feet wide. The general area was likely inhabited by fishers, and while the coastal hala forests were not usable for crops, hala and other coastal plants were gathered for many material and spiritual purposes. Ancient footpaths connected the coastline, such as the Pi'ilani trail. The area of the proposed NAR was used as a burial complex from pre- to proto-historic times that contains numerous burial sites and various structures.

After European contact, the flatter lowlands around Hana were largely converted to sugar cane plantations. However, this area was not targeted, likely because it was covered by more recent lava flows and did not have adequate soil.

After the Hana highway was built, this area became a popular visitor destination due to the black sand beach and caves at Waianapanapa, and the State Park was established.

Present Land Use and Cultural/Recreational Uses

The proposed NAR is currently unencumbered State land and visitation is primarily via the coastal Pi'ilani trail. The area is primarily used by fishers and hikers. There is ongoing cultural activities such as the gathering of marine and plant resources. Marine resources include kupe'e, limu, and a variety of fish. The neighboring area offers plants such as kukui, banana, coconut, ulu, wauke, mamaki, noni, false kamani, mango, guava, fern, and ti. Waianapanapa has also preserved cultural resources, offering the community a connection to the early, pre-history of Hana, particularly the burial grounds of ancestors. The proposed NAR is also the location of Wainapanapa Cave which is associated with a local legend. Community members visit the cave to perform prayers or provide offerings for special occasions in addition to using the pool for recreation. However, there is a statutory prohibition on entering all caves.

IV JUSTIFICATION (Specifics)

Representativeness and Scientific Value

Coastal hala forests exist in the Pu'u O 'Umi (Hawai'i), Oloku'i (Moloka'i), and Hono O Na Pali (Kaua'i) NARS. No representative areas on Maui are protected in the system. Further, these forests in the other NARS are located in very remote areas that are difficult to manage, so the Kaumanu NAR would provide an opportunity to conduct active management of this ecosystem.

Natural Communities and their Status

This area is within a mesic climatic zone with a'a (Hana volcanics) basalt substrate and dominated by strong northeast trade winds. The harsh conditions have discouraged invasion of non-native species. However, non-native plants, particularly *Casuarina* (ironwoods) have largely infiltrated the coastal areas exposed to salt spray, and *Shinus* and *Schefflera* are prominent in the inland areas.

Fourteen species of native plants were noted in the area, which is a moderate-high amount compared to other coastal sites on Maui.

Endemic and indigenous fauna observed in the State area include the endangered Hawaiian hoary bat, 'ōpe'ape'a, (Lasirus cinereus semotus); the Pacific Golden-Plover, kolea (Pluvialis fulva); and Ruddy Turnstone, 'akekeke (Arenaria interpres). The threatened Green Sea Turtle (Chelonia mydas) has also been observed offshore. An anchialine pond shrimp, Metabetaus lohena can be found in the area's caves. Rarity

The area has a large population of the endangered *Ischaemum byrone* grass, which is extremely salt-tolerant and occurs along the lava coastline.

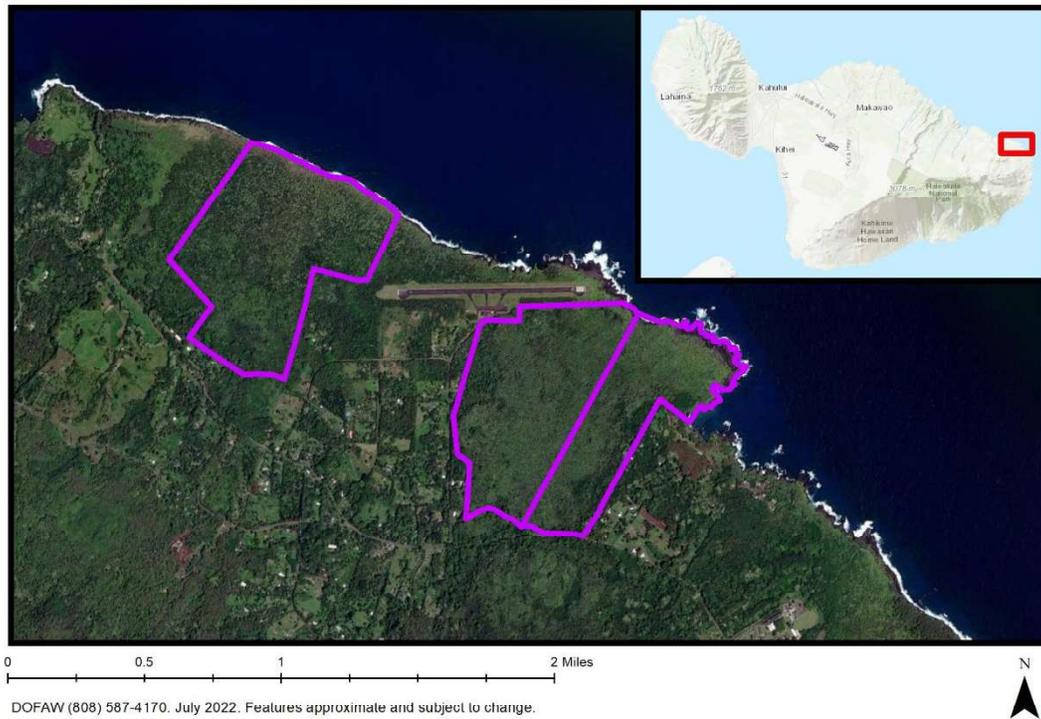
Invertebrates in the area are poorly studied, but it is likely to be important habitat for native insects such as yellow-faced bees. Various species of these bees have been listed as endangered. *Megalagrion* sp. (damselflies) have also been observed in the area.

In addition to the endangered Hawaiian hoary bat and threatened Green Sea Turtle, other endangered and threatened species that may be affected by this area include the endangered, endemic Hawaiian Petrel, 'ua' u (*Pterodroma sandwichensis*) and the threatened Newell's Shearwater, 'a'o (*Puffinus auricularis newelli*) that have both been reported to fly over the area.

Biological/Ecological Design

The boundaries of the proposed Kaumanu NAR follow the extent of three parcels to the west of Waianapanapa State Park. The Hana airport bisects the proposed NAR, however DLNR could partner with the Department of Transportation to co-manage their section of the coastline and potentially use the fencing already constructed for the airport.

Proposed Kaumanu NAR Proposed Kaumanu NAR



Location and Size, Administrative

The proposed Kaumanu NAR is located on the eastern slope of Haleakala on Maui in the Hana District, and includes approximately 620 acres. The area is identified as TMKs (2) 1-3:005:002; (2) 1-3:003:026; (2) 1-3:003:001.

Threats (Human/Biological)

The greatest immediate threat to the proposed Kaumanu NAR is continued invasion by alien plants.

Secondary threats include feral pig damage. Staff have noted extensive pig digging in the forest which will further serve to spread weeds.

Present Level of Protection

The land is within the Conservation District. As it is unencumbered State land, it is more vulnerable to be set aside for other uses, and also lacks natural resource management staff capacity.

Long-term Ecological Viability

This coastal forest, if protected from development, is generally resilient. However, over time, invasive plants will continue to replace the natives without active management.

Environmental Consequences of No Action/Urgency

The environmental consequences of no action will likely be the continued degradation and eventual loss of this unique remnant of Maui's natural heritage.

V. MANAGEMENT NEEDS

Threats Requiring Management

Staff will explore strategies to fence the area from feral pigs. Fences will include step-overs to permit continued public access into the area for fishing, hiking, and other activities.

Weed control would focus primarily on eradicating stands of *Casurina*, *Shinus*, and *Shefflera*. As the areas near the coast are the most intact, a weeding strategy from *makai* to *mauka* may be employed.

Outplanting, predator control, and translocation of native wildlife would address the loss of native biodiversity. This could help encourage populations of native bees, as well as create new protected populations of rare plants.

