Appendix A:

United States Fish and Wildlife Service

Programmatic Recovery

Biological Opinion

for Fire Break Expansion on Mauna Kea

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
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USFWS Ref. Number:
01EPIF00-2020-F-0028

Date: March 20, 2022

To: Assistant Regional Director, Ecological Services, Region 1, Portland, Oregon

From: Field Supervisor, Pacific Islands Fish and Wildlife Office Honolulu, Hawai‘i

Subject: Supplemental Project Information and Incidental Take Statement (SPIITS) under PIFWO Programmatic Recovery Biological Opinion (TAILS number 2020-F-0028)

Project: Mauna Kea Fuelbreak Maintenance Project

Applicant or Responsible Party: USFWS – WSFR Program, Portland Regional Office

Guiding Program: USFWS - WSFR

Permit Number: N/A

The U.S. Fish and Wildlife Service (Service) has completed a programmatic Biological Opinion for listed species recovery actions (PRBO) implemented, funded, or permitted by the Pacific Islands Fish and Wildlife Office (PIFWO), in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). The PRBO was finalized on February 23, 2021, pursuant to Service policy on Streamlined Consultation Guidance for Restoration/Recovery Projects and associated documents. The Service reached a conclusion in the PRBO that the recovery actions described therein would not result in jeopardy to any listed species and would not result in the destruction or adverse modification of designated critical habitat. This template references the version of the PRBO dated October 20, 2021.

Due to the uncertainty of whether incidental take would occur in association with many recovery actions or how to quantify such take, PIFWO did not specify in the PRBO Incidental Take Statement the amount and type of take anticipated. Instead, any proposed recovery actions that are compliant with the actions described and analyzed in the PRBO resulting in take of listed animals must develop a step-down project-specific Incidental Take Statement and provide any supplemental project information. Incidental take of listed plants is not prohibited by section 9 of the Act; therefore, they are not included in the Incidental Take Statement. However, any adverse effects to listed plants or adverse effects to animals (no take) should be considered in a jeopardy analysis and described in the relevant sections below.

This document transmits the Service's step-down Biological Opinion based on our review of the proposed Mauna Kea Fuelbreak Maintenance Project located on Hawai‘i Island, and its effects on the listed species and designated critical habitat shown in Table 2. The project proposal was submitted to our office for review on March 17, 2022.

Description of the Proposed Action

The Service is funding the proposed project through the Wildlife and Sport Fish Restoration (WSFR) Wildlife Restoration Grant Program, which will provide annual funding to the Hawai‘i Department of Land and Natural Resources (DLNR) for salary, supplies, and equipment to conduct Mauna Kea Fuelbreak maintenance.

The proposed project will mechanically remove invasive vegetation as described on page 21 of the PRBO. Specifically, the proposed action will create and maintain fuelbreaks by annually removing all vegetation within 10 meters along roads on state-owned land within the Mauna Kea Forest Reserve and Game Management Area and the Ka‘ohe Game Management Area. The primary purpose is to prevent fires within designated critical habitat for the federally endangerd palila (*Loxioides bailleui*) that could, if uncontrolled, spread to palila nesting areas and decimate important foraging habitat. Other benefits include preventing degradation of watershed and public hunting areas and protecting public and neighboring landowners from wildfire. Recent fires at Ka‘ohe demonstrate how vulnerable this area is to fire.

The DLNR plans to maintain roads and expand the fuelbreaks along approximately 30 miles of existing roads by chipping, grinding, cutting, and mowing vegetation up to 10 meters on both sides of the road (Figure 1). Only trees with trunks within the buffer area will be cut. Trees with canopies overhanging the buffer but whose trunks are outside it will not be cut. Vegetation proposed for removal includes primarily nonnative vegetation, but native vegetation would also be removed (e.g., *Sophora chrysophylla* [māmane] and *Myoporum sandwicense* [naio]). Other roads in the area will also be cleared of vegetation that has encroached into the road corridor, but the road widths will not be expanded. Cut vegetation would be chipped and left on site. Limbing large māmane trees within the fuelbreaks without removing the entire tree is cost prohibitive, so all vegetation within the fuelbreaks will be cut to ground level. Project impacts would be greatest during the first year when trees are removed. Annual maintenance in subsequent years would only remove grasses, shrubs, and tree seedlings that have grown since the previous year.

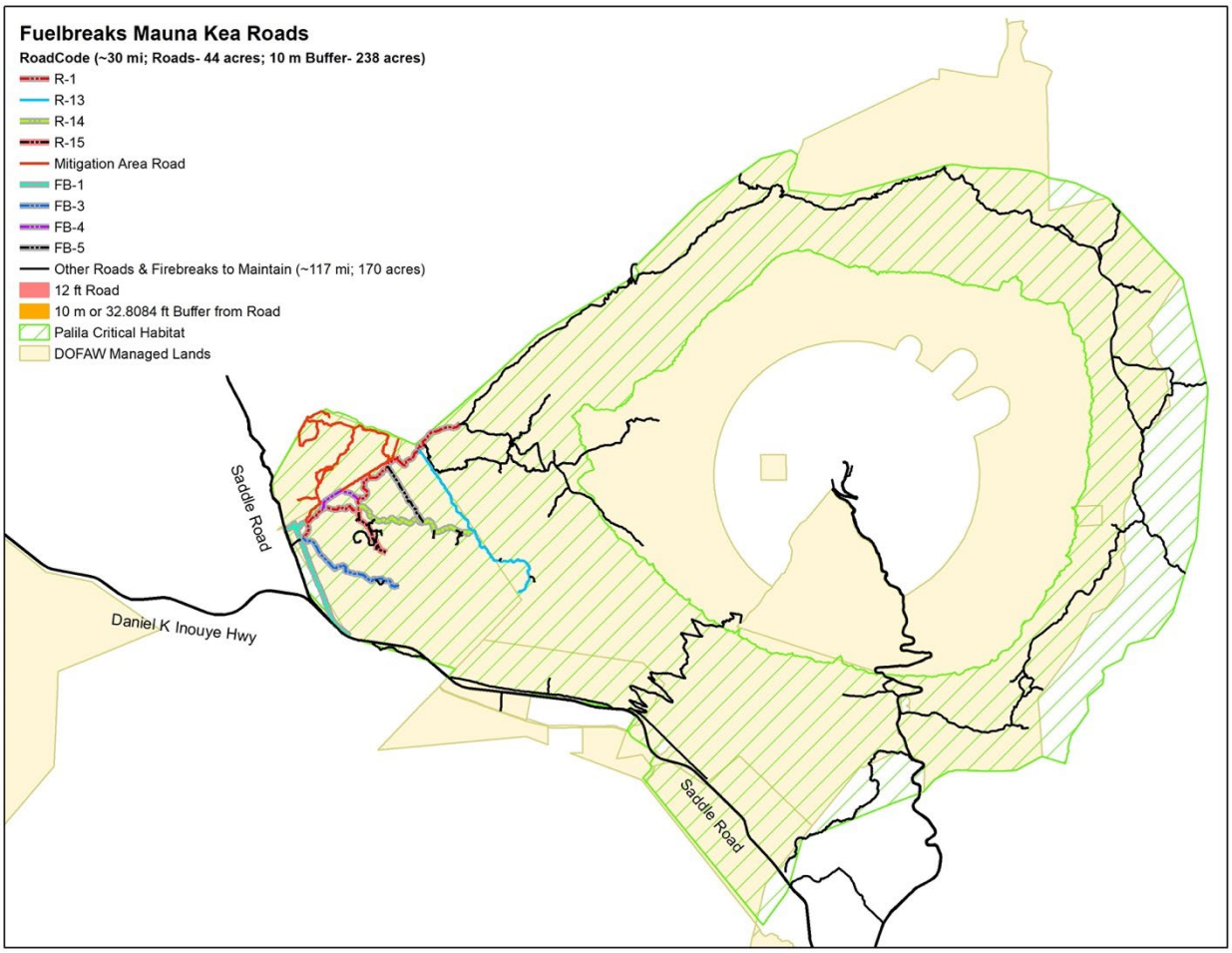

Figure 1. Mauna Kea Fuelbreak Maintenance Project area, including palila designated critical habitat, roads proposed for maintenance, and proposed fuelbreaks.

The maximum area affected by the action extends approximately 10 meters (about 33 feet) on either side of 30 miles of existing roads. When necessary and appropriate, all or some of the clearing may be on only one side of the road. For example, 20 meters may be cleared on one side of the road and nothing on the other. The total area where vegetation clearing occurs adjacent to existing roads would be up to approximately 238 acres. The DLNR estimates that it will take two years to clear all the vegetation, including mature trees in the 238-acre area (working within Service-approved work seasons to protect listed species). The Service estimates that up to 35 acres of this area is occupied by mature trees, and most are māmane, a preferred nesting and food source for the federally-endangered palila. An additional 117 miles of existing road will be maintained, including grading and clearing of low, mostly nonnative vegetation. Maximum clearing of mature trees would be achieved in the first two years of implementation; after which maintenance would occur frequently enough that new trees will not be able to mature in the buffer area.

Prevention and mitigation measures

In order to prevent or minimize impacts to ESA-listed species and palila critical habitat, Service funding to DLNR will be conditioned to require the following measures:

- Woody plants, including trees, taller than 15-ft will not be disturbed, removed, or trimmed during the bat-birthing and pup-rearing season, which occurs between June 1 and September 15.
- No trees or tree cover will be removed during the forest bird breeding season (inclusive of peak palila breeding season), between January 1 and June 30.
- Trees and vegetation taller than 15 ft will be removed, disturbed, and trimmed only between September 16 and December 31.
- Appropriate biosecurity protocols (attached) will be observed. All work vehicles, machinery, and equipment are to be cleaned, inspected by its user, and found free of mud, dirt, debris, and organisms prior to entry into palila designated critical habitat.
- DLNR staff trained to recognize ESA-listed plants will survey all proposed fuel breaks prior to clearing. Staff will follow protocols for minimizing and avoiding impacts to listed plants as identified in Table 3. Special care should be taken to search areas with native trees and vegetation where surveyors cannot see more than 5 meters from the road. Any ESA-listed plants will be flagged, mapped, and avoided as defined by Service avoidance and minimization buffers in Table 1.

Table 1. Recommended buffer distances to minimize and avoid adverse effects to listed plants from specific activities.

Action	**Buffer Distance (feet (meters)) - Keep Project Activity This Far Away from Listed Plant**	
	Grasses/Herbs/Shrubs and Terrestrial Orchids	**Trees and Arboreal Orchids**
Walking, hiking, surveys	3 ft (1 m)	3 ft (1 m)
Cutting and Removing Vegetation by Hand or Hand Tools (e.g., weeding)	3 ft (1 m)	3 ft (1 m)
Mechanical Removal of Individual Plants or Woody Vegetation (e.g., chainsaw, weed eater)	3 ft (1 m) or the height of the removed vegetation (whichever greater)	3 ft (1 m) or the height of the removed vegetation (whichever greater)
Removal of Vegetation with Heavy Equipment (e.g., bulldozer, tractor, "bush hog")	2x width equipment + height of vegetation	820 ft (250 m)

Definitions (Wagner et al. 1999)

Herb: A plant, either annual, biennial, or perennial, with the non-woody stems dying back to the ground at the end of the growing season.