VI. PUBLIC OUTREACH

The following agencies, organizations, and individuals will be notified during a public hearing process that will include a public hearing and legal ad announcing the proposed addition.

Federal

US Fish and Wildlife Service

State

Department of Hawaiian Home Lands
DLNR, Division of Conservation and Resources Enforcement
DLNR, Division of State Parks
DLNR, Land Division
DLNR, Aha Kiole Council
Na Ala Hele Advisory Council
Office of Hawaiian Affairs
Representative of the 13th Representative District
Senator of the 6th Senatorial District

County

County of Maui -Planning Department

Organizations

Aha Kiole Council
Conservation Council for Hawaii
Environment Hawaii, Inc.
Hana Ranch

Hawaii Audubon Society
 Hawaii Conservation Alliance
 Hawaiian Botanical Society
 National Tropical Botanical Garden, Kahanu
 Maui Invasive Species Committee
 Sierra Club, Maui Chapter
 Ke Ao Hali'i
 The Nature Conservancy, Maui
 Hawaii Land Trust

VII. BIBLIOGRAPHY/REFERENCES

R. Pearson, 1969, Report of Arch. Recon. at Waianapanapa State Park, Hana, Maui, Hawaii State Arch. Survey of Haawaii, Journal 70 - 2, p. 9

Warshauer, F., J. Jacobi, J. Price. 2006. Native Coastal Flora and Plant Communities in Hawa'i: Their Composition, Distribution, and Status. Final Report.

U.S. Fish and Wildlife Service, 2006. Revised Recovery Plan for Hawaiian Forest Birds. Region 1, Portland Org. 622 pp.

Ecoregional Planning Team, The Nature Conservancy Hawai'i. 2006. An Ecoregional Assessment of Biodiversity Conservation for the Hawaiian High Islands. <http://www.Hawai`iecoregionplan.info/home.html>

Appendices

Table 1
Native Plants Recorded From Vicinity of Proposed Kaumanu NAR

Scientific Name	Federal Status
<i>Cassytha filiformis</i>	
<i>Cocculus orbiculatus</i>	
<i>Cyperus polystachyos</i>	
<i>Fimbristylis cymosa</i>	
<i>Ipomoea pes-caprae</i>	
<i>Ipomoea tuboides</i>	
<i>Ischaemum byrone</i>	E
<i>Metrosideros polymorpha</i>	

<i>Mucuna sloanei</i> var. <i>persericea</i>	E
<i>Nephrolepis exaltata</i>	
<i>Pandanus tectorius</i>	
<i>Portulaca lutea</i>	
<i>Psilotum nudum</i>	
<i>Scaevola taccada</i>	
<i>Vigna marina</i>	

Federal Status E = Endangered

(Table based on results from Warshauer *et al.* 2006.)

PROPOSAL FOR THE EXPANSION OF THE `ĀHIHI KINA `U
NATURAL AREA RESERVE

August 2022

I EXECUTIVE SUMMARY

Six parcels, totaling approximately 23.43 acres in the Makawao district, on the island of Maui, are proposed as additions to the `Āhihi Kina `u Natural Area Reserve (NAR). The proposed expansion contains parcels, both *mauka* and *makai* (upland and below), of Makena Road. Adding these parcels will increase access and strengthen strategic management for the area and will provide a buffer to the NAR. Set aside of these parcels into the NAR system will enable the division to protect and restore resources through establishing visiting hours, managing parking, signage, preventing trampling of sites, and enabling the presence of ranger and docents.

II INTRODUCTION

This addition is situated on the southern shoreline of Maui, in the moku (traditional land district) of Honua'ula, on the southwest flank of Haleakala. It is within the County of Maui administrative district of Makawao near the town of Kīhei and resort areas of Wailea and Makena (Fig. 1).¹ These additions are crucial to the strategic management of the area and will provide increased access and protection from the increasing human impacts to the NAR and development of the surrounding areas.

Geologically, the area encompasses young rugged lava flows on Haleakala volcano's southwest rift zone and consists of 'a'a (rough, slow moving lava) lava.¹ Biologically, the lowland dry ecotype of area leaves the land comprised of small shrubs. The small size of the parcels and proximity to development make the presence of rare species unlikely. There are many historic sites and archaeological features on some of the parcels.



Figure 1: Map of the `Āhihi Kina`u Natural Area Reserve and proposed additions.

The proposed additions to the NAR are generally divided into the region northwest of the NAR (Kanahena and Pa`ako) and the parcels southeast of the NAR (Keone`o`io).

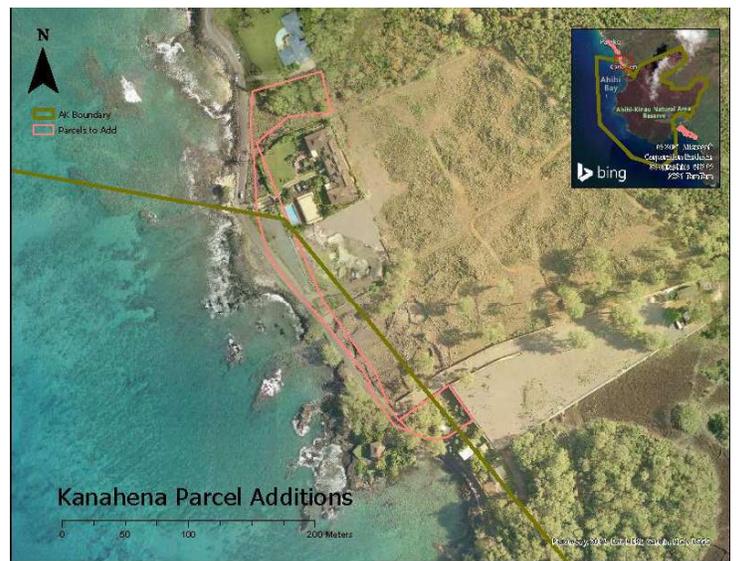
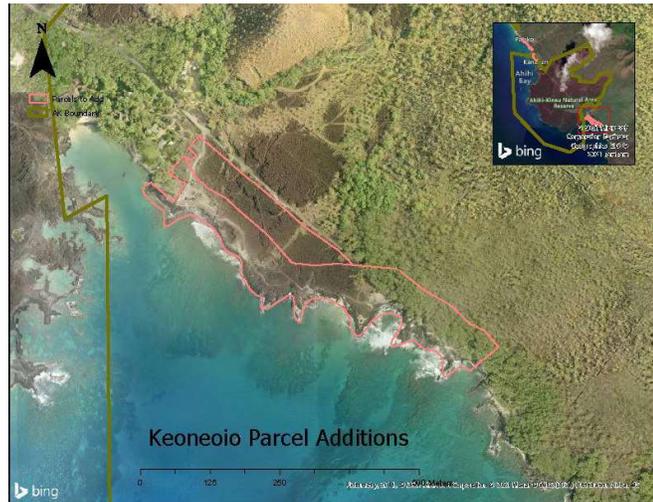


Figure 2: Expanded maps of the additional parcels to the northwest of the existing NAR (Paako and Kanahena).

Figure 3: Expanded map of the additional parcels to the southeast of the existing NAR (Keoneoio).



III BACKGROUND AND HISTORY

Past Land Use, Previous Studies, and Conservation History

A Comprehensive Resource Management Plan for the Reserve and Keone'o'io was completed in March 2007 (Desilets et al. 2007). It focuses on the management of cultural resources along the most heavily visited trail corridors. It found that the southeastern portion of the Reserve contains the highest density of archeological features. The area includes trail networks, rock shelters, habitation complexes, modified anchialine and marine pools, and heiau, clearly illustrating the importance of this area and the significant fishing grounds for this region of the island. The Reserve contains a variety of traditional Hawaiian and early historical cultural resource sites; some, such as Ma'onakala Village Complex in Kanahena, are well known. In 1971 a team from the Bernice Pauahi Bishop Museum cleared and mapped the ruins at Ma'onakala (Desilets et al. 2007). In general, lands within the proposed NAR expansion have been traditionally used in cattle ranching, and military operations during WWII (Lee-Grieg et al. 2020).