Shrub: A perennial woody plant with usually numerous primary stems arising from or relatively near the ground.

Tree: A woody perennial that usually has a single trunk.

Status of the Species and Critical Habitat

The federally listed species and designated critical habitat areas likely to be affected by the proposed project are described below in Table 2.

Table 2. Threatened (T), endangered (E), proposed (P), or candidate (C) species or designated critical habitat likely affected by the proposed project.

Scientific Name	Local	Common Name	Federal Status	Effects to designated critical habitat
Lasiurus cinereus semotus	ʻŌpeʻapeʻa	Hawaiian hoary bat	E	No
Branta sandvicensis	Nēnē	Hawaiian goose	T	No
Loxioides bailleui	Palila	n/a	E	**Yes**
Ranunculus hawaiensis	Makou	n/a	E	No
Silene hawaiiensis	n/a	n/a	T	No
Sanicula sandwicensis	n/a	n/a	E	No
Sicyos macrophyllus	ʻAnunu	n/a	E	No

ʻŌpeʻapeʻa

The ʻōpeʻapeʻa is an endangered endemic mammal found in the Hawaiian Islands in native, invasive, agricultural, and developed landscapes (i.e., volcano craters, lava fields, cropland, golf courses, residential yards, rural roads, farmsteads, forests, pastures, rangelands, reservoirs, wetlands, river corridors, and coastal waters) (Uyehara and Wiles 2009, p. 3). Listed as a subspecies of *Lasiurus cinereus*, the bat is distributed across all of the major islands of the Hawaiian Archipelago, including Kauaʻi, Oʻahu, Maui, Molokaʻi, and Hawaiʻi and, most recently, has been observed visiting Kahoʻolawe. No historical or current population estimates exist for this subspecies, though recent studies and ongoing research have shown the bats are widely distribution across the Hawaiian Islands.

The bat feeds nocturnally on invertebrates, primarily termites, mosquitoes, moths, leafhoppers, crickets, flies, beetles, and other high-flying invertebrates. The bats forage in flight in open, wooded, and linear habitats in vegetation that varies widely across habitat types and plant communities. On the island of Hawaiʻi the bats are found foraging from sea level up to 7,500-ft elevation, and have been observed near the island's summits at 13,000-ft elevation (DLNR 2015, p. 7-3), but on other islands they forage at elevations up to approximately 11,000 ft. These bats forage regularly below the forest canopy down to within 2 feet of the ground, along forest edges and gaps, and in croplands with structural diversity (Uyehara and Wiles 2009, p. 4).

Bats roost alone or with dependent young in native and invasive trees, typically more than 10- to 16-ft tall but do roost below 15-ft in height (Uyehara and Wiles 2009, p. 4). Breeding bats (e.g.,

lactating females) have been documented only on Hawai‘i, Kaua‘i, Maui, and O‘ahu (Dave Johnston, pers. obs.) (DLNR 2015, p. 7-2). Mating likely occurs between September and December, and females usually give birth to twins during June (DLNR 2015, p. 7-3). An observation in 2015 extended the known pupping season later in the year (Pinzari 2015, pers. comm.); therefore, the USFWS currently recognizes the pupping season to extend from June 1 through September 15. Lactating females are thought to preferentially use low- to mid-elevation habitats for rearing pups (USFWS 2021); however, the studies upon which this assertion is based provided limited evidence and few study sites in areas above 6,000 feet elevation (Menard 2001, Gorresen et al. 2013).

The bat was federally listed as endangered because of apparent habitat loss and limited knowledge of its distribution and life history requirements. The bats are threatened by habitat loss, pesticides, collisions with structures, and roost disturbance; however, reductions in tree cover (e.g., roost sites) might be the primary reason for the species' decline in Hawai‘i (DLNR 2015, p. 7-3). These bats are also affected by predation and collisions with wind turbines and other aerial structures, including barbed wire, where they may become entangled.

Nēnē

The nēnē occupies all the main Hawaiian Islands except Ni‘ihau, Kaho‘olawe and Lana‘i (DLNR 2015, pp. 6-111, 7-103, 7-106). They occur in multiple habitats, but prefer open areas, such as pastures, golf courses, wetlands, natural grasslands, shrublands, and lava fields. The geese nest and forage in scrub forests, grasslands, and volcanic slopes with sparse vegetation (DLNR 2015, p. 7-103). Threats include predation of eggs and goslings by invasive mammals (i.e., cats, rats, dogs, pigs, and mongooses); limited availability of suitable habitat due to habitat loss, fragmentation, and degradation, especially in lowland breeding habitat; insufficient nutritional resources due to habitat degradation; and human-caused disturbance including habituation to humans and mortality caused primarily by vehicle collisions. Nēnē are particularly vulnerable to disturbance during the breeding season, which extends to all months except May, June, and July (though the majority of birds in the wild nest between October and March) (Banko et al. 1988; USFWS 2004).

Palila

The palila is a finch-billed Hawaiian honeycreeper found only on the island of Hawai‘i. It was listed as endangered in 1967. The species occupy forests on the southwestern upper slopes of Mauna Kea, where the elevation range and habitat quality are the greatest (Scott et al. 1986; Jacobi et al. 1996; Banko et al. 1998; Gray et al. 1999). Fossil remains of palila are found at sea level on O‘ahu, suggesting the species once had a much larger range. Highest densities of palila occur in areas of greater crown cover, taller trees, and with higher proportions of native shrubs near 7,550-ft elevation. They are food specialists, preferring māmane seeds in green pods, but also will also eat māmane flowers, buds, and leaves, and naio berries (USFWS 2006, p. 7-53). Most nesting occurs in māmane trees, in forks near the ends of higher branches, while the naio tree is more frequently selected for roosting. Nesting peaks in May or June, but begins as early as January, and continues through August or mid-September, depending on the availability of green māmane pods. Primary threats to palila are habitat loss, avian disease, predation by invasive mammals, competition for native prey with invasive invertebrates, and habitat modifications from invasive ungulates and invasive vegetation that increases the risk of fire.

Palila Critical Habitat

Palila critical habitat encircles Mauna Kea up to the 10,000-ft contour line (see green hash-marked area in Figure 1). Most of the project occurs within areas designated as critical habitat for palila (USFWS 1977). In particular, expanded fuel breaks are proposed within the Mauna Kea Forest Reserve and Game Management Area and the adjacent Kaʻohe Game Management Area, which overlaps with the most densely occupied habitat for palila.

Other Hawaiian Forest Birds

Several other native and endemic Hawaiian birds, including some federally listed birds, are known to occur nearby the project area, including the following:

- ʻApapane (*Himatione sanguinea*) (endemic, not listed)
- ʻIʻiwi (*Drepanis coccinea*) (endemic, listed as threatened)
- ʻAmakihi (*Chlorodrepanis virens*) (endemic, not listed)
- ʻAkiapōlāʻau (*Hemignathus munroi*) (endemic, listed as endangered)
- ʻAkakane (*Loxops coccineus*) (endemic, listed as endangered
- ʻAlawī (*Oreomystis mana*) (endemic, listed as endangered)

Most Hawaiian forest birds are now found only in upper elevation forests. The birds likely had much larger distributions and occurred at lower elevations. The primary threats to Hawaiian forest birds are habitat loss and degredation, timber harvesting, nonnative plant species invasion, loss of native vegatation communities, predation by nonnative mammals, and diseases carried by nonnative mosquitoes. Several Hawaiian forest birds now occur in such low numbers and in such restricted ranges that they are threatened by natural processes, such as inbreeding depression and demographic stochasticity, and by hurricanes, wildfires, and periodic dieback of native vegetation. Nesting season for some Hawaiian forest birds can start as early as January, and may extend into July. Therefore, the Service considers the forest bird nesting season as January 1 through June 30 to protect Hawaiian forest birds. For more detailed and species-specific biological and status information please refer to the species profile pages, found at https://ecos.fws.gov/ecp/.

Listed Plants

The following listed plants have been documented within the vicinity of proposed project activities:

- *Ranunculus hawaiensis* (makou, endangered),
- *Silene hawaiiensis* (no common name, threatened),
- *Sanicula sandwicensis* (no common name, endangered),
- and *Sicyos macrophyllus* (ʻanunu, endangered).

The area is heavily degraded from overgrazing by feral ungulates. Currently, there are no known occurrences of threatened or endangered plants in the area. However, listed plants could still exist in the area, particularly in patches of remnant dry forest.

Environmental Baseline

Conditions common to all species

The lowland and montane dry ecological zone on the leeward side of Mauna Kea has been heavily influenced by fire, grazing, feral animals, and alien grass invasion (Stewart 2010). The southwest aspect of Mauna Kea is vulnerable to being burned by wildfires sweeping up from expansive areas of flashy fuels below and from on-site wildfire ignitions. Large wildfires have repeatedly occurred around Mauna Kea. As evidenced by the 40,000-acre wildfire burning just north of the project area in 2021 (Trauernicht 2021, p. 1), and other recent area wildfires (Figure 2), the entire project area is at extreme risk of being burned. There is no on-site fire suppression equipment and there is limited availability of equipment and personnel to suppress wildfires on the west aspect of Mauna Kea.