The Kanahena parking area was once a World War II-era dumpsite, and was cleaned up sometime between the late 1960s and 1973. After the war, the Army Corp of Engineers removed the wire from the Makena area and dumped it at the location of what is currently the Reserve's Kanahena Parking Area. As a result of this initial dumping, people began dumping material there that could not burn, however, the site has since been cleaned and is now used as a parking area/ field office (Warnecke, et al.).

Present Land Use and Access

These parcels are unencumbered land in the Conservation District. Proximity to Makena Road makes public access available, however, the parcels consist of small open spaces with little to no development. Currently, a large sign with the name of the Reserve and a map of the boundaries is located at the coastal entry on the Makena-Keone'o'io government road. About 100 meters further down the coast is a parking area in Kanahena. Within the parking area are smaller trailers within a barbed wire fence meant to function as an on-site Ranger office. Signs stating Reserve restrictions, access restrictions, UXO threat and other information are located along the road, at the Kanahena parking area, at restricted access trailheads, and at La Perouse Bay/Keone'o'io, which is within the southern parcels. Keone'o'io is currently a parking area and used as a staging for people wanting to hike the Hoapili trail. Keone`o`io and Pa`ako areas are also used by fisherman for coastal access and a temporary camp for some homeless. Portable toilets are provided at Pa`ako, Kanahena, and La Perouse Bay/Keone'o'io parking areas.

Cultural/Recreational Uses

Currently, there is fishing and general tourism visitation to these areas, particularly in the Keone'o'io side.

This submittal is for a change in designation from unencumbered land to a Natural Area Reserve. The current rules for unencumbered State lands (HAR 13-221) would be replaced by rules for NARS (HAR Ch. 13-209). While the rules are generally similar, the NAR rules are generally more restrictive, such as a prohibition on taking any natural resource items, as well as entering the reserve in groups larger in ten. Additionally, the current amendments of the NAR rules prohibit the following:

To have or possess the following tools, equipment, or implements: fishing gear or devices within `Āhihi-Kina`u natural area reserve, including but not limited to any hook-and-line, rod, reel, spear, trap, net, crowbar, or other device that may be used for the taking, injuring, or killing of marine life; cutting or harvesting tools or gear, including but not limited to chainsaws, axes, loppers, any mechanized or manual sawtooth tool, seed pickers, or machete, that may be used for the taking, injuring, or killing of plant life; and hunting gear or tools that may be used for the taking, injuring, or killing of wildlife, except as permitted by the hunting rules of the department.

A special-use permit is required to violate any rules of the NARS. This may require approval by the Natural Area Reserves System Commission and/or the Board of Land and Natural Resources, based on the magnitude of the activity.

IV JUSTIFICATION

The criteria for Scientific Value, Representativeness, Natural Communities and their

Status, Rarity, and Biological/Ecological Design are not applicable as these parcels do not contain these resources. Instead, the parcels are strategic for management of other areas of the NAR that do contain these resources.

Location and Size

These parcels are approximately 23.43-acres of coastal lowland dry terrain. It is situated in the Makawao District, and along Makena Rd. The parcels include the following TMKs:

221004075

221004110

221006010

221006077

221006078

Threats (Human/Biological) High-priority threats to `Āhihi Kina`u ecosystems are impacts from human incursion, loss of biological/cultural resources to development and overuse, as well as potential negative effects caused by climate change. These impacts pose some of the highest threats to the resources of the proposed NAR and its nearby areas. This includes the marine ecosystem, cultural sites, and historic trails. The addition of these parcels will provide DOFAW more access for landscape-scale management, and monitoring of terrestrial activities that can potentially create issues in the marine ecosystem, such as erosion/sedimentation.

Present Level of Protection

These areas are within the Conservation District, which regulates various types of development but does not require active management. If designated a NAR, there would likely be a higher level of activity for landscape-scale conservation planning, management, and a permanent status prohibiting uses inconsistent with conservation of native ecosystems.

Long-term Ecological Viability/Environmental Consequences of No Action/Urgency

Adding these lands to the NAR will help to support existing objectives found within the `Āhihi Kina`u Management Plan, specifically:

Objective L2 - Reduce Upland Development Impacts

By 2015, negative upland development impacts on the Reserve's natural and cultural resources will be largely reduced or fully mitigated through the use of various strategies to restrict or mitigate land use.

Strategic Actions

Action L2 (a) - Designate and prevent development within a Reserve buffer

zone.

Tasks include: (i) review, amend, or establish BMP for land use practices within the lands adjacent to the Reserve's boundaries; (ii) assess the land ownership interests within a 1-mile radius surrounding the Reserve's boundaries by Tax Map Key and land use zoning status **{Figure 25}**; (iii) prioritize land management actions according to proximity, feasibility, and potential for impact to resources; (iv) design and propose a 1-mile buffer zone surrounding the Reserve's boundaries within which land development activities are minimized and seek to have this accepted and approved by state and county authorities; (v) where possible, purchase, seek conservation easements on, or rezone lands encompassed within proposed 1-mile buffer zone; and (vi) work with state and county authorities to ensure a high level of scrutiny on Special Management Area permit applications in the buffer zone.

Action L2 (c) -Acquire and hold adjacent lands and infrastructure.

Tasks include: (i) seek the support of the NARS Commission and BLNR to advocate for NAR addition or expansion into eligible adjacent lands; (ii) through purchase, trade, and/or conservation easements, acquire and hold lands important to the Reserve in order to prevent development from occurring; and (iii) begin discussions with landowners within the Reserve to acquire in-holdings, and with owners of infrastructure (e.g. electric lines) about the possible return to a more natural state over time.

The addition of these important parcels to the NAR would improve and protect access as well as enhance the ability of the System to participate and contribute to conservation and restoration actions across the entire region. It could mitigate poaching, as well as potentially reduce pollution and particulates entering coastal waters due to the effects of erosion and human impacts. This could reduce sedimentation and reduce the stress put on the marine ecosystem.

As these areas are coastal and under threat from the effect of climate change, it is projected that no management action could potentially lead to loss of access to the NAR. These parcels are critical to continued access to the NAR in the face of climate change and development.

V. MANAGEMENT NEEDS

Threats Requiring Management

Management planning for `Āhihi Kina`u NAR involved an intensive public consultation process. A working group was formed in 2008 and guided the publication of the plan in

2012. One of the objectives of the plan was the goal of acquiring lands adjacent to the NAR and creating a buffer from development along with implementing management to control land-based pollution. These goals have been shared by both Reserve Managers and the public and most recently were supported by the community during an introductory meeting on the proposed parcel additions with our strategic group made up of neighbors, representatives from stakeholder groups such as fishermen and the `Aha Moku, along with representatives from the original advisory group that was involved with the creation of the management plan. There was general support for keeping the lands as open space in the face of development approaching from Kīhei and Wailea. The Department intends on conducting a public consultation process to develop additional management plans for these new areas after the formal designation.

Threats to this area include ingress from invasive species, particulate pollution entering the marine ecosystem (from erosion and human impacts), and overuse/overcrowding and its effects on the archaeological sites present. Feral ungulates threaten the resources of the proposed NAR and if these parcels are set aside, will enable the division to eliminate them. This could be potentially implemented by extending the existing permits that permit hunting in the NAR to include these areas, particularly in Keone'o'io. Human impacts caused by erosion and sedimentation can put undue stress on the coral reefs that are present. Finally, the `Āhihi Kina'u NAR coastal areas are threatened by climate change and retreating shorelines. The addition of these parcels to the NAR system will enable the division to control and manage uses consistent with coastal resilience, ensuring native habitats are maintained.

If added to the NAR, these areas may be covered by the existing visiting hour regulation, which would assist with regulating illegal camping and homeless issues. Additionally, the parking at Keone'o'io could be improved to reduce trampling and erosion that affects the nearshore reef.

VI. PUBLIC SUPPORT

A public meeting with a stakeholder group made up of members of the community living in close proximity to the reserve, regular users, local fishermen, past advisory group members and other concerned citizens was hosted by DOFAW on March 5, 2021. There was general support for adding the parcels. Concerns were centered around continued access and management of the areas to lessen human impacts and to mitigate illegal uses such as homeless encampments.

*Agencies, Organizations, and Individuals Contacted**

*Interested parties will be notified and a formal public hearing and comment period will occur for this nomination pursuant to Hawai'i Revised Statutes § 195-4.

Federal

US Fish and Wildlife Service

State

Department of Hawaiian Home Lands
DLNR, Division of Conservation and Resources Enforcement
DLNR, Land Division
DLNR, Aha Kiole Council
Office of Hawaiian Affairs
Representative of the 12th Representative District
Senator of the 6th Senatorial District

County

County of Maui -Planning Department

Organizations

`Āhihi Kina`u NAR/Keone`o`io Advisory Group
Conservation Council for Hawaii
Environment Hawaii, Inc.
Ulupalakua Ranch
Hawaii Audubon Society
Hawaiian Botanical Society
Maui Invasive Species Committee
Sierra Club, Maui Chapter
The Nature Conservancy, Maui

References

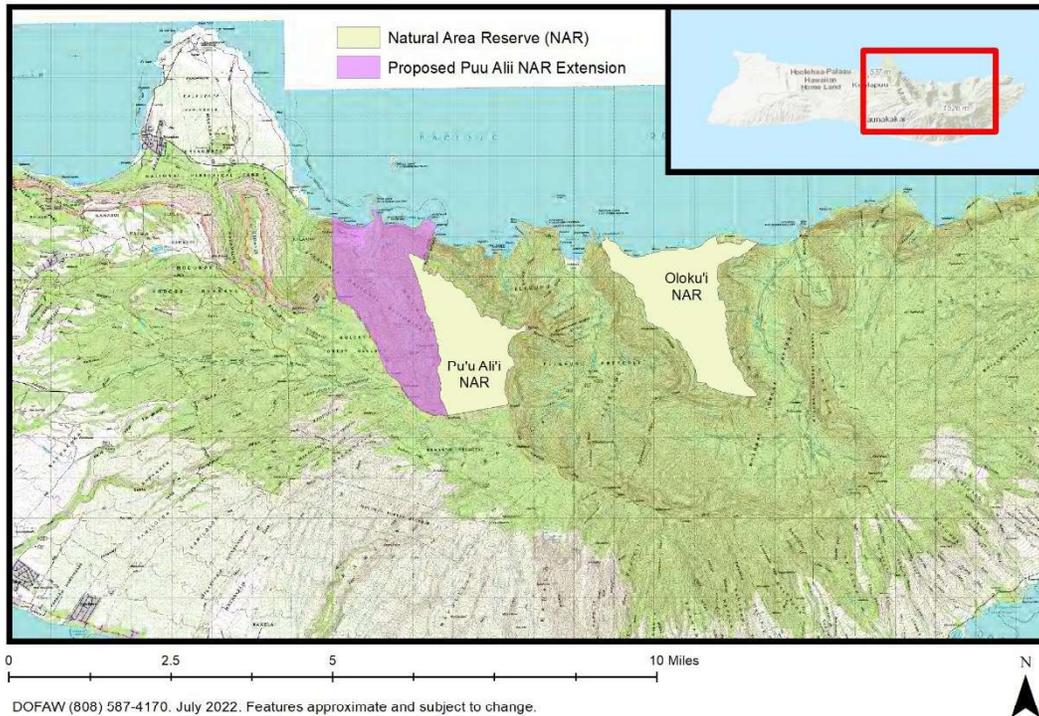
Desilets, M. and others. 2007. A Cultural Resource Management Plan for "Āhihi-Kina'u Natural Area Reserve and Keoni'io. Report no. 2085-1. Prepared for DLNR, DOFAW, and the State of Hawai'i.

Lee-Grieg, Tanya and others. 2020. Cultural Impact Assessment for the Paeahu Solar Project at Honua`ula. Prepared for Paeahu Solar, LLC

Warnecke, John Carl and Associates. No date. Environmental and Urban Design Study of the Mokena-la Perouse, Wailuku and Iahaina Areas. Island of Maui, State of Hawai'i. Prepared for National Foundation of the Arts and Humanities, County of Maui, Maui Historic Commission and Maui Beautification Committee.

PROPOSAL FOR THE EXTENSION OF THE PU'U ALI'I NATURAL AREA RESERVE, TO BE WITHDRAWN FROM THE MOLOKA'I FOREST RESERVE
2022

Proposed Pu'u Ali'i NAR Extension



I EXECUTIVE SUMMARY

An approximately 2,000-acre section of land comprising Waikolu valley on the north shore of Molokai, is proposed for inclusion in the State of Hawaii's Natural Area Reserve System (NARS). This area is adjacent to the existing Pu'u Ali'i NAR, and contains an outstanding native Hawaiian stream, and native wet cliff and coastal vegetation.

II INTRODUCTION (General)

Designation of this area would include multiple streams from *mauka* to *makai* in the Natural Area Reserves from the existing Pu'u Ali'i NAR into the valley of Waikolu. The designation does not include the Molokai tunnel diversion and is not anticipated to affect the operation of the tunnel.

III BACKGROUND AND HISTORY

Past Land Use

This land, like other valleys of the Moloka`i north shore, was settled by ancient Hawaiians. The valley bottom was likely densely populated, supported by the perennial stream that irrigated taro lo`i and other crops.

After European contact, this portion of Moloka`i Forest Reserve was set aside by Governor`s proclamation of September 11, 1916. It is part of Kalawao county.

In 1955, a use permit was granted to the Hawai`i Irrigation Authority to create a horse trail into the back of the valley to facilitate construction of a tunnel. The trail began at the upper rim of the valley at Pu`u Kaeo.

In 1958, Governor`s Executive Order 1814 withdrew approximately 7 acres from the Forest Reserve to make the lands available for the Moloka`i Irrigation Tunnel System.

In 1969, the tunnel was finalized to divert water from the back wall of the valley at approximately 925 ft elevation into the interior of Molokai, feeding the Kualapu`u Reservoir. The tunnel, which is approximately 25,000 ft, also functions as a road. The road extends partway into Waikolu valley. Infrastructure associated with the water diversions and tunnels remain, such as flumes, dams, gages, and buildings. Much of the infrastructure is unmaintained and in various states of decay.

Public Law 96-565 of 1980 established the Kalaupapa National Historical Park which included all of Kalawao County (including the Pu`u Ali`i NAR and Waikolu). A cooperative agreement between the Park and the Division of Forestry and Wildlife was ratified in 1989 and the two entities have conducted surveys and occasional management of the valley.

Present Land Use

The water diversion easement (which is not part of the proposed NAR) continues and the United States Geological Survey operates a stream gage in the valley.

The Division of Forestry and Wildlife is almost finished with a fence along the rim of Waikolu valley which is meant to exclude hooved animals from the valley and the existing Pu`u Ali`i NAR.

Cultural/Recreational Uses

The area is extremely remote. Waikolu can be walked to along a boulder strip along the coast to from Kalaupapa, however access is highly restricted by the Park and unaccompanied public access is not permitted from the Park. Leinopapa point at the west end of Waikolu provides a sheltered cove that is occasionally used as a mooring location

for boats. The visitation of Waikolu from boaters is not known. It is likely that fishers may also visit the area, likely by boat.