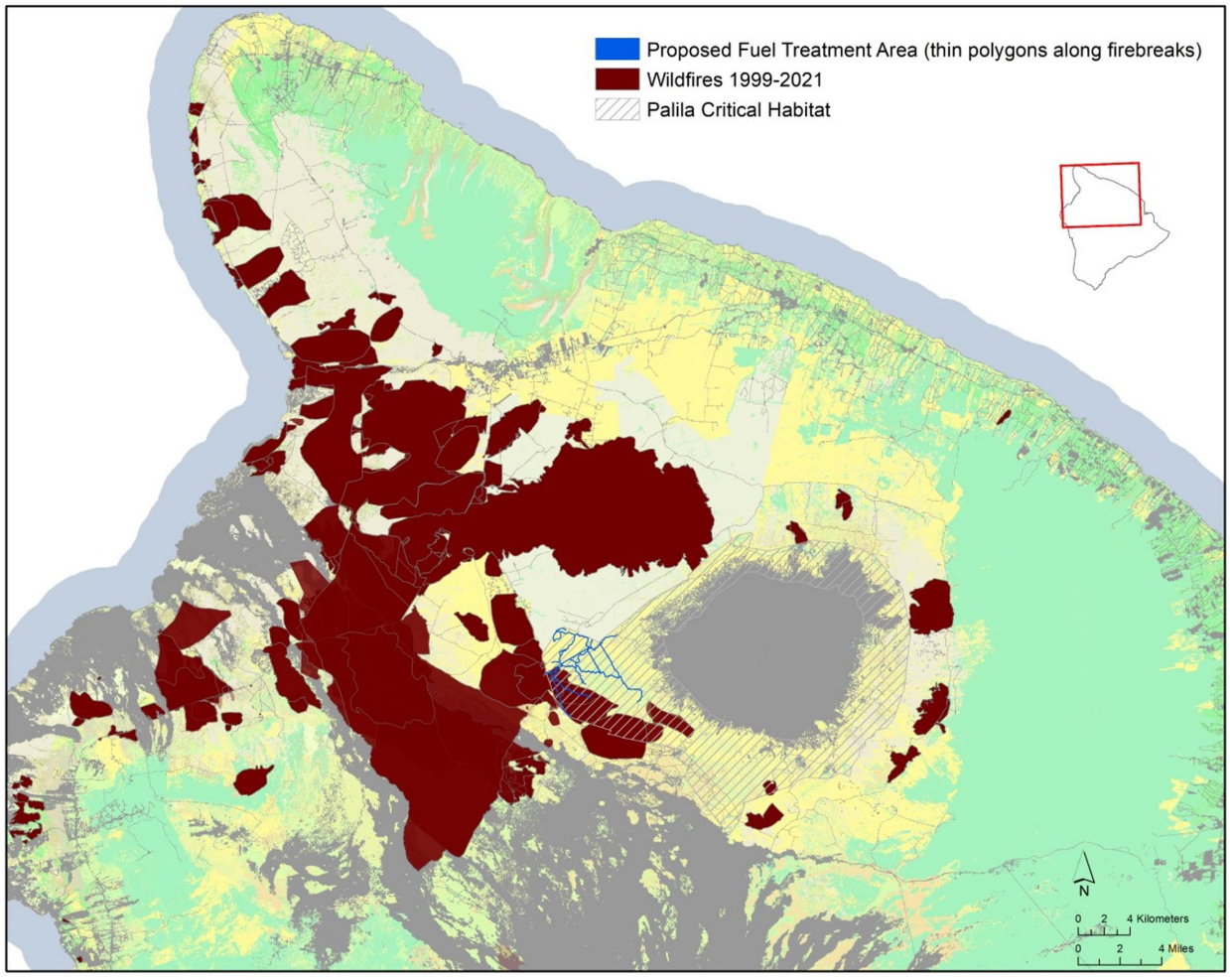

Figure 2. Fire history in the project vicinity and project area (blue line).

Historic ungulate grazing and introduction of non-native invasive grasses have resulted in conversion of native vegetation on the dry leeward sides of Hawaiian Islands to flammable grassland which has further increased the probability and intensity of subsequent fires. Ongoing removal of sheep and goats within the Kaʻohe Game Management Area and the Mauna Kea Forest Reserve by the Department of Fish and Wildlife (DOFAW) and hunters, combined with

several years of good precipitation on Mauna Kea have resulted in an increase in vegetative fuel loads in the area. Fire risk is further increased by recent die offs of naio trees resulting from infestations of naio thrips (*Klambothrips myopori),* which leaves large stands of fire-prone, dead trees. Climate change is expected to further increase the threat of wildfire on Mauna Kea as rainfall decreases in the area (Trauernicht 2020, p. 21).

Where native trees and shrubs are killed by fire, non-native invasive grasses outcompete native plant seedlings for light, water, and nutrients. In turn, these areas converted to non-native grass facilitate the further spread of future fires, reducing the amount of remaining native forest each successive dry season (Fujioka and Fujii 1980 in Cuddihy and Stone 1990, p. 93; D'Antonio and Vitousek 1992, pp. 70, 73–74; Tunison et al. 2002, p. 122). Although some burned māmane and naio may resprout following the fire, feeding, and breeding habitat for some listed species would temporarily be absent from the burned area and habitat quality would be permanently degraded by a single fire. Subsequent fires would be of increased likelihood and would further reduce the persistence of māmane and naio in the area. The entire project site vulnerable to being converted to grassland by wildfire.

Current conditions require fire pre-suppression actions aimed to reduce ignition points near roads and reduce the spread of fire across these fuel breaks. The addition of expanded fuelbreaks will help reduce both the chance of fire spread and the total compartment size of future fires.

<u>ʻŌpeʻapeʻa</u>
There are no statewide or island-specific population estimates for the ʻōpeʻapeʻa. However, according to the 2021 USFWS 5-year Status Review for ʻōpeʻapeʻa, bat populations on the island of Hawaiʻi are suggested to be stable or slightly increasing. No data are available to describe the status of bats in the proposed action area. The remnant dryland forest habitat contains trees of sufficient size to support females with pups during the breeding season (trees >15 ft tall).

<u>Nēnē</u>
The statewide nēnē count reported 1,104 individuals on the Island of Hawaiʻi in 2017 (USFWS 2019). Populations on Maui and Hawaiʻi Islands have been stable without external supplementation since approximately 2011 (USFWS 2019). Current populations are sustained by ongoing management (e.g., predator control, habitat management for nonnative plants and feral ungulates). On the Island of Hawaiʻi, traditional movements are being restored, which could be expected to improve survival and breeding success, as well as genetic exchange between subpopulations. While nēnē can occur in a wide variety of habitats and elevations, they are not frequently reported where fuelbreaks are proposed as part of this project.

<u>Palila</u>
One known core population of palila remains, which is located on the island of Hawaiʻi, in subalpine, dry forest habitat on the southwestern slope of Mauna Kea (USFWS 2020; Banko and Farmer 2014). The palila population has been surveyed annually from 1998 to 2021 to determine abundance, population trends, and spatial distribution.

Within the core survey area, the number of palila detected decreased by 22 percent between 2016 and 2017 (319 in 2016 and 248 in 2017), and a further 60 percent decrease of palila detections occurred between 2017 and 2018 (248 in 2017 and 99 in 2018) (Genz et al. 2018). See Table 3 below for the corresponding population estimates (Genz et al. 2018, Table 1). In 2019, 2020 and 2021, population estimates were 1,432, 1,312, and 678, respectively (Genz et al. 2022). The 2022 estimate was the lowest estimate since surveys began in 1998. The range of the species has not substantially changed since 1998, and the species has shown a very strong downward decline since 1998 (Genz et al. 2022). In 2017, palila were also detected in areas additional to the core population survey (focus of the surveys occurred here), downslope in the Kaʻohe Restoration Area in 2017 and 2018, and on the north slope of Mauna Kea in 2017 (Genz et al. 2018). These sightings may indicate that the population is either expanding into newly restored areas or that some birds are transient outside of the core area.

Table 3. Annual palila population estimates. Population parameters include the population estimate, lower and upper limits of the 95% confidence interval inside the core survey area (Genz et al. 2022, pp 10-11).

Year	Population Estimate	Lower Limit	Upper Limit
1998	5,953	4,894	7,153
1999	6,840	5,641	8,002
2000	2,423	1,926	2,937
2001	5,894	4,795	7,053
2002	4,294	3,627	5,075
2003	5,495	4,502	6,567
2004	4,676	3,934	5,558
2005	5,448	4,414	6,597
2006	3,036	2,463	3,673
2007	2,741	2,182	3,330
2008	1,842	1,461	2,259
2009	1,910	1,468	2,379
2010	981	753	1,231
2011	1,060	774	774
2012	1,484	1,189	1,189
2013	1,220	1,012	1,012
2014	1,244	1,002	1,491
2015	774	596	982
2016	1,339	1,049	1,653
2017	1,192	953	1,472
2018	1,027	721	1,348
2019	1,432	1,030	1,899
2020	1,312	964	1,700
2021	678	452	940

From 1998−2005, total estimated palila population on Mauna Kea fluctuated between 4,000 and 6,000. The population declined steeply from 2006 to 2010 then stabilized at around an abundance of 2,000 individuals with a much slower rate of decline. The population decline during 1998−2021 was on average 229 birds per year. Over the 23-year monitoring period, the estimated rate of change equated to an 89% decline in the population (Genz et al. 2022, Figure 3).

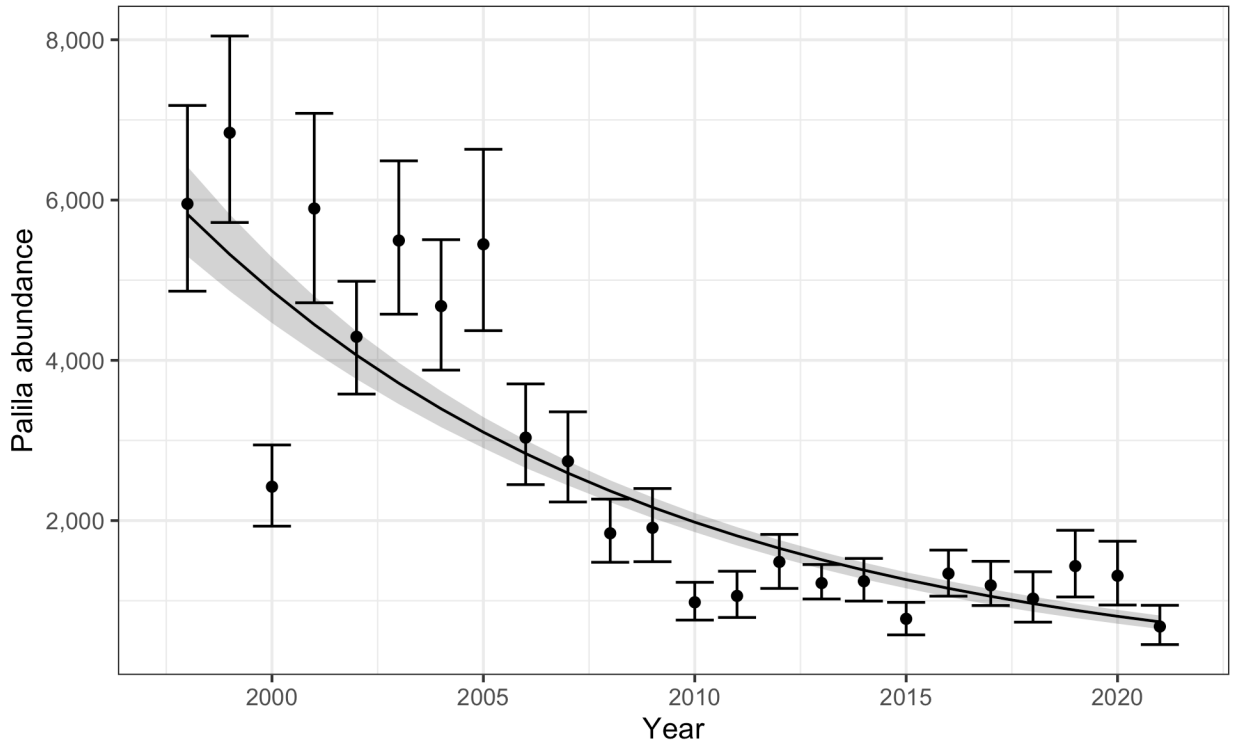

Figure 3. Annual palila population estimates inside the core survey area on the western slope of Mauna Kea from 1998 through 2021. The best fit log-linear regression line is depicted with 95% bootstrap interval error bars around the point estimates. The shaded area shows the 95% band around the bootstrapped regression (Genz et al. 2022, p. 11).