The area is within hunting unit C, however the valley bottom is seldomly visited due to visitation restrictions imposed by the Park.

IV JUSTIFICATION (Specifics)

Scientific Value

The primary reason for designation of the extension of the Pu'u Ali'i NAR into Waikolu valley is to represent the stream, which is discussed in the following section.

Representativeness

The Hawaii Stream Assessment of 1990 ranked Waikolu an "Outstanding" stream. The DLNR-Division of Aquatic Resources ranked Waikolu as a 9 out of 10, primarily because it had a high number of native species, including endangered species, and the absence of priority 1 introduced species.

Species List

Native Species

Crustaceans *Atyoida bisulcata*
Macrobrachium grandimanus

Fish *Awaous guamensis*
Eleotris sandwicensis
Kuhlia sandwicensis
Lentipes concolor
Sicyopterus stimpsoni
Stenogobius hawaiiensis

Snails *Neritina granosa*

Native Species

Insects *Anax junius*
Megalagrion blackburni
Megalagrion calliphya
Megalagrion hawaiiense
Megalagrion nigrohamatum nigrohamatum
Megalagrion pacificum
Megalagrion xanthomelas

Introduced Species

Crustaceans *Macrobrachium lar*
Snails Lymnaeid sp.

Natural Communities and their Status

The native wet cliff ecosystems found within the Pu'u Ali'i NAR extend into the upper cliffs of Waikolu, however in lower elevations that ecosystem degrades into primarily non-native landcover. The stream, however, largely remains high quality across all elevations. There also exists a band of native coastal vegetation.

Rarity

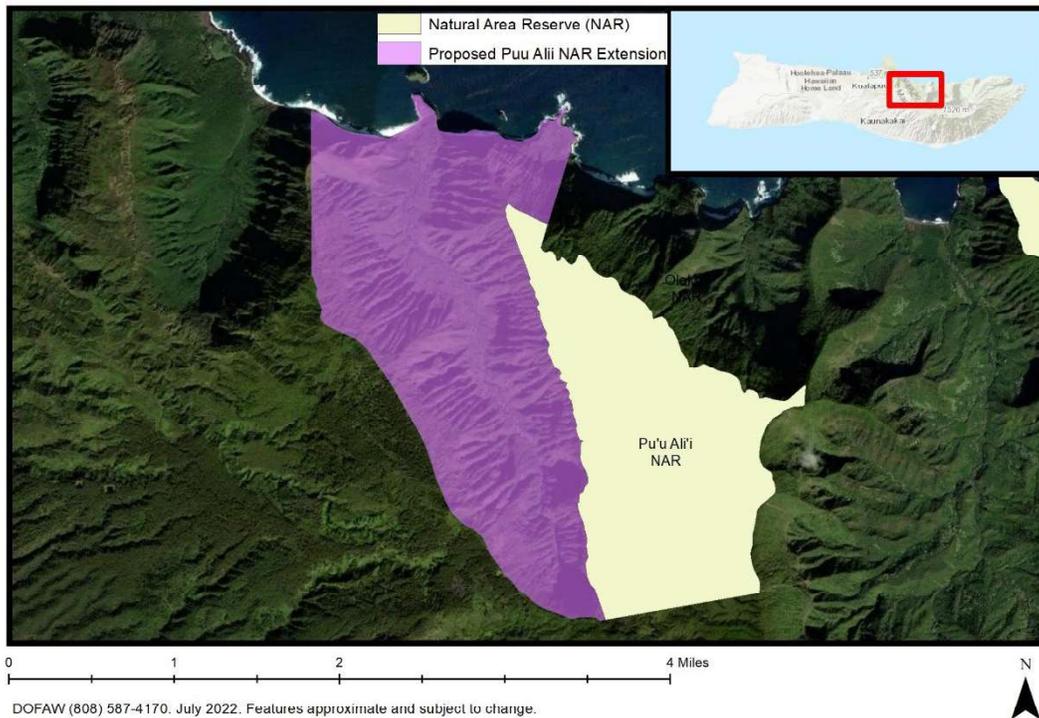
Megalagrion nigrohamatum nigrohamatum has been a candidate for listing as an endangered species.

Megalagrion pacificum and *xanthomelas* are listed endangered.

Biological/Ecological Design

The boundaries of the proposed extension follow Waikolu valley and terminate roughly at the ridge that separates Waikolu from Waialeia, the valley to the east. The highest point of the extension is near Hanalilililo.

Proposed Pu'u Ali'i NAR Extension



Location and Size, Administrative

The proposed NAR extension is located on the northern coastline of Moloka'i in Kalawao County, including approximately 2,000 acres. The area is identified as a portion of (2) 6 -1-001:002. The parcel spans from the coast to approximately 3,750 ft above sea level.

Threats (Human/Biological)

The greatest immediate threat to the proposed NAR extension is continued grazing and trampling by feral ungulates, including goats, deer and pigs. These threaten terrestrial native plants and animals, and also pollute the stream by causing erosion and through their feces.

Secondary threats include continued invasion by non-native weeds, which are being spread by ungulates.

Tertiary threats include the loss of genetic diversity as population of native plants, fish, and invertebrates decline.

Present Level of Protection

The land is currently designated as a National Historical Park and as a Forest Reserve. It is in the Conservation District.

Long-term Ecological Viability

Despite the landcover being degraded, the stream has remained relatively resilient. Additionally, upland sections remain vegetated with native species, which may persist if hooved animals are removed.

Environmental Consequences of No Action

The environmental consequences of no action will likely be the continued degradation and eventual loss of this unique remnant of native cliff vegetation and stream.

V. MANAGEMENT NEEDS

Threats Requiring Management

As noted earlier, the main threats to the proposed addition to the proposed NAR extension include:

- Grazing and trampling by feral ungulates, including goats, deer and pigs.
- Invasion by non-native plants.

Protective management would primarily entail construction of fences (on-going) to exclude feral ungulates from the reserve, and the removal of any animals within the fences.

Weed control would focus primarily on eradicating incipient populations of non-native species that have not already become dominant.

VI. PUBLIC OUTREACH

The following agencies, organizations, and individuals will be notified during a public hearing process that will include a public hearing and legal ad announcing the proposed addition.

Federal

US Fish and Wildlife Service
Kalaupapa National Historical Park

State

Department of Hawaiian Home Lands
DLNR, Division of Conservation and Resources Enforcement
DLNR, Land Division
DLNR, Aha Kiole Council
Office of Hawaiian Affairs
Representative of the 13th Representative District
Senator of the 6th Senatorial District

County

County of Maui -Planning Department

Organizations

Conservation Council for Hawaii
Environment Hawaii, Inc.
East Moloka`i Watershed Partnership/The Nature Conservancy
Moloka`i-Maui Invasive Species Committee
Sierra Club, Maui Chapter

VII. BIBLIOGRAPHY/REFERENCES

Division of Forestry and Wildlife, 2022. Files of the Moloka`i Forest Reserve.

U.S. Fish and Wildlife Service, 2022. Endangered Species website. [Endangered Species | U.S. Fish & Wildlife Service \(fws.gov\)](https://www.fws.gov/).

Parham, J., G. Higashi, E. Lapp, D. Kuamo`o, R. Nishimoto, S. Hau, J. Fitzsimons, D. Polhemus, W. Devick. 2008. Atlas of Hawaiian Watersheds & Their Aquatic Resources. Division of Aquatic Resources and Bishop Museum.
<https://www.hawaiiwatershedatlas.com/>

Warshauer, F., J. Jacobi, J. Price. 2006. Native Coastal Flora and Plant Communities in Hawa`i: Their Composition, Distribution, and Status. Final Report.

Table 1. Native Plants Recorded From Vicinity of Waikolu

<i>Argemone glauca glauca</i>

<i>Artemisia australis</i>
<i>Bidens molokaiensis</i>
<i>Canavalia molokaiensis</i>
<i>Chenopodium oahuense</i>
<i>Cyperus javanicus</i>
<i>Cyperus phleoides phleoides</i>
<i>Cyperus polystachyos miser</i>
<i>Fimbristylis cymosa</i>
<i>Lipochaeta succulenta</i>
<i>Lycium sandwicense</i>
<i>Lysimachia mauritiana</i>
<i>Osteomeles anthyllidifolia</i>
<i>Pandanus tectorius</i>
<i>Plectranthus parviflorus</i>
<i>Pseudognaphalium sandwicense</i> <i>sandwicense</i>
<i>Scaevola taccada</i>
<i>Sida fallax</i>
<i>Solanum americanum</i>
<i>Tetramolopium sylvae</i>
<i>Vigna marina</i>
<i>Wikstroemia oahuensis</i>
<i>Wikstroemia uva-ursi uva-ursi</i>

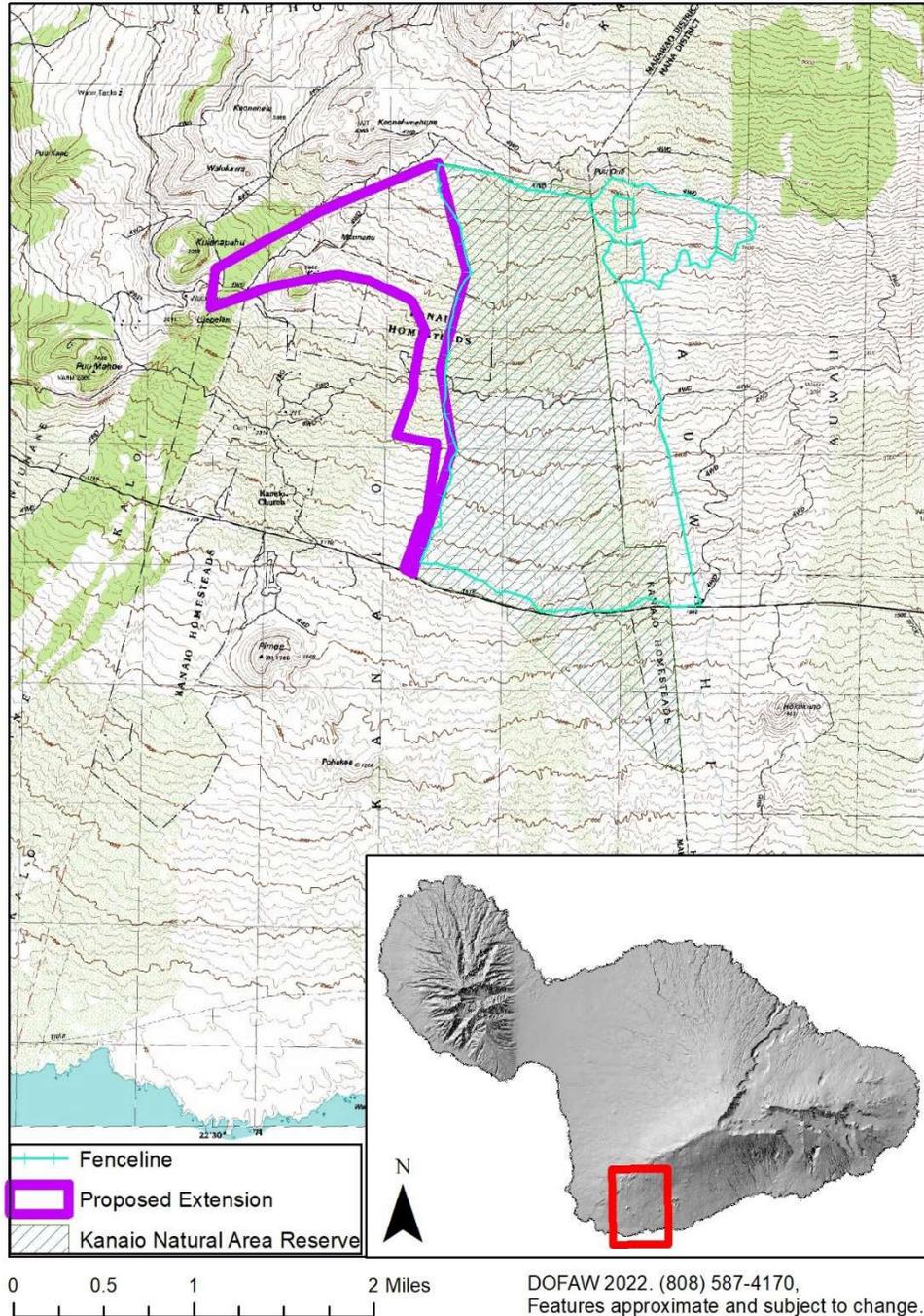
(Table based on results from Warshauer *et al.* 2006.)



1 The back wall of Waikolu valley, facing south.

PROPOSAL FOR THE EXTENSION OF KANAIO NATURAL AREA RESERVE
July 2022

Proposed Extension of the Kanaio NAR



1. EXECUTIVE SUMMARY

The Division of Forestry and Wildlife proposes to expand the existing Kanaio Natural Area Reserve by approximately 440 acres to protect native resources found on adjacent unencumbered State land. The area proposed for addition is the remaining portion of a single parcel (TMK 2-1-003-050). The expansion area includes upland grasslands to the west of the existing NAR and hosts intact native shrubland, pioneer vegetation on lava flow, and may include lava tubes and caves. Dryland forests of Hawaii, formerly extensive, are arguably the most depleted and threatened plant communities in the State. Expanding the existing NAR to include this area would be strategic to enhance invasive plant removal efforts and provide additional dryland areas that could be restored.

2. BACKGROUND/HISTORY

Past Land Use

The area described is State unencumbered land located in the Agricultural District. The entire tax map key parcel was leased to Ulupalakua Ranch for cattle grazing until 1994. However, much of the area proposed for addition to the Reserve was of limited value as pasture due to the rocky terrain.

Present Land Use

The area proposed for addition to the Natural Area Reserve is currently not under lease and is vacant.

Cultural/Recreational Uses

An archaeological reconnaissance study was conducted by US Fish & Wildlife staff as part of the environmental assessment process for the Kanaio fencing project. This report includes the results of field surveys that covered the western section and the lower portion of the northern section of the proposed addition. The study reported:

Archaeological research in the uplands of Kanaio ahupua‘a has been too limited to contribute substantially to an understanding of the area’s settlement patterns. Nearby, an extensive inventory of the adjacent moku of Kahikinui exhibited dense site distribution in the upland zone, with few sites observed in the intermediate region and virtually no archaeological remains above 2800 feet above sea level. That study also noted a correlation between upland archaeological features and the substrate on which they were located, with a higher density of structures located on pahoehoe lava substrates where sparse soil development resulted in limited agricultural value. Such a building strategy may have been practices to keep clear for agricultural purposes those areas where soil was more fertile (i.e. the older, weathered a‘a substrates with suitable solid deposition). On the NAR, the substrate is predominantly rough a‘a lava with some

overlying soil, but only on its eastern boundary and the adjacent Ulupalakua Ranch has significant soil development occurred. Because Kanaio has experienced different geological processes than the neighboring Kahikinui moku and the available body of archaeological data is still relatively small, the value in applying the settlement pattern established at Kahikinui as a model for site distribution within the NAR is limited.

(Parks, 2003).

The study reported observing a remnant of an old east-west trending trail to the west of the fencing corridor. Other cultural features observed in the area include stacked rock cattle walls associated with ranching operations, some of which could date to the mid-1800s.