Designated Critical Habitat for Palila

Critical habitat for palila was designated prior to the Service identifying Primary Constituent Elements (USFWS 1977), and therefore it is not explicit regarding the physical and biological features comprising palila critical habitat. It did, however, describe the importance of the designated critical habitat as follows:

> "The palila depends on the area delineated below for food, shelter, and nesting sites; it cannot survive without the māmane and naio trees found therein. Moreover, the delineated area apparently contains the world's entire known population of palila and supports most of the large and intermediate-sized māmane and naio trees on Mauna Kea. This area is large enough to allow space for the population to expand and includes a full range of altitudinal and geographical sites needed by palila for normal life cycle movement. Such movement is the response of the species to shifting seasonal and annual

patterns of flowering, seed set, and ensuing pod development of the māmane vegetation."

Fire is a major threat to palila critical habitat. One especially large wildfire that occurred in summer 2021 burned 250 acres of palila critical habitat. The project site is vulnerable to being burned in a single wildfire that could burn through all the entire occupied core of palila designated critical habitat.

Other Hawaiian Forest Birds
See Status of the Species and Designated Critical Habitat above.

Listed Plants
See Status of Species and Designated Critical Habitat above.

Effects of the Action

Effects common to all species
Maintenance of roads will occur on up to 147 miles of roads annually, including removal of new vegetation growth in the roadbed and grading. In addition, fire fuelbreaks up to 10 meters wide will be created and maintained along 30 miles of roads, affecting approximately 238 acres total. This activity will result in cutting and chipping of shrubs and mature trees on 238 acres on either side of the road, of which approximately 35 acres is occupied by mature trees, primarily māmane and naio. All shrubs and mature trees will be cut and mulched or chipped on site, reducing canopy cover to zero in the fuelbreak. Increased human presence, noise from machinery, and dust may affect nearby plants and animals.

ʻŌpeʻapeʻa
The endangered ʻōpeʻapeʻa roosts in both exotic and native woody vegetation across all islands. Young are left unattended in trees and shrubs while foraging. If trees or shrubs 15 ft or taller are cleared during the pupping season (between June 1 and September 15) there is a risk that young bats could inadvertently be harmed or killed since they are too young to fly or may not move away. ʻŌpeʻapeʻa occur in higher densities at low elevations during the breeding season (Menard 2001, Gorresen et al. 2013), though evidence for this assertion is limited.

To avoid and minimize impacts to the endangered ʻōpeʻapeʻa, the project will incorporate the following measures into their project plan:

- Project staff will not disturb, remove, or trim woody plants greater than 15 feet tall during the bat birthing and pup rearing season (June 1 through September 15).

Analysis of effects - ʻŌpeʻapeʻa
Based on the implementation of minimization and avoidance measures, bats are extremely unlikely to be disturbed or measurably disrupted by project activities. Therefore, effects to the ʻōpeʻapeʻa are discountable or insignificant.

Nēnē

The threatened nēnē may be observed in a variety of habitats, but prefer open areas, such as pastures, golf courses, wetlands, natural grasslands and shrublands, and lava flows. Threats to the species include introduced mammalian and avian predators, wind facilities, and vehicle strikes.

To avoid and minimize potential project impacts to nēnē, the project will incorporate the following applicable measures into their project conditions:

- Do not approach, feed, or disturb the nēnē.
- If nēnē are observed loafing or foraging within the project area during the breeding season (September through April), have a biologist familiar with nēnē nesting behavior survey for nests in and around the project area prior to the resumption of any work. Repeat surveys after any subsequent delay of work of three or more days (during which the birds may attempt to nest).
- Cease all work immediately and contact the Service for further guidance if a nest is discovered within a radius of 150 feet of proposed project, or a previously undiscovered nest is found within the 150-foot radius after work begins.

In areas where the nēnē are known to be present, post and implement reduced speed limits, and inform project personnel and contractors about the presence of federally listed species on-site.

Analysis of effects – Nēnē

The nēnē does not commonly occur within the proposed project area. Should nēnē appear in the area during project implementation, the project will enact Service recommended avoidance and minimization measures. Based on the low likelihood of nēnē presence in the area and implementation of recommended avoidance and minimization measures, the nēnē is extremely unlikely to be encountered or measurably disrupted from their normal behaviors. Therefore, effects to the nēnē are discountable and insignificant.

Palila

One known core population of palila remains, which is located in subalpine, dry forest habitat on the southwestern slope of Mauna Kea (USFWS 2020; Banko and Farmer 2014). Highest densities of palila occur in areas of greater crown cover, taller trees, and higher proportions of native shrubs near 7,550-ft elevation, where they are food specialists, preferring māmane seeds in green pods, but also will also eat māmane flowers, buds, and leaves, and naio berries (USFWS 2006, p. 7-53). Most nesting occurs in māmane trees, in forks near the ends of higher branches, while the naio tree is more frequently selected for roosting. Nesting peaks in May or June, but begins as early as January, and continues through August or mid-September, depending on the availability of green māmane pods.

Primary threats to palila are habitat loss, avian disease, predation by invasive mammals, competition for native prey with invasive invertebrates, and habitat modifications by invasive ungulates and invasive vegetation that increases the risk of fire. Road construction and development increase human access and result in increased wildfire and invasive species threats. Grazing results in reductions in woody vegetation and increased grass cover, which reduces forest habitat quality and results in increased wildfire risk on the landscape.

To conserve palila the project will implement the following avoidance and minimization measures within palila habitat:

- Avoid any activity that promotes the spread, introduction, and survival of invasive species.
- Avoid any activity that increases mosquito populations or stagnant water habitat.
- Decrease wildfire threat to montane forest habitats by avoiding parking vehicles in tall grass, ensuring that all vehicles carry fire extinguishers, storing gas and fuels in safe and secure locations, and providing staff briefings on wildfire risks and safe tool use to avoid ignition.
- Avoid removing any trees or tree cover during the peak palila breeding season, between January 1 and June 30.

Analysis of effects – Palila
Restricting project activities to avoid the palila nesting season will reduce the impacts to palila. Currently, palila do not occupy all of the suitable habitat available on Mauna Kea, although the lack of occupancy in suitable habitat may be caused by the severely declining population abundance or a range expansion of the species. Trees that may be used for nesting would be removed outside the peak nesting season for palila and we do not expect any injury or mortality to palila from the removal of the trees.

We expect adverse effects to palila from the permanent removal of their preferred food and nesting trees (māmane). Palila rely on them as food sources during the nesting season. The removal of māmane trees may reduce the availability of māmane seeds available during the breeding season. However, active restoration of māmane forests is underway which will offset some portion of this loss. Although the removal of māmane and other nesting trees may adversely affect the palila by permanently removing a source of food and nesting habitat, the fuelbreaks are deemed necessary to protect their remaining habitat over the long term.

Fire is a threat to the remaining palila population (USFWS 2020). The project will increase noise, dust, and reduce the abundance of food and nesting habitat (outside the palila breeding season). The permanent loss of food resources and nesting habitat, noise, and dust may temporarily disrupt the normal feeding, breeding, and sheltering behavior patterns of the palila. However, we do not expect the disruption to occur over the long term because conservation efforts are underway to restore māmane and another suitable habitat for the palila. Additionally, the fuelbreaks will protect the remaining suitable from catastrophic wildfire loss, which is a beneficial effect.

<u>Palila critical habitat</u>
The proposed project area overlaps with designated critical habitat for palila (USFWS 1977). This area is essential for the conservation and recovery of palila because it provides habitat necessary to maintain and expand the palila population within its historical range. This project is intended to decrease the likelihood and severity of destructive wildfires that could negatively impact palila designated critical habitat.

To avoid and minimize adverse effects to critical palila critical habitat, the following measures are incorporated into the project:

- Remove the minimum number of mature māmane trees necessary to achieve the fire prevention goals.
- Incorporate relevant actions in the attached Biosecurity Protocols into project plans and include them in all agreements with contractors.
- Minimize risk of wildfire during project implementation to prevent accidental spread to or through palila critical habitat by not parking vehicles in tall grass, ensuring all vehicles carry a fire extinguisher, storing gas and fuels in safe and secure locations, and providing staff briefings on wildfire risks and safe tool use to avoid ignition.

Analysis of effects – Palila Designated Critical Habitat
Removal of approximately 35 acres of māmane and other nesting trees will remove sources of food, shelter, and nesting sites, which are necessary for the palila. Approximately 29 acres of forest cover proposed for removal is inside the core palila survey area, which overlaps with much of the southwestern aspect of designated critical habitat for palila and is thought to support 95% of the remaining palila population (Genz et al. 2022). We estimate the proposed project will result in removal of less than 1 percent of forest cover in the core survey area. Restoration of māmane and naio trees are currently underway to increase the abundance and distribution of suitable habitat for the palila. We expect adverse effects to designated critical habitat from the loss of māmane seed pods (food), māmane and naio trees (nesting and refuge habitat), increased dust, and increased soil disturbance and compaction (affects vegetation community and structure).

The vegetation is extremely dry and the risk of wildfire and catastrophic loss of the remaining designated critical habitat for palila is considered imminent without expansion of fuelbreaks in this area. The project will have a beneficial effect by reducing vegetative fuel loads within designated critical habitat that will prevent or reduce size of wildfires that could destroy hundreds or thousands of acres of critical habitat. We expect that preserving (i.e., preventing catastrophic loss to wildfire) the remaining designated critical habitat will offset the loss of 35 acres of māmane and naio trees affected by the creation of fuelbreaks. The designated critical habitat for palila will continue to provide its intended function and this project would not adversely modify the designated critical habitat.

<u>Listed plants</u>
Service records indicate the endangered plants *Ranunculus hawaiensis* (makou), *Sanicula sandwicensis* (no common name), *Sicyos macrophyllus* (‘anunu), and *Silene hawaiiensis* (no common name) occur in the palila critical habitat polygon, however, DOFAW reports no known listed plants in the immediate vicinity of proposed activities.

Project activities may affect listed plant species by causing physical damage to plant parts (i.e., roots, stems, flowers, fruits, seeds, etc.) as well as impacts to other life-requisite features of their habitat which may result in reduction of germination, growth and/or reproduction. Cutting and removing vegetation surrounding listed plants can alter microsite conditions (e.g., light, moisture, temperature), damage or destroy the listed plants, increase the risk of invasion by nonnative plants, and cause higher incidence or intensity of fire. Activities such as grazing, using construction equipment and vehicles, and increased human traffic (i.e., trails, visitation, monitoring), can cause ground disturbance, erosion, and/or soil compaction which decreases

absorption of water and nutrients and damages the plants' root systems. This may result in reduced growth and/or mortality of listed plants. Soil disturbance or removal has the potential to negatively impact the soil seed bank of listed plant species if such species are present or historically occurred in the project area.

To avoid and minimize adverse effects on listed plants, the following measures are incorporated into the project:

- A botanical survey will be conducted prior to the onset of project activities focusing on native and protected species. If any listed species are encountered during these surveys the Service will be notified and measures to protect those plants will be implemented as outlined in Table 2.
- Incorporate the buffers shown in Table 1 into project plans to minimize and avoid impacts to listed plants and include buffers in all agreements with contractors.

Analysis of effects – Listed plants
The project area will be surveyed prior to any work and any listed plants will be protected by implementing the avoidance and minimization measures listed above. Protections include observing buffers around any threatened and endangered plant/s discovered during surveys. The dust may temporarily adversely affect plants if they are in close proximity to the project. However, surveys will occur for plants and protective buffers implemented to protect them. No listed plants would be measurably affected by project activities. Therefore, effects on listed plants are insignificant.

Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this step-down Biological Opinion (including beneficial effects). Future federal actions that are unrelated to the proposed recovery action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

United States District Court rulings in 1986, 1987, and 1999 required DLNR to eradicate sheep and goats from palila critical habitat and initiate habitat restoration actions in palila critical habitat and to support the recovery of the species. Efforts by DOFAW and public hunters to eradicate these animals have been largely successful in reducing ungulate populations. Due in part to these ungulate removal efforts and resultant decreases in grazing pressures, vegetative fuel loads and fire risks have increased and must be managed.

There are many DLNR and DOFAW actions that assist with the recovery of palila and their habitat. Public hunting remains open with no bag limits (limits on the number of animals harvested) in effect for sheep and goats, and there are no restrictions on the age or sex of the animals harvested. Public hunting will continue on a liberal schedule. DOFAW aerial shooting operations are also conducted, removing about 50 animals per operation. Over 400 hunter trips have been recorded with a harvest of over 30 sheep each year. Over 20,000 sheep have been removed since 1987.

Outplanting of māmane and other native trees is ongoing, and high survival rates of outplanted trees of up to 70 percent have been observed in restoration areas (USFWS 2020, MKFRP 2022). Efforts to control fountain grass are ongoing in the palila core area and will continue to be expanded. Trapping and removal of feral cats and mongoose in the core area will continue. Fire control infrastructure has been developed (i.e., dip tanks) and mitigation methods have been maintained (i.e., firebreaks and fuelbreaks). There is ongoing control of non-native wasps that prey on the native caterpillars eaten by palila. Research has begun on methods to control *Armillaria*, a non-native tree fungus that may contribute to māmane mortality. Biocontrol of fireweed and cape ivy was introduced near the palila core area to control these noxious weeds that threaten māmane habitats. A total of approximately 45 miles of ungulate-proof fence has been built to protect palila critical habitat, with only 8 miles of fence left to build in order to have a complete fence around the mountain. DOFAW is also continuing to monitor palila populations and habitat.

Mauna Kea Forest Restoration Project (MKFRP) partners and volunteers have made monumental efforts to restore native plants and habitats on the mountain, including in palila designated critical habitat. Since 2017, MKFRP partners have planted 72,942 native plants in the Kaʻohe Restoration Area and the 2021 Kaʻohe Fire Restoration Plots (which are in palila designated critical habitat and adjacent to the core palila population area), including 36,254 māmane, across approximately 336 acres. MKFRP reports high survival rates (average one year survival rate of 68 percent) for māmane saplings in its Puʻu Mali Restoration Area, which overlaps with palila designated critical habitat on Mauna Kea's north flank. Natural regeneration has increased in the fenced and sheep-free areas, with density of māmane saplings per acre approximately seven times higher in sheep-free areas compared to nearby areas outside the fence (MKFRP 2022).

Conclusion

The PRBO concluded that recovery actions implemented under the opinion that are compliant with its proposed actions and effects are not likely to jeopardize the continued existence of the species in Table 1 and are not likely to destroy or adversely modify designated critical habitat.

☒ **Check here if there will be no take of listed species.**

Reinitiation Notice

This concludes formal consultation on this proposed recovery action. We have determined that it falls within the parameters described and evaluated in the PRBO. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances

where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

_____	_____
Signature	Date

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PIFWO Invasive Species Biosecurity Protocols (Updated February 2022)

Project activities may introduce or spread invasive species, causing negative ecological consequences to new areas or islands, resulting in potential impacts to fish, wildlife, and their habitat. For example, seeds of invasive plant species (e.g., *Chromolaena odorata*, *Senecio madagascariensis*, *Cyathea cooperi*, or *Miconia calvescens*) can be inadvertently transported on equipment from a previous work site to a new site where the species are not present. Likewise, equipment used in an area infected with a pathogen or insect pest that can have ecological consequences (e.g., rapid ʻōhiʻa death (*Ceratocystis spp.*), black twig borer (*Xylosandrus compactus*), or naio thrips (*Klambothrips myopori*), if not properly decontaminated, can act as a vector to introduce the pathogen into a new area. Additionally, vehicles must be properly inspected and cleaned to ensure vertebrate or invertebrate pests do not stowaway and spread to other areas. These are just a few examples of how even well-intended project activities may inadvertently introduce or spread invasive species.

To avoid and minimize invasive species potential impacts to fish, wildlife, and their habitat we recommend incorporating general biosecurity protocols into your project planning (see below). Additionally, your project occurs in a geographic area and/or involves activities that risk spreading the following specific invasive species: the fungal pathogen that causes rapid ʻōhiʻa death (*Ceratocystis* spp.) and little fire ant (*Wasmannia auropunctata*). Therefore, we recommend including additional protocols specific to those invasive species as described below. Additional consultation is recommended if project activities involve transportation of materials, equipment, vehicles, etc. between islands or transpacific movement of materials or equipment.

Invasive Species Biosecurity Protocol

The following biosecurity protocol is recommended to be incorporated into planning for your project to avoid or minimize transportation of invasive species with potential to impact to fish, wildlife, and their habitat. Cleaning, treatment, and/or inspection activities are the responsibility of the equipment or vehicle owner and operator. However, it is ultimately the responsibility of the action agency to ensure that all project materials, vehicles, machinery, equipment, and personnel are free of invasive species before entry into a project site. Please refer to the resources listed below for current removal/treatment recommendations that may be relevant to your project.

1. Cleaning and treatment:
   Project applicants should assume that all project materials (i.e., construction materials, or aggregate such as dirt, sand, gravel, etc.), vehicles, machinery, and equipment contain dirt and mud, debris, plant seeds, and other invasive species, and therefore require thorough cleaning. Treatment for specific pests, for example, trapping and poison baiting for rodents, or baiting and fumigation for insects, should be considered when applicable. For effective cleaning we offer the following recommendations prior to entry into a project site:
   a. Project materials, vehicles, machinery, and equipment must be pressure washed thoroughly (preferably with hot water) in a designated cleaning area. Project materials, vehicles, machinery, and equipment should be visibly free of mud/dirt (excluding aggregate), seeds, plant debris, insects, spiders, frogs (including frog eggs), other vertebrate species (e.g., rodents, mongoose, feral cats, reptiles, etc.), and rubbish. Areas of particular concern include bumpers, grills, hood compartments, wheel wells, undercarriage, cabs, and truck beds. Truck beds with accumulated material are prime sites for hitchhiking invasive species.

   b. The interior and exterior of vehicles, machinery, and equipment must be free of rubbish and food, which can attract pests (i.e., rodents and insects). The interiors of vehicles and the cabs of machinery should be vacuumed clean particularly for any plant material or seeds.

2. Inspection:
   a. Following cleaning and/or treatment, project materials, vehicles, machinery, and equipment, must be visually inspected by its user, and be free of mud/dirt (excluding aggregate), debris, and invasive species prior to entry into a project site. For example, careful visual inspection of a vehicle's tires and undercarriage is recommended for any remaining mud that could contain invasive plant seeds.
   b. Any project materials, vehicles, machinery, or equipment found to contain invasive species (e.g., plant seeds, invertebrates, rodents, mongoose, cats, reptiles, etc.) must not enter the project site until those invasive species are properly removed/treated.

3. For all project site personnel:
   a. Prior to entry into the project site, visually inspect and clean your clothes, boots or other footwear, backpack, radio harness, tools and other personal gear and equipment for insects, seeds, soil, plant parts, or other debris. We recommend the use of a cleaning brush with sturdy bristles. Seeds found on clothing, footwear, backpacks, etc., should be placed in a secure bag or similar container and discarded in the trash rather than being dropped to ground at the project site or elsewhere.

4. Additional considerations:
   a. Consider implementing a Hazard Analysis and Critical Control Point (HACCP) plan (https://www.fws.gov/policy/A1750fw1.html) to improve project planning around reducing the risk of introducing or spreading invasive species.
   b. Avoid unnecessary exposure to invasive species at a particular site (to the extent practical) to reduce contamination and spread. For example, if your project involves people or equipment moving between multiple locations, plan and organize timelines so that work is completed in native habitat prior to working in a disturbed location to reduce the likelihood of introducing a pest into the native habitat.
   c. Maintain good communication about invasive species risks between project managers and personnel working on the project site (e.g., conduct briefings and training about invasive species). Ensure prevention measures are communicated to the entire project team. Also consider adding language on biosecurity into contracts or permitting mechanisms to provide clarity to all involved in the project. Report any species of concern or possible introduction of invasive species to appropriate land managers.

For current removal/treatment recommendations please refer to the Big Island Invasive Species Committee website: https://www.biisc.org/.

Species-Specific Biosecurity Protocols

Rapid ʻŌhiʻa Death (ROD)

Rapid ʻŌhiʻa Death (ROD) is a caused by a fungal pathogen (*Ceratocystis* spp.) that attacks and kills ʻōhiʻa trees (*Metrosideros polymorpha*). ʻŌhiʻa is endemic to the Hawaiian Islands and is the most abundant native tree species, comprising approximately 80 percent of Hawaiʻi's remaining native forests.

For more information about ROD including its current distribution, ROD science updates, and the latest on ROD protocol, please visit www.rapidohiadeath.org.

To reduce the risk of spreading ROD, the following best management practices and decontamination protocol are recommended:

Best Management Practices for ROD

1. Never transport any part of an ʻōhiʻa tree between different areas of an island or to a different island.

2. Do not use equipment from ROD infected islands on another island unless it is very specialized equipment and follows the decontamination protocol described below.

3. Avoid wounding ʻōhiʻa trees and roots with mowers, chainsaws, weed eaters, and other tools. If an ʻōhiʻa receives a minor injury like a small broken branch, then give the injury a clean, pruning-type cut (close to the main part of the trunk or branch) to promote healing, and then spray the entire wounded area with a pruning seal.

4. Always report suspect ROD ʻōhiʻa trees observed within you project area. ROD is a wilt disease that cuts off the supply of water and nutrients to the tree. The primary symptom to look for is an entire canopy or a large branch with dying leaves or red discolored leaves. Please record the GPS coordinates and location and take a picture of the tree if possible. Please report suspected ROD ʻōhiʻa trees to Big Island Invasive Species Committee (BIISC): 808-969-8268 (ohialove@hawaii.edu)

ROD Decontamination Protocol

1. Clothes, footwear, backpacks, and other personal equipment
    a. Before leaving the project site, remove as much mud and other contaminants as possible. Use of a brush with soap and water to clean gear is preferred. Footwear, backpacks, and other gear must be sanitized by spraying with a solution of >70 percent isopropyl alcohol or a freshly mixed 10 percent bleach solution.