A cultural assessment conducted by CKM Cultural Resources recognized that the area from ‘Ulupalakua to Kahikinui supported a population of 3,000 to 4,000 during pre-contact, who used the natural resources of the area for building materials, medicine, spiritual offerings, musical instruments, and weapons. After the introduction of cattle, many of the forested areas were destroyed.

Little legal recreational use currently occurs on the area proposed for addition to the Natural Area Reserve due to the limited access to the area and the restrictions on public activities on unencumbered land. Hunting is not allowed in this area, but poaching is likely to occur. In addition, all-terrain vehicle (ATV) riding and dirt bike riding is occurring illegally.

Conservation History

There has been limited conservation effort focused on the proposed expansion area. However, a few areas to the east have been managed. Historically, the leeward dryland forest of Maui was one of the richest areas in native tree species in the State. Dr. Joseph Rock, in “The Indigenous Trees of the Hawaiian Islands,” identified the Auwahi region on the southern slope of Haleakala as one of the most important botanical sites in the islands, even though it had been seriously degraded by browsing by goats and cattle and by fire when he first saw it in 1910.

The Nature Conservancy, with cooperation from Ulupalakua Ranch, undertook one of the first efforts of conservation of Maui’s dryland forest in the late 1960s, fencing an enclosure of several acres in Auwahi.

In 1990, building on this work and through the involvement and support of the Native Hawaiian Plant Society, Kanaio Natural Area Reserve was parceled out from TMK 2-1-003-050 to protect a large tract of dryland forest. Records from that time indicate that the main threat to the dryland forest was the presence of goats and pigs. In 2012, a deer-proof fence was built around the area of Kanaio NAR *mauka* (upland) of the highway. Extensive invasive weed control has also occurred.

Previous Studies

There are no known studies specifically involving the area currently proposed for addition to the

NAR.

3. JUSTIFICATION (Specifics)

Scientific Value, Representativeness, and Rarity

The area is adjacent to designated critical habitat for eight threatened and endangered plants on Maui (*Bonamia menziesii*; *Alectryon macrococcus*; *Cenchrus agrimonioides*; *Colubrina oppositifolia*; *Melicope mucronulata*; *Melicope adscendens*; *Melicope knudsenii*; *Flueggea neowawraea*); and the Blackburn's Sphinx Moth (*Manduca blackburni*).

Similar native shrublands are found in The Nature Conservancy of Hawai'i's Kamakou Preserve on Moloka'i, and at Kaupo Gap in Haleakala National Park on Maui, as well as other locations. While the proposed addition to the NAR might be viewed as a "duplicate," dryland forest and shrublands are some of the most depleted and threatened plant communities in the State. Protecting these communities in multiple areas would mitigate the loss to the natural environment if one of the areas should burn.

Biological/Ecological Design

Adding this area to the existing Natural Area Reserve is important from a regional perspective, as it will facilitate management for invasive plants, particularly black wattle (*Acacia mearnsii*). The area within the NAR has had extensive wattle control, however, this proposed area has sizable wattle populations which blow seeds into the existing NAR areas.

For conservation of the endangered plants/ecosystems of south Haleakala to be successful, a large, contiguous block of secure habitat must be provided. While the parcel has been degraded, it provides additional restoration areas.

The entire parcel is proposed to be designated a NAR. That area is largely made up of an upland section where remnant 'ōhi'a forest is being invaded by black wattle (but could be restored), and the west end includes an a'a lava flow that also has remnant native species. The a'a lava has little value for other land uses, such as pasture. There are inholdings within the central part of the parcel which are sparsely populated.

Biological features of the area proposed for addition include native-dominated dry/mesic shrubland with scattered native trees. The vegetation in the a'a areas includes shrubland comprised primarily of pukiawe (*Styphelia*), a'ali'i (*Dodonaea*) and ulei (*Osteomeles*). Trees such as 'ohi'a (*Metrosideros*), olopua (*Nestegis*), 'ala'a (*Pouteria*), lama (*Diospyros*), kauila (*Alphitonia*) and naio (*Myoporum*) are scattered across the area, inhabiting sheltered sites such as the bottoms of lava channels. Native shrubs such as akoko (*Chamaesyce*) and 'akia (*Wikstroemia*) are locally common; an understory of native sedges and ferns persists in undisturbed areas.

Present Level of Protection

The area proposed for addition to the Reserve is within the Agricultural District and under the administration of the Land Division.

Many land uses are permitted in the Agricultural District that could harm the existing natural resources.

Long-term Ecological Viability

Expanding the existing NAR would increase its long-term ecological viability. By protecting additional native shrubland, the long-term ecological viability of this natural community is enhanced and better protected against the threat of fire.

Environmental Consequences of No Action

The environmental consequence of no action would result in no protection for a declining native shrubland community; could limit future conservation efforts in partnership with Ulupalakua Ranch or with the Leeward Haleakala Watershed Restoration Partnership, and could increase costs associated with protecting the existing NAR.

Urgency

Fire and invasive plant populations need to be managed in the near term.

4. MANAGEMENT NEEDS

Threats Requiring Management

Threats to the proposed addition to the Kanaio NAR include:

- grazing and trampling by feral ungulates, including goats, cattle, deer, and pigs;
- invasion by non-native plants, including pasture grasses and the non-native tree species *Acacia mearnsii*, *Schinus*, and *Bocconia*; and
- fire.

Administrative (size, boundaries, access: roads & trails, maps more specific than in introduction, TMKs)

The overall size of the proposed addition to Kanaio NAR is approximately 440 acres. The entire area proposed for addition is State-owned, unencumbered lands currently under the administration of DLNR, Land Division as part of TMK 2-1-3-50.

Access to the area proposed for addition is from Highway 11 and by existing four-wheel drive roads through Ulupalakua Ranch land.

5. PUBLIC SUPPORT

Agencies, Organizations, and Individuals Contacted

The following agencies, organizations, and individuals will be contacted by mail, and informed about the public hearing when scheduled. Additionally, DOFAW will announce the opportunity to testify pursuant to the Sunshine law and HRS 195.

Federal

US Fish and Wildlife Service

State

DLNR, Division of Conservation and Resources Enforcement
DLNR, Land Division
DLNR, Aha Kiole Council
Na Ala Hele Advisory Council
Office of Hawaiian Affairs
Representative of the 12th Representative District
Senator of the 6th Senatorial District