2. Vehicles, machinery, and other equipment
    a. Vehicles, machinery, and other equipment must be thoroughly hosed down with water (pressure washing preferred) and visibly free of mud and debris, then sprayed with a solution of >70 percent isopropyl alcohol or a freshly mixed 10 percent bleach solution. Use of a "pump-pot" sprayer is recommended for the solution and a hot water wash is preferred. Be sure to thoroughly clean the undercarriage, truck bed, bumpers, and wheel wells.

b. If non-decontaminated personnel or items enter a vehicle, then the inside of the vehicle (i.e., floor mats, etc.) must be subsequently decontaminated by removing mud and other contaminants and sprayed with the one of the same aforementioned sanitizing solutions.

3. Cutting tools
    a. All cutting tools, including machetes, chainsaws, and loppers must be sanitized to remove visible mud and other contaminants. Tools must be sanitized using a solution of >70 percent isopropyl alcohol or a freshly mixed 10 percent bleach solution. One minute after sanitizing, one may apply an oil-based lubricant to chainsaw chains or other metallic parts to prevent corrosion as bleach is corrosive to metal.

    NOTE: When using a 10 percent bleach solution, surfaces should be cleaned wia minimum contact time of 30 seconds. Bleach must be mixed daily and used within 24 hours, as once mixed it degrades. Bleach will not work to disinfect surfaces that have high levels of organic matter such as sawdust or soil. Because bleach is also corrosive to metal, a water rinse after proper sanitization is recommended to avoid corrosion.

Little Fire Ant (LFA)

The little fire ant (*Wasmannia auropunctata*), or LFA, is an invasive species with a painful sting that can inhabit many different environments. In Hawai‘i, it often infests agricultural fields and farms, damaging crops and stinging unsuspecting workers. Little fire ants are also highly disruptive to native tropical ecosystems and harmful to wildlife. Slow moving, but tiny and capable of foraging 24 hours a day with multiple queens per colony, LFA is a formidable threat to biodiversity, agriculture, and quality of life on tropical islands in the Pacific.

For more information about LFA including helpful guides and workshops for treating or detecting LFA, please visit www.littlefireants.com.

To reduce the risk of spreading LFA, the following biosecurity protocol is recommended:

Biosecurity Protocol for LFA

1. For projects involving plants from nurseries (e.g., outplanting activities, etc.), all plants should be inspected for little fire ants and other pests prior to being transported to the project site. If plants are found to be infested by ants of any species, plants should be sourced from an alternative nursery and the infested nursery should follow treatment protocols recommended by the Hawai‘i Ant Lab (https://littlefireants.com/wp-content/uploads/2020-Management-of-Pest-Ants-in-Nurseries-min.pdf).

2. All work vehicles, machinery, and equipment should follow steps 1 and 2 in the “Invasive Species Biosecurity Protocol” for (1) cleaning and treatment and (2) inspection for invasive ants prior to entering a project site.

3. Any machinery, vehicles, equipment, or other supplies found to be infested with ants (or other invasive species) must not enter the project site until it is properly treated (https://littlefireants.com/how-to-treat-for-little-fire-ants-for-homeowners/#recommended-bait-products) and re-tested. Infested vehicles must be

treated following recommendations by the Hawai‘i Ant Lab (https://littlefireants.com/resource-center/) or another ant control expert and in accordance with all State and Federal laws. Treatment is the responsibility of the equipment or vehicle owner. Ultimately however, it is the responsibility of the action agency to ensure that all project materials, vehicles, machinery, and equipment follow the appropriate protocol(s).

4. General Vehicle Ant Hygiene: Even the cleanest vehicle can pick up and spread little fire ant. Place MaxForce Complete Brand Granular Insect Bait (1.0 percent Hydramethylnon; https://labelsds.com/images/user_uploads/Maxforce%20Complete%20Label%201-5-18.pdf) into refillable tamper resistant bait stations. An example of a commercially available refillable tamper resistant bait station is the Ant Café Pro (https://www.antcafe.com/). Place a bait station (or stations) in the vehicle and note that larger vehicles, such as trucks, may require multiple stations. Monitor bait stations frequently (every week at a minimum) and replace bait as needed. If the bait station does not have a sticker to identify the contents, apply a sticker listing contents to the station.

5. Gravel, building materials, or other equipment such as portable buildings should be baited using MaxForce Complete Brand Granular Insect Bait (1.0 percent Hydramethylnon; https://labelsds.com/images/user_uploads/Maxforce%20Complete%20Label%201-5-18.pdf) or AmdroPro (0.73 percent Hydramethylnon; https://connpest.com/labels/AMDROPRO.pdf) following label guidance.

6. Storage areas that hold field tools, especially tents, tarps, and clothing should be baited using MaxForce Complete Brand Granular Insect Bait (1.0 percent Hydramethylnon; https://labelsds.com/images/user_uploads/Maxforce%20Complete%20Label%201-5-18.pdf) or AmdroPro (0.73 percent Hydramethylnon; https://connpest.com/labels/AMDROPRO.pdf) following label guidance.

7. Vehicles that have entered a project site known or thought to overlap with areas infested with LFA should subsequently be tested for LFA with baiting in accordance with protocol recommended by the Hawai‘i Ant Lab (https://littlefireants.com/survey-your-home-for-lfa/).

8. If LFA are detected, please report it to 808-643-PEST (Hawai‘i), 671-475-PEST (Guam), or 684-699-1575 (American Samoa). Please visit https://littlefireants.com/identification-of-little-fire-ants/ for assistance in identifying LFA.

Appendix B:
Consultation letters for Fire Break Expansion on Mauna Kea

AMERICAN BIRD CONSERVANCY

Bringing back the birds

15 June 2021

David Smith
Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl Street, Room 325
Honolulu, Hawai'i 96813

RE: Review of the DLNR-DOFAW proposed actions to expand firebreak roads within the Ka'ohe Game Management Area and Mauna Kea Forest Reserve

Dear Mr. Smith,

I am sorry for the delay in responding to you, but due to COVID-19 adjustments I no longer have an office at the USGS Kīlauea Field Station in Volcanoes National Park so did not receive your letter until now. I have just read DLNR-DOFAW's proposal and appreciate you contacting American Bird Conservancy for review.

Fire is one of the primary threats to Palila Critical Habitat, Mauna Kea's dry forests, and survival of the Palila. **American Bird Conservancy strongly supports DOFAW's proactive fire management and reducing the overall risk of catastrophic fire in Palila habitat.** Based on the project description, I have two suggested modifications to the proposed mitigation actions that could be incorporated with relatively little impact to overall efficiency or causing delays.

Palila have an extended breeding season, from February-August and occasionally even longer (Banko et al. 2002, Banko and Farmer 2014). First, I would suggest not conducting any of the proposed firebreak activities during these months to avoid disturbing Palila nesting and possible abandonment of nests.

Palila depend on large māmane trees for foraging, roosting, and nesting. Māmane are an exceptionally slow-growing tree, taking 20-25 years to grow over 2 m and begin being used by the birds for food and roosting (Scowcroft and Conrad 1988, Banko and Farmer 2014). The abundance of these mature māmane trees are likely the limiting factor in Palila population increase, and protecting them is critical for the bird's recovery. Because of this, my second suggestion is to avoid cutting, removing, or disturbing any large (>2 m) māmane trees along the firebreaks and proposed expansions. Avoiding these trees and saving them will greatly benefit recovery of Mauna Kea's forests and Palila's long-term survival.

Although the entire proposed area is Palila Critical Habitat, based on the map provided (Figure 2), some of these roads do not frequently have Palila detected or using this habitat (Genz et al.

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2018). These lower elevation, generally western, roads are mostly in non-native grass, ʻaʻaliʻi, and some naio with occasional smaller māmane, e.g., FB-1, FB-4, R-15, and the lower portion of R-1. Vegetation removal along these roads is very unlikely to disturb or impact Palila. If there are logistical, budgeting, or other constraints that prevent DOFAW from incorporating the two suggestions above, splitting the roads into two categories based upon the recent detections and use by Palila might facilitate the project and make it more logistically tractable.

I greatly appreciate your and DOFAW's management and diligence to protect Palila. I am happy to discuss these recommendations further with you or whomever is most appropriate. Mahalo for the opportunity to comment on this important action.

Chris Farmer, Ph.D.
cfarmer@abcbirds.org
Hawaiʻi Program Director
808-987-1779
PO Box 1167
Volcano, Hawaiʻi 96785

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Scowcroft, P. G., and C. E. Conrad. 1988. Restoring critical habitat for Hawaii's endangered palila by reducing ungulate populations. Transactions of the Western Section of the Wildlife Society 24:72–79.

Big Island Bird Hunters
17-124 Palaai Street
Keaau, HI 96749

April 20, 2021

David Smith
Administrator
Dept of Land and Natural Resources
Forestry & Wildlife Division
1151 Punchbowl St, Rm 325
Honolulu, HI 96813

Chairperson and Members
Board of Land and Natural Resources
1151 Punchbowl St
Honolulu, HI 96813

RE Request for review of the State of Hawaii Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW) proposed actions to expand fire break roads within the Kaohe Game Management Area and Mauna Kea Forest Reserve

To all concerned:

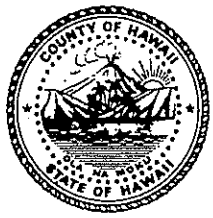
Big Island Bird Hunters are requesting that Land Board members allow for the exemption requested by DOFAW for the purpose of widening the fire break roads per their proposal. This is an action that has been lagging for the past thirty plus years as these roadsides have become tinder fire starters for these past years. One spark that can start the first fire that would be devastating to the living creatures and all growth due to the heightened fire fuel load.

We indeed have been fortunate that so far, no fires have started. Please allow this project to commence immediately. Thank you.

Very truly yours,

Big Island Bird Hunters
Steven L. Hurt
President

Cc: Steve Bergfeld,
Hawaii Island branch manager, DOFAW



County of Hawai'i

Game Management Advisory Commission

25 Aupuni Street, Suite 2603 • Hilo, Hawai'i 96720 • (808) 961-8211 • Fax (808) 961-6553
KONA: 74-5044 Ane Keohokālole Hwy., Bldg C • Kailua-Kona, Hawai'i 96740
(808) 323-4444 • Fax (808) 323-4440

October 5, 2021

David G. Smith
Administrator
Division of Forestry and Wildlife
Department of Land and Natural Resources
1151 Punchbowl Street, Room 325
Honolulu, HI 96813

SUBJECT: Review of the Department of Land and Natural Resources Division of Forestry and Wildlife proposed actions to expand firebreak roads within the Kaohe Game Management Area and the Mauna Kea Forest Reserve.

Dear Mr. Smith,

The County of Hawai'i Game Management Advisory Commission has discussed your proposal requesting an exemption from environmental compliance to dispose of hazardous fuels and maintain firebreak roads within palila critical habitat.

The Commission hereby submits its support of the proposed actions within the Kaohe Game Management area and the Mauna Kea Forest Reserve.