County

County of Maui -Planning Department

Organizations

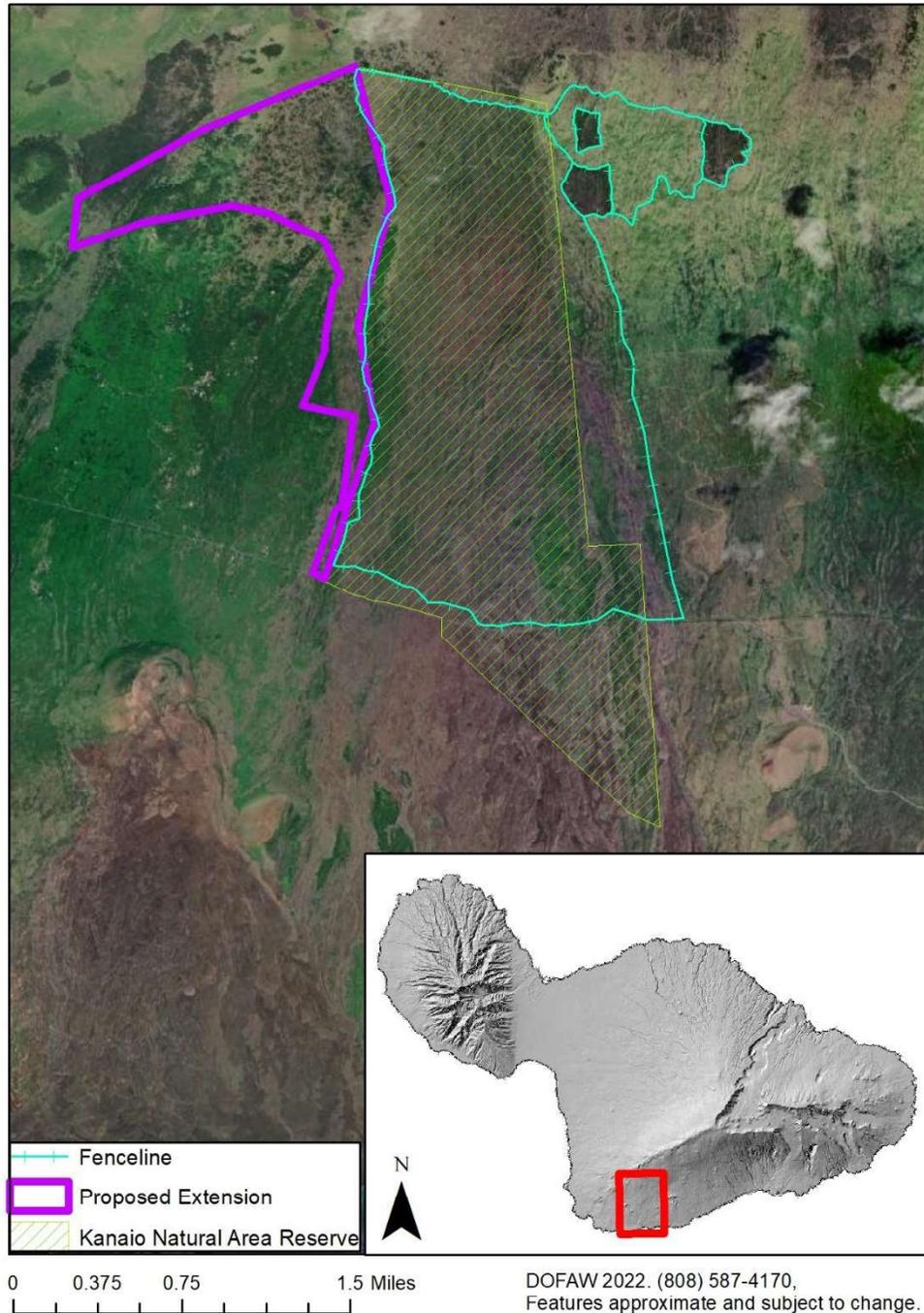
Conservation Council for Hawaii
Environment Hawaii, Inc.
Leeward Haleakala Watershed Restoration Partnership
Maui Invasive Species Committee
Sierra Club, Maui Chapter
Ulupalakua Ranch
The Nature Conservancy, Maui
Conservation Council for Hawaii
Environment Hawaii, Inc.

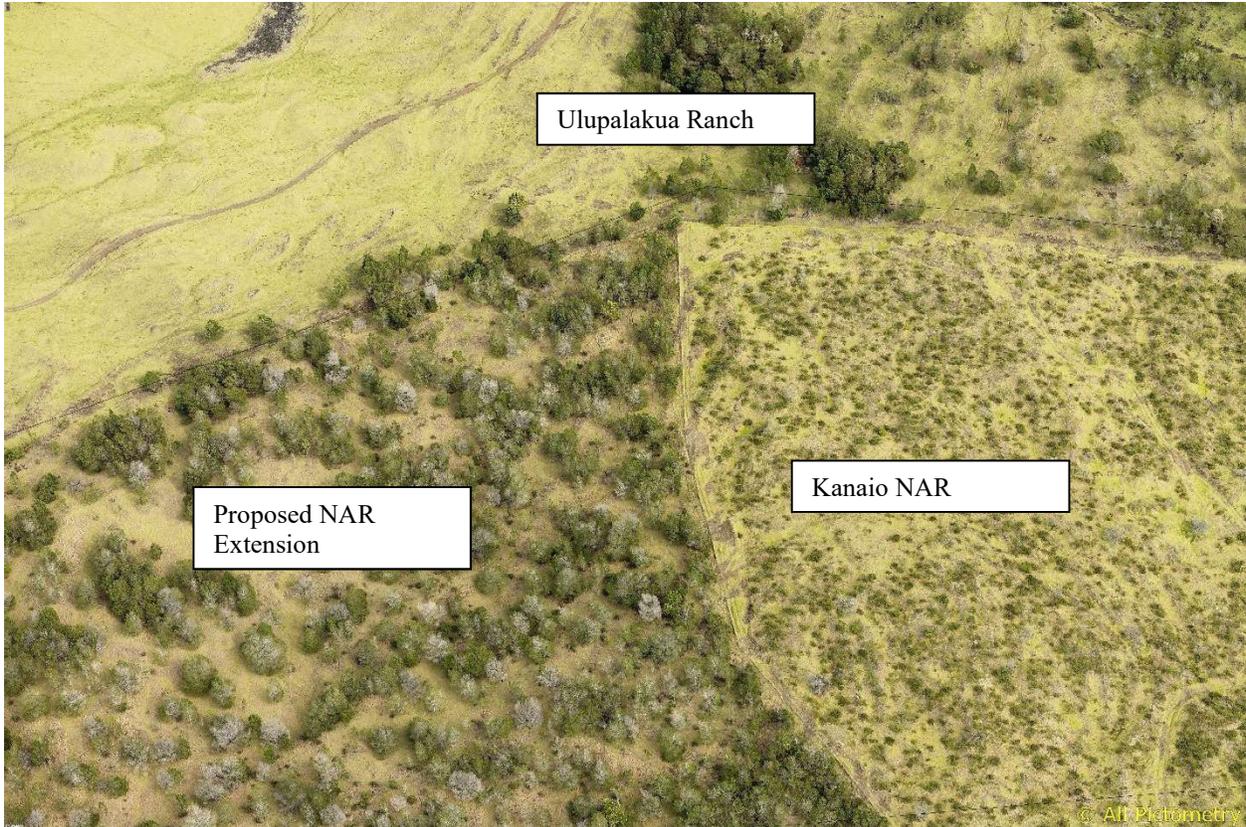
6. BIBLIOGRAPHY/REFERENCES

- CKM Cultural Resources. 2003. A Native Hawaiian Traditional Cultural Practices Assessment for Kanaio Natural Area Reserve.
- Department of Land and Natural Resources, Division of Forestry and Wildlife, Maui Branch. 2002 – 2005. personal communications.
- Department of Land & Natural Resources, Division of Forestry and Wildlife. 2003. Final Environmental Assessment: Natural Resource Conservation Project - Kanaio Natural Area Reserve. Honolulu, HI.
- Parks, Virginia. 2003. Kanaio Natural Area Reserve Ungulate Exclusion Fence Project: Cultural Resources Investigation. U.S. Fish and Wildlife Service; Sherwood, OR.
- U.S. Department of the Interior, Fish & Wildlife Service. Final Rule: Designation of Critical Habitat for 60 Plant Species from the Islands of Maui and Kahoolawe, Hawaii. May 14, 2003. 68 FR 25933.
- U.S. Department of the Interior, Fish & Wildlife Service. Final Rule: Designation of Critical Habitat for the Blackburn's Sphinx Moth. June 10, 2003. 68 FR 34710.
- __. Undated (1989?). Proposal for Kanaio Natural Area Reserve. Available from Department of Land and Natural Resources, Division of Forestry and Wildlife.

kkkkkkkkkk

Proposed Extension of the Kanaio NAR





The northeastern corner of the proposed extension of the Natural Area Reserve has large black wattle trees. In the NAR, staff have been controlling those trees for many years, so the difference is stark. Removing wattle in the proposed NAR extension will improve both areas. Photo: Pictometry.