Respectfully,

Abraham Antonio
Chairperson
Game Management Advisory Commission

United States Department of the Interior
U.S. GEOLOGICAL SURVEY
Pacific Island Ecosystems Research Center
Kilauea Field Station
P O Box 44
Hawaii Volcanoes National Park, Hawaii 96718
Tel (808) 967-7396 Fax (808) 967-8568

2 July 2021

David Smith
Administrator
Division of Forestry and Wildlife

Subject: Request for review of DLNR-DOFAW proposed actions to expand fuelbreak roads within the Kaohe Game Management Area and the Mauna Kea Forest Reserve

Thank you for the opportunity to review the State of Hawaii DLNR proposal to expand fuelbreak roads within the Kaohe Game Management Area and the Mauna Kea Forest Reserve. It has long been recognized that wildfire is a major threat to the palila and other native species within Palila Critical Habitat. Reducing fire fuels up to 10 m on both sides of existing roads and fuelbreaks, as described in your letter of 23 March 2021, aligns with the results of a USGS study by Thaxton and Jacobi (2009; http://dspace.lib.hawaii.edu/handle/10790/2693) of fire fuels, behavior, and management options in Palila Critical Habitat. They concluded that:

Based on our fuels data and fire behavior predictions, recommended actions include: (1) construction of new or expansion of existing fuelbreaks to immediately reduce fire risk to the most sensitive areas adjacent to the core Palila population on the southwest slope and the translocated Palila population on the north slope of Mauna Kea, (2) enhancement of forest restoration activities to increase fuel moisture and reduce grass fuel loads (3) installation of water sources (diptanks) in both areas to decrease firefighter response time, and (4) increased public education and awareness with regard to fire danger on Mauna Kea. (page vii)

To address their point #2, forest restoration, the loss of māmane and other native trees that may be removed along roads and fuelbreaks could eventually be mitigated by increasing tree cover away from roads and fuelbreaks. Because māmane grow slowly, it may be decades before palila benefit from planting or other measures (e.g., weed control). Nevertheless, forest restoration is an important element of both fire management and palila restoration.

Please let me know if you have questions or require additional information.

Respectfully,

Paul Banko

Paul Banko
Research Wildlife Biologist

Letter to the Hawaii Board of Land and Natural Resources

Regarding Fire Breaks on Maunakea

The Waikoloa Village Association sent the following letter to Suzanne Case, Director of the Department of Land and Natural Resources (DLNR) and Chair of the Board of Land and Natural Resources (BLNR), to the members of BLNR, and to other persons of interest.

The letter supports a proposed DLNR project to expand fire breaks in the Kaohe area of Maunakea in the heart of the Critical Palila Habitat. It also encourages DLNR to actively reduce the massive fire fuel load of grasses resulting from the eradication of grazing animals, and to improve the fire breaks on the rest of the mauna.

Although many in the fire protection community say that the threat to our community is small, the recent fire off Old Saddle Road in the Kilohana area damaged the Girl Scout Camp and threatened Waiki'i Ranch.

A field trip by members of Waikoloa Village Association's Fire Management Action Committee observed the following in the Kaohe area:

Fields of Grass

Fire Break FB-4

Fire Break FB-5

Since BLNR has not yet considered this proposal, we encourage other Firewise communities to show support for this badly needed project.

WAIKOLOA VILLAGE

July 14, 2021

Mr. Christopher Yuen
Board of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, HI 96819

Dear Ms. Case,

The Waikoloa Village community supports the DOFAW proposal to expand the firebreaks and clear vegetation around roads in the Kaohe area of Mauna Kea. The eradication of ungulates along with a few wetter years have resulted in the growth of grasses that are four-to-five feet tall, resembling wheat fields. This massive load of fine fuel is a significant threat to the native plants and animals, especially the Palila. We also believe that a mega fire on Mauna Kea could, under the right conditions, be a threat to our community.

Waikoloa Village is a community of approximately 8,780 residents and 3,515 homes, located roughly 10 miles west of the project area. Adding "approved subdivisions", for future home building, will include 4,000 units (Waikoloa Heights at 2,400 - 3,210 units/homes) and final build out of Hawaii County's Office and Housing and Community Development project (Kamakoa Nui 1,139 units/homes when final). Approximately 800 workforce affordable housing apartments; Makani Kai, 100; The Lofts, 600; Ikaika Ohana 60, to name a few; will more than double the number of residents in our Waikoloa community within the decade. The area in between consists mainly of grasslands (much of it highly flammable fountain grass) with shrubs and scattered stands of trees, crossed by Old Saddle Road and Mamalahoa Highway. Known for its strong winds, the nickname for the community is Waiko"blow"a. Over the years our community has been seriously threatened by several wildfires.

Although many would consider the risk to our community from a wildfire on Mauna Kea to be small, we believe that a combination of drought and high winds could, besides destroying the Palila critical habitat, result in a large enough fire to threaten Waikoloa Village. Climate change will make those conditions only more frequent and severe. Fires in California, Colorado and Australia highlight the destructiveness and rapid spread of grassland fires. The power disaster in Texas demonstrates the seriousness of ignoring a "small" threat with serious consequences. As a result, we strongly support this proposal.

68-1792 Melia St., Waikoloa, HI 96738 Website: www.waikoloa.org Facsimile: 808-883-9246

We would also encourage DLNR to invest in projects to reduce the fine fuel load and determine the causes for the continued reduction in the Palila population despite decades of habitat restoration.
The thick grasses appear to be greatly reducing the ability of trees to propagate naturally, with few seedlings able to survive. While saplings planted by state workers and volunteers in cleared areas appear to be surviving, the area needing planting is huge. Committing more resources to the reforestation effort is necessary, given the problems with natural propagation.

A possible solution would be to temporarily fence the open fields and use cattle, sheep or goats to remove the vegetation, as is done around the world. Trees can then be planted in the cleared areas once the animals are moved. This could hasten reforestation that is currently taking an exceedingly long time.

Meanwhile, we believe that more effort needs to be spent to determine the causes of the continued decline in the Palila population despite the many decades of investment to improve its habitat. Only then can resources be effectively focused on its recovery.

Waikoloa Village supports this proposal to widen the fire breaks and clear vegetation around roads in the Kaohe area to help prevent the spread of fire. We also strongly encourage DLNR to explore options to control the fire fuel load and create/expand fire breaks in all the overgrown areas on Mauna Kea beyond the proposed project area.

Sincerely,
ON BEHALF OF THE BOARD OF DIRECTORS

Roger E. Wehrsig
General Manager

Cc: Christopher Yuen, BLNR - Hawai'i
James A. Gomes, BLNR - Maui
Thomas Oi, BLNR - Kauai
Samuel "Ohu" Gon III, BLNR -O'ahu
Vernon Char, BLNR - At Large
Wesley "Kaiwi" Yoon, BLNR - At Large
David Smith, DOFAW
Kanalu Sproat, DOFAW
Clay Trauernicht, Pacific Fire Exchange
Nani Baretto, Hawaii Wildfire Management Organization
Elizabeth Pickett, Hawaii Wildfire Management Organization
Rep. David A. Tarnas, Water and Land Committee, House of Representatives
Mayor Mitch Roth, Hawaii County
Tim Richards, Hawaii County Councilor, District 9
Eldridge Naboa, U.S. Fish and Wildlife Service

From: Nani Barretto
To: Sproat, Kanalu
Cc: Elizabeth Pickett; Kara Vega
Subject: [EXTERNAL] Re: For Review - Mauna Kea Fire Break Expansion Project
Date: Wednesday, August 10, 2022 6:35:30 AM

Aloha e Kanalu,

Mahalo for passing this along for our review and comment (and mahalo for the phone chat). Although I will leave the technical review to Elizabeth, I did take a look at the proposed plan and applaud the State's efforts to create and maintain these fuelbreaks to increase protection for this entire region.

I am also wondering if you would be interested in sharing this project with some of the near-by communities. While HWMO supports communities across the state in becoming nationally recognized Firewise USA® sites, we also provide individualized support (financial, technical, and facilitative) to communities in specific regions. Some of the near-by communities that would be impacted by this project include Waikiʻi Ranch, Puʻuanahulu, Waikoloa Village, and Puʻukapu. We bring together the community leaders from these places on a regular basis and would love to have you share at some future gathering (virtual). Thoughts? I am including Kara Vega in this email since she supports these community's Firewise efforts as well.

P.S. I heard you speak on HPR's The Conversation the other week. Good work, you sounded great!

Mahalo,
Nani

On Mon, Aug 1, 2022 at 12:31 PM 'Sproat, Kanalu' via Directors <directors@hawaiiwildfire.org> wrote:

> Aloha,
>
> Please review the attached plan for fuel break expansion on Mauna Kea. Your input is much appreciated.
>
> Mahalo,
>
> Kanalu
>
> Get Outlook for iOS

From: Simon, Gregory D CIV USARMY USAG (USA)
To: Sproat, Kanalu
Subject: [EXTERNAL] RE: DOFAW Fuel Break expansion project on Mauna Kea (UNCLASSIFIED)
Date: Thursday, August 4, 2022 6:12:34 PM

CLASSIFICATION: UNCLASSIFIED

Kanalu,

I have reviewed the Mauna Kea Fuel break Maintenance Project proposal.

This project will help significantly reduce the severity of future wildfires and hopefully the frequency of fires on the Mauna Kea slopes. I look forward to seeing this project be a success and will recommend it as a model for future fuel break expansion initiatives aboard PTA. Please keep us apprised of the progress and statistical data demonstrating the projects impact over time.

Thank You,

Gregory Simon
Fire Chief (Acting)
U.S. ARMY Pohakuloa Training Area
Fire & Emergency Services
Duty: 808-351-3666

From: Sproat, Kanalu <kanalu.sproat@hawaii.gov>
Sent: Wednesday, August 3, 2022 8:12 AM
To: Simon, Gregory D CIV USARMY USAG (USA) <gregory.d.simon.civ@army.mil>
Subject: [Non-DoD Source] DOFAW Fuel Break expansion project on Mauna Kea

Aloha Chief Simon,

We are beginning a fuel break expansion project on Mauna Kea. The area is withing palila critical habitat, therefore, we will be claiming an exemption from environmental compliance in order to complete the work. Attached is a copy of the management plan. Please review and provide comments at your earliest convenience.

Mahalo,

Kanalu
CLASSIFICATION: UNCLASSIFIED
CLASSIFICATION: UNCLASSIFIED

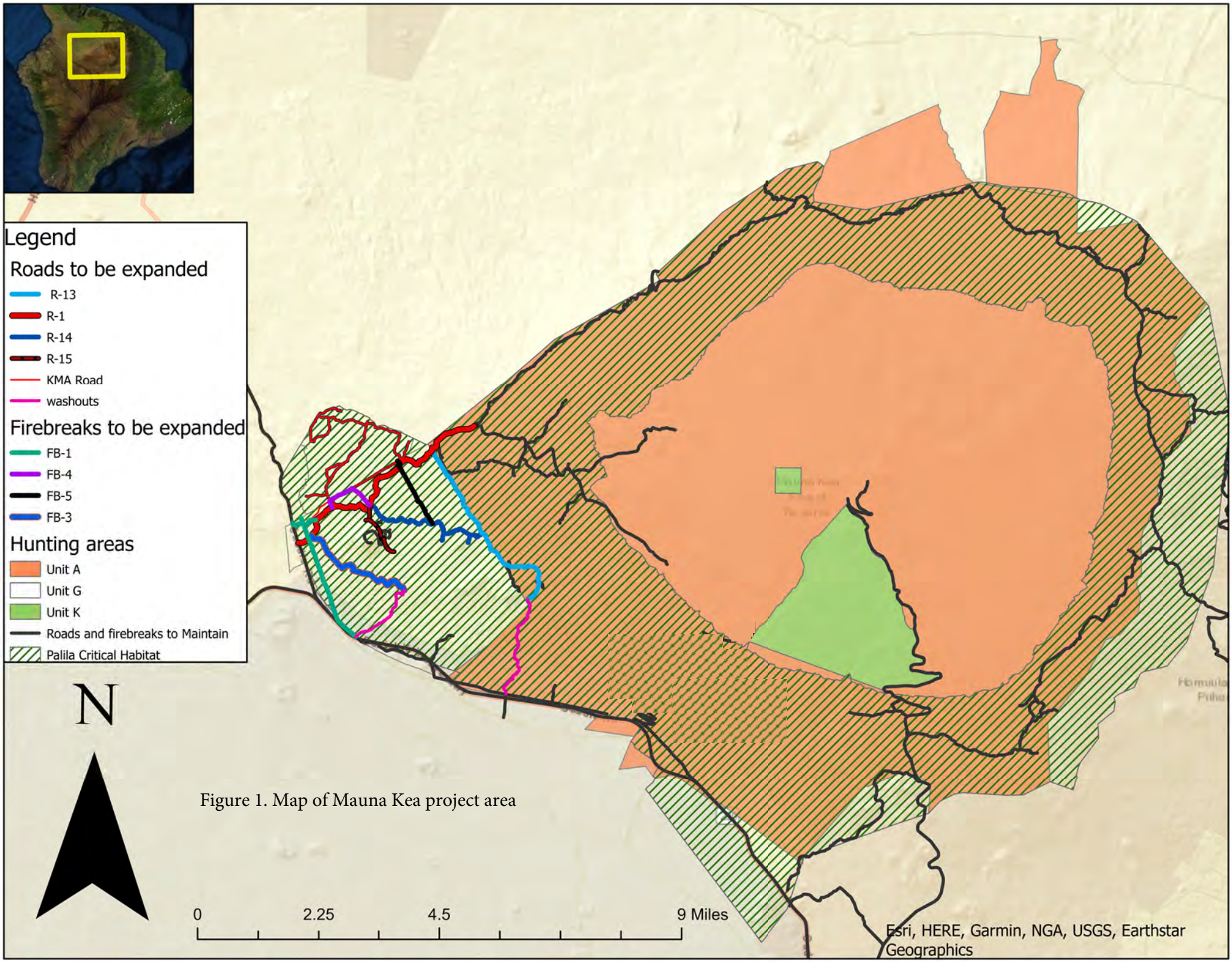
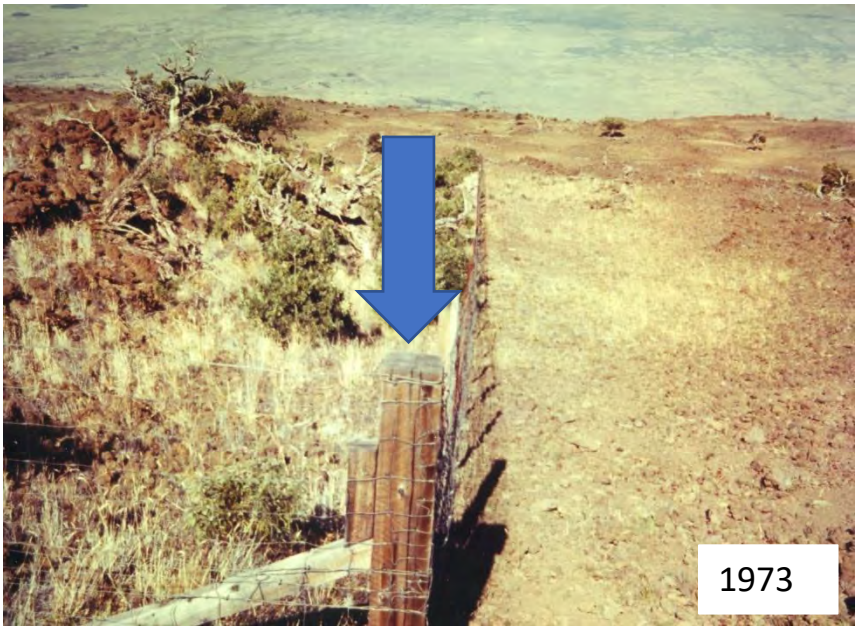


Figure 1. Map of Mauna Kea project area

Figure 2: Pu‘u Nanaha Recovery, Mauna Kea Forest Reserve



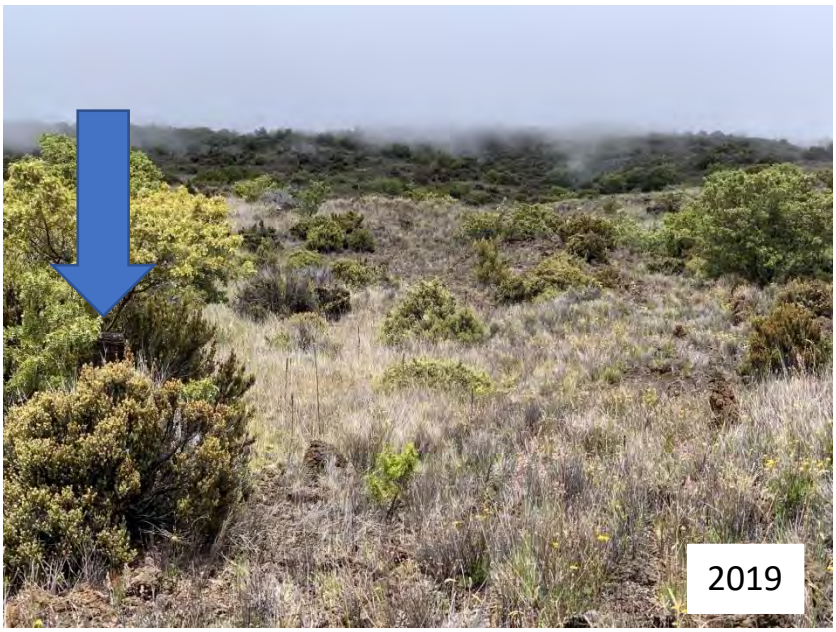


Figure 3: Skyline Road Recovery, Mauna Kea Forest Reserve

Figure 4: Keamuku Military Area (KMA) 2021 Fire stopped at existing fire break

Figure 5: Aftermath of Keamuku Military Area Fire 2021

Figure 6: Proposed Road and Fuel Break Expansion on Mauna Kea

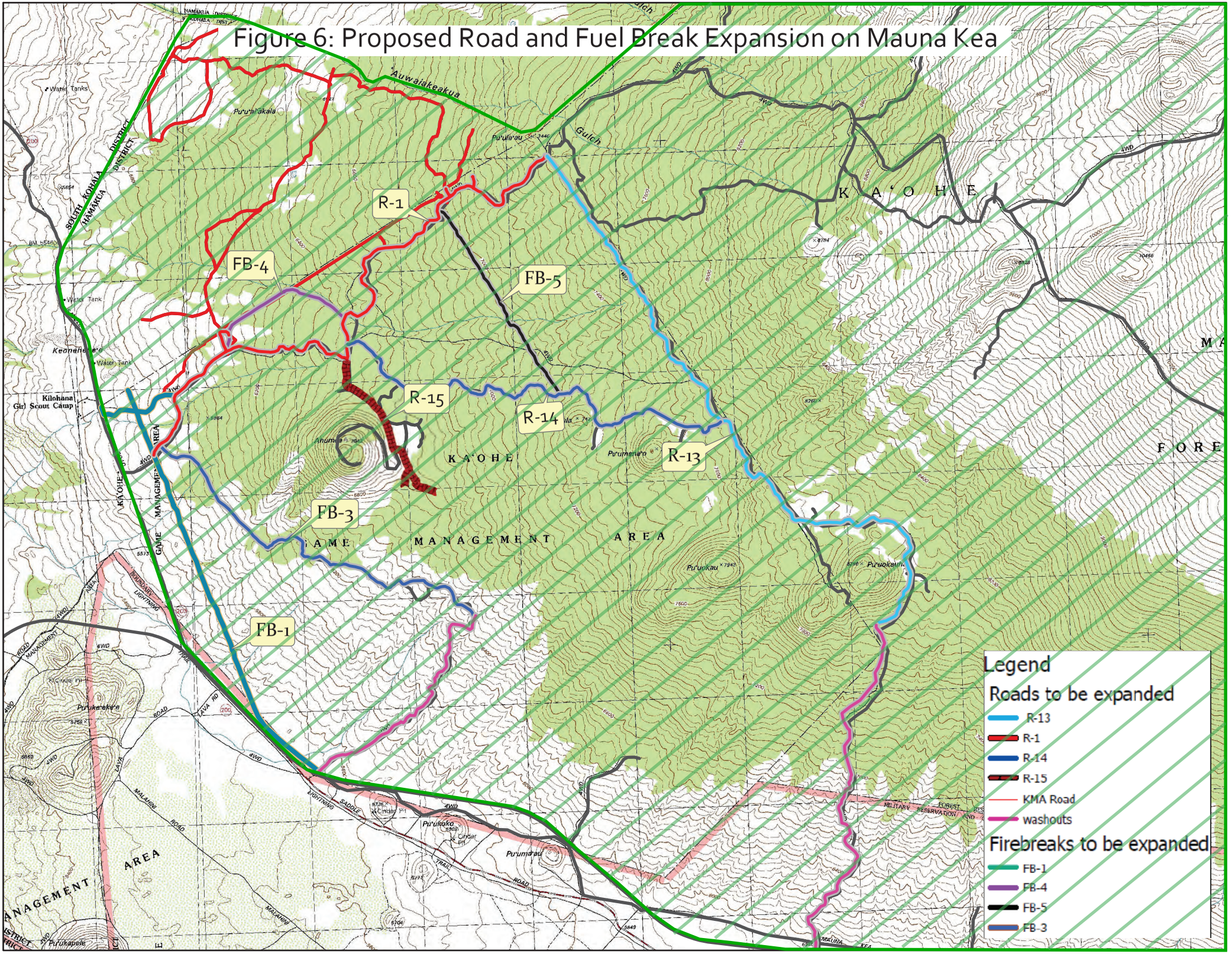


Figure 7: Pilot Project Before Treatment

Figure 8: Pilot Project After Treatment